



Date: June 22, 2016
To: Dalene J. Whitlock, Principal, PE, PTOE, W-Trans
From: Jia Hao Wu, Yanping Zhang, Denis Wu, W & S Solutions, LLC.
Reference: Technical Memorandum on VMT Procedure and Computations Draft
Subject: A New CEQA Guidelines Based VMT Modeling for Six Project Sites in Arcata

Project Background

In this memorandum, W & S Solutions (W&S) discusses the new CEQA Guidelines based VMT modeling services for the project sites in Arcata study area using the 2013 Eureka County traffic model (called the Model). This model was provided by Caltrans District 1 in 2014 and is used to perform the VMT computations.

VMT Methodology

This modeling service is based on the new CEQA Guidelines on Evaluating Transportation Impacts regarding the VMT estimation dated on January 20, 2016. The Governor's Office of Planning and Research (OPR) is mandated by SB 743 in 2013 to revise the CEQA Guidelines to eliminate the use of Level of Service (LOS) in determining transportation impacts under CEQA. The second draft of the new CEQA Guidelines to implement SB 743 is released for public comment on January 20, 2016. OPR's draft continues to use vehicle miles travelled (VMT) as the appropriate measure of transportation impacts. In addition, the draft Guidelines include recommendations that land use development proposed near transit facilities, roadway rehabilitation, transit, bicycle, and pedestrian projects should be considered to have decreased significant transportation impacts. These fundamental changes in evaluating transportation impacts have created a significant amount of concern both in the development industry and the environmental consulting industry.

The basic assumptions include the use of the demand forecasting model, the road networks and land use data for 2010 and 2040:

1. The 2040 network assumptions are the same as the 2010 road network assumptions as in the Model;
2. The land use data in 2040 are different from the 2010 assumptions;
3. The OD vehicle demand patterns in the Model are used to estimate the new demands based on additional trips generated from and attracted to these six projects so that the trip patterns are consistent;
4. The new CEQA VMT thresholds are indicated as follows:
 - a. Residential: VMT/capita 15% below regional average in 2010
 - b. Office: VMT/employee 15% below regional average in 2010
 - c. Mixed Use: Internal trips are reflected in the Model.

OPR states that for "Vehicle Miles Traveled and Land Use Projects", a development project that results in vehicle miles traveled exceeding these applicable thresholds of significance may indicate a significant impact. Generally, development projects that locate within one-half mile of either an existing major transit stop or a stop along an existing high quality transit corridor may be presumed to cause a less than significant transportation impact. Similarly, development projects that decrease vehicle miles traveled in the project area compared to existing conditions may be considered to have a less than significant transportation impact. 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.

To summarize, the new CEQA guideline asks to compute VMT per capita or per employee for new development. A per capita or per employee VMT 15% below that of existing development may be a reasonable threshold. Thus W&S needs to compute all the average VMT per trip with a trip representing either a capita or employee for 2010 and year 2040 for each of the development sites and the whole region and compare to the 2040 without project average VMT and the regional averages as well. It is noted that there are vehicle trips in 2040 without project condition at these three TAZs where these six project sites are located. Here is the methodology for the VMT computations and definitions for the total VMT and Average VMT used for each project and the whole region as follows.

1. Identify the study area in terms of TAZs and total trips generated (trips out) and attracted (trips in) in each TAZ
2. Find 2010 and 2040 vehicle OD demands and vehicle distances by AM and PM peak periods in the Model
3. Compute the 2010 and 2040 without project VMT:
 - a. $VMT_AM = Demand_AM * Distance_AM$
 - b. $VMT_PM = Demand_PM * Distance_PM$
4. Compute the 2010 and 2040 without project average VMT:
 - a. $Average\ VMT_AM = VMT_AM / Demand_AM$
 - b. $Average\ VMT_PM = VMT_PM / Demand_PM$
5. Compute the 2040 vehicle OD demands with each of these projects to obtain total additional trips in and out using Table 1: New OD Demand_AM and New OD Demand_PM using 2040 OD Demand_AM, TripsIn_AM, TripsOut_AM and 2040 OD Demand_PM, TripsIn_PM, TripsOut_PM
6. Compute the 2040 with project VMT:
 - a. $New\ VMT_AM = New\ Demand_AM * Distance_AM$
 - b. $New\ VMT_PM = New\ Demand_PM * Distance_PM$
7. Compute the 2040 average with project VMT:
 - a. $New\ Average\ VMT_AM = New\ VMT_AM / New\ Demand_AM$
 - b. $New\ Average\ VMT_PM = New\ VMT_PM / New\ Demand_PM$

Six New Development Projects

The six development projects are shown in Figure 1 and trips for daily, AM peak hour and PM peak hour listed in Table 1. These projects are located in:

1. The Village (Apartments)
2. Canyon Creek (Apartments)
3. Open Door (Medical Office)
4. Sunset Terrace (Apartments)
5. Twin Parks (Apartments)
6. Creekside (Single Family, Assisted Living)

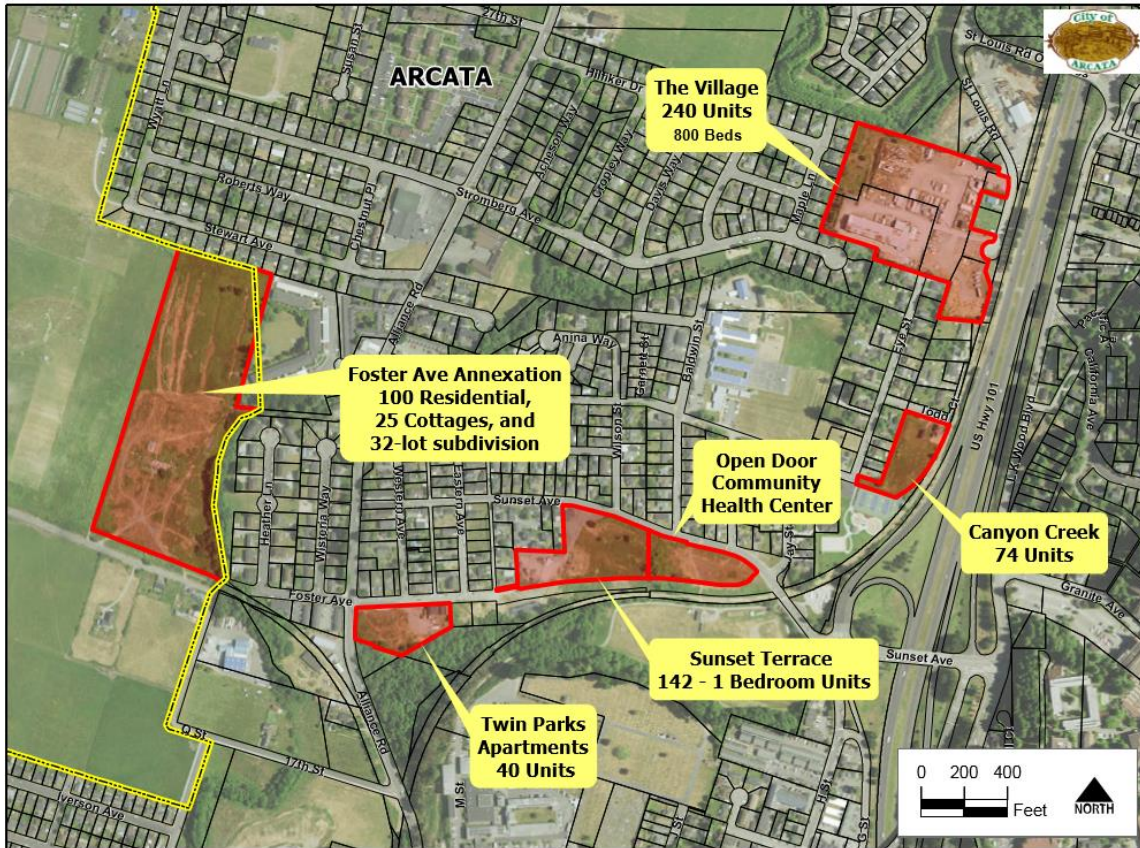


Figure 1: Study Area of 6 Projects with Land Use Data (Source: W-Trans)



Table 1: Total Trips In and Out by Daily, AM Peak Hour and PM Peak Hour

Trip Generation Summary of Project Development

Land Use	Units	Daily		AM Peak Hour				PM Peak Hour			
		Rate	Trips	Rate	Trips	In	Out	Rate	Trips	In	Out
The Village											
Apartments	240 du	6.57	1,578	0.51	121	24	97	0.62	150	97	53
Canyon Creek											
Apartments	74 du	7.73	572	0.54	40	8	32	0.79	58	38	20
Open Door											
Medical Office	30 ksf	36.13	1,084	2.39	72	57	15	3.57	107	30	77
Sunset Terrace											
Apartments	142 du	6.93	984	0.52	73	15	58	0.67	96	62	34
Twin Parks											
Apartments	40 du	9.15	366	0.58	23	5	18	0.99	40	26	14
Creekside											
Single Family	89 du	9.52	847	0.75	67	17	50	1.00	89	56	33
Assisted Living	100 beds	2.66	266	0.14	14	9	5	0.22	22	10	12
Total			5,697		410	135	275		562	319	243

Note: du = dwelling unit; ksf = 1,000 square feet (Source: W-Trans)

These six project sites are all located in three TAZs (242, 247 and 235) in the modeling network as shown in Table 2.

Table 2: Six Project Locations and Their TAZ IDs

ID	Development Site	TAZ
1	The Village Apt	242
2	Canyon Creek Apt	242
3	Open Door Com Health Ctr	247
4	Sunset Terrace Apt	247
5	Twin Park Apt	247
6	Creekside	235

VMT Computation Results

Based on the VMT computations, we obtained the following results:

1. 2040 without project trips and total and average VMT for each site: AM as shown in Table 3;
2. 2040 with project trips and total and average VMT for each site: AM as shown in Table 4;
3. 2040 without project trips and total and average VMT for each site: PM as shown in Table 5;
4. 2040 with project trips and total and average VMT for each site: PM as shown in Table 6.



A comparison between without and with projects for 2040 is obtained as shown in Table 7 below. While we see that the VMT Out and In increase by 30.76% (Out) and 25.43% (In) in AM and 38.17% (Out) and 40.22% (In) in PM, the averages of VMT per trip are very similar. Thus there are no significant changes in average VMT per capital. This may be due to 2040 having uncongested travel conditions and travel patterns and routes being similar with these new developments. If in 2040 the road system is very congested, then there will be longer travel routes with these higher VMT resulted from these additional trips. This would mean that average VMT per capital will increase significantly.

The CEQA guideline threshold states that a per capita VMT below 15% below 2010 existing condition is a reasonable threshold for no significant impact. Table 8 shows CEQA thresholds for both AM and PM for 2040 and that all the project sites generate average VMT less than these CEQA thresholds. Therefore these projects are of no significant impact.

Furthermore, the VMT based transportation impacts may be reduced by applying transportation demand management to reduce vehicle trips, building new roads to shorten travel distances as long as it doesn't trigger induced demand, and developing extensive mixed land use developments to a lot of intra zonal trips with no significant impacts.

Table 3: 2040 Without Project Trips and Total and Average VMT for Each Site: AM

ID	Development Site	TAZ	2040 Trips (Out)		2040 Trips (In)		2040 VMT Out	2040 VMT In	Avg VMT Out	Avg VMT In	Ave VMT
			Project	Without Project	Project	Without Project					
1	The Village Apt	242	0	159.82	0	117.5	790.91	764.42	4.95	6.51	5.71
2	Canyon Creek Apt	242	0	159.82	0	117.5	790.91	764.42	4.95	6.51	5.71
3	Open Door Com Health Ctr	247	0	91.79	0	40.86	424.93	232.33	4.63	5.69	5.00
4	Sunset Terrace Apt	247	0	91.79	0	40.86	424.93	232.33	4.63	5.69	5.00
5	Twin Park Apt	247	0	91.79	0	40.86	424.93	232.33	4.63	5.69	5.00
6	CreekSide	235	0	32.33	0	13.04	163.1	70.63	5.04	5.42	5.16
			0	627.34	0	370.62	3019.71	2296.46	4.81	6.20	5.41

Table 4: 2040 With Project Trips and Total and Average VMT for Each Site: AM

ID	Development Site	TAZ	2040 Trips (Out)		2040 Trips (In)		2040 VMT Out	2040 VMT In	Avg VMT Out	Avg VMT In	Ave VMT
			Project	With Project	Project	With Project					
1	The Village Apt	242	97	256.82	24	141.5	1273.9	917.18	4.96	6.48	5.60
2	Canyon Creek Apt	242	32	191.82	8	125.5	949.78	815.8	4.95	6.50	5.67
3	Open Door Com Health Ctr	247	15	106.79	57	97.86	493.88	557.23	4.62	5.69	5.19
4	Sunset Terrace Apt	247	58	149.79	15	55.86	694.5	317.41	4.64	5.68	4.96
5	Twin Park Apt	247	18	109.79	5	45.86	508.46	260.74	4.63	5.69	4.99
6	CreekSide	235	55	87.33	26	39.04	440.81	211.29	5.05	5.41	5.17
			275	902.34	135	505.62	4361.33	3079.65	4.83	6.09	5.35



Table 5: 2040 Without 2040 Trips and Total and Average VMT for Each Site: PM

ID	Development Site	TAZ	2040 Trips (Out)		2040 Trips (In)		2040 VMT Out	2040 VMT In	Avg VMT Out	Avg VMT In	Ave VMT
			Project	Without Project	Project	Without Project					
1	The Village Apt	242	0	103.85	0	133.41	553.38	656.58	5.33	4.92	5.11
2	Canyon Creek Apt	242	0	103.85	0	133.41	553.38	656.58	5.33	4.92	5.11
3	Open Door Com Health Ctr	247	0	52.27	0	63.16	240.59	299.56	4.60	4.74	4.68
4	Sunset Terrace Apt	247	0	52.27	0	63.16	240.59	299.56	4.60	4.74	4.68
5	Twin Park Apt	247	0	52.27	0	63.16	240.59	299.56	4.60	4.74	4.68
6	CreekSide	235	0	16.86	0	21.27	81.88	112.27	4.86	5.28	5.10
			0	381.37	0	477.57	1910.41	2324.11	5.01	4.87	4.93

Table 6: 2040 With Project Trips and Total and Average VMT for Each Site: PM

ID	Development Site	TAZ	2040 Trips (Out)		2040 Trips (In)		2040 VMT Out	2040 VMT In	Avg VMT Out	Avg VMT In	Ave VMT
			Project	With Project	Project	With Project					
1	The Village Apt	242	53	156.85	97	230.41	832.42	1133.7	5.31	4.92	5.08
2	Canyon Creek Apt	242	20	123.85	38	171.41	658.88	843.56	5.32	4.92	5.10
3	Open Door Com Health Ctr	247	77	129.27	30	93.16	596.34	441.52	4.61	4.74	4.67
4	Sunset Terrace Apt	247	34	86.27	62	125.16	396.94	594.25	4.60	4.75	4.69
5	Twin Park Apt	247	14	66.27	26	89.16	304.98	423.07	4.60	4.75	4.69
6	CreekSide	235	45	61.86	66	87.27	300.22	451.46	4.85	5.17	5.05
			243	624.37	319	796.57	3089.78	3887.56	4.95	4.88	4.91



Table 7: Comparison between Without and With Project Results in 2040

	ID	Development Site	TAZ	AM								PM							
				Trips (Out)		Trips (In)		VMT Out	VMT In	Avg VMT Out	Avg VMT In	Trips (Out)		Trips (In)		VMT Out	VMT In	Avg VMT Out	Avg VMT In
				Without Project	With Project	Without Project	With Project					Without Project	With Project	Without Project	With Project				
2040 Without Project	1	The Village Apt	242	0	159.82	0	117.5	790.91	764.42	4.95	6.51	0	103.85	0	133.41	553.38	656.58	5.33	4.92
	2	Canyon Creek Apt	242	0	159.82	0	117.5	790.91	764.42	4.95	6.51	0	103.85	0	133.41	553.38	656.58	5.33	4.92
	3	In Door Com Health	247	0	91.79	0	40.86	424.93	232.33	4.63	5.69	0	52.27	0	63.16	240.59	299.56	4.60	4.74
	4	Sunset Terrace Apt	247	0	91.79	0	40.86	424.93	232.33	4.63	5.69	0	52.27	0	63.16	240.59	299.56	4.60	4.74
	5	Twin Park Apt	247	0	91.79	0	40.86	424.93	232.33	4.63	5.69	0	52.27	0	63.16	240.59	299.56	4.60	4.74
	6	Creekside	235	0	32.33	0	13.04	163.1	70.63	5.04	5.42	0	16.86	0	21.27	81.88	112.27	4.86	5.28
				0	627.34	0	370.62	3019.71	2296.46	4.81	6.20	0	381.37	0	477.57	1910.41	2324.11	5.01	4.87
2040 With Project	1	The Village Apt	242	97	256.82	24	141.5	1273.9	917.18	4.96	6.48	53	156.85	97	230.41	832.42	1133.7	5.31	4.92
	2	Canyon Creek Apt	242	32	191.82	8	125.5	949.78	815.8	4.95	6.50	20	123.85	38	171.41	658.88	843.56	5.32	4.92
	3	In Door Com Health	247	15	106.79	57	97.86	493.88	557.23	4.62	5.69	77	129.27	30	93.16	596.34	441.52	4.61	4.74
	4	Sunset Terrace Apt	247	58	149.79	15	55.86	694.5	317.41	4.64	5.68	34	86.27	62	125.16	396.94	594.25	4.60	4.75
	5	Twin Park Apt	247	18	109.79	5	45.86	508.46	260.74	4.63	5.69	14	66.27	26	89.16	304.98	423.07	4.60	4.75
	6	Creekside	235	55	87.33	26	39.04	440.81	211.29	5.05	5.41	45	61.86	66	87.27	300.22	451.46	4.85	5.17
				275	902.34	135	505.62	4361.33	3079.65	4.83	6.09	243	624.37	319	796.57	3089.78	3887.56	4.95	4.88
Percent Change	1	The Village Apt	242		37.77%		16.96%	37.91%	16.66%	0.23%	-0.37%		33.79%		42.10%	33.52%	42.09%	-0.41%	-0.02%
	2	Canyon Creek Apt	242		16.68%		6.37%	16.73%	6.30%	0.05%	-0.08%		16.15%		22.17%	16.01%	22.17%	-0.16%	0.00%
	3	In Door Com Health	247		14.05%		58.25%	13.96%	58.31%	-0.10%	0.14%		59.57%		32.20%	59.66%	32.15%	0.22%	-0.07%
	4	Sunset Terrace Apt	247		38.72%		26.85%	38.81%	26.80%	0.15%	-0.07%		39.41%		49.54%	39.39%	49.59%	-0.04%	0.11%
	5	Twin Park Apt	247		16.39%		10.90%	16.43%	10.90%	0.04%	-0.01%		21.13%		29.16%	21.11%	29.19%	-0.02%	0.05%
	6	Creekside	235		62.98%		66.60%	63.00%	66.57%	0.06%	-0.08%		72.74%		75.63%	72.73%	75.13%	-0.07%	-2.03%
					30.48%		26.70%	30.76%	25.43%	0.41%	-1.73%		38.92%		40.05%	38.17%	40.22%	-1.23%	0.28%



Table 8: CEQA Significant Criterion vs. 2010 and 2040 Ave. VMT for Each Project Site

	Area	Area	AM			PM		
			2010	2040	CEQA	2010	2040	CEQA
			Avg VMT		Threshold	Avg VMT		Threshold
		Regional	7.71	8.44		7.31	8.02	
Without Project	1	The Village Apt	5.30	5.71	6.55	4.72	5.11	6.22
	2	Canyon Creek Apt	5.30	5.71	6.55	4.72	5.11	6.22
	3	Open Door Com Health Ctr	4.88	5.00	6.55	4.62	4.68	6.22
	4	Sunset Terrace Apt	4.88	5.00	6.55	4.62	4.68	6.22
	5	Twin Park Apt	4.88	5.00	6.55	4.62	4.68	6.22
	6	CreekSide	5.05	5.16	6.55	5.06	5.10	6.22
			Ave. VMT	5.13	5.41	6.55	4.70	4.93
With Project	1	The Village Apt		5.60	6.55		5.08	6.22
	2	Canyon Creek Apt		5.67	6.55		5.10	6.22
	3	Open Door Com Health Ctr		5.19	6.55		4.67	6.22
	4	Sunset Terrace Apt		4.96	6.55		4.69	6.22
	5	Twin Park Apt		4.99	6.55		4.69	6.22
	6	CreekSide		5.17	6.55		5.05	6.22
			Ave. VMT		5.35	6.55		4.91
Note. 1 CEQA Threshold = 2010 Avg VMT*0.85								
2. If 2040 VMT is less than CEQA Threshold, then there is no significant impact. All the projects are of significant impact.								