El Dorado County and City of Placerville SB 743 Implementation Plan

Prepared for:
El Dorado County Transportation Commission

July 22, 2019

RS18-3653

FEHR & PEERS

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1. Executive Summary

This executive summary provides an overview of the EDCTC SB 743 Implementation Project and summarizes the work and findings of the technical memoranda completed to date. The memoranda are included in the sections following this executive summary. The information presented in these memoranda is intended to assist the City of Placerville and El Dorado County transition to the use of VMT as the primary metric for evaluating transportation impacts under the California Environmental Quality Act (CEQA). The next steps for each agency are summarized below:

- Formally adopt a VMT calculation methodology and thresholds to determine transportation impacts (four options are presented in the thresholds assessment memorandum).
- Refine the El Dorado County Travel Demand Model
    - Provide a full accounting of VMT by accounting for intrazonal trips and trip lengths that are truncated at the current model boundaries.
    - Update the model's sensitivity to built-environment effects (i.e., the 5Ds) based on the latest published research.
- Update relevant transportation impact study (TIS) guidance to provide clear expectations about how to analyze VMT and when level of service (LOS) analysis is still required to comply with general plan requirements.

Introduction

Senate Bill (SB) 743 changes how transportation impacts are measured under the California Environmental Quality Act (CEQA) from using vehicle level of service (LOS) to using vehicle miles traveled (VMT). This change is intended to capture the impacts of driving on the environment compared to the impact on drivers. LOS or other delay metrics may still be used to evaluate the impact of projects on drivers as part of land use entitlement reviews and impact fee programs. However, LOS will no longer be allowed to be used as the metric for evaluating transportation impacts under CEQA. To implement SB 743, lead agencies will need to determine appropriate VMT methodologies, thresholds, and feasible mitigation measures. The purpose of this project is to help EDCTC partner agencies understand the specific questions that need to be addressed when making these determinations and to provide research, analysis, and other evidence to support their final SB 743 implementation decisions.

The project team has prepared six technical memoranda to date for this project. Each memorandum addresses the following key questions that each of the EDCTC partner jurisdictions need to consider when conducting VMT assessments.

1. Methodology – what VMT metric is preferred, and what methodology should be used to forecast 'projected generated VMT' and the 'project's effect on VMT' under baseline and cumulative conditions? Additionally, how does the selection of a threshold influence the methodology decision?

2. Thresholds – what threshold options are available to each jurisdiction and what substantial evidence exists to support the selection of a specific VMT threshold?
3. Mitigations – what would constitute feasible mitigation measures for a VMT impact given the land use and transportation context of El Dorado County and the City of Placerville?

Below is a summary of each of the technical memoranda. The memoranda are included in this document following the summaries.

Methodology

Baseline VMT Methodology and Data

Multiple VMT metric forms are available for lead agencies to consider when analyzing VMT impacts. For this study, base year (2016) and future year (2040) total daily VMT per service population (i.e., population plus employment) was calculated using outputs from the El Dorado County Travel Demand Model. Additionally, base year (2012) and future year (2036) total daily VMT per service population and daily household VMT per capita were calculated using the Sacramento Council of Governments (SACOG) SACSIM activity-based model. Also, the SACSIM household VMT per resident estimates were compared to similar VMT estimates based on data from the California Household Travel Survey (CHTS). The VMT estimates and comparisons of the VMT measures were displayed in a series of graphs and maps to aid in the determination of appropriate VMT metrics and source data for use in El Dorado County and the City of Placerville. El Dorado County and City of Placerville staff recommend the use of the El Dorado County Travel Demand Model, as it is currently used to evaluate proposed projects within EDCTC partner jurisdictions and is consistent with the County and City General Plans.

Tool Assessment

The capabilities of travel forecasting models along with 11 sketch model tools were reviewed to determine their strengths and weaknesses in generating appropriate VMT results for SB 743 analysis and testing VMT mitigation strategies. The travel forecasting model review resulted in the El Dorado County model being recommended for VMT impact analysis by EDCTC partner agencies. A customized forecasting and screening tool was developed using El Dorado County model inputs and outputs. This tool provides an initial screening of potential VMT impacts for projects and provides evidence to support presumptions of less than significant impact findings.

The sketch model tools were determined to be most appropriate for testing VMT mitigations, with GreenTRIP Connect and TDM+ being the most effective. Since these tools rely on Transportation Demand Management (TDM) strategies to reduce VMT, an important limitation was highlighted that many of these strategies are dependent on the ultimate building tenants of land use projects. Since tenants can change over time, potential VMT reductions of TDM strategies have a low level of confidence. Hence, the use of TDM strategies is likely to require on-going monitoring to verify performance to function as effective CEQA mitigation.

Case Study Evaluations

Recommended SB 743 VMT analysis methodologies developed as part of this project were applied to the following four case study projects to evaluate the VMT analysis process and outcomes:

- A residential development project within the City of Placerville
- A residential development within unincorporated El Dorado County
- A commercial site redevelopment project
- An HOV lane project

These case study evaluations step through the process of evaluating the four projects using the VMT screening tool, conducting a full VMT analysis using the El Dorado County Travel Demand Model, and evaluating potential VMT mitigation measures. The case study evaluations memorandum includes flow charts that describe the VMT analysis process for land use projects in El Dorado County and the City of Placerville, and separate chart that describes the process for transportation projects.

Thresholds

Existing Plan and Policy Review

The EDCTC Regional Transportation Plan, El Dorado County General Plan, and the City of Placerville General Plan, along with their corresponding EIRs, were all reviewed to identify any explicit VMT reduction expectations that could apply as impact thresholds. The VMT estimates from the EDCTC Regional Transportation Plan and the El Dorado County General Plan both include absolute increases in VMT between the base year and cumulative year scenarios. None of these documents had explicitly defined VMT reduction goals, but all three of the documents contain goals and policies that are supportive of reducing VMT.

Thresholds Assessment

Potential VMT thresholds were assessed within the context of the objectives of SB 743, legal opinions related to the legislation, proposed CEQA Guidelines updates, and the technical advisory produced by the Governor's Office of Planning and Research (OPR). Fehr & Peers identified four threshold options for consideration by lead agencies.

1. Thresholds consistent with OPR's Technical Advisory, with a 15% reduction below baseline conditions.
2. Thresholds consistent with lead agency air quality, GHG reduction, and energy conservation goals presuming compliance with California Air Resources Board's recommendations of a 16.8% reduction in light-duty vehicle VMT and 14.3% reduction in total VMT compared to baseline (2016) conditions.
3. Thresholds consistent with local general plans or the RTP/SCS future year VMT projections by Jurisdiction or Community Region.
4. Thresholds based on new development projects performing at or better than baseline (2016) VMT averages by Jurisdiction or Community Region.

Mitigations

TDM Strategies Evaluation

Transportation demand management (TDM) strategies and their effectiveness for reducing VMT were reviewed and assessed for their relevancy in the EDCTC partner agencies. Given the County's rural/suburban land use context, the following key strategies were identified as the most appropriate:

- Diversifying land use
- Improving active transportation networks
- Implementing traffic calming infrastructure
- Implementing ride-sharing programs
- Increasing transit frequency and reliability
- Encouraging telecommuting and alternative work schedules

Given the rural/suburban context of El Dorado County and the City of Placerville, the strategies above target physical project or transportation network improvements that have higher levels of confidence for VMT reduction potential compared to other employer-based strategies.

2. Methodology

Baseline VMT Methodology and Data

TECHNICAL MEMORANDUM

Date: 10.5.18

To: Woodrow Deloria (EDCTC), Natalie Porter (El Dorado County), Rebecca Neves (City of Placerville), and Melissa McConnell (City of Placerville)

From: Eric Howard and Ronald T. Milam, AICP, PTP

Subject: SB 743 Implementation Baseline VMT Methodology and Data RS18-3653

This technical memorandum summarizes the potential baseline VMT methodologies and associated data prepared for the EDCTC jurisdictions as part of the SB 743 Implementation Plans project. Baseline methodology options included the regional SACOG SACSIM model, the El Dorado County travel demand model, and 2010-2012 California Household Travel Survey (CHTS). The CHTS data was included for purposes of comparing household generated VMT from the SACSIM model.

For the SACSIM model, the VMT methodology included trips for each of the following variable formats:

- Total Daily VMT (all vehicle travel for all trip purposes)
- Total Daily VMT per Service Population (all vehicle travel per residential population and employees)
- Household VMT per Capita (all vehicle travel generated by residents of households within the SACOG region with the exception of residents that work outside the region)

For the El Dorado County model, the VMT methodology included trips for each of the following variable formats:

- Total Daily VMT (all vehicle travel for all trip purposes)
- Total Daily VMT per Service Population (all vehicle travel per residential population and employees)

The El Dorado County model structure does not allow a household VMT per capita estimate to be calculated although the model produces output labeled as household VMT. This labeling is misleading in that the model is not able to track the travel of household residents throughout the day as the SACSIM model does. The County's model is a trip-based model where all trips are independent of one another; hence, its ability to represent VMT generated from households would be limited to capturing only trips that have at least one trip end at the household. Vehicle trips made by household residents that occur between other land uses (i.e., a trip from work to a restaurant for lunch) cannot be connected back to the household of the resident. Off-the-shelf, the current El Dorado County model structure does not produce home-based VMT output, but the model could be modified to generate this metric.

The relevant VMT data from each model has been organized in the following attachments:

- Attachment A includes tables, charts, and maps containing Total Daily VMT and Total Daily VMT per Service Population from the SACSIM and El Dorado County models.
- Attachment B includes tables, charts, and maps containing Household VMT per Capita from the SACSIM Model.
- Attachment C includes a comparison of the SACSIM and CHTS Household VMT per capita estimates.

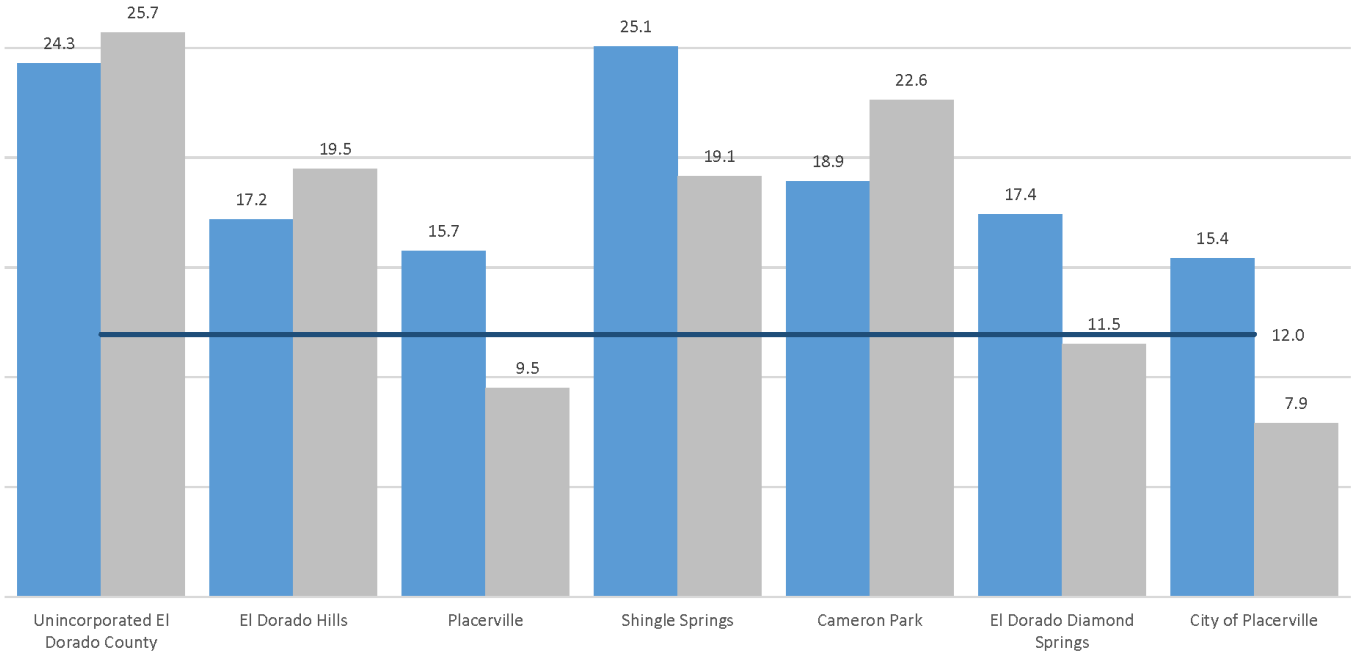
While the VMT data in the attachments is only available for a base and future year, SB 743 VMT analysis may require the development of VMT estimates for a 'baseline' year. Baseline is a CEQA term that generally refers to the year when a project's notice of preparation (NOP) is released. Hence, it may be necessary to interpolate between base and future year VMT estimates to create a specific baseline year value. Spreadsheets containing the base and future year data, and where interpolation calculations can be performed, will be transmitted separately to EDCTC.

ATTACHMENT A – Total Daily VMT and Total Daily VMT per Service Population

Table 1: Total Daily VMT and Total Daily VMT per Service Population

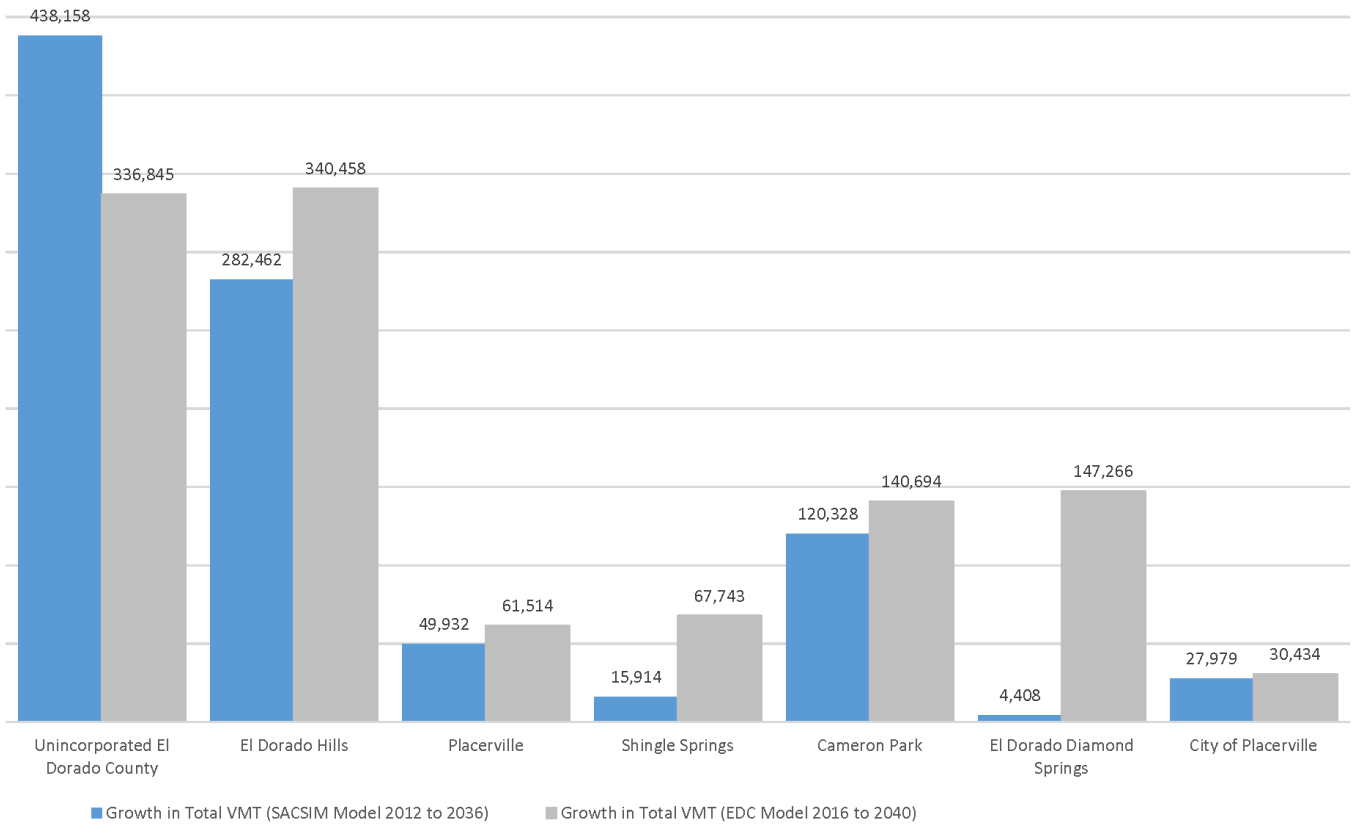
Jurisdiction	Community Region	Model	Base Year		Future Year	
			Total Daily VMT	Total VMT per Service Population	Total Daily VMT	Total VMT per Service Population
El Dorado County	Unincorporated El Dorado County	El Dorado County	1,641,730	24.3	1,978,575	23.6
		SACSIM	2,388,214	25.7	2,826,372	25.6
	El Dorado Hills	El Dorado County	882,365	17.2	1,222,823	15.6
		SACSIM	883,933	19.5	1,166,394	16.9
	Placerville	El Dorado County	343,065	15.7	404,580	15.8
		SACSIM	142,194	9.5	192,127	9.9
	Shingle Springs	El Dorado County	129,063	25.1	196,806	21.8
		SACSIM	80,708	19.1	96,622	14.8
	Cameron Park	El Dorado County	418,017	18.9	558,710	18.2
		SACSIM	421,445	22.6	541,774	20.6
	El Dorado Diamond Springs	El Dorado County	289,307	17.4	436,573	17.3
		SACSIM	74,551	11.5	78,959	10.6
	El Dorado County Total	El Dorado County	3,703,547	20.1	4,798,067	19.0
		SACSIM	3,991,046	21.9	4,902,247	20.5
City of Placerville	City of Placerville Total	El Dorado County	221,470	15.4	251,904	15.4
		SACSIM	80,914	7.9	108,893	8.2

Figure 1 - 2012/16 Daily Total VMT per Service Population by El Dorado County Community Regions & the City of Placerville



The 'City of Placerville' values represent the traffic analysis zones that are within Placerville's City Limits, the 'Placerville' values are from the zones that are within the County's Placerville Community Region.

Figure 2 - Growth in Total VMT by El Dorado County Community Regions & the City of Placerville



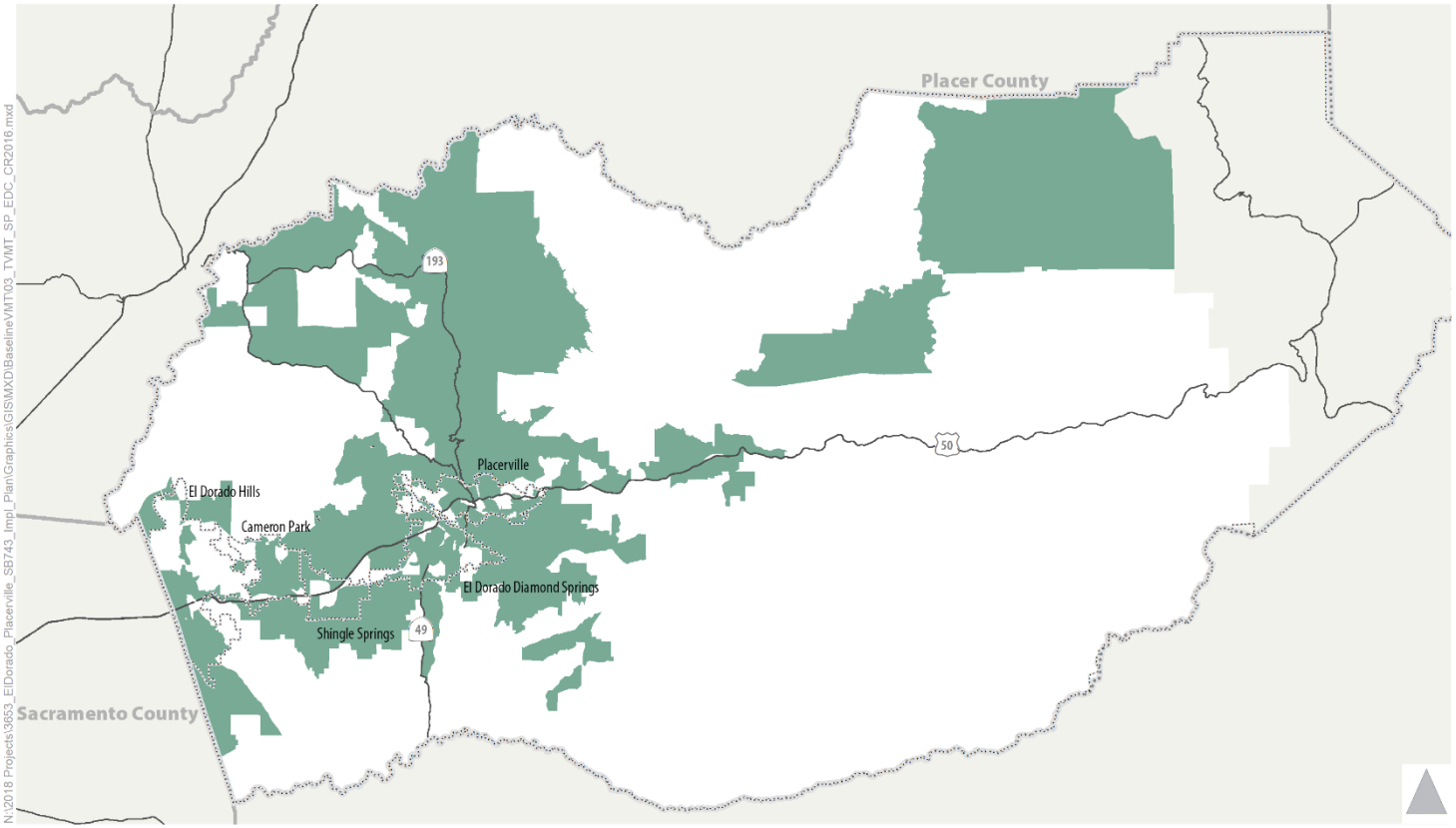


Figure 3

El Dorado County Model (2016)
Daily Total VMT per Service Population

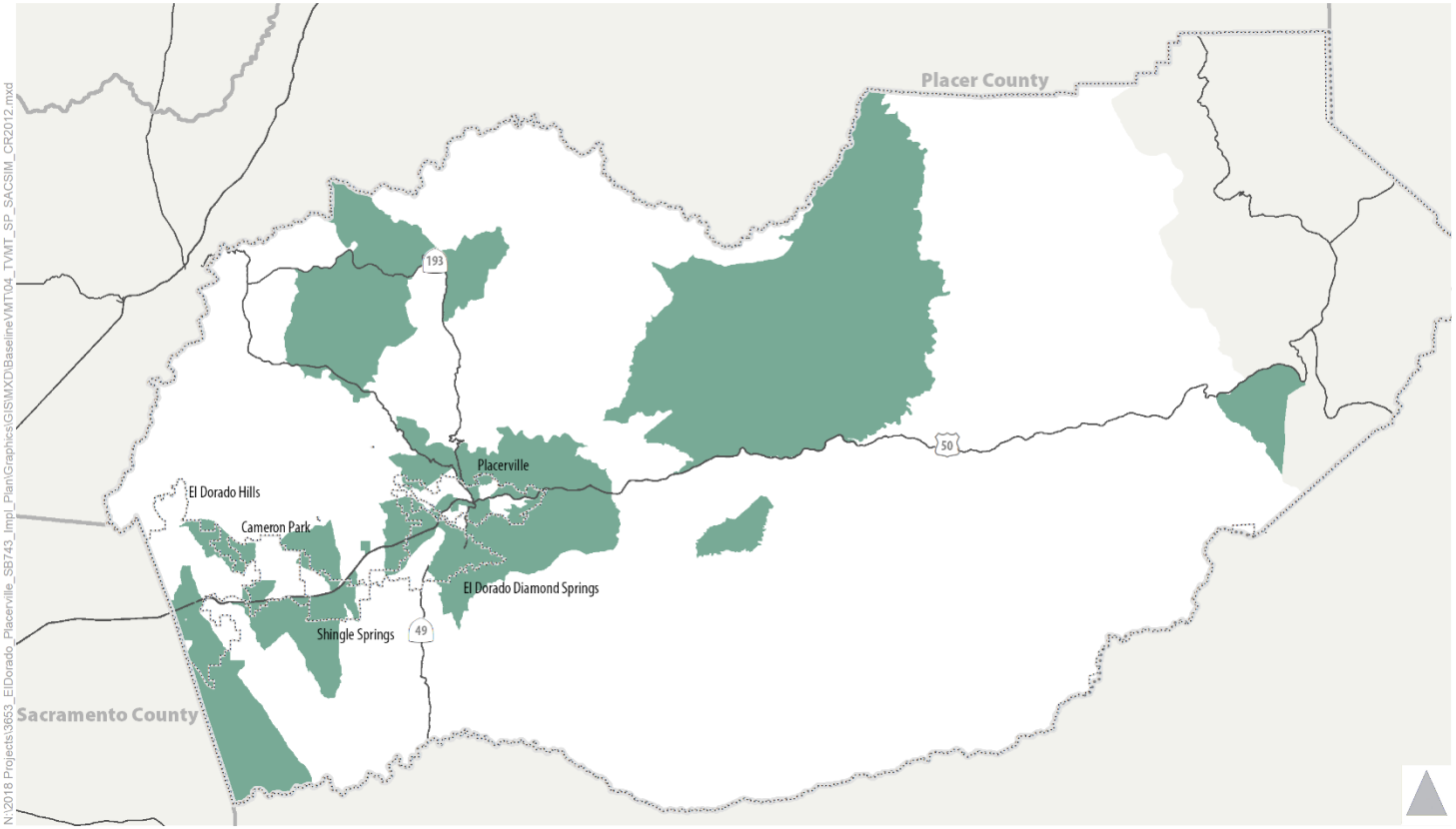


Figure 4

SACSIM Model (2012)
Daily Total VMT per Service Population

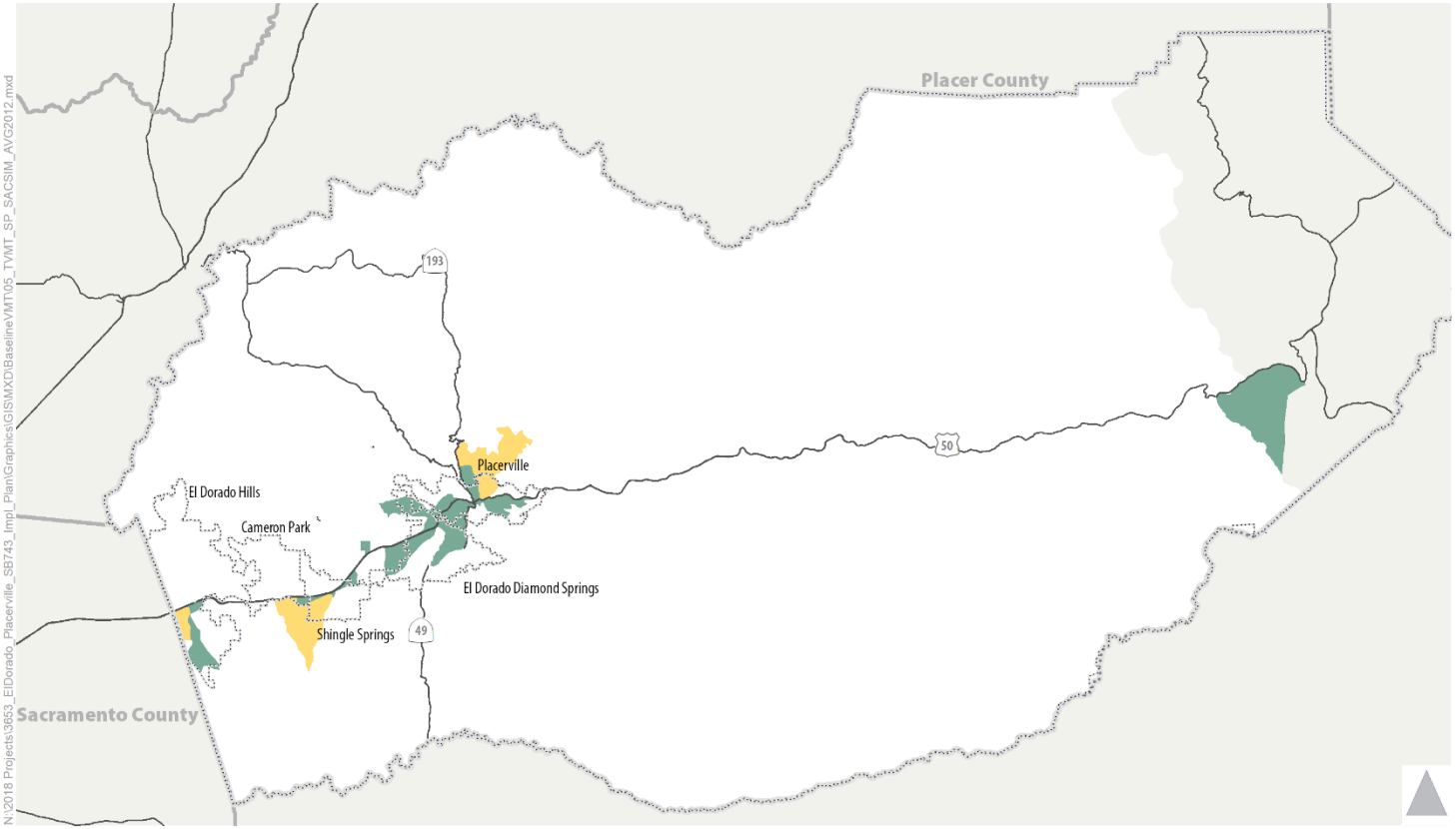
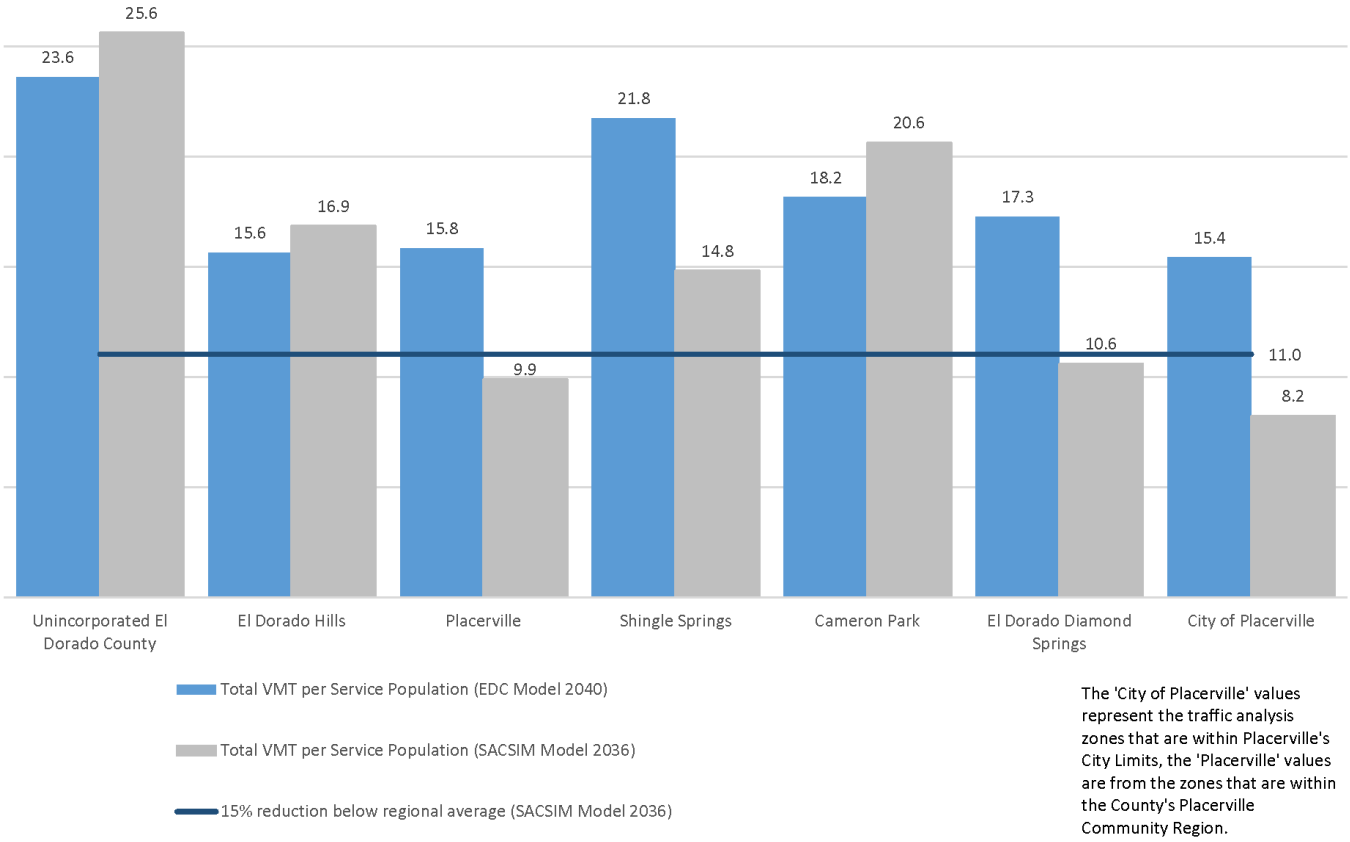


Figure 5

SACSIM Model (2012)
Daily Total VMT per Service Population

Figure 6 - 2036/40 Daily Total VMT per Service Population by El Dorado County Community Regions & the City of Placerville



The 'City of Placerville' values represent the traffic analysis zones that are within Placerville's City Limits, the 'Placerville' values are from the zones that are within the County's Placerville Community Region.

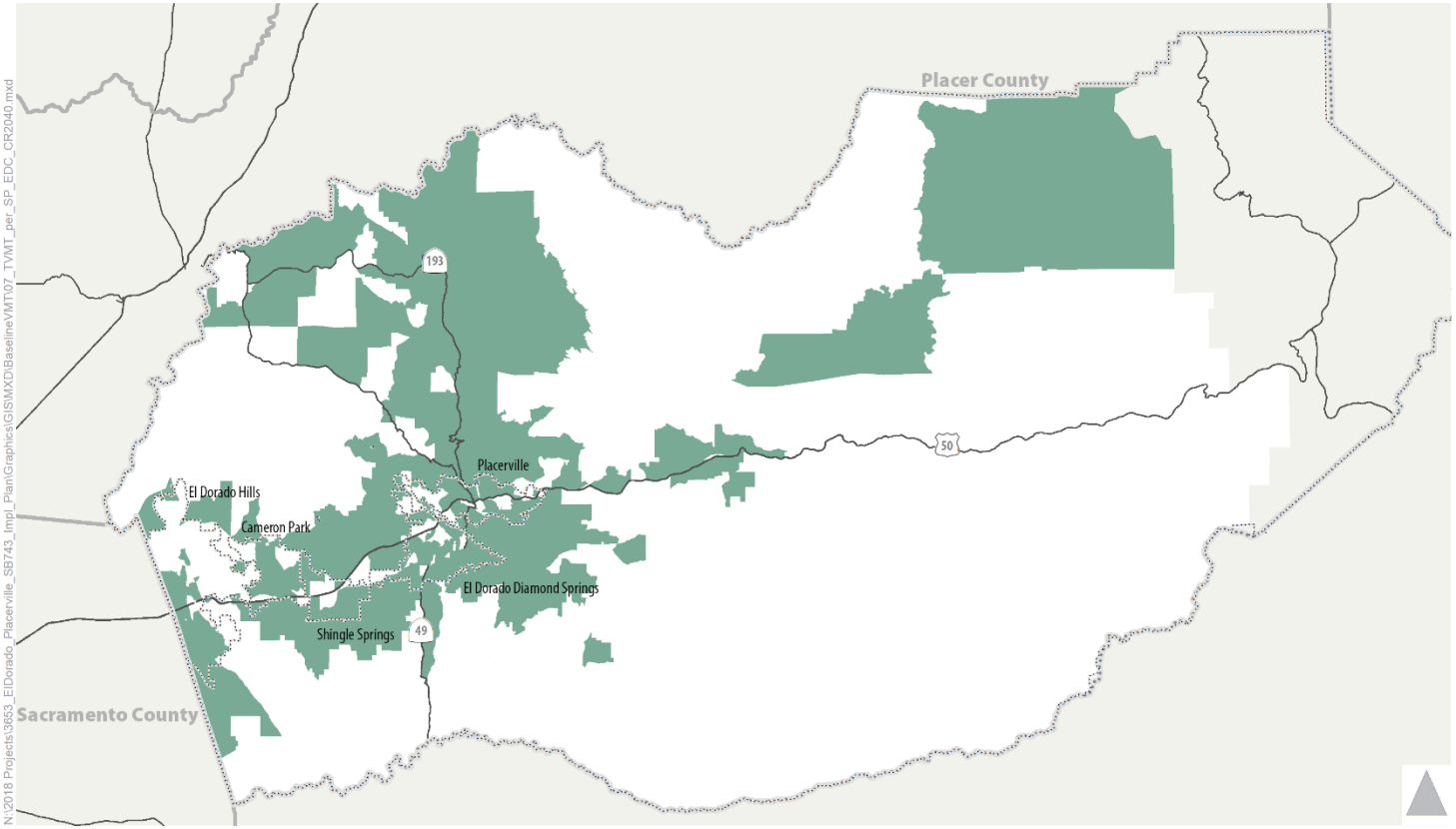


Figure 7

El Dorado County Model (2040)
Daily Total VMT per Service Population

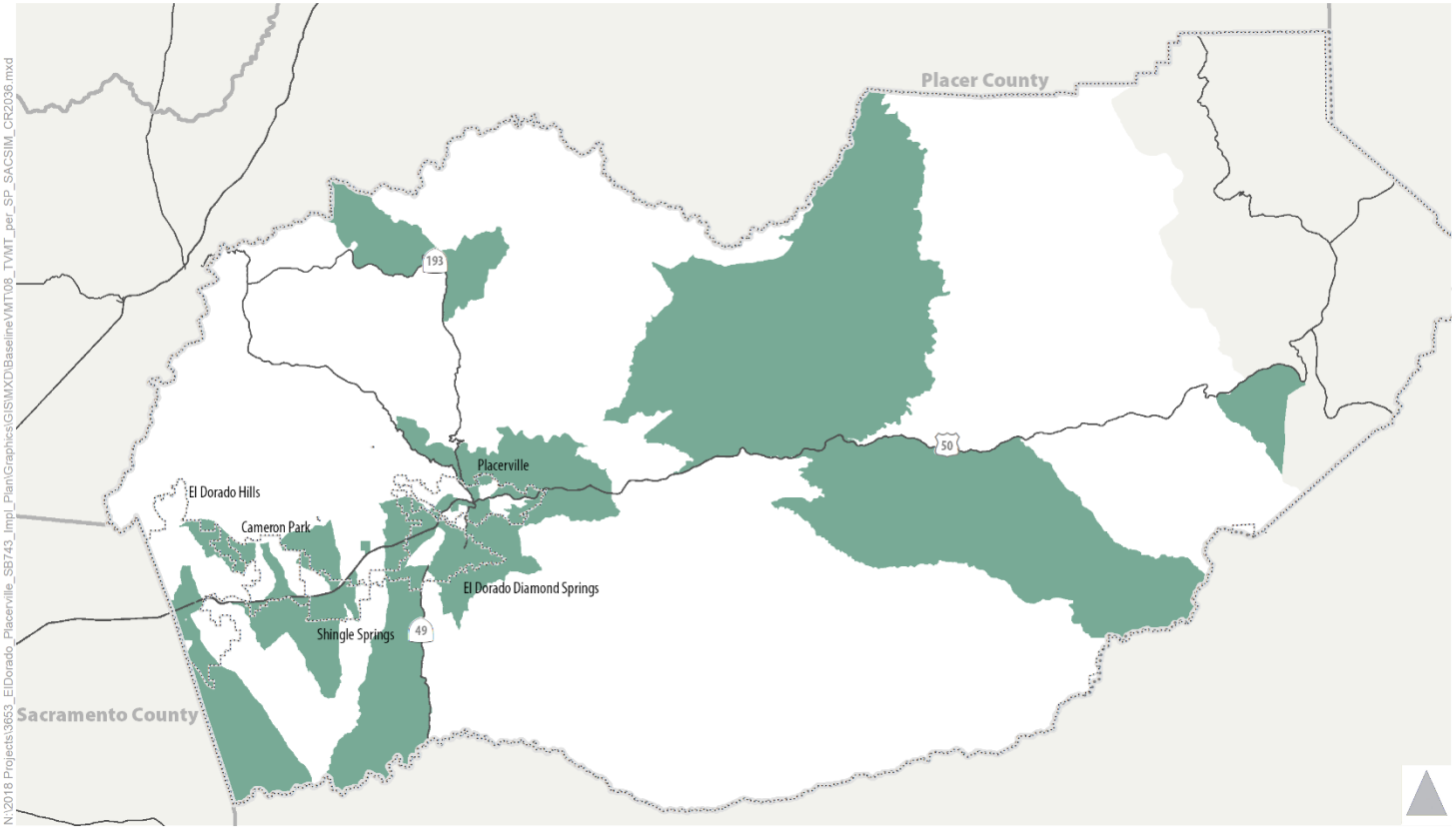


Figure 8

SACSIM Model (2036)
Daily Total VMT per Service Population

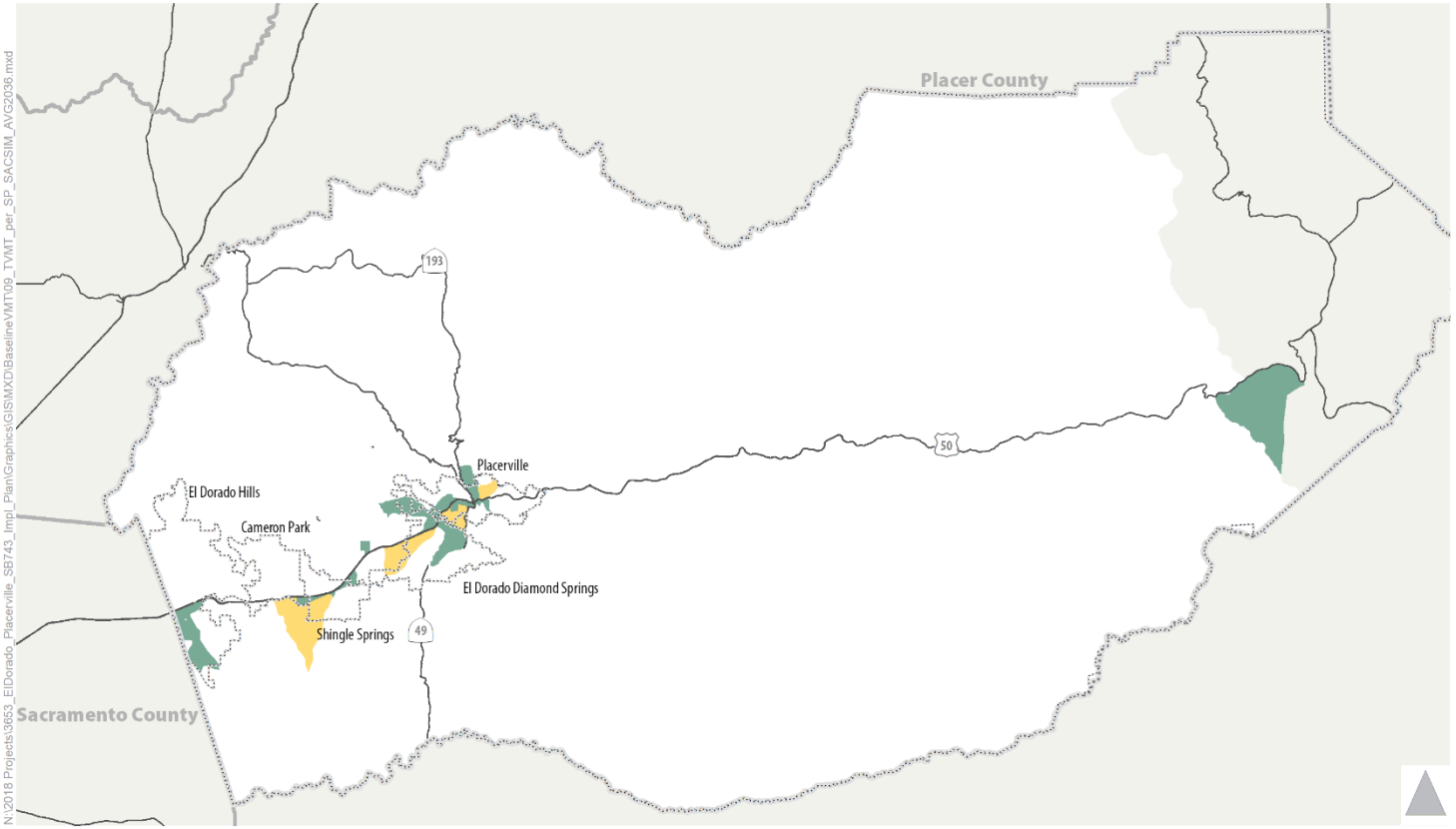


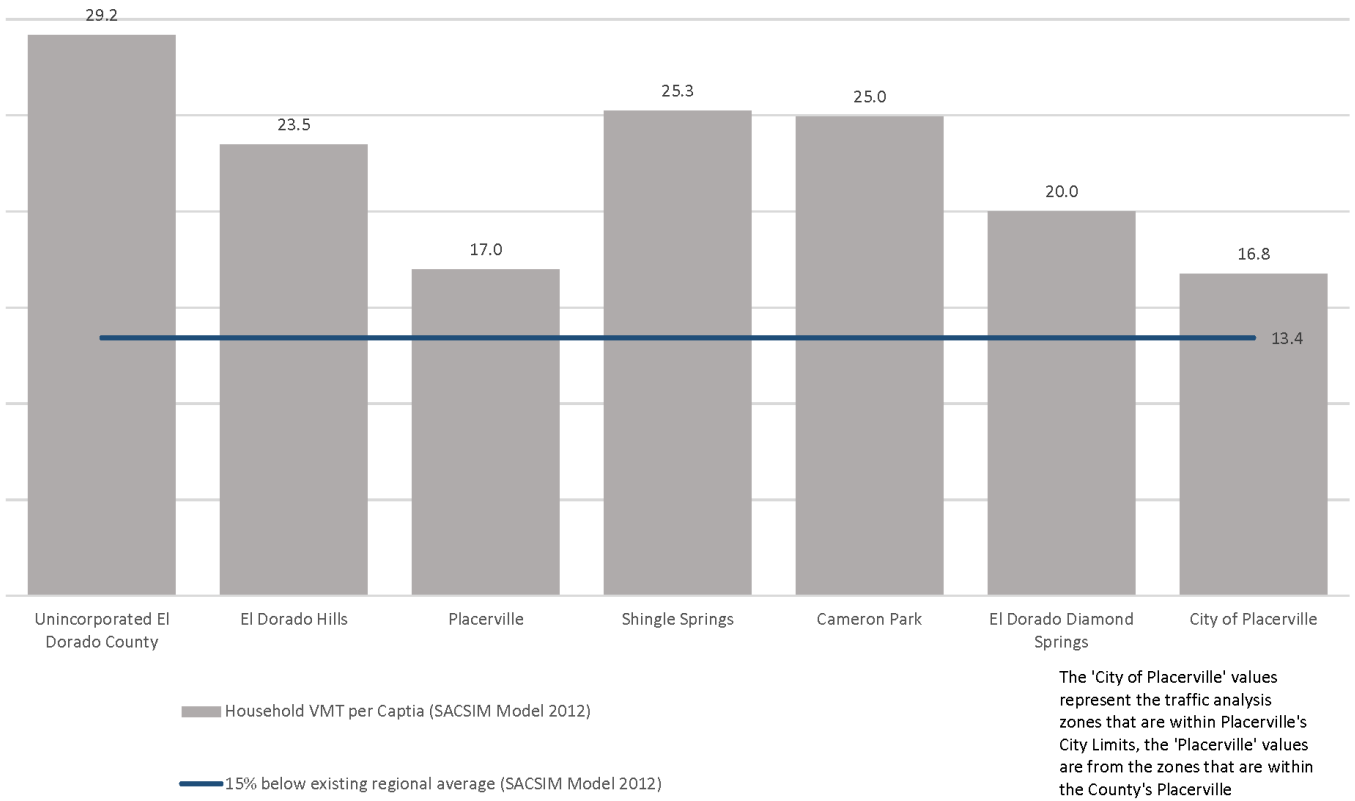
Figure 9

SACSIM Model (2036)
Daily Total VMT per Service Population

ATTACHMENT B – Household VMT per Capita

SACSIM Model 2012 and 2036

Figure 10 - SACSIM 2012 Daily Household VMT per Capita by El Dorado Community Regions & the City of Placerville



The 'City of Placerville' values represent the traffic analysis zones that are within Placerville's City Limits, the 'Placerville' values are from the zones that are within the County's Placerville Community Region.

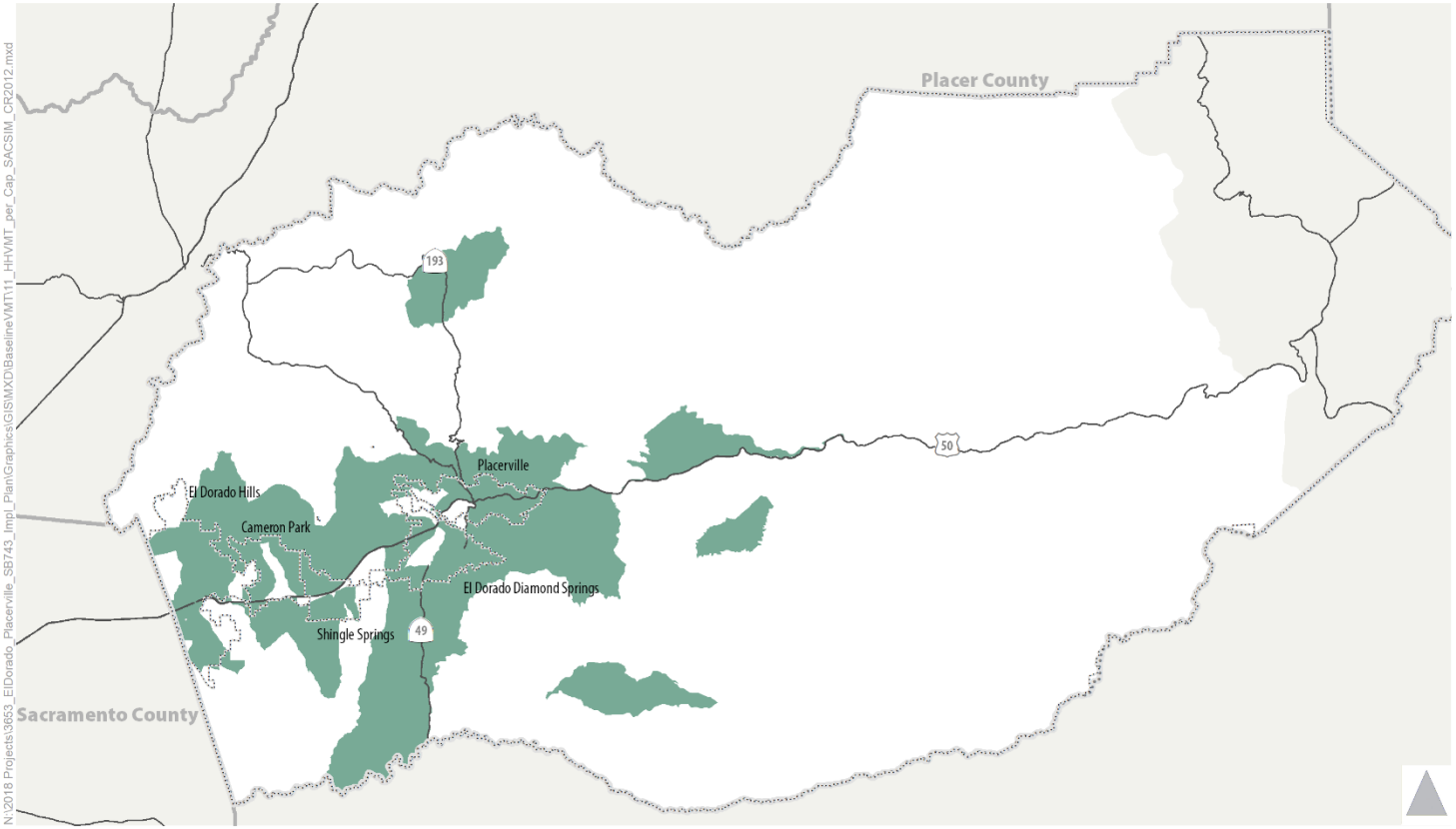


Figure 11

SACSIM Model (2012)
Daily Household VMT per Capita

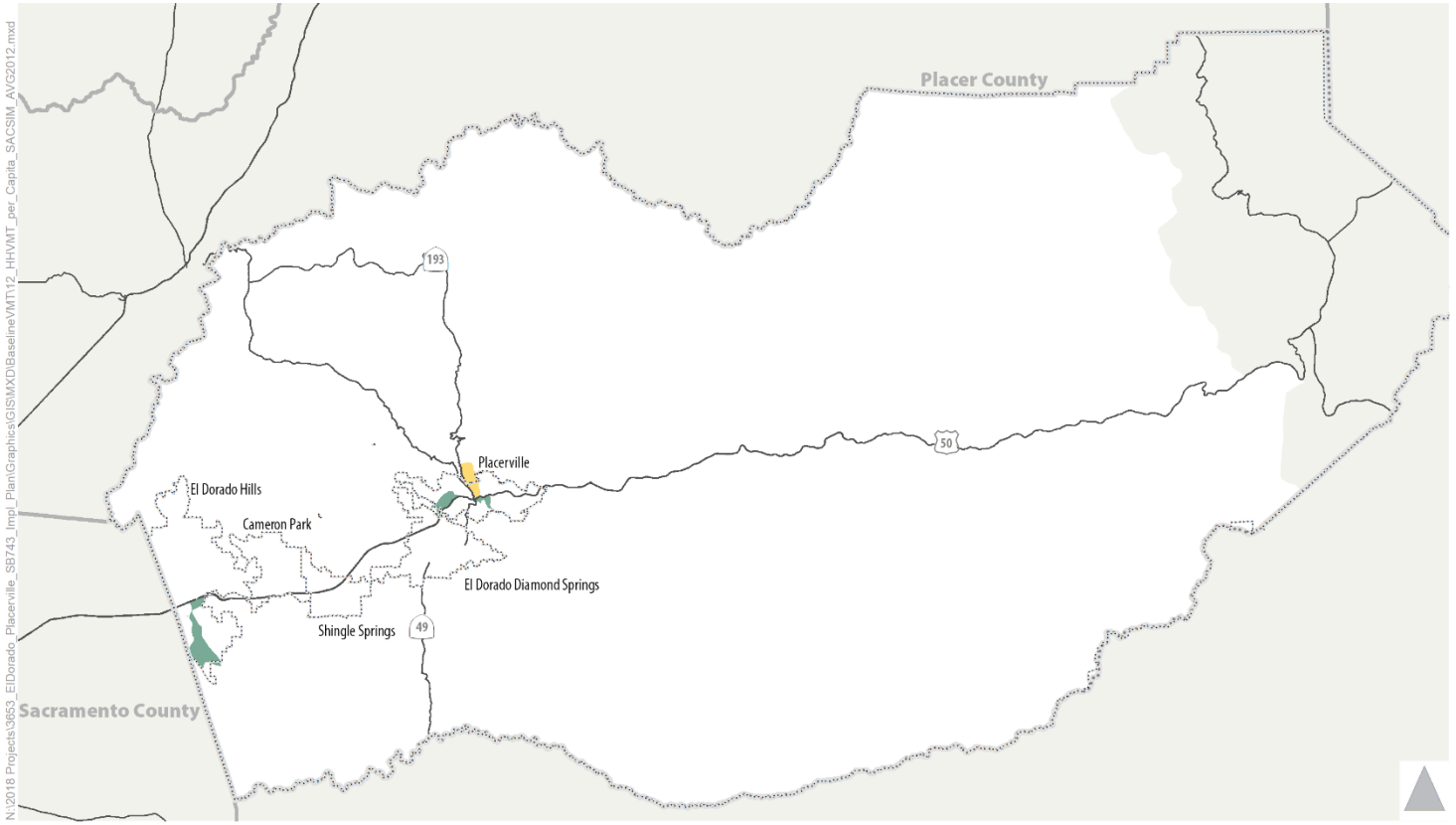
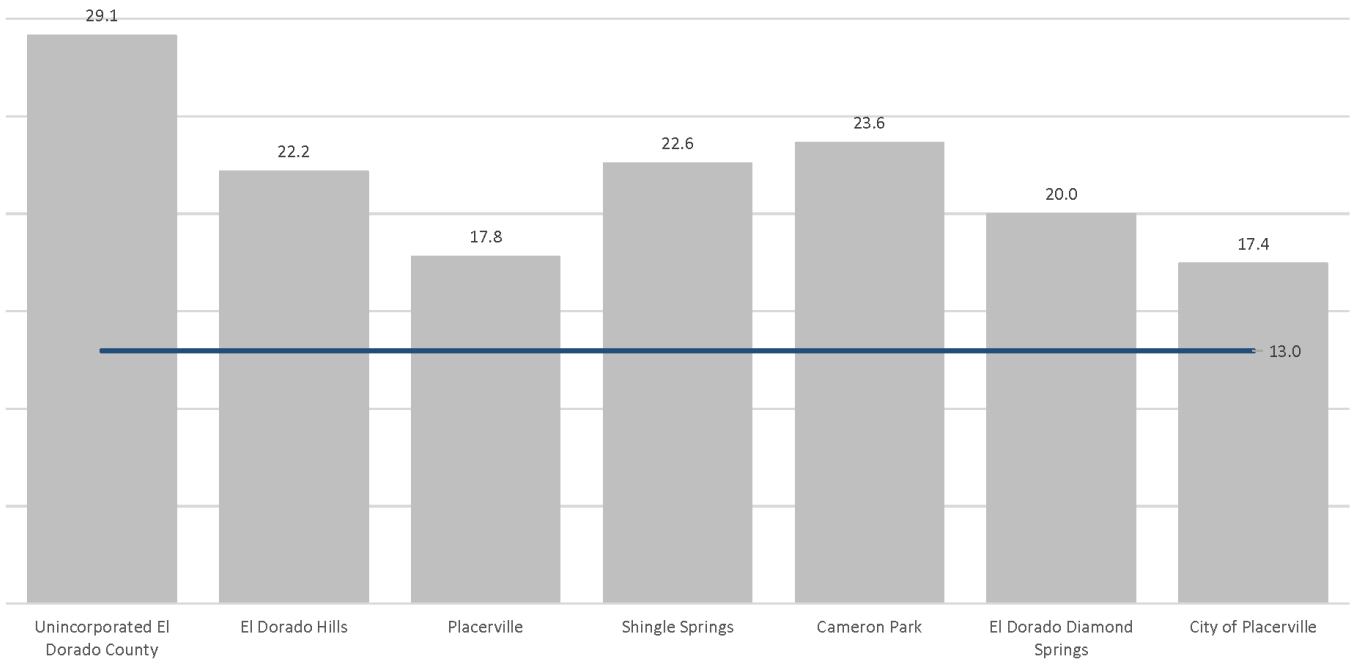


Figure 12

SACSIM Model (2012)
Daily Household VMT per Capita

Figure 13 - SACSIM 2036 Daily Household VMT per Capita by El Dorado County Community Regions & the City of Placerville



The 'City of Placerville' values represent the traffic analysis zones that are within Placerville's City Limits, the 'Placerville' values are from the zones that are within the County's Placerville Community Region.

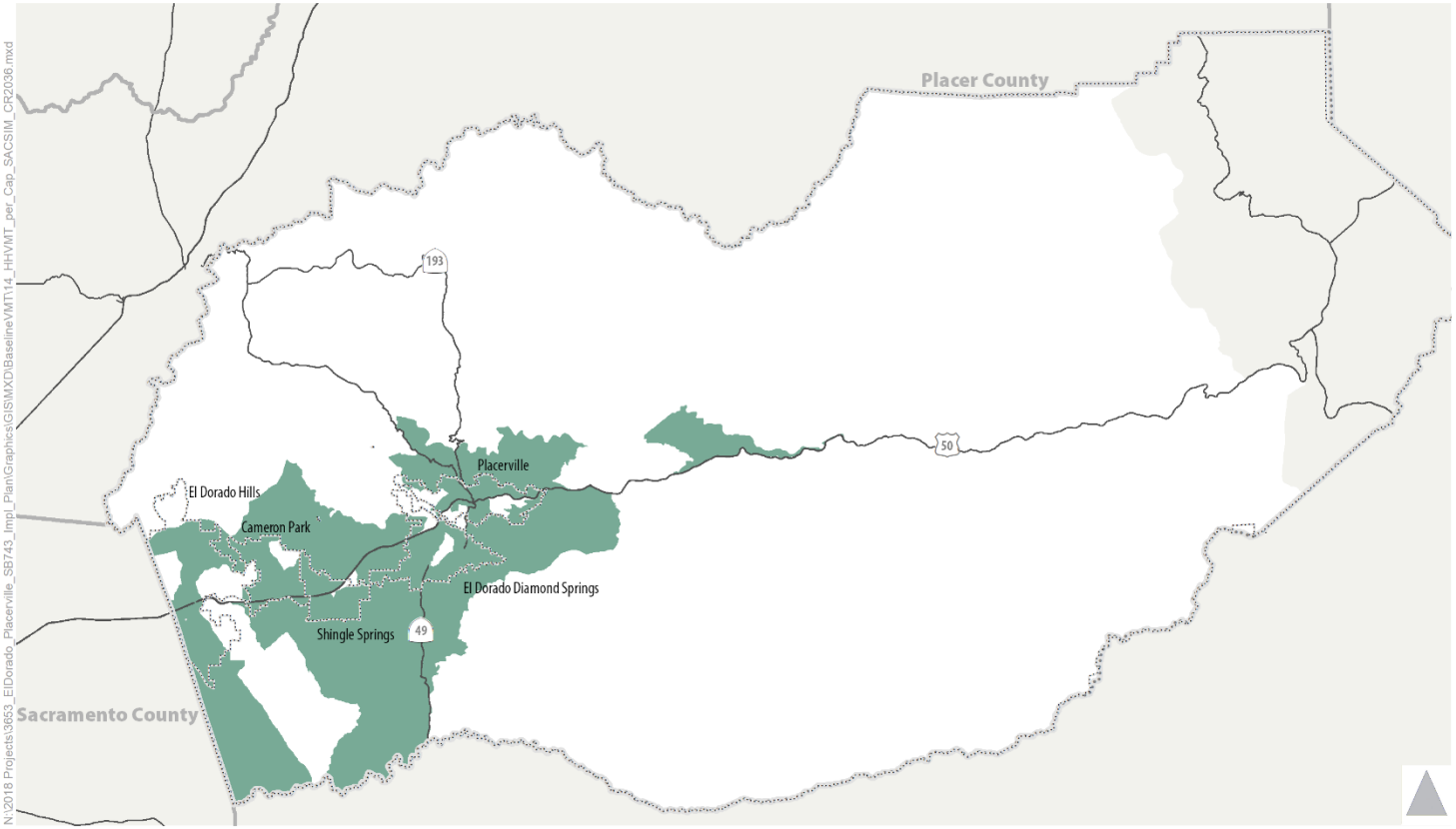


Figure 14

SACSIM Model (2036)
Daily Household VMT per Capita

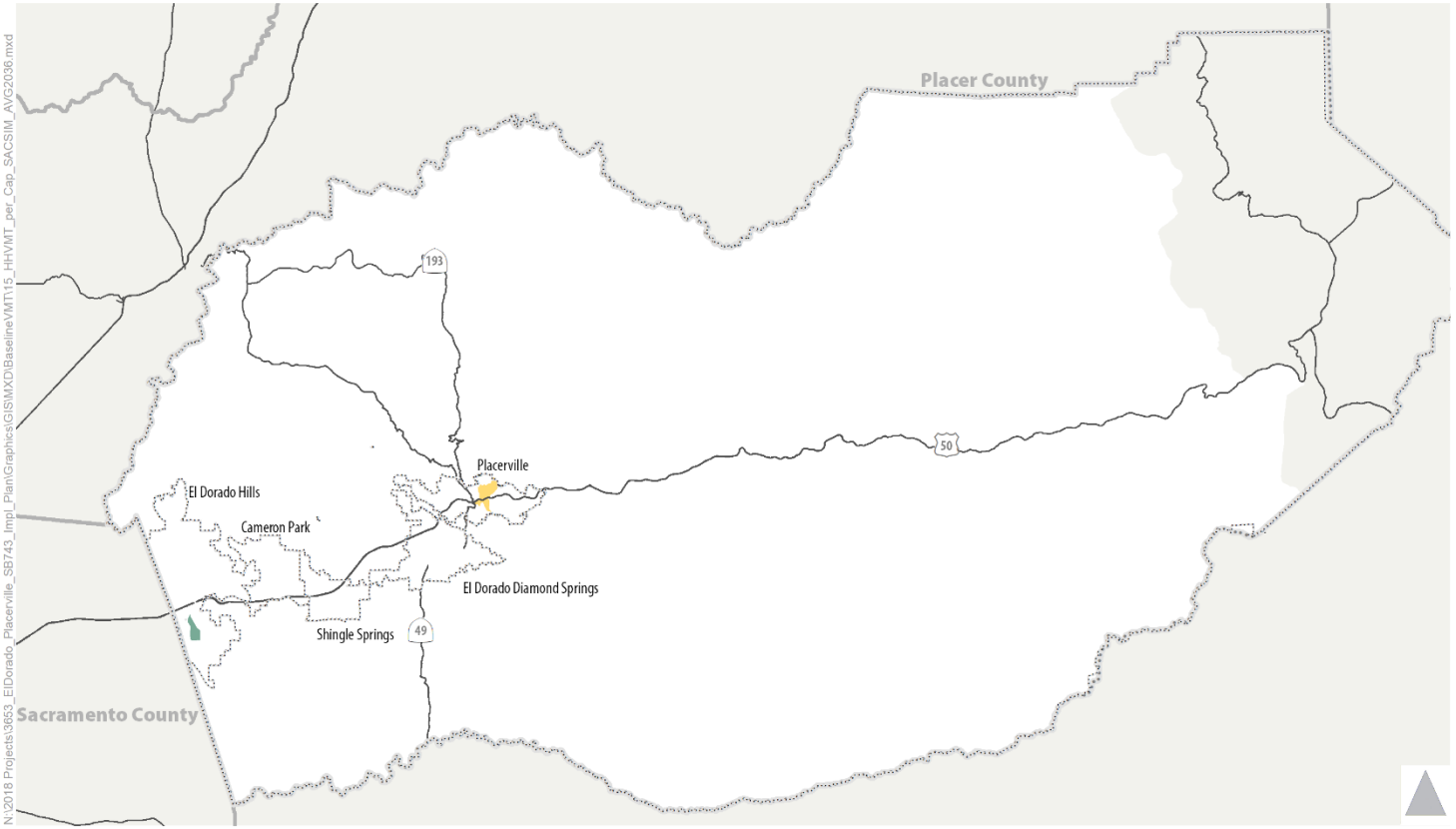
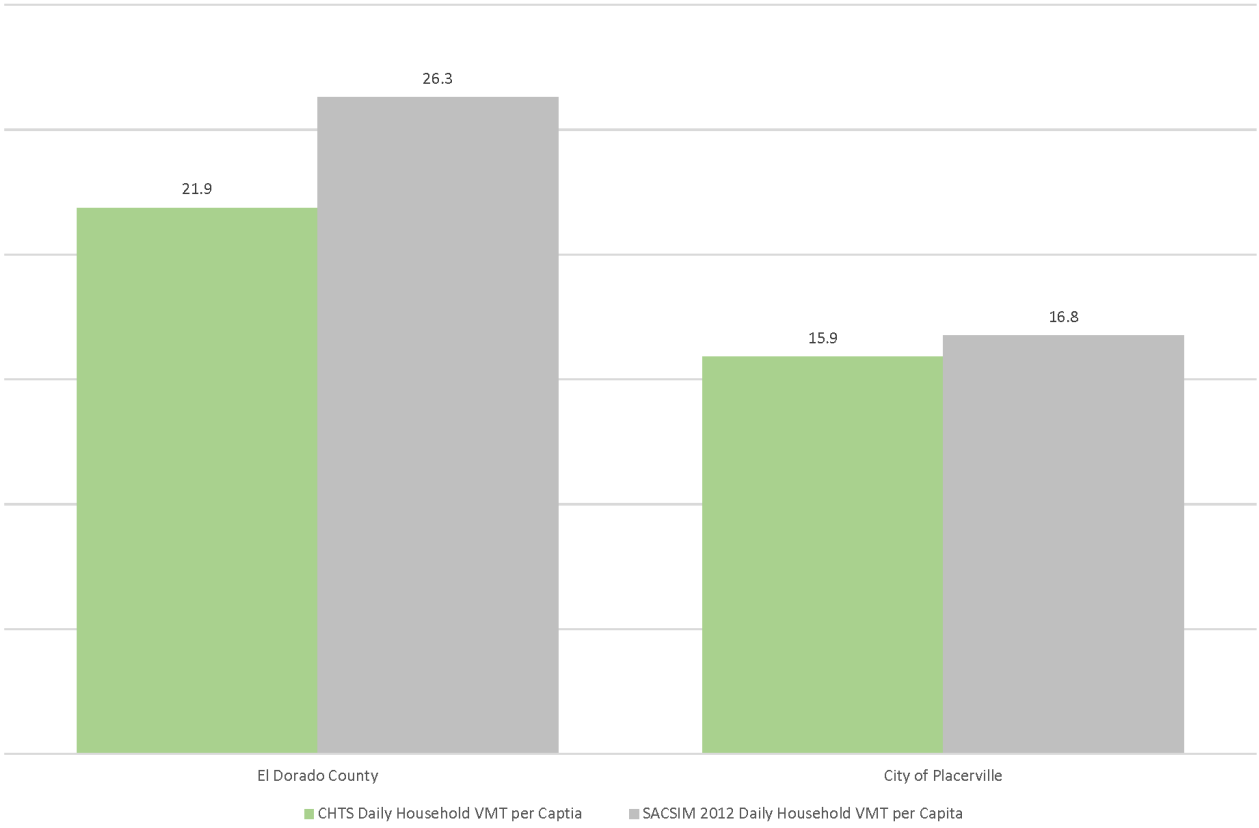


Figure 15

SACSIM Model (2036)
Daily Household VMT per Capita

ATTACHMENT C – SACSIM and CHTS Household VMT per Capita Comparison

Figure 16 - 2012/16 Daily Household VMT per Capita Comparion of CHTS and SACSIM Model Results



Tool Assessment

TECHNICAL MEMORANDUM

Date: 10.19.18

To: Woodrow Deloria (EDCTC), Natalie Porter (El Dorado County), Rebecca Neves (City of Placerville), and Melissa McConnell (City of Placerville)

From: Eric Howard and Ronald T. Milam, AICP, PTP

Subject: Review and Assessment of Existing Planning/Travel Demand Tools for SB 743 RS18-3653

This technical memorandum presents a review of existing sketch planning tools and travel demand forecasting models available for SB 743 VMT analysis in El Dorado County and the City of Placerville. We identified four travel forecasting models and 11 sketch planning tools that produce VMT forecasts or test VMT reduction strategies. However, SB 743 has an additional requirement that limits which models or tools are potentially acceptable for VMT analysis. The *Technical Advisory on Evaluating Transportation Impacts in CEQA*, State of California, Governor's Office of Planning and Research, April 2018 contains the following specification for models and methodologies.

> *Models and methodologies used to calculate thresholds, estimate project VMT, and estimate VMT reduction due to mitigation should be comparable. For example:*
>
> > *• A tour-based assessment of project VMT should be compared to a tour-based threshold, or a trip-based assessment to a trip-based VMT threshold.*
> >
> > *• Where a travel demand model is used to determine thresholds, the same model should also be used to provide trip lengths as part of assessing project VMT.*
> >
> > *• Where only trip-based estimates of VMT reduction from mitigation are available, a trip-based threshold should be used, and project VMT should be assessed in a trip-based manner.*

Presuming that the City of Placerville and El Dorado County will rely on the El Dorado County or SACOG travel forecasting models to establish VMT thresholds, these models (or their inputs/outputs) would need to be used for project analysis. As a result, current sketch tools could not be used to estimate VMT for SB 743 purposes in Placerville or El Dorado County. Instead, these tools could be used for testing VMT mitigation measures such as transportation demand management (TDM) strategies.

Travel Forecasting Models

Four travel forecasting models are available for VMT forecasting by El Dorado County and the City of Placerville including the California Statewide Travel Demand Model (CSTDM), the SACOG SACSIM and SACMET travel forecasting models, and the El Dorado County Travel Demand Model (EDCTDM). The CSTDM was developed by Caltrans and produces passenger travel demand forecasts. Details about the model can be found at the following website.

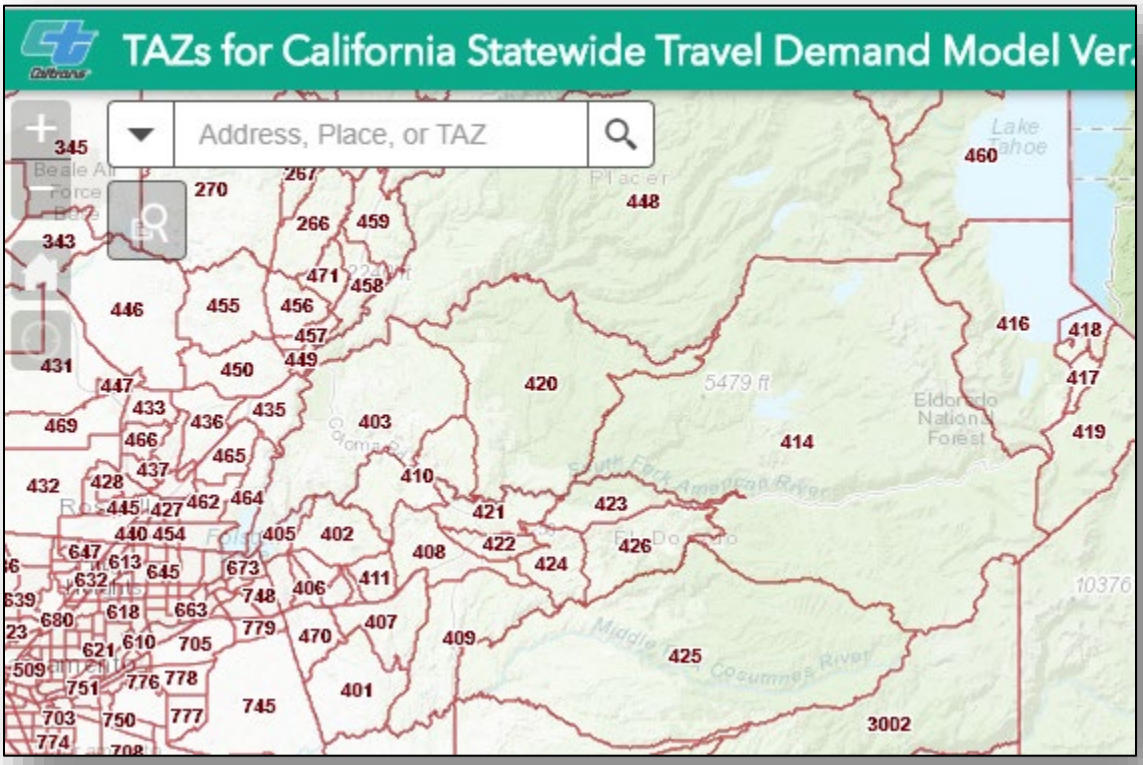
- http://www.dot.ca.gov/hq/tpp/offices/omsp/statewide_modeling/cstdm.html

In addition, Caltrans has produced VMT output data by traffic analysis zone (TAZ) for purposes of SB 743 implementation and that data can be accessed at the following website.

- http://www.dot.ca.gov/hq/tpp/offices/omsp/SB743.html

As a statewide model, the level of detail for local project applications may not be sufficient to produce reasonable results since the model was not validated at a local scale. The traffic analysis zones (TAZs) are large as shown in the map excerpt below; so, the resulting VMT outputs would not be sensitive to small scale influences of land use context.

Figure 1: California Statewide Travel Demand Model Traffic Analysis Zones



SACOG developed the SACMET and SACSIM models for regional planning purposes. The SACMET model is a trip-based model while SACSIM is an activity-based model (ABM). SACOG no longer supports the SACMET model. It was replaced by SACSIM, which is now the basis for all regional forecasts such as the those included in the *2016 Metropolitan Transportation Plan/Sustainable Communities Strategy* (MTP/SCS). SACMET can still be applied for VMT analysis as it uses many of the same input files as SACSIM, but it will not be routinely calibrated and validated. This limits its potential usefulness for SB 743 analysis.

The SACSIM model outputs can be post-processed to produce total VMT estimates at the TAZ level or household generated VMT estimates at the individual parcel level. The model is sensitive to built-environment effects and has been calibrated and validated to represent the SACOG region as explained in the model development documentation available at the following website.

- http://www.sacog.org/sites/main/files/file-attachments/appendix_c-4_travel_model_documentation.pdf

Since El Dorado County is located at the edge of the SACSIM model area, some modifications to the model may be necessary to provide a full accounting of VMT effects as recommended in the Office of Planning

and Research Technical Advisory for SB 743 implementation. The specific modifications would be to adjust the lengths of trips entering and exiting the model boundary area to capture their full travel distance and not just the distance travelled inside the model area.

The current version of the EDCTDM was recently updated to include a 2016 base year and a 2040 future year. The extent of the model boundary area consists of the Western Slope Area of El Dorado County and an extension into Sacramento County along US 50 to Rancho Cordova. The extension to Rancho Cordova allows for a more accurate accounting of travel for residents in El Dorado County who work in the Rancho Cordova area.

The model update included a limited validation of the traffic assignment step of the model using static validation tests recommended in modeling guidelines such as the *2017 Regional Transportation plan Guidelines for Metropolitan Planning Organizations*, California Transportation Commission. These tests measure how well the model traffic volume estimates match observed traffic counts. Three statistical tests were performed, and the model passed each test.

The model update extended the future year scenario from 2035 to 2040 using a 1.03% growth rate for students and households. This growth was allocated to vacant and underdeveloped parcels identified during the 2012 model update and then aggregated to TAZs. The household growth assigned to TAZs within the specific plan areas approved by the County (Bass Lake Hills, Carson Creek, Promontory, etc.) was compared against the number of approved units. In each case the total amount of growth assigned in the model was less than what is approved in each specific plan area.

The recent model update used information from SACOG's SACSIM model to update the count of trips that travel across the EDCTDM's boundary. Additionally, the land use information in the buffer area (the portion of the EDCTDM that extends into Sacramento County) was updated using land use data from the SACSIM model. The socioeconomic data used in the recent model update was also validated against the 2012 California Household Travel Survey (CHTS) and the 2015 American Community Survey. The CHTS data was used to check the average trip lengths being assigned by the model and the two values were reasonably close with 8.3 miles being estimated by the model compared to the 7.8-mile average from the CHTS. The CHTS did not have a sufficient sample size to evaluate the distribution of trip purposes and travel modes being estimated by the model.

Additionally, dynamic validation of the EDCTDM was also performed. Dynamic validation is important as it demonstrates that the model outputs respond to input changes in the appropriate direction and magnitude.

Adjustments are needed to the EDCTDM so that the VMT estimates from the model are consistent with the Office of Planning and Research Technical Advisory recommendations. Currently, the model produces two different types of VMT estimates labeled as 'household VMT' and 'commercial VMT' that are limited to travel within the model boundary that occurs on the model's roadway network. The 'household VMT' is not an accurate description of the VMT that is being outputted since it does not represent the VMT generated by households. A better label is personal vehicle VMT as it includes all the VMT for vehicles excluding commercial truck trips. The commercial VMT includes travel from commercial trucks. Both of the commercial

truck and personal vehicle VMT estimates include pass-through trips that are added to the trip assignment portion of the model. OPR recommends a full accounting of VMT to evaluate the impacts of land use and transportation projects and plans. To fully account for the VMT in the travel demand model, the following adjustments should be made.

- Estimate intrazonal trip lengths and include the VMT associated with these trips – The travel demand model does not assign trips to the network that have their origin and destination within the same TAZ. Because these trips are not assigned to the network, these trips and their trip lengths are missing from the current VMT estimates.

- Adjust the trip lengths for trips entering/leaving the model boundary area – The length of trips with an origin or destination at one of the project gateways should be adjusted to be more representatively of the full distance of these trips, and not truncate the length to the boundary of the model area.

Another potential adjustment would be to stratify the VMT estimates by trip purpose if home-based and home-based work VMT estimates are desired consistent with the OPR Technical Advisory.

Prior to applying the model for VMT analysis, the model's 5D component should be evaluated against applicable scientific literature. This component of the model should also be a focus of the dynamic validation. The 5D component is intended to capture the influence of built environment effects (i.e., the D variables) on travel related to land use context and the transportation network. The commonly accepted scientific definitions of the 5D variables used in the model are listed below[1].

- Density – a measure of dwelling unit and job density per acre
- Diversity – mix of housing, jobs, and retail land uses
- Design – a measure of connectivity and walkability
- Destinations – a measure of regional accessibility (i.e., proximity to regional centers)
- Distance to Transit – proximity to rail transit stations

In some cases, the model's 5D variables do not match the definitions above. Specifically, the diversity variable used in the 5Ds adjustment is defined based on median household income, whereas the literature defines this factor based on the diversity of land uses. Additionally, the destination factor in the model is defined by different categories of congested vehicle hours of travel (VHT) per household, and the literature describes this factor in terms of the number of unique destinations at a specific location. Distance to transit is defined as the percentage of each TAZ that is within a quarter mile (5 points) or half mile (10 points) of any type of transit stop in the model, while the literature focuses only on proximity to rail stations. Finally, the grouping of 5D factors into a point system based on three categories (low-0 points, medium-5 points, high-10 points) is not described in the scientific literature.

[1] Reid Ewing and Robert Cervero, "Travel and the Built Environment", *Journal of the American Planning Association* 76, no. 3 (2010):265-94.

Sketch Planning Tools

This review evaluated 11 sketch model tools using the following criteria. We also incorporated information from reviews conducted by researchers at UC Davis and UC Berkeley.

1. Technical and Legal Defensibility – How defensible is the use of this tool for VMT mitigation evaluation in terms of the accuracy of its outputs and frequency of use by other agencies.
2. Sensitivity – How sensitive is the tool to the specific land use contexts and TDM strategies (e.g., does the tool allow the user to import details related to the context surrounding the project site and the proposed TDM mitigation measures).
3. Utility – How easy to evaluate VMT reduction strategies using the tool.

The 11 sketch model tools reviewed are listed below:

- **CalEEMod** – is a statewide computer model designed to estimate emissions of criteria air pollutant and greenhouse gases (GHGs) associated with land use projects. This model also provides VMT estimates are a part of the emissions modeling process.

- **Sketch 7** – is a spreadsheet tool that estimates percent reductions to VMT based on the 7 Ds (density, diversity, distance, design, destination, demographics, and development scale).

- **VMT Impact Tool/Salon** – created by Deborah Salon at UC Davis for the California Air Resources Board, is a spreadsheet tool that quantifies how much VMT will change in response to changes in land use and transportation system variables.

- **GreenTRIP Connect** – is an online tool for residential projects that allows users to evaluate the VMT and GHG emissions of their project and to test a limited set of built-in TDM strategies.

- **UrbanFootprint** – is a scenario planning tools that produces VMT estimates relying on the MXD trip generation methodology. Trip lengths are calculated within the model but do not reflect network-based routing.

- **Envision Tomorrow** – is a scenario planning tool that produces VMT estimates.

- **California Smart-Growth Trip Generation Adjustment Tool** – is a spreadsheet tool that provides an estimate of the number of trips generated by land use projects implementing smart growth principles.

- **TRIMMS** – is a visual basic application spreadsheet model that estimates mode share and VMT changes brought about by a number of TDM strategies.

- **MXD/MXD+** – MXD is a mixed-use trip generation tool developed for U.S. EPA that adjusts ITE daily trip generation estimates to reflect built environment effects. MXD+ incorporates the ITE mixed-use trip generation method to produce a.m. and p.m. peak hour trip generation estimates for mixed use projects. To estimate VMT, the trip generation results from MXD/MXD+ must be multiplied by trip lengths from observed data or regional/local travel forecasting models.

- **VMT+** – is a web-based application that estimates VMT and emissions using ITE trip rates and user-defined trip and land use inputs.

- **TDM+** – is a spreadsheet tool that estimates the percent reduction in VMT due to the implementation of one or many different TDM strategies identified in the *Quantifying Greenhouse Gas Mitigation Measures*, CAPCOA, 2010.

The matrix in Attachment A provides a summary assessment of these tools and includes the findings from the reviews conducted by UC Davis and UC Berkeley. Each of the sketch models reviewed, except for the CA Smart Growth Tool and MXD/MXD+, provide direct estimates of 'project generated VMT' or calculate the percent change in VMT. None of the models is capable of evaluating the 'project's effect on VMT' or evaluating cumulative VMT impacts. Only CalEEMod, GreenTRIP Connect, TRIMMS, and TDM+ evaluate the impacts of TDM strategies for VMT mitigation.

Tool Recommendations for EDCTC Partner Agencies

According to the OPR Technical Advisory, the tools used to evaluate VMT must be consistent with the methodology used to determine VMT thresholds. To maintain consistency between methods and thresholds, we do not recommend the use of the available sketch planning tools to estimate project generated VMT for land use projects within El Dorado County or the City of Placerville. However, the sketch tools may be useful for evaluating the impacts of potential TDM strategies.

If an efficiency form of VMT (VMT per service population, VMT per resident, or VMT per employee) is selected as the metric that is used to define the VMT thresholds, then we would recommend the development of a customized screening and forecasting tool (i.e., spreadsheet or web-app). This tool would reflect the specific transportation and land use context of El Dorado County and the City of Placerville. The tool would do the following:

- Identify the TAZ associated with the project location.
- Identify the Community Region of the project, based on the project's associated TAZ.
- Determine if the TAZ VMT per service population is less than the Community Region VMT per service population (other efficiency forms of VMT could also be used).
- Determine if the project meets the screening criteria.
- Provide baseline and cumulative estimates of project generated VMT if the project fails to be screened out including VMT estimates for use in other sections of CEQA analysis, such as air quality, greenhouse gases, and energy based on TAZ VMT averages.

Tool setup would include running the base year and future year scenarios of the travel demand model to obtain VMT and land use data for each TAZ and Community Region. Key features of this tool are described in Table 1.

Table 1: VMT Forecasting Tool Specifications

Feature	Description	Elements	Comments
Setup inputs	Travel demand model data required to prepare the tool for use	For each TAZ, for the model base year and future year: • Community Regions • Land use • Total VMT per service population For each Community Region, for the model base year and future year: • Total VMT per service population	Only needs to be updated when the model is updated
Project inputs	Data required for each project	• Project baseline year (year Notice of Preparation is filed) • Community Regions • Land use • Is the project consistent with the general plan? (yes/no) • Is project consistent with RTP? (yes/no) • Does the project consist exclusively of local serving retail uses with a total project size of less than 50,000 square feet? (yes/no)	
Tool outputs	Results provided for each project	• Does the project satisfy the screening criteria? If yes, what is the basis for determination • Estimated project total VMT per service population (project baseline and future years) • Estimated project total VMT (project baseline and future years)	VMT estimates based on TAZ average

For evaluating the impacts of TDM strategies for VMT mitigation, GreenTRIP Connect and TDM+ are two possible sketch tools. GreenTrip Connect is a free tool that is easy to use, but only applies to residential projects and is limited to a few TDM strategies that may not be applicable in El Dorado County. TDM+ includes more trip reduction strategies supported by recent research, but only a few strategies are likely effective in El Dorado County as explained in the "SB 743 Implementation TDM Strategy Assessment," July 10, 2018. Both tools could be applied in El Dorado County; however, users need to be cautioned about the potential limitations of trip reduction strategies in rural and suburban areas.

ATTACHMENT A – Sketch Model Tool Applicability Finding

ATTACHMENT A: SKETCH MODEL TOOL APPLICABILITY FINDINGS

Sketch Tool	Output	Defensibility	Sensitivity	Utility	Comments	User Experience: Benefits (UC Davis[1])	User Experience: Drawbacks (UC Davis[1])	Conclusions (UC Berkeley[2])	Conclusion
CalEEMod	VMT	++ Widespread use by air districts. Defensibility depends on use by others due to lack of documentation for trip lengths and known calculation problems.	+ Many parameters, but limited sensitivity to land use context, requires use of mitigation function to accurately represent mixed-use or infill projects, does not directly capture internalization, and mitigation function is not current or fully sensitive to TDM strategies.	++ Requires installation, which can cause errors due to older programming (not updated since 2016). Use of the tool is relatively straightforward but use of mitigation function is often necessary to accurately represent proposed projects.	CAPCOA/Trinity Consultants product, may not be able to make changes.	Many, customizable inputs; program interface reduces back-end error.	Many, customizable inputs; defaults and land use categories may misrepresent project and/or context area.	Easier data demands; difficult to determine location attributes, especially to avoid double counting; documentation did not provide enough guidance on method selection.	Not recommended for VMT calculations but could be used for TDM mitigation evaluation.
Sketch 7	% Change in VMT	+ Household (HH) VMT only. Hasn't been updated since 2012.	+ No internalization, no TDM reduction, no trip purpose. Produces % change in VMT, generic place types.	+ Must have regional travel demand model data as input.		Straightforward inputs & interface; system-level outputs; outputs include walk, bike, and transit trips.	Spreadsheet interface can become "buggy", break; regional TAZ data used to calibrate tool may be difficult to obtain.	[Not reviewed]	Not recommended.
VMT Impact Tool/Salon	% Change in VMT	+ HH VMT only	+ No internalization, no TDM reduction, no trip purpose.	+ Not intuitive as a project analysis tool.	Scenario testing for census tract level & above; not project-level.	[Not reviewed]	[Not reviewed]	[Not reviewed]	Not recommended.
GreenTRIP Connect	VMT; Change in VMT	+ HH VMT only	+ Affordable housing, TDM credit for 4 strategies,	++ Easy to use, but limited to residential land uses.	Would need to work with TransForm.	Simple user interface; straightforward outputs.	Measures only residential travel, even in mixed-use projects.	[Not reviewed]	Not recommended for VMT calculations, but could be used for TDM mitigation evaluation. Application in rural areas may not be valid.
UrbanFootprint	VMT	++ Uses MXD for trip generation. Trip lengths not based on observed data.	++ Many parameters. Sensitive to land use changes from adjacent parcels. No TDM reduction.	+ Robust tool but requires training to learn.	California acquired licenses for all cities and counties.	[Not reviewed]	[Not reviewed]	[Not reviewed]	Not recommended.
Envision Tomorrow	VMT	+ Added parameters diluted research.	++ Many parameters. No TDM reduction.	+ Open source, complex spreadsheet tool.	Primarily scenario planning; owned by Fregonese.	[Not reviewed]	[Not reviewed]	[Not reviewed]	Not recommended.
CA Smart Growth Tool	Trips	++	+ No trip purposes, no TDM reduction.	+		Few, intuitive inputs with direction of where to find them.	Calculates trips one land use at a time, and in limited context areas; calculates trips, not VMT.	[Not reviewed]	Not recommended.
TRIMMS	VMT	++ Used by SJCOG.	++ Includes TDM reductions for employees (not LU).	+	Has a few elements that do not exist in CAPCOA.	[Not reviewed]	[Not reviewed]	[Not reviewed]	Not recommended.
MXD/MXD+	Trips	+++	++ Many parameters, no TDM reduction.	++		Simple inputs categories; straightforward outputs.	Important input data may be difficult to find.	High data input demands; obtaining data required GIS capability.[3]	Not recommended.
VMT+	VMT	+ Educational Tool.	+ Limited parameters.	++ Easy to use.		[Not reviewed]	[Not reviewed]	[Not reviewed]	Not recommended.
TDM+	% Change in VMT	+++ CAPCOA-based.	++	++	Only does TDM reductions; needs to be coupled with VMT estimator. Being updated based on new TDM research from ARB Net Zero Building Feasibility Study.	[Not reviewed]	[Not reviewed]	[Not reviewed]	Could be used for TDM mitigation evaluation. Application in rural areas may not be valid.

Sources: Fehr & Peers, 2018; UC Davis, 2017; UC Berkeley, 2018.
Notes: + = lowest score, +++ = highest score

[1]Amy Lee, Kevin Fang, and Susan Handy; "Evaluation of Sketch-Level Vehicle Miles Traveled (VMT) Quantification Tools," National Center for Sustainable Transportation, August 2017.
[2]Elisa Barbour, Dan Chatman, Sarah Doggett, Stella Yip, and Manuel Santana; "SB 743 implementation: Challenges and Opportunities [Draft Final]," June 5, 2018.
[3]Analysis based on earlier, public spreadsheet tool; more advanced proprietary versions available.

Case Study Evaluations

TECHNICAL MEMORANDUM

Date: 5.20.2019

To: Woodrow Deloria (EDCTC), Natalie Porter (El Dorado County), Rebecca Neves (City of Placerville), and Melissa McConnell (City of Placerville)

From: Eric Howard and Ronald T. Milam, AICP, PTP

Subject: SB 743 Case Study Evaluations RS18-3653

This technical memorandum provides a summary of the case study evaluations that were conducted to test the VMT impact review process to determine if a project has a potentially significant impact under CEQA. The specific projects tested in the case study evaluations are listed below and include three land use projects and one transportation project.

- The Ridge at Orchard Hill – a residential project in Placerville.
- Saratoga Estates – a residential project in unincorporated El Dorado Hills.
- Highway 50 HOV Lanes from Bass Lake Road to Cameron Park Drive.
- Commercial redevelopment project at the former K-mart location near the Highway 50/Missouri Flat Road Interchange.

The following three figures are a series of flow charts that outline the steps involved in evaluating land use and transportation projects within El Dorado County and the City of Placerville. Figure 1 and Figure 2 represent the VMT review process for land use projects within El Dorado County and the City of Placerville, respectively. These two processes include the VMT screening tool. This tool is intended to provide a streamlined review of projects that are located in areas likely to exhibit low VMT generation. The current version of the tool establishes low VMT generating areas as those traffic analysis zones (TAZs) with VMT generation rates below that of the surrounding Community Region or the City of Placerville average. If the proposed project is not within a low VMT generating area, then additional analysis using the El Dorado County Travel Demand Model is required.

Figure 1: VMT Analysis Process for Land Use Projects within the unincorporated area of the Western Slope of El Dorado County.

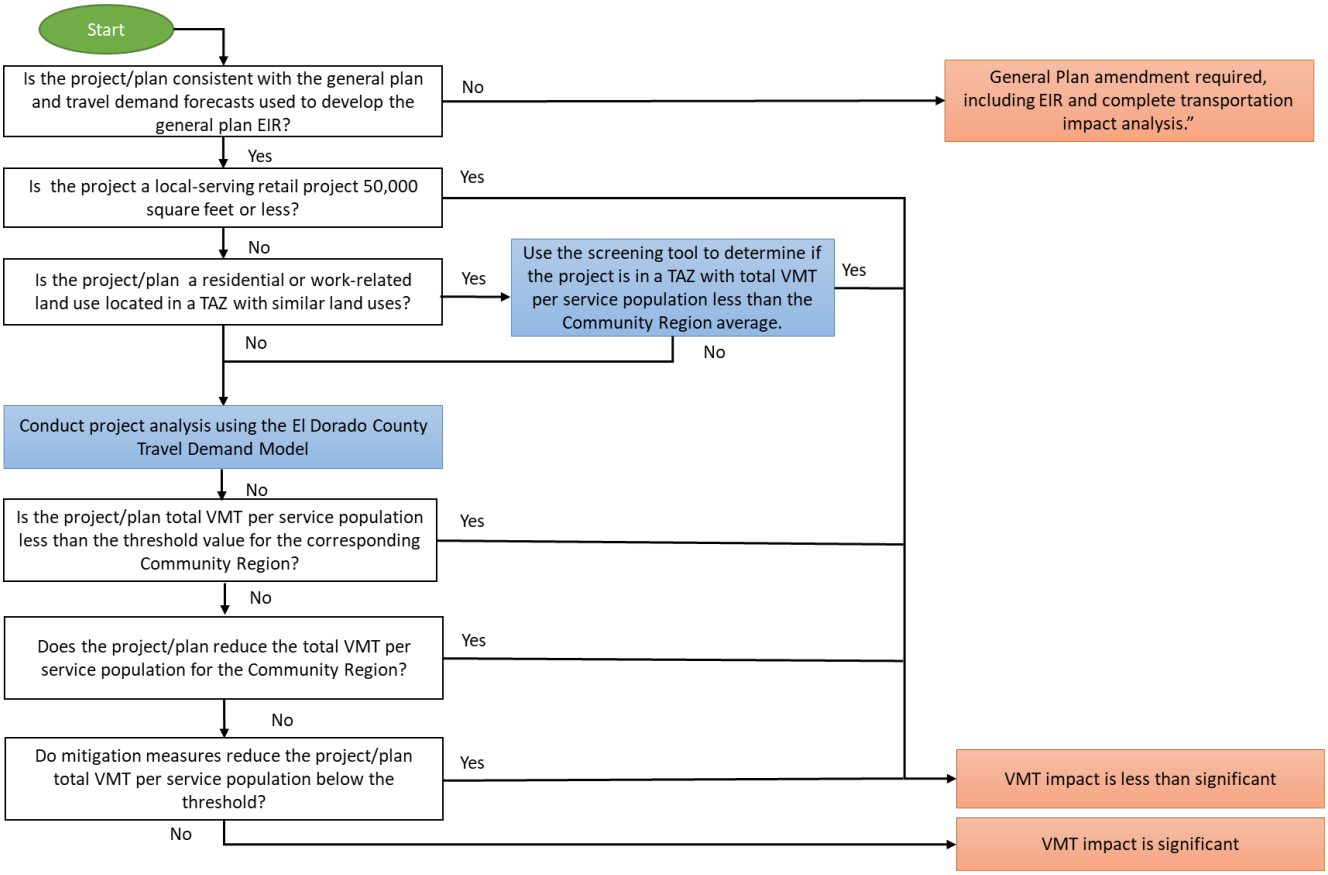


Figure 2: VMT Analysis Process for Land Use Projects within the City of Placerville

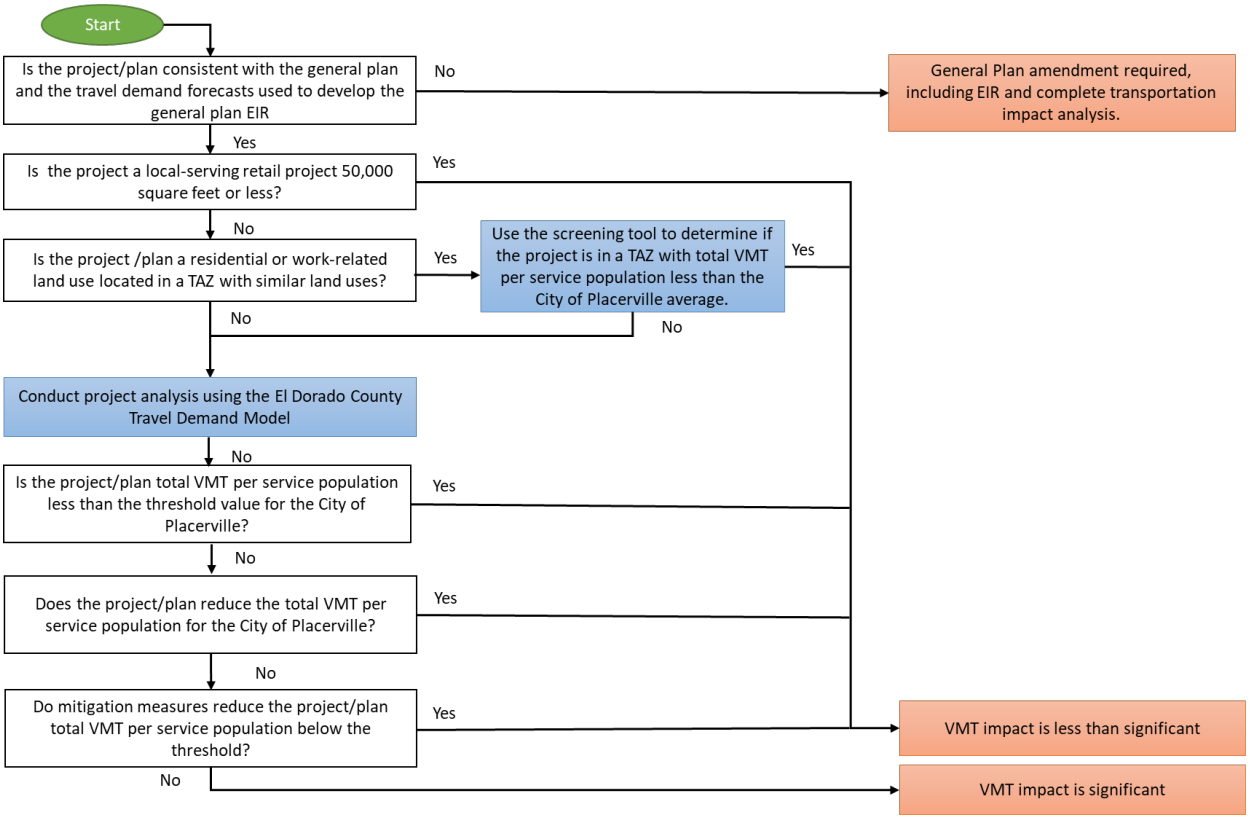
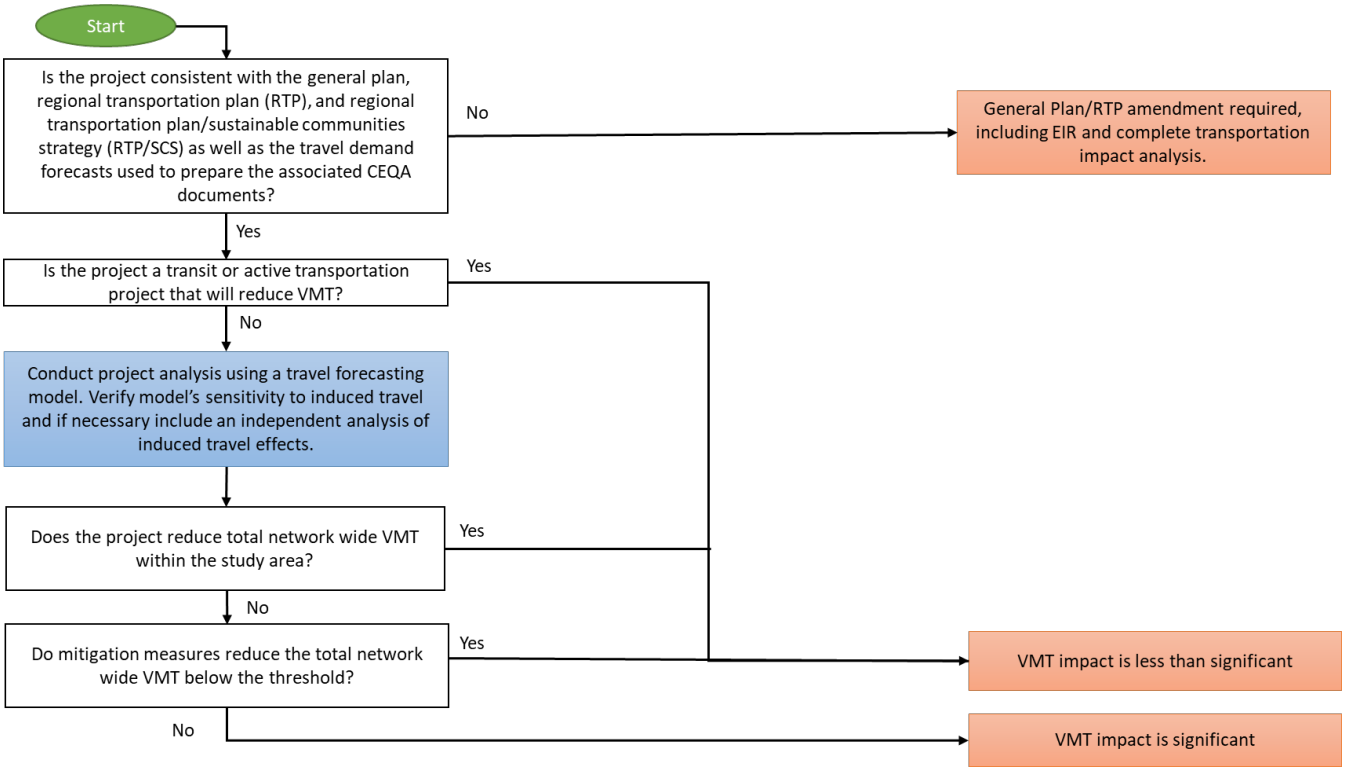


Figure 3 represents the VMT analysis process for evaluating transportation projects. In general, transit and active transportation projects may be presumed to have a less than significant VMT impact. Exceptions include on-demand transit and microtransit projects that could increase VMT. For roadway capacity expansion projects, a complete VMT impact analysis is likely required. This analysis will start with the use of a travel forecasting model such as the El Dorado County Travel Demand Model. Depending on the sensitivity of the forecasting model to induced travel effects, an additional analysis that exclusively focuses on induced travel effects may be required.

Figure 3: VMT Analysis Process for Transportation Projects



The Ridge at Orchard Hill

The Ridge at Orchard Hill is a senior housing and assisted living facility development project located southwest of Mallard Lane and northwest of Green Valley Road in Placerville, CA. This project will consist of 176 single-family attached housing units, 54 single family detached single-family housing units, and 81 units in an assisted living facility.

Is the project consistent with the general plan?

When the project was proposed, it was not consistent with the general plan and required a general plan amendment to change the land use designation from Medium Density Residential to High Density Residential. Additionally, the project required a rezoning from R1 to R3. The project also took advantage of the Housing Opportunity Overlay zoning (reduced fees and increased densities) and required a conditional use permit for the 81 unit assisted living facility. Because this project is inconsistent with the City of Placerville General Plan, an EIR and traffic impact analysis was required.

Because this project was inconsistent with the general plan, it exceeds the growth allocation present in the El Dorado County Travel Demand Model. The project site is located within TAZ 355, which has a projected

growth of 39 single-family housing units and six multifamily housing units. The proposed project exceeds the growth allocation by 15 single family and 251 multifamily units.

Does the project occur within a TAZ that has a total VMT per service population below the City of Placerville average?

The project does not occur within a low VMT generating TAZ compared to the City of Placerville total VMT per service population. TAZ 355 has a total VMT per service population value of 17.8 in the 2016 baseline scenario and 17.6 in the 2040 scenario. The City of Placerville total VMT per service population is 15.4 for 2016, and 15.3 for 2040.

Does the project reduce the total VMT per service population for the City of Placerville?

Since the project failed the VMT impact screening test, a complete VMT impact analysis was conducted using the El Dorado County Travel Demand Model. The preferred approach to modeling the project's effect on VMT is to recognize that individual land use projects do not change population and employment growth at the regional level. As noted above, the project only involves requested general plan and zoning changes. These changes influence the 'allocation' of future growth because the underlying land use supply would be changed, but they do not produce a higher level of total population or employment for the region in the future. For this case study, the approach did not account for the 'reallocation' of future growth. Instead, the project land use changes were added to the 2016 and 2040 base scenarios. This is a simplified approach and may overstate the project's VMT effects but is less likely to underestimate VMT changes.

The proposed project has a variety of VMT effects. Because the project is only part of the total land use in a specific TAZ (TAZ 355), the analysis must isolate the incremental change in total VMT per service population that occurs for TAZ 355. This calculation will represent the project generated VMT change. The project will also influence the VMT generation of neighboring areas so the analysis can also consider whether the project's effect on VMT influenced the total VMT per service population for the entire TAZ and for the City of Placerville (or other designated subarea).

As shown in Table 1, the project increases total VMT for TAZ 355, but the total VMT per service population for TAZ 355 and the City of Placerville are lower with the project. The project is improving land use efficiency by increasing the density of development in the study area. In addition, the project generated VMT estimate is 9.6 total VMT per service population, which is lower than the baseline year City of Placerville average of 15.4. Personal vehicle VMT per resident was also evaluated based on the guidance provided in OPR's *Technical Advisory on Evaluating Transportation Impacts in CEQA*. This evaluation showed that the project generated VMT estimates is 8.6 personal vehicle VMT per resident, which is less than the City of Placerville average of 25.1. Table 2 compares the total VMT per service population and the person vehicle VMT per resident to the four threshold options presented in the in the *SB 743 Implementation Thresholds Assessment Technical Memorandum* dated 5/20/2019. This information is sufficient to conclude the project generated VMT and the project's effect on VMT are less than significant based on the threshold described in the

introduction. However, final significance determination must consider other substantial evidence as explained in the *SB 743 Implementation Thresholds Assessment Technical Memorandum* prepared for this study. Table 2 provides an overview of how the project generated VMT compares to the relevant thresholds described in the threshold's memorandum.

Table 1: Summary of the VMT impacts of The Ridge at Oak Hill Project

Scenario	Geography	Total VMT	Service Population	Total VMT / Service Population	Personal Vehicle VMT	Residents	Personal Vehicle VMT per Resident
2016 Baseline	El Dorado County Model	6,941,103	473,420	14.7	5,709,975	301,684	18.9
	City of Placerville	221,470	14,375	15.4	157,330	6,275	25.1
	TAZ 355	15,264	856	17.8	11,811	489	24.2
2016 Baseline with The Ridge Development	El Dorado County Model	6,943,975	474,130	14.6	5,712,511	302,394	18.9
	City of Placerville	228,474	15,085	15.1	163,735	6,985	23.4
	TAZ 355	22,051	1,566	14.1	17,933	1,199	15.0
Increment of VMT and resident/service population growth associated with the project (2016)	El Dorado County Model	2,872	710	4.0	2,536	710	3.6
	City of Placerville	7,004	710	9.9	6,406	710	9.0
	TAZ 355	6,787	710	9.6	6,122	710	8.6
2040 Baseline	El Dorado County Model	10,091,243	703,164	14.4	8,322,367	453,732	18.3
	City of Placerville	249,755	16,327	15.3	179,009	7,678	23.3
	TAZ 355	17,314	984	17.6	13,488	596	22.6
2040 Future year with The Ridge Development	El Dorado County Model	10,119,377	703,874	14.4	8,345,203	454,442	18.4
	City of Placerville	257,698	17,036	15.1	186,047	8,388	22.2
	TAZ 355	24,215	1,693	14.3	19,689	1,306	15.1
Increment of VMT and resident/service population growth associated with the project (2040)	El Dorado County Model	28,133	710	39.6	22,836	710	32.2
	City of Placerville	7,944	710	11.2	7,038	710	9.9
	TAZ 355	6,901	710	9.7	6,202	710	8.7

Table 2: Comparison of Project VMT Metrics to the Four Threshold Options

	VMT Metrics / Threshold Option	Total VMT per Service Population	Personal Vehicle VMT per Resident[1]	Total VMT per Service Population Pass/Fail	Personal Vehicle VMT per Resident Pass/Fail
VMT Metrics	City of Placerville VMT (2016)	15.4	25.1	-	-
	Project VMT (2016)	9.9	9.0	-	-
	City of Placerville VMT (2040)	15.3	23.3	-	-
	Project VMT (2040)	11.2	9.9	-	-
Threshold Options	Reduction in Baseline VMT	15.4	25.1	Pass	Pass
	15% Reduction in Baseline VMT	11.6	18.8	Pass	Pass
	14.3% Reduction in Baseline VMT	13.2	21.5	Pass	Pass
	Reduction in Future Year VMT	15.3	23.3	Pass	Pass

[1]Personal vehicle VMT includes travel from all residents and visitors within El Dorado County that occurred in personal vehicles.

Saratoga Estates

Saratoga Estates is a 121-acre single-family residential dwelling unit development. This project is located in western El Dorado County just north of US-50 between El Dorado Hills Boulevard and the Sacramento County Line. Once complete, this project will consist of 317 single-family detached housing units.

Is the project consistent with the general plan?

The Saratoga Estates project was consistent with the general current land use designation in the El Dorado County General Plan but not the general plan travel demand model. The project would add 317 single-family housing units to TAZ 616, which slightly exceeds the 310 single-family household growth allocation included in the El Dorado County Travel Demand Model between 2016 and 2040. Additionally, the project required a rezoning from Single-Unit Residential-Open Space (R1-OS) to Single-Unit Residential-Planned Development (R1-PD) and Open-Space Planned Development (OS-PD).

The project will add an additional 7 single-family housing units beyond what was evaluated in the County's Travel Demand Model. Using the 9.44 daily trip generation rate per single-family detached housing unit from the *ITE Trip Generation Manual 10th Edition*, the 7 additional housing units will generate approximately 66 daily trips. Additionally, the 7 housing units are expected to generate 5 trips during the AM Peak Hour, and 7 trips during the PM Peak Hour according the ITE trip generations for the peak hours of the adjacent street traffic. The daily trips are less than then 100 daily trips and 10 AM or PM peak hour conditions that would trigger a requirement for a transportation impact study under the current El Dorado County *Transportation Impact Study Guidelines*. Even though the project exceeds the growth allocation evaluated in the Travel Demand Model, the difference between the project size and the growth allocation is small

enough that it may not require a more detailed VMT impact analysis simply based on general plan consistency.

The project requires changes to the local transportation network to facilitate access to the new residences. These changes include extending Saratoga Way west into the project site and extending Wilson Boulevard south so that it connects with Saratoga Way. Both of these roadway projects have been identified and included in the Circulation Element of El Dorado County's General Plan.

Does the project occur within a TAZ that has a total VMT per service population below the Community Region average?

The project occurs within a low VMT generating TAZ compared to the El Dorado Hills Community Region average. The results of the VMT screening tool indicate that the project site occurs within a TAZ that passes all five of the potential thresholds.

Table 3: Summary of VMT Metrics and Thresholds for the Saratoga Estates Project

Locations	VMT Metric / Threshold Option	Value	Pass/Fail
Saratoga Estates -TAZ 616	Baseline (2016) Total VMT per Service Population	13.8	-
	Future (2040) Total VMT per Service Population	13.2	-
El Dorado Hills Community Region	Baseline (2016) Total VMT per Service Population	17.2	Pass
	15% Reduction from Baseline	14.6	Pass
	14.3% Reduction from Baseline	14.7	Pass
	16.8% Reduction from Baseline	14.3	Pass
	Future (2040) Total VMT per Service Population	15.7	Pass

Because the project is consistent with the land use designation in the El Dorado County General Plan, and it occurs in low VMT generating TAZ compared to the Community Region average, the VMT impact could be presumed to be less than significant; however, final significance determination must consider other substantial evidence as explained in the *SB 743 Implementation Thresholds Assessment Technical Memorandum* dated 5/20/2019 prepared for this study.

Conceptual Commercial Site Redevelopment Project

A conceptual commercial site redevelopment project was evaluated at the site of an existing shopping center west of Missouri Flat Road just north of Highway 50. Currently, the shopping center contains a variety of commercial land uses (apparel store, gym, grocery store, drug store, banking, auto parts, and a mobile phone store). However, the shopping center's major retailer (K-Mart) has closed. The proposed project would redevelop the site so that a different retailer would occupy the same space.

A key CEQA question for a project like this is whether CEQA would apply. The reuse of an existing building that only involves a building permit to make tenant improvements would not be subject to CEQA because the improvements would only require a ministerial permit and would not require discretionary approval. For the purposes of this case study evaluation, we will assume that the project is subject to a design review process that requires discretionary approval.

To analyze this type of project, a clear baseline needs to be established. For this test, 2016 was selected as the baseline year consistent with the El Dorado County travel demand model base year. A check of the employment levels for the project TAZ revealed that the K-Mart was still occupied in 2016. Hence, the K-Mart's employment must be removed from the 2016 model to establish a new baseline VMT condition. To create the baseline plus project scenario, an employment estimate is needed for the new use of the K-Mart space. This employment estimate is then added to the base year model to create the new baseline plus project scenario.

Is the project consistent with the general plan?

The proposed redevelopment project is consistent with the commercial land use designation in the general plan and with current zoning that allows for commercial retail development.

Is the project within TAZ with total VMT per service population less than the Community Region average?

The project is not in a low VMT generating TAZ compared to the El Dorado/Diamond Springs Community Region average. The project is located within TAZ 140, which has a baseline total VMT per service population of 35.3. This TAZ occurs within the El Dorado/Diamond Springs Community region, which has an average total VMT per service population of 17.4.

Does the project have a lower VMT than the Community Region average?

Table 4 provides a summary of the VMT analysis conducted for the commercial redevelopment project. The project's total VMT per service population of 27.9 is higher than the baseline Community Region average of 17.4. However, the project generated a total VMT per worker of 27.9 is less than the Community Region baseline average of 39.2. Additionally, the project results in a model-wide 9,286 reduction in total VMT.

Table 4: VMT Summary of the Commercial Site Redevelopment Project

Scenario	Geography	Total VMT	Service Population	Total VMT / Service Population	Workers	Total VMT per Worker
2016 Baseline[1]	El Dorado County Model	6,950,389	473,375	14.7	171,691	40.5
	El Dorado/Diamond Springs Community Region	288,053	16,548	17.4	7,350	39.2
	TAZ 140	22,965	652	35.2	625	36.7
2016 Baseline + Redevelopment Project[2]	El Dorado County Model	6,941,103	473,420	14.7	171,736	40.4
	El Dorado/Diamond Springs Community Region	289,307	16,593	17.4	7,395	39.1
	TAZ 140	24,594	697	35.3	670	36.7
Increment of VMT and service population growth associated with the project.	El Dorado County Model	-9,286	45	-206.4	45	-206.4
	El Dorado/Diamond Springs Community Region	1,254	45	27.9	45	27.9
	TAZ 140	1,629	45	36.2	45	36.2

[1]The baseline scenario used in this project evaluation was analyzed using the 2016 scenario year from the El Dorado County Travel Demand Model with 45 employees being removed from TAZ 140 to account for the closure of the K-Mart.
[2]The baseline + project scenario used in this evaluation was analyzed using the 2016 scenario year from the El Dorado County Travel Demand Model.

Table 5 provides a summary of how the project generated VMT compares to the El Dorado/Diamond Springs Community Region Average. On a total VMT per service population basis, the project generated VMT exceeds all of the proposed thresholds. On a total VMT per worker basis, the project generated VMT is lower than the reduction in baseline VMT threshold.

Table 5: Summary of VMT Metrics and Thresholds for the Commercial Site Redevelopment Project

	VMT Metrics / Threshold Option	Total VMT per Service Population	Total VMT per Worker	Total VMT per Service Population Pass/Fail	Total VMT per Worker Pass/Fail
VMT Metrics	El Dorado/Diamond Springs VMT (2016)	17.4	39.2	-	-
	Project VMT (2016)	36.2	36.2	-	-
Threshold Options	Reduction in Baseline VMT	17.4	39.2	Fail	Pass
	15% Reduction in Baseline VMT	14.8	33.3	Fail	Fail
	14.3% Reduction in Baseline VMT	14.9	33.6	Fail	Fail

Do mitigation measures reduce the El Dorado/Diamond Springs total VMT per service population below the thresholds?

Table 5 summaries the potential VMT mitigation strategies that could be applied to the project site. The mitigation strategies have the potential to reduce VMT, but their feasibility for this project site would require an evaluation by the County and the developer. Changing the project's land uses may constitute too significant a change such that the mitigation itself creates a different project. For the pedestrian network and traffic calming strategies, the low end of the VMT reduction range would be recommended given the suburban land use context. The transit service mitigation is unlikely to be feasible for a single project since increasing frequency for the entire route would likely exceed the financial feasibility for the project. Further, the project may only be responsible for its fair share of the increase in service costs given others would also benefit from the improved service. Without a mechanism to collect the remaining fair share responsibility for the service expansion costs, the mitigation would be infeasible. The combined effect of the feasible mitigation would be a reduction of 12 VMT, which would not reduce the total VMT per worker to be below the threshold options presented in Table 6.

Table 6: Summary of VMT Mitigation Strategies for the Commercial Site Redevelopment Project

	Type of Mitigation	VMT Mitigation Strategies (Range of Potential Reductions)	Potential VMT Reductions	
			Low	High
Estimated VMT reduction from candidate mitigation strategies	Changes to built environment at the project site	Increase the mix of uses within a single development project (0% to 12%)	0	196
	Change the transportation network surrounding the project site	Provided pedestrian network improvements (0.5% to 5.7%)	8	93
	Change the transportation network surrounding the project site	Provide traffic calming measures (0.25% to 1%)	4	16
	Change the transportation network surrounding the project site	Increase Transit Service Frequency/Speed (0.3% to 6.3%)	0	103
	-	**Total VMT Reductions**	**12**	**244[1]**
Summary of VMT reductions from mitigation measures	-	Project Total VMT with Reductions	1,617	NA[2]
	-	**Mitigated total VMT per Service Population/Worker**	**35.93**	**NA[2]**

[1] The CAPCOA Quantifying Greenhouse Gas Mitigation Measures document caps the maximum VMT reductions to 15% for suburban locations (p. 55).
[2] NA = Not Applicable. As discussed above, the low end of the range is recommended for applicability in a suburban/rural land use context.

This information is sufficient to conclude the project generated VMT, and the project's effect on VMT are significant. The limited effectiveness of feasible mitigation may also result in the significant impact remaining unavoidable.

Highway 50 HOV Lane Additions

The VMT impacts of the addition of the HOV lanes on U.S. Highway 50 were evaluated as a case study. The HOV lane additions being evaluated include a single lane in both the eastbound and westbound direction between the Base Lake Road and Cameron Park Drive interchanges. A total of seven additional lane miles would be added to Highway 50 by the project.

Is the project consistent with the Regional Transportation Plan?

This project was included in the 2010-2030 El Dorado County Regional Transportation Plan and SACOG's 2012 RTP/SCS. Additionally, the project was included in the El Dorado County Travel Demand Model and SACOG's SACSIM Model.

Does the project exceed the VMT thresholds, after accounting for induced vehicle travel?

The construction of the HOV lanes between Bass Lake Road and Cameron Park Drive will increase absolute VMT and cause an increase in the total VMT per service population in both the 2016 baseline year and the 2040 future year scenarios. Table 7 provides a summary of the VMT impacts that will result from the additional HOV lanes according to the El Dorado County Travel Demand Model. The HOV lane project will result in a 0.08% increase in VMT in 2016 and a 0.4% increase in 2040 according to the model.

Table 7: VMT Summary of the HOV Lane Project

Scenario	Total VMT	Service Population	Total VMT / Service Population
2016 Baseline[1]	6,935,064	473,420	14.6
2016 Baseline + HOV Lanes[2]	6,941,103	473,420	14.7
Project Generated VMT, 2016	**6,039**	**-**	**-**
2040 Future Year[3]	10,051,714	703,164	14.3
2040 Future year + HOV Lanes[4]	10,091,243	703,164	14.4
Project Generated VMT, 2040	**39,529**	**-**	**-**

[1]The HOV Lanes between Bass Lake Rd and Cameron Park Ave were removed from the El Dorado County Travel Demand Model 2016 scenario year.
[2]The El Dorado County Travel Demand Model 2016 scenario year was used to estimate VMT for this scenario.
[3]The HOV Lanes between Bass Lake Rd and Cameron Park Ave were removed from the El Dorado County Travel Demand Model 2040 scenario year.
[4]The El Dorado County Travel Demand Model 2040 scenario year was used to estimate VMT for this scenario.

A separate analysis was conducted to independently verify the reasonableness of the model results. This analysis relies on an elasticity method that predicts VMT changes based on the lane mile changes. An 'elasticity' variable is a multiplier that represents the expected change in VMT. Research has determined a range of elasticity values for short-term and long-term conditions. Short-term elasticities allow direct comparisons to travel forecasting models based on results from opening year no project and opening year plus project scenarios. The short-term elasticity values range from 0.10 to 0.60 according to *Closing the Induced Vehicle Travel Gap Between Research and Practice,* Transportation Research Record: Journal of the Transportation Research Board, Issue Number 2653, 2017. These elasticities are based on general purpose travel lanes and are likely higher than what would result from HOV lanes, which restrict the occupancy of vehicles during peak periods.

The elasticity multiplier effectively means that an elasticity of 0.6 would signify a 0.6 percent increase in vehicle travel for every 1.0 percent increase in lane miles. If the El Dorado County Travel Demand Model is appropriately sensitive to short-term induced travel effects (e.g., changes in mode choice, route assignment, trip distribution for discretionary trips, and trip generation), the model would produce VMT output within the range estimated using the elasticities. The results of this analysis are included in Table 8.

With the construction of the HOV lanes, an additional 1,188 to 7,128 VMT is expected to be generated due to induced vehicle travel using the short-term elasticities. The El Dorado County Travel Demand model has estimated an additional 6,039 VMT will be generated from the project, which falls within the range of the two elasticity values.

Table 8: Summary of the VMT changes from Induced Vehicle Travel

Induced Demand Summary	Existing Lane Miles	Additional Lane Miles	Additional VMT
Project generated VMT from the Travel Demand Model	3,835	7	6,039
Induced vehicle travel assuming a low (10%) elasticity	3,835	7	1,188
Induced vehicle travel assuming a high (60%) elasticity	3,835	7	7,128

Do mitigation measures reduce the total VMT per service population below the County-Wide thresholds?

Table 9 provides a summary of the potential mitigation measures that could be taken to address the VMT impacts of the HOV lane project. The mitigation strategies have the potential to reduce VMT, but their feasibility for this project requires an evaluation by Caltrans and the County. There is limited direct mitigation associated with the HOV lanes, but the County may be able to implement other network or TDM strategies in the vicinity of the project. Similar to the case study above, the effectiveness of these strategies is likely to be closer to the low end of the range given the suburban land use context. The mitigation measures could reduce total VMT and total VMT per service population but to a limited degree.

Table 9: Summary of VMT Mitigation Strategies for the HOV Lanes Project

	Type of Mitigation Strategies	VMT Mitigation Strategies (Range of Potential Reductions)	Potential VMT Reductions	
			Low	High
Estimated VMT reductions from candidate mitigation strategies	Change in transportation network surrounding the project site	Provide pedestrian network improvements (0.5% to 5.7%)	30	344
	Change the transportation network surrounding the project site	Provide traffic calming measures (0.25% to 1%)	15	60
	Change the transportation network surrounding the project site	Increase transit service frequency/speed (0.3% to 6.3%)	18	380
	TDM Program	Implement a car-sharing program (0.4% to 0.7%)	24	42
	TDM Program	Encourage telecommuting and alternative work schedules (0.2% to 4.5%)	12	272
	TDM Program	Provide ride-sharing programs (2.5% to 8.3%)	151	501
	-	**Total VMT Reductions**	**251**	**664[1]**
Comparisons of VMT reductions	-	Project Generated VMT after Mitigation	5,788	NA[2]
	-	**% Reduction in total VMT**	**4.16%**	**NA[2]**

[1] The CAPCOA *Quantifying Greenhouse Gas Mitigation Measures* document caps the maximum VMT reductions to 15% for suburban locations (p. 55).
[2] NA = Not Applicable. As discussed above, the low end of the range is recommended for applicability in a suburban/rural land use context.

This information is sufficient to conclude the project generated VMT could be potentially significant. The project will likely result in an increase in VMT even after the adoption of the mitigation strategies listed in Table 9. However, final significance determination must consider other substantial evidence as explained in the *SB 743 Implementation Thresholds Assessment Technical Memorandum* prepared for this study.

3. Thresholds

Existing Plan and Policy Review

TECHNICAL MEMORANDUM

Date: 7.10.18

To: Woodrow Deloria (EDCTC), Natalie Porter (El Dorado County), Katie Jackson (El Dorado County), Rebecca Neves (City of Placerville), Melissa McConnell (City of Placerville), Pierre Rivas (City of Placerville)

From: Eric Howard, Rodney Brown, and Ronald T. Milam, AICP, PTP

Subject: Existing Plan and Policy Review for Opportunities and Issues Related to SB 743 Implementation

RS18-3653

This technical memorandum summarizes our review of the existing plans and policies developed by EDCTC, El Dorado County, and City of Placerville related to SB 743. The purpose of this review is to identify any issues and opportunities related to SB 743 implementation.

The EDCTC Regional Transportation Plan (RTP), El Dorado County General Plan, and the City of Placerville General Plan all include some underlying expectations of how VMT will change. Both the City and County have planned for additional population and employment growth, and VMT growth is expected to be proportionate to that growth. Both agencies have general plans that support efficient land use patterns that concentrate growth in existing communities and closer to services. The concentration of growth should lower VMT generation rates, but total VMT will continue to increase. None of the policy documents or related EIRs have established specific thresholds or expectations about what level of VMT growth is considered acceptable versus unacceptable, and they do not reflect current State expectations for air pollution and GHG reduction based on the ARB *AB 32 Scoping Plan* and *Mobile Source Strategy*. A summary of the VMT expectations from each plan can be found in Figure 1.

Figure 1: VMT expectations and thresholds for each plan

Plans and VMT Expectations/Thresholds

Plan	VMT Expectation for Each Plan Element: Land Use	Housing	Transportation	Health/AQ	VMT Thresholds	Comment/Discussion
EDCTC Regional Transportation Plan	N/A	N/A			None Defined	Jobs / Housing imbalance will most likely increase VMT. However efforts to increase regional transit to connect residential with employment may attenuate this increase, as will increases in infrastructure to support active transportation.
EDCTC Regional Transportation Plan EIR	N/A	N/A			None Defined	**VMT information provided in transportation section:** • Base Year (2008) - 3.6 Million Daily VMT • No Project (2035) - 4.7 Million Daily VMT • Fiscally Constrained (2035) - 4.7 Million Daily VMT • Fiscally Unconstrained (2035) - 4.7 Million Daily VMT • Environmentally Constrained Scenario - 6.4 Million Daily VMT, 31.77
El Dorado County General Plan					None Defined	Jobs / Housing imbalance and increases in population will likely increase VMT. However, concentrating development in Community Regions and Rural Centers, developing infrastructure to support active transportation, and transit development will dampen VMT growth.
El Dorado County General Plan EIR					None Defined	**VMT information provided in transportation section:** • No Project Scenario - 5.7 Million Daily VMT, 32.72 Daily VMT per Capita • Roadway Constrained 6-Lane "Plus" Scenario - 5.8 Million Daily VMT, 31.36 Daily VMT per Capita • Environmentally Constrained Scenario - 6.4 Million Daily VMT, 31.77 Daily VMT per Capita • 1996 General Plan Scenario - 6.4 Million Daily VMT, 31.64 Daily VMT per Capita
City of Placerville General Plan					None Defined	The focus on commercial growth may lead to an increase or decrease in VMT depending on the home location of the employees. Infill development could contribute to lowering VMT rates.

Clarity of VMT Expectation

- No VMT Expectation
- VMT expectation implied
- VMT explicitly described

Direction of Change in VMT

- Decrease in VMT
- Increase in VMT
- Direction is unclear

To meet the requirements of SB 743, OPR guidance suggests that lead agencies define VMT estimation methodologies and corresponding thresholds for the evaluation of general plans, land use projects, and transportation projects.

- **EDCTC** – The Regional Transportation Plan (RTP) already lists VMT-based metrics in the performance measures matrix. A key question is whether these metrics are applicable for SB 743 and what thresholds should be established for purposes of the RTP EIR.
- **El Dorado County** – The general plan does not include VMT metrics, but the EIR does. Similar to the RTP, the County will need to determine the specific VMT metric and threshold to be used for the general plan as well as subsequent land use projects. Addressing VMT impacts in the general plan EIR provides some potential benefits for streamlining land use project CEQA review. The County can also decide whether to use VMT for transportation projects.
- **City of Placerville** – The general plan does not include VMT metrics. The City has the same opportunity as the County to establish VMT metrics and thresholds at the general plan level to streamline subsequent land use project CEQA review.

The EDCTC Regional Transportation Plan, El Dorado County General Plan, and City of Placerville General Plan all include a variety of goals and policies related to VMT reduction. The influence of the goals and policies can be strengthened by adding VMT metrics and thresholds to CEQA analysis for land use and transportation projects. The key challenge is determining the appropriate threshold for determining significant impacts that require mitigation. Attachment A provides a detailed matrix of the policies presented in the plans that are supported by SB 743. VMT mitigation measures would help to promote these policies.

ATTACHMENT A – Policy Matrix

ATTACHMENT A: REVIEW OF POLICIES THAT ARE SUPPORTIVE OF VMT MITIGATION MEASURES

Plan/Document	Element	Policy	Description
El Dorado County General Plan	Land Use	2.1.1.2	Establish Community Regions to define those areas which are appropriate for the highest intensity of self-sustaining compact urban-type development or suburban type development within the County based on the municipal spheres of influence, availability of infrastructure, public services, major transportation corridors and travel patterns, the location of major topographic patterns and features, and the ability to provide and maintain appropriate transitions at Community Region boundaries. These boundaries shall be shown on the general plan land use map.
		2.1.1.3	Mixed use developments which combine commercial and residential uses in a single project are permissible and encouraged within Community Regions. Within Community Regions, the mixed-uses may occur vertically and/or horizontally. In mixed use projects, the maximum residential density shall be 20 dwelling units per acre within Community Regions. The residential component of a mixed use project may include a full range of single and/or multifamily design concepts. The maximum residential density of 20 dwelling units per acre may only be achieved where adequate infrastructure, such as water, sewer and roadway are available or can be provided concurrent with development
		2.1.2.2	Rural Center boundaries establish areas of higher intensity development throughout the rural areas of the County based on the availability of infrastructure, public services, existing uses, parcelization, impact on natural resources, etc. These boundaries shall be shown on the general plan land use map
		2.1.2.5	Mixed use developments which combine commercial and residential uses in a single project are permissible and encouraged within Rural Centers. Within Rural Centers, the mixed uses may occur either vertically and/or horizontally. The maximum residential density shall be 10 dwelling units per acre in Rural Centers in identified mixed use areas as defined in the Zoning Ordinance. The residential component of a mixed use project may include a full range of single and/or multifamily design concepts. The maximum residential density of 10 dwelling units per acre may only be achieved where adequate infrastructure, such as water, sewer and roadway are available or can be provided concurrent with development.
		2.1.4.1	Facilitate increased density and intensity of development and revitalization in identified Opportunity Areas.
		2.1.4.3	Utilize incentives to promote infill development, revitalization, rehabilitation, and mixed-use projects in designated Opportunity Areas.
		2.2.3.1	The Planned Development (-PD) Combining Zone District, to be implemented through the zoning ordinance, shall allow residential, commercial, and industrial land uses consistent with the density specified by the underlying zoning district with which it is combined. Primary emphasis shall be placed on furthering uses and/or design that (1) provide a public or common benefit on- or off-site, (2) cluster intensive land uses or lots to conform to the natural topography, (3) minimize impacts on various natural and agricultural resources, (4) avoid cultural resources where feasible, (5) minimize public health concerns, (6) minimize aesthetic concerns, and (7) promote the public health, safety, and welfare. A goal statement shall accompany each application specifically stating how the proposed project meets these criteria.

ATTACHMENT A: REVIEW OF POLICIES THAT ARE SUPPORTIVE OF VMT MITIGATION MEASURES

Plan/Document	Element	Policy	Description
El Dorado County General Plan	Land Use	2.2.4.1	Residential Planned Developments which provide a minimum of 30% commonly owned publicly dedicated open space shall be allowed an open space density bonus of additional residential units, in accordance with A through C, for the provision of lands set aside for open space, wildlife habitat areas, parks (parkland provided in excess of that required by the Quimby Act), ball fields, or other uses. Developable land as used herein means land which is included in the calculation of density for a standard subdivision, which excludes bodies of water (lakes, rivers and perennial streams) measured at the ordinary high water mark or spillway elevation for lakes and the two-year storm event for rivers and perennial streams.
		2.4.1.4	Strip commercial development shall be precluded in favor of clustered contiguous facilities. Existing strip commercial areas shall be developed with common and continuous landscaping along the street frontage, shall utilize common driveways, and accommodate parcel-to-parcel internal automobile and non-automobile circulation where possible.
		2.4.1.5	The County shall implement a program to promote infill development in existing communities. A. Projects site must be consistent with the applicable general plan designation and all applicable general plan policies as well as with applicable zoning designation and regulations. B. Project sites may not be more than five acres in size and must demonstrate substantially development has occurred on 2 or more sides of the site. C. Project site has no value as habitat for endangered, rare or threatened species. D. Approval of a project would not result in any significant effects relating to traffic, noise, air quality, or water quality. E. The site can be adequately served by all required utilities and public services.
		2.5.2.1	Neighborhood commercial centers shall be oriented to serve the needs of the surrounding area, grouped as a clustered, contiguous center where possible, and should incorporate but not be limited to the following design concepts as further defined in the Zoning Ordinance: A. Maximum first floor building size should be sized to be suitable for the site; B. Allow for Mixed Use Developments; C. No outdoor sales or automotive repair facilities; D. Reduced setback with landscaping and walkways; E. Interior parking, or the use of parking structure; F. Bicycle access with safe and convenient bicycle storage area; G. On-street parking to reduce the amount of on-site parking; H. Community bulletin boards/computer kiosks; I. Outdoor artwork, statues, etc., in prominent places; and J. Pedestrian circulation to adjacent commercial centers.
		2.5.2.2	New commercial development should be located nearby existing commercial facilities to strengthen existing shopping locations and avoid strip commercial.

ATTACHMENT A: REVIEW OF POLICIES THAT ARE SUPPORTIVE OF VMT MITIGATION MEASURES

Plan/Document	Element	Policy	Description
El Dorado County General Plan	Land Use	2.5.2.3	New community shopping centers should also contain the applicable design features of Policy 2.5.2.1.
El Dorado County General Plan	Circulation	TC-1p	The County shall encourage street designs for interior streets within new subdivisions that minimize the intrusion of through traffic on pedestrians and residential uses while providing efficient connections between neighborhoods and communities.
		TC-1v	The County shall consider modification of the circulation diagram to include a frequent transit service operating on exclusive right-of-way to the El Dorado Hills Business Park from residential communities in El Dorado County and from the City of Folsom.
		TC-2b	The County shall promote transit services where population and employment densities are sufficient to support those transit services, particularly within the western portion of the county and along existing transit corridors in the rural areas.
		TC-3c	The County shall encourage new development within Community Regions and Rural Centers to provide appropriate on-site facilities that encourage employees to use alternative transportation modes. The type of facilities may include bicycle parking, shower and locker facilities, and convenient access to transit, depending on the development size and location.
		TC-4a	The County shall implement a system of recreational, commuter, and inter-community bicycle routes in accordance with the County's Bicycle Transportation Plan. The plan should designate bikeways connecting residential areas to retail, entertainment, and employment centers and near major traffic generators such as recreational areas, parks of regional significance, schools, and other major public facilities, and along recreational routes.
		TC-4b	The County shall construct and maintain bikeways in a manner that minimizes conflicts between bicyclists and motorists
		TC-4c	The County shall give priority to bikeways that will serve population centers and destinations of greatest demand and to bikeways that close gaps in the existing bikeway system.
		TC-4d	The County shall develop and maintain a program to construct bikeways, in conjunction with road projects, consistent with the County's Bicycle Transportation Plan, taking into account available funding for construction and maintenance.
		TC-4e	The County shall require that rights-of-way or easements be provided for bikeways or trails designated in adopted master plans, as a condition of land development when necessary to mitigate project impacts

ATTACHMENT A: REVIEW OF POLICIES THAT ARE SUPPORTIVE OF VMT MITIGATION MEASURES

Plan/Document	Element	Policy	Description
El Dorado County General Plan	Circulation	TC-4f	The County shall sign and stripe Class II bicycle routes, in accordance with the County's Bicycle Transportation Plan, on roads shown on Figure TC-1, when road width, safety, and operational conditions permit safe bicycle operation.
		TC-4g	The County shall support development of facilities that help link bicycling with other modes of transportation.
		TC-4i	Within Community Regions and Rural Centers, all development shall include pedestrian/bike paths connecting to adjacent development and to schools, parks, commercial areas and other facilities where feasible. In Rural Regions, pedestrian/bike paths shall be considered as appropriate.
		TC-5a	Sidewalks and curbs shall be required throughout residential subdivisions, including land divisions created through the parcel map process, where any residential lot or parcel size is 10,000 square feet or less
		TC-5b	In commercial and research and development subdivisions, curbs and sidewalks shall be required on all roads. Sidewalks in industrial subdivisions may be required as appropriate.
		TC-5c	Roads adjacent to schools or parks shall have curbs and sidewalks
		TC-8d	The County in working with the El Dorado County Transit Authority shall identify community level Transit Priority Areas (TPA) in areas planned for residential and mixed use projects that are consistent with land use designations, densities, building intensities, and all other applicable policies.
El Dorado County General Plan	Health/Safety	6.7.1.1	Improve air quality through land use planning decisions
		6.7.2.2	Encourage the use of staggered work schedules, flexible work hours, compressed work weeks, teleconferencing, telecommuting, and car pool/van pool matching as ways to reduce peak-hour vehicle trips
		6.7.3.1	Legally permissible trip reduction programs and the development of transit and ridesharing facilities shall be given priority over highway capacity expansion when such programs and facilities will help to achieve and maintain mobility and air quality
		6.7.3.2	Transit Service – The County shall promote infill development that is compact, mixed used, pedestrian friendly, and transit oriented in areas identified as Transit Priority Project Areas.
		6.7.4.1	Reduce automobile dependency by permitting mixed land use patterns which locate services such as banks, child care facilities, schools, shopping centers, and restaurants in close proximity to employment centers and residential neighborhoods
		6.7.4.2	Promote the development of new residential uses within walking or bicycling distance to the County's larger employment centers.
		6.7.4.3	New development on large tracts of undeveloped land near the rail corridor shall, to the extant practical, be transit supportive with high density or intensity of use
		6.7.4.4	All discretion development applications shall be reviewed to determine the need for pedestrian/bike paths connecting to adjacent development and to common service facilities (e.g. clustered mail boxes, bus stops, etc.)
City of Placerville General Plan	Land Use	Goal A, Policy 1	The City shall give infill development of vacant lands within the city limits priority over development in areas to be annexed, whenever feasible

ATTACHMENT A: REVIEW OF POLICIES THAT ARE SUPPORTIVE OF VMT MITIGATION MEASURES

Plan/Document	Element	Policy	Description
City of Placerville General Plan	Land Use	Goal C, Policy 1	The City shall promote the development and renewal of the downtown as the commercial center of Placerville.
City of Placerville General Plan	Housing	Goal C, Policy 1	The City will encourage the use of density bonuses and regulatory incentives as tools to assist affordable housing development.
City of Placerville General Plan	Transportation	Goal E, Policy 2	Wherever possible, bicycle facilities should be separate from roadways and walkways.
		Goal E, Policy 4	The City shall promote the development of bicycle routes that follow the contours of the land and are compatible with the terrain.
		Goal E, Policy 5	The City shall promote the development of bicycle routes in major development areas and along railroad rights-of-way.
		Goal E, Policy 6	The City shall promote development of bicycle routes and/or trails that connect parks and schools that link the Ray Lawyer Drive/Placerville Drive area with downtown, and that link Apple Hill area with Placerville.
		Goal E, Policy 7	The City shall encourage the development of a bike trail through the city utilizing the Southern Pacific and Michigan/California Railroad rights-of-way. This trail could provide an opportunity to connect to other trail systems such as the American River Bikeway in Sacramento County
		Goal F, Policy 2	The City shall continue to enforce its program requiring adjoining property owners to repair and replace sidewalks in older neighborhoods to increase pedestrian safety and convenience.
		Goal F, Policy 3	In approving development projects, the City shall continue to require the construction of sidewalks connecting major pedestrian destinations, such as schools, hospitals, and government centers.
		Goal F, Policy 4	Where deemed necessary and appropriate, the City shall undertake construction of sidewalks connecting major pedestrian destinations, such as schools, hospitals, and government centers.
		Goal F, Policy 5	The City shall require all developments with a density of R1-2,000 or greater to provide a sidewalk on at least one side of any street that is developed as part of the project or is used as a perimeter street by that project.
		Goal F, Policy 6	The City shall require all multi-family developments to provide sidewalks on both sides of any street that is developed as part of the project and on one side of any street that is used as a perimeter street by that project.
		Goal F, Policy 7	The City shall promote the construction of pedestrian overpasses along Highway 50 in conjunction with future highway construction.
		Goal I, Policy 1	The City will work with the local school districts to provide sidewalks or walkways along routes used by school children on their way to and from school.
EDCTC Regional Transportation Plan	Highways, Streets, and Regional/Inter-Regional Roadways	Objective A, Policy 5	Develop and promote a complete transportation system that supports active transportation, improves public health, reduces greenhouse gas emissions, and offers equitable modal choices for all users to access daily goods and services

ATTACHMENT A: REVIEW OF POLICIES THAT ARE SUPPORTIVE OF VMT MITIGATION MEASURES

Plan/Document	Element	Policy	Description
EDCTC Regional Transportation Plan	Highways, Streets, and Regional/Inter-Regional Roadways	Objective B, Policy 5	Encourage local jurisdictions and transit operators to maintain transportation infrastructure which allows transit service to meet the demands of transit users effectively
		Objective C, Policy 6	Support the achievement of state and federal air quality goals and greenhouse gas reduction targets
EDCTC Regional Transportation Plan	Public Transit	Objective A, Policy 1	Encourage transit operators to prioritize transit services in urban and suburban areas, corridors with higher commuter volume, high=tourism traffic area and where other operational efficiencies exist
		Objective A, Policy 2	Encourage the development of new and innovative transit systems which are effective in serving non-typical transit users such as rural residents, recreation, and tourism travelers.
		Objective A, Policy 3	Work with transit operators, both with El Dorado County and the surrounding Counties, to coordinate with regional transit operators to support transit trips into and out of El Dorado County for employment, education, medical, tourism, and recreational travel purposes
		Objective A, Policy 4	Work with partner agencies to encourage development of bicycle and pedestrian facilities to transit stops, park and ride lots, and other multi-modal facilities
		Objective B, Policy 7	Integrate bicycle and pedestrians connections to transit stops and services
		Objective C, Policy 1	Support transit operators to provide effective, convenient, coordinated transit service that serves employment and activity centers, daily goods and services, education centers, recreation and tourism, and offers a viable option to single-occupant vehicle travel within and beyond the region
		Objective C, Policy 3	Involve employers of the region in meeting the transportation needs of employees
EDCTC Regional Transportation Plan	Non-Motorized Transportation	Objective A, Policy 3	Encourage the completion of existing bicycle and pedestrian systems and facilities, with an emphasis on closing gaps and providing connectivity to activity centers
		Objective A, Policy 4	Work with local jurisdictions to include Class I, II, and III bikeways with all new construction per currently accepted standards, and include Class II or Class III on existing facilities, and during maintenance efforts as preferred linkages in the bicycle facilities network.
		Objective B, Policy 4	Help local jurisdictions to identify and correct intersections that have sub-standard or missing crosswalk and/or curb cuts
		Objective B, Policy 5	Encourage local jurisdictions to incorporate pedestrian improvements with maintenance improvements or new developments to the existing roadway network
		Objective B, Policy 7	Work to incorporate adjacent pedestrian facilities maintenance into roadway maintenance including upgrading the pedestrian facility to current design standards

ATTACHMENT A: REVIEW OF POLICIES THAT ARE SUPPORTIVE OF VMT MITIGATION MEASURES

Plan/Document	Element	Policy	Description
EDCTC Regional Transportation Plan	Non-Motorized Transportation	Objective B, Policy 8	Encourage local jurisdictions to include sidewalks, walkways, and/or shoulders on new construction consistent with the adopted general plans, Transit Plans, and Bicycle and Pedestrian Plans
		Objective C, Policy 4	Encourage local jurisdictions to incorporate bicycle facilities when implementing maintenance improvement or new developments to the existing roadway network
EDCTC Regional Transportation Plan	Transportation Systems Management	Objective A, Policy 3	Encourage local jurisdictions to consider multi-modal transit facilities when planning development supporting large concentrations of people and services
		Objective A, Policy 4	Encourage schools to promote the use of bus transportation, non-motorized travel, and ridesharing while discouraging use of single-occupant vehicles
		Objective A, Policy 5	Encourage local jurisdiction to promote mixed use development to include multi-modal transportation facilities
		Objective B, Policy 1	Support the use of public transportation as a transportation control measure to improve throughput and reduce traffic congestion and vehicle emissions
		Objective B, Policy 3	Work with the Regional Rideshare Partnership and appropriate agencies to coordinate ridesharing activities and goals
		Objective B, Policy 5	Encourage local jurisdictions to implement a TDM ordinance for large businesses in El Dorado County
EDCTC Regional Transportation Plan	Integrated Land Use, Air Quality, and Transportation Planning	Objective A, Policy 3	Encourage local jurisdictions to seek a balance of housing and employment land uses which encourage the use and integration of transit and/or non-motorized modes in daily trips
		Objective C, Policy 5	Promote project types that have a proven track record of reducing air pollutions

Thresholds Assessment

TECHNICAL MEMORANDUM

Date: 5.20.19

To: Woodrow Deloria (EDCTC), Natalie Porter (El Dorado County), Rebecca Neves (City of Placerville), and Melissa McConnell (City of Placerville)

From: Eric Howard and Ronald T. Milam, AICP, PTP

Subject: SB 743 Implementation Thresholds Assessment RS18-3653

This technical memorandum summarizes the consultant team assessment of potential VMT thresholds for land use projects and land use plans to comply with SB 743. For transportation projects, lead agencies have the discretion to select their own metrics and thresholds and no change to current practice is required. Hence, the remainder of this memo will focus on land use thresholds and is organized into four sections.

- Section 1 – Background on CEQA Thresholds
- Section 2 – OPR VMT Threshold Recommendations
- Section 3 – Lead Agency Discretion in Setting VMT Thresholds
- Section 4 – Recommendations for EDCTC partner agencies

This memo was prepared with input from Remy Moose Manley. Their role focused on key questions associated with Sections 3 and 4.

Section 1 – Background on CEQA Thresholds

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

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

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

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

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

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

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

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

§ 15064.7. Thresholds of Significance.

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

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

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

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

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

(2) adopted for the purpose of environmental protection;

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

(4) applies to the project under review.

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

In summary, this guidance emphasizes the need for substantial evidence to support the thresholds used to determine when a project will cause an unacceptable environmental condition or outcome. For SB 743, the specific outcome of focus is the change a project will cause in vehicle miles of travel (VMT). Since VMT is already used to determine air quality, energy, and greenhouse gas (GHG) impacts as part of CEQA compliance, the challenge for lead agencies is to answer the question, **"What type or amount of change in VMT constitutes a significant impact solely for transportation purposes?"**

Section 2 - OPR VMT Threshold Recommendations

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

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.*

To support these legislative intent statements, threshold recommendations are found in the *Final Adopted Text* to the 2018 amendments and additions to the State CEQA Guidelines and the *Technical Advisory*. Specific excerpts and threshold highlights are provided below.

CEQA Guidelines Section 15064.3

(b) Criteria for Analyzing Transportation Impacts.

(1) Land Use Projects. Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.

(2) Transportation Projects. Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. To the extent that such impacts have already been adequately addressed at a programmatic level, such as in a regional transportation plan EIR, a lead agency may tier from that analysis as provided in Section 15152.

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

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

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

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

These (and the other) threshold recommendations in the *Technical Advisory* rely on the following evidence associated with the state's GHG reduction goals and targets in combination with environmental case law.

- Assembly Bill 32 (2006) requires statewide greenhouse gas reductions to 1990 levels by 2020 and continued reductions beyond 2020.
- Senate Bill 32 (2016) requires at least a 40 percent reduction in greenhouse gas emissions by 2030.
- Pursuant to Senate Bill 375 (2008), the California Air Resources Board establishes greenhouse gas reduction targets for metropolitan planning organizations (MPOs) to achieve based on land use patterns and transportation systems specified in Regional Transportation Plans and Sustainable Community Strategies. Current targets for the largest metropolitan planning organizations range from 13% to 16% reductions by 2035.
- Executive Order B-30-15 (2015) sets a GHG emissions reduction target of 40 percent below 1990 levels by 2030.
- Executive Order S-3-05 (2005) sets a GHG emissions reduction target of 80 percent below 1990 levels by 2050.
- Executive Order B-16-12 (2012) specifies a GHG emissions reduction target of 80 percent below 1990 levels by 2050 specifically for transportation.
- Senate Bill 391 requires the California Transportation Plan to support 80 percent reduction in GHGs below 1990 levels by 2050.
- The California Air Resources Board Mobile Source Strategy (2016) describes California's strategy for containing air pollutant emissions from vehicles and quantifies VMT growth compatible with achieving state targets.
- The California Air Resources Board's 2017 Climate Change Scoping Plan Update: The Strategy for Achieving California's 2030 Greenhouse Gas Target describes California's strategy for containing greenhouse gas emissions from vehicles and quantifies VMT growth compatible with achieving state targets.
- The Caltrans Strategic Management Plan (2015) calls for a 15 percent reduction in VMT per capita compared to 2010 levels, by 2020.

Lead agencies should note that the OPR recommended VMT thresholds are almost exclusively based on GHG reduction goals. While this is one of the SB 743 legislative intent objectives, a less clear connection is made to the other legislative intent objectives to encourage infill development and promote active transportation. SB 743 [Section 21099(b)(1)] also makes it explicit that criteria for determining the significance of transportation impacts shall promote, "*…the reduction of greenhouse gas emissions, the development of multimodal networks, and a diversity of land uses.*" If GHG impacts are already being adequately addressed in another CEQA section, then more evidence may be desired about VMT threshold relationships to the other criteria.

Another important distinction within the *Technical Advisory* is how projects within different land use contexts are treated. The general expectation that a 15 percent reduction below that of existing development may be reasonable is proposed for projects within urban areas of metropolitan planning organizations (MPOs). For rural areas outside MPOs, the Technical Advisory recognizes that VMT mitigation options are limited so thresholds may need to be set on a case-by-case basis.

The recognition that land use context matters when it comes to the potential VMT mitigation options and effectiveness is important. The MPO boundary distinction is not relevant to the feasibility of VMT mitigation. A rural or suburban area inside or outside an MPO boundary will have very similar limitations when it comes to the feasibility of VMT reduction options. As such, land use context and not MPO status should be the defining criteria for setting threshold expectations.

The land use context is also relevant to the potential range of effectiveness associated with VMT reduction strategies. The Technical Advisory relies on the *Quantifying Greenhouse Gas Mitigation Measures*, CAPCOA, 2010 resource document to help justify the 15 percent reduction threshold stating, "…fifteen percent reduction in VMT are achievable at the project level in a variety of place types…". A more accurate reading of the CAPCOA document is that a fifteen percent is the ***maximum*** reduction when combining multiple mitigation strategies for the suburban center place type. For suburban place types, 10% is the maximum and requires a project to contain a diverse land use mix, workforce housing, and project-specific transit. It is also important to note that the maximum percent reductions were not based on data or research comparing the actual performance of VMT reduction strategies in these place types. Instead, the percentages were derived from a limited comparison of aggregate citywide VMT performance for Sebastopol, San Rafael, and San Mateo where VMT performance ranged from 0 to 17 percent below the statewide VMT/capita average based on data collected prior to 2002. Little to evidence exists about the long-term performance of similar TDM strategies in different land use contexts. As such, VMT reductions from TDM strategies cannot be guaranteed in most cases.

The *Technical Advisory* makes specific VMT threshold recommendations for analyzing the impact of project generated VMT on baseline conditions but also recommends that VMT analysis consider a project's long-term effects on VMT and whether the project is consistent with the applicable regional transportation plan/sustainable community strategy (RTP/SCS). These recommendations raise key questions for lead agencies addressed in the next section.

Section 3 - Lead Agency Discretion in Setting VMT Thresholds

Until SB 743, the CEQA Guidelines Section 15064.7 allowed lead agencies the discretion to select their own transportation metrics and thresholds although substantial evidence was required to support their decisions. SB 743 takes the 'metric' choice away by requiring VMT. As to thresholds, additional questions have arisen as listed below.

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

Question 2 – Do lead agencies need to establish VMT thresholds for cumulative impacts?

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

The first two questions require a legal perspective and were assessed by Remy Moose Manley (RMM) as part of the WRCOG SB 743 Implementation Pathway project. Their full opinion is available as part of the WRCOG documentation at http://www.fehrandpeers.com/wrcog-sb743/ while a summary of their findings as augmented by other project team members is presented below.

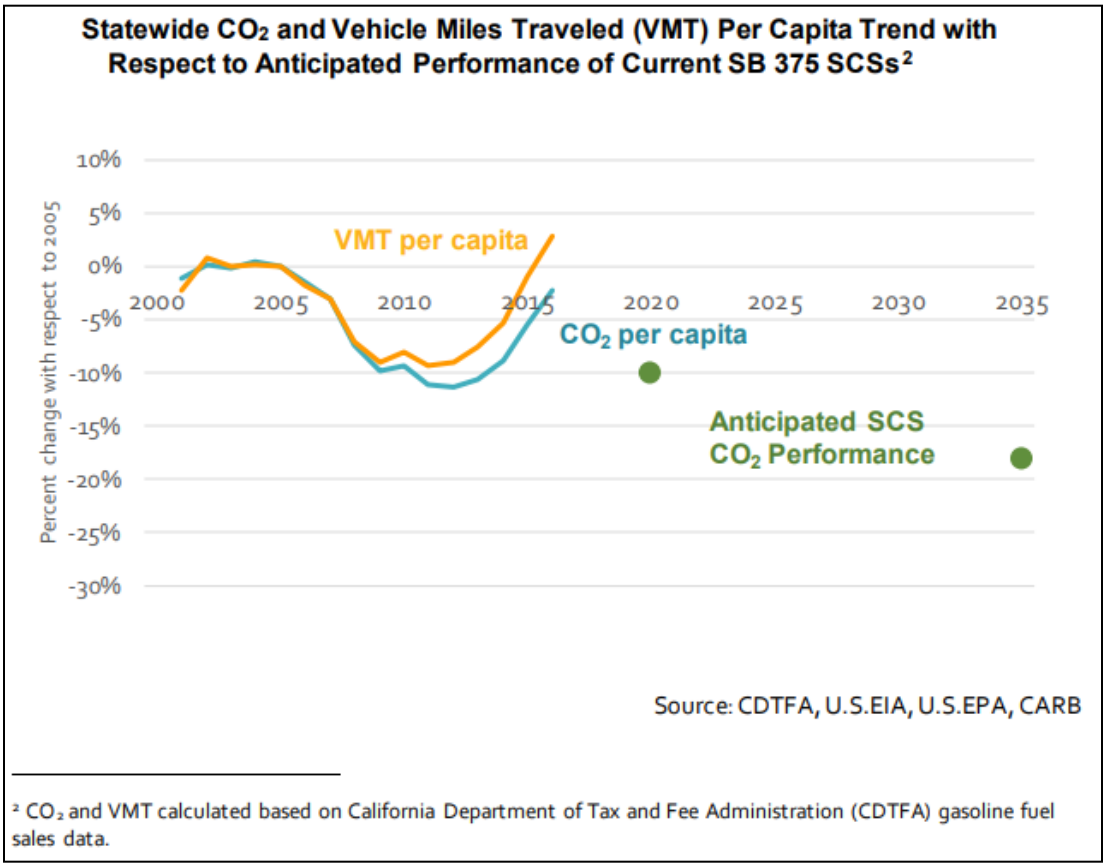
Question 1 Response – Setting a threshold lower than the 15-percent reduction recommended by OPR in their *Technical Advisory* is likely legally defensible, so long as the threshold is supported by substantial evidence. The substantial evidence is critical in the threshold setting process and should explain why the OPR recommended threshold is not appropriate for the lead agency and why another threshold was selected. This evidence will be the basis for any legal defense if the threshold is challenged and should carefully consider the definition of substantial evidence contained Section 15384 of the CEQA Guidelines. This opinion considers the fact that the 15-percent reduction is not included in the statute or the updated CEQA Guidelines; rather it is only included in OPR's *Technical Advisory*.

Section 21099, subdivision (e) states, "This section does not affect the authority of a public agency to establish or adopt thresholds of significance that are more protective of the environment." A reasonable interpretation of this language is that subdivision (e) is referring to the SB 743 statute language in Section 21099 and possibly the related CEQA Guidelines changes that would result from OPR's compliance with the direction in 21099(b)(1) to recommended revisions to the CEQA Guidelines. The statute does not contain specific thresholds and the recommended revisions to the CEQA Guidelines only include statements about what land use project effects may be presumed to have a less than significant VMT impact. Additional evidence allowing for a lower threshold is also found in the discussion above about the recognition of land use context influencing the feasibility of VMT reduction. Other substantial evidence supporting the limitations of VMT mitigation based on land use context can also be found in *Quantifying Greenhouse Gas Mitigation Measures,* CAPCOA, 2010 and

upcoming updates to this information from ARB based on their Zero-Carbon Buildings in California: A Feasibility Study.

Question 2 Response – Lead agencies should address VMT impacts in the cumulative context. The CEQA Guidelines (and the case law) are clear that consideration of cumulative impacts is key to CEQA compliance. That said, a separate quantitative threshold may not be required if the threshold applied for project-specific impacts is cumulative in nature. VMT thresholds based on an efficiency form of the metric such as VMT per capita, can address project and cumulative impacts in a similar manner that some air districts do for criteria pollutants and GHGs. Since VMT is a composite metric that will continue to be generated over time, a key consideration for cumulative scenarios is whether the rate of VMT generation gets better or worse in the long-term. If the rate is trending down over time consistent with expectations for air pollutant and GHGs, then the project level analysis may suffice. However, the trend direction must be supported with substantial evidence. This creates a potential issue for VMT because VMT rates in California have been increasing in direct conflict with RTP/SCS projections showing declines. The chart below from the *2018 Progress Report California's Sustainable Communities and Climate Protection Act,* California Air Resources Board, November 2018 charts recent VMT per capita trends. This evidence could be used to justify the need for separate cumulative analysis to verify a project's long-term effects.

Figure 1: California VMT Trends



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

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

Question 3 Response – Lead agencies need to use consistent methods when forecasting VMT for threshold setting and project analysis to ensure an apples-to-apples comparison for identifying potential impacts. The project team has confirmed through case study comparisons that failure to comply with this *Technical Advisory* recommendation can lead to erroneous impact conclusions. This is an important finding since the *Technical Advisory* also accepts that VMT analysis can be performed using sketch planning tools. Off-the-shelf, sketch planning tools for VMT analysis do not contain trip generation rates or trip lengths consistent with local and regional travel forecasting models. These models are the most likely source for city-wide and region-wide VMT estimates used in setting thresholds since sketch planning tools cannot produce these aggregate level VMT metrics. The *Technical Advisory* partially recognizes this issue by recommending that sketch planning tools use consistent trip lengths as the models used to produce thresholds but does not include a similar recommendation for trip generation rates. Both input variables need to be consistent with the travel forecasting model to produce accurate project impact analysis results.

Section 4 - Recommendations for EDCTC partner agencies

So how should lead agencies approach VMT threshold setting given their discretion? Since an impact under CEQA begins with a change to the existing environment, a starting level for potential thresholds would the baseline (i.e., existing condition) VMT, VMT per capita, VMT per employee, or VMT per service population. Since VMT will increase or fluctuate with population and employment growth, changes in economic activity, and expansion of new vehicle travel choices (i.e., Uber, Lyft, Chariot, autonomous vehicles, etc.), expressing VMT measurement in an efficiency metric form allows for more direct comparisons to baseline conditions when it comes to land use projects, land use plans, and transportation projects. Establishing a threshold such as baseline VMT per service population would be essentially setting an expectation that future land uses perform similar to existing land uses. If this is the floor, then expectations for VMT reduction can increase depending on a community's values related to vehicle use and its associated effects on mobility, economic activity, and environmental consequences. Working towards the 15-percent reduction recommended in the *Technical Advisory* becomes more feasible as the land use context changes to urban areas with higher densities and high-quality transit systems. In central cities, the 15-percent reduction can be surpassed because of the close proximity of land uses and the multiple options for accessing destinations by walking, using bicycles or scooters, sharing vehicles, and using transit.

While OPR has developed specific VMT impact thresholds for project-related impacts, current practice has not sufficiently evolved where a clear line can be drawn between 'acceptable' and 'unacceptable' levels of VMT change for the sole purpose of determining a significant transportation impact. Until SB 743, VMT changes were viewed through an environmental lens that focused on the relationship to fuel consumption and emissions. For transportation purposes, VMT has traditionally been used to evaluate whether land use or transportation decisions resulted in greater dependency on vehicle travel. Trying to determine whether a portion of someone's daily vehicle travel is unacceptable or would constitute a significant transportation impact is generally not clear to lead agencies.

Another consideration in threshold setting is how to address cumulative VMT impacts and whether addressing them in the general plan EIR is advantageous for streamlining the review of subsequent land

use and transportation projects given CEQA relief available through SB 375 or CEQA Guidelines Section 15183. This section of the Guidelines relieves a project of additional environmental review if the environmental impact was adequately addressed in the general plan EIR and the project is consistent with the general plan (see below).

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

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

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

For the City of Placerville and El Dorado County, addressing VMT impacts in general plan EIRs could be useful in understanding how VMT reduction should be balanced against other community values when it comes to setting new VMT impact thresholds for SB 743.

Given this information, lead agencies have at least four options for setting VMT thresholds as outlined below.

OPTION 1 – Rely on the OPR Technical Advisory Thresholds

The first option is to simply rely on the threshold recommendations contained in the OPR Technical Advisory. As noted above, the general expectation is that land use projects should be measured against VMT per capita or VMT per worker threshold of 15-percent below that of baseline conditions (i.e., existing development). Specific VMT thresholds for residential, office (work-related), and retail land uses are summarized below.

- Residential projects – A proposed project exceeding a level of 15 percent below existing (baseline) VMT per capita may indicate a significant transportation impact. Existing VMT per capita may be measured as regional VMT per capita 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.

For land use plans (i.e., a general plan, area plan, or community plan), a significant impact would occur if the respective thresholds above were exceeded in aggregate. This means that new population and employment growth combined the planned transportation network would need to generate future VMT per capita or VMT per worker that is less than 85 percent of the baseline value to be considered less than significant. Land use project and land use plans would also need to be consistent with the applicable RTP/SCS.

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

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

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

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

OPTION 2 – Set Thresholds Consistent with Lead Agency Air Quality, GHG Reduction, and Energy Conservation Goals

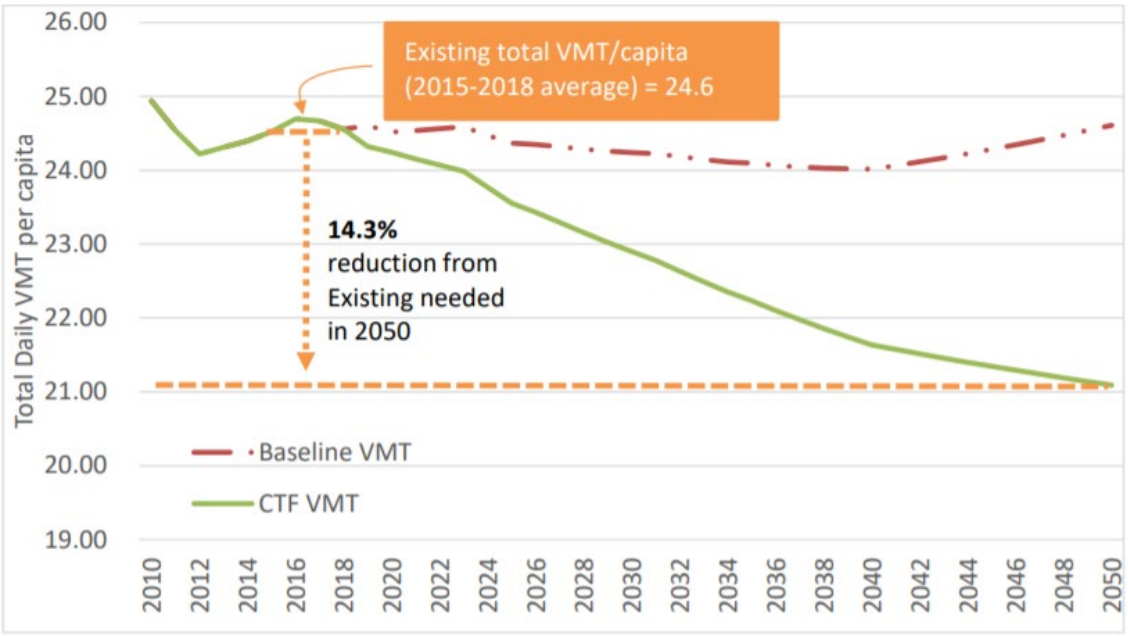
This option sets a threshold consistent with a lead agency's air quality, GHG reduction, and energy conservation goals. This approach requires that local air quality and GHG reduction goals in general plans, climate action plans, or GHG reduction plans comply with the legislation and associated plans described above on pages 5 and 6. In general, most of the expectations set through legislation are related to the state's GHG reduction goals that were originally captured in EO S-3-05.

- 2000 levels by 2010
- 1990 levels by 2020
- 80 percent below 1990 levels by 2050

SB 32 expanded on these goals and added the expectation that the state should reach 40 percent below 1990 levels by 2030 followed by SB 391 that requires the California Transportation Plan to support 80 percent reduction in GHGs below 1990 levels by 2050. With respect to the land use and transportation sectors, SB 375 tasked ARB with setting specific GHG reduction goals through the RTP/SCSs prepared by MPOs.

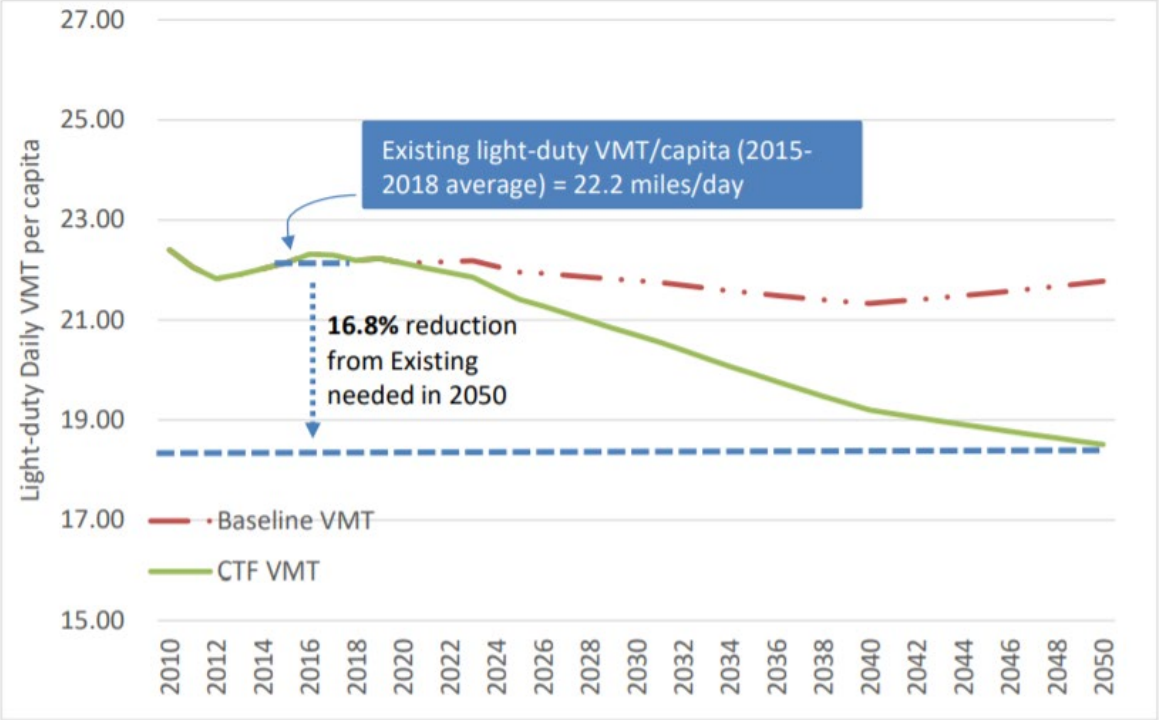
The ARB *Scoping Plan* and *Mobile Source Strategy* provide analysis related to how the state can achieve the legislative and executive goals while the Caltrans *Strategic Management Plan* and *Smart Mobility Framework* provide supportive guidance and metrics. An important recognition of the ARB *Scoping Plan* and *Mobile Source Strategy* is that the initial SB 375 targets were not aggressive enough. The ARB *2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals* document provides updated information on VMT reductions need to meet the State's GHG emission reduction targets by 2050. This document identifies two specific thresholds to meet these targets, a 14.3% reduction in total VMT per capita, and a 16.8% reduction in light-duty vehicle VMT per capita. While this evidence is tied largely to the state's emission reduction goals, the proposed VMT reductions associated with this approach to thresholds would be supportive of multimodal networks, infill development, and greater land use diversity.

Figure 2: Statewide Total VMT/Capita



Source: https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf (pg. 10)

Figure 3: Statewide Light-Duty VMT/Capita



Source: https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf (pg. 11)

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

§ 15064.7. Thresholds of Significance.

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

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

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

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

ARB meets the criteria of being a public agency and having noted expertise in the areas of VMT and emissions analysis. Further, the recommended threshold values above were developed in specific consideration of SB 743 requirements.

One other agency threshold to consider is Caltrans. The Local Development-Intergovernmental Review (LD-IGR) Branch at Caltrans (http://www.dot.ca.gov/hq/tpp/offices/ocp/igr_ceqa.html) has responsibility to reduce potential adverse impacts of local development on the state transportation system. As part of its responsibilities, each district branch performs reviews of CEQA environmental documents for local land use projects. These reviews include providing expectations for transportation impact analysis such as metrics and thresholds. Caltrans has published initial guidance related to SB 743 implementation.

- *Local Development – Intergovernmental Review Program Interim Guidance*, Caltrans, November 9, 2016 (http://www.dot.ca.gov/hq/tpp/documents/RevisedInterimGuidance11092016.pdf)

An important part of the Caltrans guidance are the following expectations for thresholds and impact findings related to VMT.

A. Comment on Vehicle Miles Traveled associated with the project.

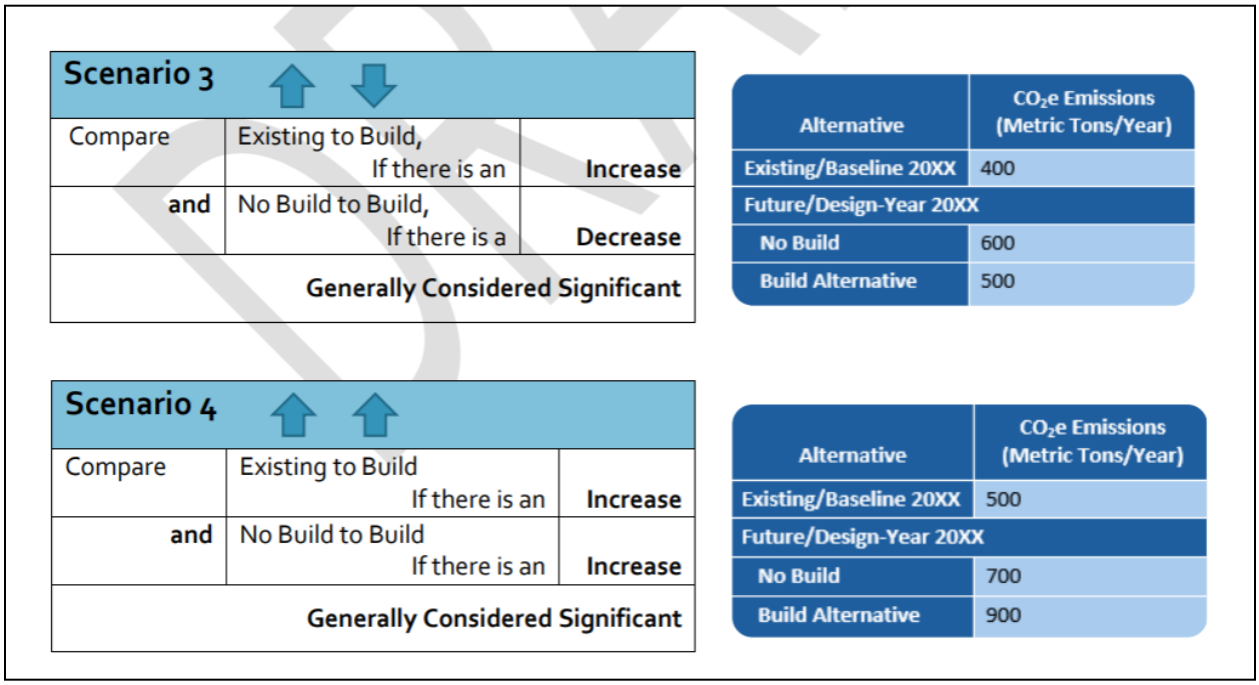
Reviewers should comment on vehicle miles traveled resulting from the land use project, applying local agency thresholds or absent those, thresholds recommended ~~by the most recent draft of~~ in ~~OPR's~~ adopted CEQA Guidelines ~~and~~ or OPR's approved Technical Advisory. If an assessment of VMT is not presented, Caltrans should request it be presented. Though SB 743 clarifies requirements for transportation analysis, a VMT analysis is already needed to meet other CEQA requirements.[1] Methods for assessing VMT should be compared to the methods recommended in the OPR's approved Technical Advisory. Where methods are not consistent with the recommendations in the Technical Advisory, Caltrans should comment on those methods. Where the project exhibits less than threshold VMT, Caltrans comments should acknowledge the project's transportation efficiency. Where the project exhibits greater than threshold VMT, Caltrans should request mitigation. Examples of mitigation measures are included in the OPR Technical Advisory. Contact ~~the~~ Caltrans SB 743 Program Implementation Manager, Alyssa Begley, for assistance with VMT calculation.

Source: http://www.dot.ca.gov/hq/tpp/documents/RevisedInterimGuidance11092016.pdf

When Caltrans reviews CEQA documents, they may function as a reviewing agency or a responsible agency. In a responsible agency role, Caltrans has approval authority over some component of the project such as an encroachment permit for access to the state highway system. Comments from Caltrans should be adequately addressed, and special attention should be paid to those comments when Caltrans serves as a responsible agency since an adequate response may be required to obtain their required approval. The interim guidance above does not endorse the *Technical Advisory* recommendations for thresholds; it only requires IGR staff to 'comment' on VMT analysis. However, Caltrans is working to establish specific VMT thresholds per conversations with Alyssa Begley, SB 743 Program Implementation Manager with Caltrans. Further, Caltrans may have establish GHG thresholds that could also serve as VMT thresholds.

In the draft *Interim Guidance: Determining CEQA Significance For Greenhouse Gas Emissions for Projects on the State Highway System,* California Department of Transportation, 2018, Caltrans recommends that any increase in GHG emissions would constitute a significant impact (see excerpt below).

Figure 4: Interim Caltrans GHG Thresholds



Scenario 3		
Compare	Existing to Build, If there is an	**Increase**
and	No Build to Build, If there is a	**Decrease**
	Generally Considered Significant	

Alternative	CO_2e Emissions (Metric Tons/Year)
Existing/Baseline 20XX	400
Future/Design-Year 20XX	
No Build	600
Build Alternative	500

Scenario 4		
Compare	Existing to Build If there is an	**Increase**
and	No Build to Build If there is an	**Increase**
	Generally Considered Significant	

Alternative	CO_2e Emissions (Metric Tons/Year)
Existing/Baseline 20XX	500
Future/Design-Year 20XX	
No Build	700
Build Alternative	900

Source: *Interim Guidance: Determining CEQA Significance For Greenhouse Gas Emissions for Projects on the State Highway System,* California Department of Transportation, 2018

Since any increase in VMT would result in an increase in GHG emissions, lead agencies could rely on this Caltrans threshold for VMT purposes using the same 15064.7(c) provision above. Using this threshold would result in most land use projects and land use plans resulting in significant impacts but it would also result in the maximum feasible mitigation for VMT.

OPTION 3 – Set Thresholds Consistent with the General Plan or RTP/SCS Future Year VMT Projections by Jurisdiction or Community Region

VMT is a composite metric that is created as an output of combining a community's long-term population and growth projections with its long-term transportation network (i.e., the general plan). Other variables are also in play related to travel behavior, but land use changes and transportation network modifications are the items largely influenced or controlled by cities and counties. As such, Placerville and the El Dorado County unincorporated area already have a VMT growth budget. This is the amount of VMT that is forecast to be generated from their general plans combined with other travel behavior inputs for the region as captured in local and regional travel forecasting models. This VMT growth has already been 'approved' by the jurisdiction, the region, and the state and could serve as the basis of a VMT threshold expressed as a VMT growth budget or as a VMT efficiency metric based on the future year VMT per capita, VMT per

employee, or VMT per service population. The measurement of VMT could occur at the jurisdictional or sub-area (i.e., community regions) level.

Potential limitations of this approach relate to the lack of a 'baseline plus project' analysis and travel forecasting model sensitivity. If a general plan includes policies or implementation programs designed to reduce VMT through transportation demand management (TDM) strategies, the current local and regional models did not include these effects. Further, current local and regional models do not capture major disruptive trend effects such as TNCs, AVs, and internet shopping. Including baseline and baseline plus project analysis could help capture some of these effects to the extent they are already influencing travel behavior.

OPTION 4 – Set Thresholds Based on Baseline VMT Performance

As noted above, an impact under CEQA begins with a change to the existing or baseline environment. There are a range of approaches to using this starting point for VMT impact analysis. At one end of the spectrum is 'total daily VMT' generated under baseline conditions. Setting this value as the threshold for a jurisdiction basically creates a budget where any increase would be a significant impact. Alternatively, the baseline VMT per capita, VMT per employee, or VMT per service population could be used to establish an efficiency metric basis for impact evaluation. Using this form of VMT would mean that future land use projects would be expected to perform no worse than existing land use projects and only projects that cause an increase in the rate of VMT generation would cause significant impacts. Since VMT will increase or fluctuate with population and employment growth, changes in economic activity, and expansion of new vehicle travel choices (i.e., Uber, Lyft, Chariot, autonomous vehicles, etc.), expressing VMT measurement in an efficiency metric form allows for more direct comparisons to baseline conditions when it comes to land use projects, land use plans, and transportation projects. Setting a threshold based on baseline levels should consider how the threshold complies with the SB 743 statute provisions described at the beginning of this memo as well as whether VMT reduction strategies are feasible in the jurisdiction.

Under this option, a separate quantitative VMT threshold would not be set for cumulative conditions, but a qualitative assessment of general plan consistency may still be included depending on whether that analysis is already being conducted for the purposes of GHG impact analysis. In general, projects should avoid jeopardizing the air quality conformity and GHG reduction performance of the general plan.

Please review this information and let us know if you have any follow up questions.

4. Mitigations

TDM Mitigation Strategies

TECHNICAL MEMORANDUM

Date: 7.10.18

To: Woodrow Deloria, EDCTC

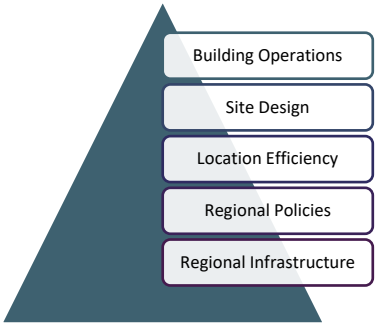
From: Eric Howard and Ronald T. Milam, AICP, PTP

Subject: SB 743 Implementation TDM Strategy Assessment RS18-3653

This technical memorandum summarizes our assessment of new research related to transportation demand management (TDM) effectiveness for reducing vehicle miles of travel (VMT). The purpose of this work was to compile new TDM information that has been published in research papers since the release of the *Quantifying Greenhouse Gas Mitigation Measures,* CAPCOA, August 2010 and to identify those strategies suited to El Dorado County and the City of Placerville given the rural and suburban land use context. The matrix in Attachment A summarizes the overall evaluation of all the CAPCOA strategies while the matrix in Attachment B identifies the top seven strategies suited for the study area.

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 El Dorado County and the City of Placerville. 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 policies related to land use location efficiency and infrastructure investments that support 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. Figure 1 presents a conceptual illustration of the relative importance of scale.

Figure 2: Transportation-Related GHG Reduction Measures



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 1 summarizes the strategies according to the scope of implementation and the agents who would implement them.

Table 1: Summary of Transportation-Related CAPCOA Measures

Scope	Agents	CAPCOA Strategies (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**

Of these strategies, only a few are likely to be effective in a rural or suburban setting such as El Dorado County. To help winnow the list, we reviewed how land use context could influence each strategy's effectiveness and identified the seven for more detailed review. These strategies are described in Attachment B and listed below. Please note that disruptive trends, including but not limited to, transportation network companies (TNCs), autonomous vehicles (AVs), internet shopping, and micro-transit may affect the future effectiveness of these strategies.

1. Increase diversity of land uses – This strategy focuses on the 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.

2. Provide pedestrian network improvements – This strategy focuses on creating a pedestrian network within the project and connecting to nearby destinations. Projects in El Dorado County tend to be smaller, 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 or benefit/assessment district based on local or regional plans such as the Active Transportation Plan under development.

3. 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. Implementation options are similar to strategy 2 above. 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.

4. Implement car-sharing program – This strategy reduces the need to own a vehicle or reduces the number of vehicles owned by a household by making it convenient to access a shared vehicle for those trips where vehicle use is essential. Note that implementation of this strategy would require regional or local agency implementation and coordination and would not likely be applicable for individual development projects.

5. 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 El Dorado 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. Note that implementation of this strategy would require regional or local agency implementation, substantial changes to current transit practices, and would not likely be applicable for individual development projects.

6. Encourage telecommuting and alternative work schedules – This strategy relies on effective internet access and speeds to individual project sites/buildings to provide the opportunity for telecommuting. The effectiveness of the strategy depends on the ultimate building tenants and this should be a factor in considering the potential VMT reduction.

7. Provide ride-sharing programs – This strategy focuses on encouraging carpooling and vanpooling by project site/building tenants and has similar limitations as strategy 6 above.

Because of the limitations noted above, strategies 1, 2, 3, 6, and 7 are initially considered the highest priorities for individual land use project mitigation subject to review and discussion with the project team and advisory committee.

ATTACHMENT A - Comparison of CAPCOA Strategies Versus New Research Since 2010

ATTACHMENT A: COMPARSION 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	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.
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). Locating new development in areas with good access to destinations reduces VMT by reducing trip lengths and making walking, biking, and transit trips more feasible. Destination accessibility is measured in terms of the number of jobs (or other attractions) reachable within a given travel time, which tends to be highest at central locations and lowest at peripheral ones.	0.5%-12%	Primary sources: Handy, S. et al. (2014). Impacts of Network Connectivity on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Handy, S. et al. (2013). Impacts of Regional Accessibility on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Secondary source: Holtzclaw, et al. (2002.) Location Efficiency: Neighborhood and Socioeconomic Characteristics Determine Auto Ownership and Use – Studies in Chicago, Los Angeles, and Chicago. Transportation Planning and Technology, Vol. 25, pp. 1–27.

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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	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. Mixing land uses within a single development can decrease VMT (and resulting GHG emissions), since building users do not need to drive to meet all of their needs. 2] Reduction in VMT due to regional change in entropy index of diversity. Providing a mix of land uses within a single neighborhood can decrease VMT (and resulting GHG emissions), since trips between land use types are shorter and may be accommodated by non-auto modes of transport. For example when residential areas are in the same neighborhood as retail and office buildings, a resident does not need to travel outside of the neighborhood to meet his/her trip needs. At the regional level, reductions in VMT are measured in response to changes in the entropy index of land use diversity.	1] 0%-12% 2] 0.3%-4%	1] Ewing, R. and Cervero, R. (2010). Travel and the Built Environment - A Meta-Analysis. Journal of the American Planning Association,76(3),265-294. Cited in California Air Pollution Control Officers Association. (2010).Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdfFrank, 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.htm2] Zhang, Wengia et al. "Short- and Long-Term Effects of Land Use on Reducing Personal Vehicle Miles of Travel."

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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	Literature or Evidence Cited
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). Locating high density development within 1/2 mile of transit will facilitate the use of transit by people traveling to or from the Project site. The use of transit results in a mode shift and therefore reduced VMT. 2] Reduction in vehicle trips due to implementing TOD. A project with a residential/commercial center designed around a rail or bus station, is called a transit-oriented development (TOD). The project description should include, at a minimum, the following design features: • A transit station/stop with high-quality, high-frequency bus service located within a 5-10 minute walk (or roughly ¼ mile from stop to edge of development), and/or • A rail station located within a 20 minute walk (or roughly ½ mile from station to edge of development) • Fast, frequent, and reliable transit service connecting to a high percentage of regional destinations • Neighborhood designed for walking and cycling	1] 0%-5.8% 2] 0%-7.3%	1] Lund, H. et al. (2004). Travel Characteristics of Transit-Oriented Development in California. Oakland, CA: Bay Area Rapid Transit District, Metropolitan Transportation Commission, and Caltrans. Tal, G. et al. (2013). Policy Brief on the Impacts of Transit Access (Distance to Transit) Based on a Review of the Empirical Literature. California Air Resources Board. Retrieved from: https://www.arb.ca.gov/cc/sb375/policies/transitaccess/transit_access_brief120313.pdf 2] Zamir, K. R. et al. (2014). Effects of Transit-Oriented Development on Trip Generation, Distribution, and Mode Share in Washington, D.C., and Baltimore, Maryland. Transportation Research Record: Journal of the Transportation Research Board. 2413, 45–53. DOI: 10.3141/2413-05
Land Use/ Location	3.1.6	LUT-6 Integrate Affordable and Below Market Rate Housing	0.04%-1.20% reduction in VMT for making up to 30% of housing units BMR	Weak - Should only be used where supported by local data on affordable housing trip generation.	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. Only applies if located in an area that may be prone to having a less robust sidewalk network.	0.5%-5.7%	Handy, S. et al. (2014). Impacts of Pedestrian Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm

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					New information	Change in VMT reduction compared to CAPCOA	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 expansion of bike networks in urban areas. Strategy only applies to bicycle facilities that provide a dedicated lane for bicyclists or a completely separated right-of-way for bicycles and pedestrians. Project-level definition: Enhance bicycle network citywide (or at similar scale), such that a building entrance or bicycle parking is within 200 yards walking or bicycling distance from a bicycle network that connects to at least one of the following: at least 10 diverse uses; a school or employment center, if the project total floor area is 50% or more residential; or a bus rapid transit stop, light or heavy rail station, commuter rail station, or ferry terminal. All destinations must be 3-mile bicycling distance from project site. Include educational campaigns to encourage bicycling.	0%-1.7%	Zahabi, S. et al. (2016). Exploring the link between the neighborhood typologies, bicycle infrastructure and commuting cycling over time and the potential impact on commuter GHG emissions. Transportation Research Part D: Transport and Environment. 47, 89-103.
Neighborhood Site Enhancements	3.2.3	SDT-3 Implement an NEV Network	0.5%-12.7% VMT reduction for GHG-emitting vehicles, depending on level of local NEV penetration	Weak - not recommended without supplemental data.	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

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					New information	Change in VMT reduction compared to CAPCOA	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; reduction assumes 1%-5% penetration rate. Implementing car-sharing programs allows people to have on-demand access to a shared fleet of vehicles on an as-needed basis, as a supplement to trips made by non-SOV modes. Transit station-based programs focus on providing the "last-mile" solution and link transit with commuters' final destinations. Residential-based programs work to substitute entire household based trips. Employer-based programs provide a means for business/day trips for alternative mode commuters and provide a guaranteed ride home option. The reduction shown here assumes a 1%-5% penetration rate.	0.3%-1.6%	Lovejoy, K. et al. (2013). Impacts of Carsharing on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm *Need to verify with more recent UCD research.*
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).	2%-12%	Victoria Transport Policy Institute (2009). Parking Requirement Impacts on Housing Affordability. Retrieved March 2010 from: http://www.vtpi.org/park-hou.pdf.

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					New information	Change in VMT reduction compared to CAPCOA	Literature or Evidence Cited
Parking Pricing	3.3.3	PDT-3 Implement Market Price Public Parking	2.8%-5.5% VMT reduction due to "park once" behavior and disincentive to driving	Adequate	Implement a pricing strategy for parking by pricing all central business district/employment center/retail center on-street parking. It will be priced to encourage park once" behavior. The benefit of this measure above that of paid parking at the project only is that it deters parking spillover from project supplied parking to other public parking nearby, which undermine the vehicle miles traveled (VMT) benefits of project pricing. It may also generate sufficient area-wide mode shifts to justify increased transit service to the area. VMT reduction applies to VMT from visitor/customer trips only. Reductions higher than top end of range from CAPCOA report apply only in conditions with highly constrained on-street parking supply and lack of comparably-priced off-street parking.	2.8%-14.5%	Clinch, J.P. and Kelly, J.A. (2003). Temporal Variance of Revealed Preference On-Street Parking Price Elasticity. Dublin: Department of Environmental Studies, University College Dublin. Retrieved from: http://www.ucd.ie/gpep/research/workingpapers/2004/04-02.pdf. Cited in Victoria Transport Policy Institute (2017). Transportation Elasticities: How Prices and Other Factors Affect Travel Behavior. Retrieved from: http://www.vtpi.org/tdm/tdm11.htm Hensher, D. and King, J. (2001). Parking Demand and Responsiveness to Supply, Price and Location in Sydney Central Business District. Transportation Research A. 35(3), 177-196 .Millard-Ball, A. et al. (2013). Is the curb 80% full or 20% empty? Assessing the impacts of San Francisco's parking pricing experiment. Transportation Research Part A. 63(2014), 76-92. Shoup, D. (2011). The High Cost of Free Parking. APA Planners Press. p. 290. Cited in Pierce, G. and Shoup, D. (2013). Getting the Prices Right. Journal of the American Planning Association. 79(1), 67-81.
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. Low end of reduction is typical of project-level implementation (payment of impact fees and/or localized improvements).	0.1%-10.5%	Handy, S. et al. (2013). Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources 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).	0.3%-6.3%	Handy, S. et al. (2013). Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Transit System	3.5.1	TST-1 Provide a Bus Rapid Transit System	0.02%-3.2% VMT reduction by converting standard bus system to BRT system	Adequate	No new information identified.	Same	N/A

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					New information	Change in VMT reduction compared to CAPCOA	Literature or Evidence Cited
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. The CTR program should include all of the following to apply the effectiveness reported by the literature: • Carpooling encouragement • Ride-matching assistance • Preferential carpool parking • Flexible work schedules for carpools • Half time transportation coordinator • Vanpool assistance • Bicycle end-trip facilities (parking, showers and lockers)	1.0%-6.0%	Boarnet, M. et al. (2014). Impacts of Employer-Based Trip Reduction Programs and Vanpools on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Commute Trip Reduction	3.4.2	TRT-2 Implement CTR Program - Required Implementation/Monitoring	4.2%-21.0% commute VMT reduction due to employer-based mode shift program with required monitoring and reporting	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or with CAPCOA strategies TRT-3.4.3 through TRT-3.4.9.	Limited evidence available. Anecdotal evidence shows high investment produces high VMT/vehicle trip reductions at employment sites with monitoring requirements and specific targets.	Same	Nelson/Nygaard (2008). South San Francisco Mode Share and Parking Report for Genentech, Inc. (p. 8) Cited in: California Air Pollution Control Officers Association. (2010). Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf
Commute Trip Reduction	3.4.4	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.	1] 0.3%-14%2] 0-16%3] 0.1% to 6.9%	1] Victoria Transport Policy Institute. (2017). Understanding Transport Demands and Elasticities. Online TDM Encyclopedia. Retrieved from: http://www.vtpi.org/tdm/tdm11.htm2] Carolina, P. et al. (2016). Do Employee Commuter Benefits Increase Transit Ridership? Evidence from 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.	3%-7.7%	Shoup, D. (1997). Evaluating the Effects of Cashing Out Employer-Paid Parking: Eight Case Studies. Transport Policy. California Air Resources Board. Retrieved from: https://www.arb.ca.gov/research/apr/past/93-308a.pdf. This citation was listed as an alternative literature in CAPCOA.

ATTACHMENT A: COMPARSION 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	Literature or Evidence Cited
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. Workplace parking pricing may include: explicitly charging for parking, implementing above market rate pricing, validating parking only for invited guests, not providing employee parking and transportation allowances, and educating employees about available alternatives.	0.5%-14%	Primary sources: Concas, S. and Nayak, N. (2012), A Meta-Analysis of Parking Price Elasticity. Washington, DC: Transportation Research Board, 2012 Annual Meeting. Dale, S. et al. (2016). Evaluating the Impact of a Workplace Parking Levy on Local Traffic Congestion: The Case of Nottingham UK. Washington, DC: Transportation Research Board, 96th Annual Meeting. Secondary sources: Victoria Transport Policy Institute. (2017). Understanding Transport Demands and Elasticities. Online TDM Encyclopedia. Retrieved from: http://www.vtpi.org/tdm/tdm11.htm Spears, S. et al. (2014). Impacts of Parking Pricing on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Commute Trip Reduction	3.4.6	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	3.4.7	1] TRT-7 Implement CTR Marketing 2] Launch Targeted Behavioral Interventions	0.8%-4.0% commute VMT reduction due to employer marketing of alternatives	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	1] Vehicle trips reduction due to CTR marketing; 2] Reduction in VMT from institutional trips due to targeted behavioral intervention programs	1] 0.9% to 26% 2] 1%-6%	1] Pratt, Dick. Personal communication regarding the Draft of TCRP 95 Traveler Response to Transportation System Changes – Chapter 19 Employer and Institutional TDM Strategies. Transit Cooperative Research Program. Cited in California Air Pollution Control Officers Association. (2010).Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf Dill, J. and Mohr, C. (2010). Long-Term Evaluation of Individualized Marketing Programs for Travel Demand Management. Portland, OR: Transportation Research and Education Center (TREC). Retrieved from: http://pdxscholar.library.pdx.edu/usp_fac 2] Brown, A. and Ralph, K. (2017.) "The Right Time and Place to Change Travel Behavior: An Experimental Study." Washington, DC: Transportation Research Board, 2017 Annual Meeting. Retrieved from: https://trid.trb.org/view.aspx?id=1437253

ATTACHMENT A: COMPARSION 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	Literature or Evidence Cited
Commute Trip Reduction	3.4.11	TRT-11 Provide Employer-Sponsored Vanpool/Shuttle	0.3%-13.4% commute VMT reduction due to employer-sponsored vanpool and/or shuttle service	Adequate - Effectiveness is building/tenant specific.	1] Reduction in commute vehicle trips due to implementing employer-sponsored vanpool and shuttle programs; 2] Reduction in commute vehicle trips due to vanpool incentive programs; 3] Reduction in commute vehicle trips due to employer shuttle programs	1] 0.5%-5.0%2] 0.3%-7.4%3] 1.4%-6.8%	1] Concas, Sisinnio, Winters, Philip, Wambalaba, Francis, (2005). Fare Pricing Elasticity, Subsidies, and Demand for Vanpool Services. Transportation Research Record: Journal of the Transportation Research Board, 1924, pp 215-223. 2] Victoria Transport Policy Institute. (2015). Ridesharing: Carpooling and Vanpooling. Online TDM Encyclopedia. Retrieved from: http://vtpi.org/tdm/tdm34.htm3] 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. Promote ride-sharing programs through a multi-faceted approach such as: • Designating a certain percentage of parking spaces for ride sharing vehicles • Designating adequate passenger loading and unloading and waiting areas for ride-sharing vehicles • Providing an app or website for coordinating rides	2.5%-8.3%	Victoria Transport Policy Institute. (2015). Ridesharing: Carpooling and Vanpooling. Online TDM Encyclopedia. Retrieved from: http://vtpi.org/tdm/tdm34.htm
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. VMT reductions apply to school trip VMT only.	5%-30%	Wilson, E., et al. (2007). The implications of school choice on travel behavior and environmental emissions. Transportation Research Part D: Transport and Environment 12(2007), 506-518.

ATTACHMENT A: COMPARSION 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	Literature or Evidence Cited
Not Applicable - not a CAPCOA strategy	Not Applicable - not a CAPCOA strategy	Not Applicable - not a CAPCOA strategy	Not Applicable - not a CAPCOA strategy	Not Applicable - not a CAPCOA strategy	Bikeshare car trip substitution rate of 7-19% based on data from Washington DC, and Minneapolis/St. Paul. Annual VMT reduction of 151,000 and 57,000, respectively. Includes VMT for rebalancing and maintenance. VMT reduction of 0.023 miles per day per bikeshare member estimated for Bay Area bikeshare, utilizing Minneapolis/St. Paul data from study above.	57,000-151,000 annual VMT reduction, based on two large US cities. VMT reduction of 0.023 miles per day per member, based on one large US city estimate.	Fishman, E., Washington, S., & Haworth, N. (2014). Bike share's impact on car use: Evidence from the United States, Great Britain, and Australia. Transportation Research Part D: Transport and Environment, 31, 13-20. TDM Methodology: Impact of Carsharing Membership, Transit Passes, Bikesharing Membership, Unbundled Parking, and Parking Supply Reductions on Driving. Center for Neighborhood Technology, Peter Haas and Cindy Copp, with TransForm staff, May 5, 2016.

ATTACHMENT B – Relevant Strategies for Implementation in El Dorado County and the City of Placerville Due to Land Use Context

ATTACHMENT B: RELEVANT STRATEGIES FOR IMPLEMENTATION IN EL DORADO COUNTY AND THE CITY OF PLACERVILLE 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	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.	1] 0%-12% 2] 0.3%-4%	1] Ewing, R. and Cervero, R. (2010). Travel and the Built Environment - A Meta-Analysis. Journal of the American Planning Association,76(3),265-294. Cited in California Air Pollution Control Officers Association. (2010).Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf Frank, L., Greenwald, M., Kavage, S. and Devlin, A. (2011). An Assessment of Urban Form and Pedestrian and Transit Improvements as an Integrated GHG Reduction Strategy. WSDOT Research Report WA-RD 765.1. Washington State Department of Transportation. Retrieved from: http://www.wsdot.wa.gov/research/reports/fullreports/765.1.pdf Nasri, A. and Zhang, L. (2012). Impact of Metropolitan-Level Built Environment on Travel Behavior. Transportation Research Record: Journal of the Transportation Research Board, 2323(1), 75-79. Sadek, A. et al. (2011). Reducing VMT through Smart Land-Use Design. New York State Energy Research and Development Authority. Retrieved from: https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/C-08-29%20Final%20Report_December%202011%20%282%29.pdf Spears, S.et al. (2014). Impacts of Land-Use Mix on Passenger Vehicle Use and Greenhouse Gas Emissions- Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm 2] Zhang, Wengia et al. "Short- and Long-Term Effects of Land Use on Reducing Personal Vehicle Miles of Travel."
Neighborhood Site Enhancements	3.2.1	SDT-1 Provide Pedestrian Network Improvements	0%-2% reduction in VMT for creating a connected pedestrian network within the development and connecting to nearby destinations	Adequate	VMT reduction due to provision of complete pedestrian networks.	0.5%-5.7%	Handy, S. et al. (2014). Impacts of Pedestrian Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Neighborhood Site Enhancements	3.2.2	SDT-2 Provide Traffic Calming Measures	0.25%-1% VMT reduction due to traffic calming on streets within and around the development	Adequate	Reduction in VMT due to building out a low-stress bike network; reduction in VMT due to expansion of bike networks in urban areas.	0%-1.7%	1] California Air Resources Board. (2016). Greenhouse Gas Quantification Methodology for the California Transportation Commission Active Transportation Program Greenhouse Gas Reduction Fund Fiscal Year 2016-17. Retrieved from: https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/ctc_atp_finalqm_16-17.pdf. 2] Zahabi, S. et al. (2016). Exploring the link between the neighborhood typologies, bicycle infrastructure and commuting cycling over time and the potential impact on commuter GHG emissions. Transportation Research Part D: Transport and Environment. 47, 89-103.

ATTACHMENT B: RELEVANT STRATEGIES FOR IMPLEMENTATION IN EL DORADO COUNTY AND THE CITY OF PLACERVILLE 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	Change in VMT reduction compared to CAPCOA(1)	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; reduction assumes 1%-5% penetration rate. Car sharing effect on VMT is still evolving due to TNC effects. UCD research showed less effect on car ownership due to car sharing participation and an uncertain effect on VMT.	0.3%-1.6%	Lovejoy, K. et al. (2013). Impacts of Carsharing on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Clewlow, Regina R. and Mishra, Gouri Shankar, (2017). Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States. UC Davis, Institute of Transportation Studies. Research Report - UCD-ITS-RR-17-07.
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.	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	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	2.5%-8.3%	Victoria Transport Policy Institute. (2015). Ridesharing: Carpooling and Vanpooling. Online TDM Encyclopedia. Retrieved from: http://vtpi.org/tdm/tdm34.htm

NOTES:

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