# City of Rolling Hills Estates Senate Bill (SB) 743 Implementation and CEQA Updates

Prepared for:
City of Rolling Hills Estates

November 2022

Project Number: LB21-0027

FEHR PEERS

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# Chapter 1 – Introduction

In response to Senate Bill (SB) 743, Rolling Hills Estates is adopting new transportation impact thresholds to adhere to CEQA requirements. To develop the guidance associated with SB 743, the City created an advisory team from the Planning and Public Works City Departments. The purpose of this report is to describe the City's process of implementing SB 743 and the recommendations developed through the advisory team.

An overview of the new CEQA guidance and the City's implementation process is summarized below.

## SB 743 Overview

On September 27, 2013, Governor Jerry Brown signed SB 743 into law and started a process intended to fundamentally change transportation impact analysis as part of CEQA compliance. In response to SB 743, the Office of Planning and Research (OPR) selected vehicle miles of travel (VMT) as the new transportation impact metric. OPR then submitted updates to the CEQA Guidelines, and these updates were certified by the Natural Resources Agency in December 2018. Lead agencies have been granted a grace period until July 1, 2020 to opt-in to implementing a VMT analysis as part of their environmental review process.

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

In summary, SB 743 eliminates level of service (LOS) as a basis for determining significant transportation impacts under CEQA and provides a new performance metric –VMT. With this change, the State is shifting the focus from measuring a project's impact to drivers (LOS) to measuring the impact of driving (VMT) to achieve their goals of reducing greenhouse gas (GHG) emissions, encouraging infill development, and improving public health through active transportation.

To help aid lead agencies with SB 743 implementation, OPR produced a Technical Advisory[1]. The Technical Advisory helps lead agencies think about the variety of implementation questions they face with respect to shifting to a VMT metric. However, lead agencies must still make their own specific decisions about VMT methodology, thresholds, and mitigation. These decisions should be consistent with the City's goals as expressed in their relevant plans and policies.

[1] *Technical Advisory on Evaluating Transportation Impacts in CEQA*, OPR, December 2018 http://opr.ca.gov/docs/20190122-743_Technical_Advisory.pdf

## Projects affected by SB 743

Two types of projects, land use development projects and transportation infrastructure projects, are affected by SB 743.

- **Land Use** – Development projects and plans (e.g., Community Plan or Specific Plan) will continue to require a transportation impact analysis. However, transportation impact studies conducted as part of the CEQA process will now be required to base project impacts on VMT. In addition, some projects, such as those located adjacent to transit, may be screened from requiring a detailed VMT analysis.

- **Transportation Infrastructure** – Prior to SB 743, transportation projects that had the potential to worsen vehicle delay, such as narrowing a roadway to enhance travel for bicyclists and pedestrians, may result in an environmental impact under CEQA. With SB 743 in place, transportation projects that promote travel by non-auto modes are no longer considered to result in an environmental impact. Roadway widening projects will now need to consider the potential to induce vehicle travel demand due to increased capacities which may make driving a more attractive travel option.

SB 743 does not prevent the City from continuing to analyze LOS as part of the development review process to determine if transportation improvements are needed to accommodate the proposed land uses, but LOS will no longer constitute the basis for CEQA impacts. In parallel with this technical document, the City is updating the Transportation Impact Analysis Report Guidelines to lay forth the requirements for CEQA and Non-CEQA sections of transportation studies.

## VMT Implementation Overview

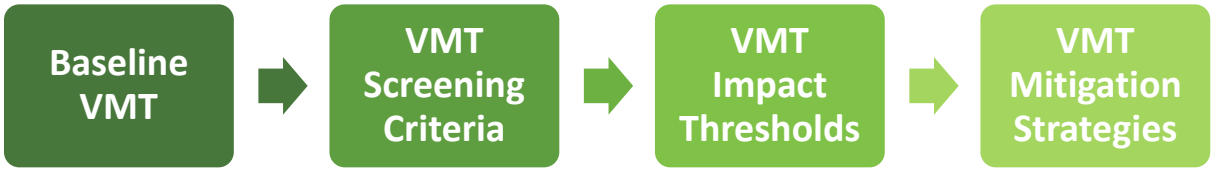
The updated CEQA guidelines have a new section for determining the significance of transportation impacts (Section 15064.3). While OPR produced a Technical Advisory to help lead agencies think about the variety of implementation questions to consider when adopting the new CEQA guidance, lead agencies must still make their own specific decisions about VMT methodology, thresholds, and mitigation.

To develop the guidance associated with SB 743 in Rolling Hills Estates, an advisory team was created with members of City Departments. The advisory team members represent the Departments of Public Works and Planning.

The City's process included defining its Baseline VMT, developing VMT screening criteria, defining its impact thresholds, and determining potential mitigation strategies. The advisory team considered multiple options for each of these components of the implementation process. This report presents the advisory team's recommendations and explains how they comply with CEQA guidance. The implementation process is illustrated below.

Other jurisdictions are currently updating their transportation impact thresholds and traffic study guidelines to comply with the State's SB 743 CEQA mandate. Most agencies are following state guidance provided by the OPR technical advisory and customizing the guidance to reflect the needs and context of each individual jurisdiction. The City of Los Angeles released their updated Transportation Assessment Guidelines (TAG) in July of 2019. Caltrans also recently released draft guidance for assessing VMT impacts on the state highway system[2]. Their draft Transportation Analysis Framework (TAF) and draft Transportation Analysis under CEQA (TAC) are currently undergoing informal review.

## Implementation Overview




## Report Overview

The following chapters describe the City's process of implementing SB 743 and the recommendations from the advisory team as follows:

- **Chapter 2: Baseline VMT** – This chapter describes the process for determining the City Baseline VMT and describes the analysis methodology and VMT metrics for Rolling Hills Estates.
- **Chapter 3: VMT Screening** – This chapter provides the options for project screening to determine if a VMT analysis is required and summarizes the VMT analysis process for projects that do not meet the screening criteria.
- **Chapter 4: VMT Impact Thresholds** – This chapter summarizes the threshold options considered by the City and presents the VMT impact thresholds for land use and transportation projects.
- **Chapter 5: VMT Mitigation Strategies** – For projects that are determined to have potential VMT impacts, mitigation options to reduce VMT and meet the City's thresholds are provided.

## Timing

All environmental documents, including negative declarations and environmental impact reports, that are released for public review must now use VMT to analyze the significance of a project's transportation impact.

[2] https://dot.ca.gov/programs/transportation-planning/office-of-smart-mobility-climate-change/sb-743

# Chapter 2 – Baseline VMT

This chapter summarizes the baseline VMT methodology and associated data in Rolling Hills Estates. Defining the City's Baseline VMT is an important initial step in the implementation process because a project's VMT will be compared to the City Baseline VMT to determine if the project exceeds the City's thresholds for VMT impacts. To determine the appropriate Baseline VMT for Rolling Hills Estates, the advisory team considered the VMT trends throughout the City and region.

## SCAG Travel Model Overview

The regional Southern California Association of Governments (SCAG) model is the best available tool to estimate VMT in Rolling Hills Estates. The most current version of the SCAG Model has a base year of 2012 and future year of 2040 and was developed for the 2016 *SCAG Regional Transportation Plan and Sustainable Communities Strategy*, April 2016. The model contains traffic analysis zones (TAZs) that contain socio-economic data reflecting the population, employment, and land use development characteristics throughout the region. The TAZ's are characterized as Tier 1 and Tier 2 zones, and each Tier 1 zone contains multiple Tier 2 zones. The Tier 2 zones represent a smaller geographic area that allows the model to produce more refined trip assignment forecasts. Both Tier 1 and Tier 2 zones are used to calculate VMT. Total VMT is calculated using the Tier 1 zones and VMT by trip purpose (e.g., home-based VMT) is calculated using the Tier 2 zones. The 2040 model used to produce VMT forecasts reflects future baseline (or business as usual) conditions.

While the SCAG model was used to estimate VMT in Rolling Hills Estates, the model contains the socio-economic data and transportation network for the entire SCAG region. The model also contains neighboring, external zones that are used to estimate travel demand that occurs between the SCAG region and adjacent areas, as well as estimate regional travel demand for those traveling through the SCAG region. The respective socioeconomic data in each TAZ within the City was updated to reflect 2012 base year and 2040 baseline totals, including population, households, and employment, based on expected baseline growth in the City.

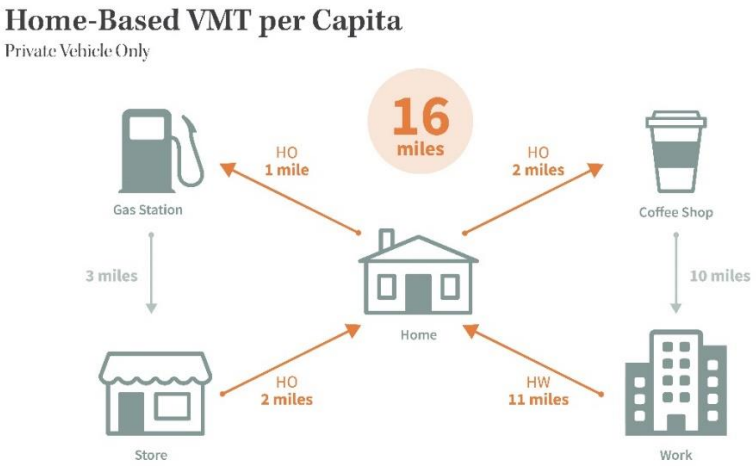
## VMT Methodology for Land Use Projects and Plans

The VMT methodology for land use projects and plans is based on the Origin-Destination (OD) VMT method. The OD VMT method estimates the VMT generated by land uses in a specific geographic area, such as the entire City or a smaller area, such as a project site. All vehicles traveling to/from the defined

geographic area are tracked within the SCAG model and the number of trips and length of trips are used to calculate the OD VMT.[3]

For land use projects and plans, the OD VMT methodology is the most appropriate method because it tracks all trips by trip purpose and the full length of those trips generated by the proposed land uses. The methodology can be used to report the following VMT metrics:

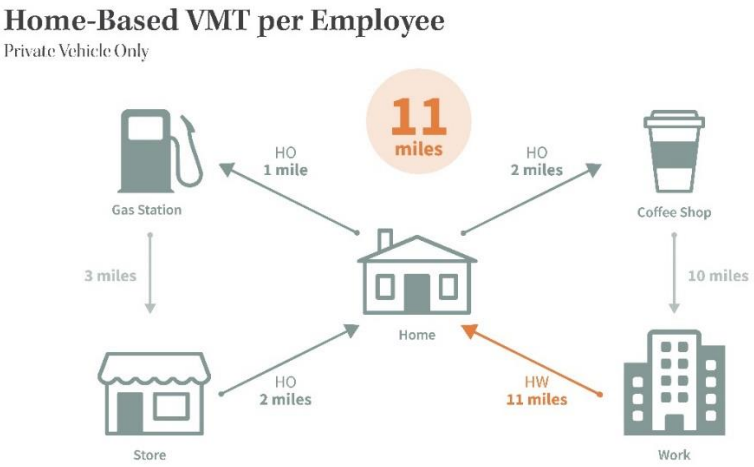
- **Total VMT per Service Population** (all vehicles and all trip purposes): The total VMT to and from all zones in the geographic area are divided by the total service population to get the efficiency metric of VMT per service population. The total service population is the sum of the number residents and the number of employees.
- **Residential (Home-based) VMT per capita** (automobile only): All home-based auto vehicle trips are traced back to the residence of the trip-maker (non-home-based trips are excluded) and then divided by the population within the geographic area to get the efficiency metric of home-based VMT per capita (or per resident). The diagram below illustrates the home-based trips that are included in this VMT metric.




Source: *Fehr & Peers, 2021*
Notes: "HO" = Home-based Other trip, "HW" = Home-based Work trip

[3] The OD VMT method requires two major data inputs. The first data input is the set of vehicle trip tables (including all vehicle trips by vehicle mode and by time of day) that contain the number of trips between each zone in the model. The second data input is the set of highway distance skims (by vehicle mode and by time of day) that allows the trip distances for each OD pair to be based on congested travel time, speed, and cost from the final highway assignment. The total VMT matrices are then generated by multiplying the final OD trip tables with the corresponding highway distance skims.

- **Work (Home-based work) VMT per employee** (automobile only): All auto vehicle trips between home and work are counted, and then divided by the number of employees within the geographic area to get the efficiency metric of home-based work VMT per employee. The diagram below illustrates the home-based work trip that is included in this VMT metric.




Source: *Fehr & Peers, 2021*
Notes: "HO" = Home-based Other trip, "HW" = Home-based Work trip

## VMT Methodology for Transportation Projects and Plans

The VMT methodology for transportation projects is based on the boundary method which considers all travel on roadways in a given area, including vehicles that are traveling on the roadways but don't have an origin or destination in the area (i.e., pass-through or external trips). The SCAG model is used to estimate the baseline VMT within the study area and then forecast the change in VMT with the project in operation. The study area should reflect the area of influence of the project. Large projects affecting regional travel may define the study area for VMT analysis as the entire City. The VMT for transportation projects is calculated as defined below.

- **Total Roadway VMT** (all vehicles): The total daily VMT estimated by multiplying the daily volume on every roadway segment by the length of every roadway segment within a given area.

In addition to VMT changes forecasted by the SCAG model, induced travel demand resulting from increasing the number of lane-miles should be considered for transportation projects and plans.

# VMT Trends

Defining the City's Baseline VMT is an important initial step in the implementation process because a project's VMT will be compared to the City Baseline VMT to determine if the project exceeds the City's thresholds for VMT impacts. To determine the appropriate Baseline VMT for Rolling Hills Estates, the advisory team considered the VMT trends throughout the City and region as described below.

## *Southern California Association of Governments (SCAG) VMT Trends*

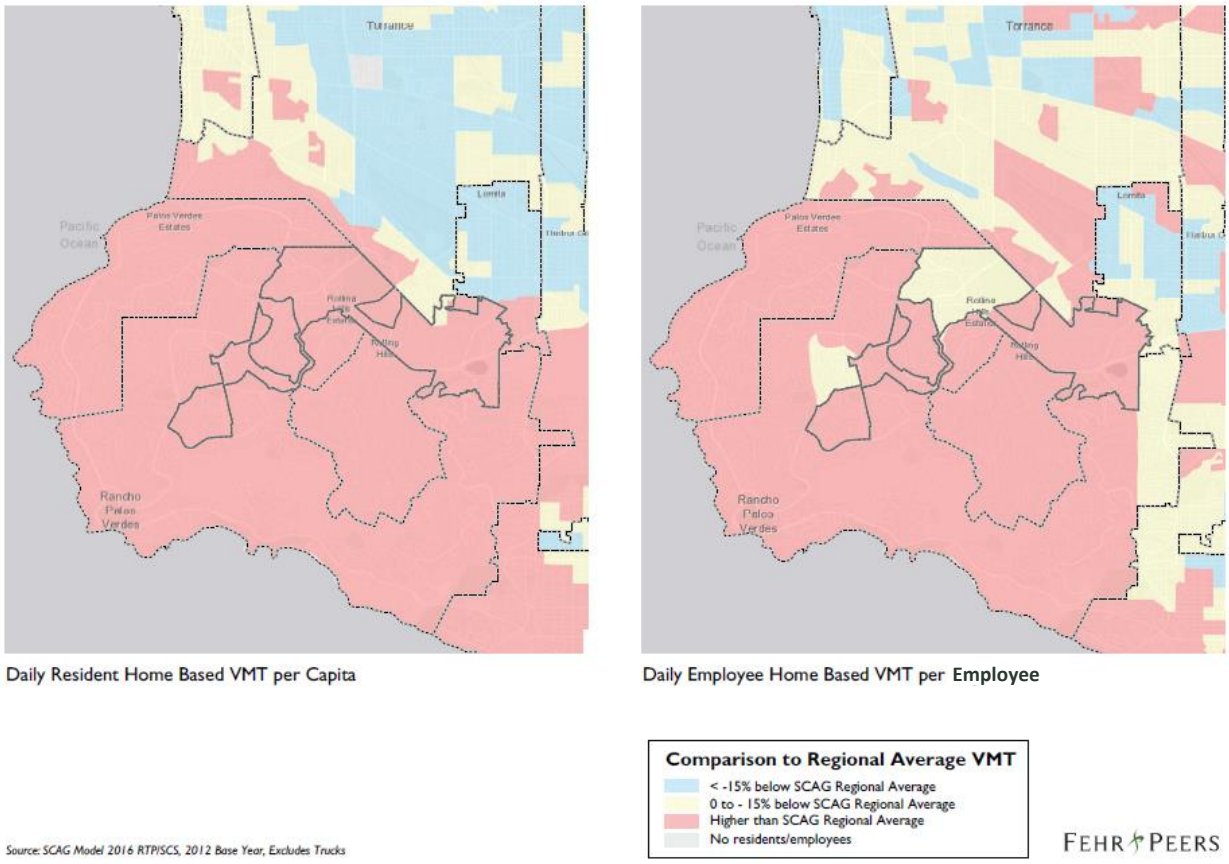
The first step in understanding the VMT trends in the City of Rolling Hills Estates was to compare the VMT metrics to the broader Southern California Association of Governments (SCAG) six-county region. **Table 1** shows the baseline VMT for the entire Rolling Hills Estates area (as illustrated **Figure 1** below) in comparison to the SCAG region. The metrics represent the 2021 base year, which are interpolated using the 2016 SCAG RTP/SCS model. The SCAG model has a calibrated base year of 2012, along with a future baseline of 2040. As shown, the VMT metrics for the City range from 18.2% higher than SCAG when considering work VMT employee to 36.9% higher than SCAG when considering total VMT per service population.

**TABLE 1: CITY OF ROLLING HILLS ESTATES BASELINE VMT METRICS COMPARED TO SCAG REGION**

| 2021 Base Year Region | Total VMT per Service Population | Residential VMT per Capita | Work VMT per Employee |
|---|---|---|---|
| **City of Rolling Hills Estates** | 45.3 | 17.8 | 20.1 |
| **SCAG Region** | 33.1 | 14.3 | 17.0 |
| **% Difference of City v. SCAG** | **+36.9%** | **+24.5%** | **+18.2%** |

Source: *Fehr & Peers* (2021) from the SCAG 2016 RTP/SCS Travel Demand Model.

***Figure 1: Rolling Hills Estates Baseline VMT Compared to SCAG Regional Average***




## *South Bay Cities Council of Governments (SBCCOG) VMT Trends*

To better understand the VMT trends within the surrounding region of the City, VMT metrics for the City were compared to the South Bay Cities Council of Governments (SBCCOG) region, as shown in **Table 2**. The SBCCOG consists of 22 cities in the South Bay, including Rolling Hills Estates, bounded in general by the I-110 and I-405 freeways. The metrics represent the 2021 base year, which are interpolated using the 2016 SCAG RTP/SCS model. The SCAG model has a calibrated base year of 2012, along with a future baseline of 2040. Overall, the VMT metrics for the SBCCOG region are relatively lower than the entire six-county SCAG region – except for the work VMT per employee metric. Similar to the SCAG region, the VMT metrics for the City of Rolling Hills Estates are higher than the SBCCOG regional baseline metrics.

**TABLE 2: CITY OF ROLLING HILLS ESTATES BASELINE VMT METRICS COMPARED TO SBCCOG REGION**

| 2021 Base Year Region | Total VMT per Service Population | Residential VMT per Capita | Work VMT per Employee |
|---|---|---|---|
| **City of Rolling Hills Estates** | 45.3 | 17.8 | 20.1 |
| **SBCCOG Region** | 32.6 | 13.3 | 18.4 |
| **% Difference of City v. SCAG** | **+39.0%** | **+33.8%** | **+9.2%** |

Source: *Fehr & Peers* (2021) from the SCAG 2016 RTP/SCS Travel Demand Model.

## City of Rolling Hills Estates Baseline VMT

Given the large differences in the VMT trends of the City compared to the SCAG and SBCCOG regions, the advisory team's recommendation was to use the Citywide average VMT metrics for the regional baseline. By establishing a Citywide Baseline VMT, the City is acknowledging the differences in local travel behavior given the land use context and transportation network to represent a more realistic and reasonable picture of VMT activity levels, and thus a more appropriate and feasible baseline for VMT analysis.

**Table 3** below shows the City Baseline VMT metrics for the Rolling Hills Estates. Future development projects and plans will be compared to the applicable Baseline VMT metrics to determine if they meet the City's thresholds for a VMT impact.

**TABLE 3: CITY OF ROLLING HILLS ESTATES 2021 BASELINE VMT**

| Region | Total VMT per Service Population | Residential VMT per Capita | Work VMT per Employee |
|---|---|---|---|
| **City of Rolling Hills Estates** | **45.3** | **17.8** | **20.1** |

Source: *Fehr & Peers* (2021) from the SCAG 2016 RTP/SCS Travel Demand Model.

While the baseline VMT trends included in Table 3 reflect the 2021 (interpolated using the SCAG 2016 RTP/SCS model), baseline conditions for CEQA purposes will be specific to the release date of a project's notice of preparation (NOP). The CEQA baseline can be estimated by interpolating between the 2012 and 2040 VMT data in the SCAG model to establish specific VMT values associated with a specific baseline year.

# Chapter 3 – VMT Screening

This chapter presents the VMT screening criteria to determine if a project requires a detailed VMT analysis. The City's options for screening projects from requiring a VMT analysis are generally based on a project's travel characteristics and their influence on VMT.

## Screening Options

SB 743 allows lead agencies to use an impact screening method to streamline land use project review for VMT impacts, and OPR has provided guidance related to opportunities for screening projects that would be expected to generate low VMT. If a project does not pass an initial screening test, which means the project may generate VMT that exceeds a defined threshold, then a full VMT impact analysis would be conducted. The City's advisory team reviewed various options for VMT screening and recommends that the following screening criteria be used to determine if a VMT analysis is required. A project needs to meet only one of the screening criteria to be screened from further VMT analysis.

### *Project Size and Type Screening*

OPR guidance states that projects that generate less than 110 net daily trips may be screened from conducting a VMT analysis as shown below. In addition, local serving retail projects less than 50,000 square feet (50 ksf) may be presumed to have a less than significant impact absent substantial evidence to the contrary. This is because local serving retail generally improves the convenience of shopping close to home and has the effect of reducing vehicle travel. The City will allow the project size and type screening recommended by OPR, but a site access and/or queuing study could still be required. **Table 4** below provides an overview of the project size screening criteria #1.

**TABLE 4: VMT SCREENING CRITERIA #1 – PROJECT SIZE**

| Screening Option | Background | OPR Guidance |
|---|---|---|
| **Project Size**  | Small projects that would generate minimal VMT could be screened. | **OPR Guidance**<br>Projects with **<110 net daily trips**[1] or local serving retail uses **<50 ksf**[2]<br>**What does this mean for the City?**<br>All projects generating fewer than 110 net daily trips and retail projects less than 50 KSF would not require VMT analysis. A site access, queuing study could still be required. |

[1] Eleven single-family units, or 20 multifamily units, generate < 110 daily trips (ITE, 10th Edition).

[2] Note that "local serving retail" screening can include general retail, pharmacy/drugstore, supermarket, bank, health club, café, or restaurant if project size is less than 50 KSF. Local serving retail will be further defined in the City's VMT analysis guidelines.

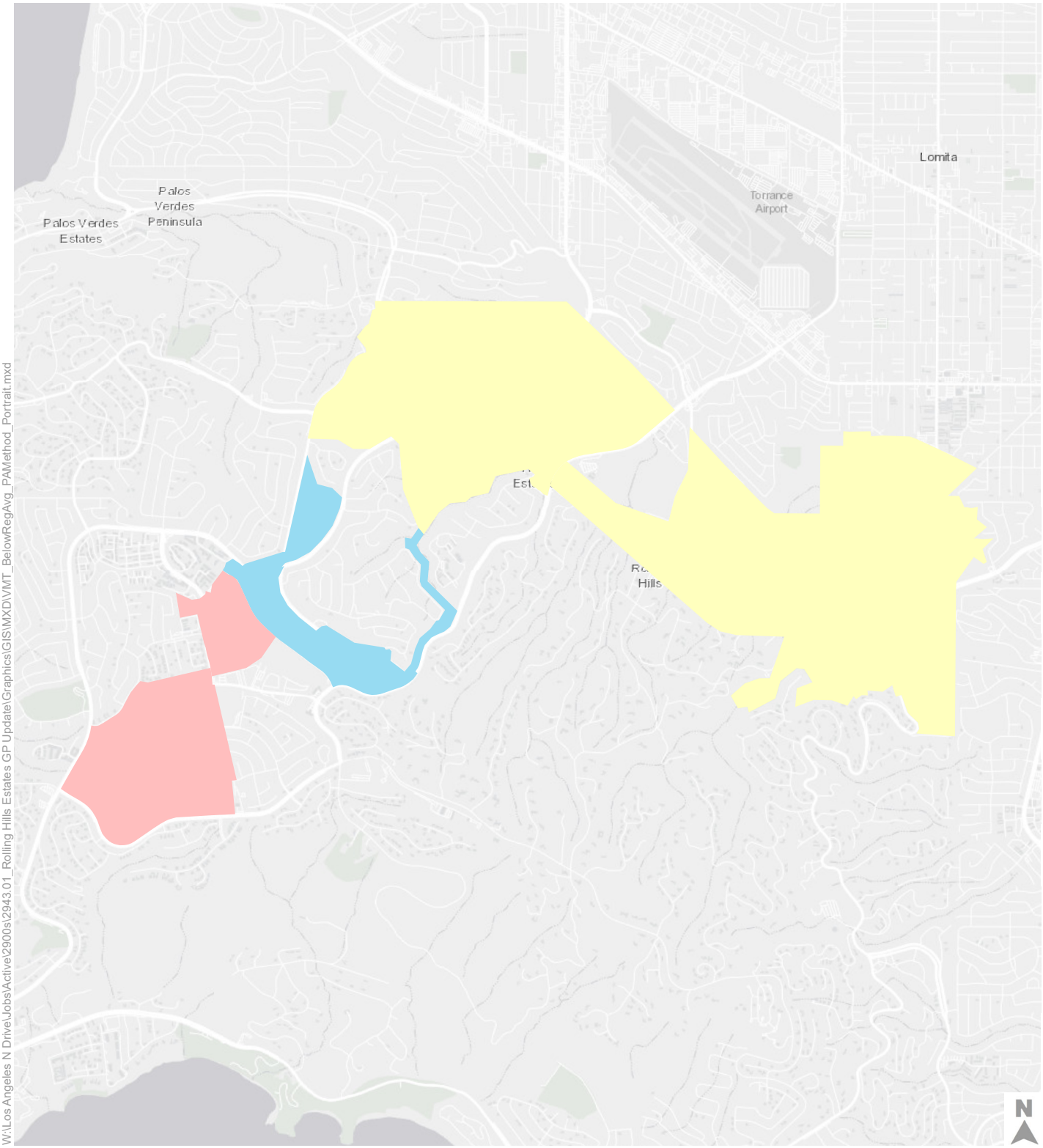
### *Low VMT Area Screening*

The OPR guidance suggests that project location can also be used to evaluate and determine up front whether a project can be screened from further VMT analysis. OPR guidance suggests that new development placed in areas that are already VMT efficient should perform similarly to existing uses. Allowing this screening would exempt projects from needing further VMT analysis. The City can still require these projects to complete a traffic study (outside of CEQA) as deemed appropriate. **Table 5** below provides an overview of the project location screening criteria #2.

**TABLE 5: VMT SCREENING CRITERIA #2 – PROJECT LOCATION**

| Screening Option | Background | OPR Guidance |
|---|---|---|
| **Project Location** | Projects located in "VMT efficient" areas may be presumed to have similar VMT patterns. | **OPR Guidance**<br>"VMT efficient" is defined as Home-Based or Home-Based Work VMT that is at least **15%** or **16.8%** lower than the baseline average; depending on whether the City selects the OPR or CARB recommended threshold.<br>**What does this mean for the City?**<br>A screening map can be prepared (see Figures 2 & 3) showing the areas of the City that are already "VMT efficient" based on the City's 15% reduction threshold. Separate screening maps are provided for residential and office/employment uses. If projects qualify for this screening, then no further VMT analysis is needed. A traffic operations study could still be required. |

**Figure 2** shows the low-VMT area screening in the City based on residential VMT per capita compared to the Citywide average for base year 2021. According to Figure 2, residential projects in the commercial district (blue area) are presumed to have a less than significant VMT impact and can be screened from further VMT analysis. **Figure 3** shows the low-VMT area screening in the City based on work VMT per employee compared to the Citywide average for base year 2021. According to Figure 3, there are no VMT efficient areas for work VMT per employee in the city, when compared to the Citywide average. For example, if there is a proposed mixed-use project of residential and office, the residential portion may be screened from further VMT analysis only. The office VMT must be still analyzed.




SCAG Model 2016 RTP

Figure 2

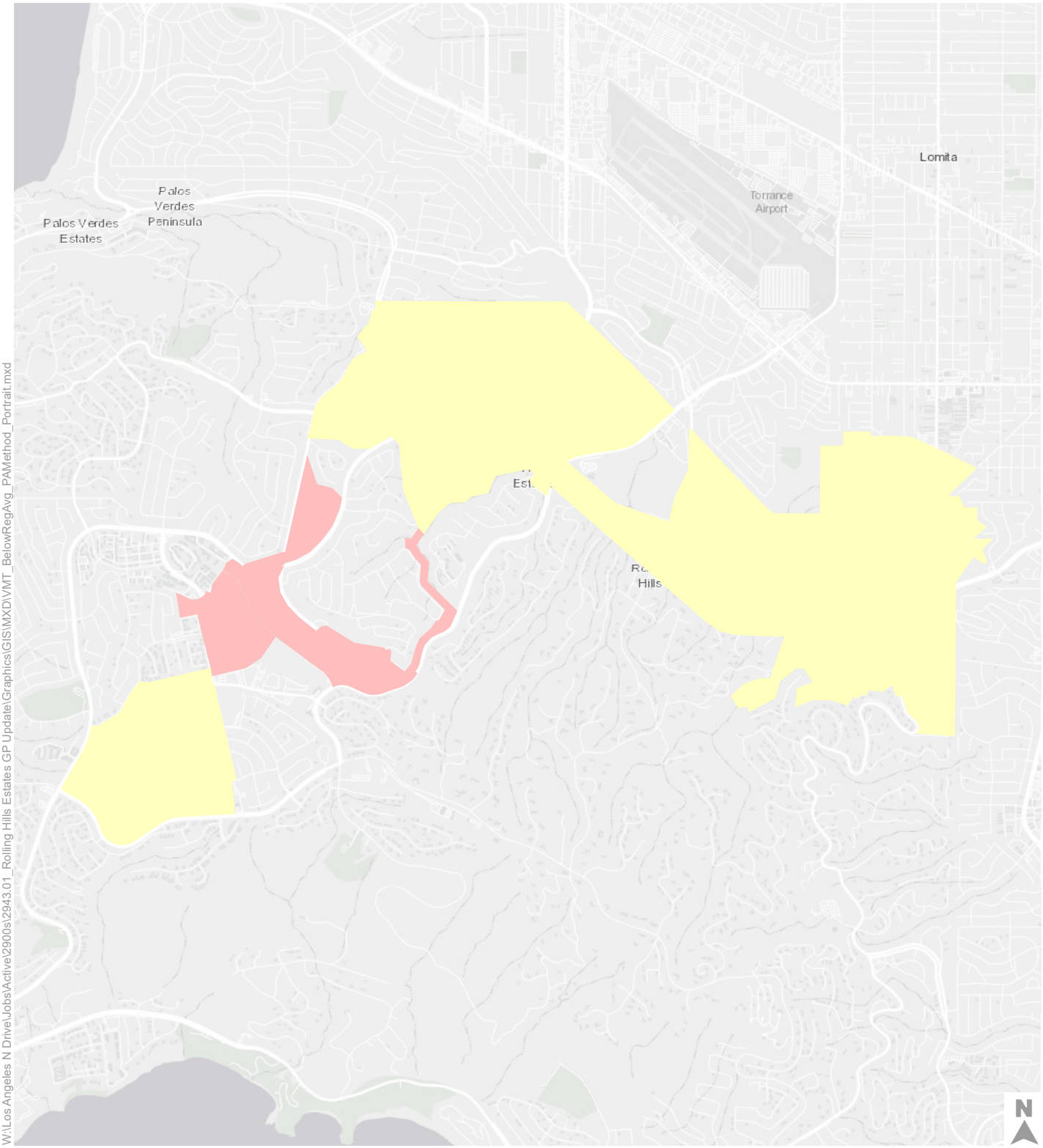
**Low VMT Area Screening - Residential**

Daily Residential Home Based VMT per Capita
Comparison to Citywide Average
2021 Baseline

< -15% below Citywide Average

0 to -15% below Citywide Average

Higher than Citywide Average




SCAG Model 2016 RTP

Figure 3

**Low VMT Area Screening - Office**

0 to -15% below Citywide Average

Higher than Citywide Average

Daily Home Based Work VMT per Employee
Comparison to Citywide Average
2021 Baseline

### *Transportation Projects Screening*

Transportation projects that promote non-auto travel, improve safety, or improve traffic operations at current bottlenecks may be screened from VMT analysis. This includes transit, bicycle and pedestrian facilities, intersection traffic control (e.g., traffic signals or roundabouts), or widening at intersections to provide new turn lanes. Transportation projects that add roadway vehicle capacity, such as road-widening or adding a through-lane at an intersection, may lead to a substantial and measurable increase in VMT. Therefore, these types of transportation projects should generally not be exempt from VMT analysis. In the case where a road-widening project also includes a new bicycle facility as part of the design, a VMT analysis is still required.

The following list provides example transportation projects that may be screened from VMT analysis, as outlined in OPR's Technical Advisory guidance[4] (please see **Attachment A** for a more detailed list):

- Rehabilitation, maintenance, replacement, safety, and repair projects designed to improve the condition of existing transportation assets (e.g., highways; roadways; bridges; culverts; Transportation Management System field elements such as cameras, message signs, detection, or signals; tunnels; transit systems; and assets that serve bicycle and pedestrian facilities) and that do not add additional motor vehicle capacity
- Installation, removal, or reconfiguration of traffic lanes that are not for through traffic, such as left, right, and U-turn pockets, two-way left turn lanes, or emergency breakdown lanes that are not utilized as through lanes
- Addition of roadway capacity on local or collector streets provided the project also substantially improves conditions for pedestrians, cyclists, and, if applicable, transit
- Addition of a new lane that is permanently restricted to use only by transit vehicles
- Reduction in number of through lanes
- Installation, removal, or reconfiguration of traffic control devices, including Transit Signal Priority (TSP) features
- Timing of signals to optimize vehicle, bicycle, or pedestrian flow
- Installation of roundabouts or traffic circles
- Installation or reconfiguration of traffic calming devices
- Addition of Class I bike paths, trails, multi-use paths, or other off-road facilities that serve non-motorized travel

[4] California Governor's Office of Planning and Research (2018). *Technical Advisory: On Evaluating Transportation Impacts in CEQA*.

## City of Rolling Hills Estates VMT Screening Criteria

**Table 6** provides a summary of VMT screening options for projects in the City as recommended by the advisory team. A project would only need to meet one of the following criteria to be screened from further VMT analysis. The screening is not part of the City's adoption of VMT thresholds. Additional screening options can be explored by the City overtime. Other projects can also be screened from needing a VMT analysis on a case by case basis. A traffic operations study could still be required.

**TABLE 6: CITY OF ROLLING HILLS ESTATES VMT SCREENING CRITERIA SUMMARY**

| Screening Categories | Project Requirements to Meet Screening Criteria |
|---|---|
| Project Size | A project that generates 110 or fewer daily trips. |
| Project Location | A project is located in a VMT efficient area, based on the low-VMT area mapping. |
| Locally Serving Retail | A project that has locally serving retail uses that are 50,000 square feet or less. If the project contains other land uses, those uses need to be considered under other applicable screening criteria. |
| Transportation Facilities | Transportation projects that promote non-auto travel, improve safety, or improve traffic operations at current bottlenecks, such as transit, bicycle and pedestrian facilities, intersection traffic control (e.g., traffic signals or roundabouts), or widening at intersections to provide new turn lanes (see **Attachment A** for detailed list). |

Note: More detailed explanations of the above screening categories can be found in Chapter 3 of this report.

# Chapter 4 – VMT Impact Thresholds

CEQA Guidelines Section 15064.7, Thresholds of Significance, encourages lead agencies to develop and publish thresholds of significance. Pursuant to Section 15064.7(b), the City will adopt a threshold of significance for VMT by resolution based upon the recommendations of the advisory team and approval by the City Council. This chapter presents the threshold options considered along with the advisory team's recommended threshold for determining VMT impacts.

## VMT Threshold Options

Lead agencies have multiple options for setting thresholds. Under any option, the lead agency must develop its own substantial evidence to support its preferred threshold and should consider multiple perspectives. These perspectives include those from the community in general as well as specific stakeholder perspectives from the development community and environmental protection groups. A threshold that is too stringent could lead to a permanent significant and unavoidable VMT impact finding increasing the complexity of environmental review process. Conversely, a threshold that does not result in any significant impacts could lead to missed opportunities to reasonably reduce VMT and related environmental impacts. If a project impact (or lack thereof) is challenged, there needs to be substantial evidence supporting the lead agency's decisions.

The advisory team considered multiple VMT threshold options based on state guidance, including VMT reduction targets prepared by OPR and Air Resources Board (ARB).

### *OPR Threshold Option*

OPR recommends that lead agencies select a significance threshold that aligns with all three statutory goals listed in Section 21099 of the Public Resources Code: (1) reduction of greenhouse gas emissions, (2) development of multimodal transportation networks and (3) a diversity of land uses. The State has clear quantitative targets for GHG emissions reduction set forth in law and based on scientific consensus, and the depth of VMT reduction needed to achieve those targets has been quantified. Tying VMT thresholds to GHG reduction also supports the two other statutory goals of promoting land use diversity and providing multimodal travel options. Therefore, to ensure adequate analysis of transportation impacts, OPR recommends using quantitative VMT thresholds linked to GHG reduction targets.

Based on OPR's review of the applicable research, and in light of an assessment by ARB in quantifying the need for VMT reduction in order to meet the State's long-term climate goals, OPR recommends that a per

capita or per employee VMT that is fifteen percent below that of existing development (i.e., 15% below the Baseline VMT) may be a reasonable threshold.

### *Air Resources Board Threshold Option*

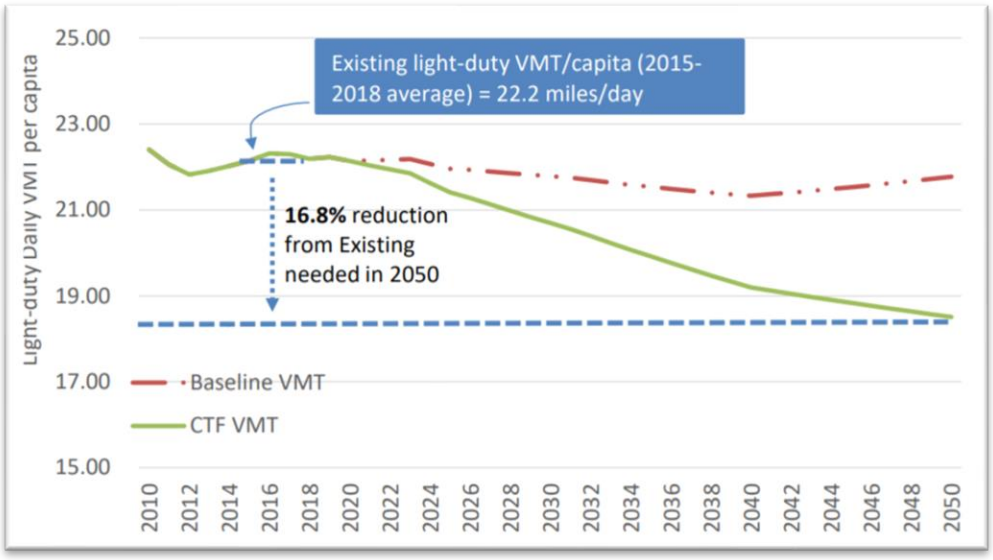
The California Air Resources Board (ARB) is responsible for developing a plan[5] to detail how the State will achieve its GHG emissions reduction targets mandated by law (SB 375, SB32 and Executive Order S-3-05). In the transportation sector, GHG emissions reducing measures include low carbon fuels, cleaner vehicles, and strategies to promote sustainable transportation choices that result in reduced VMT.

ARB developed a scenario-based modeling system (called *Vision*) that was used to identify foreseeable emission reductions associated with existing mobile-source regulations, and to explore different combinations of further advancements in technologies, fuels, and transportation system efficiencies. They modeled two scenarios: Baseline and Cleaner Technologies and Fuel (CTF).

**Figure 4** shows the results of the two modeled scenarios produced by ARB. The results show that a 16.8% reduction in VMT per capita for light-duty vehicles, below existing levels, is needed in order to achieve the state required target of 80% reduction in GHGs by 2050. Additionally, a 14.3% reduction in total VMT per capita, which includes truck VMT, is recommended. Since the goals of SB 743, along with the OPR state guidance, focus on passenger vehicle VMT, the goal of achieving a 16.8% reduction in VMT per capita is more applicable for VMT analysis in the City. ARB notes that this is a "non-binding," supportive recommendation but can serve as an alternated assessment tool for jurisdictions that choose to use them to complete the analyses directed by the CEQA Guidelines.

[5]California Air Resources Board (Jan. 2019) *California Air Resources Board 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals*, available at https://ww2.arb.ca.gov/resources/documents/carb-2017-scoping-plan-identified-vmt-reductions-and-relationship-state-climate

*Figure 4: ARB VMT Reductions and Relationship to State Climate Goals*




Source: California Air Resources Board Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals (Figure 3), January 2019.

# City of Rolling Hills Estates VMT Thresholds

## Land Use Projects and Plans

The advisory team recommends that the City define VMT impacts for land use projects and plans based on the OPR target of a 15% reduction from Baseline VMT. Doing so will align the City with the state recommended threshold guidance for determining a VMT impact.

## Transportation Projects

For roadway widening projects, a significant impact would occur if the project increased the total amount of VMT in the study area (to be defined on a project by project basis) when compared to baseline conditions. The VMT thresholds for all projects and plans in the City of Rolling Hills Estates are summarized below in **Table 7**.

**TABLE 7: CITY OF ROLLING HILLS ESTATES VMT THRESHOLDS**

| Project Type | Threshold for Determination of Significant VMT Impact |
|---|---|
| Residential Project | Project exceeds 15% below the Citywide Baseline VMT for home-based VMT per capita |
| Employment (Commercial or Industrial) Project | Project exceeds 15% below the Citywide Baseline VMT for home-based work VMT per employee |
| Regional Retail Project | Project results in a net increase in total VMT per service population in comparison to the Citywide Baseline VMT |
| Mixed-Use Projects | Evaluate each project land use component separately using the criteria above |
| Land Use Plans (Community Plan, Specific Plan) | Total VMT per service population generated by the Plan exceeds 15% below the Citywide Baseline VMT |
| Other land use types | Project exceeds 15% below the Citywide Baseline VMT. For land use types not listed above, the City can determine the appropriate VMT metric depending on the project characteristics. For projects that are generally producing job-related travel, the employment generating VMT (home-based work VMT per employee) can be compared to the citywide baseline. For other projects, the total VMT per service population can be compared to the Citywide baseline, or the net change in VMT can be compared within the study area. |
| Transportation Projects or Plans | Project results in an increase in VMT in comparison to the baseline VMT in the study area |

## VMT Analysis Methodology

For projects that do not meet any of the screening criteria described in Chapter 3, a VMT analysis would be required to determine if the project or plan exceeds the City's VMT thresholds presented above. The VMT analysis would rely on the best available data to inform trip generation and trip length estimates for the project uses. For land use plans (e.g., specific plans or community plans) and projects consisting of typical land use types, such as residential, office, and retail land uses, the VMT analysis can be conducted using the most recent version of the SCAG model. For other unique project types, such as a conference center or performing arts center, the VMT analysis should be customized to determine the unique trip generation and trip length characteristics of the proposed uses.

As required under current practice, the VMT analysis should consider the potential impacts of the project under both existing and future/cumulative conditions as follows:

- **Existing/Baseline Conditions**: Project-generated VMT should be estimated for the proposed land uses under existing/baseline conditions. VMT can be estimated using the SCAG regional travel demand model and should be reported as VMT per capita (residential projects), VMT per employee (office projects), or VMT per service population (other land uses).
- **Cumulative Conditions**: A project that is below the City's thresholds based on VMT per capita (residential projects), VMT per employee (office projects), or VMT per service population (other land uses) and does not have a VMT impact compared to baseline conditions would also not have a cumulative impact as long as it is aligned with long-term environmental goals and relevant plans.

Project effects on VMT can also be considered under cumulative conditions to determine if community plans or Citywide VMT would be higher/lower in the future with the project in place. To evaluate the project's effects on VMT, the future year travel demand model can be updated by the transportation planner/engineer completing the VMT analysis to reflect the project and determine if VMT increases or not with the project. A redistribution of land use can be completed to ensure that the "no project" assessment and the "with project" assessment contain the same land use control totals, especially if the project is large enough that it would affect land use absorption elsewhere.

# Chapter 5 – VMT Mitigation Strategies

The land use context of Rolling Hills Estates presents a challenge to the effectiveness of common TDM strategies for VMT reduction at individual project sites in the more suburban areas of the City. Despite this challenge, identifying mitigations that reduce the number of single-occupant vehicle trips and miles traveled generated by proposed projects is still relevant. Land use and transportation plans, such as Community Plans or Active Transportation Plans, provide an opportunity to reduce VMT through defining land uses mixes and densities and providing a circulation network that minimizes longer distance trips and promotes travel through active modes of transportation. This chapter summarizes the near-term TDM strategies suited to the City's transportation and land use context and identifies potential longer-term mitigation programs that may be worthy of further evaluation.

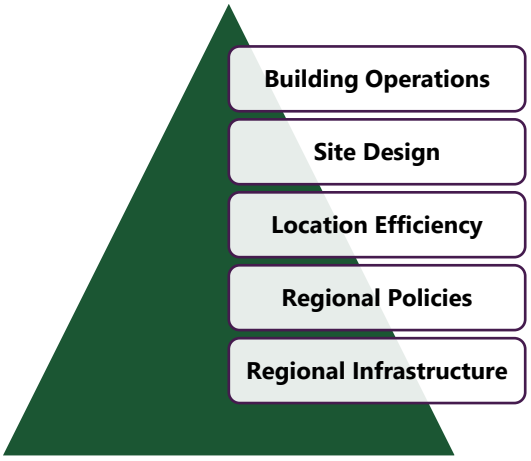
## VMT Mitigation through TDM

Projects with VMT impacts should have mitigation options available for implementation. The types of mitigation that affect VMT are those that reduce the number of single-occupant vehicles generated by the site. This can be accomplished by changing the proposed land uses, modifying the project design features, or by implementing TDM strategies. TDM strategies have been determined to be among the most effective VMT mitigators. TDM strategies are reductions made through project site modifications, programming, and operational changes.

The scale of a TDM strategy is an important consideration for mitigation effectiveness. The biggest effects of TDM strategies on VMT (and resultant emissions) derive from regional policies related to land use location efficiency and infrastructure investments that support taking transit, walking, and bicycling. While there are many measures that can influence VMT and emissions related to site design and building operations, those measures have smaller effects that are often dependent on final building tenants.

**Figure 5** presents a conceptual illustration of the relative importance of scale.

*Figure 5: Transportation-Related GHG Reduction Measures*




TDM strategies in the California Air Pollution Control Officers Association (CAPCOA) *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity*[6] can be used to quantify the VMT reduction benefits for various strategies.

## TDM Strategies: Near-Term

Specific mitigation strategies need to be tailored to the project characteristics and their effectiveness needs to be analyzed and documented as part of the environmental review process to determine if impacts could be mitigated or if they would remain significant and unavoidable. Given that research on the effectiveness of TDM strategies is continuing to evolve, feasible mitigation measures should be considered based on the best data available at the time a project is being considered by the City.

The research provided by CAPCOA estimates the effectiveness of VMT reductions by land use type, such as residential or office, and place type, such as urban or suburban. **Table 8** also provides an overview of the TDM strategies that are applicable in Rolling Hills Estates and shows how they relate to the mobility policies in the City's 2040 General Plan. **Attachment B** provides a detailed table showing these project-specific TDM strategies and the range of VMT reduction based on CAPCOA research.

To ensure that mitigation measures are implemented and effective, mitigation monitoring will be required once the project is in operation. Potential organizations have been listed for mitigation monitoring in

[6] California Air Pollution Control Officers Association (CAPCOA), *Handbook for Analyzing Greenhouse Gas Emission Reductions, Assessing Climate Vulnerabilities, and Advancing Health and Equity, 2021* https://www.airquality.org/ClimateChange/Documents/Final%20Handbook_AB434.pdf

Table 8. The actual reporting structure will be determined through further City discussions, or upon project review and approval.

**TABLE 8: TDM STRATEGIES AND RELATIONSHIP TO ROLLING HILLS ESTATES 2040 GENERAL PLAN**

| Rolling Hills Estates 2040 General Plan: Mobility Element Policies | Applicable CAPCOA TDM Category | Applicable CAPCOA TDM Strategy | City Monitoring Body[1] |
|---|---|---|---|
| Policy 3.5.1: Work with schools, parents, and students to develop transit and TDM strategies that encourage active and transit modes of travel to and from school. | Land Use/Location | Increase Destination Accessibility | TBD |
| | | Increase Transit Accessibility | Possible DPW or Self Report |
| | Neighborhood/ Site Enhancements | Provide Pedestrian Network Improvements | Possible TMO or Self Reporting |
| | | Provide Traffic Calming Measures | TBD |
| | Commute Trip Reduction Programs | Implement a School Pool Program | Possible DPW, DRP, TMO, or Self Report |
| | | Implement Bike Sharing Programs | Possible DPW, DRP, TMO, or Self Report |
| | | Implement Subsidized or Discounted Transit Program | Possible DPW, DRP, TMO, or Self Report |
| | | Implement School Bus Program | Possible DPW, DRP, TMO, or Self Report |
| | | Provide Bike Parking Near Transit | TBD |
| Policy 3.5.2: Partner with local businesses and transit agencies to develop transit and TDM strategies that empower residents to use active and transit modes around town. | Land Use/Location | Increase Destination Accessibility | Possible DPW or DRP |
| | | Increase Transit Accessibility | Possible DPW |
| | | Improve Design of Development | TBD |
| | Neighborhood/Site Enhancements | Provide Pedestrian Network Improvements | Possible TMO or Self Reporting |
| | | Incorporate Bike Lane Street Design (on-site) | TBD |
| | | Provide Bike Parking in Non-Residential Projects | TBD |
| | | Provide Bike Parking with Multi-Unit Residential Projects | TBD |
| | Commute Trip Reduction Programs | Provide Electric Vehicle Parking | TBD |
| | | Provide Ride-Sharing Programs | |

| Rolling Hills Estates 2040 General Plan: Mobility Element Policies | Applicable CAPCOA TDM Category | Applicable CAPCOA TDM Strategy | City Monitoring Body[1] |
|---|---|---|---|
| | | Implement Subsidized or Discounted Transit Program | |
| | | Provide End of Trip Facilities | |
| | Transit System Improvements | Provide a Bus Rapid Transit System | TBD |
| | | Implement Transit Access Improvements | |
| | | Expand Transit Network | |
| | | Increase Transit Service Frequency/Speed | |
| | | Provide Bike Parking Near Transit | |
| | | Provide Local Shuttles | |
| Policy 3.5.3: Work with the community to develop a list of transit and TDM strategies for commuting that meets the needs of Rolling Hills Estates' residents. | Neighborhood/Site Enhancements | Provide Pedestrian Network Improvements | TBD |
| | | Provide Traffic Calming Measures | |
| | | Incorporate Bike Lane Street Design (on-site) | |
| | | Provide Bike Parking in Non-Residential Projects | |
| | | Provide Electric Vehicle Parking | |
| | | Dedicate Land for Bike Trails | |
| | Parking Policy/Pricing | Limit Parking Supply | Possible DPW or DRP |
| | Commute Trip Reduction Programs | Implement Commute Trip Reduction Program – Voluntary | Possible DPW, DRP, TMO, or Self Report |
| | | Implement Commute Trip Reduction Program – Required Implementation/Monitoring | |
| | | Provide Ride-Sharing Programs | |
| | | Implement Subsidized or Discounted Transit Program | |
| | | Provide End of Trip Facilities | |
| | | Encourage Telecommuting and Alternative Work Schedules | |
| | | Implement Commute Trip Reduction Marketing | |

| Rolling Hills Estates 2040 General Plan: Mobility Element Policies | Applicable CAPCOA TDM Category | Applicable CAPCOA TDM Strategy | City Monitoring Body[1] |
|---|---|---|---|
| | | Implement Preferential Parking Permit Program | |
| | | Implement Car-Sharing Program | |
| | | Provide Employer-Sponsored Vanpools/Shuttle | |
| | | Implement Bike-Sharing Program | |
| | | Price Workplace Parking | |
| | | Implement Employee Parking "Cash-Out" | |
| Policy 3.5.4: Coordinate with stakeholders and effectively market transit and TDM strategies to ensure they are in line with community needs and residents are aware of the various options and programs available to them. | Commute Trip Reduction Programs | Implement Commute Trip Reduction Marketing | Possible DPW, DRP, TMO, or Self Report |

Note: 1. DPW - Department of Public Works; DRP - Department of Regional Planning; TMO - Transportation Management Organization (possible future organization that may be in place to administer and monitor VMT reduction strategies).

## VMT Mitigation Programs: Long-Term Strategies

In addition to the conventional TDM programs described above, two new concepts that are not yet available but being explored for feasibility by other jurisdictions are described below. These mitigation programs are currently being researched by the City and may be available as mitigation options in the future.

- **VMT Mitigation Exchange** – An exchange program is a concept where VMT generators can select from a pre-approved list of mitigation projects that may be located within the same jurisdiction or possibly from a larger area. The intent is to match the project's needed VMT reduction with a specific mitigation project of matching size and to provide evidence that the VMT reduction will reasonably occur.
- **VMT Mitigation Bank** – A mitigation bank is intended to serve as an entity or organization that pools fees from development projects across multiple jurisdictions to spend on larger scale

mitigation projects. This concept differs from the more conventional impact fee program approach described above in that the fees are directed to a few larger projects that have the potential for a more significant reduction in VMT and the program is regional in nature.

As these new mitigation program concepts are still evolving, the specific descriptions and elements of the programs will likely change. The first resource document to describe and assess these programs was published by U.C. Berkeley and is entitled, "*Implementing SB 743, An Analysis of Vehicle Miles Traveled Banking and Exchange Frameworks*," (The University of California Institute of Transportation Studies, October 2018). This document is a useful starting place for a dialogue about these programs.

The findings of the report are supportive of these concepts noting the following about the reasoning for their consideration.

> *Yet while methods for reducing VMT impacts—such as mileage pricing mechanisms, direct investments in new public transit infrastructure, transit access subsidies, and infill development incentives—are well understood, they may be difficult in some cases to implement as mitigation projects directly linked or near to individual developments. As a result, broader and more flexible approaches to mitigation may be necessary. In response, state and local policy makers are considering the creation of mitigation "banks" or "exchanges." In a mitigation bank, developers would commit funds instead of undertaking specific on-site mitigation projects, and then a local or regional authority could aggregate these funds and deploy them to top-priority mitigation projects throughout the jurisdiction. Similarly, in a mitigation exchange, developers would be permitted to select from a list of pre-approved mitigation projects throughout the jurisdiction (or propose their own), without needing to mitigate their transportation impacts on-site. Both models can be applied at a city, county, regional, and potentially state scale, depending on local development patterns, transportation needs and opportunities, and political will.*

This reasoning is important in Rolling Hills Estates because mitigating VMT impacts on a project-by-project basis is challenging, especially in suburban land use contexts where travel choices are limited. That said, the report and research conducted for this study identified the following key challenges with these types of programs.

- **Challenges for Mitigation Exchanges**
  - Potential mismatch between funds and mitigation projects available
  - Potential for reduced oversight of project selection
  - Difficulty in verifying VMT reductions and their sustainability, especially with VMT generation changing over time due to disruptive transportation trends such as TNCs and autonomous vehicles (AVs)
  - Difficulty in demonstrating an essential nexus
  - Potential opposition to mitigation not directly occurring in the project impact area, especially if impacts are concentrated in or near disadvantaged communities and the

mitigation occurs in more affluent areas

- **Challenges for Mitigation Banks**
  - Increased need to conduct careful CEQA/Mitigation Fee Act analysis
  - Accounting challenge in delay from fee payment to project funding
  - Greater need for program administration budget
  - Political difficulty in distributing mitigation projects and coordinating across County
  - Difficulty in verifying VMT reductions and their sustainability, especially with VMT generation changing over time due to disruptive transportation trends such as TNCs and AVs
  - Difficulty in demonstrating an essential nexus
  - Potential opposition to mitigation not directly occurring in the project impact area especially if impacts are concentrated in or near disadvantaged communities and the mitigation occurs in more affluent areas

Another important element for either of these concepts is to have an entity that is responsible for establishing, operating, and maintaining the program. This is a potential role for a regional entity (such as SCAG) or sub-regional entity, especially for programs that would extend mitigation projects beyond individual jurisdictional boundaries. A key part of 'operations' is that the entity will need the capability to provide verification of the VMT reduction performance and to adjust the program projects over time. A more localized entity could help minimize potential concerns about mitigation not occurring near the project site or in the same community,

The potential desire for VMT mitigation exchanges or banks may depend on how lead agencies and developers respond to the initial implementation of SB 743 following statewide implementation on July 1, 2020. If many projects are found to have significant VMT impacts and problems occur with finding feasible mitigation measures for individual projects, then interest may grow for more program-based mitigation.

# Attachment A: Screened Transportation Projects

## Transportation Projects That Do Not Require VMT Analysis

The following complete list is provided in the OPR Technical Advisory for transportation projects that would not likely lead to a substantial or measurable increase in vehicle travel, and therefore generally should not require an induced travel analysis:

- Rehabilitation, maintenance, replacement, safety, and repair projects designed to improve the condition of existing transportation assets (e.g., highways; roadways; bridges; culverts; Transportation Management System field elements such as cameras, message signs, detection, or signals; tunnels; transit systems; and assets that serve bicycle and pedestrian facilities) and that do not add additional motor vehicle capacity
- Roadside safety devices or hardware installation such as median barriers and guardrails
- Roadway shoulder enhancements to provide "breakdown space," dedicated space for use only by transit vehicles, to provide bicycle access, or to otherwise improve safety, but which will not be used as automobile vehicle travel lanes
- Addition of an auxiliary lane of less than one mile in length designed to improve roadway safety
- Installation, removal, or reconfiguration of traffic lanes that are not for through traffic, such as left, right, and U-turn pockets, two-way left turn lanes, or emergency breakdown lanes that are not utilized as through lanes
- Addition of roadway capacity on local or collector streets provided the project also substantially improves conditions for pedestrians, cyclists, and, if applicable, transit
- Conversion of existing general purpose lanes (including ramps) to managed lanes or transit lanes, or changing lane management in a manner that would not substantially increase vehicle travel
- Addition of a new lane that is permanently restricted to use only by transit vehicles
- Reduction in number of through lanes
- Grade separation to separate vehicles from rail, transit, pedestrians or bicycles, or to replace a lane in order to separate preferential vehicles (e.g., HOV, HOT, or trucks) from general vehicles
- Installation, removal, or reconfiguration of traffic control devices, including Transit Signal Priority (TSP) features
- Installation of traffic metering systems, detection systems, cameras, changeable message signs and other electronics designed to optimize vehicle, bicycle, or pedestrian flow
- Timing of signals to optimize vehicle, bicycle, or pedestrian flow
- Installation of roundabouts or traffic circles
- Installation or reconfiguration of traffic calming devices
- Adoption of or increase in tolls

- Addition of tolled lanes, where tolls are sufficient to mitigate VMT increase
- Initiation of new transit service
- Conversion of streets from one-way to two-way operation with no net increase in number of traffic lanes
- Removal or relocation of off-street or on-street parking spaces
- Adoption or modification of on-street parking or loading restrictions (including meters, time limits, accessible spaces, and preferential/reserved parking permit programs)
- Addition of traffic wayfinding signage
- Rehabilitation and maintenance projects that do not add motor vehicle capacity
- Addition of new or enhanced bike or pedestrian facilities on existing streets/highways or within existing public rights-of-way
- Addition of Class I bike paths, trails, multi-use paths, or other off-road facilities that serve non-motorized travel
- Installation of publicly available alternative fuel/charging infrastructure
- Addition of passing lanes, truck climbing lanes, or truck brake-check lanes in rural areas that do not increase overall vehicle capacity along the corridor

# Attachment B: VMT Reduction Strategies for Project Mitigation

| CAPCOA 2021 ID[1] | Measure | Sector | Applicable Context | Scale of application | Type of VMT affected | Measure Description | Maximum Reduction[2] |
|---|---|---|---|---|---|---|---|
| T-1 | Increase Residential Density | Land Use | Urban, Suburban | Project / Site | Project-generated trips | This measure accounts for the VMT reduction achieved by a project that is designed with a higher density of dwelling units (du) compared to the average residential density in the U.S. Increased densities affect the distance people travel and provide greater options for the mode of travel they choose. Increasing residential density results in shorter and fewer trips by single-occupancy vehicles and thus a reduction in GHG emissions. This measure is best quantified when applied to larger developments and developments where the density is somewhat similar to the surrounding area due to the underlying research being founded in data from the neighborhood level. | 30.0% |
| T-2 | Increase Job Density | Land Use | Urban, Suburban | Project / Site | Project-generated trips | This measure accounts for the VMT reduction achieved by a project that is designed with a higher density of jobs compared to the average job density in the U.S. Increased densities affect the distance people travel and provide greater options for the mode of travel they choose. Increasing job density results in shorter and fewer trips by single-occupancy vehicles and thus a reduction in GHG emissions. | 30.0% |
| T-3 | Provide Transit-Oriented Development | Land Use | Urban, Suburban, Rural | Project / Site | Project-generated trips | This measure would reduce project VMT in the study area relative to the same project sited in a non-transit-oriented development (TOD) location. TOD refers to projects built in compact, walkable areas that have easy access to public transit, ideally in a location with a mix of uses, including housing, retail offices, and community facilities. Project site residents, employees, and visitors would have easy access to high-quality public transit, thereby encouraging transit ridership and reducing the number of singleoccupancy vehicle trips and associated GHG emissions. | 31.0% |
| T-4 | Integrate Affordable and Below Market Rate Housing | Land Use | Urban, Suburban | Project / Site | Project-generated trips | This measure accounts for VMT reduction achieved for multi-family residential projects that are deed restricted or otherwise permanently dedicated as affordable housing. | 28.6% |
| T-5 | Implement Commute Trip Reduction Program (Voluntary) | Trip Reduction Programs | Urban, Suburban | Project / Site | Employee commute trips | This measure will implement a voluntary commute trip reduction (CTR) program with employers. CTR programs discourage singleoccupancy vehicle trips and encourage alternative modes of transportation such as carpooling, taking transit, walking, and biking, thereby reducing VMT and GHG emissions. | 4.0% |
| T-6 | Implement Commute Trip Reduction Program (Mandatory Implementation and Monitoring) | Trip Reduction Programs | Urban, Suburban | Project / Site | Employee commute trips | This measure will implement a mandatory CTR program with employers. CTR programs discourage single-occupancy vehicle trips and encourage alternative modes of transportation such as carpooling, taking transit, walking, and biking, thereby reducing VMT and GHG emissions. | 26.0% |
| T-7 | Implement Commute Trip Reduction Marketing | Trip Reduction Programs | Urban, Suburban | Project / Site | Employee commute trips | This measure will implement a marketing strategy to promote the project site employer's CTR program. Information sharing and marketing promote and educate employees about their travel choices to the employment location beyond driving such as carpooling, taking transit, walking, and biking, thereby reducing VMT and GHG emissions. | 4.0% |

| CAPCOA 2021 ID[1] | Measure | Sector | Applicable Context | Scale of application | Type of VMT affected | Measure Description | Maximum Reduction[2] |
|---|---|---|---|---|---|---|---|
| T-8 | Provide Ridesharing Program | Trip Reduction Programs | Urban, Suburban | Project / Site | Employee commute trips | This measure will implement a ridesharing program and establish a permanent transportation management association with funding requirements for employers. Ridesharing encourages carpooled vehicle trips in place of single-occupied vehicle trips, thereby reducing the number of trips, VMT, and GHG emissions. | 8.0% |
| T-9 | Implement Subsidized or Discounted Transit Program - Employees Only | Trip Reduction Programs | Urban, Suburban | Project / Site | Employee commute trips | This measure will provide subsidized or discounted, or free transit passes for employees and/or residents. Reducing the out-of-pocket cost for choosing transit improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. This decrease in vehicle trips results in reduced VMT and thus a reduction in GHG emissions. | 5.5% |
| T-9-A | Implement Subsidized or Discounted Transit Program - Employees and Residents | Trip Reduction Programs | Urban, Suburban | Project / Site | Project-generated trips | This measure will provide subsidized or discounted, or free transit passes for employees and residents. Reducing the out-of-pocket cost for choosing transit improves the competitiveness of transit against driving, increasing the total number of transit trips and decreasing vehicle trips. This decrease in vehicle trips results in reduced VMT and thus a reduction in GHG emissions. | 5.5% |
| T-10 | Provide End-of-Trip Bicycle Facilities | Trip Reduction Programs | Urban, Suburban | Project / Site | Employee commute trips | This measure will install and maintain end-of-trip facilities for employee use. End-of-trip facilities include bike parking, bike lockers, showers, and personal lockers. The provision and maintenance of secure bike parking and related facilities encourages commuting by bicycle, thereby reducing VMT and GHG emissions. | 4.4% |
| T-11 | Provide Employer-Sponsored Van pool | Trip Reduction Programs | Urban, Suburban, Rural | Project / Site | Employee commute trips | This measure will implement an employer-sponsored vanpool service. Vanpooling is a flexible form of public transportation that provides groups of 5 to 15 people with a cost-effective and convenient rideshare option for commuting. The mode shift from long-distance, single-occupied vehicles to shared vehicles reduces overall commute VMT, thereby reducing GHG emissions. | 8.1% |
| T-12 | Price Workplace Parking | Trip Reduction Programs | Urban, Suburban | Project / Site | Employee commute trips | This measure will price onsite parking at workplaces. Because free employee parking is a common benefit, charging employees to park onsite increases the cost of choosing to drive to work. This is expected to reduce single-occupancy vehicle commute trips, resulting in decreased VMT, thereby reducing associated GHG emissions. | 20.0% |
| T-13 | Implement Employee Parking Cash-Out | Trip Reduction Programs | Urban, Suburban | Project / Site | Employee commute trips | This measure will require project employers to offer employee parking cash-out. Cash-out is when employers provide employees with a choice of forgoing their current subsidized/free parking for a cash payment equivalent to or greater than the cost of the parking space. This encourages employees to use other modes of travel instead of single occupancy vehicles. This mode shift results in people driving less and thereby reduces VMT and GHG emissions. | 12.0% |

| CAPCOA 2021 ID[1] | Measure | Sector | Applicable Context | Scale of application | Type of VMT affected | Measure Description | Maximum Reduction[2] |
|---|---|---|---|---|---|---|---|
| T-14 | Provide Electric Vehicle Charging Infrastructure | Parking or Road Pricing/Management | Urban, Suburban, Rural | Project / Site | N/A | Install onsite electric vehicle chargers in an amount beyond what is required by the 2019 California Green Building Standards (CALGreen) at buildings with designated parking areas (e.g., commercial, educational, retail, multi-family). This will enable drivers of PHEVs to drive a larger share of miles in electric mode (eVMT), as opposed to gasoline-powered mode, thereby displacing GHG emissions from gasoline consumption with a lesser amount of indirect emissions from electricity. Most PHEVs owners charge their vehicles at home overnight. When making trips during the day, the vehicle will switch to gasoline mode if/when it reaches its maximum all-electric range. | 11.9% (GHG only; no effect on VMT) |
| T-15 | Limit Residential Parking Supply | Parking or Road Pricing/Management | Urban, Suburban | Project / Site | Project-generated trips | This measure will reduce the total parking supply available at a residential project or site. Limiting the amount of parking available creates scarcity and adds additional time and inconvenience to trips made by private auto, thus disincentivizing driving as a mode of travel. Reducing the convenience of driving results in a shift to other modes and decreased VMT and thus a reduction in GHG emissions. Evidence of the effects of reduced parking supply is strongest for residential developments. | 13.7% |
| T-16 | Unbundle Residential Parking Costs from Property Cost | Parking or Road Pricing/Management | Urban, Suburban | Project / Site | Project-generated trips | This measure will require project employers to offer employee parking cash-out. Cash-out is when employers provide employees with a choice of forgoing their current subsidized/free parking for a cash payment equivalent to or greater than the cost of the parking space. This encourages employees to use other modes of travel instead of single occupancy vehicles. This mode shift results in people driving less and thereby reduces VMT and GHG emissions. | 15.7% |
| T-17 | Improve Street Connectivity | Land Use | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | This measure accounts for the VMT reduction achieved by a project that is designed with a higher density of vehicle intersections compared to the average intersection density in the U.S. Increased vehicle intersection density is a proxy for street connectivity improvements, which help to facilitate a greater number of shorter trips and thus a reduction in GHG emissions. | 30.0% |
| T-18 | Provide Pedestrian Network Improvements | Neighborhood Design | Urban, Suburban, Rural | Community-wide / Large Plan Area | Household trips | This measure will increase the sidewalk coverage to improve pedestrian access. Providing sidewalks and an enhanced pedestrian network encourages people to walk instead of drive. This mode shift results in a reduction in VMT and GHG emissions. | 6.4% |
| T-19-A | Construct or Improve Bike Facility | Neighborhood Design | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | This measure will construct or improve a single bicycle lane facility (only Class I, II, or IV) that connects to a larger existing bikeway network. Providing bicycle infrastructure helps to improve biking conditions within an area. This encourages a mode shift on the roadway parallel to the bicycle facility from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. When constructing or improving a bicycle facility, a best practice is to consider local or state bike lane width standards. A variation of this measure is provided as T-18-B, Construct or Improve Bike Boulevard. | 0.8% |

| CAPCOA 2021 ID[1] | Measure | Sector | Applicable Context | Scale of application | Type of VMT affected | Measure Description | Maximum Reduction[2] |
|---|---|---|---|---|---|---|---|
| T-19-B | Construct or Improve Bike Boulevard | Neighborhood Design | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | Construct or improve a single bicycle boulevard that connects to a larger existing bikeway network. Bicycle boulevards are a designation within Class III Bikeway that create safe, low-stress connections for people biking and walking on streets. This encourages a mode shift from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. A variation of this measure is provided as T-18-A, Construct or Improve Bike Facility, which is for Class I, II, or IV bicycle infrastructure. | 0.2% |
| T-20 | Expand Bikeway Network | Neighborhood Design | Urban, Suburban | Community-wide / Large Plan Area | Employee commute trips | This measure will increase the length of a city or community bikeway network. A bicycle network is an interconnected system of bike lanes, bike paths, bike routes, and cycle tracks. Providing bicycle infrastructure with markings and signage on appropriately sized roads with vehicle traffic traveling at safe speeds helps to improve biking conditions (e.g., safety and convenience). In addition, expanded bikeway networks can increase access to and from transit hubs, thereby expanding the "catchment area" of the transit stop or station and increasing ridership. This encourages a mode shift from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. When expanding a bicycle network, a best practice is to consider bike lane width standards from local agencies, state agencies, or the National Association of City Transportation Officials' Urban Bikeway Design Guide. | 0.5% |
| T-21-A | Implement Conventional Carshare Program | Neighborhood Design | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | This measure will increase carshare access in the user's community by deploying conventional carshare vehicles. Carsharing offers people convenient access to a vehicle for personal or commuting purposes. This helps encourage transportation alternatives and reduces vehicle ownership, thereby avoiding VMT and associated GHG emissions. A variation of this measure, electric carsharing, is described in Measure T-20-B, Implement Electric Carshare Program. | 0.15% |
| T-21-B | Implement Electric Carshare Program | Neighborhood Design | Urban, Suburban | Community-wide / Large Plan Area | N/A | This measure will increase carshare access in the user's community by deploying electric carshare vehicles. Carsharing offers people convenient access to a vehicle for personal or commuting purposes. This helps encourage transportation alternatives and reduces vehicle ownership, thereby avoiding VMT and associated GHG emissions. This also encourages a mode shift from internal combustion engine vehicles to electric vehicles, displacing the emissions-intensive fossil fuel energy with less emissions-intensive electricity. Electric carshare vehicles require more staffing support compared to conventional carshare programs for shuttling electric vehicles to and from charging points. A variation of this measure, conventional carsharing, is described in Measure T-20-A, Implement Conventional Carshare Program. | 0.18% |

| CAPCOA 2021 ID[1] | Measure | Sector | Applicable Context | Scale of application | Type of VMT affected | Measure Description | Maximum Reduction[2] |
|---|---|---|---|---|---|---|---|
| T-22-A | Implement Pedal (Non-Electric) Bikeshare Program | Neighborhood Design | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | This measure will establish a bikeshare program. Bikeshare programs provide users with on-demand access to bikes for shortterm rentals. This encourages a mode shift from vehicles to bicycles, displacing VMT and thus reducing GHG emissions. Variations of this measure are described in Measure T-21-B, Implement Electric Bikeshare Program, and Measure T-21-C, Implement Scootershare Program. | 0.02% |
| T-22-B | Implement Electric Bikeshare Programs | Neighborhood Design | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | This measure will establish an electric bikeshare program. Electric bikeshare programs provide users with on-demand access to electric pedal assist bikes for short-term rentals. This encourages a mode shift from vehicles to electric bicycles, displacing VMT and reducing GHG emissions. Variations of this measure are described in Measure T-21-A, Implement Pedal (Non-Electric) Bikeshare Program, and Measure T-21-C, Implement Scootershare Program. | 0.06% |
| T-22-C | Implement Scootershare Program | Neighborhood Design | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | This measure will establish a scootershare program. Scootershare programs provide users with on-demand access to electric scooters for short-term rentals. This encourages a mode shift from vehicles to scooters, displacing VMT and thus reducing GHG emissions. Variations of this measure are described in Measure T-21-A, Implement Pedal (Non-Electric) Bikeshare Program, and Measure T-21-B, Implement Electric Bikeshare Program. | 0.07% |
| T-23 | Community-Based Travel Planning | Trip Reduction Programs | Urban, Suburban | Community-wide / Large Plan Area | Household trips | This measure will target residences in the plan/community with community-based travel planning (CBTP). CBTP is a residentialbased approach to outreach that provides households with customized information, incentives, and support to encourage the use of transportation alternatives in place of single occupancy vehicles, thereby reducing VMT and associated GHG emissions. | 2.3% |
| T-24 | Implement Market Price Public Parking (On-Street) | Parking or Road Pricing/Management | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | This measure will price all on-street parking in a given community, with a focus on parking near central business districts, employment centers, and retail centers. Increasing the cost of parking increases the total cost of driving to a location, incentivizing shifts to other modes and thus decreasing total VMT to and from the priced areas. This VMT reduction results in a corresponding reduction in GHG emissions. | 30.0% |
| T-25 | Extend Transit Network Coverage or Hours | Transit | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | This measure will expand the local transit network by either adding or modifying existing transit service or extending the operation hours to enhance the service near the project site. Starting services earlier in the morning and/or extending services to late-night hours can accommodate the commuting times of alternative-shift workers. This will encourage the use of transit and therefore reduce VMT and associated GHG emissions. | 4.6% |

| CAPCOA 2021 ID[1] | Measure | Sector | Applicable Context | Scale of application | Type of VMT affected | Measure Description | Maximum Reduction[2] |
|---|---|---|---|---|---|---|---|
| T-26 | Increase Transit Service Frequency | Transit | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | This measure will increase transit frequency on one or more transit lines serving the plan/community. Increased transit frequency reduces waiting and overall travel times, which improves the user experience and increases the attractiveness of transit service. This results in a mode shift from single occupancy vehicles to transit, which reduces VMT and associated GHG emissions. | 11.3% |
| T-27 | Implement Transit-Supportive Roadway Treatments | Transit | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | This measure will implement transit-supportive treatments on the transit routes serving the plan/community. Transit-supportive treatments incorporate a mix of roadway infrastructure improvements and/or traffic signal modifications to improve transit travel times and reliability. This results in a mode shift from single occupancy vehicles to transit, which reduces VMT and the associated GHG emissions. | 0.6% |
| T-28 | Provide Bus Rapid Transit | Transit | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | This measure will convert an existing bus route to a bus rapid transit (BRT) system. BRT includes the following additional components, compared to traditional bus service: exclusive right-of-way (e.g., busways, queue jumping lanes) at congested intersections, increased limited-stop service (e.g., express service), intelligent transportation technology (e.g., transit signal priority, automatic vehicle location systems), advanced technology vehicles (e.g., articulated buses, low-floor buses), enhanced station design, efficient fare-payment smart cards or smartphone apps, branding of the system, and use of vehicle guidance systems. BRT can increase the transit mode share in a community due to improved travel times, service frequencies, and the unique components of the BRT system. This mode shift reduces VMT and the associated GHG emissions. | 13.8% |
| T-29 | Reduce Transit Fares | Transit | Urban, Suburban | Community-wide / Large Plan Area | All neighborhood/ city trips | This measure will reduce transit fares on the transit lines serving the plan/community. A reduction in transit fares creates incentives to shift travel to transit from single-occupancy vehicles and other traveling modes, which reduces VMT and associated GHG emissions. This measure differs from Measure T-8, Implement Subsidized or Discounted Transit Program, which can be offered through employer-based benefits programs in which the employer fully or partially pays the employee's cost of transit. | 1.2% |

Source: Fehr & Peers, 2022.

1. Refer to updated information contained in the 2021 GHG Handbook. CAPCOA (2021) Each measure is numbered alphanumerically with the first letter of the emissions sector serving as the letter code (e.g., T=Transportation).

2. Maximum reduction is based on the 2021 GHG Handbook unless otherwise specified.