FRESNO COUNTY SB 743 IMPLEMENTATION REGIONAL GUIDELINES

Fresno Council of Governments

LSA

July 2020

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FRESNO COUNTY SB 743 IMPLEMENTATION REGIONAL GUIDELINES

Fresno Council of Governments

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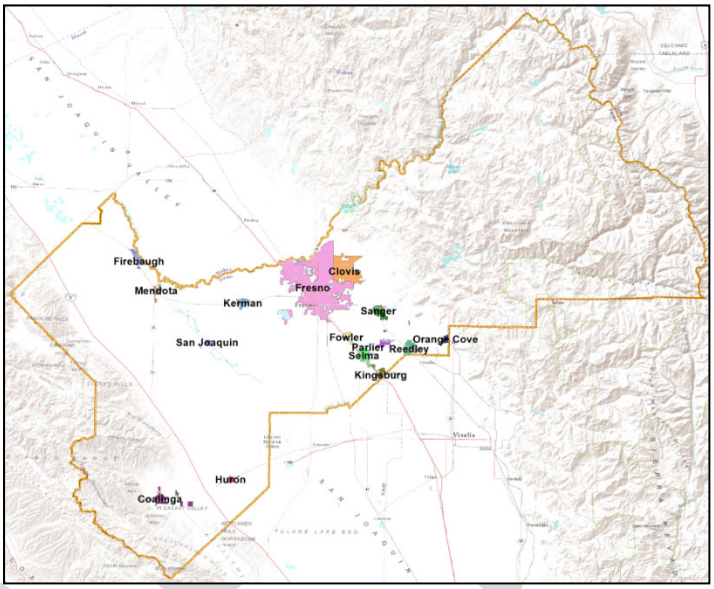
EXECUTIVE SUMMARY

Senate Bill (SB) 743, signed in 2013, and codified in the California Environmental Quality Act (CEQA) Guidelines in January 2019, changes the way transportation impacts are analyzed in the CEQA process. Vehicle miles traveled (VMT) replaces auto delay and level of service (LOS) as the metric for transportation impact determination. SB 743 takes effect statewide on July 1, 2020. In order to assist the member agencies in their shift from delay based LOS approach to VMT analysis, Fresno Council of Governments (COG) has prepared this document as a regional guide for the 16 member jurisdictions (illustrated in Figure S1). The local governments can take the recommendations in the regional guidelines as appropriate based on their individual circumstances, such as growth policies and economic development goals.



Source: Fresno County.

Figure S1: Fresno COG Member Jurisdictions—County of Fresno and 15 Cities

This document discusses in further detail the following:

- Context for VMT analysis.
- Project screening.
- VMT significance thresholds and VMT analysis for land use development projects, transportation projects, and land use plans.
- Feasible mitigation strategies applicable for the Fresno region.

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LIST OF ABBREVIATIONS AND ACRONYMS

ABM	activity-based model
ADT	average daily trips
CalEEMod	California Emissions Estimator Model
Caltrans	California Department of Transportation
CAPCOA	California Air Pollution Control Officers Association
CARB	California Air Resources Board
CEQA	California Environmental Quality Act
CO_2e	carbon dioxide equivalent
COG	Council of Governments
EIR	Environmental Impact Report
EO	Executive Order
FAR	floor-to-area ratio
GHG	greenhouse gas
GPA	General Plan Amendment
GWP	global warming potential
HOT	high-occupancy toll
HOV	high-occupancy vehicle
ITE	Institute of Transportation Engineers
LOS	level of service
LRTP	Long-Range Transportation Plan
mi	mile
MND	Mitigated Negative Declaration

MPO	Metropolitan Planning Organizations
MT	metric ton
NCST	National Center for Sustainable Transportation
ND	Negative Declaration
OPR	Governor's Office of Planning and Research
PRC	Public Resources Code
RTP	Regional Transportation Plan
RTPA	Regional Transportation Planning Agency
SB	Senate Bill
SCS	Sustainable Communities Strategy
SOC	Statement of Overriding Considerations
TA	Technical Advisory
TDM	transportation demand management
VMT	vehicle miles traveled
ZC	Zone Change

CHAPTER 1. INTRODUCTION

Senate Bill (SB) 743, signed in 2013, changes the way transportation impacts are analyzed in the California Environmental Quality Act (CEQA) process. Vehicle miles traveled (VMT) replaces auto delay and LOS as the metric for transportation impact determination. For land use development projects, VMT is simply the product of the daily trips generated by a new development and the distance those trips travel to their destinations. For capital projects, impacts are identified as the new VMT attributable to the added capital project, both from the installation of the facility and the induced growth—a new term in the CEQA lexicon—generated as a result of induced land use.

In January 2019, the Natural Resources Agency and the Governor's Office of Planning and Research (OPR) codified SB 743 into the Public Resources Code (PRC) and the *State CEQA Guidelines*. The *State CEQA Guidelines* Section 15064.3 subdivision (b) states:

1. **Land Use Projects.** Vehicle miles traveled exceeding an applicable threshold of significance may indicate a significant impact. Generally, projects within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor should be presumed to cause a less than significant transportation impact. Projects that decrease vehicle miles traveled in the project area compared to existing conditions should be presumed to have a less than significant transportation impact.

2. **Transportation Projects.** Transportation projects that reduce, or have no impact on, vehicle miles traveled should be presumed to cause a less than significant transportation impact. For roadway capacity projects, agencies have discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements. To the extent that such impacts have already been adequately addressed at a programmatic level, such as in a regional transportation plan EIR, a lead agency may tier from that analysis as provided in Section 15152.

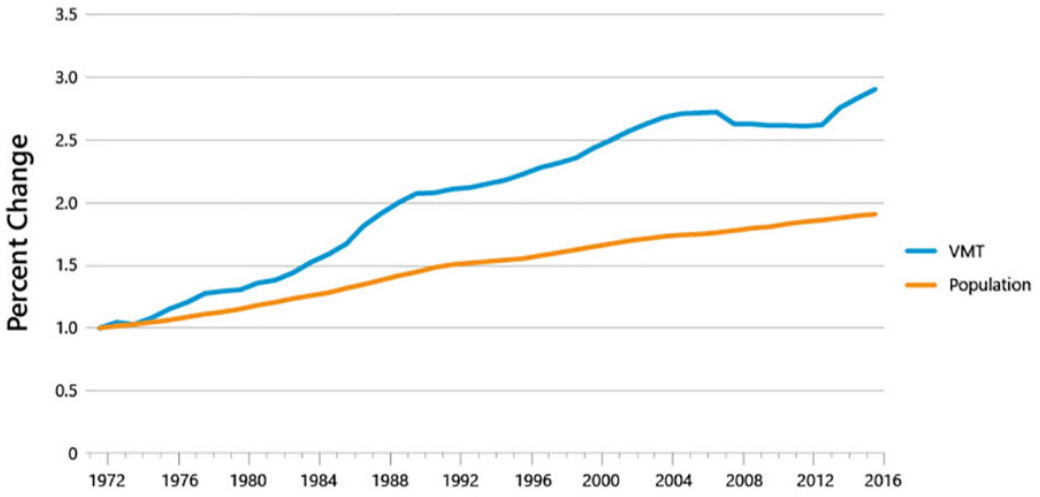
3. **Qualitative Analysis.** If existing models or methods are not available to estimate the vehicle miles traveled for the particular project being considered, a lead agency may analyze the project's vehicle miles traveled qualitatively. Such a qualitative analysis would evaluate factors such as the availability of transit, proximity to other destinations, etc. For many projects, a qualitative analysis of construction traffic may be appropriate.

4. **Methodology.** A lead agency has discretion to choose the most appropriate methodology to evaluate a project's vehicle miles traveled, including whether to express the change in absolute terms, per capita, per household or in any other measure. A lead agency may use models to estimate a project's vehicle miles traveled, and may revise those estimates to reflect professional judgment based on substantial evidence. Any assumptions used to estimate vehicle miles traveled and any revisions to model outputs should be documented and explained in the environmental document prepared for the project. The standard of adequacy in Section 15151 shall apply to the analysis described in this section.

The OPR provides a Technical Advisory (TA) as a guidance document to establish thresholds for this new VMT metric. The laws and rules governing the CEQA process are contained in the CEQA statute (PRC Section 21000 and following), the *State CEQA Guidelines* (California Code of Regulations, Title 14,

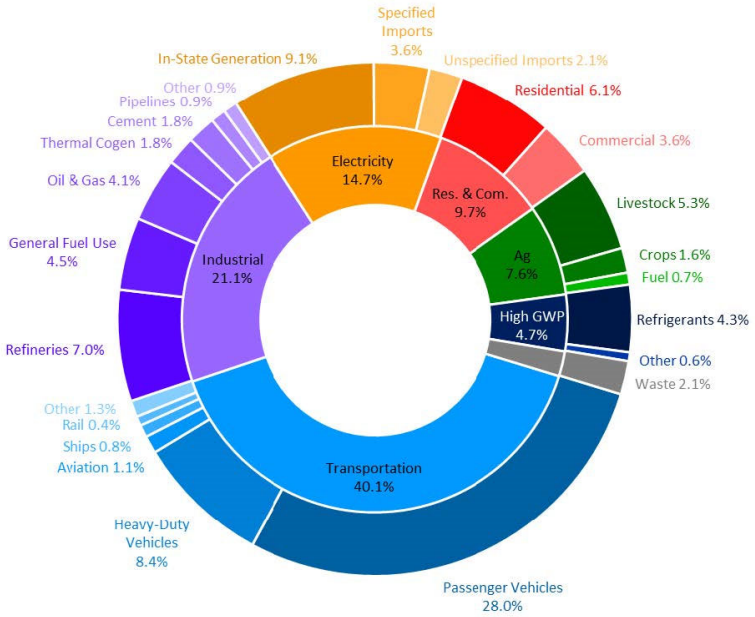
Section 15000 and following), published court decisions interpreting CEQA, and locally adopted CEQA procedures. The TA is intended as a reference document; it does not have the weight of law. Yet, deviating from the TA is best undertaken with substantial evidence to support the agency action.

The State of California is committed to reducing greenhouse gas (GHG) emissions and achieving long-term climate change goals. To achieve these climate change goals, California needs to reduce VMT. As illustrated in Figure 1, over the last 40 years, with increase in statewide population, the overall VMT has also increased. As illustrated in Figure 2, transportation is the single largest sector contributing to the State's GHG emissions. More than 40 percent of the GHG emissions come from the transportation sector, primarily passenger cars and light-duty trucks. Reducing the number of vehicle trips and the length of the trips are expected to result in reduced VMT and reduced GHG emissions. The new *State CEQA Guidelines* and the establishment of VMT thresholds for CEQA analyses is linked to GHG reduction strategies and overall statewide climate change goals.



Source: https://ca50million.ca.gov/transportation/

Figure 1: VMT Per Capita Compared to Population in California



Source: California Greenhouse Gas Emissions for 2000 to 2017 Trends of Emissions and Other Indicators (California Air Resources Board Report).

Figure 2: 2017 GHG Emissions in California by Scoping Plan Sector and Sub-Sector Category

This document provides a guide and substantial evidence for Fresno Council of Governments (COG) and its member jurisdictions in setting the thresholds of significance for CEQA transportation studies. It is divided into chapters, including:

- **Chapter 2 – Definition of Region:** This chapter describes what the comparative is for analysis purposes. Each project will be compared to an existing regional average. The geographical area that defines the region is defined and described.

- **Chapter 3 – Project Screening:** OPR acknowledges that certain projects are either low VMT generators or by virtue of their location would have a less than significant impact. The Fresno COG member jurisdictions may use these screening criteria and should offer substantial evidence for other circumstances that would lead to a less than significant impact.

- **Chapter 4 –Threshold and VMT Analysis for Land Use Development Projects:** In this chapter, thresholds that would define a significant CEQA impact are identified. The actual VMT metric (either an efficiency rate or total VMT) is described. The process of VMT analysis is also described in this chapter.

- **Chapter 5 –Threshold and Induced VMT Analysis for Transportation Projects:** This chapter describes the method to evaluate significant CEQA impacts associated with transportation projects. Many non-vehicular capital projects are presumed to have a less than significant

impact. Capacity enhancing projects may have significant impacts and may be subject to a detailed analysis that will include measuring induced travel.

- **Chapter 6 – Threshold Recommendations for Land Use Plans:** This chapter provides guidance and substantial evidence to support the threshold recommendation for land use plans and CEQA transportation analyses by Fresno COG members.

- **Chapter 7 – Mitigation Strategies:** Potential mitigation strategies are indicated in this chapter. It is noted that this discussion is not intended as a full list of measures Fresno COG members sanction as feasible. As in previous CEQA practice, it is generally the practitioner who identifies mitigation measures to offset the specific project related impacts identified in individual environmental document. The discussion here is intended as a guide for possible strategy for applicants who may wish to investigate methods to offset their specific project-related significant impacts.

CHAPTER 2. DEFINITION OF REGION: VEHICLE MILES TRAVELED CONTEXT

The question of context is the definition of the scope of the VMT analysis. The common term for this in previous delay-based LOS analyses is ***project study area***. In the delay-based LOS analyses, a project study area is generally determined based on the incremental increase in traffic from the project and its potential to create a significant LOS impact. This generally includes intersections and roadway segments where the project would add a prescribed number of peak-hour trips. Many times, lead agencies stop study area boundaries at their jurisdictional borders.

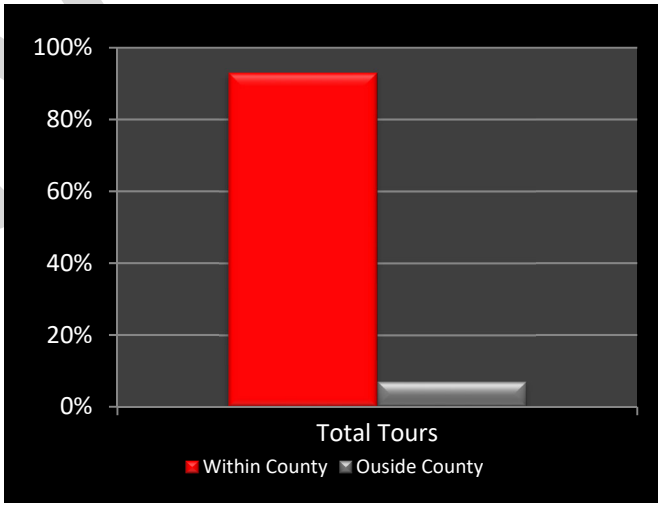
Unlike delay-based LOS analyses, VMT is a regional effect not defined by roadway, intersection, or pathway. The OPR acknowledges this in its TA (page 6), which states,

> *Lead agencies should not truncate any VMT analysis because of jurisdictional or other boundaries….*

Furthermore, the recommendations for thresholds for the primary land use types (residential and office) are based on a comparison to a ***regional average.*** Region is not defined further in the TA. Instead, the OPR offers the following suggestions:

1. *In cases where the region is substantially larger than the geography over which most workers would be expected to live, it might be appropriate to refer to a smaller geography, such as **county**, that includes the area over which nearly all workers would be expected to live (page 16).*
2. *For residential projects in unincorporated county areas, the local agency can compare a residential project's VMT to (1) the region's VMT per capita, or (2) the aggregate population weighted VMT per capita of all cities in the region (page 15).*

LSA surveyed other large urbanized areas around the State to identify what region has been established for VMT thresholds. In most cases, the County boundary has been identified as the region selected for VMT analysis. Mobility can be studied using a trip-based approach or a tour-based approach. The OPR TA states that "where available, tour-based assessment is ideal because it captures travel behavior more comprehensively." Since Fresno COG's model is an Activity-Based Model (ABM),[1] a tour-based approach has been followed. COG's ABM was used to examine the tours into and out of Fresno County. As such, consistent with the OPR TA, only tours having origins or



Source: Fresno COG Activity Based Model

Figure 3: Percentage of Total Tours Having Origins/Destinations within Fresno County and Terminating within or outside the County

[1] Fresno COG ABM Update Report: https://www.fresnocog.org/wp-content/uploads/2017/06/Fresno-COG-ABM-Report.pdf.

destinations or both within Fresno County were considered. External pass-through trips were not considered. As illustrated in Figure 3, out of the total tours, about 93 percent originate or are destined within Fresno County. The remaining 7 percent tours are pass through trips and do not have stops within Fresno County.

Because the majority of the tours are contained within Fresno County or have origins or destinations within the County, the County line may be used to define the region. It should be noted that, for residential projects, the TA states that "Existing VMT per capita may be measured as regional VMT per capita or as city VMT per capita. Proposed development referencing a threshold based on city VMT per capita (rather than regional VMT per capita) should not cumulatively exceed the number of units specified in the [sustainable community strategy] SCS for that city, and should be consistent with the SCS." As such, this analysis evaluated residential VMT per capita for all 16 member jurisdictions using Fresno County as the region as well as individual City boundaries as the region. Fresno COG recommends that each member evaluate the findings of the analysis to determine the appropriate region for its respective jurisdictions. For office, retail, and all other non-residential projects, consistent with the TA, Fresno COG recommends using Fresno County as the region. The other OPR guidance recommends consistency in approach; once a region is established, that region should be used for all subsequent traffic analyses.

In some cases, this County boundary has other names, such as the Council of Governments boundary. Nonetheless, County is a common and reoccurring context for CEQA VMT analyses throughout the State.

It should be recognized that the use of the County as the region defines the comparative, or the denominator, in the identification of project-related impact. The numerator is the project's VMT contribution. This project-related VMT profile may go beyond the County boundary and not be truncated by a jurisdictional boundary. For example, a new, large employment generating land development proposed near Fresno County's northern boundary may include VMT from as far away as Madera, Tulare, or Kings Counties, or other communities in the San Joaquin Valley. In that case, it would be the responsibility of the applicant and their traffic study preparer to include the project VMT regardless of geographical limit to the satisfaction of the agency staff. This project-related VMT profile would be compared against the Fresno County regional average.

CHAPTER 3. PROJECT SCREENING

The TA does acknowledge that certain activities and projects may result in a reduction in VMT and GHG emissions and, therefore, a less than significant impact to transportation and circulation. A variety of projects may be screened out of a complicated VMT analysis due to the presumption described in the TA regarding the occurrence of less than significant impacts.

3.1 Land Use Development Projects

The TA acknowledges that conditions may exist that would presume that a land use development project has a less than significant impact. These may be size, location, proximity to transit, or trip-making potential. For example, land use development projects that have one or more of the following attributes may be presumed to create a less than significant impact:

- The project is within 0.5 mile (mi) of a transit priority area or a high-quality transit area unless the project is inconsistent with the Regional Transportation Plan (RTP)/SCS, has a floor area ratio (FAR) less than 0.75, provides an excessive amount of parking, or reduces the number of affordable residential units. In accordance with SB 743, "transit priority areas" are defined as "an area within one-half mile of a major transit stop that is existing or planned, if the planned stop is scheduled to be completed within the planning horizon included in a Transportation Improvement Program. A 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 of 15 minutes or less during the morning and afternoon peak commute periods." A high-quality transit area or corridor is a corridor with fixed route bus service with service intervals no longer than 15 minutes during peak commute hours.

  Figure 4 depicts transit priority areas within Fresno County, including high-quality transit areas (within 0.5 mile of a major transit stop) served by the Fresno Area Express (FAX) with service intervals of 15 minutes or less. Projects proposed in these areas may be presumed to have a less-than-significant transportation impact unless the project is inconsistent with the RTP/SCS, has an FAR less than 0.75, provides an excessive amount of parking, or reduces the number of affordable residential units.

- The project involves local-serving retail space of less than 50,000 square feet (sf).

- The project has a high level of affordable-housing units.[2]

- The project generates fewer than 500 average daily trips (ADT).

- The TA recommends a volume of 110 ADT. This recommendation is not based on any analysis of GHG reduction but, rather, on a CEQA categorical exemption. This exemption criterion states that for existing facilities, including additions to existing structures of up to 10,000 sf, the project is exempted from CEQA as long as the project is in an area where public infrastructure is available to allow for maximum planned development and the project is not located in an

[2] The affordable-housing requirement to meet the screening criteria is to be determined by each Fresno COG jurisdiction.

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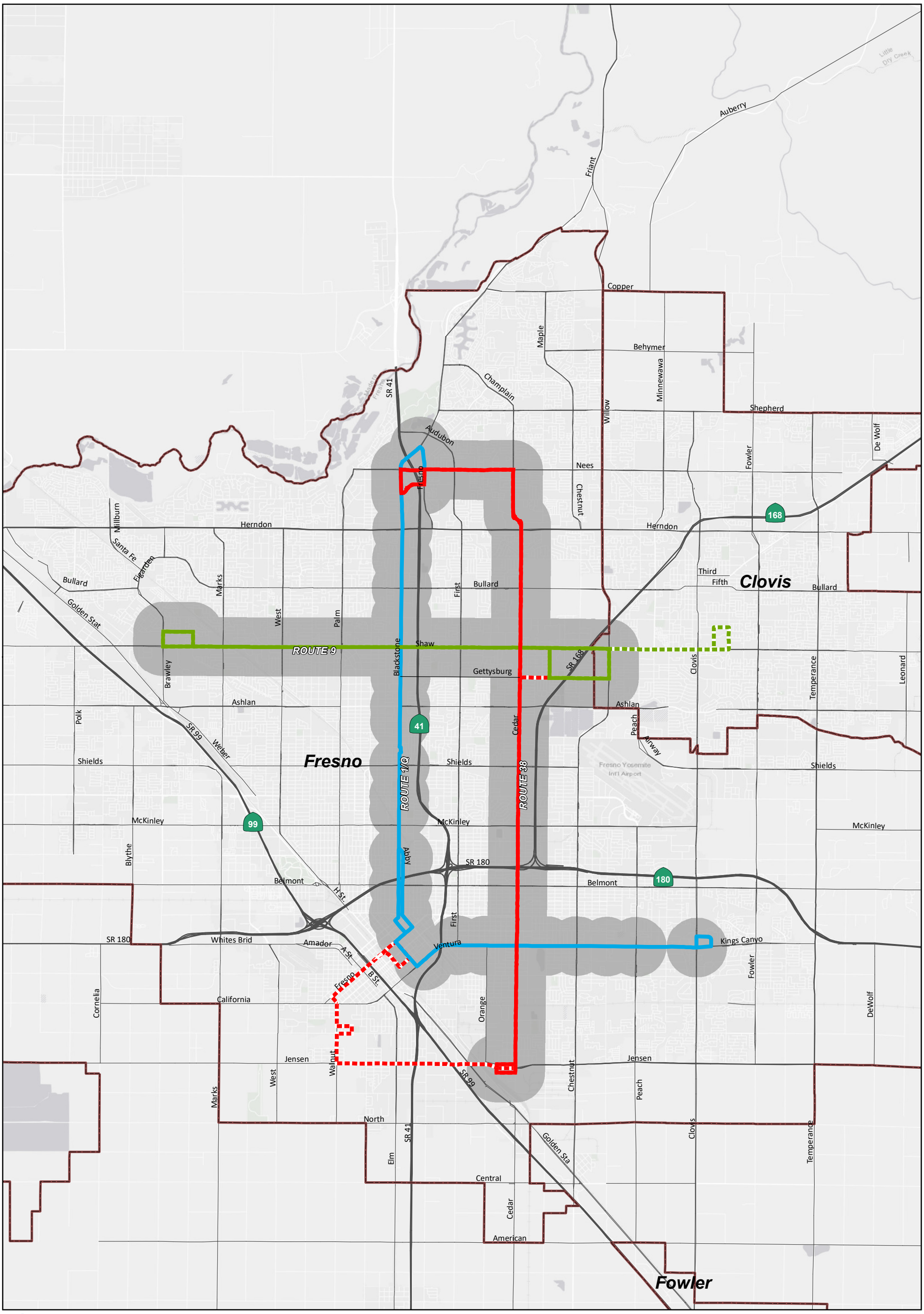

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LEGEND

- Cities with Sphere of Influence
- Route 1/Q (Bus Rapid Transit)
- Route 9
- Route 38
- Half-Mile Buffer
- Route 9 (Headway more than 15 Mins.)
- Route 38 (Headway more than 15 Mins.)

0 4000 8000
FEET

FIGURE 4

Fresno County SB 743 Implementation Regional Guidelines

High-Quality Transit Area Within Fresno County

SOURCE: Fresno Area Express (FAX) (03/20), City of Fresno (04/20), ESRI

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environmentally sensitive area (*State CEQA Guidelines* Section 15301, subdivision (e)(2). As stated in the OPR TA, for projects that have a linear increase in trip generation with respect to the building footprint, the daily trip generation is anticipated to be between 110 and 124 trips per 10,000 sf. Therefore, based on this assumption, the OPR recommends 110 ADT as the screening threshold. However, the California Emissions Estimator Model (CalEEMod) was used to characterize the effect of changes in project-related ADT to the resulting GHG emissions. This model was selected because it is provided by the California Air Resources Board (CARB) to be used statewide for developing project-level GHG emissions. CalEEMod was used with the built-in default trip lengths and types to show the vehicular GHG emissions from incremental amounts of ADT. Table A shows the resulting annual VMT and GHG emissions from the incremental ADT.

Table A: Representative VMT and GHG Emissions from CalEEMod

Average Daily Trips (ADT)	Annual Vehicle Miles Traveled (VMT)	GHG Emissions (Metric Tons CO_2e per year)
200	683,430	258
300	1,021,812	386
400	1,386,416	514
500	1.703,020	643
600	2,043,623	771

Source: CalEEMod version 2016.3.2.
CalEEMod = California Emissions Estimator Model
CO_2e = carbon dioxide equivalent
GHG = Greenhouse Gas

A common GHG emissions threshold is 3,000 metric tons (MT) of carbon dioxide equivalent[3] (CO_2e) per year.[4] The vehicle emissions are typically more than 50 percent of the total project GHG emissions. Thus, a project with 500 ADT would generally have total project emissions that could be less than 1,300 MT CO_2e/year (i.e., 50 percent or 643 MT CO_2e/year from vehicle emissions and the other 50 percent coming from other project activities). As this level of GHG emissions would be less than 3,000 MT CO_2e/year, the emissions of GHG from a project up to 500 ADT would typically be less than significant. Therefore, it is recommended that projects be screened out if they generate fewer than 500 ADT.

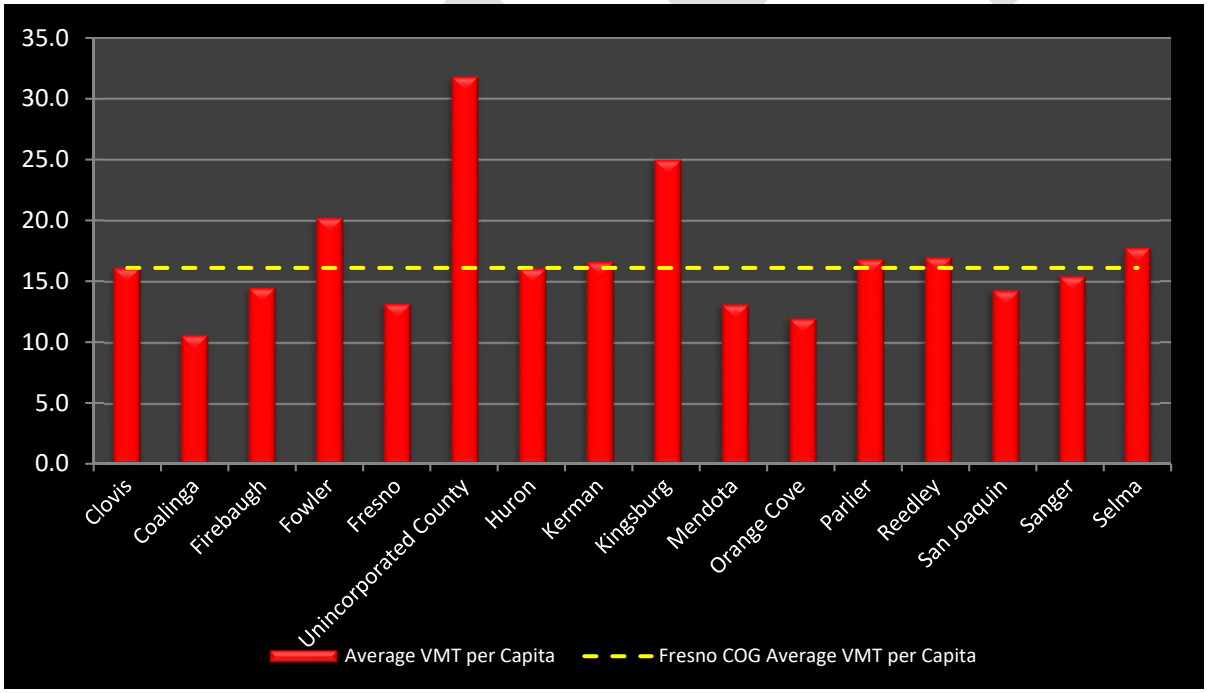
- The development of institutional/government and public service uses that support community health, safety and welfare may also be screened from subsequent CEQA VMT analysis. These facilities (e.g. police stations, fire stations, community centers, refuse stations) are already part of the community and, as a public service, the VMT is accounted for in the existing regional average. Many of these facilities generate fewer than 500 ADT and/or use vehicles other than passenger cars or light-duty trucks. These other vehicle fleets are subject to regulation outside of CEQA, such as CARB and the San Joaquin Valley Air Pollution Control District. The local

[3] Carbon dioxide equivalent (CO_2e) is a concept developed to provide one metric that includes the effects of numerous GHGs. The global warming potential (GWP) of each GHG characterizes the ability of each GHG to trap heat in the atmosphere relative to another GHG. The GWPs of all GHGs are combined to derive the CO_2e.

[4] Source: http://www.aqmd.gov/home/rules-compliance/ceqa/air-quality-analysis-handbook/ghg-significance-thresholds.

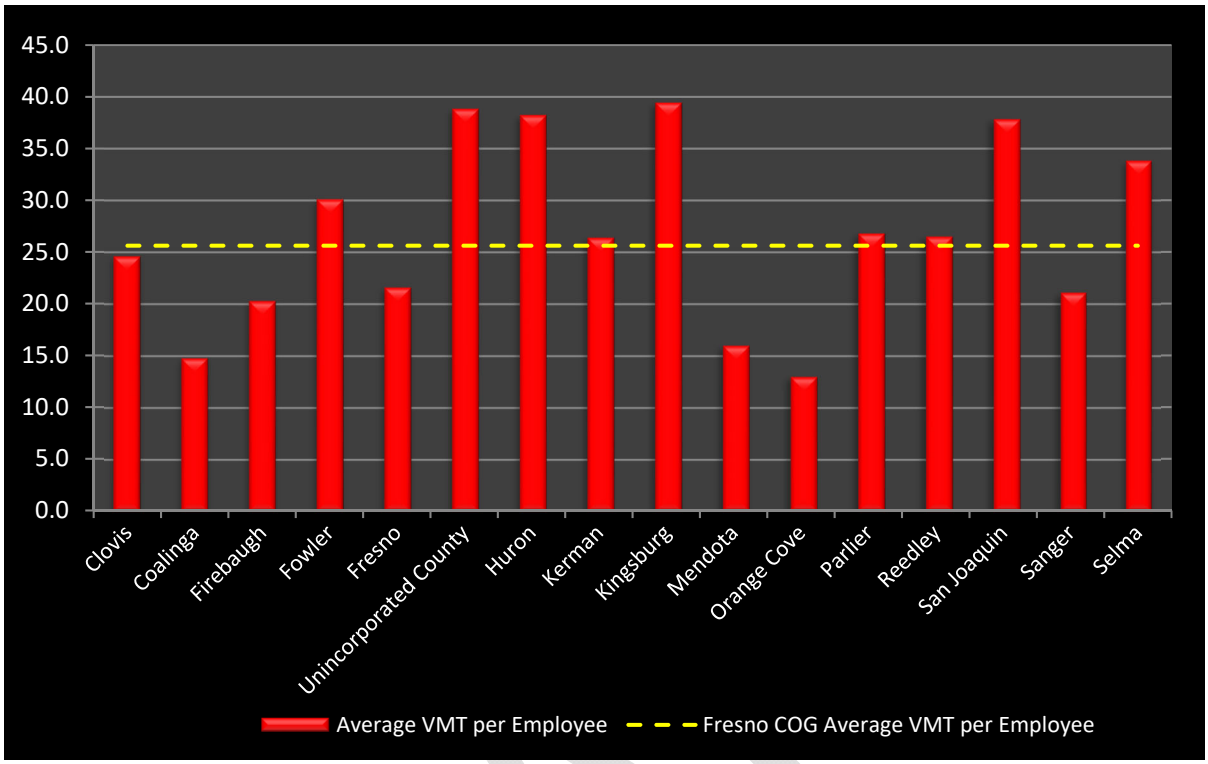
jurisdiction will have the discretion to determine whether such facilities, that provide safety, security, and serve the local communities, can be screened out from the VMT analysis.

- The TA states "Residential and office projects that are located in areas with low VMT, and that incorporate similar features (i.e., density, mix of uses, transit accessibility), will tend to exhibit similarly low VMT. Maps created with VMT data, for example from a travel survey or a travel demand model, can illustrate areas that are currently below threshold VMT. Because new development in such locations would likely result in a similar level of VMT, such maps may be used to screen out residential and office projects from needing to prepare a detailed VMT analysis." VMT per capita was calculated for each member jurisdiction and compared with the VMT per capita of the entire Fresno County. Figure 5 illustrates a comparison between average VMT per capita for each member jurisdiction compared to the countywide average. This provides an overview of member jurisdictions' average VMT profile (high, medium, and low) compared to the regional average. Figure 6 illustrates a similar comparison for VMT per employee. Region-wide screening maps were also created for residential and office projects. Figure 7 illustrates the VMT per capita screening map for the region. Appendix A includes detailed residential screening maps. Figure 8 illustrates the VMT per employee screening map for the region. Appendix B provides detailed screening maps for office projects.



Source: Fresno COG Activity Based Model.

Figure 5: Average VMT per Capita for Member Jurisdictions Compared to Countywide Average VMT Per Capita



Source: Fresno COG Activity Based Model.

Figure 6: Average VMT per Employee for Member Jurisdictions Compared to Countywide Average VMT per Employee

Based on the individual COG agency traffic study guidelines or existing CEQA guidelines, other conditions may apply to screen out projects. Consistency with other plans to reduce GHG emissions may also reflect substantial evidence supporting a screening out, or the agencies may adopt the TA recommendations in total.

Additionally, the 2020 *State CEQA Guidelines* Section 15007 (c) states that "if a document meets the content requirements in effect when the document is sent out for public review, the document shall not need to be revised to conform to any new content requirements in Guideline amendments taking effect before the document is finally approved." Therefore, if a land use development/transportation project is already cleared by a certified Environmental Impact Report (EIR) or an adopted Negative Declaration (ND)/Mitigated Negative Declaration (MND), then subsequent projects that are consistent with the approved project will not require a new VMT analysis.

The Fresno COG VMT Screening Tool can be used to determine whether a land use development project may be screened from a detailed VMT analysis. It should be noted that if a project constitutes a General Plan Amendment (GPA) or a Zone Change (ZC), none of the above screening criteria may apply. The City will be required to evaluate such projects on a case-by-case basis to determine whether a VMT analysis would be required. The VMT screening tool is available on

Fresno COG's website at https://www.fresnocog.org/project/sb743-regional-guidelines-development/.

3.2 Transportation Projects

The primary factor to consider for transportation projects is the potential to increase vehicle travel, sometimes referred to as "induced travel." Based on the OPR TA, while the lead agency has discretion to continue to use a delay-based LOS analysis for CEQA disclosure of transportation projects, changes in vehicle travel must also be quantified. The lead agency may solely use VMT analysis for CEQA disclosure of transportation projects, but can also require an LOS analysis for design, traffic operations, and safety purposes. The TA lists a series of projects that would not likely

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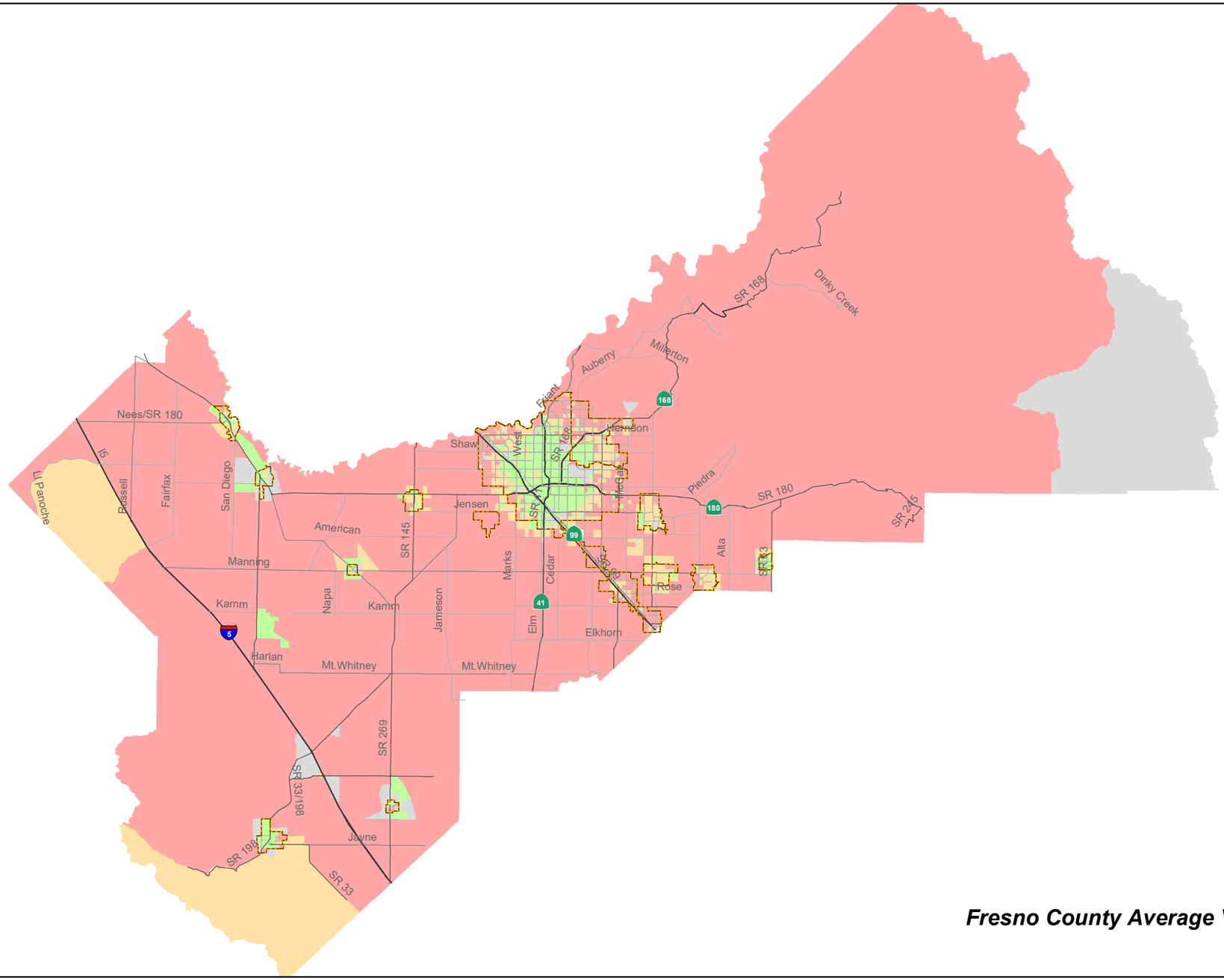

Fresno County Average VMT per Capita: 16.1
Threshold: 13%

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Cities Including Sphere of Influence

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

FIGURE 7

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

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Fresno County SB 743 Implementation Regional Guidelines

VMT per Capita Screening Map for Fresno County

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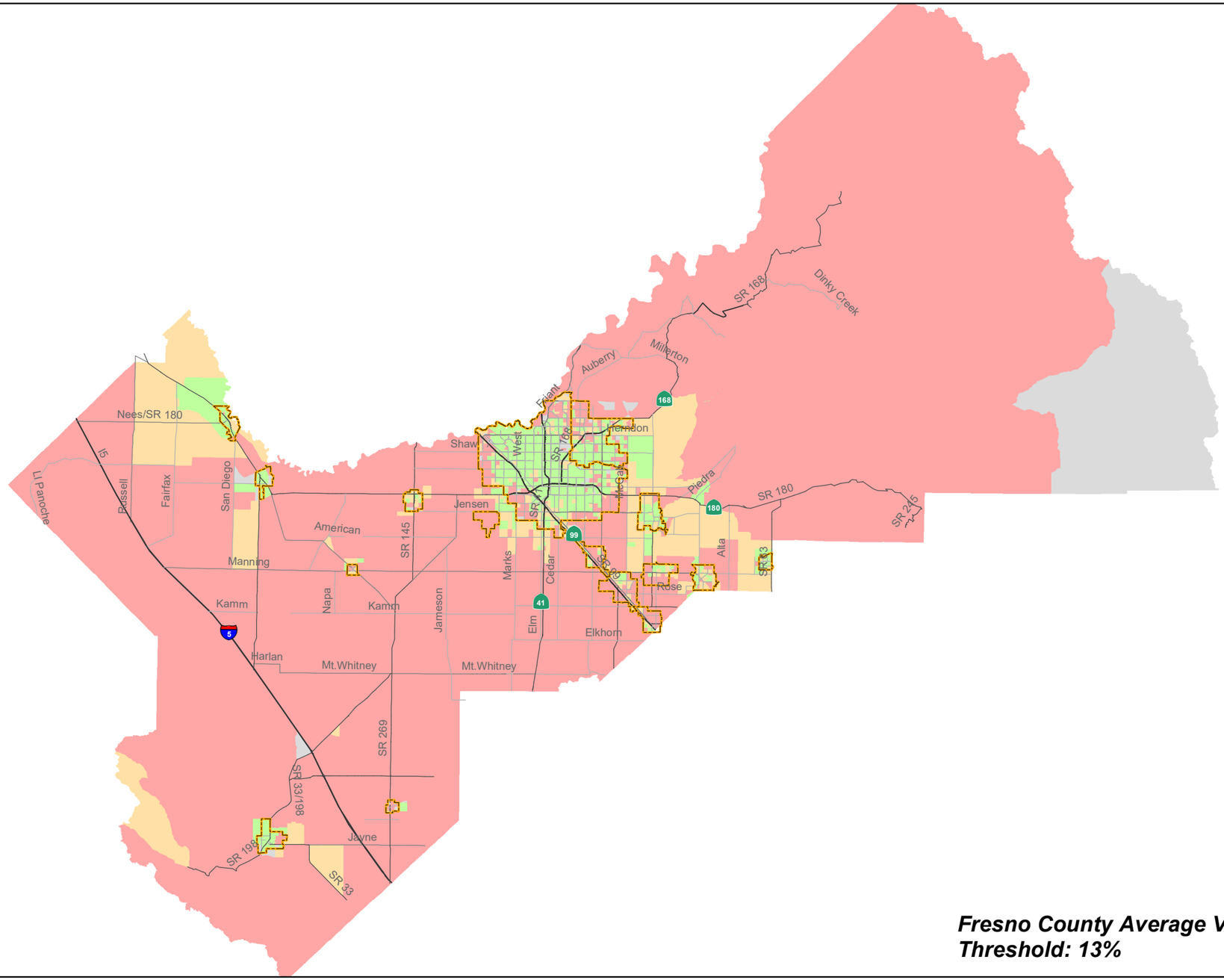

Fresno County Average VMT per Employee: 25.6
Threshold: 13%

LSA

Cities Including Sphere of Influence

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

FIGURE 8

Fresno County SB 743 Implementation Regional Guidelines

VMT per Employee Screening Map for Fresno County

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

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lead to a substantial or measurable increase in vehicle travel and which would, therefore, not require an induced travel analysis. These include the following:

- 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 1 mi 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 the 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., high-occupancy vehicles [HOVs], high-occupancy toll [HOT] lane traffic, or trucks) from general vehicles.
- Installation, removal, or reconfiguration of traffic control devices, including Transit Signal Priority 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 a new transit service.
- Conversion of streets from one-way to two-way operation with no net increase in the 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 nonmotorized 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.

Additionally, transit and active transportation projects generally reduce VMT and, therefore, may be presumed to cause a less than significant impact on transportation. This presumption may apply to all passenger rail projects, bus and bus rapid-transit projects, and bicycle and pedestrian infrastructure projects. The agency may use this CEQA presumption of less than significant impact to aid in the prioritization of capital projects, as the CEQA process for any of these project types would be more streamlined than other capacity-enhancing capital projects.

CHAPTER 4. THRESHOLD AND VMT ANALYSIS FOR LAND USE DEVELOPMENT PROJECTS

4.1 Thresholds for Land Use Projects

The TA states that SB 743 and all CEQA VMT transportation analyses refer to automobiles. Here, the term automobile refers to on-road passenger vehicles, specifically cars and light duty trucks (page. 4). Heavy-duty trucks can be addressed in other CEQA sections (air quality, greenhouse gas, noise, and health risk assessment analysis) and are subject to regulation in a separate collection of rules under CARB jurisdiction. This approach was amplified by Chris Ganson, Senior Advisor for Transportation at OPR, in a recent presentation at the Fresno Council of Governments (October 23, 2019) and by Ellen Greenberg, the California Department of Transportation (Caltrans) Deputy Director for Sustainability, at the San Joaquin Valley Regional Planning Agencies' Directors' Committee meeting (January 9, 2020).

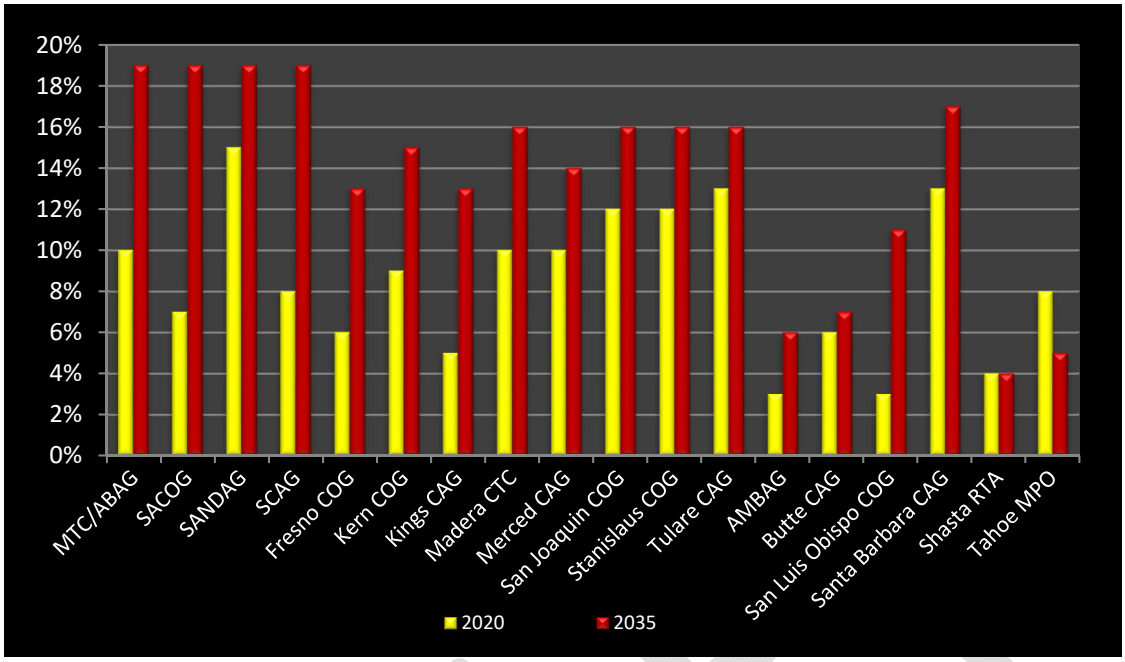
The OPR has identified the subject of the thresholds as the primary trips in the home-based typology: specifically, home-based work tours. This includes residential uses, office uses, and retail uses. The home-based work tour type is the primary tourmaking during the peak hours of commuter traffic in the morning and evening periods.

The impact of transportation has shifted from congestion to climate change, and the purpose of the CEQA analysis is to disclose and ultimately reduce GHG emissions by reducing the number and length of automobile trips. As part of the SB 375 land use/transportation integration process and GHG goal setting, the State and Regional Transportation Planning Agencies (RTPAs) have agreed to reduce GHG through integrated land use and transportation planning by a statewide average of approximately 15 percent by 2035. Figure 9 illustrates SB 375 regional GHG emissions reduction targets for all the 18 Metropolitan Planning Organizations (MPOs) in California that CARB established in 2018. Furthermore, in its 2017 Scoping Plan-Identified VMT Reductions and Relationship to State Climate Goals, the CARB recommends total VMT per capita rates approximately 15 percent below existing conditions.

The TA therefore recommends:

> *A proposed (residential) project exceeding a level of 15 percent below existing regional average VMT per capita may indicate a significant transportation impact.*
>
> *A similar threshold would apply to office projects (15 percent below existing regional average VMT per employee).*
>
> *VMT generated by retail projects exceeding 50,000 sf would indicate a significant impact for any net increase in total VMT.*

It is noted that the aggregate GHG emission reduction sought after by CARB in the 2017 Scoping Plan is 15 percent statewide. This is one reason OPR believes the 15 percent reduction in VMT is appropriate. The aggregate 15 percent GHG emission reduction applies across all land use and transportation activities and would indicate that the State and its individual MPOs are compliant with the SB 375 goals, the overall State climate change strategy, and Scoping Plan objectives.



Source: https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets.

Figure 9: SB 375 Regional Plan Climate Targets for California's 18 MPOs

CARB establishes GHG targets for each of the 18 MPOs in the State, reviews the SCSs and makes a determination whether the SCSs would achieve GHG reduction targets if implemented. Fresno COG's 2018 RTP/SCS demonstrated a GHG reduction of 10 percent by 2035 through the integrated land use, transportation initiatives, and capital project listing, which meets the targets set by the CARB. All reviewing federal and State authorities, including the CARB, approved Fresno COG's 2018 RTP/SCS. In the spring of 2018, CARB adopted new GHG targets for all the 18 MPOs in the State based on the 2017 Scoping Plan and other new data. CARB established a 13 percent GHG reduction target for 2035 for the Fresno region's third RTP/SCS. The State recognizes that Fresno County's contribution to the aggregate 15 percent statewide GHG emission reduction is 13 percent. Other regions may achieve greater reductions to achieve the aggregate statewide goal.[5] As such, reduction in GHG directly corresponds to reduction in VMT. In order to reach the statewide GHG reduction goal of 15 percent, the Fresno region must reduce GHG by 13 percent. The method of reducing GHG by 13 percent is to reduce VMT by 13 percent as well.

Therefore, Fresno County member jurisdictions may establish a threshold for land use developments, specifically residential and office, of exceeding 13 percent below the existing regional VMT per capita as indicative of a significant environmental impact.

No other discrete land use types are identified for threshold development. Mixed-use projects may be evaluated for each component of the project independently, or the lead agency may use the predominant land use type for the analysis. The lead agency will make a determination of the

[5] The latest GHG targets by region can be found at https://ww2.arb.ca.gov/our-work/programs/sustainable-communities-program/regional-plan-targets.

predominant land use type on a case-by-case basis based on the project description. Credit for internal trip capture should be made. Internal trip capture may be calculated using the latest edition of the Institute of Transportation Engineers (ITE) *Trip Generation Handbook* (for smaller projects), the Fresno COG ABM (for larger projects), or other applicable sources approved by the agency. The TA suggests that lead agency may, but is not required to, develop thresholds for any other use. This method may underreport the benefits of mixed-use by only evaluating the predominant land use or by limiting the acknowledgment of trip savings to internal capture in trip generation. The results will most likely over-report the project VMT and overstate the potential CEQA impacts from these beneficial project types.

For land use types other than residential, office, and retail, one approach is to review the agency General Plan and/or the Fresno COG RTP/SCS and identify whether the implementation of the plan would result in a reduction of VMT and GHGs. If it does, the lead agency may conclude the implementation of the plan, including all the other land use types will achieve the regional climate change goals. Therefore, consistency with the plan and no net change in VMT per employee for the other land use types is a rational threshold. However, for projects seeking a GPA, a project exceeding a level of 13 percent below the existing County average VMT per employee would indicate a significant transportation impact.

This approach would require disclosure of substantial evidence, including the General Plan findings, and other supporting traffic and air quality forecasting support. Additionally, if the agency wishes to establish some other threshold less stringent than the 13 percent recommended for residential and office projects, a body of substantial evidence would be necessary.

4.2 Land Use Projects VMT Analysis/Mitigation Process

Figure 10 demonstrates the potential land use development entitlement process to comply with the *State CEQA Guidelines* related to VMT and transportation impacts. It provides the path from application filing through determination of impacts. It is presented as the standard process; each development application is considered unique and may create alternative or modified steps through the process. Each step that diverges from this standard process should be accompanied with substantial evidence demonstrating compliance with other climate change and GHG emission reduction laws and regulations.

4.2.1 Agency Communication

At the outset of the project development process, the applicant should seek a meeting with the lead agency's staff to discuss the project description, the transportation study content and the analysis methodology. Key elements to address include a description of the project in sufficient detail to generate trips and identify the potential catchment area (i.e., trip lengths if no modeling is undertaken), estimate project VMT, discuss project design features that may reduce the VMT from the project development, and discuss the project location and associated existing regional VMT percentages. As a result of the meeting, the applicant or their consultant shall prepare a transportation analysis scope of work for review and approval by the agency.

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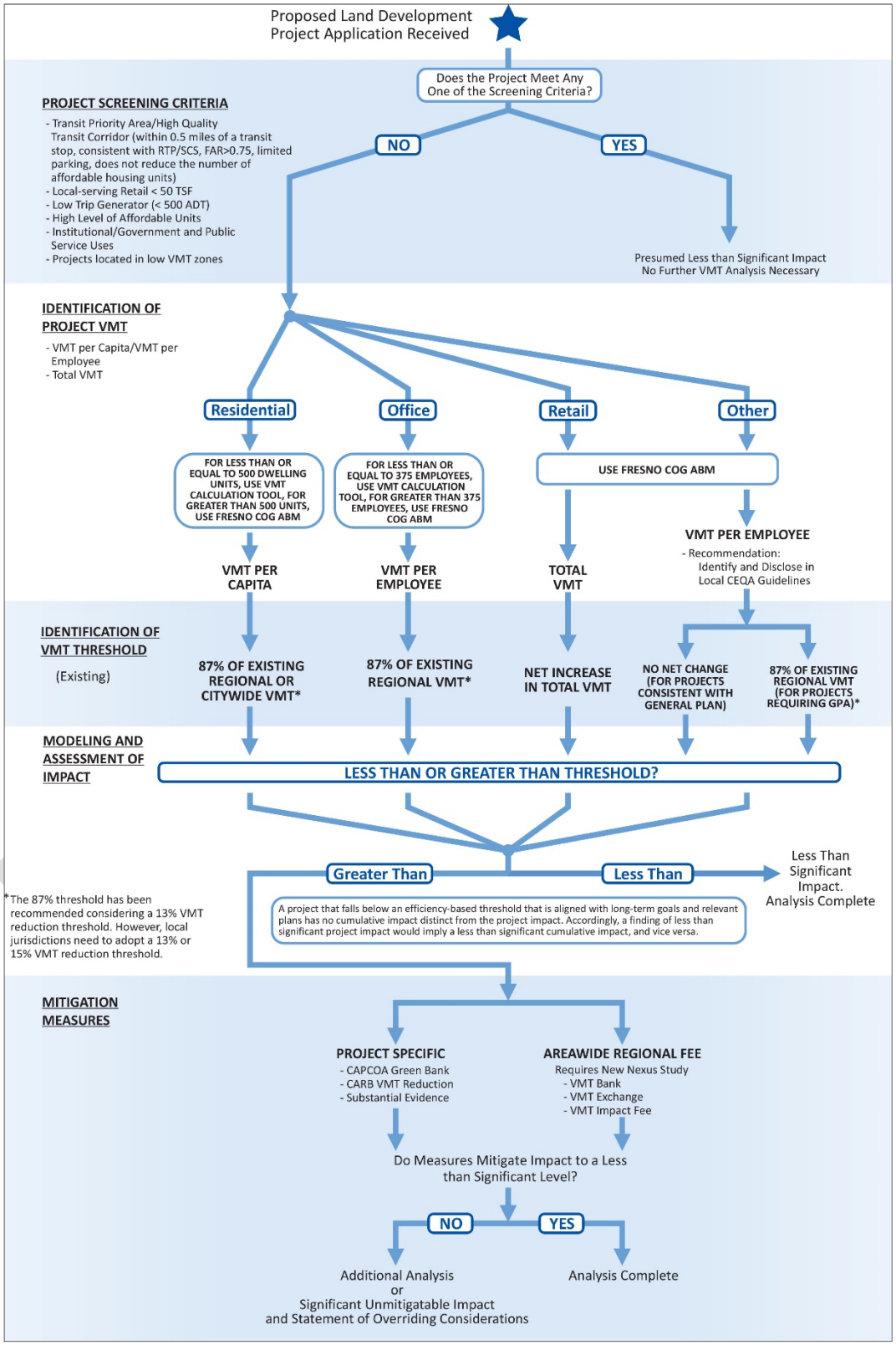

Figure 10: VMT Analysis Process for Land Use Development Projects

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Projects that will have impact on Caltrans facilities may be subject to the Caltrans Local Development-Intergovernmental Review program. Caltrans may review the VMT analysis methodology, findings, and mitigation measures for each one of these development projects that is determined to affect the State highway system and falls within Caltrans jurisdiction.

4.2.2 Project Screening

Once a development application is filed and the meeting is held, project screening is conducted as the initial step. If the project meets any one of the screening criteria, the project may be presumed to create a less than significant impact. No further VMT analysis is necessary. The CEQA document should enumerate the screening criterion and how the project meets or exceeds that threshold. If project screening does not apply, a VMT analysis may be required. The extent of this analysis may be a simple algebraic demonstration or a more sophisticated traffic modeling exercise. This distinction is addressed later.

4.2.3 Development Project VMT Analysis

The first step is to identify the project land use type and the appropriate metric to use, i.e., VMT per capita, VMT per employee, or total VMT. The metric should be VMT per capita for residential projects, VMT per employee for office projects, and total VMT for retail projects. For mixed-use projects, after taking credit for internal trip capture, the project VMT can be estimated based on each component of the project independently, or the lead agency may use the predominant land use type for the analysis. For all other uses, the metric used should be VMT per employee.

4.2.3.1 Small Project Vehicle Miles Traveled Analysis

Project VMT may be calculated using the Fresno COG VMT Calculation Tool for residential projects with 500 dwelling units or fewer, office projects with 375 employees or fewer. For all other projects, the VMT analysis should be determined using the Fresno COG ABM. The VMT calculation tool can be found at: https://www.fresnocog.org/project/sb743-regional-guidelines-development/.

4.2.3.2 Large Project Vehicle Miles Traveled Analysis

Large or multi-use projects require the use of the Fresno COG ABM. For purposes of agency review, all development projects, other than residential uses with less than or equal to 500 dwelling units or offices with less than or equal to 375 employees, should use the Fresno COG ABM. At this level of trip generation, the probability of trip fulfilment expands to an area greater than the immediate project location and may include a greater regional attraction. The Fresno COG ABM can more accurately define the project trip characteristics and the total VMT generated by the project.

Next, the project generated VMT per capita/VMT per employee/total VMT is compared to the appropriate significance threshold. This is either equal to or more than 13 percent below the existing regional average per capita or employment for specific uses or no net increase in total VMT for retail or other uses that are consistent with the General Plan. For those projects that require a GPA, a threshold of exceeding 13 percent below existing regional average is appropriate, as the project has yet to be evaluated as part of the agency's ultimate land use development vision.

If the project VMT metric is less than the significance threshold, the project is presumed to create a less than significant impact. No further VMT analysis is required. If the project is greater than the significance threshold, mitigation measures are required.

4.2.4 Mitigation Measures

The applicant is required, per CEQA, to identify feasible offsets to completely or to extent possible mitigate the impact created by the project. These can come from the mitigation strategies provided by the agency (Appendices A and B), or selected based on the applicant and their CEQA team experience. The agency must approve and accept the ultimate mitigation ascribed to the project and the related VMT percentage reduction.

If the mitigation measures mitigate the project impact to less than the jurisdictional threshold, the project is presumed to have an impact mitigated to a less than significant level. No further VMT analysis is required. If the project's VMT impact cannot be mitigated, the agency may 1) request the project be redesigned, relocated or realigned to reduce the VMT impact, or 2) require the preparation of an EIR with a Statement of Overriding Considerations (SOC) for the transportation impacts associated with the project. All feasible mitigation measures must be assigned to and carried out by the project even if an EIR/SOC is prepared.

CHAPTER 5. THRESHOLD AND INDUCED VMT ANALYSIS FOR TRANSPORTATION PROJECTS

The 2020 *State CEQA Guidelines* include Section 15064.3.b.(2) to address transportation projects. It reads:

> *For roadway capacity projects, agencies have the discretion to determine the appropriate measure of transportation impact consistent with CEQA and other applicable requirements.*

Lead agencies may continue to use delay and LOS for transportation projects for design and traffic operations purposes as long as impacts related to "other applicable requirements" are disclosed. This has generally been interpreted as VMT impacts and other State climate change objectives. These other applicable requirements may be found in other parts of an environmental document (i.e., air quality, GHG), or may be provided in greater detail in the transportation section.

For projects on the State highway system, Caltrans will use and will require sponsoring agencies to use VMT as the CEQA metric, and Caltrans will evaluate the VMT "attributable to the project" (Caltrans Draft VMT-Focused Transportation Impact Study Guide, 2020).

The assessment of a transportation project's VMT should disclose the VMT without the project and the difference in VMT with the project. Any growth in VMT attributable to the transportation project would result in a significant impact.

Capacity improvement projects have the potential of producing significant transportation impacts because they are likely to induce travel. According to the OPR TA, induced travel is the additional vehicle travel that is caused by the new capacity on the roadway. The induced travel could include route switching, time-of-day change, model shift, longer trips, new trips to existing destinations, and additional travel due to new development. Many traffic models have limited abilities to forecast new trips and new developments associated with the capacity improvements, as their land use or socioeconomic databases are fixed to a horizon date. OPR refers to a limited set of reports that would indicate elasticities.

The most recent major study (Duranton & Turner 2011, p. 24), estimates an elasticity of 1.0, meaning that every 1 percent change in lane miles results in a 1 percent increase in VMT.

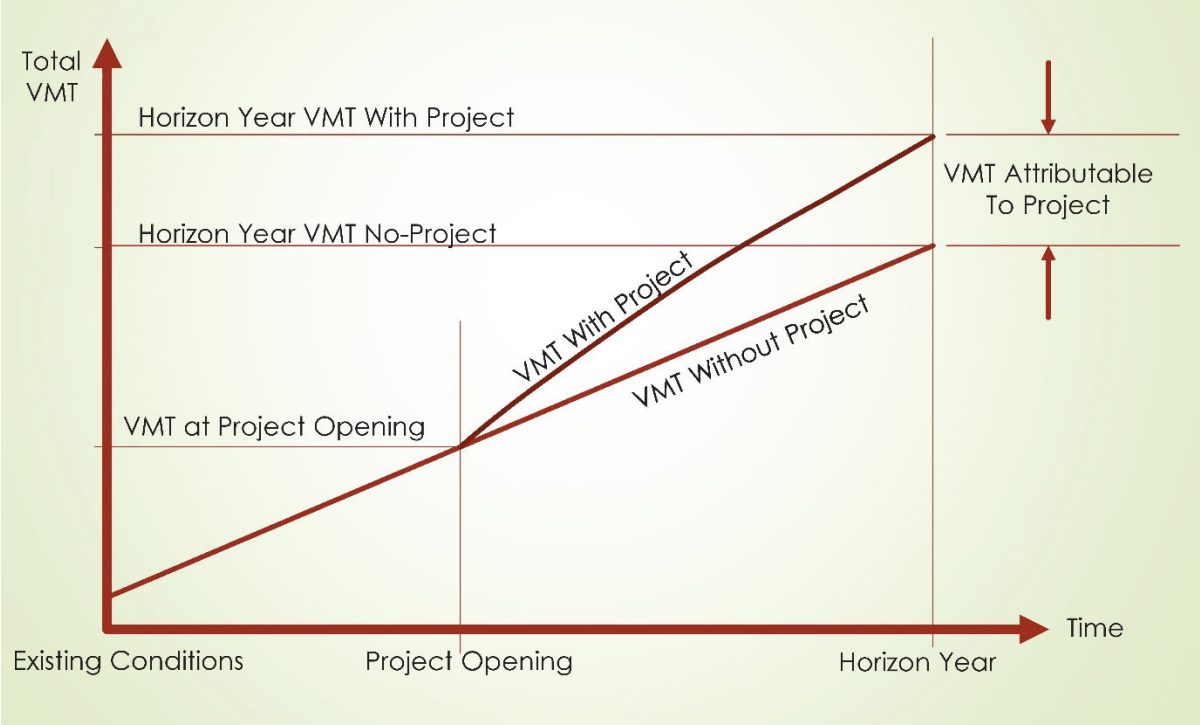
The TA presents one method to identify the induced growth, as follows.

> *To estimate VMT impacts from roadway expansion projects:*
>
> 1. *Determine the total lane-miles over an area that fully captures travel behavior changes resulting from the project (generally the region, but for projects affecting interregional travel look at all affected regions).*
> 2. *Determine the percentage change in total lane miles that will result from the project.*
> 3. *Determine the total existing VMT over that same area.*

4. *Multiply the percentage increase in lane miles by the existing VMT, and then multiply that by the elasticity from the induced travel literature:*

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

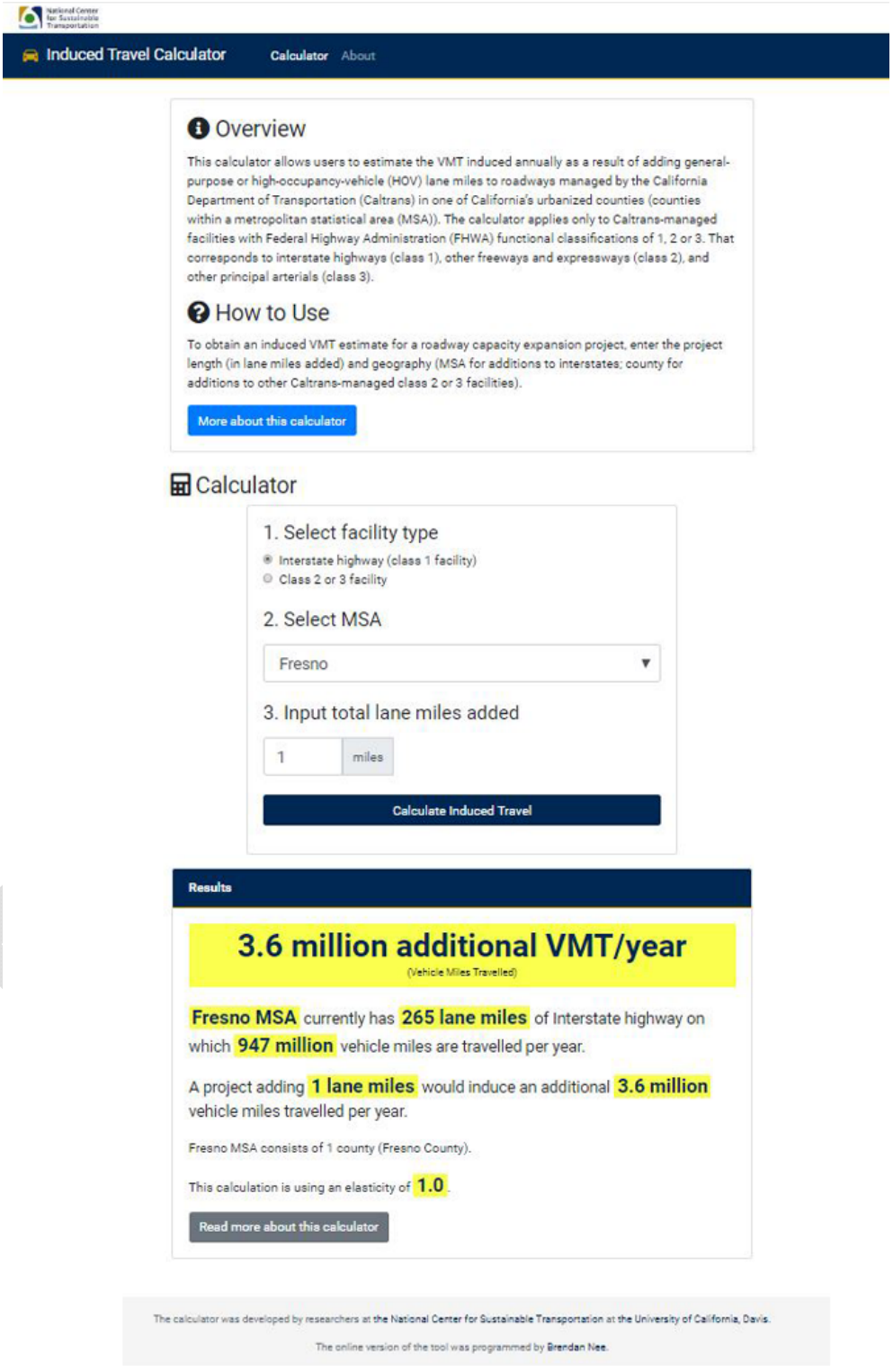
Figure 11 provides a representative illustration of induced VMT attributable to a project.



Source: Presentation: Caltrans Transportation Analysis under CEQA or TAC: Significance Determinations for Induced Travel Analysis (SHCC Pre-Release Session 2 Jeremy Ketchum, Division of Environmental Analysis, Caltrans; March 2, 2020).

Figure 11: Induced Travel – VMT Attributable to a Project

Caltrans has identified a computerized tool that estimates VMT generation from transportation projects. It was developed by the National Center for Sustainable Transportation (NCST) at University of California, Davis and is based on elasticities and the relationship of lane mile additions and growth in VMT. It uses Federal Highways Administration definitions of facility type and ascribes VMT increases to each facility. Output includes increases on million vehicle miles per year. Caltrans is investigating its use for all its VMT analyses of capital projects on the State Highway System. The NCST tool is available at https://blinktag.com/induced-travel-calculator. Figure 12 provides an illustration of that tool.



Source: https://blinktag.com/induced-travel-calculator/index.html

Figure 12: Caltrans Induced Travel Calculator

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The TA provides other options to identify induced growth- and project-related VMT. These include:

1. Employ an expert panel. *An expert panel could assess changes to land use development that would likely result from the project. This assessment could then be analyzed by the travel demand model to assess effects on vehicle travel. Induced vehicle travel assessed via this approach should be verified using elasticities found in the academic literature.*

2. Adjust model results to align with the empirical research. *If the travel demand model analysis is performed without incorporating projected land use changes resulting from the project, the assessed vehicle travel should be adjusted upward to account for those land use changes. The assessed VMT after adjustment should fall within the range found in the academic literature.*

3. Employ a land use model, running it iteratively with a travel demand model. *A land use model can be used to estimate the land use effects of a roadway capacity increase, and the traffic patterns that result from the land use change can then be fed back into the travel demand model. The land use model and travel demand model can be iterated to produce an accurate result.*

The TA provides a final warning:

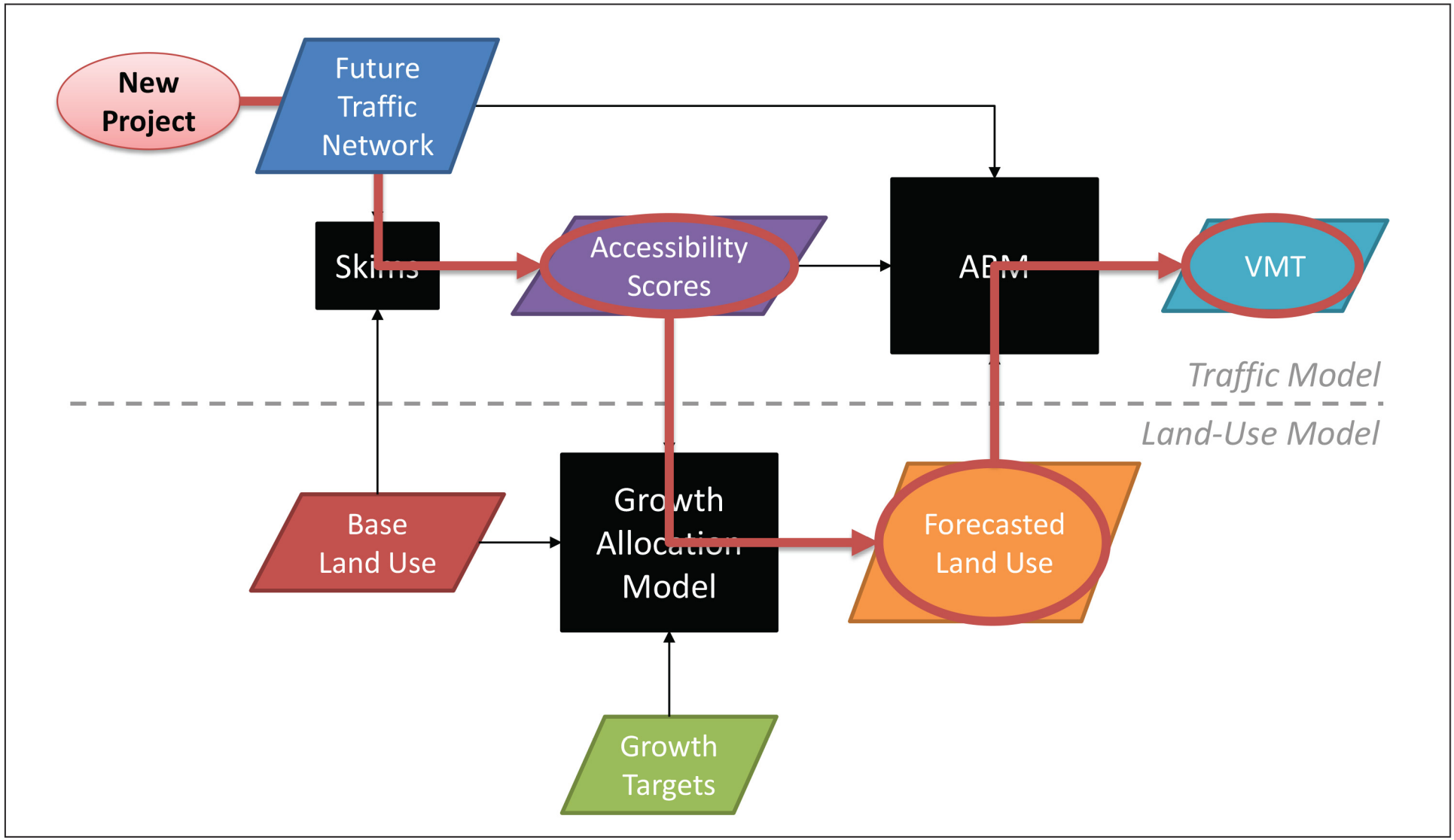
> *Whenever employing a travel demand model to assess induced vehicle travel, any limitation or known lack of sensitivity in the analysis that might cause substantial errors in the VMT estimate (for example, model insensitivity to one of the components of induced VMT described above) should be disclosed and characterized, and a description should be provided on how it could influence the analysis results. A discussion of the potential error or bias should be carried into analyses that rely on the VMT analysis, such as greenhouse gas emissions, air quality, energy, and noise.*

Due to the lack of sensitivity of the NCST tool to project location, roadway type, congestion level, surrounding land uses, and localized trip characteristics, it was determined that the Fresno COG ABM is able to provide a more robust and comprehensive estimation of the VMT generated by capacity projects if combined with an integrated land use modeling process. The Fresno COG ABM is a tour-based model that is sensitive to route switching, mode shift, time-of-day change, longer trips, and new trips to existing destinations due to capacity improvements to the transportation system. In order to address the induced travel generated from new land use due to capacity improvements, which the ABM is not sensitive to by itself, Fresno COG staff and the Resource Systems Group, Inc. (RSG) have prepared a detailed iterative and integrated process for the induced VMT analysis. The methodology looks at induced VMT from new land uses generated by transportation capacity improvement projects. It provides iterative and incremental feedback between the Fresno COG ABM and the land-use growth allocation model such that changes in the traffic network are incorporated into land-use allocation, and vice-versa. For capacity projects that are not under Caltrans' jurisdiction, it is recommended that the Fresno COG ABM in combination with the expanded land use tool be utilized to calculate project-related induced VMT. As illustrated in Figure 11, VMT attributable to the project must be calculated by evaluating no project and with project conditions

under the horizon year scenario using Fresno COG ABM. Net increase in induced VMT will result in a significant impact for the proposed project.

Figure 13 illustrates a conceptual overview of the methodology to be followed to calculate induced demand. As illustrated in Figure 13, the effect of induced VMT will be required to be evaluated with an integrated land use and travel demand modeling process.

Detailed description of the integrated process for estimating induced VMT is provided in Appendix C.



LSA

FIGURE 13

Fresno County SB 743 Implementation Regional Guidelines

Conceptual Methodology for Calculating Induced Demand for Transportation Projects

SOURCE: Fresno Council of Governments

I:\FCG1901\Reports\Traffic\fig13_InducedVMTMethodology_05-28-2020.ai (05/28/2020)

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CHAPTER 6. THRESHOLD RECOMMENDATIONS FOR LAND USE PLANS

The OPR guidance has provided guidance on traffic analyses for land use plans in the TA. The TA reiterates previous direction regarding individual land use assessments:

- Analyze the VMT outcomes over the full area over which the plan may substantively affect travel patterns (the definition of region).

- VMT should be counted in full rather than split between origins and destinations (the full impact of the project VMT).

The TA provides a single sentence as consideration for land use plans. It states, "A general plan, area plan, or community plan may have a significant impact on transportation if proposed new residential, office or retail land uses would in aggregate exceed the respective thresholds recommended above." This recommendation refers to a threshold of exceeding 13 percent below the existing regional average, for residential and office uses and no net gain for retail land uses.

To assess a land use plan, use of a traffic-forecasting tool is recommended. Therefore, Fresno COG recommends use of the ABM to asses VMT for land use plans. The total VMT for the plan may be identified for all tour types and all potential VMT contributors within the plan area. Model runs may be conducted for the existing base year and the horizon year with project (plan).

The SB 375 process establishes ambitious and achievable GHG reduction targets for the 18 MPOs in the State. The achievements of the targets are provided through the integration of land use and transportation planning, not solely through the imposition of regulation on passenger cars and light-duty trucks. CARB reviews the strategies and programs that the regional agencies put in place in the SCS to achieve the GHG reduction. The CARB approved the new GHG reduction targets for all the 18 MPOs in the State in the spring of 2018. The 2018 targets are applicable to the third SCSes for the MPOs.

Other legislative mandates and State policies speak to GHG reduction targets. A sample of these include:

- Assembly Bill 32 (2006) requires statewide GHG emissions reductions to 1990 levels by 2020 and continued reductions beyond 2020.

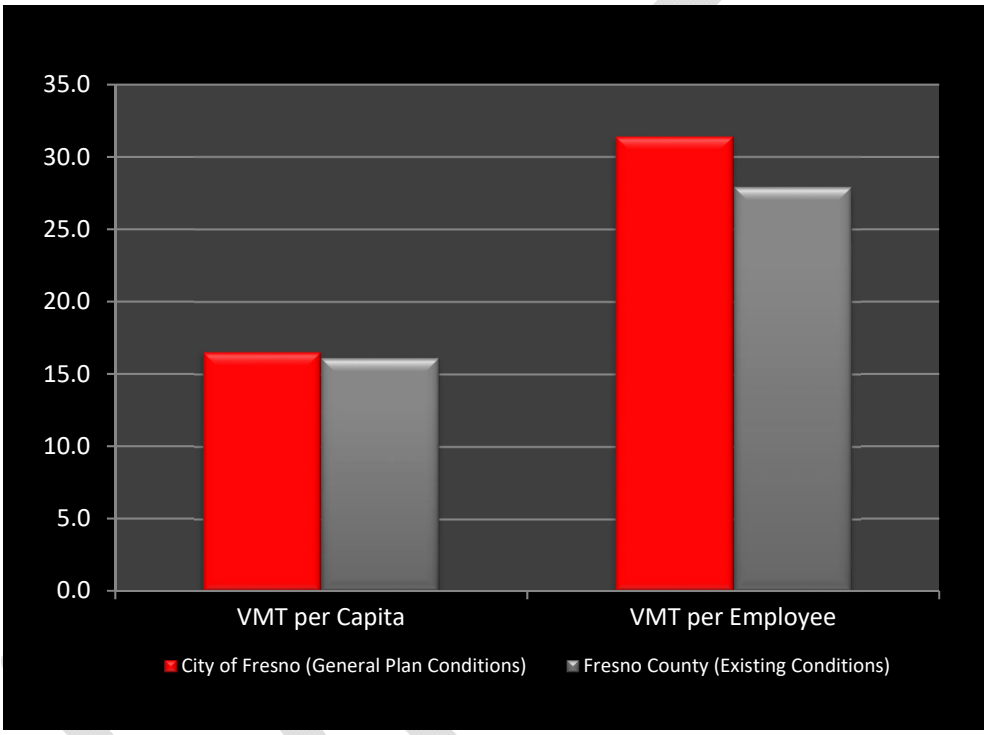
- SB 32 (2016) requires at least a 40 percent reduction in GHG emissions from 1990 levels by 2030.

- Executive Order (EO) B-30-15 (2015) sets a GHG emissions reduction target of 40 percent below 1990 levels by 2030.

- EO S-3-05 (2005) sets a GHG emissions reduction target of 80 percent below 1990 levels by 2050.

- EO B-16-12 (2012) specifies a GHG emissions reduction target of 80 percent below 1990 levels by 2050 specifically for transportation.

Therefore, the recommended methodology for conducting VMT assessments for land use plans is to compare the existing VMT per capita and/or VMT per employee for the region with the expected horizon year VMT per capita and/or VMT per employee for the land use plan of the jurisdiction. If there is a net increase in the VMT metric under horizon year conditions, then the project will have a significant impact. Figure 14 illustrates the comparison of VMT per capita and VMT per employee under the horizon year for the City of Fresno General Plan compared to the existing regional VMT per capita and existing VMT per employee, respectively.



Source: Fresno COG Activity Based Model

Figure 14: VMT Per Capita and VMT per Employee Comparisons - City of Fresno General Plan versus Fresno County under Existing Conditions

CHAPTER 7. MITIGATION STRATEGIES

When a lead agency identifies a significant CEQA impact according to the thresholds described above, the agency must identify feasible mitigation measures in order to avoid or substantially reduce that impact. Although previous LOS impacts could be mitigated with location-specific LOS improvements, VMT impacts will require mitigation of regional impacts through more behavioral changes. Enforcement of mitigation measures will be still be subject to the mitigation monitoring requirements of CEQA, as well as the regular police powers of the agency. These measures can also be incorporated as a part of plans, policies, regulations, or project designs.

7.1 Definition of Mitigation

Section 15370 of the *2020 State CEQA Guidelines* defines mitigations as follows:

> *"Mitigation" includes:*
>
> *a. Avoiding the impact altogether by not taking a certain action or parts of an action.*
>
> *b. Minimizing impacts by limiting the degree or magnitude of the action and its implementation.*
>
> *c. Rectifying the impact by repairing, rehabilitating, or restoring the impacted environment.*
>
> *d. Reducing or eliminating the impact over time by preservation and maintenance operations during the life of the action.*
>
> *e. Compensating for the impact by replacing or providing substitute resources or environments, including through permanent protection of such resources in the form of conservation easements.*

Section 15097 of the *State CEQA Guidelines* states that "the public agency shall adopt a program for monitoring or reporting on the revisions which it has required in the project and the measures it has imposed to mitigate or avoid significant environmental effects."

VMT mitigations may not be physical improvements; rather, they are complex in nature and will significantly depend on changes in human behavior. Therefore, it will be important that lead agencies develop a proper monitoring program to ensure the implementation of these mitigation measures, throughout the life of a project, in compliance with CEQA. Lead agencies must also coordinate with other responsible agencies as part of this monitoring program to determine the feasibility of the mitigations and whether they would last in perpetuity.

Historically, mitigation measures for LOS based transportation impacts have addressed either trip generation reductions or traffic-flow-capacity enhancements. LOS mitigation measures include adding capacity to intersections, roadways, ramps, and freeways. However, transportation demand management (TDM) actions, active transportation amenities, and other measures to reduce the number of trips creating an impact are also possible mitigation strategies.

LOS based mitigations are mostly physical improvements whose benefits are observable, measurable, and virtually perpetual. The addition of a left-turn lane at an intersection will behave similarly regardless of location and will continue to perform as intended until the lane is removed or modified. A lane mile of roadway will carry a similar volume of traffic if designed consistently across most jurisdictions in California, and it will continue to do so as long as the lane exists.

The definition of VMT mitigation measures is somewhat different. Most VMT mitigations may seem feasible from a theoretical perspective, but practical implementation of these strategies as formal CEQA mitigation measures in perpetuity is yet to be tested. Several of these mitigations are contextual and behavioral in nature. Their success will depend on the size and location of the project as well as expected changes in human behavior. For example, a project providing a bike share program does not necessarily guarantee a behavioral change within the project's population; the level of improvement may be uncertain and subject to the whim of the population affected.

LOS mitigations (such as addition of turn lanes) focus more on rectifying a physical CEQA impact (strategy "c" of *State CEQA Guidelines* Section 15370). On the contrary, the majority of VMT mitigations (such as commute trip-reduction programs) will aim at reducing or eliminating an impact over time through preservation and monitoring over the life of the project (strategy "d" of *State CEQA Guidelines* Section 15370). Additionally, some VMT mitigations (such as those focused on land use/location-based policies) will aim at minimizing impacts by reducing the number of trips generated by the projects (strategy "b" of *State CEQA Guidelines* Section 15370).

Furthermore, it may be that identified VMT impacts cannot be mitigated at the project-specific level. Most VMT impacts are in the context of the region of analysis. The incremental change in VMT associated with a project in the particular setting in which it may be located would suggest a greater VMT deficit than individual strategies can offset. Only a regional solution (e.g., completion of a transit system, purchase of more transit buses, or gap closure of an entire bicycle master plan system) may offer the incremental change necessary to reduce the VMT impact to a level of insignificance. Also, VMT, as a proxy for GHG emissions, may not require locational specificity. A project does not necessarily need to diminish the VMT at the project site to gain benefit in VMT and GHG reduction in the State. Offsets in an area where the benefit would be greater will have a more effective reduction in VMT and GHG and contribute to the State's ultimate climate goals. This is the basis for the cap-and-trade strategies.

These issues of regional scale, partial participation, and geographic ambiguity confound the certainty of agency identification of VMT mitigation measures. Section 15126.4 of the *State CEQA Guidelines* states, "Where several measures are available to mitigate an impact, each should be discussed and the basis for selecting a particular measure should be identified. **Formulation of mitigation measures shall not be deferred until some future time** [emphasis added]." Certainty does not yet exist that partial participation in VMT mitigation measures is permissible. Regional VMT mitigation is considered the most effective method for large-scale VMT reduction, yet the cost and implementation barriers are greater in most cases than one project can undertake. The only exception may be where VMT mitigation strategies are provided at a regional level in the form of mitigation banks, fees, and exchanges and the projects are subject to contribute to these fee

programs consistent with applicable provision to ensure compliance and consistency with CEQA and other legal requirements.

Section 21099 (b) (4) of the PRC states, "This subdivision [requiring a new transportation metric under CEQA] does not preclude the application of local general plan policies, zoning codes, conditions of approval, thresholds, or any other planning requirements pursuant to the police power or any other authority." Hence, despite the fact that automobile delay will no longer be considered a significant impact under CEQA, the lead agency can still require projects to meet the LOS standards designated in its zoning code or general plan. Therefore, in that case, the project might still be required to propose LOS improvements for congestion relief in addition to VMT strategies as CEQA mitigation measures.

7.2 Mitigation Measures

7.2.1 Land Use Development Projects and Community/General Plans

Mitigations and project alternatives for VMT impacts have been suggested by the OPR and are included in the TA. VMT mitigations can be extremely diverse and can be classified under several categories such as land use/location, road pricing, transit improvements, commute trip reduction strategies, and parking pricing/policy. However, the issue with VMT mitigations is the quantitative measurement of the relief provided by the strategies. How much VMT reduction does a TDM program, a bike share program, a transit route, or 1 mile of sidewalk provide? Improvements related to VMT reduction strategies have been quantified in sources such as the California Air Pollution Control Officers Association (CAPCOA) report *Quantifying Greenhouse Gas Mitigation Measures* (CAPCOA Green Book) and CARB sources, and are generally presented in wide ranges of potential VMT reduction percentages.

Source: https://abc30.com/3126364/

Bus Rapid Transit in City of Fresno

Source: https://www.fresnocog.org/project/measure-c/

Fresno County Transportation Authority's Measure C Program

Appendix D is a summary of the different VMT mitigation measures and project alternatives stated in the CAPCOA Green Book (only those strategies directly attributed to transportation) and the OPR TA for land use development projects. It also refers to mitigation measures listed in other sources such as the VMT Measurement Calculator for the City of Los Angeles, the transportation analysis guidelines for the City of San Jose and the San Diego Region, and the memorandum Analysis of VMT Mitigation Measures Pursuant to SB 743, prepared by Iteris, Inc., for the Los Angeles County Metropolitan Transportation Authority.

Appendix E provides a list of mitigations for land use development projects based on the research work performed by Deborah Salon, Marlon G. Boarnet, Susan Handy, Steven Spears, and Gil Tal with the support of CARB. For a few mitigation measures, Fresno COG staff conducted additional research as applicable to the Fresno COG region using the Fresno COG ABM and locally available empirical data. Based on that analysis, specific VMT reduction percentages were developed for these mitigation measures. Details about these mitigation measures are provided in the *Fresno County SB 743 Implementation Regional Guidelines – Technical Documentation.*

Source: https://www.fresno.gov/publicworks/wp-content/uploads/sites/17/2016/09/170022FresnoATPFinal012017.pdf

Bike Routes in the City of Fresno

For all other mitigation measures, the project applicant will be required to provide a substantial evidence while identifying a project-specific value. In case that information is not available, consistent with the Fresno COG's recommendations, the project should apply the low-point of provided ranges for VMT reduction. Where a mitigation strategy does not have an identified VMT reduction range, the project applicant would be required to provide a reduction estimate supported by evidence.

As for land use plans, the potential mitigation measures for community/general plans would be similar to those for land use development projects, with certain modifications. The OPR TA does not specifically state any VMT mitigations for land use plans. However, the transportation impact study guidelines for the San Diego Region list potential mitigation measures. These measures have been summarized in Appendix F along with corresponding VMT reduction percentages obtained from CAPCOA.

It must be noted that Appendices D through F provide only summaries of the mitigations stated in the sources mentioned above. The reader should refer to the original source for further details and for subsequent updates to the mitigation measures. Also, Appendices D through F do not provide an exhaustive list of mitigation measures to offset the CEQA impacts. Other measures can also be accepted by agencies based on provision of substantial evidence.

As additional mitigation measures are developed to offset VMT impacts in the future for the *State CEQA Guidelines* process, linkages between the strategy and the incremental effect and quantified offset must be made. This can be based on other sources' observations and measurements or the agency's experience in these practices. The key to mitigation is to base its efficacy on real and substantial evidence.

7.2.2 Transportation Projects

Although OPR provides detailed guidance on how to assess induced-growth impacts associated with transportation projects, it leaves the subject of mitigation measures vague. Only four strategies are suggested as mitigation measures:

- Tolling new lanes to encourage carpools and fund transit improvements.
- Converting existing general-purpose lanes to HOV or HOT lanes.
- Implementing or funding off-site travel demand management.
- Implementing Intelligent Transportation Systems strategies to improve passenger throughput on existing lanes.

Source: https://medium.com/@davidcanepa/toll-lanes-good-for-the-rich-bad-for-the-environment-4f1ec24105d3

Toll Lanes

No quantified reduction percentage is allocated to these strategies, and LSA could find no substantial evidence that would provide guidance to levels of significance after implementation of these strategies. Review of the four recommended strategies suggests that OPR is directing strategies away from general-purpose mixed-flow lanes on expressways, freeways, and arterial highways. Inasmuch as these are the project descriptions and Purpose and Need, the project intent and the project mitigation may be at odds. The lead agency would be subject to an SOC for the capital project VMT impact.

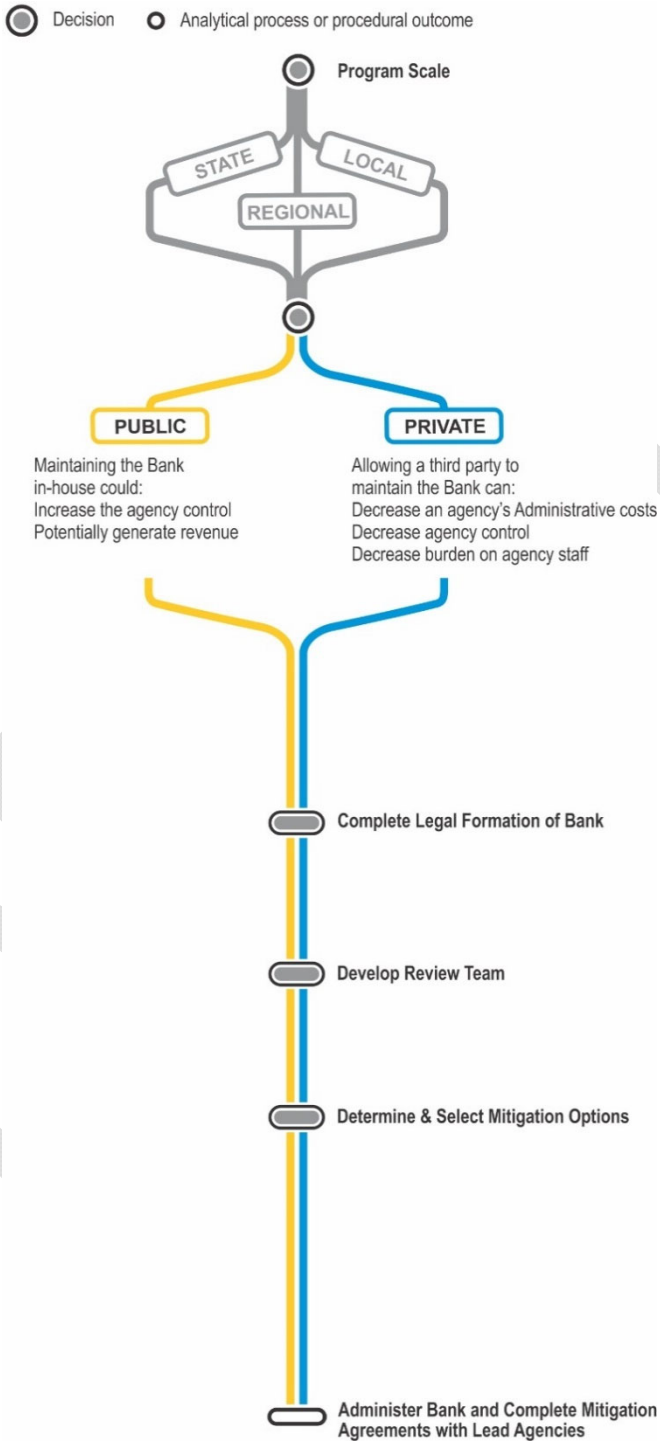
7.3 Funding Mechanisms

The change in the metric for transportation impacts from LOS to VMT will lead to a shift in impacts and mitigation measures from being local and project-specific to being more regional in nature. OPR acknowledges the regional nature of VMT impacts and states that regional VMT reduction programs and fee programs (in-lieu fees and development impact fees) may be appropriate forms of mitigation. Fee programs are particularly useful to address cumulative impacts. It is very important for the agencies to coordinate with the RTPA or the MPO to develop such mitigation programs that would fund transit, develop active transportation plans, etc. These programs are regional in nature and best suited for administration by the regional agency. Regional agencies may also wish to coordinate with appropriate stakeholders, including participating local jurisdictions, developers, and other interests while conducting nexus studies and checking for rough proportionality and compliance with CEQA.

Most of the VMT mitigations included in Appendix C are applicable in urban areas. They are less effective in suburban and rural contexts, where TDM strategies may become diluted or are not applicable. Thus, site-specific strategies are more suitable in urban areas, whereas program-level strategies are more suitable for projects in suburban/rural areas. In the latter approach, cumulative contributions for development mitigations can pay for VMT reduction strategies that would not be feasible for the individual projects to implement themselves. Apart from fee programs, program-based mitigation approaches may include mitigation exchanges and mitigation banks. The mitigation exchange concept requires a developer to implement a predetermined project that would reduce VMT in order to propose a new one. On the other hand, the concept of mitigation banks seeks to establish monetary values for VMT reductions so that developers can purchase VMT reduction credits.

As previously stated, VMT impacts are more regional in nature. Hence, there might be requirements for mitigations outside the control of the lead agency, and without consent from the agency controlling the mitigations, the impacts might remain significant and unavoidable. Additionally, identification of regional improvements where projects can contribute their fair share to mitigate impacts might prove to be difficult. Therefore, it is recommended that local agencies working collaboratively within their regions to ultimately establish fee programs, mitigation banks, and exchanges as the most efficient way to establish a regional mitigation pathway where the projects can contribute. Procedural flow charts for VMT banks, exchanges, and impact fees are on the following pages.

Procedural Flow Chart – VMT Bank



Source: VMT Mitigation Through Banks and Exchanges: Understanding New Mitigation Approaches. A White Paper by Fehr & Peers (January 2020).

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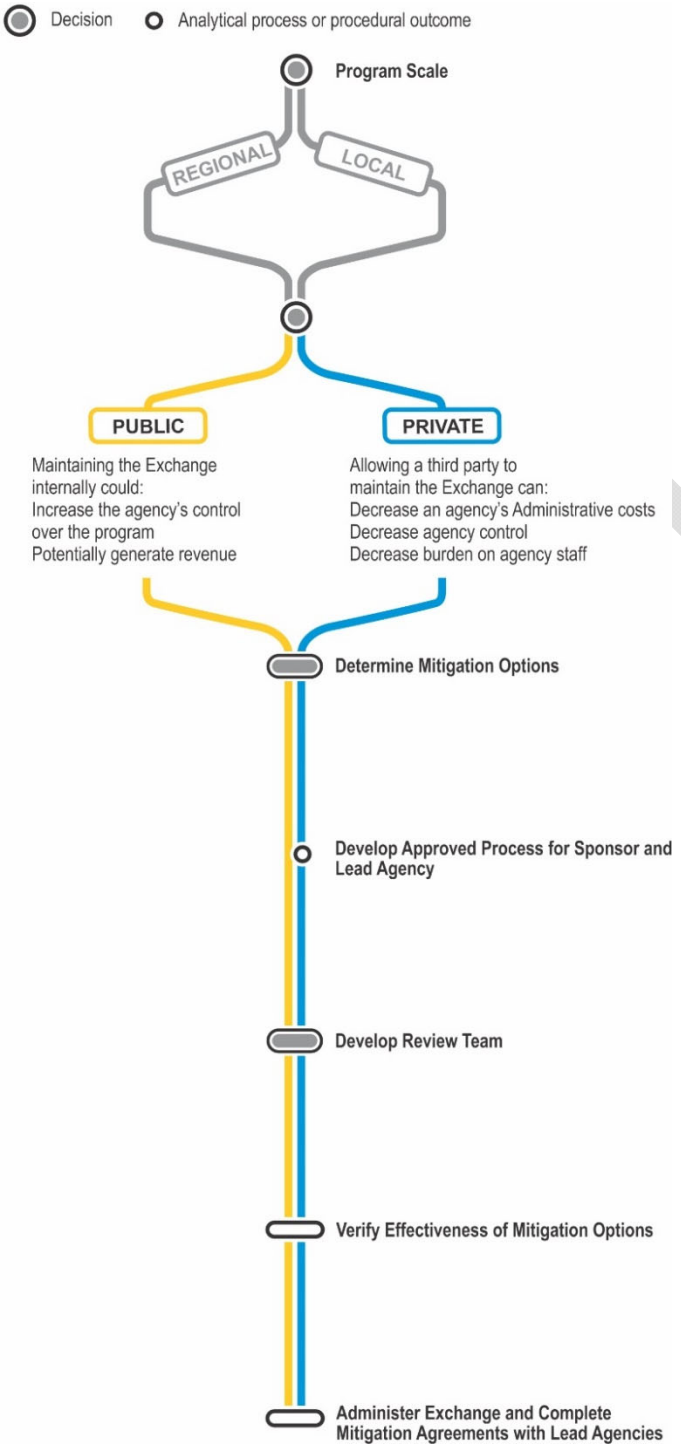
Procedural Flow Chart – VMT Exchange



Source: VMT Mitigation Through Banks and Exchanges: Understanding New Mitigation Approaches. A White Paper by Fehr & Peers (January 2020).

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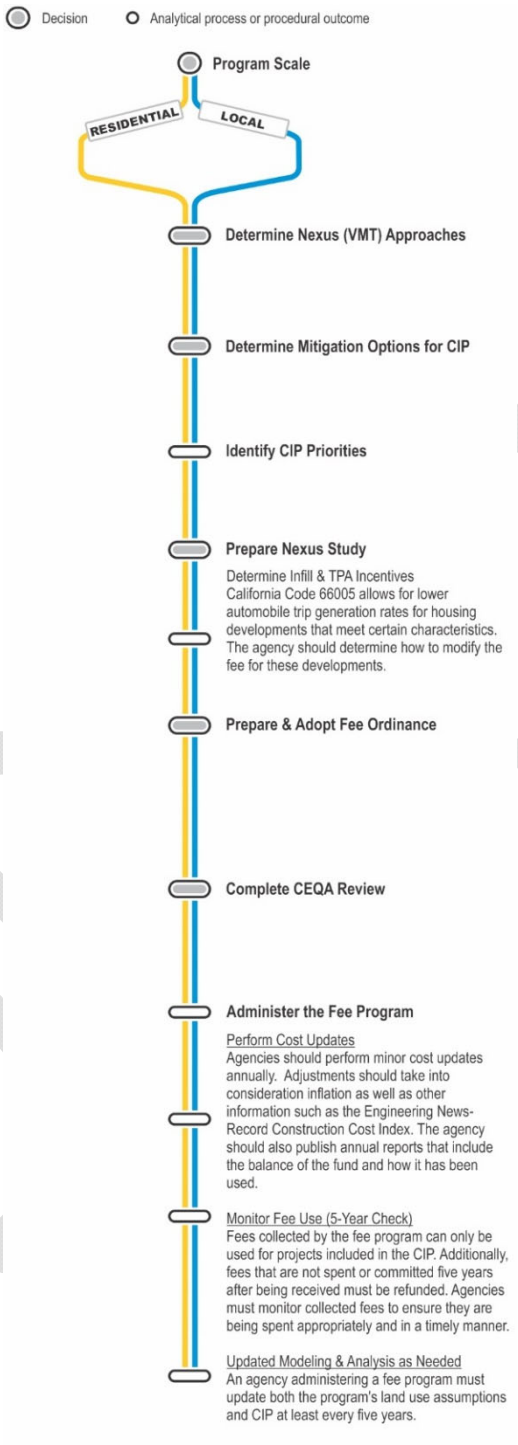
Procedural Flow Chart – VMT Impact Fee



Source: Understanding New Mitigation Approaches. A White Paper by Fehr & Peers (January 2020).

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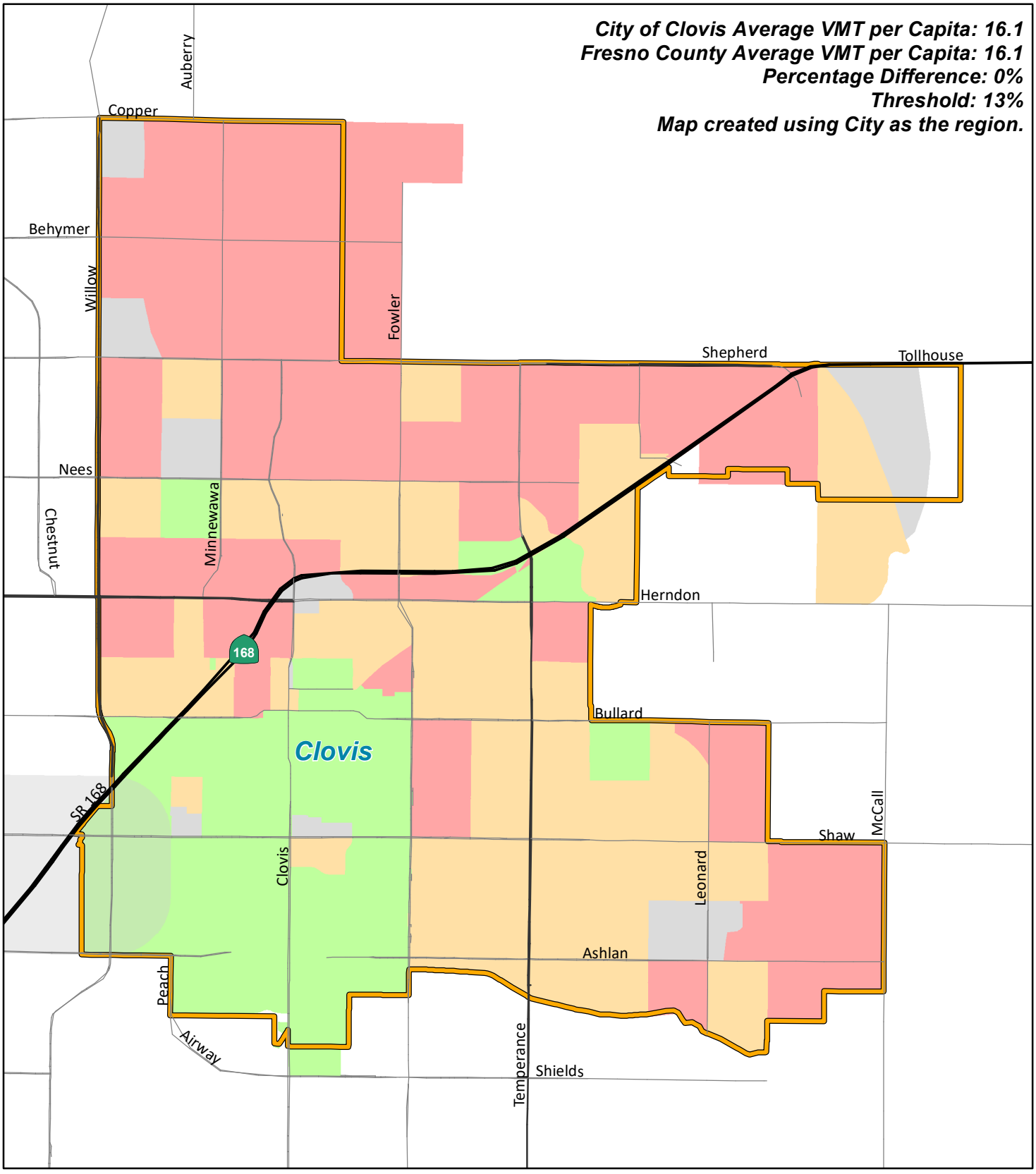
APPENDIX A

VMT SCREENING MAPS FOR MEMBER JURISDICTIONS – RESIDENTIAL PROJECTS



LSA

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

APPENDIX A-1a

N

0 3000 6000

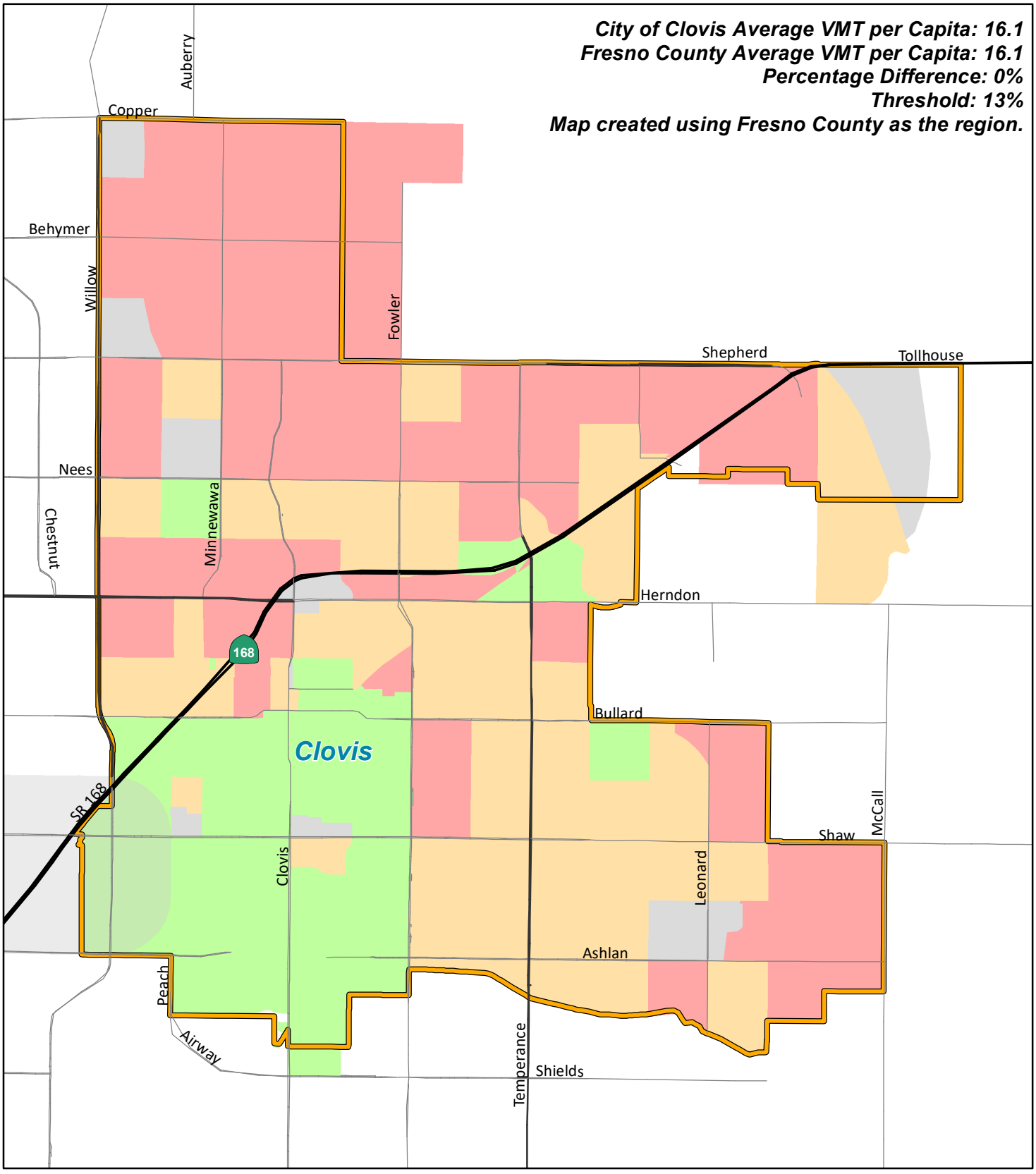
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig1_Clovis.mxd (5/1/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Clovis - Existing VMT per Capita



LSA

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

APPENDIX A-1b

N

0 3000 6000

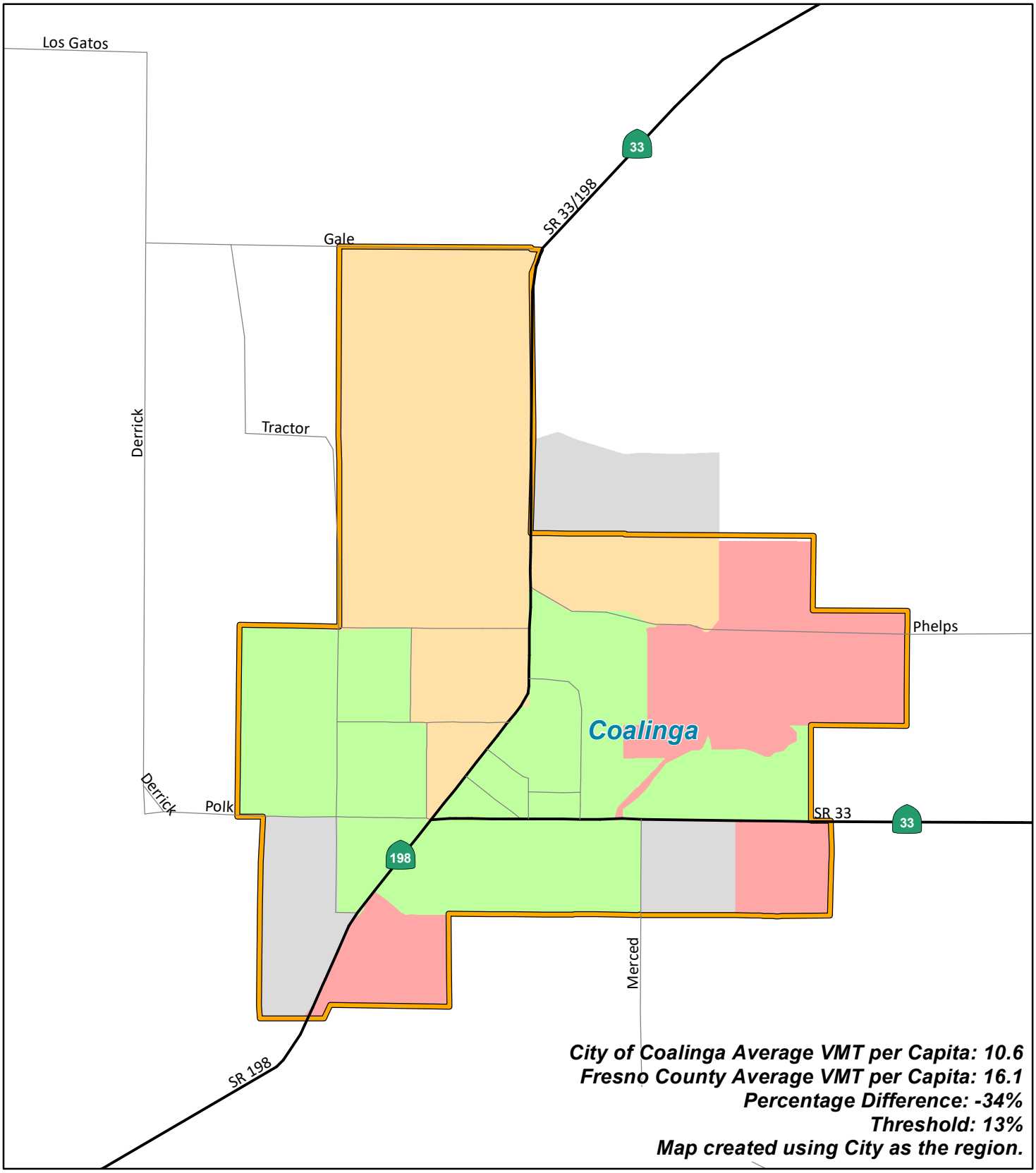
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of Clovis - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig1_Clovis_COGAVG.mxd (5/1/2020)



LSA

APPENDIX A-2a

VMT per Capita

- No Population
- Less than 9.2
- 9.2 - 12.0
- Greater than 12.0

City with Sphere of Influence

N

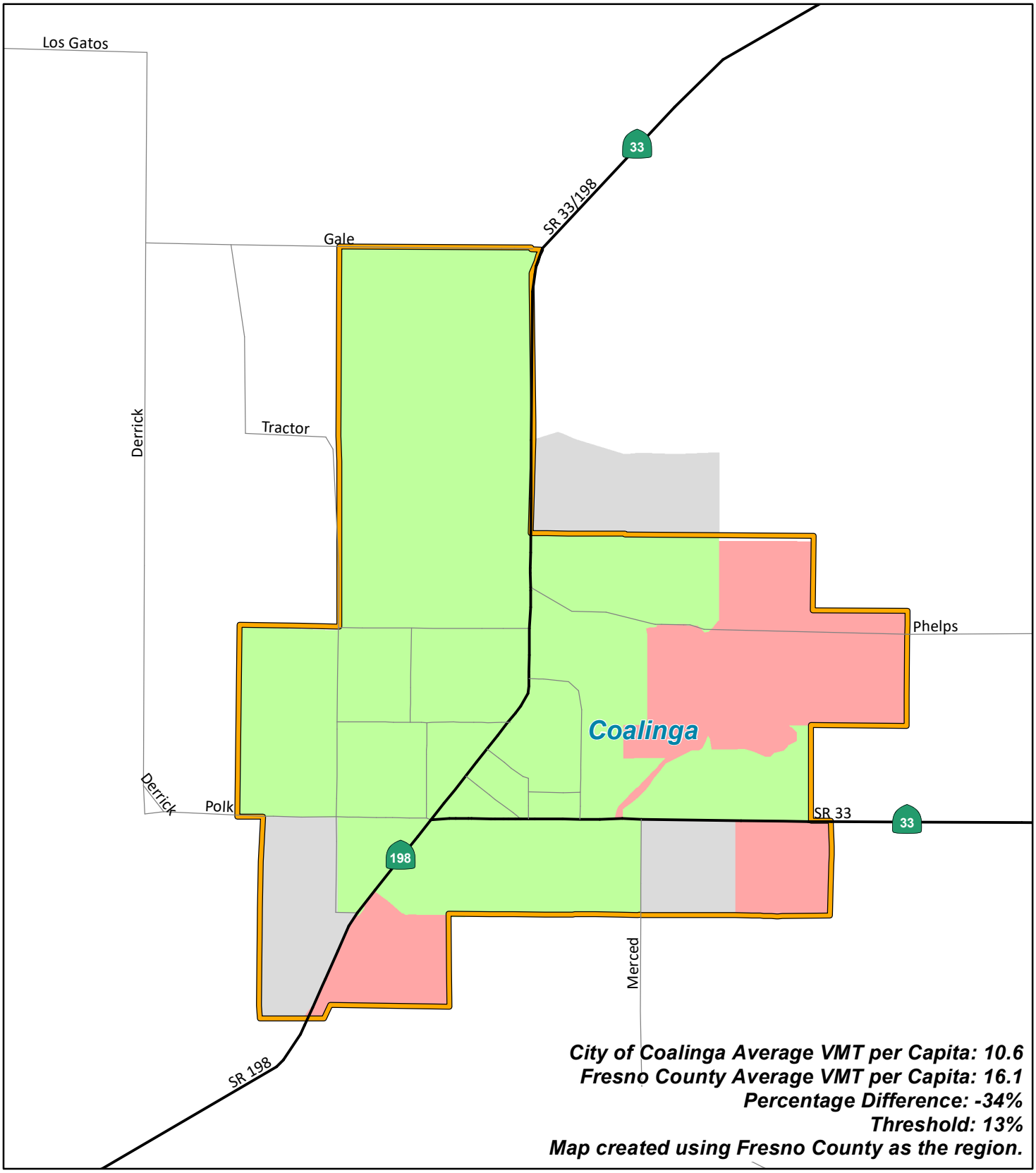
0 1875 3750
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of Coalinga - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig2_Coalinga.mxd (4/29/2020)



LSA

APPENDIX A-2b

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

N

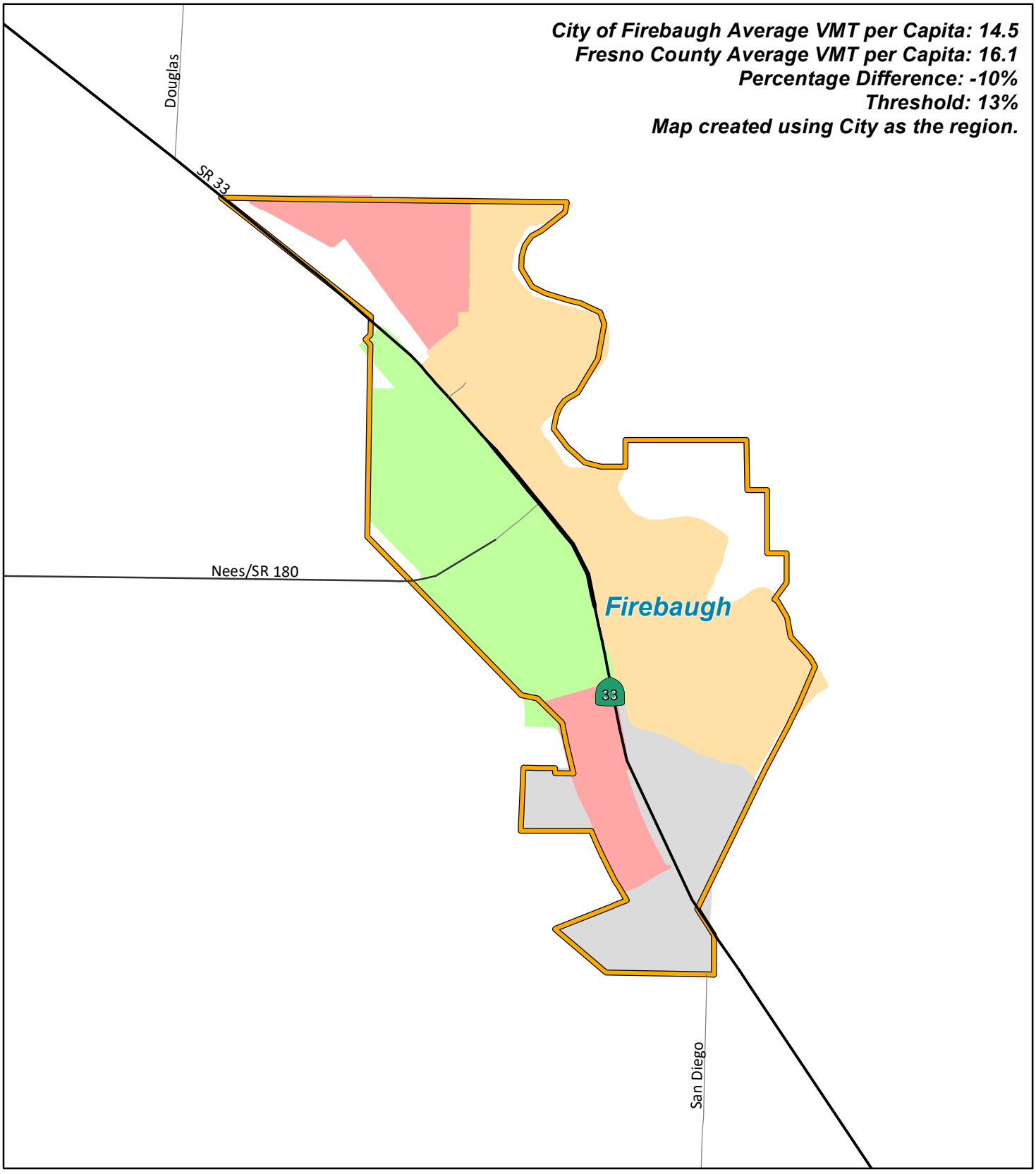
0 1875 3750
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

Fresno County SB 743 Implementation Regional Guidelines

City of Coalinga - Existing VMT per Capita

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig2_Coalinga_COGAVG.mxd (4/29/2020)



LSA

APPENDIX A-3a

VMT per Capita

- No Population
- Less than 12.6
- 12.6 - 16.4
- Greater than 16.4

City with Sphere of Influence

N

0 1800 3600

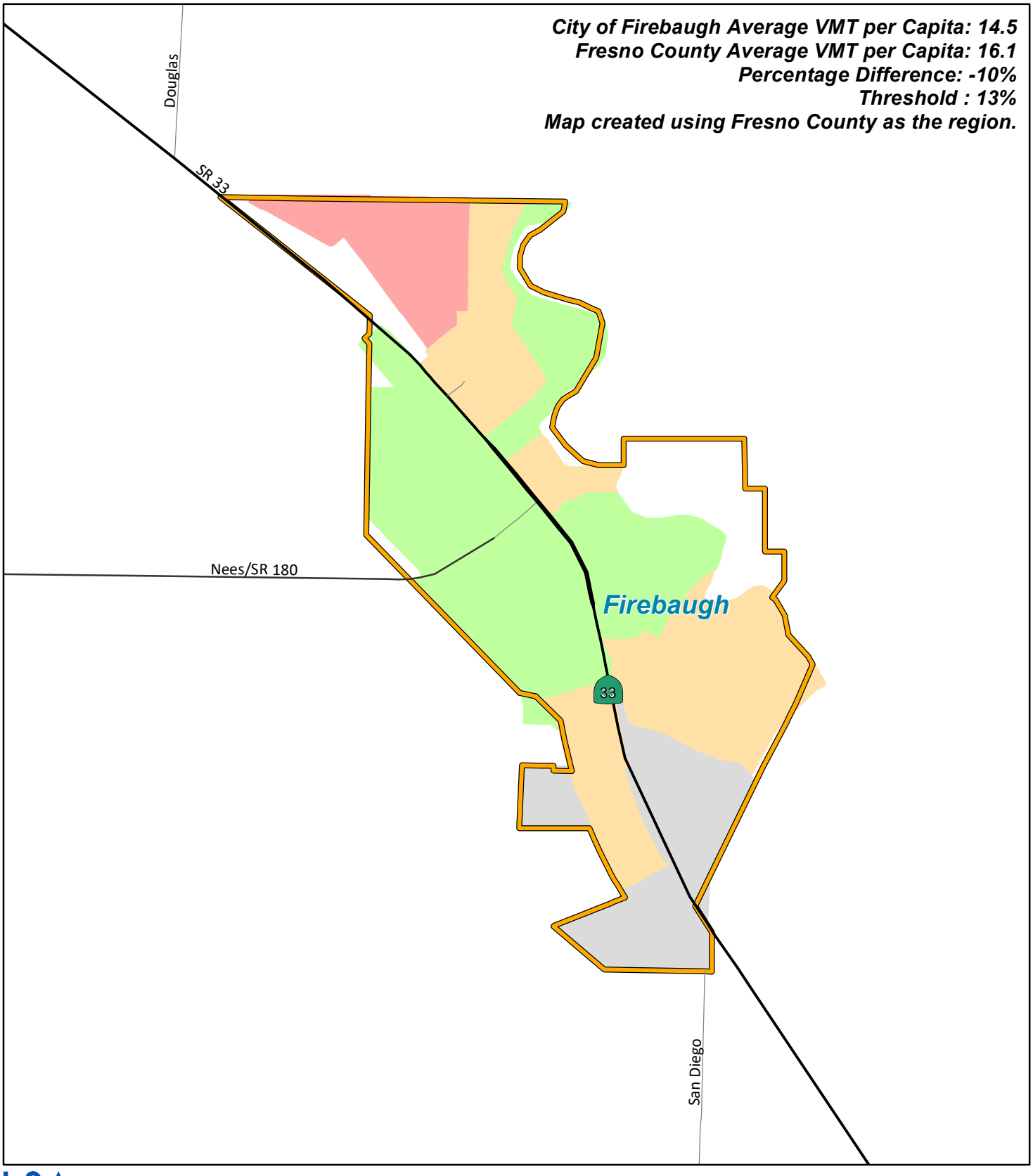
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

Fresno County SB 743 Implementation Regional Guidelines

City of Firebaugh - Existing VMT per Capita

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig4_Firebaugh.mxd (4/29/2020)



LSA

APPENDIX A-3b

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

N

0 1800 3600

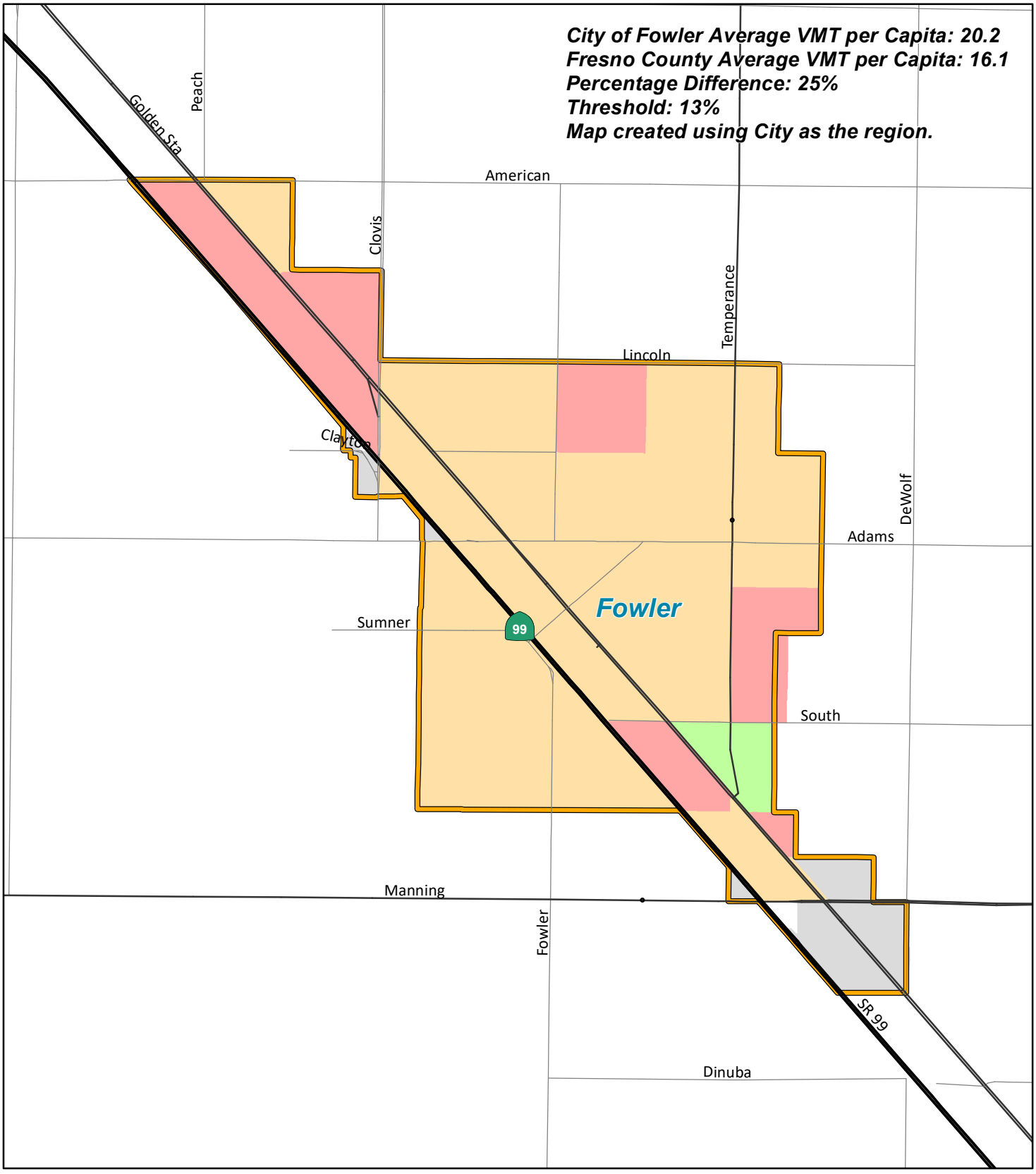
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

Fresno County SB 743 Implementation Regional Guidelines

City of Firebaugh - Existing VMT per Capita

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig4_Firebaugh_COGAVG.mxd (4/29/2020)



LSA

APPENDIX A-4a

VMT per Capita

- No Population
- Less than 17.5
- 17.5 - 22.8
- Greater than 22.8

City with Sphere of Influence

N

0 2000 4000

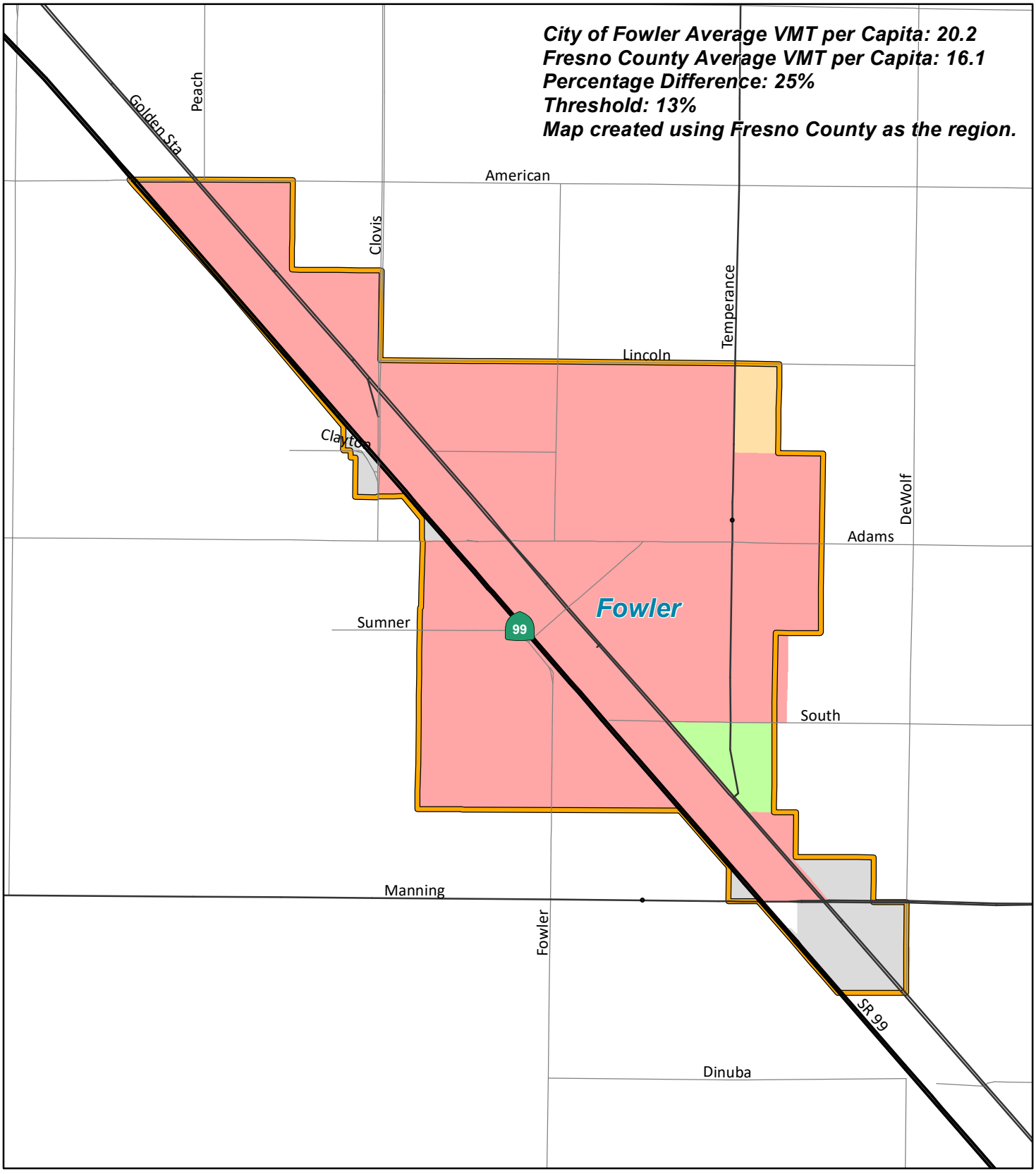
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of Fowler - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig5_Fowler.mxd (4/29/2020)



LSA

APPENDIX A-4b

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

N

0 2000 4000

FEET

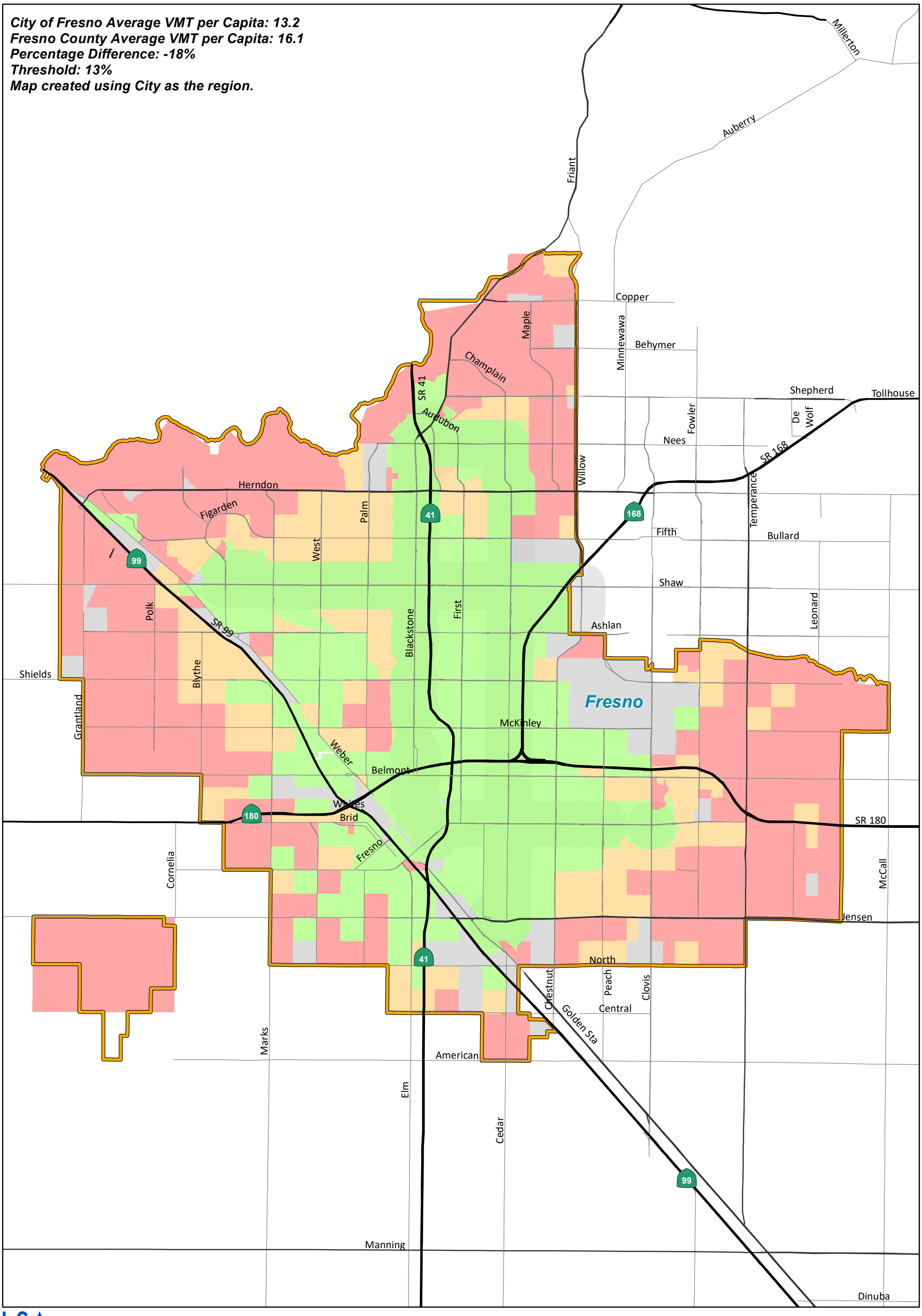
SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig5_Fowler_COGAVG.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Fowler - Existing VMT per Capita

City of Fresno Average VMT per Capita: 13.2
Fresno County Average VMT per Capita: 16.1
Percentage Difference: -18%
Threshold: 13%
Map created using City as the region.



LSA

City with Sphere of Influence

VMT per Capita
- No Population
- Less than 11.5
- 11.5 - 14.9
- Greater than 14.9

APPENDIX A-5a

0 5000 10000
FEET

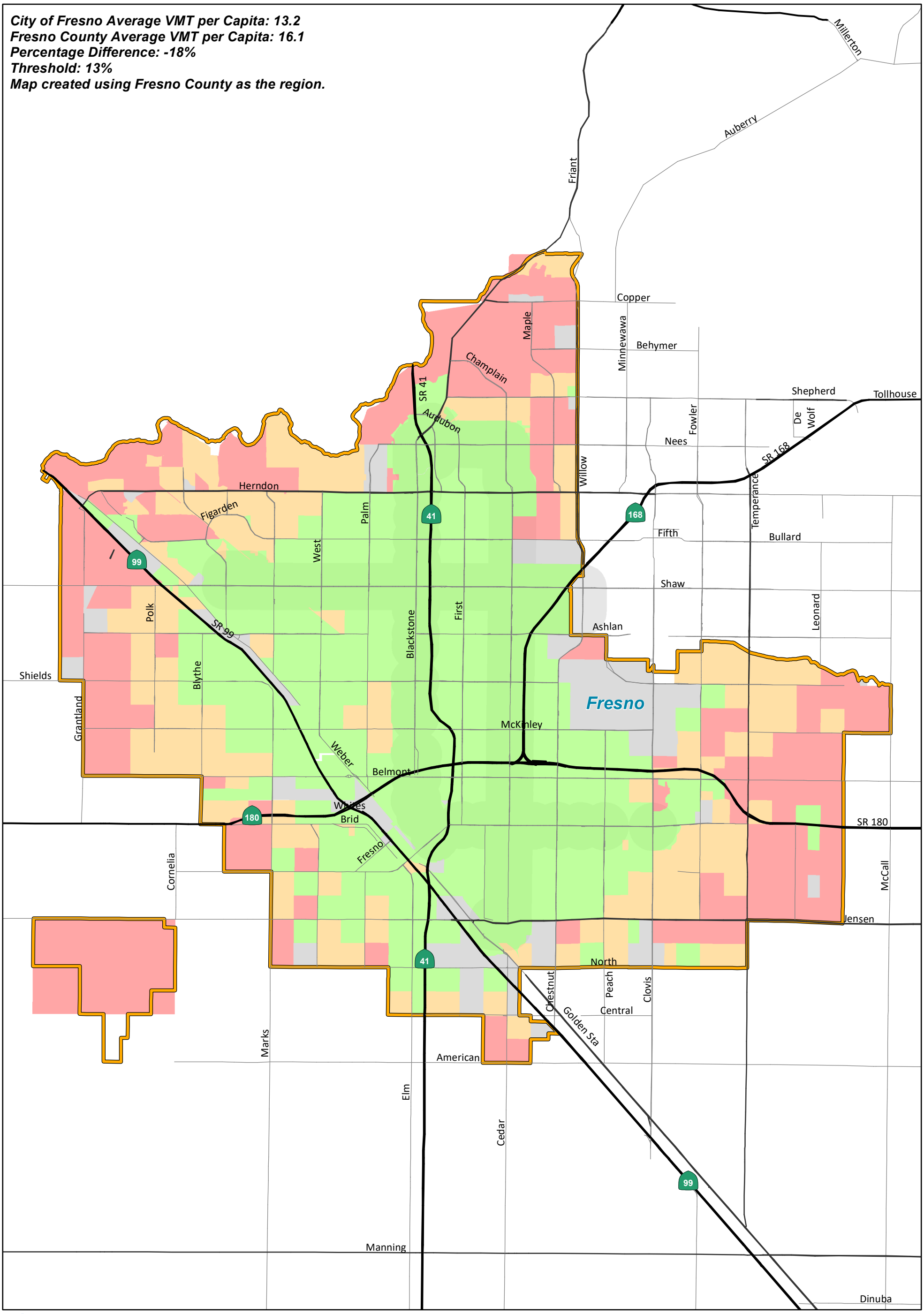
SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig6_Fresno.mxd (5/1/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Fresno - Existing VMT per Capita

City of Fresno Average VMT per Capita: 13.2
Fresno County Average VMT per Capita: 16.1
Percentage Difference: -18%
Threshold: 13%
Map created using Fresno County as the region.



LSA

LEGEND

City with Sphere of Influence

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

APPENDIX A-5b

0 5000 10000
FEET

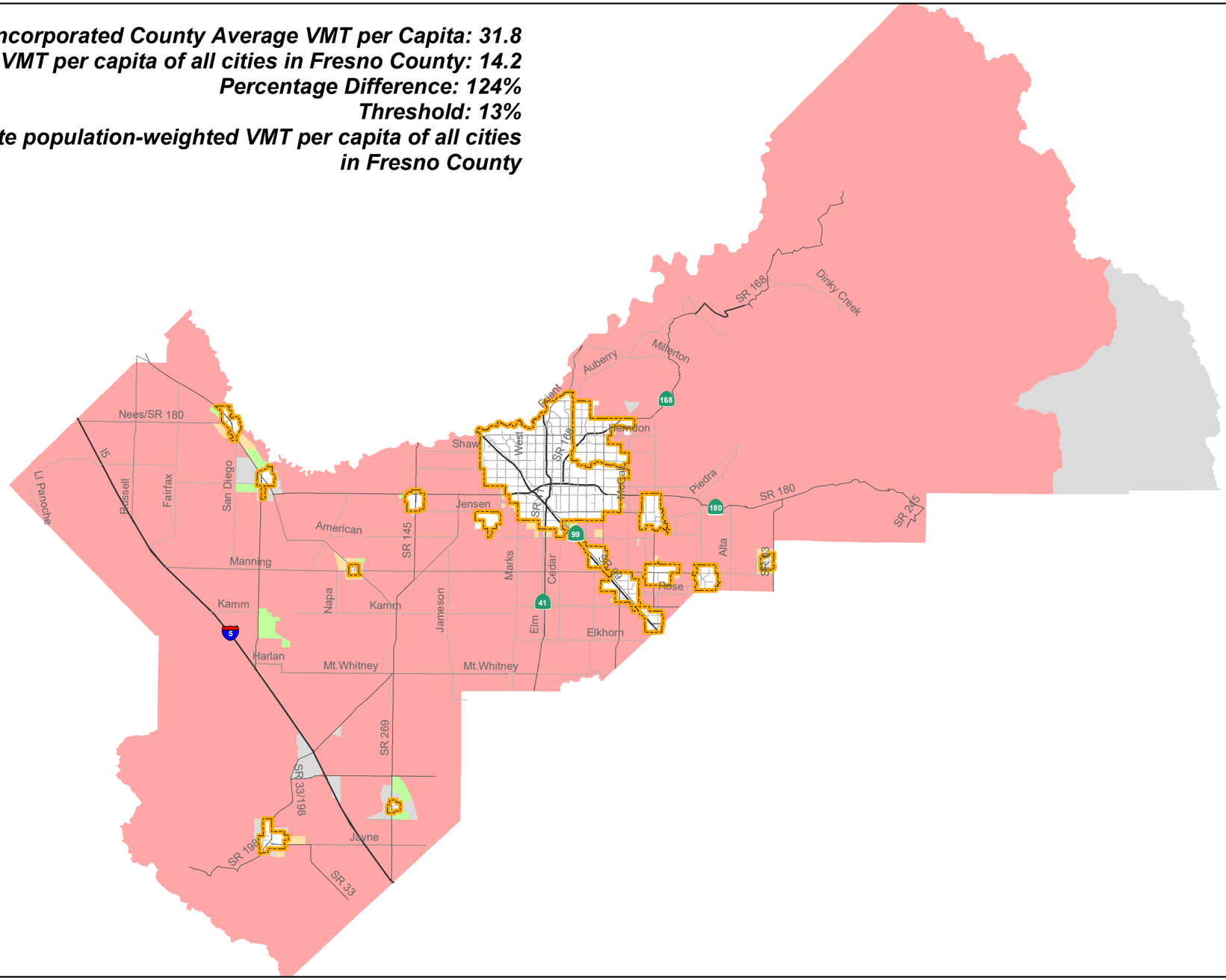
Fresno County SB 743 Implementation Regional Guidelines

City of Fresno - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig6_Fresno_COGAVG.mxd (5/1/2020)

Unincorporated County Average VMT per Capita: 31.8
Aggregate population-weighted VMT per capita of all cities in Fresno County: 14.2
Percentage Difference: 124%
Threshold: 13%
Map created using the aggregate population-weighted VMT per capita of all cities in Fresno County



LSA

Cities Including Sphere of Influence

VMT per Capita
- No Population
- Less than 12.4
- 12.4 - 16.0
- Greater than 16.0

APPENDIX A-6a

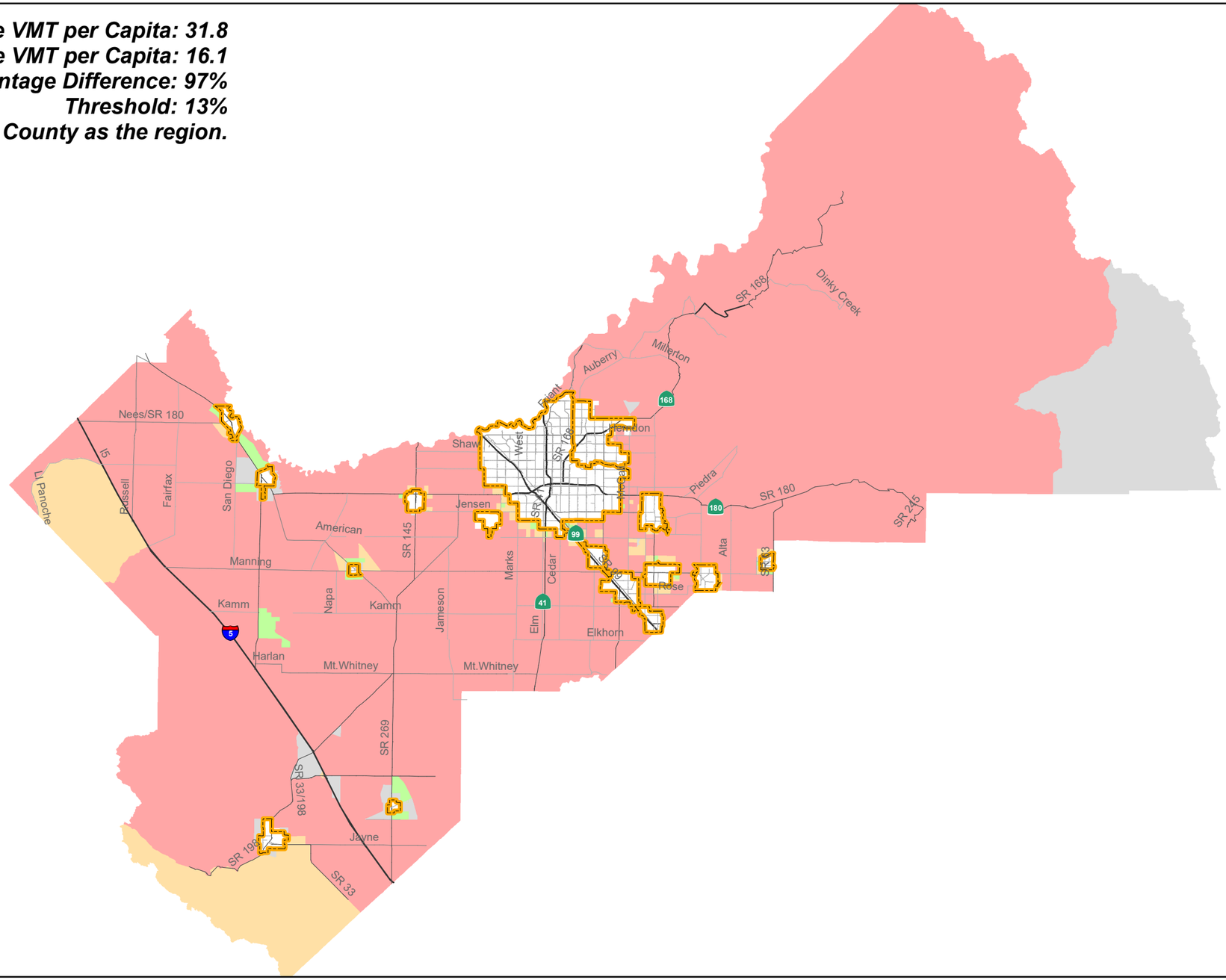
Fresno County SB 743 Implementation Regional Guidelines

Unincorporated County Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig7_Fresno_County.mxd (7/1/2020)

Unincorporated County Average VMT per Capita: 31.8
Fresno County Average VMT per Capita: 16.1
Percentage Difference: 97%
Threshold: 13%
Map created using Fresno County as the region.



LSA

Cities Including Sphere of Influence

VMT per Capita
- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

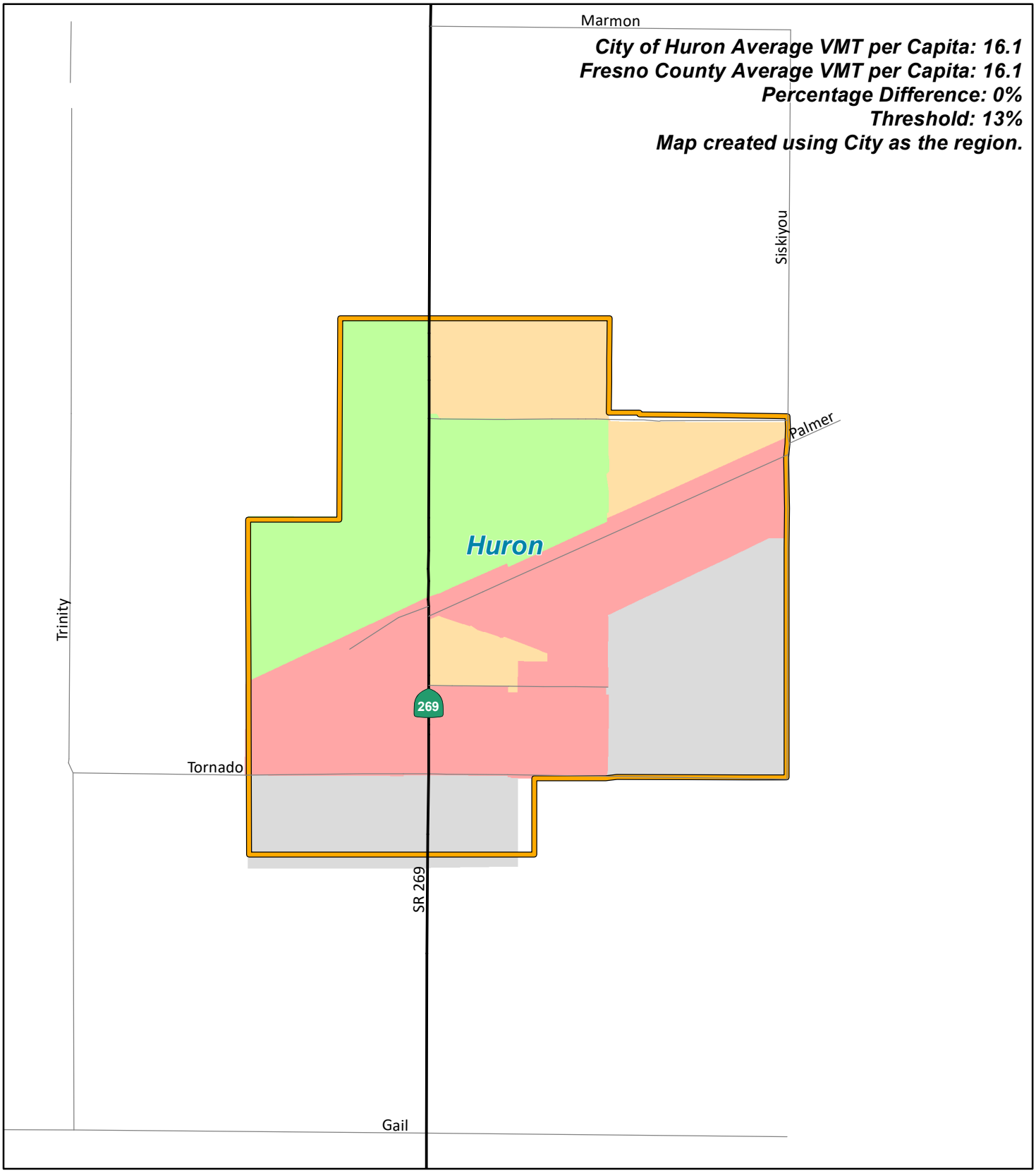
APPENDIX A-6b

Fresno County SB 743 Implementation Regional Guidelines

Unincorporated County Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig7_Fresno_County_COGAVG.mxd (7/1/2020)



LSA

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.1
- Greater than 18.1

City with Sphere of Influence

APPENDIX A-7a

N

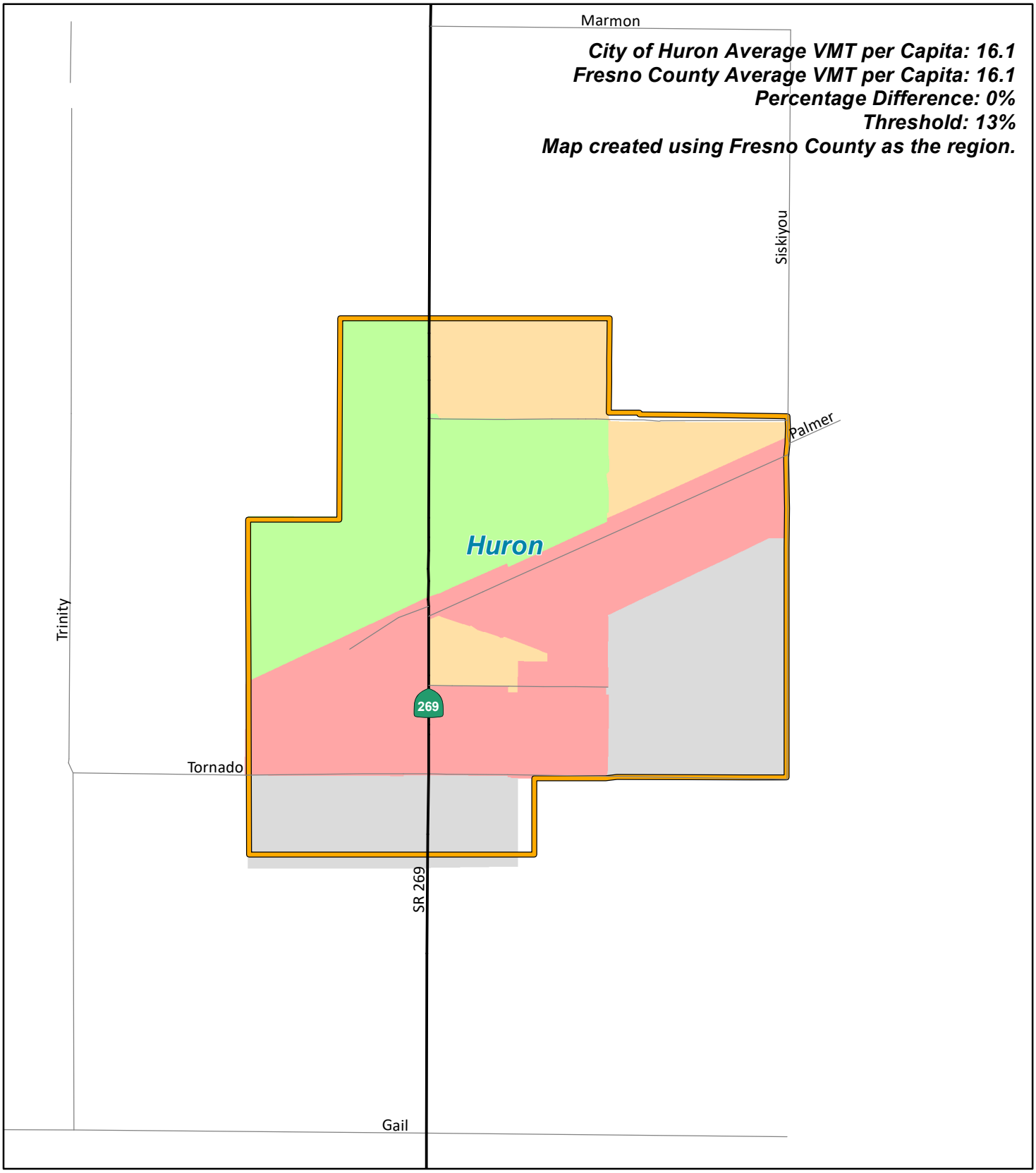
0 1000 2000
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of Huron - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig8_Huron.mxd (4/29/2020)



LSA

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

APPENDIX A-7b

N

0 1000 2000

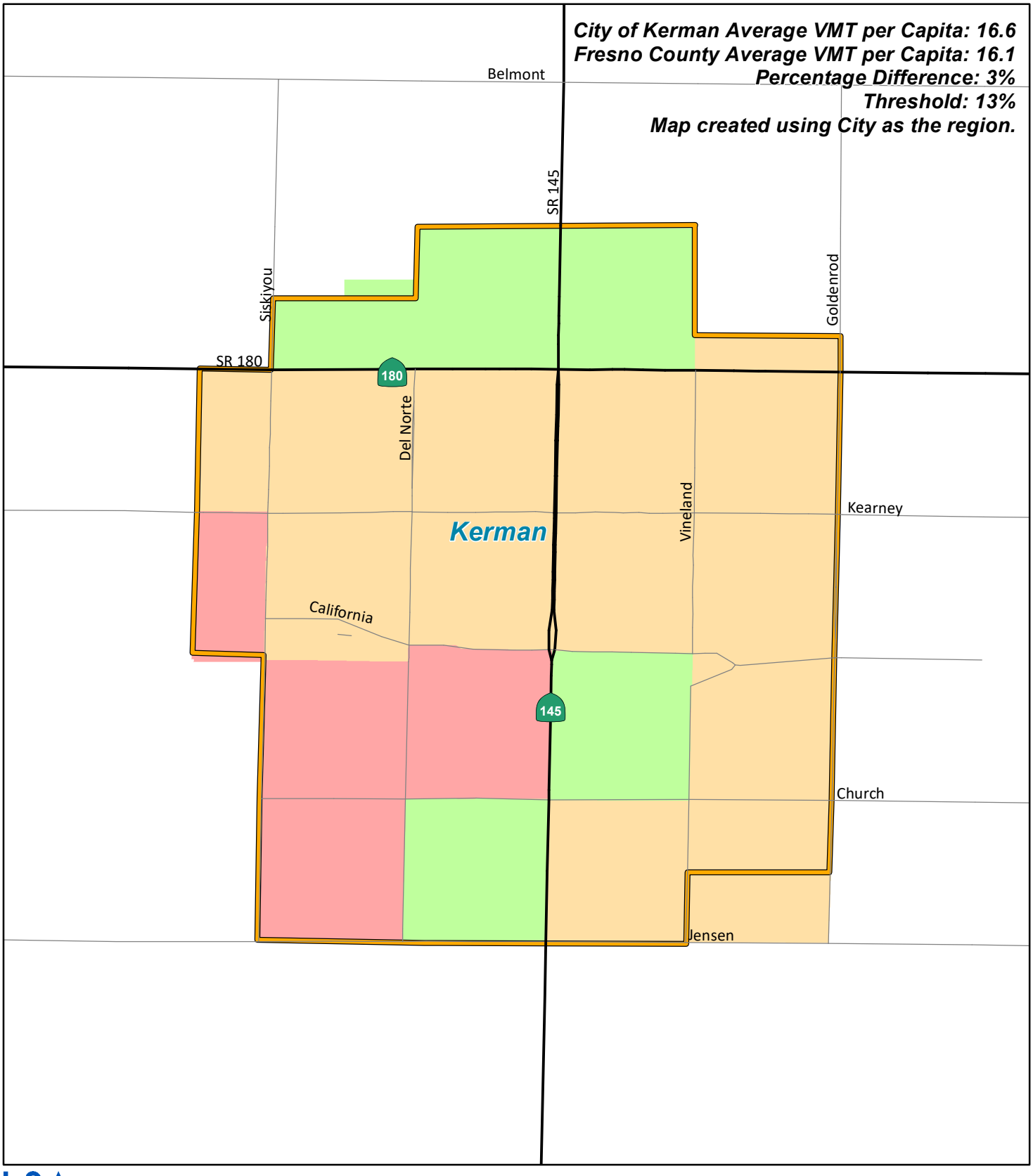
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of Huron - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig8_Huron_COGAVG.mxd (4/29/2020)



LSA

VMT per Capita

- No Population
- Less than 14.4
- 14.4 - 18.8
- Greater than 18.8

City with Sphere of Influence

APPENDIX A-8a

N

0 1500 3000

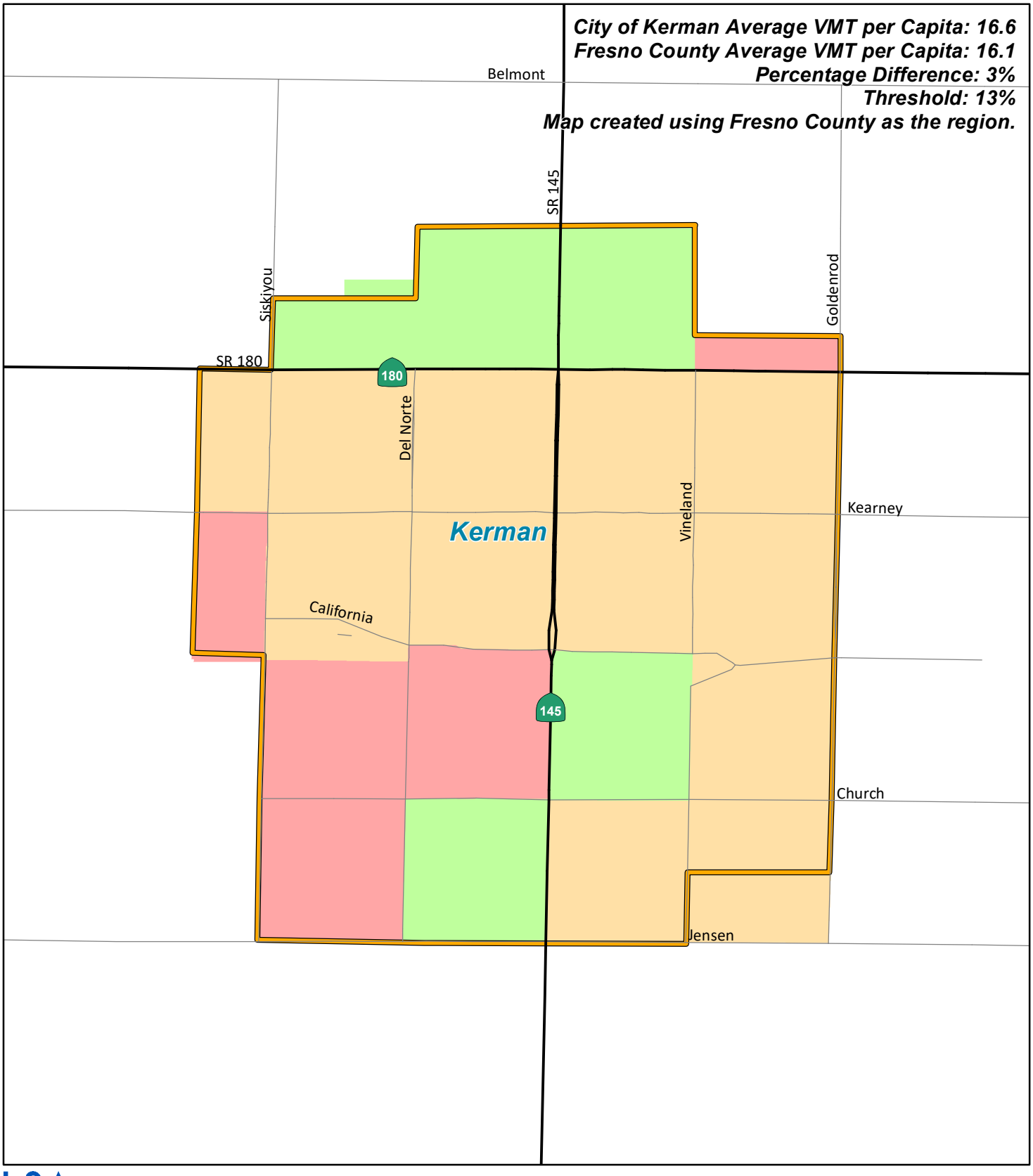
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig9_Kerman.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Kerman - Existing VMT per Capita



LSA

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

APPENDIX A-8b

N

0 1500 3000

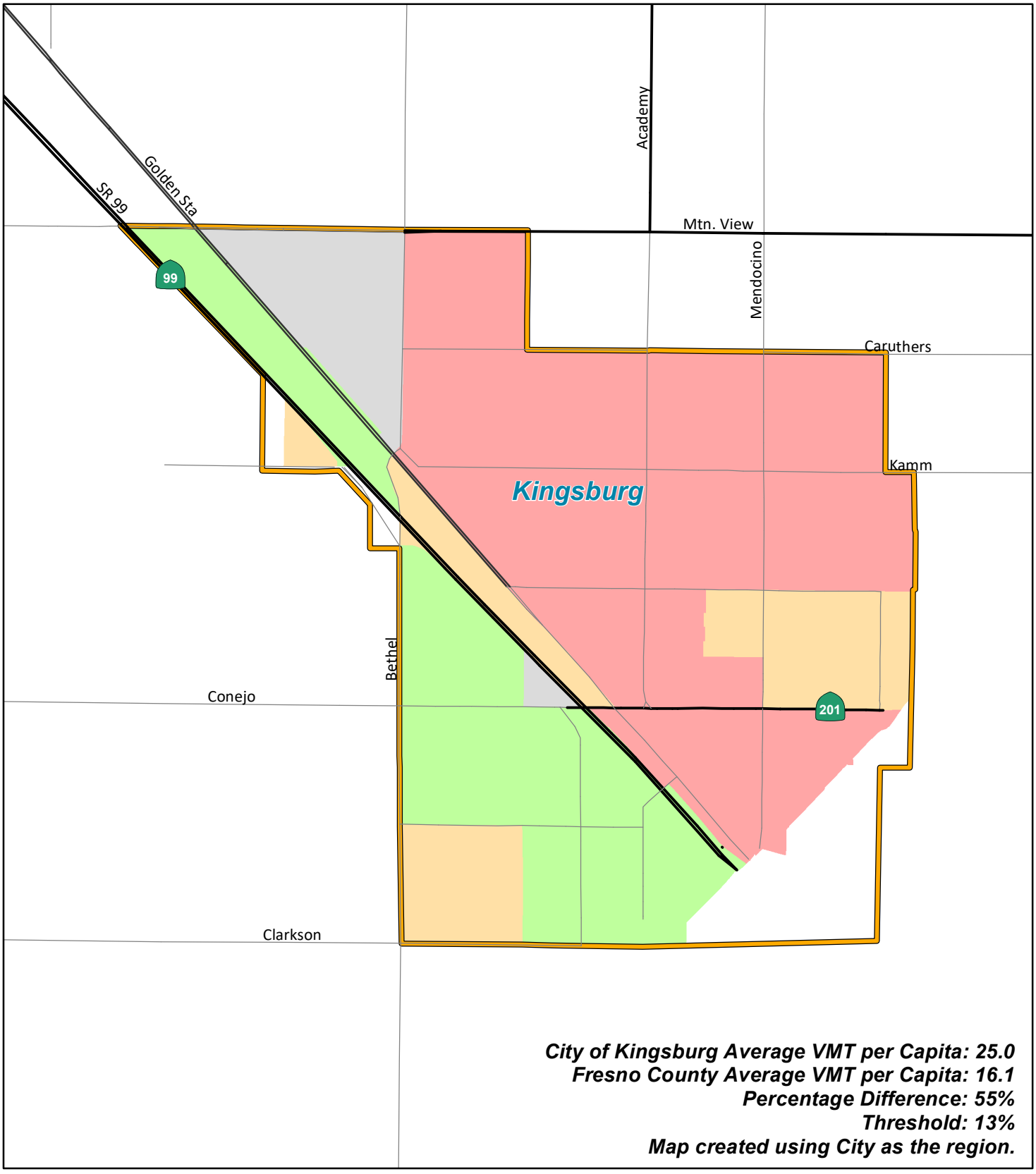
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of Kerman - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig9_Kerman_COGAVG.mxd (4/29/2020)



LSA

APPENDIX A-9a

VMT per Capita

- No Population
- Less than 21.7
- 21.7 - 28.2
- Greater than 28.2

City with Sphere of Influence

N

0 1500 3000

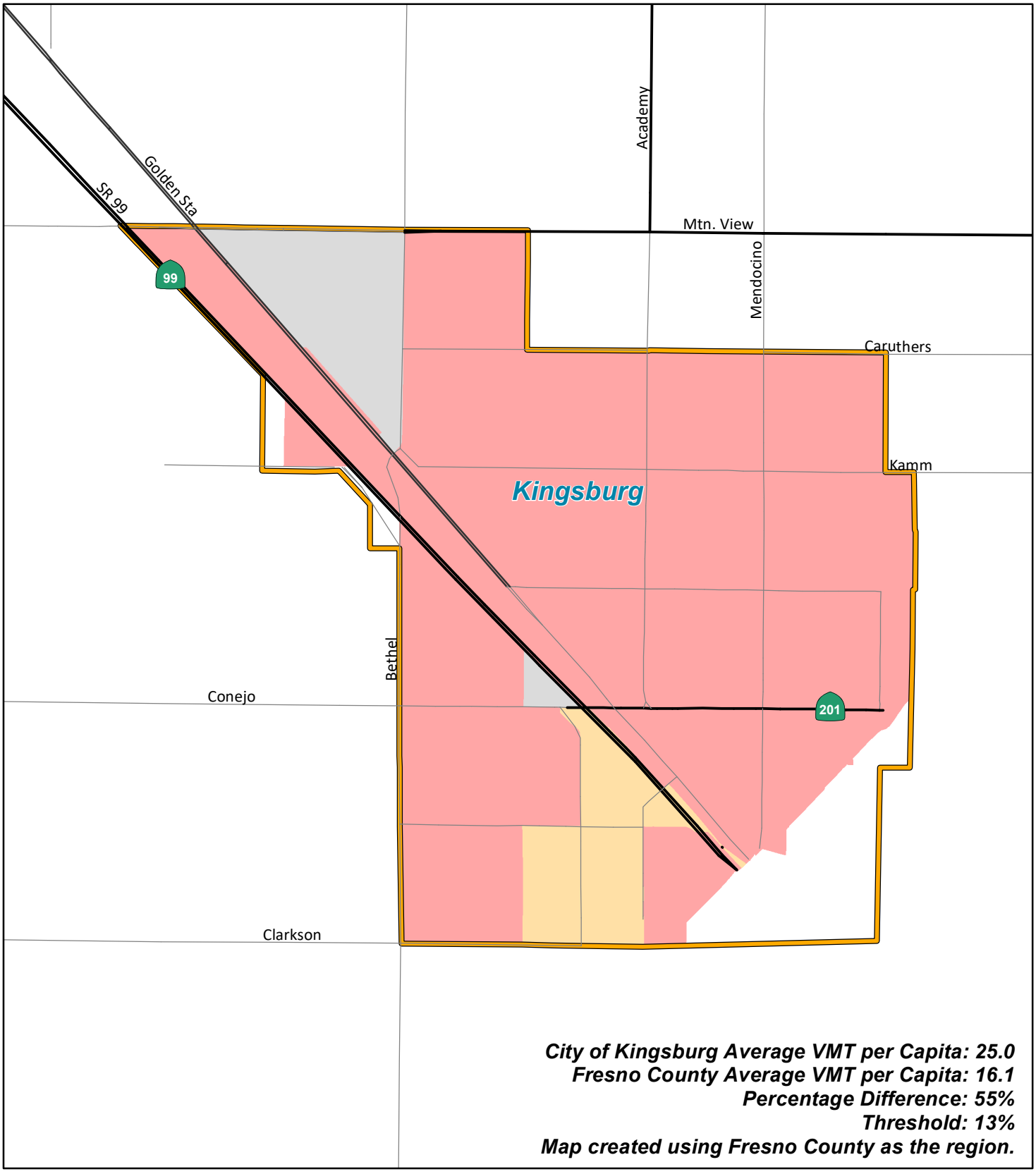
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig10_Kingsburg.mxd (1/22/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Kingsburg - Existing VMT per Capita



LSA

APPENDIX A-9b

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

N

0 1500 3000

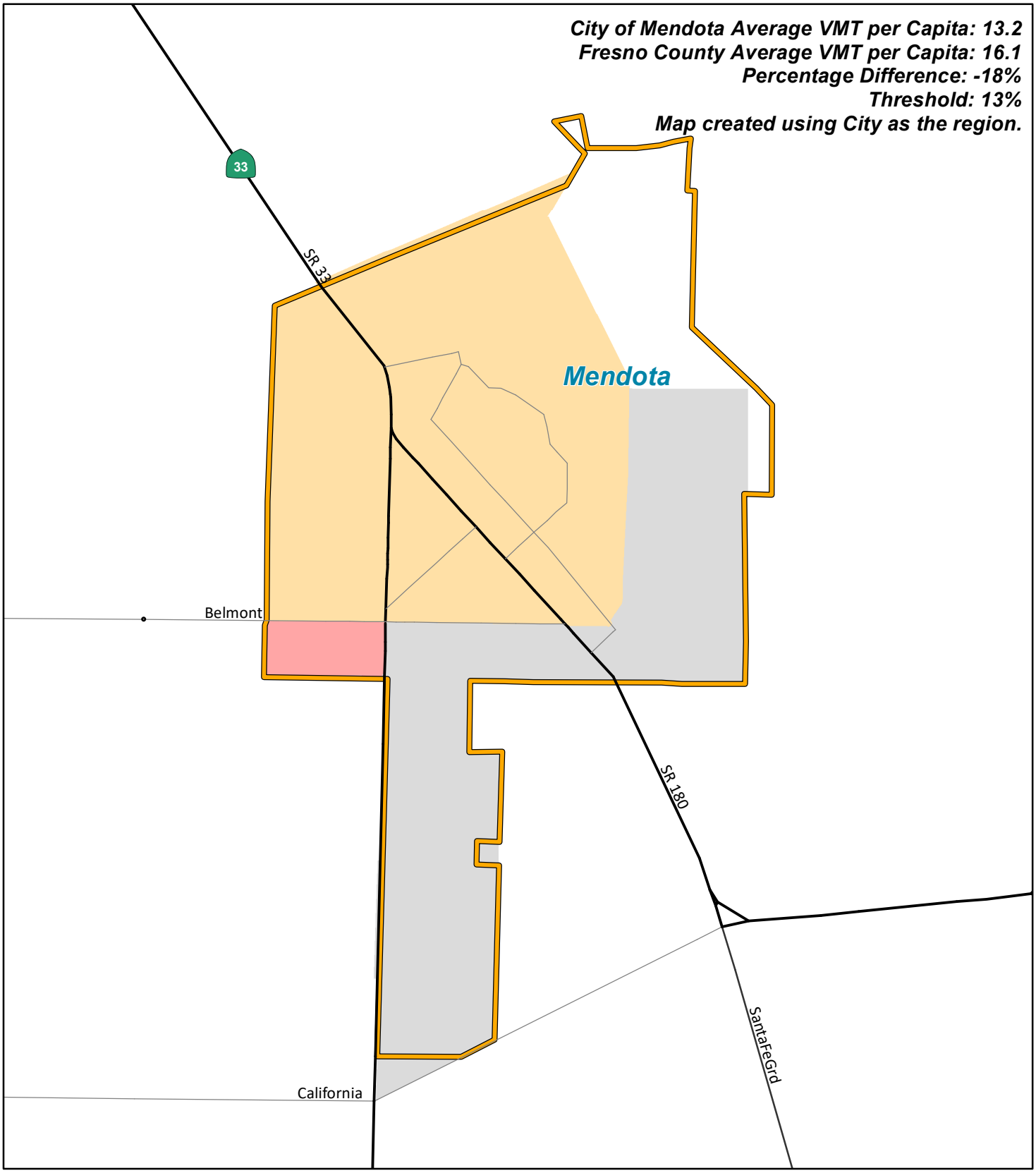
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of Kingsburg - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig10_Kingsburg_COGAVG.mxd (4/29/2020)



LSA

VMT per Capita

- No Population
- Less than 11.5
- 11.4 - 14.9
- Greater than 14.9

City with Sphere of Influence

APPENDIX A-10a

N

0 1500 3000

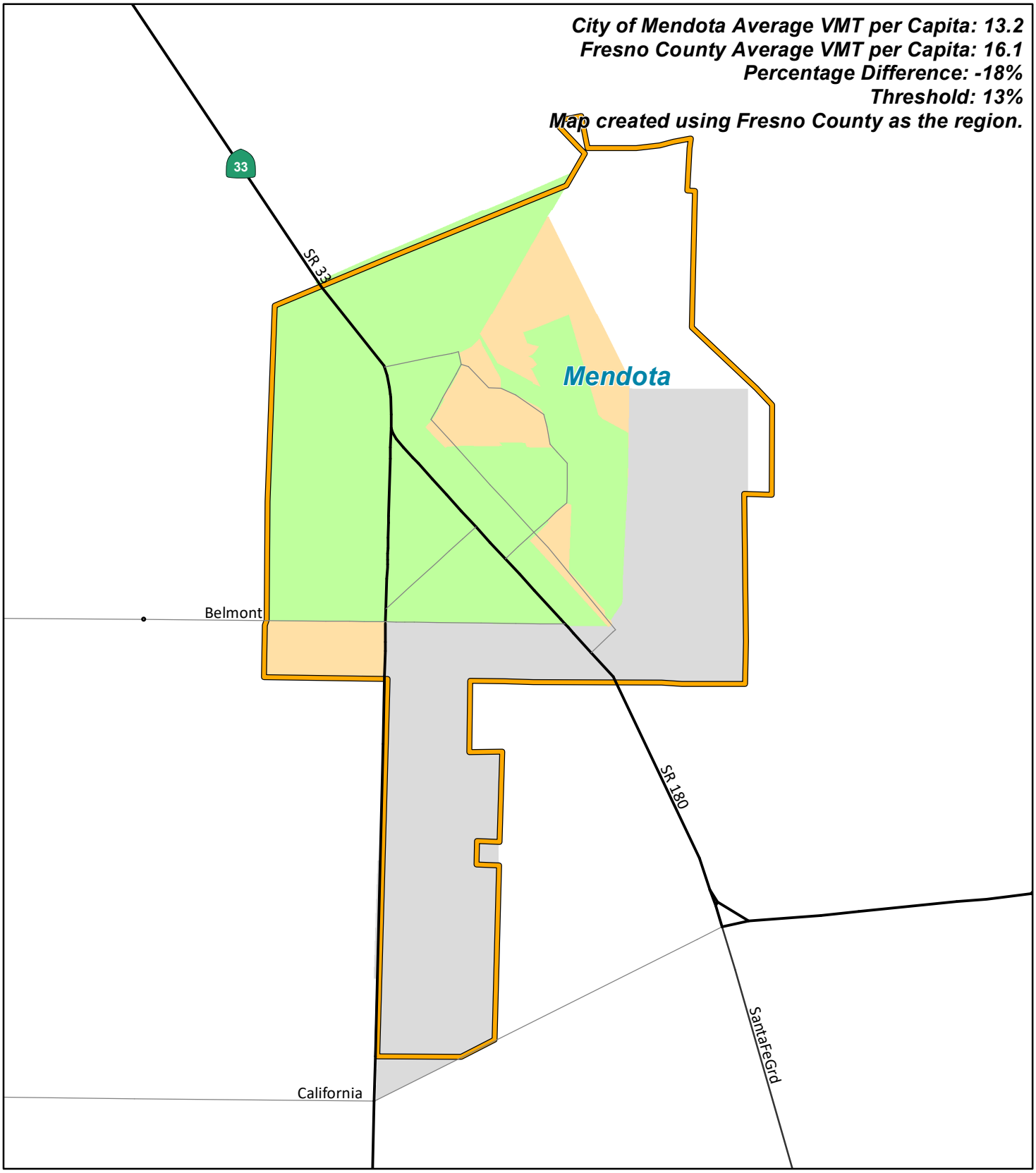
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig11_Mendota.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Mendota - Existing VMT per Capita



LSA

APPENDIX A-10b

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

N

0 1500 3000

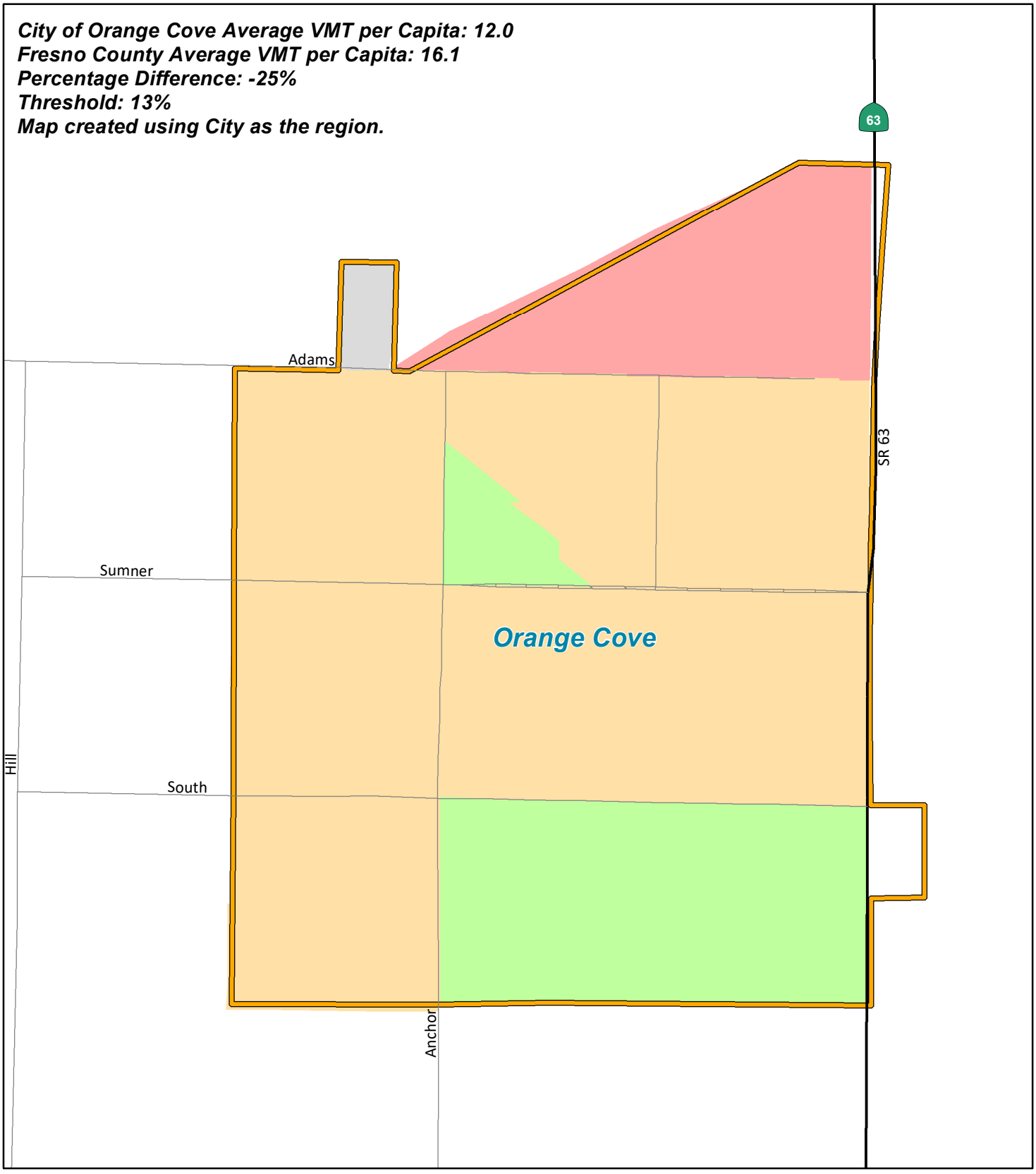
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of Mendota - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig11_Mendota_COGAVG.mxd (4/29/2020)



LSA

APPENDIX A-11a

VMT per Capita

- No Population
- Less than 10.5
- 10.5 - 13.6
- Greater than 13.6

City with Sphere of Influence

N

0 1000 2000
FEET

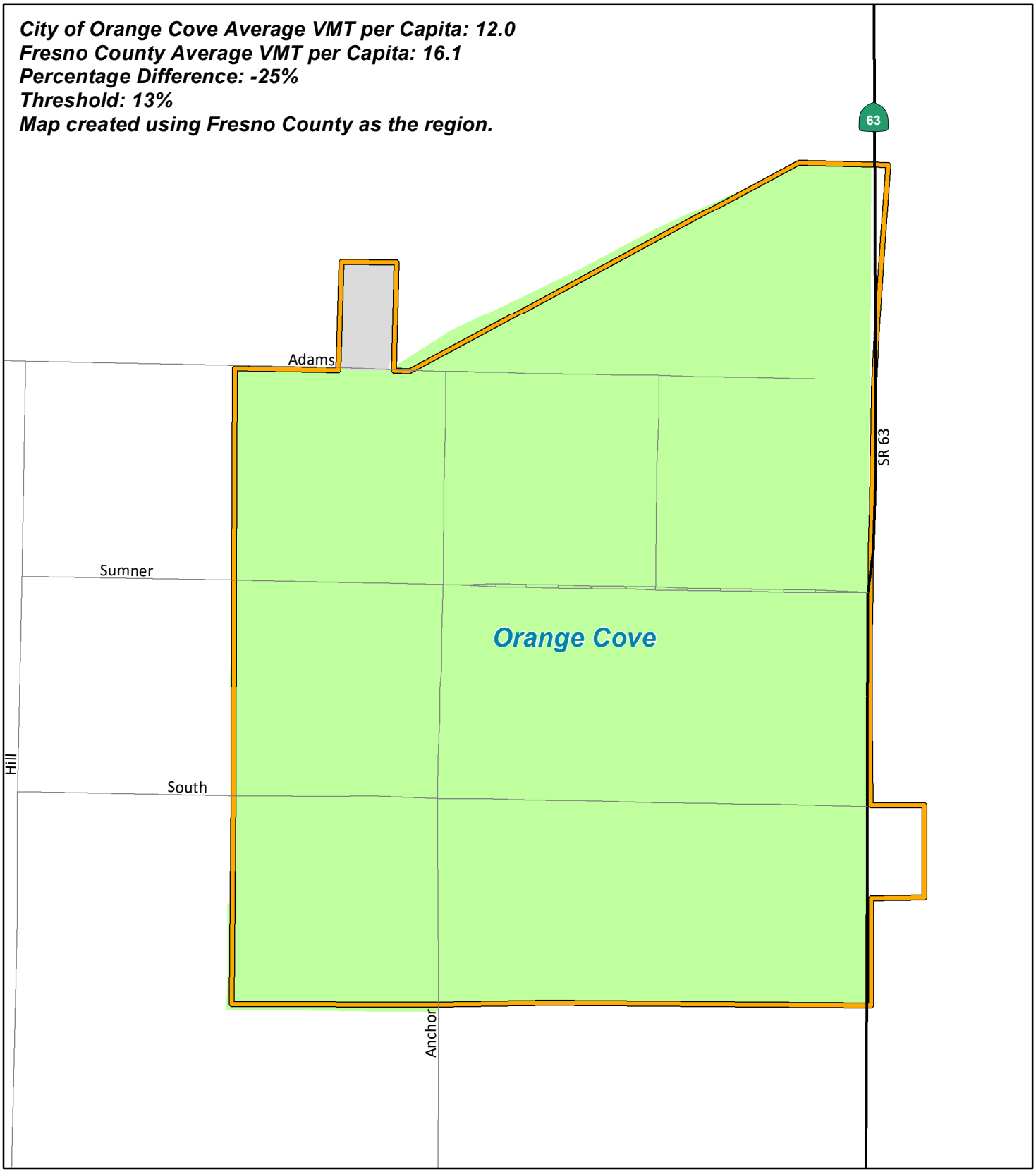
Fresno County SB 743 Implementation Regional Guidelines

City of Orange Cove - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig12_Orange_Cove.mxd (4/29/2020)

City of Orange Cove Average VMT per Capita: 12.0
Fresno County Average VMT per Capita: 16.1
Percentage Difference: -25%
Threshold: 13%
Map created using Fresno County as the region.



LSA

APPENDIX A-11b

VMT per Capita
- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

N

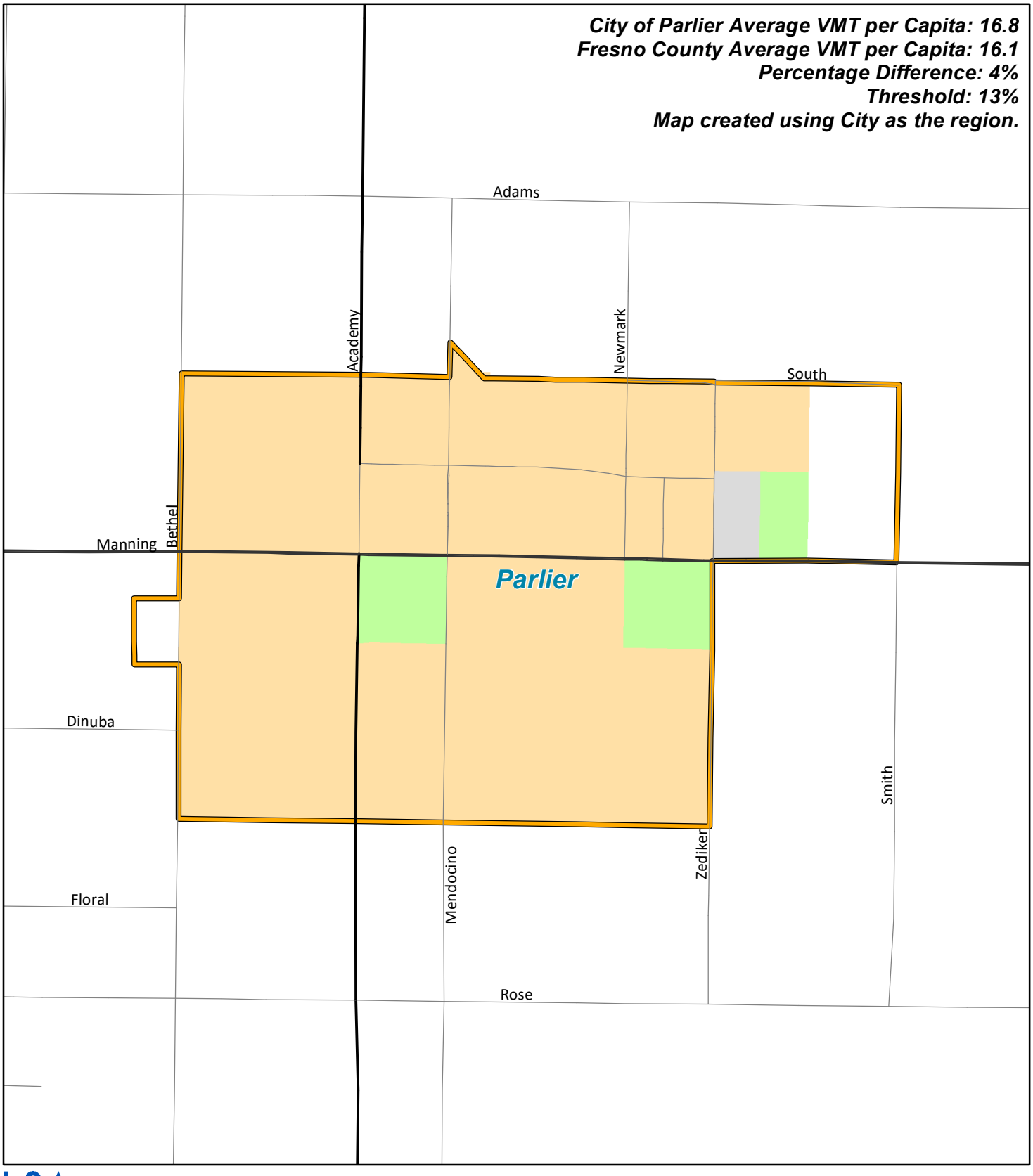
0 1000 2000
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of Orange Cove - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig12_Orange_Cove_COGAVG.mxd (4/29/2020)



LSA

VMT per Capita

- No Population
- Less than 14.6
- 14.6 - 19.0
- Greater than 19.0

City with Sphere of Influence

N

0 2000 4000

FEET

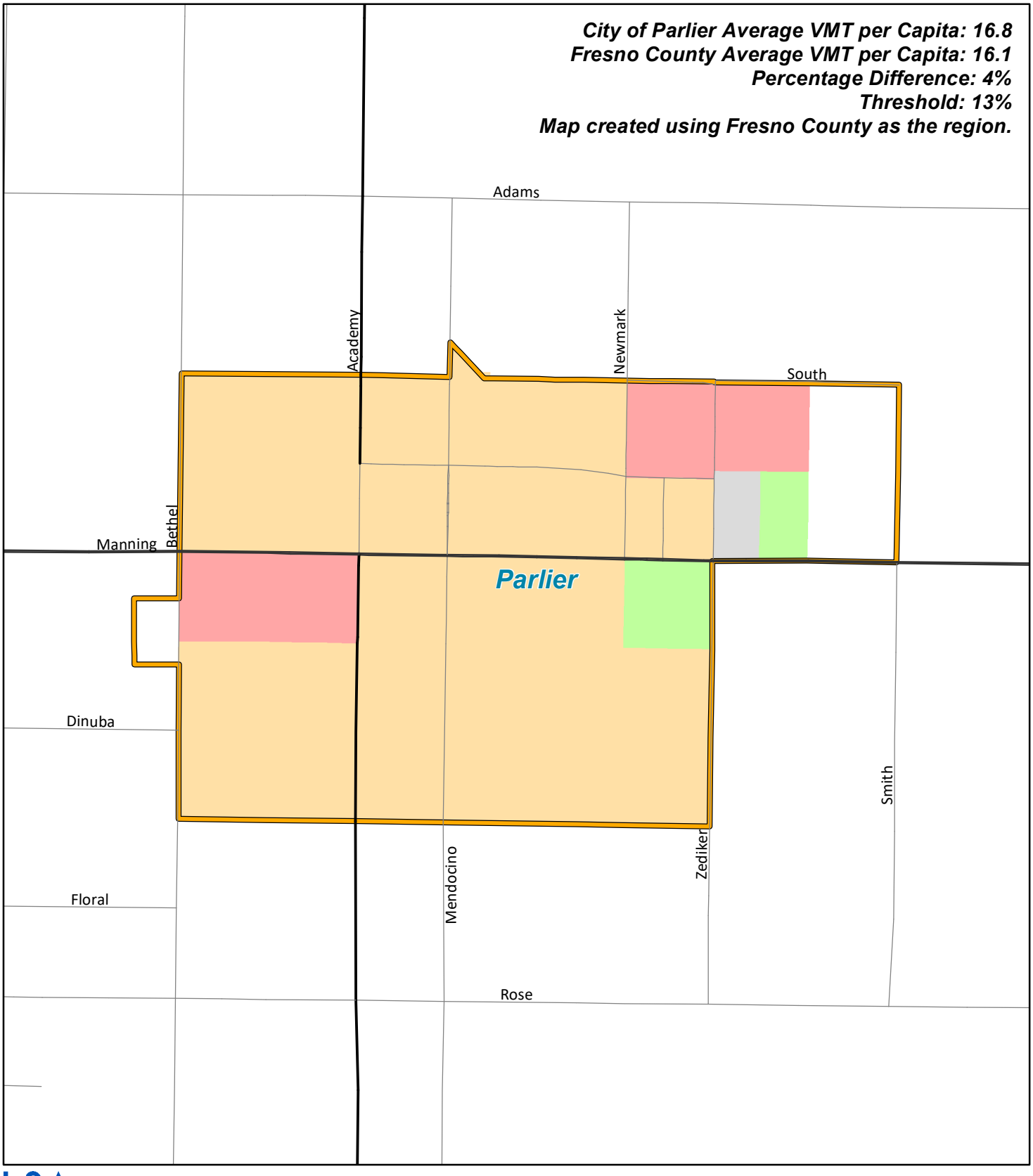
APPENDIX A-12a

Fresno County SB 743 Implementation Regional Guidelines

City of Parlier - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig13_Parlier.mxd (4/29/2020)



LSA

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

N

0 2000 4000

FEET

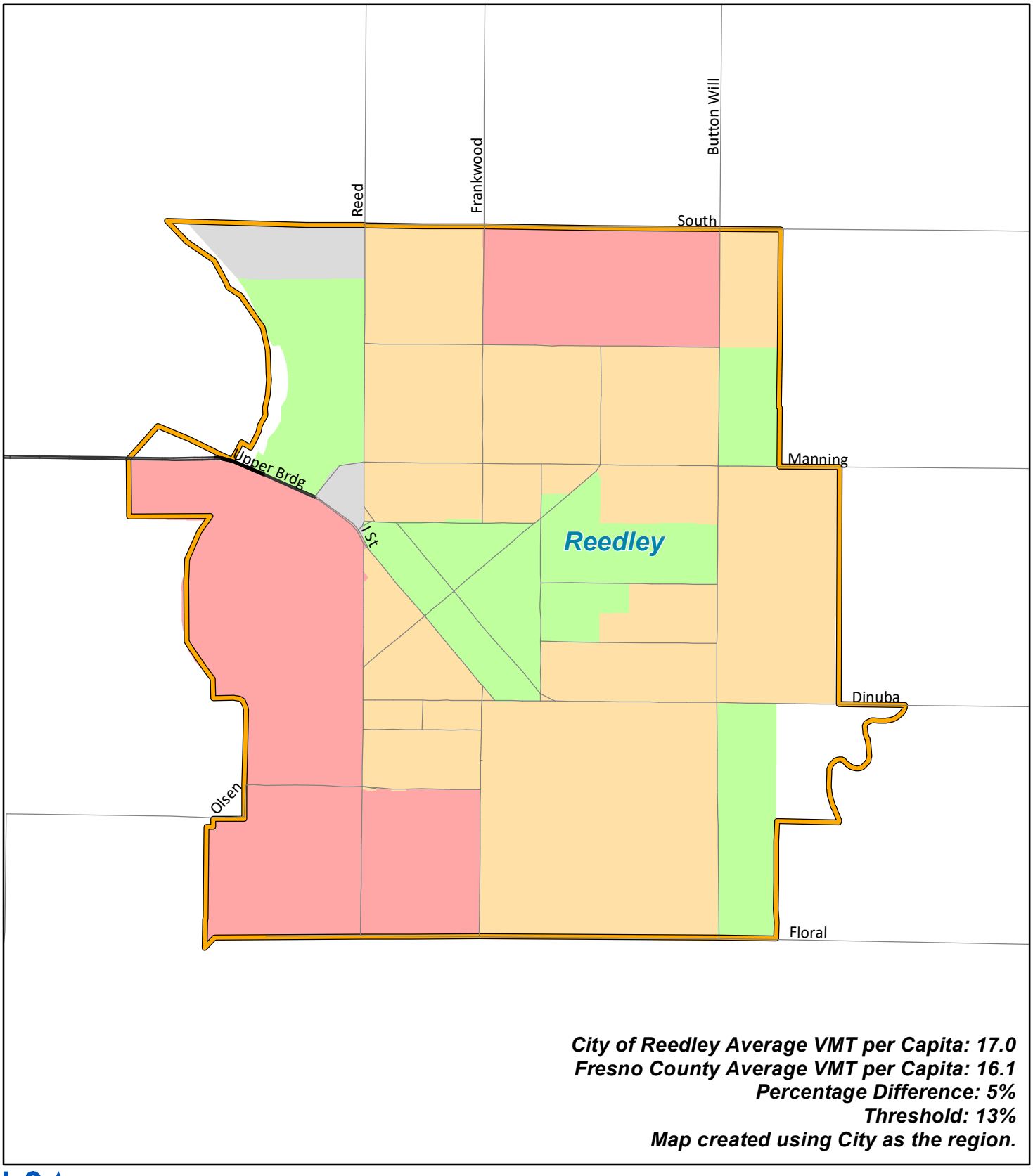
APPENDIX A-12b

Fresno County SB 743 Implementation Regional Guidelines

City of Parlier - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig13_Parlier_COGAVG.mxd (4/29/2020)



City of Reedley Average VMT per Capita: 17.0
Fresno County Average VMT per Capita: 16.1
Percentage Difference: 5%
Threshold: 13%
Map created using City as the region.

LSA

APPENDIX A-13a

VMT per Capita

- No Population
- Less than 14.8
- 14.8 - 19.2
- Greater than 19.2

City with Sphere of Influence

N

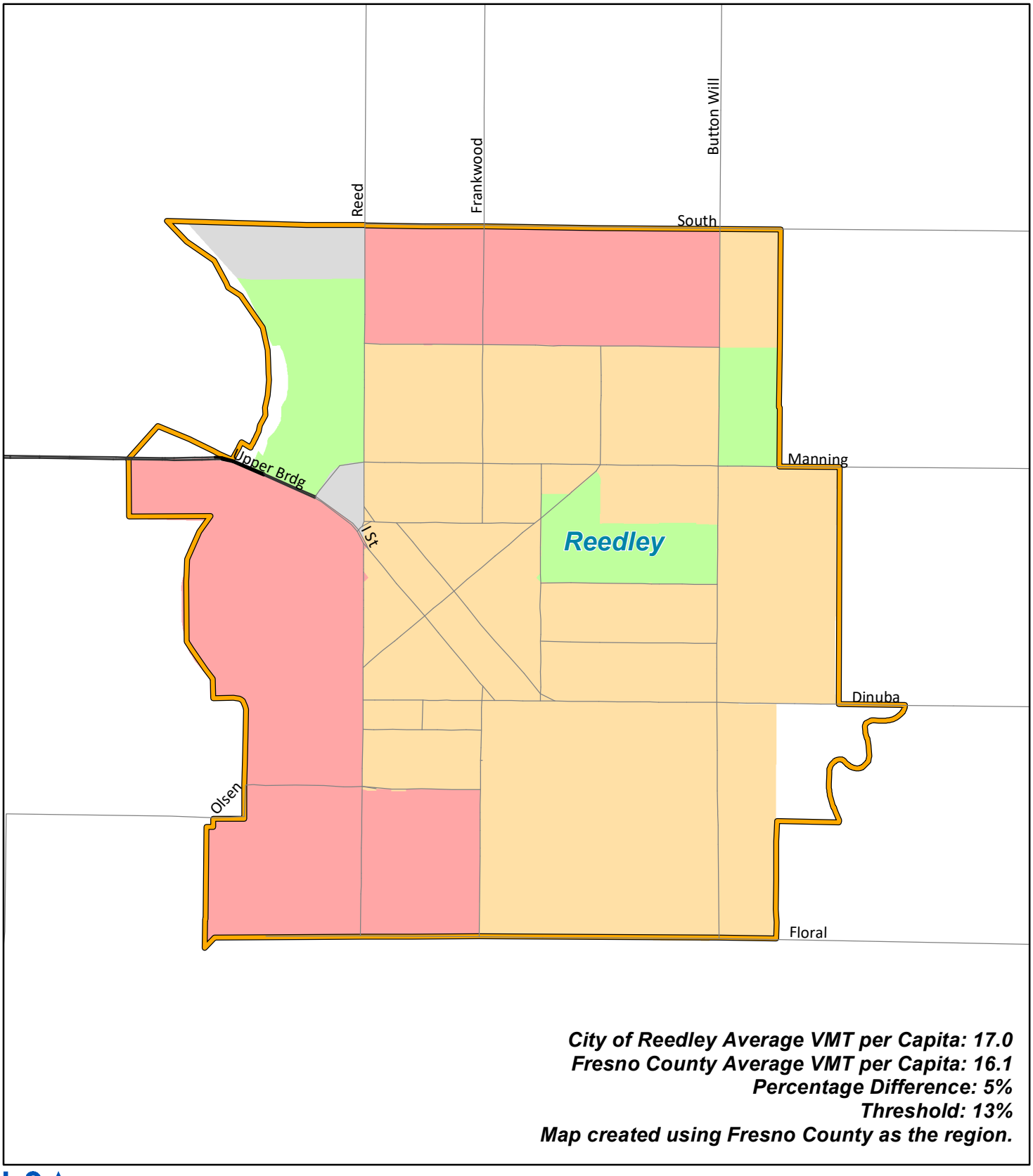
0 1500 3000
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of Reedley - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig14_Reedley.mxd (4/29/2020)



City of Reedley Average VMT per Capita: 17.0
Fresno County Average VMT per Capita: 16.1
Percentage Difference: 5%
Threshold: 13%
Map created using Fresno County as the region.

LSA

APPENDIX A-13a

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

N

0 1500 3000
FEET

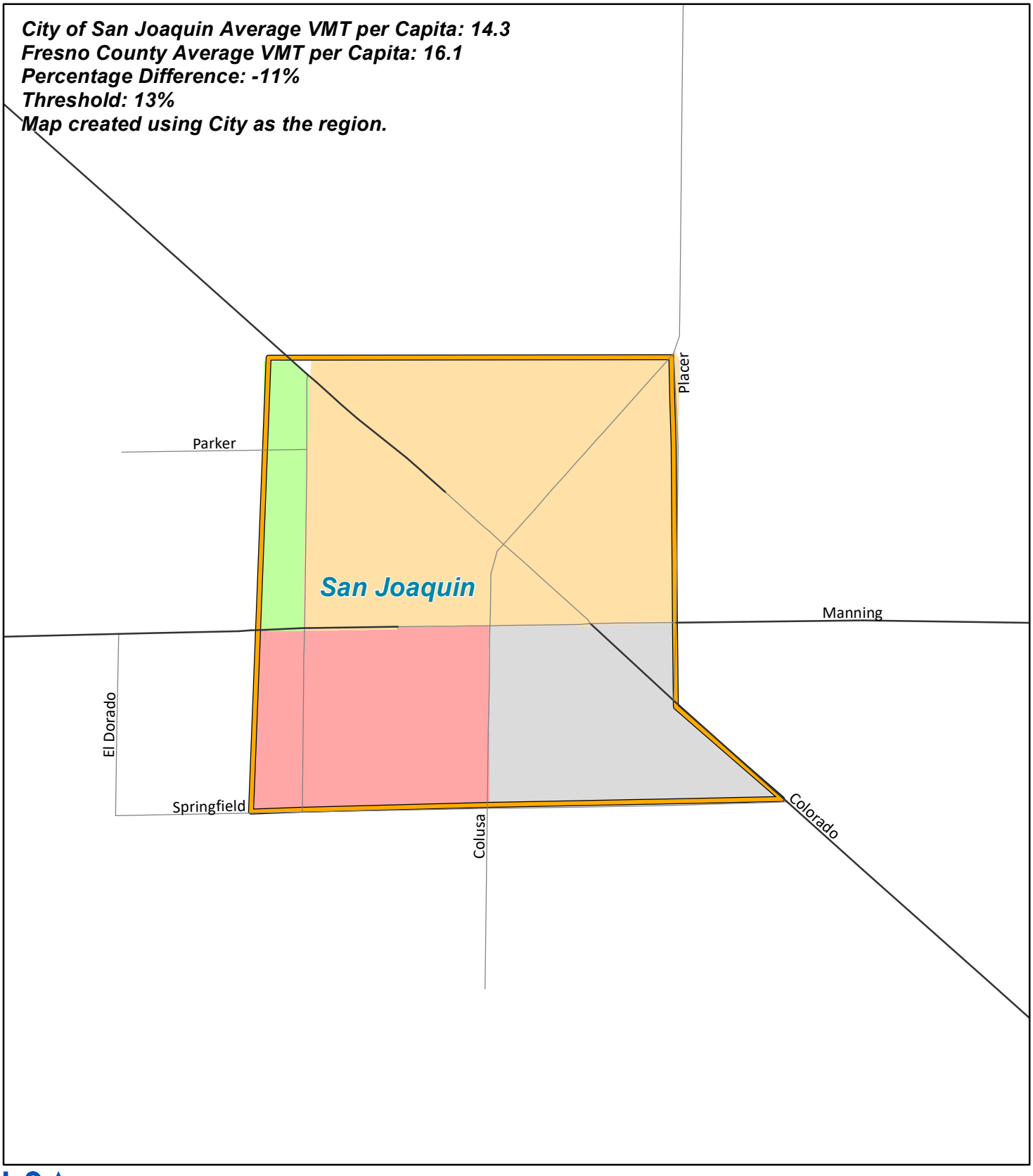
Fresno County SB 743 Implementation Regional Guidelines

City of Reedley - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig14_Reedley_COGAVG.mxd (1/22/2020)

City of San Joaquin Average VMT per Capita: 14.3
Fresno County Average VMT per Capita: 16.1
Percentage Difference: -11%
Threshold: 13%
Map created using City as the region.



LSA

APPENDIX A-14a

VMT per Capita
- No Population
- Less than 12.4
- 12.4 - 16.1
- Greater than 16.1

City with Sphere of Influence

N

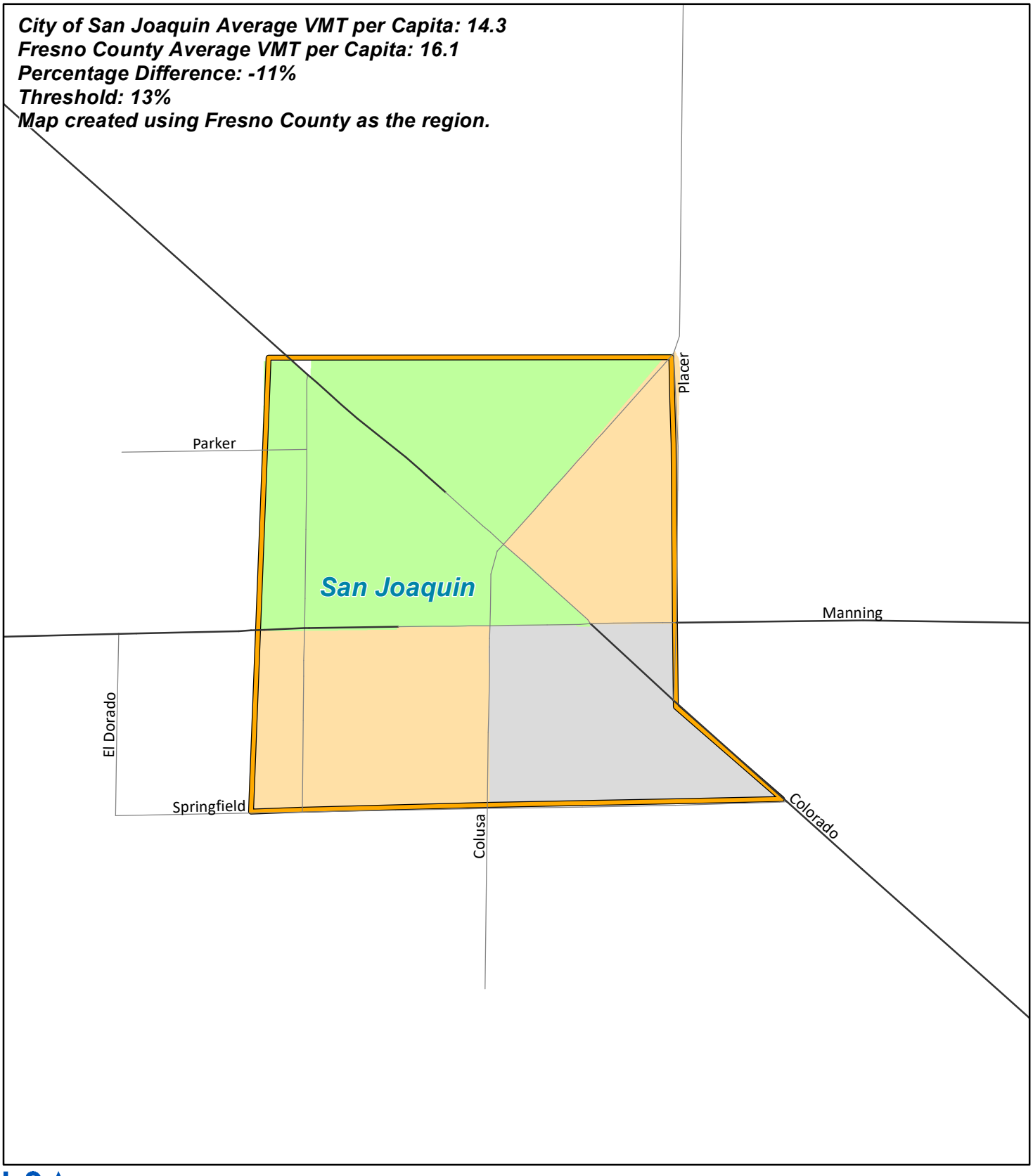
0 1000 2000
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

Fresno County SB 743 Implementation Regional Guidelines

City of San Joaquin - Existing VMT per Capita

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig15_San_Joaquin.mxd (4/29/2020)



LSA

APPENDIX A-14b

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

N

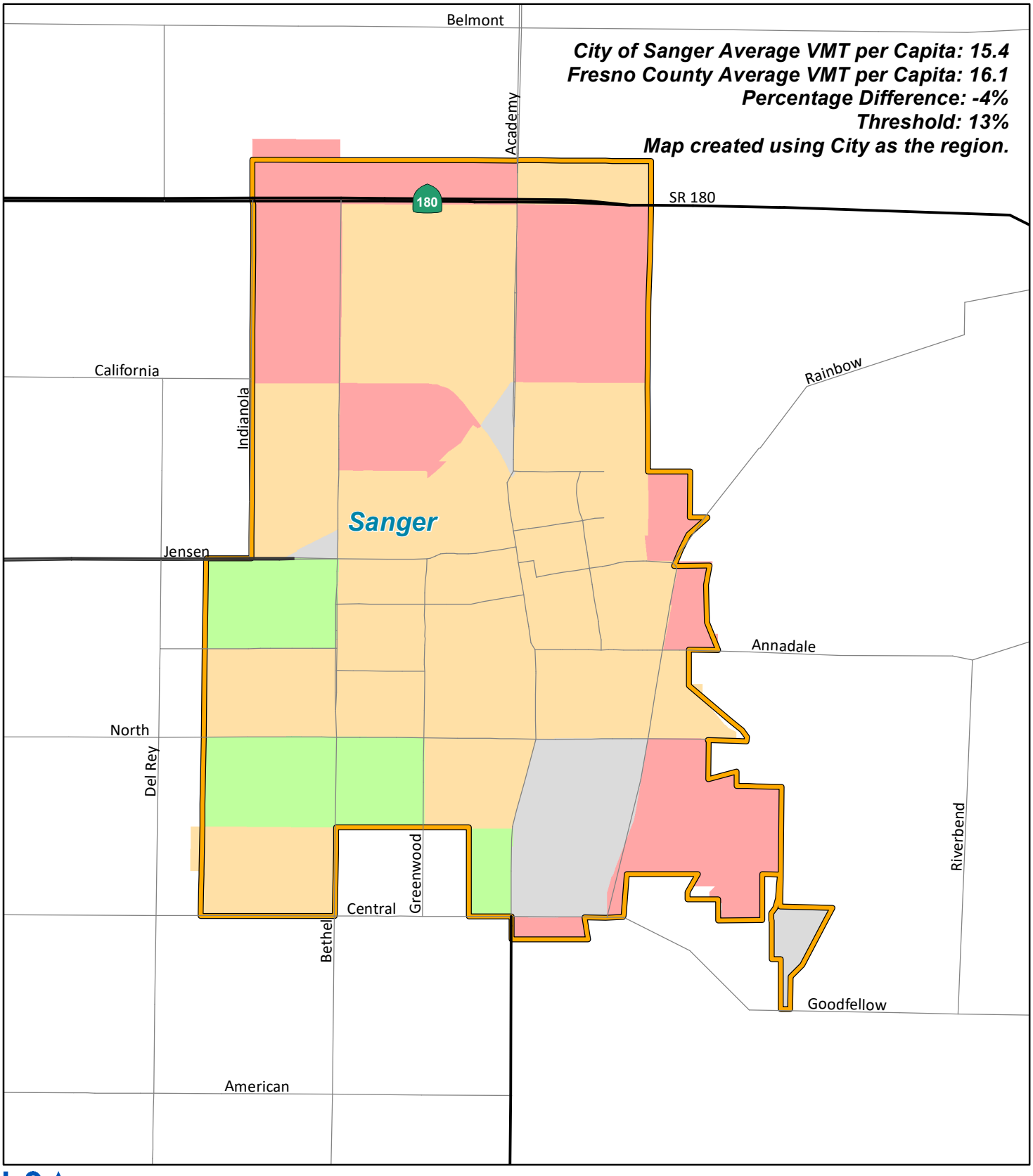
0 1000 2000
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of San Joaquin - Existing VMT per Capita

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig15_San_Joaquin_COGAVG.mxd (4/29/2020)



LSA

VMT per Capita

- No Population
- Less than 13.4
- 13.4 - 17.5
- Greater than 17.5

City with Sphere of Influence

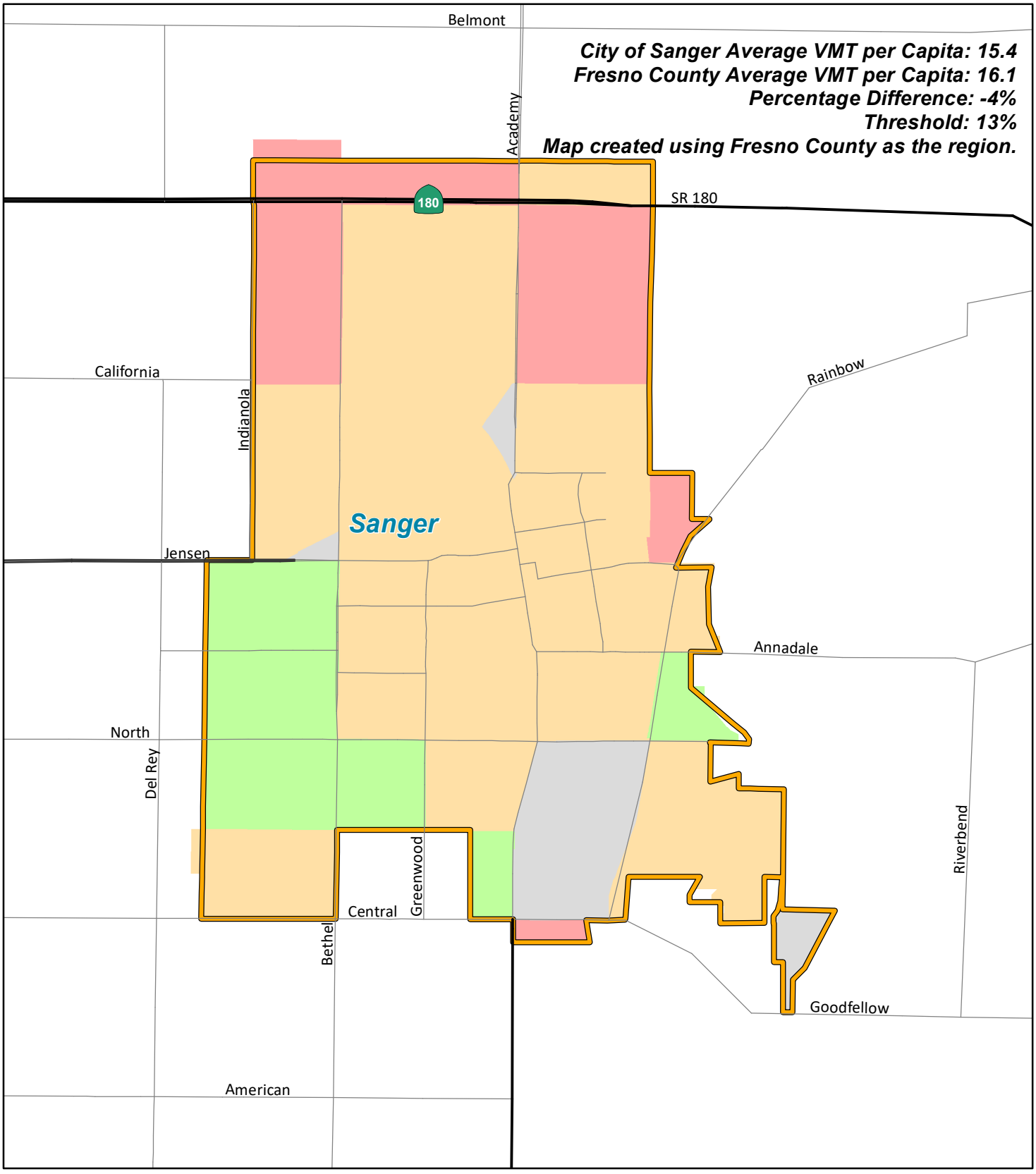
0 2000 4000
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig16_Sanger.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Sanger - Existing VMT per Capita



LSA

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

APPENDIX A-15a

N

0 2000 4000

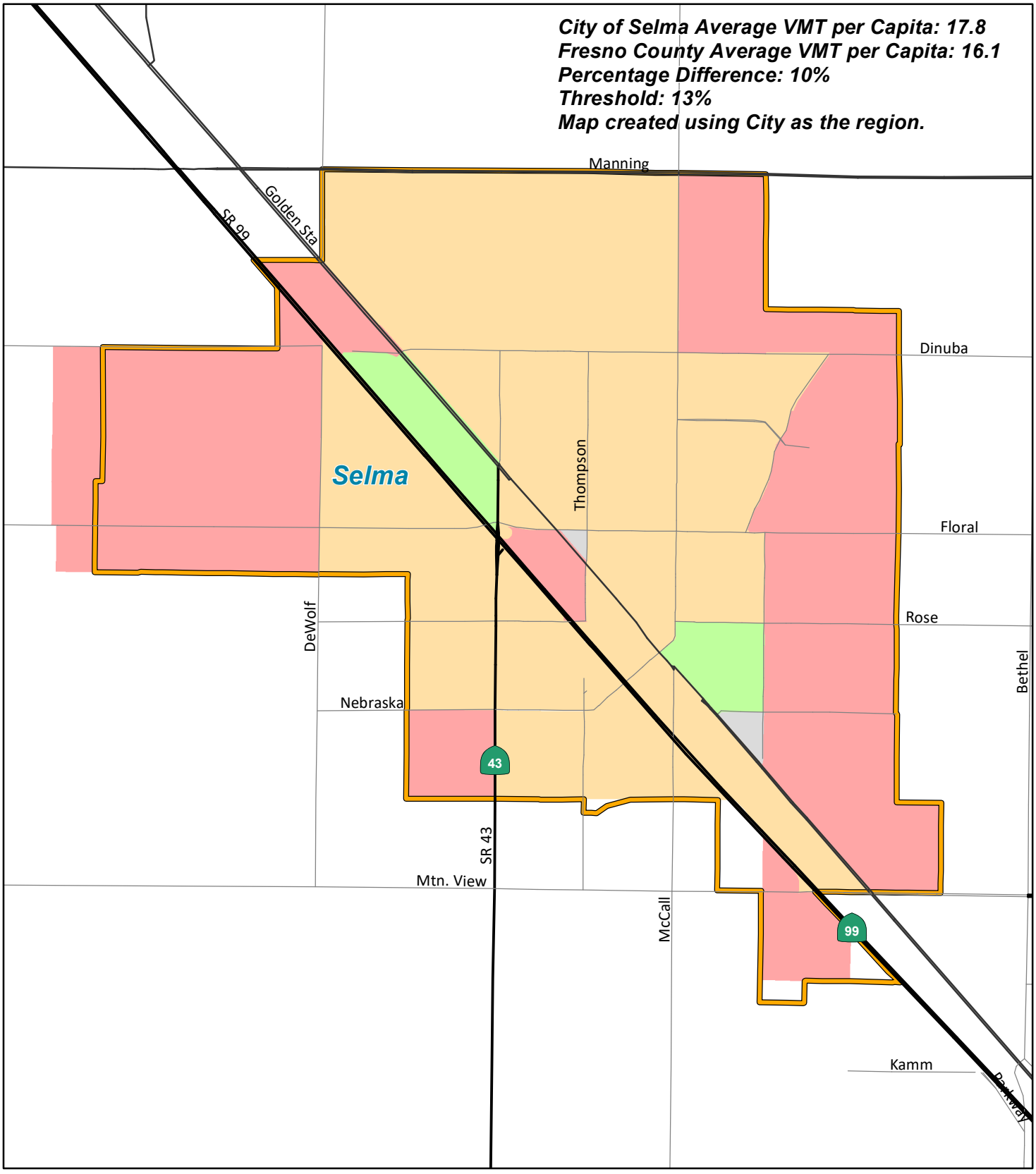
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

Fresno County SB 743 Implementation Regional Guidelines

City of Sanger - Existing VMT per Capita

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig16_Sanger_COGAVG.mxd (4/29/2020)



LSA

APPENDIX A-16a

VMT per Capita

- No Population
- Less than 15.5
- 15.5 - 20.1
- Greater than 20.1

City with Sphere of Influence

N

0 2000 4000

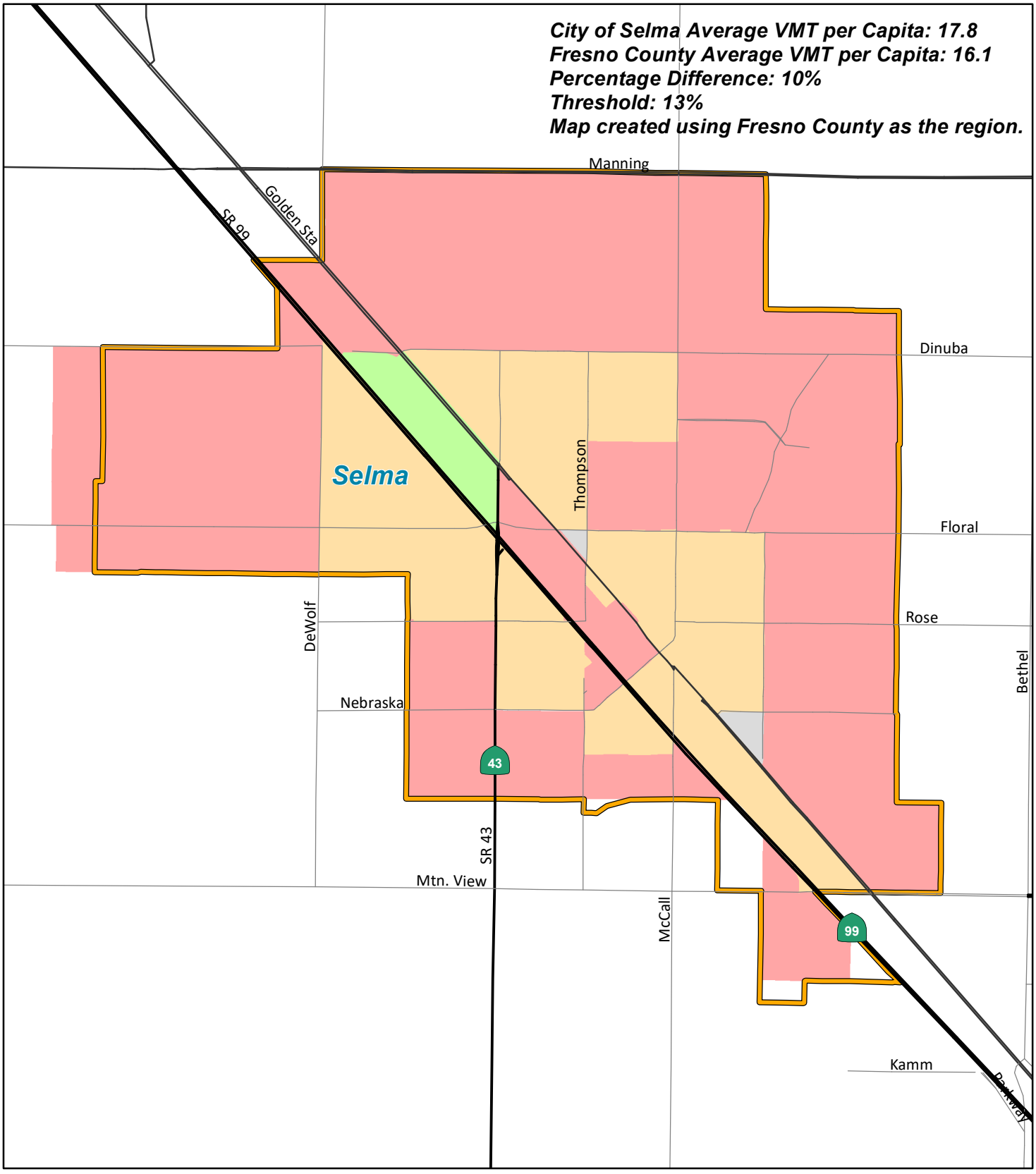
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig17_Selma.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Selma - Existing VMT per Capita



LSA

APPENDIX A-16b

VMT per Capita

- No Population
- Less than 14.0
- 14.0 - 18.2
- Greater than 18.2

City with Sphere of Influence

N

0 2000 4000

FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig17_Selma_COGAVG.mxd (1/23/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Selma - Existing VMT per Capita

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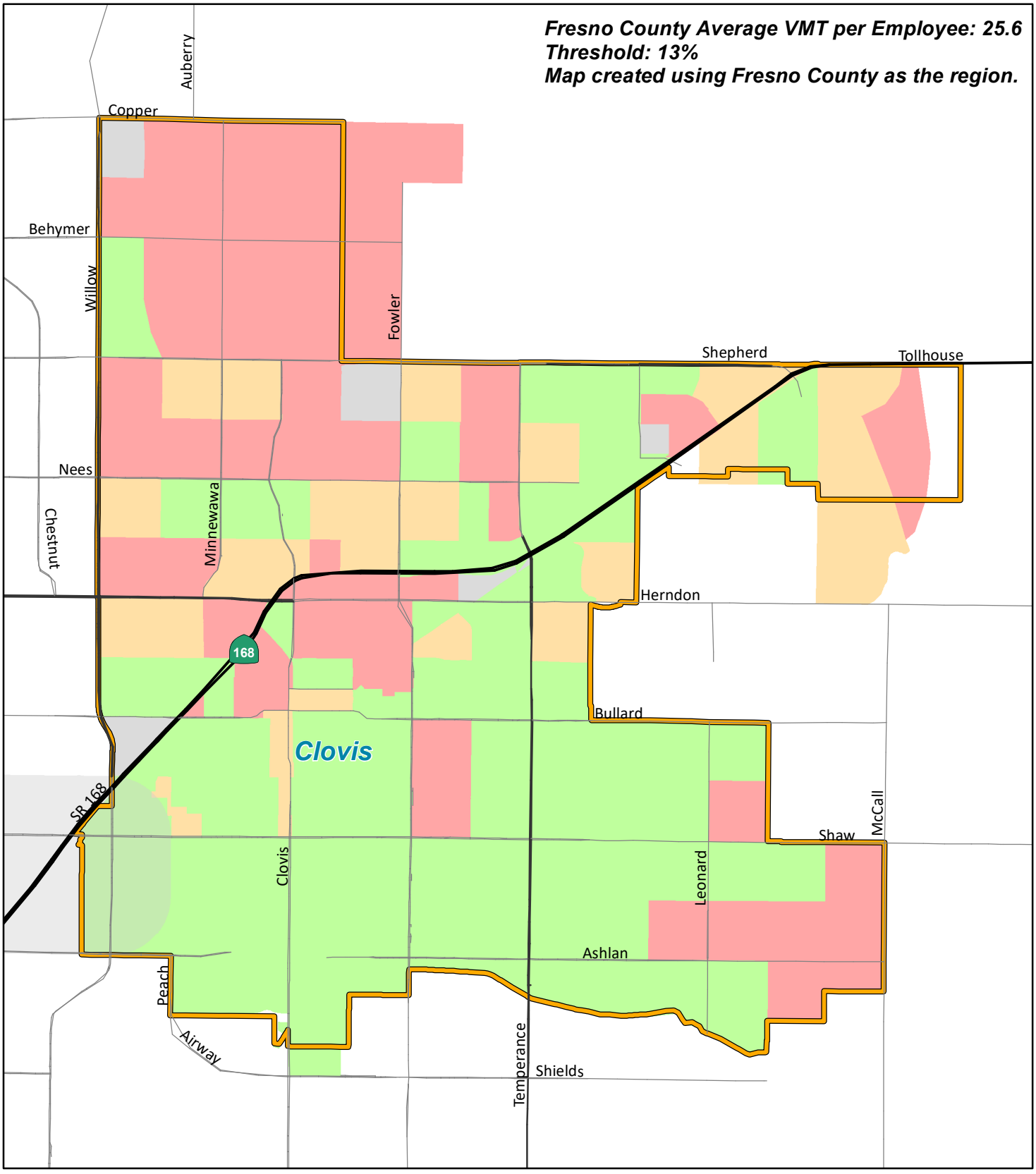
APPENDIX B

VMT SCREENING MAPS FOR MEMBER JURISDICTIONS – OFFICE PROJECTS



LSA

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

City with Sphere of Influence

APPENDIX B-1

N

0 3000 6000

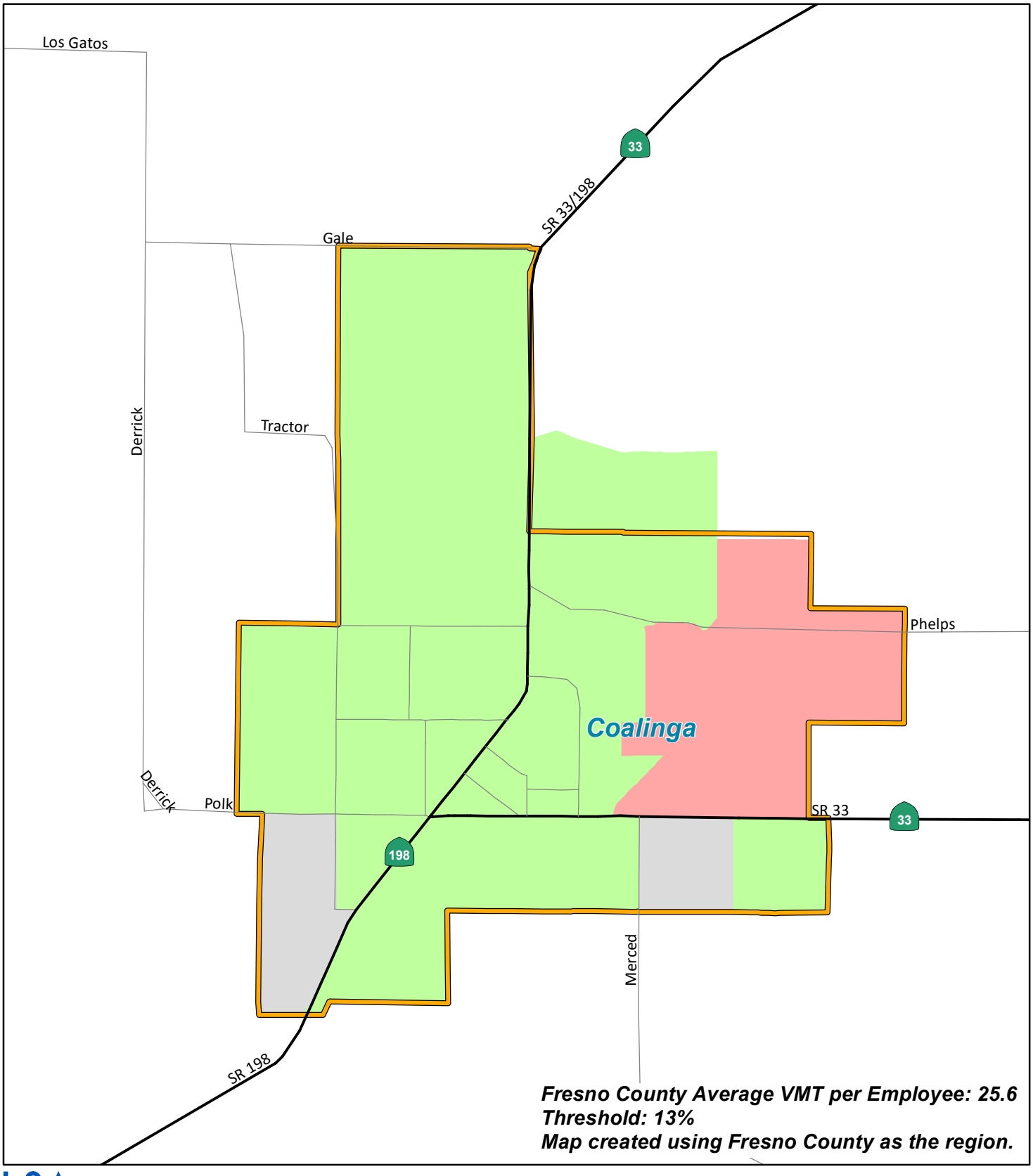
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of Clovis - Existing VMT per Employee

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig1_Clovis_EMP.mxd (5/1/2020)



LSA

APPENDIX B-2

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

City with Sphere of Influence

N

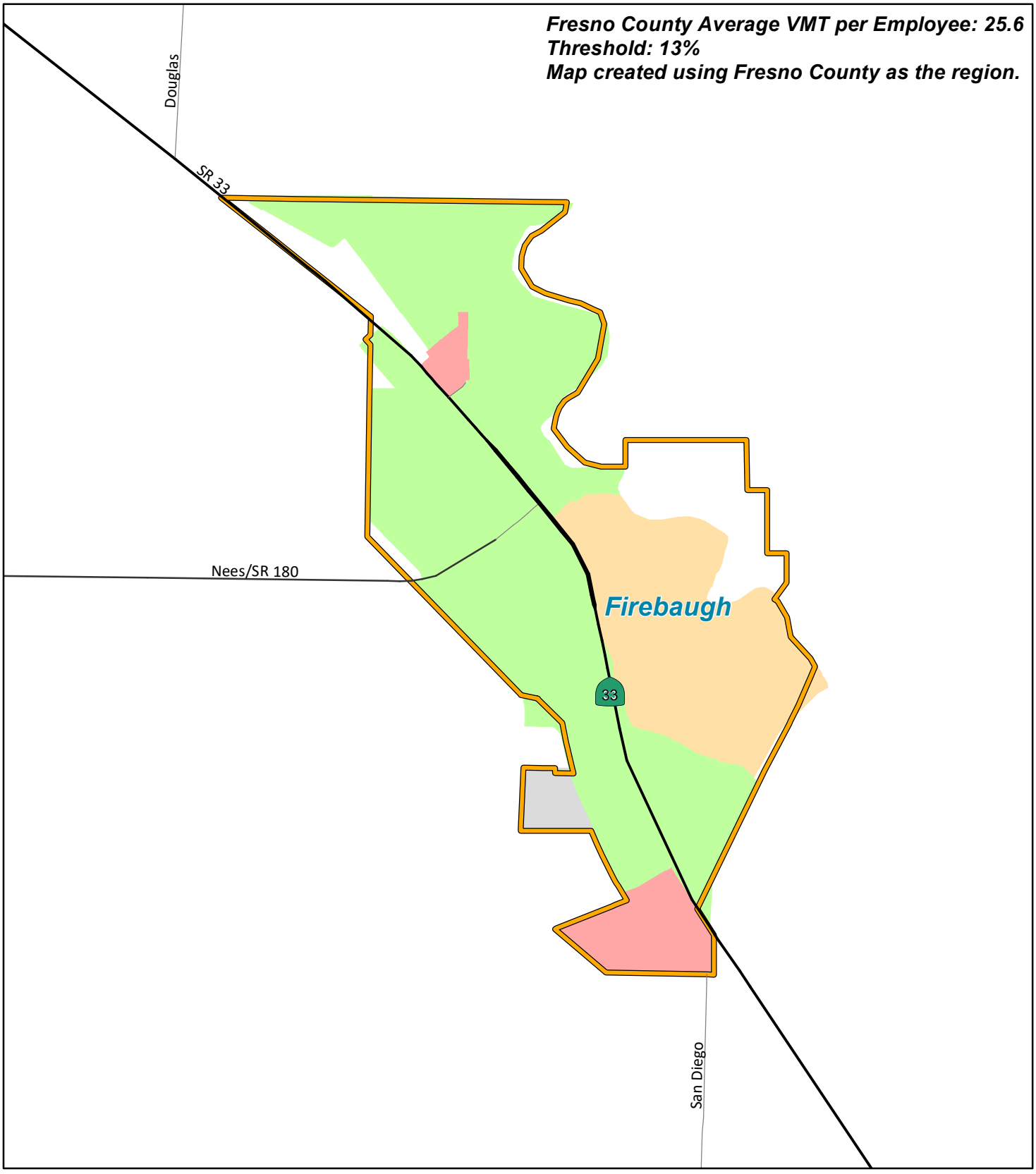
0 1875 3750
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig2_Coalinga_EMP.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Coalinga - Existing VMT per Employee



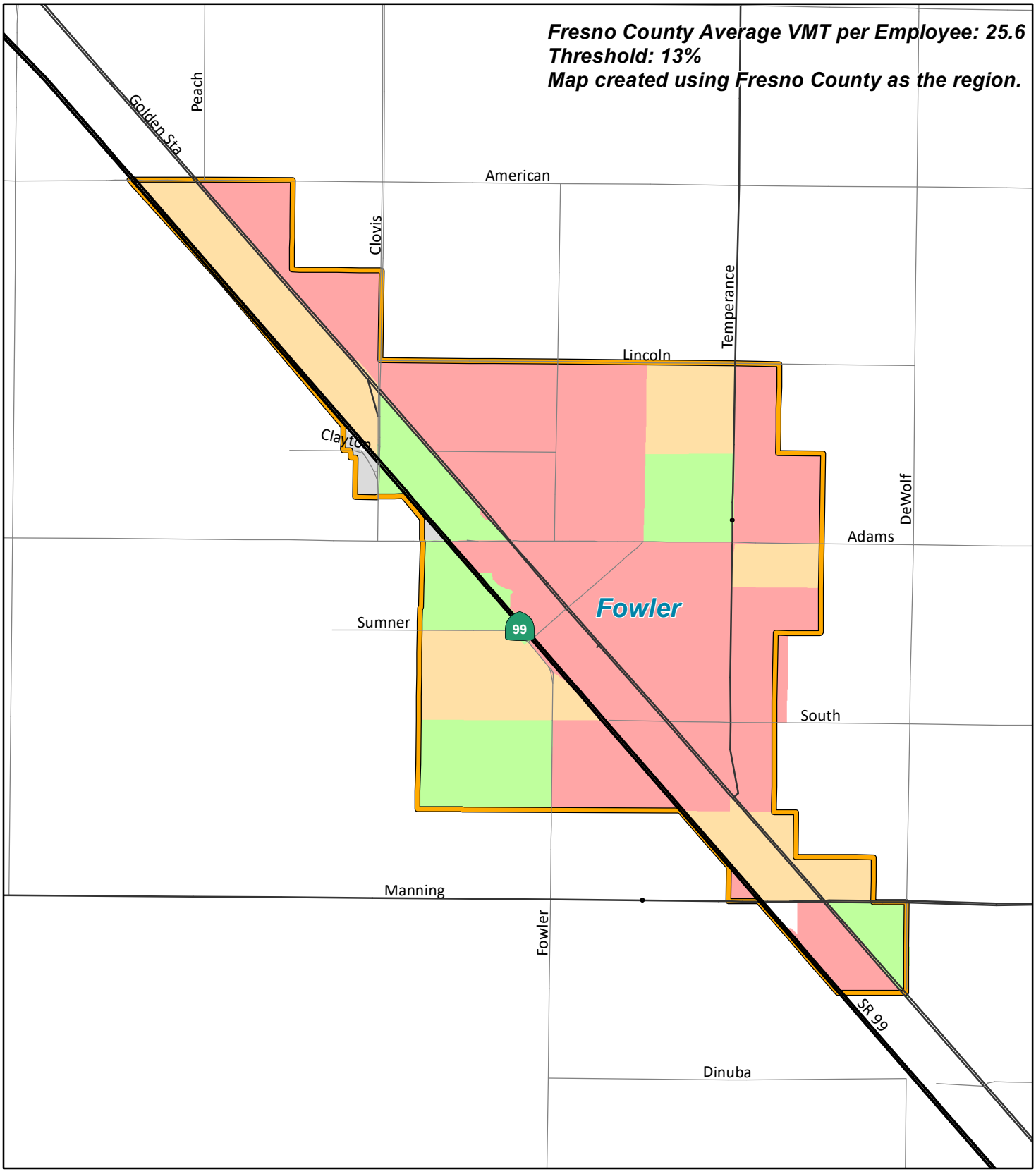
APPENDIX B-3

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig4_Firebaugh_EMP.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Firebaugh - Existing VMT per Employee



LSA

APPENDIX B-4

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

City with Sphere of Influence

N

0 2000 4000

FEET

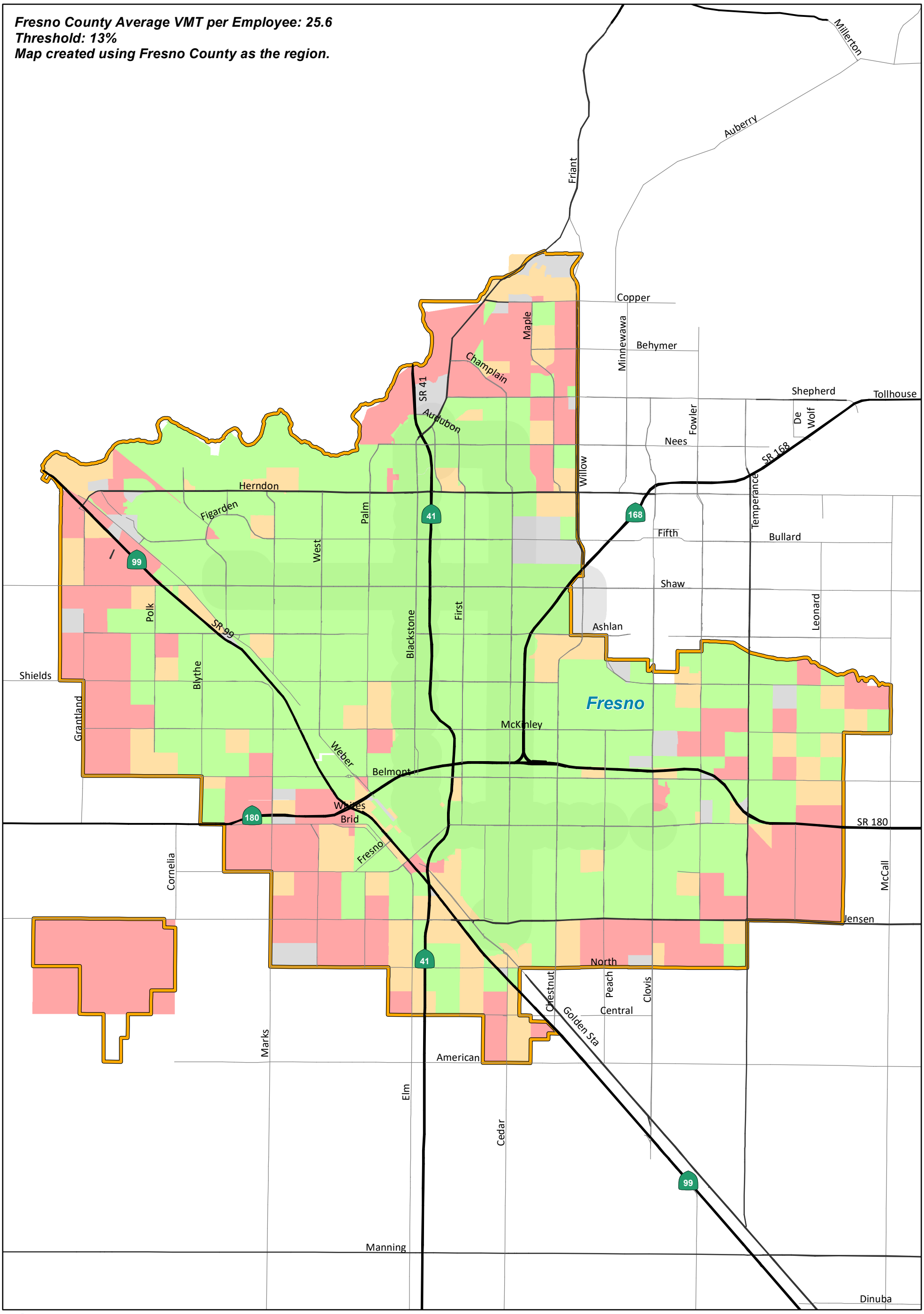
SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig5_Fowler_EMP.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Fowler - Existing VMT per Employee

Fresno County Average VMT per Employee: 25.6
Threshold: 13%
Map created using Fresno County as the region.



LSA

APPENDIX B-5

City with Sphere of Influence

VMT per Employee
- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

N

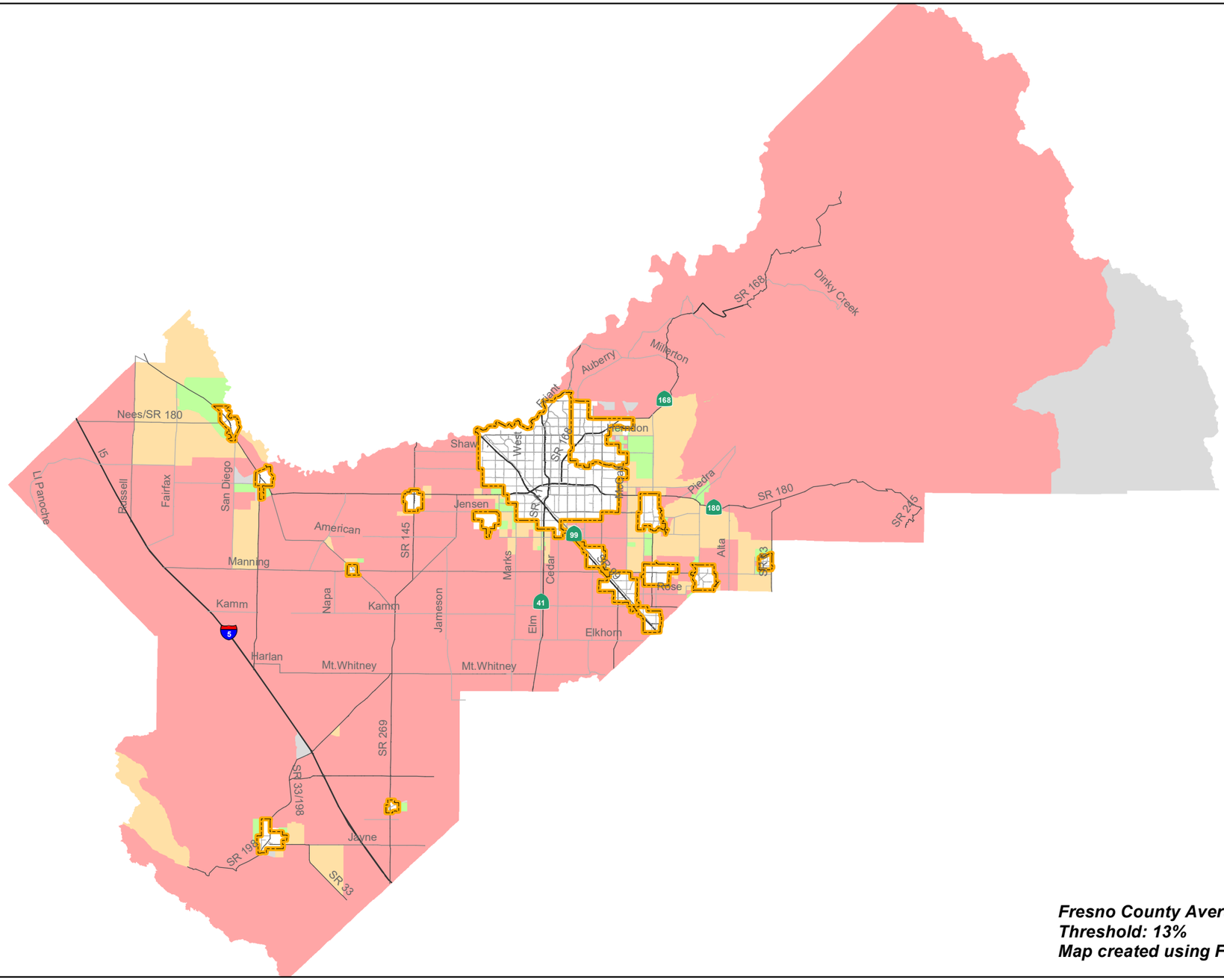
0 5000 10000
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig6_Fresno_EMP.mxd (4/30/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Fresno - Existing VMT per Employee



Fresno County Average VMT per Employee: 25.6
Threshold: 13%
Map created using Fresno County as the region.

LSA

Cities Including Sphere of Influence

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

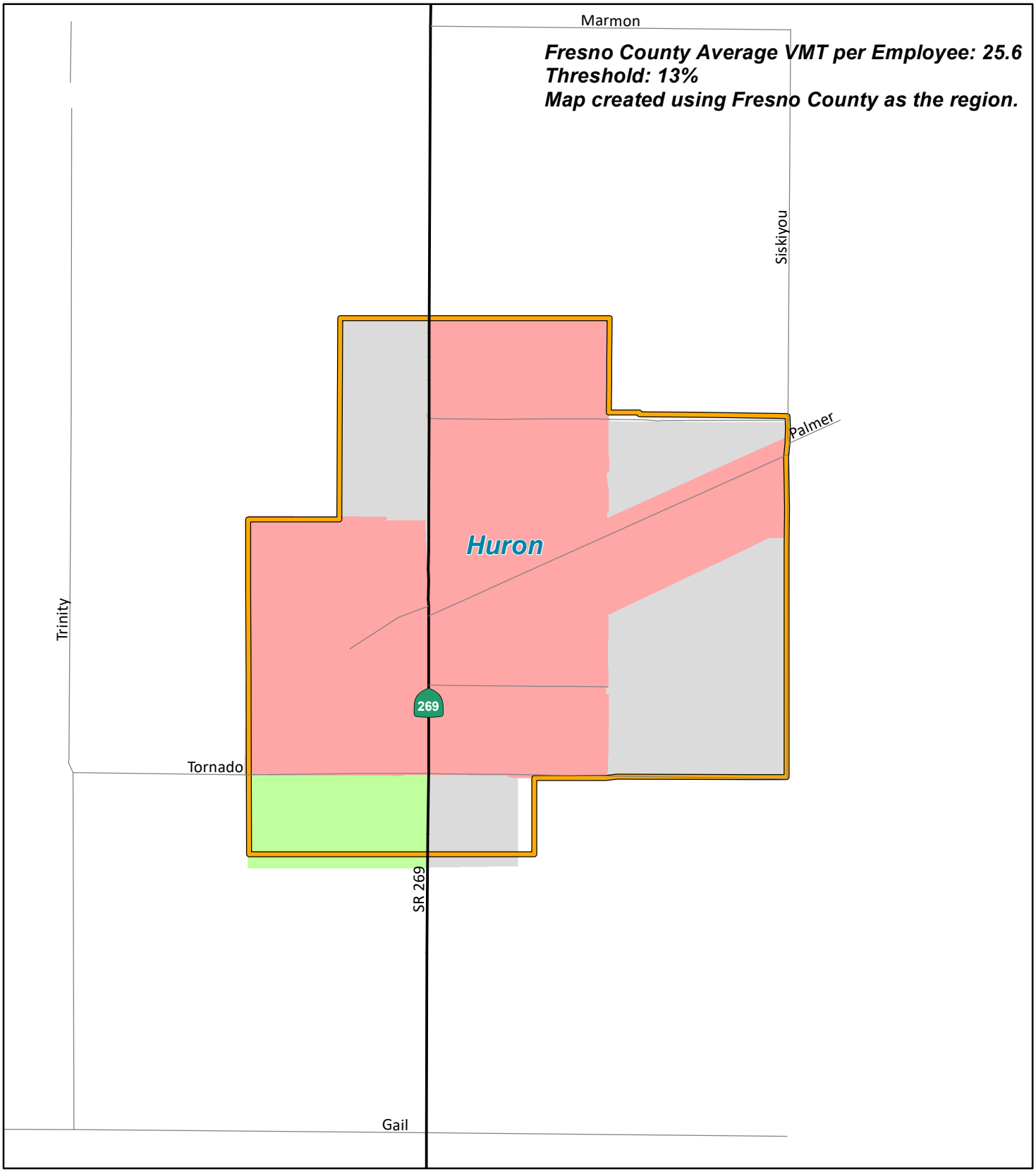
APPENDIX B-6

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig7_Fresno_County_EMP.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

Unincorporated County Existing VMT per Employee



LSA

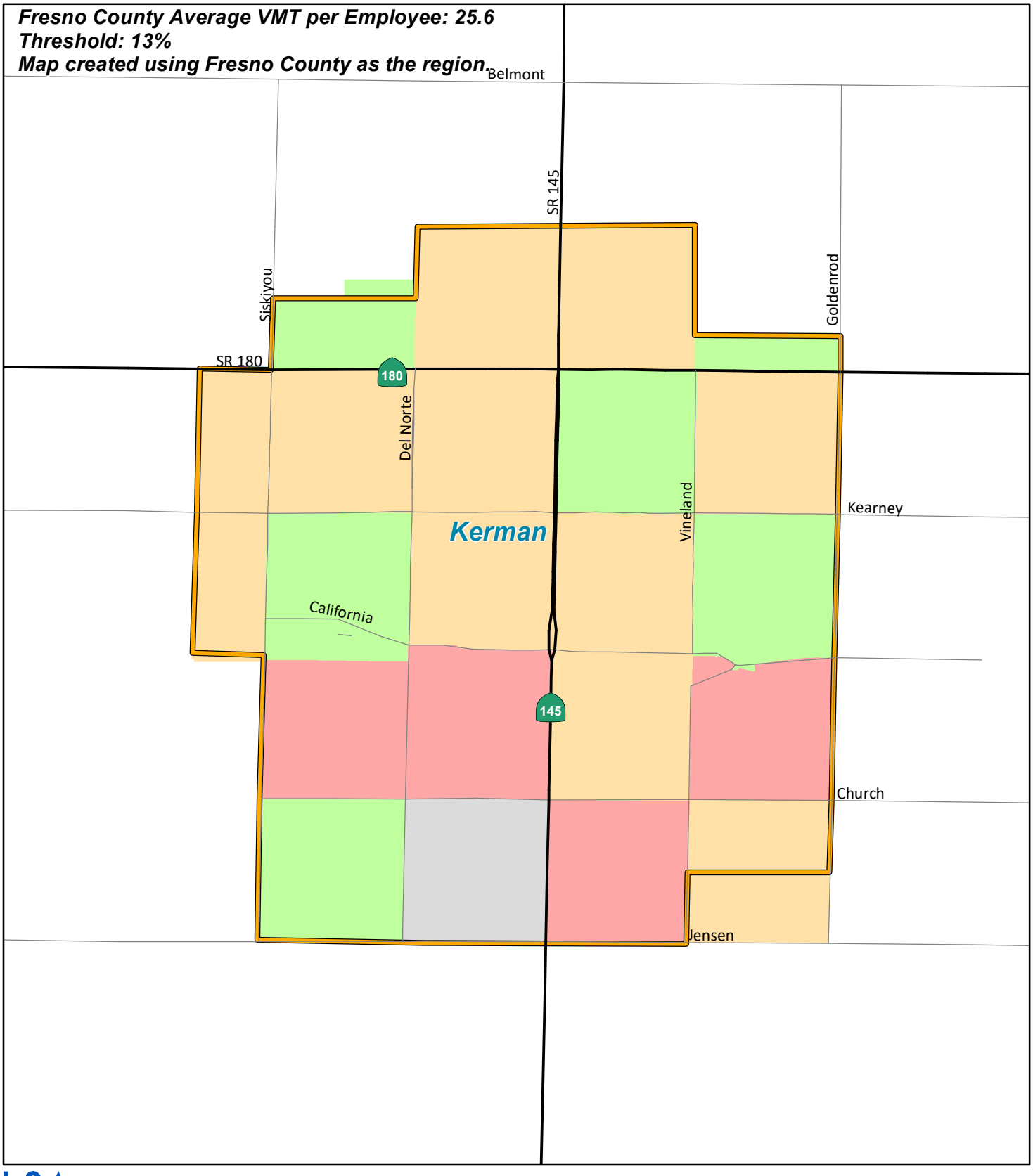
APPENDIX B-7

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig8_Huron_EMP.mxd (2/24/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Huron - Existing VMT per Employee



LSA

APPENDIX B-8

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

City with Sphere of Influence

N

0 1500 3000

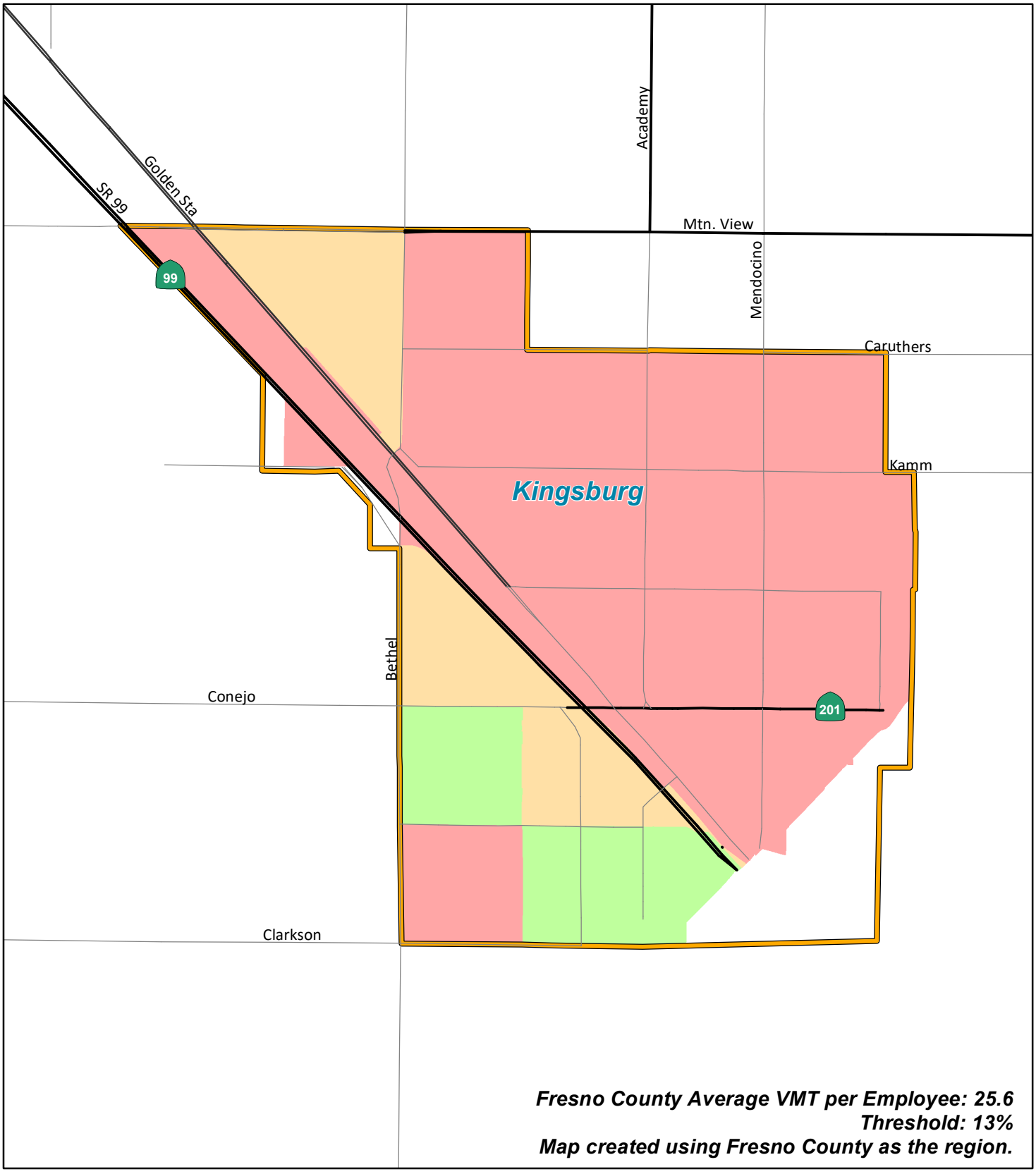
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig9_Kerman_EMP.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Kerman - Existing VMT per Employee



LSA

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

City with Sphere of Influence

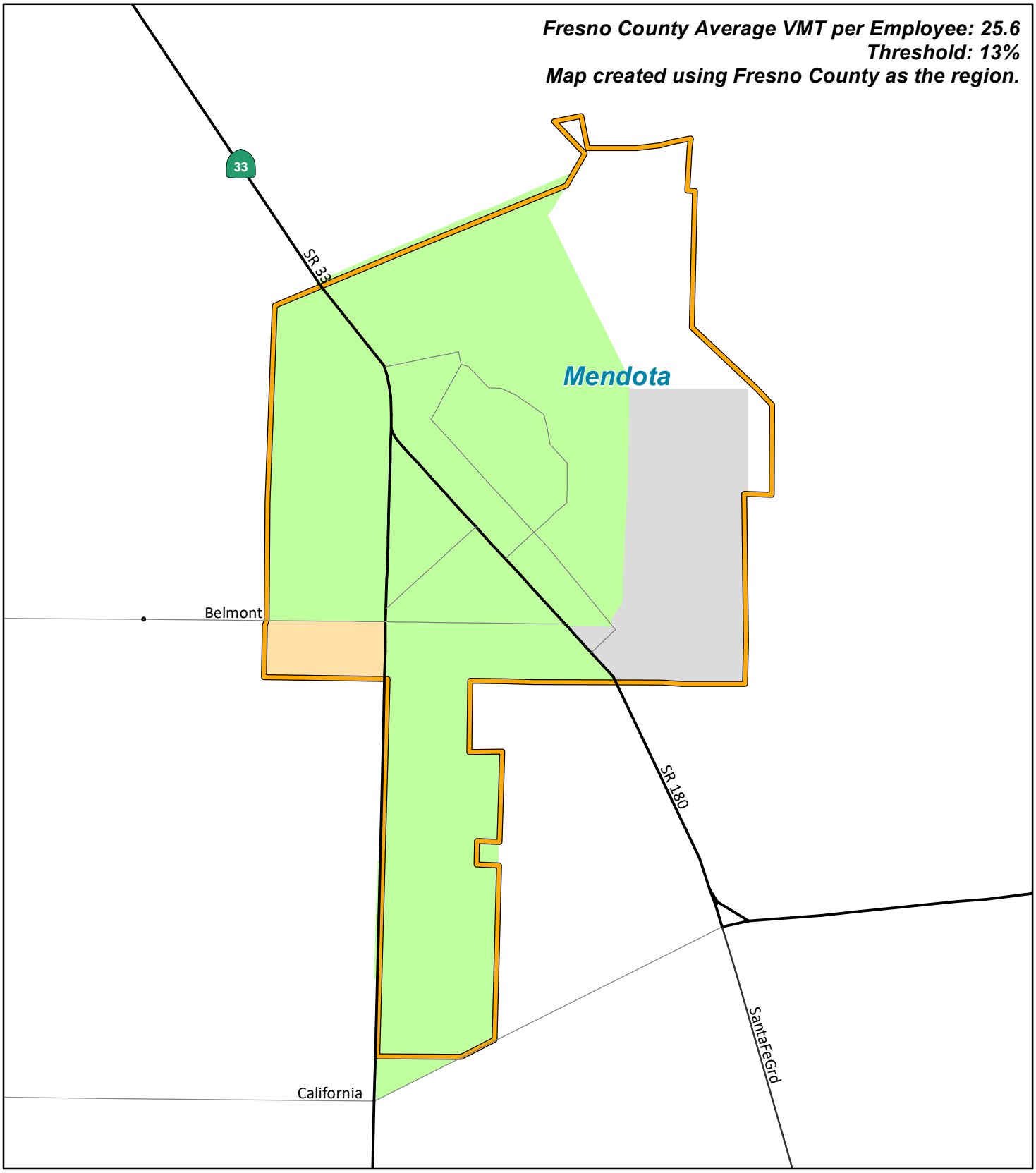
0 1500 3000
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig10_Kingsburg_EMP.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Kingsburg - Existing VMT per Employee



LSA

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

City with Sphere of Influence

APPENDIX B-10

N

0 1500 3000

FEET

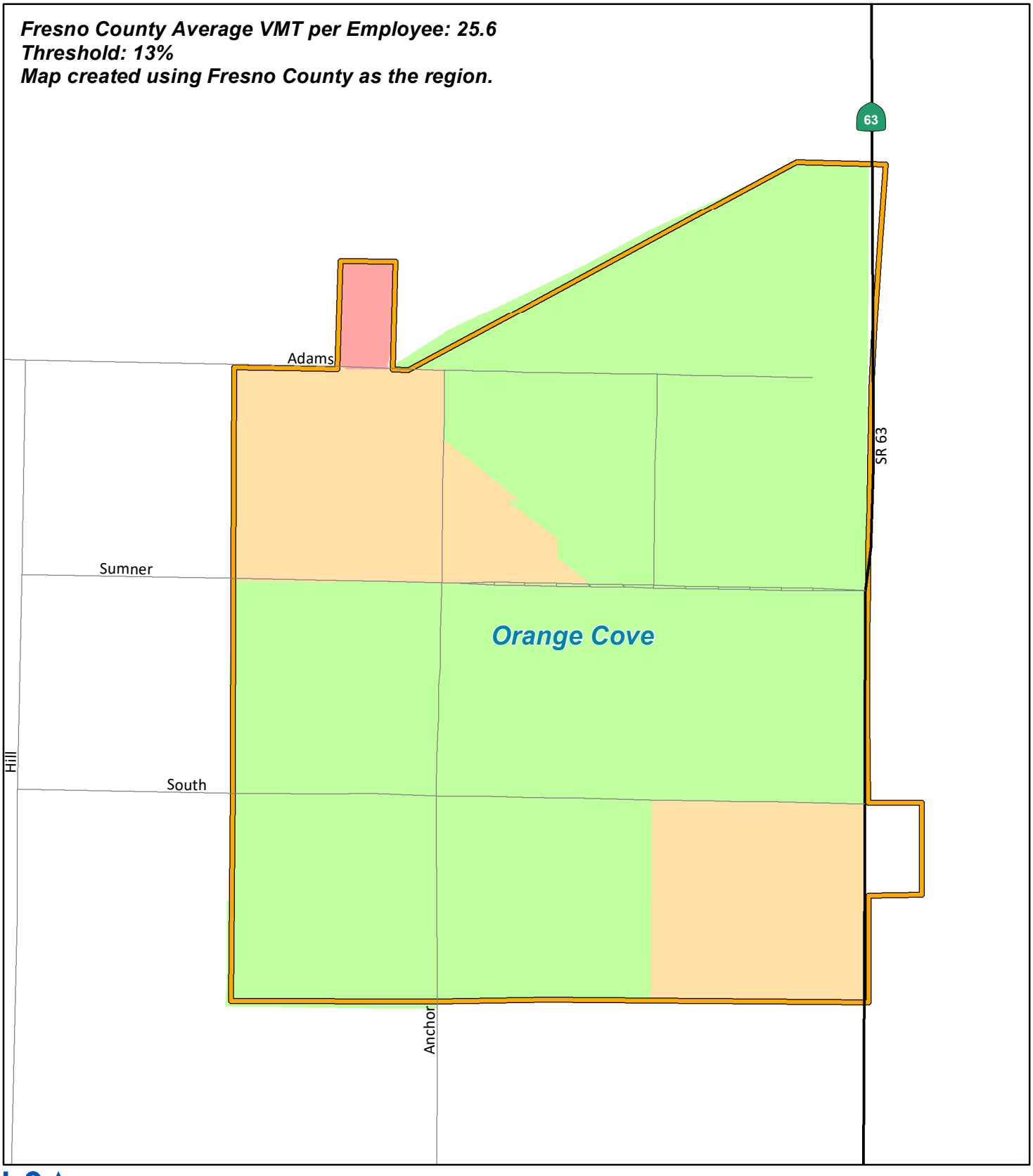
SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig11_Mendota_EMP.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Mendota - Existing VMT per Employee

Fresno County Average VMT per Employee: 25.6
Threshold: 13%
Map created using Fresno County as the region.



LSA

VMT per Employee
- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

City with Sphere of Influence

N

0 1000 2000
FEET

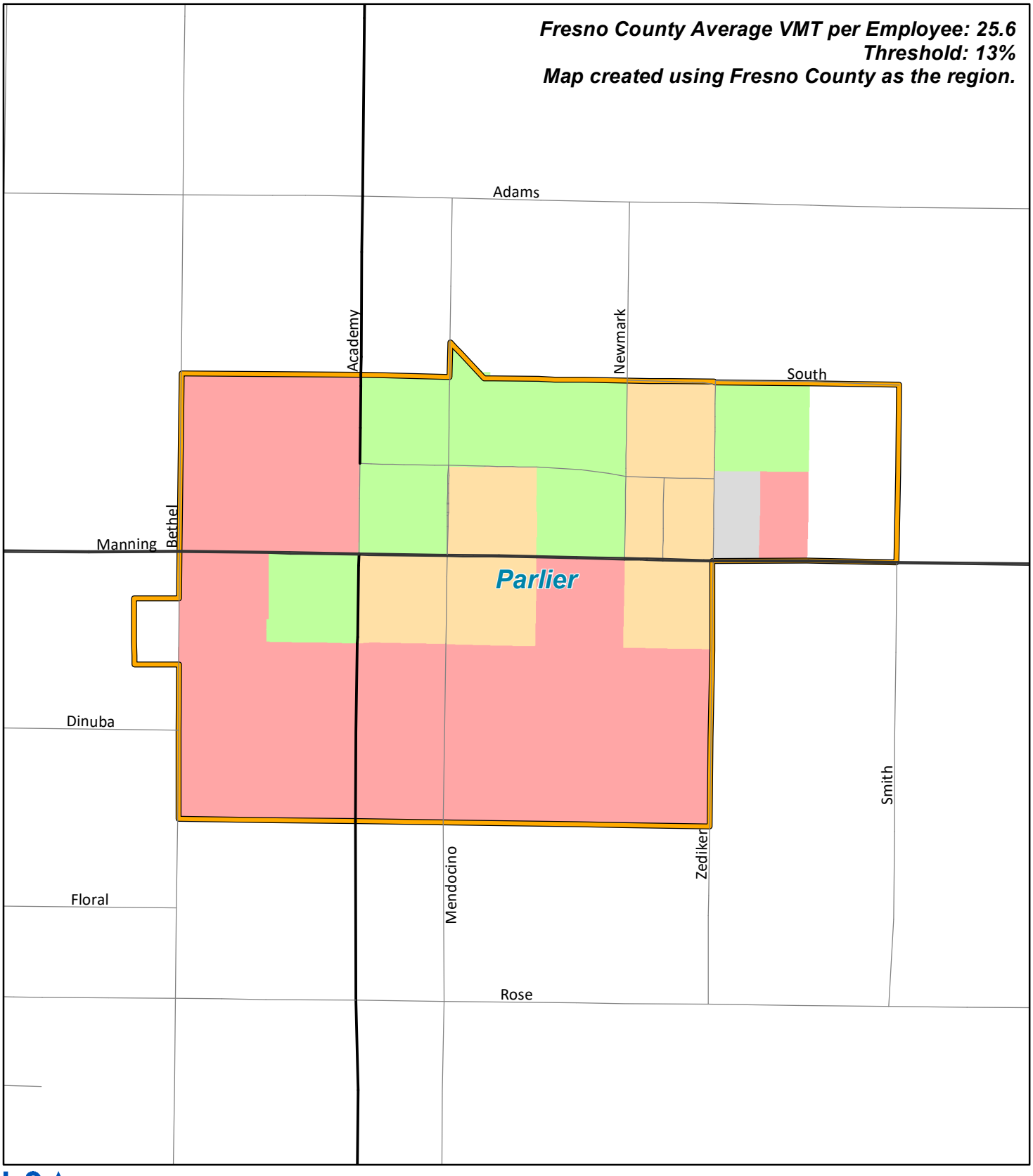
APPENDIX B-11

Fresno County SB 743 Implementation Regional Guidelines

City of Orange Cove - Existing VMT per Employee

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig12_Orange_Cove_EMP.mxd (4/29/2020)



LSA

APPENDIX B-12

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

City with Sphere of Influence

N

0 2000 4000

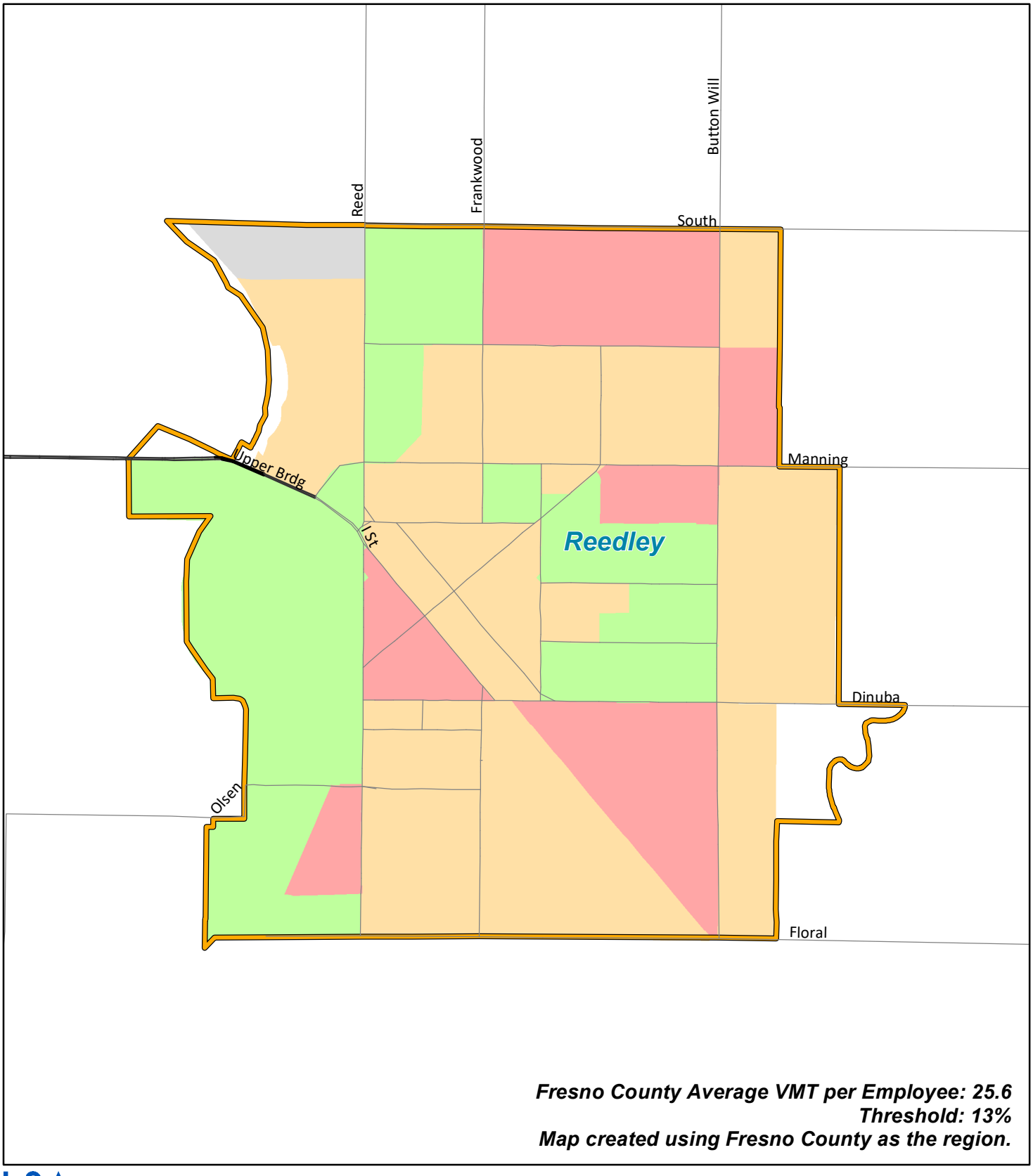
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig13_Parlier_EMP.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Parlier - Existing VMT per Employee



Fresno County Average VMT per Employee: 25.6
Threshold: 13%
Map created using Fresno County as the region.

LSA

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

City with Sphere of Influence

APPENDIX B-13

N

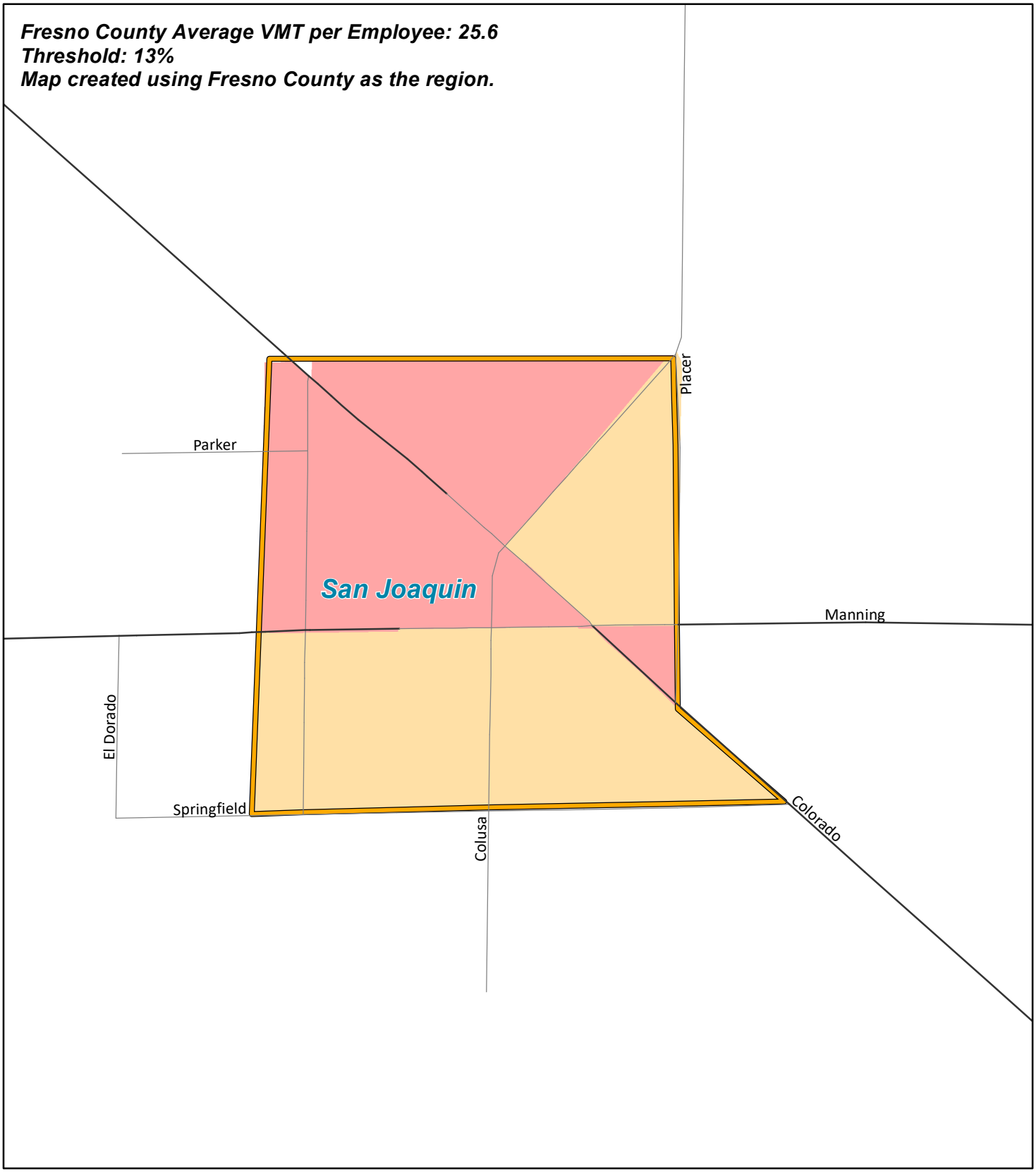
0 1500 3000
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

Fresno County SB 743 Implementation Regional Guidelines

City of Reedley - Existing VMT per Employee

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig14_Reedley_EMP.mxd (4/29/2020)



LSA

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

City with Sphere of Influence

APPENDIX B-14

N

0 1000 2000

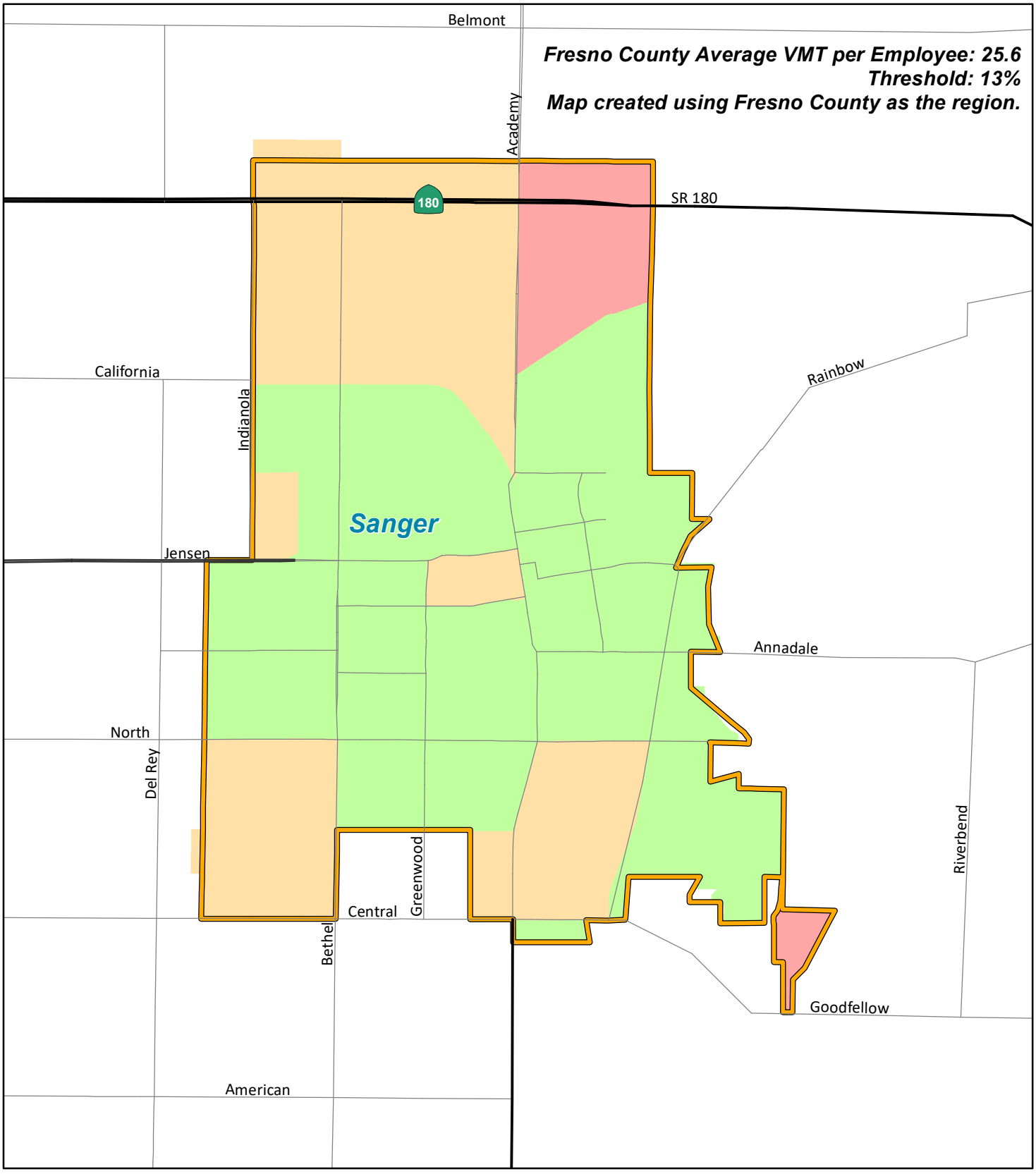
FEET

Fresno County SB 743 Implementation Regional Guidelines

City of San Joaquin - Existing VMT per Employee

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig15_San_Joaquin_EMP.mxd (4/29/2020)



LSA

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

City with Sphere of Influence

APPENDIX B-15

N

0 2000 4000

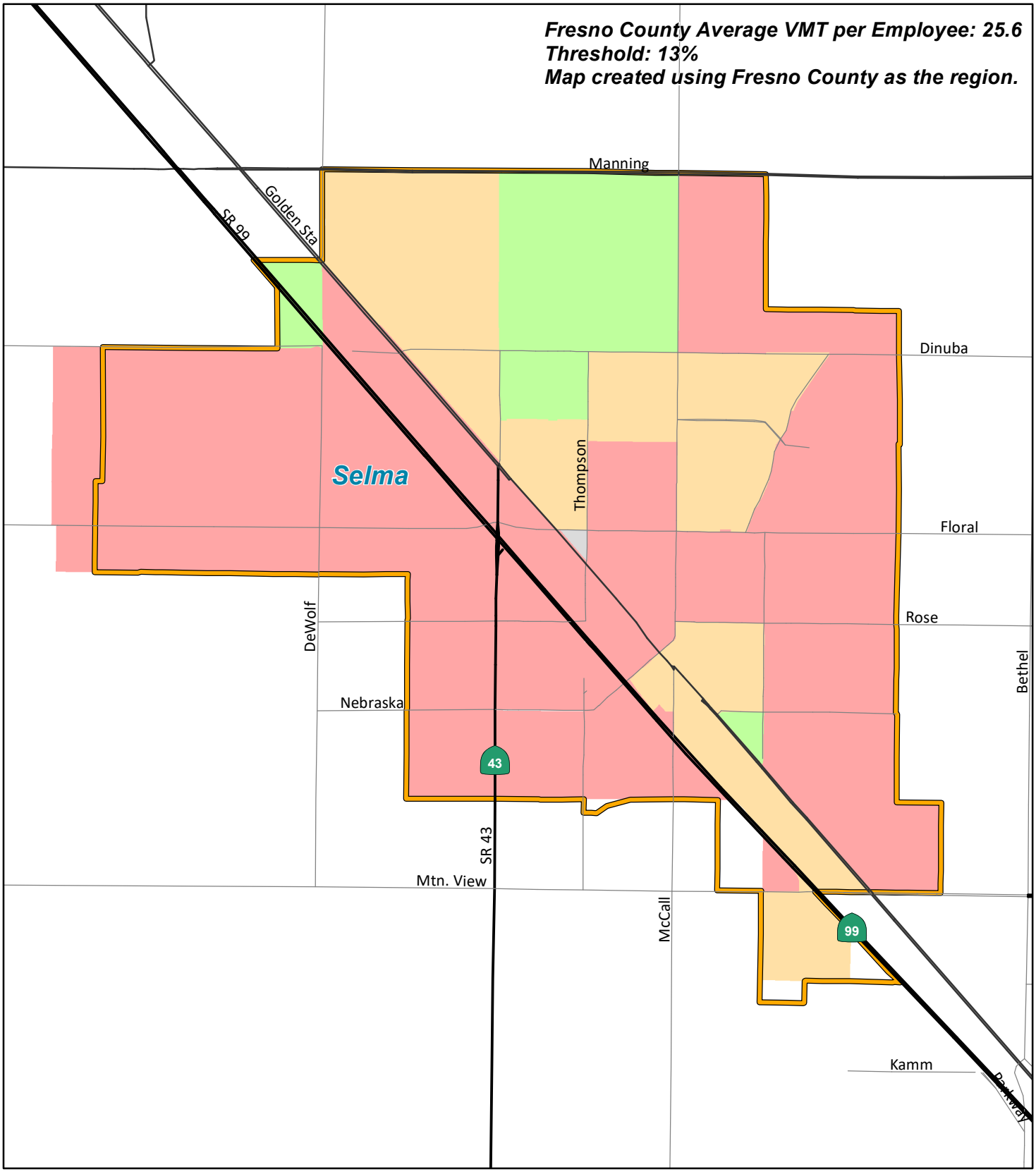
FEET

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig16_Sanger_EMP.mxd (4/29/2020)

Fresno County SB 743 Implementation Regional Guidelines

City of Sanger - Existing VMT per Employee



LSA

APPENDIX B-16

VMT per Employee

- No Employee
- Less than 22.3
- 22.3 - 28.9
- Greater than 28.9

City with Sphere of Influence

N

0 2000 4000

FEET

Fresno County SB 743 Implementation Regional Guidelines

City of Selma - Existing VMT per Employee

SOURCE: Fresno COG Activity Based Travel Demand Model (2019)

R:\FCG1901 FresnoCOG VMT\GIS\VMT_Maps_04-20-2020\fig17_Selma_EMP.mxd (4/29/2020)

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APPENDIX C

INTEGRATED PROCESS FOR ESTIMATING INDUCED VMT

Appendix C: Estimating Induced Demand for Roadway Capacity Projects

Short Term Induced Demand

Increasing roadway capacity is primarily aimed at decreasing auto travel times, either by adding capacity to existing facilities or by providing a more direct travel route between origins and destinations. The term 'induced demand' is used to describe an economic concept where increased supply (in this case, road capacity) results in an increase in demand. In transportation, increased demand can be measured a number of ways. In cases where capacity is added to an existing facility, volume can be compared before and after the capacity increase. However, this is not a useful measure in cases where a new facility is added to the system. Therefore, total vehicle miles of travel is often used as a systemwide measure of induced demand.

In his seminal book Stuck In Traffic (Brookings Institution Press, 1992), economist Anthony Downs describes a concept termed "Triple Convergence". This refers to the idea that if roadway capacity is added to a new road overnight, the next day there would be much less congestion on the road. But over time, the road would fill back up with traffic and the travel time would be close to or as congested as it was before capacity was added. The reason for this is because of three behavioral responses; travelers who were taking alternative routes would switch to the new road (route switching), travelers who were traveling in off-peak time periods would switch to peak periods (time-of-day switching), and travelers who were traveling by alternative modes would switch to auto (mode switching).

There are actually two other effects that Downs doesn't consider: travelers could select new destinations in the corridor if faster travel times make more destinations accessible to activities, and travelers could travel more frequently in total if faster travel times made time available for new activities that were not possible before. For example, people going to work instead of telecommuting or people going to a movie instead of watching one at home.

The Fresno activity-based model (FresnoABM) comprises of demand and network models that fully cover the above described behavior. DaySim is the activity-based model component. It consists of a series of sub-models including long-term choices such as work and school location choice, and auto ownership, and short-term choices such as tour and stop generation, tour and stop time-of-day choice, tour and stop mode choice, and other choices – see Figure 1. The result of the activity-based model is travel demand for the residents of Fresno County. These models are sensitive to accessibilities (e.g. travel time) throughout the model system. Therefore, changes in travel times affect all of the model components.

Once travel demand is generated, auto trips are assigned to the auto network using Cube software. Level-of-service skims are built based on the congested travel times in the network and used for the next iteration of demand. . In total, the model is run three times to achieve convergence, where the travel times input to the model are consistent with the travel times generated by the demand in the model. This can be thought of as an equilibrium solution between supply and demand. Iteration is also

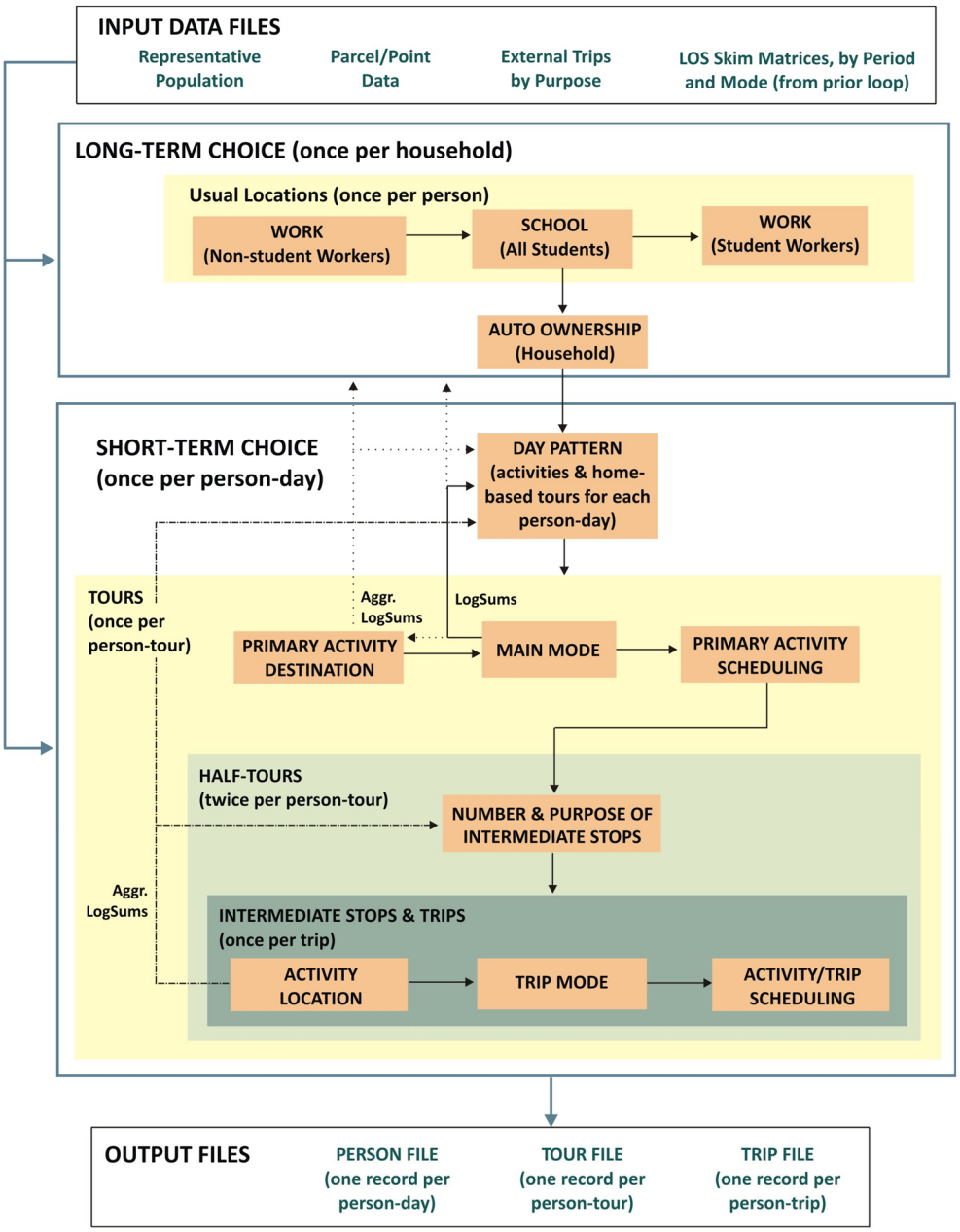

FIGURE 1: DAYSIM SUB-MODELS

used within the traffic assignment step itself, according to a process that seeks to find a condition known as 'Wardrop's User Equilibrium' where, given fixed demand (from the last iteration of the travel model) no user can switch their route and find a lower cost path. This process accounts for the effects of congestion on route choice. The other aspects of changes of travel behavior referred to above (time of day switching, mode switching, destination switching, and frequency of travel) are considered explicitly by DaySim.

It should also be pointed out that because equilibrium is achieved both in traffic assignment and in global feedback loops, the result of the model is one in which travelers may be switching multiple times in multiple directions to achieve equilibrium. What we observe at the end of the process is what Downs

observes after capacity increases over time; the roadway capacity increase may lead to increased volumes, which results in increased congestion which could be close to or the same as the congestion before the roadway capacity increase, albeit with more vehicles and an overall increase in utility.

In 2008, Sacramento Area Council of Government (SACOG) performed several tests using DaySim to examine sensitivity to induced travel. The results were documented in a report (https://www.sacog.org/sites/main/files/file-attachments/appendix_c-4_travel_model_documentation.pdf) and also published in a scientific journal paper (https://www.sciencedirect.com/science/article/pii/S1755534513700277).

Long Term Induced Demand

According to many studies and literatures such as Fundamental Law of Road Congestion: Evidence from US Cities (Duranton and Turner, 2011), and Impact of Highway Capacity and Induced Travel on Passenger vehicle Use and Greenhouse Gas Emissions Policy Brief (Handy and Boarnet, 2014), transportation capacity projects also have long term impacts on vehicle miles traveled. One of the long term impacts from capacity improvement is land use changes, which may include more dispersed development in remote areas if no proper land use control policy is in place. Such more dispersed development in remote areas will lead to additional VMT should it be allowed to happen without any mitigation. Since most travel demand models, including ABMs, have a separate land use modeling process, the land use changes generated by the new capacity improvements are generally not reflected in the traditional travel demand forecasting process. In order to address the long term VMT impacts from land use changes generated by capacity improvement projects, Fresno COG, in collaboration with RSG Inc., developed an integrated process to estimate both the short term and long term VMT impacts from new capacity improvement.

The following methodology is employed to estimate the effect of induced VMT from new land uses generated due to transportation capacity improvement projects. This process provides iterative and incremental feedback between the activity-based travel-demand model (ABM) and the land-use growth allocation model such that changes in the traffic network are incorporated into land-use allocation, and vice-versa.

Step 1: Base Year Model Run

A full ABM run is performed with base year network and socioeconomic data.

Step 2: Incremental Land-Use Allocation

An increment period is determined for the land-use allocation (e.g. 3 years). Growth targets are established for the new year at the zone, jurisdiction, and regional level. Planned transportation improvements for the new target year are incorporated into the model network.

For each incremental target year, skim results from the previous target year's ABM run are analyzed and fed into the land-use allocation model. The skims essentially indicate the accessibility of each zone by mode, i.e. a time-weighted aggregation of housing and services reachable by that zone using the coded traffic network. This takes into account both the relative location of each zone to destinations in other zones, as well as the nature and quality of the transportation choices available to that zone to reach those destinations.

The base parcel fabric is then analyzed for development attractiveness, including factors such as existing development characteristics, planned land-use characteristics, proximity to high-quality transit, intersection with conservation zones, etc. Also considered are the skim results from the previous run, making parcels in zones with high accessibility to jobs and housing via the previous model network (including transportation improvements) more attractive to new development. In this way, the transportation projects reflected in the previous run contribute to the accessibility of each zone and, consequently, the attractiveness of parcels for new development.

Each of the factors considered above are weighted and aggregated to create a total development score for each parcel in the planning area, where higher scores denote parcels that are more likely to attract future development.

Finally, development is assigned beginning with the highest-scoring parcels until growth targets are achieved – first at the zone level, then at the jurisdictional and regional levels. The character and intensity of each parcel's development is consistent with the planned land use designated to that parcel by the applicable jurisdiction's general and/or specific plans. The new land-use pattern (along with the improved model network) is then run through the ABM process again, and the procedure repeats for the next increment period. This iterative process continues until the horizon year is met.

Land-Use Allocation Tool

The land-use allocation tool has the following parameters:

Data Inputs

- **Base Year Socioeconomic Data.** This includes population, housing, and employment data at the parcel, microzone (MAZ) and traffic analysis zone (TAZ) levels.
- **Demographic Forecast.** Detailed growth forecast data providing jurisdiction-level (i.e. spheres of influence) growth targets.
- **ABM Skim Results.** The allocation model incorporates ABM skim results for the following modes: bike (MAZ-level), transit (TAZ-level), and SOV (TAZ-level).
- **Development Type Data.** Future growth is allocated by using archetypal development types that are designed to be reflective of the land-use designations described in the general and specific plans of the jurisdictions in the region. Each parcel eligible for future growth is assigned development types that represent, respectively, low-intensity, moderate-intensity, and high-intensity development.
- **Cube Land Model Results (optional).** The land-use allocation model supports the incorporation of TAZ-level growth targets from a Cube Land run, controlled to a user-provided level of confidence.

Input Parameters

- **Target Year**
- **Parameter Weights.** The user can indicate the weight of each of the following parameters when determining a parcel's development attractiveness score:
    - **Infill Weight.** Parcels closer to city limits or the geographic center of an unincorporated community have a higher infill score.

    - **Conservation Weight.** Parcels are given conservation scores based on the percentage of their area that does not intersect with any conservation resources (e.g. important farmland).
    - **TOD Weight.** Parcels closer to high-quality transit can be given a higher weight.
    - **DT Weight.** Parcels located in the downtown region of the FMCA can be given a higher weight.
    - **Bike Weight.** Parcels in zones with more favorable bike skim results have a higher bike score.
    - **Transit Weight.** Parcels in zones with more favorable transit skim results have a higher transit score.
    - **SOV Weight.** Parcels in zones with more favorable SOV skim results have a higher SOV score.
    - **Density Weight.** Parcels whose development types have higher net density are given higher density scores. Used to calibrate region-wide density measures.
    - **Single-Family Weight.** Parcels with single-family units in their development types are given higher SF scores. Used to calibrate region-wide housing mix measures.
    - **Mixed-Use Weight.** Parcels with mixed-use development in their development types are given higher MU scores. Used to calibrate region-wide housing mix measures.
    - **Infill Penalty.** The total score of parcels within city limits can be penalized. Used to calibrate regional infill goals.
    - **Redevelopment Penalty.** The total score of parcels with existing development can be penalized. Used to calibrate regional redevelopment goals.
- **Forecast Adjustments.** The following adjustments can be made if the user wishes to deviate from the demographic forecast:
    - **Population Adjustment.** The region-wide population growth target can be increased or decreased.
    - **Employment Adjustment.** The region-wide employment growth target can be increased or decreased.
    - **Vacancy Rate Adjustment.** The region-wide vacancy rate can be increased or decreased.
    - **Urban Adjustment.** The region-wide share of population and employment growth allocated to the urban area can be increased or decreased.
- **Redevelopment Minimum Density.** The minimum net density increase (combined housing and employment) can be set to screen out developed parcels that are unlikely to be redeveloped.
- **Cube Factor.** The TAZ-level growth controls from the Cube Land run, if any, are scaled to match the jurisdiction-level forecast data and then adjusted by this factor. This allows the user to control how much confidence is to be given to the Cube Land results and, alternately, how much influence and flexibility should be given to the land-use allocation model.

Output Parameters

- **Socioeconomic Data** for target year (parcel level)
- **Performance Metric Report**
- **PopulationSim Input Files:**
    - mazData.csv
    - gq_maz.csv

- countyData.csv

- **ABM Input Files:**
  - maz_parks.csv
  - se_detail.csv

Figure 2 below is a flowchart that demonstrates how the iterative modeling process will be conducted.

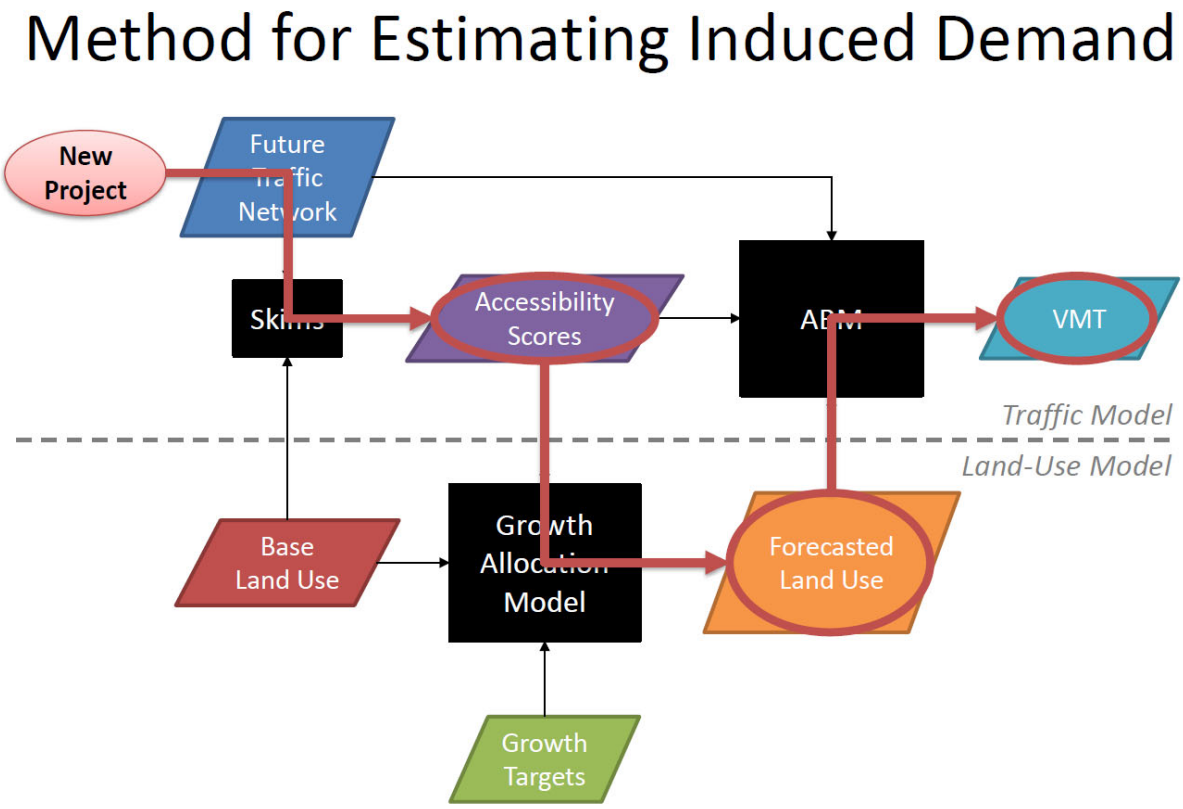

FIGURE 2 INTEGRATED INDUCED DEMAND MODELING PROCESS

Calibration and Validation

While calibrating what weight should be given to accessibility results across the various travel modes presents myriad challenges, including a lack of literature on the subject, Fresno COG will perform calibration runs and sensitivity analyses to ensure that the land-use allocation model is sensitive to these factors in intuitive and appropriate ways, using detailed land-use data for the Fresno County region from 2014 and 2019 to compare projected results from the allocation model to known data.

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APPENDIX D

VEHICLE MILES TRAVELED MITIGATION MEASURES FOR LAND USE DEVELOPMENT PROJECTS

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Table D - Vehicle Miles Traveled Mitigation Measures for Land Development Projects

#	Mitigation Measure	VMT Reduction[1]	Local VMT Reduction Calculations (Local Data/Fresno COG ABM)[2]	CAPCOA[3]	OPR TA[4]	Los Angeles Metro[5]	City of San Jose[6]	City of Los Angeles[7]	San Diego Region[8]	Notes
Mitigation Measures with Percentage VMT Reductions calculated using Fresno COG ABM/Locally available emperical data										
1	Provide a Bus Rapid Transit System (Addition of a New Route)	0.02% – 3.20%	Information included in the Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation	Y	Y	Y	N	N	Y	Notes: CAPCOA TST-1 (Applicable in urban and suburban context; negligible in rural context; appropriate for specific or general plans). This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service.'
2	Provide a Bus Rapid Transit System (Substitution of an Existing Bus Route with a BRT Route)	0.02% – 3.20%	Information included in the Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation	Y	Y	Y	N	N	Y	Notes: CAPCOA TST-1 (Applicable in urban and suburban context; negligible in rural context; appropriate for specific or general plans). This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service.'
3	Implement a local carpool program	1.00% – 15.00% commute VMT	Information included in the Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-3 [Provide Ride-Sharing Programs: applicable in urban and suburban context; Negligible impact in many rural contexts, but can be effective when a large employer in a rural area draws from a workforce in an urban or suburban area, such as when a major employer moves from an urban location to a rural location; appropriate for residential, retail, office, industrial, and mixed-use projects]; City of San Jose [Ride share for employment uses only]; City of LA [Measured in terms of employees eligible (%)]
4	Implement a local vanpool program	0.30% - 13.40% commute VMT reduction (for CAPCOA TRT-11: Provide Employer-Sponsored Vanpool/Shuttle); 7.20% - 15.80% school VMT reduction (for CAPCOA TRT-10: Implement a School Pool Program)	Information included in the Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation	Y	Y	Y	Y	Y	Y	Notes: Similar to CAPCOA TRT-11 (Provide employer-sponsored vanpool/shuttle) - the measure is applicable for urban, suburban, and rural context, and is appropriate for office, industrial, and mixed-use projects); City of San Jose [Similar measure is Subsidize Vanpool]; City of LA [Similar measure is Employer sponsored vanpool or shuttle (Degree of implementation (low, medium, high), employees eligible (%), employer size (small, medium, large)]
5	Expand transit network	0.10% – 8.20%	Information included in the Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TST-3; Measure applicable in urban and suburban context, maybe applicable in rural context but no literature documentation available, appropriate for specific or general plans. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'; City of San Jose [Increase transit accessibility to improve last-mile transit connections; Improve network connectivity/design to make destinations and low-carbon travel modes accessible; both applicable for both residential and employment uses]; City of LA [Existing transit mode share (as a percent of total daily trips) (%), Lines within project site improved (<50%, >=50%)]
6	Incorporate bike lane street design (on-site)	1% increase in share of workers commuting by bicycle (for each additional mile of bike lanes per square mile) (*Bicycle Commuting and Facilities in Major U.S. Cities: If You Build Them, Commuters Will Use Them – Another Look* by Dill and Carr (2003)); 0.075% increase in bicycle commuting with each mile of bikeway per 100,000 residents (*If You Build Them, Commuters Will Use Them; Cross-Sectional Analysis of Commuters and Bicycle Facilities* by Nelson and Allen (1997))	Information included in the Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation	Y	Y	Y	Y	Y	Y	Notes: CAPCOA SDT-5 [Grouped strategy, benefits of Bike Lane Street Design are small and should be grouped with the LUT-9 (Improve Design of Development) strategy to strengthen street network characteristics and enhance multi-modal environments], the measure is applicable in urban and suburban contexts and is appropriate for residential, retail, office, industrial, and mixed-use projects. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'; City of San Jose [Expand the reach of bike access with investment in infrastructure: applicable for both residential and employment uses]; City of LA [Provide bicycle facility along site (Yes/No)]
Mitigation Measures with Percentage VMT Reductions from CAPCOA only										
7	Subsidize vanpool	0.30% - 13.40% commute VMT	N/A	Y	Y	N	Y	Y	Y	Notes: CAPCOA TRT-11 (Provide employer-sponsored vanpool/shuttle) - the measure is applicable for urban, suburban, and rural context, and is appropriate for office, industrial, and mixed-use projects); City of San Jose [Subsidize Vanpool]; City of LA [Employer sponsored vanpool or shuttle (Degree of implementation (low, medium, high), employees eligible (%), employer size (small, medium, large)]
8	Improve or increase access to transit	CAPCOA TST-2: Not quantified alone, grouped strategy with TST-3 'Expand transit network' and TST-4 'Increase transit service frequency/speed'; CAPCOA LUT-5: 0.50% - 24.60%	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TST-2: Implement Transit Access Improvements (applicable in urban and suburban context, and appropriate for residential, retail, office, mixed use, and industrial projects); CAPCOA LUT-5: Increase Transit Accessibility [May be grouped with CAPCOA measures LUT-3 (mixed use development), SDT-2 (traffic calmed streets with good connectivity), and PPT-1 through PPT-7 (parking management strategies); measures are applicable in urban and suburban contexts; appropriate in rural context if development site is adjacent to a commuter rail station with convenient rail service to a major employment center; appropriate for residential, retail, office, industrial, and mixed-use projects]; City of San Jose [Increase transit accessibility to improve last-mile transit connections; Improve network connectivity/design to make destinations and low-carbon travel modes accessible; both applicable for both residential and employment uses]; City of LA [Existing transit mode share (as a percent of total daily trips) (%), Lines within project site improved (<50%, >=50%)]

Table D - Vehicle Miles Traveled Mitigation Measures for Land Development Projects

#	Mitigation Measure	VMT Reduction[1]	Local VMT Reduction Calculations (Local Data/Fresno COG ABM)[2]	CAPCOA[3]	OPR TA[4]	Los Angeles Metro[5]	City of San Jose[6]	City of Los Angeles[7]	San Diego Region[8]	Notes
9	Increase access to common goods and services, such as groceries, schools, and daycare	Similar to CAPCOA LUT-3 (Increase Diversity of Urban and Suburban Developments (Mixed Use)): 9.00% - 30.00% VMT reduction and CAPCOA LUT-4 (Increase Destination Accessibility): 6.70% - 20.00% VMT reduction	N/A	Y	Y	Y	Y	N	Y	Notes: Similar to CAPCOA LUT-3 (Increase Diversity of Urban and Suburban Developments (Mixed Use) - Applicable in urban and suburban context; negligible in rural context (unless the project is a master-planned community; appropriate for mixed-use projects) and CAPCOA LUT-4 (Applicable in urban and suburban context, negligible in rural context, appropriate for residential, retail, office, industrial, and mixed-use projects); City of San Jose [Access to Neighborhood Schools: Applicable for residential uses only]; City of San Jose [Very similar to measure 'Increase diversity of uses' - Applicable for residential and employment uses]
10	Incorporate affordable housing into the project	0.04% - 1.20%	N/A	Y	Y	Y	Y	N	Y	Notes: Similar measure is CAPCOA LUT-6 [Integrate Affordable and Below Market Rate Housing] - [Applicable in urban and suburban contexts; negligible impact in a rural context unless transit availability and proximity to jobs/services are existing characteristics; appropriate for residential and mixed-use projects]; City of San Jose [Similar to measure 'Integrate affordable and market rate housing] - Measure is applicable for residential uses only
11	Incorporate neighborhood electric vehicle network	0.50% - 12.70%	N/A	Y	Y	Y	N	N	Y	Notes: CAPCOA SDT-3 [Neighborhood electric vehicles (NEV) would result in a mode shift and therefore reduce the traditional vehicle VMT and GHG emissions. Range depends on the available NEV network and support facilities, NEV ownership levels, and the degree of shift from traditional; measure is applicable in urban, suburban, and rural context, for small citywide or large multi-use developments, and appropriate for mixed-use projects]
12	Orient project towards transit, bicycle, and pedestrian facilities	`1) 0.25% - 0.5% (0.25% reduction is attributed for a project oriented towards a planned corridor and 0.5% reduction is attributed for a project oriented towards an existing corridor) (as per the Sacramento Metropolitan Air Quality Management District (SMAQMD) *Recommended Guidance for Land Use Emission Reductions*), 2) 0.5% reduction in VMT per 1% increase in transit frequency and per 10% increase in transit ridership (as per the Center for Clean Air Policy (CCAP) *Transportation Emission Guidebook*)	N/A	Y	Y	Y	N	N	Y	Notes: CAPCOA LUT-7 [Orient project toward non-auto corridor]; Grouped strategy with LUT-3 (Increase Diversity of Urban and Suburban Developments (Mixed Use) ; there is no sufficient evidence that the measures results in non-negotiable trip reduction unless combined with other measures, including neighborhood design, density and diversity of development, transit accessibility and pedestrian and bicycle network improvements; the measure is applicable for urban or suburban context (may be applicable in a master-planned rural community) and is appropriate for residential, retail, office, industrial, and mixed use projects
13	Provide pedestrian network improvements	0.00% - 2.00%	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA SDT-1 [applicable in urban, suburban, and rural context; appropriate for residential, retail, office, industrial, and mixed-use projects; reduction benefit only occurs if the project has both pedestrian network improvements on site and connections to the larger off-site network]. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'; City of San Jose [Provide pedestrian network improvements for active transportation: applicable for both residential and employment uses]; City of LA [Included (within project and connecting off-site/within project only)]
14	Increase transit service frequency/speed	0.02% – 2.50%	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TST-4, applicable in urban and suburban context, maybe applicable in rural context but no literature documentation available, appropriate for specific or general plans. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'; City of San Jose [Similar to measure 'Subsidize public transit service upgrades']; City of LA [Reduction in headways (increase in frequency) (%)]
15	Required project contributions to transportation infrastructure improvement projects	Not Quantified: Grouped strategy (with RPT-2 and TST-1 through 7)	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA RPT-3 (Applicable in urban, suburban and rural context; appropriate for residential, retail, office, mixed use, and industrial projects); measure similar to some of the measures discussed above. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service.'
16	Increase destination accessibility	6.70% – 20.00%	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA LUT-4 [Destination accessibility measured in terms of the number of jobs or other attractions reachable within a given travel time, which tends to be the highest at central locations and lowest at peripheral ones; the location of the project also increases the potential for pedestrians to walk and bike to these destinations and therefore reduces VMT; applicable for urban and suburban contexts, negligible impact in a rural context; appropriate for residential, retail, office, industrial, and mixed-use projects]. This can be considered under Technical Advisory Measure 'Improve pedestrian or bicycle networks, or transit service'; City of San Jose [Increase transit availability to improve last-mile transit connections; Improve network connectivity/design to make destinations and low-carbon travel modes accessible; both applicable for both residential and employment uses]; City of LA [Lines within project site improved (<50%, >=50%)]
17	Provide traffic calming measures	0.25% – 1.00%	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA SDT-2 [applicable in urban, suburban, and rural contexts; appropriate for residential, retail, office, industrial, and mixed-use projects]; City of San Jose [Applicable for both residential and employment uses]; City of LA [Streets with traffic calming improvements (%), intersections with traffic calming improvements (%)]

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18	Provide bike parking in non-residential projects	0.625% (as per the Center for Clean Air Policy (CCAP) *Transportation Emission Guidebook*)	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA SDT-6 [Bike Parking in Non-Residential projects has minimal impacts as a standalone strategy and should be grouped with the LUT-9 (Improve Design of Development) strategy to encourage bicycling by providing strengthened street network characteristics and bicycle facilities]; the measure is applicable in urban, suburban, and rural contexts; appropriate for retail, office, industrial, and mixed-use projects; City of San Jose [Provide bike parking and end-of-trip facilities such as bike parking, bicycle lockers, showers, and personal lockers (Applicable for both residential and employment uses)]; City of LA [Include bike parking/lockers, showers, & repair station (Y/N)]
19	Provide bike parking with multi-unit residential projects	Not Quantified	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA SDT-7 [Grouped Strategy; the benefits of Bike Parking with Multi-Unit Residential Projects have no quantified impacts and should be grouped with the LUT-9 (Improve Design of Development) strategy to encourage bicycling by providing strengthened street network characteristics and bicycle facilities. The measure is applicable in urban, suburban, or rural contexts. It is appropriate for residential projects.]; City of San Jose [Provide bike parking and end-of-trip facilities such as bike parking, bicycle lockers, showers, and personal lockers (Applicable for both residential and employment uses)]; City of LA [Include bike parking/lockers, showers, & repair station (Y/N)]
20	Limit or eliminate parking supply	5.00% - 12.50%	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA PDT-1 (applicable in urban and suburban context, negligible in rural context, appropriate for residential, retail, office, industrial, and mixed-use projects); reduction can be counted only if spillover parking is controlled (via residential permits and on-street market parking); follow multi-faceted strategy including 1) elimination/reduction of minimum parking requirements, 2) creation of maximum parking requirements, and 3) provision of shared parking; City of San Jose [Decrease project parking supply at the project site to rates lower than the standard parking minimums where allowable in the San Jose Municipal Code (applicable for employment uses)]; City of LA [City code parking provision (spaces), actual parking provision (spaces)]
21	Unbundle parking costs from property costs	2.60% - 13.00%	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA PDT-2 (applicable in urban and suburban context, negligible in rural context, appropriate for residential, retail, office, industrial and mixed-use projects; complimentary strategies include workplace parking pricing); City of San Jose [Unbundle On-Site Parking Costs: Application for Residential Uses Only]; City of LA [Monthly cost for parking ($)]
22	Provide parking cash-out programs	0.60% – 7.70% commute VMT	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-15 [Implement employee parking "cash-out"; the term “cash out” is used to describe the employer providing employees with a choice of forgoing their current subsidized/free parking for a cash payment equivalent to the cost of the parking space to the employer. The measure is applicable in urban and suburban context; it is not applicable in rural context; it is appropriate for retail, office, industrial, and mixed-use projects. Restrictions are applied only if complementary strategies are in place: a) Residential parking permits and market rate public on-street parking to prevent spill over parking; b) Unbundled parking - is not required but provides a market signal to employers to forgo paying for parking spaces and “cash-out” the employee instead. In addition, unbundling parking provides a price with which employers can utilize as a means of establishing “cash-out” prices; City of San Jose [Parking cash-out: Employment uses only]; City of LA [Parking cash-out: Employees eligible (%)]
23	Implement or provide access to a commute reduction program - Voluntary	1.00% - 6.20% commute VMT	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-1: Commute Trip Reduction Program – Voluntary, is a multi-strategy program that encompasses a combination of individual measures described CAPCOA measures TRT-3 through TRT-9. It is presented as a means of preventing double-counting of reductions for individual measures that are included in this strategy. It does so by setting a maximum level of reductions that should be permitted for a combined set of strategies within a voluntary program. The main difference between a voluntary and a required program is: A) Monitoring and reporting is not required B) No established performance standards (i.e. no trip reduction requirements). The measure is applicable in urban and suburban contexts, negligible in a rural context, unless large employers exist and suite of strategies implemented are relevant in rural settings. The measure is appropriate for retail, office, industrial, and mixed-use projects; City of San Jose [Applicable for employment uses only]; City of LA [Employees and residents participating (%)]
24	Implement car-sharing program	0.40% – 0.70%	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-9 [urban and suburban context, negligible in rural context, and appropriate for residential, retail, office, industrial, and mixed-use projects]; City of San Jose [Applicable for both residential and employment uses]; City of LA [Car share project setting (urban, suburban, all other)]

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Table D - Vehicle Miles Traveled Mitigation Measures for Land Development Projects

#	Mitigation Measure	VMT Reduction[1]	Local VMT Reduction Calculations (Local Data/Fresno COG ABM)[2]	CAPCOA[3]	OPR TA[4]	Los Angeles Metro[5]	City of San Jose[6]	City of Los Angeles[7]	San Diego Region[8]	Notes
25	Implement bike-sharing program	Taking evidence from the literature, a 135-300% increase in bicycling (of which roughly 7% are shifting from vehicle travel) results in a negligible impact (around 0.03% VMT reduction)	N/A	Y	Y	N	Y	Y	Y	Notes: CAPCOA TRT-12 [This measure has minimal impacts when implemented alone. The strategy's effectiveness is heavily dependent on the location and context. Bike-sharing programs have worked well in densely populated areas (examples in Barcelona, London, Lyon, and Paris) with existing infrastructure for bicycling. Bike sharing programs should be combined with Bike Lane Street Design (SDT-5) and Improve Design of Development (LUT-9). The measure is applicable in urban and suburban-center context only; it is negligible in a rural context; appropriate for residential, retail, office, industrial, and mixed-use projects; City of San Jose [Bike share for employment and residential uses]; City of LA [bike share - within 600 feet of existing bike share station - OR -implementing new bike share station (Y/N)]
26	Provide transit passes	Similar to CAPCOA TRT-4 [Implement Subsidized or Discounted Transit Program]; for TRT-4, commute VMT reduction is 0.30% - 20.00%	N/A	Y	Y	Y	Y	Y	Y	Notes: Similar to CAPCOA TRT-4 [Implement Subsidized or Discounted Transit Program]; City of San Jose [Implement Subsidized or Discounted Transit Program]; City of LA [Employees and residents eligible (%), amount of transit subsidy per daily passenger (daily equivalent) ($)]
27	Implement a school pool program	7.20% - 15.80% school VMT reduction	N/A	Y	Y	N	Y	Y	Y	Notes: CAPCOA TRT-10 [This project will create a ridesharing program for school children. Most school districts provide bussing services to public schools only. School Pool helps match parents to transport students to private schools, or to schools where students cannot walk or bike but do not meet the requirements for bussing. The measure is applicable in urban, suburban, and rural context and is appropriate for residential and mixed-use projects.]; City of San Jose [School carpool program - residential uses only)]. This measure can be considered under the Technical Advisory Measure 'Shifting single occupancy vehicle trips to carpooling or vanpooling, for example providing ride matching services.'; City of LA [School carpool program - level of implementation (low, medium, high)
28	Operate free direct shuttle service	CAPCOA TST-6 (Provide Local Shuttles): Not Quantified; 0.30% - 13.40% commute VMT reduction (for CAPCOA TRT-11: Provide Employer-Sponsored Vanpool/Shuttle)	N/A	Y	Y	N	Y	Y	Y	Notes: CAPCOA TST-6 (Provide Local Shuttles - grouped strategy with TST-5 'Provide Bike Parking Near Transit' and TST-4 'Increase Transit Service Frequency/Speed') - Applicable in urban/suburban context; appropriate for large residential, retail, office, mixed use, and industrial projects; solves the "first mile/last mile" problem; CAPCOA TRT-11 (Provide employer-sponsored vanpool/shuttle) - the measure is applicable for urban, suburban, and rural context, and is appropriate for office, industrial, and mixed-use projects. This measure can be considered under the Technical Advisory Measure 'Shifting single occupancy vehicle trips to carpooling or vanpooling, for example providing ride matching services.'; City of San Jose [Employment uses only]; City of LA [Employer sponsored vanpool or shuttle (Degree of implementation (low, medium, high), employees eligible (%), employer size (small, medium, large)]
29	Provide teleworking options	0.07% - 5.50% commute VMT	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-6 [Applicable in urban, rural, and suburban contexts; appropriate for retail, office, industrial, and mixed-use projects]; City of San Jose [Alternative work schedules and telecommute (employment land uses only)]; City of LA [Alternative work schedules and telecommute (employees participating (%), type of program)]
30	Subsidize public transit service upgrades	Not Quantified	N/A	Y	Y	N	Y	N	Y	Notes: Similar to CAPCOA TST-2 through TST-4; City of San Jose [Subsidize transit service through contributions to the transit provider to improve transit service to the project (e.g. frequency and number of routes); applicable for both residential and employment uses]. The measure is included under the Technical Advisory Measure 'Provide incentives or subsidies that increase the use of modes other than single-occupancy vehicle.'
31	Implement subsidized or discounted transit program	0.30% – 20.00% commute VMT	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-4 [Implement subsidized or discounted transit program (the measure is applicable in urban and suburban context, negligible in a rural context, appropriate for residential, retail, office, industrial, and mixed-use projects); The project will provide subsidized/discounted daily or monthly public transit passes. The project may also provide free transfers between all shuttles and transit to participants. These passes can be partially or wholly subsidized by the employer, school, or development. Many entities use revenue from parking to offset the cost of such a project. The measure is included under the Technical Advisory Measure 'Provide incentives or subsidies that increase the use of modes other than single-occupancy vehicle.'; City of San Jose [Implement Subsidized or Discounted Transit Program]; City of LA [Transit subsidies measured by employees and residents eligible (%), and amount of transit subsidy per passenger (daily equivalent) ($)]
32	Providing on-site amenities at places of work, such as priority parking for carpools and vanpools, secure bike parking, and showers and locker rooms	22% increase in bicycle mode share (UK National Travel Survey)/2%-5% reduction in commute vehicle trips (*Transportation Demand Management Encyclopedia*)/0.625% reduction in VMT (*Center for Clean Air Policy (CCAP) Emission Guidebook*)	N/A	Y	Y	Y	Y	Y	Y	Notes: CAPCOA TRT-5 [Provide End of Trip Facilities]: End-of-trip facilities have minimal impacts when implemented alone. This strategy's effectiveness in reducing vehicle miles traveled (VMT) depends heavily on the suite of other transit, pedestrian/bicycle, and demand management measures offered. End-of trip facilities should be grouped with Commute Trip Reduction (CTR) Programs (TRT-1: Implement Commute Trip Reduction Program - Voluntary through TRT-2: Implement Commute Trip Reduction Program – Required Implementation/Monitoring) and TRT-3 (Provide Ride-Sharing Programs); City of San Jose [Similar measures include 'Provide bike parking/end of trip bike facilities', 'Implement car sharing programs']; City of LA [Include bike parking/lockers, showers, & repair station (Y/N)]
33	Provide employee transportation coordinators at employment sites	Not Quantified	N/A	Y	Y	Y	N	N	Y	Included as part of CAPCOA TRT-1 (Implement Commute Trip Reduction Program - Voluntary)
34	Provide a guaranteed ride home service to users of non-auto modes	Not Quantified	N/A	N	Y	Y	N	N	Y	

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Table D - Vehicle Miles Traveled Mitigation Measures for Land Development Projects

#	Mitigation Measure	VMT Reduction[1]	Local VMT Reduction Calculations (Local Data/Fresno COG ABM)[2]	CAPCOA[3]	OPR TA[4]	Los Angeles Metro[5]	City of San Jose[6]	City of Los Angeles[7]	San Diego Region[8]	Notes
35	Locate project in an area of the region that already exhibits low VMT	10.00% - 65.00%	N/A	Y	Y	Y	N	N	Y	Notes: CAPCOA LUT-2 (Applicable in urban and suburban contexts; negligible in rural contexts; appropriate for residential, retail, office, industrial, and mixed-use projects)
36	Locate project near transit	0.50% - 24.60%	N/A	Y	Y	Y	N	N	Y	Notes: CAPCOA LUT-5 [May be grouped with CAPCOA measures LUT-3 (mixed use development), SDT-2 (traffic calmed streets with good connectivity), and PPT-1 through PPT-7 (parking management strategies); measures are applicable in urban and suburban contexts; appropriate in rural context if development site is adjacent to a commuter rail station with convenient rail service to a major employment center; appropriate for residential, retail, office, industrial, and mixed-use projects]
37	Increase project/development density	1.50% - 30.00%	N/A	Y	Y	Y	Y	N	Y	Notes: CAPCOA LUT-1 (Applicable in urban and suburban contexts only; negligible in rural context; appropriate for residential, retail, office, industrial, and mixed-use projects); City of San Jose [Applicable for both residential and employment uses]
38	Increase the mix of uses within the project or within the project's surroundings	9.00% - 30.00%	N/A	Y	Y	Y	Y	N	Y	Notes: CAPCOA LUT-3: Increase Diversity of Urban and Suburban Developments (Mixed Use) [Applicable in urban and suburban context, negligible in rural context, and appropriate for mixed-use projects]; City of San Jose [Applicable for both residential and employment uses]
39	Improve network connectivity and/or increase intersection density on the project site	Similar measure is CAPCOA LUT-9 [Improve Design of Development]: 3.0% - 21.3% reduction in VMT	N/A	Y	Y	Y	Y	N	Y	Notes: Similar measure to CAPCOA LUT-9 (Improve Design of Development); City of San Jose [Build new street connections and/or connect cul-de-sacs to provide pedestrian and bicycle access: applicable for both residential and employment uses]
40	Price workplace parking	0.10% - 19.70% commute VMT	N/A	Y	N	N	Y	Y	N	Notes: CAPCOA TRT-14 [Urban and suburban context; Negligible impact in a rural context; Appropriate for retail, office, industrial, and mixed-use projects; Reductions applied only if complementary strategies are in place: o Residential parking permits and market rate public on-street parking - to prevent spill-over parking o Unbundled parking - is not required but provides a market signal to employers to transfer over the, now explicit, cost of parking to the employees. In addition, unbundling parking provides a price with which employers can utilize as a means of establishing workplace parking prices; City of San Jose [Price On-Site Workplace Parking (for employment uses only)]; City of LA [Daily parking charge ($), Employees subject to priced parking (%)]
41	Locate project near bike path/bike lane	0.625%	N/A	Y	N	Y	N	N	N	Notes: CAPCOA LUT-8 (Grouped strategy with 'Increase Destination Accessibility'; the measure is most effective when applied in combination of multiple design elements that encourage this use; strategy should be grouped with 'Increase Destination Accessibility' strategy to increase the opportunities for multi-modal travel; measure is applicable in urban or suburban context, may be applicable in a rural master planned community; appropriate for residential, retail, office, industrial, and mixed-use projects
42	Implement Commute Trip Reduction Marketing	0.80% - 4.00% commute VMT	N/A	Y	N	Y	Y	N	N	Notes: CAPCOA TRT-7 (applicable in urban and suburban context; negligible in rural context; appropriate for residential, retail, office, industrial, and mixed-use projects); City of San Jose [Employment uses only]
43	Education and encouragement - Voluntary travel behavior change program	1.00% - 6.20% commute VMT	N/A	Y	N	N	Y	Y	N	Notes: Similar to CAPCOA TRT-1 (Implement Commute Reduction Program - Voluntary); City of San Jose [For both residential and employment uses]; City of LA [Employees and residents participating (%)]
44	Education and encouragement - Promotions and marketing	0.80% - 4.00% commute VMT	N/A	Y	N	N	Y	Y	N	Notes: Similar to CAPCOA TRT-7 [Implement Commute Reduction Marketing]; City of San Jose [Similar measure might be 'Implement commute trip reduction marketing/educational campaign' (applicable for employment uses)]; City of LA [Employees and residents participating (%)]
45	Implement neighborhood shuttle	Not Quantified	N/A	Y	N	N	Y	Y	N	Notes: CAPCOA TST-6 (Provide Local Shuttles - grouped strategy with TST-5 'Provide Bike Parking Near Transit' and TST-4 'Increase Transit Service Frequency/Speed') - Applicable in urban/suburban context; appropriate for large residential, retail, office, mixed use, and industrial projects; solves the "first mile/last mile" problem; City of San Jose [Similar measure: 'Operate a free direct shuttle service' (applicable for employment uses only)]; City of LA [Degree of Implementation (low/medium/high), employees and residents eligible (%)]
46	Install park-and-ride lots	Two sources: 0.10% - 0.50% VMT reduction (as per 2005 Federal Highway Administration (FHWA) study) and 0.50% VMT reduction per day (as per Washington State Department of Transportation (WSDOT))	N/A	Y	N	N	N	N	N	Notes: CAPCOA RPT-4 (Applicable in suburban and rural context; appropriate for residential, retail, office, mixed use, and industrial projects); Grouped strategy with RPT-1, TRT-11, TRT-3, and TRT-1 through 6
47	Electrify loading docks and/or require idling-reduction systems	26% - 71% reduction in Truck refrigeration units (TRU) idling GHG emissions	N/A	Y	N	N	N	N	N	Notes: CAPCOA VT-1 (Measure applicability: Truck refrigeration units (TRU))
48	Utilize alternative fueled vehicles	Reduction in GHG emissions varies depending on vehicle type, year, and associated fuel economy	N/A	Y	N	N	N	N	N	Notes: CAPCOA VT-2 (Measure applicability: vehicles)
49	Utilize electric or hybrid vehicles	0.40% - 20.30% reduction in GHG emissions	N/A	Y	N	N	N	N	N	Notes: CAPCOA VT-3 (Measure applicability: vehicles)
50	Provide bike parking near transit	Not Quantified	N/A	Y	N	N	N	N	N	Notes: CAPCOA TST-5 (should be implemented with other two measures as mentioned to encourage multi-modal use in the area and provide ease of access to nearby transit for bicyclists (measure applicable in urban and suburban context; appropriate for residential, retail, office, mixed use, and industrial projects); Grouped strategy (with measures TST-3 'Expand transit network' and TST-4 'Increase transit service frequency/speed')

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Table D - Vehicle Miles Traveled Mitigation Measures for Land Development Projects

#	Mitigation Measure	VMT Reduction[1]	Local VMT Reduction Calculations (Local Data/Fresno COG ABM)[2]	CAPCOA[3]	OPR TA[4]	Los Angeles Metro[5]	City of San Jose[6]	City of Los Angeles[7]	San Diego Region[8]	Notes
51	Improve design of development	3.00% - 21.30%	N/A	Y	N	N	N	N	N	Notes: CAPCOA LUT-9 (Include design elements to enhance walkability and connectivity; improved street network characteristics within a neighborhood such as street accessibility; design also measured in terms of sidewalk coverage, building setbacks, street widths, pedestrians crossings, presence of street trees, and a host of other physical variables that differentiate pedestrian-oriented environments from auto-oriented environments); measure is applicable in the urban and suburban contexts, negligible impact in rural context; appropriate for residential, retail, office, industrial, and mixed-use projects
52	Provide electric vehicle parking	Not Quantified	N/A	Y	N	N	N	N	N	Notes: CAPCOA SDT-8 [This is a grouped strategy and the benefits of electric vehicle parking may be quantified when grouped with the use of electric vehicles and or SDT-3 (Implement a Neighborhood Electric Vehicle (NEV) Network). This measure is applicable in urban or suburban contexts and is appropriate for residential, retail, office, mixed use, and industrial projects.]
53	Dedicated land for bike trails	Not Quantified	N/A	Y	N	N	N	N	N	Notes: CAPCOA SDT-9 [Larger projects may be required to provide for, contribute to, or dedicate land for the provision of off-site bicycle trails linking the project to designated bicycle commuting routes in accordance with an adopted citywide or countywide bikeway plan. The benefits of Land Dedication for Bike Trails have not been quantified and should be grouped with the LUT-9 (Improve Design of Development) strategy to strengthen street network characteristics and improve connectivity to off-site bicycle networks. The measure is applicable in urban, suburban, or rural contexts and is appropriate for large residential, retail, office, mixed use, and industrial projects.]
54	Implement school bus program	38.00% - 63.00% school VMT reduction	N/A	Y	N	N	N	N	N	Notes: CAPCOA TRT-13 [Applicable in urban, suburban, and rural context; appropriate for residential and mixed-use projects]
55	Implement preferential parking permit program	Not Quantified	N/A	Y	N	N	N	N	N	Notes: CAPCOA TRT-8 [The project will provide preferential parking in convenient locations (such as near public transportation or building front doors) in terms of free or reduced parking fees, priority parking, or reserved parking for commuters who carpool, vanpool, ride-share or use alternatively fueled vehicles. The project will provide wide parking spaces to accommodate vanpool vehicles. The impact of preferential parking permit programs has not been quantified by the literature and is likely to have negligible impacts when implemented alone. This strategy should be grouped with Commute Trip Reduction (CTR) Programs (TRT-1 and TRT-2) and TRT-3 (Provide Ride-Sharing Programs) as a complementary strategy for encouraging non-single occupant vehicle travel. This measure is applicable in urban and suburban contexts and is appropriate for residential, retail, office, mixed use, and industrial projects.]

Notes:

VMT = Vehicle Miles Traveled; CAPCOA = California Air Pollution Control Officers Association; Fresno COG = Fresno Council of Governments; ABM = Activity-Based Model, OPR = Office of Planning and Research; TA = Technical Advisory; HOV = High Occupancy Vehicle; HOT = High Occupancy Toll; ITS = Intelligent Transportation System

CAPCOA Transportation Mitigation Categories (LU = Land Use/Location, SD = Neighborhood/Site Enhancements, PD = Parking Policy/Pricing, TR = Commute Trip Reduction Programs, TS = Transit System Improvements, RP = Road Pricing/Management; V = Vehicles)

[1] VMT reduction numbers obtained from *Quantifying Greenhouse Gas Mitigation Measures* published by the California Air Pollution Control Officers Association in August 2010.

[2] Fresno COG VMT reduction recommendation for these measures obtained based on analysis conducted by Fresno COG staff and LSA using local data and/or the COG's Activity Based Model. Details are provided in the *Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation*.

[3] *Quantifying Greenhouse Gas Mitigation Measures* published by the California Air Pollution Control Officers Association in August 2010.

[4] *Technical Advisory on Evaluating Transportation Impacts in CEQA* published by the Governor's Office of Planning and Research State of California in December 2018.

[5] *Analysis of VMT Mitigation Measures Pursuant to SB 743* prepared by Iteris, Inc. in February 2018.

[6] *City of San Jose Transportation Analysis Handbook* (dated April 2018).

[7] *City of Los Angeles VMT Calculator Version 1.2*

[8] *Guidelines for Transportation Impact Studies in the San Diego Region* developed by San Diego Section of the Institute of Transportation Engineers (ITE) and the San Diego Traffic Engineers Council (SANTEC) in January 2019.

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APPENDIX E

VEHICLE MILES TRAVELED MITIGATION MEASURES FOR LAND USE DEVELOPMENT PROJECTS (CARB PAPERS)

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Table E - Vehicle Miles Traveled Mitigation Measures for Land Development Projects (CARB Papers)[1]

#	Mitigation Measure	VMT Reduction[2]	Local VMT Reduction Calculations (Local Data/Fresno COG ABM)[3]	Notes
1	Provide Bicycling Network Improvements	No effect on VMT	Information included in the Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation	
2	Implement Transit Improvements	No effect on VMT	Information included in the Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation	
3	Improve or increase access to transit	1.3% - 5.8%	N/A	Variable: Various factors associated with proximity to transit stop (please refer to *How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.)
4	Land Use Mix	Elasticity: 0.02 - 0.10	N/A	Variable: Entropy - variety and balance of land-use types within a neighborhood
5	Regional Accessibility	Elasticity: 0.05 - 0.25	N/A	Variable: Various factors associated with job accessibility and distance to CBD (please refer to *How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.)
6	Job-Housing Balance	Elasticity: 0.06 - 0.31 for commute VMT	N/A	Variable: Various factors associated with job accessibility (please refer to *How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.)
7	Provide Pedestrian Network Improvements	Elasticity: 0.00 - 0.02 for sidewalk length, 0.19 for Pedestrian Environment Factor	N/A	
8	Voluntary Travel Behavior Change (VTBC) Program	5% - 12%	N/A	
9	Implement Employer-Based Trip Reduction (EBTR) Program	1.33% - 6% of commute VMT	N/A	
10	Provide telecommuting options	Home-based telecommuting: 48.1% for household VMT, 66.5% - 76.6% for all personal VMT, and 90.3% for commute VMT only; Center-based telecommuting: 53.7% - 64.8% for all personal VMT and 62.0% - 77.2% for commute VMT only	N/A	
11	Increase Project/Development Density	Elasticity: <=0.07 - 0.19	N/A	Variable: residential density
12	Improve network connectivity and/or increase intersection density on the project site	Elasticity: -0.46 - 0.59	N/A	Variable: Various factors associated with intersection or street density (please refer to *How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.)
13	Implement Parking Cash-out Programs or Workplace Parking Pricing	12% of commute VMT (parking cash out); 2.3% - 2.9% for $3 per day workplace parking price; 2.8% for price increase equivalent to 60% hourly value of commuter travel time cost	N/A	

Notes:

VMT = Vehicle Miles Traveled

[1] All mitigation measures have been obtained from *How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.).

[2] All VMT reduction numbers have been obtained from *How do Local Actions Affect CMT? A Critical Review of the Empirical Evidence* (Salon, D., Boarnet, M.G., Handy, S., Spears, S., and Tal, G.).

[3] Fresno COG VMT reduction recommendation for these measures obtained based on analysis conducted by Fresno COG staff and LSA using local data and/or the COG's Activity Based Model. Details are provided in the *Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation.*

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APPENDIX F

VEHICLE MILES TRAVELED MITIGATION MEASURES FOR COMMUNITY PLANS AND GENERAL PLANS

LSA

Table F - Vehicle Miles Traveled Mitigation Measures for Community Plans and General Plans[1]

#	Mitigation Measure	CAPCOA VMT Reduction	Local VMT Reduction Calculations (Local Data/Fresno COG ABM)[2]
1	Shift single occupancy vehicle trips to carpooling or vanpooling by providing ride-matching services or shuttle services	0.30% - 13.40% commute VMT reduction (for CAPCOA TRT-11: (Provide Employer-Sponsored Vanpool/Shuttle)); Grouped strategy (for CAPCOA TST-6 (Provide Local Shuttles))	Information included in the Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation
2	Provide enhanced bicycle and/or pedestrian facilities	0.00% - 2.00% (for pedestrian network improvements); Multiple measures for bike facilities, refer to Table A for VMT reduction percentages	Information included in the Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation
3	Provide incentives or subsidies that increase the use of modes other than a single-occupancy vehicle	0.30% - 13.40% commute VMT reduction (for CAPCOA TRT-11: (Provide Employer-Sponsored Vanpool/Shuttle)); Grouped strategy (for CAPCOA TST-6 (Provide Local Shuttles)); 0.30% - 20.00% commute VMT reduction (for CAPCOA TRT-4 (Implement Subsidized or Discounted Transit Program))	N/A
4	Modify land use plan to increase development in areas with low VMT/capita characteristics and/or decrease development in areas with high VMT/capita characteristics	Not quantified in CAPCOA	N/A
5	Add roadways to the street network if those roadways would provide shorter travel paths for existing and/or future trips	Not quantified in CAPCOA	N/A
6	Improve or increase access to transit	CAPCOA TST-2 (Implement transit access improvements): Not quantified alone, grouped strategy with TST-3 (Expand transit network) and TST-4 (Increase transit service frequency/speed); CAPCOA LUT-5 (Increase transit accessibility): 0.50% - 24.60%	N/A
7	Increase access to common goods and services, such as groceries, schools, and daycare	Similar to CAPCOA LUT-3 (Increase Diversity of Urban and Suburban Developments (Mixed Use)): 9.00% - 30.00% VMT reduction and CAPCOA LUT-4 (Increase Destination Accessibility): 6.70% - 20.00% VMT reduction	N/A
8	Incorporate a neighborhood electric vehicle network	0.50% - 12.70%	N/A
9	Provide traffic calming	0.25% – 1.00%	N/A
10	Limit or eliminate parking supply	5.00% - 12.50%	N/A

LSA

Table F - Vehicle Miles Traveled Mitigation Measures for Community Plans and General Plans[1]

#	Mitigation Measure	CAPCOA VMT Reduction	Local VMT Reduction Calculations (Local Data/Fresno COG ABM)[2]
11	Implement or provide access to a commute reduction program - Voluntary	1.00% - 6.20% commute VMT	N/A
12	Provide car-sharing, bike sharing, and ride-sharing programs	0.40% - 0.70% VMT reduction (for car sharing); 1.00% - 15.00% commute VMT reduction (for ride-sharing); a 135% - 300% increase in biking (of which roughly 7% are shifting from vehicle travel) results in a negligible impact (around 0.03% VMT reduction)	N/A
13	Provide partially or fully subsidized transit passes	Similar to CAPCOA TRT-4 [Implement Subsidized or Discounted Transit Program]; for TRT-4, commute VMT reduction is 0.30% - 20.00%	N/A
14	Provide telework options	0.07% - 5.50% commute VMT	N/A
15	Provide employee transportation coordinators at employment sites	Not quantified in CAPCOA	N/A
16	Provide a guaranteed ride home service to users of non-auto modes	Not quantified in CAPCOA	N/A

Notes:

VMT = Vehicle Miles Traveled; Fresno COG = Fresno Council of Governments; ABM = Activity-Based Model; CAPCOA = California Air Pollution Control Officers Association

CAPCOA Transportation Mitigation Categories (LU = Land Use/Location, SD = Neighborhood/Site Enhancements, PD = Parking Policy/Pricing, TR = Commute Trip Reduction Programs, TS = Transit System Improvements, RP = Road Pricing/Management; V = Vehicles)

[1] All mitigation measures have been obtained from the *Guidelines for Transportation Impact Studies in the San Diego Region* developed by San Diego Section of the Institute of Transportation Engineers (ITE) and the San Diego Traffic Engineers Council (SANTEC) in January 2019.

[2] Fresno COG VMT reduction recommendation for these measures obtained based on analysis conducted by Fresno COG staff and LSA using local data and/or the COG's Activity Based Model. Details are provided in the *Fresno County SB 743 Implementation Regional Guidelines - Technical Documentation.*

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