

**Attachment: Traffic Analysis Results**

Traffic simulation modeling analysis was completed for Santa Cruz Ave from Alameda De Las Pulgas to Junipero Serra Blvd. Analysis was performed for existing conditions as well as road diet conditions. Traffic counts used for this study were conducted by Quality Counts in April of 2012 and include turn counts for vehicles, pedestrians and bicycles.

These analyses were performed utilizing the Highway Capacity Manual (HCM) and its guidelines and definitions for Level of Service (LOS) and vehicular delays.

The HCM defines LOS as the average total vehicle delay of all movements through an intersection. Vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time.

LOS	Average Delay/Vehicle (sec/veh)	
	Signalized Intersection	Unsignalized intersection
A	≤10	≤10
B	>10 - 20	>10 - 15
C	>20 - 35	>15 - 25
D	>35 - 55	>25 - 35
E	>55 - 80	>35 - 50
F	>80	>50

### ***Study Area Configuration***

On the east side of Alameda DLP currently a bike lane is striped from Avy Ave to the north down to Alameda DLP. There is a gap in the bike lane from Alameda DLP through the intersection with Sand Hill Rd. The bike lane continues from a point south of Sand Hill Rd through the intersection with Junipero Serra Blvd and southwardly on Alpine Rd.



## Existing Conditions Analysis

The existing conditions for the three intersections of this study were evaluated and the results are summarized in the table below.

EXISTING CONDITIONS		AM				PM			
		Volume	Delay (s/v)	LOS	95% Queue (ft)	Volume	Delay (s/v)	LOS	95% Queue (ft)
<b>Santa Cruz and Alameda DLP</b>									
Alameda DLP	EB	679	21.4	C	137	381	12.8	B	124
Campo Bello Ln	NEB	14	26.6	C	16	9	46.6	D	17
Santa Cruz	NWB	851	12	B	103	1161	10.2	B	278
Santa Cruz	SB	369	21.4	C	137	440	40.5	D	245
<b>Santa Cruz and Sand Hill</b>									
Santa Cruz	NWB	1196	43.1	D	355	1096	17.8	B	178
Santa Cruz	SEB	1070	45	D	353	905	17.4	B	162
Sand Hill	NEB	1682	76.6	E	873	1152	265.2	F	352
Sand Hill	SWB	861	60.6	E	248	1661	333.9	F	533
<b>Santa Cruz and Alpine/Junipero Serra</b>									
Santa Cruz	SB	1208	31.7	C	375	1146	20.2	C	156
Junipero Serra	WB	294	16.9	B	63	1022	28.4	C	422
Alpine	NB	1587	21	C	325	706	42.9	D	260

Santa Cruz Ave and Alameda DLP: This intersection currently operates at acceptable levels of service with reasonable delays and queues during the AM and PM peak hours. (San Mateo County Intersection)

Santa Cruz Ave and Sand Hill Rd: This intersection currently functions at an unacceptable LOS of E for the intersection with average delays of 58.4 seconds per vehicle. Sand Hill Ave suffers extensive delays both in the AM and PM peak hours with extensive queue lengths due to the large number of vehicles utilizing this intersection. (Shared San Mateo County and City of Menlo Park Intersection)

Santa Cruz Ave and Alpine Rd/Junipero Serra: This intersection currently operates at acceptable levels of service with reasonable delays and queues during the AM and PM peak hours. (City of Menlo Park Intersection)



Existing AM



Existing PM

## Road Diet Conditions Analysis

- Road Diet in the NB Direction:**

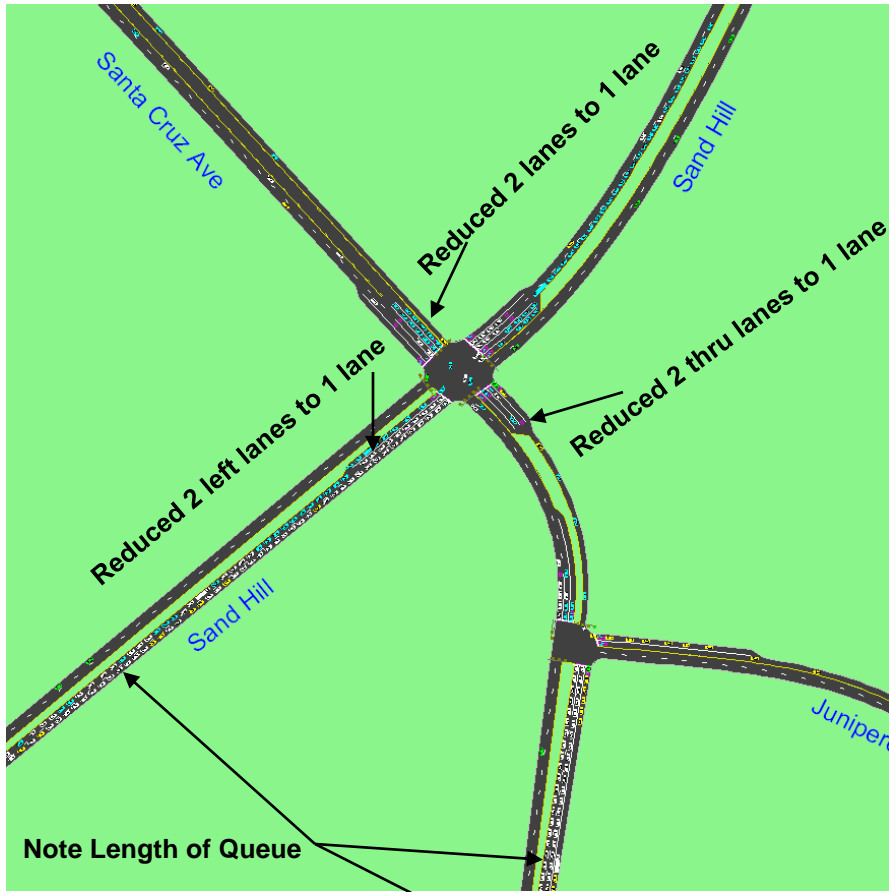
The system's conditions for the three study intersections were evaluated under road diet conditions and the results are summarized in the table below. Under the NB road diet condition, one lane is eliminated in the NWB direction of Santa Cruz Ave to provide space for a bike lane.

NB ROAD DIET ONDITIONS		AM				PM			
		Volume	Delay (s/v)	LOS	95% Queue (ft)	Volume	Delay (s/v)	LOS	95% Queue (ft)
<b>Santa Cruz and Alameda DLP</b>									
Alameda DLP	EB	679	21.4	C	281	381	12.8	B	124
Campo Bello Ln	NEB	14	26.6	C	16	9	46.6	D	17
Santa Cruz	NWB	851	12	B	278	1161	10.2	B	278
Santa Cruz	SB	369	21.4	C	125	440	40.5	D	245
<b>Santa Cruz and Sand Hill</b>									
Santa Cruz	NWB	1196	124.6	F	1008	1096	34.6	C	446
Santa Cruz	SEB	1070	45	D	353	905	17.4	B	162
Sand Hill	NEB	1682	209.9	F	873	1152	570	F	527
San Hill	SWB	861	61.4	E	248	1661	638.6	F	533
<b>Santa Cruz and Alpine/Junipero Serra</b>									
Santa Cruz	SB	1208	31.7	C	375	1146	20.2	C	156
Junipero Serra	WB	294	16.9	B	63	1022	28.4	C	442
Alpine	NB	1587	21	C	325	706	42.9	D	260

Santa Cruz Ave and Alameda DLP: This intersection will continue to operate at acceptable levels of service with reasonable delays and queues during the AM and PM peak hours. (San Mateo County Intersection)

Santa Cruz Ave and Sand Hill Rd: This intersection will be completely overwhelmed under road diet conditions. There is a massive volume of vehicles that utilize this intersection. Eliminating a lane from Santa Cruz Ave will in turn eliminate turn lanes from other approaches to turn onto Santa Cruz Ave and thereby pushing the intersection into failure. Almost all approaches will function at LOS F, with queues reaching to upstream intersections. (Shared San Mateo County and City of Menlo Park Intersection)

Santa Cruz Ave and Alpine Rd/Junipero Serra: This intersection will continue to operate at acceptable levels of service with reasonable delays and queues during the AM and PM peak hours. (City of Menlo Park Intersection)



NB Road Diet AM



NB Road Diet PM

- **Road Diet in the SB Direction:**

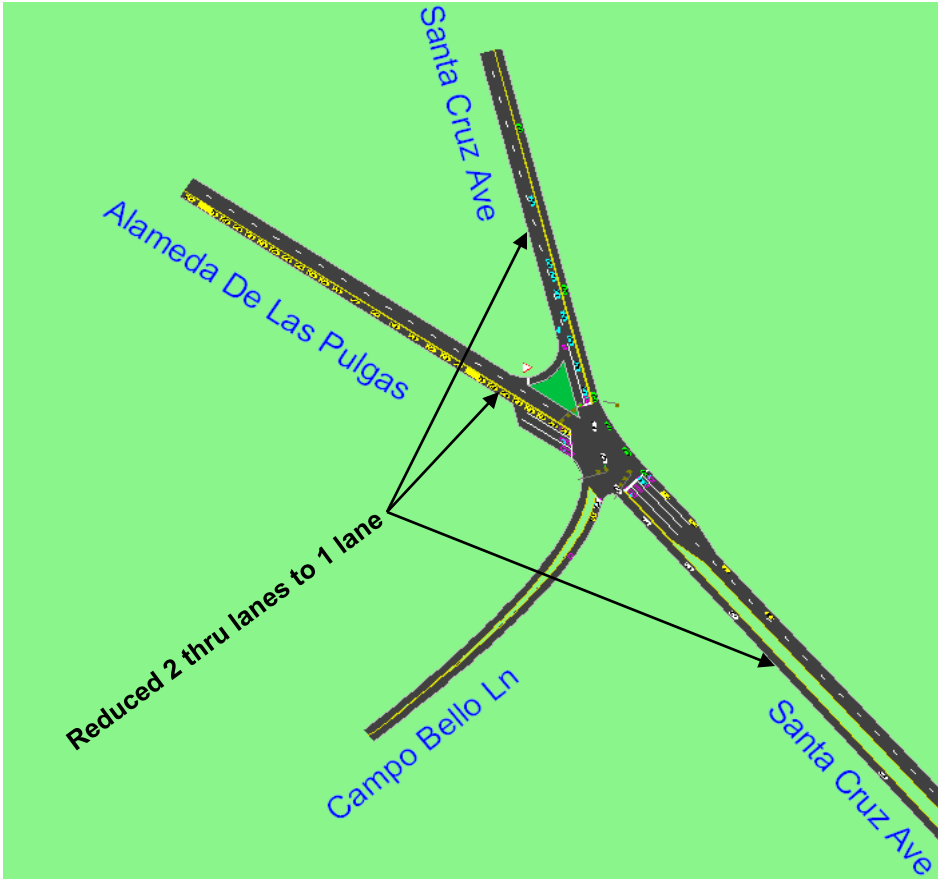
The system's conditions for the three study intersections were evaluated under road diet conditions and the results are summarized in the table below. Under the SB road diet condition, one lane is eliminated in the SEB direction of Santa Cruz Ave to provide space for a bike lane.

SB ROAD DIET CONDITIONS		AM				PM			
		Volume	Delay (s/v)	LOS	95% Queue (ft)	Volume	Delay (s/v)	LOS	95% Queue (ft)
<b>Santa Cruz and Alameda DLP</b>									
Alameda DLP	EB	679	21.3	C	281	381	15.7	B	262
Campo Bello Ln	NEB	14	26.6	C	16	9	46.6	D	17
Santa Cruz	NWB	851	12	B	184	1161	10.2	B	278
Santa Cruz	SB	369	27.6	C	264	440	61.5	E	533
<b>Santa Cruz and Sand Hill</b>									
Santa Cruz	NWB	1196	43.1	D	355	1096	24.9	C	182
Santa Cruz	SEB	1070	45	D	353	905	17.4	B	108
Sand Hill	NEB	1682	76.6	E	873	1152	265.2	F	352
San Hill	SWB	861	60.6	E	248	1661	333.9	F	533
<b>Santa Cruz and Alpine/Junipero Serra</b>									
Santa Cruz	SB	1208	31.7	C	375	1146	20.2	C	156
Junipero Serra	WB	294	16.9	B	63	1022	28.4	C	442
Alpine	NB	1587	21	C	325	706	42.9	D	260

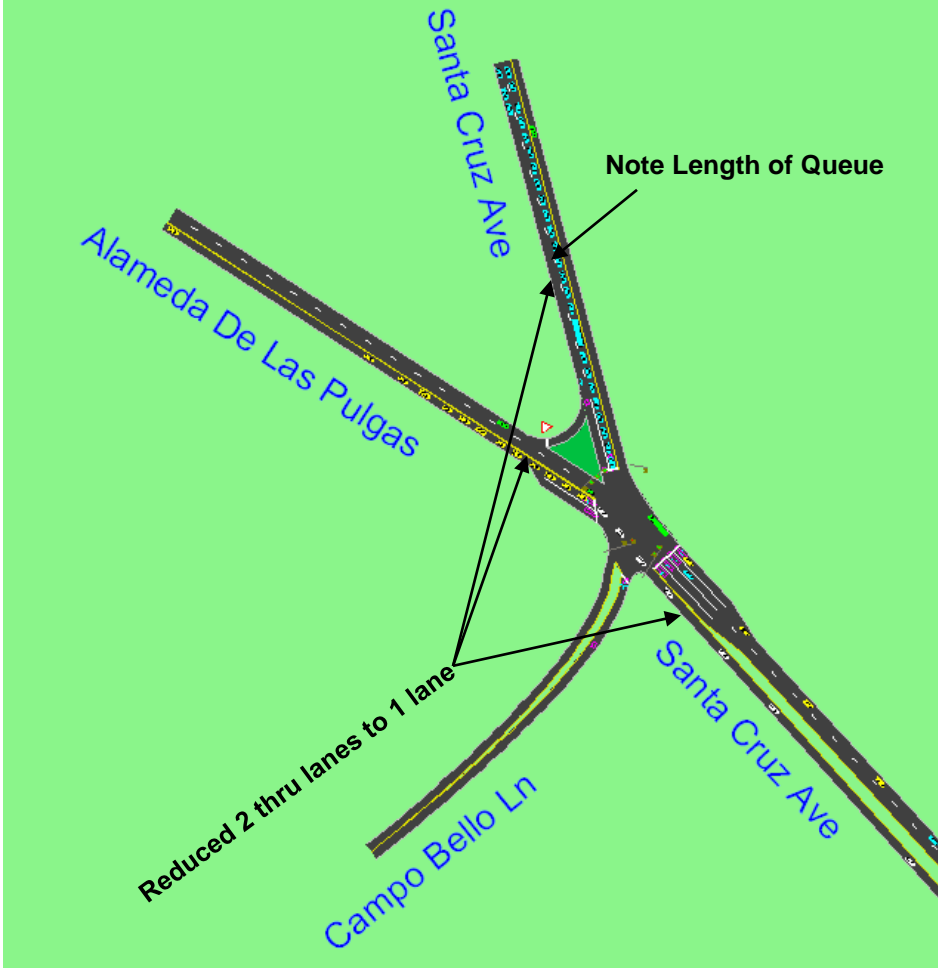
Santa Cruz Ave and Alameda DLP: This intersection will no longer operate at acceptable levels of services. The southbound direction of Santa Cruz will experience average delays of 61 seconds per vehicle with queues reaching well over 500 feet during the PM peak hour. It should be noted with queues this long, there is a chance of increased cut-through traffic on Sharon to Alameda DLP during the PM peak hour. The intersection will experience reasonable delays and queues during the AM peak hour. (San Mateo County Intersection)

Santa Cruz Ave and Sand Hill Rd: This intersection is currently overwhelmed with unacceptable delays and long queues and it will suffer even more under road diet conditions. However, it should be noted that the additional delays on this intersection due to a SB road diet are minimal. (Shared San Mateo County and City of Menlo Park Intersection)

Santa Cruz Ave and Alpine Rd/Junipero Serra: This intersection will continue to operate at acceptable levels of service with reasonable delays and queues during the AM and PM peak hours. (City of Menlo Park Intersection)



SB Road Diet AM



SB Road Diet PM



## ***Recommendations:***

Based on the results of this study, a NB Road Diet is not recommended for Santa Cruz Avenue due to severe congestion imposed upon the intersection with Sand Hill Road. This intersection currently has significant delays due to the large vehicular volumes. Eliminating any auxiliary lanes will push the intersection into even more severe congested gridlock conditions.

A SB Road Diet may be a viable option as it only adversely impacts the SB Santa Cruz traffic at the Alameda DLP during the PM peak with LOS of E. However, the queues during the PM peak will be in excess of 500 feet and that will encourage drivers to cut through Sharon Rd to get to Alameda DLP. Sharon Rd already experiences cut-through issues and traffic calming measures have been installed on Sharon Rd to alleviate this issue. Sharon Rd, Avy Ave and Altschull Ave are all a part of this neighborhood and can potentially be affected. Due to increased congestion on SB Santa Cruz at Alameda and potential for increase of cut-through traffic on Sharon Rd, a SB road diet is not recommended at this time.

A significant number of bicyclists utilize this intersection. It is of utmost importance to this Department to provide a configuration that can be optimally used by bicyclists as well as motorist. It is most advantageous and safe to have separate bike lanes dedicated to the bicyclists as shared lanes can be confusing and not as safe. There is very limited space on Santa Cruz to provide separate bike lanes (60.8 feet of space at the narrow point of Santa Cruz). As eliminating a travel lane is not a reasonable option, this Department proposes the elimination of parking along Santa Cruz Ave during the hours of 7:00-9:00 AM and 4:00-6:00 PM to accommodate the bicyclists outside of the motorist travel lanes.

It should be noted that there is high demand for parking along Santa Cruz at this location, and removing parking will meet great resistance from the residents, especially from Menlo Commons. This Department has proposed to eliminate some parking along this segment of Santa Cruz and has not been able to get approval due to great opposition. This Department feels that not having parking during peak hours is a reasonable compromise that will address bicyclists concerns during the peak hours, yet save overnight and midday parking for the residents during less congested times.