Los Angeles County
Metropolitan Transportation
Authority
One Gateway Plaza
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Los Angeles, CA

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PLANNING AND PROGRAMMING COMMITTEE
SEPTEMBER 20, 2023

SUBJECT: STATUS REPORT ON METRO VMT MITIGATION PROGRAM

ACTION: RECEIVE AND FILE

RECOMMENDATION

RECEIVE AND FILE status report on Metro's Vehicle Miles Traveled (VMT) Mitigation Program.

ISSUE

Metro is developing a framework to mitigate induced Vehicle Miles Traveled (VMT) impacts from projects on the State Highway System (SHS). This work is being conducted in compliance with Caltrans' California Environmental Quality Act (CEQA) transportation impact metric determination, pursuant to Senate Bill (SB) 743, an unfunded mandate. This framework will allow Metro to mitigate any potential induced VMT impacts by investing in our own Metro VMT-reducing operations, projects, and programs, or those of our public agency partners, including active transportation, bus-only lanes, bike share expansion, increased service frequency for our transit operations or those of our partner transit agencies, and affordable housing, among others.

This report builds on the July 2023 presentation to the Board of Directors and provides further updates on the development of this framework, including the preliminary project cost increases to satisfy compliance with SB 743, using either the current Caltrans Guidance (California Induced Travel Calculator) or the Los Angeles (LA) County-specific quantification approach, with a comparative summary of the strengths and limitations of both approaches included as Attachment A. This quantification approach will identify the mitigation obligation for individual projects as well as influence the broader mitigation framework development.

BACKGROUND

In September 2020, Caltrans released statewide guidance for analyzing the CEQA VMT impacts of projects on the SHS. In response, Metro pursued and was awarded Fiscal Year (FY) 2021-22 Caltrans Sustainable Transportation Planning Grant Program funds, with the Board authorizing the CEO to execute a Resolution (Attachment B, File# 2021-0471). These funds were awarded to develop a VMT Mitigation Program (Program) which would analyze, identify, and quantify VMT attributable to Metro's projects on the SHS and develop a framework to mitigate those impacts. Following Board approval of the Resolution, execution of the grant fund agreement, and procurement of a consultant, Metro Complete Streets & Highways staff, in collaboration with a comprehensive list of internal Metro, regional, and statewide stakeholders, including Metro's Office of Sustainability, began work on the Program.

The VMT Mitigation Program aims to reduce the impacts of VMT while simultaneously providing greater mobility options for the County's residents by investing in Metro VMT-reducing operations, projects, and programs, or those of our public agency partners. The approach aligns with Metro's "Modernizing the Highway Program" Board direction and the Board adopted "Objectives for Multimodal Highway Investment". Additional policies guiding the development of this Program are those advanced by the Metro Office of Sustainability, including the LA Metro Climate Action and Adaptation Plan (2019) and the goals and next steps prescribed in the "Climate Emissions Analysis: Metro's Indirect Impact on Greenhouse Gas Emissions" (2022). The current framework design is in alignment with and represents the further implementation of climate-related policies previously adopted by the Board, which recognizes that lowering per capita VMT is a central component of reducing Greenhouse Gases (GHG) from the transportation sector and thus meeting regional climate action goals.

Some of the VMT-reducing options under review and consideration include, but are not limited to improved access to transit, pedestrian, or bicycle networks; construction or improvement of bike facilities or bike boulevards; implementation or access to a commute reduction program; provision of bike-sharing and ride-sharing programs; provision of subsidized transit passes; telework options; implementation of management strategies (e.g., pricing, vehicle occupancy requirements); improved transit network coverage or hours; improved transit service frequency; Bus Rapid Transit (BRT) or bus-only lanes; e-bike subsidies; and acceleration of transit-oriented, affordable housing joint development land use projects.

Through this Program, Metro is leading efforts to measure and mitigate VMT impacts equitably and strategically in a manner that allows for public investment in VMT-reducing projects of our agency and municipal partners. Metro's ongoing, significant investment in multimodal options delivered through Propositions A and C and Measures R and M, including transit, rail, and bus service, and the strategic deployment of multimodal ExpressLanes throughout the County, have contributed to a wealth of travel options that are not available in other regions in the State and which are already reducing VMT and VMT per capita Countywide, leading to suppressed demand for road travel and changing travel patterns and relationships, in furtherance of Metro's climate policies.

DISCUSSION

The development of this Program will bring transparency and efficiency to the delivery of Measure R and M highway improvement projects in collaboration with Caltrans Headquarters (HQ), Caltrans District 7, the subregional Councils of Governments, and local jurisdictions. These projects require individual environmental clearance, necessitating VMT impact analysis, and potential mitigation, consistent with Caltrans guidance. Some of these projects will be starting their environmental review phase in the immediate future; therefore, the development of guidance and the ultimate adoption of the Program, including the LA County-specific quantification approach and mitigation quantification tool, will provide a timely roadmap for constructing and/or funding meaningful VMT-offsetting projects on and off the SHS, in parallel to the larger highway project implementation timeframe. Assessment of how and where VMT mitigation strategies can be located also offers the opportunity to consider direct investment in historically disadvantaged communities with decades of underinvestment, significantly advancing social equity. After this effort, the approved Program would identify and prioritize projects and programs that would provide broader VMT reductions at a local and/or regional level and facilitate funding to construct or implement them.

VMT Regulatory and Policy Guidance

The first major completed deliverable is the *VMT Regulatory and Policy Guidance* memorandum (Attachment C), which summarizes a literature review related to VMT quantification and mitigation strategies. Policy guidance reviewed included VMT impact and mitigation estimation documents at the state and federal levels. This memo lists the project types currently assumed to increase (induce) or not increase VMT, summarizes several mitigation options, and closes with a review of methodological guidance to VMT quantification, including a description of the available tools, including elasticity-based methods (like the “one size fits all” California Induced Travel Calculator), travel demand models (such as the Southern California Association of Governments activity-based regional travel demand model [SCAG ABM]), and qualitative assessments when neither is useful.

The memo documents the strengths and limitations of each tool. For example, elasticity-based methods are not sensitive to land use context, geographic constraints, congestion levels, and availability of multimodal options, including transit and active transportation, with these tools viewed as a rapid response approach that could result in an over or underestimation of VMT. In comparison, travel demand models forecast VMT changes based on variables such as population and employment growth and income changes and can better reflect context sensitivity for existing land uses and the transportation network, including available high-quality transit options. A draft of this memo was shared with the Policy Working Group (PWG), which includes a comprehensive list of internal Metro, regional, and statewide stakeholders informing the policy-related aspects of the Program, including mitigation criteria, mitigation selection, and framework development. The PWG provided minor comments to the draft, which were incorporated into the final memo.

VMT Quantification Tools and Preferred Methodology

The second major completed deliverable is the *VMT Quantification Tools and Preferred Methodology* memorandum (Attachment D), which builds on the previous memo. Recognizing that unique local conditions exist within LA County, a “one size fits all” approach may not account for local context and could over or underestimate VMT impacts. This precision matters not only in accurately accounting for the anticipated VMT impacts and mitigations but also in acting as responsible stewards of public funds provided by the voters. To commence this work, Metro assembled a Project Development Team (PDT) comprised of the authors of the relevant guiding documents or developers of the local modeling tool for VMT estimation. The PDT is composed of the California Governor’s Office of

Planning and Research (OPR), Caltrans HQ, Caltrans District 7, and SCAG.

The second memo outlines a locally refined, context-sensitive, LA County-specific quantification approach to VMT analysis, better balancing Caltrans' priorities with Metro's subregional priorities, developing stakeholder consensus on project VMT analysis, and informing the subsequent selection of VMT mitigation strategies. The memo evaluates existing VMT quantification tools, presents recommendations on travel demand model improvements, and assesses the quantification methods established by Caltrans for projects on the SHS specific to the context in LA County. This evaluation addresses Caltrans' current VMT quantification practice, which is based on the statewide application of national research on induced travel during an era where VMT experienced almost uninterrupted growth. The memo notes that the Caltrans VMT quantification tool does not consider differences between widened highways or new highways, project location or project type (General Purpose vs. High Occupancy Vehicle vs. High Occupancy Toll/ExpressLanes), nor the VMT dampening effects or synergistic benefits of existing Countywide multimodal options which are further envisioned in Metro's Long Range Transportation Plan (LRTP).

Metro convened the PDT four times from May 2022 through February 2023 to develop and present the quantification approach from concept to final proposal. In addition, Metro held two focus meetings with SCAG in June and September 2022 to address concerns regarding induced travel, with SCAG indicating general support for the approach. Furthermore, Metro held two focus meetings with Caltrans HQ in August 2022 and February 2023 to daylight concerns with the statewide VMT modeling tool and review Metro's quantification approach to try to resolve differences. In June 2023, Metro met with the Los Angeles Department of Transportation (LADOT) to discuss the proposed approach, with LADOT expressing no objections related to the work conducted. Finally, in August 2023, Metro presented the quantification approach to the PWG, with the PWG providing no comments or objections to the approach.

It should also be noted that SCAG has indicated concern with what the Caltrans VMT guidance may mean for the development of the regionwide ExpressLanes network. In response to this concern, SCAG has convened an expert panel including researchers from the University of California-Los Angeles and other academic institutions to explore if there is any difference in induced travel effects between General Purpose, High Occupancy Vehicle, and High Occupancy Toll/ExpressLanes additions. As of August 2023, the expert panel is working to finalize a research report on their findings with a target publication date of fall/winter 2023.

Findings

Travel in LA County and changes in local travel patterns over the last two decades are inconsistent with national trends and different than other regions in California. Based on population estimates from the United States Census and VMT estimates from the Highway Performance Monitoring System (HPMS) data between 2001-2019, the observed changes in VMT and VMT per capita in LA County differ significantly from national and statewide trends. VMT and VMT per capita in LA County are lower than national averages, the lowest in the SCAG region, and on the lower end of VMT per capita statewide, with these declining VMT trends due in part to Metro's significant investment in rail and bus transit, with the Metro A (Blue), B (Red), C (Green), D (Purple), E (Expo), L (Gold), and K lines entering service starting in 1990, 1993, 1995, 2003, 2012, and 2022, respectively. The tables and charts that illustrate these differing relationships are presented below:

Table 1: Comparison of HPMS and Population Data - 2001 to 2019

	California	Los Angeles MSA
Change in Total VMT	+15%	-4%
Change in Total Population	+14%	+5%
Change in Per Capita VMT	+1%	-8%

Figure 1: Total Daily VMT - California and Los Angeles MSA - 2001 to 2019 (HPMS)

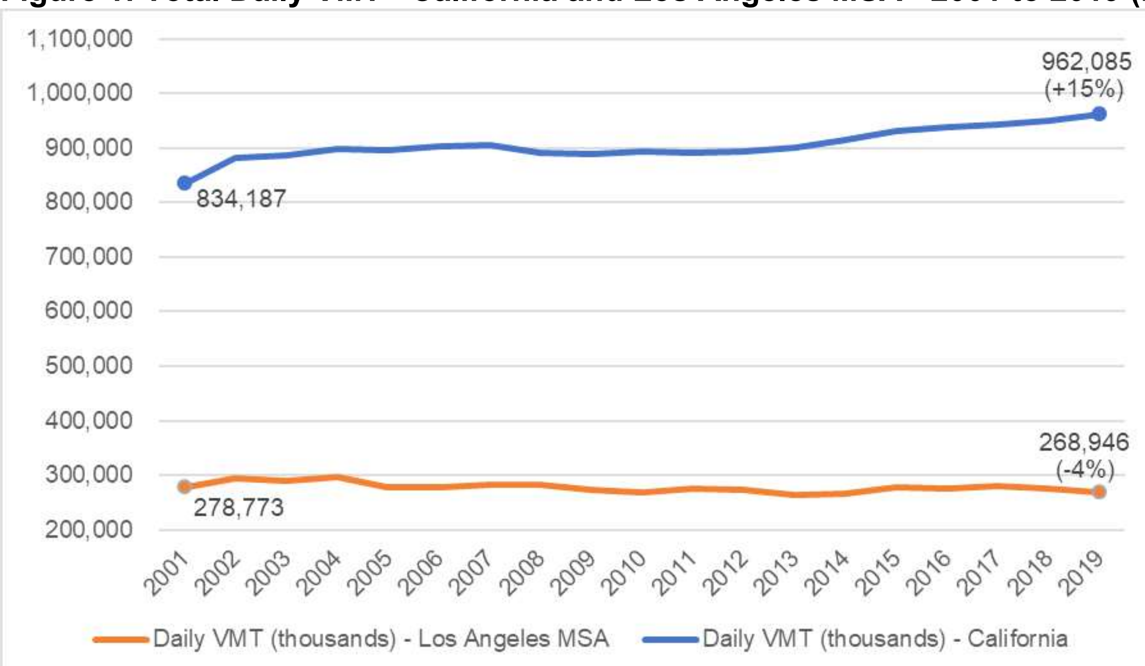
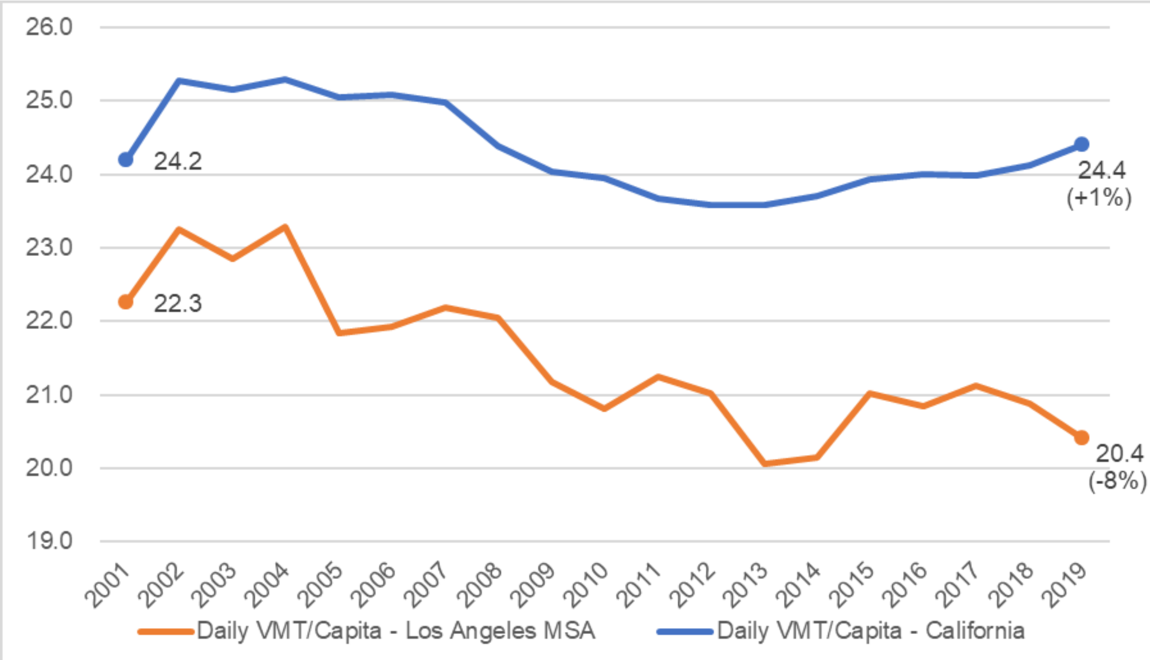


Figure 2: VMT Per Capita - California and Los Angeles MSA - 2001 to 2019 (Census & HPMS)



By not fully considering the LA County context, the Caltrans approach does not account for the multimodal advances Metro has made in creating modal alternatives to vehicular travel. Building on this analysis, the memo outlines proposed refinements to VMT quantification methods applied to SHS projects at a program and project level within LA County, detailing an evidence-based, locally specific, context-sensitive quantification approach to estimating long-term induced VMT, in alignment with the California OPR and Caltrans Transportation Analysis Framework (TAF) SB 743 guidance that state that "the studies on induced travel reveal a range of elasticities" and that "knowledge of local conditions can help contextualize the calculator's estimates". Metro will continue to refine the quantification approach in the next 6 months to ensure that induced VMT effects are captured accurately, reflective of LA County conditions, and accounting for Metro's current and ongoing investments in transit and multimodal transportation, offsetting the induced VMT effects of strategic ExpressLanes and mobility and safety improvement projects on the SHS.

Caltrans Response to Metro's LA County-Specific Quantification Approach

Caltrans HQ reviewed Metro's LA County-specific quantification approach and responded to the locally-specific substantial evidence contained within. These responses were limited to addressing the proposed elasticity values, with Caltrans HQ declining to deviate from the existing statewide guidance without undertaking their further research. Metro staff continues to work with Caltrans HQ to explore the range of published academic research demonstrating divergent long-term induced VMT elasticity values (0.1 to 0.4), including those research efforts that explicitly control for reassignment/diversion effects that move vehicles off of local roadways and onto highways and do not constitute new VMT, the observed declining VMT trends in the LA County MSA over the last 20 years, and the percentage of induced VMT that comprises the closest-aligned category with the legislative intent of SB 743. Caltrans HQ also stated that they prefer reviewing methodologies on a project-by-project basis and Metro, with concurrence from Caltrans HQ, will be conducting a more detailed analysis using Metro's proposed LA County-specific quantification approach for evaluation of upcoming projects and for the development of mitigation strategies, both of which must be CEQA defensible.

Project Cost Implications

The VMT mitigation requirements for all highway projects will depend on what methodology is ultimately accepted for use in project-level analysis. An order of magnitude estimate of the mitigation requirements and the resulting financial impacts is presented below using recently published costs for VMT mitigation per daily VMT reduced and the LA County-specific quantification approach elasticity factor of 0.29 or the Caltrans preferred California Induced Travel Calculator elasticity factor of 0.75. These costs include $860 for Transportation Demand Management (TDM) programs and $3,000 to $46,000 for programmatic and capital projects, including shared mobility hubs, express bus service, and Class IV two-way cycle tracks per daily VMT reduced. To use an example of a Metro project, the potential financial impacts of the Board-directed State Route (SR) 14 Traffic Safety Improvement Project are shown in the table below using the cost of $3,000 per daily VMT reduced:

Table 2: SR-14 Traffic Safety Improvement Project - Potential Mitigation Requirements

Project Cost	LA County-Specific Qu	California Induced Travel Calculator
Estimated Capital Cost	$168 million	
Mitigation Cost	$97.7 million	$252.6 million
Total Project Cost	$265.7 millio	$420.6 million
Mitigation Cost Difference		$154.9 million
Total Project Cost % Increase with Mitigation	+58%	+150%

Based on two projects currently under environmental review (I-680 Northbound Express Lane Completion Project in Contra Costa County and I-5 Managed Lanes Project [SR-55 to OC/LA County Line] in Orange County), Caltrans HQ has approved the circulation of the CEQA environmental documents with VMT mitigation costs equal to or exceeding the capital cost of each project, at a minimum doubling project costs based on VMT mitigation requirements.

This is compounded by the fact that the passage of Proposition A and C and Measure R and M pre-date the release of the Caltrans VMT guidance, which states that mitigation must not already be included in planning documents or previously funded. As a result, Metro is unable to leverage our broader program of VMT reducing projects, including our major transit investments, to balance or offset the VMT impacts of our highway program of projects, effectively penalizing Metro for being proactive in advancing local sales tax measures that fund alternative modes of transportation that are already reducing VMT and VMT per capita Countywide.

Importantly, while these potential mitigation requirements represent potential increases in the capital costs of any one project, these mitigation actions represent benefits regarding the multimodal programs that can be created or enhanced through mitigation, increasing potential opportunities to pursue State and Federal grant funding for subsequent phases of projects. After the Board considers the implications of the divergent technical approach and potential project cost impacts, Metro staff will present this information to the PWG for their review and consideration.

EQUITY PLATFORM

Staff has worked closely with the Office of Equity and Race (OER) from the inception of the Program to understand and address the equity implications of the Program. This critical analysis has been conducted using OER's pilot Equity Planning and Evaluation Tool (EPET) as the guide. Staff seeks to balance the economic, access, and mobility benefits of increased VMT with the intended Program outcome of reducing VMT burdens, including emission of air pollution, collisions, and a built environment that can feel hostile for people traveling by non-auto modes.

The development of the Program aims to prioritize the ways in which Metro can influence people traveling to reduce their VMT but with the goal of ensuring that the Program does not create new inequities in who bears the burden of VMT reduction and who benefits from VMT-reducing mobility investments. Due to the built environment in LA County and the high cost of housing, vehicles greatly improve mobility for low-income individuals who cannot afford to live near their daily destinations. While the American Community Survey (ACS) year 2019 estimates indicate that most transit riders are low-income (80%), the ACS also shows that most low-income individuals drive (81% of low-income workers drive versus 7% who take transit), with highway improvements benefiting both automobile and transit users, with ExpressLanes and HOV lanes prioritizing transit use and carpool and vanpool formation.

The Program team is evaluating the potential benefits of these VMT mitigation measures and resulting investments to Metro's updated 2022 Equity Focus Communities (EFCs) by comparing Countywide VMT patterns from the SCAG ABM Traffic Analysis Zones (TAZs) and how they relate to EFCs. This data reveals several interesting findings that can help inform where VMT mitigation actions are geographically targeted to have the greatest impact:

- The average daily home-based VMT per capita is lower in EFC-TAZs (18.4) than in Non-EFC-TAZs (23.2).
- Across all TAZs, the average daily home-based VMT per capita is just under 5 miles higher in Non-EFC TAZs than in EFC-TAZs.
- Across high VMT TAZs, defined as those that exceed the Countywide average daily VMT per capita (~20.4), that difference is less than 2 miles (24.8 for EFC-TAZs vs 23.0 for Non-EFC-TAZs).
- Over 75% of the non-EFC population resides in high-VMT TAZs, while about 27% of the EFC population resides in high-VMT TAZs.

Specifically, the data and maps (Attachments E and F) show that there are disparities in VMT per capita between EFCs and non-EFCs, including in high VMT TAZs, which will help inform where VMT mitigation actions are geographically targeted to have the greatest impact on reducing VMT while avoiding over-burdening EFCs with undue responsibility to mitigate VMT. Secondarily, the Program team is developing criteria for evaluating, validating, and prioritizing potential VMT mitigation options and evaluating if the criteria will ensure an equitable approach by confirming that EFCs receive their fair share of benefits and are protected from disproportionate impacts. This approach guides the policy-related aspects of the Program, including prioritization of mitigation predicated on EFC-based needs, with the viability of these priorities specifically analyzed and weighted against other evaluation criteria.

Staff has prioritized the inclusion of a diverse set of stakeholders, including Metro's Office of Sustainability, through the active involvement of both a PDT, working on the technical methodologies, and the PWG, informing the development of mitigation options and the framework structure, with both guiding the Program development. Coordination with OER is ongoing throughout the Program development, including their active participation in the PWG as well as over a dozen focus meetings or reviews of key equity-related deliverables.

Staff has built on the PDT and PWG internal and external regional and statewide stakeholder input by undertaking a comprehensive outreach strategy targeting other Countywide stakeholders, including chambers of commerce, community-based organizations, advocacy groups, councils of governments/joint powers authorities, and environmental and social justice organizations, among others, to inform the selection and prioritization of mitigation options, with this outreach effort currently underway. This outreach will conclude by the end of 2023.

IMPLEMENTATION OF STRATEGIC PLAN GOALS

The Program supports the implementation of the following Strategic Plan Goals:

1. Provide high-quality mobility options that enable people to spend less time traveling

The Program will allow Metro to continue to fund important, voter-approved highway improvement projects, delivering significant investments to further the goals identified in Metro's Vision 2028 Strategic Plan, LRTP, and Goods Movement Strategic Plan, supporting a vibrant economy, goods movement efficiency, and enhanced mobility for people and goods. These projects will simultaneously result in investments in ongoing VMT and GHG reducing projects, including active transportation and safety-focused projects, consistent with Metro's Complete Streets policy.

4. Transform LA County through regional collaboration and national leadership.

Consistent application of a locally refined method provides clarity for project teams working on environmental compliance for projects on the SHS and a consistent approach against which Caltrans HQ and District 7 can conduct their review of Metro's environmental documents for SHS projects. The Program goals include directly expanding the toolbox of VMT quantification approaches and mitigation strategies available to our public sector partners throughout the County and state. The research resulting from the Program is expanding the knowledge base overall and setting the stage for Metro and its public agency partners to provide further innovation in the field.

5. Provide responsive, accountable, and trustworthy governance within the Metro organization.

The Program's goals of accurately quantifying VMT resulting from Metro's Measure R and Measure M SHS projects ensures that project impact mitigation actions and associated costs are both fair and reasonably related to expected changes in local travel patterns based on locally specific substantial evidence. This approach ensures that Metro will prioritize limited funds to provide the most value to the public while maintaining a high standard of fiscal responsibility and achieving the highest return on investment for taxpayers.

NEXT STEPS

Staff will continue to report back at key milestones throughout the Program development. The final Program will be presented to the Board for consideration in early 2024. Metro will continue to work with Caltrans to evaluate project VMT impacts and develop corresponding mitigation strategies. Metro, through this Program, intends to utilize its existing transit operations, projects, and programs, and possibly those of our public agency partners, as VMT mitigation strategies for subregional highway project priorities while also coordinating and partnering with other municipal agencies to support and continue their ongoing VMT mitigation efforts. Future updates will include working with the PDT and PWG and through the broader Countywide stakeholder outreach effort to continue progress on the following critical items:

1. Development of a VMT mitigation quantification tool and guidance.
2. Further identification of eligible Metro and/or countywide programs that demonstrate CEQA-defensible and quantifiable VMT reductions.
3. Development of a series of criteria for evaluating, validating, and prioritizing potential VMT mitigation options.
4. Development of preliminary mitigation action cost estimates.
5. The development of a pilot VMT mitigation strategy, including preliminary administrative cost estimates to run the pilot.

ATTACHMENTS

Attachment A - Strengths and Limitations of Caltrans Guidance and LA County-Specific Quantification Approach
Attachment B - Grant Award Resolution
Attachment C - VMT Regulatory and Policy Guidance Memorandum
Attachment D - VMT Quantification Tools and Preferred Methodology
Attachment E - Metro EFCs & TAZ VMT Data - Countywide
Attachment F - Metro EFCs & Highway Projects & Programs - Countywide

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Stephanie N. Wiggins
Chief Executive Officer

Attachment A: Strengths and Limitations of Caltrans Guidance and LA County-Specific Quantification Approach

Caltrans Guidance (California Induced Travel Calculator)	**LA County-Specific Quantification Approach**
Strengths	
1. Forecasts long-term induced Vehicle Miles Traveled (VMT) changes while controlling for variables such as population/employment growth and income changes 2. Best used to understand order-of-magnitude induced VMT impacts 3. Caltrans' preferred methodology with broad applicability across the entire state of California 4. Meets California Environmental Quality Act (CEQA) defensibility requirements 5. Simple to use	1. Combines the advantages of the Southern California Association of Governments (SCAG) Activity-Based Model (ABM) and elasticity-based methodology to calculate combined short/long-range induced VMT 2. Calibrated/validated to LA County-specific data sources, and context, incorporating Metropolitan Statistical Area (MSA)-by-MSA VMT differences 3. Forecasts VMT changes based on variables such as population/employment growth, automobile operating costs, and income changes 4. Reflects context sensitivity for land use (infill vs. greenfield, high vs. low density), the transportation network (available multimodal travel options including off-peak bus service, bus rapid transit, and rail transit), congestion levels, and network effects (i.e., building a bridge) 5. Measures VMT of passenger (light-duty) cars and trucks, aligning with legislative intent of Senate Bill (SB) 743 6. Presumes High Occupancy Vehicle (HOV)/High Occupancy Toll (HOT)/General Purpose (GP) lanes have different induced VMT effects 7. Provides information about a "without project" condition and cumulative impacts, required by CEQA and National Environmental Policy Act (NEPA) 8. Provides VMT by speed bin, required for federal air quality conformity analysis
Limitations	
1. Does not provide precise, project-specific outcomes 2. Ignores MSA-by-MSA VMT variations and declining LA County VMT trends 3. Academic research utilizes demographic data (1973-2003) that does not reflect recent changes (COVID-19, Transportation Network Companies (TNCs), internet shopping, etc.) 4. Does not reflect context sensitivity for land use (infill vs. greenfield, high vs. low density), the transportation network (available multimodal travel options including off-peak bus service, bus rapid transit, and rail transit), congestion levels, and network effects (i.e., building a bridge) 5. Presumes HOV/HOT/GP lanes have the same induced VMT effect 6. Presumes only remedy to both congestion and induced VMT is congestion pricing while ignoring other solutions (e.g., bus and rail transit, telecommuting, car/vanpooling, etc.) 7. Does not provide information about a "without project" condition or cumulative impacts, required by CEQA and NEPA 8. Does not provide VMT by speed bin, required for federal air quality conformity analysis 9. Per University of California, Davis, developers of the Calculator, long-term validation likely not possible	1. Increased complexity compared to the California Induced Travel Calculator 2. Requires additional time, resources, and technical analysis to produce results 3. Requires additional study and concurrence by Caltrans prior to deployment 4. Has not been CEQA tested to prove CEQA defensibility

ATTACHMENT B

LOS ANGELES COUNTY METROPOLITAN TRANSPORTATION AUTHORITY BOARD RESOLUTION AUTHORIZING THE CHIEF EXECUTIVE OFFICER TO EXECUTE AGREEMENTS WITH THE CALIFORNIA DEPARTMENT OF TRANSPORTATION FOR THE METRO VEHICLE MILES TRAVELED (VMT) MITIGATION PROGRAM

WHEREAS, the Sustainable Transportation Planning Grant Program was created by the California Department of Transportation (Caltrans) to provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability; and

WHEREAS, Metro is eligible to receive Federal and/or State funding through the Sustainable Transportation Planning Grant Program; and

WHEREAS, Metro was awarded a $700,000 Sustainable Transportation Planning Grant in Fiscal Year (FY) 2021-2022 from Caltrans for the Metro Vehicle Miles Traveled (VMT) Mitigation Program; and

WHEREAS, a Restricted Grant Agreement is needed to be executed with Caltrans before such funds can be claimed through the Sustainable Transportation Planning Grant Program; and

WHEREAS, Metro wishes to delegate authorization to execute this agreement and any amendments thereto necessary to claim funds awarded through the FY 2021-22 Sustainable Transportation Planning Grant Program to the Chief Executive Officer or her designee.

NOW, THREFORE, BE IT RESOLVED by the Board of Directors of the Los Angeles County Metropolitan Transportation Authority that:

1. The Chief Executive Officer (CEO) or her designee is authorized to execute all Restricted Grant Agreements and any amendments thereto with Caltrans.

CERTIFICATION

The undersigned, duly qualified and serving as Board Clerk of the Los Angeles County Metropolitan Transportation Authority, certifies that the foregoing is a true and correct representation of a Resolution adopted at a legally convened meeting of the Board of Directors of the Los Angeles County Metropolitan Transportation Authority held July 22, 2021.

COLLETTE LANGSTON
Metro Board Clerk

DATED: 7/22/2021

FEHR & PEERS

Memorandum

Date: July 25, 2022

To: Julio Perucho, Metro

From: Amanda Chapman and Chelsea Richer, Fehr & Peers

Subject: VMT Regulatory and Policy Guidance (Task 3)

LA22-3343

Introduction

The purpose of this memorandum is to summarize a literature review of regulatory and policy guidance related to Vehicle Miles Traveled (VMT) quantification and mitigation strategies, in the context of potential applications to highway improvement projects included in Los Angeles County Metropolitan Transportation Authority's (Metro's) Sales Tax Measures Expenditure Plans/Ordinances and corresponding subregional programs.

Statement of Purpose

Metro, in partnership with the California Department of Transportation (Caltrans), is developing the VMT Mitigation Program to support the region's Assembly Bill (AB) 32 and Senate Bill (SB) 375 goals by reducing the impacts of VMT and correlated greenhouse gas (GHG) emissions while affording greater mobility and access for the County's residents. Aligning Metro's highway investments with the spirit of SB 743 that emphasizes multi-modal and smart growth strategies to reduce VMT, this program will allow Metro to support the region's goal of reducing VMT impacts; provide Metro, Caltrans, and other project delivery partners within the County of Los Angeles with refined tools to determine project VMT impacts more accurately; and provide feasible and enforceable VMT mitigation strategies.

History of SB 743 Policy

Signed into law on September 27, 2013, California State SB 743 directed the Governor's Office of Planning and Research (OPR) to "prepare, develop, and transmit to the Secretary of the Natural Resources Agency for certification and adoption proposed revisions to the guidelines adopted pursuant to Section 21083 establishing criteria for determining the significance of transportation impacts of projects within transit priority areas… Upon certification of the guidelines by the

Secretary of the Natural Resources Agency pursuant to this section, automobile delay, as described solely by Level of Service (LOS) or similar measures of vehicular capacity or traffic congestion within a transit priority area, shall not support a finding of significance pursuant to this division…"

On August 11, 2015, OPR released a preliminary draft of changes to California Environmental Quality Act (CEQA), revising the Guidelines based on public comments received at that time. In October 2015, OPR and the Natural Resources Agency conducted a public workshop based on this draft.

On January 20, 2016, OPR updated the CEQA Guidelines via the *Revised Proposal on Updates to the CEQA Guidelines on Evaluating Transportation Impacts in CEQA*, with the evaluation of vehicle miles traveled (VMT) recognized as "generally the most appropriate measure of transportation impacts." OPR also stated that lead agencies may tailor their analysis to include other measures.

On November 2017, OPR proposed a new section, 15064.3, to help determine the significance of transportation impacts. This section was updated July 2, 2018, and finalized on December 28, 2018, with criteria for analyzing transportation impacts, and is seen below in the "Thresholds of Significance" section. Its purpose is to describe specific elements for considering the transportation impacts of a given project given the use of VMT as the primary measurement.

In December 2018, OPR shared its comprehensive update to the CEQA guidance per the proposed updates to analysis of GHG emissions, with a particular focus on the shift in how transportation impacts would be analyzed, among other items. This document codified that in the State of California, environmental analysis under CEQA of a project's transportation impacts would be done through analysis of VMT. VMT was already being used to study other impacts such as air quality, GHGs, and energy use. This major shift in approach clearly prioritized projects that reduce the number of miles that cars travel and increased use of other modes. The Guidelines allowed for two years for cities and lead agencies to update their process.

Per the guidance from OPR, "a lead agency may elect to be governed by the provisions of this section immediately. Beginning on July 1, 2020, the provisions of this section shall apply statewide." In order to comply with the guidelines understood to become the standard in our state, environmental impact reports must evaluate vehicle trips and VMT consistent with the intent of SB 743.

Vehicle Miles Traveled (VMT) and Level of Service (LOS)

The shift towards VMT reflects a major change of the State's priorities, emphasizing the reduction of GHGs by encouraging high-occupancy, multi-modal, and active transportation modes and infill land use development, discouraging urban sprawl. The metrics with which transportation impacts are measured inherently direct the future of the built environment. SB 743 initiated the change of primary metric from LOS to VMT; this change in the way of analyzing potential impacts necessitated new ways of considering project VMT quantification and mitigation strategies.

VMT is a measure of the number of miles traveled within a defined area and are based on the number of vehicle trips (VT) multiplied by the average trip length in miles for various trip types. It measures miles traveled (e.g., private automobiles, trucks and buses[1]) generated by all land uses (e.g., residential, retail, office). It can be studied by population, employment, or service population. To obtain an average VMT per service population, the total VMT is divided by the total population and employees within the area of analysis. While the total VMT is expected to increase as growth occurs in a given area, a reduction in per-capita or total VMT over time can be used as an indicator of reduced reliance on single-occupancy automobiles. Reducing VMT can help meet the State's goals of reducing GHG emissions, as mandated by AB 32 and SB 375.

LOS was used previously as the primary method for determining CEQA transportation-related impacts. LOS is a measure used to describe the condition of traffic flow, ranging from excellent conditions at LOS A to overloaded conditions at LOS F. Congested conditions and poor LOS is generally associated with the highest pollutant emission intensity.[2] Traditional mitigation measures to address the LOS impact often involved increasing capacity (i.e., the width of a roadway or intersection), which has the potential to induce more trips/VMT and reduce some of the emissions benefits gained from congestion relief. The concept of induced travel demand will be discussed further in this memorandum.

Policy Guidance

This section of the memorandum discusses policy guidance related to VMT quantification and mitigation strategies, as well as project types currently assumed to increase or induce VMT, and project types currently assumed to not increase VMT. It also outlines potential challenges and considerations.

Caltrans' SB 743 Environmental Essentials for Project Development & Delivery

As part of a three-part series (parts two and three forthcoming), Caltrans' *SB 743 Environmental Essentials for Project Development & Delivery* acknowledges the gaps in existing state-wide experience as of yet in avoiding and mitigating induced travel and summarizes current best-practices in planning and project delivery. It exists less as a policy document and more as general guidance given the common themes and questions Caltrans has come across in projects requiring

[1] For SB743 purposes, only automobile VMT is required to be analyzed. Total VMT including heavy trucks and buses is only required for other resource sections such as energy and air quality.

[2] Zhang, Kai & Batterman, Stuart & Dion, Francois. (2011). Vehicle emissions in congestion: Comparison of work zone, rush hour and free-flow conditions.

CEQA analysis since the establishment of SB 743. The following is a brief summary of the sections of this document:

1. *Balancing Transportation and Environmental Outcomes* – Caltrans as an agency must balance the need for improving the statewide transportation system, while aiming to reduce VMT and GHG emissions. Previously the agency focused on projects that primarily advanced transportation outcomes specifically, but now Caltrans has several guiding documents that reflect the current statewide environmental goals as well. Per the "plan consistency" requirement of CEQA, these documents can help proposers of projects achieve balanced outcomes and focus on projects that "can facilitate access to desired destinations, for both travelers and freight, without inducing VMT through the construction of additional capacity."[3]
2. *Avoidance and Minimization in Project Alternatives* – All components of a project, from alternatives to design, should consider environmental effects, with an approach that minimizes these impacts from the purpose and needs statements onwards as opposed to assuming mitigation will be possible. If a project can endeavor to avoid these effects during scoping, project design, alternative development, and construction materials and process, the EIR process will be much more streamlined.
3. *Full Disclosure and Informed Decision-Making* – While CEQA requires the use of the best available information (such as the Transportation Analysis under CEQA [TAC] and Transportation Analysis Framework [TAF]), discussed later in this memorandum), it is also imperative that we disclose VMT as well as any other metrics and information critical to telling the whole story, and explain unknowns, assumptions, and technical challenges in a way that understandable to a broad audience.
4. *Good Faith Effort and Substantial Evidence* – Schedule pressure is not a good reason to reduce the analysis, as we must show that we took all reasonable and feasible approaches to balancing transportation and environmental needs in a project. Similarly, budget pressures are not a good reason to discount mitigation, as the cost of such must be incorporated into the total project cost. The conclusions of analysis are much better supported by demonstration of due diligence.
5. *An Overview of Significance Determinations* – While mitigation strategies should be considered a last resort more than an assumed part of a project, features or design elements can be incorporated into the project such as those that encourage mode shift away from single occupancy vehicles. Additionally, projects should be evaluated based on the VMT potentially induced by the project and its effects on land development.
6. *Mitigation Adequacy and Implementation Assurance* – Mitigation measures must be "reasonable, feasible, effective, and our commitment to their implementation needs to be

[3] SB 743 Environmental Essentials, Accessed on 3.30.22, https://dot.ca.gov/-/media/dot-media/programs/sustainability/documents/sb-743-environmental-essentials-for-project-development-and-delivery-a11y.pdf

assured." They do not need to be confined to one jurisdiction or agency. For mitigation measures that are considered and determined ill-suited, similar analysis should be explored and conveyed.

VMT Impact Estimation: Regional & State Documents

OPR CEQA Guidelines Update (2018)

Following the SB 743 history shared earlier in this memorandum, OPR shared its comprehensive update to the CEQA guidance in December 2018 per the proposed updates to analysis of GHG emissions, with a particular focus on the shift in how transportation impacts would be analyzed, among other items. This document codified that in the State of California, environmental analysis under CEQA of a project's transportation impacts would be done through analysis of VMT. VMT was already being used to study other impacts such as air quality, GHGs, and energy use. This major shift in approach clearly prioritized projects that reduce the number of miles that cars travel and increased use of other modes. The Guidelines allowed for two years for cities to update their process.

OPR Technical Advisory on Evaluating Transportation Impacts in CEQA (2018)

This document includes recommendations on how to assess and analyze VMT under the 2018 CEQA Guidelines update, how to approach thresholds of significance, and consideration of mitigation measures. Referencing the California Air Resources Board (CARB) *2016 Mobile Source Strategy*, this document notes that it will not be possible to meet statewide emissions goals without reducing VMT, as well as documenting the benefits of those reductions to public health. Examples of environmental, health, and fiscal benefits are documents at OPR's website.[4]

Thresholds of significance are often used to determine impact significance, and should be "quantitative, qualitative, or performance level of a particular environmental effect".[5] Section 21099 of the *California Public Resources Code* requires that these thresholds must promote reduction of GHG emissions, development of multimodal networks, and diversity of land uses. Lead agencies may define their own, and can look towards a variety of state polices to help create their thresholds (as listed in this document), but OPR itself recommends a threshold "of per capita or per employee VMT that is fifteen percent below that of existing development"[6]. The overall analysis should address:

[4] https://opr.ca.gov/ceqa/sb-743/

[5] Governor's Office of Planning and Research. 2018, April. *Technical Advisory on Evaluating Transportation Impacts in CEQA*. Note, Note, the use of the term "performance level" is intended to provide guidance for impacts that may have a less direct quantitative connection to environmental harm.

[6] Governor's Office of Planning and Research. 2018, April. *Technical Advisory on Evaluating Transportation Impacts in CEQA*.

- Direct, indirect and cumulative effects of the transportation project (CEQA Guidelines, § 15064, subds. (d), (h))
- Near-term and long-term effects of the transportation project (CEQA Guidelines, §§ 15063, subd. (a)(1), 15126.2, subd. (a))
- The transportation project's consistency with state greenhouse gas reduction goals (Pub. Resources Code, § 21099)
- The impact of the transportation project on the development of multimodal transportation networks (Pub. Resources Code, § 21099)
- The impact of the transportation project on the development of a diversity of land uses (Pub. Resources Code, § 21099)

Screening thresholds may be used to streamline review based on a presumption of no VMT impacts. For example, projects generating less than 110 trips per day, residential and office projects in areas that already have low VMT, and projects near transit stations with certain stipulations can often be presumed to have a less-than-significant VMT impact.

Transportation projects "would need to quantify the amount of additional vehicle travel in order to assess air quality impacts, greenhouse gas emissions impacts, energy impacts, and noise impacts"[7] and analyze and report induced growth and change in VMT. Estimation of the VMT impacts and induced travel is necessary to understanding the full effects of the project. This should be done by estimating the "change in total VMT" method, described further in the *Methodological Guidance* below.

SCAG Connect SoCal 2020-2045 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) (2020)

Per requirements from SB 375, the Southern California Association of Governments (SCAG) regularly produces an RTP/SCS to convey a vision for the six-county region across many aspects, including mobility, economy, and sustainability. This document also includes projections for future growth in households, population and jobs, an important baseline from which VMT impacts may be compared against. The latest RTP/SCS, adopted in September 2020 and titled *Connect SoCal*, estimates an increase of 1.6 million households, 3.7 million people, and 1.6 million jobs from 2020-2045. It also reported that the mode split in 2016 across the region was 36% single-occupancy vehicle (SOV) across all trip types and has a goal of increasing non-SOV work trips by 3%. Other relevant goals include reducing VMT per capita by 5%, vehicle hours traveled by 9%, reducing delay per capita, and creating new jobs. Key aspects of the plan include investment in broadband to enable people to access opportunities through virtual technology, increasing job density in sub-regional centers where housing is already located, housing supportive infrastructure, accelerated electrification, shared mobility as a service, and "Go Zones", where

[7] Governor's Office of Planning and Research. 2018, April. *Technical Advisory on Evaluating Transportation Impacts in CEQA*.

mobility options are housed together, and tolls are used to reduce reliance on SOVs. The plan laid out in *Connect SoCal* is projected to decrease daily per capita VMT from 21.8 miles to 20.7 miles.

California Air Resources Board's Mobile Source Strategy (2020)

This document demonstrates how the State can meet several goals through the advancement of cleaner technology and alternative fuels, identifying that the transportation sector is a major contributor to GHG emissions in the state. The 2020 Strategy includes goals of 100% of California registered medium and heavy-duty to be zero-emission vehicles by 2045 where feasible, 100% of light-duty vehicle sales to be zero-emission vehicles by 2035, and 100% of off-road vehicles and equipment to be zero emission by 2035. These goals would be accomplished through the detailed plan outlined in the 2020 Strategy, including manufacturing requirements, in-use requirements, incentive programs, enforcement strategies, outreach and education, and infrastructure planning.

CalSTA's Climate Action Plan for Transportation Infrastructure (CAPTI, 2021)

Acknowledging the role that transportation systems and infrastructure play in GHG emissions and building on California executive orders related to reducing emissions from transportation specifically, this document outlines the recommendation to invest the state's transportation dollars to combat climate change and support public health, safety, and equity.

The CAPTI approach to highway expansion projects addresses how these projects further dependency on SOV travel, have not reduced overall congestion, and are very costly. Accordingly, a guiding investment principle for this entity is promoting projects that do not significantly increase passenger vehicle travel, alternatively emphasizing investment in multimodal options, pricing strategies, and using technology to optimize operations.[8]

Among the strategies CAPTI plans to employ, some relevant ones include:

- Develop and Utilize Equity Index to Assist in Evaluation or Prioritization of Caltrans Projects
- Develop and Implement the Caltrans Strategic Investment Strategy (CSIS)
- Update the 2023 State Highway System Management Plan (SHSMP) to Meaningfully Advance CAPTI Investment Framework
- Develop and Implement Caltrans Climate Action Plan (CCAP)
- Explore a statewide VMT mitigation bank
- Convene a Roadway Pricing Working Group
- Explore a "Highways to Boulevards" Conversion Pilot Program

[8] CalSTA Climate Action Plan for Transportation Infrastructure (CAPTI), 2021

California Air Resources Board (CARB) Climate Change Scoping Plan (2022)

This document outlines how California can become carbon neutral by 2045. Previous plans aimed to get the state to 1990 levels of emissions or 40% below that; this plan expands on those actions to capture and store carbon and further actions to reduce emissions. To accomplish this, carbon must be edged out of use in every sector of the economy. This must be done for the benefit of everyone in the State, but particularly for the low-income communities hit hardest by environmental justice issues. Relevant to this study, a large part of the Scoping Plan includes movement towards zero-emission transportation, providing communities with enhanced options for use of active modes of travel that decrease reliance on cars, and the preservation of natural lands to help sequester carbon. Per the TAC (described below), Caltrans expects this document to be referred to when following the CEQA requirement of being consistent with other plans.

VMT Impact Estimation: Caltrans Documents

Caltrans Transportation Analysis under CEQA (TAC) (2020)

This document provides guidance on how to analyze induced travel associated with transportation projects on State Highways System (SHS) specifically, reflecting a major shift in approach. It is related to the Caltrans SB 743 Transportation Analysis Framework (TAF) in that once a project has been screened to likely induce travel using the TAC, one should refer to the TAF for the process that follows. Several project types are identified in the TAC as not being affected by this guidance, as they are assumed by Caltrans not to have an impact. See the section of this document titled *Project Types Assumed Not to Increase VMT* for the complete list.

SB 743 influenced two major areas of Caltrans' activities: proposed project or plan's potential impact on the SHS, and the CEQA analysis of capacity-increasing projects on the SHS. Caltrans states here that VMT is the most appropriate metric for analysis of SHS project impacts, and has chosen to express it in absolute terms. To accomplish this analysis, quantitative methods such as forecasting and calculator tools are preferred, which are outlined in the *Methodological Guidance* section of this document. Qualitative methods are appropriate in specific instances, such as the application of travel demand management (TDM) strategies. Capacity-increasing projects should consider including investment in multi-modal transportation infrastructure and expansion of existing/exploration of new pricing strategies. A separate project EIR may not be necessary if it is deemed appropriate to tier from the local RTP/SCS.

Generally speaking, VMT impacts should be anticipated when a project:

- Induces travel, often via:
    - Route changes (may increase or decrease overall VMT)
    - Mode shift to automobile use (increases overall VMT)
    - Longer trips (increases overall VMT)
    - More trips (increases overall VMT)

- Location and land use changes (increases or decreases overall VMT)

Caltrans SB 743 Transportation Analysis Framework (TAF) (2020)

This document provides guidance on how to determine impact significance under CEQA on the SHS. It should be consulted "when a transportation project on the SHS could lead to a measurable and substantial increase in vehicle travel."[9] As a general rule, projects that result in a reduction in the cost of travel, whether time or money, leads to an increase in VMT. This increase manifests in longer trips, changes in mode choice, route changes, newly generated trips, and location and land use changes – a wider area than the project boundary itself. There are various tools for estimating this induced travel, which are discussed in the *Methodological Guidance* below.

Caltrans Strategic Plan (2021)

This document lays out goals for management and guidance of Caltrans for 2020-2024, focusing on safety, cultivating excellence, enhancing and connecting the multimodal transportation network, strengthening stewardship and driving efficiency, leading climate action, and advancing equity and livability in all communities. Strategies relevant to this effort include:

- Using operational incentives to reduce VMT through high occupancy modes, active transportation, and TDM
- Optimize and expand equitable pricing
- Establish a VMT monitoring and reduction program

Caltrans SB 743 Review Process Summary (Internal Caltrans document, April 2022)

This document outlines when and how to submit for SB 743 Review. In addition to the VMTDD document described below, projects must submit their VMT study methodology, induced travel study, mitigation scoping plan, and induced travel risk assessment. These analyses should include details on how the NCST calculator or travel model was used, details on tolling for pricing projects, and land-use considerations for interchange projects.

Caltrans Vehicle-Miles Traveled Decision Document (VMTDD) (Internal Caltrans document, April 2022)

This three-page form is used as an element of Project Initiation Documents (PIDs) to determine CEQA requirements. It includes the following questions in order to determine whether a project is anticipated to have VMT impacts:

- Are all project alternatives screened as not likely to induce travel per Section 5.1.1 of Transportation Analysis Under CEQA?

[9] Caltrans SB 743 Transportation Analysis Framework (TAF), 2020

- Do any of the project alternatives add lane-miles (mainline or aux lanes greater than 1 mile) to the SHS?
- Do any of the proposed alternatives add other capacity to the SHS (e.g., a new or widened interchange)?
- Has induced VMT been estimated, as prescribed in TAF, TAC, or other methods, for the project alternatives?
- Have VMT-reducing project elements or mitigation measures been identified?
- What is the budget for VMT mitigation? Provide the dollar figure and rationale.
- Provide estimated completion dates and points of contacts for any applicable technical studies to be produced in Project Approval & Environmental Document (PA&ED) stage and submitted to HQ.

Caltrans' 2022 State Highway Operation and Protection Program (SHOPP, 2022)

This document outlines a four-year program of projects to improve sustainability of the SHS and related infrastructure. This includes $17.9 billion in projects over those four years, which came from the proposed list of projects from Caltrans in early 2022 and is based in asset management. Expected accomplishments from these projects include improvements to 6,347 lane miles of pavement, improvements to 9.2 million square feet of bridges, rehabilitation of 397,724 linear feet of culverts, and addressing 2,803 field elements. Several projects also promote active transportation and sustainability.

Caltrans Policy Guidance Under Development

The following guiding documents are under development. The first two have been summarized above as they are currently functioning similar to other adopted policy documents published by Caltrans; however, it is possible the guidance and policy direction contained therein may shift before formal publication. Upon formal publication, we recommend these are reviewed again to assess whether they provide further insight into the quantification of VMT:

- Caltrans SB 743 Review Process Summary
- Caltrans Vehicle-Miles Traveled Decision Document (VMTDD)
- Caltrans Mitigation Playbook (Draft July 2022)
- Caltrans When Are VMT Impacts from A Project Acceptable?
- Caltrans VMT Analysis of Auxiliary Lanes

Additional information is made available regularly on the Caltrans website (dot.ca.gov) as guidance is developed and formalized.

Project Types Assumed to and Assumed Not to Increase VMT (per Caltrans and OPR)

The following project types are assumed to increase VMT, per the TAC:

- New general purpose (GP)/mixed flow lanes
- New high occupancy vehicle (HOV) lanes
- New peak period lanes
- New express/toll lanes
- New auxiliary lanes that serve the through traffic (over a mile long)
- New lanes through grade-separated interchanges
- Other projects adding capacity to SHS

The following project types are assumed not to increase VMT, per the TAC:

- Rehabilitation, maintenance, replacement, safety, and repair projects
- Roadside safety devices or hardware installation
- Roadway shoulder enhancements for use only by transit vehicles or bicycles or to improve traffic safety
- Addition of an auxiliary lane of less than one mile in length designed to improve roadway safety
- Installation, removal, or reconfiguration of traffic lanes that are not for through traffic
- Addition of roadway capacity on local or collector streets provided the project also substantially improves conditions for pedestrians, cyclists, and, if applicable, transit
- Conversion of existing general-purpose lanes (including ramps) to managed lanes or transit lanes, or changing lane management in a manner that would not substantially increase vehicle travel
- Addition of a new lane that is permanently restricted to use only by transit vehicles
- Reduction in number of through lanes
- Grade separation
- Installation, removal, or reconfiguration of traffic control devices
- Installation of traffic metering systems, detection systems, cameras, changeable message signs and other electronics
- Timing of signals
- Installation of roundabouts or traffic circles
- Installation or reconfiguration of traffic calming devices
- Adoption of or increase in tolls
- Initiation of new transit service
- Conversion of streets from one-way to two-way operation with no net increase in number of through lanes
- Removal or relocation of off-street or on-street parking spaces
- Adoption or modification of on-street parking or loading restrictions
- Addition of traffic wayfinding signage
- Addition of new or enhanced bike or pedestrian facilities on existing streets/highways or within existing public rights-of-way

- Addition of Class I bike paths, trails, multi-use paths, or other off-road facilities that serve non-motorized travel
- Installation of publicly available alternative fuel/charging infrastructure
- Addition of passing lanes, truck climbing lanes, or truck brake-check lanes in rural areas
- HOV bypass lanes on on-ramps
- Local and collector roads in rural areas that don't include sidewalks where there would be no pedestrian traffic to use them
- Lanes through grade-separated interchanges without additional receiving lanes downstream
- Adding vehicle storage to a ramp without further reconfiguration
- Park and Ride facilities
- Truck size and weight inspection stations

VMT Mitigation Estimation: Policy Summaries by Document

OPR Technical Advisory on Evaluating Transportation Impacts in CEQA (2018)

When capacity-increasing roadway projects induce travel, mitigation measures an agency can consider include tolling or increasing tolling, converting GP lanes to HOV or high occupancy toll (HOT), TDM programs, or implementing Intelligent Transportation Systems (ITS) for better passenger throughput. When any kind of significant impact is determined, several mitigation measures are recommended by OPR:

- Improve or increase access to transit.
- Increase access to common goods and services, such as groceries, schools, and daycare.
- Incorporate affordable housing into the project.
- Incorporate neighborhood electric vehicle network.
- Orient the project toward transit, bicycle, and pedestrian facilities.
- Improve pedestrian or bicycle networks, or transit service.
- Provide traffic calming.
- Provide bicycle parking.
- Limit or eliminate parking supply.
- Unbundle parking costs.
- Provide parking or roadway pricing, or cash-out programs.
- Implement or provide access to a commute reduction program.
- Provide car-sharing, bike sharing, and ride-sharing programs.
- Provide transit passes.
- Shifting single occupancy vehicle trips to carpooling or vanpooling, for example providing ridematching services.
- Providing telework options.

- Providing incentives or subsidies that increase the use of modes other than single-occupancy vehicle.
- Providing on-site amenities at places of work, such as priority parking for carpools and vanpools, secure bike parking, and showers and locker rooms.
- Providing employee transportation coordinators at employment sites.
- Providing a guaranteed ride home service to users of non-auto modes.

Project alternatives should also be considered for reduction in VMT (several of which are only applicable to land use development projects), including:

- Locate the project in an area of the region that already exhibits low VMT.
- Locate the project near transit.
- Increase project density.
- Increase the mix of uses within the project or within the project's surroundings.
- Increase connectivity and/or intersection density on the project site.
- Deploy management strategies (e.g., pricing, vehicle occupancy requirements) on roadways or roadway lanes.

Caltrans VMT Program Bulletin 21-01: VMT Mitigation Funding Status & Additionality (2021)

This document discusses VMT mitigation funding for programmed projects, those in a fiscally constrained portion of an RTP, and those in an unconstrained portion. Generally, "Caltrans' investment strategy seeks to minimize any induced traffic that would generate VMT, which would reduce or eliminate the need for mitigation."[10] However, when SHS projects do generate VMT, mitigation strategies must be employed per CEQA.

In order to qualify as a mitigation strategy, the investment must be able to demonstrate a negative effect on VMT and be relatively likely to come to fruition. However, the mitigation does not need to be specific to the project, such as investment in a transit project that is already on a Caltrans district or partner wish list of VMT-reducing projects. Such a project being counted as a mitigation measure must pass the "additionality test", or ensure that the funding provided via the project looking for mitigation must provide additional resources by dollars or time that would not have otherwise been available. Support for a VMT-reducing project that is already on a jurisdictional or regional wish-list is a reasonable way to mitigate SHS VMT, but not projects that are already built or not in need of support. Evaluation of funding status is key to determining whether a project on an existing list may be leveraged as mitigation for another VMT inducing project.

[10] Caltrans VMT Program Bulletin 21-01: VMT Mitigation Funding Status & Additionality (2021)

Potential Challenges and Considerations

Several challenges currently exist when considering the guidance related to VMT quantification, owing to the fact that understanding of the metric of VMT and the implications of induced travel conceptually and temporally are still being studied and understood. Caltrans as an agency is still evolving in their approach to VMT impact assessment and mitigation expectations, and more recent documents are inconsistent with the more formalized TAC and TAF documents. While some of these documents still inform the process and may be treated during environmental review as formalized policy, several of the more recent publications are still in draft or have not yet gone through the same internal vetting process to create "one voice", and as such there are competing guidelines at present. With final policy guidance on induced travel still forthcoming, there are persistent challenges in anticipating whether and how projects' environmental analysis will fulfill Caltrans guidance or not.

Methodological Guidance

This section of the memorandum discusses methodological guidance on VMT quantification and related estimation tools, mitigation methods, and strategies.

General Quantification of VMT Methods Approach

OPR Technical Advisory on Evaluating Transportation Impacts in CEQA (2018)

As explained in the CEQA guidelines update and related documents, CEQA defers to the lead agency to determine the method of analyzing impacts. This document provides suggestions regarding those methodology options, including considerations of:

- *Vehicle types* – The CEQA Guidelines specifically call out "For the purposes of this section, 'vehicle miles traveled' refers to the amount and distance of automobile travel attributable to a project"[11], referring specifically to cars and light-duty trucks. Should heavy-duty trucks be included as they are combined in the input data, it is important to be consistent with their inclusion throughout the process.
- *Truncation of space and time* – analysis should not be limited to the jurisdictional area if the project may have broader reaching impacts, ensuring that the good faith effort is taken per CEQA guidelines. Projects should also look at both short and long-term effects on VMT.

When considering which VMT to count, an analysis can be trip-based (basic and traditional method of counting each leg of a journey, compiling them into home-based VMT) or tour-based (counting all legs of a journey into tours, compiling them into household VMT). It can also be

[11] Governor's Office of Planning and Research. 2018, December 28. *CEQA Guidelines*.

assessed as "change in total VMT", looking at the net difference on the project area VMT with and without a project.

Transit and active transportation projects are assumed not to increase VMT, nor are roadway capacity reduction projects. However, adding new roadway capacity where there is currently or may be congestion should be assumed to induce travel. The figure below shows a method of determining these impacts in many but not all scenarios. VMT impacts can also be analyzed at a programmatic level.

To estimate VMT impacts from roadway expansion projects:

1. Determine the total lane-miles over an area that fully captures travel behavior changes resulting from the project (generally the region, but for projects affecting interregional travel look at all affected regions).
2. Determine the percent change in total lane miles that will result from the project.
3. Determine the total existing VMT over that same area.
4. Multiply the percent increase in lane miles by the existing VMT, and then multiply that by the elasticity from the induced travel literature:

[% increase in lane miles] x [existing VMT] x [elasticity] = [VMT resulting from the project]

Figure 1 – Method recommended for estimating VMT impacts on roadway expansion projects. Governor's Office of Planning and Research. 2018, April. Technical Advisory on Evaluating Transportation Impacts in CEQA.

Methodological Discussion of Transportation Projects Known to Increase VMT

When considering projects that have multiple aspects or could be analyzed in different ways, it is valuable to consider the variation in methodological approaches that are possible. In general, a project is expected to cause an increase in VMT when travel is induced or SOV travel becomes more time or cost effective, and a project would be expected to decrease VMT when travel by car is made less attractive. However, goals of a project might be met that are also important for the region when VMT goals are not, such as an increase in VMT with a decrease in congested peak hours or a decrease in average travel time. As projects are reviewed for their VMT impacts, efficiency and maximization of existing infrastructure through better timing and tolling mechanisms should not be discounted as beneficial to the region. This is particularly relevant for ITS enhancements and projects focused on increase accessibility in infill development locations.

VMT Estimation Tools

As noted in the TAF, there are three primary categories of tools for estimating induced travel:

- Elasticity-based methods, which look at the percent increase of VMT associated with a given percent increase in roadway lane miles.
- Travel demand models, which spatially locate socio-economic data into analysis zones and forecast trips to and from those zones based on the related data.
- Qualitative assessments, which are appropriate in limited circumstances, primarily when neither the NCST calculator (described below) nor a travel demand model is useful, such as when a project type is on the screened-out list from the TAC.

NCST Travel Calculator

This tool puts into practice an elasticity-based method developed at The National Center for Sustainable Transportation at UC Davis. It calculates VMT specifically in relation to addition of new GP or HOV lanes on the SHS. Originally, it was not used for high occupancy toll lanes, managed lanes, or truck lanes, but a 2021 update has clarified that those types of projects be analyzed using the calculator as well.[12] It is based on statistical studies that quantify VMT for both short and long term effects.

In general, the calculator reflects the change in total VMT attributable to the project while controlling for other factors that contribute to VMT growth based on research-derived elasticities from nation-wide studies.

Travel Demand Models

Models estimate travel by inputting socio-economic data into Transportation Analysis Zones (TAZs) and setting up networks that accurately reflect roadway conditions (number of lanes, availability of turns, etc.). When looking at different scenarios with a model, such as No Project and With Project, it is vital that comparable data and methods are used for inputs in both.

When utilizing a travel demand model (possibly with off-model post processing), the requirements for analyzing the full impacts of vehicle travel from a capacity-increasing project include changes in VMT due to changes in:

- Trip length (generally increases VMT)
- Mode shift (generally shifts from other modes toward automobile use, increasing VMT)
- Route choice (can act to increase or decrease VMT but is likely to decrease emissions because more direct or preferred facility routing occurs)
- Newly generated trips (generally increases VMT)

[12] Memo: Changes to NCST Tool for VMT Analysis (Nov 2021)

Potential Challenges, Limitations, and Considerations

NCST Travel Calculator

As described above, the NCST Calculator forecasts long-term VMT changes while controlling for variables such as population and employment growth, income changes, etc. This tool uses MSA-specific lane miles as baseline for elasticity calculations. However, the NCST calculator and elasticity models in general are not sensitive to land use context, geographic constraints, or the amount of existing congestion. Additionally, it produces an annual forecast, while project analysis typically requires a weekday forecast, and does not distinguish between GP and HOV/HOT lanes. As a result, use of the NCST Calculator and the elasticity approach in general should be viewed as a rapid-response but oversimplified analysis approach and could result in an over-estimation or under-estimation of induced VMT with a high degree of uncertainty, depending on project context.

Travel Demand Models

Travel models forecast VMT changes based on variables such as population and employment growth, and income changes, and therefore can reflect context sensitivity for land use and the network. They can be locally calibrated and validated to observed local VMT conditions. Travel models vary in their setup, whether they are activity or trip based, and whether they are able to estimate induced travel related to highway projects. This results more often in underestimation than overestimation of induced VMT and makes them more complicated and time-intensive to run than an elasticity-based calculator. They may not include a process for capturing potential changes in trip generation or land use growth allocation depending on setup. Some limitations can be addressed by incorporating the land use feedback loop and dynamic traffic assignment module. Models also often lack commercial driving sensitivity.

Relationship to Metro’s SHS Project List

Metro’s SHS Project List contains 55 projects at the writing of this memo and includes projects and programs from several sources such as Measure R, Measure M, and the 2020 Long Range Transportation Plan (LRTP). The projects and programs are currently in varying phases, ranging from pre-planning to in planning, environmental review, final design, and construction. Due in part to the variety in origin and status, the current level of detail also varies widely in these projects, which has an effect on how accurately presumptions can be made regarding potential impacts. Project types on this list include grade separations, soundwalls, interchange and ramp modifications, ITS and other technological upgrades, addition of HOV lanes, HOT lanes, or ExpressLanes, auxiliary lanes, collector-distributor roads, various efficiency and safety upgrades, and new highways.

The above guidance is intended to set the context for a review of Metro's SHS Project List in order to understand the analysis needs and starting assumptions for each type of project. For example, projects on the SHS Project List that also fall on the list of projects assumed to increase VMT may require a more extensive analysis approach to understanding induced VMT than a project that is comprised of elements on the list of Projects Assumed Not to Increase VMT (though these projects may also be subject to induced VMT analysis as the complexities between Caltrans guidance continue to evolve).

Next steps in the Metro VMT Mitigation Program project include reaching a decision on how to categorize, evaluate, and quantify the VMT impacts of projects on the SHS so that a mitigation program can be developed. Understanding the magnitude of mitigation needs is a crucial first step in development of a mitigation program for the agency. Through a series of meetings with the Project Development Team (PDT) comprised of representatives from Metro, Caltrans, OPR, and SCAG, the approach to evaluating projects on the SHS will be determined.

Memorandum

Date: February 21, 2023

To: Julio Perucho, Metro

From: Anna Luo, Chelsea Richer, Ron Milam, and Jeremy Klop, Fehr & Peers

Subject: VMT Quantification Tools and Preferred Methodology (Task 4)

LA22-3343

Executive Summary

This memorandum establishes an evidence-based approach to refine the VMT quantification methods established by Caltrans for projects on the State Highway System (SHS) specific to the context in Los Angeles County. Current VMT quantification practice is based on statewide application of national research on induced travel. While these efforts and prior research are robust, travel in Los Angeles County and changes in local travel patterns over the last two decades are inconsistent with national trends and different than other regions in California. The observed changes in total Vehicle Miles Traveled (VMT) and VMT per capita in Los Angeles County outperform national and statewide trends: lower than national averages, lowest in the Southern California Association of Governments (SCAG) region, and on the lower end of VMT per capita growth statewide.[1, 2] These trends are elaborated in this memorandum.

This memorandum outlines notable and consequential differences in induced travel effects that are unique to Los Angeles County, and which justify refinements to VMT quantification methods applied to projects on the SHS in Los Angeles County. Consistent application of this locally refined method provides clarity for project teams working on environmental compliance for projects on the SHS and a consistent approach against which Caltrans' District 7 and Headquarters can conduct their review of Metro's environmental documents for SHS projects. A locally specific VMT quantification method also ensures that project impact mitigation actions and associated costs

[1] US DOT Transportation and Health Tool, 2015. Available at https://www7.transportation.gov/transportation-health-tool.

[2] California Air Resources Board. Draft 2022 Progress Report: California's Sustainable Communities and Climate Protection Act (SB 375). Available at https://ww2.arb.ca.gov/sites/default/files/2022-07/2022_SB_150_Main_Report_Draft_ADA.pdf.

are both fair and reasonably related to expected changes in local travel patterns and locally specific substantial evidence.

Key issues addressed in this memo, and their corresponding recommended approaches, include:

- The types of projects that are presumed to not result in a VMT impact (i.e., screened from VMT quantification)
    - This memo recommends the addition of five types of projects to the list of projects that are presumed not to result in a VMT impact.[3]
- Selection of the appropriate quantification method to estimate long-term induced VMT (i.e., a simpler approach using an elasticity factor, that only works for projects with lane-mile additions, or a more complex approach using a travel demand model that works for all types of projects but may not fully capture long-term induced VMT)
    - For projects that include lane-mile additions, this memo recommends the use of a hybrid approach, using both the elasticity method and the SCAG 2020 Regional Transportation Plan/Sustainable Communities Strategy (RTP/SCS) Activity Based Model (SCAG 2020 ABM).
    - For projects that do not include lane-mile additions, this memo recommends the use of the SCAG 2020 ABM.
- Approach to modifying selected quantification method (i.e., local refinement of the elasticity factors used in the Caltrans-preferred National Center for Sustainable Transportation (NCST) Induced Travel Calculator (NCST Calculator) to better align the elasticity factor with CEQA statute, published research, and Los Angeles County context)
    - For program-level VMT quantification, this memo recommends using a modified elasticity factor of 0.39 for Class 1 facilities and 0.29 for Class 2 and 3 facilities, which reflects local context, is supported by multiple sources of published literature, and is consistent with the category of induced VMT that aligns most closely to the CEQA statute.
    - For project-level VMT quantification, this memo recommends further adjusting the elasticity factor to reflect differences in project location and project type, which would be derived by deploying the SCAG 2020 ABM in conjunction with the above long-term elasticity factors.

Introduction

The Los Angeles County Metropolitan Transportation Authority (Metro), in partnership with the California Department of Transportation (Caltrans), is developing the VMT Mitigation Program to

[3] This list can be found in the Caltrans policy document *Transportation Analysis under CEQA for Projects on the State Highway System* (TAC), 2020, pages 13-15. Available at https://dot.ca.gov/-/media/dot-media/programs/sustainability/documents/2020-09-10-1st-edition-tac-fnl-a11y-new-nov2021.pdf.

support the region's Senate Bill (SB) 743 goals of reducing the impacts of VMT and correlated greenhouse gas (GHG) emissions while affording greater mobility and access for Los Angeles County's residents. Aligning Metro's highway investments with the legislative intent of SB 743 that emphasizes multi-modal and smart growth strategies to reduce VMT, this program will allow Metro to support the region's goal of reducing VMT impacts, provide Metro, Caltrans, and other project delivery partners within the County with refined tools to determine project VMT impacts more accurately, and provide feasible and enforceable VMT mitigation strategies.

The purpose of this memorandum is to summarize an evaluation of VMT quantification tools and present recommendations on model improvements and a suggested approach to forecast VMT, in the context of potential application to SHS improvement projects included in Metro's Sales Tax Measures Expenditure Plans/Ordinances and corresponding subregional programs. Although the CEQA Guidelines [Section 15064.3(a)] only require the evaluation of automobile VMT (light-duty cars and trucks), the quantification tool recommended by Caltrans includes all types of VMT, including medium and heavy-duty vehicles (reflecting commercial or freight activity), and applies a state-wide approach that imposes extra cost on projects in low-VMT areas. Therefore, to best respond to CEQA requirements and to calibrate the quantification to local context in the Los Angeles MSA, a modification to the Caltrans-recommended tool is warranted.[4]

This memorandum also provides recommended project types as additions to the induced VMT screening list outlined in the first version of the Caltrans policy document *Transportation Analysis under CEQA for Projects on the State Highway System* (TAC) as they are projects not likely to lead to measurable and substantial increases in VMT.[5] Per the scope of work for this effort, this memorandum is not intended to, and does not, quantify the VMT impacts of Metro's program of highways and complete streets projects.

Finally, this memorandum offers a brief discussion of alignment of this effort with other efforts underway at Metro that relate to VMT quantification, including how the proposed California Environmental Quality Act (CEQA) methodology included herein relate to other published estimates of induced travel and VMT increases over time.

Background

In response to recent revisions to the CEQA Guidelines, CEQA case law, and guidance issued by the California Governor's Office of Planning and Research (OPR), Caltrans has determined that VMT is the most appropriate metric for determining transportation impacts for capacity-

[4] CEQA Guidelines Section 15064.3(b)(2) and (4) do provide lead agency discretion in setting a different form of the metric; however, Caltrans' policy documents do not establish the requirement to include commercial trips.

[5] Transportation Analysis under CEQA for Projects on the State Highway System. Caltrans, 2020. Retrieved from https://dot.ca.gov/-/media/dot-media/programs/sustainability/documents/2020-09-10-1st-edition-tac-fnl-a11y-new-nov2021.pdf.

increasing transportation projects on the SHS. VMT impact analysis may also be required for National Environmental Policy Act (NEPA) purposes.

For roadway capacity projects on local roadways not on the SHS, lead agencies have the discretion to select their preferred metric consistent with CEQA expectations. This has traditionally been the case for NEPA projects as well. Beyond transportation impacts, VMT is also a required input for air quality, GHG, and energy impact analysis.

Induced vehicle travel effects are the underlying forces behind VMT changes associated with roadway capacity expansion projects. The concept of induced demand for VMT is well-established by transportation planning research, dating back to a 1962 paper by Anthony Downs.[6] However, the best approach to estimating the effects of building new lane miles, and the potential magnitude of such effects, is still widely debated.[7] These effects can potentially diminish expected congestion relief benefits of building new non-priced capacity improvements. Note, congestion relief is only one possible benefit gained from capacity improvements, along with the accommodation of additional travelers, improved access, and safety enhancements. The main resources on induced vehicle travel for environmental impact analysis of transportation projects are listed below.

- OPR's Technical Advisory on Evaluating Transportation Impacts in CEQA, December 2018.
  - https://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf
- Caltrans' Transportation Analysis Framework (TAF) First Edition: Evaluating Transportation Impacts of State Highway System Projects, September 2020.[8]
  - https://dot.ca.gov/-/media/dot-media/programs/sustainability/documents/2020-09-10-1st-edition-taf-fnl-a11y-new-.pdf
- Caltrans' Transportation Analysis Under CEQA (TAC) First Edition: Evaluating Transportation Impacts of State Highway System Projects, September 2020.[9]
  - https://dot.ca.gov/-/media/dot-media/programs/sustainability/documents/2020-09-10-1st-edition-tac-fnl-a11y-new-nov2021.pdf
- CARB 2017 Scoping Plan – Identified VMT Reductions and Relationship to State Climate Goals, January 2019.
  - https://ww2.arb.ca.gov/sites/default/files/2019-01/2017_sp_vmt_reductions_jan19.pdf

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[6] The Law of Peak-Hour Expressway Congestion. Anthony Downs, Traffic Quarterly, 1962. Volume 16, pp393-409.. Retrieved from https://babel.hathitrust.org/cgi/pt?id=uc1.$b3477&view=1up&seq=457.

[7] Induced Demand: An Urban and Metropolitan Perspective. Robert Cervero, 2001. Prepared for Policy Forum: Working Together to Address Induced Demand. Retrieved from https://escholarship.org/uc/item/5pj337gw.

[8] Updates to the TAF and the TAC are periodically posted as Bulletins and Hot Topics at https://dot.ca.gov/programs/sustainability/sb-743/sb743-resources.

[9] Updates to the TAC and the TAF are periodically posted as Bulletins and Hot Topics at https://dot.ca.gov/programs/sustainability/sb-743/sb743-resources.

- CARB Research on Effects of Transportation and Land-Use Related Policies
    - https://ww2.arb.ca.gov/sites/default/files/2020-06/Impact_of_Highway_Capacity_and_Induced_Travel_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Policy_Brief.pdf
    - https://ww2.arb.ca.gov/sites/default/files/2020-06/Impact_of_Highway_Capacity_and_Induced_Travel_on_Passenger_Vehicle_Use_and_Greenhouse_Gas_Emissions_Technical_Background_Document.pdf
- NEPA Travel and Land Use Forecasting
    - https://www.environment.fhwa.dot.gov/env_topics/other.aspx
- Ronald T. Milam, et al., Closing the Induced Vehicle Travel Gap between Research and Practice, Transportation Research Record (TRR) #2653, 2017, p10-16.
    - https://pdfs.semanticscholar.org/48aa/57a40a71f7c6ba90106f0acdbfccb37de0b2.pdf
- Ronald T. Milam and Jerry Walters, et al. Induced Travel Technical Investigation. Caltrans TAG/TISG Induced Demand Subcommittee – Status Summary, April 24, 2016.
- Dowling Associates for the California Air Resources Board. Effects of Increased Highway Capacity on Travel Behavior, 1994.

Importantly, establishment of a VMT impact presumes the future plus project condition results in VMT levels that are higher than the existing conditions. A review of HPMS data from the past 20 years – aligning with the timeframe along which the effects of long-term induced VMT should be visible – demonstrates a different trend in the Los Angeles-Long Beach-Anaheim MSA (previously referred to as the Los Angeles, Long Beach, Pomona, Ontario MSA or simply, the Los Angeles MSA which captures both Los Angeles and Orange counties). As shown in Table 1, below, between 2001-2019, HPMS data experienced a decline in daily total VMT (-4%) despite a smaller decline in lane miles (-0.28%) and an increase in population (+5%). In contrast, California has seen an increase in lane miles, VMT, and population state-wide.

Table 1: Comparison of HPMS and Population Data, Los Angeles MSA & California

	Los Angeles MSA	California
Change in Total Lane Miles, 2001-2019	-0.28%	+7.7%
Change in Total VMT, 2001-2019	-4%	+15%
Change in Total Population, 2001-2019	+5%	+14%

Source: Fehr & Peers, 2023.

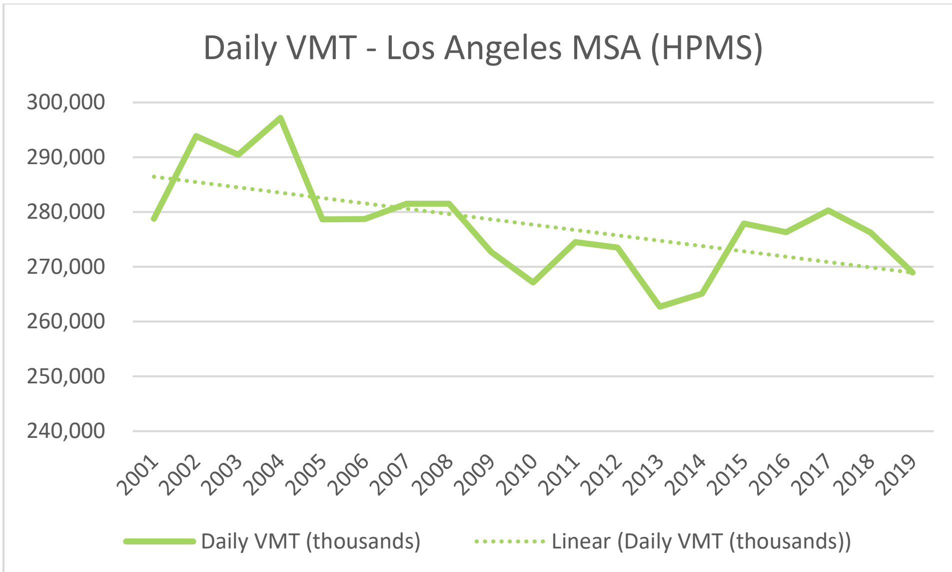

Figure 1: Daily VMT (Los Angeles MSA), 2001-2019

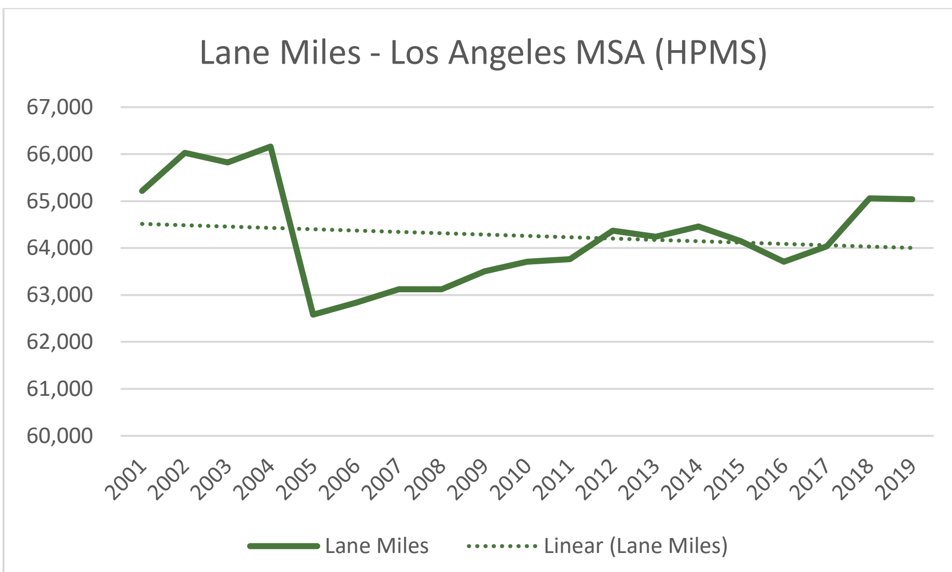

Figure 2: Total Lane Miles (Los Angeles MSA), 2001-2019

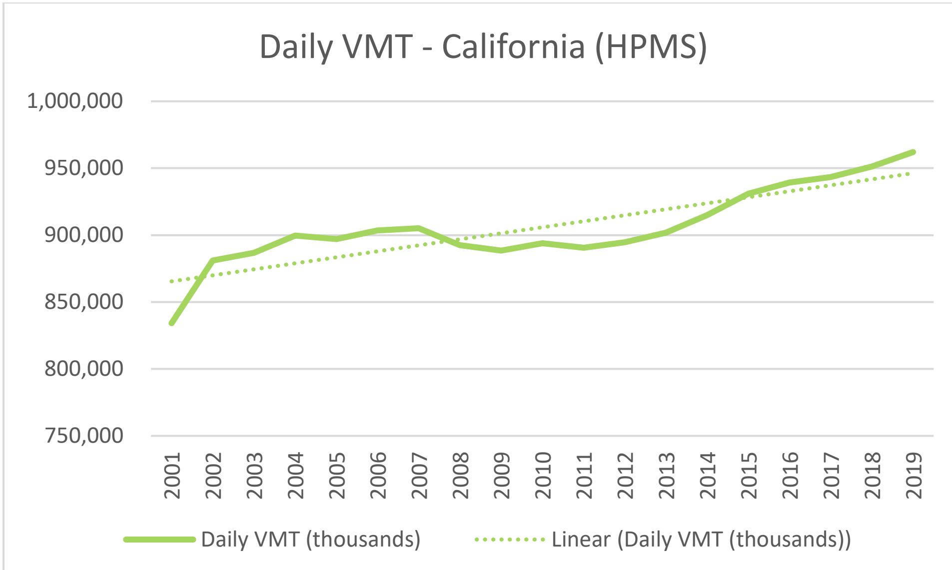

Figure 3: Daily VMT (California), 2001-2019

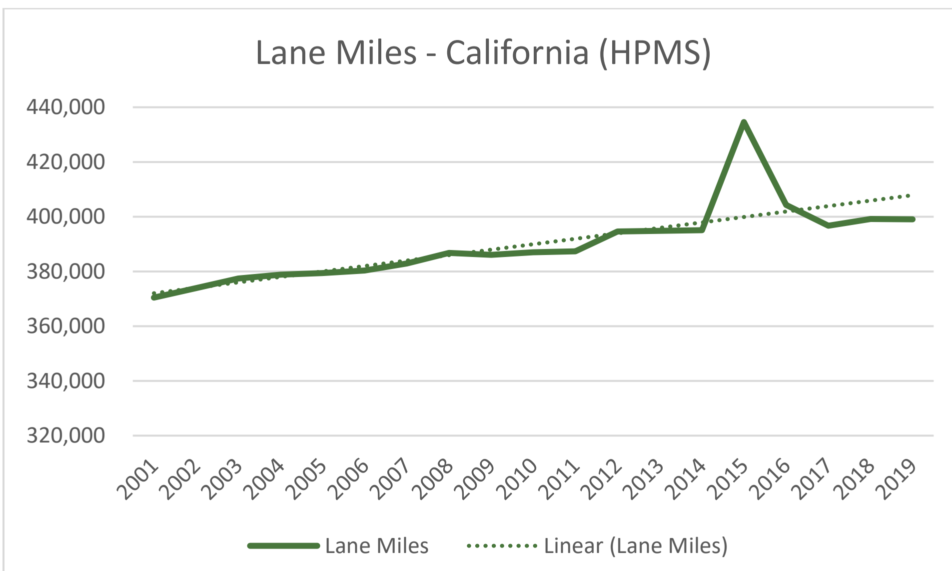

Figure 4: Total Lane Miles (California), 2001-2019

This data points to a more efficient travel pattern in Los Angeles compared to other parts of the California, as well as other parts of the US and past periods of Southern California's history (as documented in the induced VMT literature), where rapid expansion of developed land and expansion of the vehicle transportation system to connect to those areas led to less efficient travel patterns and induced demand as a result. These notable and consequential differences in induced travel effects that are unique to Los Angeles County justify refinements to VMT quantification methods applied to projects on the SHS in Los Angeles County. The following sections explain the locally specific quantification methodology to forecast induced VMT for Metro's highway projects based on the above documents and CEQA compliance.

VMT Quantification Tools

As indicated in the OPR's Technical Advisory and Caltrans' Transportation Analysis Framework (TAF) and TAC, two methods are highlighted to forecast induced VMT: 1) an empirical approach using elasticities, and 2) a travel demand model.

- **Elasticity-based methods**, which produce a percent increase in VMT associated with a given percent increase in roadway lane miles. The tool that is emerging as the most commonly used is the National Center for Sustainable Transportation (NCST) Induced Travel Calculator (NCST Calculator), based on national research and published literature on the relationship between lane miles and induced VMT. Although the concept and calculation is simple, the selection of the right elasticity number is debated.[10] Furthermore, an elasticity-based approach cannot be deployed on projects that do not have lane-mile additions.
- **Travel demand models**, which spatially locate socio-economic data into analysis zones and forecast trips to and from those zones based on the related data. Travel demand models aim to capture complex relationships between both land use and transportation changes and can vary in terms of their levels of calibration and validation as well as their associated reasonableness and sensitivity.

Each method has its merits and limitations, and this evaluation offers an approach to understanding and potentially reconciling these two methods to perform a complete analysis satisfying the CEQA (and NEPA) expectations, specific to the context in Los Angeles County.

NCST Calculator

The elasticity method is based on statistical studies that aim to quantify induced vehicle travel that is exclusively associated with expanding roadway capacity (i.e., adding lane miles). The elasticity of VMT to lane miles includes short-term and long-term estimates of induced travel effects. Short-term effects occur in the short period of time (1-2 years) after a roadway capacity project is open to traffic. Long-term effects tend to occur within a 10- to 20-year timeframe, although the most recent research tends to focus on 20 years. In general, the elasticities reflect the change in total VMT attributable to lane mile increases while controlling for other factors that contribute to VMT growth such as population and economic growth.

Some researchers have also included an accounting of the specific sources of induced VMT including the proportion from passenger (light-duty) versus commercial (medium and heavy-

[10] Cervero, 2001.

duty) vehicles. This accounting is relevant for CEQA purposes since different types of VMT may be required depending on the impact subject. For transportation impacts, only passenger VMT is required per CEQA Guidelines Section 15064.3(a).

Under the elasticity method, Caltrans recommends the use of the NCST Calculator (https://travelcalculator.ncst.ucdavis.edu/) to forecast long-term induced VMT. The process of calculating induced travel using elasticities is shown in Figure 5. The NCST Calculator includes 2016-2019 VMT and lane-mile data so the user only needs to input the baseline year (preferably the latest year), change in lane miles associated with a proposed project, and the type of functional classification (selected from a drop-down menu). For interstate highways (Class 1), the VMT forecast is based on inputs for the corresponding Metropolitan Statistical Area (MSA) and uses an elasticity of 1.0. For other freeways and expressways (Class 2) and other principal arterials (Class 3), the calculator uses county-level inputs and an elasticity of 0.75.

To estimate VMT impacts from roadway expansion projects:

1. Determine the total lane-miles over an area that fully captures travel behavior changes resulting from the project (generally the region, but for projects affecting interregional travel look at all affected regions).
2. Determine the percent change in total lane miles that will result from the project.
3. Determine the total existing VMT over that same area.
4. Multiply the percent increase in lane miles by the existing VMT, and then multiply that by the elasticity from the induced travel literature:

[% increase in lane miles] x [existing VMT] x [elasticity] = [VMT resulting from the project]

Figure 5: Method recommended for estimating VMT impacts on roadway expansion projects. Governor's Office of Planning and Research. 2018, April. Technical Advisory on Evaluating Transportation Impacts in CEQA.

According to the NCST, the NCST Calculator is applicable for General Purpose (GP), High Occupancy Vehicle (HOV), and high-occupancy toll (HOT) lane projects involving the addition of lanes to class 1, 2, and 3 facilities, which cover the SHS and most major arterials. For a specific map of class 1, 2, and 3 facilities, refer to the Caltrans statewide functional classification map available at the website - https://dot.ca.gov/programs/research-innovation-system-information/office-of-highway-system-information-performance/functional-classification. Users of the map need to zoom in closely to their study area for the map to reveal all functional classes.

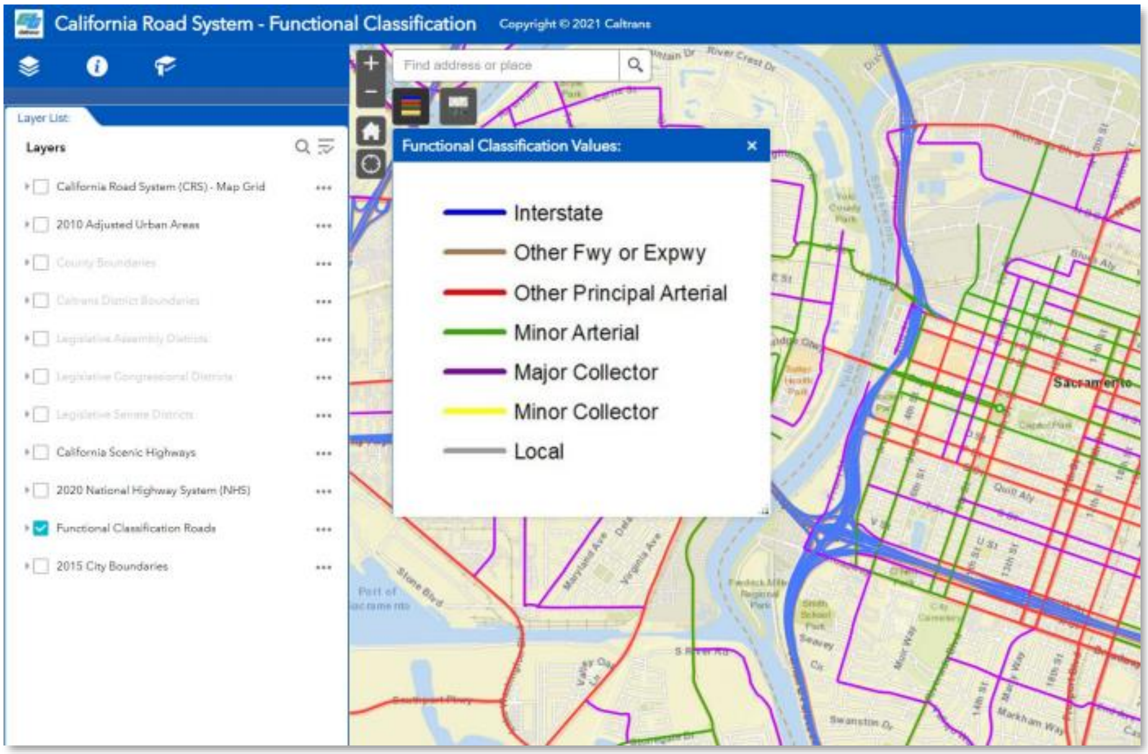

Figure 6: Caltrans Functional Classifications

The elasticities produce a forecast of total VMT attributable to a project, including all VMT (passenger and commercial). This is important because the CEQA Guidelines Section 15064.3(a) states, "For the purposes of this section, 'vehicle miles traveled' refers to the amount and distance of automobile travel attributable to a project." (Emphasis added.)

Given that CEQA only requires evaluation of automobile VMT, the elasticity factor embedded within the likely overstates the VMT that would be necessary to evaluate transportation impacts associated with a project on the SHS. In addition, passenger/automobile VMT is the most closely associated with the legislative intent of SB 743, which aims to influence and encourage infill development, promote public health through active transportation, and enable California to build in a way that allows Californians to drive less.[11]

Modification of the elasticity factor does not solve all the limitations of using an elasticity-based approach and points to the need for a hybrid approach that also deploys a travel demand model to further refine estimates of long-term induced vehicle travel. Specifically, the limitations of the NCST Calculator are noted below.

[11] CEQA Transportation Impacts (SB 743). Governor's Office of Planning and Research. Retrieved from https://opr.ca.gov/ceqa/sb-743/.

- Most of the data used in the research studies ranges from the 1980s to the early 2000s, although one study extended its data from 1981 to 2015. This period may not be reflective of current VMT trends and may not produce induced travel elasticities that accurately represent HOT/ExpressLane effects given their limited implementation during this time period in comparison to GP and HOV lanes.

  This limitation is especially problematic for the Los Angeles MSA due to the introduction and expansion of ExpressLanes and rail transit[12] occurring since the early 2000s. Although one of the main research studies utilized in support of the NCST Calculator elasticities (Duranton & Turner[13]) concludes that extensions to public transit are not effective policies with which to combat traffic congestion or reduce VMT, this research only measured public transportation as the daily average peak service of large buses; other forms of transit such as railroads and subways were not accounted for in their estimations. In the Los Angeles MSA, it is possible the combination of rail expansion and ExpressLane implementation have resulted in different outcomes, as demonstrated by the recent HPMS data analysis in the introduction, which stands in contrast to statewide trends (and national trends) that form the basis of the studies that the NCST Calculator relies on.

- The elasticities are not sensitive to network effects associated with some roadway capacity projects such as bottlenecks that may have larger effects on travel times as well as bridges that can substantially reduce the distance between origins and destinations. Bridges that close a network gap have the greatest potential for reducing VMT due to shorter trip lengths.

- The elasticities are also not sensitive to project types (GP/HOV/HOT/Express Lanes), land use context, geographic constraints (e.g., water or topography barriers), or the amount of existing congestion. Without sensitivity to the project corridor context, the calculator results may over- or under-estimate induced VMT effects. Specifically, the Duranton & Turner study concludes that congestion pricing is the main candidate tool to curb traffic congestion and induced VMT, with HOT or ExpressLanes presently operating as congestion pricing in Los Angeles[14], but no adjustments are made to account for these project types in the elasticities. This lack of sensitivity is also inconsistent with recent studies that demonstrated that the removal of HOV policies significantly increases traffic

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[12] The Metro A (Blue), B (Red), C (Green), D (Purple), E (Expo), L (Gold), and K lines entered service starting in 1990, 1993, 1995, 2003, 2012, and 2022, respectively, with the Express Lane network operational in 2012.
[13] The Fundamental Law of Road Congestion: Evidence from US Cities, Gilles Duranton and Matthew A. Turner, American Economic Review 101, October 2011.
[14] Congestion Pricing: Examples Around the U.S. Available at https://ops.fhwa.dot.gov/congestionpricing/resources/examples_us.htm

congestion[15] and project context, including project type and project location, result in large variations in elasticities.[16]

- Application of elasticities at the statewide level functionally penalizes projects in low-VMT areas by imposing additional mitigation costs to the project development process. This is directly in conflict with the legislative intent of SB 743, which is intended to encourage project development in areas that have low-VMT patterns, including infill areas. Local refinement to reflect observed VMT patterns is appropriate and consistent with SB 743 and is supported by recent research that concludes that to truly minimize the bias in the elasticity measurements, it is necessary to observe MSAs on a case-by-case basis[17].

- The VMT forecast represents the project-generated effect and does not include information about the No Project condition. This is one of the bigger limitations of elasticity methods because understanding what would otherwise happen without the project is required for CEQA/NEPA impact analysis and essential information for decision making.

- The VMT forecast does not include a distribution of VMT by speed bin, which is commonly needed for air quality and GHG analysis.

- The VMT forecasts do not include potential VMT effects beyond the MSA or county boundaries.

- The elasticity values were derived from research data representing a period when substantial socioeconomic changes were contributing to increasing VMT per capita (e.g., 1980s to early 2000s). This period was also prior to widespread use of transportation network companies (TNCs), substantial internet shopping, expanded food delivery, and recent COVID-19 travel disruptions.

- In uncongested suburban areas, the VMT forecasts from the calculator may be unreasonably high and would not be compatible with observed trip rates and trip lengths. Without congestion, vehicle trip rates and lengths are not influenced or suppressed in these areas. This lack of sensitivity to corridor land use and congestion context means

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[15] R. Hanna, G. Kreindler, B. A. Olken (2017.) Citywide Effects of High-Occupancy Vehicle Restrictions: Evidence From "3-In-1" In Jakarta. Available at https://dspace.mit.edu/bitstream/handle/1721.1/114521/CITYWIDE%20EFFECTS%20OF%20HIGH%20OCCUPANCY%20VEHICLE%20RESTRICTIONS.pdf

[16] M. L. Anderson and L. W. Davis (2021). Estimating Induced Travel from Capacity Expansions on Congested Corridors. Available at https://ww2.arb.ca.gov/sites/default/files/2021-04/18RD022.pdf.

[17] J, Wang. G. Leovan. E. Arroyo (2022). The Fundamental Law of Road Congestion: Is it Truly Fundamental?

that adding lane miles in a suburban area with no congestion will have the same proportional effect as adding lane miles in an urban area with multiple hours of congestion. As additional evidence to the lack of latent demand for travel in suburban environments, residential vehicle trip rates in suburban areas have been stable over time across multiple versions of the Institute of Transportation Engineers (ITE) Trip Generation Manual.

- The most recent input data for the calculator reflect 2019 conditions. Given CEQA Guidelines expectations that the baseline year is normally the year in which the notice of preparation (NOP) is released for a project, the induced vehicle travel analysis would be strengthened by using the most recent input data available. More current VMT and lane-mile estimates will become available in the future from the Caltrans Highway Performance Monitoring System (HPMS) and PeMS websites below.
    - https://dot.ca.gov/programs/research-innovation-system-information/highway-performance-monitoring-system https://dot.ca.gov/programs/research-innovation-system-information/highwayperformance-monitoring-system
    - https://dot.ca.gov/programs/traffic-operations/mpr/pems-source

- Finally, Per the UC Davis NCST (the developers of the NCST Calculator) own research effort published in September 2022[18], a "true validation (of the NCST calculator) may not be possible, given the long periods of time over which projects are constructed and induced travel effects occur, as well as the challenge of isolating the effect of a single capacity expansion from the effects of other capacity expansions as well as other factors in real-world settings (e.g., population changes, income changes, shifts in industries and job types, and global pandemics like we have seen with COVID-19)." This inability to validate the Calculator over the long-term time period it purports to measure could very likely result in mitigation investments that far exceed what is actually necessary to reduce a project impact to a level less than significant under CEQA.

Travel Demand Models

Travel demand models estimate travel forecasts by inputting socio-economic data into Transportation Analysis Zones (TAZs) and setting up networks that accurately reflect roadway conditions (number of lanes, functional classification, capacity, speeds, availability of turns, etc.). When looking at different scenarios with a model, such as No Project and With Project, it is vital that comparable data and methods are used for inputs in both.

[18] Updating the Induced Travel Calculator, 2022, p22. Retrieved from https://escholarship.org/content/qt1hh9b9mf/qt1hh9b9mf.pdf

When utilizing a travel demand model (possibly with off-model post-processing), the full impacts of induced vehicle travel from a capacity-increasing project should include changes in VMT due to changes in:

- Trip length (generally increases VMT)
- Mode shift (generally shifts from other modes toward automobile use, increasing VMT)
- Route choice (can increase or decrease VMT but is likely to decrease emissions because more direct or preferred facility routing occurs)
- Newly generated trips (generally increases VMT)

Travel demand models forecast short-term VMT changes based on variables such as population and employment growth, and income changes, and therefore can reflect context sensitivity for land use and transportation network features. They can be locally calibrated and validated to observed local VMT conditions. Travel models vary in their setup, whether they are activity or trip based, and whether they are able to estimate induced travel related to highway projects.

Travel demand models more often underestimate rather than overestimate induced vehicle travel and are more complicated and time-intensive to run than an elasticity-based calculator. In general, a major issue related to using the travel demand model approach in impact analysis is that most models in California, and the rest of the U.S., do not have feedback processes that influence trip generation rates or land use growth allocation.[19] Hence, these components of the models tend to be 'fixed' versus being dynamically linked to changes in accessibility associated with a transportation network modification. Models also tend to lack dynamic validation to help users understand their level of sensitivity to small network changes. Additional processing is required to handle these limitations of a model before applying to VMT analysis, which are described in the following section.

Travel Demand Model Review

For the purpose of this project, two regional travel demand models were reviewed related to the VMT analysis competence, which are Metro's Travel Demand Model (TDM) (version CBM18B) and the SCAG 2020 ABM. Additional models were considered for review, including the City of Los Angeles, City of Culver City, and City of Pasadena models, but were eliminated early due to their inconsistency with the most recent 2020 SCAG RTP/SCS and the lack of county-wide geographic coverage.

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[19] For further discussion of model improvements, see page 18.

Metro's TDM

The Metro TDM has a sophisticated mode choice procedure that estimates the mode shift due to changes in accessibility. The model assignment procedure is capable of reflecting the change in routing/path choice when the roadway congestion level varies.

From the perspective of induced travel, the Metro TDM can estimate induced travel demand due to mode shift between auto modes and other modes, and path shift (using different roadways). However, the Metro TDM does not have any module to estimate potential new trips due to a project, nor changes in origin-destination patterns of person trips due to a project. The overall travel demand (person trip tables) is initially derived from the SCAG Model (using a method that combines results from the 2016 RTP base year model and the 2020 RTP model inputs).

Given this relationship between the SCAG Model and the Metro Model, the evaluation of the Metro Model against the CEQA Guidelines is closely tied to the evaluation of the SCAG 2020 ABM, detailed further below.

SCAG 2020 ABM

Model Assessment

Based on the CEQA Guidelines, the following specific criteria were developed to assess the SCAG 2020 ABM performance related to SB 743 VMT analysis for highway projects on the SHS.

- *Capable of producing regional, jurisdictional, and project-scale VMT estimates* – VMT analysis for air quality, GHG emissions, energy, and transportation impacts requires comparisons to thresholds at varying scales.

- *VMT estimates that do not reflect truncated trip lengths at model or political boundaries* – The OPR Technical Advisory states that lead agencies should not truncate any VMT analysis because of jurisdictional or model boundaries. The intent of this recommendation is to ensure that VMT forecasts provide a full accounting of project effects.

- *Model's Sensitivity in VMT changes from various model inputs*, such as auto operating costs, transit services, transit fare, work from home/telecommute, freeway capacity, principal arterial capacity, household income, neighborhood household density, neighborhood bike lane density, job center parking price, and toll pricing.

- *Inclusion of trip generation and land use feedback process* – The TAF identified the checklist for evaluating model adequacy and stated that the travel demand model should have the capability to predict land use changes and trip generation changes resulted from transportation improvements projects.

The specific assessment findings for the SCAG 2020 ABM are contained in Table 2.

Table 2: Assessment Summary of SCAG 2020 ABM

Assessment Criteria	Assessment Results	Notes
Capable of producing regional, jurisdictional, and project-scale VMT estimates.	Regional VMT – yes Jurisdictional VMT – yes Project-scale VMT – uncertain; sensitivity tests have indicated some "noise" in the model	Scale of model may be too large for some project level applications. Subarea model calibration and validation may be required for project-scale VMT analysis.
VMT estimates that do not truncate trip lengths at model or political boundaries.	Depends on TAZ location.	The model includes the Counties of Los Angeles, Orange, Ventura, Riverside, and San Bernardino, but truncates trips leaving this area. TAZs central to the region will tend to have less truncation than TAZs at the model border. Other data sources such as household travel surveys or mobile device data may be required to understand the trip lengths and refine the model results.
Model's sensitivity in VMT changes from various model inputs	The model shows reasonable sensitivity in VMT changes from the tested model inputs. The VMT elasticity is shown to range from 0.28-0.40 for freeway capacity and 0.32-0.48 for principal arterial capacity.	The sensitivity results were obtained from the *SCAG's Travel Demand Model Sensitivity Tests Report* dated August 2020. Sensitivity tests were conducted related to project type and project context and are detailed further in the following section.
Inclusion of trip generation and land use feedback process	The trip generation module is not sensitive to travel time and cost. No land use feedback has not been incorporated into model forecasting process at project level. Based on these limitations, the model results reflect short-term VMT sensitivity only.	The vehicle trip generation rates can be manually adjusted into the model, or off-model processing can be applied to refine the VMT forecasts. Follow OPR's recommendations to incorporate the VMT effects that are caused by the subsequent land use changes.

Case Study Results

To evaluate whether the SCAG 2020 ABM is sensitive to local context and project type, and in response to input from the Project Development Team (PDT), a case study was conducted to evaluate the model's sensitivity using the following two highway projects located in an urban and suburban area.

1. *Interstate 5 (I-5) High Occupancy Vehicle (HOV) Project in Santa Clarita (Suburban)*

This project adds a new HOV lane in each direction along a 14-mile I-5 segment from Newhall Pass to Parker Road. It is currently under construction.

For this case study, three scenarios were evaluated for the I-5 corridor: 1) adding a GP lane in each direction; 2) adding an HOV lane in each direction as currently under construction; and 3) adding an HOT lane in each direction along the study segment.

2. *I-10 Express Lane Project (Urban)*

This project includes the addition of Express Lanes along a 16-mile I-10 segment from I-605 to the Los Angeles County border. It is currently under the project approval/environmental document (PA/ED) phase.

For this case study, three scenarios were also evaluated for the I-10 project: 1) adding a GP lane in each direction; 2) adding an HOV lane in each direction; and 3) converting the existing HOV lane to HOT lane and adding the 2^{nd} HOT lane in each direction as currently proposed.

As a result, the following seven scenarios were assessed for the VMT analysis using the Future Year 2045 SCAG's 2020 ABM. The socioeconomic data was held constant under all analysis scenarios.

1. Baseline Scenario (without I-5 and I-10 projects)
2. I-5 GP Scenario (add the I-5 GP lanes)
3. I-5 HOV Scenario (add the I-5 HOV lanes as currently under construction)
4. I-5 HOT Scenario (add the I-5 HOT Lanes)
5. I-10 GP Scenario (add the I-10 GP lanes)
6. I-10 HOV Scenario (add the I-10 HOV lanes)
7. I-10 HOT Scenario (add the I-10 HOT Lanes as currently proposed)

The VMT results were calculated under each scenario for the combined freeway/expressway/principal arterial roadway facility group (which are equivalent to FHWA Class 1, 2, and 3 facilities) within the counties of Los Angeles and Orange (consistent with MSA). Additionally, VMT elasticity was calculated under Scenarios 2 through 7 using the percent change in VMT divided by percent change in lane miles. The VMT results are displayed in Figure 7 and Table 3.

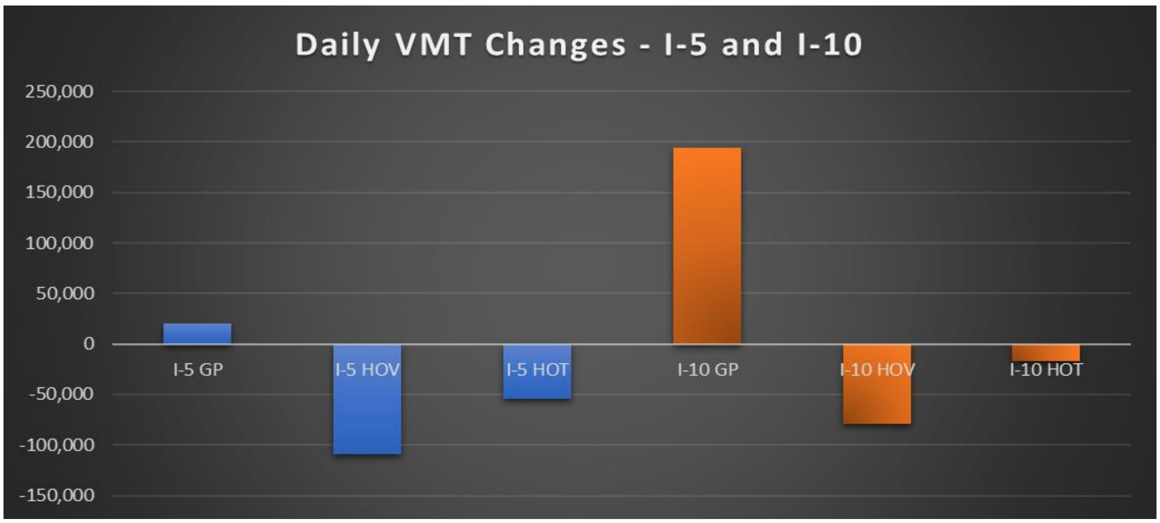

Figure 7: SCAG Model Case Study Results - Daily VMT Changes

Table 3: Daily VMT Results in Los Angeles-Long Beach-Anaheim MSA (LA & OC Counties)

Scenario	Daily VMT	VMT Change	VMT Change %	VMT Elasticity
Baseline	227,046,731	-	-	-
I-5 GP Lane	227,066,754	20,023	0.01%	0.06
I-5 HOV Lane	226,937,209	-109,522	-0.05%	-0.34
I-5 HOT Lane	226,992,941	-53,790	-0.02%	-0.17
I-10 GP Lane	227,240,528	193,797	0.09%	0.48
I-10 HOV Lane	226,967,641	-79,090	-0.03%	-0.20
I-10 HOT Lane	227,029,716	-17,015	-0.01%	-0.04

Source: Fehr & Peers, 2022.

The model shows sensitivity to local context as anticipated, with a greater VMT elasticity for the I-10 corridor in a more urban setting than the I-5 corridor located in a more suburban area. Project type also resulted in a variation in VMT changes, with increased VMT when adding GP lanes (higher in an urban area with latent demand due to currently-congested conditions) and a reduction in VMT with inclusion of HOV or HOT lanes (smaller reduction in an urban area where latent demand exists due to currently-congested conditions). Note, these location-specific and type-specific changes are likely to be different as the land use and transportation network context varies. For example, in hyper-congested environments, demand for travel may not increase with new capacity as rapidly as in areas with less congestion.[20] In these environments, one explanation may be that the available time budgeted for household travel is already expended or over-extended and travel time savings from new managed capacity may not be substantial enough to make a difference in back-filling the new time that was created with new trips.[21]

Model Improvements and Application Considerations

Currently, the SCAG 2020 ABM – and therefore the Metro Model – does not clear the TAF model checklist. The requirements described in the TAF model checklist create a high bar to clear, should an agency prefer to use a model-based approach rather than an elasticity-based approach. Current models in use in California cannot meet all the criteria on the checklist without modification. If SCAG's 2020 ABM is preferred to produce long-term induced travel, the[19] following improvements to the model are recommended to address the limitations identified in Table 1 and meet the TAF model checklist for VMT analysis.

Sensitivity to trip generation – If a trip generation module is not sensitive to travel time and cost, the analyst can manually adjust the vehicle trip generation rates or use off-model processing to increase the VMT forecasts. For example, using an "induced demand" sub-model, trips could be added or removed from the auto trip matrix using a logit equation that compares travel times of future years to travel times of the base year to determine the scale of trip additions/reductions. Other agencies across California have explored the development of such a sub-model to address this feedback loop need but have not yet implemented an approach.

Dowling Associates (1994) conducted a travel behavior survey of residents in San Francisco and San Diego to better understand direct traveler responses to travel time changes.[22] This study found that a five-minute time savings would cause survey respondents to make an extra stop or change their destination for only about 4% of their trips. This paper also cites a Dutch study that found that over 90% of the observed increase in traffic volumes on a new freeway in a congested

[20] RAND and WSP. Latest Evidence on Induced Travel Demand: An Evidence Review (May 2018).

[21] For more information on the concept of a travel time budget, see Stopher, Ahmed & Liu (2016), available at https://link.springer.com/article/10.1007/s11116-016-9694-6.

[22] Dowling Associates for the California Air Resources Board. Effects of Increased Highway Capacity on Travel Behavior (1994).

area are the result of changes in the time a trip is made, and changes in the route taken.[23] Together, these indicate a limited sensitivity to new trips generated as a result of new capacity.

Adjustments may not be appropriate or necessary in suburban or rural areas where congestion is not severe enough to suppress existing vehicle trip making. In these settings, land uses are already generating vehicle trips at full demand levels (i.e., rates similar to those in the ITE Trip Generation Manual). A comparison to ITE rates could be used as evidence to determine whether an adjustment is necessary, and if so, the level of appropriate adjustment.

Sensitivity to land use – OPR's recommendations can be followed to incorporate the VMT effects that are caused by the subsequent land use changes.

- Employ an expert panel, including local agencies' land use planners, to develop a scenario of anticipated land use growth for project alternatives. This process should recognize whether land use effects are intra- or inter-regional. If population is attracted from an adjacent region, the difference in VMT per capita generation rates may also need to be addressed.
- Adjust model results to align with the short-term elasticity research. Note that this is only possible for short-term elasticities, which range from 0.1-0.60 as documented in the California Air Resources Board (CARB) research noted above. Please note that short-term VMT forecasts from travel models are not directly comparable to long-term VMT forecasts based on elasticity factors.
- Employ a land use model, running it iteratively with a travel demand model. A wide range of land use models exist but most are likely to be too time-consuming or costly to apply for an individual project. At the regional scale, options such as the University of California (UC) Davis' UPlan regional land use model, CommunityViz, UrbanSim, and others can incorporate attractors such as highways, highway ramps, major arterial roads, minor arterial roads, transit lines, and existing land use development, assigning future regional growth to the areas around these attractors based on the strength of attraction of each feature and the distance from each feature.

Fixed parameters for IX trips, XI trips, and medium/heavy-duty vehicle trips – The SCAG 2020 ABM uses fixed parameters for internal-external (IX) and external-internal (XI) trips as well as medium/heavy-duty vehicle trips, which does not allow for any feedback to these variables based on changes to other model parameters. This can be rectified through model refinements and modifications.

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[23] A. L. Loos, P. H. L. Bovy, and T. Van Der Hoom (1991). The M10 Amsterdam Orbital Motorway: Effects of Opening upon Travel Behavior. Available at https://repository.tudelft.nl/islandora/object/uuid%3A7c6c408c-b90f-4524-9d99-d827dcccb70f.

Static versus dynamic traffic assignment – A final issue that is whether (and how) a model uses static traffic assignment (STA) instead of dynamic traffic assignment (DTA), and how that affects VMT forecasts. One research paper directly comparing STA and DTA estimates revealed how the limited sensitivity of STA over-predicts traffic volumes, which would contribute to overestimates of VMT.[24]

Despite the noted model limitations, a model may still be useful to understand the incremental difference between project alternatives that the NCST Calculator or other elasticity methods will not reveal. The model's forecasts of VMT can also be stratified by speed bin, which is important for emissions analysis, and disaggregated to understand the relative share of VMT that is comprised by light duty (or passenger) vehicles relevant for transportation impact determination, and the relative share of medium or heavy-duty vehicles, reflecting commercial travel. Thus, use of a travel demand model may be useful under the following conditions.

1. Comparisons between no build and build alternatives in the same analysis year are useful for impact-related decisions. This comparison can be used to estimate a short-term induced vehicle travel elasticity that can be compared against the short-term academic elasticity estimates for reasonableness.
2. The NCST Calculator is not applicable due to project type, or has greater limitations than a travel demand model based on substantial evidence about the specific characteristics of the project.
3. VMT by speed bin or vehicle type is needed to evaluate emissions for air quality, transportation, or GHG analysis.

Suggested Quantification Approach for Metro's VMT Mitigation Program

Metro's SHS Project List contains 55 projects at the writing of this memo and includes projects and programs from several sources such as Measure R, Measure M, and the 2020 Long Range Transportation Plan (LRTP). The projects and programs are currently in varying phases, ranging from pre-planning to planning, environmental review, final design, and construction. Due in part to the variety in originating plan and current status, the current level of detail about each project also varies widely. Thus, there is a limit to how accurately presumptions can be made regarding potential impacts at this stage.

Project types on this list include grade separations, soundwalls, interchange and ramp modifications, Intelligent Transportation Systems (ITS) and other technological upgrades, addition

[24] Forecasting the impossible: The status quo of estimating traffic flows with static traffic assignment and the future of dynamic traffic assignment, Research in Transportation Business & Management, Vol. 29, pp 85-92. 2018.

of HOV lanes, HOT lanes, or Express Lanes, auxiliary lanes, collector-distributor roads, various efficiency and safety upgrades, and new highways.

Based on the assessments of VMT quantification tools and SCAG's 2020 ABM, the following quantification approaches are recommended at a program level and at a project level.

Program Level

To refine the NCST Calculator results to align with the CEQA Guidelines and the legislative intent of SB 743, only the induced VMT related to automobile travel at the individual/household level should be included. Furthermore, the induced VMT elasticity factor should be more in line with the results of the SCAG model tests, which demonstrate an over-estimation of induced VMT compared to the observed VMT trends in the Los Angeles MSA.

One of the main research studies used to support the NCST Calculator's approach offers one approach to isolating the induced travel related to individual/household travel changes. Based on Duranton & Turner's analysis, changes in individual or household driving account for 9%-39% of all induced VMT associated with a 10% increase in lane miles.

Concentrating on the induced VMT effects associated only with automobile travel and applying these percentages to a 1.0 starting elasticity (the NCST Calculator's elasticity for Class 1 facilities) produces a range in elasticity values from 0.09 to 0.39 (9% of 1.0 to 39% of 1.0). Applied to a 0.75 starting elasticity (the NCST Calculator's elasticity for Class 2 and 3 facilities), the range becomes 0.07 to 0.29 (9% of 0.75 to 39% of 0.75).

An elasticity of 0.39 – the result of applying the high end of the 9%-39% range described above to the 1.0 elasticity in the NCST Calculator – is also aligned with research by Robert Cervero, who demonstrated a long-term elasticity of 0.39 based on California data and relying on a modeling methodology that accounted for the effect that previous development and roadway capacity investment had on influencing lane mile increases.[25] Other studies have also found an elasticity of lane-miles with respect to total VMT of 0.33 revealing a strong two-way relationship where every 10% increase in VMT, lane-miles grew by 3.3%.[26] Additionally, studies that estimate elasticities of demand with respect to road capacity considering all road types (and therefore controlling for reassignment/trip diversion effects) at the state or regional level find smaller induced demand effects, such that a 10% increase in capacity would result in induced demand in the range 1% to

[25] Road Expansion, Urban Growth, and Induced Travel – A Path Analysis, Robert Cervero, APA Journal, Spring 2003, Vol. 69, No. 2.

[26] Induced Travel Demand and Induced Road Investment: A Simultaneous Equation Analysis, Journal of Transport Economics and Policy, Vol. 36, No. 3, pp 469-490. September 2002.

4%.[27, 28] Finally, where the impact of road capacity that adds to the length of the road network is distinguished from lane capacity increases for the existing network, the former can be interpreted as an accessibility effect.[29, 30] This is associated with a smaller elasticity (approximately 0.3). Finally, these elasticity factors are also more in line with the elasticity factors produced by the SCAG Model sensitivity tests and case studies.

Therefore, a refinement to the 1.0 elasticity factor embedded in the NCST Calculator can be used to generate long-term VMT changes at the MSA level while controlling for variables such as population growth, employment growth, and income changes. Substantial evidence exists across multiple research studies, SCAG Model tests, and observed VMT data to justify an elasticity closer to 0.39 to account only for long-term induced automobile travel for Class 1 facilities and a 0.29 elasticity factor for Class 2 and 3 facilities.

For the VMT Mitigation Program, rather than using the 1.0 elasticity factor for Class I facilities, the suggested approach would start with a modified elasticity factor and incorporate further adjustments from the SCAG 2020 ABM to establish a range of induced vehicle travel using the two available quantification tools discussed in the previous section.

1. Modify Elasticity Factors in the NCST Calculator to Exclude Freight VMT and Reflect Local Conditions

As described above, medium and heavy-duty vehicle VMT is embedded within the data that underpins the NCST Calculator. These vehicle classes capture regional freight and commercial travel which supports not only the Southern California region but the rest of the US as well, is not separated out from the NCST Calculator's elasticity factors and assumptions. In recognition of the regional and national nature of this type of driving, SB 743 only requires lead agencies to consider passenger travel (light duty vehicles and trucks) when determining VMT impacts, as this type of travel is the most influenceable by lead agencies' transportation and land use planning decisions.[31] As such, isolating automobile VMT helps communicate what is likely to be influenced by a project, and similarly, what could be influenced by mitigation actions. The NCST Calculator currently omits this important policy distinction in its calculations.

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[27] Hymel, Kent M., Kenneth A. Small, and Kurt Van Dender. 2010. "Induced demand and rebound effects in road transport." Transportation Research Part B: Methodological 44 (10): pp 1220-1241.
[28] Gonzalez, Rosa Marina, and Gustavo A. Marrero. 2012. "Induced road traffic in Spanish regions: A dynamic panel data model." Transportation Research Part A: Policy and Practice 46 (3): pp 435-445.
[29] Hsu, W-T and H. Zhang. 2014. "The fundamental law of highway congestion revisited: Evidence from national expressways in Japan." Journal of Urban Economics 81: 65–76.
[30] Pasidis, I. 2017. 'Urban transport externalities.' PhD Thesis, University of Barcelona.
[31] Note, total VMT is required for Air Quality, GHG, and Energy impact analysis under CEQA.

The final adjusted elasticity factor is consistent with the high end of the range for changes in VMT due to individual or household driving as presented in Duranton & Turner (2011), or 39% of the total induced VMT, for an elasticity factor of 0.39 or 0.29 depending on the facility classification. The modified VMT elasticity factors are shown in Table 4, in comparison to the original NCST elasticity factors. The modified VMT elasticity factor will then be applied to the total lane mile additions from the multi-modal highway program to calculate the induced vehicle travel.

These factors fall within the induced VMT range used by Metro's *Climate Emissions Analysis: Metro's Indirect Impact on Greenhouse Gas Emissions* (Climate Emissions Study) presented to the Board of Directors in August 2022.[32] The range used in that study was based on a short-term elasticity factor of 0.23 from SCAG-authored sensitivity tests and a long-term elasticity factor of 1.0 from the NCST Calculator. The Climate Emissions Study did not exclude medium or heavy-duty vehicle travel from the analysis.

Table 4: NCST VMT Elasticities & Adjusted Elasticity Factor

Tool	***Elasticity***	***Source***
NCST – Class 1 Facilities (Short + Long Term)	1.0	NCST
NCST – Class 2 and 3 Facilities (Short + Long Term)	0.75	NCST
Modified NCST - Class 1 Facilities (Short + Long Term) ***VMT Only for Passenger (Light-Duty) Cars and Trucks***	0.39	NCST, Cervero, Duranton & Turner
Modified NCST – Class 2 and Class 3 Facilities (Short + Long Term) ***VMT Only for Passenger (Light-Duty) Cars and Trucks***	0.29	NCST, Cervero, Duranton & Turner

The benefit of this method is that it requires a lower effort than a modeling-based approach and can be operationalized through a spreadsheet tool. However, it has the limitations noted in the previous section. Relying on this method alone may not provide a complete picture of potential VMT effects and may over-estimate the impact of induced vehicle travel by not accounting for other factors contributing to long-term traffic increases.

[32] LA Metro. Climate Emissions Analysis: Metro's Indirect Impact on Greenhouse Gas Emissions. August 2022. Retrieved from https://metro.legistar.com/LegislationDetail.aspx?ID=5759433&GUID=230DEBE4-8769-4DE1-B67E-DD79194C2CA6&Options=&Search=

2. SCAG's 2020 ABM

In addition, SCAG's 2020 ABM will be used to develop two model scenarios with and without the highway improvements projects, the VMT results of which will be obtained to determine the short-term induced VMT resulting from the program. As noted previously, this approach provides merits of reflecting the local context, but may underestimate induced VMT due to the revealed limitations. The results of this comparison will allow for further refinement of the elasticity factor used at the program level.

Results from the two quantification methodologies would establish a final range of induced VMT for the highway improvements projects at the program level, which will be used to develop the mitigation program that meets the program objectives and provides flexible and viable mitigation options. As noted in the introduction, this memorandum is intended to articulate the approach, and does not present the quantification results of this methodology. Task 6, development of a VMT Tool, will incorporate quantification results.

Project Level

At a project level, since an elasticity-based approach (such as the modified NCST Calculator elasticity factor approach described above) is not directly applicable for many of the project types contained on Metro's project list, using a hybrid approach is likely to be more appropriate when quantification is required. The steps to estimate induced vehicle travel for a project on the SHS are described below.

Step 1 – Project Screening for Quantification Needs

The first step is to determine whether the project should be presumed to not result in a VMT impact and therefore excluded from needing to perform an induced travel analysis, following the project screening guidance provided in the TAC. The TAC states that the emphasis of this guidance is to identify those projects that will lead to a measurable and substantial increase in vehicle travel. Projects not likely to lead to a measurable and substantial increase in VMT generally should not require an induced travel analysis per OPR's Technical Advisory. While the TAC provides a list of 32 project types that are screened from induced travel analysis, it also states additional project types could be added to the screening list if they are not likely to lead to a measurable and substantial increase in VMT.

The following project types are anticipated to meet this criterion and therefore are recommended to include to the screening project list in TAC.

A. **Auxiliary lanes:** Auxiliary lanes (also known as acceleration/deceleration lanes and speed change lanes), allow drivers to either increase or decrease their speed in an area where high-speed highway mainline traffic is not present and are supplementary to through-traffic movement. The speed difference between the highway mainline and on- and off-ramps or surrounding streets can be significant, introducing turbulence resulting in stop-and-go traffic and increased collision rates. Regardless of length, auxiliary lanes that are designed primarily to improve safety of existing lanes by facilitating weaving may add miles but are not likely to influence travel behavior in terms of number of trips or trip distance because they do not change the fundamental availability of the roadway once the vehicle is on the mainline of the freeway.

B. **Truck only lanes in the urban context:** Adding lane miles for trucks (commercial) travel is not likely to translate meaningfully to additional capacity for the general public such that new travel is induced. Truck only lanes serve to increase truck travel time reliability, increasing efficiency of passenger and transit vehicles on main traffic lanes by removing turbulence introduced by slower moving heavy trucks, and increase safety by removing heavy trucks from main traffic flow. Truck (commercial) travel is also insensitive to roadway capacity with this demand unable to use alternative modes in the absence of new capacity. Truck only lanes primarily serving safety-related goals rather than travel time related goals are not likely to influence travel behavior.

C. **Operational improvements:** Projects that improve operations through and do not add through-traffic lane miles to the freeway mainline, in addition to those operational projects listed in the TAC (such as collector-distributor roads), are not likely to translate meaningfully to additional capacity. These projects may solve bottleneck issues during a peak period and address operational issues of traffic backing up onto neighborhood streets, which both have safety implications, but are not likely to induce new trip-making or change the length of trips already on the network.

D. **Ramp reconfiguration projects:** Projects that add lane miles by reconfiguring on/off ramps but do not change the fundamental availability of the roadway once a person is on the mainline are unlikely to translate to additional capacity and induced VMT. Any additional VMT resulting from the additional length of the reconfigured ramps would be analyzed at the project level and disclosed.

E. **Congestion pricing and lane management projects that are intended to manage traffic to reduce VMT:** While some roadway management projects are designed to maintain certain travel speeds or result in congestion reduction primarily, projects that include pricing and high-occupancy features designed to influence travel behavior can counter-balance induced travel effects.[33]

Step 2 – Identify VMT Quantification Method

If induced vehicle travel quantification is required for a project on the SHS, the appropriate method will be identified based on project types, knowing an elasticity-based approach is not directly appliable to many types. A hybrid method can integrate both the SCAG 2020 ABM, and future iterations of the ABM, and the modified NCST elasticity-based methods. This approach allows the same land uses for all alternatives but should acknowledge the limitation of using fixed land use inputs. Notably, the discussion would describe which alternative the land use forecasts best reflect and how the accessibility differences between the alternatives could affect the allocation of future growth. The SCAG 2020 ABM will be used to forecast the short-term induced travel effect for the build condition of project alternatives, while the modified elasticities from the NCST calculator will be used to forecast long-term VMT effects of the project build alternatives. The elasticity will be modified to address limitations as described in Table 3 above and is anticipated to produce a low-end and high-end of a long-term induced vehicle travel range.

The details of this method are listed below.

1. The SCAG 2020 ABM will be used to generate volume forecasts and VMT information for No Build and Build alternatives with a fixed set of land use forecasts.

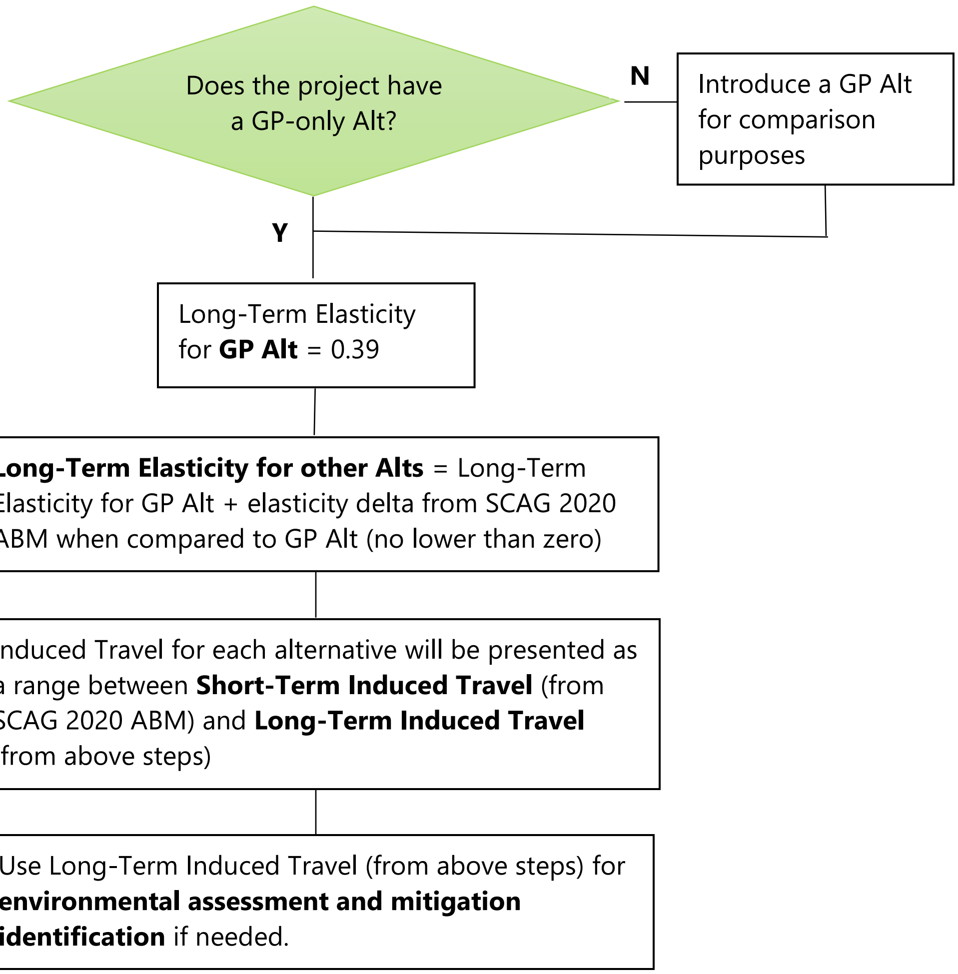
    - Metro will inform the analyst whether these land use forecasts represent the build or no build condition.
    - Typically, project development and environmental impact analysis is only performed on projects that have already been included in a regional transportation plan, so SCAG's land use forecasts are most likely to represent build conditions.
    - The environmental document will disclose the limitations of the model with an acknowledgement that the actual land use will likely differ among alternatives. Where appropriate, the analyst can qualitatively explain how the project could affect land use and what the likely outcome would be in terms of the direction of change with respect to vehicle trips and VMT.
    - Short-term induced vehicle travel effects will be generated for each of build alternatives, using the SCAG 2020 ABM.

[33] This type of managed lane has not yet been implemented in California, but has been suggested on at least one project in Caltrans District 4, which had a Draft EIR circulated at the time of writing this memorandum. DEIR available at https://dot.ca.gov/-/media/dot-media/district-4/documents/37-corridor-projects/sr37-draft-eir-ea-1q7600-sears-pt-mare-island-proj-vol1-a11y.pdf, with information about the tolling scenarios described on page 2-56.

- For base year and open year with project scenarios, the Home-based Work and Home-based University/School trips should be held constant as in the corresponding No-Build scenarios, because the work and university/school locations will not change immediately due to the project.

2. A modified long-term elasticity factor will be employed to generate the long-term induced travel effect for VMT, following the steps shown in the flowchart on the next page and described below.

   A. If multiple alternatives are involved, a modified long-term elasticity of 0.39 will be used to generate the long-term induced travel for the "Base" Build Alternative, e.g., the GP Alternative. The elasticity of 0.39 was derived from the "individual and household travel" component part of induced travel only, as described above. This approach represents the GP capacity improvement projects in a typical urban area. In the event that the short term induced vehicle travel effects produced in the step above exceeds a 0.39 elasticity factor, the higher of the two values should be used to ensure all potential long-term impacts are accounted for. An example of these two cases is shown below.
   B. The SCAG 2020 ABM results described in the earlier section (I-5 and I-10 case study analysis) showed there is a difference in the elasticity values between urban and suburban areas when determining the short-term induced travel. However, the recent UC Davis update to the NCST research and Calculator indicated no difference in long-term elasticity values for urban versus suburban context. Therefore, to consider the conservative approach, the same elasticity of 0.39 will be applied to determine the long-term induced travel for both urban and suburban projects.
   C. For projects in which the GP Alternative is not considered, a GP scenario will be introduced only to establish the "Base" Build Alternative for comparison purpose.
   D. For other build alternatives, such as HOV or HOT scenarios, the long-term induced travel effect for VMT will pivot from the "Base" Build Alternative's VMT estimate by applying an incremental difference between each alternative and the "Base" Build Alternative derived by evaluating the alternatives using the SCAG 2020 ABM. That incremental difference will then be applied to the "Base" Build's long-term induced travel estimate to generate the long-term induced travel effects for each other alternative.
   E. The SCAG 2020 ABM results (short-term induced VMT) and the elasticity-factor results (long-term induced VMT) can then be reported as a range, and the environmental assessment could be based on the higher long-range VMT estimate for the purposes of identifying mitigation needs. This minimizes the risk associated with potential underestimation of induced vehicle travel.



Elasticity Calculations for I-5 Corridor Case Study
Long-Term Elasticity for Alternatives

GP Alt 0.39

HOV Alt =0.39 – Delta of Elasticity Values from SCAG 2020 ABM (GP Alt – HOV Alt)
=0.39 – (0.06 - (-0.34))
=0.39 – (0.4) = **-0.01**
Since the calculated value is below zero, the long-term elasticity value is set to be zero under the HOV Alt.

HOT Alt =0.39 – Delta of Elasticity Values from SCAG 2020 ABM (GP Alt – HOT Alt)
=0.39 – (0.06 - (-0.17))
=0.39 – (0.23) = **0.16**
The long-term elasticity value is set at 0.16 under the HOT Alt.

Elasticity Calculations for I-10 Corridor Case Study
Long-Term Elasticity for Alternatives

GP Alt	0.48
HOV Alt	=0.48 – Delta of Elasticity Values from SCAG 2020 ABM (GP Alt – HOV Alt) =0.48 – (0.48 - (-0.20)) =0.48 – (0.68) = **-0.20** Since the calculated value is below zero, the long-term elasticity value is set to be zero under the HOV Alt.
HOT Alt	=0.48 – Delta of Elasticity Values from SCAG 2020 ABM (GP Alt – HOT Alt) =0.48 – (0.48 - (-0.04)) =0.48 – (0.52) = **-0.04** Since the calculated value is below zero, the long-term elasticity value is set to be zero under the HOT Alt.

For projects on the SHS, this method should be reviewed with Caltrans staff prior to application given the TAF recommendations and the potential for the TAF to continuously be updated as new information and research is published. Please note that the induced vehicle effects not captured by the travel demand model could influence the peak hour design volumes used in traffic operations analysis and the VMT by speed bin estimates used for emissions analysis. At a minimum, these limitations will be acknowledged and disclosed in the environmental documents.

To help facilitate future Caltrans reviews of the model or induced vehicle travel analysis conducted with the SCAG 2020 ABM, it is suggested that Metro conduct an early review of the model against the TAF First Edition model checklist noted above for each project as it advances through the environmental review process. The intent of this review is to demonstrate the model's ability to meet the sensitivity expectations set forth in the checklist for the specific project under study. This review can be coordinated with Caltrans Headquarters and District 7 staff to build consensus around the findings. If the review reveals any limitations of the model beyond the limitations described here, they could be addressed to help prepare the model for future applications on subsequent projects and/or incorporated into the scoping for the next major project required to apply the model.

Step 3 – Identify VMT Mitigation Opportunities

For projects with significant induced vehicle travel impacts, the final step is to identify appropriate mitigation strategies that match the project needs, which could be specific mitigation opportunities/strategies or through the established VMT Mitigation Program. Where possible, project features may be able to be incorporated as part of an evaluated alternative that may reduce the magnitude of VMT mitigation needed.

Conclusion & Next Steps

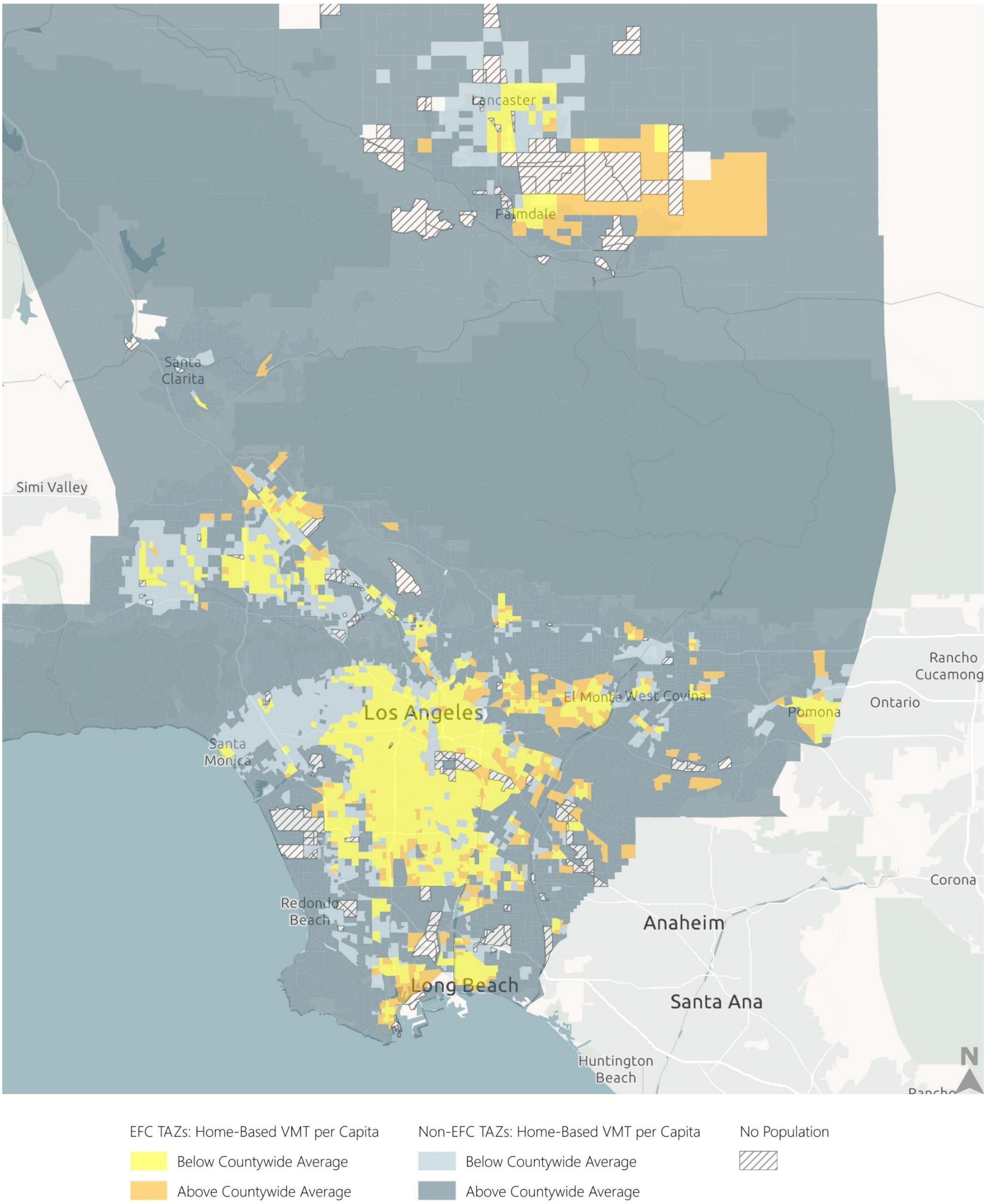
This memorandum is intended to provide clarity on an approach to quantifying induced vehicle travel at a program level and at a project level for future environmental review of projects on the SHS in Los Angeles County. Recognizing that the policy and regulatory landscape in this space is evolving, this document outlines a hybrid approach to setting a lower and upper boundary of a range for project-related VMT impacts that is in line with recent applications of the policy guidance.

For the purposes of developing the VMT Mitigation Program, quantifying the magnitude of how much VMT mitigation may be necessary to fully mitigate Metro's SHS project list is difficult to define at this time due to lack of specific details for each potential project alternative, due to the flexibility afforded to subregions in how to scope projects. In addition, project specifics would be defined through upstream phases of project development which would include close coordination and partnership with Metro's subregional project leads and Caltrans. These upstream phases may directly incorporate VMT reduction strategies or may define a Purpose and Need that would influence project approvals regardless of the project's ability to mitigate VMT impacts. Regardless of these upstream project development activities, Metro anticipates a need for future projects to have mitigation options available to them that currently do not exist.

The forthcoming development of the VMT quantification tool in Task 6 will allow individual projects to test ways to mitigate associated VMT through quantified mitigation actions. By the conclusion of the VMT Mitigation Program, the program framework will help provide clarity in quantifying VMT impacts, pathways to mitigation on a project level, and information to help the agency make informed decisions about project alternatives and tradeoffs between the benefits of capacity increasing highway improvement projects and the cost of VMT mitigation.

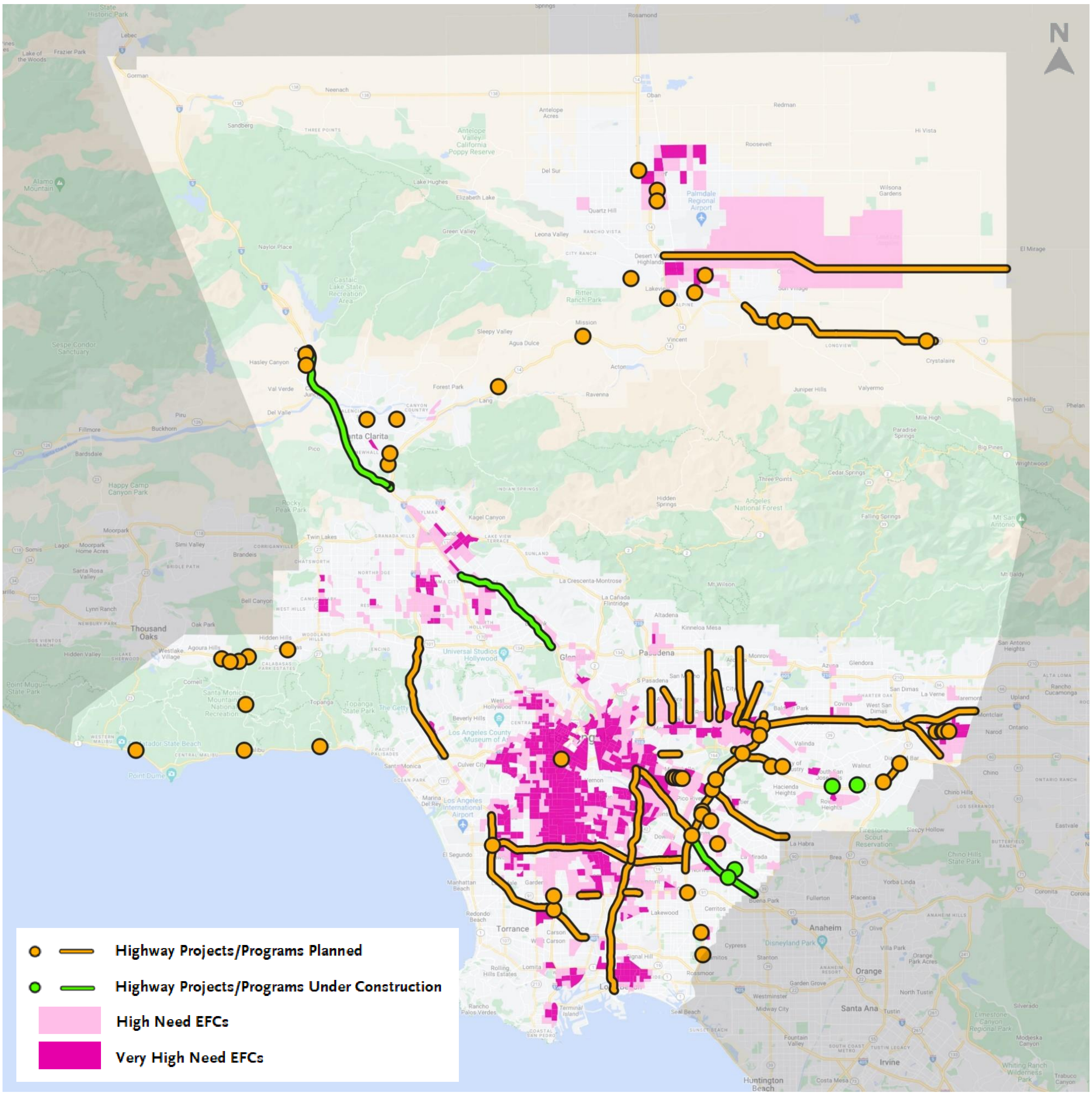
Attachment E

Metro EFCs & TAZ VMT Data - Countywide



Attachment F

Metro EFCs & Highway Projects & Programs – Countywide



We're working on greater mobility options.

VMT Mitigation Program

September 2023

Metro

Overview

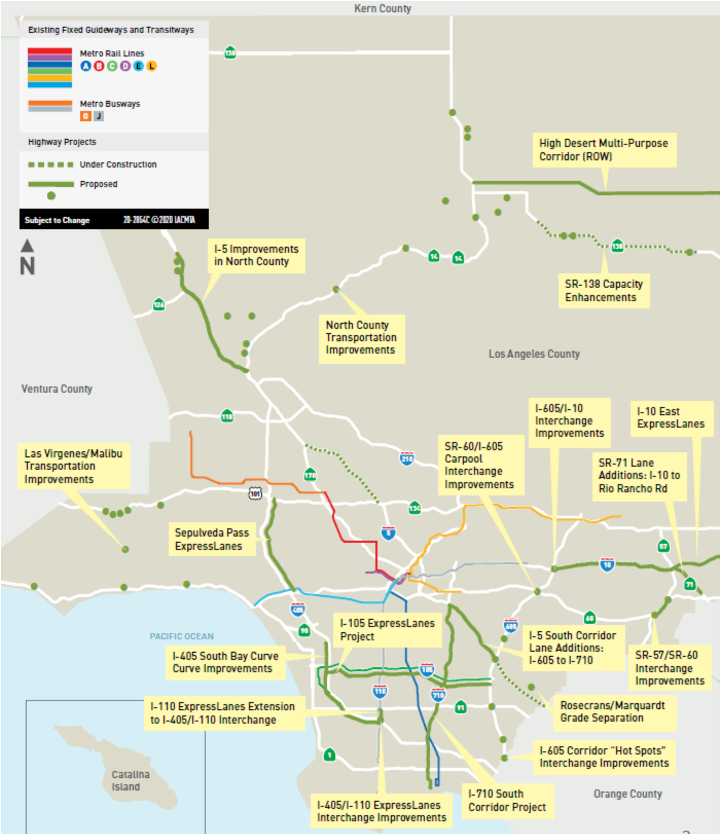
> **<u>RECEIVE & FILE</u> to update Board on Metro VMT Mitigation Program**

> **<u>Program Goals</u>**

- Understand and apply SB 743 policy to highway projects
- Define approach to quantify potential Vehicle Miles Traveled (VMT) impacts
- Establish VMT Mitigation Program (March 2024)

> **<u>Consistency with Board Directives</u>**

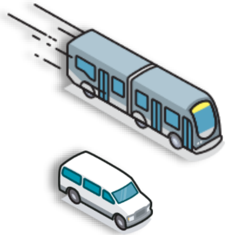
- **2021:** Modernizing the Highway Program
- **2022:** Objectives for Multimodal Highway Investment



Source: Metro 2020 LRTP

Potential Mitigation Strategies

Transit & Vanpool



Operational: More service hours, better service coverage
Programmatic: Fare subsidies, TDM programs, expansion of vanpool and shuttle programs
Capital: Bus-only lanes, bus stop improvements, more rail or bus vehicles

Active Transportation

Programmatic: Bikeshare and scooter-share membership subsidies, e-bike purchase subsidies
Capital: Active transportation corridors, first/last mile improvements

Land Use

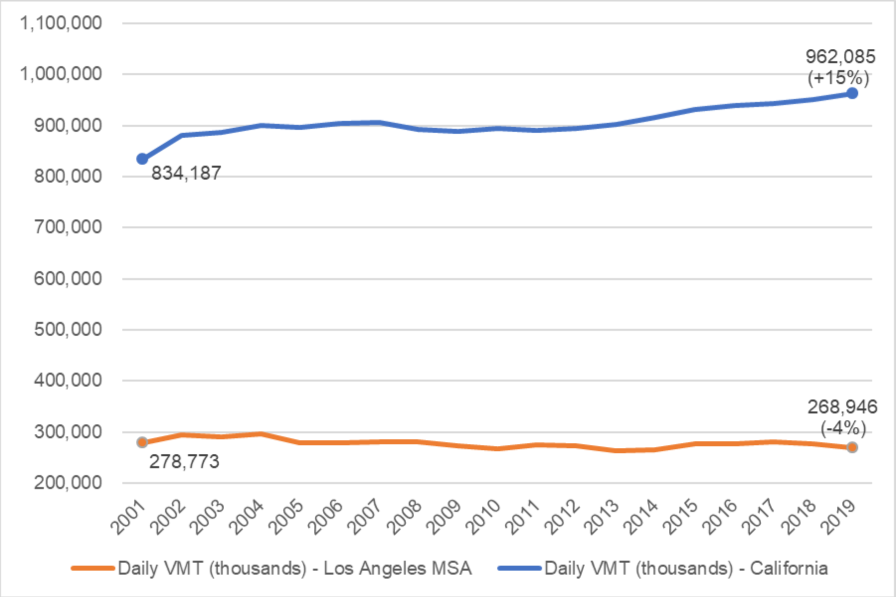
Land Use: Affordable housing; transit-oriented housing; transit-oriented mixed-use neighborhoods

Pricing

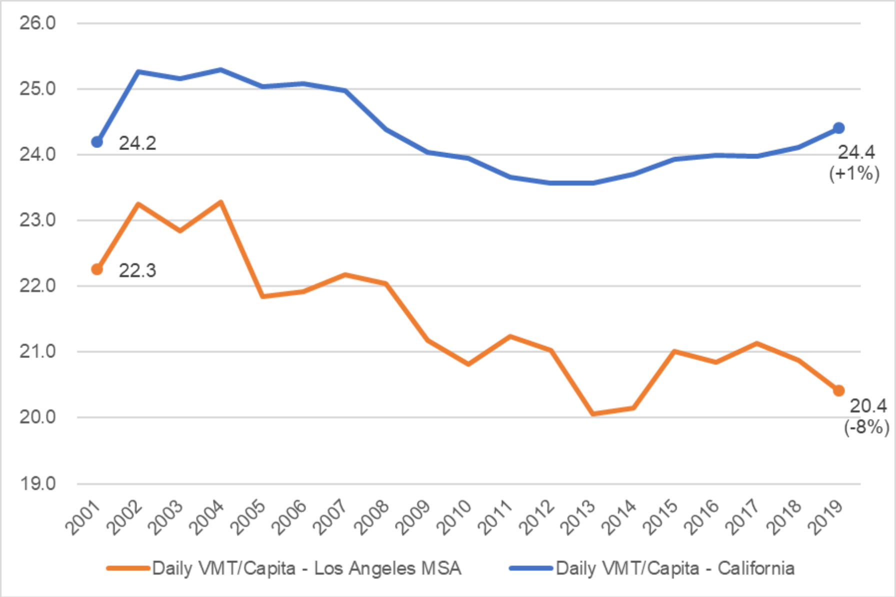
Pricing: Corridor/cordon pricing, VMT tax, parking pricing

Quantification Approach

Total Daily VMT



Per Capita VMT



Project Cost Implications

Project Cost	LA County-Specific Quantification Approach	California Induced Travel Calculator
Estimated Capital Cost	$168 million	
Mitigation Cost[1]	$97.7 million	$252.6 million
Total Project Cost	$265.7 million	$420.6 million
Mitigation Cost Difference		**+ $154.9 million**
Total Project Cost % Increase with Mitigation	+58%	+150%

[1] Based on mitigation costs included as part of the Interstate 680 Northbound Express Lane Completion Project in Contra Costa County, CA.

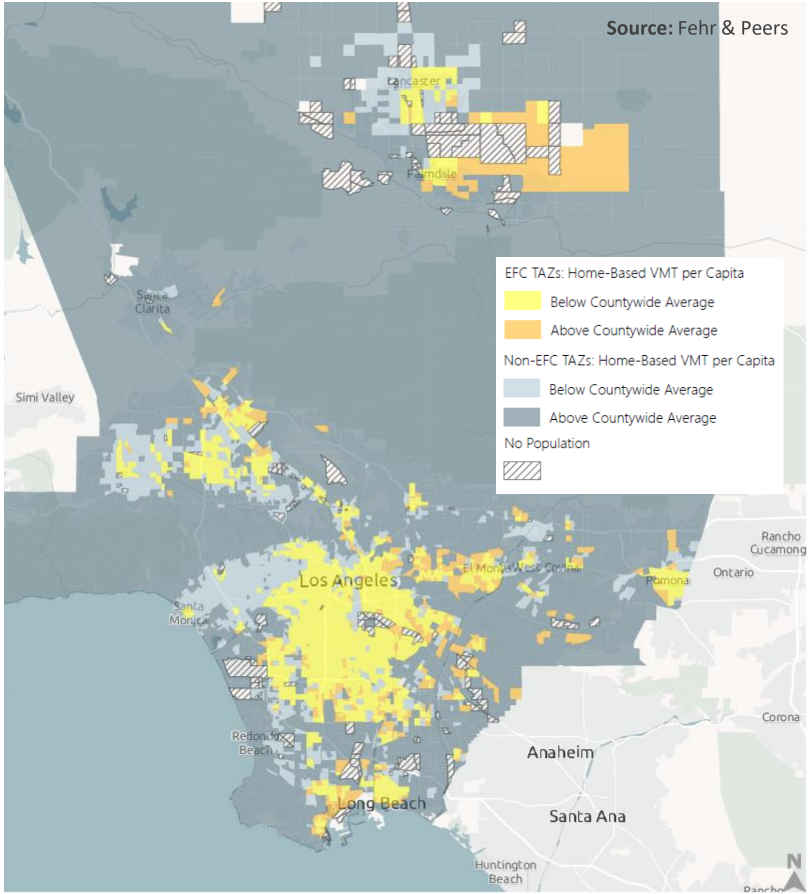
Equity Analysis

Balancing benefits/burdens of VMT creation **and** VMT reduction

Multiple stakeholder engagement pathways

Equity is both an **outcome** and a **process** to address racial, socioeconomic, and gender disparities to ensure **fair and just access to opportunities** such as jobs, housing, education, mobility options, and healthier communities.

VMT mitigations **must** reduce VMT; they can also improve access to opportunities



Project Schedule

WE ARE HERE

2022	2023	2024
Summer Summarize plans and policy guidance	**Spring/Summer** Develop VMT mitigation quantification tool	**Spring** Board adopts VMT Mitigation Program
Fall/Winter Establish VMT quantification methodology and mitigation evaluation criteria	**Fall/Winter** Develop draft VMT Mitigation Program framework	

ONGOING PUBLIC PARTICIPATION