City of Redlands CEQA Assessment VMT Analysis Guidelines

A key element of SB 743, signed in 2013, is the elimination of automobile delay and LOS as the sole basis of determining CEQA impacts. The most recent CEQA guidelines, released in December 2018, recommend VMT as the most appropriate measure of project transportation impacts. However, SB 743 does not prevent a city or county from continuing to analyze delay or LOS as part of other plans (i.e., the general plan), studies, or ongoing network monitoring.

The following recommendations assist in determining VMT impact thresholds and mitigation requirements for various land use projects' TIAs.

Analysis Methodology

For purposes of SB 743 compliance, a VMT analysis should be conducted for land use projects as deemed necessary by the Traffic Division and would apply to projects that have the potential to increase the average VMT per service population (i.e. population plus employment) compared to the SBCTA region or the City boundary. Normalizing VMT per service population essentially provides a transportation efficiency metric that the analysis is based on. Using this efficiency metric allows the user to compare the project to the region for purposes of identifying transportation impacts.

These guidelines are based on the SBCTA SB 743 Implementation Study which provides options for both methodologies and VMT screening. The methodologies and significance thresholds presented below are based on SBCTA recommendations from the Implementation Study; lead agencies may wish to modify these thresholds with alternative thresholds of significance and methodologies as appropriate.

Project Screening

There are three types of screening that lead agencies can apply to effectively screen projects from project-level assessment. These screening steps are summarized below:

Step 1: Transit Priority Area (TPA) Screening

Projects located within a TPA[1] may be presumed to have a less than significant impact absent substantial evidence to the contrary. This presumption may *NOT* be appropriate if the project:

- Has a Floor Area Ratio (FAR) of less than 0.75;

[1] A TPA is defined as a half mile area around an existing major transit stop or an existing stop along a high- quality transit corridor per the definitions below.

Pub. Resources Code, § 21064.3 - 'Major transit stop' means a site containing an existing rail transit station, a ferry terminal served by either a bus or rail transit service, or the intersection of two or more major bus routes with a frequency of service interval of 15 minutes or less during the morning and afternoon peak commute periods.

Pub. Resources Code, § 21155 - For purposes of this section, a 'high-quality transit corridor' means a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

- Includes more parking for use by residents, customers, or employees of the project than required by the jurisdiction (if the jurisdiction requires the project to supply parking);
- Is inconsistent with the applicable Sustainable Communities Strategy (as determined by the lead agency, with input from the Metropolitan Planning Organization); or
- Replaces affordable residential units with a smaller number of moderate- or high-income residential units.

Step 2: Low VMT Area Screening

Residential and office projects located within a low VMT-generating area may be presumed to have a less than significant impact absent substantial evidence to the contrary. In addition, other employment-related and mixed-use projects may qualify for the use of screening if the project can reasonably be expected to generate VMT per resident, per worker, or per service population that is similar to the existing land uses in the low VMT area.

For this screening in the SBCTA area, the SBTAM travel forecasting model was used to measure VMT performance for individual jurisdictions and for individual traffic analysis zones (TAZs). TAZs are geographic polygons similar to Census block groups used to represent areas of homogenous travel behavior. Total daily VMT per service population (population plus employment) was estimated for each TAZ. This presumption may not be appropriate if the project land uses would alter the existing built environment in such a way as to increase the rate or length of vehicle trips.

To identify if the project is in a low VMT-generating area, the analyst may review the SBCTA screening tool and apply the appropriate threshold (identified later in this chapter) within the tool. Additionally, as noted above, the analyst must identify if the project is consistent with the existing land use within that TAZ and use professional judgement that there is nothing unique about the project that would otherwise be mis-represented utilizing the data from the travel demand model.

The SBCTA screening tool can be accessed at the following location:

https://devapps.fehrandpeers.com/SBCTAVMT/

Step 3: Project Type Screening

Local serving retail projects with stores less than 50,000 square feet may be presumed to have a less than significant impact absent substantial evidence to the contrary. Local serving retail generally improves the convenience of shopping close to home and has the effect of reducing vehicle travel. Additional screening for retail projects is discussed below.

In addition to local serving retail, the following uses can also be presumed to have a less than significant impact absent substantial evidence to the contrary as their uses are local serving in nature:

- Local-serving K-12 schools
- Local parks
- Day care centers
- Local-serving gas stations
- Local-serving banks

- Local-serving hotels (e.g. non-destination hotels)
- Student housing projects on or adjacent to college campuses
- Local-serving assembly uses (places of worship, community organizations)
- Community institutions (Public libraries, fire stations, local government)
- Local serving community colleges that are consistent with the assumptions noted in the RTP/SCS
- Affordable or supportive housing
- Assisted living facilities
- Senior housing (as defined by HUD)

Projects which generate less than 3,000 MT CO2e per year can be presumed to have a less than significant impact on VMT. Projects which generate less than 3,000 MT CO2e per year include the following:

- Single family residential – 167 Dwelling Units or fewer
- Multifamily residential (low-rise) – 232 Dwelling Units or fewer
- Multifamily residential (mid-rise) – 299 Dwelling Units or fewer
- Office – 59,100 square feet or less
- Local Serving Retail – 112,400 square feet or less (no stores larger than 50,000 square feet)
- Warehousing – 463,600 square feet or less
- Light Industrial – 74,600 square feet or less

Additional detail is provided in *Substantial Evidence for Trip-Based Screening Threshold*, provided in the attachments.

VMT Assessment for Non-Screened Development

Projects not screened through the steps above should complete VMT analysis and forecasting through the SBTAM model to determine if they have a significant VMT impact. This analysis should include the following scenarios. Note that projects that are consistent with the General Plan would not need to prepare a Cumulative analysis, since the General Plan has been found to be consistent with the City's threshold of VMT per capita that is 15 percent below baseline conditions:

- Baseline conditions - This data is already available in the web screening map.
- Baseline plus project for the project - The project land use would be added to the project TAZ or a separate TAZ would be created to contain the project land uses. A full base year model run would be performed and VMT changes would be isolated for the project TAZ and across the full model network. The model output must include reasonableness checks of the production and attraction balancing to ensure the project effect is accurately captured. If this scenario results in a less-than-significant impact, then additional cumulative scenario analysis may not be required (more information about this outcome can be found in the Thresholds Evaluation discussion later in this chapter).
- Cumulative no project - This data is available from SBCTA.
- Cumulative plus project - The project land use would either be added to the project TAZ or a separate TAZ would be created to contain the project land uses. A full buildout year model

run would be performed and VMT changes would be isolated for the project TAZ and across the full model network. The model output must include reasonableness checks of the production and attraction balancing to ensure the project effect is accurately captured. Cumulative plus Project VMT evaluation will include VMT/SP and project effect on VMT, as discussed below.

The Cumulative plus project scenario noted above will summarize two types of VMT: (1) project generated VMT per service population and comparing it back to the appropriate benchmark noted in the thresholds of significance, and (2) the project effect on VMT, comparing how the project changes VMT on the network looking at Citywide VMT per service population and comparing it to the no project condition.

Project-generated VMT shall be extracted from the travel demand forecasting model using the origin-destination trip matrix and shall multiply that matrix by the final assignment skims. The project-effect on VMT shall be estimated using the City boundary and extracting the total link-level VMT for both the no project and with project condition. Both project-generated VMT and Citywide link-level VMT shall be reported per service population.

In some cases, it may be appropriate to extract the Project-generated VMT using the production-attraction trip matrix. This may be appropriate when a project is entirely composed of retail or office uses, and there is a need to isolate the home-based-work (HBW) VMT for the purposes of isolating commute VMT. The City should evaluate the appropriate methodology based on the project land use types and context.

A detailed description of this process is attached to these guidelines.

CEQA VMT Impact Thresholds

The SBCTA Implementation Study provided several options related to VMT thresholds of significance and guidance/substantial evidence related to thresholds of significance. Lead agencies should refer to that document for guidance/options.

VMT Impacts

An example of how VMT thresholds would be applied to determine potential VMT impacts is provided below.

A project would result in a significant project-generated VMT impact if either of the following conditions are satisfied:

The baseline project-generated VMT per service population exceeds a level 15 percent below the San Bernardino County regional average VMT per service population, or

For projects that are inconsistent with the City's General Plan, the cumulative project-generated VMT per service population exceeds a level 15 percent below the San Bernardino County regional average VMT per service population,

A project would result in a significant project effect on VMT impact if either of the following conditions are satisfied:

> For projects that are inconsistent with the City's General Plan, the project causes total daily VMT per service population within the City to be higher than the no project alternative under Cumulative conditions.

Please note that the cumulative no project shall reflect the adopted RTP/SCS; as such, if a project is consistent with the regional RTP/SCS, then the cumulative impacts shall be considered less than significant subject to consideration of other substantial evidence

VMT Mitigation Measures

To mitigate VMT impacts, the following choices are available to the applicant:

- Modify the project's-built environment characteristics to reduce VMT generated by the project
- Implement transportation Demand Management (TDM) measures to reduce VMT generated by the project.
- Participate in an available VMT fee program and/or VMT mitigation exchange/banking program (if they exist) to reduce VMT from the project or other land uses to achieve acceptable levels
- Implement Pedestrian and sidewalk improvements consistent with the Transit Villages Specific Plan (TVSP) within the plan area (i.e., wider than typical 5'0" sidewalks for high-pedestrian traffic areas).
- Outside of the TVSP area, implement pedestrian and sidewalk improvements that meet or exceed the minimum requirements of the Redlands Municipal Code.
- If constructing pedestrian network improvements is not necessary or feasible on or adjacent to the project site, then provide a fair share payment to a fund designated for off-site pedestrian network improvements somewhere else in the City (may require a nexus study).
- Construct bicycle network improvements along the project's frontage consistent with the Bicycle Master Plan and/or Sustainable Mobility Plan (pending adoption in 2021).
- If constructing bicycle network improvements is not necessary or feasible on or adjacent to the project site, then provide a fair share payment to fund designated off-site bicycle network improvements somewhere else in the City (may require a nexus study).
- Provide a Passenger Loading Zone adjacent to the project's frontage consistent with the Redlands Municipal Code (e.g., for rideshare services, etc.).
- Construct one or more improvements listed in RMC Chapter 18.224 (Transportation Control Measures) including bicycle racks, etc.
- Provide a payment or facility to Omnitrans for one or more off-site improvements listed in RMC Chapter 18.224 such as a new bus pad and shelter (if applicable), etc.
- Provide any other feasible and simple real property improvements that can be provided by a developer on or adjacent to the project site.
- Provide voluntary payment to the City to "buy down" VMT impacts by funding construction of off-site infrastructure that supports alternative transportation modes.

As part of the SBCTA Implementation Study, key TDM measures that are appropriate to the region were identified. Measures appropriate for most of the SBCTA region are summarized in Attachment B of the of the SB743 Implementation Mitigation and TDM Strategy Assessment memo (provided as Attachment 3). Evaluation of VMT reductions should be evaluated using state-of-the-practice methodologies recognizing that many of the TDM strategies are dependent on building tenant performance over time. As such, actual VMT reduction cannot be reliably predicted and monitoring may be necessary to gauge performance related to mitigation expectations.

CEQA Assessment - Active Transportation and Public Transit Analysis

Potential impacts to public transit, pedestrian facilities and travel, and bicycle facilities and travel can be evaluated using the following criteria.

A significant impact occurs if the project conflicts with adopted policies, plans, or programs regarding public transit, bicycle, or pedestrian facilities, or otherwise decreases the performance or safety of such facilities.

Therefore, the TIA should include analysis of a project to examine if it is inconsistent with adopted policies, plans, or programs regarding active transportation or public transit facilities, or otherwise decreases the performance or safety of such facilities and make a determination as to whether it has the potential to conflict with existing or proposed facilities supporting these travel modes.

Attachment 1 - Substantial Evidence for Trip-Based Screening Threshold

Background.

Senate Bill 743 (Steinberg, 2013), which was codified in Public Resources Code section 21099, required changes to the guidelines implementing CEQA (CEQA Guidelines) (Cal. Code Regs., Title 14, Div. 6, Ch. 3, § 15000 et seq.) regarding the analysis of transportation impacts. As one appellate court recently explained: "During the last 10 years, the Legislature has charted a course of long-term sustainability based on denser infill development, reduced reliance on individual vehicles and improved mass transit, all with the goal of reducing greenhouse gas emissions. Section 21099 is part of that strategy . . . ." (Covina Residents for Responsible Development v. City of Covina (2018) 21 Cal.App.5th 712, 729.) ***Pursuant to Section 21099, the criteria for determining the significance of transportation impacts must "promote the reduction of greenhouse gas emissions***, the development of multimodal transportation networks, and a diversity of land uses." (Id., subd. (b)(1); see generally, adopted CEQA Guidelines, § 15064.3, subd. (b) [Criteria for Analyzing Transportation Impacts].) To that end, in developing the criteria, OPR has proposed, and the California Natural Resources Agency (Agency) has certified and adopted, changes to the CEQA Guidelines that identify vehicle miles traveled (VMT) as the most appropriate metric to evaluate a project's transportation impacts. With the California Natural Resources Agency's certification and adoption of the changes to the CEQA Guidelines, automobile delay, as measured by "level of service" and other similar metrics, generally no longer constitutes a significant environmental effect under CEQA. (Pub. Resources Code, § 21099, subd. (b)(3).)

It should be noted that SB 743 (the legislation) does not specify any screening thresholds or impact criteria for transportation impacts using VMT. In fact, the legislation does not even specify VMT as the metric – but directs the OPR to identify the appropriate metric. The OPR evaluated several metrics including VMT, Automobile Trips Generated, Multimodal LOS, Fuel Use, and Motor Vehicle Hours Traveled, and ultimately settled on VMT. SB 743 includes legislative intent to help guide the development of the new criteria for transportation impacts to align with Green House Gas (GHG) reduction. For example, Section 1 of the legislation states: "*New methodologies under the California Environmental Quality Act are needed for evaluating transportation impacts that are better able to promote* ***the state's goals of reducing greenhouse gas emissions and traffic-related air pollution****, promoting the development of a multimodal transportation system, and providing clean, efficient access to destinations.*" Further, subdivision (b) of the new Section 21099 requires that the new criteria "*promote the* ***reduction of greenhouse gas emissions****, the development of multimodal transportation networks, and a diversity of land uses.*"

OPR'S Technical Advisory

To assist in the process, the OPR released several technical advisories. The technical advisory states that "*…(it) is one in a series of advisories provided by the Governor's Office of Planning and Research (OPR) as a service to professional planners, land use officials, and CEQA practitioners. OPR issues technical assistance on issues that broadly affect the practice of land use planning and the California Environmental Quality Act (CEQA) (Pub. Resources Code, § 21000 et seq.). (Gov. Code, § 65040, subds. (g), (l), (m).)* ***The purpose of this document is to provide advice and recommendations, which***

agencies and other entities may use at their discretion. This document does not alter lead agency discretion in preparing environmental documents subject to CEQA. This document should not be construed as legal advice."

Screening Thresholds Recommended by OPR

Many agencies use "screening thresholds" to quickly identify when a project should be expected to cause a less-than-significant impact without conducting a detailed study. (See e.g., CEQA Guidelines, §§ 15063(c)(3)(C), 15128, and Appendix G.) As explained below, this technical advisory suggests that lead agencies may screen out VMT impacts using project size, maps, transit availability, and provision of affordable housing. The Technical Advisory recommends the following thresholds:

SCREENING THRESHOLD FOR SMALL PROJECTS. Many local agencies have developed screening thresholds to indicate when detailed analysis is needed. Absent substantial evidence indicating that a project would generate a potentially significant level of VMT, or inconsistency with a Sustainable Communities Strategy (SCS) or general plan, *projects that generate or attract fewer than 110 trips per day generally may be assumed to cause a less-than significant transportation impact.*

Analysis. To set this 110-trip threshold, the OPR uses a CEQA exemption for additions to existing structures of up to 10,000 square feet. The Technical Advisory states, "*CEQA provides a categorical exemption for existing facilities, including additions to existing structures of up to 10,000 square feet, so long as the project is in an area where public infrastructure is available to allow for maximum planned development and the project is not in an environmentally sensitive area. (CEQA Guidelines, § 15301, subd. (e)(2).) Typical project types for which trip generation increases relatively linearly with building footprint (i.e., general office building, single tenant office building, office park, and business park) generate or attract an additional 110-124 trips per 10,000 square feet. Therefore, absent substantial evidence otherwise, it is reasonable to conclude that the addition of 110 or fewer trips could be considered not to lead to a significant impact*". It should be noted that, for a similar size building, many land uses generate significantly higher trips than the 110 daily-trip threshold. For example, a 10,000 square foot Drive-In Bank generates 1,000 daily trips. Similarly, a 10,000 square foot drugstore with drive through window would generate 1,092 daily trips, and a typical Post Office would generate 1,039 trips. **Therefore, there are many land-uses where the 10,000 square foot exemption would result in substantially higher trips than the 110-trip threshold used by the OPR.**

Recommendation. Based on the intent and stated goals of SB-743, the City has evaluated land uses in the City from a GHG emissions perspective. In San Bernardino County, there are two Air Quality Management Districts – the Mohave Desert AQMD (MDAQMD) and the South Coast AQMD (SCAQMD). The MDAQMD uses a threshold of 100,000 Metric Tons (MT) of CO2 Equivalents (CO2e) per year as a threshold to identify significant impacts[2]. The SCAQMD in its *Interim CEQA GHG Significance Threshold for Stationary Sources, Rules and Plans*[3] recommends a screening threshold of 3,000 MT of CO2e per year for residential and commercial sectors and 10,000 MT of CO2e per year for industrial projects.

Understanding that the SCAQMD's recommendations are the most stringent in the region, and the City is within the SCAQMD region, the City evaluated various land uses using City specific average trip lengths by

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[2] *MDAQMD California Environmental Quality Act (CEQA) And Federal Conformity Guidelines (http://www.mdaqmd.ca.gov/home/showdocument?id=538)*

[3] *http://www.aqmd.gov/docs/default-source/ceqa/handbook/greenhouse-gases-(ghg)-ceqa-significance-thresholds/ghgboardsynopsis.pdf?sfvrsn=2*

trip purpose from the San Bernardino Transportation Analysis Model (SBTAM). Specifically, the following land uses were evaluated –

- Single family residential
- Multifamily residential (low-rise, one or two levels)
- Multifamily residential (mid-rise, between three and 10 levels)
- Office
- Retail
- Warehousing
- Light Industrial

Table A summarizes the findings of the evaluation. The GHG emissions were calculated based on 100 units (DU or 1,000 square feet). The resulting emissions were compared to the SCAQMD threshold of 3,000 MT CO2e/year and the number of units to trigger the threshold was calculated.

Land Use	***Units***		***Mobile CO2e[1]***	***Total CO2e[1]***	***Trip Rate[2]***	***Size that Triggers Threshold***	***Daily Trips***
Single Family DU	100	DU	1212	1799	9.44	167	1574.21
Multifamily DU (low-rise)	100	DU	947	1294	7.32	232	1697.06
Multifamily DU (mid-rise)	100	DU	672	1005	5.44	299	1623.88
Office	100	TSF	4963	5076	9.74	59.102	575.65
Retail	100	TSF	2144	2669	37.75	112.402	4243.16
Warehouse (unrefrigerated)	100	TSF	386	647	1.74	463.679	806.80
General Light Industrial	100	TSF	2964	4018	4.96	74.664	370.33

[1] Calculated using CalEEMod.

[2] Based on Trip Rates from the Institute of Transportation Engineers, *Trip Generation*, 10th Edition and SBTAM trip lengths.

Based on this analysis, the City recommends that projects up to the size indicated in the following list be considered exempt from preparation of a VMT analysis. These projects would generate less than 3,000 MT CO2e/year and would not have a significant impact on CO2e, based on SCAQMD Guidelines. Additionally, these projects would fall below the screening threshold proposed by SCAQMD.

- Single family residential – 167 Dwelling Units or fewer
- Multifamily residential (low-rise) – 232 Dwelling Units or fewer
- Multifamily residential (mid-rise) – 299 Dwelling Units or fewer
- Office – 59,100 square feet or less
- Retail – 112,400 square feet or less
- Warehousing – 463,600 square feet or less
- Light Industrial – 74,600 square feet or less

Attachment 2 - Detailed VMT Forecasting Information

Most trip-based models generate daily person trip-ends for each TAZ across various trip purposes (HBW, HBO, and NHB, for example) based on population, household, and employment variables. This may create challenges for complying with the VMT guidance because trip generation is not directly tied to specific land use categories. The following methodology addresses this particular challenge among others.

Production and attraction trip-ends are separately calculated for each zone, and generally: production trip-ends are generated by residential land uses and attraction trip-ends are generated by non-residential land uses. OPR's guidance addresses residential, office, and retail land uses. Focusing on residential and office land uses, the first step to forecasting VMT requires translating the land use into model terms, the closest approximations are:

- Residential: home-based production trips
- Office: home-based work attraction trips

Note that this excludes all non-home-based trips including work-based other and other-based other trips.

The challenges with computing VMT for these two types of trips in a trip-based model are 1) production and attraction trip-ends are not distinguishable after the PA to OD conversion process and 2) trip purposes are not maintained after the mode choice step. For these reasons, it not possible to use the VMT results from the standard vehicle assignment (even using a select zone re-assignment). A separate post-process must be developed to re-estimate VMT for each zone that includes trip-end types and trip purposes.

- Re-skim final loaded congested networks for each mode and time period
- Run a custom PA to OD process that replicates actual model steps, but:
- Keeps departure and return trips separate
- Keeps trip purpose and mode separate
- Converts person trips to vehicle trips based on auto occupancy rates and isolates automobile trips
- Factors vehicle trips into assignment time periods
- Multiply appropriate distance skim matrices by custom OD matrices to estimate VMT
- Sum matrices by time period, mode, and trip purpose to calculate daily automobile VMT
- Calculate automobile VMT for individual TAZs using marginal totals:
- Residential (home-based) - row of departure matrix plus column of return matrix
- Office (home-based work) - column of departure matrix plus row of return matrix

Appropriateness Checks

Regardless of which method is used, the number of vehicle trips from the custom PA to OD process and the total VMT should match as closely as possible with the results from the traditional model process. The estimated results should be checked against the results from a full model run to understand the degree of accuracy. Note that depending on how each model is setup, these custom

processes may or may not include IX/XI trips, truck trips, or special generator trips (airport, seaport, stadium, etc.).

When calculating VMT for comparison at the study area, citywide, or regional geography, the same methodology that was used to estimate project-specific VMT should be used. The VMT for these comparisons can be easily calculated by aggregating the row or column totals for all zones that are within the desired geography.

Attachment 3 – Attachment B from the SB743 Implementation Mitigation and TDM Strategy Assessment Memo

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Relevant Strategies for Implementation in SBCTA Jurisdictions Due to Land Use Context

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	New Information Since CAPCOA Was Published in 2010		
					New information	Change in VMT reduction compared to CAPCOA(1)	Literature or Evidence Cited
Land Use/ Location	3.1.3	LUT-3 Increase Diversity of Urban and Suburban Developments	9%-30% VMT reduction due to mixing land uses within a single development	Adequate	1] VMT reduction due to mix of land uses within a single development; 2] Reduction in VMT due to regional change in entropy index of diversity.	1] 0%-12% 2] 0.3%-4%	1] Ewing, R. and Cervero, R. (2010). Travel and the Built Environment - A Meta-Analysis. Journal of the American Planning Association,76(3),265-294. Cited in California Air Pollution Control Officers Association. (2010).Quantifying Greenhouse Gas Mitigation Measures. Retrieved from: http://www.capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf Frank, L., Greenwald, M., Kavage, S. and Devlin, A. (2011). An Assessment of Urban Form and Pedestrian and Transit Improvements as an Integrated GHG Reduction Strategy. WSDOT Research Report WA-RD 765.1. Washington State Department of Transportation. Retrieved from: http://www.wsdot.wa.gov/research/reports/fullreports/765.1.pdf Nasri, A. and Zhang, L. (2012). Impact of Metropolitan-Level Built Environment on Travel Behavior. Transportation Research Record: Journal of the Transportation Research Board, 2323(1), 75-79. Sadek, A. et al. (2011). Reducing VMT through Smart Land-Use Design. New York State Energy Research and Development Authority. Retrieved from: https://www.dot.ny.gov/divisions/engineering/technical-services/trans-r-and-d-repository/C-08-29%20Final%20Report_December%202011%20%282%29.pdf Spears, S.et al. (2014). Impacts of Land-Use Mix on Passenger Vehicle Use and Greenhouse Gas Emissions- Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm 2] Zhang, Wengia et al. "Short- and Long-Term Effects of Land Use on Reducing Personal Vehicle Miles of Travel."
Neighborhood Site Enhancements	3.2.1	SDT-1 Provide Pedestrian Network Improvements	0%-2% reduction in VMT for creating a connected pedestrian network within the development and connecting to nearby destinations	Adequate	VMT reduction due to provision of complete pedestrian networks.	0.5%-5.7%	Handy, S. et al. (2014). Impacts of Pedestrian Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm
Neighborhood Site Enhancements	3.2.2	SDT-2 Provide Traffic Calming Measures	0.25%-1% VMT reduction due to traffic calming on streets within and around the development	Adequate	Reduction in VMT due to building out a low-stress bike network; reduction in VMT due to expansion of bike networks in urban areas.	0%-1.7%	1] California Air Resources Board. (2016). Greenhouse Gas Quantification Methodology for the California Transportation Commission Active Transportation Program Greenhouse Gas Reduction Fund Fiscal Year 2016-17. Retrieved from: https://www.arb.ca.gov/cc/capandtrade/auctionproceeds/ctc_atp_finalqm_16-17.pdf. 2] Zahabi, S. et al. (2016). Exploring the link between the neighborhood typologies, bicycle infrastructure and commuting cycling over time and the potential impact on commuter GHG emissions. Transportation Research Part D: Transport and Environment. 47, 89-103.
Neighborhood Site Enhancements	3.4.9	TRT-9 Implement Car-Sharing Program	0.4% - 0.7% VMT reduction due to lower vehicle ownership rates and general shift to non-driving modes	Adequate	Vehicle trip reduction due to car-sharing programs; reduction assumes 1%-5% penetration rate. Car sharing effect on VMT is still evolving due to TNC effects. UCD research showed less effect on car ownership due to car sharing participation and an uncertain effect on VMT.	0.3%-1.6%	Lovejoy, K. et al. (2013). Impacts of Carsharing on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm Clewlow, Regina R. and Mishra, Gouri Shankar, (2017). Disruptive Transportation: The Adoption, Utilization, and Impacts of Ride-Hailing in the United States. UC Davis, Institute of Transportation Studies. Research Report - UCD-ITS-RR-17-07.
Transit System	3.5.4	TST-4 Increase Transit Service Frequency/Speed	0.02%-2.5% VMT reduction due to reduced headways and increased speed and reliability	Adequate	Reduction in vehicle trips due to increased transit frequency/decreased headway.	0.3%-6.3%	Handy, S. et al. (2013). Impacts of Transit Service Strategies on Passenger Vehicle Use and Greenhouse Gas Emissions - Policy Brief and Technical Background Document. California Air Resources Board. Retrieved from: https://arb.ca.gov/cc/sb375/policies/policies.htm

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Relevant Strategies for Implementation in SBCTA Jurisdictions Due to Land Use Context

CAPCOA Category	CAPCOA #	CAPCOA Strategy	CAPCOA Reduction	Strength of Substantial Evidence for CEQA Impact Analysis?	New Information Since CAPCOA Was Published in 2010		
					New information	Change in VMT reduction compared to CAPCOA(1)	Literature or Evidence Cited
Commute Trip Reduction	3.4.6	TRT-6 Encourage Telecommuting and Alternative Work Schedules	0.07%-5.5% commute VMT reduction due to reduced commute trips	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	VMT reduction due to adoption of telecommuting	0.2%-4.5%	Handy, S. et al. (2013). Policy Brief on the Impacts of Telecommuting Based on a Review of the Empirical Literature. California Air Resources Board. Retrieved from: https://www.arb.ca.gov/cc/sb375/policies/telecommuting/telecommuting_brief120313.pdf
Commute Trip Reduction	3.4.3	TRT-3 Provide Ride-Sharing Programs	1%-15% commute VMT reduction due to employer ride share coordination and facilities	Adequate - Effectiveness is building/tenant specific. Do not use with "TRT-1 Implement CTR Program - Voluntary" or "TRT-2 Implement CTR Program - Required Implementation/Monitoring."	Commute vehicle trips reduction due to employer ride-sharing programs	2.5%-8.3%	Victoria Transport Policy Institute. (2015). Ridesharing: Carpooling and Vanpooling. Online TDM Encyclopedia. Retrieved from: http://vtpi.org/tdm/tdm34.htm

NOTES:

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