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A Research Report from the National Center for Sustainable Transportation

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16. Abstract
This report investigates how local governments (cities and counties) are implementing California's Senate Bill 743, adopted in 2013 to eliminate traffic delay, measured using level-of-service (LOS) standards, as a basis for analyzing and mitigating transportation-related impacts of development projects and plans as called for under the California Environmental Quality Act (CEQA). Based on a survey of local planning directors in California, administered in Spring, 2024, the report finds that more than four-fifths of localities are continuing to apply LOS standards on an "off-CEQA" basis in the permitting process for individual development projects, as well as in community-level plans and policies. Most respondent localities reported that using both VMT and LOS at both the project- and plan-level has not created conflicts, indicating that they are able to align VMT and LOS. Mitigation strategies reported as effective in reducing VMT and also improving LOS include improving active travel facilities, supporting mixed-use development, and relaxing parking requirements; these strategies can be deemed "best practices" for aligning VMT and LOS objectives

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November 2024

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EXECUTIVE SUMMARY

In 2013, then-Governor Jerry Brown signed Senate Bill (SB) 743 into law. The law represented a sea change in analysis and mitigation of transportation impacts of development projects and plans, conducted under the California Environmental Quality Act (CEQA), which until then had been focused on mitigating impacts of traffic delay, measured using automobile level of service (LOS) standards and metrics. For decades, traffic engineers had used LOS standards as a basis for implementing roadway measures to accommodate added traffic, such as through retiming or adding traffic signals, adding turn lanes, and/or widening roadways. But the use of LOS as the guiding metric for transportation impacts review had come under criticism for various reasons, including for increasing the cost of infill development in urban areas and generally inducing more auto-dependency.

SB 743 called for a different performance metric for assessing transportation impacts of development better suited to achieving state goals for reducing greenhouse gases (GHGs), promoting infill development, and encouraging multimodal transportation. Pursuant to SB 743, the Governor's Office of Planning and Research (OPR) and the California Natural Resources Agency promulgated technical guidance that eliminated automobile LOS as an impact for examination under CEQA, and replaced it with vehicle miles traveled (VMT). Implementation of the LOS-to-VMT shift was left up to lead agencies—the agencies with primary permit approval authority over a given development project, which for land development is usually a local government (city or county). Agencies were required to begin complying with SB 743 by July 1, 2020.

The LOS-to-VMT shift was expected to create potential challenges for transportation analysts and planners, given the often-limited resources of local governments, the perceived lack of established practice with respect to VMT impact analysis, and the uncertain synergies or conflicts that could arise between LOS and VMT standards and mitigation measures, given that most jurisdictions were expected to continue using LOS standards (outside of CEQA) as part of the permitting process for land development projects, and also in wider-scale transportation policies and plans. With those concerns in mind, this report explores how California's cities and counties are implementing SB 743 and whether and how they are continuing to use LOS outside of CEQA in project-level analyses and/or higher-level plans and policies. We conducted a survey of local planning directors in California, obtaining responses from 94 cities and counties, and we conducted two case studies of cities that have used SB 743 implementation as a basis for systematically reconfiguring transportation impact fees and Transportation Demand Management (TDM) programs and policies.

Our survey findings indicate that most jurisdictions are implementing VMT analysis and mitigation at the development project level, as called for under SB 743, while also maintaining

largely intact their pre-SB 743 LOS metrics and standards, which now must be applied "off-CEQA" in reference to local General Plan standards and associated policies such as for project-level review requirements that are applied in addition to CEQA requirements. More than four-fifths (83%) of survey respondent jurisdictions continue to require project-level LOS analysis (outside of CEQA) as part of the permitting process for land development projects. A small but notable share of localities (15%) has reduced LOS requirements and associated costs to developers.

With most localities utilizing both LOS and VMT standards, are developers (or more specifically, development project permit applicants, who must pay for the costs of development review and mitigation, when required) facing higher costs? Are localities (local lead agencies) facing greater planning challenges in aligning these objectives? Overall, the combined costs to developers of both analysis and mitigation for both VMT and LOS is reported to be about the same (18% of respondents) or slightly higher (40% of respondents) than pre-SB 743 costs for addressing LOS alone, but a significant share (26%) of localities deems the combined costs to be much higher. The remaining 16% of localities deems the costs to be lower, indicating that 34% consider costs to be the same or lower than before SB 743. Regression analysis of the survey results indicates that combined costs tend to be lower in denser and more urban localities, corresponding to expectations about which sorts of development are most likely to be streamlined during CEQA review under SB 743 (low-VMT infill development, in particular), and which can be expected to require more mitigation (high-VMT, low-density, outlying, car-dependent development, in particular).

Our survey found similar bifurcated results that reflect how SB 743 "lands on the ground" for different types of communities; for example, when asked whether more development projects are likely to have potentially significant transportation impacts under CEQA using a VMT-based standard versus an LOS-based standard, 42% of respondents indicated "fewer projects," 43% indicated "more projects," and 16% indicated "no change." Regression analysis indicated that less Democratic-leaning and less densely built cities with fewer transit commuters expect that more projects will require mitigation.

A related question is whether localities expect the location of development projects requiring CEQA mitigation of transportation impacts to change as the result of SB 743. More than half (55%) of respondent localities indicated that they do not expect locations to change; these localities tend to be either low-VMT or high-VMT cities, where either most projects can be screened out or few can be screened out from VMT analysis. However, localities that span the urban spectrum—with room to grow in multiple areas with different land use characteristics—were more likely to expect the location to change.

We also probed whether conflicts or synergies have emerged in using both VMT and LOS standards, at both the project- and community-wide plan and policy levels. Most (60%) of respondents reported that using both VMT and LOS for project-level analyses and mitigation has not created conflicts, and about the same share reported no conflicts at the community-wide plan or policy level. This finding indicates that most, though by no means all, localities

have been able to align VMT and LOS. Specific conflicts reported by respondents include the induced travel effects of roadway capacity expansions intended to reduce automobile congestion—because expanding roadway capacity often causes increased VMT. Conflicts were also reported at a community-and plan-level scale in deciding how to allocate funds from city-wide transportation impact fees between roads, transit, and biking and walking facilities. A related challenge reported for rural and suburban jurisdictions is that VMT mitigation measures are costly and may be considered ineffective. However, respondents noted that some VMT mitigation measures can also improve LOS, particularly expanding or improving active travel facilities, enabling and supporting mixed-use development, and relaxing parking requirements; these strategies can be deemed "best practices" for aligning VMT and LOS objectives.

About half of localities have incorporated VMT goals and standards into their General Plans and some are translating VMT into associated transportation programs and policies, such as impact fees. Denser, more urban jurisdictions are more likely to have revisited their plan-level transportation goals in light of SB 743. However, that has not resulted in many corresponding changes to plan-level LOS standards. Nearly four-fifths (79%) of respondents indicated their jurisdiction has not "lowered (made more lenient)" its LOS standards since switching from LOS to VMT metrics for CEQA transportation impact analysis, and nearly the same share (76%) indicate they do not plan to do so in the future.

Overall, our survey findings reveal that few localities are altering LOS standards and analysis requirements, and those which are doing so are mostly in denser and more urban areas. Unsurprisingly, those locales also appear to be benefiting most from post-SB 743 streamlining of the development approval process. Jurisdictions are still only beginning to extend SB 743 implementation beyond project-level review to also serve as a basis for systematically reconfiguring transportation impact fees and TDM programs and policies. However, the two cities we studied in depth, San Francisco and San Diego, serve as models for using the transition to SB 743 impacts analysis as the basis for this sort of systematic policymaking.

Collectively, the survey findings confirm that implications of SB 743 vary by community type. For many, the expected pattern is occurring, in which the type and location of development projects requiring mitigation has shifted to lower-density localities, and within localities, to lower-density, less transit-proximate parts of town. VMT mitigation requirements in the most urban areas can be minimal, sharply contrasting with the situation in rural cities and towns, where few projects may escape mitigation requirements.

Chapter 1. Introduction

For nearly 50 years, automobile level of service (LOS), a measure of traffic delay, was the primary metric considered in assessing transportation-related environmental impacts under California's state-level equivalent of the National Environmental Policy Act (NEPA), the California Environmental Quality Act (CEQA). Senate Bill (SB) 743, adopted in 2013, changed that. SB 743 shifted the focus of transportation impacts analysis under CEQA from maintaining LOS standards for vehicular throughput to instead considering impacts on the amount of driving, as measured by vehicle miles traveled (VMT). This report explores how California's local governments (cities and counties) are implementing SB 743 and, in particular, whether and how they are continuing to use LOS outside of CEQA in project-level analyses and/or higher-level plans and policies. This introductory chapter first sets the context for the report by providing a primer on CEQA, describing the objectives of SB 743 in more detail, and summarizing previous research findings on SB 743 implementation. The chapter then concludes by describing the objectives and methods of the research discussed in this report.

CEQA primer

CEQA is California's foundational environmental review law, requiring analysis and, if feasible, mitigation of significant adverse environmental impacts. The metrics and thresholds for analyzing impact significance—including transportation impact significance—are critical in determining whether and to what extent projects must undergo CEQA review, what type of mitigation measures will be required for any significant impacts, and how likely a project is to be challenged in court. Lead agencies—which, for land development projects are frequently cities and counties—generally have discretion to choose their own impact metrics and significance thresholds.

CEQA imposes a tiered system of environmental review for non-exempt projects that require discretionary approvals, including most larger land development projects, as well as conditional use permits, zoning changes, and amendments to General Plans, the official plans that frame and guide local development choices. Once the lead permitting agency (usually a city or county government) determines that a project is subject to CEQA, it prepares an "initial study" to determine whether the project would have potentially "significant" environmental impacts, including transportation system impacts (14 California Code of Regulations [CEQA Guidelines] Section 15063; CEQA Guidelines, Appendix G). If the agency determines that the project would have no significant environmental impacts, it may prepare a "negative declaration" (PRC Section 21080). If the agency determines that any potentially significant impact would be mitigated (lessened) to a less-than-significant level by revisions to the project plans, it may prepare a "mitigated negative declaration" (PRC Section 21080). The agency must prepare a full environmental impact report (EIR) when there is substantial evidence that the project may have a significant and unavoidable impact on the physical environment, i.e., that the impact would exceed the lead agency's own stipulated "threshold of significance"—the standard the lead agency employs for determining whether an impact is significant or not. The developer of the project in question must mitigate or avoid any impacts deemed significant, if feasible (PRC

Section 21002.1). Costs for both review and mitigation are generally borne by the project proponent.

SB 743: From LOS to VMT

Automobile LOS has been the principal metric used in transportation impact analyses across the US for more than 50 years, including—until recently—in CEQA analysis. However, as interest in promoting sustainable transport options and strategies began to grow, LOS came under increasing criticism for undermining development of multimodal transportation networks, infill development, and even roadway network optimization for motor vehicles—the very purpose for which LOS standards were meant to be used (Governor's Office of Planning and Research (OPR), 2013); Henderson, 2011). In practice, LOS mitigation often entailed modifications such as roadway widening which could forestall and conflict with infill, transit, and biking or pedestrian improvements.

In 2013, California took groundbreaking action to address these concerns by passing SB 743, which eliminated LOS measures of automobile delay as an environmental impact to be addressed under CEQA, and called for a different performance metric for assessing transportation impacts of development better suited to achieving state goals for reducing greenhouse gases (GHGs), promoting infill development, and encouraging multimodal transportation. In December 2018, the California Natural Resources Agency promulgated regulations implementing SB 743, which replaced LOS with VMT as "the most appropriate metric to evaluate a project's transportation impacts" (California Natural Resources Agency, 2019; OPR, 2018).

In comparison with LOS analysis and mitigation, VMT-based impacts review effectively "overturns the apple cart" in terms of which sorts of development are likely to require mitigation under CEQA. Because infill, mixed-use, transit-oriented development is less likely to generate VMT, it is therefore less likely to require mitigation. By contrast, low-density, outlying, car-dependent development is more likely to generate VMT, and thus more likely to require mitigation.

Under SB 743, lead agencies were required to stop using LOS for CEQA purposes and start implementing SB 743 by July 1, 2020. The Governor's Office of Planning and Research (OPR), in its informal *Technical Advisory on Evaluating Transportation Impacts in CEQA (Technical Advisory)*, provided suggestions on identifying VMT thresholds for land use development projects, land use plans and transportation projects, as well as some guidance on estimating and mitigating VMT impacts (OPR, 2018). Lead agencies retain discretion to choose their own impact metrics and significance thresholds; they are not required to follow OPR's recommendations. However, many local governments do so to help ensure that their review procedures are legally defensible (Barbour et al., 2019; Volker et al., 2023).

OPR suggests a two-step approach for identifying project-level significance thresholds. First, a screening threshold can be used to "quickly identify" when a project can be expected to cause a less-than-significant VMT impact without conducting a detailed study (OPR, 2018, p. 12). OPR

recommends five types of screening thresholds: small-project screening, map-based screening for residential and office projects (to identify low-VMT versus high-VMT areas in which projects are located), screening for projects near transit stations (often called "transit priority areas"), screening for affordable housing projects, and screening for local-serving retail. If the proposed project does not pass the screening test, OPR recommends that the lead agency conduct a VMT impact analysis to compare the project's forecasted impacts against a numeric threshold of significance. OPR suggests separate thresholds for residential, office, and retail projects. For residential projects, OPR proposes a threshold of 15% below the average existing VMT per capita (either household VMT or home-based VMT) in the applicable area. For a city, OPR recommends that projects be pegged to either the city's VMT or the region's VMT as the baseline. OPR also proposes using an efficiency-based threshold for office projects—15% below the existing VMT per employee (either employee work tour VMT or home-based work trip VMT) in either the region or, in areas with smaller commute sheds, the county or other smaller geography. Lastly, for retail projects, OPR proposes using a "net increase in total VMT" threshold, where the project would be deemed to have a significant VMT impact if it would increase the total VMT in the affected area.

Implementing SB 743 while retaining LOS

Research studies conducted prior to July 1, 2020—when the LOS-to-VMT shift went into effect—used surveys, interviews, and counterfactual analyses to assess how planners viewed the impending switch from LOS to VMT, what challenges they might face in implementing it, whether it would streamline the approval process for land development projects or make it more costly, and how LOS might continue to be used outside of the CEQA process (Lee and Handy, 2018; Barbour et al. 2019; Volker, Kaylor, & Lee, 2019; Volker, Lee, & Fitch, 2019). Volker, Lee, and Fitch (2019) used a counterfactual analysis to predict that the shift from LOS to VMT could potentially reduce the burden of environmental review of developments, especially in low-VMT areas. However, interviews and surveys of planners indicated that most cities and counties intended to retain LOS standards outside of CEQA, potentially reducing the overall streamlining impact (Barbour et al., 2019, 2021, 2022; Volker, Kaylor, & Lee, 2019). Survey research conducted in 2019 found that four-fifths of California cities were intending to retain use of LOS in their development approval procedures, meaning they would need to balance and somehow integrate LOS with VMT metrics and standards (Barbour et al., 2021, 2022).

In continuing to use LOS, cities and counties must peg LOS-based procedures to "off-CEQA" criteria and authority, such as to meet goals and standards stipulated in cities' General Plans and associated development project application review guidelines, or, in the case of locally-assessed impact fees, on the basis of the state's Mitigation Fee Act (MFA).[1] The 2019 survey by

[1] California enacted the MFA in 1987, through Assembly Bill 1600. The Act defined impact fees as applicable to projects so as to cover the costs of their impacts on public facilities, and required localities to demonstrate a reasonable relationship between a proposed fee and project impacts in the form of legislatively enacted findings. Impact fees are appropriately applied to fund construction or improvement of physical facilities needed to support

Barbour and co-authors found that 70% of California cities had adopted development impact fees for transportation, three-quarters of which were funding not just roadways but other transportation modes. About one-third (36%) of these cities indicated they either had already or were planning to revise their impact fees to align with SB 743, and another 43% indicated they might do so.

Research conducted since July 1, 2020, largely confirms these anticipated effects. Volker et al. (2023) used document review, direct outreach to local governments, and expert interviews to catalogue how each of California's 539 cities and counties had responded to SB 743. They found that every jurisdiction for which they obtained information about their LOS use continued to employ the metric for planning and project-level review outside of CEQA. However, they also found that LOS impact analyses done outside of CEQA were not necessarily as comprehensive and expensive as they would have been for CEQA purposes. One transportation planner interviewed from a large city explained that while they still routinely conduct "circulation and queuing analys[es]" they are "scaled down to be more specific to projects that would affect a broader area or when they do the analysis, [they are] typically just the adjacent intersections rather than 30 intersections that would typically have been in the CEQA analysis." This pattern of reducing the scope of LOS analyses outside of the CEQA process was echoed by four additional interviewees, including one planner who worked for three different cities and a consultant familiar with transportation impact analyses across the state. In addition, one interviewee from a statewide consulting firm estimated that their firm charges 20% less on average to prepare a CEQA VMT impact analysis than they charged to prepare a CEQA LOS analysis, and that not including the reduced cost of mitigation for VMT impacts versus LOS impacts in urban areas. Another interviewee with experience with transportation impact analyses across the state estimated that in urban areas the total cost of a VMT impact analysis plus any associated mitigation was just 5% or 10% of the cost of what CEQA-related LOS impact analyses and associated mitigation measures had been. One interviewee summed up the overall effect on development thusly: "SB 743 is what you make of it" in urban areas; "cities that want to streamline" can streamline, but they can also "continue using LOS" to "basically make growth just as difficult as it has been." However, Volker et al. (2023) concluded that for locations outside urban areas, development projects are less likely to be streamlined. One interviewee even opined that there are "no solutions that are readily available for" high-VMT jurisdictions, considering the cost and inadequacy of VMT mitigation measures in those jurisdictions.

Thus, the vast majority of California localities are attempting to straddle and combine VMT and LOS standards and metrics, encompassing goals for both VMT reduction and congestion management, with potentially far-reaching consequences for transportation planning in the state. While most localities have so far focused mainly on implementing SB 743 for project-level analysis and mitigation (as required by the law), some localities are going further, by using the

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new development, and may not be applied to address existing deficiencies or for maintenance and operations of public facilities.

transition to revisit their transportation policies more broadly, such as their transportation impact fees, and Transportation Demand Management (TDM) policies, imposed on new development. Adopting a systematic approach to reducing VMT, such as through improving multimodal network capacity in "location-efficient" areas (with compact, mixed-use development), can more effectively mitigate VMT than can ad hoc, project-level strategies (Fehr & Peers, 2020, 2021). Especially in built-up urban areas where LOS-oriented strategies are increasingly ineffective for managing vehicle congestion, shifting the emphasis toward improving multi-modal transport efficiency and reducing VMT is often considered a natural course (Barbour et al., 2019).

Utilizing both LOS and VMT standards in the project approvals process can create tensions, however. VMT-mitigating strategies aim to *reduce* driving, often by supporting non-auto modes rather than easing automobile traffic, while auto LOS-mitigating strategies focus on *easing* vehicular traffic, through strategies that often increase VMT and emissions. We explore these trends and tensions further in this report. As localities proceed with SB 743 implementation while retaining LOS, it is important to investigate how and whether localities are able to effectively integrate both these goals and their related standards, and to identify best practices for doing so.

Research objectives for this project

The research described in this report responds directly to an identified Caltrans research need to evaluate the "future of the role of level of service in transportation." In calling for the research, Caltrans noted that, "With implementation of SB 743, Caltrans has moved away from using level of service (LOS) as an environmental concern under CEQA, and toward vehicle-miles traveled. However, LOS is deeply engrained in practice both within the department and among partners, and its use persists outside of CEQA, e.g., in General Plans and in traffic operations decision-making. Developers now…must mitigate for both VMT and LOS, potentially worsening the housing-supply crisis. As well, the mitigations for LOS tend to undermine mitigation for VMT." Caltrans called for research to investigate the tensions that might arise in applying both LOS and VMT goals and standards simultaneously, and to identify best practices in doing so, with the aim "to provide coherence between goals around minimizing VMT and avoiding congestion and safety hazards, while at the same time reducing regulatory burdens on homebuilders."

With these objectives in mind, the research conducted for this report employed two principal methods: (1) an on-line survey of city and county planning department directors, and (2) case studies of two cities to assess local practices for implementing VMT and LOS standards simultaneously. This report proceeds by first presenting findings from the on-line survey, and second by presenting case study findings from San Francisco and San Diego.

Chapter 2. Survey Findings on Implementing LOS and VMT Goals and Standards

This chapter presents findings from an on-line survey of California city and county planning directors (or their equivalent, such as community development directors in cities without a designated planning director) conducted in Spring, 2024. Survey findings from city planning directors were analyzed in conjunction with public-use data on city characteristics obtained from the US Census Bureau and the California Secretary of State's Office, to investigate whether any patterns could be detected in survey responses relating to differences in cities' built-form, demographic, and political characteristics. The same secondary analysis was not conducted for survey data obtained from county planning directors because county governments oversee development that takes place in unincorporated territory, and Census and other public-use data are not easily obtainable at that scale.

Survey sample characteristics and representativeness

Among all cities and counties in the state, the survey response rate was 17%. The response rate was higher among counties; of 57 invited to participate in the survey (with San Francisco considered as a city, not a county), 18 (32%) responded (see Table 1). Of 482 cities invited to participate, 76 (16%) responded.

Table 1. Survey sample by region

	Region							
In survey sample? (a.k.a. survey respondent?)	Sacra-mento	SF Bay Area	Central Coast	Central Valley	Los Angeles	North/ Mountains	San Diego	**Total**
Cities								
Yes	7	17	5	4	37	4	2	76
No	16	84	28	58	154	50	16	406
Total	23	101	33	62	191	54	18	482
Counties								
Yes	2	4	1	4	2	5	1	18
No	4	4	4	4	4	18	0	39
Total	6	8	5	8	6	23	1	57

Note: San Francisco is considered to be a city in our survey sample.

The cities in our survey sample (i.e. the cities whose planning directors or their equivalents responded to our survey) generally resemble other cities in the state on many key characteristics analyzed (Table 2). The survey sample is over-represented by large-population cities, and cities with higher activity density (a measure of "urban-ness" calculated as the sum of residential population plus people who work within the city, regardless of where they live,

divided by city land in square miles). In general, on the other city characteristics tested, the survey sample is fairly representative of cities as a whole in the state.

Table 2. Survey sample city characteristics

	Average values across cities						
In survey sample?	Population	Percent people of color (non-white, non-Hispanic)	Median household income	Single-family percent of homes	Percent transit commuters	Activity density*	Percent Democratic of registered voters
Yes	131,281	58%	101,128	60%	2.5%	6810	47%
No	55,119	56%	99,355	65%	2.1%	6017	44%

* = residential population plus people who work within the city, regardless of where they live, divided by land in square miles

Data sources for city characteristics: US Census Bureau, American Community Survey 2022 5-year dataset; California Secretary of State for voter registration data

Survey findings on basics of VMT and LOS analysis and mitigation at the project level

The survey investigated local actions taken to comply with SB 743. Two-thirds (65%) of respondents (both city and county planning directors) indicated that their jurisdiction has adopted VMT-based thresholds of significance for use in project-level CEQA review, pursuant to SB 743. Only 13% said they had not done so, while 16% indicated they were in the process of developing a threshold policy, and 7% indicated they were informally following another jurisdiction's thresholds (note that these percentage values were subject to rounding).

Following the state guidance supplied by OPR, 83% of respondents indicated their jurisdiction applies screening criteria to identify projects with a less-than-significant VMT impact, allowing them to forego a full VMT impact analysis for certain types of projects. More than half (61%) said they use a sketch-type tool (e.g., a spreadsheet tool) for estimating project-level VMT impacts for CEQA review.

These findings indicate that most localities have taken steps needed to comply with SB 743 and implement project-level VMT analysis. But meanwhile, more than four-fifths (83%) of survey respondents also indicated that their jurisdiction continues to require project-level LOS analysis (outside of CEQA) as part of the permitting process for land development projects. The share (percentage) that does so is slightly lower for cities than for counties. Thus, the survey strongly confirms that most localities are attempting to combine both VMT and LOS standards and metrics.

Nearly three-quarters (73%) of respondents indicated that their jurisdiction's previous (pre-SB 743) project-level LOS analysis metrics and methods are "similar" to their current (post-SB 743) LOS analysis metrics and methods. A small share (15%) of respondents indicated their current

(post-SB 743) LOS analysis covers fewer intersections and/or road segments than before. The most common metric used for project-level LOS analysis is intersection LOS; 40% of respondent localities indicated they use this metric alone, while another 40% indicated they use it in combination with roadway segment LOS (the remaining share either use roadway segment LOS on its own or they use another metric).

Survey findings on the reported cost to developers of project-level mitigation for LOS impacts, including fees and/or exactions, comparing pre-SB 743 versus post-SB 743 costs, parallel the findings just reported on LOS analysis methods; 62% of respondents say the costs are "similar," while 11% say that current LOS mitigation is less expensive than before SB 743. A large share (21%) of respondents indicated they "don't know" about how costs compare. The significant "don't know" share reflects the fact that our survey obtained second-hand information from planners, rather than first-hand information directly from developer project applicants themselves; nevertheless, as the survey findings also indicate, most of the surveyed planners deemed themselves to be familiar enough with their community's development approval process to provide a response which can be reasonably considered to be generally accurate if imprecise. Planners know the costs of fees and exactions because they are imposed by the government. In addition, planners also know the cost of mitigation measures since many of them require governmental right of way or involvement.

Thus, the survey findings indicate that most localities are implementing VMT analysis and mitigation as called for under SB 743, while also maintaining largely intact their LOS metrics and standards, which now must be applied "off-CEQA" in reference to General Plan standards and associated policies such as for project-level review requirements. A small but notable share of localities (15%) report having reduced LOS requirements, and associated costs to developers, but the majority have maintained current practices, while shifting them off-CEQA.

Opportunities and challenges of combining VMT and LOS analysis and mitigation at the project level

A central focus for this research project is to consider the consequences and implications of combining analysis and mitigation for both VMT (via CEQA) and LOS (outside of CEQA). A central consideration is cost of compliance by developers (generally, people or entities who submit project applications for permit approval review must pay for the costs of both impact analysis and mitigation). Does adding VMT analysis and mitigation requirements to LOS requirements significantly increase project review costs?

The reported costs to developers, based on the survey findings, to implement project-level VMT analysis and mitigation, follows a somewhat complex pattern across localities. In general, survey respondents indicate that VMT ***analysis*** costs for developers are lower than the costs previously imposed (pre-SB 743) for LOS analysis at the project level; nearly two-thirds (64%) of respondents say that VMT analysis costs for developers are the same or lower than LOS analysis costs before SB 743 (Table 3). This makes sense because VMT analyses are often done with simple sketch or map-based models, which are relatively inexpensive to run (Volker et al., 2023), and VMT procedures build upon LOS analysis techniques already in place (Barbour et al.,

2019). However, when it comes to VMT ***mitigation*** costs (as opposed to analysis costs), a bifurcated pattern is evident, with about one-third of respondents (35%) indicating costs are much lower, but the same share indicating mitigation costs are slightly higher or much higher (Table 3). The combined costs to developers of both analysis and mitigation for both VMT and LOS is generally reported to be about the same (18% of respondents) or slightly higher (40% of respondents) than pre-SB 743 costs, but a significant share (26%) of localities considers the combined costs to be much higher. Note that only about two-thirds of survey respondents answered these questions about analysis and mitigation costs, indicating that significant shares of survey-takers likely did not know the answers.

Table 3. Reported costs to developers of pre- and post-SB 743 project-level transportation impacts analysis and mitigation

	Reported costs to developers of ***analyzing*** VMT impacts compared to pre-SB 743 costs of analyzing for LOS		Reported costs to developers of ***mitigating*** VMT impacts compared to pre-SB 743 costs of mitigating for LOS		Reported ***combined costs*** for both VMT and LOS project-level analysis and mitigation, compared to pre-SB 743) costs of analyzing and mitigating project-level LOS	
	N	Share (%)	N	Share (%)	N	Share (%)
Much lower	14	22%	20	35%	6	9%
Slightly lower	13	20%	6	11%	4	6%
About the same	14	22%	11	19%	12	18%
Slightly higher	14	22%	8	14%	26	40%
Much higher	9	14%	12	21%	17	26%
Total	64	100%	57	100%	65	100%

It makes sense that mitigation costs could vary across communities and differ from analysis costs. Compared to LOS mitigation, VMT mitigation requirements streamline low-VMT infill development during CEQA review, while requiring more mitigation for high-VMT, low-density, outlying, car-dependent development. This shift in mitigation priorities can help explain the bifurcated pattern evident for mitigation costs, spelled out in the findings shown in Table 3.

Given this logic, we might expect the pattern seen in Table 3 to correlate with city characteristics that distinguish more built-up urban cities from more outlying, low-density suburban cities. To test this hypothesis, the research team analyzed the combined cost survey response variable shown in Table 3 (the final survey question shown in the table) in conjunction with the information on city characteristics, shown earlier in Table 2 (the data distinguishing cities by their built-form, demographic, and political characteristics).

Four of the city characteristics we tested are correlated at 0.20 or more (by absolute value) with responses to the survey question about combined costs to developers of VMT and LOS analysis and mitigation, compared to pre-SB 743 costs for analysis and mitigation of LOS alone (Table 4). Only one of these bivariate correlations is statistically significant using ANOVA analysis, however—for activity density, our measure of "urban-ness", calculated as the sum of residential population plus people who work within the city, regardless of where they live, divided by city land in square miles. This negative correlation indicates that higher density, more mixed-use cities (with higher values on activity density) are experiencing lower costs for project-level transportation impact analysis and mitigation in the post-SB 743 era than before, even though developers must pay for meeting both LOS and VMT requirements.

Table 4. City characteristics associated with reported cost comparison between pre-SB 743 LOS and post-SB 743 LOS+VMT analysis and mitigation

Survey question: Considering the combined costs for both VMT and LOS analysis and mitigation in your jurisdiction, is project-level transportation impact analysis and mitigation more expensive now than before SB 743 was implemented? Consider the total cost of analyzing and mitigating transportation-related impacts both pursuant to and outside of CEQA, including any locally imposed fees and exactions.

	Median household income	Single-family percent of homes	Percent transit commuters	Activity density*
Much lower	125,675	53%	3%	10,188
Slightly lower	119,526	49%	3%	5,449
About the same	113,435	56%	4%	7,226
Slightly higher	92,989	61%	3%	7,052
Much higher	88,566	60%	1%	4,571
Total	100,868	58%	3%	6,566
Correlation	-0.39	0.20	-0.20	-0.35
Statistically significant (ANOVA)?	No	No	No	Yes

* = sum of residential population plus people who work within the city, regardless of where they live, divided by land in square miles

Data source for city characteristics: US Census Bureau, American Community Survey 2022 5-year dataset

The correlations seen in Table 4 on single-family home share, and percent of city commuters who take transit to work, corroborate the same logic described above, namely that more urban, compact-growth, transit-friendly cities are those experiencing lower post-SB 743 transportation impact review and mitigation costs in the post-SB 743 era. Larger-population cities also fit that mold. But an ordered logit regression employing these same city-characteristic variables, along with dummy variables indicating location by region, shows two variables prove to be statistically significant predictors, both in a negative direction, namely median household income and percent of registered voters that are Democrats (see Appendix A). This finding

indicates that poorer, less Democratic cities are experiencing higher transportation impacts analysis and mitigation costs post-SB 743.

The survey probed further about challenges in aligning VMT and LOS analysis and mitigation. Respondents were asked directly whether the mitigation measures that their jurisdiction recommends or requires for achieving LOS standards at the project level ever conflict with the mitigation measures imposed for achieving VMT standards. Most (60%) of respondents reported "no", they do not conflict, a reassuring finding for policymakers concerned that adoption of SB 743 is presenting localities with significant challenges in aligning and coordinating VMT and LOS goals and standards.

However, 40% of respondents, a substantial share, indicated that LOS and VMT mitigation requirements applied to project applications do conflict. The survey then asked how difficult it has been for localities to resolve the conflicts; one third (33%) of respondents said it has been minimally difficult, 44% said it has been somewhat difficult, and 22% said it has been very difficult.

Survey respondents who reported experiencing LOS-VMT conflicts were asked to describe an example, if they wished. Some of the write-in responses are illuminating. One reported issue has to do with unknown impacts on VMT of certain LOS mitigation techniques in use, and concern about potential conflicts especially for roadway widening projects. So, for example, two respondents noted:

> "An LOS mitigation would add a lane to an off-ramp intersection. It's unknown whether the increase in intersection capacity would increase VMT since the improvement would be localized. The environmental analysis for the off-ramp widening has not been performed yet."
>
> "Roadway improvements to improve LOS could increase VMT. We have not run into this yet, though we anticipate problems."

These comments reflect concerns about "induced travel" effects of roadway capacity expansions intended to reduce automobile congestion—expanding roadway capacity often causes increased VMT (Volker & Handy, 2022).

Another, related issue noted by respondents has to do with challenges faced by rural areas. One respondent noted:

> "[We are] a rural agency in the foothills. Projects identified to address failing LOS directly conflict with VMT, as they add capacity to existing roadways, or create new roads in some cases. The induced VMT that comes along with these needed projects increases a project's VMT, leading to potential significant impacts. To compound the problem, there aren't sufficient mitigation measures to address the VMT already being created. Transit options don't exist and there are only so many locations in the more populated areas of the County where ped and bike facilities make sense."

However, suburban and even urban areas can also experience VMT-LOS conflicts, often touching on how to trade off priorities at a wider-than-local project scale. Respondents noted:

> "Funds needed for signalization installation or dedicated turning lanes could be used for pedestrian or bicycle improvements instead. Where sidewalks or bike line gap closure might help to offset VMT impacts, the cost is prohibitive since it requires extensive engineering, ROW acquisition, wetland fill, etc."
>
> "Typical spot LOS improvements for development projects (e.g. adding/lengthening turn pockets, installing traffic signals, intersection operational improvements) are not really capacity-increasing, and thus do not conflict. However, we have had larger projects (i.e. specific/master plans), in which we are requiring roadway widening to provide sufficient capacity, which also has the effect of increasing VMT. This is analyzed, disclosed, and mitigated to the extent feasible in the EIR."
>
> "VMT encourages development around transportation hubs....like urban centers. It does not really address LOS impacts and makes it difficult for the local jurisdiction to impose LOS mitigation measures."
>
> "We use VMT for CEQA and LOS for our Transportation Impact Fee program to implement the mitigations identified in our (pre-SB 743) General Plan. The TIF intersections identified generally are "mitigated" by adding turn lanes for queue issues. These are limited locations but sometimes at odds with our bike/ped oriented VMT mitigations included in our adopted guidelines."
>
> "VMT analyses make it easy to ignore queueing and safety impacts and tend to downplay necessary mitigation. This makes it easy for project proponents to try to shrug off the impacts by claiming VMT analysis is all that is required under CEQA, forcing lead agencies to reject EIRs until safety issues are properly addressed."

These respondent comments indicate that while many localities are anticipating project-level VMT-LOS conflicts, this question is still being worked out in practice. At a very localized project-level scale, LOS mitigation strategies such as improved turning lanes are not necessarily expected to conflict with VMT mitigation (if they do not "increase capacity," as the respondent indicated), but even when this is the case, LOS-VMT conflicts can emerge at a wider community-and plan-level, scale, such as in deciding how to allocate funds from city-wide transportation impact fees between roads, transit, and active transport (biking and walking) facilities.

To investigate the response pattern on LOS-VMT conflicts faced by survey respondents, we examined how and whether city responses are associated with the factors distinguishing cities by type, employing the same Census-derived variables discussed above. The analysis revealed few clear patterns, however. The "yes" response—indicating conflicts experienced between locally applied LOS and VMT mitigation measures—is negatively correlated, to a statistically significantly degree using ANOVA analysis, with single-family home share and median household income of respondent cities, and positively correlated, to a statistically significantly degree, with percent transit commuters. These findings do not mirror those presented above

about reported costs of VMT and LOS analysis and mitigation; in the case of perceived conflicts, more urban, infill-type cities (those with more multi-unit housing and more transit commuting) are found to experience more conflict in aligning LOS and VMT goals and standards than other cities, even though this same city type has not experienced higher post-SB 743 combined costs for VMT and LOS analysis and mitigation, as reported earlier. However, logistic regression analysis of the conflict variable, using the same city characteristics shown earlier (the variable set shown in Appendix A) shows no significant predictors at the $p<0.10$ level.

Another way to probe how and whether SB 743 has changed the types of development projects that are more likely to be subject to mitigation requirements is to consider how the new post-SB 743 VMT requirements have changed the number and location of projects subject to mitigation under CEQA. Our survey asked whether respondents expect that more development projects are likely to have potentially significant transportation impacts under CEQA using a VMT-based standard versus an LOS-based standard; survey responses were bifurcated, with 42% indicating “fewer projects” are expected to have significant impacts, 16% indicating “no change” in the expected number of projects, and 43% indicating “more projects.” As in the discussion above, this sort of bifurcated response pattern begs the question of whether and how it might reflect differences by city type.

On a bivariate basis, the correlation between number of projects expected to be subject to mitigation requirements is statistically significant, and negative, for the following city-type variables: median household income, percent transit commuters, activity density, and percent Democratic registered voters by city; these findings indicate that poorer, less Democratic and less densely built cities with fewer transit commuters expect that more projects will require mitigation. Ordered logit regression confirms these results, also adding the less congruous finding that San Francisco Bay area cities are significantly more likely to expect that more projects will require mitigation for VMT (see Appendix A). Aside from the Bay Area indicator, these findings correspond to the pattern seen earlier for the survey response variable on costs for transportation impact review and mitigation; less “urban” cities are more likely to expect that more projects will require mitigation for VMT, reflecting the “overturning of the apple cart” that SB 743 has engendered. Indeed, the correlation between the reported cost variable and the reported number of projects variable is fairly high (0.42), and statistically significant.

A related question is how SB 743 is altering the location within cities for projects that are most likely to engender significant impacts and therefore require mitigation. The survey asked respondents whether they expect that the location of development projects within the community deemed to have potentially significant transportation impacts under CEQA will change much as a result of their jurisdiction's implementation of SB 743. More than half (55%) of respondents said “no,” while 32% said “yes, somewhat,” and 14% said “yes, a lot.” Given how SB 743 has been expected to alter the types and locations of projects requiring mitigation, it may be surprising that few respondents expect the location of projects requiring mitigation to change much. However, an ordered logit regression of this survey response variable on the city characteristics employed for analysis shows two factors are statistically significant predictors, namely activity density (negatively correlated) and percent Democratic (positively correlated)

(see Appendix A). This finding corroborates that lower-density jurisdictions are more likely to expect changes in the location of projects requiring mitigation for VMT impacts, compared to the location of projects requiring mitigation for LOS impacts, which is consistent with the expectations described in this report.

The survey asked respondents to describe in detail, if they wished, the location changes they expect to occur as a result of SB 743, in terms of projects requiring mitigation. The responses corroborate how SB 743 is altering the types and locations of projects requiring mitigation:

> "Downtown infill projects screen out from VMT because density is sufficient. Edge properties result in VMT impacts because density is not sufficient and there's no high priority transit. Under LOS it was opposite."
>
> "Previously, under LOS, projects in the outlying areas of the County would not have any significant LOS impacts because the traffic volumes are so low. Now, a project proposed in the same location would create a ton of new VMT, resulting in significant impacts."
>
> "Some infill locations may be screened out of VMT analysis, while most of our single-family home subdivisions that are located on the outer edges of the city will have higher VMT and significant impacts, leading to EIRs being required now for most of those projects or at least more mitigation through development of infrastructure or higher costs to pay for funding such infrastructure."
>
> "More new projects in the growth areas will have significant impacts, and fewer infill projects will have impacts."
>
> "Most of our new projects are now located in infill commercial areas along the major corridors and therefore will be below the VMT thresholds."

Other respondents explain why they don't expect a reversal in location of projects requiring mitigation to occur. This can vary depending on how SB 743 provisions for determining "significant" impacts lands on a particular locality. A city could experience little change in mitigation requirements, for example, if few projects are subject to VMT mitigation under provisions of SB 743, because most of the territory in the city is determined, according to OPR's suggested significance thresholds, to be low-VMT and/or transit-proximate already, so most projects "screen out" from VMT mitigation needs. One respondent described this situation:

> "Minimal change is expected - we are an urbanized area with a strict urban limit line. Most projects screen out via project screening tools."
>
> "VMT analysis favors infill, while LOS favors greenfield development. As a result, the change in state policy has facilitated infill development, while sometimes imposing somewhat higher mitigation requirements for greenfield projects. On the balance, most [local] projects do not trigger significant VMT impacts, so this rarely happens in our community."

The opposite situation also can occur, also helping to explain why a locality expects little location change. If the entire local territory is determined to be "high-VMT" under the

provisions and recommended metrics of SB 743, it is therefore more subject to mitigation requirements across the board—in this case, while *more* projects will be subject to VMT mitigation needs, their location may not shift as a result of SB 743. One respondent described this situation:

> "I do not expect locational changes for the simple reason that the screening maps do not screen out anywhere in [our rural town], even downtown, from having to do a VMT analysis for office or other employment-type developments. The screen map for residential VMT isn't much better, as only a few areas in town are deemed to not have a potentially significant transportation impact."

These concerns relate to the challenges faced in rural areas:

> "In a rural county, 90-95%+ of the county is already located in a high VMT zone."
>
> "VMT requirements will support more infill projects, however VMT has increased requirements across the board because we are really rural and remotely located. Many of the screening tools result in unrealistic requirements."
>
> "We are a rural county...VMT does not work for projects in unincorporated communities who are not urban. The only option is to have a county-wide program that requires in lieu fees be paid but we have not had the time or money to invest in developing this yet."
>
> "VMT discourages development in rural areas and creates unfair disadvantage for developers in suburban centers located within rural areas. This creates more traffic driving to the urban centers where development is encouraged."
>
> "The VMT baseline for our jurisdiction has an unintended consequence of favoring development outside of the town center. The town is small, has very limited transit, and caters to tourists. The State's VMT requirements and OPR's guidance have proven unhelpful in many respects for this type of setting."

Therefore, we see that perceived impacts of SB 743 vary depending on wider-than-local conditions and the context of city location within the urban/suburban/rural spectrum of the wider region. Localities that are located at either end of this regional spectrum appear to expect less location change in projects requiring mitigation, while communities somewhere in between, with room to grow, and with varied land use characteristics in different parts of town, appear to expect more location change.

Some respondents also explained that we should not assume that CEQA review requirements, on their own, dictate the location of development; instead, development location is affected by many market, political, and policy forces and constraints un-related to CEQA review:

> "Not much has changed directly from SB 743 in regards to where developers site their projects; they continue to respond to broader market trends and changes."
>
> "VMT does not appear to be the primary driving force of where projects are being proposed."

> "Project locations are based on land and redevelopment opportunities and costs, not CEQA or 743."
>
> "While in theory switching from LOS to VMT should incentivize infill and disincentivize greenfield, the market realities in my area are that buyers still favor single family detached housing. And financial challenges with affordable housing, NIMBY pushback against high density projects, etc., pose a greater challenge to those types of housing products than a VMT switch can address."
>
> "The city is in an area with no alternative transportation systems other than bus. It is also in a housing-rich/jobs-poor area with requires commuting. Although more compact and mixed use development is encouraged, much of the city supports a more rural lifestyle which does not lend itself to reduced VMT."
>
> "In the unincorporated [part of our county], the properties located outside urban growth boundaries would be considered to have high transportation impacts due to their remoteness / rural nature. But projects on unincorporated parcels within the urban growth boundaries are limited to potential locations as determined by other factors, not necessarily VMT considerations (such as zoning regulations, availability of public services and infrastructure, etc.)."
>
> "Infill projects are more likely to have VMT impacts outside of low-VMT generating TAZ areas, while most specific planned developments already required an EIR that is often tiered off of for projects."
>
> "There are some uses which require a rural location, [and] these will be the same regardless of whether LOS or VMT is applied. Furthermore, land acquisition costs in the developed urban areas where VMT can be easily reduced has driven an increasing amount of development into the rural areas, where it is difficult to mitigate for the increased VMT."

However, other respondents indicated that mitigation requirements under SB 743 may indeed influence developer choices about the location of new development. Respondents noted:

> "The VMT residential screening maps identify the west and southern part of our city as having a potentially significant transportation impact. Since mitigation in these areas could represent a cost to development, developers will take into consideration the screening map in deciding whether to develop in these areas and may choose against residential development in high VMT areas."
>
> "[Developers] would probably choose to build in a city able to mitigate VMT impacts because the [regional] train serves it, or some other type of rapid transit."

Collectively, the survey findings about LOS-VMT mis/alignment point to a few key conclusions. The implications and perceptions of SB 743 vary by community type. For many, the expected pattern is occurring, in which the type and location of development projects requiring mitigation has shifted to lower-density parts of town, and away from higher-density, transit-proximate areas. This pattern is reinforced and mirrored at a wider-than-local scale, in which

VMT mitigation requirements in the most urban cities can be minimal, contrasting with the situation in rural cities and towns, where few projects may escape mitigation requirements.

The respondent comments on project-level VMT-LOS conflicts, discussed earlier, indicate that while many localities are anticipating conflicts, this question is still being worked out in practice. At a very localized project-level scale, LOS mitigation strategies such as improved turning lanes are not necessarily expected to conflict with VMT mitigation, but even when this is the case, LOS-VMT conflicts can emerge at a wider community-and plan-level, scale, such as in deciding how to allocate funds from city-wide transportation impact fees between roads, transit, and active transport (biking and walking) facilities.

It is to the question of how localities are addressing VMT-LOS mis/alignment at the wider, community-level scale that this report now turns.

Opportunities and challenges of combining VMT and LOS analysis and mitigation at the community-wide, plan-level scale

As noted from the start of this report, many localities have focused so far mainly on implementing SB 743 at the project-level scale, to comply with CEQA review requirements, but some localities have also started to integrate VMT-reducing strategies into policies, plans, and programs operating at a jurisdiction-wide scale, such as through goals and standards incorporated into General Plans (which guide jurisdiction-wide development) and associated programs such as impact fees imposed on developers for transportation purposes. Connecting the dots between community-wide and project-level VMT reduction strategies can help localities in linking plans and policies systematically to support efficient land use and transportation simultaneously. Our survey probed about these types of strategies, and this section reports on the findings.

The survey asked whether respondents' jurisdictions have established VMT-related objectives and associated performance measures in the General Plan or other official transportation policies. Nearly half (46%) said yes, but over half (54%) said no, indicating that plan-level (as opposed to project-level) implementation of SB 743 may still be emerging. Asked about the metric/standard used by the jurisdictions that include such a goal/standard in the General Plan, more than half reported their goals/standards are set for per capita VMT, which aligns with the metric recommended for compliance with SB 743.

The response pattern for this survey question is significantly associated on a bivariate basis, using ANOVA, with only one city characteristic among those tested for this project, namely percent transit commuters (positively correlated at 0.205), indicating that higher-transit localities are more likely to have adopted VMT objectives in the General Plan. However, in a multivariate logistic regression, two other variables proved to be statistically significant predictors, namely activity density, with a negative association (meaning less dense cities are more likely to have adopted VMT objectives in the General Plan), and percent people of color, which is positively associated. These findings are not easy to interpret.

Meanwhile, 90% of respondents indicated that their jurisdiction also has set goals/standards for LOS in their General Plan. More than half (56%) of surveyed jurisdictions have established LOS standards for specified intersections, 43% for specified street types, and in 23% for "specified areas." These response options were not exclusive; 30% of jurisdictions use two or more of these metrics/standards. Asked about their jurisdiction's primary objectives in setting the LOS standards, two-thirds (65%) of respondents identified "improving/maintaining mobility (e.g. traffic speed)," 57% identified "improving/maintaining safety at intersections," and 32% "safety for emergency vehicles" (again, these response options were not exclusive, with significant overlap/combination of responses).

Nearly four-fifths (79%) of respondents indicated their jurisdiction has not "lowered (made more lenient) its LOS standards since switching from LOS to VMT metrics for CEQA transportation impact analysis," and nearly the same share (76%) indicate they do not plan to do so in the future. These findings underscore the persistence of LOS in local policymaking, not just for project-level review but for other policy purposes.

Paralleling the investigation of project-level techniques, the survey then probed whether plan-based LOS and VMT metrics/standards ever conflict. Specifically, the survey asked whether "LOS-based and VMT-based metrics/standards included in your jurisdiction's General Plan ever conflict, in terms of the strategies you contemplate to achieve them." Nearly two-thirds (62.5%) of respondents indicated they do not conflict, but for more than one-third (37.5%), they do. Among these respondents, 33% have found it "minimally difficult" to resolve these conflicts, 56% have found it "somewhat difficult," and the remaining 11% have found it "very difficult." On a bivariate basis, the response pattern for the survey question on conflict is significantly correlated with a number of city characteristics: population size (positively associated, with a correlation of 0.39), and activity density (positively associated, with a correlation of 0.29). The latter finding indicates that denser cities are experiencing more LOS-VMT conflicts in connection to adopting community-wide policies and programs. However, the response rate for this question was low, and the sample was too small to support a logistic regression.

Asked whether SB 743's requirement to switch transportation impact metrics from LOS to VMT for CEQA analysis aligns with the wider transportation policy goals of the jurisdiction, 40% indicated "no, not much," 41% indicated "yes, somewhat," and only 19% indicated "yes, very much." Responses to this question correlate fairly strongly, and to a statistically significant degree (-0.47), with reported costs for VMT-plus-LOS analysis and mitigation, compared to pre-SB 743 costs; in other words, not surprisingly, those localities that report higher costs for post-SB 743 analysis and mitigation are also the localities least likely to consider SB 743 as aligned with their wider transportation policy goals.

On a bivariate basis, the response pattern for the survey question on policy alignment is statistically significantly correlated with a number of city characteristics: median household income (positively associated, with a correlation of 0.24); percent single-family homes (negatively associated, with a correlation of -0.33); percent transit commuters (positively associated, with a correlation of 0.35); and percent registered Democrats (positively associated,

with a correlation of 0.52). These findings conform to the expected pattern, reflecting the city types expected to benefit from provisions of SB 743; cities with more multi-unit housing, more transit commuters, and with richer and more Democratic voters are more likely to consider their transportation policy goals as aligning with SB 743. However, an ordered logit regression, controlling for all city characteristics at once, shows only median household income and percent registered Democrats to be statistically significant predictors (both positively associated) at the $p<0.10$ level (see Appendix A).

The survey probed whether and how SB 743 has caused localities to re-visit their community-wide transportation policies and programs. Asked whether SB 743 has "resulted in a re-evaluation of transportation goals and objectives in your General Plan," 53% of respondents said "no, not much," 30% said "yes, somewhat," and 17% said "yes, very much." On a bivariate basis, this survey response variable is correlated to a statistically significant degree with two city characteristics: population (positively correlated at 0.28), and percent transit commuters (positively correlated at 0.17). The findings indicate that larger, more transit-friendly cities have been more likely than others to revisit their transportation policies as the result of SB 743. But an ordered logit regression shows no statistically significant predictors.

Asked about what other transportation-related policies the locality has re-visited because of SB 743, 65% indicated they have re-visited their jurisdiction's transportation impact review guidelines, 37% their transportation impact fee, 37% their parking requirements, 28% their capital improvement plan, 28% their local zoning, 18% their permit review streamlining procedures (e.g. providing for "ministerial" or a.k.a. non-discretionary review of VMT-friendly projects), and 8% their parking pricing policies (again, the response options were not exclusive, and most jurisdictions selected more than one response).

The findings in this section indicate that LOS remains solidly embedded not just in project-level procedures used for local development permit review, but also at the community-wide scale in local General Plans. Meanwhile, about half of localities have started to also incorporate VMT goals and standards into their General Plans and associated transportation programs and policies. A majority of respondent localities indicated that LOS and VMT goals and standards in their General Plans do not conflict, and also that SB 743 goals align with local transportation policy goals. These findings should be reassuring to policy analysts concerned that SB 743 implementation presents a difficult challenge for California local governments. But the majority signaling successful accommodation and integration of VMT goals and standards into their plans and policies, along with LOS, is fairly low, indicating that a significant share of localities are still working out how to balance the two.

Mitigation strategies to align VMT and LOS goals and standards

The survey investigated specific mitigation measures adopted for alleviating both project-level and community-wide LOS and VMT impacts, as well as their interaction—probing to understand which sorts of measures are considered most effective for addressing *both* LOS and VMT goals. Such measures can be considered best practices for balancing and integrating LOS and VMT in the post-SB 743 era.

Respondents were asked about community-scale LOS mitigation measures they have adopted; four-fifths (79%) indicated they have taken steps to improve intersection timing, two-thirds (65%) to improve intersection turn lanes, one-third (34%) to widen roadway segments, and one-sixth (16%) to add roadways (note that these response options were not exclusive; respondents could select more than one).

Respondents were also asked about VMT mitigation measures at both the project level and plan level, and whether those measures also help achieve LOS objectives. Asked whether respondent localities "recommend or require mitigation measures that could both reduce VMT (for CEQA purposes) and improve LOS (to meet local standards)", nearly three-quarters (69%) indicated they do. When asked which of a list of identified project-level mitigation measures the respondent considers most effective for both reducing VMT and improving LOS, the results indicate that improving bicycle and pedestrian facilities are the measures considered most effective for improving both LOS and VMT (Figure 1) (respondents were asked to select up to four mitigation measures). Forty-seven survey-takers, or half of all survey-takers, answered this question. The set of potential measures listed in the survey was taken from the City of San Francisco's TDM program, which is applied at the local project level as part of the development permit approval review process.

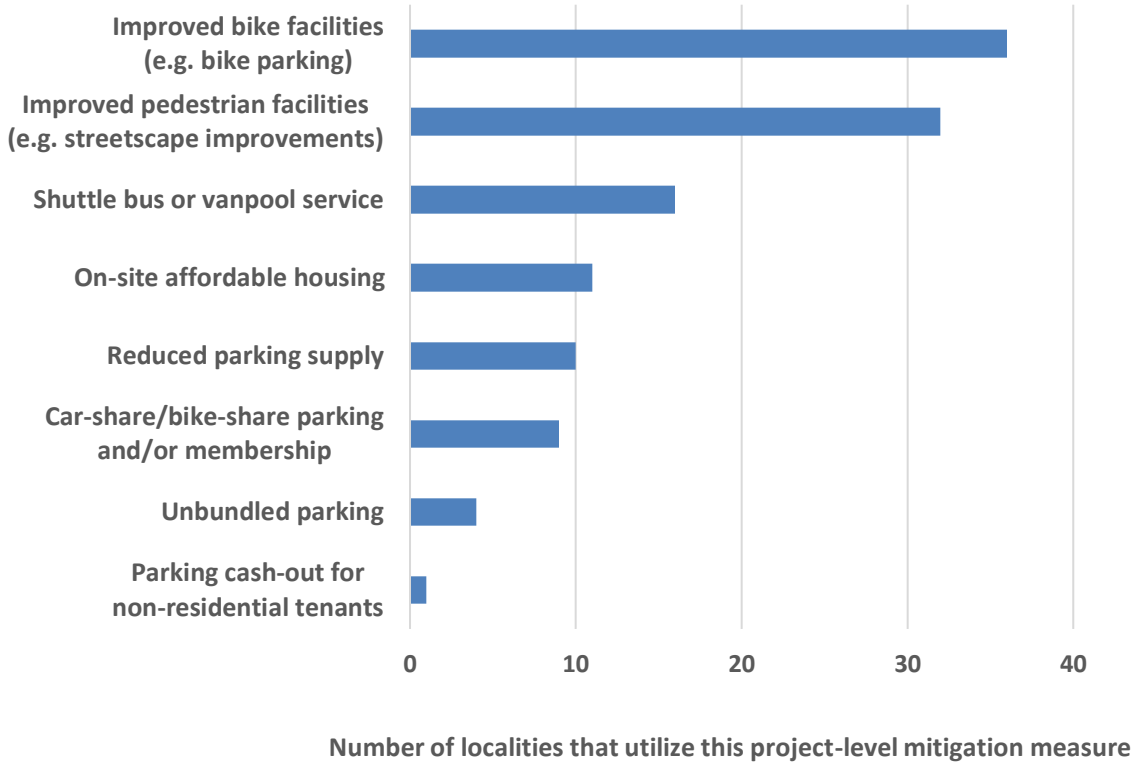

Figure 1. Project-level measures considered most effective for both LOS and VMT mitigation

The survey also asked about community-scale policies and programs to mitigate VMT impacts, and their interaction with LOS. A list of possible strategies for reducing VMT was presented, and

respondents were asked if their jurisdiction had adopted them, and if so, how effective they considered each strategy to be in mitigating VMT impacts. The policies most commonly adopted, and considered most effective in mitigating VMT, are mixed-use zoning, improved pedestrian facilities, bike-only lanes, and affordable housing density bonus programs (Figure 2).

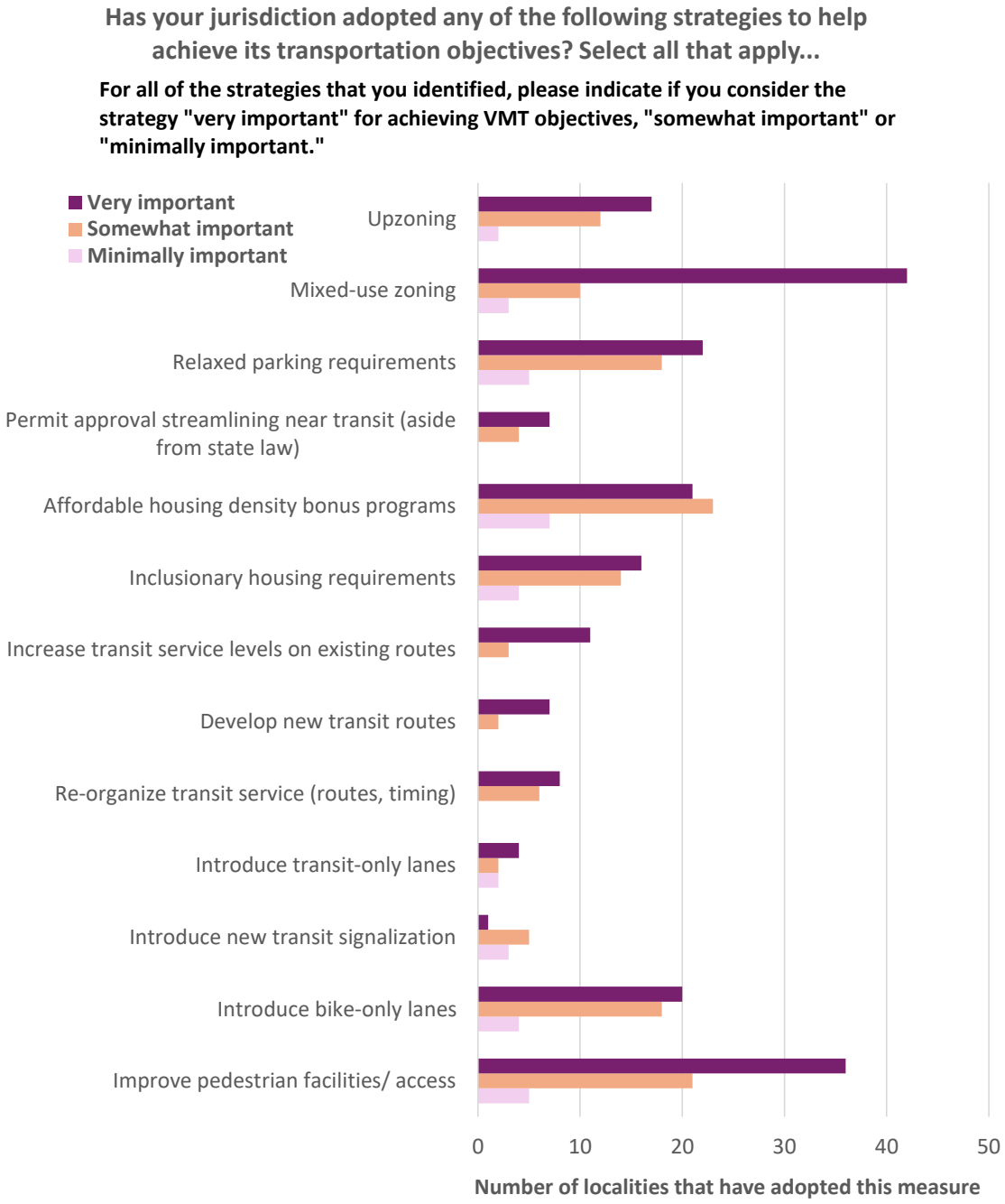

Figure 2. Plan/program-level measures considered most effective for VMT mitigation

The survey then followed up by asking, for the same adopted strategies, whether respondents believe they will also improve LOS. The results indicate that "best practice" strategies capable of addressing both LOS and VMT impacts, according to survey respondents, include, in particular, improving pedestrian facilities, introducing bike-only lanes, implementing mixed use zoning, and relaxing parking requirements (Figure 3).

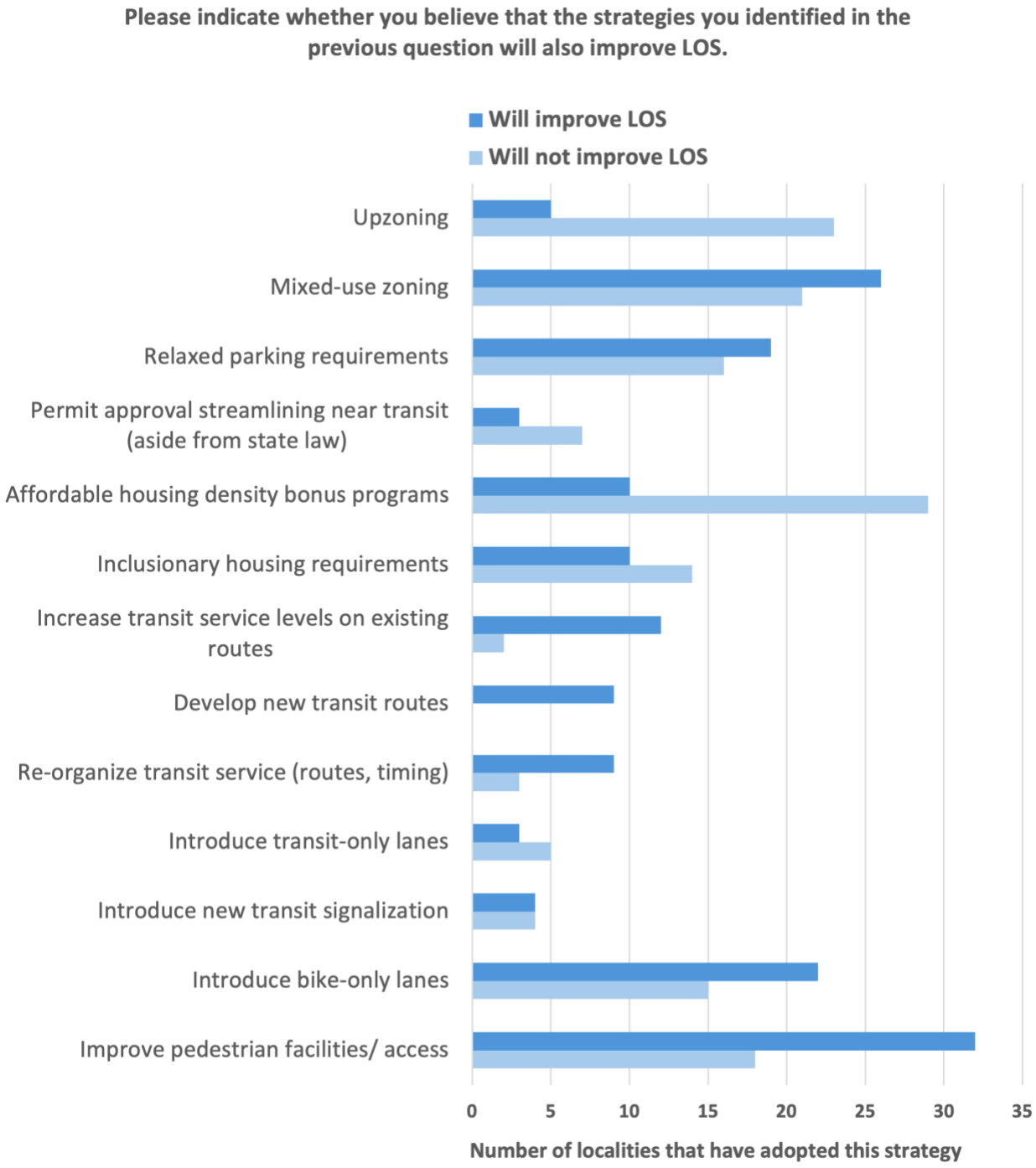

Figure 3. Plan/program-level measures considered most effective for both LOS and VMT mitigation

These findings underscore the value, both at the project level and the wider community-wide level, of improving pedestrian and bicycle facilities, for mitigating both VMT and LOS impacts. Mixed-use zoning and relaxing parking requirements also come across as salient best practices for mitigating both VMT and LOS impacts at the plan-level scale.

The survey probed further about some specific transportation policy strategies, with implications for LOS and VMT. More than two-thirds (68%) of respondent localities indicated they have adopted a transportation impact fee, a means to charge new development for costs of ameliorating impacts. Of the localities with an impact fee, 83% said they use it to fund multiple modes. When asked whether they had adopted or revised the transportation impact fee since SB 743 was passed, 68% said no, and 32% yes. Asked about the legal "nexus" on which their fee is based, 62% indicated it is LOS-based, 14% that it is VMT-based, and 20% "other."[2] These findings support the conclusion that only a portion of California localities has fully integrated VMT objectives into wider-than-local-project policies and plans.

The survey also asked some questions about how localities utilize CEQA provisions to streamline CEQA impacts review for infill projects located near transit, including "tiering off" community-scale plans. Tiering allows projects already covered in a CEQA-approved community-wide plan to avoid subsequent review. A large majority (88%) of respondents who answered this question said their jurisdiction uses or plans to use tiering (e.g., CEQA Guidelines sections 15152 and 15183 or Public Resources Code section 21155.4) to eliminate or reduce the scope of VMT impact analysis for development projects consistent with an existing plan (e.g., the General Plan or a Specific Plan). However, the number of survey responses to this question was fairly small, making it hard to generalize. One-quarter (25%) of respondents further indicated that their jurisdiction provides for permit approval streamlining (e.g., ministerial review) for development projects located near transit, above and beyond provisions in state law.

Most (76%) of respondents said their jurisdiction has never issued any Statements of Overriding Consideration for VMT impacts for CEQA purposes, at the project level. Lead agencies can adopt Statements of Overriding Consideration for a project (or plan) deemed to have significant environmental impacts, but for which mitigation is deemed infeasible. The survey also asked whether respondent jurisdictions had or planned to adopt a Statement of Overriding Considerations for VMT impacts from the General Plan (as opposed to project-level impacts); while the number (22) of responses to this question was low, the high share (52%) of respondents who said "yes" is discouraging. By issuing a Statement of Overriding

[2] Under provisions of the state's Mitigation Fee Act (MFA), localities can impose impact fees to achieve officially established policy goals (such as in the General Plan), so long as the fee program complies with requirements for demonstrating a "rational nexus" between the fee's purpose, the need for the fee, the cost of facilities for addressing the need, and the allocation of the fee to new development based on its contribution to the demonstrated need. Local agencies must adopt an impact fee nexus study before a development fee is adopted, which must include information on the "reasonable relationship" that supports the agency's actions, and must identify the existing and proposed new level of service for each public facility, and explain why any new level of service is appropriate. For a study of post-SB 743 impact fees in California, see Barbour (2022).

Considerations for VMT objectives established in the General Plan, localities can set a basis for avoiding or reducing VMT mitigation at the project level.

Finally, the survey asked whether jurisdictions have in-house staff who have developed or are developing VMT thresholds and project or policy-level review methods. More than half (56%) of respondents said no. Asked whether they have received any technical support while developing the locality's VMT standards and project review methods, 78% of respondents said they had received assistance from a consulting firm, 36% from a Metropolitan Planning Organization (federally-mandated regional transportation planning agencies), 17% from OPR, and 11% from Caltrans (respondents could select more than one of these response options). This finding helps explain why localities are still only beginning to fully integrate VMT objectives into their plan- and program-level strategies; they rely on assistance for doing so.

Chapter 3. Case studies on SB 743 Implementation

Some cities are approaching implementation of SB 743 as a basis for systematically reconfiguring transportation impact fees and Transportation Demand Management (TDM) programs and policies. Two cities we studied, San Francisco and San Diego, serve as models for using the transition to SB 743 impacts analysis as the basis for this sort of systematic policymaking.

San Francisco's Transportation Sustainability Program: Linking SB 743 compliance with systematic policy change

The first, and still most far-reaching, example of this approach was undertaken in San Francisco, even before SB 743 went into full effect. LOS analysis and mitigation had been the subject of concern for many years in San Francisco, with city planners complaining that the LOS metric failed to capture important environmental effects of development, contradicted the city's policies for prioritizing "transit first," entailed costly, time-consuming, and unpredictable requirements for project sponsors, called for infeasible and ineffective mitigations, created implementation burdens for the planning department, and discouraged infill development due to a "last-in" bias, meaning that infill was required to bear the burden of existing cumulative traffic problems (Chang, 2012). Many policies that supported the city's transit-first vision, in the context of the city's rapid growth and limited land space, ran into conflicts with the LOS metric, which measures auto delay. As much of the city is already built out, the majority of new development is infill, which could trigger a bad LOS score. The LOS metric was a key tool utilized in the courts by city residents to hinder the implementation of transit-first strategies (Bialick, 2013b; Henderson, 2011; Swan, 2019).

Given the clear conflicts between the LOS metric and many of San Francisco's growth policies and goals, the passage of SB 743 in 2013 provided a useful solution. San Francisco's historic struggle with LOS, exemplified through lawsuits over its bike plan and environmental review for bus-rapid transit, facilitated a shift to VMT metrics even before passage of SB 743, but the city went further than just adopting VMT standards for project-level CEQA review, as called for under the law. San Francisco also adopted complementary, inter-connected strategies to maximize VMT reductions, in particular, by updating its transportation impact fees and TDM policies. Between 2015 to 2017, the city adopted a Transportation Sustainability Program (TSP), which includes the replacement of LOS with a VMT metric for CEQA traffic analysis, linked to a new Sustainable Transportation Fee and a Transportation Demand Management (TDM) Ordinance, ensuring that CEQA review will support efforts to systematically leverage infill development to improve transit and non-motorized modes. San Francisco dubbed the three parts of its Transportation Sustainability Program "align," "invest," and "shift."

For the "align" component, the city used OPR's recommended thresholds of significance for determining projects that could require mitigation under CEQA for their VMT impacts, as a basis for simplifying and streamlining CEQA review of traffic impacts. The city uses a screening approach to determine whether projects fall below the VMT significance threshold, with criteria established identifying types, characteristics, and/or locations of projects that would not result

in significant impacts to VMT (SF Planning Department, March 3, 2016; Wietgrefe, 2017). The location-based screening criteria rely on maps produced using the city's activity-based travel demand model, which are then used to determine how development-estimated VMT by land use type compares to OPR's recommended threshold of significant VMT impacts set at 15% below regional average VMT per capita or per worker. If a project meets the screening criteria, then VMT impacts are presumed to be less than significant and a detailed VMT analysis is not required. According to the city's analysis, "Most land use and transportation projects proposed in San Francisco over the last several years would meet the screening criteria…and would not require a detailed VMT analysis" (SF Planning Department, March 3, 2016).

This approach allowed San Francisco to "solve" a decade-long discussion about how to link a new CEQA metric for traffic impacts to the city's mitigation fee and TDM ordinance, by de-linking them. CEQA requirements do not form the legal basis for the city's new Transportation Sustainability Fee (the "invest" component of the TSP) and Transportation Demand Ordinance (the "shift" component of the TSP), which were developed instead to comply with requirements of the state's Mitigation Fee Act. Using this approach, the Transportation Sustainability Fee focuses not on project-by project mitigation needs, but instead on systematic assessment of needs and identification of capital and maintenance projects to improve transit and alternatives modes for the city as a whole.

The San Francisco Board of Supervisors adopted the Transportation Sustainability Fee (TSF) in November 2015, as a citywide impact fee on both residential and non-residential development that replaced the existing Transit Impact Development Fee (TIDF), adopted in 1981, which applied only to non-residential development (Spencer, 2015). As noted previously, funds raised by the fee are directed as supplemental funding for a specified set of projects, including adding more than 180 vehicles to the Muni fleet; upgrading Muni maintenance facilities; upgrading transit reliability through reengineering of transit stops and streets; new or improved BART train cars; investment in electrifying Caltrain to increase service into and out of San Francisco; and improved bike and pedestrian infrastructure. As noted above, the specifics of the Transportation Sustainability Fee were controversial and debated for a number of years before adoption, in particular about the level of the fee and what sorts of development should be exempted. The fee ultimately adopted by the Board of Supervisors was set at only about one quarter of the full level identified in the required nexus study to cover mitigation needs, an outcome viewed by some observers as a victory for developers in the debate.

The Transportation Demand Management Program—the third so-called "shift" component of the Transportation Sustainability Program—was adopted in 2017 to re-frame project mitigation away from roadway enhancements, as under LOS-based review, to instead favor mitigations aimed at reducing VMT. The TDM Program, an ordinance which amended the city's planning code, requires developers to provide on-site amenities to reduce car travel and support trip-making by sustainable modes, such as by providing bicycle amenities and subsidized transit passes (TDM Ordinance on-line FAQ). Development projects must incorporate TDM amenities early in the design phase to meet a targeted number of mitigation points depending on the type of land use and the number of parking spaces the project is proposing. The more parking

proposed for a project, the higher the number of points the development must achieve. The city created an online tool to help developers calculate their project's required points and forecast different ways to meet the requirement through different TDM measures.[3]

San Francisco's three-pronged Transportation Sustainability Program has enabled the city to align CEQA reform under SB 743 with plans for transit and TDM enhancements. Notably, San Francisco could weave the elements of the TSP together more easily than many other cities may be able to do, because most territory in the city falls below OPR's recommended threshold for significant VMT, allowing for regulatory streamlining and cost savings for reduced environmental review, and because the city runs its own transit service, making collaboration among city- and county-level agencies and functions easier than in many other cities which lack the same institutional coherence between land use and transport functions.

San Diego's Active Transportation In-lieu Fee: A city-wide approach for funding the most effective VMT reduction measures

San Diego more recently re-formulated its transportation impact fee, so as to align it with SB 743, and in so doing also resolved some long-standing concerns about how such fees had been imposed in the city in the past. San Diego's approach is instructive for cities with variable development patterns, where some parts of town are high-VMT-producing while other areas (such as denser TOD zones) are more VMT-efficient.

Previously, the city had assessed fees per housing unit, with funds locked into special accounts for each of the city's 50-odd community planning areas, creating inequities (Keatts, 2020b). Areas of the city that were more suburban in character were able to assess up to 100% of the cost of new facilities needed to serve development, meaning they generally had much higher reserves of funds than older, more urbanized areas served by transit (Elmer, 2020). By 2020, the city's planning department was seeking to revise this approach to create a more systematic, sustainable, and equitable approach (Elmer, 2020). Rather than continuing to impose fees that vary by neighborhood, the department aimed to set one flat developer fee and put the money into a citywide pot, which could provide more funding to the neediest neighborhoods, according to the department (Elmer, 2020).

The city revised its impact fee system in 2020, to align with adoption of new methods to comply with SB 743. In addition to adopting VMT metrics for use in CEQA analysis at the project level, the city adopted a new Active Transportation In-lieu Fee (also known as the VMT fee) as part of its Complete Communities Mobility Choices Initiative (City of San Diego, n.d.). Under this program, the city is broken out into four mobility zones, designated based on the VMT-reducing potential of new development. Mobility Zones 1, 2, and 3 are deemed to be VMT-efficient, with

[3] The program applies to projects with 10 units or more of new residential development, 10,000 square feet or more of commercial development and relatively large (25,000 square feet or more) changes of use like expanding an auto shop or other small industrial space into office space. Residential projects that are 100 percent affordable are exempt (TDM Ordinance on-line FAQ).

the average number of vehicle miles traveled per capita or per employee less than 85% of the regional average, the threshold established for CEQA analysis of significant VMT impacts requiring mitigation, if feasible. Mobility Zone 4 is VMT-inefficient, with average VMT per capita or per employee greater than 85% of the regions.

The new in-lieu fee, set at $1400 per VMT produced, applies to all development in Mobility Zone 4, with the funds to be used for active transportation and VMT-reducing infrastructure projects located within Mobility Zone 1, 2, or 3 (the lower VMT areas). The rationale for this approach is that investing in VMT reducing infrastructure in Mobility Zone 4 yields the least amount of citywide VMT reductions, and instead, it is cheaper and more efficient to invest in VMT reducing facilities in the other mobility zones (ibid). At least 50 percent of all new funds will be spent solely within Communities of Concern.[4]

In this fashion, San Diego has integrated all parts of the city into a set of zones based on average VMT impacts, with mitigation requirements directed to funding high-impact VMT-reducing measures in the city's most location-efficient zones. This kind of approach allows the city to connect the dots between project-level VMT mitigation and coordinated, strategic city-wide policies and programs to reduce VMT, along with means to fund them. Through this approach, the city can maximize the potential for VMT reductions.

[4] Projects in Mobility Zones 2 and 3 can pay also pay the VMT fee, or instead provide Active Transportation Measures, which are VMT reduction measures such as lighting along public walkways, pedestrian refuges and raised or widened crosswalks and sidewalks, shade trees, transit stop upgrades, designated car-share or carpool vehicle parking, or electric bicycle charging stations. Mobility Zone 1, which includes the downtown area, is not required to implement active transportation measures. Multifamily residential development in Mobility Zone 2 must provide amenities such as bicycle storage or repair stations, transit pass subsidies, or micro mobility charging spaces; all other development in Mobility Zone 2 must provide Active Transportation Measures. All development in Mobility Zone 3 must provide Active Transportation Measures. Certain projects are exempt, regardless of Mobility Zone, including affordable housing, locally serving retail and public facilities, and certain mixed use projects.

Chapter 4. Conclusion

For nearly 50 years, LOS was the primary metric of transportation-related environmental impacts under CEQA. SB 743 upended the status quo, leading to VMT replacing LOS as the primary metric for analyzing the transportation impacts for CEQA purposes. We investigated how California's local governments (cities and counties) are implementing SB 743 and, in particular, whether and how they are continuing to use LOS outside of CEQA in project-level analyses and/or higher-level plans and policies. We used both a survey of local planning directors (n=94) and case studies of San Francisco and San Diego.

Our survey findings indicate that most jurisdictions are implementing VMT analysis and mitigation into CEQA analyses at the development project level, as called for under SB 743. However, 83% of respondent jurisdictions continue to require project-level LOS analysis outside of CEQA as part of the permitting process for land development projects. Only 15% of localities reported having reduced LOS requirements and associated costs to developers. When considering the combined costs to developers of the analysis and mitigation of both VMT and LOS impacts, most jurisdictions reported that the total costs were about the same (18%) or just slightly higher (40%) or slightly lower (6%) than pre-SB 743 costs. However, a sizeable minority (26%) deemed the costs to be much higher, while only 9% considered them to be much lower. Denser and more urban localities were more likely to report lower combined costs relative to pre-SB 743 costs. Future research should try to estimate these cost changes more specifically, e.g., by using project-level data or surveying developers.

In addition to changing development costs on average, our survey findings also indicate that the LOS-to-VMT shift is expected to change the number, type, and location of development projects requiring mitigation of transportation impacts under CEQA. For example, 42% of respondents indicated that fewer projects would have potentially significant transportation impacts than before SB 743, while 43% thought more projects would have significant transportation impacts. Collectively, the survey findings confirm that SB 743's impacts vary by community type. For many, the expected pattern is occurring, in which the type and location of development projects requiring mitigation has shifted to lower-density localities, and within localities, to lower-density, less transit-proximate parts of town. Future research could provide more specificity by quantitatively analyzing the amount, type, and location of development before and after SB 743 implementation.

At the planning and program level, we found that about half of jurisdictions have incorporated VMT goals and standards into their General Plans. However, only a few localities have correspondingly revised their LOS standards and analysis requirements, and those which are doing so are mostly in denser and more urban areas. In addition, jurisdictions are still only beginning to extend SB 743 implementation beyond project-level review to also serve as a basis for systematically reconfiguring transportation impact fees and TDM programs and policies. However, the two cities we studied in depth, San Francisco and San Diego, serve as models for using the transition to SB 743 impacts analysis as the basis for this sort of systematic policymaking.

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Data Summary

Products of Research

The data collected for this report is comprised of information obtained from publicly available sources, as cited in the report, and from a confidential survey. No new publicly available data was compiled from the research project.

Data Access and Sharing

The publicly available data used in analysis for the report is cited in the report, and the individual survey responses are not publicly available due to confidentiality assurances.

Appendix A

Ordered logit regressions								
Dependent variable (survey question):	Considering the combined costs for both VMT and LOS analysis and mitigation in your jurisdiction, is project-level transportation impact analysis and mitigation more expensive now than before SB 743 was implemented?*		On average, are more development projects in your jurisdiction likely to have potentially significant transportation impacts under CEQA using a VMT-based standard versus an LOS-based standard?		Do you expect that the location of development projects deemed to have potentially significant transportation impacts under CEQA will change much as a result of your jurisdiction's implementation of SB 743?		Does SB 743's requirement to switch transportation impact metrics from LOS to VMT for CEQA analyses align with the transportation policy goals of your city, in your opinion?	
Response options:	Much lower; slightly lower; about the same; slightly higher; much higher		Fewer projects; no change; more projects		No, not much; yes, somewhat; yes, a lot		No, not much; yes, somewhat; yes, a lot	
	Coeff-icient	Signifi-cant? (P>t)	Coeff-icient	Signifi-cant? (P>t)	Coeff-icient	Signifi-cant? (P>t)	Coeff-icient	Signifi-cant? (P>t)
Log of population	-0.15		-0.56		0.44		0.36	
Pct people of color (non-white and non-Hispanic)	1.15		5.80	*	-1.02		-0.95	
Log of median HH income	-3.47	**	-5.54	**	0.77		2.97	**
% of homes are single-family	0.36		0.49		-3.17		-2.77	
% of commuters take transit	-12.45		-31.52	*	-0.07		11.00	
Log of activity density	-0.06		-0.75		-1.01	**	-0.60	
% Democrat of registered voters	-8.40	**	-15.17	*	8.00	*	13.55	**
Sacramento region	-15.53		2.19		-2.02		0.42	
SF Bay Area	-12.68		5.31	**	-2.53		-2.44	
Central Valley	-15.85		17.12		-0.09		0.35	
Central Coast	-13.44		3.57		-18.11		-1.51	
Los Angeles area	-16.09		2.25		-1.75		-1.52	
San Diego area	-13.75		2.71		-0.02		-1.98	
N=	54		52		61		64	
Pseudo R2	0.21		0.39		0.19		0.24	

* " Consider the total cost of analyzing and mitigating transportation-related impacts both pursuant to and outside of CEQA, including any locally imposed fees and exactions."