Senate Bill 743 Vehicle Miles Traveled Implementation

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Cover: State Route 49, Nevada City (Source: Fehr & Peers, 2016)

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 Nevada 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 Nevada County
- Discusses alternatives for VMT measurement methods and thresholds
- Recommends VMT methods and thresholds for lead agencies in Nevada County
- Uses recent projects in Nevada County to demonstrate how these methods and thresholds would be used
- Recommends transportation demand management (TDM) strategies for reducing VMT on projects in Nevada 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:

1. 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.

2. 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.

These statements are important because they provide direction to OPR and to lead agencies. For OPR, the direction is largely about what new metrics should achieve. For lead agencies like the County of Nevada, the Cities of Grass Valley and Nevada City, and the Town of Truckee, the direction is about expected changes in transportation analysis plus what factors to consider for significance thresholds.

To implement this intent, SB 743 contains amendments to current congestion management law that allows cities and counties to effectively opt-out of the LOS standards that would otherwise apply. Further, SB 743 requires OPR to update the CEQA Guidelines and establish *"criteria for determining the significance of transportation impacts of projects within transit priority areas."* The new criteria *"shall promote the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses."* After the Secretary of the Natural Resources Agency certified the new guidelines, *"automobile delay, as described solely by level of service or similar measures of vehicular capacity or traffic congestion shall not be considered a significant impact on the environment …, except in locations specifically identified in the guidelines, if any."*

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.

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

[1] Automobile includes passenger cars and light trucks. However, OPR's Technical Advisory allows VMT analysis to include all vehicles (i.e., commercial trucks).

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.

Caltrans routinely reviews CEQA documents for local agency development projects. In this role, Caltrans is either a commenting agency or a responsible agency under CEQA (see CEQA § 21069) and sets expectations for adequate analysis of the State highway system. Caltrans recently released a draft update to their Transportation Impact Study Guide (TISG) (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, California Air Resources Board's *(ARB's) 2017 Climate Change Scoping Plan Update: The Strategy for Achieving California's 2030 Greenhouse Gas Target* (2017), 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.

If a lead agency chooses a different threshold, they may have to complete more than one impact analysis.

2.3 VMT Assessment

2.3.1 VMT Measurement

VMT can be measured in a variety of ways depending on whether the intent is to capture the amount of vehicle travel generated by a project (i.e., number of vehicle trips multiplied by their corresponding trip lengths) or a project's effect on VMT within a defined study area. Project effect information is more meaningful for VMT analysis because land use projects and land use plans often influence the vehicle travel associated with neighboring land uses. VMT is a preferred metric for environmental effects because

it captures how a project influences the environment related to fuel consumption and emissions while also serving as an indicator of potential impacts to pedestrians, bicyclists, transit riders, and travel safety.

VMT growth associated with land use and transportation projects is part of adopted regional transportation plans (RTPs) and general plans. These plans typically consider the acceptability of VMT growth at a cumulative or programmatic level. Additional VMT reduction may be achieved at the project level especially through TDM strategies, which are not fully accounted for in regional level travel forecasting models.

Although VMT is focused on vehicle travel, the goal of reducing per capita VMT growth rates leads to an emphasis on the effects of development patterns (e.g., land use mix and density) together with pedestrian, bicycle, and transit infrastructure. These factors have an impact on the number and length of vehicle trips. Efforts to reduce VMT may also include TDM strategies that encourage more efficient forms of travel or vehicle use.

2.3.2 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 in the jurisdiction for trips made to and from the home for a typical weekday.
- Daily home-based work VMT per employee – VMT generated by employees in the jurisdiction for their commute trip to and from home for a typical weekday.
- Daily total VMT per service population – All VMT generated by residents, workers, students, customers, and visitors within the jurisdiction for a typical weekday.

VMT estimates for Nevada County were developed using a variety of measures and tools. These estimates are provided in Appendix A.

Estimates of current VMT and forecasts of future VMT are inherently dependent on the methodology used. These estimates and forecasts may not account for recent changes in economic activity, or future trends such as greater transportation network company (TNC) use through autonomous vehicles (AVs). Prior to COVID-19, expectations about the influence of these missing factors were that vehicle travel is likely to increase over time as the human driving function is eliminated, operating and parking costs are

reduced, and access to a variety of vehicle types becomes more ubiquitous. VMT trends will need to be monitored over time as COVID-19 economic outcomes may dampen these expectations.

2.3.3 VMT Thresholds

The OPR *Technical Advisory on Evaluating Transportation Impacts in CEQA* recognizes that areas outside of metropolitan planning areas, especially rural counties, have fewer options for reducing VMT. As such, VMT thresholds may be best determined on a case-by-case basis. While recognizing that rural areas are unique is important, using a case-by-case or project-by-project approach to threshold setting could be viewed as arbitrary. Further, having fewer mitigation options is not a sound basis for determining VMT impact significance.

For informational purposes, the land use project VMT thresholds recommended by OPR for projects in metropolitan planning organization (MPO) areas are listed below.

- For residential projects, OPR recommends a project threshold of 15 percent below the existing VMT per capita, either measured as a regional VMT per capita or as city VMT per capita. The VMT for the residential metric only includes VMT generated by residents, some of which starts and ends outside the area.
- For office projects, OPR recommends a project threshold of 15 percent below the existing regional VMT per employee. The VMT for the office metric only includes VMT generated by workers employed in the area.
- For retail projects, OPR recommends a project threshold of any net increase in total area VMT.

Another VMT per capita threshold option is total VMT per service population (total of residents and employees).

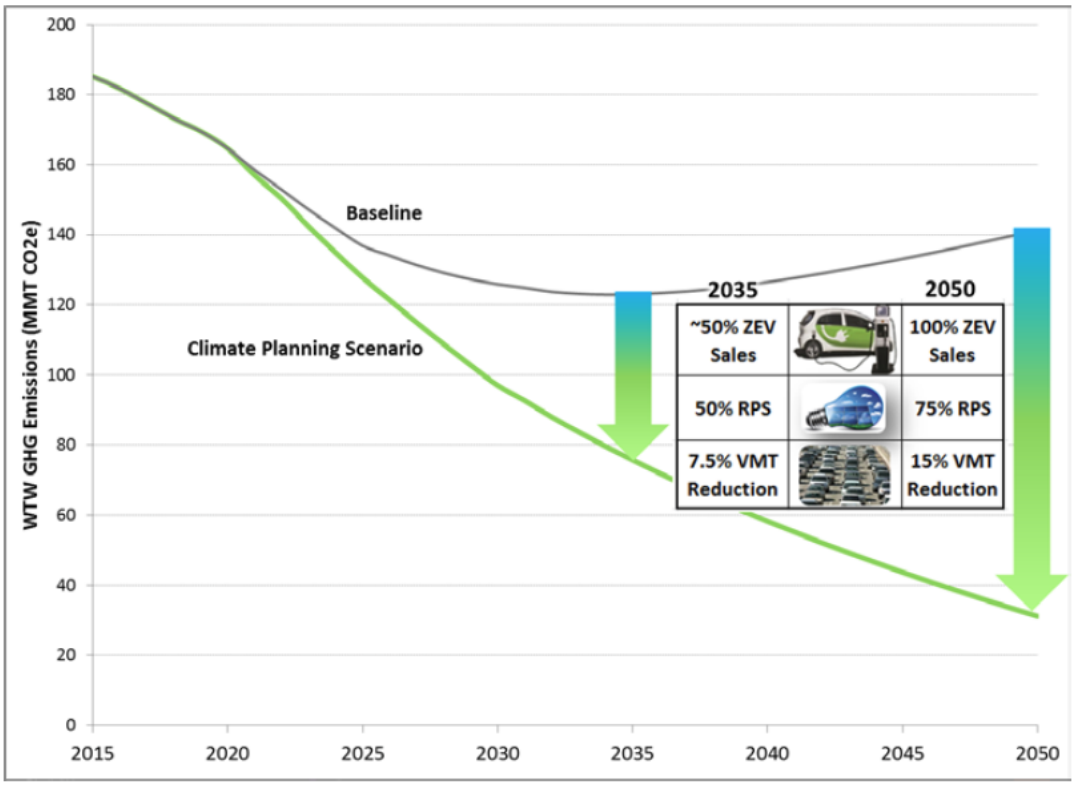
OPR's Technical Advisory recommends that all land use project (and land use plans) be evaluated for consistency with the relevant Regional Transportation Plan/Sustainable Community Strategy (RTP/SCS). Nevada County is not an MPO and is only required to prepare an RTP, not an RTP/SCS. Nevertheless, consistency with the RTP is a useful starting point for impact analysis. Consistency should be measured to verify that the approval of the land use plan or land use project does not jeopardize the VMT forecasts and associated impact findings of the RTP EIR. While consistency with an RTP and its EIR is a reasonable starting place for VMT impact analysis for all projects, further analysis may be required. The evidence cited in the Technical Advisory includes the following important resource documents.

- *California Air Resources Board Mobile Source Strategy (2016)* (https://www.arb.ca.gov/planning/sip/2016sip/2016mobsrc.htm) describes California's strategy for

containing air pollutant emissions from vehicles and quantifies VMT growth compatible with achieving state targets.

- *California Air Resources Board's 2017 Climate Change Scoping Plan Update: The Strategy for Achieving California's 2030 Greenhouse Gas Target* (2017) (https://www.arb.ca.gov/cc/scopingplan/scopingplan.htm) describes California's strategy for containing greenhouse gas emissions from vehicles and quantifies VMT growth compatible with achieving state targets.

These documents provide evidence that RTP/SCS GHG reductions are not sufficient to meet California's targets as shown in the following chart.



WTW = well-to-wheel emissions
MMT CO2e = million metric tons carbon dioxide equivalent
RPS = renewable portfolio standard

California GHG Emissions Targets
Source: https://www.arb.ca.gov/cc/sb375/final_staff_proposal_sb375_target_update_october_2017.pdf (page 12)

The baseline scenario in the chart above includes the influence of the first round of RTP/SCSs, which is not sufficient to achieve statewide emissions goals. The chart notes that an additional 15 percent reduction in total VMT is required to hit the proposed trend line by 2050. Note that the baseline trend did not consider recent updates to statewide population forecasts that reduced future 2050 population by about 5 million

or key disruptive trends such as TNCs, AVs, or COVID-19 economic effects so it is possible that VMT reduction expectations may change over time.

3. Transportation Impact Analysis Changes for Nevada County

This chapter addresses the following topics regarding implementation of SB 743 in Nevada County:

- Impact analysis and measurement: LOS vs. VMT
- VMT impact analysis methodology
- Setting VMT significance thresholds
- Continued use of LOS after SB 743

3.1 Impact Analysis and Measurement

3.1.1 Level of Service (LOS)

Until SB 743, transportation impact analysis performed to comply with CEQA commonly focused on the perspective of automobile drivers when measuring potential impacts, specifically by measuring the level of delay for drivers traveling through certain intersections or on certain roadway segments. This perspective reflects general traffic engineering practices and how traffic operations are measured based on quantitative metrics such as vehicle speed or delay.

Since LOS is directly related to driving convenience (e.g., measurement of delay), it generally found acceptance by public agencies needing to measure roadway network performance and assessing how that performance may change due to a land use development or transportation project. Part of the acceptance was the ability to communicate network performance in a form that was directly relevant to drivers and generally understood by the public and decision makers. The current practice, however, does have limitations and consequences that contributed to the SB 743 shift away from vehicle LOS to VMT for CEQA purposes.

3.1.2 Vehicle Miles Traveled (VMT)

VMT does not directly measure traffic operations but instead is a measure of network use or efficiency, especially if expressed as a function of population or employment (i.e., average daily VMT per resident). VMT can also serve as a proxy for impacts related to energy use, air pollution emissions, GHG emissions, safety, and roadway maintenance (see http://opr.ca.gov/ceqa/updates/sb-743/ for more information). For agencies looking for a connection between VMT and traffic operations, it is possible to isolate VMT that occurs during peak periods or on congested roadways (i.e., congested VMT). Congested VMT is

commonly measured by accumulating VMT on roadway links with volume-to-capacity (V/C) ratios greater than 1.0 while peak period VMT tends to isolate the portion of daily VMT occurring during the morning and evening commute periods (e.g., 6-9 AM and 4-7 PM). Efforts to reduce peak period or congested VMT can have the co-benefit of reducing travel delays presuming the level of improvement does not induce new vehicle travel.

The relationship between VMT and energy or emissions is based on fuel consumption. The traditional use of VMT in environmental impact analysis is to estimate mobile air pollution emissions, GHGs, and energy consumption. VMT is typically calculated using travel demand models, which estimate the total number and length of vehicle trips for a given area. VMT can also be calculated using spreadsheet models especially for land use development projects. These calculations are based on vehicle trip generation estimates multiplied by trip lengths. Trip rates and trip lengths should come from locally validated sources such as household travel surveys, mobile device data, and local trip generation studies. In absence of those data sources, statewide or national data, such as vehicle trip rates from the ITE Trip Generation Manual, can be substituted with appropriate acknowledgement about the limitations of the data such as not being calibrated/validated to California with very limited sensitivity to land use context.

The shift to VMT for transportation impact analysis that complies with CEQA does require lead agencies to consider multiple steps as part of the implementation process depending on the type of project under analysis. Generally, a VMT analysis for CEQA purposes includes the following steps.[2]

1. Selecting a preferred VMT methodology.
2. Establishing baseline VMT levels (based on observed data or travel forecasting models).
3. Setting VMT thresholds for project and cumulative conditions.
4. Estimating and forecasting project and cumulative VMT effects.
5. Comparing project and cumulative VMT estimates/forecasts to the VMT thresholds to determine significant impacts.
6. Selecting VMT reduction strategies to mitigate significant impacts to the extent feasible.

[2] More detailed annotated flowcharts showing these steps for a general plan, a land use project, and a transportation project are available at http://www.fehrandpeers.com/sb743/.

Selecting the methodology and setting thresholds is one of the more challenging steps in the process and deserves special attention from lead agencies given the role that VMT plays in other environmental impact topics as explained in the next sections.

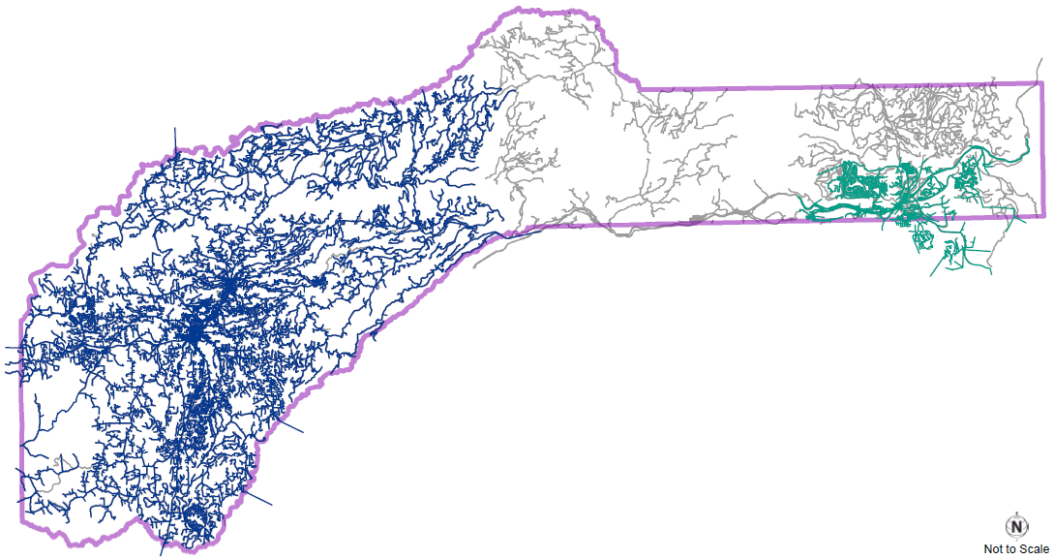
3.2 VMT Impact Analysis Methodology

The OPR *Technical Advisory on Evaluating Transportation Impacts in CEQA* makes it clear that both short-term and long-term projects effects on VMT should be analyzed, but specifically how to perform this analysis is left up to the lead agencies.

> *Where those VMT effects will grow over time, analyses should consider both a project's short-term and long-term effects on VMT. – Page 6*

The VMT impact analysis methodology should be able to estimate "project generated VMT" and the "project's effect on VMT" under both project and cumulative conditions. This statement holds true for land use projects, land use plans (i.e., the general plan), and transportation projects (if VMT is selected to evaluate transportation projects). Regional travel demand models tend to be the preferred tools for this type of analysis, but spreadsheet or sketch models may also be applicable if populated with accurate and defensible input data. Regional models can often serve as a source of this data, which may be required if the regional model was used to establish VMT impact thresholds.

While a range of methods exist for generating VMT estimates and forecasts, Nevada County jurisdictions have often relied on regional travel forecasting models. The western Nevada County and Truckee models (both trip-based models that estimate trips based on land use amounts and patterns) are estimated, calibrated, and validated using local and regional data. However, some areas of Nevada County are not covered in either the Nevada County model or the Truckee model, as shown on the gray roads in the following figure.



Travel Demand Model Coverage in Nevada County
Blue = Western Nevada County model, Green = Truckee model
Source: Fehr & Peers, 2019.

Projects located in the areas not covered by existing models have limited options for performing VMT analysis. Without expansion of the Nevada County or Truckee models to cover these areas, VMT analysis would be limited to spreadsheets or simple sketch models. Because these areas have relatively low population and are less likely to be developed in the future than the areas covered by the models, use of spreadsheets or sketch models may be the best option. Even for areas covered by existing travel models, additional actions may be required to fully comply with SB 743 expectations as outlined in the OPR *Technical Advisory on Evaluating Transportation Impacts in CEQA*.

VMT forecasts should not truncate trip lengths based on political boundaries. To meet this expectation, the existing Nevada County model and data processing have been enhanced to include the additional trip length that occurs outside the model boundary for trips with at least one trip-end in the model area. The Truckee model may also require similar enhancements. Alternatively, spreadsheet or sketch models could be developed that rely on the vehicle trip generation estimates from the local models (or models sensitive to local land use context) but use complete trip lengths based on other observed travel data sources such as the California Household Travel Survey (CHTS) or big data sources such as StreetLight.

OPR also recommends that the VMT analysis methodology used to set thresholds should be the same as that used for project analysis to ensure an apples-to-apples comparison.

> *When using models and tools for those various purposes, agencies should use comparable data and methods, in order to set up an "apples-to-apples" comparison between thresholds, VMT estimates, and VMT mitigation estimates. – Page 30*

Since project generated VMT estimates for land use projects will typically rely on just two variables, vehicle trips and vehicle trip lengths, the methodology used to estimate these two parameters deserves special attention. ITE vehicle trip rates are a common data source but these rates are not calibrated and validated for California jurisdictions, which limits their accuracy and defensibility. In fact, the *ITE Trip Generation Handbook* recommends relying on locally valid data to produce accurate vehicle trip generation estimates especially to account for local land use context effects. One way to accomplish this outcome is to rely on methods such as the US EPA MXD trip generation tool (https://www.epa.gov/smartgrowth/mixed-use-trip-generation-model), which modifies ITE vehicle trip generation estimates to account for seven built environment variables related to land use and demographics. Alternatively, jurisdictions can perform local land use specific trip generation studies. For trip lengths, limited data exists typically from aggregate household travel surveys, (http://www.dot.ca.gov/hq/tpp/offices/omsp/statewide_travel_analysis/chts.html) big data vendors (i.e., StreetLight, https://www.streetlightdata.com/) or regional travel forecasting models.

As noted above, the "project generated VMT" estimates will need to be supplemented with analysis that demonstrates the "project's effect on VMT." This type of analysis provides a more complete picture of how a project will influence existing and future VMT associated with the project and the surrounding generators of VMT. This method recognizes that the land use projects and land use plans approved by cities and counties only influence the potential supply of land use types and amounts (and sometimes their form) that can occur on specific parcels. These decisions do not change the long-term projections of population and employment at a regional or even sub-regional scale, but they will influence the future allocation of that growth, which may result in more or less VMT. Since VMT is a composite metric that reflects the combination of influences from the transportation network, land use patterns, travel behavior, etc., the main CEQA question should be whether the changes proposed by the project result in a better or worse VMT outcome over time (i.e., the cumulative scenario). Otherwise, decision makers and the public will be misinformed about how a project is likely to affect VMT and its related influence on other effects such as emissions. All project generated VMT estimates will show a net positive while the project's effect on VMT could be an increase or a decrease. Judging projects or plans solely on a projected generated threshold could result in significant impacts for projects that would realistically be reducing the potential long-term VMT for the area.

3.3 Setting VMT Significance Thresholds

In general, the CEQA Guidelines Section 15064.7 allows lead agencies the discretion to select their own transportation impact metrics and thresholds. SB 743 limits that discretion to some degree by directing OPR to select a new transportation impact metric and to provide guidance on thresholds. Further, SB 743 included Section 21099(e), which likely limits the ability of lead agencies to select thresholds less

protective of the environment than those recommended by OPR. Another important aspect of Section 15064.7 is that the selection of thresholds needs to be supported by substantial evidence. This means that the selection of VMT thresholds needs to consider data, facts, research, and analysis related to what amount of VMT change would constitute a significant impact.

While OPR has developed specific VMT impact thresholds for project-related impacts (the current guidance does not fully address cumulative impacts), current practice has not sufficiently evolved where a clear line can be drawn between "acceptable" and "unacceptable" levels of VMT change for purposes of determining significant transportation impacts. Instead, lead agencies will need to consider a variety of evidence from sources such as those listed below to create the substantial evidence to support a new VMT threshold.

- AB 32 Scoping Plan.
- SB 375 Targets and MTC RTP-SCS.
- SB 743 Objectives and OPR's recommendations.
- ARB Mobile Source Strategy.
- Governor's Executive Orders (EO-S-3-05, EO-B-16-12, and EO-B-30-15).
- Caltrans Strategic Management Plan (SMP) VMT Reduction Target.
- Caltrans Smart Mobility Framework.
- CAPCOA's Quantifying Greenhouse Gas Mitigation Measures.

Given this information, lead agencies in Nevada County have at least two options for setting thresholds.

1. Rely on VMT threshold recommendations developed by OPR for MPO areas.

If VMT reduction is an important goal for a lead agency in Nevada County, they could rely on the thresholds recommended by OPR . The current OPR threshold guidance is contained in the *Technical Advisory on Evaluating Transportation Impacts in CEQA,* California Governor's Office of Planning and Research, December 2018. The thresholds for land use projects, land use plans, and transportation projects are described below.

a. Land use projects

OPR guidance on thresholds for land use projects is listed 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 or as city VMT per capita.
- 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.

A key limitation of the OPR recommendations is that they only cover project impact thresholds for residential, office, and retail land uses. Other land uses are not addressed and guidance for cumulative impacts is limited to avoiding inconsistencies with the relevant RTP/SCS. In general, work-related land uses could use the OPR recommendations, and consistency with the RTP VMT forecasts could substitute for RTP/SCS consistency.

b. Land use plans

For land use plans such as general plans, the OPR recommendation is that a significant impact may occur if the plan is not consistent with the relevant RTP/SCS and if the plan's aggregate land uses generate VMT at a rate greater than 15 percent below the baseline average. Nevada County is not an MPO and is only required to prepare an RTP so this guidance could be interpreted such that plans should be consistent with the RTP. Consistency is a determination that each lead agency is responsible for making based on substantial evidence. At a minimum, consistency should consider if the following statements are true.

- Physical area where development can occur is similar to that in the RTP.
- Development specified in the plan leads to VMT that is equal to or less than the VMT per capita and VMT per employee resulting from the RTP.

As discussed earlier, evidence suggests that RTP and RTP/SCS related emissions reductions are not sufficient to meet California's targets. This evidence also suggests that consistency with the RTP alone would not be sufficient for a less-than-significant impact finding. Instead, lead agencies may need to estimate whether their proposed general plans could reduce regional VMT in line with the ARB recommendation.

c. Transportation projects

For transportation projects, the CEQA Guidelines allow the lead agency to select its preferred metric for impact analysis. This may include continued use of vehicle LOS and delay metrics presuming these metrics are found to be consistent with CEQA (CEQA Guidelines Section 15064.3) and protective of the environment (CEQA Guidelines Section 15064.7). However, the impact analysis for all relevant sections of the EIR should recognize that roadway capacity expansions projects have the potential to generate induced VMT. The key question regarding induced VMT is whether some or all of it is undesirable such that a threshold can be associated with it.

2. Develop jurisdiction-specific VMT thresholds.

Lead agencies have the option to develop their own VMT thresholds for land use plans, land use projects, and transportation projects. In rural areas of non-MPO counties (i.e., areas not near established or incorporated cities or towns), OPR notes that fewer options may be available for reducing VMT, and significance thresholds may be best determined on a case-by-case basis. OPR also notes, however, that "clustered small towns and small town main streets may have substantial VMT benefits compared to isolated rural development…" (page 19). As such, establishing sub-regional VMT thresholds that capture local land use contexts should be considered.

While recognizing that rural areas are unique is important, using a case-by-case or project-by-project approach to threshold setting could be viewed as arbitrary. Establishing clear thresholds for each lead agency adds clarity to the development review process. Exactly what the VMT impact threshold should be is more difficult question. Determining when a VMT change represents a significant impact is difficult to establish without linking VMT to other environmental resources and considering its relationship to the built environment and economic factors. This determination already occurs for energy, air quality, and GHGs, so agencies will need to consider how VMT is used in these other impact areas in establishing a new threshold specifically for transportation. If these other sections include expectations for VMT reduction, then a new VMT threshold for SB 743 should not be inconsistent.

Lead agencies could also consider establishing the "existing" or "baseline" VMT per resident or VMT per employee as the recommended threshold given that CEQA impacts begin with how a project changes baseline conditions. If a project would not change baseline VMT per resident or VMT per employee, then the project would perform similar to existing development. This may be sufficient evidence to demonstrate that a project would have a less than significant impact on VMT but would not be sufficient to demonstrate that the project would adequately contribute to VMT reduction necessary to achieve state VMT and GHG reduction goals. Since a threshold is not a "safe harbor," the other evidence presented above from ARB about the need for VMT reduction should also be considered in making final impact significance determinations.

It is also important to consider that VMT, by itself, is a composite metric that measures the vehicle travel effect associated with land use patterns, growth, transportation network changes, and human travel behavior. Further, VMT also varies over time as a function of economic activity and travel cost. VMT tends to increase with economic activity and decline with higher costs for vehicle travel (i.e., higher gas prices). New trends associated with growing use of TNCs along with future shifts to autonomous vehicles (AVs) are likely to complicate VMT forecasts since the potential change is highly dependent on whether future vehicles are heavily shared.

Under the options above, threshold setting is likely to involve consideration of VMT forecasts from the two travel models used in Nevada County. This conclusion is drawn from the need to evaluate projects based on RTP consistency, produce VMT forecasts that are not constrained to political boundaries, and the potential use of threshold benchmarks tied to sub-regional, citywide, or region-wide scales.

Since the OPR recommendations tie the thresholds to "baseline" conditions, the actual threshold should be based on an interpolation between the base year and future year values for a project's specific baseline year. Also, note that rounding can matter, and the jurisdictions will also need to decide how many decimal places to include. Given the accuracy of forecasts, more than one decimal place is typically not reasonable.

As noted earlier, evaluating project effects on VMT or VMT per resident or employee should consider that most development projects only involve changing land use type or expanding allowed land use supply. As such, project generated VMT effects should rely on constant levels of population growth, employment growth, student growth, and income within the study area unless substantial evidence exists to demonstrate that the project approval will change these variables. In almost all land use decisions, the change in general plan land use designation and underlying zoning will only affect the allocation of future growth within a region.

3.4 Continued Use of LOS After SB 743

As noted earlier, cities and counties can continue to use vehicle LOS as part of their transportation planning and entitlement review. The loss of vehicle LOS in CEQA will likely reinforce the importance of the general plan and supporting implementation methods (such as impact fee programs) as the primary means for defining a jurisdiction's policy approach to transportation network operation and expansion. As the importance of general plans increases, it is worth noting that many general plan circulation elements (and resulting traffic impact fees) were developed without consideration of capital, operations, and maintenance financial constraints. Jurisdictions may also find themselves in a difficult situation if the traffic impact fee necessary to fully fund the circulation element exceeds a reasonable level that could be supported within the real estate and development marketplace.

Any general plan LOS expectations (and commensurate development levels) should reflect the amount of infrastructure the jurisdiction can afford to build, operate, and maintain. Development projects consistent with this type of general plan would require little (or no) vehicle LOS impact analysis for off-site roadways or intersections, but instead could focus on issues such as the adequacy of multi-modal site access and parking provision to comply with applicable design standards. This could substantially reduce the effort required in typical CEQA transportation impact studies.

3.5 Pros and Cons of Options for VMT Thresholds

Based on the information above, a comparison of pros and cons for two options for establishing new VMT thresholds are presented below.

1. **Use OPR VMT thresholds for MPO areas for all future projects and plans requiring environmental review**

Pros: Provides simple guidance for thresholds that are known to be consistent with most up-to-date state-level guidance; Caltrans has indicated it will refer to these thresholds in absence of locally established thresholds. For transportation projects, OPR guidance presumes that small roadway expansions, all transit, and all bicycle and pedestrian projects have less than significant VMT impacts.

Cons: Local land use projects may not be able to achieve VMT levels that are 15 percent below baseline conditions and is likely to be even more challenging in rural areas of Nevada County.

Additionally, the 15 percent reductions specified in the *Technical Advisory* are based on light-duty vehicle VMT (i.e., passenger cars and light trucks). 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 2018 baseline levels 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 may increase.

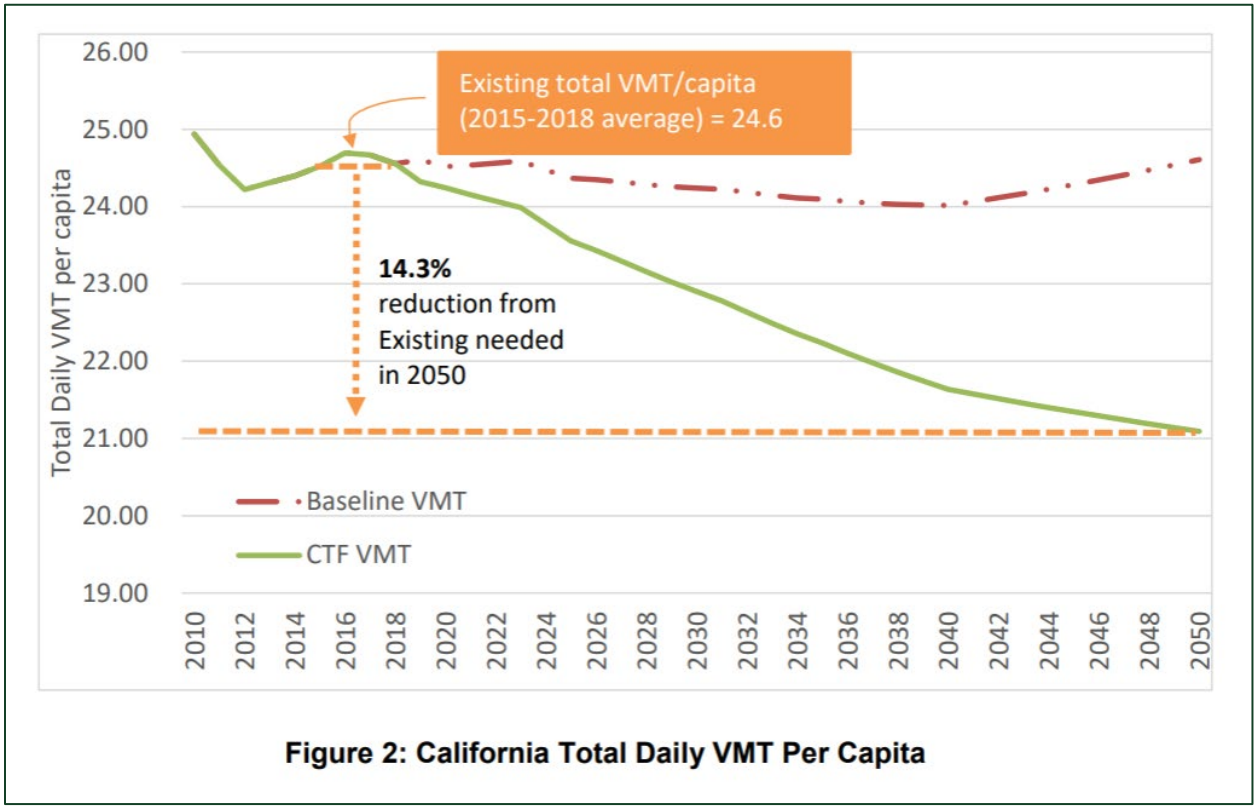
2. **Adopt (i.e., through resolution or ordinance) jurisdiction-specific VMT thresholds.**

Pros: Allows for locally based determination of what constitutes an environmental impact and consistency across other impact topics such as air quality, GHGs, and energy.

Cons: Local jurisdictions will need to establish substantial evidence for the specific adopted thresholds. This is particularly important if the thresholds deviate from the OPR recommendations or are inconsistent with the RTP. Such an effort would require the assistance of each jurisdiction's CEQA attorney. The threshold recommendations may not

fully reflect the best available data on VMT reductions needed to meet state desired air pollution and GHG goals as established in the ARB Mobile Source Strategy.

Determining an appropriate VMT threshold may depend 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. Analytical studies such as the ARB *2017 Scoping Plan* did not differentiate the adverse effects of VMT/GHG by area type so a change in rural or urban VMT would have the same effect. 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 (i.e., passenger cars and light trucks) or VMT per capita and 14.3 percent total (i.e., all vehicles) VMT per capita would be appropriate (see the following excerpt).



ARB Recommended Total VMT per Capita Threshold
Source: *California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals*, January 2019

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.

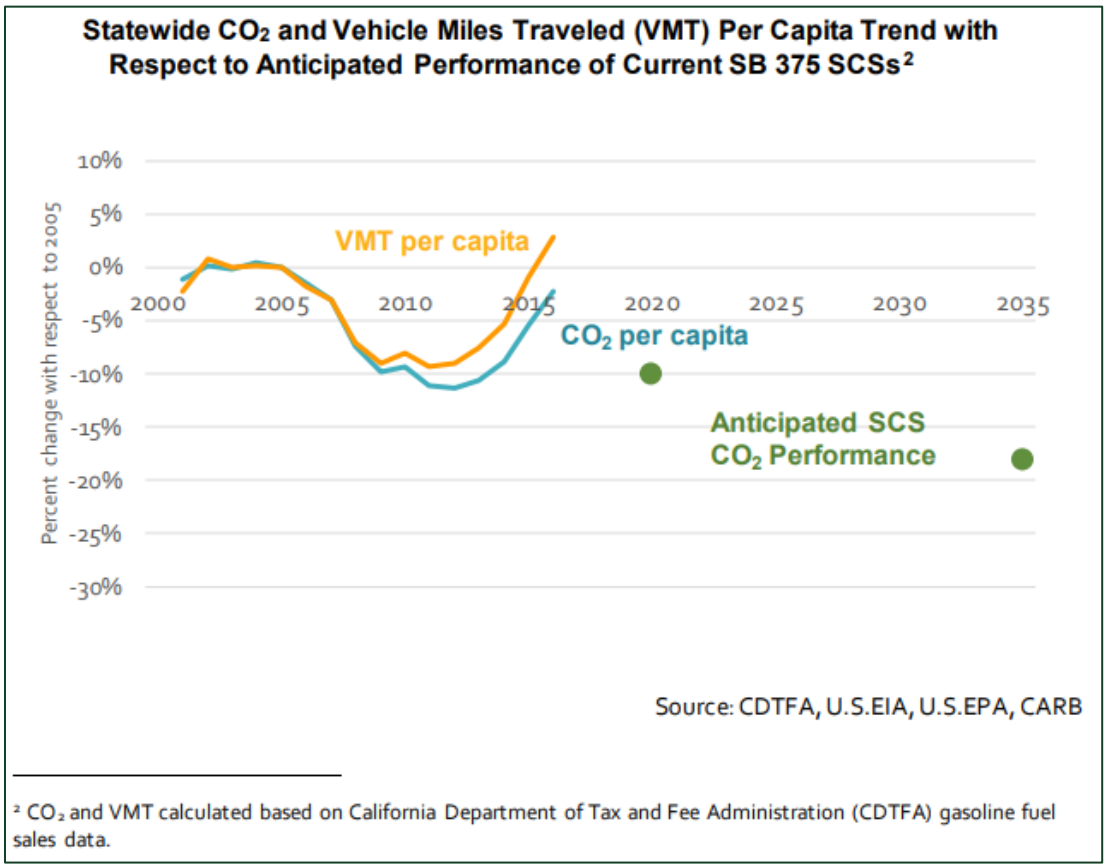
In treating VMT as only a mobility metric, the basic rationale would be that VMT is simply another way of measuring transportation network performance and that the lead agency is granted the discretion to measure network performance expectations and their effects on humans. These effects are not limited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

The lead agency may also note that the ARB *2017 Scoping Plan* 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. 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 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).

A potential challenge to any VMT threshold is that the *2018 Progress Report California's Sustainable Communities and Climate Protection Act*, California Air Resources Board (ARB), November 2018 includes evidence that VMT and GHG per capita had recently been increasing. According to the *2018 Progress Report*, VMT rates in California have been increasing in direct conflict with regional transportation plan/sustainable community strategy (RTP/SCS) projections showing declines, as shown in the following chart.



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

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.

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."

Significance thresholds are not a safe harbor under CEQA.[3] A lead agency will need to consider other substantial evidence related to VMT impacts when analyzing specific projects and making VMT impact significance determinations. 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. It is especially important when thresholds closer to baseline (instead of a 14.3 percent or more reduction from baseline) are selected. This consideration should include information such as the OPR and ARB VMT thresholds, the SB 32 scoping plan, the *2018 Progress Report*, and the recent COVID-19 effects.

One approach to using thresholds and "other substantial evidence" when analyzing a project could follow the steps below.

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 the final impact is determined, develop mitigation measures if appropriate.

3.6 Screening

Analysis of smaller, less complex projects can be simplified by using screening criteria. OPR 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 presumption of less than significant impact using screening of a project is based on limited information, 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

[3] Protect the Historic Amador Waterways v. Amador Water Agency (2004) 116 Cal. App. 4th 1099, 1108-1109.

The following screening thresholds are most applicable in Nevada County jurisdictions:

- Projects consistent with an RTP or General Plan that attract fewer than 110 trips per day. However, substantial evidence for this threshold is not provided. Because VMT is cumulative, any addition may be considered significant.

- Residential and office projects that are located in areas below threshold VMT that incorporate similar features (i.e., density, mix of uses, transit accessibility).

- 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. Given Nevada County's location relative to other retail centers in Auburn, Roseville, Sacramento, and Reno, such projects may also reduce VMT.

- Projects in western Nevada County consistent with an RTP or General Plan that generate less than 630 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 vehicle trip generation rate contained in the OPR *Technical Advisory* for small project screening and average vehicle trip lengths for western Nevada County using the travel forecasting model. A similar number may be calculated using the Truckee travel forecasting model.

3.7 Transportation Projects

For transportation projects, the OPR *Technical Advisory on Evaluating Transportation Impacts in CEQA* includes a spreadsheet methodology for estimating induced VMT using elasticities of VMT to lane miles based on published research. While this methodology is simple to use, it will always show an increase in VMT with any increase in lane miles. Roadway networks can generate relationships that are more complex, especially if a roadway projects helps to fill a gap in the network (i.e., constructs a new bridge) such that VMT may decrease. Hence, regional models tend to be preferred if a complete analysis of VMT effects is desired. It is also important to note that induced vehicle travel research is largely based on congested urban areas. The elasticity estimates may not be appropriate for use in rural areas where people are less likely to be avoiding making trips due to existing congestion.

4. Methodology and Threshold Recommendations

This chapter recommends VMT methodologies and thresholds for all NCTC jurisdictions.

4.1 Measure

Recommendation: Use total weekday VMT per service population (residents plus employees and students) as the measure of VMT.

This measure captures all vehicles and trip types related to VMT production by the service population, which includes residents, employees, and students. This measure also provides the benefit of being consistent with VMT data used in other sections of CEQA analysis, such as air quality, greenhouse gases, and energy. If desired, a lead agency may also use VMT per resident and VMT per employee to measure VMT effects. When using any of these forms of VMT, it is important to recognize that VMT is being expressed as a generation rate and not a ratio. For example, VMT per service population is how much VMT is generated by the residents, employee, and students of the project.

Visitors (tourists) can generate VMT that may not be accounted for by employment levels. An example is visitors that are attracted to self-directed outdoor recreation opportunities, such as hiking or bicycling, which may not directly involve local businesses. If the travel demand model includes visitors as an input in the trip or activity generation step, visitors should also be included in the service population.

Variation among model travel analysis zones (TAZs) in the mix of residential and work-related land uses may create anomalous patterns when screening using total VMT per service population, so, for screening purposes, two other measures may be useful:

- For residential land use projects, home-based VMT per resident
- For work-related land use projects, home-based work VMT per employee

4.2 Thresholds of Significance

Recommendation: A project's or plan's VMT impact may be considered less than significant if:

- The project or plan total weekday VMT per service population is equal to or less than "X" percent below the subarea mean under baseline conditions;

AND

- The project or plan is consistent with the jurisdiction's general plan and the Nevada County Regional Transportation Plan.

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

The *Technical Advisory* notes that in rural areas of non-MPO counties such as Nevada County, fewer options may be available for reducing VMT, but that clustered small towns and small-town main streets may have substantial VMT benefits compared to isolated rural development. Therefore, a more modest reduction may be in line with general plan objectives and also appropriate for the land use context for Nevada County. However, because the Caltrans TISG draft is supportive of the specific OPR *Technical Advisory* guidance, less restrictive thresholds are unlikely to be accepted for state highway facilities,

When selecting a threshold, it is necessary to establish how natural and human environment harm is being avoided. Therefore, thresholds should not be tied to mitigation feasibility, and it is thus difficult to treat rural areas differently than urban areas. In this respect, VMT may be considered to be more like air quality, which generally uses specific thresholds used regardless of jurisdiction, and less like LOS, which generally uses thresholds based on local values and perceptions. The 14.3 percent reduction in total VMT per capita and the 16.8-percent reduction in light-duty vehicle VMT per capita recommended in ARB's 2017 *Scoping Plan* (for the Western Nevada County model, which estimates total VMT, setting "X" equal to 14.3) are supported by substantial evidence. Additionally, they are referenced in the OPR *Technical Advisory* which has been endorsed by Caltrans in their draft TISG. Endorsement by Caltrans could establish them as a State threshold as noted above.

If a lesser value of "X" is selected, other substantial evidence will still need to be considered in the final impact determination, including the latest information from ARB on VMT thresholds and the ARB *2018 Progress Report*, which shows that statewide VMT trend is up.

Bicycle, pedestrian, and transit project may be presumed to have no VMT impact. However, project impacts on these modes and facilities still must be analyzed. Similarly, impacts of projects on the safety of the transportation system still must be analyzed.

These thresholds were developed to be used with the model-based methodology discussed later in this memorandum. The subarea threshold acknowledges the differences in VMT generation in different parts of Nevada County. Subareas, based on similar travel characteristics and proximity, are recommended to be:

- City of Grass Valley
- City of Nevada City
- Town of Truckee
- Alta Sierra
- Lake of the Pines
- Lake Wildwood and Penn Valley
- Remainder of Western Nevada County
- Remainder of Eastern Nevada County

For each project or plan that does not meet the screening criteria discussed further below, determine a project analysis baseline year (typically when the Notice of Preparation is filed) by interpolating between the model base and future years. This interpolation acknowledges the growth and VMT adopted by the general plans for each jurisdiction. Alternatively, in areas with little or no growth (such as Nevada City), use of the model base year as the project analysis baseline year may be acceptable.

NCTC jurisdictions may consider more stringent thresholds to increase their defensibility. According to the *2018 Progress Report California's Sustainable Communities and Climate Protection Act*, California Air Resources Board (ARB), November 2018, VMT rates in California have been increasing in direct conflict with regional transportation plan/sustainable community strategy (RTP/SCS) projections showing declines, as discussed above.

ARB has also produced specific guidance for VMT reductions to meet statewide goals in the ARB *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals*, January 2019. ARB recommends VMT reductions of 16.8 percent reduction from baseline for light-duty vehicle VMT or a 14.3 percent reduction for total VMT, as discussed above.

These reductions are dependent on MPO RTP/SCS targets being met, which may not be a reasonable assumption for CEQA purposes given the information presented above from the *2018 Progress Report California's Sustainable Communities and Climate Protection Act*. Also, ARB does not provide details about whether the VMT values should be compared against jurisdictional or regional baseline values, nor does ARB distinguish between rural and urban areas. Since the analysis was based on statewide data, it may be reasonable to presume that the reduction expectation is a fair-share estimate for all jurisdictions.

At a minimum, this additional evidence needs to be considered by lead agencies when assessing VMT impact significance.

4.3 VMT Methodology for Land Use Projects and Land Use Plans

Recommendation: Use travel demand forecasting models to analyze VMT in subareas covered by NCTC and Truckee models.

These models are estimated, calibrated, and validated using local and regional data and can provide the reasonable estimates of VMT. The models can be used directly or used to create screening tools, discussed in more detail later in this chapter.

We recommend analyzing project-level VMT effects of the project by adding it to the base year model to create a base year plus project scenario. Similarly, we recommend analyzing cumulative VMT effects by modifying the allocation of future year land use growth based on the project's land use supply changes.

Estimate VMT per service population to one decimal place. Further precision is beyond the accuracy of the models.

To support this recommendation, update both models to improve their estimates of VMT:

- Update both models or model post-processing tools to account for trip distances outside of the model area, based on trip distances from the California State Travel Demand Model (CSTDM) or California Household Travel Survey (CHTS).
- Update both models to include intrazonal trip distances.
- Update the Truckee model to forecast daily traffic volumes, in addition to PM peak period or scale PM peak period volumes to daily volumes using big data resources (such as StreetLight or INRIX) that can provide relative traffic volumes over the course of a day.
- Update the future year Truckee model to represent a specific future year instead of or in addition to an undefined buildout year or use historic traffic counts combined with population/employment projections to develop growth factors that could be applied to estimate traffic volumes in a specific future year
- Identify conversion factors to translate square feet of development to employees and households to residents.

The western Nevada County model also does not currently model home-based work attractions to schools separate from other attractions; these trips are included with student trips. Separation of these would improve estimation of home-based work VMT for screening discussed below.

Truckee traffic characteristics are also different from Western Nevada County travel patterns due to the large share of seasonal tourist traffic in Truckee. Traffic patterns may be very different in summer and winter due to resort and tourist traffic. Additionally, many dwelling units are used as second homes or vacation rentals, and thus experience different occupancy patterns than full-time housing. These characteristics influence annual traffic levels and may be important for the town to consider if using annualized emissions estimates based on VMT. The model or its outputs can be adjusted to account for seasonality especially with new data sources such as mobile device data.

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
    - Changes to land use that affect subareas
    - 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

Recommendation: Using screening to simplify analysis for many land use projects.

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

- The project generates less than 630 VMT per day and is consistent with the jurisdiction's general plan and the Regional Transportation Plan.

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

- The project is a residential or work-related land use, located in a TAZ with similar land uses and travel demand characteristics, and the TAZ VMT per service population is equal to or less than x % below the subarea mean. The project should also be consistent with the jurisdiction's general plan and the Nevada County Regional Transportation Plan.

- The project is a residential-related land use and the TAZ home-based VMT per resident is equal to or less than x % below the subarea mean. The project should also be consistent with the jurisdiction's general plan and the Regional Transportation Plan.

- The project is a work-related land use and the TAZ home-based work VMT per employee is equal to or less than x % below the subarea mean. The project should also be consistent with the jurisdiction's general plan and the Regional Transportation Plan.

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

Note that screening is also possible for transit priority areas, however no such areas exist in Nevada County. Transit priority areas are defined as areas within one-half mile of a major transit stop. Major transit stops are typically defined as transit serving rails stations, ferry terminals, or the intersection of at least two bus routes with headways of 15 minutes or less.

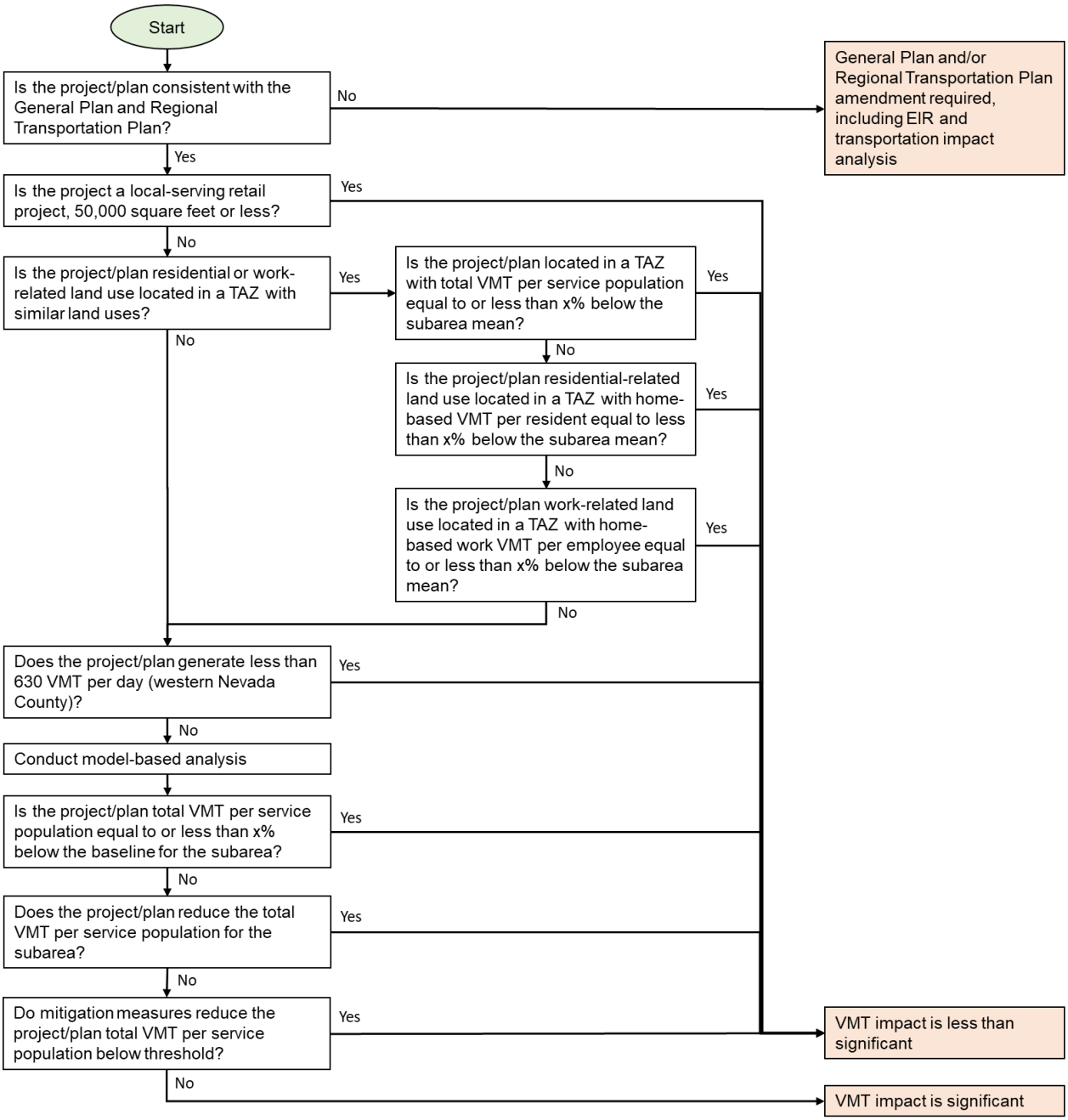
Additionally, though the OPR *Technical Advisory on Evaluating Transportation Impacts in CEQA* recommends a screening threshold for small projects of 110 trips, this number is not supported by substantial evidence, and we do not recommend using it. The July 2, 2018 revisions to Section 15064.4 (b) of the CEQA Guidelines added the sentence, "A project's incremental contribution may be cumulatively considerable even if it appears relatively small compared to statewide, national or global emissions." The California Natural Resources Agency "Addendum to the Initial Statement of Reasons," dated July 2, 2018, provides further discussion of this addition.

To simplify the determination if a project meets the last criteria, the baseline total weekday VMT per service population, home-based VMT per resident, and home-based VMT per employee can be calculated for each TAZ and subarea can be calculated for each TAZ and subarea. TAZs with a result lower than the sub-regional threshold can then be identified and mapped for use by planning department staff. A tool for performing this screening has been developed and is discussed in Appendix B.

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

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

This process is summarized in the flowchart below.



Recommendation: if a project in an area not covered by the NCTC or Truckee travel demand forecasting models is not screened by the retail screening criterion above, require detailed project VMT analysis.

The area outside of the two models, namely eastern Nevada County outside of Truckee, has a relatively small proportion of Nevada County's population and development. Much of this area is also mountainous with few paved roads. Generally, little development is expected outside of the model areas. The retail screening criterion identified above can also be used to screen projects in these areas.

If a project outside of the model areas does not meet this criterion, we recommend requiring the project to do more detailed VMT analysis. ITE trip rates, CHTS trip rates and trip lengths, and CSTDM trip rates and trip lengths are all possible sources of data for such an analysis.

The analysis will also need to calculate the threshold total weekday VMT per service population for the subarea in which the project is located and determine if the project meets the threshold. The threshold analysis will need to meet the substantial evidence criterion of CEQA Guidelines Section 15064.7, thus considering data, facts, research, and analysis.

4.4 Transportation Projects

Transportation projects have the potential to change travel patterns and may lead to additional vehicle travel on the roadway network, also referenced as induced vehicle travel (OPR *Technical Advisory*, pp. 19-23, and Appendix 2). This is particularly true for roadway capacity expansion projects., Under CEQA Guidelines Section 15064.3(b)(2), lead agencies have the discretion to select their own metrics for all modes. Lead agencies may consider retaining current practices such as using LOS methodologies and thresholds as identified in the General Plan, but should evaluate whether use of LOS still complies with the new CEQA Guidelines expectations in Sections 15064.3, 15064, and 15064.7. Lead agencies that do not choose VMT will still need VMT as an input to air quality, GHG, and energy impact analysis. 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. Preliminary Caltrans information states the following (emphasis added):

> C. Thresholds
>
> C1. What will Caltrans use as the CEQA threshold of significance? What is considered a VMT-significant impact?

> CEQA does not require that a lead agency adopt thresholds of significance. As a statewide agency with projects in a variety of environmental settings, Caltrans has not adopted thresholds of significance, and instead makes significance findings on a case-by-case basis considering the unique circumstances of the project as well as the environmental setting. *Caltrans' draft guidance suggests that generally, an increase in "VMT attributable to the project" as defined in the OPR Technical Advisory should be considered significant unless there are project-specific circumstances, which would render the impact less than significant and that determination can be supported by substantial evidence.*
>
> Source: Q&A from November 8, 2019 Webinar (https://dot.ca.gov/-/media/dot-media/programs/transportation-planning/documents/sb-743/2019-12-18-qa.pdf)

OPR's *Technical Advisory* provides an extensive list of projects which 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.

If VMT is used as the metric, transit and active transportation projects may be considered to have less than significant impact.

If the General Plan does not contain LOS thresholds, as in Nevada City, significance criteria should be developed consistent with the current community values with respect to expectations for transportation network performance. The current Nevada City General Plan has two local circulation objectives:

- Limit road widening and other major change to the characteristic street pattern. Rather, use these eccentricities as traffic capacity constraints, and encourage added traffic to be diverted as directly as possible to the highways.
- Improve the access to the few freeway interchange points, since they are to receive a large portion of future added traffic.

These objectives may be interpreted to mean that more restrictive thresholds may be appropriate for Nevada City.

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

Rather than analyzing VMT for each proposed land use project individually, a jurisdiction may choose to utilize VMT analysis performed during the development of the General Plan and General Plan EIR as the basis for determination of impact of proposed projects. Section 15183 of the CEQA Guidelines includes the following potential exemption for consideration by lead agencies.

> *(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.*

Setting a threshold for the general plan itself and analyzing VMT impacts in the general plan EIR could help projects qualify for this exemption.

4.6 Traffic Study Guidelines

Traffic study guidelines used by NCTC member agencies to incorporate the recommendations above. Nevada County and its municipalities currently utilize traffic study guidelines as follows:

- Nevada County: *Traffic Impact Study Guidelines* (November 2013)
- Grass Valley:
    - Section 4 of *Design Standards* (February 2012)
    - *Scoping Agreement for Traffic Study* (February 2012)
- Nevada City: no traffic study guidelines
- Truckee: no traffic study guidelines

As noted earlier, 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. 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.

Recommended additions to traffic study guidelines are provided in Appendix C. The Nevada County and Grass Valley guidelines are very similar, but the multiple subareas in Nevada County add complexity not necessary for Grass Valley, so separate recommended changes have been provided. Although neither Nevada City nor Truckee currently have guidelines, the Grass Valley guidelines could be readily adapted for use in those municipalities if guidelines are developed for those municipalities.

The recommendations in Appendix C are made to include analysis of VMT. Analysis of VMT does not preclude the need for analysis of transit, bicycle, and pedestrian impacts. Current discussion of these modes in the existing guidelines is limited. It is recommended that both jurisdictions consider additional guideline updates to include impacts of proposed projects on those modes.

Appendix C includes factors for converting land use categories in the NCTC travel demand model to residents, employees, and students. Jurisdictions may wish to cross-reference their general plan land use categories to the model categories to further simplify this conversion process.

4.7 Disruptive Trend Impacts on VMT Estimation

The VMT methodologies and thresholds described above are based on a presumption that future travel behavior will be consistent with recent travel behavior. Disruptive trend changes including current COVID-19 effects, TNCs such as Uber and Lyft, lower fuel prices, and public availability of AVs may change future travel behaviors, resulting in future VMT differing from current forecasts. As these trends evolve, models will need to be updated to reflect them.

5. Test Cases

This section documents test cases for the proposed VMT analysis methodologies and thresholds. Test cases were developed based on recent projects in Nevada County.

5.1 Retail Store, Alta Sierra

This test case uses a 9,100 square foot retail store on Alta Sierra Drive in Nevada County.

5.1.1 Analysis

Considering the questions in the process flowchart:

- Is the project/plan consistent with the General Plan and Regional Transportation Plan travel demand model?

  Partially/No: The project is consistent with the Neighborhood Commercial designation in the Nevada County General Plan map. However, insufficient information is available to determine if the analysis conducted for the general plan and EIR included this type and amount of development in this location. A review of the Nevada County travel model revealed the project was not consistent with the land use inputs for the TAZ in which it is located. As such, the project would not be consistent with the associated 2016 Regional Transportation Plan (RTP).

Based on the answer to this question, a General Plan amendment and RTP model adjustment may be desired, including environmental review and transportation impact analysis unless other evidence is provided that the project is likely to reduce baseline VMT. The next screening criterion is based on the project's land use and size.

- Is the project a local-serving retail project, 50,000 square feet or less?

  Yes: The project is a 9,100 square foot retail store.

The yes answer to this screening question is evidence that should be considered in making a VMT impact determination. The OPR Technical Advisory recommends screening out local serving retail projects because they generally help reduce VMT within the market area they serve. A new retail use does not change the local population, or its discretionary income spent on local retail shopping. Instead, the project provides a new shopping destination for the neighborhood and that typically results in shorter shopping trip lengths that can result in less VMT when measured across the neighborhood. This

conclusion would also apply under cumulative conditions presuming no substantial changes to the subarea land use and transportation context.

Given all the above information, a lead agency would have a choice about impact significance. The project size and likely VMT effects would typically reduce baseline VMT for the neighborhood and not alter or jeopardize the RTP or its findings. Consistency with the general plan is an interpretation to be made by the local agency and can consider consistency in light of the entire plan versus a single element or technical topic.

5.1.2 Recommendation

When reviewing this project, it was noted that the County-designated Alta Sierra Community Region is not located in the model's Alta Sierra subarea. NCTC may consider updating TAZ subarea designations or TAZ boundaries to better match County designations.

Having a current general plan with growth allocations and a circulation element consistent with the RTP travel demand model can help with consistency findings. As these plans and their related modeling deviate, potential inconsistencies become more problematic for individual land use project reviews.

5.2 Residential Development, Nevada City

This test case consists of 15 single-family dwelling units, 12 single-family dwelling units with second dwelling units, and 32 townhouses in a development on Providence Mine Road in Nevada City.

5.2.1 Analysis

- Is the project/plan consistent with the General Plan and Regional Transportation Plan travel demand model?

  No: The General Plan map indicates that the proposed parcel is designated as Employment Center. Residential uses are not consistent with this land use. Further, the NCTC travel demand model used for the RTP does not properly account for the effect of the project on VMT due to this change in land use.

Therefore, a General Plan amendment and RTP travel model adjustment may be required, including EIR and transportation impact analysis.

For purposes of this case study, a complete VMT analysis was also conducted using the NCTC travel model. This analysis would be like that required for an EIR. The model was run after adding the land use for this project. The results of this model run were used to answer the following:

- Does the project/plan reduce the total VMT per service population for the subarea?

  Yes: Using a baseline year of 2019, model results indicated that the total VMT per service population for the Nevada City subarea would be 34.8 without the project and 34.3 with the project. Using a cumulative year of 2035, model results indicated that the total VMT per service population for the Nevada City subarea would be 32.5 without the project and 32.0 with the project. Therefore, the project reduces the total VMT per service population for the subarea.

This evidence supports a conclusion that the project would have a less than significant VMT impact under baseline plus project conditions and cumulative conditions.

5.2.2 Recommendation

In performing the VMT analysis, the analyst was required to determine the appropriate NCTC travel model TAZ to modify to accurately represent the projects added residential units. The NCTC travel model was developed with the parcel data available at the time (2012). Since that time, the mapping accuracy of the parcel data has been improved. However, the travel model still reflects the old parcel data mapping. Therefore, the TAZ boundaries do not align with the parcel boundaries, as shown in the snapshot from the VMT tool below.

Source: Fehr & Peers, 2019.

Users of the model and screening tool need to be aware of this misalignment to avoid making errors associating parcels with their corresponding TAZs. The tool uses parcel centroids for mapping to minimize the potential for errors but updating the TAZ GIS data would eliminate this issue.

5.3 Single Family Housing, Grass Valley

This test case consists of 37 single-family dwelling units along or near Ryans Lane in Grass Valley.

5.3.1 Analysis

- Is the project/plan consistent with the General Plan and Regional Transportation Plan?

  Yes: The area is designated Urban Low Density in the Grass Valley General Plan map and the growth allocation in the NCTC travel demand model is sufficient to include the project, so it is consistent with the 2016 Regional Transportation Plan.

- Is the project a local-serving retail project, 50,000 square feet or less?

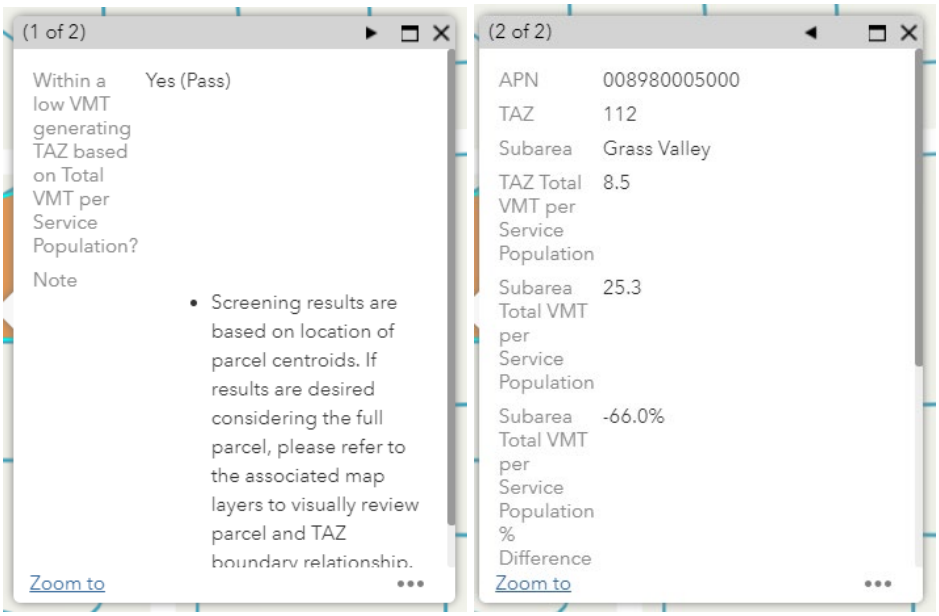
  No: The project is single-family housing.

- Is the project/plan residential or work-related land use located in a TAZ with similar land uses?

  Yes: The project is single-family housing located in a TAZ with existing single-family housing.

- Is the project/plan located in a TAZ with total VMT per service population equal to or x% less than the subarea mean?

  Yes: If analyzing the project under current baseline conditions (i.e., a 2019 baseline year), the project TAZ has 66% lower VMT per service population than the Grass Valley subarea mean. Output from the NCTC SB 743 Screening Tool, using a threshold of baseline VMT, is shown below.



Source: Fehr & Peers, 2019.

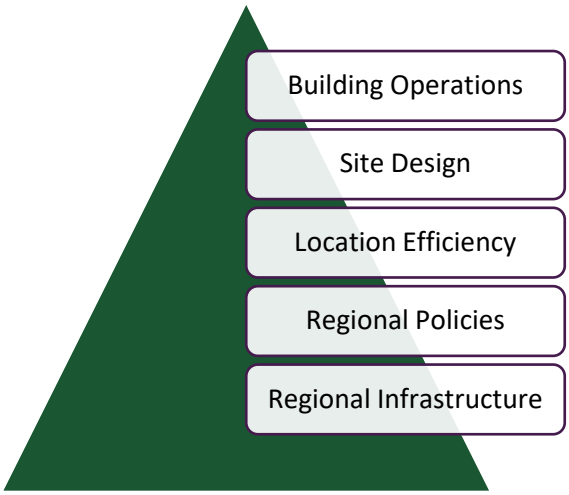
This evidence supports a conclusion that the project would have a less than significant VMT impact under baseline plus project conditions. This conclusion would also apply under cumulative conditions presuming no substantial changes to the subarea land use and transportation context.

6. TDM Strategies

This chapter summarizes our assessment of new research related to transportation demand management (TDM) effectiveness for reducing 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,* CAPCOA, August 2010 and to identify those strategies suited to Nevada County given its rural and suburban land use context. The first matrix in Appendix D summarizes the overall evaluation of all the CAPCOA strategies while the second matrix in Appendix D identifies the top seven strategies suited for Nevada County.

6.1 Strategy Review

This information can be used as part of the SB 743 implementation to determine potentially feasible VMT mitigation measures for individual land use projects in Nevada County. An important consideration for the mitigation effectiveness is the scale for TDM strategy implementation. The biggest effects of TDM strategies on VMT (and resultant emissions) derive from regional infrastructure and service investments that support use of transit, walking, and bicycling. While there are many measures that can influence VMT and emissions that relate to site design and building operations, they have smaller effects that are often dependent on final building tenants. The image below presents a conceptual illustration of the relative importance of scale.



Of the 50 transportation measures presented in the CAPCOA 2010 report *Quantifying Greenhouse Gas Mitigation Measures*, 41 are applicable at building and site level. The remaining nine are functions of, or

depend on, site location and/ or actions by local and regional agencies or funders. Table 2 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 (see full CAPCOA list below)
Building Operations	Employer, Manager	**26 total** 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 total** 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
Regional Infrastructure and Services	Regional and local agencies	**6 total**

Source: Fehr & Peers, 20198.

6.2 Recommended Strategies for Nevada County

Of these strategies, only a few are likely to be effective in a rural or suburban setting such as Nevada County. To help winnow the list, we reviewed how land use context could influence each strategy's effectiveness and identified seven for more detailed review. These strategies are described in the second matrix in Appendix D and listed below.

- 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 Nevada 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 Nevada 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.

- Project-scale strategies

4. 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.

5. Encourage telecommuting and alternative work schedules – This strategy relies of 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 this should be a factor in considering the potential VMT reduction. Effectiveness may also be limited in more rural areas of the County with limited broadband internet access.

6. Implement car-sharing programs and ride-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. Implementation of this strategy may require regional or local agency implementation and coordination and may not be applicable for all individual development projects. School-pools

(ridesharing programs for school children) and voluntary employer-based trip reduction programs could also be encouraged. This strategy also 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.

7. Implement parking management – This strategy focuses 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 small-town and rural settings such as Nevada County but will depend on the specific project site and the surrounding parking supply.

All seven strategies are suitable for use in Nevada 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. Overall, strategies 1, 2, 4, 5, and 6 are considered the highest priorities for Nevada County.

Appendix A:

Baseline VMT Data

This appendix summarizes base year vehicle miles traveled (VMT) data for jurisdictions and larger unincorporated population centers in Nevada County as estimated from several sources:

- NCTC travel demand forecasting model (TDM), covering western Nevada County, prior to model updates made as part of this project
- Town of Truckee TDM
- California Household Travel Survey (CHTS)
- California State Travel Demand Model (CSTDM)
- MXD+ data analysis

Three different measures of VMT, where available, are compared from each source:

- Total VMT: sum of VMT for all vehicle trips and trip purposes
- Residential VMT per capita: sum of VMT for trips originating from home, divided by the number of residents
- VMT per worker: sum of VMT for trips from home to work, divided by the number of workers

Results of this analysis are summarized in the following tables. Note that some data sources do not include data for every location analyzed. Each data source is discussed in the next section.

Table A-1: Total VMT by Data Source

Location	NCTC TDM	Truckee TDM	CHTS[1]	CSTDM	MXD+[2]
Grass Valley	748,500			231,000	
Nevada City	300,700			150,800	
Truckee		201,300		100,600	
Alta Sierra	122,000			609,200	
Lake Wildwood	117,700			318,100	
Penn Valley	42,400				
Lake of the Pines	95,100				
Unincorporated Nevada County				1,392,700	
Nevada County Total				1,875,100	

Notes: [1]Not available, household-based survey
[2]Not available
Source: Caltrans, NCTC, Town of Truckee, Fehr & Peers, 2018.

Table A-2: Residential VMT per Capita by Data Source

Location	NCTC TDM	Truckee TDM[1]	CHTS	CSTDM	MXD+ Single Family Households	MXD+ Multi-Family Households
Grass Valley	14.8		3.2[2]	8.1	17.3	10.9
Nevada City	13.2		0.7[2]	13.5	7.6	4.4
Truckee			14.4[2]	7.2	45.1	31.5
Alta Sierra	27.8		12.9[2]	19.2	49.8	24.8
Lake Wildwood	34.3		12.4[2]	19.3	35.7	19.8
Penn Valley	18.6					
Lake of the Pines	25.0					
Unincorporated Nevada County			16.3[3]	18.7		
Nevada County Total			15.7	19.0		

Notes: [1]Not available from Truckee TDM without further model development
[2]Very small sample size
[3]Small sample size
Source: Caltrans, NCTC, Fehr & Peers, 2018.

Table A-3: Home-Based VMT per Worker by Data Source

Location	NCTC TDM	Truckee TDM[1]	CHTS[2]	CSTDM	MXD+ Office Only
Grass Valley	18.6			10.0	7.2
Nevada City	26.6			10.3	2.1
Truckee				7.8	3.7
Alta Sierra	14.0			10.3	8.6
Lake Wildwood	11.2			9.8	6.3
Penn Valley	20.1				
Lake of the Pines	11.4				
Unincorporated Nevada County				10.0	
Nevada County Total				9.6	

Notes: [1]Not available from Truckee TDM without further model development.
[2]Not available, household-based survey
Source: Caltrans, NCTC, Fehr & Peers, 2018.

Data Sources

NCTC Travel Demand Forecasting Model

We estimated VMT using the NCTC travel demand forecasting model for each jurisdiction and larger unincorporated population centers covered by the model.

- Base year of model is 2012.
- This model covers the western portion of Nevada County, and therefore cannot provide VMT estimates for Truckee or the County as a whole.
- Distances for trips that connect to areas outside of the model (IX and XI trips) are shorter than actual, as model trips are truncated at the edge of the model area. Thus, actual VMT is likely higher than these estimates.
- Intrazonal VMT is also not included in these estimates. However, the model could be updated to add this capability.
- The differences in per capita VMT between Lake Wildwood and Penn Valley are greater than expected. Although Penn Valley has a greater mix of land uses, accounting for some of this difference, land use mix may not fully explain the observed differences in per capita VMT.
- This model uses square feet as the variable for most non-household land use. To calculate the VMT per worker, typical employee per thousand square feet values were used. However, actual values in Nevada County may vary.
- This model does not separately model home-based work attractions to schools; these trips are included with student trips.

Town of Truckee Travel Demand Model

We estimated VMT for the Town of Truckee using the Truckee travel demand forecasting model.

- Base year of the model is 2014.
- The model covers the Town of Truckee and nearby areas in eastern Nevada County and eastern Placer County only.
- Distances for trips that connect to areas outside of the model (IX and XI trips) are shorter than actual, because model trips are truncated at the edge of the model area. Thus, actual VMT is likely higher than these estimates.
- Intrazonal VMT is also not included in these estimates. However, the model could be updated to add this capability.
- Residential and worker VMT were not readily available from the Truckee TDM. However, the model could be updated to provide these measures.

California Household Travel Survey

We used data from the California Household Travel Survey to estimate home-based VMT for each jurisdiction and larger unincorporated population center that had aggregated data.

- The survey was conducted in 2012.

- Sample sizes for each city and population center were small, as noted in Tables 1 and 2. Therefore, actual VMT may be significantly different for every area other than the County as a whole.
- Because the survey is based on households, total VMT and worker VMT are not available.

California State Travel Demand Model

We used the California State Travel Demand model to estimate VMT for each jurisdiction and larger unincorporated population center.

- Base year of the model is 2010.
- TAZ boundaries in the model do not match directly to the boundaries of each city or population center. For some cities and population centers (particularly Grass Valley and Lake Wildwood), the difference was large. Thus, actual VMT will vary from these estimates.
- The CSTDM does not provide the level of detail available in local TDMs. This may be a factor behind the similar results in each jurisdiction for VMT per worker.

MXD+

We used Fehr & Peers Main Street/MXD+ tool to provide another estimate of VMT. Main Street utilizes MXD+, which was developed for the US EPA by Fehr & Peers and academic researchers to consider various built environment variables such as land use density, regional location, and proximity to transit. The tool includes CHTS trip lengths and ITE Trip Generation Manual (9th Edition) trip rates. This data was supplemented with California Department of Finance data on household size.

The following issues were noted during this analysis:

- Because CHTS data is used for trip lengths, small sample sizes reduce the accuracy of estimates for each jurisdiction and place.
- ITE trip rates are based on studies from locations across the country. Local trip rates may be more or less than national average rates.

Discussion

As shown in Tables A- 1 to A-3, VMT estimates for each source vary. As shown for all data sources, VMT per capita or worker generally increases with increasing distance from urban areas. In general, VMT estimates are dependent on methodology used. We have more confidence in local models, such as the NCTC and Truckee TDMs, which have been calibrated and validated using local data. However, these models have their own issues with trip lengths for trips with origins or destinations outside the model as discussed earlier.

Nevada County Travel Demand Model Updates

To address issues with trip lengths for trips with origins or destinations outside the model, the Nevada County TDM and supporting calculations were updated to properly account for these trip lengths and intrazonal trips. Additional updates were made to ensure data represented calculations as identified (including proper accounting for hotel trips, education employment, and other trips to and from home). VMT ratios were then calculated using the methodology discussed and recommended in this report. Results are shown in the following table.

Table A-4: Total VMT per Service Population from Nevada County TDM

Location	Total VMT per Service Population[1]	Home-Based Production VMT per Resident	Home-Based Work Attraction VMT per Employee[2]
Grass Valley	28.0	7.1	13.1
Nevada City	36.2	11.3	22.1
Alta Sierra	17.1	17.0	9.8
Lake Wildwood	22.5	22.8	22.3
Penn Valley	18.8	12.0	13.1
Lake of the Pines	16.4	15.4	11.3
Unincorporated Western Nevada County	18.1	16.6	13.1
Western Nevada County Total	22.2	14.9	15.4

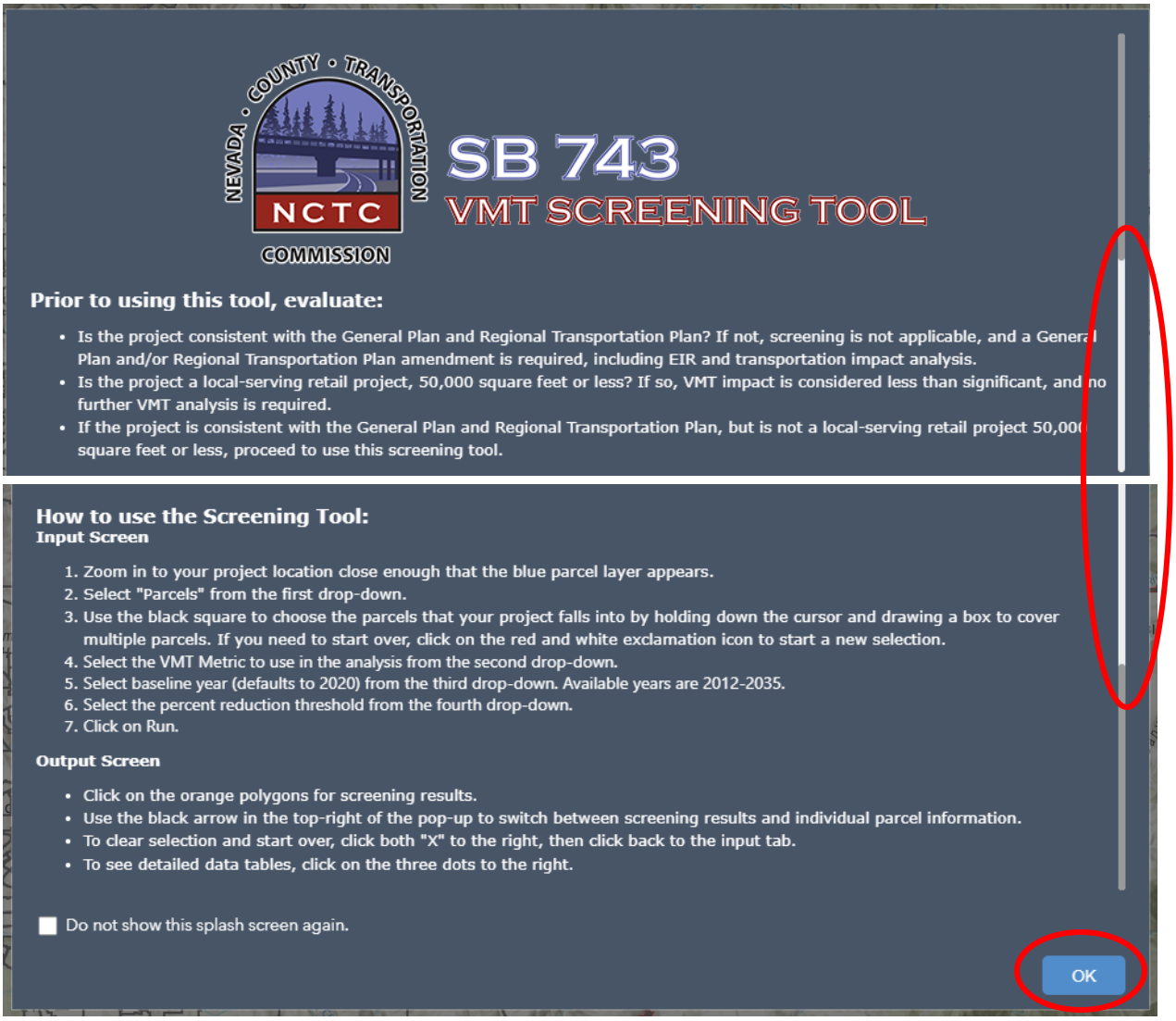
Notes: [1]Service population defined as sum of residents, employees, and students
[2]Education employees not included; current model structure does not included home-based work attractions for schools
Source: Fehr & Peers, 2019.

Appendix B:

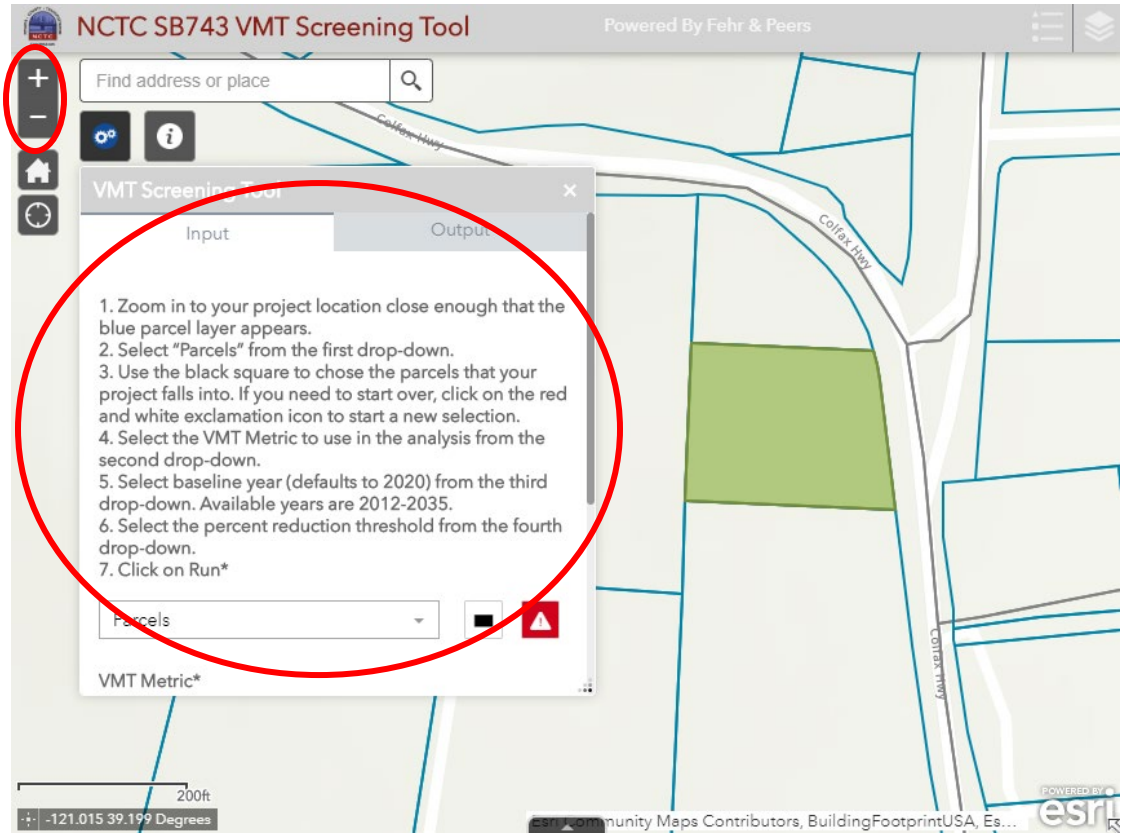
VMT Screening Tool

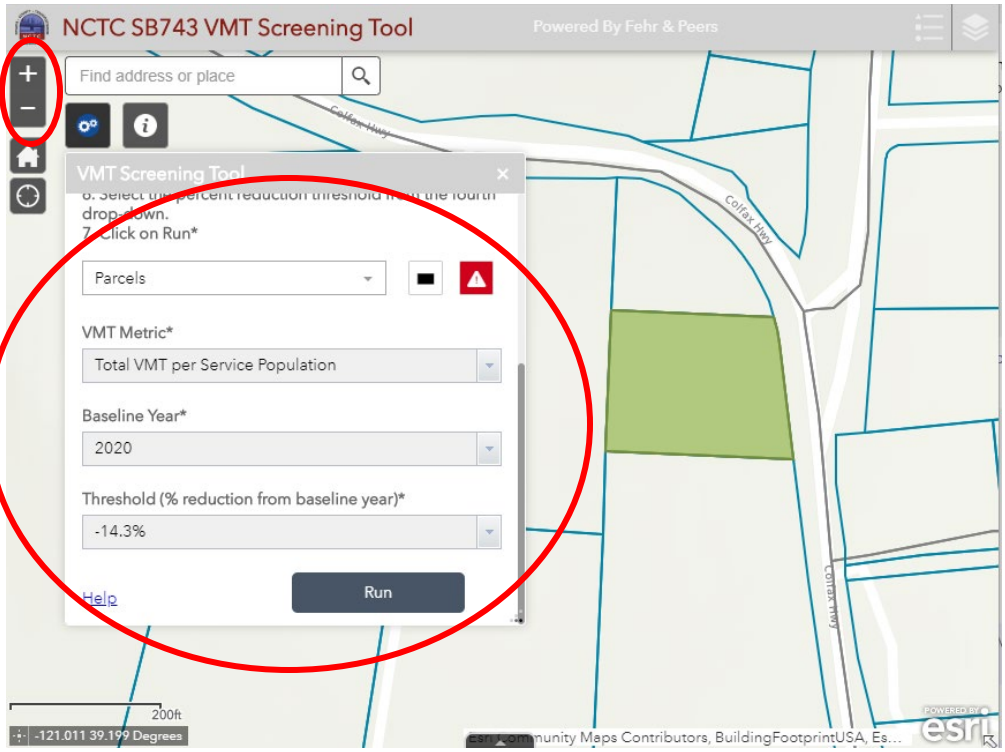
To support the screening process, a screening tool was developed for western Nevada County. The tool uses data from the Nevada County Travel Demand Model to compare the VMT per service population for the TAZ in which a study parcel is located to the VMT for the subarea in which the parcel is located. Thus, 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/nctcvmt/. A splash screen displays a summary of instructions for using the tool (scroll to view all instructions). Click "OK" to close the splash screen and enter data.



An input window is then shown with instructions for selecting a parcel, VMT metric, baseline year, and threshold. Scroll the window to make selections. Follow the instructions to select the parcel to be analyzed. The mouse and +/- icons may be used to navigate the map by scrolling and zooming.



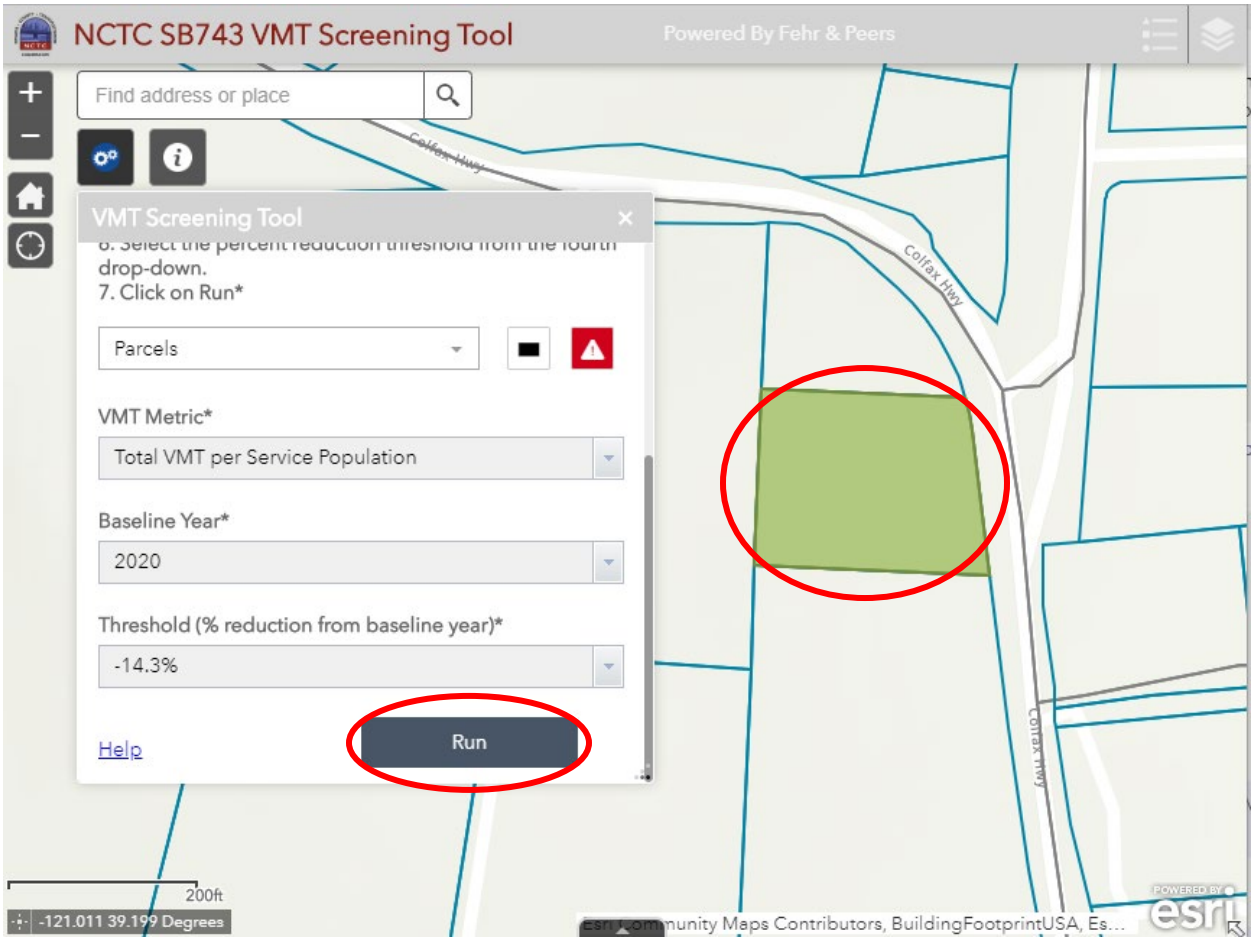

NCTC SB743 VMT Screening Tool
Powered By Fehr & Peers
Find address or place
VMT Screening Tool
drop-down.
7. Click on Run*
Parcels
VMT Metric*
Total VMT per Service Population
Baseline Year*
2020
Threshold (% reduction from baseline year)*
-14.3%
Help
Run
Colfax Hwy
200ft
-121.011 39.199 Degrees
esri

Selection results will then be shown.

- **Selected parcel** – shaded green
- **Parcel boundaries** – indicated with blue lines
- **TAZ boundaries** – indicated with dark gray lines

Some deviation exists between the boundaries because the model was developed with an earlier version of the Nevada County parcel GIS dataset. Since that time, the parcel dataset has been improved.

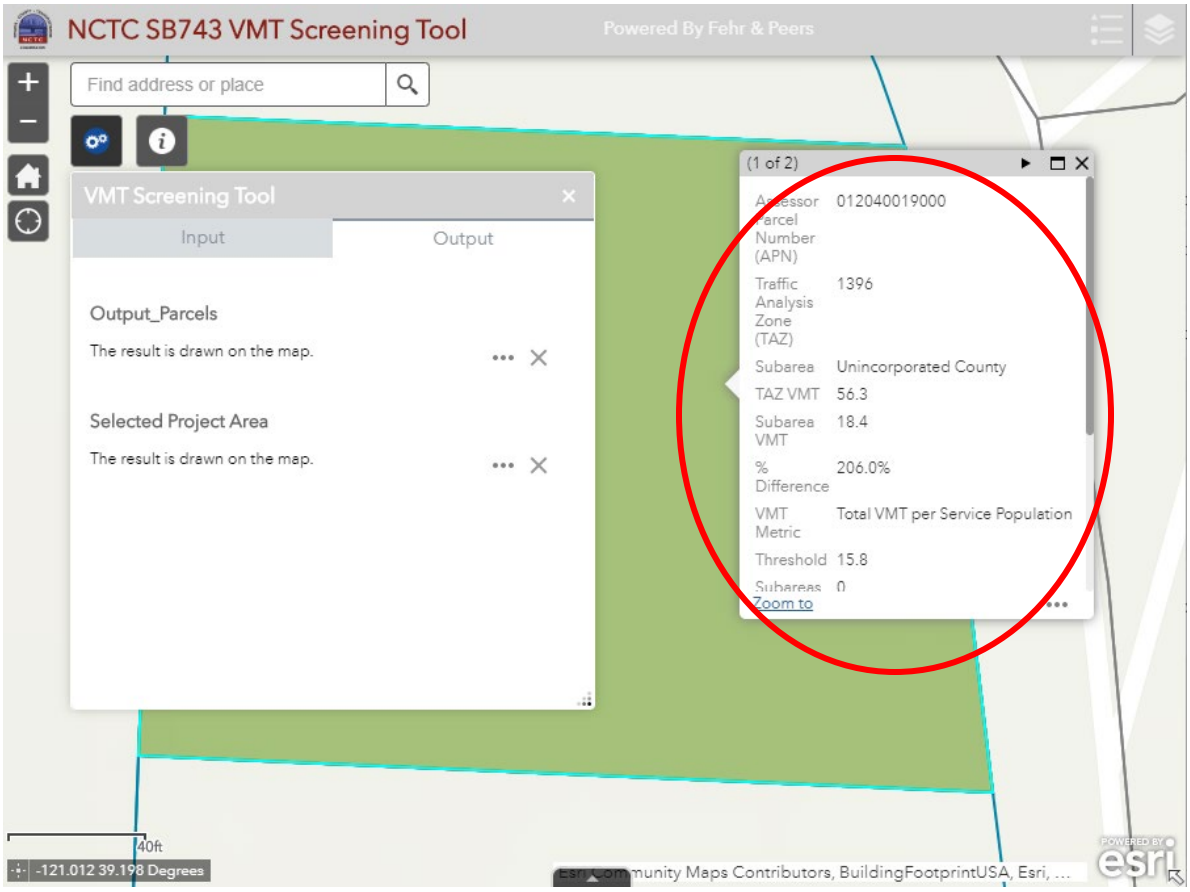
Click "Run" to obtain results for the selected parcel.

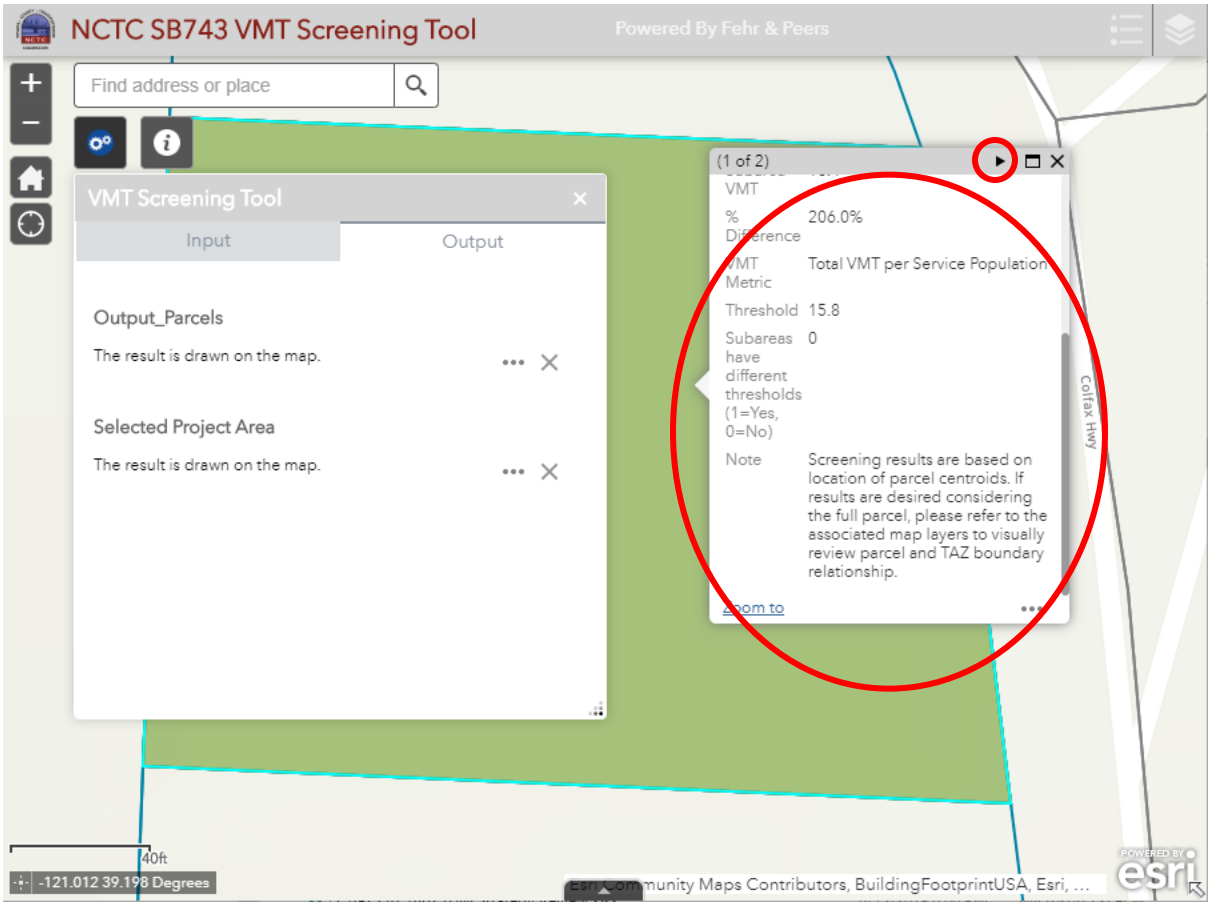


Results are returned after a few seconds. Results may be viewed by clicking on the parcel. Scroll the window and click on the arrow in the upper right corner of the results window to view all results.

The following results are shown:

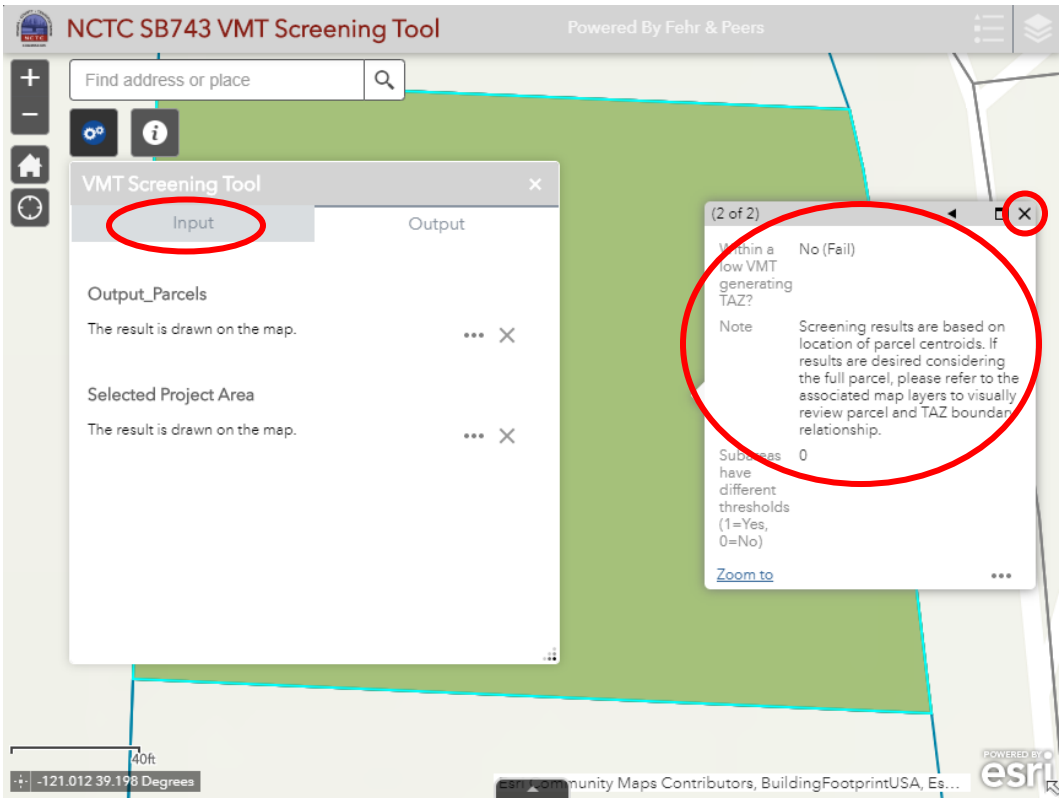
- **Assessor Parcel Number (APN)** – the parcel number
- **Traffic Analysis Zone (TAZ)** – the number of the travel analysis zone from the Nevada County Travel Demand Model in which the parcel is located
- **Subarea** – the subarea of Nevada County in which the parcel and TAZ are located
- **TAZ VMT** – the VMT metric average for the entire TAZ
- **Subarea VMT** – the VMT metric average for the entire subarea
- **% Difference** – compares TAZ results to subarea results; positive values indicate TAZ results are greater than the subarea, 0% indicates TAZ and subarea results are equal, and negative values indicate TAZ results are less than the subarea
- **VMT Metric** – the metric selected for analysis
- **Threshold** – the maximum VMT metric to pass screening
- **Subareas have different thresholds (1=Yes, 0=No)** - applies if parcels selected are in more than one subarea


NCTC SB743 VMT Screening Tool
Powered By Fehr & Peers
Find address or place
VMT Screening Tool
Input
Output
Output_Parcels
The result is drawn on the map.
Selected Project Area
The result is drawn on the map.
(1 of 2)
Assessor Parcel Number (APN) 012040019000
Traffic Analysis Zone (TAZ) 1396
Subarea Unincorporated County
TAZ VMT 56.3
Subarea VMT 18.4
% Difference 206.0%
VMT Metric Total VMT per Service Population
Threshold 15.8
Subareas 0
Zoom to
40ft
-121.012 39.198 Degrees
Esri Community Maps Contributors, BuildingFootprintUSA, Esri, ...
esri


NCTC SB743 VMT Screening Tool
Powered By Fehr & Peers
Find address or place
VMT Screening Tool
Input
Output
Output_Parcels
The result is drawn on the map.
Selected Project Area
The result is drawn on the map.
(1 of 2)
VMT
% Difference
206.0%
VMT Metric
Total VMT per Service Population
Threshold
15.8
Subareas have different thresholds (1=Yes, 0=No)
0
Note
Screening results are based on location of parcel centroids. If results are desired considering the full parcel, please refer to the associated map layers to visually review parcel and TAZ boundary relationship.
Zoom to
Colfax Hwy
40ft
-121.012 39.198 Degrees
Esri Community Maps Contributors, BuildingFootprintUSA, Esri, ...
esri

- **Within a low VMT generating TAZ?** – indicates if screening criteria is met (if "% Difference" is 0% or less)

After results have been viewed, another parcel may be evaluated by clicking the "X" in the upper-right corner of the results window, then clicking on the "Input" window tab.



Appendix C: Recommended Updates to Traffic Study Guidelines

Recommended additions to traffic study guidelines are provided below. The Nevada County and Grass Valley guidelines are very similar, but the multiple subareas in Nevada County add complexity not necessary for Grass Valley, so separate recommended changes have been provided. Although neither Nevada City nor Truckee currently have guidelines, the Grass Valley guidelines could be readily adapted for use in those municipalities if guidelines are developed for those municipalities.

The recommendations below are made to include analysis of VMT. Analysis of VMT does not preclude the need for analysis of transit, bicycle, and pedestrian impacts. Current discussion of these modes in the existing guidelines is limited. It is recommended that both jurisdictions consider additional guideline updates to include impacts of proposed projects on those modes.

Where "x%" is cited, it should be updated based on the threshold adopted by the jurisdiction.

The last section in this appendix provides factors for converting land use categories in the NCTC travel demand model to residents, employees, and students. Jurisdictions may wish to cross-reference their general plan land use categories to the model categories to further simplify this conversion process.

Nevada County

The following changes apply to the Nevada County guidelines.

Requirement for Traffic Study

Add the following criteria to the list of criteria that may require a traffic study:

- The project does not meet the requirements for VMT screening, as analyzed by planning staff
- The project description otherwise indicates that the project VMT per service population may exceed a value of x% less than the subarea mean under baseline conditions
    - "Service population" is defined as the total number of residents, employees, and students.
    - Nevada County subareas are defined as follows
        - Alta Sierra (traffic analysis zones (TAZs) identified as Alta Sierra in the NCTC travel demand model)
        - Lake of the Pines (TAZs identified as Lake of the Pines in the NCTC travel demand model)
        - Lake Wildwood and Penn Valley (TAZs identified as Lake Wildwood and Penn Valley in the NCTC travel demand model)
        - Remainder of unincorporated western Nevada County (area covered by the NCTC travel demand model)
        - Remainder of unincorporated eastern Nevada County (area not covered by the NCTC travel demand model)

VMT Screening

Create a new section in the guidelines.

VMT Screening

To determine if a traffic study is required, the type of traffic study needed, and to facilitate the traffic study process, the project applicant shall submit the following information:

- Project site plan
- Project description identifying:
    - Square footage of proposed buildings by type of use
    - Expected number of residents, employees and students by use, if known
    - Proposed project phasing identifying areas and dates of completion based on square footage by use
    - Expected year of completion of the project
    - Any General Plan modifications

Using this information, the County will conduct project screening to determine if the project meets the screening criteria:

- The project is consistent with the General Plan
- The project is consistent with the Regional Transportation Plan (RTP)
- The project fulfills one of the following:
    - The project is a local-serving retail project, 50,000 square feet or less
    - The project is a residential or work-related land use located in a TAZ with similar land uses, and the project is in a TAZ with total VMT per service population equal to or less than x% below the subarea mean
    - The project is residential-related land use located in a TAZ with home-based VMT per resident equal to or less than x% below the subarea mean
    - The project is work-related land use located in a TAZ with home-based work VMT per employee equal to or less than x% below the subarea mean?
    - The project is located in the western Nevada County travel forecasting model area and generates less than 630 VMT per day

For purposes of making consistency findings with the general plan and RTP, the preferred method for land use projects is to 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. County staff conducting this analysis will need to consider whether any of the expected growth has already been assigned to previously approved projects.

If the project meets the screening criteria, the VMT impact may be determined to be less than significant. If not, VMT analysis will be required. For projects not screened out due to unique project factors that may create VMT larger than expected for projects with similar land use, these factors should be addressed and included in the VMT impact analysis.

Traffic Study Content

Add the following to the list of required traffic study content.

VMT Analysis

A project's or plan's VMT impact may be considered less than significant if:

- The project or plan total weekday VMT per service population is equal to or less than x% below the subarea mean under baseline conditions, or the project reduces the total VMT per service population for the subarea

  AND

- The project or plan is consistent with General Plan and the Nevada County Regional Transportation Plan.

These criteria are general guidance for general use. As such, they should be formally adopted by lead agencies according to the CEQA Guidelines Section 15064.7.

The project analysis baseline year is typically when the Notice of Preparation is filed.

To analyze VMT, use the travel demand forecasting model covering the project area, if available.

- Analyze baseline year conditions by interpolating between the model base and future years. This interpolation acknowledges the growth and VMT adopted by the General Plan. Alternatively, in subareas with little or no growth use of the model base year as the project analysis baseline year may be acceptable but should be justified.
- Analyze project-level VMT effects of the project by adding project land use to the base year model to create a base year plus project scenario.
- Analyze cumulative VMT effects by modifying the allocation of future year land use growth based on the project's land use supply changes.
- Estimate VMT per service population to one decimal place.
- Utilize model post-processing tools that account for trip distances outside of the model area, based on trip distances from the California State Travel Demand Model (CSTDM) or California Household Travel Survey (CHTS).
- Ensure intrazonal trip distances are included in the analysis.
- Utilize conversion factors to translate square feet of development to workers and households to residents. Conversion factors appropriate to the NCTC travel demand model are provided in Appendix A.

For projects in areas not covered by the NCTC Travel Demand Model, other analysis methods for VMT are required.

- Methodology may involve spreadsheet estimations or other VMT tools, selected as appropriate for the project.
- ITE trip rates, CHTS trip rates and trip lengths, and CSTDM trip rates and trip lengths are all possible sources of data for such an analysis.
- Calculate the threshold total weekday VMT per service population for the subarea in which the project is located. Threshold recommendation must meet the substantial evidence criterion of CEQA Guidelines Section 15064.7, thus considering data, facts, research, and analysis.
- Determine if the project meets the threshold.

Conclusions/Mitigation Measures

The memorandum "SB 743 Implementation TDM Strategy Assessment" (April 4, 2018), identified transportation demand management strategies that can potentially be used to reduce VMT impacts. An updated summary of the strategies discussed in that memo is provided in Appendix B.

Add the following to this section:

If VMT analysis indicates that the VMT impact of the project is significant, mitigation measures may be considered and analyzed to determine if they would reduce project/plan total VMT per service population below the threshold. Analysis must meet the substantial evidence criterion of CEQA Guidelines Section 15064.7, thus considering data, facts, research, and analysis.

Appendices

Add the following to the list of typical detailed appendix material:

- VMT reports and summaries

Grass Valley

The following changes apply to the Grass Valley guidelines.

Requirement for Traffic Study

Add the following criteria to the list of criteria that may require a traffic study:

- The project does not meet the requirements for VMT screening, as analyzed by planning staff
- The project description otherwise indicates that the project VMT per service population may exceed a value of x% less than the City of Grass Valley mean under baseline conditions
    - "Service population" is defined as the total number of residents, employees, and students.

VMT Screening

Create a new section in the guidelines.

VMT Screening

To determine if a traffic study is required, the type of traffic study needed, and to facilitate the traffic study process, the project applicant shall submit the following information:

- Project site plan
- Project description identifying:
    - Square footage of proposed buildings by type of use
    - Expected number of residents, employees and students by use, if known
    - Proposed project phasing identifying areas and dates of completion based on square footage by use
    - Expected year of completion of the project

- Any General Plan modifications

Using this information, the City will conduct project screening to determine if the project meets the screening criteria:

- The project is consistent with the General Plan
- The project is consistent with the Regional Transportation Plan (RTP)
- The project fulfills one of the following:
  - The project is a local-serving retail project, 50,000 square feet or less
  - The project is a residential or work-related land use located in a TAZ with similar land uses, and the project is in a TAZ with total VMT per service population equal to or less than x% below the City of Grass Valley mean
  - The project is residential-related land use located in a TAZ with home-based VMT per resident equal to or less than x% below the City of Grass Valley mean
  - The project is work-related land use located in a TAZ with home-based work VMT per employee equal to or less than x% below the City of Grass Valley mean?
  - The project generates less than 630 VMT per day

For purposes of making consistency findings with the general plan and RTP, the preferred method for land use projects is to 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. City staff conducting this analysis will need to consider whether any of the expected growth has already been assigned to previously approved projects.

If the project meets the screening criteria, the VMT impact may be determined to be less than significant. If not, VMT analysis will be required. For projects not screened out due to unique project factors that may create VMT larger than expected for projects with similar land use, these factors should be addressed and included in the VMT impact analysis.

Traffic Study Content

Add the following to the list of required traffic study content.

VMT Analysis

A project's or plan's VMT impact may be considered less than significant if:

- The project or plan total weekday VMT per service population is equal to or less than x% below the City of Grass Valley mean under baseline conditions, or the project reduces the total VMT per service population for the City of Grass Valley

  AND

- The project or plan is consistent with General Plan and the Nevada County Regional Transportation Plan.

These criteria are general guidance for general use. As such, they should be formally adopted by lead agencies according to the CEQA Guidelines Section 15064.7.

The project analysis baseline year is typically when the Notice of Preparation is filed.

To analyze VMT, use the travel demand forecasting model.

- Analyze baseline year conditions by interpolating between the model base and future years. This interpolation acknowledges the growth and VMT adopted by the General Plan.
- Analyze project-level VMT effects of the project by adding project land use to the base year model to create a base year plus project scenario.
- Analyze cumulative VMT effects by modifying the allocation of future year land use growth based on the project's land use supply changes.
- Estimate VMT per service population to one decimal place.
- Utilize model post-processing tools that account for trip distances outside of the model area, based on trip distances from the California State Travel Demand Model (CSTDM) or California Household Travel Survey (CHTS).
- Ensure intrazonal trip distances are included in the analysis.
- Utilize conversion factors to translate square feet of development to workers and households to residents. Conversion factors appropriate to the NCTC travel demand model are provided in Appendix A.

Conclusions/Mitigation Measures

The TDM Strategies chapter identified transportation demand management strategies that can potentially be used to reduce VMT impacts.

Add the following to this section:

If VMT analysis indicates that the VMT impact of the project is significant, mitigation measures may be considered and analyzed to determine if they would reduce project/plan total VMT per service population below the threshold. Analysis must meet the substantial evidence criterion of CEQA Guidelines Section 15064.7, thus considering data, facts, research, and analysis.

Appendices

Add the following to the list of typical detailed appendix material:

- VMT reports and summaries

Scoping Agreement for Traffic Study

Add the following to section A, Requirements for Traffic Study, before item 5:

VMT Screening

- Is the project consistent with the General Plan? □Yes □No
- Is the project consistent with the Regional Transportation Plan? □Yes □No
- Does the project fulfill one of the following?
    - The project is a local-serving retail project, 50,000 square feet or less □Yes □No
    - The project is a residential or work-related land use located in a TAZ with similar land uses
      AND
      The project is in a TAZ with total VMT per service population equal to or less than x% below the City of Grass Valley mean □Yes □No

- The project is a residential land use located in a TAZ with similar land uses
  AND
  The project is in a TAZ with home-based VMT per resident equal to or less than x% below the City of Grass Valley mean □Yes □No
- The project is a work-related land use located in a TAZ with similar land uses
  AND
  The project is in a TAZ with home-based work VMT per employee equal to or less than x% below the City of Grass Valley mean □Yes □No
- The project generates less than 630 VMT per day □Yes □No

- Does the project meet the requirements above and therefore pass VMT screening? □Yes □No

Table C-1: NCTC Travel Demand Model Land Use Input Conversion Factors

Land use	Model land use category	Units	Residents per unit	Employees or students per unit	Limited data
Single Family Dwelling Unit	SF	Dwelling Units	2.7		
Multi-Family Dwelling Unit	MF	Dwelling Units	1.9		
Mobile Home Unit	MH	Dwelling Units	1.9		
Senior Housing	SEN	Dwelling Units	1.5		yes
Office	OFF	KSF		3.0	
Medical Office	MED_OFF	KSF		4.1	yes
Hospital	HOSP	Beds		5.9	yes
Light Industrial	LI	KSF		1.6	
Warehouse	WARE	KSF		0.34	
Church	CHURCH	KSF		0.44	yes
Public/Quasi-Public	PQP	KSF		3.0	yes
Park	PARK	Acres			
Retail	RET	KSF		2.3	yes
Golf Course	GOLF	Holes		1.1	yes
Restaurant	REST	KSF		5.3	
Fast-Food (Hi-Turnover) Restaurant)	RESTHI	KSF		10.4	
Gas Station	GAS	Pumps		0.62	
Hotel/Lodging	LODGING	Rooms		0.58	
K-8 School	K8	Students		0.09	yes
High School	HIGHSCH	Students		0.09	
College/University	COLL	Students		0.18	yes

Note: Project-specific data should be used where available. These conversion factors are generally based on national data sources and are not specific to Nevada County, and limited data was available for some land uses. Local land use comparable to the specific project being analyzed may also be surveyed to provide best results, especially where national data is limited.

Sources: ITE Trip Generation Manual (10th Edition), California Dept. of Finance Report E-5 (2018), local research by Fehr & Peers (2018).

Appendix D:

TDM Strategy Evaluation

TDM STRATEGY EVALUATION

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Comparison of CAPCOA Strategies Versus New Research Since 2010

					New Information Since CAPCOA Was Published in 2010		
CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	New information	Change in VMT reduction compared to CAPCOA(1)	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	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.	Lower	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	3.1.9	LUT-9 Improve Design of Development	3.0% - 21.3% reduction in VMT due to increasing intersection density vs. typical ITE suburban development	Adequate	No update to CAPCOA literature; advise applying CAPCOA measure only to large developments with significant internal street structure.	Same	N/A
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	Reduction in VMT due to increased regional accessibility (jobs gravity)	Lower	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.

Comparison of CAPCOA Strategies Versus New Research Since 2010

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	New Information Since CAPCOA Was Published in 2010		
					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	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.	Lower	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	3.1.5	LUT-5 Increase Transit Accessibility	0.5%-24.6% reduce in VMT due to locating a project near high-quality transit	Adequate	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); 2] Reduction in vehicle trips due to implementing TOD.	Lower	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.	Observed trip generation indicates substantial local and regional variation in trip making behavior at affordable housing sites. Recommend use of ITE rates or local data for senior housing.	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.
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	VMT reduction due to provision of complete pedestrian networks.	Higher	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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Comparison of CAPCOA Strategies Versus New Research Since 2010

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	New Information Since CAPCOA Was Published in 2010		
					New information	Change in VMT reduction compared to CAPCOA(1)	Literature or Evidence Cited
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	Reduction in VMT due to building out a low-stress bike network; reduction in VMT due to expansion of bike networks in urban areas.	Similar	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.
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.	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
Neighborhood Site Enhancements	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	Vehicle trip reduction due to car-sharing programs; reduction assumes 1%-5% penetration rate.	Higher	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
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.	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.)	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).	Similar	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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Comparison of CAPCOA Strategies Versus New Research Since 2010

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	New Information Since CAPCOA Was Published in 2010		
					New information	Change in VMT reduction compared to CAPCOA(1)	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	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.	Higher	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.
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	Reduction in vehicle trips due to increased transit service hours or coverage.	Similar	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	3.5.4	TST-4 Increase Transit Service Frequency/Speed	0.02%-2.5% VMT reduction due to reduced headways and increased speed and reliability	Adequate	Reduction in vehicle trips due to increased transit frequency/decreased headway.	Higher	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 new information identified.	Same	N/A
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.	Reduction in vehicle trips in response to employer-led TDM programs.	Similar	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.	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

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Comparison of CAPCOA Strategies Versus New Research Since 2010

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	New Information Since CAPCOA Was Published in 2010		
					New information	Change in VMT reduction compared to CAPCOA(1)	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."	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.	Lower	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	3.4.15	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).	Shoup case studies indicate a reduction in commute vehicle trips due to implementing cash-out without implementing other trip-reduction strategies.	Same	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.
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.	Reduction in commute vehicle trips due to priced workplace parking; effectiveness depends on availability of alternative modes.	Lower	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	3.4.6	TRT-6 Encourage Telecommuting and Alternative Work Schedules	0.07%-5.5% commute VMT reduction due to reduced commute trips	Adequate - Effectiveness is building/tennant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	VMT reduction due to adoption of telecommuting	Similar	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

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Comparison of CAPCOA Strategies Versus New Research Since 2010

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	New Information Since CAPCOA Was Published in 2010		
					New information	Change in VMT reduction compared to CAPCOA(1)	Literature or Evidence Cited
Commute Trip Reduction	3.4.7	TRT-7 Implement CTR Marketing	0.8%-4.0% commute VMT reduction due to employer marketing of alternatives	Adequate - Effectiveness is building/tennant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	1] Vehicle trips reduction due to CTR marketing; 2] Reduction in VMT from institutional trips due to targeted behavioral intervention programs	Higher	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	3.4.11	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.	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	Lower	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	3.4.3	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."	Commute vehicle trips reduction due to employer ride-sharing programs	Lower	Victoria Transport Policy Institute. (2015). Ridesharing: Carpooling and Vanpooling. Online TDM Encyclopedia. Retrieved from: http://vtpi.org/tdm/tdm34.htm
Commute Trip Reduction	3.4.10	TRT-10 Implement a School Pool Program	7.2%-15.8% reduction in school VMT due to school pool implementation	Adequate - School VMT only.	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
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.	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.	Lower	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.

NOTES:

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

TDM STRATEGY EVALUATION

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Relevant Strategies for Implementation in Nevada County Due to Land Use Context

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	New Information Since CAPCOA Was Published in 2010		
					New information	VMT reduction	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	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.
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	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
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	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.

Relevant Strategies for Implementation in Nevada County Due to Land Use Context

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	New Information Since CAPCOA Was Published in 2010		
					New information	VMT reduction	Literature or Evidence Cited
Neighborhood Site Enhancements	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	Vehicle trip reduction due to car-sharing programs; does not include added VMT that may occur from vehicle balancing as part of program. 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% Before applying a reduction, the analyst should review the detailed research for type of carshare program and account for potential added VMT from vehicle balancing as part of program.	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
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	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). Effectiveness of transit may involve uncertainty due to national trends of declining transit ridership since 2014.	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
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."	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	3.4.3	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."	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-	2.5%-8.3%	Victoria Transport Policy Institute. (2015). Ridesharing: Carpooling and Vanpooling. Online TDM Encyclopedia. Retrieved from: http://vtpi.org/tdm/tdm34.htm