Senate Bill 743 Vehicle Miles Traveled Regional Baseline Study

Prepared for:
Lake Area Planning Council

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LAKE AREA PLANNING COUNCIL
LAKE APC

FEHR PEERS

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1. Introduction

On September 27, 2013, Governor Jerry Brown signed Senate Bill (SB) 743 into law and started a process intended to fundamentally change transportation impact analysis as part of California Environmental Quality Act (CEQA) compliance. These changes include elimination of auto delay, level of service (LOS), and other similar measures of vehicular capacity or traffic congestion as a basis for determining significant impacts. Amendments and additions to the CEQA Guidelines eliminate auto delay for CEQA purposes and identify vehicle miles traveled (VMT) as the preferred CEQA transportation metric. Therefore, the jurisdictions in Lake County need to select VMT analysis methodologies, set new VMT thresholds for transportation impacts, and determine what mitigation strategies are most feasible.

This report:

- Provides an overview of SB 743 and related policies and how VMT may be measured
- Summarizes available VMT data for Lake County
- Discusses alternatives for VMT measurement methods and thresholds
- Recommends VMT methods and thresholds for lead agencies in Lake County
- Uses recent and theoretical projects in Lake County to demonstrate how these methods and thresholds would be used
- Recommends transportation demand management (TDM) strategies for reducing VMT on projects in Lake County

2. Background

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

2.1 Definitions

CEQA refers to the California Environmental Quality Act. 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.

LOS refers to "level of service," 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).

VMT refers to "vehicle miles traveled," 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.

2.2 VMT Policy Overview

On September 27, 2013, Governor Jerry Brown signed SB 743 into law and started a process intended to fundamentally change transportation impact analysis as part of CEQA compliance. These changes include elimination of *auto delay, LOS, and other similar measures of vehicular capacity or traffic congestion* as a basis for determining significant impacts. The California Natural Resources Agency has issued amendments and additions to the CEQA Guidelines reflecting these changes (http://resources.ca.gov/ceqa/). The changes eliminate auto delay for CEQA purposes and identify VMT as the preferred CEQA transportation metric.

The Governor's Office of Planning and Research (OPR) has also issued supporting information entitled *Technical Advisory on Evaluating Transportation Impacts in CEQA* (December 2018) (http://opr.ca.gov/ceqa/updates/sb-743/), providing additional information on assessing VMT and setting significance thresholds.

The focus of SB 743's changes can be found in the following two legislative intent statements:

- Ensure that the environmental impacts of traffic, such as noise, air pollution, and safety concerns, continue to be properly addressed and mitigated through the California Environmental Quality Act.

- More appropriately balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of greenhouse gas emissions.

The changes to the CEQA Guidelines identify automobile[1] VMT as the preferred CEQA transportation metric and, upon their certification on December 28, 2018, eliminated use of auto delay and LOS statewide for CEQA transportation analysis. The new guidelines and the OPR technical advisory include specifications for VMT methodology and recommendations for significance thresholds and mitigation. As noted above, SB 743 requires impacts to transportation network performance to be viewed through a filter that promotes *"the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses."* VMT can help identify how projects (land development and infrastructure) influence accessibility (i.e., lower VMT may indicate increased multimodal access to places and people) and emissions, so its selection is aligned with the objectives of SB 743.

SB 743 does not prevent an agency from continuing to analyze delay or LOS as part of other plans (i.e. a general plan), fee programs, or ongoing network monitoring, but these metrics will no longer constitute the sole basis for CEQA impacts. Agencies determining that continued use of vehicle LOS is an important part of transportation analysis can still use vehicle LOS outside of the CEQA process. The most common applications will likely occur for jurisdictions wanting to use vehicle LOS to size roadways in their general plan or determine nexus relationships for their impact fee programs. Jurisdictions can also continue to condition projects to build transportation improvements through the entitlement process in a variety of ways, such as using general plan consistency findings.

2.3 VMT Assessment

This section explains how VMT may be estimated and forecasted.

2.3.1 VMT Measurement

VMT is typically a measure of the amount of automobile travel generated by a project (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 within a defined study area (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

[1] While SB 743 did not 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.) However, 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)."

neighboring land uses and may displace other existing trips within the region. Considering displaced trips is consistent with CEQA. (*Association of Irritated 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), consistent with OPR's recommendations. This methodology is consistent with direction from the 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 emissions and air quality pollution. Low VMT generating areas also 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]

VMT 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 VMT growth at a regional or jurisdiction-wide level, usually through the effect that VMT growth has on air quality and greenhouse gas (GHG) emissions. Additional VMT reduction may be achieved at the project level, especially through Transportation Demand Management (TDM) strategies, which are not fully accounted for in regional level travel forecasting models, including the Wine Country Travel Demand Model (WCTDM) that covers Lake County.

While VMT is focused on vehicle travel, the goal of reducing VMT growth focuses on changing development patterns (e.g., land use mix and density) together with providing more pedestrian, bicycle, and transit infrastructure. 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 VMT may also include TDM strategies that encourage more efficient forms of travel or vehicle use. TDM strategies are discussed further in the Fehr & Peers memorandum "Transportation Demand Strategies Assessment for VMT Mitigation" (April 3, 2020).

2.3.2 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). (CEQA Guidelines, § 15130(b)(3).) This determination by the lead agency has been granted substantial deference by the courts. Similar issues are likely to arise in the context of VMT analyses, regardless of which methodology is selected. The geographic scope under an absolute VMT methodology (e.g., total VMT) 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 VMT efficiency

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

methodology (e.g., VMT 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 VMT analyses:

- "Lead agencies should not truncate any VMT analysis because of jurisdictional or other boundaries." (OPR Technical Advisory, p. 7.)
- "Existing VMT per capita may be measured as regional VMT per capita or as city VMT 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 other 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 VMT outcomes of land use plans across the full area over which the plan may substantively affect travel patterns, including beyond the boundary of the plan or jurisdictions geography." (OPR Technical Advisory, p. 18.)
- "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.)

2.3.3 VMT Estimates and Forecasts

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

- Daily total VMT – All VMT generated by trips with at least one trip end in the jurisdiction for a typical weekday.
- Daily home-based VMT per resident – VMT generated by residents of households within the jurisdiction with at least one trip end at a dwelling unit for a typical weekday.
- Daily home-based VMT per worker – VMT generated by workers within the jurisdiction traveling between work and home for a typical weekday.
- Daily total VMT per service population – All VMT generated by residents and workers within the jurisdiction for a typical weekday.

VMT estimates for Lake County were developed using three different methods/tools (California Household Travel Survey, California Statewide Travel Demand Model, and Wine Country Travel Demand Model [WCTDM]) 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 internet shopping, 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 current 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) have temporarily but profoundly changed travel conditions. While travel activity 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, such as replacing daily commutes with telework.

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.[3] Also, while VMT is currently linked to greenhouse gas emissions and air pollution, increases in vehicular fuel efficiency and electrification may eventually reduce these relationships, which may also necessitate updates to VMT methodology and significance thresholds.

2.4 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. They 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 corridor may have a less-than-significant impact on VMT

- *Affordable Housing*

[3] 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. https://link.springer.com/article/10.1007/s11116-018-9937-9.

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 evidence to support its use on a project, screening benefits project applicants and agencies wanting to streamline development review. However, the law surrounding the presumption of less than significant impact using screening thresholds is not well developed, and therefore screening adds 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 Lake County jurisdictions:

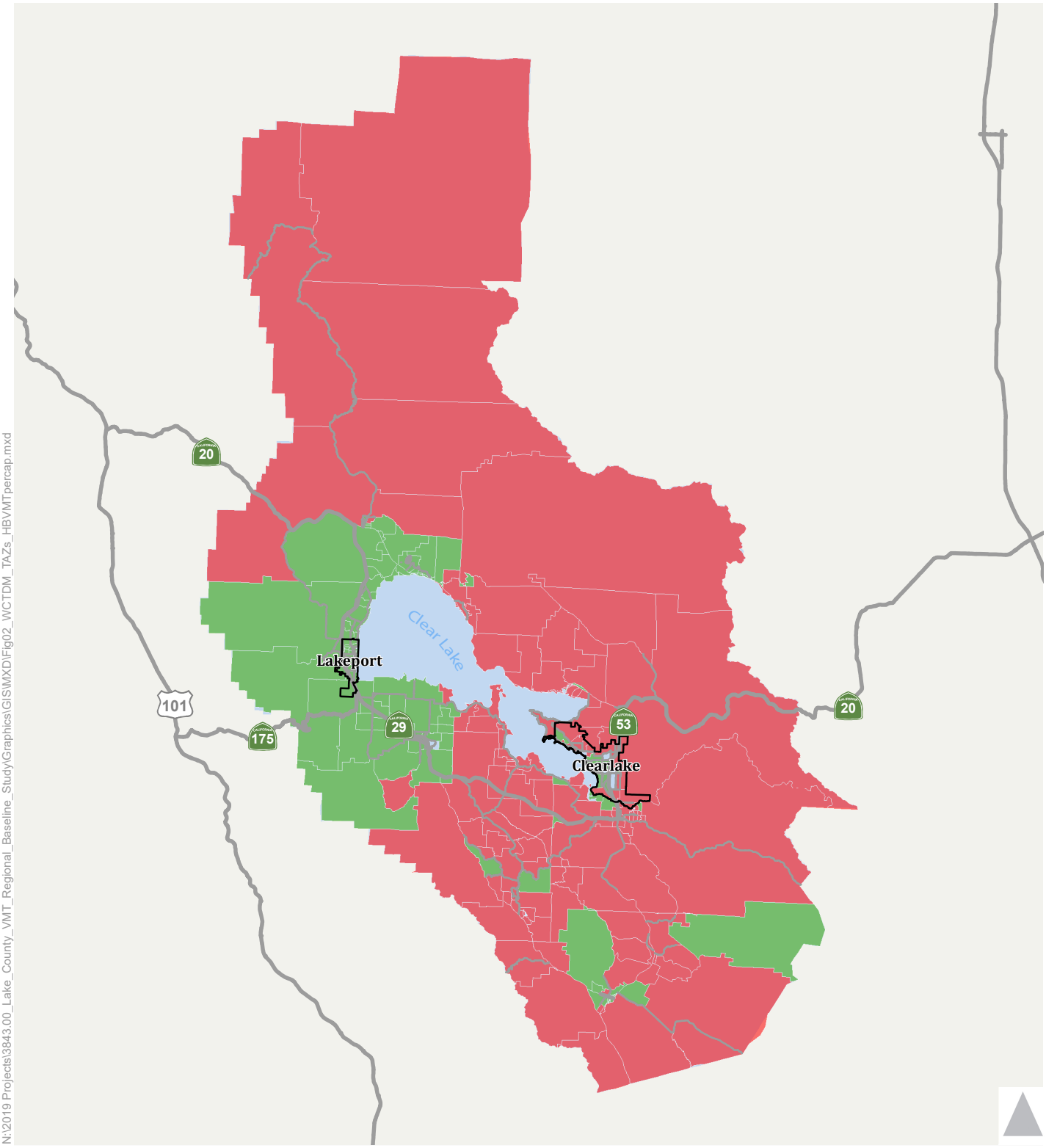
- *Small Projects*
  Projects consistent with an RTP and General Plan that generate less than 1,393 VMT per day. This value is based on the CEQA exemptions allowed for projects up to 10,000 square feet as described in CEQA Guidelines Sections 15303. The specific VMT estimate relies on the daily vehicle trip generation rate for general office uses from ITE 10th Edition Trip Generation and the average vehicle trip length for Lake County based on the 2012 California Household Travel Survey (CHTS).[4]

  Converting this value to an equivalent number of residential households would indicate that **residential projects up to 22 units** in Lake County could be screened out of analysis.[5] Another option for residential projects is to simply rely on the CEQA Guidelines Section 15315 exemption for minor land divisions of four or fewer parcels. Four households would generate approximately 254 VMT per day in Lake County based on the 2012 CHTS, while eight households (assuming one Accessory Dwelling Unit per parcel) would generate approximately 508 VMT per day. After updates are made to the Wine Country Travel Demand Model, this number of households may be updated to use trip lengths from that model.

- *Map-Based Screening for Residential and Office Projects*
  Residential and office projects that are located in areas of low VMT (below the thresholds recommended by the OPR *Technical Advisory*) and that incorporate similar features (i.e., density, mix of uses, transit accessibility). Figure 1 and Figure 2 show areas of low VMT per resident and per employee, respectively, using estimates from the Wine Country Travel Demand Model. Low VMT in these figures is defined as 14.3% or more below the countywide average. A tool to simplify this analysis was developed. Instructions for using this tool, including screenshots, are

[4] The calculation is: 9.74 trips per 1 KSF general office building * 10 KSF * 14.3 average miles per trip in Lake County = 1,393 VMT.
[5] The calculation is: 1,393 VMT / 63.53 VMT per household (per 2012 CHTS) = 21.9 households.

provided in Appendix C. The tool gives users the option to select a threshold of either 14.3% below the countywide average or 15% below the countywide average.

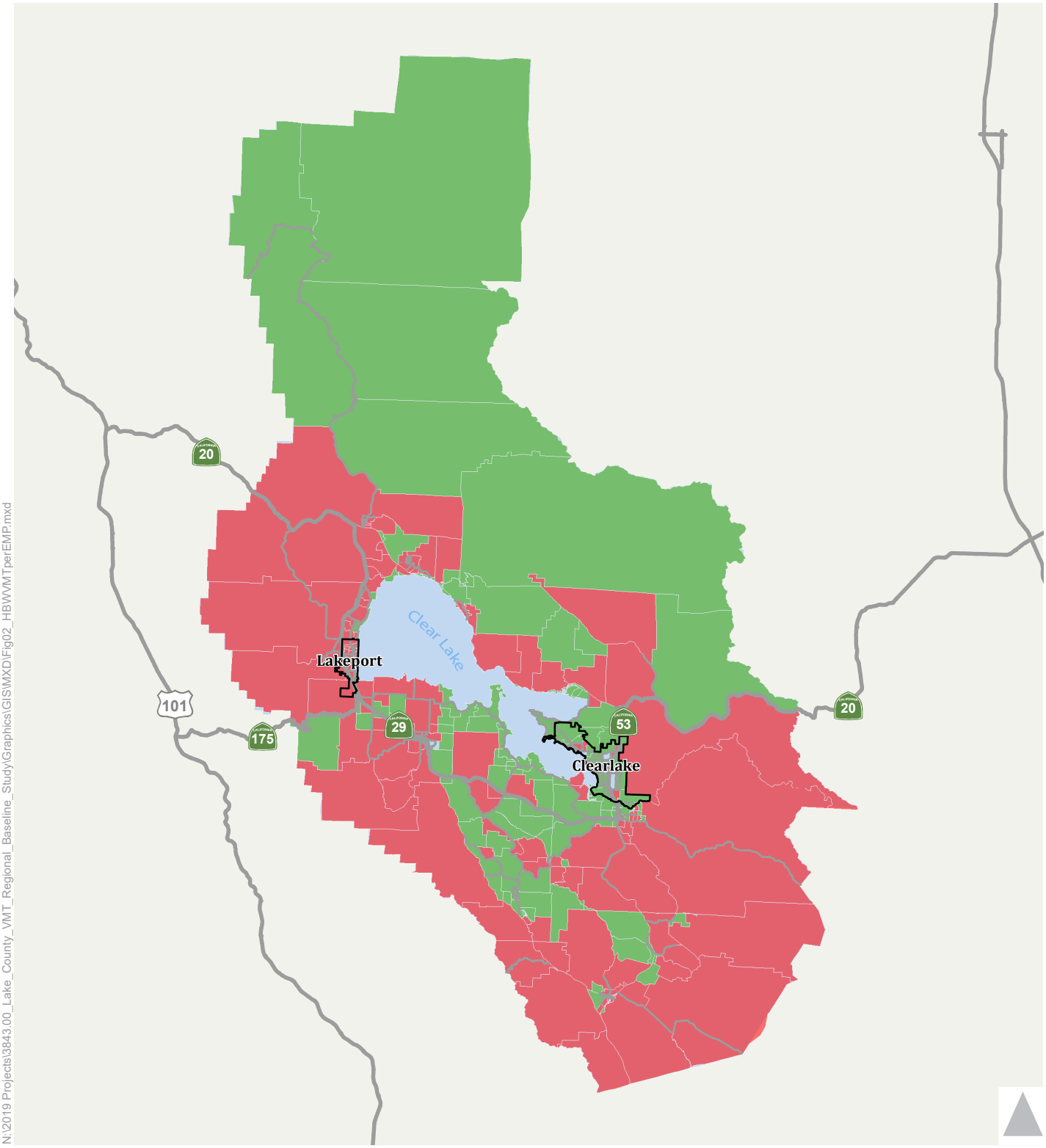


Low VMT Areas (More than 14.3% below Countywide average)

Not Low VMT Areas (Less than 14.3% below Countywide average)

Figure 1

Daily Home-Based VMT per Resident
Lake County



Low VMT Areas (More than 14.3% below Countywide average)

Not Low VMT Areas (Less than 14.3% below Countywide average)

Figure 2

Daily Home-Based Work VMT per Employee
Lake County

- *Local-Serving Retail*
  The OPR *Technical Advisory* also notes that **local-serving retail projects, typically less than 50,000 square feet**, improve retail destination proximity and thus shorten trips and reduce VMT. If defined in local zoning codes, lead agencies may use this definition to screen such projects. 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. Such studies may be particularly relevant when retail projects larger than 50,000 square feet are evaluated.

Note that screening is also possible for transit priority areas (TPAs) (CEQA Guidelines § 15064.3(b)(1)); however, no such areas exist in Lake County. TPAs are defined as areas within one-half mile of a major transit stop. Major transit stops[6] are typically defined as transit serving rail stations, ferry terminals, bus rapid transit, or transit stops on bus routes with headways 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. Such screening would need to be supported by substantial evidence in the cities of Clearlake and Lakeport.

Other screening criteria, such as for affordable residential projects, may be developed, but would need to be supported by substantial evidence consistent with CEQA Guidelines Section 15064.7, thus considering data, facts, research, and analysis.

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. If change in VMT by speed bin is desired, then the travel demand model should be updated to incorporate the project and determine this output.

2.5 VMT Thresholds

2.5.1 Background on CEQA Thresholds

Establishing CEQA thresholds for VMT requires complying with the statutory language added by SB 743, as well as guidance contained in CEQA Guidelines Section 15064, 15064.3, and 15064.7. The excerpts below highlight the amendments to the two CEQA Guidelines Sections that were adopted by the California Natural Resources Agency and certified by the Office of Administrative Law at the end of 2018.

[6] Public Resources Code Section 21064.3.

§ 15064. Determining the Significance of the Environmental Effects Caused by a Project.

(a) Determining whether a project may have a significant effect plays a critical role in the CEQA process.

(1) If there is substantial evidence, in light of the whole record before a lead agency, that a project may have a significant effect on the environment, the agency shall prepare a draft EIR.

(2) When a final EIR identifies one or more significant effects, the lead agency and each responsible agency shall make a finding under Section 15091 for each significant effect and may need to make a statement of overriding considerations under Section 15093 for the project.

(b) **(1)** The determination of whether a project may have a significant effect on the environment calls for careful judgment on the part of the public agency involved, based to the extent possible on scientific and factual data. An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting. For example, an activity which may not be significant in an urban area may be significant in a rural area.

(2) Thresholds of significance, as defined in Section 15064.7(a), may assist lead agencies in determining whether a project may cause a significant impact. When using a threshold, the lead agency should briefly explain how compliance with the threshold means that the project's impacts are less than significant. Compliance with the threshold does not relieve a lead agency of the obligation to consider substantial evidence indicating that the project's environmental effects may still be significant.

Source: *Final Adopted Text for the 2018 Amendments and Additions to the State CEQA Guidelines.* California Natural Resources Agency (page 8), http://resources.ca.gov/ceqa/

§ 15064.7. Thresholds of Significance.

(a) ~~**Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects**~~**.** A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.

(b) **Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects.** Thresholds of significance to be adopted for general use as part of the lead agency's environmental review process must be adopted by ordinance, resolution, rule, or regulation, and developed through a public review process and be supported by substantial evidence. **Lead agencies may also use thresholds on a case-by-case basis as provided in Section 15064(b)(2).**

(c) When adopting **or using** thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence.

(d) Using environmental standards as thresholds of significance promotes consistency in significance determinations and integrates environmental review with other environmental program planning and regulation. Any public agency may adopt or use an environmental standard as a threshold of significance. In adopting or using an environmental standard as a threshold of significance, a public agency shall explain how the particular requirements of that environmental standard reduce project impacts, including cumulative impacts, to a level that is less than significant, and why the environmental standard is relevant to the analysis of the project under consideration. For the purposes of this subdivision, an "environmental standard" is a rule of general application that is adopted by a public agency through a public review process and that is all of the following:

(1) a quantitative, qualitative or performance requirement found in an ordinance, resolution, rule, regulation, order, plan or other environmental requirement;

(2) adopted for the purpose of environmental protection;

(3) addresses the environmental effect caused by the project; and,

(4) applies to the project under review.

Source: *Final Adopted Text for the 2018 Amendments and Additions to the State CEQA Guidelines*. California Natural Resources Agency (pages 14-15), http://resources.ca.gov/ceqa/

As noted in the CEQA sections above, lead agencies have the discretion to select thresholds on a case-by-case basis or develop and adopt thresholds for general use. The remainder of this memo focuses on guidance related to adopting thresholds for general use.

The CEQA Guidelines are clear that thresholds adopted for general use 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.

2.5.2 OPR VMT Threshold Recommendations for Land Use Projects

SB 743 includes the following legislative intent statements, which were used to help guide OPR's VMT threshold recommendations.

- *New methodologies under the California Environmental Quality Act are needed for evaluating transportation impacts that are better able to promote the state's goals of reducing greenhouse gas emissions and traffic-related air pollution, promoting the development of a multimodal transportation system, and providing clean, efficient access to destinations.*
- *More appropriately balance the needs of congestion management with statewide goals related to infill development, promotion of public health through active transportation, and reduction of greenhouse gas emissions.*

To support these legislative intent statements, threshold recommendations are found in Section 15064.3 of the 2018 CEQA Guidelines amendments. and the *Technical Advisory on Evaluating Transportation Impacts in CEQA,* California Governor's Office of Planning and Research (OPR) (December 2018). Specific excerpts and threshold highlights are provided below.

> CEQA Guidelines Section 15064.3
>
> *(b) Criteria for Analyzing Transportation Impacts.*
>
> *(1) Land Use Projects. Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.*
>
> *(2) Transportation Projects. Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. To the extent that such impacts have already been adequately addressed at a programmatic level, such as in a regional transportation plan EIR, a lead agency may tier from that analysis as provided in Section 15152.*

Technical Advisory on Evaluating Transportation Impacts in CEQA (page 10)

Based on OPR's extensive review of the applicable research, and in light of an assessment by the California Air Resources Board quantifying the need for VMT reduction in order to meet the State's long-term climate goals, OPR recommends that a per capita or per employee VMT that is fifteen percent below that of existing development may be a reasonable threshold.

Technical Advisory on Evaluating Transportation Impacts in CEQA – Rural Projects Outside of Metropolitan Planning Organizations (MPOs) (page 19)

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

The recognition that rural areas are different is consistent with the flexibility provided by CEQA Guidelines Section 15064(b)(1). In these areas, VMT per resident or per worker tends to be higher than in urban areas. Although mitigation may be less feasible in rural areas due to longer distances between origins and destinations and limited travel mode choices, such differences in mitigation feasibility are not a reasonable basis to justify lower VMT thresholds compared to urban areas. This issue is discussed in more detail below.

These (and the other) threshold recommendations in the *Technical Advisory* are intended to help achieve the state's GHG reduction goals and targets considered in development of OPR's *Technical Advisory* as follows;

- Assembly Bill 32 (2006) requires statewide greenhouse gas reductions to 1990 levels by 2020 and continued reductions beyond 2020.
- Senate Bill 32 (2016) requires at least a 40 percent reduction in greenhouse gas emissions by 2030.
- Pursuant to Senate Bill 375 (2008), the California Air Resources Board establishes greenhouse gas reduction targets for MPOs to achieve based on land use patterns and transportation systems specified in Regional Transportation Plans and Sustainable Community Strategies. At the time the *Technical Advisory* was released, target reductions by 2035 for the largest MPOs ranged from 13% to 16%. The current targets for these MPOs are 19%.
- Executive Order B-30-15 (2015) sets a GHG emissions reduction target of 40 percent below 1990 levels by 2030.
- Executive Order S-3-05 (2005) sets a GHG emissions reduction target of 80 percent below 1990 levels by 2050.
- Executive Order B-16-12 (2012) specifies a GHG emissions reduction target of 80 percent below 1990 levels by 2050 specifically for transportation.

- Senate Bill 391 requires the California Transportation Plan to support 80 percent reduction in GHGs below 1990 levels by 2050.
- The California Air Resources Board Mobile Source Strategy (2016) describes California's strategy for containing air pollutant emissions from vehicles and quantifies VMT growth compatible with achieving state targets.
- The California Air Resources Board's 2017 Climate Change Scoping Plan Update: The Strategy for Achieving California's 2030 Greenhouse Gas Target describes California's strategy for reducing greenhouse gas emissions from vehicles and quantifies VMT growth compatible with achieving state targets.
- The Caltrans Strategic Management Plan (2015) calls for a 15 percent reduction in VMT per capita compared to 2010 levels by 2020.
- Executive Order B-55-18 (2018) established an additional statewide goal of achieving carbon neutrality as soon as possible, but no later than 2045, and maintaining net negative emissions thereafter.

Lead agencies should note that the OPR-recommended VMT thresholds are focused on GHG reduction goals. As OPR's *Technical Advisory* (p. 8) explains,

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

While SB 743 legislative objectives include reduction in GHG emissions, OPR's Technical Advisory focuses less on the other legislative objectives to encourage infill development and promote active transportation. SB 743 [Section 21099(b)(1)] also makes it explicit that criteria for determining the significance of transportation impacts shall promote "*…the reduction of greenhouse gas emissions, the development of multimodal networks, and a diversity of land uses.*" If GHG impacts are already being adequately addressed in another CEQA section, then more evidence may be desired about VMT threshold relationships to the other criteria. In particular, how should lead agencies balance the accommodation of housing needs that contribute to land use diversity but also contribute to VMT increases? Given the status of housing supply shortages and affordability in California, this is not a small issue. The use of VMT as an impact metric will

likely trigger more significant impacts in suburban and rural areas that have the highest VMT generation rates and limited or costly mitigation options. Adding more impact mitigation costs to suburban and rural housing projects may be counter to land use diversity and adequate/affordable housing goals.

2.5.2.1 Threshold Recommendations by Land Use Type

Specific numerical VMT thresholds for residential, office (work-related), and retail land uses from the *Technical Advisory* are summarized below.

- Residential projects – A proposed project exceeding a level of 15 percent below existing (baseline) VMT per capita may indicate a significant transportation impact. Existing VMT per capita may be measured as regional VMT per capita, a citywide VMT per capita, or as geographic sub-area VMT per capita. Lead agencies should determine their VMT metric so that project applicants apply a consistent threshold.
- Office projects – A proposed project exceeding a level of 15 percent below existing (baseline) regional VMT per employee may indicate a significant transportation impact.
- Retail projects – A net increase in total VMT may indicate a significant transportation impact.
- Mixed-use projects – Lead agencies can evaluate each component of a mixed-use project independently and apply the significance threshold for each project type included (e.g., residential and retail). Alternatively, a lead agency may consider only the project's dominant use. In the analysis of each use, a project should take credit for internal capture.
- Other non-residential project types – OPR recommends using the quantified thresholds above (page 17), thus a proposed project exceeding a level of 15 percent below existing regional VMT per employee for the proposed non-residential project type or resulting in a net increase in total VMT may be considered significant. Lead agencies, using more location-specific information, may develop their own more specific thresholds, which may include other land use types.
- Redevelopment projects – Where a project replaces existing VMT-generating land uses, if the replacement leads to a net overall decrease in VMT, the project would lead to a less-than-significant transportation impact. If the project leads to a net overall increase in VMT, then the thresholds described above should apply.

As shown above, OPR does not make consistent recommendations for employment land use projects. In some cases, OPR recommends a 15-percent reduction in per capita VMT, in some cases no increase in total VMT, and in some cases OPR leaves threshold selection to jurisdiction discretion. Evidence is lacking on what justifies different treatments across different land use types. Lead agencies that use the above thresholds should be prepared to justify their reasoning and be able to explain it to project applicants, decision makers, and the public.

The 15 percent reductions specified in the *Technical Advisory* are based on light-duty vehicle VMT (i.e., passenger cars and light trucks). They were also included before completion of ARB modeling of MPO

regional transportation plan/sustainable communities strategies (RTP/SCSs). The ARB *Scoping Plan* and *Mobile Source Strategy* identifies that a 14.3 percent reduction in total VMT or a 16.8-percent reduction in light-duty vehicle VMT per capita from baseline levels (the average of years 2015-2018) is necessary to meet state GHG reduction goals by 2050. These reduction values are based on a fair share estimate of new development's responsibility for VMT reduction and presume that all 2050 California residents will be performing at the reduced VMT levels. If existing residents (those present in 2018) do not change their travel behavior and the full reduction in VMT was allocated to new growth, then the reduction goal would be much higher. Further, if VMT per capita trends continue to increase as noted in the *2018 Progress Report California's Sustainable Communities and Climate Protection Act*, California Air Resources Board, November 2018, then these reduction percentage values would have to increase. Also, the recommendation above for mixed-use projects to rely on the "dominant use" in VMT analysis may present new challenges. 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.

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).) OPR's guidance also recommends measuring VMT in absolute terms, which measures the total VMT in an area with and without the project. This approach is consistent with traditional CEQA analyses that measure impacts in comparison to existing conditions and with OPR's CEQA Guidelines amendments and *Technical Advisory*, which state that (1) "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." (CEQA Guidelines § 15064.3(b)(1).) (2) "Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact." ((CEQA Guidelines § 15064.3(b)(2).) (3) "Where development decreases VMT, lead agencies should consider the impact to be less than significant," (OPR *Technical Advisory*, p. 16.), (4) "Where a project replaces existing VMT-generating land uses, if the replacement leads to a net overall decrease in VMT, the project would lead to a less-than-significant transportation impact." (OPR *Technical Advisory*, p. 17.)

For rural areas outside MPOs, the *Technical Advisory* explains that VMT mitigation options are limited, so thresholds may need to be set on a case-by-case basis. This rationale may not provide the best justification for selecting thresholds. The intent of threshold setting is to determine what change in VMT would constitute a significant environmental impact, considering SB 743's statutory goals and the associated CEQA Guidelines. While land use context is a valid consideration when setting thresholds, so are these goals.

The *Technical Advisory* makes specific VMT threshold recommendations for analyzing the short-term impact of project generated VMT on baseline conditions, but also recommends that VMT analysis consider a project's long-term effects on VMT, The *Technical Advisory* states (p. 6):

> [W]here methodologies exist that can estimate the full extent of vehicle travel from a project, the lead agency should apply them to do so. Where those VMT effects will grow over time, analyses should consider both a project's short-term and long-term effects on VMT.

Another factor for consideration is whether the project is consistent with the applicable RTP. Although OPR recommends that such consistency not be the sole basis for transportation impact analysis (p. 22), land use projects that are inconsistent with the RTP may have significant VMT impacts, if they make it more difficult for the region to achieve its SB 375 GHG reduction targets and air quality conformity. However, consistency should not necessarily be based on RTP modeling assumptions alone; rather, such consistency may be based on the overarching goals and policies of the RTP. Consequently, a high-density pedestrian oriented mixed-use development may still further the RTP/SCS objectives even though that project's site was modeled as low density residential.

These recommendations raise key questions for lead agencies, as addressed in the next section.

2.5.3 Lead Agency Discretion in Setting VMT Thresholds

Prior to SB 743 implementation, CEQA Guidelines Section 15064.7 allowed lead agencies the discretion to select their own transportation impact metrics although substantial evidence was required to support their decisions. For transportation impact metrics, SB 743 deleted vehicle delay as a metric, and CEQA Guidelines Section 15064.3 provided that VMT is generally the most appropriate metric for land use projects. As to thresholds, additional questions have arisen as listed below.

- Question 1: Do lead agencies have discretion to set a different VMT threshold than recommended by OPR?
- Question 2: Do lead agencies need to establish VMT thresholds for cumulative impacts?
- Question 3: Do lead agencies need to use the same VMT methodology for setting thresholds and for conducting project VMT forecasts?

The answers to the first two questions require a legal perspective and were informed by a memorandum prepared by Remy Moose Manley (RMM) as part of the Western Riverside Council of Governments (WRCOG) SB 743 Implementation Pathway project, whose opinion is summarized below, together with supplemental analysis. Their full opinion is available as part of the WRCOG documentation at http://www.fehrandpeers.com/wrcog-sb743/ while a summary of their selected findings, together with supplemental analysis ,is presented below.

2.5.3.1 Question 1: Do lead agencies have discretion to set a different VMT threshold than recommended by OPR?

Setting an efficiency threshold lower than the 15 percent reduction recommended by OPR in their *Technical Advisory* is likely legally defensible, so long as the threshold is supported by substantial evidence. The substantial evidence is critical in the threshold setting process and should explain why the OPR-recommended threshold is not appropriate for the lead agency or project, and why another threshold was selected. This evidence will be the basis for supporting the recommended threshold and

should carefully consider the definition of substantial evidence contained in Section 15384 of the CEQA Guidelines. This answer considers the fact that the 15 percent reduction is not included in the statute or the updated CEQA Guidelines; rather it is only included in OPR's *Technical Advisory*. However, it is unknown how much weight future courts may give OPR's *Technical Advisory* since this is where OPR complies with Section 21099(b)(1) to develop recommendations for significance criteria.

The revisions to the CEQA Guidelines only include statements about what land use project types and locations may be presumed to have a less than significant VMT impact. Additional evidence allowing for a lower threshold (i.e., less than 15 percent) is also found in the discussion above about the recognition of land use context influencing VMT performance.

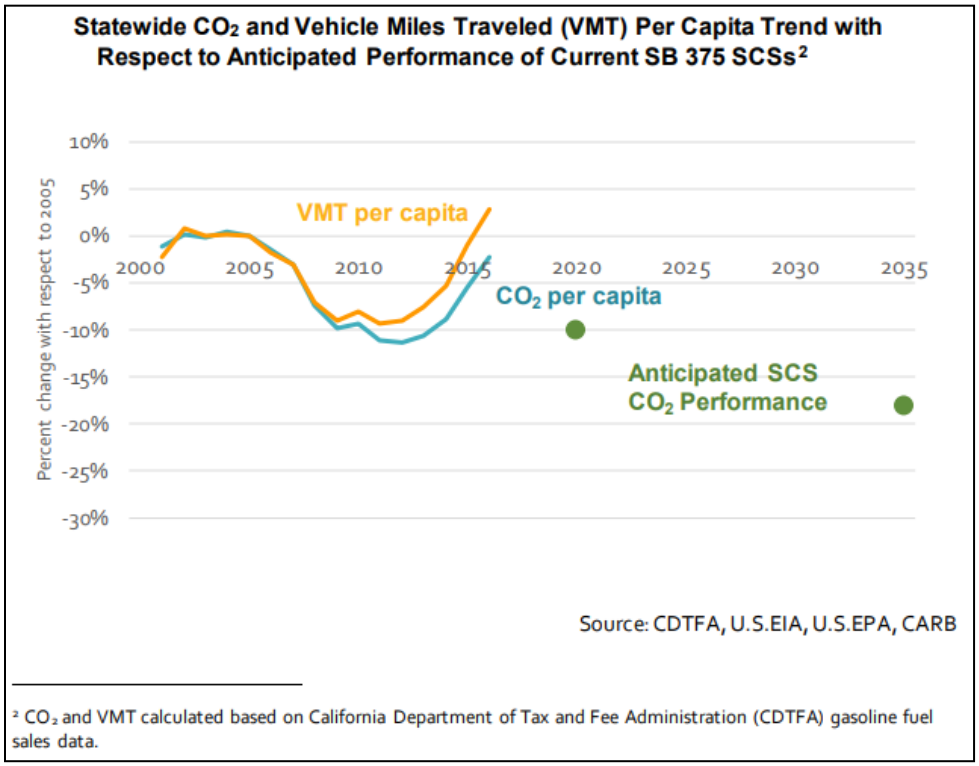
2.5.3.2 Question 2: Do lead agencies need to establish VMT thresholds for cumulative impacts or use different methods for cumulative impact analysis?

In addition to direct impact analysis, lead agencies should address VMT impacts in the cumulative context. The CEQA Guidelines (and the case law) are clear that consideration of cumulative impacts is important to CEQA compliance. That said, a separate quantitative threshold may not be required if the threshold applied for project-specific impacts is cumulative in nature. VMT thresholds based on an efficiency form of the metric such as VMT per capita, can address both project and cumulative impacts in a similar manner that some air districts do for criteria pollutants and GHGs.

As explained in OPR's *Technical Advisory*, when using an absolute VMT metric, i.e., total VMT (as recommended below for retail and transportation projects), analyzing the combined impacts for a cumulative impact analysis may be appropriate. However, a project that falls below an efficiency-based threshold that is aligned with long-term environmental goals and relevant plans would have no cumulative impact distinct from the project impact. Accordingly, a finding of a less-than-significant project impact would imply a less than significant cumulative impact, and vice versa. (OPR *Technical Advisory*, p. 6.)

A key consideration for cumulative scenarios is whether the rate of VMT generation gets better or worse in the long-term. If the rate is trending down over time, then the project level analysis may suffice. However, the trend direction must be supported with substantial evidence. This creates a potential issue for VMT because per capita VMT rates in California have been increasing, a trend inconsistent with RTP/SCS projections showing declines. The chart below from the *2018 Progress Report, California's Sustainable Communities and Climate Protection Act*, California Air Resources Board, November 2018 charts recent VMT per capita trends and shows VMT per capita increasing in recent years. At a minimum, this evidence should be disclosed as part of the VMT impact analysis. Lead agencies should also determine whether this may constitute sufficient evidence to require a cumulative analysis to verify the baseline plus project VMT impact conclusions. The basic question to answer is whether a less than significant impact conclusion under baseline plus project conditions would be reasonably sustained long-term if background VMT per capita trends are increasing.

Figure 3: California VMT Trends



Source: 2018 Progress Report California's Sustainable Communities and Climate Protection Act, California Air Resources Board, 2018

For some projects, measuring project-generated VMT will only tell part of the impact story, especially if they exceed a project threshold based on VMT per capita or similar efficiency metric. Measuring the "project's effect on VMT" may be necessary to fully explain the project's impact, especially under cumulative conditions. This occurs because of the nature of discretionary land use decisions. Cities and counties influence land supply through changes to general plan land use designations and zoning for parcels. These changes rarely, if ever, influence the long-term amounts of regional population and employment growth. Viewed through this lens, a full disclosure of VMT effects requires capturing how a project may influence the VMT generated by the project and nearby land uses. Also, some mitigation strategies that improve walking, bicycling, or transit to/from the project site can also reduce VMT from neighboring land uses (for example, installing a bike share station on the project site would influence the riding behavior of project residents and those living and working nearby).

2.5.3.3 Question 3: Do lead agencies need to use the same VMT methodology for setting thresholds and for conducting project VMT forecasts?

Lead agencies need to use consistent methods when forecasting VMT for threshold setting and project analysis to ensure an apples-to-apples comparison for identifying potential impacts. The project team has

confirmed through case study comparisons[7] that failure to comply with this approach, as recommended by the *Technical Advisory,* can lead to erroneous impact conclusions. This is an important finding, since the *Technical Advisory* also accepts that VMT analysis can be performed using sketch planning tools. Off-the-shelf sketch planning tools for VMT analysis do not contain trip generation rates or trip lengths consistent with local and regional travel forecasting models. These models are the most likely source for city-wide and region-wide VMT estimates used in setting thresholds because sketch planning tools cannot produce these aggregate-level VMT metrics. The *Technical Advisory* partially recognizes this issue by recommending that sketch planning tools use consistent trip lengths as the models used to produce thresholds, but it does not include a similar recommendation for trip generation rates. Both input variables, trip lengths and trip generation rates, need to be consistent with the travel forecasting model to produce accurate project impact analysis results.

2.5.4 Alternatives for VMT Measurement Methods and Thresholds

So how should lead agencies approach VMT threshold setting given their discretion? Since an impact under CEQA is a change to the existing environment, a starting level for potential thresholds is the baseline (i.e., existing condition): total VMT, VMT per capita, VMT per employee, or VMT per service population. Since VMT would normally be expected to increase or fluctuate with population and employment growth, changes in economic activity, and expansion of new vehicle travel choices (i.e., Uber, Lyft, autonomous vehicles, etc.), expressing VMT as an efficiency metric (i.e., per capita, per employee, or per service population) allows for comparisons to baseline conditions for land use projects and land use plans. Establishing a threshold such as not exceeding baseline VMT per service population would mean that future land uses would not have a significant transportation impact if they perform similarly to existing land uses. If this approach is utilized for an efficiency metric, lead agencies may need to demonstrate their project is displacing growth from other less efficient locations.

Alternatively, lead agencies can establish reductions from baseline levels as a threshold. How much of a reduction may depend on the values placed on vehicle use and its associated effects on mobility, economic activity, and environmental consequences.

[7] The table below shows the results of using different VMT methods. The italicized numbers in parentheses under city and region are the threshold values (15% below the non-italicized values). If the travel demand model was used to set the italicized threshold values in the first row and the model was also used for the project analysis, then no impact would occur. If the project analysis instead used Institute of Transportation Engineers (ITE) trip generation rates and California Household Travel Survey (CHTS) trip lengths, then the project's 11.26 estimate would be higher than the model threshold values for both the City and Region resulting in a significant impact. Using thresholds derived from the ITE+CHTS data would have reversed this impact finding demonstrating that consistent methodology is essential for avoiding erroneous impact conclusions.

VMT Method	Existing Home-Based VMT per Capita		
	City	Region	Project
Travel demand model	9.86 *(8.38)*	11.97 *(10.17)*	5.46
ITE + CHTS	23.90 (*20.32*)	25.67 (*21.82*)	11.26

Another consideration in threshold setting is how to address cumulative VMT impacts and whether addressing them in the general plan EIR is advantageous for streamlining the review of subsequent land use and transportation projects given CEQA streamlining available through CEQA Guidelines Section 15183.[8] This section of the Guidelines relieves a project of additional environmental review if the environmental impact was adequately addressed in the general plan EIR and the project is consistent with the general plan, except if there are project-specific significant impacts peculiar to the project (see below).

> 15183. PROJECTS CONSISTENT WITH A COMMUNITY PLAN OR ZONING
>
> (a) CEQA mandates that projects which are consistent with the development density established by existing zoning, community plan, or general plan policies for which an EIR was certified shall not require additional environmental review, except as might be necessary to examine whether there are project-specific significant effects which are peculiar to the project or its site. This streamlines the review of such projects and reduces the need to prepare repetitive environmental studies.

The use of Section 15183 also addresses cumulative impacts as acknowledged in Section 15130(e).

> 15130. DISCUSSION OF CUMULATIVE IMPACTS
>
> (e) If a cumulative impact was adequately addressed in a prior EIR for a community plan, zoning action, or general plan, and the project is consistent with that plan or action, then an EIR for such a project should not further analyze that cumulative impact, as provided in Section 15183(j).

For Lake APC jurisdictions, addressing transportation VMT impacts in the City or County General Plan EIR could be useful in understanding how VMT reduction should be balanced against other community objectives when it comes to setting new VMT impact thresholds for SB 743.

Given the above information, each Lake APC jurisdiction has at least five options for setting VMT thresholds.

- Option 1: Rely on OPR *Technical Advisory* MPO thresholds guidance – 14.3%-16.8% below baseline, depending on type of vehicles
- Option 2: Rely on OPR *Technical Advisory* rural thresholds guidance – case-by-case
- Option 3: Set thresholds consistent with the general plan or travel demand model future year VMT projections
- Option 4: Set thresholds at or below baseline VMT performance, measured in absolute or efficiency metrics

[8] A General Plan EIR can also be used to streamline project-level VMT analysis though other methods such as tiered EIRs (CEQA Guidelines Section 15152) and Program EIRs (CEQA Guidelines Section 15168).

- Option 5: Set thresholds consistent with state VMT and GHG reduction goals – 6.5% growth in total VMT through 2050

Each of these options is discussed below.

Option 1: Rely on OPR Technical Advisory MPO thresholds – 14.3%-16.8% below baseline

The first option is to simply rely on the threshold recommendations contained in the OPR *Technical Advisory*. As noted above, OPR generally recommends that impacts of land use projects (other than retail) should be measured against VMT per capita or VMT per worker threshold of 15 percent below that of baseline conditions (i.e., existing development).

For land use plans (i.e., a general plan, policy area plan, or specific area plan), a significant impact would occur if the respective thresholds above were exceeded for all land uses in the plan area. This means that new population and employment growth combined with the planned transportation network would need to generate future VMT per capita or VMT per worker that is less than 85 percent of the baseline value to be considered less than significant. Land use projects and land use plans would also need to be consistent with the jurisdiction's general plan.

A potential limitation of the OPR recommendations is that the substantial evidence used to justify the thresholds is largely based on the state's air quality and GHG goals. Three issues arise from this reliance.

1. The OPR recommended threshold does not establish a level of VMT reduction that would result in the state meeting its air quality and GHG goals according to the *California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals* (2019). This may create confusion with air quality and GHG impact analysis in environmental documents, which should already address the influence of VMT.

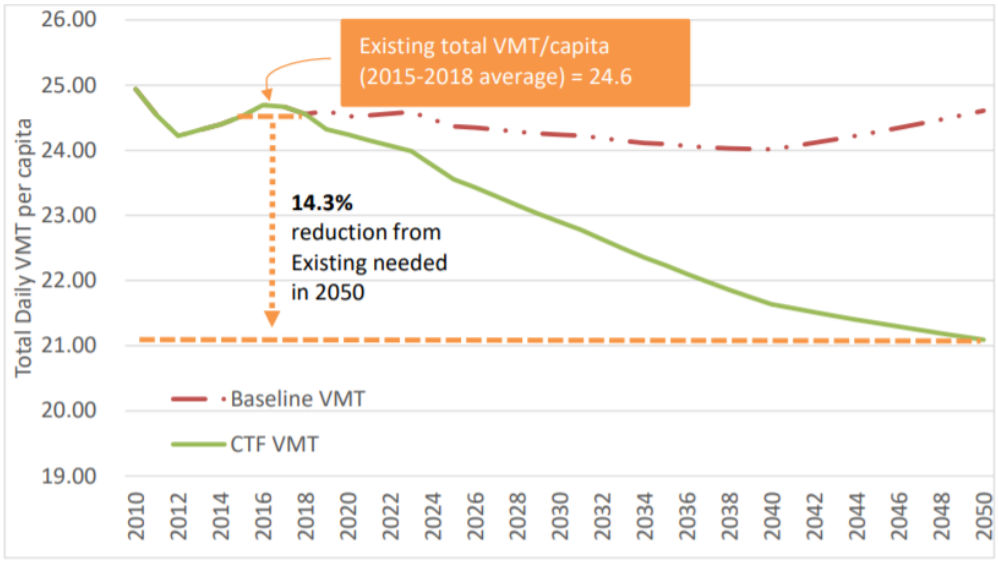
2. The OPR recommended thresholds do not directly reflect expectations related to the other SB 743 objectives related to statewide goals to promote public health through active transportation, infill development, multimodal networks, and a diversity of land uses. Recommending a reduction below baseline levels is consistent with these objectives. but the numerical value has not been tied to specific statewide values for each objective or goal.

3. State policies for air quality and GHG reductions may not align with local/lead agency policies. Using state policies for a local lead agency threshold may create inconsistencies with local city or county general plans.

ARB has since built on the work of OPR, using their recommendation of a 15 percent threshold as an input in models estimating future change in state VMT and GHG. The ARB *2017 Scoping Plan* and *Mobile Source Strategy* provide analysis related to how the state can achieve the legislative and executive goals while the Caltrans *Strategic Management Plan* and *Smart Mobility Framework* provide supportive guidance and metrics. An important recognition of the ARB *Scoping Plan* and *Mobile Source Strategy* is that the initial SB 375 targets alone were not sufficient to achieve state GHG reduction targets.

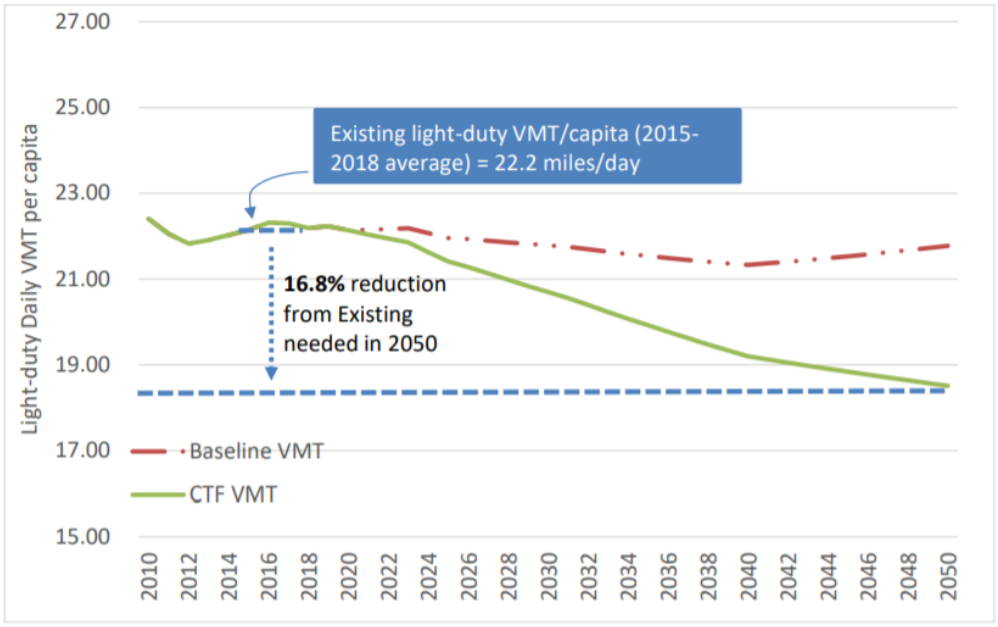
The Air Resources Board's 2019 white paper entitled "2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals" provides updated information on VMT reductions needed to meet the State's GHG emission reduction targets by 2050. This document identifies two specific thresholds that could meet these targets, a 14.3-percent reduction in total VMT per capita, and a 16.8-percent reduction in light-duty vehicle VMT per capita. While this evidence is tied largely to the state's emission reduction goals, the proposed VMT reductions associated with this approach to thresholds would also be supportive of multimodal networks, infill development, and greater land use diversity. The Wine Country Travel Demand Model does not currently include any disaggregation of passenger/light-duty and heavy-duty vehicles, so 14.3 percent would be a more appropriate threshold using estimates from the model.

Figure 4: Statewide Total VMT/Capita



Source: *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals*, ARB (pg. 10)
https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf

Figure 5: Statewide Light-Duty VMT/Capita



Source: *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals*, ARB (pg. 11) https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf

One benefit of relying on ARB for a threshold recommendation is the CEQA Guidelines provision in Section 15064.7(c) highlighted below.

§ 15064.7. Thresholds of Significance.

(a) ~~**Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects.**~~ A threshold of significance is an identifiable quantitative, qualitative or performance level of a particular environmental effect, non-compliance with which means the effect will normally be determined to be significant by the agency and compliance with which means the effect normally will be determined to be less than significant.

(b) **Each public agency is encouraged to develop and publish thresholds of significance that the agency uses in the determination of the significance of environmental effects.** Thresholds of significance to be adopted for general use as part of the lead agency's environmental review process must be adopted by ordinance, resolution, rule, or regulation, and developed through a public review process and be supported by substantial evidence. **Lead agencies may also use thresholds on a case-by-case basis as provided in Section 15064(b)(2).**

(c) When adopting **or using** thresholds of significance, a lead agency may consider thresholds of significance previously adopted or recommended by other public agencies or recommended by experts, provided the decision of the lead agency to adopt such thresholds is supported by substantial evidence.

Source: Final Adopted Text for the 2018 Amendments and Additions to the State CEQA Guidelines. California Natural Resources Agency (p. 14) http://resources.ca.gov/ceqa/

ARB meets the criteria of being a public agency and having noted expertise in the areas of VMT and climate policy. Further, the recommended threshold values above were developed in specific consideration of SB 743 requirements. ARB's *2017 Scoping Plan* (p. 11) provides that its recommendations "are non-binding, and intended as supportive documentation that can be used at a lead agency's discretion to help substantiate significance thresholds used for purposes of compliance with SB 743, and to help minimize occurrence of duplicate or redundant analysis across transportation and climate resource impact areas under CEQA."

One other agency threshold to consider is based on Caltrans guidance. The Local Development-Intergovernmental Review (LD-IGR) Branch at Caltrans (https://dot.ca.gov/programs/transportation-planning/office-of-smart-mobility-climate-change/local-development-intergovernmental-review) seeks to reduce potential adverse impacts of local development on the state transportation system. As part of its responsibilities, each district branch performs reviews of CEQA environmental documents for local land use projects. These reviews include providing recommendations for transportation impact analysis such as metrics and thresholds.

When Caltrans reviews CEQA documents, they may function as a reviewing agency or a responsible agency. In a responsible agency role, Caltrans has approval authority over some component of the project such as an encroachment permit for access to the state highway system. Comments from Caltrans should be adequately addressed, and special attention should be paid to those comments when Caltrans serves as a responsible agency because an adequate response may be required to obtain their required approval.

Caltrans recently released an update to their Transportation Impact Study Guide (https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/sb-743/2020-02-26-transmittal-and-draft-vmt-focused-tisg.pdf). Key points from this draft include the following:

- Caltrans recommends use of OPR's recommended thresholds for land use projects.
- Caltrans supports CEQA streamlining for land use projects in transit priority areas and areas with existing low VMT, as described in OPR's *Technical Advisory*.
- Caltrans recommends following the guidance on methods of VMT assessment found in OPR's *Technical Advisory*.
- Caltrans comments on a CEQA document may note methodological deviations from those methods and may recommend that significance determinations and mitigation be aligned with state GHG reduction goals as articulated in that guidance, ARB's *Scoping Plan*, and related documentation.
- In rural areas, Caltrans may comment requesting VMT-reducing strategies for the rural area be included programmatically, including at the General Plan level, for example. Caltrans will also recommend establishment of programs or methods to reduce VMT and support appropriate bicycle, pedestrian, and transit infrastructure, services or incentives.

With Caltrans endorsement of the recommended OPR thresholds, a state VMT threshold has been recommended for impacts to the state highway system. If a lead agency chooses a different threshold, they may have to complete more than one impact analysis.

Option 2: Rely on OPR Technical Advisory discussion for rural thresholds – case-by-case

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

When determining thresholds on a case-by-case basis, the lead agency could consider the following factors when making a significance determination.

- What are the state expectations for VMT reduction from rural areas? Would the state agree that the amount of new VMT generated is small enough that it would not interfere with the state's ability to achieve desired VMT and GHG emissions reductions?
- What is the land use context and associated lead agency policy for VMT reduction? Since the CEQA Guidelines allow for thresholds to vary based on land use context, the lead agency may consider sensitivity to VMT reduction in different land use contexts (i.e., rural areas, small towns, and unincorporated community centers).
- Is the project displacing other less efficient development? For example, is the project diverting trips from more distant stores, which results in a net (absolute) VMT reduction, e.g., constructing a grocery store in a food desert? (OPR *Technical Advisory* p. 30)

For rural areas, the Caltrans Transportation Impact Study Guide (TISG) is consistent with the OPR guidance, and provides the following advice:

> "OPR's Technical Advisory indicates significance thresholds for projects in rural areas of non-MPO counties may be best determined on a case-by-case basis. In these rural areas, programmatic VMT mitigation is sometimes the most effective. Caltrans may comment requesting VMT-reducing strategies for the rural area be included programmatically, including at the General Plan level, for example. Caltrans will also recommend establishment of programs or methods to reduce VMT and support appropriate bicycle, pedestrian, and transit infrastructure, services, or incentives".

Option 3: Set thresholds consistent with the general plan or travel demand model future year VMT projections

VMT is a composite metric that is created as an output of combining a community's long-term population and growth projections with its long-term transportation network (e.g., as reflected in the general plan). Other variables are also in play related to travel behavior, but land use changes and transportation network modifications are the items largely influenced or controlled by cities and counties. As such, to the extent total VMT across the model area network has been estimated in general plan EIRs or other studies, each jurisdiction already has a total VMT growth "budget." This is the amount of absolute VMT change that is forecast to be caused from implementing the jurisdiction's General Plan. This VMT growth has already been planned for and determined to be "acceptable" by the jurisdiction. Regional planning

agencies also incorporate the general plan growth as input to their RTPs and associated environmental impact analysis. This level of VMT could serve as the basis of a VMT threshold expressed as absolute VMT growth or as a VMT efficiency metric based on the future year VMT per capita, VMT per employee, or VMT per service population. Projects that would result in exceedances of projected future VMT would be considered to have a significant impact.

Potential limitations of this approach relate to the lack of a "baseline plus project" analysis and travel forecasting model sensitivity. For example, if a general plan includes policies or implementation programs designed to reduce VMT through transportation demand management (TDM) strategies, the current Wine Country Travel Demand Model may not include these effects. Further, the current model does not capture major disruptive trend effects such as TNCs, AVs, and internet shopping.

Option 4: Set thresholds based on baseline VMT performance

As noted above, an impact under CEQA begins with a change to the existing or baseline environment. There are a range of approaches to using this starting point for VMT impact analysis. At one end of the spectrum is "total daily VMT" generated under baseline conditions. Setting this value as the threshold for a jurisdiction basically creates a benchmark where any increase would be a significant impact. Alternatively, the baseline VMT per capita, VMT per employee, or VMT per service population could be used to establish an efficiency metric basis for impact evaluation. Using this form of VMT would mean that future land use projects would be expected to perform no worse than existing land use projects and only projects that cause an increase in the rate of VMT generation would cause significant impacts. Since VMT will increase or fluctuate with population and employment growth, changes in economic activity, and expansion of new vehicle travel choices (i.e., Uber, Lyft, autonomous vehicles, etc.), expressing VMT measurement in an efficiency metric form allows for more direct comparisons to baseline conditions for land use projects and land use plans.

Under this option, baseline plus project analysis may suffice for both project and cumulative purposes unless VMT trends are increasing over time. At a minimum, a qualitative assessment of RTP and General Plan consistency should still be included to verify the project avoids jeopardizing the air quality conformity and GHG reduction performance of other relevant plans.

The ARB *Scoping Plan* did not identify a scale at which VMT per capita reductions necessary to meet statewide goals should be measured, but instead provided the results of a statewide analysis. Larger scales (Countywide, for example) will provide greater benefit to urbanized areas, as these areas generally have less VMT per capita. The scale at which the baseline is measured may be subject to a future legal test.

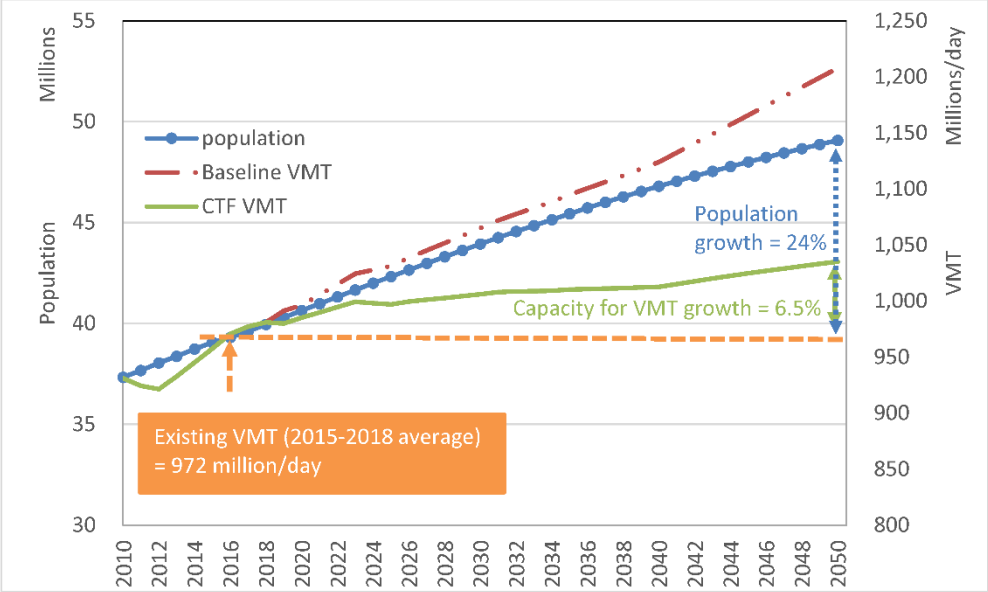
Option 5: Set thresholds consistent with state VMT and GHG reduction goals – 6.5% growth in total VMT through 2050

The goal of this option is to evaluate whether projects will interfere with the state's ability to meet its GHG reduction goals and VMT assumptions that would achieve those goals. A lead agency can define the

terms of what constitutes such interference, based on substantial evidence. One example of how this can be quantitatively evaluated is to use the ARB estimate included in its *Scoping Plan*.

As discussed above, under Option 1 (pages 19), ARB meets the criteria of being a public agency and having noted expertise in the areas of VMT and climate policy. The ARB 2019 white paper identifies that the state "…can accommodate a cumulative increase in total statewide daily VMT of about 6.5 percent in 2050… and still achieve the 2050 climate goal" when compared to the average statewide daily VMT from 2015-2018, as shown in Figure 6. Thus, less restrictive VMT thresholds may not jeopardize state goals, if shown to be implemented in a way that limits the total daily VMT increase for the jurisdiction to be less than or equal to the 6.5 percent increase identified in the *2017 Scoping Plan*. A lead agency wanting to rely on this evidence would need to develop a method for equitably allocating the VMT growth across time (i.e., baseline to 2050), regions, jurisdictions, and project types (i.e., land use versus transportation projects).

Figure 6: California Total Projected Population Growth and VMT Growth



Source: *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals*, ARB (pg. 7)
https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf

This example for setting VMT impact thresholds would establish a fair share portion of this statewide VMT growth for Lake APC jurisdictions. Estimating 6.5 percent growth in VMT from the average of the years 2015-2018 would provide a total VMT threshold through 2050. This is the total VMT beyond which the jurisdiction would be interfering with the state's abilities to meet its GHG reduction goals (i.e., VMT growth would exceed 6.5 percent growth). This budget for VMT growth could then be annualized, with additional guidance for the location and type of VMT growth. For example, land use projects may be prioritized in low-VMT areas. Total VMT could be checked annually to measure progress towards this budget.

So long as any individual project does not exceed the available VMT budget (by year or another period of time), and as long as it is consistent with the general plan and Regional Transportation Plan, this information would provide the evidence that the project would have a less than significant VMT impact. No further VMT impact analysis would be required for CEQA purposes.

To determine the project's total VMT, applicants would use the travel demand model, taking the difference between total VMT without and with the project.

If population growth and development in Lake APC jurisdictions continue as they have in recent years, this budget should be more than sufficient to accommodate that growth without requiring VMT analysis for most projects. If things change and development increases significantly (or the budget changes due to background conditions), Lake APC jurisdictions would want to revisit this method. Again, lead agencies wanting to rely on this evidence should also include a method for equitably allocating the VMT growth across time (i.e., baseline to 2050), regions, jurisdictions, and project types (i.e., land use versus transportation projects).

2.5.5 Selecting Thresholds

Based on our review of local planning documents, provided in Appendix A, each jurisdiction has expressed policies related to VMT reduction, whether directly through reduction of VMT or vehicle travel, or in related goals pertaining to reducing air quality impacts, reducing greenhouse gas emissions, or improving energy efficiency. Therefore, a VMT thresholds approach which includes VMT reduction is consistent with local plans. Lead agencies should also reconcile how their VMT threshold contributes to state goals for GHG reduction mentioned above and discuss how it is helping to meet these goals.

Determining an appropriate VMT threshold may depend on whether the courts treat VMT more like air pollution and less like level of service (LOS). If VMT causes adverse effects to human health similar to air pollution, then the threshold should be tied to substantial evidence (i.e., scientific studies) that relate VMT to human health (or human welfare or safety). If this effect varies by area type, then the different thresholds may be appropriate. Currently (May 2020), the limited scientific evidence related to VMT changes and their potential for causing adverse effects on humans is the ARB *2017 Scoping Plan*. This analysis did not differentiate by area type so a change in rural VMT has no different effect on humans than a change in urban VMT. The VMT would still generate the same amount of GHG emissions (and air pollutant emissions plus other indirect adverse effects) that would still have the same contribution to climate change. Thus thresholds based on the necessary reductions cited in the *Scoping Plan* of 16.8 percent light-duty vehicle VMT per capita and 14.3 percent total VMT per capita would be appropriate. The Wine Country Travel Demand Model does not currently include any disaggregation of passenger/light-duty and heavy-duty vehicles, so 14.3 percent would be a more appropriate threshold for Lake APC jurisdictions, using estimates from the model.

On the other hand, if VMT is treated more like LOS, then lead agencies would have a similar level of discretion to establish thresholds based on context (i.e., sensitivity to the amount of vehicle travel). Past practice allowed lead agencies to set LOS thresholds based largely on the local community's sensitivity to

travel delay. This is consistent with CEQA Guidelines Section 15064: "…An ironclad definition of significant effect is not always possible because the significance of an activity may vary with the setting. For example, an activity which may not be significant in an urban area may be significant in a rural area." Rural areas that were more sensitive were allowed to establish LOS thresholds that equated to lower levels of delay. Using this analogy, a lead agency could set VMT thresholds based on a community's sensitivity to the amount of vehicle travel or its associated effects.If a lead agency wants to treat VMT like LOS, they should consult with their CEQA counsel and be able to answer the basic question of whether the treatment adequately meets the environmental protection expectations of CEQA. This assessment should consider the substantial evidence prepared by OPR on the following website.

- http://opr.ca.gov/ceqa/updates/sb-743/

Adverse effects on human welfare or safety are prevalent in research about the relationship between VMT and air quality, climate change, energy consumption, housing affordability, and safety.

In treating VMT as only a mobility metric, the basic rationale would be that VMT is simply another way of measuring transportation network performance and that the lead agency is granted the discretion to measure network performance expectations and their effects on humans. These effects are not limited to GHG, air pollution, energy, housing affordability, and safety, but should also consider the other legislative intents of CEQA emphasized with highlights below.

> **Chapter 1: Policy**
>
> **§ 21000. LEGISLATIVE INTENT**
> The Legislature finds and declares as follows:
> (a) The maintenance of a quality environment for the people of this state now and in the future is a matter of statewide concern.
> (b) It is necessary to provide a high-quality environment that at all times is healthful and pleasing to the senses and intellect of man.
> (c) There is a need to understand the relationship between the maintenance of high-quality ecological systems and the general welfare of the people of the state, including their enjoyment of the natural resources of the state.
> (d) The capacity of the environment is limited, and it is the intent of the Legislature that the government of the state take immediate steps to identify any critical thresholds for the health and safety of the people of the state and take all coordinated actions necessary to prevent such thresholds being reached.
> (e) Every citizen has a responsibility to contribute to the preservation and enhancement of the environment.
> (f) The interrelationship of policies and practices in the management of natural resources and waste disposal requires systematic and concerted efforts by public and private interests to enhance environmental quality and to control environmental pollution.
> (g) It is the intent of the Legislature that all agencies of the state government which regulate activities of private individuals, corporations, and public agencies which are found to affect the quality of the environment, shall regulate such activities so that major consideration is given to preventing environmental damage, while providing a decent home and satisfying living environment for every Californian.
>
> **§ 21001. ADDITIONAL LEGISLATIVE INTENT**
> The Legislature further finds and declares that it is the policy of the state to:
> (d) Ensure that the long-term protection of the environment, consistent with the provision of a decent home and suitable living environment for every Californian, shall be the guiding criterion in public decisions.

A potential challenge to any VMT threshold is that the ARB 2018 *Progress Report* includes evidence that VMT per capita is increasing and so are GHG per capita emissions. Further, the ARB Vision modeling of

VMT used in these reports did not consider the influence of TNCs or AVs and made several assumptions about future outcomes related to fuels and electric vehicles that may not meet a CEQA reasonably foreseeable definition. While this background condition exists, the requirement to consider "other substantial evidence" when making a significance finding may result in significant VMT impacts unless the threshold is no increase in total VMT.

Recent reductions in travel caused by COVID-19 shelter-in-place orders is a new consideration that could more than offset the previous trends. Almost real-time VMT data is available through big data vendors such as StreetLight Data.

- https://www.streetlightdata.com/vmt-monitor-by-county/

In late May 2020, Lake County VMT compared to January 2020 was down by about 30-35 percent.

Another potential challenge is that an increase in VMT is a possible detriment to overall safety. The OPR 2017 *General Plan Guidelines*, Appendix B, Transportation Safety, summarize research indicating that "higher total amounts of motor vehicle travel create higher crash exposure," and "reducing vehicle miles traveled reduces collision exposure and improves safety."

Regardless of the specific threshold a lead agency selects, they will still need to consider other substantial evidence related to VMT impacts when analyzing specific projects and making VMT impact significance determinations. This includes information such as the OPR and ARB VMT thresholds, the SB 32 scoping plan, the *2018 Progress Report California's Sustainable Communities and Climate Protection Act* progress report on SB 375, and recent VMT data such as reported by StreetLight. How a lead agency considers this information may vary depending on their specific approach to CEQA and their sensitivity to project opposition and legal risk.

Lead agencies could use the following approach to using thresholds and "other substantial evidence" when analyzing a project's VMT impacts in a CEQA document

1. Use the lead agency threshold to make initial significance determination.
2. Summarize the "other substantial evidence" that is relevant to making a VMT significance determination.
3. Consider the other substantial evidence when making a final significance determination.
4. After making the final impact determination, develop mitigation measures if appropriate.

3. Recommendations for Lake APC Jurisdictions

Considering the information above, the following measure and threshold are recommended for Lake APC jurisdictions. These recommendations are based on a presumption that future travel behavior will be consistent with recent travel behavior. However, any subsequent changes including changes in usage of transportation networking companies (TNCs) such as Uber and Lyft, lower fuel prices, public availability of autonomous vehicles (AVs), and long-term Covid-19 effects (increases in telecommuting) may change future travel behaviors, resulting in future VMT differing from current forecasts. As these trends evolve, models may need to be updated to reflect them.

A single measure and threshold are specified with several options for the method of estimating VMT. One method accounts for both project VMT and project effect on VMT, while other options account for only project VMT. Project VMT is required in all cases; project 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. More detailed discussions of the process and flowchart steps are provided in Appendix B.

3.1 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.

- *Small Projects*
  The project generates less than 1,393 VMT per day[9] and is consistent with the jurisdiction's general plan and the Regional Transportation Plan.

- *Local-Serving Retail*
  The project is a local-serving retail or other local serving employment project less than 50,000 square feet (larger retail projects may also qualify due to distance from other population centers) and is consistent with the jurisdiction's general plan and the Regional Transportation Plan.

- *Map-Based Screening for Residential and Office Projects*

[9] For explanation of this estimate, see Section 2.4 Screening, discussion of Small Projects in main text and footnote, p.7.

The project is a residential-related land use and the home-based VMT per resident of its associated Traffic Analysis Zone (TAZ) is equal to or less than x % below the 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 home-based work VMT per employee of its associated TAZ is equal to or less than x % below the mean. 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 the last two criteria, the baseline total weekday home-based VMT per resident and home-based VMT per employee can be calculated for each TAZ. TAZs with a result lower than the threshold can then be identified and mapped for use by planning department staff. A tool to simplify this analysis was developed. Instructions for using this tool, including screenshots, are provided in Appendix C.

3.2 VMT Budget for Land Use and Transportation Projects

3.2.1 Measure

Total Daily VMT

3.2.2 Threshold

Total VMT for the model area remains below VMT budget (e.g. within the 6.5% growth, annualized).

3.2.3 Method 1

Use the Wine Country Travel Demand Model (or an updated Lake-only version) to analyze total VMT with and without the project. This method can be applied to land use projects, land use plans, and transportation projects. As noted in Appendix A, updates to the model are recommended.

3.2.4 Method 2

Use locally valid or industry standard trip generation rates (such as ITE) and trip lengths from the California Household Travel Survey (assuming there is sufficient sample size to make the data valid) or Wine Country Travel Demand Model to estimate project VMT. This method is most appropriate for land use projects.

3.2.5 Method 3

Use big data from mobile devices for similar project types in similar land use contexts to estimate VMT generation rates. This method is most appropriate for land use projects.

Note that this methodology will not be sufficient for every potential project. The planner or engineer performing the project analysis should assess if project-specific data and calculations may provide a more appropriate answer than this methodology. Assessment should include consideration of the following:

- Does the project 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 have specific impacts outside of the model area?
    - Does the project affect travel at specific, known locations outside of 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
    - Hospitals, which have different land use than medical offices
    - Special uses evaluated as discretionary action under CEQA

3.3 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, 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 lands through grade separated interchanges. The OPR *Technical Advisory* discussion about projects that increase roadway capacity (page 24) may imply that any increase in total VMT may indicate a significant impact, which is consistent with the following guidance from the *Draft Transportation Impacts Analysis Under CEQA for Projects on the State Highway System*, Caltrans, March 1, 2020:

> **5.6.a. 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.b. MPO Areas:** 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.

OPR's *Technical Advisory* provides an extensive list of projects 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. (OPR *Technical Advisory*, pp. 20-21.) Appendix 2 to OPR's *Technical Advisory* provides specific guidance on calculating induced vehicle travel.

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

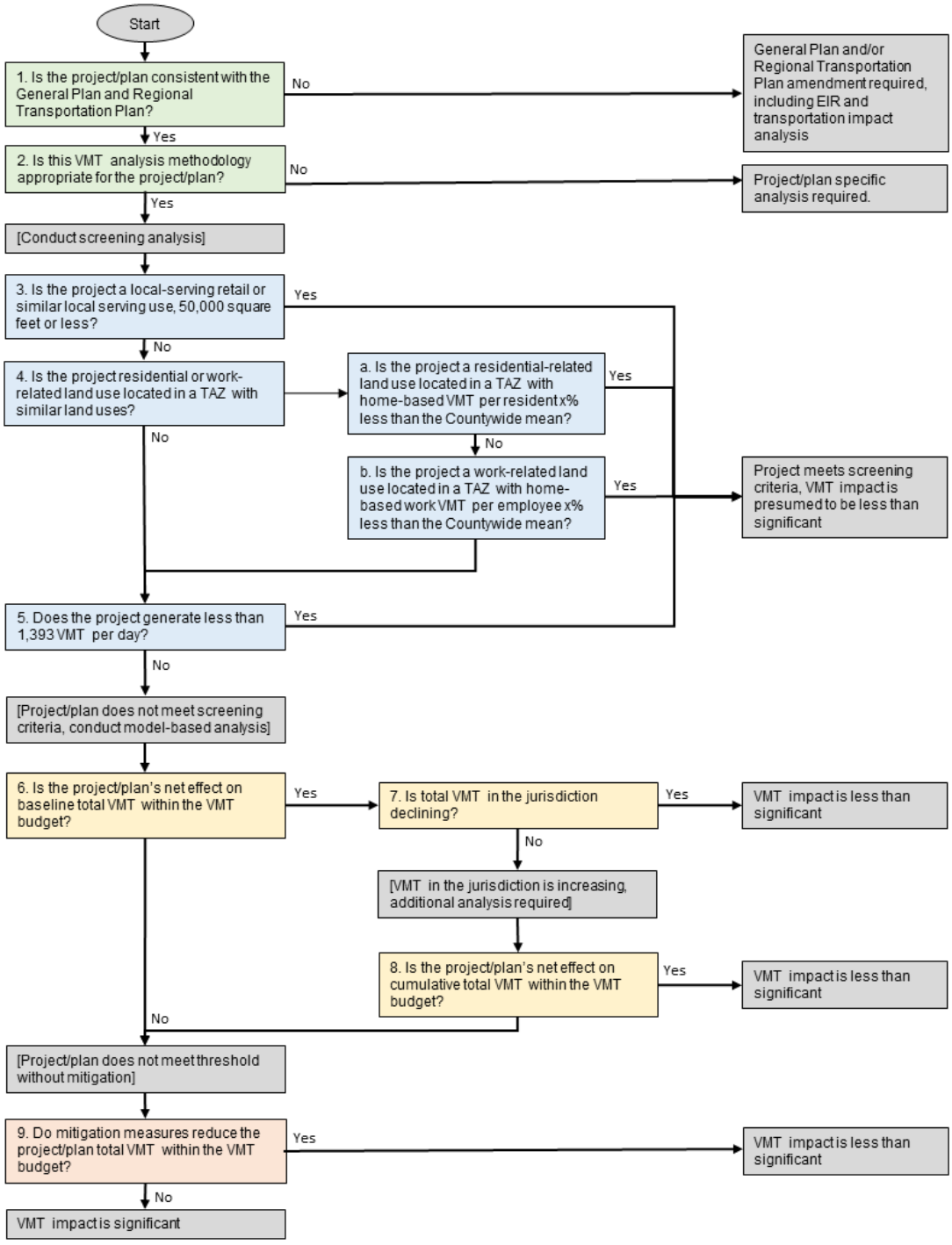
3.4 Analysis of Construction Traffic

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.

3.5 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 preclude projects consistent with the general plan from further VMT impact analysis if such subsequent projects do not trigger subsequent review under CEQA Guidelines Section 15162. 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).

3.6 Process Flowchart



4. Test Cases for VMT Analysis

This section uses two recent projects and one hypothetical project in Lake County and its municipalities as test cases for the proposed VMT analysis methods and thresholds. For each test case, the project was assessed to determine if the method was appropriate or if more detailed analysis was required. If the method was determined to be appropriate, the flowchart above was used to analyze the test case.

Each test case is discussed below. Analysis results are shown in italics.

4.1 Clearlake Walmart Expansion

This proposed project consists of the expansion and remodeling of the existing Walmart store in the Clearlake Shopping Center. It would include the addition of approximately 38,741 square feet (sf) of building area to the north and west sides of the existing approximately 109,517 sf store. The expansion is anticipated to include additional uses, such as expanded grocery sales, grocery/merchandise pickup service, alcohol sales, a medical clinic, a vision center, a bank or financial institution, a nail salon or other tenants, and would include expansion of business hours to 24-hour operations.

4.1.1 Analysis

The project was assessed to determine if the methodology is appropriate, including:

- Does the project change the assumptions in the model?
- Does the project have specific impacts outside the model area?
- Does the project have specific impacts that will not be captured by the model?

The methodology may be appropriate: the project may change the assumptions in the model or have specific impacts that will not be captured by the model because it involves an expansion in hours of operation that is likely not reflected in the land use inputs and trip generation rates included in the model. Separate analysis may be required to capture the VMT associated with expanding business hours to 24-hour operations. The project is not likely to have specific impacts outside the model area.

The questions in the flowchart were evaluated:

- Is the project consistent with the General Plan and Regional Transportation Plan (RTP)?
  Yes: The project is consistent with the commercial designation in the City of Clearlake General Plan.

- Does the project generate less than 1,393 VMT per day?
  Because the project includes retail uses, whether it is local serving or not is a more appropriate screening question (see subsequent local-serving retail question). To estimate the daily VMT generation of the project, additional analysis may be required, including updating the travel demand model or using big data to estimate VMT at the site. This level of analysis would defeat the

purpose of screening, so it is more appropriate to assess whether the project can be considered local-serving retail first.

For reference, the average length of a trip in Lake County, according to the 2012 California Household Travel Survey, is 14.3 miles. The weekday daily trip rate for shopping center, according to ITE Trip Generation 10th Edition*, is 37.75 trips per 1,000 square feet. 37.75 trips * 38.741 KSF * 14.3 miles = 20,913 VMT per day.*

- Is the project residential and a minor land division of four or fewer parcels?
  No.

- Is the project a local-serving retail project, 50,000 square feet or less?
  Probably not. The current site includes more than 50,000 square feet of commercial uses, which may be considered local-serving or may be considered regional-serving. The OPR Technical Advisory leaves such a distinction up to the discretion of lead agencies because they "will best understand their own communities and the likely travel behaviors of future users" and are therefore "in the best position to decide when a project will likely be local-serving" (OPR Technical Advisory, p.17). While the expansion consists of less than 50,000 square feet of retail uses, the total buildout of the site would include over 100,000 square feet of commercial use.

  There are a couple ways to think about this question:

  1. *Is the site, in its current form and at its current size, local or regional serving? One way of answering this question is to compare the average trip length to and from the site to the average home-based other trip length in the City or County. If the average trip length to and from the site is shorter than the average for the City or County, the site may be considered local serving. If longer than the average, it may be considered regional serving.*
  2. *Is the expansion likely to attract customers from a wider geographic area? The lead agency may want to solicit more information from the applicant about market studies for the expansion.*

- Is the project a residential or work-related land use located in a TAZ with similar land uses?
  The project is a primarily work-related land use.

- Is the project's net effect on VMT within the VMT budget?

  To determine the project's net effect on VMT, a few methods are available, as described in the memorandum "VMT Analysis Methodologies and Thresholds," dated June 5, 2020:

  1. *Use the Wine Country Travel Demand Model (or an updated Lake-only version) to analyze total VMT with and without the project.*
  2. *Use locally valid or industry standard trip generation rates (such as ITE) and trip lengths from the California Household Travel Survey or travel demand model to estimate project VMT. In this*

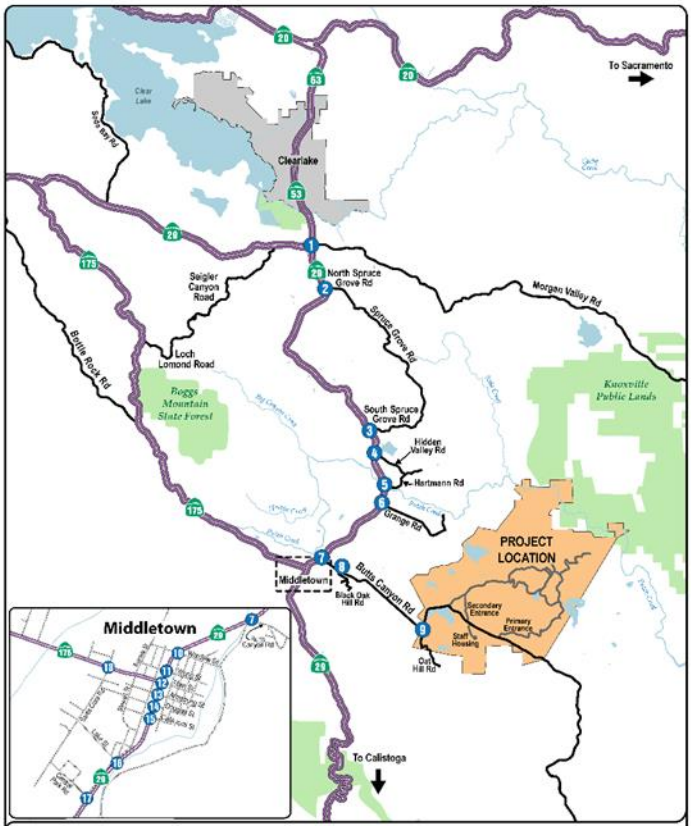
case, trip generation at the current Walmart site could be collected using 24-hour driveway counts.

3. *Use big data from mobile devices for the current Walmart to estimate existing VMT generation and economic analysis of the expansion's intended market to estimate VMT growth.*

In conclusion, the project likely does not pass screening criteria, although sufficient evidence that the project is local serving (from market studies, big data, or other sources) would support the presumption that its VMT impact is less than significant. Barring such a determination, VMT analysis is required to determine whether the project's VMT impact is significant or not.

4.2 Maha Resort at Guenoc Valley

This proposed project consists of the development of a master planned mixed-use resort and residential community that – at full buildout – could include up to 900 hotel and resort residential units; 1,400 residential villas; 300 workforce housing units; resort amenities; and accessory uses within the 16,000-acre Guenoc Valley Ranch property in southeast Lake County



Excerpt from Transportation Impact Analysis, Maha Resort at Guenoc Valley, February 7, 2020

4.2.1 Analysis

The project was assessed to determine if the methodology is appropriate, including:

- Does the project change the assumptions in the model?
- Does the project have specific impacts outside the model area?
- Does the project have specific impacts that will not be captured by the model?

The methodology is not appropriate: the project would change the assumptions in the model including land uses at the project site, and a general plan amendment would be necessary. Additionally, the travel forecasting model TAZs do not include this much growth, and the large addition to housing would change the model results.

To accomplish this analysis, the following actions would be necessary:

- Identify the expected hotel and housing mix.
- Identify the expected buildout timeline, including expectations for 2030, the cumulative year of the model.
- Update the model TAZs to reflect this change.
- Update the model results, with and without the project.
- Determine if the project net effect on total VMT, comparing no project to with project, results in more than 6.5 percent growth for the model area.

4.3 Boutique Hotel in Lakeport

The proposed project includes a bed and breakfast-style hotel with up to 15 units along the lakeshore in the City of Lakeport.

4.3.1 Analysis

The project was assessed to determine if the methodology is appropriate, including:

- Does the project change the assumptions in the model?
- Does the project have specific impacts outside the model area?
- Does the project have specific impacts that will not be captured by the model?

The methodology may be appropriate: the project does not change the assumptions in the model, nor have specific impacts outside the model area. Because the model does not include hotel or lodging as a land use input, the project may have specific impacts not captured by the model.

The questions in the flowchart were evaluated:

- Is the project consistent with the General Plan and Regional Transportation Plan (RTP)?
  Yes: The project is consistent with the resort residential designation in the City of Lakeport General Plan.

- Does the project generate less than 1,393 VMT per day?
  To make this determination, some VMT estimation is required. The Wine Country Travel Demand Model does not include hotel or lodging as a land use input; consequently, we cannot isolate trip generation or VMT associated with hotel uses. To estimate daily VMT for the project, an applicant would need to use big data from mobile devices for a nearby bed and breakfast or hotel to estimate VMT for the proposed project. In this case, there are existing hotels near the lake shore within the City of Lakeport.

  If such analysis determines the daily VMT to be less than 1,393 per day, the project may be assumed to have a less than significant VMT impact.

- Is the project residential and a minor land division of four or fewer parcels?
  No.

- Is the project a local-serving retail project, 50,000 square feet or less?
  No.

- Is the project a residential or work-related land use located in a TAZ with similar land uses?
  The project is a primarily work-related land use.

- Is the project's net effect on VMT within the VMT budget?

  To determine the project's net effect on VMT, a few methods are available, as described in the memorandum "VMT Analysis Methodologies and Thresholds," dated June 5, 2020:

  1. *Use the Wine Country Travel Demand Model (or an updated Lake-only version) to analyze total VMT with and without the project.*
  2. *Use big data from mobile devices for a nearby bed and breakfast or hotel to estimate VMT for the proposed project. In this case, there are existing hotels near the lake shore within the City of Lakeport.*

In conclusion, the project will require some level of VMT analysis. Big data vendors like StreetLight Data provide relatively cost effective VMT products that likely offer the most reliable and effective method for estimating VMT for the proposed project. The results of this analysis will determine whether the project is likely to have a significant VMT impact or not.

4.4 Cannabis Cultivation and Processing Facility

The proposed project includes a cannabis cultivation and processing facility in unincorporated Lake County.

4.4.1 Analysis

The project was assessed to determine if the methodology is appropriate, including:

- Does the project change the assumptions in the model?
- Does the project have specific impacts outside the model area?
- Does the project have specific impacts that will not be captured by the model?

The methodology may be appropriate: cannabis cultivation and processing facilities are relatively new land uses that may or may not be consistent with land use assumptions included in the model. Such a facility may be consistent with trip generation assumptions included in the industrial land use input or, perhaps, the agricultural land use input, but additional data and analysis is required to justify the inclusion of a cannabis facility in one of those land use categories. Such a project is not likely to have specific impacts outside the model area.

The questions in the flowchart were evaluated:

- Is the project consistent with the General Plan and Regional Transportation Plan (RTP)?
  Maybe: This depends on how the local ordinance regulating cannabis cultivation and processes facilities is written, including where such uses can be located.

- Does the project generate less than 1,393 VMT per day?
  To make this determination, some VMT estimation is required. The Wine Country Travel Demand Model includes both industrial and agricultural land uses. If such a project is determined to be consistent with either of those uses, the model can be used to estimate project VMT. To check such consistency, driveway counts could be collected at three existing cannabis facilities to estimate average trip generation per 1,000 square feet. This trip generation rate could be compared to inputs for industrial and agricultural uses in the model.

  If such a project is not consistent with inputs built into the model for industrial or agricultural uses, an applicant would need to use big data from mobile devices for a nearby facility to estimate VMT for the proposed project. In this case, if no existing cannabis cultivation facilities exist in Lake County, similar facilities in neighboring Mendocino or Sonoma Counties may be used as proxies.

  If such analysis determines the daily VMT to be less than 1,393 per day, the project may be assumed to have a less than significant VMT impact.

- Is the project residential and a minor land division of four or fewer parcels?
  No.

- Is the project a local-serving retail project, 50,000 square feet or less?
  No.

- Is the project a residential or work-related land use located in a TAZ with similar land uses?
  The project is a primarily work-related land use.

- Is the project's net effect on VMT within the VMT budget?

  To determine the project's net effect on VMT, a few methods are available, as described in the memorandum "VMT Analysis Methodologies and Thresholds," dated June 5, 2020:

  3. *If cannabis cultivation and processing facilities are determined to be consistent with industrial or agricultural (or some other use) included in the Wine Country Travel Demand Model (or an updated Lake-only version), use the model to analyze total VMT with and without the project.*
  4. *Use big data from mobile devices for a nearby cannabis cultivation and processing facility to estimate VMT for the proposed project.*

In conclusion, the project will require some level of VMT analysis. First, the lead agency may need to determine if such facilities are consistent with existing assumptions and inputs included in the Wine Country Travel Demand Model (or an updated Lake-only version). Such a consistency check will require collecting data from existing facilities. For VMT analysis, the model may be appropriate, or big data from mobile devices can be used. The results of this analysis will determine whether the project is likely to have a significant VMT impact or not.

5. Transportation Demand Management Strategies

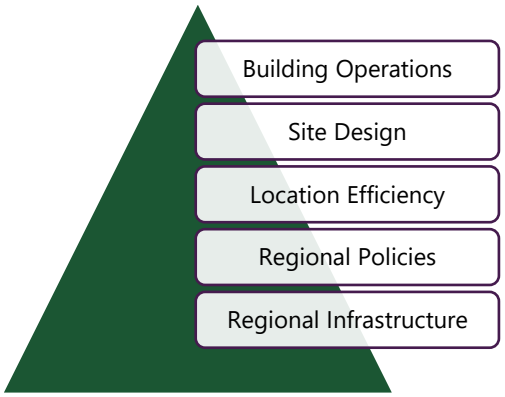
This technical memorandum summarizes our assessment of new research related to transportation demand management (TDM) effectiveness for reducing vehicle miles of travel (VMT). The purpose of this work was to compile new TDM information that has been published in research papers since release of the *Quantifying Greenhouse Gas Mitigation Measures*, California Air Pollution Control Officers Association (CAPCOA), August 2010, and to assemble that research with other available data to compile a list of potential VMT reduction mitigation measures for use in Lake County given its small town and rural land use context.

The CAPCOA report is a primary resource for the assessment of quantifiable greenhouse gas emission reduction benefits. CAPCOA's research focuses on strategies to reduce greenhouse gas emissions at the project level, primarily in terms of land use, transportation, and energy use. The transportation component includes a comprehensive set of guidelines for assessing and quantifying reductions in VMT and greenhouse gas emissions associated with 50 TDM strategies, both individually and in combination. The strategies cover a wide range of measures, from increasing transit frequency to implementing road pricing to encouraging location-efficient land uses, as well as more traditional TDM measures like ride-sharing programs and parking cash-out. For each strategy, the report provides a fact sheet that summarizes the available literature on the strategy and provides a methodology for quantifying the strategy's effectiveness, both individually and in groups. Attachment A in Appendix D summarizes the overall evaluation of all the CAPCOA strategies while Attachment B in Appendix D identifies the top strategies suited for implementation in Lake County.

5.1 Strategy Review

The matrix in Attachment A summarizes the overall evaluation findings and provides a complete list of VMT reduction mitigation strategies based on new research. An important consideration for the effectiveness of these TDM strategies is the appropriate scale of implementation. The strategies described in this memorandum include regional, city, and community-scale transportation infrastructure strategies (for example, expanding the transit or bicycle network) and project-level strategies (for example, building site TDM strategies such as parking pricing and transit pass subsidies). The largest reductions in VMT (and resulting emissions) derive from regional and city policies related to land use location efficiency and infrastructure investments that support transit, walking, and biking. While there are many measures related to site design and building operations that can influence VMT, they typically have smaller effects that are often dependent on building tenants. Figure 7 presents a conceptual illustration of the relative importance of scale.

Figure 7: Transportation-Related GHG Reduction Measures



Source: Fehr & Peers, 2020

Of the 50 transportation-related strategies presented in the CAPCOA 2010 report, three are vehicle strategies unrelated to VMT reduction. Of the remaining 47, 41 are applicable at building and site level. The other six are functions of, or depend on, site location and/or actions by local and regional agencies or funders. Table 1 summarizes the strategies according to the scope of implementation and the agents who would implement them.

Table 1: Summary of Transportation-Related CAPCOA Measures

Scope	Agents	CAPCOA Strategies
Building Operations	Employer, Manager	**26** from five CAPCOA strategy groups: • **3** from 3.2 Site Enhancements group • **3** from 3.3 Parking Pricing Availability group • **15** from 3.4 Commute Trip Reduction group • **2** from 3.5 Transit Access group • **3** from 3.7 Vehicle Operations group
Site Design	Owner, Architect	**15** from three strategy groups: • **6** from 3.1 Land Use group • **6** from 3.2 Site Enhancements group • **1** from 3.3 Parking group • **2** from 3.6 Road Access group
Location Efficiency	Developer, Local Agency	**3** shared with Regional and Local Policies
Alignment with Regional and Local Policies	Regional and Local Agencies	**3** shared with Location Efficiency

Source: Fehr & Peers, 2020

We further reduced this list of strategies to the 27 included in Appendix D by eliminating strategies that require moving the project to a different location and those for which the literature does not support a quantified and calculable reduction in VMT. Of these 27 strategies, only a few are likely to be effective in a

rural or small-town setting such as Lake County. To winnow the list, we reviewed applicability at the project scale and how land use context could influence each strategy's effectiveness.

We identified nine strategies most likely to be effective in Lake County. These strategies are described in Attachment B and listed below. Note that disruptive trends, including but not limited to, transportation network companies (TNCs), autonomous vehicles (AVs), internet shopping, and micro-transit may affect the future effectiveness of these strategies.

- Community-scale strategies

1. Provide pedestrian network improvements – This strategy focuses on creating a pedestrian network within the project and connecting to nearby destinations. Projects in Lake County tend to be small so the emphasis of this strategy would likely be the construction of network improvements that connect the project site directly to nearby destinations. Alternatively, implementation could occur through an impact fee program (discussed in more detail below) or benefit/assessment district targeted to various areas in the County designated for improvements through local or regional plans. Implementation of this strategy may require regional or local agency coordination and may not be applicable for all individual land use development projects.
2. Provide traffic calming measures and low-stress bicycle network improvements – This strategy combines the CAPCOA research focused on traffic calming with new research on providing a low-stress bicycle network. Traffic calming creates networks with low vehicle speeds and volumes that are more conducive to walking and bicycling. Building a low-stress bicycle network produces a similar outcome. One potential change in this strategy over time is that e-bikes (and e-scooters) could extend the effective range of travel on the bicycle network, which could enhance the effectiveness of this strategy. Implementation options are similar to strategy 2 above. Implementation of this strategy may require regional or local agency coordination and may not be applicable for all individual land use development projects.
3. Increase transit service frequency and speed – This strategy focuses on improving transit service convenience and travel time competitiveness with driving. Given land use density in Lake County, this strategy may be limited to traditional commuter transit where trips can be pooled at the start and end locations or require new forms of demand-responsive transit service. The demand-responsive service could be provided as subsidized trips by contracting to private TNCs or taxi companies. Alternatively, a public transit operator could provide the subsidized service but would need to improve on traditional cost effectiveness by relying on TNC ride-hailing technology, using smaller vehicles sized to demand, and flexible driver employment terms where drivers are paid by trip versus by hour. Implementation of this strategy would require regional or local agency implementation and/or substantial changes to current transit practices, and therefore would not likely be applicable to individual development projects.
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 for those trips where vehicle use is essential. Note that implementation of this strategy would require regional or local agency implementation and coordination.

5. Provide coordinated schoolpools – 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. Effectiveness of this program depends on the extent to which resident schoolchildren are already walking, biking, and riding the school bus to school.

- Project-scale strategies

6. Increase diversity of land uses – This strategy focuses on inclusion of mixed uses within projects or in consideration of the surrounding area to minimize vehicle travel in terms of both the number of trips and the length of those trips.
7. Provide ride-sharing program – This strategy focuses on encouraging carpooling and vanpooling by project site/building tenants, which depends on the ultimate building tenants; this should be a factor in considering the potential VMT reduction.
8. 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 depends on the ultimate building tenants and may require monitoring. This strategy also relies on Lake Transit continuing to provide similar or better service throughout the County, in terms of frequency and speed.
9. Encourage telecommuting and alternative work schedules – This strategy relies on effective internet access and speeds to individual project sites/buildings to provide the opportunity for telecommuting. The effectiveness of the strategy depends on the ultimate building tenants and the nature of work done by tenants' employees (can the work be done remotely in the first place?); two factors that should be considered for potential VMT reduction. Effectiveness may also be limited in more rural areas of the County with limited broadband internet access.
10. Implement parking management – Parking management strategies focus on the management of parking to influence vehicle travel. Free and ubiquitous parking supply tends to increase vehicle use while reducing parking supply and pricing spaces can help reduce vehicle travel. A reduction in parking supply can also be used to incentivize infill development and higher density development by reducing the cost of building parking spaces. This strategy may be less effective in surburban and rural settings such as Lake County but will depend on the specific project site and the surrounding parking supply.

All ten strategies are suitable for use in Lake County. However, the most effective strategies are community scale and would likely require a program approach to implementation, such as an impact fee program, mitigation bank, or mitigation exchange. These approaches are discussed below. Project site mitigation effectiveness is more limited given the land use context.

5.2 Limitations of Quantification

To be effective mitigation measures, TDM strategies must have sufficient evidence to quantify the level of VMT reduction that a strategy could achieve for a given project site. In general, the TDM strategies can be quantified using CAPCOA calculation methodologies but there are some important limitations for project site applications and combining strategies as explained below.

5.2.1 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.

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, the CAPCOA methodology identifies VMT reduction maximums based on community types tied to land use context. The caps are applied at each step of the VMT reduction calculation (at the strategy scale, the combined strategy scale, and the global scale). However, these caps are not based on research related to the effectiveness of VMT reduction strategies in different land use contexts. Instead, the percentages were derived from a limited comparison of aggregate citywide VMT performance for Sebastopol, San Rafael, and San Mateo, where VMT performance ranged from 0 to 17 percent below the statewide VMT/capita average based on data collected prior to 2002. Little to no evidence exists about the long-term performance of similar TDM strategies in different land use contexts. Therefore, VMT reductions from TDM strategies cannot be guaranteed in most cases.

5.2.2 Combining VMT Reduction Strategies

Each of the CAPCOA 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:

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

where

$$P_x = percent\ reduction\ of\ each\ VMT\ reduction\ strategy$$

This adjustment methodology is a mathematical approach to dampening the potential effectiveness and 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 California Environmental Quality Act (CEQA) review.

5.3 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 but has limitations with regards to using mitigation to fundamentally change the project. 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. 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.

5.3.1 Addressing Limitations

In response to the limitations of focusing exclusively on project site TDM strategies, new mitigation concepts are emerging that cover larger areas and rely on region- or city-scale programs to achieve VMT reductions. These program-based concepts are outlined below. As with all VMT mitigation, these programs require substantial evidence to demonstrate that the projects included in the programs would achieve the expected VMT reductions. Additionally, the discretionary action to adopt the program may require CEQA review.

- 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. These types of fee programs are time consuming to develop, monitor, and maintain but 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.
- VMT Exchanges – This concept (along with VMT banks) borrows mitigation approaches from other environmental analysis such as wetlands. 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 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 condition known as "additionality."

- VMT Banks – This concept attempts to create a monetary value for VMT reduction (for example, credits) 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 site TDM 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 LOS impacts.
- Greater VMT reduction potential – Since these programs coordinate citywide land use and transportation projects, they have the potential to result in greater VMT reduction potential than site-level TDM 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, 2020

Appendices

Appendix A:
Baseline VMT Data

Introduction

This appendix discusses the following:

- Lake County region VMT data compiled from existing sources
- A review of both the Wine Country Travel Demand Model (WCTDM) and Lake County Travel Demand Model (Lake TDM) suitability for vehicle miles traveled (VMT) estimation for California Environmental Quality Act (CEQA) analysis
- WCTDM model VMT estimates for the Lake County region
- A review of current local planning documents relevant to Senate Bill (SB) 743 implementation and VMT

VMT Data from Existing Sources

VMT data for Lake County was compiled from two existing sources: the California Household Travel Survey (CHTS) and the California State Travel Demand Model (CSTDM).

California Household Travel Survey

Table 1 shows VMT results from the CHTS. The survey was conducted in 2012. Sample sizes for each city are small, as noted in the table. Therefore, actual VMT may be notably different for every area other than the County as a whole. Any use of the city level data shown in grey highlights in the table is cautioned. Only at the full county level was the sample size sufficient for producing a complete set of statistically valid outputs. Also, because the survey is based on households, total VMT is not available.

Estimated VMT per resident in the City of Lakeport is significantly higher than that in Clearlake or the rest of the County, while home-based work trip lengths are shorter. Estimates for both cities should be considered with caution because of the small sample sizes.

Table 1: CHTS (2012) VMT Estimates

Metric	Lakeport	Clearlake	Lake County (Unincorporated)	Lake County (Total)
Household VMT	303,364	201,794	1,144,790	1,658,324
Home-based VMT	216,906	153,675	873,499	1,239,370
Home-based work trip length (miles)	1.7	32.1	16.2	14.8
Total Residents [1]	5,427	9,984	39,786	55,197
Total VMT per resident	56.5	20.4	27.5	29.2
Home-based VMT per resident	41.4	15.6	22.1	22.8
Percentage of VMT that is home-based	73.2%	76.2%	80.3%	77.8%
Sample Persons	32	50	151	233

Note: [1] Total residents reported in the CHTS differ from other population estimates for the same year. For 2012, the California Department of Finance included the following population estimates in its Report E-5, including higher estimates for the City of Clearlake and the County but lower estimates for the City of Lakeport:

Lakeport 4,829
Clearlake 15,552
Unincorporated Lake 44,348
Total Lake 64,729

Data highlighted in grey are based on small sample sizes; actual numbers may be notably different.

Source: Caltrans 2013 (https://www.nrel.gov/transportation/secure-transportation-data/tsdc-california-travel-survey.html), Fehr & Peers 2020.

California State Travel Demand Model

Table 2 shows VMT results from the CSTDM. Base year of the model is 2010. Travel analysis zone (TAZ) boundaries in the model do not match directly to the boundaries of each city or population center. For example, the TAZ that includes the City of Lakeport also extends beyond the City boundary and includes almost twice the City's population, as compared to Department of Finance estimates from the same year. The CSTDM is best suited to analyzing trips made between population centers or regions; its analysis zones are not refined enough to provide accurate results for localities. Thus, actual VMT will vary from these estimates.

Table 2: CSTDM (2010) VMT Estimates

Metric	Lakeport	Clearlake	Lake County (Unincorporated)	Lake County (Total)
Total VMT	104,365	102,556	993,547	1,200,469
Home-based VMT	77,490	79,695	783,546	940,731
Home-based work trip length (miles)	9.1	9.7	17.3	13.3
Residents	9,421	10,837	44,408	64,666
Total VMT per resident [2]	11.1	9.5	22.4	18.6
Home-based VMT per resident [2]	8.2	7.4	17.6	14.5
Percentage of VMT that is home-based	74.2%	77.7%	78.9%	78.4%

Note: [1] Total residents reported in the CSTDM differ from other population estimates for the same year. For 2010, the California Department of Finance included the following population estimates in its Report E-5, including higher estimates for the City of Clearlake and the County but lower estimates for the City of Lakeport:

Lakeport 4,753
Clearlake 15,250
Unincorporated Lake 44,662
Total Lake 64,665

[2] VMT per resident is expressed as a generation rate and not a ratio. For example, VMT per resident is how much VMT is generated by the residents of a location. It does not include VMT on the model roadway network that is generated by other sources such as external trips that do not stop in the County.

Source: Caltrans 2015 (https://dot.ca.gov/programs/transportation-planning/multi-modal-system-planning/statewide-modeling [Caltrans website updates may limit available data]), Fehr & Peers 2020.

What this data does show is that VMT per person in the unincorporated County is higher than that in Lakeport or Clearlake. The VMT results per resident – both total VMT and home-based VMT – are significantly lower than the same findings from the CHTS. The estimated percent of total VMT that is home-based, however, is comparable to that found in the CHTS.

Wine Country Travel Demand Model and Lake County Travel Demand Model Review

Fehr & Peers reviewed both the WCTDM and the Lake TDM to assess their respective suitability to perform VMT estimation for CEQA transportation impact analysis. The Lake Area Microsimulation Model was also reviewed as a potential tool for VMT estimation. While the microsimulation model can produce VMT as an output, it is dependent on the WCTDM outputs. For this reason, the microsimulation model was not found to be appropriate for CEQA related VMT impact analysis. The remainder of this discussion therefore focuses on the WCTDM and Lake TDM and additional expectations associated with CEQA compliance.

CEQA compliance has two basic elements:

- The legal risk of challenge associated with inadequately analyzing impacts due to use of models that do not meet benchmark expectations.
- The mitigation risk of mis-identifying the impact and the mitigation strategies to reduce the impact.

Agencies with a high risk of legal challenges will likely be concerned about both elements while agencies with less legal risk should still be concerned about the second element since it is also relevant for all other transportation analysis based on model forecasts.

CEQA Expectations for Environmental Impact Analysis

The CEQA Guidelines contain clear expectations for environmental analysis as noted below; however, the Guidelines are silent about what data, analysis methods, models, and mitigation approaches are adequate for transportation impacts.

§ 15003 (F) = fullest possible protection of the environment…
§ 15003 (I) = adequacy, completeness, and good-faith effort at full disclosure…
§ 15125 (C) = EIR [Environmental Impact Report] must demonstrate that the significant environmental impacts of the proposed project were adequately investigated…
§ 15144 = an agency must use its best efforts to find out and disclose…
§ 15151 = sufficient analysis to allow a decision which intelligently takes account of environmental consequences…

All of these sections suggest accuracy is important and have largely been recognized by the courts as the context for judging an adequate analysis. So, then what is the basis for determining adequacy, completeness, and a good faith effort when it comes to forecasting and transportation impact analysis? A review of relevant court cases suggests the following conclusions.

- CEQA does not require the use of any specific methodology. Agencies must have substantial evidence to support their significance conclusions. (Association of Irritated Residents v. County of Madera (2003) 107 Cal.App.4th 1383.)
- CEQA does not require a lead agency to conduct every test or perform all research, study, and experimentation recommended or demanded by commenters. (CEQA Guidelines, § 15204, subd. (a))
- CEQA does not require perfection in an EIR but rather adequacy, completeness and a good faith effort at full disclosure while including sufficient detail to enable those who did not participate in the EIR preparation to understand and consider meaningfully the issues raised by the project. (Kings County Farm Bureau v. City of Hanford (1990) 221 Cal.App.3d 692)

- Lead agencies should not use scientifically outdated information in assessing the significance of impacts. (Berkeley Keep Jets Over the Bay Comm. v. Board of Port Comm. (2001) 91 Cal.App.4th 1344.)
- Impact analysis should improve as more and better data becomes available and as scientific knowledge evolves. (Cleveland National Forest Foundation v. San Diego Association of Governments, Cal. Supreme Ct. S223603, 2017).

These conclusions tend to reinforce the basic tenet of CEQA that requires substantial evidence to support all aspects of the impact analysis and related decisions. Further, analysis should produce accurate and meaningful results. This expectation is grounded in the basic purpose behind environmental regulations like CEQA that attempt to accurately identify and disclose potential impacts and to develop effective mitigation. Accurate and reliable travel forecasts are essential for meeting these expectations.

In setting specific CEQA expectations for travel forecasting models, an important consideration is that expectations may vary based on the variety of factors listed below.

- Complexity of the transportation network and number of operating modes
- Available data
- Urban versus rural setting
- Planned changes in the transportation network (particularly to major roads or transit systems)
- Availability of resources to develop and apply travel demand models
- Population and employment levels
- Congestion levels
- Regulatory requirements
- Types of technical and policy questions posed by decision makers
- Desired level of confidence in the analysis findings
- Anticipated level of legal scrutiny

In California, travel forecasts are generated using various forms of models that range from simple spreadsheets based on historic traffic growth trends to complex computer models that account for numerous factors that influence travel demand. According to *Transportation and Land Development, 2nd Edition*, Institute of Transportation Engineers (ITE), 2002, the appropriate model depends on the size of the development project and its ability to affect the surrounding area. As projects increase in size, the likelihood of needing a complex model (such as a four-step model) increases because of the number of variables that influence travel demand and transportation network operations. The study area can also influence the type of model needed especially if congestion

occurs or if multiple transportation modes operate in the study area. Either of these conditions requires robust models that can account for the myriad of travel demand responses that can occur from land use or transportation network changes.

The other relevant national guidance on model applications and forecasting is the *NCHRP Report 765, Analytical Travel Forecasting Approaches for Project-Level Planning and Design*, Transportation Research Board, 2014. This detailed resource has many applicable sections. A few direct excerpts worth noting about forecasting expectations for models are listed below.

- A travel forecasting model should be sensitive to those policies and project alternatives that the model is expected to help evaluate.
- A travel forecasting model should be capable of satisfying validation standards that are appropriate to the application.
- Project-level travel forecasts, to the extent that they follow a conventional travel model, should be validated following the guidelines of the *Travel Model Validation and Reasonableness Checking Manual, Second Edition* from the Federal Highway Administration (FHWA). Similar guidelines are provided in NCHRP Report 716. This level of validation is necessary, but not sufficient, for project-level forecasts. Project-level forecasts often require better accuracy than can be obtained from a travel model alone.
- The model should be subject to frequent recalibrations to ensure that validation standards are continuously met.

Model Assessment

The information above was used to develop specific questions for assessing and comparing the WCTDM and Lake TDM. This assessment is to help inform Lake APC about potential improvements that may be desirable for future model applications intended for CEQA purposes and does not indicate that previous applications of either model were inappropriate. The assessment used the following specific criteria. Criteria that are unique to SB 743 are highlighted in **bold text**.

- Model documentation – this criterion relies on the availability of documentation about the model's development including its estimation, calibration, and validation as well as a user's guide.
- Completed calibration and validation within the past 5 years – recent calibration and validation is essential for ensuring the model accurately captures evolving changes in travel behavior. Per NCHRP Report 765, "The model should be subject to frequent recalibrations to ensure that validation standards are continuously met."
- Demonstrated sensitivity to VMT effects across demographic, land use, and multimodal network changes – validation reporting checked for static and dynamic tests per the *2017 Regional Transportation Plan Guidelines for Metropolitan Transportation Planning*

Organizations, California Transportation Commission (CTC), 2017 and *Travel Model Validation and Reasonableness Checking Manual, Second Edition*, Travel Model Improvement Program (TMIP), FHWA, 2010.

- Capable of producing both "project-generated VMT" and "project effect on VMT" estimates for households, home-based trips, and total trips – both metrics are essential for complete VMT analysis. Project-generated VMT is useful for understanding the VMT associated with the trips traveling to/from a project site. The "project's effect on VMT" is more essential for understanding the full influence of the project since it can alter the VMT generation of neighboring land uses.
- **Capable of producing regional, jurisdictional, and project-scale VMT estimates – VMT analysis for air quality, greenhouse gases, energy, and transportation impacts requires comparisons to thresholds at varying scales. For SB 743, the *Technical Advisory on Evaluating Transportation Impacts in CEQA*, December 2018, California Governor's Office of Planning and Research (OPR) recommends thresholds based on comparisons to regional or city-wide averages.**
- **Level of VMT estimates that truncate trip lengths at model or political boundaries – The OPR *Technical Advisory* states that lead agencies should not truncate any VMT analysis because of jurisdictional or model boundaries. The intent of this recommendation is to ensure that VMT forecasts provide a full accounting of project effects.**

The specific assessment findings for both the WCTDM and Lake TDM are contained in Table 3.

Table 3: WCTDM and Lake TDM Model Assessment

Screening Check	Screening Determination and Notes		
	WCTDM		Lake TDM
Model documentation	WCTDM Development Report is available on Lake APC website: https://www.lakeapc.org/wp-content/uploads/2018/06/WCIRP-Model-Development-Report-Final.pdf Full Development Report, with appendices, is available from Caltrans		Lake TDM Development Report is not available.
	Model files are controlled. Input and output files are maintained and controlled by user agreements, but not by Lake APC, who can direct a potential user to Caltrans staff that control the files. TAZ shapefile was not included with files provided by Caltrans initially. This file was obtained through specific request, separately.		Model files are not controlled. A number of consultants (GHD, W-Trans, Price Consulting Services, and Fehr & Peers) and the City of Clearlake have copies of the model files.
Completed calibration and validation within the past five years	Updated more than five years ago. Last calibrated in 2009.		Partially updated in 2016. Extent of calibration is unknown.
Demonstrated sensitivity to VMT effects across demographic, land use, and multimodal network changes	Sensitivity tests to land use and roadway network changes have been performed and documented. Documentation of the sensitivity tests is included within the WCTDM Model Development Report.		Whether sensitivity tests were performed is unknown.
Capable of producing both "project-generated VMT" and "project effect on VMT" estimates for households, home-based trips, and total trips.	Project-generated VMT – yes	As a trip-based model, household generated VMT is not an available output. The model is not able to separate home-based trips from total trips without modification of model scripting, or analysis using trip matrices.	The model lacks a trip generation step. As a result, VMT cannot be tied to land use inputs.
	Project effect on VMT – yes		
	Total VMT – yes		
	Household VMT – no		
	Home-based VMT – not without modification		
	Regional VMT - yes	The model covers all of Mendocino, Napa, Lake, and Sonoma Counties. The model	The model lacks a trip generation step. As a result, VMT cannot be tied to land use inputs.
	Jurisdictional VMT - yes		

Capable of producing regional, jurisdictional, and project-scale VMT estimates.	Project-scale VMT - yes	generally has a high level of detail in urban areas; some project-scale VMT estimates may be limited in rural areas with lower level of detail.	
Level of VMT estimates that truncate trip lengths at model or political boundaries.	Depends on TAZ location. The model truncates trips leaving the four-county area.		Depends on TAZ location. The model truncates trips leaving Lake County.

Source: Fehr & Peers 2020.

The main findings of the WCTDM assessment are listed below.

- Model documentation, consisting of a model development report, provides details of the model including input data, model validation, future year model, model limitations, and how to use the model.
- The model covers all of Lake County and Mendocino, Napa, and Sonoma Counties.
- The model has not been recalibrated since it was originally developed in 2009.
- The model includes seasonal dwelling unit data, but these units are only given recreational trip generation in the Friday PM peak hour scenario. They would not be included in home-based VMT estimates.
- The model documentation covered sensitivity tests for both land use and roadway network changes.
- The model can produce VMT outputs that are commonly used for emissions modeling. New VMT metric forms that isolate the type of land use or trip purpose are not available as a current output. The model can provide total VMT estimates across multiple scales, but not household or home-based VMT estimates.
- The model is subject to trip length truncation at model boundaries.

Outstanding questions arising from the Lake County TDM assessment are listed below.

- Does this model tier-off of the four-county Wine Country Travel Demand Model?
    - Differences in the land use categories, land use units, trip purposes, and overall model structure appear to deviate from the WCTDM.
- What are the base and future years of the model?
    - The model input files indicate a base year 2007 and future year 2030; however, the Year 2040 General Plan Analysis Memo (Omni Means, 10/16/2018) notes that the base data (specifically the traffic counts) are in 2015, and future year analysis is 2040.
- What are the land use categories from the model; specifically what does land use code CR represent?
    - The model lacks documentation. Presumably CR is a commercial type of land use, but this requires confirmation.
- Are the input files for base year 2007 available?
    - The 2007 input files were not included in the initial dataset provided, notably the Gateway Productions and Attractions (GPA) file.
- Does the model include a trip generation component?
    - The inputs are in units of daily trips by land use category, instead of the quantity of land use.
- What assumptions underlie the Trip Generation Inputs?

    - The trip generation rates for the land use growth between base and future year do not match the trip generation rates for the 2007 land use within the off-model trip generation spreadsheet.
    - How is internal to external (IX) travel leaving Lake County and external to internal (XI) travel entering Lake County determined? Specifically, how is the GPA file developed?
- Are through trips included (XX) for travel that passes through Lake County?
- Is there assignment or time-of-day breakdown for AM and PM peak hour travel?

Wine Country Travel Demand Model VMT

Using the WCTDM, VMT was assessed for base year and future year conditions, for the County as a whole and for the individual jurisdictions separately.

The model uses dwelling units, students, and jobs as land use inputs. VMT is frequently measured per resident, per employee, or per service population, where service population generally consists of residents, employees, and students. Data from *the Trip Generation Manual* and California Department of Finance, 2010 and 2020 City/County Population and Housing Estimates (2020) were used to estimate residents from dwelling units. These conversion factors are shown in Table 4. These factors do not include population from seasonal residences because the model does not assign weekday trip generation to seasonal residences.

Table 4: WCTDM Land Use Conversion Factors

Land Use Type	Conversion Factor	Units	Source
Single Family Residential Dwelling Units	2.52	Residents per dwelling unit	ITE Trip Generation Manual (10th Edition) CA Dept. of Finance City/County Population and Housing Estimates (2020)
Multi-Family Residential Dwelling Units	2.1	Residents per dwelling unit	ITE Trip Generation Manual (10th Edition) CA Dept. of Finance City/County Population and Housing Estimates (2020)

Source: Fehr & Peers 2020.

VMT estimates for each geography are shown in Table 5 for 2009 and Table 6 for 2030. These tables include total VMT (i.e., VMT from all vehicle trips, trip purposes, and all vehicle types), total VMT per service population, home-based VMT per resident, and home-based VMT per worker. Service population is defined as the total number of residents, employees, and students. VMT per service population is expressed as a generation rate and not a ratio. It does not include VMT on the model roadway network that is generated by other sources such as external trips that do not stop in the County.

Table 5: WCTDM VMT Estimates, 2009

Jurisdiction	Residents	Employees	Students	Service Population	Total VMT	Total VMT per Service Population[1]	Home-Based Production VMT	Home-Based VMT per Resident[1]	Home-Based Work Attraction VMT	Home-Based Work VMT per Employee
Lakeport	5,029	5,207	2,694	10,236	325,741	31.8	42,037	8.4	69,816	13.4
Clearlake	13,646	2,111	3,059	15,757	391,110	24.8	291,915	21.4	17,592	8.3
Lake County (Unincorporated)	47,294	10,121	6,424	57,415	1,802,955	31.4	1,261,546	26.7	129,662	12.8
Lake County (Total)	65,970	17,439	12,177	83,409	2,519,806	30.2	1,595,499	24.2	217,071	12.4

Note: [1] VMT per service population or resident is expressed as a generation rate and not a ratio. For example, VMT per resident is how much VMT is generated by the residents of a location. It does not include VMT on the model roadway network that is generated by other sources such as external trips that do not stop in the County.
Source: Fehr & Peers 2020.

Table 6: WCTDM VMT Estimates, 2030

Jurisdiction	Residents	Employees	Students	Service Population	Total VMT	Total VMT per Service Population[1]	Home-Based Production VMT	Home-Based VMT per Resident[1]	Home-Based Work Attraction VMT	Home-Based Work VMT per Employee
Lakeport	9,143	5,732	2,694	14,875	425,441	28.6	113,849	12.5	69,547	12.1
Clearlake	29,420	2,698	3,059	32,118	1,165,672	36.3	1,034,275	35.2	22,218	8.2
Lake County (Unincorporated)	60,074	13,688	6,424	73,762	2,904,085	39.4	2,179,232	36.3	178,385	13.0
Lake County (Total)	98,637	22,118	12,177	120,755	4,495,198	37.2	3,327,356	33.7	270,150	12.2

Note: [1] VMT per service population or resident is expressed as a generation rate and not a ratio. For example, VMT per resident is how much VMT is generated by the residents of a location. It does not include VMT on the model roadway network that is generated by other sources such as external trips that do not stop in the County.
Source: Fehr & Peers 2020.

As shown in the VMT estimates from the 2009 model base year, both VMT per service population (30.2 – 31.8) and VMT per employee are generally consistent across the County (12.4 – 13.4), with slightly lower VMT for both metrics in the City of Clearlake (24.8 and 8.3, respectively). This is consistent with the CSTDM results. The City of Lakeport showed the highest home-based work VMT per employee (13.4). Lakeport also showed the lowest home-based VMT per resident (8.4), which is consistent with the CSTDM results. The home-based VMT per resident estimates from the model fall in between the estimates from the CSTDM and CHTS.

Model Update Summary

Based on the analysis results above, the following changes to the model or supporting analysis tools have been completed or are recommended.

- Addition of intrazonal VMT estimation: *completed*
    - Developed methodology and included in VMT calculations
- Calculation of home-based VMT: *completed*
    - Developed calculations using model output matrices
- Development of land use conversion factors: *completed*
    - Developed based on ITE and California Department of Finance data
- Updated calibration and validation: *recommended*
    - Updated traffic counts and other supporting data are required
- Correction for trip truncation at model boundary: *recommended*
    - Additions to gateway distances based on CSTDM required
- Split large TAZs: *recommended*
    - Analysis of parcel data and refinement of model roadway networks required

Recommendations for Model Improvements

The following improvements are recommended for the WCTDM to be updated for use in CEQA analysis:

- recalibration based on recent count data
- updates to calculate home-based VMT,
- revised trip generation for seasonal dwelling units,
- updates to estimate trip lengths beyond model boundaries, and
- incorporation of hotel as a land use.

Without these updates to the WCTDM, VMT analysis is limited to the sketch model and spreadsheet tools and techniques described below. However, Lake County has a relatively small population and is not forecasting significant population growth or future development. Data from the California Department of Finance estimates population to have declined in recent years and to grow by between 0.1 and 0.2 percent per year over the next decade. Similarly, the Bureau of Economic Analysis estimates that employment in the County has grown by an average of 0.2 percent per year over the last decade. If these trends continue, use

of spreadsheets or sketch models may be a viable option for estimating VMT. Such tools could be used to screen projects and to estimate VMT for projects which do not meet screening criteria.

Local Planning Document Review

A review of local planning documents was conducted to help inform this study about the potential VMT reduction goals of local agencies. This information is important to help inform SB 743 VMT impact significance thresholds. Relevant goals, objectives, and policies are listed below. Goals directly related to VMT, such as for air quality, are also included.

Other policies in these plans may also be supported by VMT reduction but are not listed below. These policies include promotion of bicycling, walking, compact development, open space preservation, and natural resource conservation.

Lake Area Planning Council

2017 Lake County Regional Transportation Plan

- Objectives
  - Reduce Greenhouse Gas Emissions by promoting and facilitating transit use and increasing Active Transportation alternatives, page 24
  - Reduce and mitigate environmental impacts of current and future transportation projects, page 24
  - Reduce Greenhouse Gas Emissions and Vehicle Miles Traveled, page 67

Lake County

2010 Lake County 2030 Regional Blueprint

- Blueprint Vision, page 4
  - Preserve what we value about Lake County, including clean air
  - Attain elements of a sustainable lifestyle, including less driving and more walking and biking
- Blueprint Principles, page 5
  - Environment: Maintain good air quality

2008 Lake County General Plan

- Health and Safety Element, Goal HS-3
  - To reduce the generation of air pollutants and promote non-polluting activities to minimize impacts to human health and the economy of the County, page 7-9

- Policy HS-3.3 Transportation and Air Quality – To reduce the number of vehicle trips and miles traveled, residential development should be in close proximity to places of shopping, play, and employment. Where feasible walking and bicycle trails, and cluster development should be considered, page 7-9
- Policy HS-3.7 Development Requirements – The County shall require consideration of alternatives or amendments that reduce emissions of air pollutants when reviewing project applications, page 7-10
- Policy HS 3.8 County Review of Development Proposals – The County shall require consideration of alternatives or amendments that reduce emissions of air pollutants when reviewing project applications, page 7-10
- Policy HS-3.9 Air Quality Analysis – The County may require an analysis of potential air quality impacts associated with significant new developments through the environmental review process, and identification of appropriate mitigation measures prior to approval of any major development project, page 7-10

2011 Lake County Regional Transportation Bikeway Plan

- Objective 4 – Reduce Greenhouse emissions and Vehicle miles traveled (VMTs) through increased bicycle use, page 14

Kelseyville Area Plan

- Air Quality Objective 4.4 – To protect residents of the Kelseyville Planning Area from poor or diminished air quality, and to maintain air quality for the area's unique natural features and viewsheds.
    - Policy 4.4f – Air quality impacts should be considered in relation to traffic circulation and land use. Bike paths and pedestrian walkways should be promoted to reduce vehicular use in the central district.

Upper Lake – Nice Area Plan (Draft)

- Air Quality Objective 4.4.1 – To protect the health of residents of the Upper Lake - Nice Planning Area from poor or diminished air quality, and to maintain air quality for the area's unique natural features and viewsheds
    - Policy 4.4.1.f - Air quality impacts should be considered in relation to traffic circulation and land use. Bike paths and pedestrian walkways should be promoted to reduce vehicular use in the planning area.

1988 Lower Lake Area Plan

- Air Quality Objective 4.4 – To protect residents of the Lower Lake area from poor or diminished air quality. It is also the county's objective to maintain air quality for the area's unique natural features and viewsheds.
    - Policy 4.42 – In relationship to traffic circulation and land use, air pollution impacts shall be considered.

1989 Cobb Mountain Area Plan

- Air Quality Objective 4.4 – To protect residents of the Cobb Mountain Area from poor or diminished air quality. It is also the county's objective to maintain air quality for the area's unique natural features and viewsheds.

2000 Lakeport Area Plan

- Air Quality Objective 4.4.1 – Protect the health of residents of the Lakeport Planning Area from poor or diminished air quality, and to maintain air quality for the area's unique natural features and viewsheds.
    - Policy 4.4.1.e – Consider air quality impacts in relation to traffic circulation and land use. Bike paths and pedestrian walkways should be promoted to reduce vehicular use in the planning area.

2007 Rivieras Area Plan

- Air Quality Objective 4.4.1 – Protect the health of residents of the Rivieras Planning Area from poor or diminished air quality.

2009 Shoreline Communities Area Plan

- Air Quality Objective 4.4.1 – Protect residents of the Shoreline Communities Planning Area from poor or diminished air quality, and maintain air quality for the area's unique natural features and viewsheds.

2010 Middletown Area Plan

- Air Quality Objective 4.4.1 – Minimize air pollution emissions and maintain clear visibility for the area's viewsheds.

City of Lakeport

2009 City of Lakeport General Plan 2025

- Policy LU 3.6 – Minimize Community Impacts. Design development to minimize potential community impacts adversely affecting residential and commercial areas in relation to local and

regional air quality and odor, adequacy of municipal services, local traffic conditions, visual quality, and noise levels.

City of Clearlake

2017 City of Clearlake 2040 General Plan Update

- Program CI 3.5.3.2 – The City will coordinate with Caltrans, the Lake County Air Pollution Control District, and the Lake Area Planning Council to minimize air quality and transportation impacts associated with planned and existing transportation facilities.
- Objective CO 3.2 – Support the County in reducing particulate emissions.
- Objective CO 7.1 – Comply with Federal and State requirements regarding climate change.
    - Policy CO 7.1.1 – The City should conform to the goals, objectives, policies, and programs outlined in a Climate Action Plan to reduce citywide greenhouse gas emissions.
    - Policy CO 7.1.1.1 – The City should prepare and adopt a Climate Action Plan that provides goals, objectives, policies, and programs to reduce greenhouse gas emissions.

Appendix B:
VMT Impact Analysis Guidance

Introduction

This appendix provides guidance for traffic study guidelines that can be used by Lake Area Planning Council (Lake APC) member agencies for vehicle miles traveled (VMT) analysis. The guidance updates California Environmental Quality Act (CEQA) transportation analysis to address the requirements of Senate Bill (SB) 743.

This document is organized as follows:

- Current Traffic Study Guidance
- Analysis Methodology for Land Use Projects
- Analysis Methodology for Land Use Plans
- Analysis Methodology for Transportation Projects

Current Traffic Study Guidance

Existing traffic study guidance was reviewed for each of the Lake APC jurisdictions and Caltrans.

Lake APC Jurisdictions

No traffic study guidelines were identified for any of the Lake APC jurisdictions.

As discussed in the VMT Policy Overview section, SB 743 does not prevent an agency from continuing to analyze delay or level of service (LOS) as part of land use project entitlement review, other plans (i.e. a general plan), fee programs, or ongoing network monitoring. Agencies that consider continued use of vehicle LOS to be an important part of their transportation analysis process can still use vehicle LOS outside of the CEQA process. Therefore, LOS requirements do not need to be removed from these documents. However, roadway capacity expansion projects proposed to meet LOS requirements may cause VMT impacts that need to be addressed through the CEQA process.

Caltrans Transportation Impact Study Guide

Caltrans has released the *Vehicle Miles Traveled-Focused Transportation Impact Study Guide,* (May 2020) (https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/sb-743/2020-05-20-approved-vmt-focused-tisg-a11y.pdf). This TISG only addressed VMT impact analysis and future updates may address other travel modes and safety. The TISG is intended to be used by the Caltrans Local Development-Intergovernmental Review (LD-IGR) program during environmental review of land use projects and plans. The TISG will replace the *Guide for the Preparation of Traffic Impact Studies* (Caltrans, 2002).

The objectives of the TISG are to provide:

a. Guidance in determining when a lead agency for a land use project or plan should analyze possible impacts to the State Highway System, including its users.
b. An update to the *Guide for the Preparation of Traffic Impact Studies* (Caltrans, 2002) that is consistent with SB 743 and the CEQA Guidelines adopted on December 28, 2018.
c. Guidance for Caltrans land use review that supports state land use goals, state planning priorities, and GHG emission reduction goals.
d. Statewide consistency in identifying land use projects' possible transportation impacts to the State Highway System, and to identify potential non-capacity increasing mitigation measures.
e. Recommendations for early coordination during the planning phase of a land use project to reduce the time, cost, and/or frequency of preparing a Transportation Impact Study or other indicated analysis.

Analysis Methodology for Land Use Projects

The analysis methodology below is based on a VMT budget as threshold. Refer to Section 2.5.4 Alternatives for VMT Measurement Methods and Thresholds for a discussion of threshold options.

The following steps describe the process for analyzing VMT impacts of land use projects. These steps are also depicted in the flowchart included in Section 3 of the report, Recommendations for Lake APC Jurisdictions.

Initial Assessment

As the first steps in analysis, plan consistency and methodology appropriateness should be assessed. The following information will generally be required:

- Project site plan
- Project description identifying:
    - Project land uses and expected number of dwelling units, population, employees, and/or students by use
    - Proposed changes to public roadways
    - Proposed project phasing identifying dates of completion
    - Expected year of completion of the project

1. Determine if the project is consistent with the General Plan and Regional Transportation Plan.

The project should be consistent with the General Plan of the local jurisdiction, including the land use designated for the area. The project should also be consistent with the Regional Transportation Plan (RTP), including the model used for analyzing the RTP.

For purposes of making consistency findings with the general plan and RTP, verify that implementation of the project would not exceed the expected growth in its associated traffic analysis zone (TAZ) of the relevant travel forecasting models used for the general plan and RTP analysis.

If the project is inconsistent with either of these plans, a General Plan and/or RTP amendment may be required, including environmental impact review and transportation impact analysis.

2. Assess if this VMT analysis methodology is appropriate for the project.

The methodology described here will not be sufficient for every potential project. The planner or engineer performing the project analysis should assess if project-specific data and calculations may provide more appropriate results than this methodology. Assessment should include consideration of the following:

- Does the project 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 have specific impacts outside of the model area?
    - Does the project affect travel at specific, known locations outside of 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
    - Hospitals, which have different land use than medical offices
    - Special uses evaluated as discretionary action under CEQA

Screening

Lead agencies may choose to use an impact screening method to streamline land use project review for VMT impacts. If a project does not pass an initial screening test, then a full impact analysis is warranted. Screening may be conducted as outlined below. If a project meets any of these screening criteria, the presumption that VMT impact is less than significant is supported.

3. Determine if the project is a local-serving retail or similar local serving use, 50,000 square feet or less.

Local serving retail projects less than 50,000 square feet may be presumed to have a less than significant impact absent substantial evidence to the contrary. Local serving retail generally improves the convenience of shopping close to home and has the effect of reducing vehicle travel. Other local serving land uses such as dining may also be similarly evaluated.

4. Determine if the project is in a low VMT area with similar land uses.

Residential and office projects located within a low VMT generating area may be presumed to have a less than significant impact absent substantial evidence to the contrary. In addition, other employment-related

and mixed-use land use projects may qualify for the use of screening if the project can reasonably be expected to generate VMT per resident or per worker that is similar to the existing land uses in the low VMT area.

For this screening in the Lake APC area, the Wine Country Travel Demand Model (WCTDM) was used to measure VMT performance for the County and for individual traffic analysis zones (TAZs). TAZs are geographic polygons similar to census block groups used to represent areas of homogenous travel behavior. If the project land use is similar to the existing TAZ land use, low VMT areas may be considered as follows:

a. For residential projects, those TAZs that perform at or below the County average for home-based VMT per resident under baseline year conditions are considered low VMT areas.
b. For work-related projects, those TAZs that perform at or below the County average for home-based work VMT per employee under baseline year conditions are considered low VMT areas.

Lake APC has created a web-based screening tool for this purpose. The tool is available at https://devapps.fehrandpeers.com/DRAFTLakeCountyVMT/ (temporary location) or https://apps.fehrandpeers.com/LakeCountyVMT/ (final location)

5. Determine if the project generates less than 1,393 VMT per day

This value is based on the CEQA exemptions allowed for projects up to 10,000 square feet as described in CEQA Guidelines Sections 15303. 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 Lake County based on the 2012 California Household Travel Survey (CHTS).[10] Converting this value to an equivalent number of residential households would indicate that residential projects up to 22 units in Lake County could be screened out of analysis.[11] Another option for residential projects is to simply rely on the CEQA Guidelines Section 15315 exemption for minor land divisions of four or fewer parcels. Four households would generate approximately 254 VMT per day in Lake County based on the 2012 CHTS. After updates are made to the Wine Country Travel Demand Model, this number of households may be updated to use trip lengths from that model.

VMT Analysis

If the project does not meet any of the screening criteria through the steps above, VMT analysis and forecasting should be conducted using one of three methods to determine if they have a significant VMT impact.

- *Method 1:* Use the Wine Country Travel Demand Model (or an updated Lake-only version) to analyze total VMT with and without the project. This method can be applied to land use projects, land use plans, and transportation projects.

[10] The calculation is: 9.74 trips per 1 KSF general office building * 10 KSF * 14.3 average miles per trip in Lake County = 1,393 VMT.
[11] The calculation is: 1,393 VMT / 63.53 VMT per household (per 2012 CHTS) = 21.9 households.

- *Method 2:* Use locally valid or industry standard trip generation rates (such as ITE) and trip lengths from the California Household Travel Survey (assuming there is sufficient sample size to make the data valid) or Wine Country Travel Demand Model to estimate project VMT. This method is most appropriate for land use projects.
- *Method 3:* Use big data from mobile devices for similar project types in similar land use contexts to estimate VMT generation rates. This method is most appropriate for land use projects.

6. Determine if the project's net effect on baseline total VMT is within the VMT budget.

Table 1 shows the Daily VMT budget, or threshold, for each Lake APC jurisdiction using Highway Performance Monitoring (HPMS) data from Caltrans. First, the average of the years 2015-2018 is presented to correspond to the baseline of analysis included in the California Air Resources Board (ARB) estimates of VMT growth statewide. Then 6.5 percent growth is added to this average to correspond to the cumulative increase in total statewide daily VMT that ARB estimated can be accommodated while still achieving the state's 2050 climate goals. The VMT budget represents this 6.5 percent growth in total daily VMT in each Lake APC jurisdiction. Finally, the daily VMT budget is annualized. VMT estimated on State highways and roads under the jurisdiction of the Bureau of Indian Affairs, State Park Service, and U.S. Forest Service are not included in these estimates or budgets.

Table 1: Daily VMT Budget by Jurisdiction, 2018-2050

Jurisdiction[1]	Average Daily VMT (2015-2018)	Average Daily VMT with 6.5% Growth	Daily VMT Budget (2018-2050)	Annual Daily VMT Budget(2018-2050)[2]
Clearlake	124,250	132,330	8,080	253
Lakeport	46,050	49,040	2,989	93
Lake County (Unincorporated)	524,250	558,320	34,070	1,065

Notes:
1. Does not include VMT estimated on state highways or on roads under the jurisdiction of the Bureau of Indian Affairs, State Park Service, or U.S. Forest Service.
2. Annual Daily VMT Budget = VMT Budget / 32 years (2018 through 2050)
Sources: California Department of Transportation, 2015-2018. Fehr & Peers, 2020.

On an annual or biennial basis, Lake APC jurisdictions should revise their VMT budgets. Using HPMS data from Caltrans, for example, they may find that current VMT is higher or lower than the average daily VMT from the years 2015-2018 presented in Table 1. The corresponding VMT budget – through 2050 and annualized – will therefore increase or decrease. There may also be more recent estimates available from ARB or other state agencies that provide updated guidance on setting this VMT budget.

Jurisdictions may also consider methods to equitably allocate their VMT budget by project type (i.e., land use versus transportation projects).

If the project VMT exceeds the VMT budget, proceed to mitigation.

If the project VMT is within the VMT budget, proceed to the next step.

7. Determine if VMT trends for the jurisdiction are declining.

An updated Wine Country Travel Demand Model (or Lake-only version) will be the best method for forecasting future VMT across a jurisdiction and determining if VMT trends are increasing or decreasing. If the jurisdiction's cumulative total VMT is less than the baseline, VMT may be considered to be declining.

If VMT trends for the jurisdiction are declining, the presumption that VMT impact is less than significant is supported.

If VMT trends for the jurisdiction are not declining, proceed to the next step.

8. Determine if the project's net effect on cumulative total VMT is within the VMT budget.

If the jurisdiction VMT trend is upward, the project's net effect on cumulative total VMT – rather than baseline total VMT – should be the basis for assessing it within the VMT budget. If the project's net effect on cumulative total VMT is within the VMT budget, the presumption that VMT impact is less than significant is supported.

If it exceeds the VMT budget, proceed to the next step.

Mitigation

If the project VMT is determined to be significant, mitigation measures should be identified and applied to determine if project VMT can be reduced to less than significant levels.

9. Determine if mitigation measures reduce the project's net effect on total VMT to levels that fall within the VMT budget.

The project was assessed to determine if the methodology is appropriate, including:

- Does the project change the assumptions in the model?
- Does the project have specific impacts outside the model area?
- Does the project have specific impacts that will not be captured by the model?

The methodology may be appropriate: the project does not change the assumptions in the model, nor have specific impacts outside the model area. Because the model does not include hotel or lodging as a land use input, the project may have specific impacts not captured by the model.

The questions in the flowchart were evaluated:

- Is the project consistent with the General Plan and Regional Transportation Plan (RTP)?

Yes: The project is consistent with the resort residential designation in the City of Lakeport General Plan.

- Does the project generate less than 1,393 VMT per day?
  To make this determination, some VMT estimation is required. The Wine Country Travel Demand Model does not include hotel or lodging as a land use input; consequently, we cannot isolate trip generation or VMT associated with hotel uses. To estimate daily VMT for the project, an applicant would need to use big data from mobile devices for a nearby bed and breakfast or hotel to estimate VMT for the proposed project. In this case, there are existing hotels near the lake shore within the City of Lakeport.

  If such analysis determines the daily VMT to be less than 1,393 per day, the project may be assumed to have a less than significant VMT impact.

- Is the project residential and a minor land division of four or fewer parcels?
  No.

- Is the project a local-serving retail project, 50,000 square feet or less?
  No.

- Is the project a residential or work-related land use located in a TAZ with similar land uses?
  The project is a primarily work-related land use.

- Is the project's net effect on VMT within the VMT budget?

  To determine the project's net effect on VMT, a few methods are available, as described in the memorandum "VMT Analysis Methodologies and Thresholds," dated June 5, 2020:

  5. *Use the Wine Country Travel Demand Model (or an updated Lake-only version) to analyze total VMT with and without the project.*
  6. *Use big data from mobile devices for a nearby bed and breakfast or hotel to estimate VMT for the proposed project. In this case, there are existing hotels near the lake shore within the City of Lakeport.*

In conclusion, the project will require some level of VMT analysis. Big data vendors like StreetLight Data provide relatively cost effective VMT products that likely offer the most reliable and effective method for estimating VMT for the proposed project. The results of this analysis will determine whether the project is likely to have a significant VMT impact or not.

5.4 Cannabis Cultivation and Processing Facility

The proposed project includes a cannabis cultivation and processing facility in unincorporated Lake County.

5.4.1 Analysis

The project was assessed to determine if the methodology is appropriate, including:

- Does the project change the assumptions in the model?
- Does the project have specific impacts outside the model area?
- Does the project have specific impacts that will not be captured by the model?

The methodology may be appropriate: cannabis cultivation and processing facilities are relatively new land uses that may or may not be consistent with land use assumptions included in the model. Such a facility may be consistent with trip generation assumptions included in the industrial land use input or, perhaps, the agricultural land use input, but additional data and analysis is required to justify the inclusion of a cannabis facility in one of those land use categories. Such a project is not likely to have specific impacts outside the model area.

The questions in the flowchart were evaluated:

- Is the project consistent with the General Plan and Regional Transportation Plan (RTP)?
  Maybe: This depends on how the local ordinance regulating cannabis cultivation and processes facilities is written, including where such uses can be located.

- Does the project generate less than 1,393 VMT per day?
  To make this determination, some VMT estimation is required. The Wine Country Travel Demand Model includes both industrial and agricultural land uses. If such a project is determined to be consistent with either of those uses, the model can be used to estimate project VMT. To check such consistency, driveway counts could be collected at three existing cannabis facilities to estimate average trip generation per 1,000 square feet. This trip generation rate could be compared to inputs for industrial and agricultural uses in the model.

  If such a project is not consistent with inputs built into the model for industrial or agricultural uses, an applicant would need to use big data from mobile devices for a nearby facility to estimate VMT for the proposed project. In this case, if no existing cannabis cultivation facilities exist in Lake County, similar facilities in neighboring Mendocino or Sonoma Counties may be used as proxies.

  If such analysis determines the daily VMT to be less than 1,393 per day, the project may be assumed to have a less than significant VMT impact.

- Is the project residential and a minor land division of four or fewer parcels?

No.

- Is the project a local-serving retail project, 50,000 square feet or less?
  No.

- Is the project a residential or work-related land use located in a TAZ with similar land uses?
  The project is a primarily work-related land use.

- Is the project's net effect on VMT within the VMT budget?

  To determine the project's net effect on VMT, a few methods are available, as described in the memorandum "VMT Analysis Methodologies and Thresholds," dated June 5, 2020:

  7. *If cannabis cultivation and processing facilities are determined to be consistent with industrial or agricultural (or some other use) included in the Wine Country Travel Demand Model (or an updated Lake-only version), use the model to analyze total VMT with and without the project.*
  8. *Use big data from mobile devices for a nearby cannabis cultivation and processing facility to estimate VMT for the proposed project.*

In conclusion, the project will require some level of VMT analysis. First, the lead agency may need to determine if such facilities are consistent with existing assumptions and inputs included in the Wine Country Travel Demand Model (or an updated Lake-only version). Such a consistency check will require collecting data from existing facilities. For VMT analysis, the model may be appropriate, or big data from mobile devices can be used. The results of this analysis will determine whether the project is likely to have a significant VMT impact or not.

Transportation Demand Management Strategies section identified strategies most likely to be effective to reduce VMT in Lake County. Appendix D summarizes recent research on these strategies. Mitigation strategies appropriate to the project should be assessed, and potential effect of these strategies on VMT estimated. Assessment may include evaluating project conditions, evaluating the potential effect of the mitigation measure based on magnitude of the change made, and assessing the VMT impact based on cited literature and/or evaluation using the Wine Country Travel Demand Model and the process above. Analysis must meet the substantial evidence criterion of CEQA Guidelines Section 15064.7, thus considering data, facts, research, and analysis.

If mitigation reduces the project's net effect on total VMT to within the jurisdiction's VMT budget, the presumption that VMT impact is less than significant is supported but may require ongoing monitoring if the mitigation involves transportation demand management (TDM) strategies that are dependent on building tenant performance. If not, the presumption that VMT impact is significant is supported.

Analysis Methodology for Land Use Plans

Land use plans are not subject to screening and require specific VMT analysis. Land use plans can be tested for significant impacts using the same VMT budget described in steps 6 to 9 above.

This analysis requires modeling the land use plan changes in the WCTDM (or an updated Lake-only version) to determine VMT impacts. To capture the project effect, model-wide cumulative year population and employment growth totals should be unchanged with addition of the plan. The land use plan only influences land use allocation, so land use in other areas of the model should be adjusted such that the growth totals model-wide remain the same between the cumulative year no project and plus project scenarios. If not, a General Plan and/or RTP update will be required.

Analysis Methodology for Transportation Projects

Use of VMT as an environmental impact metric for transportation projects is discretionary under the Section 15064.3(b)(2) of the updated CEQA Guidelines (http://resources.ca.gov/ceqa/docs/2018_CEQA_FINAL_TEXT_122818.pdf).

If a lead agency wants to use VMT, it is important that the analysis method and the forecasting account for any induced vehicle travel effects. The WCTDM can be used to perform this analysis but it should be tested for induced vehicle travel sensitivity. The analysis should also account for potential increases in trip generation and changes in long-term land use patterns that may occur due to induced vehicle travel. These effects are not directly included in the WCTDM, but its inputs and parameters can be modified to include additional sensitivity, or off-model analysis methods such as the use of research-based elasticities can be used to measure regional VMT changes associated with changes in lane-miles associated with proposed projects. However, these elasticities were derived from urban areas and may not be appropriate for rural areas. The following resources should be consulted for induced vehicle travel recommended analysis practices.

- *Technical Advisory on Evaluating Transportation Impacts in CEQA*, California Governor's Office of Planning and Research, December 2018 (http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf)
- "Closing the Induced Vehicle Travel Gap Between Research and Practice," *Transportation Research Record: Journal of the Transportation Research Board*, Volume 2653, 2017 (https://trrjournalonline.trb.org/doi/pdf/10.3141/2653-02)

Using VMT as a transportation project impact metric would allow for a variety of transit, bicycle, and pedestrian projects to be presumed to have a less than significant impact. Smaller roadway network modifications such as intersection restriping could also be presumed to have a less than significant impact. Roadway capacity expansion projects are the types of projects that can increase vehicle travel and VMT by changing people's travel behavior, including making new vehicle trips and making longer vehicle

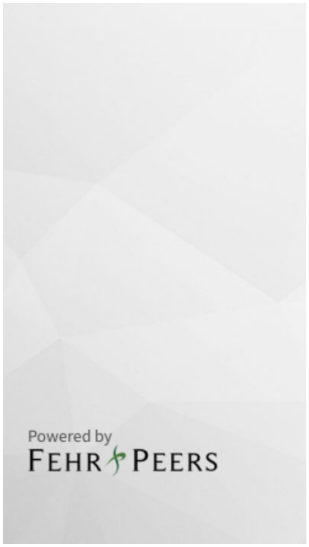
trips. If a lead agency treated transportation projects similar to land use projects in the above case studies, then a potential threshold option would be to consider the project's net effect on total VMT in relation to the jurisdiction's VMT budget.

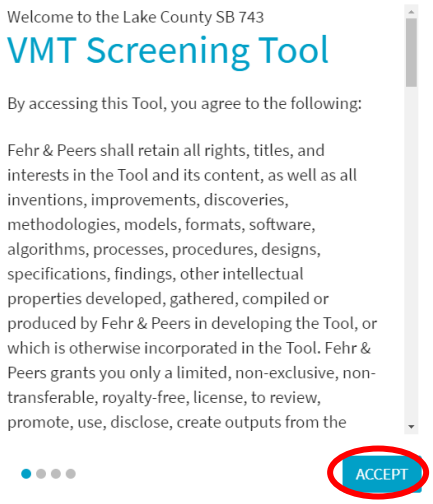
Appendix C:
VMT Screening Tool

To support the screening process, a screening tool was developed for Lake Area Planning Council (Lake APC) jurisdictions. The tool uses data from the Wine Country Travel Demand Model (WCTDM) to compare the home-based VMT per resident and home-based work VMT per employee for the TAZ in which a study parcel is located to the same measure for the County as a whole. Using this tool, a parcel can be evaluated for screening without additional runs of the travel demand model.

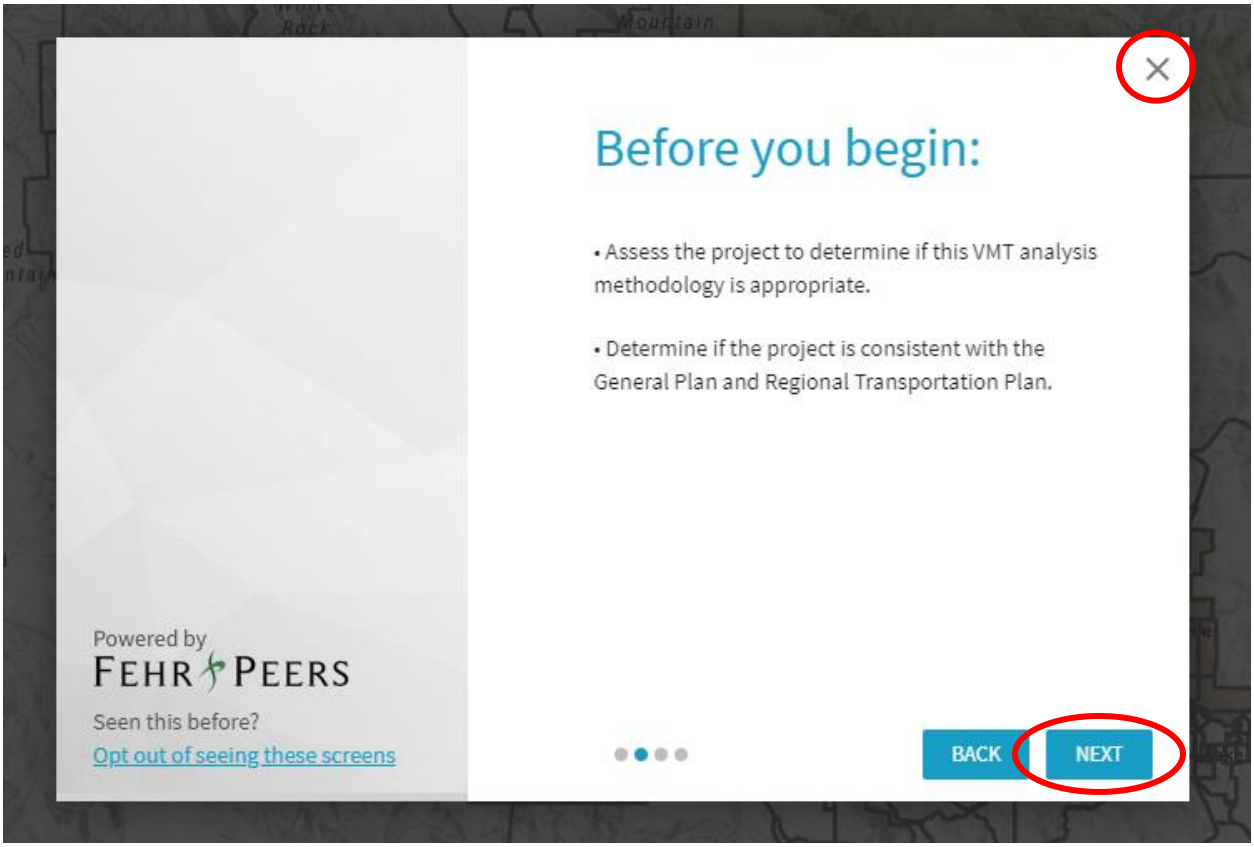
To use the tool, navigate to https://apps.fehrandpeers.com/LakeCountyVMT/.

A splash screen displays terms and conditions for use of the tool. Click "ACCEPT" to view the next screen of instructions.

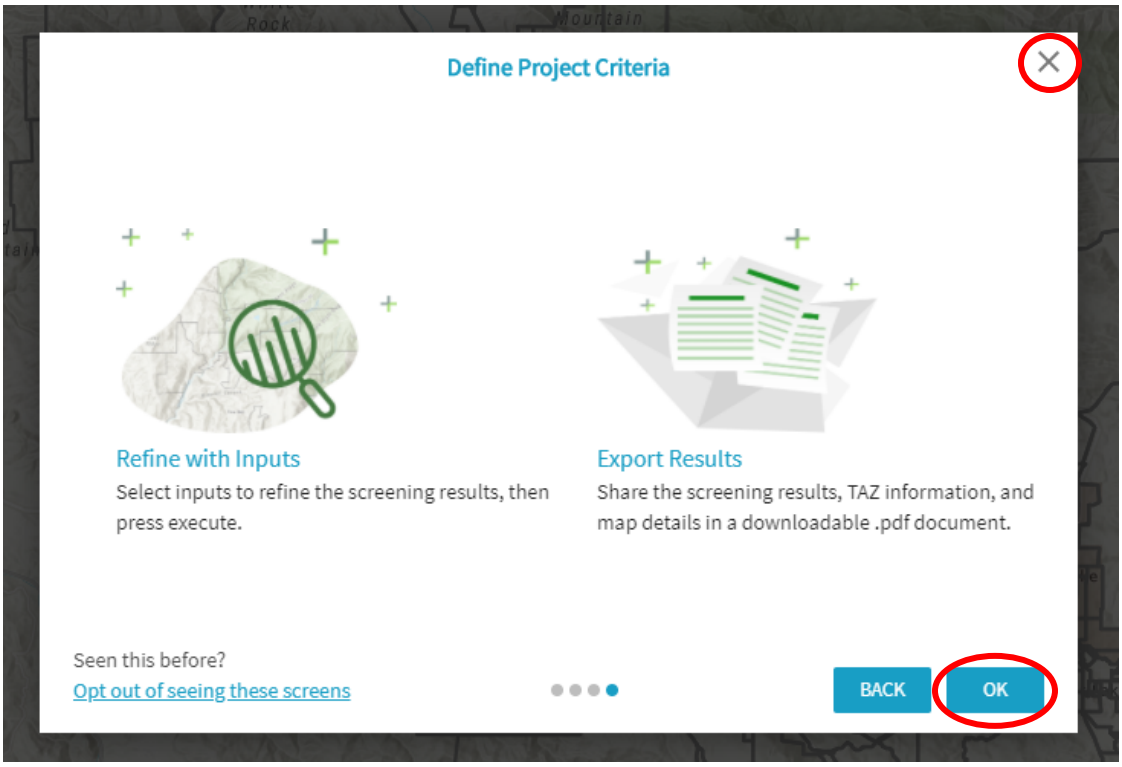


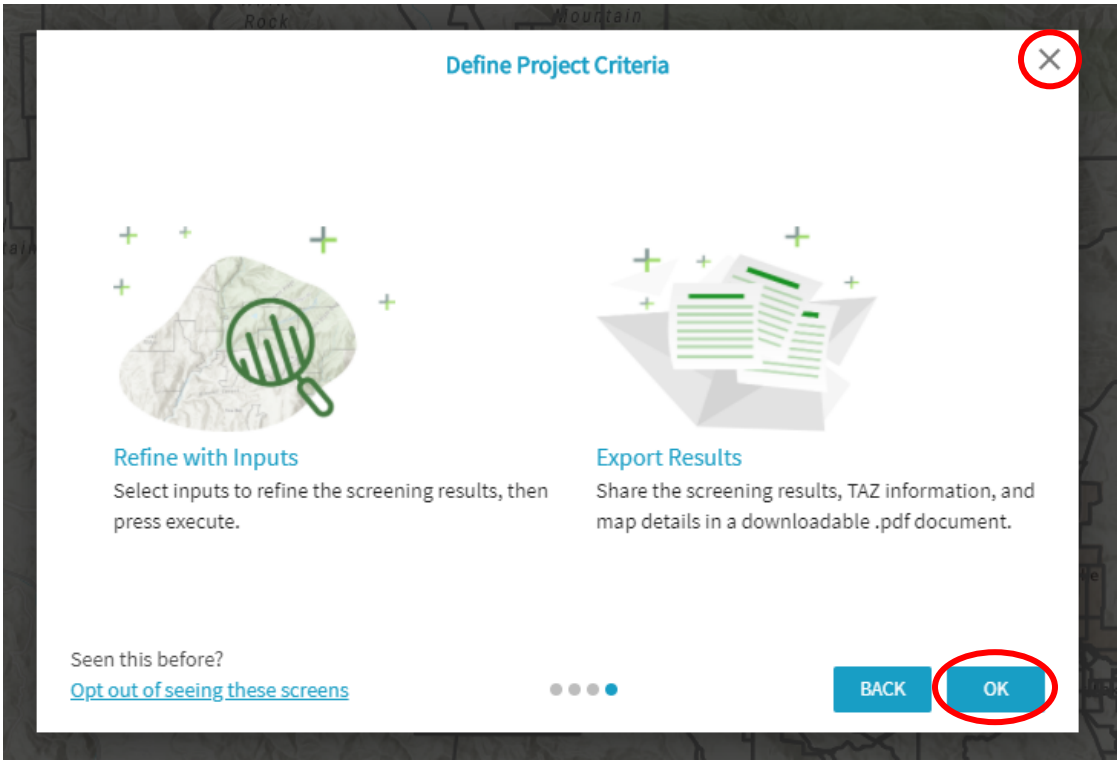


The next screen provides initial questions to determine if the tool is appropriate for a given project. Click "NEXT" to view the next screen of instructions.

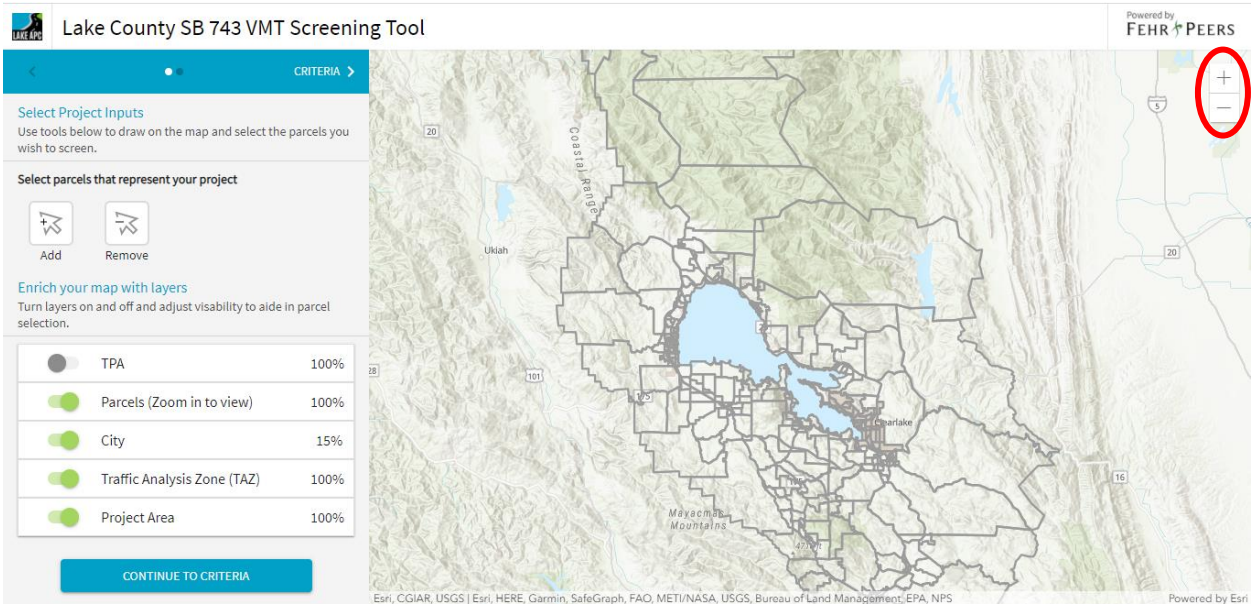


Click the "X" or "OK" on the last two pages to close the splash screen and enter data.

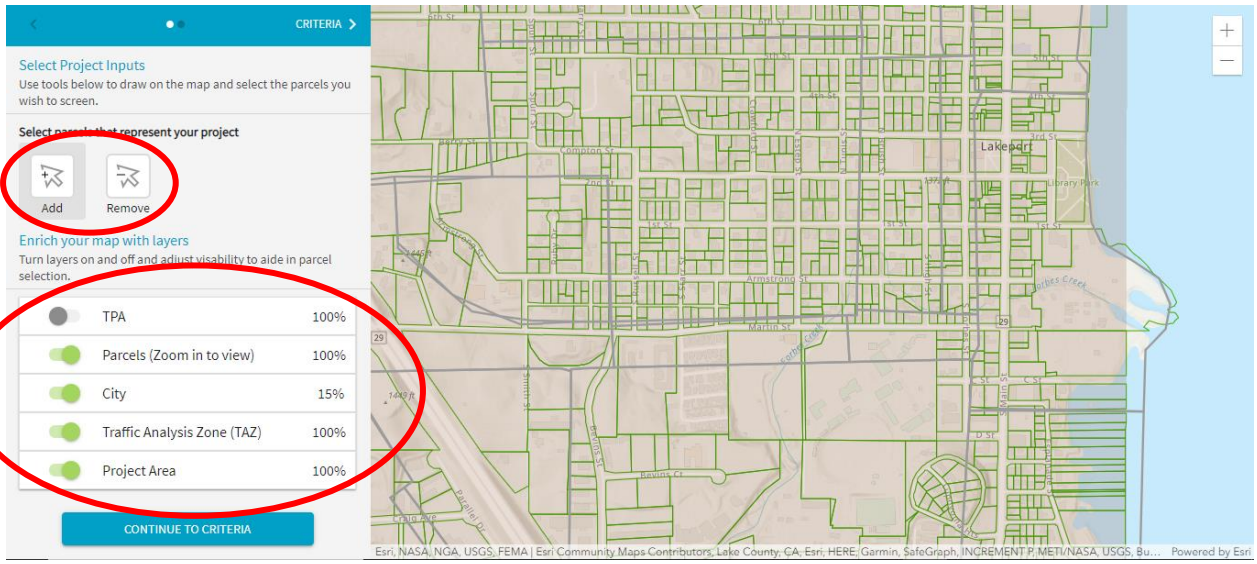




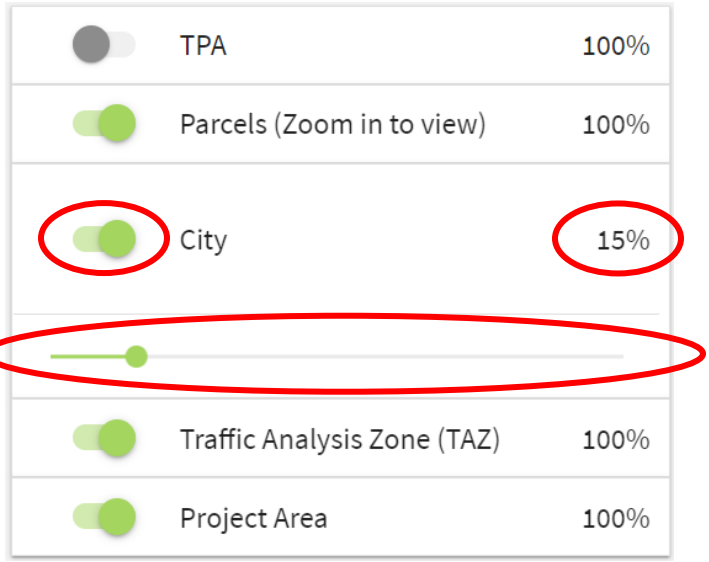
An input window is then shown. The mouse may be used to navigate the map by scrolling and zooming or using the "+" and "-" buttons located in the top right corner.



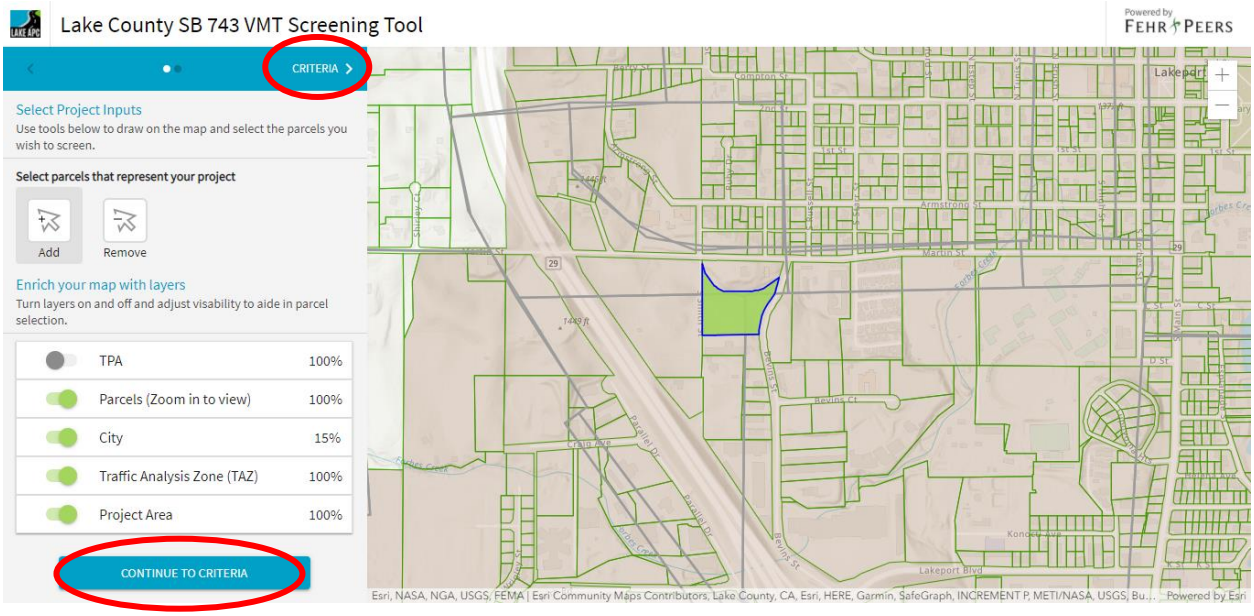
If you do not see the parcels, zoom in until you see the green lines. Use the arrow "Add" and "Remove" buttons to add or remove analysis parcels. Click on a layer name to make adjustments to the layer. TAZs will be shown with a grey outline.



Clicking on the percentage next to each layer reveals a slider. Use this slider to adjust the visibility (transparency) of the layer. Use the switch to turn the layer on and off in the map.

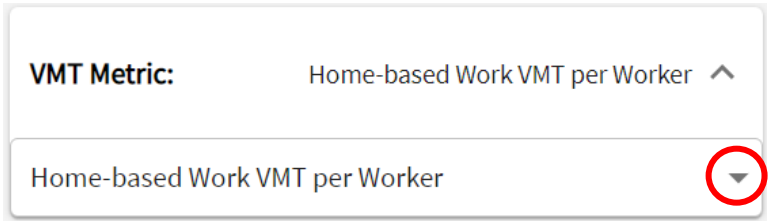


A selected parcel (the project area) will be displayed with green fill and a blue outline. Click on "CRITERIA >" or "CONTINUE TO CRITERIA" to proceed to the next screen.

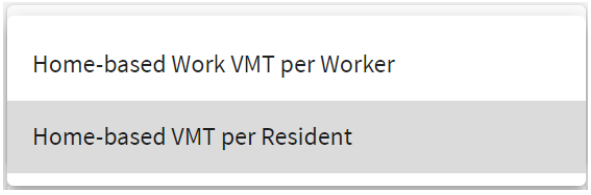


To select project inputs, click the arrows to open and close options for "VMT Metric," "Baseline Year," or "Threshold."

After the input is opened, click the solid arrow to show options.



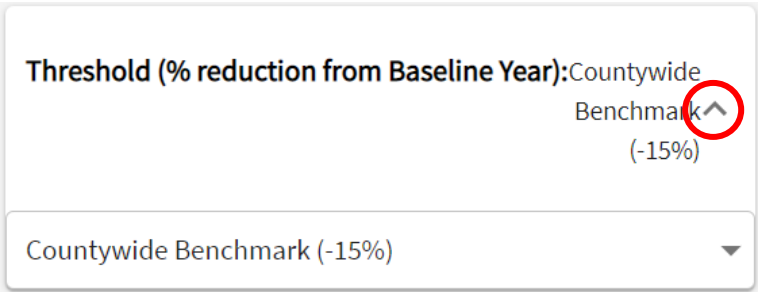
Then click on an option to select it. The selected option will be highlighted in gray. Use Home-based Work VMT per Worker for projects whose VMT is primarily worker-generated and Home-based VMT per Resident for projects whose VMT is primarily residential.



Repeat this option selection process for "Baseline Year."

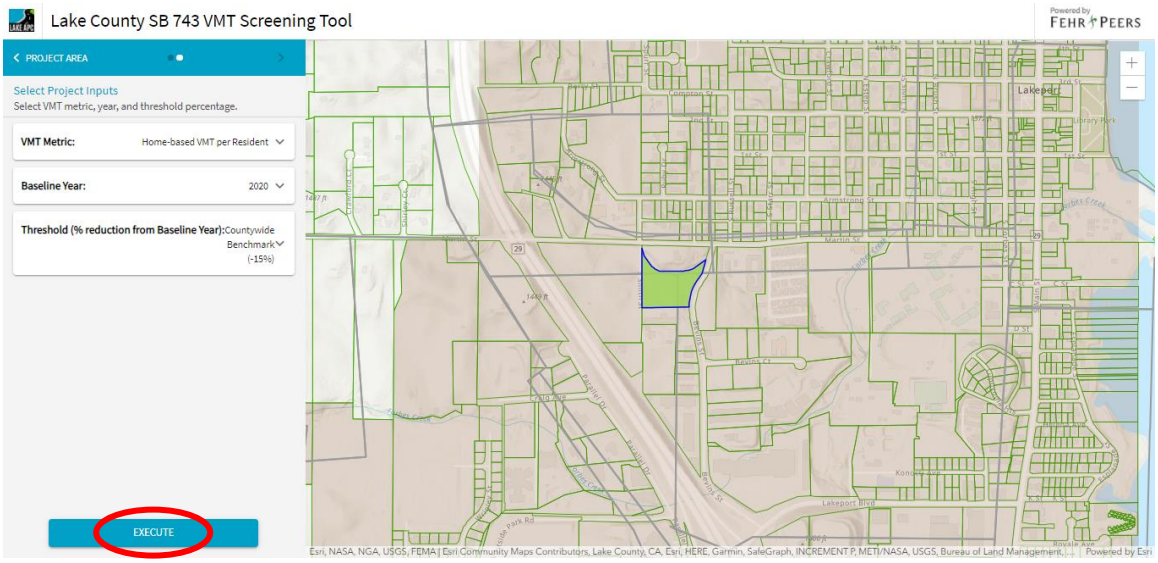
Use the slider to select a baseline year for VMT screening. Options range from 2009 (the base year of the WCTDM) and 2030 (the future year of the WCTDM). Any year selected in between 2009 and 2030 results in a linear interpolation between the data from 2009 and 2030.

Repeat this option selection process for "Threshold."

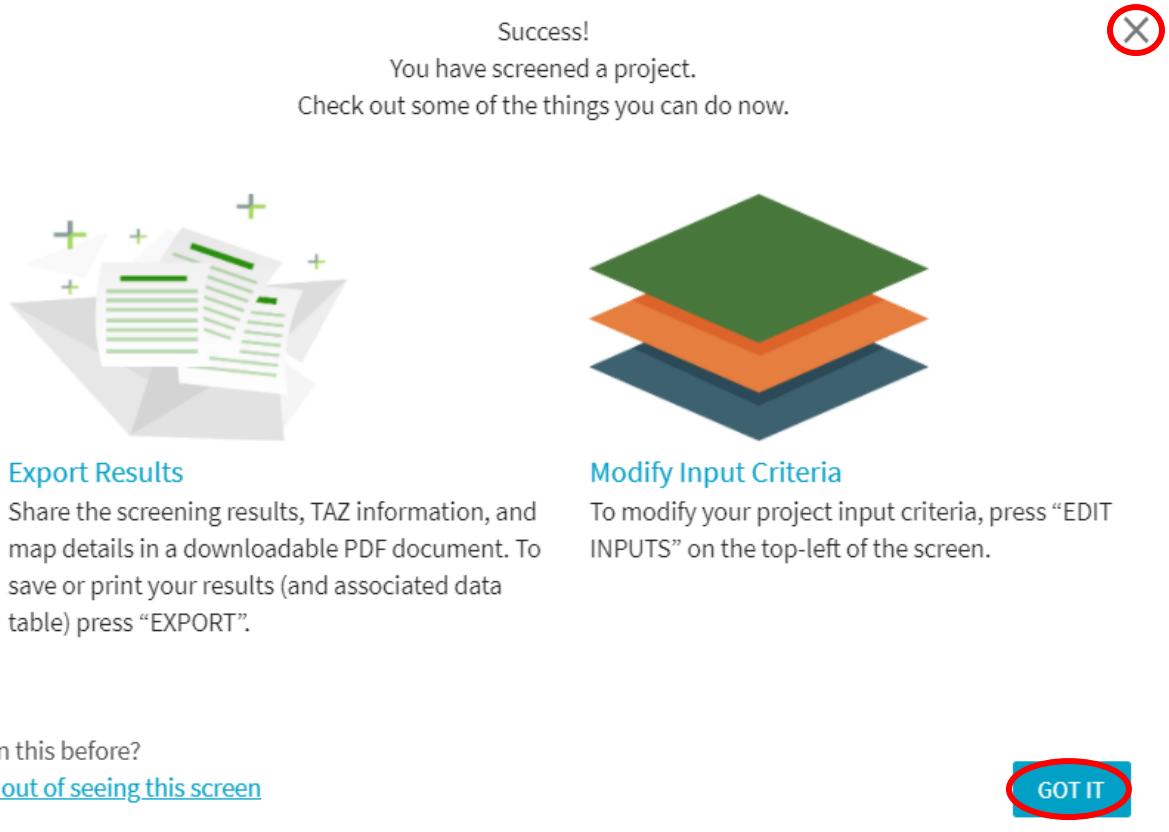


Then click on an option to select it. The selected option will be highlighted in gray. Screening threshold options include a 15 percent, 0 percent, or 14.3 percent reduction from baseline. The choice of threshold will depend on guidance from the lead agency.

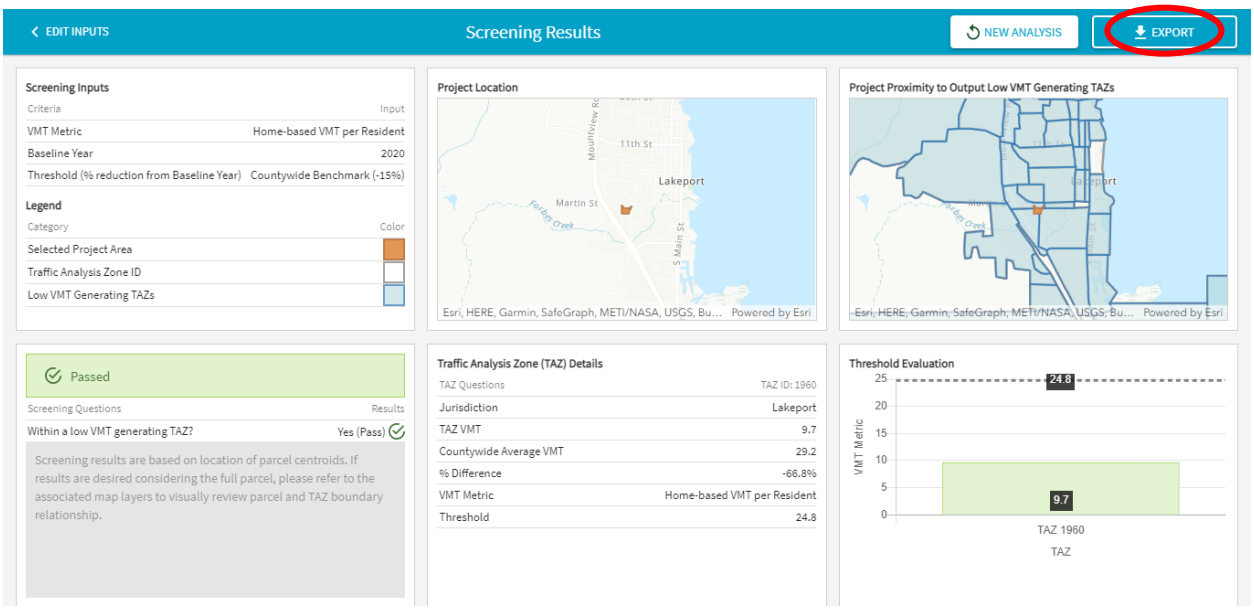
After desired options are selected, click "EXECUTE" to obtain results for the selected parcel.



Results are returned after a few seconds. A splash screen will provide further instructions. Click the "X" or "GOT IT" button to close the splash screen and view the results.



Results will then be displayed, including screening input options selected, whether screening passed or failed, and details of the screening results. To export these results, click the "EXPORT" button.

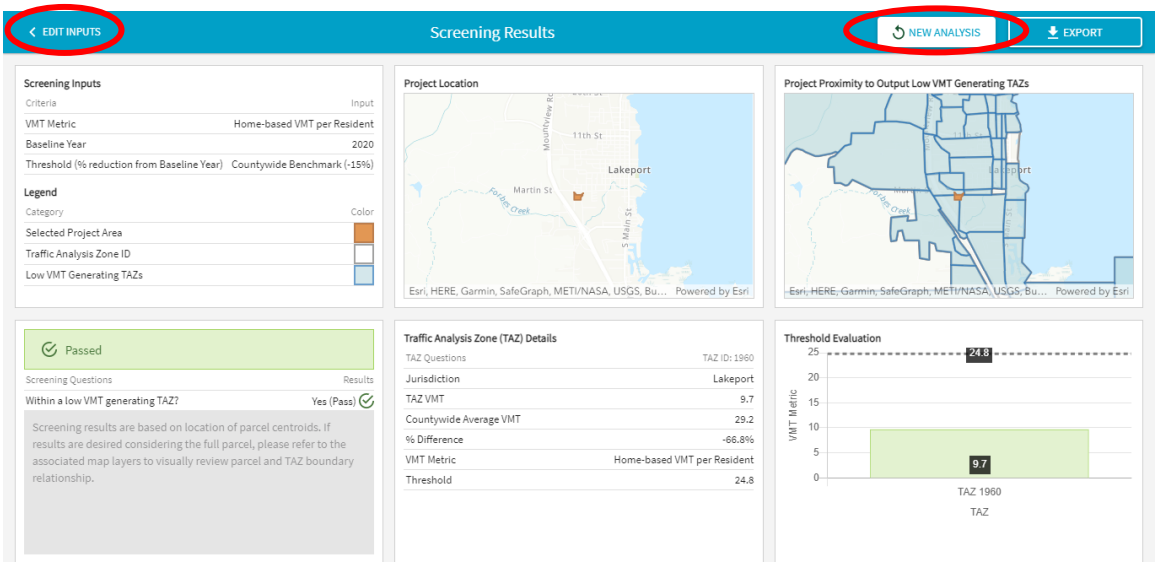


After clicking the export button, two files will be available for download:

- A comma-separated values (.csv) file with the numeric results of the analysis
- A portable document format (.pdf) file with the images displayed in the screening results window

The export process works best with the Chrome browser. There is a known bug in the Firefox browser which prevents the images from being exported. However, a screenshot may also be used to capture an image of the results.

After the screening results are reviewed and saved as desired, the user may click on "< EDIT INPUTS" to go back and change parameters or options in the analysis. Alternatively, the user may start a new analysis from the beginning by pressing the "NEW ANALYSIS" button.



Appendix D:
TDM Strategy Evaluation

Attachment D1: Transportation Demand Strategies Assessment

FEHR & PEERS

Comparison of CAPCOA Strategies Versus New Research Since 2010

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	Applicable to Individual Land Use Projects?	New Information Since CAPCOA Was Published in 2010		
						New information	Change in VMT reduction compared to CAPCOA	Literature or Evidence Cited
Land Use/Location	3.1.1	LUT-1 Increase Density	0.8% - 30% VMT reduction due to increase in density	Adequate	Yes - however, the project must increase residential or employment density by at least 10%.	Increasing residential density is associated with lower VMT per capita. Increased residential density in areas with high jobs access may have a greater VMT change than increases in regions with lower jobs access. The range of reductions is based on a range of elasticities from -0.04 to -0.22. The low end of the reductions represents a -0.04 elasticity of demand in response to a 10% increase in residential units or employment density and a -0.22 elasticity in response to 50% increase to residential/employment density.	0.4% -10.75%	Primary sources: Boarnet, M. and Handy, S. (2014). Impacts of Residential Density on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Secondary source: Stevens, M. (2017). Does Compact Development Make People Drive Less? Journal of the American Planning Association, 83(1), 7-18.
Land Use/ Location	3.1.3	LUT-3 Increase Diversity of Urban and Suburban Developments	9%-30% VMT reduction due to mixing land uses within a single development	Adequate	Yes	1] VMT reduction due to mix of land uses within a single development. Mixing land uses within a single development can decrease VMT (and resulting GHG emissions), since building users do not need to drive to meet all of their needs. 2] Reduction in VMT due to regional change in entropy index of diversity. Providing a mix of land uses within a single neighborhood can decrease VMT (and resulting GHG emissions), since trips between land use types are shorter and may be accommodated by non-auto modes of transport. For example when residential areas are in the same neighborhood as retail and office buildings, a resident does not need to travel outside of the neighborhood to meet his/her trip needs. At the regional level, reductions in VMT are measured in response to changes in the entropy index of land use diversity.	1] 0%-12% 2] 0.3%-4%	1] Ewing, R. and Cervero, R. (2010). Travel and the Built Environment - A Meta-Analysis. Journal of the American Planning Association,76(3),265-294. Cited in California Air Pollution Control Officers Association. (2010).Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf Frank, L., Greenwald, M., Kavage, S. and Devlin, A. (2011). An Assessment of Urban Form and Pedestrian and Transit Improvements as an Integrated GHG Reduction Strategy. WSDOT Research Report WA-RD 765.1. Washington State Department of Transportation. Retrieved from: http://www.wsdot.wa.gov/research/reports/fullreports/765.1.pdf Nasri, A. and Zhang, L. (2012). Impact of Metropolitan-Level Built Environment on Travel Behavior. Transportation Research Record: Journal of the Transportation Research Board, 2323(1), 75-79. Sadek, A. et al. (2011). Reducing VMT through Smart Land-Use Design. New York State Energy Research and Development Authority. Retrieved from: https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/C-08-29%20Final%20Report_December%202011%20%282%29.pdf Spears, S.et al. (2014). Impacts of Land-Use Mix on Passenger Vehicle Use and Greenhouse Gas Emissions- Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm 2] Zhang, Wengia et al. "Short- and Long-Term Effects of Land Use on Reducing Personal Vehicle Miles of Travel."
Land Use/Location	3.1.4	LUT-4 Increase Destination Accessibility	6.7%-20% VMT reduction due to decrease in distance to major job center or downtown	Adequate	Yes	Reduction in VMT due to increased regional accessibility (jobs gravity). Locating new development in areas with good access to destinations reduces VMT by reducing trip lengths and making walking, biking, and transit trips more feasible. Destination accessibility is measured in terms of the number of jobs (or other attractions) reachable within a given travel time, which tends to be highest at central locations and lowest at peripheral ones.	0.5%-12%	Primary sources: Handy, S. et al. (2014). Impacts of Network Connectivity on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Handy, S. et al. (2013). Impacts of Regional Accessibility on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Secondary source: Holtzclaw, et al. (2002.) Location Efficiency: Neighborhood and Socioeconomic Characteristics Determine Auto Ownership and Use – Studies in Chicago, Los Angeles, and Chicago. Transportation Planning and Technology, Vol. 25, pp. 1–27.

Attachment D1: Transportation Demand Strategies Assessment

FEHR PEERS

Comparison of CAPCOA Strategies Versus New Research Since 2010

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Land Use/ Location	3.1.5	LUT-5 Increase Transit Accessibility	0.5%-24.6% reduce in VMT due to locating a project near high-quality transit	Adequate	Yes - the project must include the TOD design features.	1] VMT reduction when transit station is provided within 1/2 mile of development (compared to VMT for sites located outside 1/2 mile radius of transit). Locating high density development within 1/2 mile of transit will facilitate the use of transit by people traveling to or from the Project site. The use of transit results in a mode shift and therefore reduced VMT. 2] Reduction in vehicle trips due to implementing TOD. A project with a residential/commercial center designed around a rail or bus station, is called a transit-oriented development (TOD). The project description should include, at a minimum, the following design features: • A transit station/stop with high-quality, high-frequency bus service located within a 5-10 minute walk (or roughly ¼ mile from stop to edge of development), and/or • A rail station located within a 20 minute walk (or roughly ½ mile from station to edge of development) • Fast, frequent, and reliable transit service connecting to a high percentage of regional destinations	1] 0%-5.8% 2] 0%-7.3%	1] Lund, H. et al. (2004). Travel Characteristics of Transit-Oriented Development in California. Oakland, CA: Bay Area Rapid Transit District, Metropolitan Transportation Commission, and Caltrans. Tal, G. et al. (2013). Policy Brief on the Impacts of Transit Access (Distance to Transit) Based on a Review of the Empirical Literature. California Air Resources Board. Retrieved from: https://www.arb.ca.gov/cc/sb375/policies/transitaccess/transit_access_brief120313.pdf 2] Zamir, K. R. et al. (2014). Effects of Transit-Oriented Development on Trip Generation, Distribution, and Mode Share in Washington, D.C., and Baltimore, Maryland. Transportation Research Record: Journal of the Transportation Research Board. 2413, 45–53. DOI: 10.3141/2413-05
Land Use/ Location	3.1.6	LUT-6 Integrate Affordable and Below Market Rate Housing	0.04%-1.20% reduction in VMT for making up to 30% of housing units BMR	Weak - Should only be used where supported by local data on affordable housing trip generation.	Potentially yes - the use of this strategy would need to be supported by local data.	Observed trip generation indicates substantial local and regional variation in trip making behavior at affordable housing sites. Recommend use of ITE	N/A	"Draft Memorandum: Infill and Complete Streets Study, Task 2.1: Local Trip Generation Study." Measuring the Miles: Developing new metrics for vehicle travel in LA. City of Los Angeles, April 19, 2017.
Land Use/Location	3.1.9	LUT-9 Improve Design of Development	3.0% - 21.3% reduction in VMT due to increasing intersection density vs. typical ITE suburban development	Adequate	Yes	No update to CAPCOA literature; advise applying CAPCOA measure only to large developments with significant internal street structure.	Same	N/A
Neighborhood Site Enhancements	3.2.1	SDT-1 Provide Pedestrian Network Improvements	0%-2% reduction in VMT for creating a connected pedestrian network within the development and connecting to nearby destinations	Adequate	No - this strategy would require a project to integrate into a larger overall network of pedestrian facilities that would require local and/or regional agency coordination to implement. Current research supports city and neighborhood level VMT reductions, but none of the literature reviewed contains and evaluation of project-specific reductions.	VMT reduction due to provision of complete pedestrian networks. Only applies if located in an area that may be prone to having a less robust sidewalk network.	0.5%-5.7%	Handy, S. et al. (2014). Impacts of Pedestrian Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm

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Neighborhood Site Enhancements	3.2.2	SDT-2 Provide Traffic Calming Measures	0.25%-1% VMT reduction due to traffic calming on streets within and around the development	Adequate	Potentially yes - The requirements for the project-level definition must be met. In general, this strategy would require a project to integrate into a larger overall network of bicycle facilities that would require local and/or regional agency coordination to implement.	Reduction in VMT due to expansion of bike networks in urban areas. Strategy only applies to bicycle facilities that provide a dedicated lane for bicyclists or a completely separated right-of-way for bicycles and pedestrians. Project-level definition: Enhance bicycle network citywide (or at similar scale), such that a building entrance or bicycle parking is within 200 yards walking or bicycling distance from a bicycle network that connects to at least one of the following: at least 10 diverse uses; a school or employment center, if the project total floor area is 50% or more residential; or a bus rapid transit stop, light or heavy rail station, commuter rail station, or ferry terminal. All destinations must be 3-mile bicycling distance from project site. Include educational campaigns to encourage bicycling.	0%-1.7%	Zahabi, S. et al. (2016). Exploring the link between the neighborhood typologies, bicycle infrastructure and commuting cycling over time and the potential impact on commuter GHG emissions. Transportation Research Part D: Transport and Environment. 47, 89-103.
Neighborhood Site Enhancements	3.2.3	SDT-3 Implement an NEV Network	0.5%-12.7% VMT reduction for GHG-emitting vehicles, depending on level of local NEV penetration	Weak - not recommended without supplemental data.	No - the evidence supporting this strategy is limited.	Limited evidence and highly limited applicability. Use with supplemental data only.	N/A	City of Lincoln, MHM Engineers & Surveyors, Neighborhood Electric Vehicle Transportation Program Final Report, Issued 04/05/05, and City of Lincoln, A Report to the California Legislature as required by Assembly Bill 2353, Neighborhood Electric Vehicle Transportation Plan Evaluation, January 1, 2008. Cited in: California Air Pollution Control Officers Association. (2010). Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf
Parking Pricing	3.3.1	PDT-1 Limit Parking Supply	5%-12.5% VMT reduction in response to reduced parking supply vs. ITE parking generation rate	Weak - not recommended. Fehr & Peers has developed new estimates for residential land use only that may be used.	Yes - evidence is only available to support taking these reduction high-transit urban areas.	CAPCOA reduction range derived from estimate of reduced vehicle ownership, not supported by observed trip or VMT reductions. Evidence is available for mode shift due to presence/absence of parking in high-transit urban areas; additional investigation ongoing	Higher	Fehr & Peers estimated a linear regression formula based on observed data from multiple locations. Resulting equation produces maximum VMT reductions for residential land use only of 30% in suburban locations and 50% in urban locations based on parking supply percentage reductions.
Parking Pricing	3.3.2	PDT-2 Unbundle Parking Costs from Property Cost	2.6% -13% VMT reduction due to decreased vehicle ownership rates	Adequate - conditional on the agency not requiring parking minimums and pricing/managing on-street parking (i.e., residential parking permit districts, etc.).	Yes - however, the project must be in a location that does not require parking minimums and has priced or permitting on-street parking.	Reduction in VMT, primarily for residential uses, based on range of elasticities for vehicle ownership in response to increased residential parking fees. Does not account for self-selection. Only applies if the city does not require parking minimums and if on-street parking is priced and managed (i.e., residential parking permit districts).	2%-12%	Victoria Transport Policy Institute (2009). Parking Requirement Impacts on Housing Affordability. Retrieved March 2010 from: http://www.vtpi.org/park-hou.pdf.

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CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	Applicable to Individual Land Use Projects?	New Information Since CAPCOA Was Published in 2010		
						New information	Change in VMT reduction compared to CAPCOA	Literature or Evidence Cited
Parking Pricing	3.3.3	PDT-3 Implement Market Price Public Parking	2.8%-5.5% VMT reduction due to "park once" behavior and disincentive to driving	Adequate	Yes - however, the VMT reductions would only apply to visitor or customer trips.	Implement a pricing strategy for parking by pricing all central business district/employment center/retail center on-street parking. It will be priced to encourage park once" behavior. The benefit of this measure above that of paid parking at the project only is that it deters parking spillover from project supplied parking to other public parking nearby, which undermine the vehicle miles traveled (VMT) benefits of project pricing. It may also generate sufficient area-wide mode shifts to justify increased transit service to the area. VMT reduction applies to VMT from visitor/customer trips only. Reductions higher than top end of range from CAPCOA report apply only in conditions with highly constrained on-street parking supply and lack of comparably-priced off-street parking.	2.8%-14.5%	Clinch, J.P. and Kelly, J.A. (2003). Temporal Variance Of Revealed Preference On-Street Parking Price Elasticity. Dublin: Department of Environmental Studies, University College Dublin. Retrieved from: http://www.ucd.ie/gpep/research/workingpapers/2004/04-02.pdf. Cited in Victoria Transport Policy Institute (2017). Transportation Elasticities: How Prices and Other Factors Affect Travel Behavior. Retrieved from: http://www.vtpi.org/tdm/tdm11.htm Hensher, D. and King, J. (2001). Parking Demand and Responsiveness to Supply, Price and Location in Sydney Central Business District. Transportation Research A. 35(3), 177-196. Millard-Ball, A. et al. (2013). Is the curb 80% full or 20% empty? Assessing the impacts of San Francisco's parking pricing experiment. Transportation Research Part A. 63(2014), 76-92. Shoup, D. (2011). The High Cost of Free Parking. APA Planners Press. p. 290. Cited in Pierce, G. and Shoup, D. (2013). Getting the Prices Right. Journal of the American Planning Association. 79(1), 67-81.
Commute Trip Reduction	3.4.1	TRT-1 Implement CTR Program - Voluntary	1.0%-6.2% commute VMT reduction due to employer-based mode shift program	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-2 Implement CTR Program - Required Implementation/Monitoring" or with CAPCOA strategies TRT-3.4.3 through TRT-3.4.9.	Yes - however, the effectiveness of a voluntary CTR program would be building tenant specific and may require monitoring to evaluate the program's effectiveness.	Reduction in vehicle trips in response to employer-led TDM programs. The CTR program should include all of the following to apply the effectiveness reported by the literature: • Carpooling encouragement • Ride-matching assistance • Preferential carpool parking • Flexible work schedules for carpools • Half time transportation coordinator • Vanpool assistance • Bicycle end-trip facilities (parking, showers and lockers)	1.0%-6.0%	Boarnet, M. et al. (2014). Impacts of Employer-Based Trip Reduction Programs and Vanpools on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Commute Trip Reduction	3.4.2	TRT-2 Implement CTR Program - Required Implementation/Monitoring	4.2%-21.0% commute VMT reduction due to employer-based mode shift program with required monitoring and reporting	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or with CAPCOA strategies TRT-3.4.3 through TRT-3.4.9.	Yes - however, the effectiveness of a CTR program would be building tenant specific and may require monitoring to evaluate the program's effectiveness.	Limited evidence available. Anecdotal evidence shows high investment produces high VMT/vehicle trip reductions at employment sites with monitoring requirements and specific targets.	Same	Nelson/Nygaard (2008). South San Francisco Mode Share and Parking Report for Genentech, Inc.(p. 8) Cited in: California Air Pollution Control Officers Association. (2010). Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf
Commute Trip Reduction	3.4.3	TRT-3 Provide Ride-Sharing Programs	1%-15% commute VMT reduction due to employer ride share coordination and facilities	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	Yes - however, the effectiveness of the ride-sharing programs is building tenant specific and may require monitoring to evaluate the program's effectiveness.	Commute vehicle trips reduction due to employer ride-sharing programs. Promote ride-sharing programs through a multi-faceted approach such as: • Designating a certain percentage of parking spaces for ride sharing vehicles • Designating adequate passenger loading and unloading and waiting areas for ride-sharing vehicles • Providing an app or website for coordinating rides	2.5%-8.3%	Victoria Transport Policy Institute. (2015). Ridesharing: Carpooling and Vanpooling. Online TDM Encyclopedia. Retrieved from: http://vtpi.org/tdm/tdm34.htm

Attachment D1: Transportation Demand Strategies Assessment

FEHR PEERS

Comparison of CAPCOA Strategies Versus New Research Since 2010

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	Applicable to Individual Land Use Projects?	New Information Since CAPCOA Was Published in 2010		
						New information	Change in VMT reduction compared to CAPCOA	Literature or Evidence Cited
Commute Trip Reduction	3.4.4	TRT-4 Implement Subsidized or Discounted Transit Program	0.3%-20% commute VMT reduction due to transit subsidy of up to $6/day	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	Yes - however, the effectiveness of a transit subsidy program would be building tenant specific and may require monitoring to evaluate the program's effectiveness.	1] Reduction in vehicle trips in response to reduced cost of transit use, assuming that 10-50% of new bus trips replace vehicle trips; 2] Reduction in commute trip VMT due to employee benefits that include transit 3] Reduction in all vehicle trips due to reduced transit fares system-wide, assuming 25% of new transit trips would have been vehicle trips.	1] 0.3%-14% 2] 0-16% 3] 0.1% to 6.9%	1] Victoria Transport Policy Institute. (2017). Understanding Transport Demands and Elasticities. Online TDM Encyclopedia. Retrieved from: http://www.vtpi.org/tdm/tdm11.htm 2] Carolina, P. et al. (2016). Do Employee Commuter Benefits Increase Transit Ridership? Evidence rom the NY-NJ Region. Washington, DC: Transportation Research Board, 96th Annual Meeting. 3] Handy, S. et al. (2013). Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Commute Trip Reduction	3.4.6	TRT-6 Encourage Telecommuting and Alternative Work Schedules	0.07%-5.5% commute VMT reduction due to reduced commute trips	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	Yes - however, the effectiveness of telecommuting and alternative work schedules is building tenant specific and may require monitoring to evaluate the program's effectiveness.	VMT reduction due to adoption of telecommuting. Alternative work schedules could take the form of staggered starting times, flexible schedules, or compressed work weeks.	0.2%-4.5%	Handy, S. et al. (2013). Policy Brief on the Impacts of Telecommuting Based on a Review of the Empirical Literature. California Air Resources Board. Retrieved from: https://www.arb.ca.gov/cc/sb375/policies/telecommuting/telecommuting_brief120313.pdf
Commute Trip Reduction	3.4.7	1] TRT-7 Implement CTR Marketing 2] Launch Targeted Behavioral Interventions	0.8%-4.0% commute VMT reduction due to employer marketing of alternatives	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	Yes - however, the effectiveness of CTR marketing and behavioral intervention programs is building tenant specific and may require monitoring to evaluate the program's effectiveness.	1] Vehicle trips reduction due to CTR marketing; 2] Reduction in VMT from institutional trips due to targeted behavioral intervention programs	1] 0.9% to 26% 2] 1%-6%	1] Pratt, Dick. Personal communication regarding the Draft of TCRP 95 Traveler Response to Transportation System Changes – Chapter 19 Employer and Institutional TDM Strategies. Transit Cooperative Research Program. Cited in California Air Pollution Control Officers Association. (2010).Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf Dill, J. and Mohr, C. (2010). Long-Term Evaluation of Individualized Marketing Programs for Travel Demand Management. Portland, OR: Transportation Research and Education Center (TREC). Retrieved from: http://pdxscholar.library.pdx.edu/usp_fac 2] Brown, A. and Ralph, K. (2017.) "The Right Time and Place to Change Travel Behavior: An Experimental Study." Washington, DC: Transportation Research Board, 2017 Annual Meeting. Retrieved from: https://trid.trb.org/view.aspx?id=1437253
Commute Trip Reduction	3.4.9	TRT-9 Implement Car-Sharing Program	0.4% - 0.7% VMT reduction due to lower vehicle ownership rates and general shift to non-driving modes	Adequate	No - this strategy would require local and/or regional agency coordination to implement.	Vehicle trip reduction due to car-sharing programs; reduction assumes 1%-5% penetration rate. Implementing car-sharing programs allows people to have on-demand access to a shared fleet of vehicles on an as-needed basis, as a supplement to trips made by non-SOV modes. Transit station-based programs focus on providing the "last-mile" solution and link transit with commuters' final destinations. Residential-based programs work to substitute entire household based trips. Employer-based programs provide a means for business/day trips for alternative mode commuters and provide a guaranteed ride home option. The reduction shown here assumes a 1%-5% penetration rate.	0.3%-1.6%	Lovejoy, K. et al. (2013). Impacts of Carsharing on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Need to verify with more recent UCD research.
Commute Trip Reduction	3.4.10	TRT-10 Implement a School Pool Program	7.2%-15.8% reduction in school VMT due to school pool implementation	Adequate - School VMT only.	Not applicable, unless if the project being evaluated is a school.	Limited new evidence available, not conclusive	Same	Transportation Demand Management Institute of the Association for Commuter Transportation. TDM Case Studies and Commuter Testimonials. Prepared for the US EPA. 1997. (p. 10, 36-38) WayToGo 2015 Annual Report. Accessed on March 12, 2017 from http://www.waytogo.org/sites/default/files/attachments/waytogo-annual-report-2015.pdf

Comparison of CAPCOA Strategies Versus New Research Since 2010

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	Applicable to Individual Land Use Projects?	New Information Since CAPCOA Was Published in 2010		
						New information	Change in VMT reduction compared to CAPCOA	Literature or Evidence Cited
Commute Trip Reduction	3.4.11	TRT-11 Provide Employer-Sponsored Vanpool/Shuttle	0.3%-13.4% commute VMT reduction due to employer-sponsored vanpool and/or shuttle service	Adequate - Effectiveness is building/tenant specific.	Yes - however, the effectiveness of the employer-sponsored vanpool/shuttle programs is dependent on the building tenant specific and the quality of the vanpool/shuttle service being provided. This reduction strategy may require monitoring to evaluate the program's effectiveness.	1] Reduction in commute vehicle trips due to implementing employer-sponsored vanpool and shuttle programs; 2] Reduction in commute vehicle trips due to vanpool incentive programs; 3] Reduction in commute vehicle trips due to employer shuttle programs	1] 0.5%-5.0% 2] 0.3%-7.4% 3] 1.4%-6.8%	1] Concas, Sisinnio, Winters, Philip, Wambalaba, Francis, (2005). Fare Pricing Elasticity, Subsidies, and Demand for Vanpool Services. Transportation Research Record: Journal of the Transportation Research Board, 1924, pp 215-223. 2] Victoria Transport Policy Institute. (2015). Ridesharing: Carpooling and Vanpooling. Online TDM Encyclopedia. Retrieved from: http://vtpi.org/tdm/tdm34.htm 3] ICF. (2014). GHG Impacts for Commuter Shuttles Pilot Program.
Commute Trip Reduction	3.4.13	TRT-13 Implement School Bus Program	38%-63% reduction in school VMT due to school bus service implementation	Adequate - School VMT only.	Not applicable, unless if the project being evaluated is a school.	VMT reduction for school trips based on data beyond a single school district. School district boundaries are also a factor to consider. VMT reduction does not appear to be a factor that was considered in a select review of CA boundaries. VMT reductions apply to school trip VMT only.	5%-30%	Wilson, E., et al. (2007). The implications of school choice on travel behavior and environmental emissions. Transportation Research Part D: Transport and Environment 12(2007), 506-518.
Commute Trip Reduction	3.4.14	TRT-14 Price Workplace Parking	0.1%-19.7% commute VMT reduction due to mode shift	Adequate - Effectiveness is building/tenant specific.	Yes - however, the effectiveness of pricing workplace parking could be building tenant specific and may require monitoring to evaluate the program's effectiveness.	Reduction in commute vehicle trips due to priced workplace parking; effectiveness depends on availability of alternative modes. Workplace parking pricing may include: explicitly charging for parking, implementing above market rate pricing, validating parking only for invited guests, not providing employee parking and transportation allowances, and educating employees about available alternatives.	0.5%-14%	Primary sources: Concas, S. and Nayak, N. (2012), A Meta-Analysis of Parking Price Elasticity. Washington, DC: Transportation Research Board, 2012 Annual Meeting. Dale, S. et al. (2016). Evaluating the Impact of a Workplace Parking Levy on Local Traffic Congestion: The Case of Nottingham UK. Washington, DC: Transportation Research Board, 96th Annual Meeting. Secondary sources: Victoria Transport Policy Institute. (2017). Understanding Transport Demands and Elasticities. Online TDM Encyclopedia. Retrieved from: http://www.vtpi.org/tdm/tdm11.htm Spears, S. et al. (2014). Impacts of Parking Pricing on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Commute Trip Reduction	3.4.15	TRT-15 Employee Parking Cash-Out	0.6%-7.7% commute VMT reduction due to implementing employee parking cash-out	Weak - Effectiveness is building/tenant specific. Research data is over 10 years old (1997).	Yes - however, the effectiveness of employee parking cash-out could be building tenant specific and may require monitoring to evaluate the program's effectiveness.	Shoup case studies indicate a reduction in commute vehicle trips due to implementing cash-out without implementing other trip-reduction strategies.	3%-7.7%	Shoup, D. (1997). Evaluating the Effects of Cashing Out Employer-Paid Parking: Eight Case Studies. Transport Policy. California Air Resources Board. Retrieved from: https://www.arb.ca.gov/research/apr/past/93-308a.pdf. This citation was listed as an alternative literature in CAPCOA.
Transit System	3.5.3	TST-3 Expand Transit Network	0.1-8.2% VMT reduction in response to increase in transit network coverage	Adequate	No - expanding the transit network would require local and/or regional agency coordination to implement.	Reduction in vehicle trips due to increased transit service hours or coverage. Low end of reduction is typical of project-level implementation (payment of impact fees and/or localized improvements).	0.1%-10.5%	Handy, S. et al. (2013). Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Boas. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Transit System	3.5.4	TST-4 Increase Transit Service Frequency/Speed	0.02%-2.5% VMT reduction due to reduced headways and increased speed and reliability	Adequate	No - increasing the quality of transit service would require local and/or regional agency coordination to implement.	Reduction in vehicle trips due to increased transit frequency/decreased headway. Low end of reduction is typical of project-level implementation (payment of impact fees and/or localized improvements).	0.3%-6.3%	Handy, S. et al. (2013). Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Transit System	3.5.1	TST-1 Provide a Bus Rapid Transit System	0.02%-3.2% VMT reduction by converting standard bus system to BRT system	Adequate	No - the conversion of standard bus system to BRT would require local and/or regional agency coordination to implement.	No new information identified.	Same	N/A

Comparison of CAPCOA Strategies Versus New Research Since 2010

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	Applicable to Individual Land Use Projects?	New Information Since CAPCOA Was Published in 2010		
						New information	Change in VMT reduction compared to CAPCOA	Literature or Evidence Cited
Not Applicable - not a CAPCOA strategy	Not Applicable - not a CAPCOA strategy	Not Applicable - not a CAPCOA strategy	Not Applicable - not a CAPCOA strategy	Not Applicable - not a CAPCOA strategy	No -evidence currently does not show a project-specific VMT reductions, the current studies have shown city-wide VMT reductions from changes in travel modes.	Bikeshare car trip substitution rate of 7-19% based on data from Washington DC, and Minneapolis/St. Paul. Annual VMT reduction of 151,000 and 57,000, respectively. Includes VMT for rebalancing and maintenance. VMT reduction of 0.023 miles per day per bikeshare member estimated for Bay Area bikeshare, utilizing Minneapolis/St. Paul data from study above.	57,000-151,000 annual VMT reduction, based on two large US cities. VMT reduction of 0.023 miles per day per member, based on one large US city estimate.	Fishman, E., Washington, S., & Haworth, N. (2014). Bike share's impact on car use: Evidence from the United States, Great Britain, and Australia. Transportation Research Part D: Transport and Environment, 31, 13-20. TDM Methodology: Impact of Carsharing Membership, Transit Passes, Bikesharing Membership, Unbundled Parking, and Parking Supply Reductions on Driving. Center for Neighborhood Technology, Peter Haas and Cindy Copp, with TransForm staff, May 5, 2016.

Attachment D2: Transportation Demand Strategies Assessment

FEHR PEERS

Relevant Strategies for Implementation in Lake APC Jurisdictions

						New Information Since CAPCOA Was Published in 2010		
CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	Applicable to Individual Land Use Projects?	New information	Change in VMT reduction compared to CAPCOA(1)	Literature or Evidence Cited
Land Use/ Location	3.1.3	LUT-3 Increase Diversity of Urban and Suburban Developments	9%-30% VMT reduction due to mixing land uses within a single development	Adequate	Yes	1] VMT reduction due to mix of land uses within a single development; 2] Reduction in VMT due to regional change in entropy index of diversity.	1] 0%-12% 2] 0.3%-4%	1] Ewing, R. and Cervero, R. (2010). Travel and the Built Environment - A Meta-Analysis. Journal of the American Planning Association,76(3),265-294. Cited in California Air Pollution Control Officers Association. (2010).Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf Frank, L., Greenwald, M., Kavage, S. and Devlin, A. (2011). An Assessment of Urban Form and Pedestrian and Transit Improvements as an Integrated GHG Reduction Strategy. WSDOT Research Report WA-RD 765.1. Washington State Department of Transportation. Retrieved from: http://www.wsdot.wa.gov/research/reports/fullreports/765.1.pdf Nasri, A. and Zhang, L. (2012). Impact of Metropolitan-Level Built Environment on Travel Behavior. Transportation Research Record: Journal of the Transportation Research Board, 2323(1), 75-79. Sadek, A. et al. (2011). Reducing VMT through Smart Land-Use Design. New York State Energy Research and Development Authority. Retrieved from: https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/C-08-29%20Final%20Report_December%202011%20%282%29.pdf Spears, S.et al. (2014). Impacts of Land-Use Mix on Passenger Vehicle Use and Greenhouse Gas Emissions- Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm 2] Zhang, Wengia et al. "Short- and Long-Term Effects of Land Use on Reducing Personal Vehicle Miles of Travel."
Neighborhood Site Enhancements	3.2.1	SDT-1 Provide Pedestrian Network Improvements	0%-2% reduction in VMT for creating a connected pedestrian network within the development and connecting to nearby destinations	Adequate	No - this strategy would require a project to integrate into a larger overall network of pedestrian facilities that would require local and/or regional agency coordination to implement. Current research supports city and neighborhood level VMT reductions, but none of the literature reviewed contains and evaluation of project-specific reductions.	VMT reduction due to provision of complete pedestrian networks.	0.5%-5.7%	Handy, S. et al. (2014). Impacts of Pedestrian Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Neighborhood Site Enhancements	3.2.2	SDT-2 Provide Traffic Calming Measures	0.25%-1% VMT reduction due to traffic calming on streets within and around the development	Adequate	Potentially yes - The requirements for the project-level definition must be met. In general, this strategy would require a project to integrate into a larger overall network of bicycle facilities that would require local and/or regional agency coordination to implement.	Reduction in VMT due to building out a low-stress bike network; reduction in VMT due to expansion of bike networks in urban areas.	0%-1.7%	1] California Air Resources Board. (2016). Greenhouse Gas Quantification Methodology for the California Transportation Commission Active Transportation Program Greenhouse Gas Reduction Fund Fiscal Year 2016-17. Retrieved from: https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/ctc_atp_finalqm_16-17.pdf. 2] Zahabi, S. et al. (2016). Exploring the link between the neighborhood typologies, bicycle infrastructure and commuting cycling over time and the potential impact on commuter GHG emissions. Transportation Research Part D: Transport and Environment. 47, 89-103.
Parking Pricing	3.3.1	PDT-1 Limit Parking Supply	5%-12.5% VMT reduction in response to reduced parking supply vs. ITE parking generation rate	Weak - not recommended. Fehr & Peers has developed new estimates for residential land use only that may be used.	Yes - evidence is only available to support taking these reduction high-transit urban areas.	CAPCOA reduction range derived from estimate of reduced vehicle ownership, not supported by observed trip or VMT reductions. Evidence is available for mode shift due to presence/absence of parking in high-transit urban areas; additional investigation ongoing	Higher	Fehr & Peers estimated a linear regression formula based on observed data from multiple locations. Resulting equation produces maximum VMT reductions for residential land use only of 30% in suburban locations and 50% in urban locations based on parking supply percentage reductions.

Relevant Strategies for Implementation in Lake APC Jurisdictions

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CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	Applicable to Individual Land Use Projects?	New information	Change in VMT reduction compared to CAPCOA(1)	Literature or Evidence Cited
Parking Pricing	3.3.2	PDT-2 Unbundle Parking Costs from Property Cost	2.6% -13% VMT reduction due to decreased vehicle ownership rates	Adequate - conditional on the agency not requiring parking minimums and pricing/managing on-street parking (i.e., residential parking permit districts, etc.).	Yes - however, the project must be in a location that does not require parking minimums and has priced or permitting on-street parking.	Reduction in VMT, primarily for residential uses, based on range of elasticities for vehicle ownership in response to increased residential parking fees. Does not account for self-selection. Only applies if the city does not require parking minimums and if on-street parking is priced and managed (i.e., residential parking permit districts).	2%-12%	Victoria Transport Policy Institute (2009). Parking Requirement Impacts on Housing Affordability. Retrieved March 2010 from: http://www.vtpi.org/park-hou.pdf.
Parking Pricing	3.3.3	PDT-3 Implement Market Price Public Parking	2.8%-5.5% VMT reduction due to "park once" behavior and disincentive to driving	Adequate	Yes - however, the VMT reductions would only apply to visitor or customer trips.	Implement a pricing strategy for parking by pricing all central business district/employment center/retail center on-street parking. It will be priced to encourage park once" behavior. The benefit of this measure above that of paid parking at the project only is that it deters parking spillover from project supplied parking to other public parking nearby, which undermine the vehicle miles traveled (VMT) benefits of project pricing. It may also generate sufficient area-wide mode shifts to justify increased transit service to the area. VMT reduction applies to VMT from visitor/customer trips only. Reductions higher than top end of range from CAPCOA report apply only in conditions with highly constrained on-street parking supply and lack of comparably-priced off-street parking.	2.8%-14.5%	Clinch, J.P. and Kelly, J.A. (2003). Temporal Variance Of Revealed Preference On-Street Parking Price Elasticity. Dublin: Department of Environmental Studies, University College Dublin. Retrieved from: http://www.ucd.ie/gpep/research/workingpapers/2004/04-02.pdf. Cited in Victoria Transport Policy Institute (2017). Transportation Elasticities: How Prices and Other Factors Affect Travel Behavior. Retrieved from: http://www.vtpi.org/tdm/tdm11.htm Hensher, D. and King, J. (2001). Parking Demand and Responsiveness to Supply, Price and Location in Sydney Central Business District. Transportation Research A. 35(3), 177-196. Millard-Ball, A. et al. (2013). Is the curb 80% full or 20% empty? Assessing the impacts of San Francisco's parking pricing experiment. Transportation Research Part A. 63(2014), 76-92. Shoup, D. (2011). The High Cost of Free Parking. APA Planners Press. p. 290. Cited in Pierce, G. and Shoup, D. (2013). Getting the Prices Right. Journal of the American Planning Association. 79(1), 67-81.
Commute Trip Reduction	3.4.3	TRT-3 Provide Ride-Sharing Programs	1%-15% commute VMT reduction due to employer ride share coordination and facilities	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	Yes - however, the effectiveness of the ride-sharing programs is building tenant specific and may require monitoring to evaluate the program's effectiveness.	Commute vehicle trips reduction due to employer ride-sharing programs	2.5%-8.3%	Victoria Transport Policy Institute. (2015). Ridesharing: Carpooling and Vanpooling. Online TDM Encyclopedia. Retrieved from: http://vtpi.org/tdm/tdm34.htm
Commute Trip Reduction	3.4.4	TRT-4 Implement Subsidized or Discounted Transit Program	0.3%-20% commute VMT reduction due to transit subsidy of up to $6/day	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	Yes - however, the effectiveness of a transit subsidy program would be building tenant specific and may require monitoring to evaluate the program's effectiveness.	1] Reduction in vehicle trips in response to reduced cost of transit use, assuming that 10-50% of new bus trips replace vehicle trips; 2] Reduction in commute trip VMT due to employee benefits that include transit 3] Reduction in all vehicle trips due to reduced transit fares system-wide, assuming 25% of new transit trips would have been vehicle trips.	1] 0.3%-14% 2] 0-16% 3] 0.1% to 6.9%	1] Victoria Transport Policy Institute. (2017). Understanding Transport Demands and Elasticities. Online TDM Encyclopedia. Retrieved from: http://www.vtpi.org/tdm/tdm11.htm 2] Carolina, P. et al. (2016). Do Employee Commuter Benefits Increase Transit Ridership? Evidence rom the NY-NJ Region. Washington, DC: Transportation Research Board, 96th Annual Meeting. 3] Handy, S. et al. (2013). Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Commute Trip Reduction	3.4.6	TRT-6 Encourage Telecommuting and Alternative Work Schedules	0.07%-5.5% commute VMT reduction due to reduced commute trips	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	Yes - however, the effectiveness of telecommuting and alternative work schedules is building tenant specific and may require monitoring to evaluate the program's effectiveness.	VMT reduction due to adoption of telecommuting	0.2%-4.5%	Handy, S. et al. (2013). Policy Brief on the Impacts of Telecommuting Based on a Review of the Empirical Literature. California Air Resources Board. Retrieved from: https://www.arb.ca.gov/cc/sb375/policies/telecommuting/telecommuting_brief120313.pdf

Attachment D2: Transportation Demand Strategies Assessment

FEHR PEERS

Relevant Strategies for Implementation in Lake APC Jurisdictions

						New Information Since CAPCOA Was Published in 2010		
CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	Applicable to Individual Land Use Projects?	New information	Change in VMT reduction compared to CAPCOA(1)	Literature or Evidence Cited
Commute Trip Reduction	3.4.9	TRT-9 Implement Car-Sharing Program	0.4% - 0.7% VMT reduction due to lower vehicle ownership rates and general shift to non-driving modes	Adequate	No - this strategy would require local and/or regional agency coordination to implement.	Vehicle trip reduction due to car-sharing programs; reduction assumes 1%-5% penetration rate. Car sharing effect on VMT is still evolving due to TNC effects. UCD research showed less effect on car ownership due to car sharing participation and an uncertain effect on VMT.	0.3%-1.6%	Lovejoy, K. et al. (2013). Impacts of Carsharing on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Clewlow, Regina R. and Mishra, Gouri Shankar, (2017). Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States. UC Davis, Institute of Transportation Studies. Research Report - UCD-ITS-RR-17-07.
Commute Trip Reduction	3.4.10	TRT-10 Implement a School Pool Program	7.2%-15.8% reduction in school VMT due to school pool implementation	Adequate - School VMT only.	Not applicable, unless if the project being evaluated is a school.	Limited new evidence available, not conclusive	Same	Transportation Demand Management Institute of the Association for Commuter Transportation. TDM Case Studies and Commuter Testimonials. Prepared for the US EPA. 1997. (p. 10, 36-38) WayToGo 2015 Annual Report. Accessed on March 12, 2017 from http://www.waytogo.org/sites/default/files/attachments/waytogo-annual-report-2015.pdf
Transit System	3.5.4	TST-4 Increase Transit Service Frequency/Speed	0.02%-2.5% VMT reduction due to reduced headways and increased speed and reliability	Adequate	No - increasing the quality of transit service would require local and/or regional agency coordination to implement.	Reduction in vehicle trips due to increased transit frequency/decreased headway.	0.3%-6.3%	Handy, S. et al. (2013). Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm

NOTES:

(1) For specific VMT reduction ranges, refer to the cited literature.