FEHR PEERS

MEMORANDUM

Date: April 18, 2018

To: Bob Brown & Steve Marshall, City of Novato

From: Bob Grandy

Subject: VMT Analysis for Novato General Plan Update EIR

SF18-0959

The purpose of this memorandum is to provide Vehicle Miles Traveled (or VMT) forecasts for the City of Novato General Plan EIR as well as a description of options for adopting VMT thresholds for future development and transportation project CEQA studies.

VMT Policy Overview

The following section provides an overview of the guidance developed by the Governor's Office of Planning and Research (OPR) for implementation of Senate Bill (SB) 743.

On September 27, 2013, Governor Jerry Brown signed SB 743 into law and started a process intended to fundamentally change transportation impact analysis as part of CEQA compliance. These changes include elimination of *auto delay, level of service (LOS), and other similar measures of vehicular capacity or traffic congestion* as a basis for determining significant impacts. The Governor's Office of Planning and Research (OPR) has issued draft guidance entitled, *Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA* (January 2016), covering the specific changes to the CEQA guidelines. The draft guidance recommends elimination of auto delay for CEQA purposes and the use of Vehicle Miles Traveled, or VMT, as the preferred CEQA transportation metric. Therefore, the City will need to select VMT analysis methodology, set new VMT thresholds for transportation impacts, and determine what mitigation strategies are most feasible.

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

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

VMT *refers to "Vehicle Miles Traveled," a metric that accounts for the number of vehicle trips generated and the length or distance of those trips. For transportation impact analysis, VMT is generally expressed as VMT per capita for a typical weekday.*

SB 743 includes the following two legislative intent statements.

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

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

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

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

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

OPR submitted final guidelines in late 2017 to the Resources Agency for rulemaking and is recommending automobile[1] Vehicle Miles Traveled (VMT) as the preferred CEQA transportation metric and the elimination of auto delay and LOS Statewide. The 2017 OPR documents include specific CEQA Guideline changes and

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

a Technical Advisory with specifications for VMT methodology and recommendations for significance thresholds and mitigation. As noted above, SB 743 requires impacts to transportation network performance to be viewed through a filter that promotes *"the reduction of greenhouse gas emissions, the development of multimodal transportation networks, and a diversity of land uses."* VMT can help identify how projects (land development and infrastructure) influence accessibility (i.e., lower VMT may indicate increased multimodal access to places and people) and emissions, so its selection is aligned with the objectives of SB 743.

While the final implementation steps for SB 743 have not yet been completed, enough information is available to inform lead agencies about how to prepare for the upcoming transition to VMT. In some cases, this transition may need to be accelerated in response to actions of Caltrans since they routinely review CEQA documents for local agency development projects. In this role, Caltrans is either a commenting agency or a responsible agency under CEQA (see CEQA § 21069) and sets expectations for adequate analysis of the State highway system. Caltrans has already started their SB 743 transition and is requesting VMT impact analysis in new transportation impact studies based on interim guidance (http://www.dot.ca.gov/hq/tpp/documents/RevisedInterimGuidance11092016.pdf). While certification of the new SB 743 CEQA Guidelines by the Resources Agency is not expected until later in 2018 (and may include a grace period for implementation until January 1, 2020), the Caltrans expectations may accelerate SB 743 implementation for some projects.

VMT Analysis for General Plan EIR

The following section is text describing VMT forecasts that was developed for the General Plan EIR transportation chapter.

Novato General Plan EIR VMT Assessment

Pursuant to SB 743, VMT is the State of California's preferred metric to assess transportation impacts under the CEQA by evaluating the changes in VMT caused by a project. When fully implemented, vehicle LOS and delay will be prohibited from being used as the sole basis for transportation impacts associated with land use plans and land use projects. VMT can be measured in a variety of ways depending on whether the intent is to capture the amount of vehicle travel generated by a project (i.e., number of vehicle trips multiplied by their corresponding trip lengths) or a project's effect on VMT within a defined study area. Project effect information is more meaningful for VMT analysis because land use projects and land use plans often influence the vehicle travel associated with neighboring land uses. VMT is a preferred metric for environmental effects because it captures how a project influences the environment related to fuel consumption and emissions while also serving as an indicator of potential impacts to pedestrians, bicyclists, transit riders, and travel safety.

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

Although VMT is focused on vehicle travel, the goal of a zero-or-less per capita VMT growth rate leads to an emphasis on the effects of development patterns (e.g., land use mix and density) together with pedestrian, bicycle, and transit infrastructure, given that all of these factors have an impact on the number and length of vehicle trips. Efforts to reduce VMT may include TDM strategies and improvements to pedestrian, bicycle, and transit infrastructure.

For this EIR, VMT forecasts were extracted from MTC's Travel Model One, in accordance with the latest OPR guidelines, for the City of Novato, Marin County, and the nine-county Bay Area region. MTC's Travel Model One produces forecasts for a base year 2015 scenario and a 2040 horizon year. The following VMT data is provided for informational purposes. The general plan EIR does not include transportation impact analysis related to VMT changes since SB 743 has not yet been fully implemented and the City has not yet adopted a VMT significance threshold for the general plan. Instead, VMT information is provided in the EIR transportation section to help inform potential VMT significance thresholds for subsequent land use projects. The influence of VMT on other environmental impacts related to air quality, energy, and greenhouse gases can be found in those chapters of the general plan EIR. The City of Novato will be establishing formal VMT significance thresholds for CEQA purposes after certification of the SB 743 CEQA Guidelines by the California Natural Resources Agency.

VMT Estimates and Forecasts

VMT can be expressed in a variety of forms depending on specific objectives of the analysis. For purposes of this study, the following forms of VMT are provided.

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

Table 1 shows the daily total VMT for the City of Novato, Marin County, and the MTC (i.e., Bay Area) Region. The City of Novato is forecast to experience a reduction in total VMT of 12.6 percent between 2015 and 2040. Marin County is forecast to experience a similar reduction in total VMT, while the Bay Area region is forecast to experience an increase in total VMT of 6.8 percent from 2015 to 2040. These forecasts do not account for recent improvements in economic activity, increases in vehicle travel due to transportation network companies (TNCs) such as UBER and Lyft, or future trends such as autonomous vehicles (AVs). Current expectations about the influence of these missing factors is that vehicle travel is likely to increase over time as the driving function is eliminated, operating and parking costs are reduced, and access to a variety of vehicle types becomes more ubiquitous. Recent travel demand research revealed increases in VMT that could more than offset the projected declines in Table 1.

TABLE 1
TOTAL VMT BY CITY, COUNTY, AND REGION

Forecast Year	City of Novato	Marin County	MTC Region
2015	1,850,065	9,099,298	225,089,658
2040	1,616,968	7,984,428	240,480,597
% Change	-12.6%	-12.3%	+6.8%

Source: MTC Travel Model One

The *Technical Advisory on Evaluating Transportation Impacts on CEQA* released by OPR in November 2017 identifies the following recommended VMT thresholds for land use projects.

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

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

Table 2 provides VMT estimates and forecasts using the VMT per resident, per worker, and per service population forms described above for the City of Novato, Marin County, and the MTC (i.e., Bay Area) Region. VMT for the City of Novato, across all three metric forms, is higher than the nine-county bay area region. This is due to higher average trip lengths that occur for trips being made to and from the City of Novato. For the 2040 forecasts, it is also due to higher levels of vehicle trips per capita.

TABLE 2
VMT PER CAPITA BY CITY, COUNTY, AND REGION

Scenario	City of Novato	Marin County	MTC Region
2015 Daily total VMT per service population	23.6	25.1	20.6
2015 Daily VMT per capita resident	19.0	19.0	15.3
2015 Daily VMT per worker	30.4	31.4	22.7
2040 Daily total VMT per service population	19.1	20.0	17.8
2040 Daily VMT per resident	18.6	18.4	13.8
2040 Daily VMT per worker	29.2	29.3	20.3

Note:
1. Service Population is the total of residents and employees forecasts in MTC Travel Model One for each jurisdiction.

Source: MTC Travel Model One

Table 3 compares the VMT per resident, per worker, and per service population for the City of Novato and Bay Area region. The VMT values for the City of Novato are 7 to 44 percent higher, across all three metrics and both forecast years, than the corresponding VMT measures for the nine-county MTC region.

TABLE 3
COMPARISON OF VMT PER RESIDENT, WORKER, AND SERVICE POPULATION – CITY OF NOVATO TO MTC BAY AREA REGION

Scenario	City of Novato	MTC Region	Percent Change: City of Novato Compared to Regional Average
2015 Daily total VMT per service population	23.6	20.6	+14.6%
2015 Daily VMT per resident	19.0	15.3	+24.2%
2015 Daily VMT per worker	30.4	22.7	+33.9%
2040 Daily total VMT per service population	19.1	17.8	+7.3%
2040 Daily VMT per resident	18.6	13.8	+34.8%
2040 Daily VMT per worker	29.2	20.3	+43.8%

Note:
1. Service Population is the total of residents and employees forecast in MTC Travel Model One for each jurisdiction.

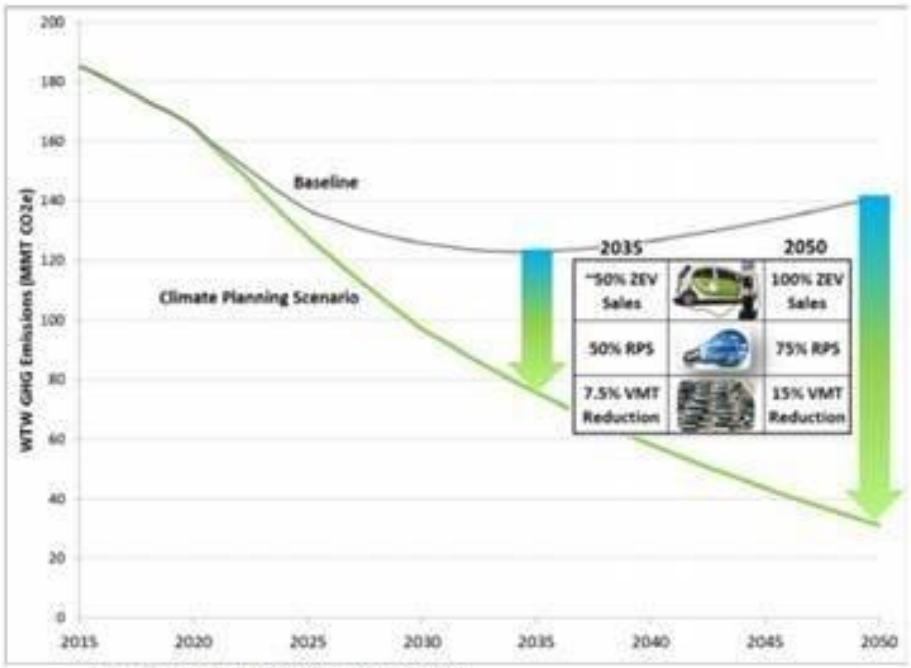
Source: MTC Travel Model One

Finally, OPR's Technical Advisory recommends that all land use project (and land use plans) be evaluated against consistency with the relevant Regional Transportation Plan -Sustainable Communities Strategy (RTP-SCS). Consistency should be measured to verify that the approval of the land use plan or land use project does not jeopardize the VMT forecasts and associated air quality conformity findings and GHG reduction performance of the RTP-SCS. While consistency with an RTP-SCS is a reasonable starting place for VMT impact analysis for all projects, further analysis is required. The evidence cited in the Technical Advisory includes the following important resource documents.

- *California Air Resources Board Mobile Source Strategy (2016)*, which describes California's strategy for containing air pollutant emissions from vehicles, and quantifies VMT growth compatible with achieving state targets.
- *California Air Resources Board's 2017 Climate Change Scoping Plan Update: The Strategy for Achieving California's 2030 Greenhouse Gas Target* describes California's strategy for containing greenhouse gas emissions from vehicles, and quantifies VMT growth compatible with achieving state targets.

These documents make it clear that RTP-SCS GHG reductions are not sufficient to meet California's targets (see chart below).

Figure 1: Statewide On-Road GHG Emissions



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

The baseline scenario in the chart above includes the influence of the first round of RTP-SCSs, which is not sufficient to achieve statewide emissions goals. The chart notes that an additional 15 percent reduction in total VMT is required to hit the proposed trend line by 2050. Note that the baseline trend did not consider key disruptive trends such as TNCs and AVs so it is possible that baseline VMT may be higher.

This evidence suggests that consistency with the RTP-SCS alone would not be sufficient for a less than significant impact finding. Instead, lead agencies will need to estimate whether their proposed general plan could reduce regional VMT in line with the ARB recommendation.

The proposed Novato General Plan is consistent with the MTC RTP-SCS based on population and employment forecasts, as well as the major elements of the transportation network. However, the general plan does not contain actions that are likely to reduce future VMT to levels that are aligned with the ARB requirements.

For more information about potential environmental impacts of the proposed general plan's VMT changes, consult the air quality, energy, and greenhouse gas chapters of this document.

Future VMT Impact Threshold Options

Based on the background context described above, the remainder of this document addresses the following topics regarding implementation of SB 732 after the General Plan Update and EIR are adopted.

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

IMPACT ANALYSIS AND MEASUREMENT

Level of Service (LOS)

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

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

Vehicle Miles Travelled (VMT)

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

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

The relationship between VMT and energy or emissions is based on fuel consumption. The traditional use of VMT in environmental impact analysis is to estimate mobile air pollution emissions, GHGs, and energy consumption. VMT is typically calculated using travel demand models, which estimate the total number and length of vehicle trips for a given area. VMT can also be calculated using spreadsheet models especially for land use development projects. These calculations are based on vehicle trip generation estimates multiplied by trip lengths. Trip rates and trip lengths should come from locally validated sources such as household travel surveys, mobile device data, and local trip generation studies. In absence of those data sources, statewide or national data, such as vehicle trip rates from the ITE Trip Generation Manual, can be substituted.

While a range of models exist for generating VMT estimates and forecasts, the Bay Area region has often relied on regional travel forecasting models developed by the Metropolitan Transportation Commission (MTC). The MTC model known as Travel Model One is an activity-based model (ABM) that estimates trips based on individual activity and travel patterns influenced by land use. The model is estimated, calibrated, and validated using local and regional data. Travel Model One is the model used by MTC for developing Plan Bay Area, the RTP-SCS.

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

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

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

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

VMT IMPACT ANALYSIS METHODOLOGY

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

> *"Analyses should also consider both short- and long-term effects on VMT." – Page III:16*

The VMT impact analysis methodology should be able to estimate 'project generated VMT' and the 'project's effect on VMT' under both project and cumulative conditions. This statement holds true for land use projects, land use plans (i.e., the general plan), and transportation projects. Regional models such as MTC Travel Model One tend to be the preferred tools for this type of analysis, but spreadsheet or sketch models may also be applicable if populated with accurate and defensible input data. Regional models can often serve as a source of this data, which may be required if the regional model was used to establish VMT impact thresholds. OPR recommends that the VMT analysis methodology used to set thresholds should be the same as that used for project analysis to ensure an apples-to-apples comparison.

> *"When using models and tools for those various purposes, agencies should use comparable data and methods, in order to set up an 'apples-to-apples' comparison between thresholds, VMT estimates, and mitigation VMT estimates." – Page III:15*

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

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

For transportation projects, the OPR *Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA* includes a spreadsheet methodology for estimating induced VMT using elasticities of VMT to lane miles based on published research. While this methodology is simple to use, it will always show an increase in VMT with any increase in lane miles. Roadway networks can generate more complex relationships especially if a roadway projects helps to fill a gap in the network (i.e., new bridges) such that VMT may decrease. Hence, regional models tend to be preferred if a complete analysis of VMT effects is desired.

SETTING VMT SIGNIFICANCE THRESHOLDS

In general, the CEQA Guidelines Section 15064.7 allows lead agencies the discretion to select their own transportation impact metrics and thresholds. SB 743 limits that discretion to some degree by directing OPR to select a new transportation impact metric and to provide guidance on thresholds. Further, SB 743 included Section 21099(e), which likely limits the ability of lead agencies to select thresholds less protective of the environment than those recommended by OPR. Another important aspect of Section 15064.7 is that the selection of thresholds needs to be supported by substantial evidence. This means that the selection of VMT thresholds needs to consider data, facts, research, and analysis related to what amount of VMT change would constitute a significant impact.

While OPR has developed specific VMT impact thresholds for project-related impacts (the current guidance does not fully address cumulative impacts), current practice has not sufficiently evolved where a clear line can be drawn between 'acceptable' and 'unacceptable' levels of VMT change for purposes of

determining significant transportation impacts. Instead, lead agencies will need to consider a variety of evidence from sources such as those listed below to create the substantial evidence to support a new VMT threshold.

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

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

1) **Rely on VMT threshold recommendations developed by OPR.**

   Lead agencies may rely on the thresholds contained in the OPR SB 743 recommendations once they are final. The current OPR threshold guidance is contained in the *Technical Advisory on Evaluating Transportation Impacts in CEQA,* California Governor's Office of Planning and Research, April 2018. The thresholds cover land use projects, land use plans, and transportation projects.

   OPR recommendations for residential and office land use project VMT thresholds are set at fifteen percent below baseline VMT/capita (i.e., resident) and VMT/employee for the city or region (within MPO areas). A typical new suburban development project can expect project changes and transportation demand management (TDM) measures detailed in the *Quantifying Greenhouse Gas Mitigation Measures,* California Air Pollution Control Officers Association (CAPCOA), August 2010 to reduce VMT by a maximum of up to ten percent (fifteen percent in a "suburban center" similar to downtown Novato). Hence, the OPR threshold is set at the maximum level of potential VMT reduction in a suburban center expected from project design and TDM strategies according to CAPCOA. This maximum was not derived from statistical research about the actual effectiveness of TDM strategies in different community types. Further, available research confirms that TDM strategy effectiveness is heavily influenced by project site location and the ultimate site tenants, which can change over time. Considering this additional information raises questions about whether the TDM effectiveness especially in suburban areas could achieve the CAPCOA maximums. Nevertheless, for projects not able to reach the CAPCOA maximum level of reduction, VMT impacts would be significant and unavoidable.

For land use plans such as the general plan, the OPR recommendation is that a significant impact may occur if the plan is not consistent with the relevant RTP-SCS (i.e., the MTC Plan Bay Area for the City of Novato). Consistency with the SCS means all of the following are true.

- Development specified in the plan is also specified in the RTP-SCS (i.e. the plan does not specify developing in outlying areas specified as open space in the RTP-SCS).
- Taken as a whole, development specified in the plan leads to VMT that is equal to or less than the VMT per capita and VMT per employee specified in the RTP-SCS.

For transportation projects, the current OPR recommendation is being modified, so it should not be relied upon. In general, transportation projects have the potential to generate induced VMT. The key question regarding induced VMT is whether some or all of it is undesirable such that a threshold can be associated with it.

A key limitation of the OPR recommendations is that they only cover project impact thresholds for residential, office, and retail land uses. Other land uses are not addressed and guidance for cumulative impacts is limited to avoiding inconsistencies with the relevant RTP-SCS.

2) **Develop jurisdiction-specific VMT thresholds.**

Lead agencies have the option to develop their own VMT thresholds for land use plans, land use projects, and transportation projects. Determining when a VMT change represents a significant impact is difficult to establish without linking VMT to other environmental resources and considering its relationship to the built environment and economic factors. This determination already occurs for energy, air quality, and GHGs, so agencies will need to consider how VMT is used in these other impact areas in establishing a new threshold specifically for transportation. As such, it will also be important to consider that VMT, by itself, is a composite metric that measures the vehicle travel effect associated with land use patterns, growth, transportation network changes, and human travel behavior. Further, VMT also varies over time as a function of economic activity and travel cost. VMT tends to increase with economic activity and decline with higher costs for vehicle travel (i.e., higher gas prices). New trends associated with growing use of TNCs along with future shifts to automated vehicles are likely to complicate VMT forecasts since the potential change is highly dependent on whether future vehicles are heavily shared.

Under either option, threshold setting is likely to involve consideration of VMT forecasts from the regional MTC travel model. This conclusion is drawn from the combination of OPR recommendations to evaluate

projects based on RTP-SCS consistency, VMT forecasts that are not constrained to political boundaries, and threshold benchmarks tied to citywide or region-wide scales.

Complying directly with the OPR recommendations would result in the following thresholds for a typical residential project in Novato.

- Using the 2015 daily VMT per resident estimates in Table 3 above, the Novato VMT threshold for new residential projects would be either 15 percent below the regional average (i.e., 0.85 x 15.3 = 13.0) or citywide average (i.e., 19.0 x 0.85 = 16.2).

- Using the 2040 daily VMT per resident estimates in Exhibit 4, the Novato VMT threshold for new residential projects would be either 15 percent below the regional average (i.e., 0.85 x 13.8 = 11.7) or citywide average (i.e., 18.6 x 0.85 = 15.8).

Since the OPR recommendations tie the thresholds to 'baseline' conditions, the actual threshold should be based on an interpolation between the 2015 and 2040 values for a project's specific baseline year. Also, note that rounding can matter and the City will also need to decide how many decimal places to include. Given the accuracy of forecasts, more than one decimal place is typically not reasonable. For employment-related land uses, daily VMT per worker would be required. For land uses such as local-serving retail that have the potential to reduce existing VMT, total VMT estimates would be needed. All of this information is available from the regional model and total VMT is typically generated for the air quality, GHG, and energy impact analysis for projects. The proposed SB 743 guidelines include language that would allow for total VMT to be used for all CEQA impact analysis purposes.

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

MITIGATION OPTIONS

VMT mitigation typically involves modifying the project to reduce its VMT generation or VMT effect (such as inducing additional vehicle trips through an expanded roadway). This is a different focus compared to current transportation impact practice where the use of vehicle LOS usually involves modification of the

external roadway network to increase capacity. This traditional form of mitigation can lead to induced vehicle travel leading to even more VMT.

Mitigation Options for Land Use Plans and Development Projects

As explained above, the use of VMT changes the focus of transportation impact analysis and mitigation. In some cases, this change could be substantial for jurisdictions and developers comfortable with current practice where transportation impacts and mitigation largely affect the external roadway network. With the impact spotlight shining on VMT, more attention will center on the project's physical design and whether it incorporates strategies to reduce vehicle use and encourage active transportation and transit use.

To reduce VMT for mitigation purposes, the type of project matters. For large area land use plans such as general plans and specific plans, mitigation will typically focus on physical design elements related to the ultimate built environment, which includes the density and mix of land uses in and around the project area plus the availability and quality of the transportation network related to transit, walking, and bicycling. As project scale shrinks, TDM strategies become more relevant especially when they can be tied directly to the ultimate project occupants or tenants.

Key references describing the possible built environment and TDM strategies as well as their effectiveness at reducing VMT are listed below.

- *Quantifying Greenhouse Gas Mitigation Measures*, CAPCOA, 2010
- *SB 375 Research on Impacts of Transportation and Land Use-Related Policies*, California Air Resources Board - https://arb.ca.gov/cc/sb375/policies/policies.htm
- *Integrating Demand Management into the Transportation Planning Process: A Desk Reference*, FHWA, 2013 - http://ops.fhwa.dot.gov/publications/fhwahop12035/fhwahop12035.pdf

The CAPCOA document contains the matrix below that organizes various VMT reduction strategies into groups. The matrix generally presents VMT reduction strategies for development projects as one of three basic intervention types:

- Project improvements (such as adding mixed-use components to a project, including affordable housing units, limiting the parking supply, or providing enhanced pedestrian access),
- Transportation programs (such as shuttle service, marketing, and carshare provision), and
- Public amenities (including funding transit service expansion, and land use characteristics of surrounding parcels).

Using groups to organize the strategies helps to identify the maximum level of expected VMT reduction based on community type because strategy effectiveness is directly related to the built environment of an area (e.g., a city center versus rural town). To apply the matrix, users start at the top in the first row to understand the maximum reduction expectations regardless of the combination of individual strategies. The second row further subdivides the first row to help clarify the specific maximum reduction potential based on specific sub categories. For example, a development project in a suburban area will generally be able to achieve a maximum VMT reduction of about 10 to 15 percent based on the five subcategories of transportation measures in the matrix. To understand how this maximum applies consider a specific strategy such as unbundled parking costs that has a 13 percent reduction potential. In a suburban center with a maximum reduction potential of 15 percent from the four transportation measure categories, the unbundled parking cost effectiveness could be applied fully. In a regular suburban area, the maximum reduction of 10 percent in the second row would limit the effectiveness of this individual strategy to 10 percent and no further strategies could improve on that outcome with the exception of pricing.

Transportation Measures (Five Subcategories) Global Maximum Reduction (all VMT): Urban = 75%; Compact Infill = 40%; Suburban Center or Suburban with NEV= 15%; Suburban = 10%					Global Cap for Road Pricing needs further study	
Transportation Measures (Four Categories) Cross-Category Max Reduction (all VMT): Urban = 70%; Compact Infill = 35%; Suburban Center or Suburban with NEV= 15%; Suburban = 10%				Max Reduction = 15% overall; Work VMT = 25%; School VMT = 65%	Max Reduction = 25% (all VMT)	
Land Use/Location Max Reduction: Urban = 55%; Compact Infill = 30%; Suburban Center = 10%; Suburban = 5%	Neighborhood/ Site Enhancement Max Reduction without NEV = 5%; with NEV = 15%	Parking Policy/ Pricing Max Reduction = 20%	Transit System Improvements Max Reduction = 10%	Commute Trip Reduction (assumes mixed use) Max Reduction = 25% (work VMT)	Road Pricing Management Max Reduction = 25%	Vehicles
Density (30%)	Pedestrian Network (2%)	Parking Supply Limits (12.5%)	Network Expansion (8.2%)	CRT Program Required = 21% work VMT Voluntary = 6.2 work VMT	Cordon Pricing (22%)	Electrify Loading Docks
Design (21.3%)	Traffic Calming (1%)	Unbundled Parking Costs (13%)	Service Frequency/ Speed (2.5%)	Transit Fare Subsidy (20% work VMT)	Traffic Flow Improvements (45% CO_2)	Utilize Alternative Fueled Vehicles
Location Efficiency (55%)	NEV Network (14.4) <NEV Parking>	On-street Market Pricing (5.5%)	Bus Rapid Transit (3.2%)	Employee Parking Cash-out (7.7% work VMT)	Required Contributions by Project	Utilize Electric or Hybrid Vehicles
Diversity (30%)	Car Share Program (0.7%)	Residential Area Parking Permits	Access Improvements	Workplace Parking Pricing (19.7% work VMT)		
Destination Accessibility (20%)	Bicycle Network <Lanes> <Parking> <Land Dedication for Trails>		Station Bike Parking	Alt Work Schedules & Telecommute (5.5% work VMT)		
Transit Accessibility (25%)	Urban Non-motorized Zones		Local Shuttles	CRT Marketing (5.5% work VMT)		
BMR Housing (1.2%)			Park & Ride Lots	Employer Sponsored Vanpools/Shuttles (13.4% work VMT)		
Orientation Toward Non-auto Corridor				Ride Share Program (15% work VMT)		
Proximity to Bike Path				Bike Share Program		
				End of Trip Facilities		
				Preferential Parking Permit		
				School Pool (15.8% school VMT)		
				School Bus (5.3% school VMT)		

Mitigations external to the project will largely include potential fair-share funding for area-wide or jurisdiction-wide programs such as transit improvements or enhanced active transportation networks. For communities that already embrace goals to reduce VMT, transportation impact analysis for CEQA compliance may become more streamlined with less overall effort associated with impact analysis and mitigation.

Mitigation Options for Transportation Projects

The California Air Resource Board website noted above also contains transportation-related policy options, which can be used as mitigation for land use or transportation projects. Based on the current OPR guidance, the only transportation projects likely to have VMT impacts are larger roadway capacity expansion projects. Transit, bicycle, pedestrian, and smaller roadway modifications would be presumed to have a less than significant impact because they would either help to reduce VMT or cause negligible VMT increases. Mitigation for larger roadway projects may need to consider potential modifications to the project that would minimize VMT increases possibly through managed lane operation (i.e., construction of high-occupancy vehicle lanes instead of general purpose lanes) or integration of transit, bicycle, or pedestrian facilities into a project that increases non-auto travel.

CONTINUED USE OF LOS AFTER SB 743

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

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

PROS AND CONS OF OPTIONS FOR ADOPTING VMT THRESHOLDS FOR FUTURE DEVELOPMENT AND TRANSPORTATION PROJECT CEQA STUDIES

Based on the information above, a comparison of pros and cons for two options for establishing new VMT thresholds for the City of Novato, for adoption after certification of the new SB 743 CEQA Guidelines by the California Natural Resources Agency (i.e., anticipated in the summer of 2018), are presented below for informational purposes.

1. ***Use OPR VMT thresholds for all future projects requiring environmental review***

   Pros: Provides simple guidance for thresholds that are known to be consistent with most up-to-date state-level guidance; Caltrans is likely to refer to these thresholds in absence of locally established thresholds. The City of Novato may have few if any transportation project significant impacts since the OPR guidance tends to presume that small roadway expansions, all transit, and all bicycle and pedestrian projects have less than significant VMT impacts.

   Cons: OPR threshold recommendations may not fully reflect the local transportation context, or present realistic mitigation goals for development in Novato. Individual land use projects would need to achieve VMT levels that are 15 percent below baseline conditions, which exceeds the maximum mitigation reduction of 10 percent for a suburban area based on research and guidance from CAPCOA.

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

   Pros: Allows for locally-based determination of what constitutes an environmental impact and consistency across other impact topics such as air quality, GHGs, and energy. Also allows for adjustments to realistic TDM-based and project-based mitigation goals.

   Cons: The City of Novato, perhaps in conjunction with TAM and other Marin County jurisdictions, will need to establish substantial evidence for the specific adopted thresholds. This is particularly important if the thresholds deviate from the OPR recommendations or are inconsistent with MTC Plan Bay Area. Such an effort would require the assistance of the City's CEQA attorney. The threshold recommendations may not fully reflect the best available data on VMT reductions needed to meet state desired air pollution and GHG goals as established in the ARB Mobile Source Strategy.