

Appendix G

Transportation



MEMORANDUM

Date: August 28, 2019
To: Chris Mundhenk, Ascent Environmental
From: Bryan Esparza, Daniel Rubins and Jason Pack
Subject: **Cal Poly San Luis Obispo Master Plan Senate Bill 743 Vehicles Miles Traveled Assessment**

SJ19-1945

This memorandum summarizes a Senate Bill 743 Vehicle Miles Traveled Assessment for the Cal Poly Master Plan.

SB 743 VMT Assessment Overview

Senate Bill (SB) 743, signed by Governor Jerry Brown in 2013, changes the way transportation impacts are to be identified in the future under the California Environmental Quality Act (CEQA). Specifically, the legislation directed the State of California's Office of Planning and Research (OPR) to look at different metrics for identifying transportation impacts and ultimately make corresponding revisions to the CEQA Guidelines. Following several years of draft proposals and related public comments, OPR settled upon VMT as the preferred metric for assessing passenger vehicle related impacts and issued revised CEQA Guidelines in December 2018 along with a *Technical Advisory on Evaluating Transportation Impacts in CEQA* (December 2018) to assist practitioners in implementing the CEQA Guidelines revisions to use VMT as the new metric. Under the revised Guidelines, vehicle LOS will no longer be used as a determinant of significant environmental impacts, and an analysis of VMT will be required. The deadline for transitioning to VMT for CEQA analysis is July 2020; until that time, lead agencies, such as the California State University (CSU) in this case, have the discretion to include a VMT analysis as part of their CEQA documentation.

In response to this recent legislation, the CSU Chancellors Office has updated the 2012 *California State University Transportation Impact Study Manual* (2012 CSU TISM) to the recently published



2019 California State University Transportation Impact Study Manual (CSU TISM). The *2019 CSU TISM* provides guidance for the VMT impact analysis.

As discussed below, the VMT analysis presented in this section considers both the Project's direct impacts relative to VMT, as well as a cumulative analysis, which considers the Project's long-term effect on VMT.

To implement an SB 743 VMT assessment, certain methodological determinations must first be made. The necessary determinations, and the selected tools to be used in this case, are as follows (consistent with the *2019 CSU TISM*):

- Select a VMT calculation tool
 - Use the San Luis Obispo Council of Governments (SLOCOG) regional travel model.
- Select the VMT accounting method(s)
 - Project generated VMT
 - Project's effect on VMT evaluated using boundary VMT
- Calculate the baseline and cumulative regional VMT estimates
 - VMT from all trip purposes and vehicle types (i.e., there is no separation of VMT by land use) for a mixed-use project like the Master Plan
- Set a VMT threshold(s)
 - Project generated VMT threshold should be 15 percent below the Existing Conditions Project generated VMT for the SLOCOG region
 - Project's effects on VMT threshold is no change from Cumulative Conditions to Cumulative with Project Conditions in the boundary VMT per service population.

Like the calculation of VMT estimates for the greenhouse gas analysis, the SLOCOG travel model is used to estimate daily VMT for this analysis. To conduct the direct and cumulative analyses presented here, the analysis considers the following:

1. Project-generated VMT: The sum of the "VMT from" and "VMT to" the Cal Poly campus.
2. Project's effect on VMT: The Project's effect on VMT is an evaluation of the change in travel on all roadways within San Luis Obispo County.

The Project generated VMT per service population is used to evaluate how the Cal Poly campus VMT changes (increases or decreases) between the without Project and with Project scenarios, considering both VMT increases due to growth and VMT reductions due to changes in travel



behavior. Project generated VMT is used to evaluate changes in the VMT rate at the Project site (i.e., the direct impacts); however, it does not evaluate a Project's effect on VMT on the entire roadway system,¹ which is evaluated as part of the cumulative analysis.

As to the cumulative analysis, that is the Project's effect on VMT, the Cal Poly campus land use changes are relatively small compared to the San Luis Obispo County residential population and employment; therefore, it is likely that the Project would have more localized VMT effects such as shifting some existing trips to/from other neighborhoods. Furthermore, the Project may cause existing pass-through traffic to shift to alternate routes as more Cal Poly campus traffic uses the local streets within and near the Cal Poly campus. Therefore, the Project's effect on VMT, as evaluated by the cumulative effects of the Project's land use and transportation changes, compare the changes in boundary VMT per service population² between the Cumulative and Cumulative with Project Conditions.

The analysis presented here focuses on the VMT for all trip purposes and vehicle types (i.e., there is no separation of VMT by land use). The analysis thresholds were developed using the Existing Conditions VMT for San Luis Obispo County because a substantial majority of the campus population lives within San Luis Obispo.

VMT Estimation Process for the SB 743 Assessment

Project Generated VMT per Service Population Estimation Method

The Project generated VMT is the VMT from all vehicle trips for all trip purposes and types. It is calculated by summing the "VMT from" and "VMT to" a specified area. The VMT accounting is:

$$\text{Project Generated VMT} = (II + IX) + (II + XI) = 2 * II + IX + XI$$

¹ An often-cited example of how a project can affect VMT is the addition of a grocery store in a food desert. Residents of a neighborhood without a grocery store have to travel a great distance to an existing grocery store. Adding the grocery store to that neighborhood will shorten many of the grocery shopping trips and reduce the VMT to/from the neighborhood. This concept is likely to occur with the addition of campus housing.

² Boundary VMT captures all VMT on a roadway network within a specified geographic area including local trips plus interregional travel that does not have an origin or destination within the area.



- Internal-internal (II): The full length of all trips made entirely within the geographic area limits is counted.
- Internal-external (IX): The full length of all trips with an origin within the geographic area and destination outside of the area is counted.
- External-internal (XI): The full length of all trips with an origin outside of the geographic area and destination within the area is counted.

The intra-zonal VMT and VMT between traffic analysis zones, or TAZs, that are both in the study area are double counted. To cancel out the double counting, the Project generated VMT is divided by the service population (residential population, employment population and student population), the generators of both trip ends of the VMT. This is necessary when expressing VMT as an efficiency metric that also represents the VMT generation rate of the service population. The resulting Project-generated VMT is then compared to the existing VMT and a determination made as to whether the Project VMT exceeds the applicable thresholds. As an illustrative example, a staff person living on-campus generates VMT leaving its resident and also generates VMT arriving at its place of work on-campus (as an employee).

Project's Effect on VMT Estimation Method (Using Boundary VMT)

As noted earlier, the Project's effect on VMT, or cumulative impact, is evaluated using the boundary VMT, which captures all VMT on a roadway network within a specified geographic area, including local trips plus interregional travel that does not have an origin or destination within the area. The geographical boundary method considers traffic within the physical limits of the selected study area for which most of the Cal Poly campus trips occur. The use of boundary VMT is a more complete evaluation of the potential effects of the project because it captures the combined effect of new VMT, shifting existing VMT to/from other neighborhoods, and/or shifts in existing traffic to alternate travel routes or modes. The boundary VMT is divided by the service population (residents plus employees) to distinguish the effects of population and/or employment growth from the effects of changes in personal travel behavior.

Service Populations

Service population is the sum of the number of employees, residents, and students within the designated geographic area. **Table 1** shows the service populations for the Cal Poly campus and San Luis Obispo County as used in this analysis. Like the Project generated VMT specification, the service population includes the residents, employees and students for both trip ends.



TABLE 1: SERVICE POPULATIONS

	Existing Conditions	Existing with Project Conditions	Cumulative Conditions	Cumulative with Project Conditions
Cal Poly Campus				
Employees (A) ¹	3,270	3,940	3,270	3,940
Residents (B) ¹	7,760	16,030	7,760	16,030
Students (C) ^{1, 2}	21,810	25,000	21,810	25,000
Service Population (A + B + C = D) ^{1,3}	32,840	44,970	32,840	44,970
San Luis Obispo County				
Employees (E) ¹	110,950	111,620	112,060	132,470
Residents (F) ¹	261,110	269,370	296,550	304,810
Students (G) ^{1, 4}	66,090	69,270	75,840	79,030
Service Population (E + F + G = H) ^{1,5}	438,150	450,260	484,450	516,310

Notes:

1. Rounded service population to nearest 10.
2. Students on the Cal Poly Campus are defined as university students.
3. Service population is defined as the sum of all employees, residents, and students (University; no K to 12 on-campus).
4. Students in San Luis Obispo County are defined as K to University students.
5. Service population is defined as the sum of all employees, residents, and students (K to University).

Source: SLOCOG Travel Forecasting Model for 2018 and 2045 by Fehr & Peers, August 2019.

SB 743 VMT Assessment

Project Generated VMT Impact Thresholds and Impact Criteria

The regionwide thresholds for Project generated VMT is 15 percent below the Existing Conditions VMT per service population for San Luis Obispo County; OPR recommends use of the same threshold in its *Technical Advisory on Evaluating Transportation Impacts in CEQA*. The CSU has selected the 15 percent reduction based on the OPR *Technical Advisory* and the fact that most of the students, faculty, and staff live within San Luis Obispo County. Thus, the threshold to be applied in this analysis is 15% below existing VMT, or 19.22:



- **Countywide:** SLOCOG Project generated VMT per service population of $22.61 \times 85\% = 19.22$.

Therefore, the Project generated VMT would exceed the applicable thresholds if the daily Project generated VMT per service population is above the regionwide VMT per service population threshold of 19.22. The Existing with Project Conditions Project generated VMT estimates for the Cal Poly campus are compared to this threshold to identify Project impacts.

Projects Effect on VMT Thresholds and Impact Criteria

The regionwide impact threshold for the Project's effect on VMT is expressed as follows:

- **Countywide:** San Luis Obispo County Cumulative Conditions boundary VMT per service population of 26.22.

Therefore, the Project's effect on VMT would exceed the applicable threshold if:

- The Project causes the cumulative countywide daily boundary VMT per service population to increase above 26.22.

The purpose of this comparison is to determine if the Project would result in an increase in the countywide boundary VMT from Cumulative Conditions to Cumulative with Project Conditions.

Results for SB 743 VMT Assessment

The results of the Project generated VMT and Project's effect on VMT analyses are presented in **Table 2** and **Table 3**, respectively.

Project Generated VMT

The Project generated VMT impacts under Existing with Project Conditions based on the countywide threshold is determined as follows:

- **Countywide:** As shown in **Table 2**, The Cal Poly Project generated VMT per service population of 24.26 for the Cal Poly campus is more than the countywide threshold of 19.22. Therefore, the Project generated VMT would exceed the applicable thresholds under Existing with Project Conditions.



The Project generated VMT per service population for the Cal Poly campus decreases by 16.8 percent from Existing Conditions to Existing with Project Conditions, which indicates the benefit of providing on-campus student, staff and faculty housing, and neighborhood residential. However, the Project generated VMT per service population of the Cal Poly campus under Existing with Project Conditions (24.26) is 7.3% greater than the San Luis Obispo generated VMT per service population under Existing Conditions (29.17) and 26.2 percent greater than the countywide Project generated VMT threshold.

TABLE 2: PROJECT GENERATED VMT FOR SB 743 VMT ASSESSMENT

	Existing Conditions	Existing with Project Conditions
Cal Poly Campus		
Vehicle Miles Traveled (A) ¹	957,900	1,090,800
Service Population (B) ^{1,2}	32,840	44,970
VMT per Service Population (A/B = C)	29.17	24.26
San Luis Obispo County		
Vehicle Miles Traveled (D) ¹	9,906,300	
Service Population (E) ^{1,2}	438,100	
VMT per Service Population (D/E = F)	22.61	

Notes:

1. Rounded service population and VMT to nearest 10.
2. Service population is defined as the sum of all employees, residents and students.

Source: Fehr & Peers, August 2019.

Projects Effect on VMT

The results of the analysis addressing the Project's effect on VMT under Cumulative with Project Conditions are presented in **Table 3** and are as follows:

- **Countywide:** As shown on **Table 3**, the countywide boundary VMT per service population of 24.68 under Cumulative with Project Conditions is less than the countywide threshold of 26.22. Therefore, the Project would not exceed the applicable thresholds relative to the Project's effect on VMT under Cumulative with Project Conditions.



TABLE 3: PROJECT’S EFFECT ON VMT (BOUNDARY VMT) FOR SB 743 VMT ASSESSMENT

	Cumulative Conditions	Cumulative with Project Conditions
San Luis Obispo County		
Vehicle Miles Traveled (D)	12,703,200	12,740,000
Service Population (E)	484,400	516,300
VMT per Service Population (D/E = F)	26.22	24.68

Notes:

1. Rounded service population and VMT to nearest 100.
2. Service population is defined as the sum of all employees, residents and students.

Source: Fehr & Peers, August 2019.

VMT Mitigation

A goal of the Cal Poly Master Plan is to accommodate student enrollment and on-campus neighborhood growth by providing transportation options that minimize the increase in vehicle trips and vehicle miles traveled. The campus can take actions to reduce daily trips and vehicle miles traveled by increasing the on-campus housing goal, and/or implementing a transportation demand management (TDM) and parking management plan. Potential actions the campus could take could include:

- Increase On-Campus Housing Goal – One obvious step to reduce the project’s effects would be to increase the on-campus housing goal.
- Enhance TDM Requirements – The transportation analysis evaluates project effects based on Cal Poly campus rates from the SLOCOG travel model. A reduction in daily trips and VMT could be achieved with but not limited to the following TDM measures:
 - Expand the local and regional public transit service
 - Support active transportation projects on and near the Cal Poly campus
 - Implement carpool and/or vanpool incentive programs
 - Offer remote working options
- Parking Management – To manage the parking supply, Cal Poly could manage future parking supply by implementing policies that focus on reducing academic and residential parking demand. Several parking pricing and management strategies that may reduce vehicle trip generation and VMT include:



- Restricting Parking Spaces by Student Class – No parking spaces for freshman and/or sophomores would reduce the residential parking demand.
- Adjusting the Cost of Parking Permits – This strategy could include higher cost for on-campus resident parking permits, tiered parking pricing based on the distance to the Cal Poly campus, and/or a tiered pricing from limited days (1-day, 2 days, etc.) These parking strategies would reduce the residential and academic parking demand.
- Establishing Designated Parking Locations by Academic Program – This parking management strategy would help manage the academic parking demand.
- Pick-Up/Drop-Off Charges – Solely relying on the number of parking spaces to manage vehicle trip generation does not account for emerging forms of transportation, such as Transportation Network Companies (e.g., Uber and Lyft) supporting delivery trips, and visitors. Therefore, to minimize increased trips by these emerging transportation modes could be accomplished by developing a parking district that charges for pick-up and drop-off on the Cal Poly campus.

The travel model shows that a small portion of the daily trips (less than 15 percent) travel outside of San Luis Obispo; however, these inter-county trips represent approximately 35 percent of the Project generated VMT for the Cal Poly campus. **Table 4** shows a percentage of Project generated VMT for the Cal Poly campus commute sheds (areas where the campus population travels to/from) is summarized under Existing Conditions and Existing with Project Conditions:

- 1) On-campus Project generated VMT with both trip ends on-campus;
- 2) Intra-County project generated VMT with one trip end on-campus and one trip end within San Luis Obispo (either the unincorporated or the incorporated portion of San Luis Obispo County); and
- 3) Inter-County project generated VMT with one trip end on-campus and one trip end outside of San Luis Obispo.

For comparative purposes, the San Luis Obispo County VMT is shown for Existing Conditions. This distribution of project generated VMT by commute shed can help guide the VMT reduction to target. Additional information from the Cal Poly campus would assist with understanding these distributions of project generated VMT by commute shed to help develop appropriate TDM and Parking Management policy responses.



TABLE 4: DISTRIBUTION OF PROJECT GENERATED VMT BY COMMUTE SHED

	Existing Conditions	Existing with Project Conditions
Cal Poly Campus		
On-Campus Project Generated VMT	0.5%	0.4%
Intra-County Project Generated VMT	64.0%	64.4%
Inter-County Project Generated VMT	35.5%	35.2%
San Luis Obispo County		
On-Campus Project Generated VMT	0.0%	
Intra-County Project Generated VMT	59.2%	
Inter-County Project Generated VMT	40.8%	

Notes:

1. Rounded percentage to nearest tenth of a percent.

Source: Fehr & Peers, August 2019.

Attachments

Attachment A: Summary of SLOCOG Model Inputs and VMT Adjustments

Attachment A: Summary of SLOCOG Model Inputs and VMT Calculations

At present, the San Luis Obispo Council of Governments (SLOCOG) travel model is the best tool available for developing 2018 and 2045 light-duty vehicle estimates for streets and highways in the County and for performance indicators such as vehicle miles traveled (VMT). The SLOCOG travel forecasting model was developed to provide improved countywide travel forecasting as part of continued planning efforts to address long-term transportation infrastructure needs. The SLOCOG travel model includes a 2015 base year, and a 2045 future year that reflect growth in San Luis Obispo County. The weekday daily model assignment is the sum of four time periods including: 1) morning peak period (6:00 to 9:00 AM), 2) mid-day peak period (9:00 AM to 4:00 PM), 3) evening peak period (4:00 to 7:00 PM), and 4) evening off-peak period (7:00 PM to 6:00 AM).

A review of the transportation analysis zones (TAZs) for unincorporated areas of San Luis Obispo County was undertaken. The review's purpose was to determine which TAZs should be included in the calculation of VMT for Cal Poly campus.

A map showing TAZs for the Cal Poly campus is shown in **Figure A-1**. As shown in **Figure A-1**, the travel demand model area includes all of San Luis Obispo County. Although not shown in **Figure A-1**, adjacent jurisdictions (e.g., Santa Barbara County, Kern, County, or Monterey County) are represented by external stations or gateways where major roadways provide access into the overall model area. These stations capture the traffic entering, exiting, or passing through the model area on major county and state roadways (e.g. Hwy 1, US 101, and SR 46). To include VMT outside of San Luis Obispo County, the distances listed in **Table A-1** were used to estimate VMT for Cal Poly campus or San Luis Obispo County trips occurring outside of San Luis Obispo County.

The land use inputs used for this analysis are summarized in **Table A-2**. The data dictionary for the land use codes is shown **Table A-3**.



Figure A-1: Cal Poly SLO TAZ Map

Table A-1: Summary of SLOCOG Model Inputs¹

Existing Conditions																
TAZ	TOTHH	HHPOP	RUG2	RUT1	RUG2_HHPOP	RUT1_S1_IN1	RUT1_S2_IN2	RUT1_A2564	RUT1_A65	POP2544	POP4564	POP6500	TOTEMP	EDUCHEALTH	RETAIL	COLLEGE
1570	0	0	0	0	0	0.049	0.044	0.675	0.24	0	0	0	0	0	0	0
1776	0	0	0	0	0	0.049	0.044	0.675	0.24	0	0	0	0	0	0	0
1777	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21812
2145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Existing with Project Condition																
TAZ	TOTHH	HHPOP	RUG2	RUT1	RUG2_HHPOP	RUT1_S1_IN1	RUT1_S2_IN2	RUT1_A2564	RUT1_A65	POP2544	POP4564	POP6500	TOTEMP	EDUCHEALTH	RETAIL	COLLEGE
1570	200	225	225	200	225	200	0.044	0.675	200	0	0	225	60	60	0	0
1776	190	400	400	190	400	0.049	190	190	0.24	120	280	0	7	0	7	0
1777	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25000
2145	190	400	400	190	400	0	190	190	0	120	280	0	7	0	7	0

Cumulative Conditions																
TAZ	TOTHH	HHPOP	RUG2	RUT1	RUG2_HHPOP	RUT1_S1_IN1	RUT1_S2_IN2	RUT1_A2564	RUT1_A65	POP2544	POP4564	POP6500	TOTEMP	EDUCHEALTH	RETAIL	COLLEGE
1570	0	0	0	0	0	0.049	0.044	0.675	0.24	0	0	0	0	0	0	0
1776	0	0	0	0	0	0.049	0.044	0.675	0.24	0	0	0	0	0	0	0
1777	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	21812
2145	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Cumulative with Project Conditions																
TAZ	TOTHH	HHPOP	RUG2	RUT1	RUG2_HHPOP	RUT1_S1_IN1	RUT1_S2_IN2	RUT1_A2564	RUT1_A65	POP2544	POP4564	POP6500	TOTEMP	EDUCHEALTH	RETAIL	COLLEGE
1570	200	225	225	200	225	200	0.044	0.675	200	0	0	225	60	60	0	0
1776	190	400	400	190	400	0.049	190	190	0.24	120	280	0	7	0	7	0
1777	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	25000
2145	190	400	400	190	400	0	190	190	0	120	280	0	7	0	7	0

Notes

1. Table includes select list of SLOCOG travel demand model land use changes to the TAZs representing Cal Poly SLO campus. Land use changes for Existing Conditions and Cumulative Conditions include college enrollment updates. Land use changes to Existing with Project Conditions and Cumulative with Project Conditions include college enrollment, retirement community, and workforce housing updates.

Table A-2: External Node ID Adjusted¹

Location	External Node	Link ID	Distance Added (miles)
Hwy 1 N	1	28442	75
US 101 N (A)	2	28443	40
US 101 N (B)	3	28455	40
Hwy 41 N	4	28445	75
Hwy 46 E	5	28447	50
Hwy 58 E	6	28449	50
Hwy 166 E	7	28451	60
Hwy 33 S	8	28450	60
US 101 S (A)	9	28452	2
US 101 S (B)	9	28453	2
Hwy 1 S	10	28454	10

Notes:

1. Distance added to external Node and corresponding link ID to capture VMT outside of the SLOCOG County boundary.

TABLE A-3: LAND USE CATEGORIES

Attribute	Description	Units
TOTHH	Total households in TAZ	Households
HHPP	Total population in TAZ	People
RUG2	Single family attached grouping	People
RUT1	Single family type (detached, attached, and rural groupings)	Households
IN1	Less than \$19,999	People
IN2	\$20,000 – \$39,999	People
POP2544	People 25 to 44 years	People
POP4564	People 45 to 64 years	People
POP6500	People 65 years and over	People
TOTEMP	Total employees	Employees
EDUCHEALTH	Educational care, Health Care, and social Assistance	Employees
RETAIL	Retail trade	Employees
COLLEGE	College enrollment	student enrollment

Source: SLOCOG Regional Travel Demand Model User's Guide, 2013
Fehr & Peers, 2019

Roadway	From	To	Existing				Existing Plus Project		Net Increase	
			Average Daily Pedestrian Volume	Average Daily Bicycle Volume	% of Total Ped ADT	% of Total Bike ADT	Average Daily Pedestrian Volume	Average Daily Bicycle Volume	Average Daily Pedestrian Volume	Average Daily Bicycle Volume
Grand Avenue	Slack Street	US 101 Northbound	639	532	11%	8%	732	610	93	78
E Foothill Boulevard	California Boulevard	Santa Rosa Street	1,806	1,344	31%	21%	2,070	1,541	264	197
California Boulevard	Campus	E Foothill Boulevard	603	656	10%	10%	691	752	88	96
California Boulevard	E Foothill Boulevard	Hathway Avenue	505	562	9%	9%	579	644	74	82
Railroad Safety Trail (along California Boulevard)	Campus	E Foothill Boulevard	499	918	9%	14%	572	1,052	73	134
Railroad Safety Trail (along California Boulevard)	E Foothill Boulevard	Hathway Avenue	1,230	1,517	21%	24%	1,410	1,739	180	222
Highland Drive	Mount Bishop Road	Santa Rosa Street	511	831	9%	13%	586	953	75	122

Source: City of San Luis Obispo Traffic Counts and Speed Surveys, 2019.

<http://slocity.maps.arcgis.com/apps/OnePane/basicviewer/index.html?appid=f808ee341ad743259b9f7b455cd7b69b>