

Appendix B: Supplemental Trip-Based VMT Sensitivity Analysis

MEMORANDUM

Date: June 1, 2020 Project #: 20345

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Project: Loomis Costco

Subject: Response to Placer County Air Pollution Control District Review Comments

This memorandum documents VMT sensitivity analyses prepared in response to questions and comments provided by the Placer County Air Pollution Control District (District) in a February 10, 2020 letter. After reviewing and discussing the VMT analysis presented in the Recirculated Draft Environmental Impact Report (RDEIR), the District expressed a position that the method of calculating project trip generation may underestimate the total number of new trips generated by the proposed Project that could, in turn, lead to an under-reporting of the projected VMT. The District recommended that the Town of Loomis revisit the method used to identify the new daily trips generated by the proposed Project, incorporating both the new trips generated by the proposed Loomis Costco and potential increases in member visits to the existing Roseville warehouse. The District also offered a suggested approach to determine the VMT. This memorandum presents the results of the supplemental sensitivity analysis in response to the District's suggestions.

ADDITIONAL COSTCO DATA

In response to the comments received, Costco provided additional data to further assess VMT changes. The following information was provided for the period from April 15 through May 12, 2019¹:

- Location of Costco members grouped within 1-mile grid areas who shopped at the existing Roseville Costco (warehouse and fuel station)
- Number of visits made by each Costco member who shopped at the existing Roseville Costco (warehouse and fuel station)
- Number of warehouse transactions, number of fuel station transactions, and number of same-day warehouse and fuel station transactions (internal trips)

¹ The April – May period was chosen to reflect a typical period while school was in session with no major holidays. Per Costco, the period tends to be busy related to approaching end-of-school year and graduation-related sales and early summer vacation activities.

- Market area of existing Roseville Costco versus the market area of Roseville Costco and Loomis Costco assuming the proposed Project is developed
 - Number of existing members that live within the Roseville site market area with the Loomis site operational
 - Number of visits by existing members that will reside within the new Loomis market area when the Loomis site is operational

This data was analyzed using GIS to identify the anticipated travel route between each one-mile grid area and the existing Roseville Costco. The travel route for each trip was then used to determine a 1-way trip length. For reference, Figure 1 illustrates the trip paths made from the one-mile grid areas to the existing Roseville Costco assuming all trips occur between the member home and the Costco site (i.e., no reductions for trips by members who also are using the roadway system for other shopping or work purposes). The average one-way trip length for these trips was identified through the GIS analysis as 20.94 miles.

EXISTING COSTCO MEMBER CHANGES WITH LOOMIS COSTCO OPEN

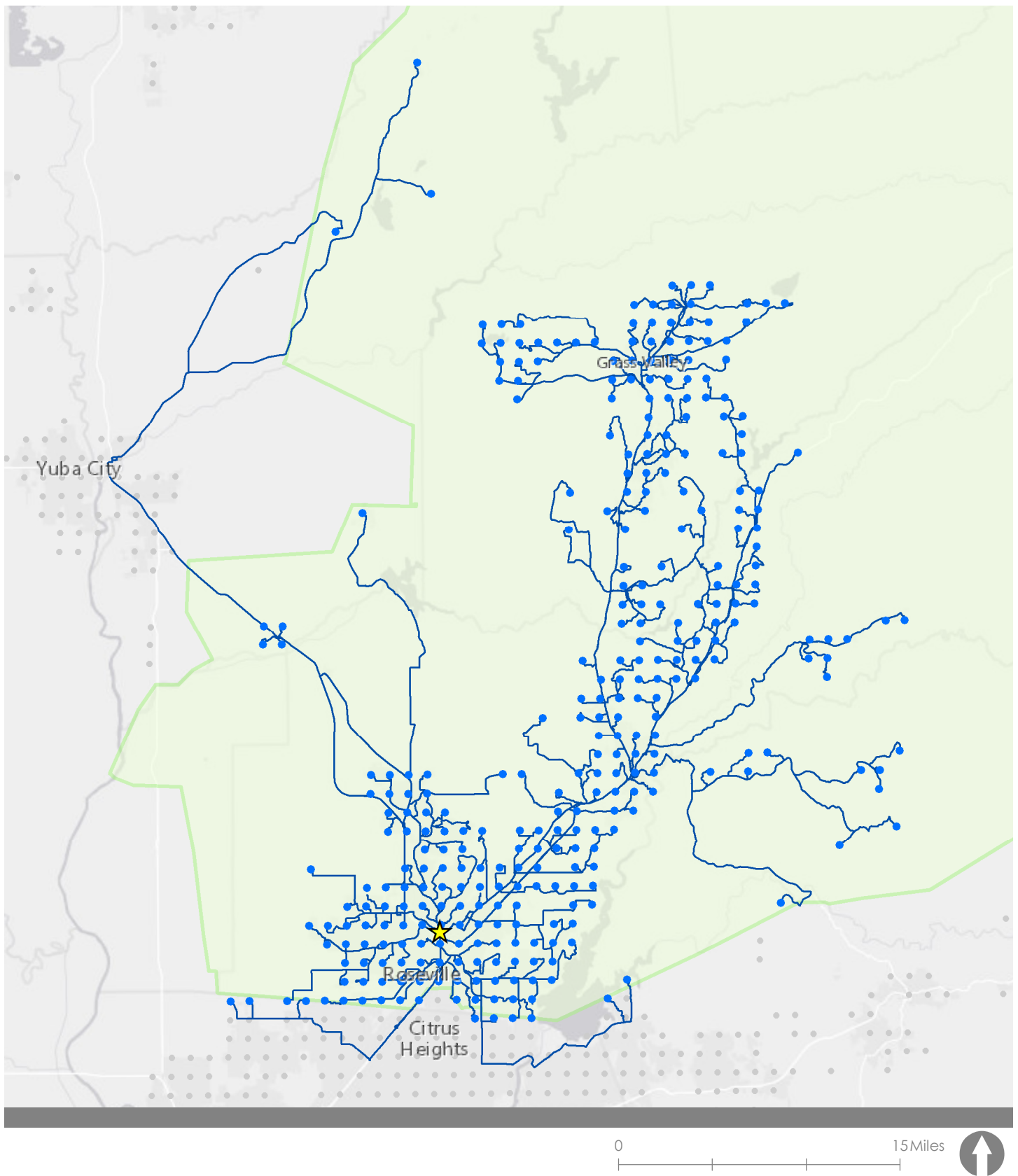
Figure 2 illustrates the revised market area for Roseville assuming the proposed Loomis Costco is opened. This figure also shows the corresponding travel routes of the members who continue to shop at Roseville. Figure 3 illustrates the market area assumed to be captured by the new Loomis Costco within which members are currently shopping at Roseville. This figure also shows the corresponding travel routes for the Loomis Costco member visits.

For ease of comparison, Figure 4 combines the two locations and their associated travel routes by members. This figure is helpful in understanding how the changes relate to the existing member-based behaviors at the Roseville location today.

As shown in comparing Figure 1 with Figure 2, the existing Roseville Costco market area shrinks relative to current conditions and the new Loomis Costco predominately serves the market area situated to the north and east. Based on the GIS analyses, the existing and future one-way average trip lengths are calculated² as:

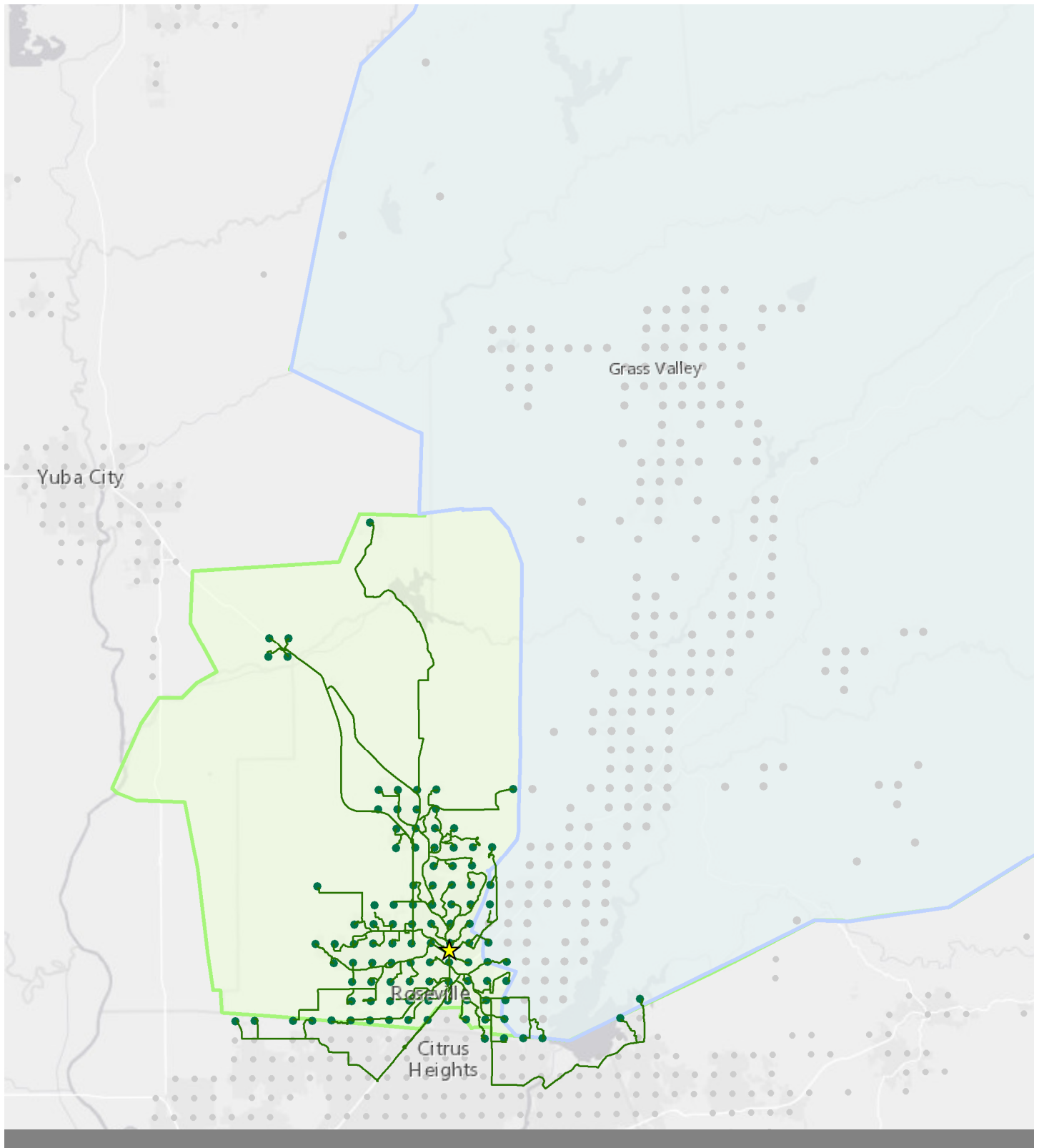
- Existing Roseville with no Loomis location = 20.94 miles
- Roseville once Loomis opens = 7.36 miles
- Loomis = 21.95 miles

² These trip lengths are different from the values presented in the Loomis Costco Transportation Impact Analysis (Loomis Costco TIA) because the Loomis Costco TIA was predicated on analysis by zip code and for an earlier time period. Despite the difference in grouping (zip code vs. more refined 1-mile grid) and analysis period, the current trip length analysis is very similar to the material previously presented in the Loomis Costco TIA (i.e., 7.2 miles for Roseville and 22 miles for Loomis).



- Roseville Members
- Roseville Routes
- ★ Roseville Costco
- Roseville Market

Figure 1

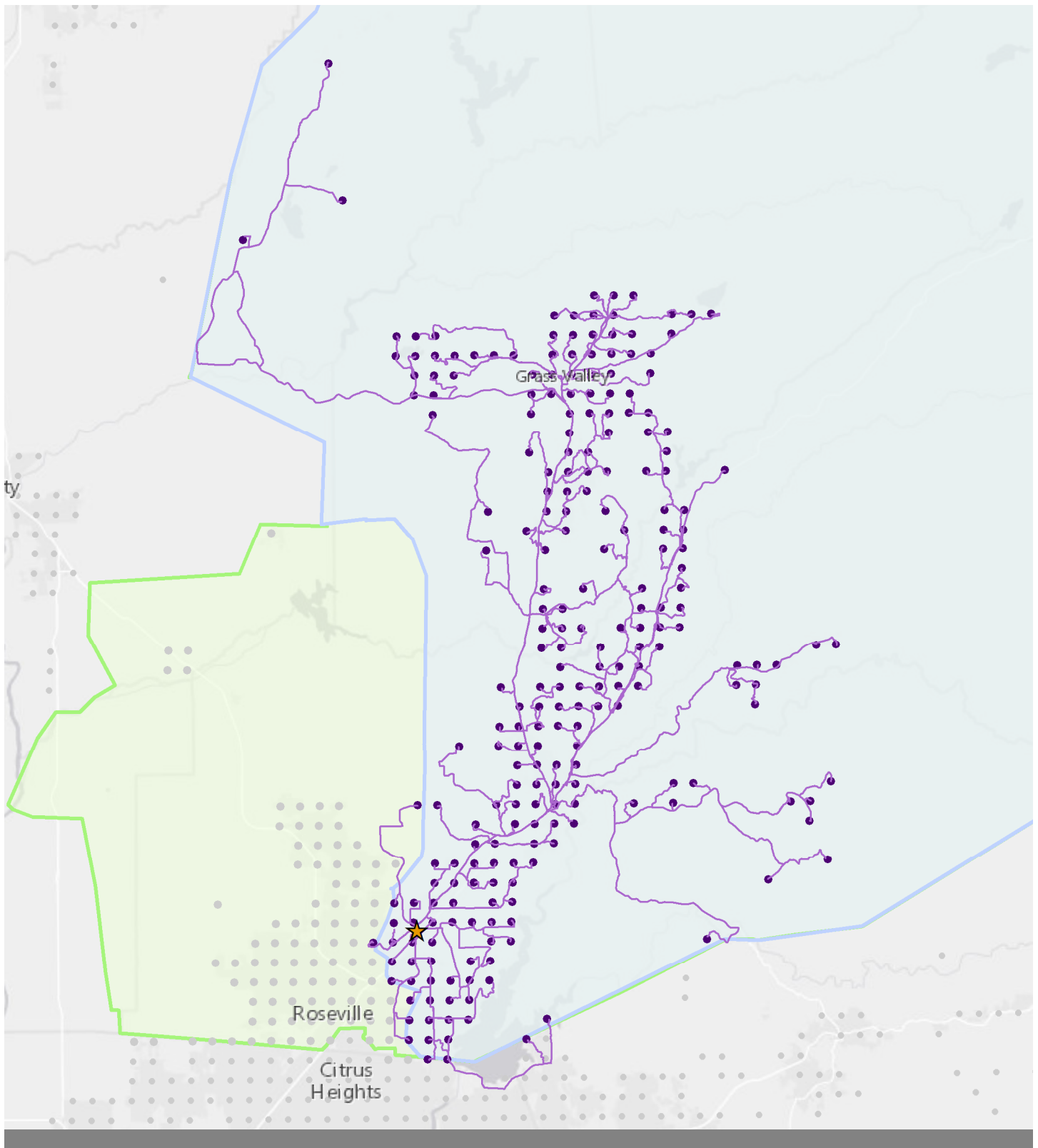


- Roseville Members — Roseville Routes
- ★ Roseville Costco ■ Roseville Market
- Loomis Market



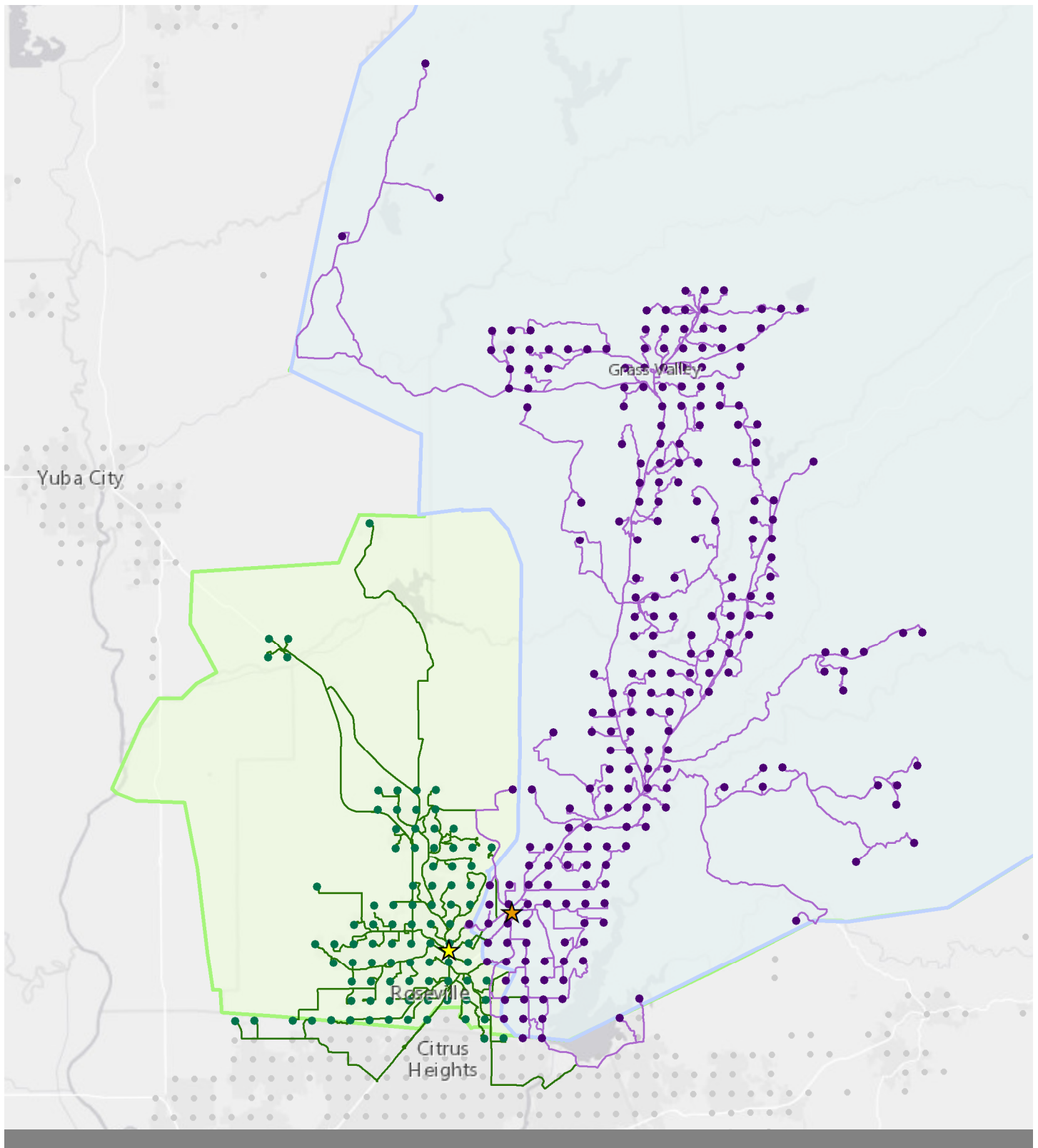
Figure 2

Roseville Costco Market Area Vehicle Travel Routes with Loomis Costco Open



- Loomis Members
 Loomis Routes
- Loomis Costco
 Loomis Market
- Roseville Market

Figure 3



- Roseville Members — Roseville Routes
- Loomis Members — Loomis Routes
- ★ Roseville Costco ■ Roseville Market
- ★ Loomis Costco ■ Loomis Market

0 15 Miles



Figure 4

EXISTING ROSEVILLE COSTCO TRIPS & VMT

Traffic counts were not collected at the existing Roseville Costco as part of the Loomis Costco TIA. Given the on-going COVID-19 pandemic, it is not possible to collect data now that would reflect “normal” travel patterns. Lacking the ability to conduct “existing” traffic counts, Roseville Costco Warehouse and Fuel Station transaction data for the period from April 15 through May 12, 2019 was used as a proxy for traffic counts. As previously noted, the data included same day trips to the warehouse and fuel station, allowing for elimination of internal shared trips associated with a member making a purchase at both the warehouse and fuel station.

Focusing on the mid-week Tuesday through Thursday period (consistent with best industry practices related to approximate typical weekday conditions) for the four weeks analyzed, an average of 8,094 distinct transactions per day were recorded. This average includes the elimination of the “internal” transactions that occurred at both the warehouse and the fuel station.

It can be reasonably assumed that each transaction is associated with two member trips, one entering the Costco site and one leaving. Thus, the number of daily member trips associated with the existing Roseville site is estimated as 16,188 (calculated as 8,094 transactions × 2).

In addition to the members trips, there will be employee trips, warehouse delivery trips and fuel delivery trips. Applying the Costco database trip type used in the Loomis Costco TIA (pass-by and diverted) data to the member trips and adding in the identical number of employee and delivery trips as were assumed for the proposed Loomis Costco, the Roseville Costco trip estimate prior to the Loomis Costco Project Opening is shown in Table 1 as 121,563 VMT.

Table 1. Estimated Roseville Costco VMT Before Proposed Loomis Costco Opens

Trip Type ¹	Weekday Trips	Average Trip Length (miles)	Vehicle Miles Traveled (VMT)
Member Primary (31.9%)	5,349 ²	20.94	112,008
Member Pass-by (33.3%)	5,570	0.00	0
Member Diverted (31.5%)	5,269	0.50	2,635
Employee (3.0%)	500	7.80	3,900
Warehouse Delivery (0.2%)	26	100.00	2,600
Fuel Station Delivery (0.1%)	14	30.00	420
Total	16,728	7.27 (weighted average)	121,563

¹ Percentages shown rounded to the nearest 0.1

² Value derived by subtracting pass-by, diverted, employee, warehouse delivery and fuel delivery trips from 16,728 total trips

It should be noted that the trips shown for the Roseville Costco site in Table 1 of this memorandum exceed the trip estimate provided for the Roseville Costco shown in Table 16 of the Loomis Costco TIA. The two estimates differ because:

1. The trips shown are for two different time periods. The trip estimates in Table 1 of this memorandum represent the Roseville Costco *before* the Loomis Costco opens while the trip estimates provided for the Roseville Costco shown in Table 16 of the Loomis Costco TIA represent the period *after* opening of the proposed Loomis Costco.

- The *existing* trip estimates provided in Table 1 of this memorandum are based on detailed member data from the Roseville Costco obtained since preparation of the Loomis Costco TIA whereas the trip estimates in Table 16 of the Loomis Costco TIA were estimated for a *future* condition based on the same trip rates assumed for Loomis Costco applied to the existing Roseville Costco warehouse building size.

PROPOSED LOOMIS COSTCO TRIPS & VMT

The trip generation of the Loomis Costco Project is estimated at 12,290 daily trips as documented in Table 12 of the Loomis Costco TIA. Note the primary trips in Table 2 are represented by the sum of the member primary trips as well as the employee, warehouse delivery and fuel station delivery trips (4,330 total primary trips). Table 2 of this memorandum summarizes the trips associated with the proposed Loomis Costco project by trip source and corresponding trip length as well as the associated VMT. The estimates presented in Table 2 include both new member trips and existing member trips that shifted from the Roseville Costco site to the proposed Loomis Costco Project site.

Table 2. Estimated Loomis Costco Project VMT

Trip Type ¹	Weekday Trips	Average Trip Length (miles)	Vehicle Miles Traveled (VMT)
Member Primary (30.8%)	3,790	21.95	83,191
Member Pass-by (33.3%)	4,090	0.00	0
Member Diverted (31.5%)	3,870	0.50	1,935
Employee (4.1%)	500	7.80	3,900
Warehouse Delivery (0.2%)	26	100.00	2,600
Fuel Station Delivery (0.1%)	14	30.00	420
Total	12,290	7.49 (weighted average)	92,046

¹ Percentages shown rounded to the nearest 0.1

CHANGES TO ROSEVILLE SITE VMT WITH LOOMIS COSTCO PROJECT OPEN

The Roseville Costco warehouse is expected to become less crowded with the new Loomis Costco Project opening as some Roseville Costco members shift to the Loomis Costco site (resulting in fewer trips to the Roseville site). As a result, one can postulate that new trips are expected at the Roseville Costco associated with a combination of new Roseville Costco members and increased shopping by existing Roseville members (i.e., "latent demand"). Estimates of the Roseville Costco-related VMT assuming opening of the Loomis Costco were calculated as outlined below.

Shift in Existing Roseville Costco Member Visits to Loomis Costco

The Loomis Costco TIA documents that an estimated 31 percent of existing Roseville Costco members are located north of the Loomis Project site and could therefore shift their membership to the Loomis Costco site reflective of a shorter travel distance. It is assumed that this 31 percent reduction could be applied evenly to primary, pass-by and diverted member trips.

New Costco Member Visits

Costco estimates a total regional membership of 104,200 for both the Roseville and Loomis warehouses as documented in the Loomis Costco TIA. Of these members, 9,100 are projected to be new members (approximately 8.7 percent growth in the total membership). The remaining 95,100 members are existing members who are currently visiting the Roseville site and are already traveling on the regional transportation network.

Changes in Member Visit Frequency

To assist with this analysis, Costco researched changes in member shopping frequency (latent demand) associated with other Costco warehouses in northern California. This research revealed how the opening of a new Costco warehouse impacted the market area of an existing nearby Costco warehouse. The research found that existing members tend to purchase more products at an existing Costco (increased sales) after the new Costco opening, but the increase in visit frequency (trips) is relatively minor in the “after” scenario for the original location. Table 3 below shows the average annual change in member shopping frequency (4.3%) at the representative California Costco warehouse locations examined after another Costco opened in the same market trade area³. As shown, the original “Costco” location has seen an average of 1.5 additional trips by each member per year as a result of “latent demand.”

Table 3. Change in Member Visit Frequency at Existing Costco Impacted by New Costco Opening

Costco Location	Average Annual Visit Frequency (trips per year)			
	Before	After	Change	% Change
Visalia Costco impacted by new Hanford Costco Opening	34.5	35.5	1	2.8%
Garden Grove Costco impacted by new Huntington Beach Costco	44	45.5	1.5	3.3%
South Sacramento Costco impacted by new Elk Grove Costco	27.5	29.5	2	6.8%
Average				4.3%

³ Data shown in Table 3 was obtained from Costco.

Application To Roseville Costco Trips

Table 4 presents an estimate of the Roseville Costco trip generation after opening of the proposed Loomis Costco, assuming the changes in member trips summarized above.

Table 4. Estimated Roseville Costco VMT After Proposed Loomis Costco Opens

Trip Type	Weekday Trips ¹ (A)	Trip Shift to Loomis Costco ² (B)	New Member Trips ³ (C)	Existing Member Trip Increase ⁴ (D)	Total Weekday Daily Trips ⁵	Average Trip Length (miles)	Vehicle Miles Traveled (VMT)
Member Primary (31.9%)	5,349	-1,658	+465	+179	4,335	7.36	31,906
Member Pass-by (33.3%)	5,570	-1,727	+485	+186	4,514	0.00	0
Member Diverted (31.5%)	5,269	-1,633	+458	+176	4,270	0.50	2,135
Employee (3.0%)	500	N/A	N/A	N/A	500	7.80	3,900
Warehouse Delivery (0.2%)	26	N/A	N/A	N/A	26	100.00	2,600
Fuel Station Delivery (0.1%)	14	N/A	N/A	N/A	14	30.00	420
Total	16,728	-5,018	1,408	541	13,659	3.0 (weighted average)	40,961

¹ Values from Table 1

² 31% reduction of trips in Column A due to member shift to new Loomis Costco

³ 8.7% increase of trips in Column A due to new members at Roseville Costco

⁴ 4.3% increase of trips by existing members at Roseville Costco due to reduced crowds; reflects 4.3% applied to total of Column A – Column B + Column C)

⁵ Reflects total of Column A – Column B + Column C + Column D

N/A = not applicable

TOTAL CHANGE IN COSTCO VMT

The overall change in VMT was estimated considering both the Roseville site and the proposed Loomis site as shown in Table 5.

Table 5. System Change in VMT associated with Loomis and Roseville Costco Sites

	VMT Estimate
Existing Condition VMT	
Roseville Costco Site (from Table 1)	121,563 VMT
Future Condition VMT with Loomis Costco Open	
Roseville Costco Site (from Table 4)	40,961 VMT
Loomis Costco Site (From Table 2)	92,046 VMT
Total (Roseville + Loomis)	133,007 VMT
Future Condition VMT – Existing Condition VMT	11,444 VMT

CONCLUSION

The VMT sensitivity assessment methodology presented in this letter projects a 11,444 VMT increase when considering both the new Loomis Costco and the change in Roseville Costco trip-making. The Loomis Costco TIA in the RDEIR projects the overall VMT increase to be 17,865 VMT (10,945 member related VMT + 3,900 employee related VMT + 3,020 delivery related VMT). As such, we conclude the 17,865 VMT estimate presented in both the Loomis Costco TIA and RDEIR is conservative and reasonable. Please contact us if you have questions or need additional information.