## **Appendix N** Alternatives Transportation Impact Analysis

## Stanford University Medical Center

**Draft Environmental Impact Report** 

## **Transportation Impact Analysis**

## **Alternatives Analysis**

Prepared by

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## 1.0 SUMC Alternatives

A total of seven alternatives have been proposed for the SUMC expansion. The first six SUMC alternatives do not entail more traffic being generated than the base proposal analyzed in the main report. Five of the proposed alternatives would have no additional trips being generated, while the sixth alternative considers the full build-out of SUMC being equivalent to 60% of the base proposal. The seventh alternative consists of the full SUMC expansion but with built-in housing units to reduce travel. The following sections discuss all seven alternatives.

## 1.1 No Project Alternative A – Retro Fit Work Only / No New Structures

As the name implies, this alternative involves only structural retrofitting and there would be no change in the size of SUMC from today. Some structures at SUMC do not comply with current building requirements and they have to be upgraded by 2013 and 2030 – deadlines imposed by SB 1953 for retrofit or replacement of hospital facilities. As a result, no additional traffic would be generated by SUMC if this alternative is adopted. No quantitative analysis is necessary for the purposes of the EIR.

## 1.2 No Project Alternative B – Replace SB 1953 Non Compliant Building at Maximum Allowable FAR

This alternative would increase the actual footage of SUMC by 9,064 square feet. This area is allowed under the current FAR of 1.0. The additional area would allow the hospital to 'right-size' and the resultant number of beds would be 285 less than the current number. As a result, there would not be an increase in the number of trips generated. No quantitative analysis is necessary for the purposes of the EIR if this alternative is adopted.

## **1.3 Historic Preservation Alternative**

This alternative would retain the 1959 Hospital Building complex and construct the same building program as the base SUMC project. However, in order to preserve trees, the module in the median of Pasteur Drive would be moved to the main hospital area at Pasteur and Welch. No quantitative analysis is necessary for the purposes of the EIR if this alternative is adopted as it would be the same as the base proposal analysis presented in the main report.

## **1.4 Tree Preservation Alternative**

This alternative would construct the same building program as the base SUMC project but would preserve trees by moving the module in the median of Pasteur Drive to the main hospital area at Pasteur/Welch. No quantitative analysis is necessary for the purposes of the EIR if this alternative is adopted as it would be the same as the base proposal analysis presented in the main report.

## 1.5 Reduced Intensity Alternative A – Right-Size SHC and LPCH Facilities without Adding Beds

The current SUMC has a combined total of 713 beds. For this alternative, the number of beds would remain the same although the net area would be increased by 446,000 square feet. This alternative would allow SUMC to 'right-size' its current number of beds in order to accommodate the additional space needed for modern facilities. As employee and patient numbers are expected to stay the same, no new

trips would be generated. Therefore, no quantitative analysis is necessary for the purposes of the EIR if this alternative is adopted.

## 1.6 Reduced Intensity Alternative B – Right-Size SHC and LPCH Facilities Plus Add Square Footage in an Amount Less than the Proposed Project

In this alternative, SUMC would be 'right sized' with additional square footage to operate at a level equivalent to approximately 60% of the base proposed expansion presented in the main report. Quantitative analysis of this project alternative is presented in Chapters 2 and 3.

## 1.7 Village Concept Alternative

The 'Village Concept' (VC) alternative is part of the planning process to lower the number of trips generated by SUMC by providing housing for SUMC employees within the project vicinity. In addition, the VC aims to enhance and improve the environment for non-motorized travel in and around the project site. Analysis of this alternative is presented in Chapters 4 and 5.

## 2.0 Project Impact for Reduced Intensity Alternative B

The following sections discuss the project impact on the different transportation elements in the analysis year of 2025.

## 2.1 Trip Generation

The trip generation for this alternative is presented in Table 1. The hospital size used for determining the number of trips generated is equivalent to 60% of the full build-out. The Medical Office Building (MOB) is at 100% build-out.

Land Use	Sizo			AM Peak			PM Peak	
	3120	Daily	In	Out	Total	In	Out	Total
Stanford Hospita	als and Clinics and	d Lucile Pa	ckard Chi	ldren's Ho	spital:			
Trip	Rates		0.62	0.2	0.82	0.23	0.58	0.81
Hospitals	512,982 s.f. <sup>1</sup>		318	103	421	118	298	416
Hospitals Subtotal		5630	318	103	421	118	298	416
Medical Office B	uildings:							
Trip	Rates		2.02	0.62	2.64	0.55	1.64	2.19
701 Welch	(56,300 s.f.)		(114)	(35)	(149)	(31)	(92)	(123)
703 Welch	(23,500 s.f.)		(47)	(15)	(62)	(13)	(38)	(51)
1101 Welch	(40,100 s.f.)		(80)	(24)	(104)	(22)	(66)	(88)
Hoover Pavilion	144,230 s.f.		291	89	380	79	236	315
MOB Subtotal		661	50	15	65	13	40	53
TOTALS		6291	368	118	486	131	338	469

 Table 1

 Stanford University Medical Center (SUMC) Trip Generation Estimate

Notes: s.f. = square feet.

 Trip generation for hospitals and clinics are at 60% of growth and occupancy as per Fehr and Peers Trip Generation methodology, Nov 14 2007 memo. Source: AECOM 2008

## 2.2 Intersection Analysis

The project trips presented in Table 1 were distributed according to the same percentages presented in the main report and added to the 2025 No Build traffic volume at each of the 66 study intersections. Figures 1 presents the No Build traffic volumes for 2025. Figure 2 presents the 60% SUMC volumes. Figure 3 presents the 'With Project (60% SUMC)' traffic volumes in 2025.

Table 2 presents the LOS comparison for all study intersections between the 2025 No Build and With 60% SUMC scenarios. The impacted intersections are highlighted. The TRAFFIX calculations are presented in Appendix A.

In the AM peak hour, four intersections would be impacted.

• El Camino Real / University Avenue -Palm Drive (#10) – LOS changes from LOS E to F with the average critical delay increasing by 12.8 seconds and the V/C increased by 0.033. This intersection is significantly affected by the project.

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STANFORD EIR **Figure 1a** 





STANFORD EIR Figure 1b



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STANFORD EIR Figure 2a 60% SUMC VOLUMES

AM (PM) Peak Hour

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STANFORD EIR Figure 2b

60% SUMC VOLUMES

AM (PM) Peak Hour

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STANFORD EIR Figure 2c

60% SUMC VOLUMES AM (PM) Peak Hour

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Etter SUMO Volumes etc			

STANFORD EIR Figure 2d 60% SUMC VOLUMES AM (PM) Peak Hour

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$17 \qquad \qquad$	<b>18</b> (1000000000000000000000000000000000000		

STANFORD EIR Figure 3a

2025 WITH 60% SUMC VOLUMES AM (PM) Peak Hour



$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	21 (122) (1	22 (381)2002 100(123) 103(103) 179(323) 22 (381)202 (381)202 (100) (111(101) Churchill 101(103) 179(323) (100) (1
23 23 23 23 23 23 23 23 23 23	<b>74</b> 745 742(629) 742(	25 (864) (864) (864) (864) (127(202) (103) Campus Dr E (103) (103) Campus Dr E (103) (10)	28 (143) 28 (143) 28 (143) 23 (1434) 23 (1434) 23 (1434) 23 (1434) 23 (15 (0) 53 (0) 53 (0) 53 (0) 54 (1434) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) 5 (0) (0) 5 (0) (0) (0) (0) (0) (0) (0) (0)
26 (21) (21) (21) (22) (21) (22) (22) (21) (22) (22) (21) (22) (	27	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Band Hill (212) Sand Hill (212) A111 (215) A111 (2
30 (0.998) SC2 (0.998) SC2	31 <sup>™</sup> <sup>™</sup> <sup>™</sup> <sup>™</sup> <sup>™</sup> <sup>™</sup> <sup>™</sup> <sup>™</sup>	32 (1) (1) (2) (2) (2) (2) (2) (2) (2) (2	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
$34 \qquad \qquad$	<b>35</b> (67) (111) (67) (111) (11) (111)	36 (1) (1) (1) (1) (1) (1) (1) (1)	

STANFORD EIR Figure 3b

2025 WITH 60% SUMC VOLUMES AM (PM) Peak Hour





Figure 3c 2025 WITH 60% SUMC VOLUMES AM (PM) Peak Hour



$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$57 \qquad \qquad$	$58 \qquad (i) \\ -37(173) \\ -244(205) \\ Welch Rd \\ \hline 5 (35) \\ 411(346) \\ \hline \\ 5 (35) \\ 411(346) \\ \hline \\ 68(12) \\ 88(12) \\ (100) \\ 88(12) \\ (100) \\ 88(12) \\ (100) \\ ($	59 (M) <sup>LG</sup> Inassed (071) HF7 → 164(297) (103(92)) 233(258) → 61(42) →
60 (http://www.anditationality.com/ (	61 (0821) 0082)995 → 165(141) 173(278) 302(213) → 362(325) →	62 sdurg give give give give give give give giv	63 (25) (25) (25) 094 → 434(892) 434(892) 434(892) 434(892) 434(892) 434(892) 400 Rd Alpine Rd 678(611) 167(219) → 88 167(219) → 167(219)
64 sdue & 796(1320) ← 639(1781) Page Mill Rd 0 (0) 1133(635) ← (0) 1133(635) ← (0) 0 (0) 1133(635) ← (0) 1133	65 (100) 751(471) 172(82) 65 (100) 65 (100) 65 (100) 74 (10) 150(269) 903(420) 90	66 (122) 66 (122) 66 (122) 66 (122) 60 (122) 60 (122)	

Figure 3d 2025 WITH 60% SUMC VOLUMES AM (PM) Peak Hour

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## Table 2 LOS Comparison with 60% SUMC in 2025

		Impact		N	N	٢	z	z	Z	z	Ν	Z	$\mathbf{F}$	z	N	N	N	Ν	z	Z	Y	Y	N	N	Z	≻	z	z	z
mpare		A Crit V/C		0.013	0.015	0.008	0.013	0.018	0.005	0.018	0.029	0.018	0.045	0.008	0.008	0.01	0.01	0.011	0.01	0.01	0.028	0.014	0.009	0.008	0.007	0.01	0.008	0.007	0.01
U U		A Avg Crit	Delay	2.6	-0.1	1.9	-0.2	2.1	-0.1	0.7	-1.5	4.9	9.4	1.3	0.3	0	0	0.1	3.3	2	5	3.7	0.6	0.1	1.4	4	0.5	0.1	2.6
MC		Crit	V/C	0.925	0.629	0.97	0.541	0.943	0.578	0.744	0.608	0.993	0.988	0.944	0.765	0.737	0.743	0.767	1.048	0.972	0.95	0.969	0.824	0.68	0.937	1.146	0.802	0.625	1.001
50% SUI	PM	Avg Del	(sec)	52.9	21.3	60.6	12.4	42.7	13.8	37.7	24.6	41.2	62.5	56.4	23.3	26.5	27.7	28.1	69.4	52.7	64.2	57.5	33.6	38.7	36.8	111.5	21.2	13.7	82.1
2025 +(			LOS	D-	C+	Ш	В	D	В	D+	C	D	E	E+	С	С	С	C	Е	D-	Е	E+	C-	D+	D+	ш	C+	В	ш
7		Crit	V/C	0.912	0.614	0.962	0.528	0.925	0.573	0.726	0.579	0.975	0.943	0.936	0.757	0.727	0.733	0.756	1.038	0.962	0.922	0.955	0.815	0.672	0.93	1.136	0.794	0.618	0.995
No Builc	PM	Avg Del	sec)	51.6	21.5	58.9	12.6	41.6	13.9	36.7	22.8	38.4	51.6	55.5	23.1	26.5	27.7	28.1	67.2	51.6	60.1	54.5	33.3	38.8	36	109.2	20.6	13.6	79.8
2025		/	OS (5	D-	C+	E+	В	D	В	D+	C+	D+	D-	E+	С	С	С	С	Е	D-	Ш	D-	C-	D+	D+	ш	C+	В	ы
		bact ?		N	N	Z	z	z	z	z	z	z	٨	z	N	N	N	z	٢	z	z	z	N	N	Z	z	z	z	z
pare		Crit Imp	>	0.015	0.017	0.022	0.014	0.015	0.015	0.006	0.031	0.023	0.033	0.014	0.015	0.004	0.011	0.011	0.016	0.01	0.021	0.02	0.007	.008	0.005	0.004	0.019	0.019	0.006
Com		'g Δ (	y Vr	0.6 (	-0.2 (	2.6 (	-0.1 (	0.3 (	0.1 (	0.4 (	2.1 (	1 (	12.8 (	1.2 (	0.3 (	0 (	-0.1 (	0.1 (	5 (	0.6	0.5 (	4.2	0.1 (	0.1 (	0.4 (	1.9 (	0.7 (	0.7 (	0.4 (
		∆ A\ Cri	Delá	21	69	24	49	25	02	13	28	51	14	67	82	54	51	60	48	53	78	94	15	74	78	34	74	25	93
SUMC		Crit	V/C	3 0.8	6 0.5	9 0.9	3 0.5	3 0.8	4 0.7	4 0.6	4 0.5	7 0.6	7 1.	8 0.8	7 0.6	6 0.	6 0.5	8 0.7	7 1.0	7 0.8	8 0.6	5 0.8	8 0.6	2 0.6	7 0.7	9 1.2	6 0.	4 0.6	3 0.6
5 + 60%	AM	Avg Del	(sec)	39.	15.	47.	9.	26.	15.	27.	15.	18.	87.	-20	24.	18.	23.	25.	69.	40.	36.	45.	28.	41.	23.	126.	14.	14.	2
2025			LOS	D	В	D	A	c	В	С	В	-8	Ł	D	С	-B	С	С	Е	D	+D	D	С	D	С	ш	В	B	D-
ild		Crit	V/C	0.806	0.552	0.902	0.535	0.81	0.687	0.607	0.497	0.628	1.107	0.853	0.667	0.536	0.54	0.698	1.032	0.843	0.657	0.874	0.608	0.666	0.773	1.23	0.721	0.606	0.687
5 No Bu	AM	Avg Del	(sec)	39	15.8	46.5	9.5	26.1	15.3	25.5	14.1	18.1	79.5	49.9	24.5	18.7	23.8	25.8	66.6	40.6	36.4	41.7	28.7	41.3	23.5	126	14.2	14	50.8
202			LOS	D	В	D	A	C	В	С	В	ė	ப்	D	С	B-	С	C	Е	D	D+	D	С	D	с	ш	В	В	D
		Intersection		El Camino Real / Valparaiso Avenue	El Camino Real/Santa Cruz Avenue	El Camino Real / Ravenswood Avenue	El Camino Real / Roble Avenue	El Camino Real / Middle Avenue	El Camino Real / Cambridge Avenue	EI Camino Real / Sand Hill Road-Alma Street	El Camino Real / Quarry Road	Alma Street / Lytton Avenue	El Camino Real/ University Avenue-Palm Drive	El Camino Real/ Embarcadero Road-Galvez Street	El Camino Real/ Churchill Avenue	El Camino Real / Serra Street-Park Drive	El Camino Real / Stanford Avenue	El Camino Real/ California Avenue	El Camino Real/ Page Mill Road-Oregon Expressway	Woodland Avenue/ University Avenue	Middlefield Road/ Willow Road	Middlefield Road / Lytton Avenue	Middlefield Road / University Avenue	Middlefield Road / Embarcadero Road	Alma Street / Churchill Avenue	Junipero Serra Boulevard-Foothill Expressway/Page Mill Road	Junipero Serra Boulevard / Stanford Avenue	Junipero Serra Boulevard / Campus Drive East	Junipero Serra Boulevard / Campus Drive West
_		#		#1	#2	#3	#4	£#	9#	L#	8#	6#	#10	#11	#12	#13	#14	#15	#16	#17	#18	#19	#20	#21	#22	#23	#24	#25	#26
				_	-	-		-							-	-	_							_					

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		20	125 No BL	uild	2025	+ 60% SU	IMC	0	ompare		202	5 No Bui	Id	2025 -	+60% SL	JMC	C	ompare	
			AM			AM						PM			PM				
#	Intersection		Avg Del	Crit		Avg Del	Crit	Δ Avg Crit	A Crit	mpact ?		Avg Del	Crit		Avg Del	Crit	Δ Avg Crit	Δ Crit	mpact
		LOS	(sec)	V/C	LOS	(sec)	V/C	Delay			LOS	(sec)	V/C	LOS	(sec)	V/C	Delay		
#27	Junipero Serra Boulevard/Alpine Road- Santa Cruz Avenue	D+	36.6	0.902	D+	37.3	0.909	0.8	0.007	z	D	48.8	0.963	D	50.5	0.973	1.9	0.01	z
#28	Sand Hill Cir- I-280 / Sand Hill Road	D+	36.9	0.723	D+	37.9	0.736	0.9	0.013	z	C+	22.4	0.722	Ċ,	22.5	0.736	0.3	0.014	z
#29	Sharon Park Drive / Sand Hill Road	С	30.7	0.842	С	31.1	0.856	0.7	0.014	N	С	27.8	0.892	С	28.4	0.904	0.9	0.012	N
#30	Santa Cruz Avenue / Sand Hill Road	D-	52.5	1.067	E+	58.1	1.1	11.6	0.033	٢	D	44.7	0.832	D	45.5	0.845	0.8	0.013	N
#31	Oak Avenue / Sand Hill Road -Vine Street	А	6	0.702	A	9.1	0.722	0.1	0.02	N	A	6	0.847	A	9.6	0.866	0.8	0.019	N
#32	Stock Farm Road / Sand Hill Road	В	17	0.627	В	17.2	0.643	0.4	0.016	z	Ċ	34.4	0.833	D+	38.8	0.854	6.7	0.021	Ν
#33	Pasteur Drive / Sand Hill Road	Ъ	18.5	0.585	Ъ	19.6	0.611	1.7	0.026	z	ပ	26.8	0.678	ပ	28.2	0.691	2	0.013	z
#34	Arboretum Road / Sand Hill Road	C+	20.5	0.52	C+ C	21.5	0.571	1.5	0.051	z	C	30.6	0.689	Ċ	32.6	0.705	3.3	0.016	N
#35	Arboretum Road / Quarry Road	C	31.6	0.517	Ċ	32.5	0.557	0.8	0.04	z	C	28.8	0.61	C	29.1	0.64	1	0.03	N
#36	Arboretum Road / Palm Drive	C	24.6	0.856	C	27.1	0.889	4.2	0.033	z	C+	21.2	0.744	Ċ	22.1	0.75	0.1	0.006	Ν
#37	Arboretum Road / Galvez Street / (unsignalized)	Е	38.8	0.772	Е	42.3	0.798	3.5	0.026	z	F	230.5	1.463	F	251.4	1.514	20.9	0.051	Υ
#38	EL Camino Real / Charleston Road	D-	53.1	0.877	D-	53.5	0.885	0.6	0.008	N	Е	65.4	0.992	Е	66.2	0.996	1.1	0.004	Ν
#39	Alma Street / Charleston Road	E+	55.8	0.965	E+	57	0.972	1.6	0.007	z	ப்	76.2	1.055	ப்	77.8	1.061	2.1	0.006	z
#40	Middlefield Road / Charleston Road	D	46.6	0.828	D	46.7	0.829	0.1	0.001	z	D	47.5	0.848	D	47.6	0.849	0.1	0.001	N
#41	Middlefield Road / Hamilton Avenue	В	17	0.508	В	17.6	0.523	0.7	0.015	z	Ŗ	18.7	0.431	Ъ	19	0.445	0.3	0.014	N
#42	Alma Street / Hamilton Avenue	В	14.3	0.59	В	15.2	0.608	0.9	0.018	z	C+	20.6	0.694	Ċ	20.9	0.7	0.3	0.006	Ν
#43	University Drive / Santa Cruz Avenue	C+	22.8	0.612	C+	22.9	0.615	0.2	0.003	z	C	29.5	0.718	ပ	29.6	0.722	0.1	0.004	Ν
#44	El Camino Real / Oak Grove Avenue	С	30.4	0.655	С	30.3	0.673	-0.1	0.018	N	D+	35	0.745	D+	35	0.761	0.2	0.016	Ν
#45	Middlefield Road / Ringwood Avenue	C	30.4	0.704	ပ	30.4	0.705	0.1	0.001	z	ċ	33.8	0.868	Ċ	33.8	0.869	0.1	0.001	N
#46	Middlefield Road / Ravenswood Avenue	С	30.6	0.865	С	31.5	0.874	1.2	0.009	N	D-	54.1	1.008	E+	56	1.017	2.4	0.009	Υ
#47	El Camino Real / Encinal Road	C+	20.2	0.658	C+	20.1	0.672	0.1	0.014	N	C+	21.3	0.686	C+	21.2	0.698	0	0.012	Ν
#48	Bay Road / Marsh Road	В	13.3	0.606	В	13.3	0.611	0	0.005	N	В	12.6	0.537	В	12.6	0.542	0	0.005	Ν
#49	Marsh Road / US 101 SB Off-Ramp	B-	19.2	0.812	Ŗ	19.3	0.813	0	0.001	N	С	28.1	0.954	С	28.5	0.959	0.9	0.005	N
#50	Marsh Road / US 101 NB Off-Ramp	В	15.1	0.612	В	15.1	0.612	0	0	N	C+	21.3	0.932	C+	21.3	0.932	0	0	N
#51	Bay Road / Willow Road	B-	18.8	0.648	B-	18.7	0.66	0	0.012	N	В	17.5	0.619	В	17.9	0.664	-4.4	0.045	Z
#52	Bayfront Expressway / Willow Road	D	42.5	0.969	D	43.2	0.977	1.6	0.008	N	F	115.6	1.221	F	117.9	1.228	3	0.007	Υ
#53	University Avenue / Bayfront Expressway	D	43.5	1.057	D	44.2	1.062	1.6	0.005	N	F	104.6	1.167	F	106.6	1.173	2.3	0.006	Υ
#54	Bay Road / University Avenue	D+	38.8	0.836	D+	38.8	0.839	0.1	0.003	N	F	96.1	1.166	F	96.7	1.168	0.9	0.002	N
#55	Donohoe Street / University Avenue	ш	73.9	1.018	ш	74.5	1.021	0.8	0.003	z	D	43	0.899	D	43	0.899	0	0	z
#56	Welch Road / Quarry Road	C+	20.9	0.558	C+	22.2	0.605	2.3	0.047	N	C+	21.4	0.541	С	23.2	0.581	3	0.04	Ν
#57	Durand Way / Sand Hill Road	В	12.1	0.662	В	12.8	0.683	1.1	0.021	Z	B-	19.5	0.617	B-	19.8	0.634	0.4	0.017	Z
#58	Pasteur Drive NB / Welch Road	А	8.8	0.354	А	8.9	0.373	0.1	0.019	N	B+	10.5	0.433	B+	10.6	0.45	0	0.017	Ν
#59	Pasteur Drive SB / Welch Road	Β+	10.1	0.31	B+	10.2	0.34	0.2	0.03	Z	A	8.5	0.272	A	8.6	0.289	0	0.017	z

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Compare		t Impact		z	z	~	7	7	z	~
Compare										_
Ŭ		Δ Crit	212	0.017	0.002	0.025	0.004	0	0.004	0.002
		Δ Avg Crit	Delay	0.9	0.4	6.1	0.3	0	0.6	-0.3
JMC		Crit	V/C	0.648	0.923	1.814	0.562	0.276	1.501	0.813
+60% SL	PM	Avg Del	(sec)	28	31.8	211.8	25	16.1	101.5	96.8
2025			LOS	С	D	ш	С	С	F	ц
p		Crit	V/C	0.631	0.921	1.789	0.558	0.276	1.497	0.811
25 No Bui	ΡM	Avg Del	(sec)	26.8	31.4	205.7	24.7	16.1	100.9	797
20:			LOS	С	D	ч	С	С	F	ц
		Impact ?		Z	Z	٨	z	N	z	N
Compare		Δ Crit	710	0.024	0.002	0.032	0.01	0.004	0	0.001
0		Δ Avg Crit	Delay	4.5	0.2	7.5	2.9	0.5	0.5	-0.5
JMC		Crit	V/C	0.756	0.889	2.506	1.715	0.636	1.386	0.744
+ 60% Sl	AM	Avg Del	(sec)	35.4	23.7	331.1	276.6	45.1	123.1	105.4
2025			LOS	D+	С	ш	F	Е	F	F
uild		Crit	V/C	0.732	0.887	2.474	1.705	0.632	1.386	0.743
25 No Bu	AM	Avg Del	(sec)	32.5	23.5	323.6	273.7	44.6	122.6	105.8
20			LOS	Ċ	С	ц	F	Е	Ł	ч
		Intersection		Durand Way Extension / Welch Road	Bowdoin Street / Stanford Road / (unsignalized)	Alpine Road / I-280 NB Off-Ramp (unsignalized)	Alpine Road / I-280 SB Off-Ramp (unsignalized)	Page Mill / I-280 NB Off-Ramp/ (unsignalized)	Page Mill Road / I-280 SB Off-Ramp (unsignalized)	Foothill Expressway / Arastradero Road
		#		09#	19#	#62	#63	#64	#65	99#

- El Camino Real / Page Mill Road-Oregon Expressway (#16) LOS remains at E. The average critical delay increased by 5 seconds and the V/C increased by 0.016. This intersection is significantly affected by the project.
- Sand Hill Road / Santa Cruz Avenue (#30) LOS changes from LOS D to E and therefore this intersection is considered significantly affected by the project.
- Alpine Road / I-280 NB Off-Ramp (#62) (unsignalized) LOS remains at F. The City of Palo Alto has not adopted specific criteria for impacts at unsignalized intersections. Therefore if traffic signal warrants are met, additional traffic through the intersection would constitute a significant impact. Traffic signal warrants at this intersection are met at baseline conditions as well as with project.

These four intersections are also impacted when the project is at full build-out in 2025. The intersection of Arboretum Road / Galvez Street (#37) (unsignalized) would not be impacted in this project alternative.

In the PM peak hour, 10 intersections would be impacted, instead of 12 intersections as in the full buildout scenario. The intersections are:

- El Camino Real / Ravenswood Avenue (#3) LOS remains at E but at least one critical movement for this State controlled Menlo Park intersection exceeded 0.8 seconds. This intersection is significantly affected by the project.
- El Camino Real / University Avenue -Palm Drive (#10) LOS changes from LOS D to E. This intersection is significantly affected by the project.
- Middlefield Road / Willow Road (#18) LOS remains at E but the increase in average critical movements exceeded 0.8 seconds for this Menlo Park intersection. This intersection is significantly affected by the project.
- Middlefield Road / Lytton Avenue (#19) LOS changes from LOS D to E. This intersection is significantly affected by the project.
- Junipero Serra Boulevard / Page Mill Road (#23) LOS remains at F. The average critical delay increased by 4 seconds and the V/C increased by 0.01. This intersection is significantly affected by the project.
- Arboretum Road / Galvez Street (#37) (unsignalized) LOS remains at F. The City of Palo Alto has not adopted specific criteria for impacts at unsignalized intersections. Therefore if traffic signal warrants are met, additional traffic through the intersection would constitute a significant impact. Traffic signal warrants are met at this intersection.
- Middlefield Road / Ravenswood Avenue (#46) LOS changes from LOS D to E. This intersection is significantly affected by the project.
- Bayfront Expressway / Willow Road (#52) LOS remains at F but the delay of at least one critical movement for this State controlled Menlo Park intersection exceeded 0.8 seconds. This intersection is significantly affected by the project.
- Bayfront Expressway / University Avenue (#53) LOS remains at F but the delay of at least one critical movement for this State controlled Menlo Park intersection exceeded 0.8 seconds. This intersection is significantly affected by the project.
- Alpine Road / I-280 NB Off-Ramp (#62) (unsignalized) LOS remains at F. The City of Palo Alto has not adopted specific criteria for impacts at unsignalized intersections. Therefore if traffic signal warrants are met, additional traffic through the intersection would constitute a significant impact. Traffic signal warrants at this intersection are met at baseline conditions as well as with project.

These intersections are also impacted in the 2025 full build-out scenario. The intersections of El Camino Real / Page Mill Road-Oregon Expressway (#16) and Junipero Serra Boulevard / Campus Drive West (#26) would not be impacted during the PM peak hour for this project alternative.

## 2.3 Menlo Park Roadway Analysis

Table 3 presents the ADT comparison of roadways in Menlo Park for this project alternative in 2025. Impacted roadways are highlighted.

Five roadways would be impacted by this project alternative. These roadways are also impacted when SUMC is fully built-out.

Roadway	Туре	Segment	No Build	With 60% SUMC	Impact
Marsh Road	Minor Arterial	West of US.101	39454	39741	Y
Sand Hill Road	Minor Arterial	East of Santa Cruz Avenue	33407	34641	Y
Willow Road	Minor Arterial	East of Middlefield Road	23823	24510	Y
WINOW ROAU	Collector	West of Middlefield Road	6315	6315	N
Alpine Road	Minor Arterial	West of Junipero Serra Boulevard	25120	25440	Y
Middlafiald Boad	Minor Arterial	North of Ravenswood Avenue	14359	14552	N
	Minor Arterial	South of Ravenswood Avenue	25215	25242	N
Ravenswood Avenue	Minor Arterial	East of El Camino Real	22705	22912	Y
Santa Cruz Avenue	Minor Arterial	West of El Camino Real	6530	6530	N
Valparaiso Avenue	Minor Arterial	West of EI Camino Real	16239	16286	N

Table 32025 Roadway ADT Analysis (Menio Park)

Source: AECOM 2010

## 2.4 Palo Alto Residential Street Analysis

Table 4 presents the TIRE Index analysis for this project alternative in 2015 and 2025 respectively. No residential streets in Palo Alto would be impacted by this project alternative in either analysis years.

	2025		No Proje	ct (Base)	0.1 Change in the	With 60%	% SUMC (Co with Base)	ompared
Roadway	Segment	City	ADT	TIRE Index	TIRE Index	ADT	Change	Impact
Santa Cruz Avenue	North of Sand Hill Road	MP	25747	4.4	6600	25847	100	N
Sharon Road	North of Sharon Park Drive	MP	4774	3.7	1250	4788	13	N
Stanford Avenue	North of Sand Hill Road	MP	186	2.3	52	186	0	N
Leland Avenue	North of Sand Hill Road	MP	337	2.5	79	337	0	Ν
Vine Street	North of Sand Hill Road	MP	429	2.6	94	429	0	Ν
Hawthorne Avenue	East of Alma Street	PA	2193	3.3	500	2266	73	Ν
Everett Avenue	East of Alma Street	PA	1759	3.2	380	1832	73	Ν
Hamilton Avenue	Between Chaucer Street & Lincoln Avenue	PA	3121	3.5	825	3528	407	N

Table 42025 TIRE Index Comparison

Source: AECOM 2010

## 2.5 Freeway Analysis

As indicated in the main report, project volumes on the study freeway segment under the 100% build-out condition are less than one percent of the segment capacity for the mixed lanes. As such, the project volumes under this project alternative would also be less than one percent of the segment capacity. Therefore, in accordance to the CMP freeway analysis guidelines, no further analysis is necessary for 2025.

## 2.6 Parking Analysis

In this project alternative, the hospitals and clinics would be operating at a level equivalent to 60% of the full project build-out. Table 5 presents the expected project parking demand for this project alternative. Using the parking demand rate determined through the survey conducted on existing parking conditions, 913 spaces would be needed for the hospitals. Taking into account a 10-percent supply buffer to ensure that drivers are able to locate parking spaces without excessive re-circulating through the parking area, the parking demand at the hospitals is calculated to be 1,004. Taking away spaces available from current vacancies, new parking spaces needed for the hospital would be 746. Parking demand has also been calculated using the City's zoning ordinance and using Parking Generation, a national publication of ITE. The City's Zoning ordinance estimates parking demand for the hospitals almost exactly the same as that based on surveying existing uses. For the MOB, 577 spaces would be needed to meet the parking demand. Similarly, taking into account a 10-percent supply buffer to ensure that drivers are able to locate parking spaces without excessive re-circulating through the parking area, the parking demand at MOB would be 635. The City's Zoning Ordinance estimates the MOB parking at 577 spaces, but does not include a 10 percent buffer. Parking Generation estimates the MOB parking at 509 spaces. The total demand for SUMC is estimated to be 1,381 spaces. The proposed number of parking spaces for hospital and MOB expansion is 1,499, about 200 spaces more than the Palo Alto Zoning Ordinance requirement. However, this parking supply number does not take into account traffic mitigation measures that may be implemented. A reduction in parking due to implementing mitigation measures like the Go Pass and the provision of remote parking lots must be factored into the final on-site parking supply.

## 2.7 Transit Impacts

The proposed SUMC expansion alternative would cause an increase in the level of traffic congestion at several locations throughout the study area. While mitigation measures such as roadway improvements and TDM measures have been identified to alleviate some of the traffic impacts, implementation of many of the traffic improvements are either infeasible or undesirable and TDM measures do not fully mitigate the traffic impacts. Impacts to transit service in the study area because of congested intersections are considered a significant impact according to City of Palo Alto criteria and occur as a result of this project alternative. A detailed discussion has been provided in the main report.

The SUMC is currently served by the Marguerite shuttles that connect to the Palo Alto and California Avenue Caltrain stations. Other transit services to the Caltrain stations and the Stanford Shopping Center that provide connecting service to the Marguerites include SamTrans Routes, VTA Routes, the U Line from the East Bay and the Palo Alto shuttles. Expansion of the hospital would increase demand for transit service in the area. Also, to the extent that the GO Pass is implemented as a project component or mitigation measure, the GO Pass is expected to increase transit ridership.

T SUMC Estimated Parking
-----------------------------

					-	-		-				
ITE Parking Generation <sup>5</sup>	Parking Demand		703 spaces	775 spaces	1,478 spaces	9	(258 spaces)	1,220 spaces	lerideu New Farking Suppry <sup>2</sup> / 1995 / 1995 / 1995 / 1720 Spaces	509 spaces	9	1,729 spaces
	Parking Demand Rate		4.72 spaces per bed	3.53 spaces per ksf						3.53 spaces per ksf		
City Zoning Ordinance <sup>4</sup>	Parking Demand		100 spaces	878 spaces	978 spaces	-6	(258 spaces)	720 spaces		577 spaces	-6	1,297 spaces
	Parking Demand Rate		0.67 spaces per bed	4.0 spaces per ksf						4.0 spaces per ksf		
	Size	Hospitals	149 beds	219.42 ksf								
Fehr and Peers	Parking Demand				913 spaces	1,004 spaces	(258 spaces)	746 spaces		577 spaces	635 spaces	1,381 spaces
	Parking Demand Rate <sup>1</sup>				1.78 spaces per ksf	bly (Demand + 10%) <sup>3</sup>	ailable from current vacancies <sup>2</sup>	j Supply <sup>3</sup>		4.00 spaces per ksf	(Demand + 10%) <sup>3</sup>	ing Supply
	Size				512, 982	ed New Parking Supp		iended New Parking		144.230 ksf	ew parking Supply	nmended new Park
	Land Use		Hospital (LPCH + SHC)	Clinics (LPCH + SHC)	Total	Gross Recommende	Spaces av	Recomm		Hoover Pavilion Site- New + re-use	Recommended N	Total recor

Note: ksf = 1,000 square feet

Parking demand based on estimated AM peak hour rate from data collection. The AM peak hour parking rate is slightly higher than the PM peak hour parking rate. Fehr & Peers analysis summarizes the parking areas with existing vacancies. These areas include L-7, L-13, S-4. 

Parking supply increases the parking demand by 10 percent to ensure drivers are able to locate the parking space without re-circulating through the parking area. Parking demand is based on City Zoning Ordinance 2007. Parking demand is based on ITE Parking Generation 3<sup>rd</sup> edition. 10% vacancy factor not applied to supply requirements

Hospital and Clinics @ 60% of full build-out

Source: AECOM 2009

The mode split to transit for the existing hospital is 8.9 percent according to Stanford data. This includes ridership on Marguerite shuttles, SamTrans, AC Transit, VTA buses and Caltrain. The mode split for transit is expected to increase to 21.1 percent if all hospital employees are provided with GO Passes. Up to 115 transit trips would be created by the project during each of the AM and PM peak hour, depending on the success of the GO Pass. Given the high level of transit service to the surrounding area, increased transit ridership could be accommodated by the existing routes, with three possible exceptions. Expansion of the Go Pass program to all hospital employees will increase ridership on the Marguerite shuttles, most notably Line A and Line B Counter-Clockwise. Increased ridership on these two routes could cause a load factor of greater than 1.25. This would be considered a significant impact when it happens. Historically, Stanford monitors ridership on the Marguerite and adjusts transit service to all hospital employees. Also, the current load factor on the U Line from the East Bay is approaching 1.0 (0.94 according to AC Transit). The expanded ridership could push the load factor above 1.0. A load factor on the U Line greater than 1.0 would be considered a significant impact.

## 2.8 Local Circulation Impacts

The SUMC project will result in several changes to local access and circulation. While to a great extent, the project will rely on the existing roadway network, there are changes to the network that will enhance and modify local access, including improving the capacity of Welch Road, adding extensions on Durand Way, Quarry Road, and Roth Way, and increasing the capacity of Pasteur Drive. A detailed discussion has been provided in the main report.

While the project is proposing improvements to roadway circulation around the SUMC campus, the amount of traffic projected on Welch Road is approaching the capacity of the roadway. Inadequate local roadway circulation is a potential significance impact since it may cause an operational safety hazard.

## 2.9 Pedestrian and Bicycle Impacts

Pedestrian and bicycle traffic around the SUMC campus is currently very extensive. Expansion of SUMC would increase the level of bicycle and pedestrian activity. An extensive pedestrian and bicycle network currently exists around project vicinity. This network should be enhanced in association with the project by providing additional accesses to remove barriers. A detailed discussion has been provided in the main report.

A comprehensive approach to providing the needed pedestrian and bicycle improvements should be incorporated into the project during the planning stages to avoid their preclusion in the future. The increase in congestion that results in the increase in traffic related hazards to pedestrians and cyclists is a significant impact per the City's criteria. The increase in intersection congestion related to project generated traffic is a significant project impact and the increase in intersection congestion related to project traffic and other traffic growth in the area is a significant cumulative impact.

## 2.10 Emergency Vehicle Access Impacts

Emergency vehicles require access within the study area to respond to emergencies and also to access the SUMC emergency room. Travel time by emergency vehicles would increase because of additional traffic congestion associated with the project. The City's significance criteria identify inadequate emergency access as a significant impact. The increased congestion identified in this analysis due to the proposed SUMC expansion at study area intersections is considered a significant impact. Any intersection significantly impacted by the project scenarios in terms of level of service or increase in vehicle delay is also impacted for emergency vehicle access. Emergency vehicle impacts are identical to the project scenario intersection impacts documented in Section 2.1 of this report. Traffic volume increases caused by project generated

traffic is a significant project impact and traffic volume increases caused by project traffic and other traffic growth in the area is a significant cumulative impact.

## 2.11 Construction Impacts

Project-related construction traffic could contribute to increased intersection delays and interference with pedestrians, bicyclists and transit. Also, construction traffic may create an operational hazard or result in inadequate emergency access. During the construction period, impacts might arise from a substantial increase in heavy truck travel, as materials are brought in to the project site, and demolished or excavated materials are hauled out. Temporary lane or road closures might be required for the construction and for underground utility work. Construction activities would lead to both temporary disruption of transportation system operation and possible damage to elements of the roadway system such as pavement and bridges. An extensive discussion of the project construction impact has been presented in the main report.

Other projects in and around the SUMC may also be under construction during the time that the hospital is being built. The list of current projects that have been approved for development provides a benchmark of the degree of construction that could occur simultaneously with SUMC. Figure 4 shows the projects that have been approved within the city limits. While most of these projects would be completed prior to the construction of SUMC, a similar list of project could be expected to come on line during the time of SUMC's construction. The projects shown on Figure 4 that would have construction workers using similar travel routes as SUMC construction workers are those in the downtown area and those along El Camino Real south to Page Mill Road. Small residential and retail projects would not create a large number of construction trips and are not included in the following list. Another project that would potentially be constructed at the same time as the proposed SUMC project is the high speed rail (HSR). It is expected to commence construction in 2012 along the Caltrain corridor. Construction traffic associated with the construction of the SUMC project and the following list of projects, together with the HSR, represents a potentially significant cumulative impact.

<u>Reference Number</u>	<u>Address</u>
5	657 Alma
6	473 Acacia
7	260 Homer
10	325 Lytton
15	850 Webster
33	317 – 323 University
39	278 University
41	310 University
44	777 Welch
50	49 Wells
51	441 Page Mill
52	855 El Camino Real
54	195 Page Mill
63	2747 – 2785 Park
64	801 – 875 Alma
65	2180 El Camino Real

In addition to development in the City, construction on the Stanford campus would also have cumulative effect on traffic with SUMC. The following is a list of potential projects that could be under construction on Stanford within the jurisdiction of Santa Clara County. Construction traffic associated with the construction of the SUMC project and the following list of projects represents a potentially significant cumulative impact.

- Li Ka Shing Center for Learning and Knowledge (now-2010)
- Lorry I. Lokey Stem Cell Research Building (now-2010)

## STANFORD EIR Mountain View STIERLIN RD AMPHITHEATRE PKWY OLD MIDDLERELD WAY CASTRO ST MIDDLEFELD RD BAILEY AVE AIRAMONTE AVE CENTRAL EYON CHARLESTON RD CALIFORNIA ST El Canino REAL RENGSTOR Los Altos YAW MAI8A7 Ð EDITH AVE Palo Alto COLORHDOO 280 FREMONT RD 0% LA PALOMA RD Los Altos Hills 15 & JAONONEH FOOTHILL EXPY CER GALVEZ ST 280 ARASTRADERO RD to the state Stanford Hospital Menlo Park 8 y -SAND HILL R D SABL Portola Valley AECOM SOURCE: PBS&J NORTH VOODSIDE RD 280

DEVELOPMENT LOCATIONS

## Figure 4

Projects on the Science and Engineering Quad that would be under construction are:

- Center for Nanoscale Science and Technology (now-2010)
- Huang Engineering Center (now-2010)
- Bio-engineering / Chemical Engineering (2011-2013)

## 2.12 Project Plus High Speed Rail Analysis

The 2025 'With Project (60% SUMC)' intersection operations accounted for the project conditions under this project alternative. The cumulative intersection operations would also include the possibility of high speed rail (HSR) being constructed on the peninsula between San Francisco to San Jose and continuing to the Central Valley and Southern California. The 2025 traffic projections developed from the City's travel demand model did not include HSR as part of the transportation network. However, recent federal funding allocations provided to the California High Speed Rail Authority make HSR a reasonably foreseeable project. It is possible that construction of HSR could begin in 2012 and continue through the construction of the proposed SUMC expansion.

A HSR station may be constructed in the mid-peninsula area between San Francisco and San Jose. A station could be constructed at one of three possible locations; Redwood City, Palo Alto or Mountain View, or a mid-peninsula station may not be provided. At this point, the location of the station, if any, is too speculative to be included in this analysis as a cumulative project.

Traffic impacts associated with HSR will be concentrated around the stations. Automobile traffic to the station area will increase for persons being dropped off, for persons driving to the station and parking and for taxis dropping off passengers. Also, transit vehicle traffic to and from the station may also increase. Without knowing the specific alignment and project parameters of the HSR, the cumulative impact of HSR is too speculative to be included in this analysis. Construction of a HSR station in Palo Alto is speculative and station-related impacts in Palo Alto are not included in this traffic analysis.

## 3.0 **Project Mitigation for Reduced Intensity Alternative B**

This section looks at the mitigation measures proposed to reduce the expected impacts of this project alternative to a less than significant level.

Mitigation measures to improve intersection performance are divided into four levels. The first level is the implementation of traffic-adaptive signal technology and the second level is the provision of additional pedestrian / bicycle undercrossings in the project vicinity. Another mitigation measure is the implementation of transportation demand management (TDM) programs. TDM would be employed to reduce drive alone trips and to encourage use of public transport. This section also looks at the physical improvements that would be necessary to achieve acceptable traffic operations. However, not all physical improvements are feasible and this discussion has been included for information purposes only. Finally, reductions in traffic volumes on roadways as a result of providing remote employee parking lots near freeway interchanges are evaluated.

## 3.1 Traffic Adaptive Signal Technology

Table 6 presents the summary of intersections impacted by this project alternative in 2025 after implementing traffic adaptive technology. Detail calculations are presented in Appendix B. During the AM peak hour, two intersections remain impacted. The intersections of El Camino Real / University Avenue -Palm Drive (#10) and El Camino Real / Page Mill Road-Oregon Expressway (#16) would no longer be impacted. The intersections of Sand Hill Road / Santa Cruz Avenue (#30) and Alpine Road / I-280 NB Off-Ramp (#62) remain impacted after this mitigation is implemented, as with the base proposal with this mitigation measure. During the PM peak hour, the intersections of El Camino Real / Ravenswood Avenue (#3) and Middlefield Road / Lytton Avenue (#19) would no longer be impacted. The other eight intersections remain impacted. This is one less than the nine intersections of the base proposal that remain impacted with this mitigation measure.

The traffic adaptive signal technology is a feasible mitigation. In Palo Alto, there is a Citywide Traffic Impact Fee program that the applicant will be required to contribute to. However, this fee is not structured to mitigate one hundred percent of these project related impacts and an additional fee could be imposed to mitigate the remaining share of the project impacts. In Menlo Park, the contribution should be tied to the amount of traffic added to analyzed intersections by the project.

## 3.2 New Pedestrian and Bicycle Undercrossings

In addition to the existing undercrossings at University and Homer, two new undercrossings will be constructed in the study area in the future. One is near Everett Avenue in Palo Alto and the other near Middle Avenue in Menlo Park. These additional undercrossings north of University Avenue will facilitate walking and bicycling from residential and commercial areas in North Palo Alto and South Menlo Park.

Following the same methodology detailed in the main report, up to 87 employees from SUMC would use the four pedestrian and bicycle undercrossings in the study area under this project alternative. The number of peak hour project trips that will be reduced is calculated to 20 trips. The undercrossings are also expected to cause a slight reduction to background traffic in their vicinity by facilitating non-motorized modes of transportation.

Table 7 presents the summary of intersections still impacted by this project alternative after the two new undercrossings are built and traffic adaptive technology implemented for. The TRAFFIX calculations are presented in Appendix C.

During the AM peak hour of 2025, two intersections remain impacted by this project alternative. The intersections of Sand Hill Road / Santa Cruz Avenue (#30) and Alpine Road / I-280 NB Off-Ramp (#62) would

			2025 AM			2025 PM		
			Impact			Impact		
#	Intersection		No Build	With 60% SUMC	With 60% SUMC + Signal Adaptive	No Build	With 60% SUMC	With 60% SUMC + Signal Adaptive
Column			Α	В	c	D	E	F
1	El Camino Real/Valparaiso Avenue	MP						
2	El Camino Real/Santa Cruz Avenue	MP						
3	El Camino Real/Ravenswood Avenue	MP				•	•	
4	El Camino Real/Roble Avenue	MP						
5	El Camino Real/Middle Avenue	MP						
6	El Camino Real/Cambridge Avenue	MP						
/	El Camino Real/Sand Hill Road-Alma Street	PA						
0 0								
10	El Camino Real/University Avenue-Palm Drive(Single Int)	PA	•					
11	El Camino Real/Embarcadero Road-Galvez Street	PA	•			•		•
12	El Camino Real/Churchill Avenue	PA						
13	El Camino Real / Serra Street-Park Boulevard	PA						
14	El Camino Real / Stanford Avenue	PA						
15	El Camino Real / California Avenue	PA						
16	El Camino Real / Page Mill Road-Oregon Expressway	PA	•	•		•		
17	Woodland Avenue / University Avenue	EPA						
18	Middlefield Road / Willow Road	MP				•	•	•
19	Middlefield Road / Lytton Avenue	PA					•	
20	Middlefield Road / University Avenue	PA						
21	Middletield Road / Embarcadero Road	PA		ļ				
22	Alma Street / Churchill Avenue	PA						
23	Junipero Serra Boulevard-Foothili Expressway/Page Mill Road	PA	•			•		•
24	Junipero Serra Boulevard / Staniord Avenue	SCC						
20	Junipero Serra Boulevard / Campus Drive Last	300 SCC						
20	Junipero Serra Boulevard / Alpine Road-Santa Cruz Avenue	MP						
28	Sand Hill Cir- I-280 / Sand Hill Road	MP						
29	Sharon Park Drive / Sand Hill Road	MP						
30	Santa Cruz Avenue / Sand Hill Road	MP		•	•			
31	Oak Avenue / Sand Hill Road -Vine Street	MP						
32	Stock Farm Road / Sand Hill Road	PA						
33	Pasteur Drive / Sand Hill Road	PA						
34	Arboretum Road / Sand Hill Road	PA						
35	Arboretum Road / Quarry Road	PA						
36	Arboretum Road / Palm Drive	PA						
37	Arboretum Road / Galvez Street / (unsignalized)	PA	•			•	•	•
38	EL Camino Real / Charleston Road	PA				•		
39	Alma Street / Charleston Road	PA	•			•		
40	Middlefield Road / Charleston Road	PA						
41	Middlelleld Road / Hamilton Avenue	PA						
42	Iniversity Drive / Santa Cruz Avenue	MP						
44	El Camino Real / Oak Grove Avenue	MP						
45	Middlefield Road / Ringwood Avenue	MP						
46	Middlefield Road / Ravenswood Avenue	MP					•	•
47	El Camino Real / Encinal Road	MP						
48	Bay Road / Marsh Road	MP						
49	Marsh Road / US 101 SB Off-Ramp	MP						
50	Marsh Road / US 101 NB Off-Ramp	MP						
51	Bay Road / Willow Road	MP						
52	Bayfront Expressway / Willow Road	MP				•	•	•
53	University Avenue / Baytront Expressway	MP				•	•	•
54	Bay Road / University Avenue	EPA	•			•		
25 56	Welch Road / Ouerry Road	EPA DA	*					
57	Durand Way / Sand Hill Road	PA PA						
58	Pasteur Drive NB / Welch Road	PA						
59	Pasteur Drive SB / Welch Road	PA						
60	Durand Way Extension / Welch Road	PA						
61	Bowdoin Street / Stanford Road (unsignalized)	PA						
62	Alpine Road / I-280 NB Off-Ramp (unsignalized)	PA	٠	•	•	•	•	•
63	Alpine Road / I-280 SB Off-Ramp (unsignalized)	PA	•					
64	Page Mill Road/ I-280 NB Off-Ramp (unsignalized)	PA	•					
65	Page Mill Road / I-280 SB Off-Ramp (unsignalized)	PA	•			•		
66	Foothill Expressway / Arastradero Road	SCC	•			•		
	Total Locations		11	4	2	15	10	8
<u> </u>	PA Locations		9	3	1	8	5	4
•	(Diamond) Base							
	(Dot) SUMC Project Impact							
	Intersection with Traffic Adaptive Technology							

 Table 6

 Summary of SUMC Impact With Traffic Adaptive Technology in 2025

Source: AECOM, 2010
				2025 A	M		2025 F	M
1				Impa	ct	1	Impa	ct
#	Intersection	City	No Build	With 60% SUMC	With 60% SUMC + Undercrossings + Signal Adaptive	No Build	With 60% SUMC	With 60 % SUMC + Undercrossings + Signal Adaptive
	Column		А	В	С	D	E	F
1	El Camino Real/Valparaiso Avenue	MP						
2	El Camino Real/Santa Cruz Avenue	MP						
3	El Camino Real/Ravenswood Avenue	MP				•	•	
4	El Camino Real/Roble Avenue	MP						
5	El Camino Real/Middle Avenue	MP						
0	El Camino Real/Cambridge Avenue							
/	El Camino Real/Sand Hill Road-Alma Street	PA						
9		PA PA						
10	El Camino Real/University Avenue-Palm Drive(Single Int)	PA	•				•	
11	El Camino Real/Embarcadero Road-Galvez Street	PA	· ·			•		
12	El Camino Real/Churchill Avenue	PA				· · · · ·		
13	El Camino Real / Serra Street-Park Boulevard	PA						
14	El Camino Real / Stanford Avenue	PA						
15	El Camino Real / California Avenue	PA						
16	El Camino Real / Page Mill Road-Oregon Expressway	PA	•	•		•		
17	Woodland Avenue / University Avenue	EPA						
18	Middlefield Road / Willow Road	MP				•	•	•
19	Middlefield Road / Lytton Avenue	PA						
20	Middlefield Road / Embargadara Boad	PA						
21	Alma Street / Churchill Avenue	PA PA						
22	Luninero Serra Boulevard-Foothill Expresswav/Page Mill Road	PA	•			•		
24	Junipero Serra Boulevard / Stanford Avenue	SCC	· · · · · · · · · · · · · · · · · · ·					
25	Junipero Serra Boulevard / Campus Drive East	SCC						
26	Junipero Serra Boulevard / Campus Drive West	SCC				•		
27	Junipero Serra Boulevard / Alpine Road-Santa Cruz Avenue	MP						
28	Sand Hill Cir- I-280 / Sand Hill Road	MP						
29	Sharon Park Drive / Sand Hill Road	MP						
30	Santa Cruz Avenue / Sand Hill Road	MP		•	•			
31	Oak Avenue / Sand Hill Road -Vine Street	MP						
32	Stock Farm Road / Sand Hill Road	PA						
33	Pasteur Drive / Sand Hill Road	PA						
34	Arboretum Road / Sand Hill Road	PA						
26	Arboretum Road / Balm Drive							
37	Arboretum Road / Galvez Street / (unsignalized)	PA PA	•			•		
38	EL Camino Real / Charleston Road	PA	· ·			•		
39	Alma Street / Charleston Road	PA	•			•		
40	Middlefield Road / Charleston Road	PA						
41	Middlefield Road / Hamilton Avenue	PA						
42	Alma Street / Hamilton Avenue	PA						
43	University Drive / Santa Cruz Avenue	MP						
44	El Camino Real / Oak Grove Avenue	MP						
45	Imidaletield Road / Ringwood Avenue	MP						
46	jivildaletiela Road / Ravenswood Avenue	MP					•	•
47	El Gamino Real / Encinal Road	MP						<u> </u>
40	Marsh Road / US 101 SB Off-Ramp	MP						
50	Marsh Road / US 101 NB Off-Ramp	MP						
51	Bay Road / Willow Road	MP						
52	Bayfront Expressway / Willow Road	MP				•	•	•
53	University Avenue / Bayfront Expressway	MP				•		•
54	Bay Road / University Avenue	EPA				•		
55	Donohoe Street / University Avenue	EPA	•					
56	Welch Road / Quarry Road	PA						
57	Durand Way / Sand Hill Road	PA						
50	Pasteur Drive NB / Welch Road	PA DA						
60	Durand Way Extension / Welch Road	PA PA						
61	Bowdoin Street / Stanford Road (unsignalized)							
62	Alpine Road / I-280 NB Off-Ramp (unsignalized)	PA	•	•	•	•		
63	Alpine Road / I-280 SB Off-Ramp (unsignalized)	PA	•			*		
64	Page Mill Road/ I-280 NB Off-Ramp (unsignalized)	PA	•					
65	Page Mill Road / I-280 SB Off-Ramp (unsignalized)	PA	•			•		
66	Foothill Expressway / Arastradero Road	SCC	•			•		
	Total Locations		11	4	2	15	10	7
	PA Locations		9	3	1	8	5	3
•	(Diamond) Base							
•	(Dot) SUMC Project Impact							
	Intersection with Traffic Adaptive Technology							
Sou	Irce: AECOM, 2010							

Table 7Summary of SUMC Impact With New Undercrossings and<br/>Traffic Adaptive Technology in 2025

no longer be impacted. This is one intersection less than the main proposal with this mitigation measure. In the PM peak hour, seven out of the 10 intersections remain impacted. The intersections of El Camino Real / Ravenswood Avenue (#3), El Camino Real / University Avenue -Palm Drive (#10) and Middlefield Road / Lytton Avenue (#19) would no longer be impacted. The base proposal has nine intersections that remained impacted with this mitigation measure.

SUMC shall contribute to the cost of construction of the Everett Avenue undercrossing of the Caltrain tracks in Palo Alto and the Middle Avenue undercrossing in Menlo Park. In Palo Alto, there is a Citywide Traffic Impact Fee program that the applicant will be required to contribute to. However, this fee is not structured to mitigation one hundred percent of these project related impacts and an additional fee could be imposed to mitigate the remaining share of the project impacts. In Menlo Park, the contribution should be tied to the amount of traffic added to analyzed intersections by the project.

#### 3.3 Transport Demand Management (TDM)

Details of the TDM plans have been presented in the main report and are not repeated here. One of the main elements of the TDM program is to provide eligible SUMC employees with Caltrain GO Passes to encourage the use of public transport to and from work. This is aimed at reducing drive-alone trips. As with the main report, the proportion of Caltrain users under this project alternative is assumed to reach the current university level of 15.8 percent. Table 8 presents the summary of intersections still impacted by this project alternative after the implementing the TDM plans, building of the two new undercrossings and implementing the traffic adaptive technology in 2025.

In the AM peak hour for 2025, no intersections would be impacted when all three mitigation measures (traffic adaptive, new undercrossings and GO Pass) are in place. This is similar to the base proposal with this mitigate measure. The TRAFFIX calculations are presented in Appendix D. In the PM for 2025, two intersections remain impacted by this project alternative. The intersections are Bayfront Expressway / Willow Road (#52) and Bayfront Expressway / University Avenue (#53). The base proposal has four intersections that remained impacted with this mitigation measure.

If GO Passes are provided to all hospital employees, the congestion levels at some intersections would be reduced to a less than significant level. The TDM measures proposed as mitigation measures would, however, increase transit ridership on some routes although probably to a less than significant level. At such time that ridership load factors during either the AM or PM peak exceed 1.0 on the U Line, headways shall be decreased to bring the load factor to less than 1.0. Load factor is the ratio of number of passenger versus the number of seats. A load factor of 1.0 means the number of passengers equals the number of seats and no passenger would be standing. Monitoring shall be conducted periodically to determine the current load factor. At such time that ridership load factors during either the AM or PM peak exceed 1.25 on Marguerite Line A or Line B Counter-Clockwise, headways shall be decreased to bring the load factor to less than 1.25. Monitoring shall be conducted periodically to determine the 2.5 monitoring shall be conducted periodically to less than 1.25. Monitoring shall be conducted periodically to less than 1.25. Monitoring shall be conducted periodically to less than 1.25. Monitoring shall be conducted periodically to less than 1.25. Monitoring shall be conducted periodically to less than 1.25. Monitoring shall be conducted periodically to less than 1.25. Monitoring shall be conducted periodically to less than 1.25. Monitoring shall be conducted periodically to determine the current load factor.

# 3.4 Transit Service Mitigation

Expansion of transit service in the study area provides an alternative to automobile travel. While the precise level of direct reduction in peak hour travel is difficult to quantify, current literature indicates that expanded transit service provides an overall benefit to the area by reducing the level of auto travel throughout the day, thus reducing both traffic and air quality impacts (including impacts associated with greenhouse gas emissions). VTA recently completed the Palo Alto Transit Service Market Analysis. That study developed Transit Competitive Factors. The Stanford Shopping Center and downtown Palo Alto were found to be Transit Competitive Origins. Strong transit linkages were found between these origins and destinations.

# Table 8 Summary of SUMC Impact With TDM, New Undercrossings and Traffic Adaptive Technology in 2025

				2025 AM		2025 PM		
				Impact			Impact	
#	# Intersection (		No Build	With SUMC	With SUMC + Undercrossings + Signal Adaptive	No Build	With SUMC	With SUMC + Undercrossings + Signal Adaptive
	Column		Α	В	С	D	E	F
1	El Camino Real/Valparaiso Avenue	MP						
2	El Camino Real/Santa Cruz Avenue	MP				•		
3	El Camino Real/Ravenswood Avenue	MP				•	-	
4	El Camino Real/Robie Avenue	MP						
5	El Camino Real/Middle Avenue	IVIP						
7	El Camino Real/Cambridge Avenue				1			
/	El Camino Real/Ouarn/ Rd	PA DA						
9	Alma Street/Lytton Avenue	PA						
10	El Camino Real/University Avenue-Palm Drive(Single Int)	PA	•					
11	El Camino Real/Embarcadero Road-Galvez Street	PA	· ·					
12	El Camino Real/Churchill Avenue	PA						
13	El Camino Real / Serra Street-Park Boulevard	PA						
14	El Camino Real / Stanford Avenue	PA						
15	El Camino Real / California Avenue	PA						
16	El Camino Real / Page Mill Road-Oregon Expressway	PA	•	•		•		
17	Woodland Avenue / University Avenue	EPA						
18	Middlefield Road / Willow Road	MP		Ì		•	•	
19	Middlefield Road / Lytton Avenue	PA					•	
20	Middlefield Road / University Avenue	PA						
21	Middlefield Road / Embarcadero Road	PA						
22	Alma Street / Churchill Avenue	PA						
23	Junipero Serra Boulevard-Foothill Expressway/Page Mill Road	PA	•			•	•	
24	Junipero Serra Boulevard / Stanford Avenue	SCC						
25	Junipero Serra Boulevard / Campus Drive East	SCC						
26	Junipero Serra Boulevard / Campus Drive West	SCC				•		
27	Junipero Serra Boulevard / Alpine Road-Santa Cruz Avenue	MP						
28	Sand Hill Cir- I-280 / Sand Hill Road	MP						
29	Sharon Park Drive / Sand Hill Road	MP						
30	Santa Cruz Avenue / Sand Hill Road	MP		•				
31	Oak Avenue / Sand Hill Road -Vine Street	MP						
32	Stock Farm Road / Sand Hill Road	PA						
33	Pasteur Drive / Sand Hill Road	PA						
34	Arboretum Road / Sand Hill Road	PA						
35	Arboretum Road / Quarry Road	PA						
36	Arboretum Road / Palm Drive	PA						
37	Arboretum Road / Galvez Street / (unsignalized)	PA	•			•	•	
38	EL Camino Real / Charleston Road	PA				•		
39	Alma Street / Charleston Road	PA	•			•		
40	Middlefield Road / Charleston Road	PA						
41	Middlefield Road / Hamilton Avenue	PA						
42	Alma Street / Hamilton Avenue	PA						
43	University Drive / Santa Cruz Avenue	MP						
44	El Camino Real / Oak Grove Avenue	MP						
45	Initialienera Koad / Kingwood Avenue			1				
46	Innurenera Road / Kavenswood Avenue	MP					-	
47								
48	Day Ruau / Marsh Ruau							
49								
50	Imaish Ruad / US_IUT IND_UI-Ramp							
51	Bayfront Expressivery / Willow Road							
52	Daynon Explessway / Willow Nodu	MD						
54	Bay Road / University Avenue	ED^						
55	Donohoe Street / University Avenue	EPA						
50	Welch Road / Quarty Road		-					
57	Durand Way / Sand Hill Road	PA PA						
58	Pasteur Drive NB / Welch Road	PA						
59	Pasteur Drive SB / Welch Road	PA						
60	Durand Way Extension / Welch Road	PA						
61	Bowdoin Street / Stanford Road (unsignalized)	PA	-	1				
62	Alpine Road / I-280 NB Off-Ramp (unsignalized)	PA	•	•		•	•	
63	Alpine Road / I-280 SB Off-Ramp (unsignalized)	PA				*		
64	Page Mill Road/ I-280 NB Off-Ramp (unsignalized)	PA	•					
65	Page Mill Road / I-280 SB Off-Ramp (unsignalized)	PA	•			•		
66	Foothill Expressway / Arastradero Road	SCC	•			•		
<u> </u>	Total Locations		11	4	0	15	10	2
	PA Locations		9	3	0	8	5	0
-			-	-	-	-	-	-
L.	(Diamonu) Base							
-	Loui Sulvic Project Impact							
0.0								

Source: AECOM, 2010

The following specific mitigation measures should be implemented to reduce traffic congestion caused by SUMC:

- The use of transit as a primary means of access to SUMC is expected to increase, particularly with the implementation of the GO Pass for all hospital employees. Currently, approximately 3.6 percent of hospital employees use Caltrain to commute to work. On a typical work day this equates to about 279 daily inbound and outbound trips assuming hospital expansion, most of which occur during the peak hours and most of which use Marguerite shuttles to travel between the hospital and PAITS. Providing GO Passes for all hospital employees as mitigation for traffic impacts could increase the percentage of Caltrain users to about 15.8 percent or more and the daily inbound and outbound Caltrain riders to approximately 1.222 trips, or an increase of 945 riders. Additionally, ridership on the U-Line from the East Bay will also increase, particularly if parking spaces in the expanded. Ardenwood park-and-ride lots are made available to SUMC employees. Transit ridership between SUMC and Hoover Pavilion is associated with the parking shuttle. During the peak periods, the parking shuttle will accommodate about 438 riders. The level of projected transit ridership is considered to be beyond the ability of the current Marguerite shuttle stops to adequately accommodate. Currently, Marguerite shuttle stops include red painted curbs approximately 40 to 100 feet long, with sign posts, and utilize the 8-foot sidewalk width as passenger boarding areas. Bus turn-outs to allow the bus to be completely out of the travel way occur at selected locations, usually on streets with bicycle lanes. The increase in transit ridership is projected at a level that mini-transit centers should be incorporated into the project design. These transit centers would be located at LPCH and at SHC and would be offstreet facilities. The transit centers would accommodate three to four buses simultaneously, have shelters, seating, lighting, signs, maps, bus schedules, and bicycle parking. On-street bus stops along Welch Road and Quarry Road would also be provided, but the transit centers would accommodate the majority of transit riders and would be located to maximize the convenience of employees, patients and visitors. One transit center in the vicinity of Welch Road and Pasteur Drive to serve SHC and another on Welch Road near Quarry Road to service LPCH would provide the focal point for transit use for SUMC. Stanford shall revise their SUMC site plan to incorporate two transit hubs as noted above to reduce the impact to transit service caused by the proposed expansion.
- SUMC should contribute to expand the Marguerite shuttle service into Palo Alto. Specifically, Marguerite shuttles should connect SUMC to downtown Palo Alto and the areas surrounding the downtown. Currently, Marguerite Routes A and B do not extend into downtown Palo Alto. While the DT and M routes do extend into downtown areas, they do not operate during the majority of the day. This expanded shuttle service could be new routes or an extension of existing routes. Current headways on existing routes should be maintained with the expansion.
- Currently, Palo Alto operates the Crosstown Shuttle. More efficient transit service may be provided by providing this service as a part of Marguerite Shuttles. SUMC should participate in operating the Palo Alto Crosstown Shuttle service. The Citywide Traffic Impact Fee can be applied to shuttle service expansion including operating costs. Then current fee is \$2,861 per net new PM peak hour trips. A portion of Stanford's Citywide Traffic Impact Fee should be used to expand City Shuttle Services.
- In 2007, the VTA adopted a new Bus Service Operating Plan which made major modifications to the current bus transit network. The plan introduced Community Bus Service throughout Santa Clara County, which features smaller vehicles with an identity tied to the individual communities

served. As a part of that plan, local communities are required to cover 25 percent of the cost if they want to have the service free of charge to the riders. SUMC shall contribute to fund Palo Alto's share of expanded VTA Community Bus Service.

• In Menlo Park, the contribution to transit service improvements should be tied to the amount of traffic added to study area intersections by the project.

#### 3.5 **Physical Intersection Improvements**

Table 9 lists the physical improvements that could mitigate all the impacted intersections. Most of the physical intersection improvements discussed below are infeasible because of the lack of right-of-way, the need to remove mature trees and prohibitive cost. They are therefore identified for information only. The feasible improvements are highlighted in Table 9. For intersections identified for improvement in the City of Menlo Park's General Plan, the General Plan improvements are evaluated to determine if they mitigate the project impact.

		Peak			
#	Intersection	Hour	Jurisdiction	Roadway Mitigation	Feasible?
10.	El Camino Real / University Avenue - Palm Drive	AM / PM	Caltrans	Provide an exclusive right-turn lane for eastbound and westbound Palm Drive-University Avenue, giving two lanes to the through movement along Palm Drive-University Avenue. While physically possible, this mitigation would require the acquisition of right-of-way, the construction of a retaining wall for the westbound right turn and the relocation of the entrance arch to Stanford for the eastbound right turn. This mitigation measure would be inconsistent with City General Plan Policy T-27.	No
16.	El Camino Real / Page Mill Road - Oregon Expressway	AM / PM	Caltrans	Provide an exclusive right-turn lane for westbound Oregon Expressway in addition to the two through lanes and increase the cycle length to 160 seconds. The westbound right turn lane is feasible, but would require right-of-way from the VTA park-and-ride lot. This mitigation is consistent with previous identified mitigation for the 1998-2010 Palo Alto Comprehensive Plan EIR.	Yes
62	Alpine Road / I-280 NB Off-Ramp	AM / PM	Caltrans	Signalize the intersection. Signalization of this intersection is feasible. Traffic signal warrants are met. Additionally, the left turn lane could be modified to a shared left/right lane.	Yes
37	Arboretum Road / Galvez Street	AM / PM	PA	Signalize the intersection. Signalization of this intersection is feasible. Traffic signal warrants are met. This mitigation measure was previously identified in the Sand Hill Road EIR and was also assumed in the Cancer Center EIR.	Yes
30	Santa Cruz Avenue / Sand Hill Road	AM	MP	This intersection is fully built-out, additional improvements would be difficult to implement. Northbound Santa Cruz Avenue needs an additional right turn lane. The right-of-way requirements and cost make the improvements infeasible. This intersection is under the jurisdiction of Menlo Park. Any capacity improvements would require their approval.	No

# Table 9Intersection Improvements

#	Intersection	Peak Hour	Jurisdiction	Roadway Mitigation	Feasible?
3	El Camino Real / Ravenswood Avenue	PM	Caltrans	Under Menlo Park's General Plan, the proposed improvements are: to re-stripe the exclusive right-turn lane on southbound El Camino Real to shared through/right lane and to provide an additional through lane for northbound El Camino Real by removing the right-turn slip island. The general plan improvement also proposes to provide an exclusive right-turn lane for eastbound Menlo Avenue. This intersection is located in Menlo Park. Approval for implementation would be required from Caltrans and Menlo Park.	Yes
52	Bayfront Expressway / Willow Road	PM	Caltrans	Provide one more right-turn lane for eastbound Willow Road and make the right-turn movement for southbound Bayfront Expressway 'overlap' with the left-turn of eastbound Willow Road. The intersection has signals for the right-turn movement for southbound Bayfront but the 'overlap' phase is not implemented. The intersection performance will also improve with only the additional eastbound right-turn lane provision. Implementation is physically possible. This intersection is located in Menlo Park. Changes to the traffic signal would require consent from Caltrans and Menlo Park. The Peninsula Gateway transportation analysis suggested grade-separation of this intersection.	Yes
53	University Avenue / Bayfront Expressway	PM	Caltrans	Grade separate the northbound left-turn from Bayfront Expressway to University Avenue. This intersection is located in Menlo Park. Approval for implementation would be required from Caltrans and Menlo Park. The Peninsula Gateway transportation analysis also suggested grade-separation of this intersection.	No
23	Junipero Serra Boulevard – Foothill Expressway / Page Mill Road	PM	SCC	Provide three left-turn lanes for northbound Foothill Expressway onto westbound Page Mill Road. Page Mill Road must be widened to receive the three turn lanes. Though physically possible, it would be costly to widen Page Mill Road between Junipero Serra Boulevard and Old Page Mill Road (or Coyote Hill Road) and Foothill Expressway. This intersection is under the jurisdiction of Santa Clara County and implementation of any mitigation measures would require their approval.	No
18	Middlefield Road / Willow Road	PM	MP	Make the right-turn movement for northbound Middlefield Road 'overlap' with the left-turn of westbound Willow Road. To effectively utilize the additional capacity of right-turn signal overlap, the existing right-turn should be lengthened. This measure is physically possible. However, extending the right- turn lane would require removal of the planter box and also removal of several on-street parking spaces in front of the grocery store. This intersection is under the jurisdiction of Menlo Park. Changes to the traffic signal and lengthening the right-turn lane would require consent from Menlo Park.	No
19	Middlefield Road / Lytton Avenue	PM	PA	Provide a new exclusive right-turn lane for southbound Middlefield Road. This will provide two southbound through lanes and a right turn lane. This mitigation is considered	No

#	Intersection	Peak Hour	Jurisdiction	Roadway Mitigation	Feasible?
				infeasible because of right-of-way required from the residences, removal of mature trees and reducing the width of already narrow front yards. Capacity improvements at this intersection would be contrary to the City's General Plan Policy T-27.	
46	Middlefield Road / Ravenswood Avenue	PM	MP	Under Menlo Park's General Plan, the proposed improvement for this intersection is to provide an additional exclusive left- turn lane for northbound Middlefield Road. This intersection is located in Menlo Park. Traffic capacity improvements would require their approval.	Yes

Source: AECOM, 2010

#### 3.6 Remote Parking Lots

Another mitigation measure is available through the construction of remote parking lots near freeway interchanges. The regional employees for SUMC working typical weekday periods between 6am and 6pm who use I-280, US 101, and SR 84 would be required to park in the remote parking lots and use a shuttle bus to reach either the hospital/clinics or MOBs. Details of this mitigation measure have been presented in the main report.

Table 10 presents the summary of intersections still impacted by this project alternative after implementing remote parking, traffic adaptive technology and building two new pedestrian / bicycle undercrossings in 2025. The TRAFFIX calculations are presented in Appendix E

In the AM for 2025, two out of four intersections remain impacted under this project alternative. The intersections are Santa Cruz Avenue / Sand Hill Road (#30) and I-280 NB Off-Ramp / Alpine Road (unsignalized) (#62). The same intersections are also impacted in the base proposal with this mitigation measure. In the PM peak hour, six intersections out of 10 intersections remain impacted. The intersections are:

- Middlefield Road / Willow Road (#18)
- Arboretum Road / Galvez Street (#37) (unsignalized)
- Middlefield Road / Ravenswood Avenue (#46)
- Bayfront Expressway / Willow Road (#52)
- Bayfront Expressway / University Avenue (#53
- Alpine Road / I-280 NB Off-Ramp (#62) (unsignalized)

The base proposal has seven intersections that remained impacted in the PM peak hour after implementing the same mitigation measures.

#### 3.7 Freeway Mitigation

No study freeway segment would be impacted by this project alternative. No mitigation is necessary.

#### 3.8 Residential Street Mitigation (Palo Alto)

No study residential streets in Palo Alto would be impacted by the project as presented in Section 2.3. No mitigation is necessary.

Table 10Summary of SUMC Impact With Remote Parking,New Undercrossings and Traffic Adaptive Technology in 2025

				2025	AM	2025 PM		
				Impa	ict		Impa	act
#	Intersection	City	No Build	With 60% SUMC	With 60% SUMC + Remote Parking + Undercrossings + Signal Adaptive	No Build	With 60% SUMC	With 60% SUMC + Remote Parking + Undercrossings + Signal Adaptive
	Column		Α	В	С	D	E	F
1	El Camino Real/Valparaiso Avenue	MP						
2	El Camino Real/Santa Cruz Avenue	MP						
3	El Camino Real/Ravenswood Avenue	MP				•		
4	El Camino Real/Roble Avenue	MP						
5	El Camino Real/Middle Avenue	MP						
6	El Camino Real/Cambridge Avenue	MP					I	·
7	El Camino Real/Sand Hill Road-Alma Street							i
0								i
9	Alma Street/Lytton Avenue							
10	El Camino Real/University Avenue-Palm Drive/Single Int)	DA	<b>_</b>					
10			-				┢━━━━┥	h
11	El Camino Real/Embarcadero Road-Galvez Street	PA				-		
12	El Camino Real/Churchin Avenue	PA						
13	El Camino Real / Stenford Augure	PA						
14		PA					l	l
15	El Camino Real / California Avenue	PA					لــــــــــــــــــــــــــــــــــــــ	
16	El Camino Real / Page Mill Road-Oregon Expressway	PA	<b>•</b>	•		+	J	
17	Woodiand Avenue / University Avenue	IFb4					µ]	
18	Middlefield Road / Willow Road	MP				•		•
19	Middlefield Road / Lytton Avenue	PA						
20	Middlefield Road / University Avenue	PA						
21	Middlefield Road / Embarcadero Road	PA						1
22	Alma Street / Churchill Avenue	PA						1
23	Junipero Serra Boulevard-Foothill Expressway/Page Mill Road	PA	•			•		
24	Junipero Serra Boulevard / Stanford Avenue	SCC						
25	Junipero Serra Boulevard / Campus Drive East	SCC						
26	Junipero Serra Boulevard / Campus Drive West	SCC				•	[]	
27	Junipero Serra Boulevard / Alpine Road-Santa Cruz Avenue	MP						
28	Sand Hill Cir- I-280 / Sand Hill Road	MP						
29	Sharon Park Drive / Sand Hill Road	MP						
30	Santa Cruz Avenue / Sand Hill Road	MP		•	•			
31	Oak Avenue / Sand Hill Road -Vine Street	MP		_				
32	Stock Farm Road / Sand Hill Road	PA						i
33	Pasteur Drive / Sand Hill Road	PA						
34	Arboretum Road / Sand Hill Road	PA						
35	Arboretum Road / Quarry Road							
26	Arboretum Road / Balm Drive						┟─────┦	
30	Arboretum Road / Calum Street / (unsignalized)	PA	•			•		
37	Arboretum Road / Galvez Street / (unsignalized)	PA	•			•		
38	EL Camino Real / Charleston Road	PA						
39	Middlefield Deed / Charleston Road	PA						
40	Middlefield Road / Charleston Road	PA						
41	Middlefield Road / Hamilton Avenue	PA					l	
42	Alma Street / Hamilton Avenue	PA						
43	University Drive / Santa Cruz Avenue	MP					µ]	
44	El Camino Real / Oak Grove Avenue	MP					J	
45	Middlefield Road / Ringwood Avenue	MP					<u> </u>	
46	Middlefield Road / Ravenswood Avenue	MP						•
47	El Camino Real / Encinal Road	MP						
48	Bay Road / Marsh Road	MP						
49	Marsh Road / US 101 SB Off-Ramp	MP						
50	Marsh Road / US 101 NB Off-Ramp	MP						
51	Bay Road / Willow Road	MP						
52	Bayfront Expressway / Willow Road	MP				•		•
53	University Avenue / Bayfront Expressway	MP				•		•
54	Bay Road / University Avenue	EPA				•		
55	Donohoe Street / University Avenue	EPA	•				I	
56	Welch Road / Quarry Road	PA						
57	Durand Way / Sand Hill Road	PA					I	
58	Pasteur Drive NB / Welch Road	PA						
59	Pasteur Drive SB / Welch Road	PA						
60	Durand Way Extension / Welch Road	PA						
61	Bowdoin Street / Stanford Road (unsignalized)	PA						·
62	Alpine Road / L-280 NB Off-Ramp (unsignalized)		<b>^</b>		•	<b>^</b>		
62	Alpine Road / 1-200 NB Off-Ramp (unsignalized)						┟────┤	
64	Page Mill Pood/ L280 NB Off-Pamp (unsignalized)							
04	prage Mill Bood / 1200 NB Officianty (Unsignalized)					<u>^</u>	l	
CO		PA				*	I	
66	roomini Expressway / Arastradero Road	SUC		<u> </u>		•	لـــــ	
⊢	I oral Locations		11	4	2	15	10	6
<u> </u>	PA Locations		9	3	1	8	5	2
•	(Diamond) Base							
•	(Dot) SUMC Project Impact							
	Intersection with Traffic Adaptive Technology							
0								

Source: AECOM, 2010

# 3.9 Roadway Mitigation (Menlo Park)

Table 11 to Table 13 present the roadways in Menlo Park still impacted under this project alternative with the different mitigation measures in place for 2025+.

From Table 11, it can be seen that the two new pedestrian / bicycle undercrossings would remove the impact on Ravenswood Avenue under this project alternative in both study years. The other four roadways remain impacted under this project alternative.

Roadway	Туре	Segment	No Build	With 60% SUMC	Impact
Marsh Road	Minor Arterial	West of US.101	39454	39741	Y
Sand Hill Road	Minor Arterial	East of Santa Cruz Avenue	33407	34641	Y
Willow Road	Minor Arterial	East of Middlefield Road	23823	24510	Y
	Collector	West of Middlefield Road	6315	6315	N
Alpine Road	Minor Arterial	West of Junipero Serra Boulevard	25120	25440	Y
Middlefield Road	Minor Arterial	North of Ravenswood Avenue	14359	14552	N
	Minor Arterial	South of Ravenswood Avenue	25215	24901	N
Ravenswood Avenue	Minor Arterial	East of EI Camino Real	22705	22590	N
Santa Cruz Avenue	Minor Arterial	West of EI Camino Real	6530	6530	N
Valparaiso Avenue	Minor Arterial	West of El Camino Real	16239	16286	N

 Table 11

 2025 Roadway ADT Analysis with Undercrossings (Menlo Park)

Source: AECOM, 2010

Table 12 presents the results of ADT analysis when the proposed TDM and new pedestrian / bicycle undercrossings are in place for 2025 under this project alternative. Impacts on the five affected roadways are alleviated in both study years under this project alternative. No roadways would be impacted in 2025 if the two mitigation measures are successfully adopted under this project alternative.

 Table 12

 2025 Roadway ADT Analysis with TDM and Undercrossings (Menlo Park)

Roadway	Туре	Segment	No Build	With 60% SUMC	Impact
Marsh Road	Minor Arterial	West of US.101	39454	39434	N
Sand Hill Road	Minor Arterial	East of Santa Cruz Avenue	33407	33347	N
	Minor Arterial	East of Middlefield Road	23823	23910	N
WIIIOW ROad	Collector	West of Middlefield Road	6315	6315	N
Alpine Road	Minor Arterial	West of Junipero Serra Boulevard	25120	25100	N
Middlofiold Road	Minor Arterial	North of Ravenswood Avenue	14359	14346	N
	Minor Arterial	South of Ravenswood Avenue	25215	24728	N
Ravenswood Avenue	Minor Arterial	East of El Camino Real	22705	22229	N
Santa Cruz Avenue	Minor Arterial	West of EI Camino Real	6530	6530	N
Valparaiso Avenue	Minor Arterial	West of El Camino Real	16239	16239	Ν

Source: AECOM, 2010

As seen in Table 13, four roadways remain impacted in 2025 if the remote parking program is adopted together with the provision of the new pedestrian / bicycle undercrossings. Impacts on Ravenswood Avenue would be alleviated under this project alternative for this project alternative.

Roadway	Туре	Segment	No Build	With 60% SUMC	Impact
Marsh Road	Minor Arterial	West of US.101	39454	39615	Y
Sand Hill Road	Minor Arterial	East of Santa Cruz Avenue	33407	34187	Y
Willow Dood	Minor Arterial	East of Middlefield Road	23823	24103	Y
WINOW ROad	Collector	West of Middlefield Road	6315	6315	N
Alpine Road	Minor Arterial	West of Junipero Serra Boulevard	25120	25333	Y
Middlafiald Road	Minor Arterial	North of Ravenswood Avenue	14359	14486	N
	Minor Arterial	South of Ravenswood Avenue	25215	24755	N
Ravenswood Avenue	Minor Arterial	East of El Camino Real	22705	22370	N
Santa Cruz Avenue	Minor Arterial	West of EI Camino Real	6530	6530	N
Valparaiso Avenue	Minor Arterial	West of EI Camino Real	16239	16279	N

 Table 13

 2025 Roadway ADT Analysis with Remote Parking and Undercrossings (Menlo Park)

Source: AECOM, 2010

In Menlo Park, the contribution to roadway mitigation should be tied to the amount of traffic added to study area intersections by the project.

#### 3.10 Parking Mitigation

Under this project alternative, SUMC is sufficiently parked. With the proposed TDM measures, such as the GO Pass, there will be an overall parking saving of about 640 spaces. The proposed remote parking plan would reduce the required parking by about 380 parking spaces at SUMC.

#### 3.11 Transit Mitigation

Expansion of transit service in the study area provides an alternative to automobile travel. While the precise level of direct reduction in peak hour travel is sometimes difficult to quantify, current literature indicates that expanded transit service provides an overall benefit to the area by reducing the level of auto travel throughout the day, thus reducing both traffic and air quality impacts (including impacts associated with greenhouse gas emissions). An extensive discussion of the mitigation measures aim at alleviating transit impact has been presented in the main report.

#### 3.12 Local Circulation Mitigation

The local circulation network will be enhanced by the SUMC project. Capacity will be added to Welch Road and to Pasteur Drive. However, the traffic projections for Welch Road indicate that it will be approaching capacity. The traffic volumes projected for Welch Road combined with the numerous turning vehicles, pedestrian movements across and along Welch Road and bicycle travel along Welch Road will potentially create a safety hazard which is a significant impact. Durand Way, Roth Way and Quarry Road will be extended to provide additional access. The local street network will be further enhanced with the connection of Sand Hill Road to Campus Drive West via Pasteur Drive, a currently designated private street and Roth

Way. The private street connection between Roth Way and Pasteur Drive should be designed to a cross section consistent with the adjoining public streets. After project completion, Stanford shall fund an independent traffic evaluation, commissioned by the City, based on actual travel patterns, volumes and emergency access, with an emphasis on ease of circulation around and through the medical complex to determine if the private street connection should be operated as a public street. If the independent traffic study demonstrates that the connection between Roth Way and Pasteur Drive would improve circulation, it should be designated as a public street for all vehicular, bicycle, pedestrian and transit traffic.

#### 3.13 Pedestrian and Bicycle Mitigation

The proposed pedestrian and bicycle improvements under this project alternative will provide an overall benefit to the project study area by reducing auto related traffic and providing infrastructure for an alternative travel choice to driving. Enhancements to the pedestrian and bicycle network can be made to reduce overall traffic, to further improve the linkages between the project and downtown Palo Alto and the surrounding residential neighborhoods and to improve air quality and reduce greenhouse gases by reducing vehicle miles traveled. The improved facilities would also mitigate the hazards to pedestrians and cyclists brought about by the increased vehicular traffic and congestions. A list of improvements has been presented in the main report and will not be repeated here.

#### 3.14 Emergency Vehicle Access Mitigation

The Installation of emergency vehicle traffic signal priority (Opticom) at all intersections significantly impacted under this project alternative will reduce emergency vehicles response time through the study intersections.

#### 3.15 Construction Mitigation

Project-related construction traffic could contribute to increased intersection delays and interference with pedestrians, bicyclists, and transit. During the construction period, impacts might arise from a substantial increase in heavy truck travel, as materials are brought in to the project sites, and demolished or excavated materials are hauled out. Temporary lane or road closures might be required for the construction and for underground utility work. Construction activities would lead to both temporary disruption of transportation system operation and permanent damage to elements of the system such as pavement and bridges.

A comprehensive construction mitigation plan has been identified and presented in the main report and will not be repeated here.

#### 3.16 Vehicle Miles Travelled

The amount of travel undertaken by employees and patients of SUMC can be calculated in the form of daily vehicle miles travelled (VMT). VMT is the summation of the multiplication of number of trips and its corresponding average travel distance. The VMT for SUMC under this project alternative is approximately 172,500 daily vehicle miles. With the proposed TDM program, the VMT can be reduced to approximately 149,100 daily vehicle miles.

# 4.0 **Project Analysis for Village Concept**

The City has developed the Village Concept (VC) alternative to provide opportunities to enhance the SUMC project by providing a more walkable, bikeable, mixed-use, transit-oriented and well-connected urban environment. It aims to create a 'live, work and play' environment within the SUMC project vicinity thereby reducing the need to travel.

#### 4.1 Trip Generation

A total of 490 housing units have been planned for three housing parcels within the SUMC project area. The housing unit locations are:

• Quarry Road / Arboretum Drive, 240 units

The City would recommend that the SUMC Project sponsors dedicate this housing to SUMC Project employees. This site consists of eight acres and is located on the southeastern corner of Quarry Road and Arboretum Road. Across Quarry Road to the north is the Stanford Shopping Center and the Hoover Pavilion Site is adjacent to the east. A commercial bank is located at the northwest corner of the site. Currently, this site is used as the Hoover Pavilion South lot.

The Quarry Road/Arboretum Drive site is zoned as Academic Reserve and Open Space, per the approved Stanford Community Plan/General Use Permit<sup>1</sup>. This site is within unincorporated Santa Clara County, and any changes to the previously approved housing therein would require County approval.

• Quarry Road / El Camino Real, 180 units

The City would recommend that the SUMC Project sponsors dedicate this housing to SUMC Project employees. This site consists of approximately 6.2 acres and is located on the southwestern corner of Quarry Road and El Camino Real. Across from Quarry Road to the north is the Stanford Shopping Center, and across from Palo Road to the west is the Hoover Pavilion Site. Currently, this site is open space and no buildings are located on the property.

The Quarry Road/El Camino Real site is also zoned as Academic Reserve and Open Space, per the approved Stanford Community Plan/General Use Permit. The City would recommend that the SUMC Project sponsors construct this housing within two years of the first building permit for the SUMC Project.

• Sand Hill Road / Pasteur Drive, 70 units

The City would recommend that this housing be dedicated by the SUMC Project sponsors to SUMC Project employees. This site consists of 2.5 acres and is located on the southeast corner of Pasteur Drive and Sand Hill Road. The site is just north of the Main SUMC Site, and Sand Hill Fields is located across Pasteur Drive, to the east of the site. Currently, this site is open space and no buildings are located on the property. This site is within City of Palo Alto jurisdiction and is zoned RM-40,<sup>2</sup> which allows multiple-family residential units at a maximum residential density of 40 dwelling units/acre.<sup>3</sup> The City would recommend that Stanford construct this housing within four years of the first building permit for the SUMC Project.

<sup>&</sup>lt;sup>1</sup> Stanford University Draft Community Plan and General Use Permit Application, Final Environmental Impact Report, Certified by the Santa Clara County Board of Supervisors, December 2000.

<sup>&</sup>lt;sup>2</sup> City of Palo Alto, Zone Map Page 04, 2006.

<sup>&</sup>lt;sup>3</sup> City of Palo Alto, *Zoning Regulations of the City of Palo Alto*, Title 18 of the Palo Alto Municipal Code, Section 18.13.010(c), October 11,

<sup>2007.</sup> 

The new rental housing units constructed at the three sites under the Village Concept Alternative would be developed by Stanford University. As discussed above, the City would recommend that housing be prioritized for SUMC Project employees instead of post-doctoral fellows and graduate students, as contemplated under the CP/GUP. Although the City would recommend that these units be dedicated to SUMC Project employees, rather than postgraduates and/or hospital residents, this would not trigger a "shift" in housing demand since the VC would consume only a portion of the "overage" housing that is allowed under the GUP.

The occupancy rate of these housing units is assumed to be 2.2 persons/unit. This analysis assumes that all 490 housing units will be prioritized for SUMC employees per the recommendation and one person from each unit is a SUMC employee. The inbound drive-alone trips in the morning and outbound trips in the evening would be reduced since these employees can now walk or bike to / from work. In addition, trips generated from all three sites will be reduced because of Transit Oriented Development (TOD) and the proximity of significant transit services to these housing sites. Table 14 presents the trip generations with the 490 housing units.

	1	VC	The Gen					
Land Lise	Sizo			AM Peak		PM Peak		
	0126	Daily	In	Out	Total	In	Out	Total
Sta	anford Hospitals	and Clinic	s and Luci	le Packard	d Children'	s Hospital:		
Trip Rat	e <sup>1</sup>		0.62	0.2	0.82	0.23	0.58	0.81
Hospitals	854,970 s.f.		530	171	701	197	496	693
Hospitals S	Subtotal	9400	530	171	701	197	496	693
		Medic	al Office E	Buildings:			·	
Trip Ra	ate <sup>1</sup>		2.02	0.62	2.64	0.55	1.64	2.19
701 Welch	(56,300 s.f.)		(114)	(35)	(149)	(31)	(92)	(123)
703 Welch	(23,500 s.f.)		(47)	(15)	(62)	(13)	(38)	(51)
1101 Welch	(40,100 s.f.)		(80)	(24)	(104)	(22)	(66)	(88)
Hoover Pavilion	144,230s.f.		291	89	380	79	236	315
MOB Sul	ototal	661	50	15	65	13	40	53
		v	illage Con	cept:				
Trip Rat	e <sup>2</sup>		0.76	0.24	1.00	0.27	0.73	1.00
SUMC Employees	490 <sup>4</sup>	(492) 4	(79)	(25)	(104) 4	(28)	(76)	(104) <sup>4</sup>
Trip Rat	e <sup>3</sup>		0.2	0.8	1.00	0.65	0.35	1.00
Non SUMC Employees	588 <sup>4</sup>	1370 <sup>4</sup>	18	73	91 <sup>4</sup>	92	49	141 <sup>4</sup>
VC Sub	total		(61)	48	(14)	64	(27)	37
ΤΟΤΑ	LS		519	234	752	274	509	709

#### Table 14 VC Trip Generation

Notes:

s.f. = square feet.

Source: AECOM, May 2009

1. Trip generation based on survey data from Fehr and Peers, 2007, adjusted by AECOM according to white paper analysis contained in Appendix A of main report

2. SUMC employee in / out distribution rate = average in / out distribution of Hospital and Medical Office Building

3. Non SUMC employee in / out distribution rate from ITE (Land Use 220)

4. See Vehicle Miles Traveled calculations in Appendix K of this report

## 4.2 **Project Impact – Intersection Analysis**

#### 2025 No Build traffic volumes + Village Concept (SUMC at 100% build-out with proposed housing)

The project trips presented in Table 14 were distributed according to the same percentages presented in the main report and added to the 2025 No Build traffic volume at each of the 66 study intersections. The No Build traffic volumes for 2025 are presented in Figure 1a-1d. Figures 5a-d present the VC only volumes and Figure 6a-d present the 'With VC' volumes in 2025. The intersection impacts are summarized in Table 15. Appendix F presents the TRAFFIX details.

In the AM peak hour, 6 intersections would be impacted by this project alternative; one more than the base SUMC proposal. The impacted intersections are:

- El Camino Real / University Avenue Palm Drive (#10)
- El Camino Real / Page Mill Road-Oregon Expressway (#16)
- Sand Hill Road / Santa Cruz Avenue (#30)
- Arboretum Road / Galvez Street (#37) (unsignalized
- Alpine Road / I-280 NB Off-Ramp (#62) (unsignalized)
- Alpine Road / I-280 SB Off-Ramp (#63) (unsignalized)

The intersection of Alpine Road / I-280 SB Off-Ramp (#63) (unsignalized) is not impacted in the base SUMC proposal but impacted under this project alternative.

In the PM peak hour, the same 12 intersections would be impacted under this project alternative. The impacted intersections are:

- El Camino Real / Ravenswood Avenue (#3)
- El Camino Real / University Avenue -Palm Drive (#10)
- El Camino Real / Page Mill Road-Oregon Expressway (#16)
- Middlefield Road / Willow Road (#18)
- Middlefield Road / Lytton Avenue (#19)
- Junipero Serra Boulevard / Page Mill Road (#23)
- Junipero Serra Boulevard / Campus Drive West (#26)
- Arboretum Road / Galvez Street (#37) (unsignalized)
- Middlefield Road / Ravenswood Avenue (#46)
- Bayfront Expressway / Willow Road (#52)
- Bayfront Expressway / University Avenue (#53)
- Alpine Road / I-280 NB Off-Ramp (#62) (unsignalized)

#### 4.3 Palo Alto Residential Street Analysis

A street is considered impacted if the TIRE Index increases by 0.1. An increase in the TIRE Index of 0.1 or more indicates that residents will notice an increase in traffic on the street. The 'With VC' scenario is compared to the 'No Build' scenario to determine any project impact. No residential roadway segments would be significantly impacted by this project alternative in 2025 as seen in Table 16.

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$17 \qquad \qquad$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$		

**Figure 5a** 

2025 VILLAGE CONCEPT ONLY VOLUMES

$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	21 (0) $(0)(0)$ $(0)(0)$ $(0)$	$\begin{array}{c c} 22 \\ & & & \\ \hline (1) \\ (0) \\ $
$\begin{array}{c} \textbf{23} \\ \textbf{23} \\ \textbf{23} \\ \textbf{23} \\ \textbf{24} \\ \textbf{13} \\ \textbf{24} \\ \textbf{13} \\ \textbf{0} \\ \textbf$	<b>54</b> 44 (1) 1 (1) 20 (44) 44 1 (1) 1 (1) 2 (44) 2 (44) 1 (1) 1 (1) 2 (1) 1 (1) 2 (1)	<b>52</b> <b>Cambra DL E</b> <b>10</b> (0) 0 0 0 <b>10</b> (0) 0 0 0 0 0 <b>10</b> (0) 0 0 0 0 0 0 <b>10</b> (0) 0 0 0 0 0 0 <b>10</b> (0) 0 0 0 0 0 0 0 0 0 <b>10</b> (0) 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	28 ↓ □ ↓ □ ↓ 0 (0) ↓ 0 (0) ↓ 29 (64) ↓ 0 (0) ↓ 0 (0
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	27 $\downarrow$ 10 (23) $\downarrow$ 8 (12) Santa Cruz Alpine 24 (12) $\rightarrow$ $\bigcirc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	(0) 0 (0) 0 (0) 0 (0) 0 (0) 1 1 1 1 1 1 1 1 1 1
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	31	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
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STANFORD EIR Figure 5b

2025 VILLAGE CONCEPT ONLY VOLUMES

37 (0) (0) (0) (0) (11) Galvez 9 (27) → 9 (7) 4 29 (11) Embarcadero	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c} \textbf{43} \\ \hline \textbf{4} \\ \textbf{5} \\ \textbf{5} \\ \textbf{5} \\ \textbf{6} \\ \textbf{6} \\ \textbf{5} \\ \textbf{6} \\ \textbf{6} \\ \textbf{5} \\ \textbf{6} \\ \textbf$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c c} \textbf{46} & & & \\ & (\textbf{p}) & (\textbf{p}$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
$\begin{array}{c} 49 \\ \hline & & \\ & \\ & \\ & \\ & \\ & \\ & \\ & \\ &$	50 <sup>C</sup> S <sup>2</sup> C <sup>7</sup> , <sup>A</sup> S <sup>2</sup> O <sup>5</sup> ,	51 (0) 0 (0) 0 (0) 0 ↓ 0 (0) 56 (29) 0 (0) ↓ Willow Rd 25 (55) ↓	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
$\begin{array}{ c c c c c }\hline 53 & & & & & \\\hline 53 & & & & & \\\hline & & & & & \\\hline & & & & & \\\hline & & & &$	$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	

STANFORD EIR Figure 5c

2025 VILLAGE CONCEPT ONLY VOLUMES

$56 \xrightarrow{\text{P2}}{(100)} \xrightarrow{\text{P2}}{100} \xrightarrow{\text{(45)}}{72} \xrightarrow{(40)}{72} \xrightarrow{(40)}{72} \xrightarrow{(40)}{73} \xrightarrow{(40)}{73} \xrightarrow{(40)}{72} (4$	<b>57</b> (0) $(0)$	58 (I) 1 - 1 - 1 - 20 (14) -5 -5 (5)5 (5)5 (5)	59 (1) (0) 12 (2) (2) (2) (2) (2) (2) (2) (2) (2) (2
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2025 SI MC Village Concept with only -ref			

STANFORD EIR Figure 5d

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17 (201) (212) (	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$		STANFORD FIR

Figure 6a 2025 WITH VILLAGE CONCEPT VOLUMES AM (PM) Peak Hour



$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	21 (122) (12) (122)	22 (100(123) 100(123) 100(123) 100(325) 22 (111(101) Churchill 100(123) 100
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26 (21) (21) (22) (21) (22) (	27 ← 590(954) ← 907(575) Santa Cruz Alpine 1099(881) ← (919) 603(262) ← (949) Constant	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$	Band Hill Cr Sand Hill Cr 128 (20) 412 (216) 2300 (20) 2300 (20) 2000 (20) 2000
<b>30</b> (150) 30 (150) 314(150) 314(150) 314(150) 314(150) 314(150) 314(150) 314(150) 314(150) 314(150) 314(150) 314(150) 278(280) 314(150) 580 1241 12	31	32 (1,1,1)	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$
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Figure 6b

2025 WITH VILLAGE CONCEPT VOLUMES AM (PM) Peak Hour







$\begin{array}{c} 56 & & & & \\ & & & & \\ & & & & \\ & & & & $	<b>57</b> ( $(1,1)$ ) ( $(1$	58 (i) 335(182) ↓ 254(213) Welch Rd 0 (40) ↓ 421(353) ↓ (10) (1	<b>59</b> (1307) (13
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STANFORD EIR Figure 6d 2025 WITH VILLAGE CONCEPT VOLUMES AM (PM) Peak Hour

			2025 AM			2025 PM			
			Impact			Impact			
#	Intersection	City	No	With	With	No	With	With	
			Build	SUMC	vc	Build	SUMC	vc	
	Column		Α	В	С	D	E	F	
1	El Camino Real/Valparaiso Avenue	MP							
2	El Camino Real/Santa Cruz Avenue	MP							
3	El Camino Real/Ravenswood Avenue	MP				•			
4	El Camino Real/Roble Avenue	MP							
5	El Camino Real/Middle Avenue	MP							
6	El Camino Real/Cambridge Avenue	MP							
7	EI Camino Real/Sand Hill Road-Alma Street	PA							
8	El Camino Real/Quarry Rd	PA							
9	Alma Street/Lytton Avenue	PA							
10	El Camino Real/University Avenue-Palm Drive(Single Int)	PA	•	•					
11	El Camino Real/Embarcadero Road-Galvez Street	PA				٠			
12	El Camino Real/Churchill Avenue	PA				•			
13	El Camino Real / Serra Street-Park Boulevard	PA							
14	El Camino Real / Stanford Avenue	PA							
15	El Camino Real / California Avenue	PA							
16	El Camino Real / Page Mill Read-Orogon Expressivov								
17	Weedland Avanue / University Avanue		-			-			
10	Middlefield Reed / Willow Reed								
10	Middlefield Road / Lytton Avenue								
19	Initiale Road / Lytton Avenue	PA							
20	Invitoureneru Road / University Avenue								
21	Innocenera Koad / Emparcadero Koad								
22	Arma Street / Churchill Avenue								
23	Junipero Serra Boulevaro-Footniii Expressway/Page Mill Road		•			•			
24	Junipero Serra Boulevard / Stanford Avenue	SCC						L	
25	Junipero Serra Boulevard / Campus Drive East	SCC							
26	Junipero Serra Boulevard / Campus Drive West	SCC				•	•		
27	Junipero Serra Boulevard / Alpine Road-Santa Cruz Avenue	MP							
28	Sand Hill Cir- I-280 / Sand Hill Road	MP						L	
29	Sharon Park Drive / Sand Hill Road	MP							
30	Santa Cruz Avenue / Sand Hill Road	MP							
31	Oak Avenue / Sand Hill Road -Vine Street	MP							
32	Stock Farm Road / Sand Hill Road	PA							
33	Pasteur Drive / Sand Hill Road	PA							
34	Arboretum Road / Sand Hill Road	PA							
35	Arboretum Road / Quarry Road	PA							
36	Arboretum Road / Palm Drive	PA							
37	Arboretum Road / Galvez Street / (unsignalized)	PA	•	•	•	•	•		
38	EL Camino Real / Charleston Road	PA				•			
39	Alma Street / Charleston Road	PA	•			•			
40	Middlefield Road / Charleston Road	PA							
41	Middlefield Road / Hamilton Avenue	PA							
42	Alma Street / Hamilton Avenue	PA							
43	University Drive / Santa Cruz Avenue	MP							
44	El Camino Real / Oak Grove Avenue	MP							
45	Middlefield Road / Ringwood Avenue	MP							
46	Middlefield Road / Ravenswood Avenue	MP							
47	El Camino Real / Encinal Road	MP							
48	Bay Road / Marsh Road	MP							
49	Marsh Road / US 101 SB Off-Ramp	MP							
50	Marsh Road / US 101 NB Off-Ramp	MP							
51	Bay Road / Willow Road	MP	İ			İ			
52	Bayfront Expressway / Willow Road	MP				<b></b>		_	
52	University Avenue / Bayfront Expressway	MP							
5/	Bay Road / University Avenue	FPA							
55	Donoboe Street / University Avenue					-			
50	Wolch Road / Quarry Road		<b>—</b> —						
57									
57	Duranu way / Sanu Fill Rudu								
50	Pasteur Drive ND / Welch Road								
59	Presteur Dilve SD / Welch Road	PA							
00	Duranu way Extension / Weich Road								
61	Downoin Street / Stanford Road (unsignalized)		-						
62	Alpine Koad / I-280 NB Off-Ramp (unsignalized)	PA	• <u>•</u>	•	•	•			
63	Alpine Road / I-280 SB Off-Ramp (unsignalized)	PA	•		•				
64	Page Mill Road/ I-280 NB Off-Ramp (unsignalized)	PA	•						
65	Page IVIII Koad / 1-280 SB OIT-Kamp (Unsignalized)	PA	•			•	ļļ		
66	Foothill Expressway / Arastradero Road	SCC	•			•			
L	Total Locations	_	11	5	6	15	12	12	
	PA Locations		9	4	5	8	6	6	
•	(Diamond) Base								
	(Dot) SUMC or VC Project Impact								

Table 15Summary of VC Impact in 2025

Source: AECOM 2010

	2025				0.1 Change in	With VC (Compared with 2025 Base)		
Roadway	Segment	City	ADT	TIRE Index	the TIRE Index	ADT	Change	Impact
Santa Cruz Avenue	North of Sand Hill Road	MP	25747	4.4	6600	25900	153	Ν
Sharon Road	North of Sharon Park Drive	MP	4774	3.7	1250	4808	33	Ν
Stanford Avenue	North of Sand Hill Road	MP	186	2.3	52	186	0	Ν
Leland Avenue	North of Sand Hill Road	MP	337	2.5	79	337	0	Ν
Vine Street	North of Sand Hill Road	MP	429	2.6	94	429	0	Ν
Hawthorne Avenue	East of Alma Street	PA	2193	3.3	500	2313	120	Ν
Everett Avenue	East of Alma Street	PA	1759	3.2	380	1879	120	Ν
Hamilton Avenue	Between Chaucer Street & Lincoln Avenue	PA	3121	3.5	825	3794	673	N

Table 162025 TIRE Index Comparison

Source: AECOM 2010

#### 4.4 Menlo Park Roadway Analysis

As part of the City of Menlo Park evaluation criteria, selected roadways are being evaluated to determine the effect of the proposed project. Average daily traffic (ADT) of these roadways were calculated for the project and compared to the 'No Build' scenario to determine project impact. Table 17 presents the ADT comparison of roadways in Menlo Park for this project alternative in 2025. Impacted roadways are highlighted.

Five roadways will be impacted by this project alternative in both years. These roadways are also impacted under the main SUMC expansion proposal.

Roadway	Туре	Segment	No Build	With VC	Impact
Marsh Road	Minor Arterial	West of US.101	39454	39908	Y
Sand Hill Road	Minor Arterial	East of Santa Cruz Avenue	33407	35408	Y
Willow Pood	Minor Arterial	East of Middlefield Road	23823	24924	Y
WIIIOW Roau	Collector	West of Middlefield Road	6315	6315	Ν
Alpine Road	Minor Arterial	West of Junipero Serra Boulevard	25120	25647	Y
Middlefield Read	Minor Arterial	North of Ravenswood Avenue	14359	14679	Ν
	Minor Arterial	South of Ravenswood Avenue	25215	25282	Ν
Ravenswood Avenue	Minor Arterial	East of EI Camino Real	22705	23038	Y
Santa Cruz Avenue	Minor Arterial	West of El Camino Real	6530	6530	Ν
Valparaiso Avenue	Minor Arterial	West of EI Camino Real	16239	16319	Ν

Table 172025 Roadway ADT Analysis (Menio Park)

Source: AECOM, 2010

#### 4.5 Freeway Analysis

Table 18 shows the project volumes along the study segments of US 101 and I-280. The traffic volumes from this project alternative are less than one percent of the segment capacity of the mixed lanes. As such, no further analysis is necessary for this project alternative.

			TICCWA	y volun	ies with	v C			
	U.S. 101 Segment	Direction	No. of Mixed Lanes	Peak Period	Total Capacity	Total VC Trips	VC Trips with HOV adj	% Capacity Added with HOV Adj	Analysis Required
1	University Avenue to Willow Road	NB	3	AM PM	6900 6900	4 9	3	0.04%	NO NO
2	University Avenue to Willow Road	SB	3	AM PM	6900 6900	9 5	7 4	0.10% 0.05%	NO NO
3	University Avenue to Embarcadero /Oregon E'way	NB	3	AM PM	6900 6900	25 13	19 10	0.27% 0.14%	NO NO
4	University Avenue to Embarcadero /Oregon E'way	SB	3	AM PM	6900 6900	11 24	8 18	0.12% 0.26%	NO NO
5	Embarcadero / Oregon Expressway to San Antonio Road	NB	3	AM PM	6900 6900	74 38	55 29	0.80% 0.41%	NO NO
6	Embarcadero / Oregon Expressway to San Antonio Road	SB	3	AM PM	6900 6900	33 73	25 55	0.36% 0.79%	NO NO
	I-280 Segment	Direction	No. of Mixed Lanes	Peak Period	Total Capacity	Total VC Trips	VC Trips with HOV adj	% Capacity Added	Analysis Required
1	Sand Hill Road to Woodside Road	NB	4	AM PM	9200 9200	23 50		0.25% 0.54%	NO NO
2	Sand Hill Road to Woodside Road	SB	4	AM PM	9200 9200	51 26		0.55% 0.28%	NO NO
3	Alpine Road to Page Mill Road	NB	4	AM PM	9200 9200	4 2		0.04%	NO NO
4	Alpine Road to Page Mill Road	SB	4	AM PM	9200 9200	2 4		0.02% 0.04%	NO NO
5	Page Mill Road to El Monte Avenue	NB	4	AM PM	9200 9200	25 12		0.27% 0.13%	NO NO
6	Page Mill Road to El Monte Avenue	SB	4	AM PM	9200 9200	11 24		0.12% 0.26%	NO NO

Table 18 Freeway Volumes with VC

Source: AECOM 2010

#### 4.6 Parking Analysis

A detailed analysis of the parking provision for the SUMC expansion project has been presented in the main report. While there is no change to the parking provision proposed under the VC, the parking demand will be reduced as the pool of employees coming from outside the SUMC campus would be smaller if the VC alternative is adopted.

#### 4.7 **Project Site Local Circulation Analysis**

The SUMC project will result in several changes to local access and circulation and these changes will also take place under the VC alternative. While to a great extent, the project will rely on the existing roadway network, there are changes to the network that will enhance and modify local access, including improving the capacity of Welch Road, adding extensions on Durand Way, Quarry Road, and Roth Way and increasing the capacity of Pasteur Drive. The following discusses the individual components of the roadway network.

#### Welch Road

Welch Road between Quarry Road and Pasteur Drive currently has 29 driveways, of which 4 are closed. The remaining 25 driveways provide for a combination of inbound, outbound, and two-way access to the individual land parcels along Welch Road. The current traffic volumes are 11,375 vehicles per day, as measured in Fall 2008. Pedestrian crossings for Welch Road are concentrated at three locations; near the Stanford Barn and on both sides of the LPCH parking structure access. Hourly pedestrian volume at these three crossings was observed at approximately 200 persons during the midday, the time of greatest pedestrian activity. None of the three pedestrian crossings are signalized; one is controlled by a crossing guard. Therefore, pedestrians frequently cross Welch Road which affects the traffic capacity of Welch Road. Because of the numerous driveways, overlap of left turns occurs at 3 locations. Overlapping left turns tend to increase congestion by

restricting through traffic when opposing left turn queues block each other. The existing constraints to capacity on Welch Road include the side friction caused by numerous driveways and slow traffic turning into and out of the driveways, left turns blocking the through traffic movements and frequent pedestrian crossings. The 'With VC' scenario includes some modifications to Welch Road to improve traffic flow and accommodate the future traffic volumes from the hospital expansion. Under the 'With VC' scenario, Welch Road will be a 3lane roadway with on-street bike lanes. There will be one through lane in each direction (11-foot through lanes), with a two way left turn lane in the center (12-foot center left turn lane). The bike lanes will be six feet wide, including the gutter. Right turns into driveways will occur from the through lanes, however, left turns will be removed from the through lanes. The future traffic volumes on Welch Road are projected at 14,750 vehicles per day. This level of traffic on a two-way roadway with a continuous two way left turn lane in the median is approaching the capacity of the roadway. The three pedestrian crossings are proposed to be combined into one or two locations. The main pedestrian crossing at the LPCH access will be signalized. Signalization of the pedestrian crossing will improve the capacity of Welch Road by concentrating crossings into specific time segments, rather than the current operation where pedestrians cross individually or in smaller groups nearly continuously. The three locations with overlapping left turns are removed. The conflict at 703 and 730 Welch Road is eliminated with the realignment of the driveways. The conflict at 780/800 Welch Road and 777/801 Welch Road is eliminated by closing a driveway. The conflict at 1110 Welch Road and 1101 Welch Road is eliminated by moving the access to 1101 Welch Road onto Durand Way. Driveways in the vicinity of the Quarry Road intersection would be restricted to right in and right out only. A center barrier median will be constructed between Quarry Road and the entrance to LPCH to prevent left turns to and from the driveways. The barrier median will also improve the capacity of Welch Road. A computer simulation was made of traffic and pedestrian movements along Welch Road. That simulation demonstrated that the modified roadway design proposed as part of the project improves traffic flow.

#### Durand Way

An extension of existing Durand Way from Sand Hill Road to Welch Road is proposed as part of the hospital project build-out in 2025. The roadway is proposed as a four-lane cross section, with two lanes in each direction and on-street bike lanes. Travel lane widths are 11 feet and the bike lanes are 6 foot, including the gutter pan. This design will enable left turn queues to extend from Sand Hill Road back to Welch Road, or the reverse. The intersections of both Sand Hill Road / Durand Way and Welch Road / Durand Way would be signalized. At Sand Hill Road, the two westbound lanes on Durand Way should be a left and a through/right. This lane striping will keep the queues from extending back to the Welch Road intersection. At Welch Road, the two lanes on Durand Way should be striped for a right and a through/left. The two traffic signals on Durand Way should be interconnected. The signal cycles on Sand Hill Road range from 120 to 140 seconds to maximize through travel on Sand Hill Road. The signal cycle lengths on Welch Road will not be as long. Instead, the cycle lengths at Welch/Durand should be one-half of those on Sand Hill to maintain coordination. The extension of Durand Way to Sand Hill Road provides traffic relief to Pasteur Drive and to Welch Road. Durand Way was included in the computer simulation and acceptable traffic operations are expected. Queue lengths were also calculated using TRAFFIX. Adequate storage is provided to accommodate vehicles between these two intersections.

#### Quarry Road Extension

An extension of Quarry Road is proposed to provide access to hospital parking. At the approximate location where existing Quarry Road turns to connect to Campus Drive West, the Quarry Road extension will continue south to Roth Way. The Quarry Road extension will be a two-lane roadway with on-street bike lanes. Lane widths will be 11 feet with 6-foot bike lanes including the gutter pan. The connection to existing Quarry Road would be stopped controlled for the Quarry Road extension leg.

#### Roth Way

Roth Way will connect Campus Drive West to the Quarry Road extension. This connection will provide access to a proposed parking structure. Roth Way will be a two-lane roadway with on-street bike lanes. The travel lanes will be 11 feet and the bike lanes 6 feet including the gutter pan.

#### Pasteur Drive

The two legs of Pasteur Drive currently exist and provide access to the Medical Center and to the underground parking garage. On-street parking will be removed from Pasteur Drive and the roadway will provide two lanes of travel in each direction with on-street bike lanes. Travel lanes will be 11 feet with 6-foot bike lanes including the gutter.

#### Service Connection Between Campus Drive West and Pasteur Drive

A private street connection is proposed between the intersection of Roth Way/Quarry Road Extension and Pasteur Drive. Stanford has indicated that this service road would be for limited access (emergency vehicle, transit, service). This roadway makes a connection between Sand Hill Road at Pasteur Drive and Campus Drive West at Roth Way. As such, it enhances the grid pattern of the local street network. Local circulation could be improved with this roadway opening to all traffic as a public street.

While the project is proposing improvements to roadway circulation around the SUMC campus, the amount of traffic projected on Welch Road is approaching the capacity of the roadway. A public roadway connection between Pasteur Drive and Campus Drive West could reduce traffic on Welch Road. Inadequate local roadway circulation is a potential significant impact since it may cause an operational safety hazard.

#### 4.8 Transit Analysis

The proposed SUMC project will cause an increase in the level of traffic congestion at several locations throughout the study area and that level of congestion will also occur with the VC alternative. While mitigation measures such as roadway improvements and TDM measures have been identified to alleviate some of the traffic impacts, implementation of many of the traffic improvements are either infeasible or undesirable and TDM measures do not fully mitigate the traffic impacts. Impacts to transit service in the study area because of congested intersections are considered a significant impact according to City of Palo Alto criteria and occur as a result of this project alternative. A detailed discussion has been provided in the main report.

The SUMC is currently served by the Marguerite shuttles that connect to the Palo Alto and California Avenue Caltrain stations. Other transit services to the Caltrain stations and the Stanford Shopping Center that provide connecting service to the Marguerites include SamTrans Routes, VTA Routes, the U Line from the East Bay and the Palo Alto shuttles. Expansion of the hospital would increase demand for transit service in the area. Also, to the extent that the GO Pass is implemented as a project component or mitigation measure, the GO Pass is expected to increase transit ridership.

The mode split to transit for the existing hospital is 8.9 percent according to Stanford data. This includes ridership on Marguerite shuttles, SamTrans, AC Transit, VTA buses and Caltrain. The mode split for transit is expected to increase to 21.1 percent if all hospital employees are provided with GO Passes. Up to 150 employee transit trips would be created by the VC during the peak hour, depending on the success of the GO Pass. Given the high level of transit service to the surrounding area, increased transit ridership could be accommodated by the existing routes, with three possible exceptions. Expansion of the Go Pass program to all hospital employees will increase ridership on the Marguerite shuttles, most notably Line A and Line B Counter-Clockwise. Increased ridership on these two routes could cause a load factor of greater than 1.25. This would be considered a significant impact when it happens. Historically, Stanford monitors ridership on the Marguerite and adjusts transit service to meet demand. Monitoring of Lines A and B needs to continue with expansion of the GO Pass program to all hospital employees. Also, the current load factor on the U Line

from the East Bay is approaching 1.0 (0.94 according to AC Transit). The expanded ridership could push the load factor above 1.0. A load factor on the U Line greater than 1.0 would be considered a significant impact.

#### 4.9 Pedestrian and Bicycle Analysis

Pedestrian and bicycle traffic around the SUMC campus is currently very extensive. Expansion of SUMC would increase the level of bicycle and pedestrian activity. An extensive pedestrian and bicycle network currently exists around project vicinity. This network should be enhanced in association with the project by providing additional accesses to remove barriers. A detailed discussion has been provided in the main report.

A comprehensive approach to providing the needed pedestrian and bicycle improvements should be incorporated into the project during the planning stages to avoid their preclusion in the future. The increase in congestion that results in the increase in traffic related hazards to pedestrians and cyclists is a significant impact per the City's criteria. The increase in intersection congestion related to project generated traffic is a significant project impact and the increase in intersection congestion related to project traffic and other traffic growth in the area is a significant cumulative impact.

#### 4.10 Emergency Vehicle Access Analysis

Emergency vehicles require access within the study area to respond to emergencies and also to access the SUMC emergency room. Travel time by emergency vehicles would increase because of additional traffic congestion associated with the project. The City's significance criteria identify inadequate emergency access as a significant impact. The increased congestion identified in this analysis due to the proposed SUMC expansion at study area intersections is considered a significant impact. Any intersection significantly impacted by the project scenarios in terms of level of service or increase in vehicle delay is also impacted for emergency vehicle access. Emergency vehicle impacts are identical to the project scenario intersection impacts documented in Section 4.2 of this report. Traffic volume increases caused by project generated traffic is a significant project impact and traffic volume increases caused by project traffic and other traffic growth in the area is a significant cumulative impact.

#### 4.11 Construction Impact

Project-related construction traffic could contribute to increase intersection delays and interference with pedestrians, bicyclists and transit. Also, construction traffic may create an operational hazard or result in inadequate emergency access. During the construction period, impacts might arise from a substantial increase in heavy truck travel, as materials are brought in to the project site, and demolished or excavated materials are hauled out. Temporary lane or road closures might be required for the construction and for underground utility work. Construction activities would lead to both temporary disruption of transportation system operation and possible damage to elements of the roadway system such as pavement and bridges. An extensive discussion of the project construction impact has been presented in the main report.

Other projects in and around the SUMC may also be under construction during the time that the hospital is being built. The list of current projects that have been approved for development provides a benchmark of the degree of construction that could occur simultaneously with SUMC. Figure 4 earlier shows the projects that have been approved within the city limits. While most of these projects would be completed prior to the construction of SUMC, a similar list of project could be expected to come on line during the time of SUMC's construction. The projects shown on Figure 4 that would have construction workers using similar travel routes as SUMC construction workers are those in the downtown area and those along EI Camino Real south to Page Mill Road. Small residential and retail projects would not create a large number of construction trips and are not included in the following list. Another project that would potentially be constructed at the same time as the proposed SUMC project is the high speed rail (HSR). It is expected to commence construction in 2012 along the Caltrain corridor. Construction traffic associated with the construction of the SUMC project and the following list of projects, together with the HSR, represents a potentially significant cumulative impact.

Reference Number	<u>Address</u>
5	657 Alma
6	473 Acacia
7	260 Homer
10	325 Lytton
15	850 Webster
33	317 – 323 University
39	278 University
41	310 University
44	777 Welch
50	49 Wells
51	441 Page Mill
52	855 El Camino Real
54	195 Page Mill
63	2747 – 2785 Park
64	801 – 875 Alma
65	2180 El Camino Real

In addition to development in the City, construction on the Stanford campus would also have cumulative effect on traffic with SUMC. The following is a list of potential projects that could be under construction on Stanford within the jurisdiction of Santa Clara County. Construction traffic associated with the construction of the SUMC project and the following list of projects represents a potentially significant cumulative impact.

- Li Ka Shing Center for Learning and Knowledge (now-2010)
- Lorry I. Lokey Stem Cell Research Building (now-2010)

Projects on the Science and Engineering Quad that would be under construction are:

- Center for Nanoscale Science and Technology (now-2010)
- Huang Engineering Center (now-2010)
- Bio-engineering / Chemical Engineering (2011-2013)

#### 4.12 Project Plus High Speed Rail Analysis

The 2025 'With VC' intersection operations accounted for the project conditions under this project alternative. The cumulative intersection operations would also include the possibility of HSR being constructed on the peninsula between San Francisco to San Jose and continuing to the Central Valley and Southern California. The 2025 traffic projections developed from the City's travel demand model did not include HSR as part of the transportation network. However, recent federal funding allocations provided to the California High Speed Rail Authority make HSR a reasonably foreseeable project. It is possible that construction of HSR could begin 2012 and continue through the proposed SUMC expansion.

A HSR station may be constructed in the mid-peninsula area between San Francisco and San Jose. A station could be constructed at one of three possible locations; Redwood City, Palo Alto or Mountain View, or a mid-peninsula station may not be provided. At this point, the location of the station, if any, is too speculative to be included in this analysis as a cumulative project.

Traffic impacts associated with HSR will be concentrated around the stations. Automobile traffic to the station area will increase for persons being dropped off, for persons driving to the station and parking and for taxis dropping off passengers. Also, transit vehicle traffic to and from the station may also increase. Construction of a HSR station in Palo Alto is speculative, and station-related impacts in Palo Alto are not included in this traffic analysis.

### 4.13 Adjustments to Pedestrian Crossing Timing

With the improved pedestrian linkages within the project site, non-motorized travel is expected to increase. Existing crosswalk times can be adjusted to allow for more time for pedestrian and cyclists to cross the intersection thereby accommodating the increased volume.

For the VC alternative, three intersections were evaluated to determine the effect of adding time to the pedestrian signals. Additional pedestrian crossing time can increase overall intersection delay and reduce the level of service. The three intersections being evaluated are:

- El Camino Real / Quarry Road (#8)
- Arboretum Road / Quarry Road (#35)
- Welch Road / Quarry Road (#56)

Table 19 shows the three intersections, the length of all existing crosswalks and the minimum crossing time. The minimum crossing time is based on an average walking speed of 3.5 feet per second.

Two adjustments to pedestrian crossing time were evaluated. The minimum crossing time was increased by a 1.5 factor and a 2.0 factor. The results of these adjustments are shown in Table 20.

		Crosswalk Length (ft)			Min Crossing Time (Sec)				
#	Intersection	Ν	S	E	W	Ν	S	E	W
8	El Camino Real and Quarry Road	115	N/A	N/A	90	33	N/A	N/A	26
35	Arboretum Road and Quarry Road	95	115	100	85	27	33	29	24
56	Welch Road and Quarry Road	55	50	N/A	90	16	14	N/A	26

Table 19 Minimum Crossing Time

Source: AECOM, 2010

For the intersection of El Camino Real / Quarry Road (#8), the LOS would deteriorate from level B to E during the AM peak hour as more time is given to pedestrians which would be considered a significant impact. During the PM peak hour, the LOS would deteriorate from level C to D as more time is given to pedestrians. These levels are still within the acceptable thresholds. The overall cycle time is set to remain the same with the higher pedestrian crossing time to maintain signal progression along El Camino Real.

For the intersection of Arboretum Road / Quarry Road (#35), the LOS would deteriorate from level C to E during the AM peak hour as more time is given to pedestrians which would be considered a significant impact. During the PM peak hour, the LOS would deteriorate from level C to D as more time is given to pedestrians. These levels are still within the acceptable thresholds. The overall cycle time is increased as a result of increasing the pedestrian crossing time.

For the intersection of Welch Road / Quarry Road (#56), the LOS would deteriorate from level C to D during the AM peak hour and would remain at level C during the PM peak hour as more time is given to pedestrians. The LOS are within acceptable thresholds for both the AM and PM peak hours. However, the overall cycle time is increased as a result of increasing the pedestrian crossing time.

During the AM and PM peak hours, the pedestrian crossing times at the three evaluated intersections can be increased by a factor of 1.5 and in some cases 2.0, without causing the level of service to drop below level D. During the off peak hours when traffic volumes are lower, the pedestrian crossing adjustment would have a lesser effect on intersection operations, or the factor could be increased.

	Adjustments
	Timing
Table 20	Pedestrian
	comparison with
	LOS C

			AM					PM				-
			Avg		Crit							-
	Cycle		Delay	Avg	Delay	Cycle		Avg	Avg	Crit		
	Length		(Sec /	Crit	(Sec/	Length		Delay	Crit	Delay		
# Intersection	(sec)	LOS	Veh)	V/C	Veh)	(sec)	LOS	(Sec)	V/C	(Sec)	Scenario	_
												<b> </b> ,
8 El Camino Real / Quarry Road	131	В	14.1	0.497	17.9	143	C+	22.8	0.579	16.0	No Build	· · ·
	131	В	16.2	0.545	20.9	143	ပ	25.4	0.623	15.1	With SUMC	,
	131	ပ	30.9	0.545	37.6	143	ပ	31.7	0.609	25.1	With VC - 1.5 times ped adjustments	_
	131	ш	68.7	0.544	91.4	143	D	50.2	0.576	59.6	With VC - 2.0 times ped adjustments	_
												_
35 Arboretum Road / Quarry Road	100	C	31.6	0.517	32.3	100	C	28.8	0.61	31.7	No Build	
	100	ٺ	32.9	0.594	33.9	100	ပ	29.5	0.655	33.1	With SUMC	,
	150	۵	45.4	0.498	51.8	126	D	41.1	0.61	43.9	With VC - 1.5 times ped adjustments	_
	180	+ ш	59.5	0.491	76.5	159	D	50.0	0.597	52.7	With VC - 2.0 times ped adjustments	_
56 Welch Road / Quarry Road	70	C+	20.9	0.558	24.1	55	C+	21.4	0.541	23.1	No Build	
	70	C	24.1	0.644	29.4	55	c	25.2	0.616	30.2	With SUMC	_
	146	പ്	34.0	0.582	39.0	92	ပ	26.6	0.554	25.8	With VC - 1.5 times ped adjustments	_
	173	Δ	39.2	0.573	45.0	112	ပ	30.1	0.539	29.0	With VC - 2.0 times ped adjustments	
			Í			ĺ		ĺ				

Source: AECOM, 2010

# 5.0 Project Mitigation

This section looks at the mitigation measures proposed to reduce the expected impacts of this project alternative to a less than significant level.

Mitigation measures to improve intersection performance are divided into four levels. The first level is the implementation of traffic-adaptive signal technology and the second level is the provision of additional pedestrian / bicycle undercrossings in the project vicinity. Another mitigation measure is the implementation of transportation demand management (TDM) programs. TDM would be employed to reduce drive alone trips and to encourage use of public transport. This section also looks at the physical improvements that would be necessary to achieve acceptable traffic operations. However, not all physical improvements are feasible and this discussion has been included for information purposes only. Finally, reductions in traffic volumes on roadways as a result of providing remote employee parking lots near freeway interchanges are evaluated.

#### 5.1 Traffic Adaptive Signal Technology

Table 21 presents the summary of intersections impacted by this project alternative after traffic adaptive technology has been implemented in 2025. During the AM peak hour, the intersection of El Camino Real / Page Mill Road – Oregon Expressway (#16) would no longer be impacted. Five other intersections remain impacted after implementation of the traffic adaptive signal technology. During the PM peak hour, three intersections would no longer be impacted after implementing the traffic adaptive signal technology. The three intersections are:

- El Camino Real / Ravenswood Avenue (#3)
- El Camino Real / Page Mill Road Oregon Expressway (#16)
- Middlefield Road / Lytton Avenue (#19)

Nine other intersections remain impacted during the PM peak hour in 2025 after the implementation of the traffic adaptive signal technology. Appendix G presents the LOS details.

The traffic adaptive signal technology is a feasible mitigation. In Palo Alto, there is a Citywide Traffic Impact Fee program that the applicant will be required to contribute to. However, this fee is not structured to mitigation one hundred percent of these project related impacts and an additional fee could be imposed to mitigate the remaining share of the project impacts. In Menlo Park, the contribution should be tied to the amount of traffic added to analyzed intersections by the project.

#### 5.2 New Pedestrian and Bicycle Undercrossings

In addition to the existing undercrossings at University and Homer, two new undercrossings will be constructed in the study area in the future. One is near Everett Avenue in Palo Alto and the other near Middle Avenue in Menlo Park. These additional undercrossings north of University Avenue will facilitate walking and bicycling from residential and commercial areas in North Palo Alto and South Menlo Park.

Following the same methodology detailed in the main report, up to 91 employees from SUMC would use the four pedestrian and bicycle undercrossings in the study area by 2025 under this project alternative. The number of peak hour project trips that will be reduced is calculated to 21 trips. The undercrossings are also expected to cause a slight reduction to background traffic in their vicinity by facilitating non-motorized mode of transportation.

n         Instruction         Open dual law law law law law law law law law l				2025 AM			2025 PM		
Image: start with the start of the start	#	Intersection	City	-	Impact	With VC -	1	Impact	With VC ·
Column         A         B         Clammer Production of the product of the				No Build	With VC	Signal Adaptive	No Build	With VC	Signal Adaptive
1         Contino Real/Supervisor         MP         MP<		Column		A	В	C	D	E	F
2         Difference Registrance Curve Avenue         MP	1	El Camino Real/Valparaiso Avenue	MP						
B         Discrementation Mathematication Math	2	El Camino Real/Santa Cruz Avenue	MP						
B         Discrete         Discrete         Discrete         Discrete           B         Comino Read/Sand HI Road-Ana Sineet         PA         Image: Comino Read/Sand HI Road-Ana Sineet         PA           B         Comino Read/Sand HI Road-Ana Sineet         PA         Image: Comino Read/Sand HI Road-Ana Sineet         PA           B         Comino Read/Sand HI Road-Ana Sineet         PA         Image: Comino Read/Sand HI Road-Ana Sineet         PA           B         Comino Read/Sand HI Road-Ana Sineet         PA         Image: Comino Read/Sand HI Road-Ana Sineet         PA           B         Comino Read/Sand HI Road-Ana Sineet         PA         Image: Comino Read/Sand HI Road-Ana Sineet         Image: Comino Read/Sand HI Road-Ana Sineet         PA         Image: Comino Read/Sand HI Road-Ana Sineet         Image: Comino Read/Sand HI Road-Ana Sineet <td>3</td> <td>El Camino Real/Ravenswood Avenue</td> <td>MP</td> <td></td> <td></td> <td></td> <td>•</td> <td>•</td> <td></td>	3	El Camino Real/Ravenswood Avenue	MP				•	•	
B         Common Neuron Neuronal Street         PA         PA           0         Common Read/Commy Rd         PA	4	El Camino Real/Robie Avenue	MP						
P         Common ReadSand Hill Road-Alma Sitest         PA         PA           B         Cannino ReadSand Hill Road-Alma Sitest         PA         Image: Common Read Common Alma Common Read Sitest Alma Common Read Read Read Read Read Read Read Read	6	El Camino Real/Cambridge Avenue	MP						
B         E         Control Nature PA         PA         PA         PA         PA           10         Contron Keal/Linearth, Ventar Pain Unteilloring PA         PA<	7	El Camino Real/Sand Hill Road-Alma Street	PA						
9         Ams StreetLytron Avenue         PA         Image: Control Reading France Andre State: Street         PA         Image: Control Read: Street Andre Andre Street Andre Street Andre Street Andre Street Andre Street Andre Street Andre Street Andre Street Andre Street Andre Street Andre Street Andre Street A	8	El Camino Real/Quarry Rd	PA						
Diff Commo Read/University Avenue/Park Diversity (Park Park Park Park Park Park Park Park	9	Alma Street/Lytton Avenue	PA						
11         El Carmo Nazil-Enderadore Nado Ganez Stretet         PA         Image: Construction of Constructi	10	El Camino Real/University Avenue-Palm Drive(Single Int)	PA	•	•	•		•	•
11       El Camino Ranzi / Sandra Annue       PA	11	El Camino Real/Embarcadero Road-Galvez Street	PA				•		
18         El Camino Res/ Jasardo Avenue         PA         Image: Camino Res/ Jasardo Avenue         PA           18         El Camino Res/ Fago MIR Road-Oregon Expressway         PA         •         •         •           18         El Camino Res/ Fago MIR Road-Oregon Expressway         PA         •         •         •           18         Middled Road J Vision Avenue         PA         •         •         •         •           18         Middled Road J Vision Avenue         PA         •         •         •         •           18         Middled Road J Vision Avenue         PA         •         •         •         •           21         Middled Road J Vision Avenue         PA         •         •         •         •           23         Jarjege Sama Budeard T-Contral Avenue         SCC         •	12	El Camino Real / Serra Street-Park Boulevard	PA PA						
15         El Camino Real / Califonia Junca         PA         Image: Control Real / Page Mill Road Organ Expressiony         PA         Image: Control Real / Page Mill Road Organ Expressiony         PA         Image: Control Real / Page Mill Road Organ Expressiony         PA         Image: Control Real / Page Mill Road Organ Expressiony         PA         Image: Control Real / Page Mill Road Organ Expressiony         PA         Image: Control Real / Page Mill Road Organ Expressiony         PA         Image: Control Real / Page Mill Road Organ Expression Page Organ Organ Expression Page Organ Organ Expression Page Organ Organ Expression Page Organ Organ Expression Page Organ Organ Expression Page Organ Organ Expression Page Organ Organ Organ Expression Page Organ Organ Organ Expression Page Organ Organ Expression Page Organ Organ Organ Expression Page Organ	14	El Camino Real / Stanford Avenue	PA						
To         El Camino Real // Page Mill Road Oregon Expressiony         PA         ●	15	El Camino Real / California Avenue	PA						
17       Woodlend Annue / University Annue       EPA       ●       ●         18       Middeled Road / Vinion Annue       PA       ●       ●         19       Middeled Road / University Annue       PA       ●       ●         21       Middeled Road / University Annue       PA       ●       ●         21       Middeled Road / University Annue       PA       ●       ●         21       Middeled Road / University Annue       PA       ●       ●         21       Middeled Road / University Annue       PA       ●       ●       ●         22       Middeled Road / Enclored Annue       PA       ●	16	El Camino Real / Page Mill Road-Oregon Expressway	PA	•	•		•	•	
18         Modeland Road / Union Road         MP          •        •         •         * </td <td>17</td> <td>Woodland Avenue / University Avenue</td> <td>EPA</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td>	17	Woodland Avenue / University Avenue	EPA						
10         Modeland Road / University Avenue         PA <ul> <li>Modeland Road / University Avenue</li> <li>PA</li> <li>Modeland Road / University Avenue</li> <li>PA</li> <li>Modeland Road / Stanton Avenue</li> <li>PA</li> <li>Modeland Road / Stanton Avenue</li> <li>PA</li> <li>Modeland Road / Stanton Avenue</li> <li>SGC</li> <li>Modeland Road / Stanton Avenue / Stanton Avenue / Stanton Avenue / Stanton Avenue / Stant Hill Road</li> <li>MP</li> <li>SGC</li> <li>Modeland Road / Stanton Avenue / Stant Hill Road</li> <li>MP</li> <li>SGC</li> <li>SGC<td>18</td><td>Middlefield Road / Willow Road</td><td>MP</td><td></td><td></td><td></td><td>•</td><td>•</td><td>•</td></li></ul>	18	Middlefield Road / Willow Road	MP				•	•	•
and indication fload / Environment of the second	19	Middlefield Road / Lytton Avenue	PA					•	
20/2         Margens Street / Churchill Avenue         PA	20	Middlefield Road / Embarcadero Road							
22         Linghes Same Boulewark Forch II Express way/Page Mill Road         PA         Imper Same Boulewark / Stantar Cruz Avenue         Imper Same Boulewark / Stantar Hill Road         Imper Same Boulewark / Stantar Hill R	22	Alma Street / Churchill Avenue	PA						
24       Julpico Sem Boukerd / Standrof Annue	23	Junipero Serra Boulevard-Foothill Expressway/Page Mill Road	PA	•			•	•	•
25         Julpiero Sera Bouleard / Campus Drive Bast         SCC <ul> <li>Soluriance Sera Bouleard / Annue Drive Road-Santa Cuz Avenue</li> <li>MP</li> <li>Sand Hill Crady</li> <li>MP</li> <li>Sand Hill Crady Santa Hill Road</li> <li>MP</li> <li>Santa Cuz Avenue / Sand Hill Road</li> <li>MP</li> <li>Santa Cuz Avenue / Sand Hill Road</li> <li>MP</li> <li>Santa Cuz Avenue / Sand Hill Road</li> <li>MP</li> <li>Santa Cuz Avenue / Sand Hill Road</li> <li>MP</li> <li>Santa Cuz Avenue / Sand Hill Road</li> <li>PA</li> <li>Stock Fam Kand / Sand Hill Road</li> <li>PA</li> <li>Stock Fam Kand / Sand Hill Road</li> <li>PA</li> <li>Stock Fam Kand / Sand Hill Road</li> <li>PA</li> <li>Stock Fam Kand / Sand Hill Road</li> <li>PA</li> <li>Stock Fam Kand / Sand Hill Road</li> <li>PA</li> <li>Stock Fam Kand / Sand Hill Road</li> <li>PA</li> <li>Stock Fam Kand / Sand Hill Road</li> <li>PA</li> <li>Stock Fam Kand / Sand Hill Road</li> <li>PA</li> <li>Stock Fam Kand / Sand Hill Road</li> <li>PA</li> <li>Stock Fam Kand / Sand Hill Road</li> <li>Stock Fam Kand</li> <li>Stock Fam Ka</li></ul>	24	Junipero Serra Boulevard / Stanford Avenue	SCC						
28       Junpero Serra Bouleard / Jampiero Sand Hill Road       MP         28       Sand Hill Cri +280 / Sand Hill Road       MP         28       Sand Hill Cri +280 / Sand Hill Road       MP         30       Sand Toruz Avenue / Sand Hill Road       MP         30       Sand Toruz Avenue / Sand Hill Road       MP   <	25	Junipero Serra Boulevard / Campus Drive East	SCC						
27       Jumpero Serra Boulseniol / Apine Road-Santa Cruz Avenue       MP         28       Sand Hill - Kalor, Sand Hill Road       MP         29       Sand Hill - Kalor, Sand Hill Road       MP         20       Sand Rule - Kalor, Sand Hill Road       MP         31       Dak Avenue / Sand Hill Road       MP         31       Dak Avenue / Sand Hill Road       PA         33       Patter Dive / Sand Hill Road       PA         34       Attoretum Road / Sand Hill Road       PA         35       Rokateur Dive / Sand Hill Road       PA         36       Attoretum Road / Sand Hill Road       PA         36       Attoretum Road / Sand Hill Road       PA         37       Attoretum Road / Sand Hill Road       PA         36       Attoretum Road / Sand Hill Road       PA         37       Attoretum Road / Sand Hill Road       PA         38       Attoretum Road / Sand Hill Road       PA         40       Maddelded Road / Charleston Road       PA         41       Maddelded Road / Charleston Road       PA         41       Maddelded Road / Charleston Road       PA         42       Intersty Drive / Santa Cuz Avenue       MP         43       Intersty Drive / Santa Cuz Avenue </td <td>26</td> <td>Junipero Serra Boulevard / Campus Drive West</td> <td>SCC</td> <td></td> <td></td> <td></td> <td>•</td> <td>•</td> <td>•</td>	26	Junipero Serra Boulevard / Campus Drive West	SCC				•	•	•
20       Bitting Park 2007 said Hill Road       HP           30       Saita Cutz, Avenue / Sand Hill Road       HP           30       Saita Cutz, Avenue / Sand Hill Road       HP           31       Saita Cutz, Avenue / Sand Hill Road       HP           32       Stock Farm Road / Sand Hill Road       PA           33       Saita Cutz, Avenue / Sand Hill Road       PA           34       Abcoretum Road / Sand Hill Road       PA            34       Abcoretum Road / Sand Hill Road       PA             34       Abcoretum Road / Jami Dirke Road       PA	27	Junipero Serra Boulevard / Alpine Road-Santa Cruz Avenue	MP						
Solitica Curra Avenue / Sand Hill Road         MP         Image: Control of Contrel of Contrel of Control of Control of Control of Control of Cont	28	Sano Hill Cit- F280 / Sano Hill Road	MP						
31       Oak Avenue / Sand Hill Road - Vine Street       MP	30	Santa Cruz Avenue / Sand Hill Road	MP		•	•			
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33       Pateur Dire / Sand Hill Road       PA	32	Stock Farm Road / Sand Hill Road	PA						
34       Aboretum Road / Sand Hill Road       PA	33	Pasteur Drive / Sand Hill Road	PA						
Jack Protection Road / Pain Drive         PA         Image: Constraint of the pain o	34	Arboretum Road / Sand Hill Road	PA						
30       Nuberlain Noad / Galvez Street / (unsignalized)       PA       ●	35	Arboretum Road / Quarry Road	PA						
38       EL Camino Real / Charleston Road       PA       ●       ●       ●         39       Alma Street / Charleston Road       PA       ●       ●       ●         39       Alma Street / Charleston Road       PA       ●       ●       ●         41       Middlefield Road / Hamilton Avenue       PA       ●       ●       ●         42       Alma Street / Hamilton Avenue       PA       ●       ●       ●         43       Indiversity Drive / Santa Cruz Avenue       MP       ●       ●       ●         44       EL Camino Real / Cak Croce Avenue       MP       ●       ●       ●         44       EL Camino Real / Cak Croce Avenue       MP       ●       ●       ●         45       Middlefield Road / Ringwood Avenue       MP       ●       ●       ●         46       Madari Road Clos Roard Can Cruz Avenue       MP       ●       ●       ●       ●         47       El Camino Real / Encinal Road       MP       ●	37	Arboretum Road / Fain Drive	PA	•			-		
39       Alma Street / Charleston Road       PA       ●       ●         40       Middefield Road / Larneston Road       PA       ●       ●         41       Middefield Road / Hamilton Avenue       PA       ●       ●         42       Alma Street / Hamilton Avenue       PA       ●       ●       ●         43       University Drive / Santa Cruz Avenue       MP       ●       ●       ●         44       El Camino Real / Oak Grove Avenue       MP       ● <td>38</td> <td>EL Camino Real / Charleston Road</td> <td>PA</td> <td>•</td> <td></td> <td></td> <td>•</td> <td></td> <td></td>	38	EL Camino Real / Charleston Road	PA	•			•		
40       Middefield Road / Charleston Road       PA	39	Alma Street / Charleston Road	PA	•			•		
11       Middlefield Road / Hamilton Avenue       PA       Image Street / Hamilton Avenue       PA         24       Aima Street / Hamilton Avenue       MP       Image Street / Hamilton Avenue       MP         44       El Camino Real / Oak Grove Avenue       MP       Image Street / Hamilton Avenue       MP         44       El Camino Real / Encline Road       MP       Image Street / Hamilton Avenue       MP         45       Middlefield Road / Ravenswood Avenue       MP       Image Street / Hamilton Avenue       Image Street / Hamilton Avenue         46       Middlefield Road / Ravenswood Avenue       MP       Image Street / Hamilton Avenue       Image Street / Hamilton Avenue         47       El Camino Real / Encline Road       MP       Image Street / Hamilton Avenue       Image Street / Hamilton Avenue         48       Bay Road / US 101 SB Off-Ramp       MP       Image Street / Hamilton Avenue       Image Street / Hamilton Avenue         50       Marsh Road / US 101 SB Off-Ramp       MP       Image Street / Hamilton Avenue       Image Street / Hamilton Avenue         51       Bay Road / University Avenue       EPA       Image Street / Hamilton Avenue       Image Street / Hamilton Avenue         52       Donchoe Street / Juniversity Avenue       EPA       Image Street / Hamilton Avenue       Image Street / Hamilton Avenue	40	Middlefield Road / Charleston Road	PA						
42       Alma Street / Hamilton Avenue       PA	41	Middlefield Road / Hamilton Avenue	PA						
43       Onkersity Drive / Santa Cruz Avenue       MP	42	Alma Street / Hamilton Avenue	PA						
In Clarind Value Order Order Server       Min       Interface       Interface         Middlefield Road / Raywood Avenue       MP       Interface       Interface         Middlefield Road / Raywood Avenue       MP       Interface       Interface         Middlefield Road / Raywood Avenue       MP       Interface       Interface         Mark Road / WS 101 SB Off-Ramp       MP       Interface       Interface         Mark Road / US 101 NB Off-Ramp       MP       Interface       Interface         Mark Road / US 101 NB Off-Ramp       MP       Interface       Interface         Mark Road / US 101 NB Off-Ramp       MP       Interface       Interface         Mark Road / US 101 NB Off-Ramp       MP       Interface       Interface         Say Road / Willow Road       MP       Interface       Interface         Say Road / University Avenue       EPA       Interface       Interface         Sourd Vary Road       PA       Interface       Interface       Interface	43	University Drive / Santa Cruz Avenue	MP						
Middlefield Road / Rayenswood Avenue       MP       ●       ●         47       El Camino Real / Encinal Road       MP       ●       ●         48       Bay Road / Marsh Road       MP       ●       ●       ●         49       Marsh Road / US 101 SB Off-Ramp       MP       ●       ●       ●         50       Marsh Road / US 101 NB Off-Ramp       MP       ●       ●       ●         51       Bay Road / Willow Road       MP       ●	45	Middlefield Road / Ringwood Avenue	MP						
47       El Camino Real / Encinal Road       MP       Image: Constraint of the second of the seco	46	Middlefield Road / Ravenswood Avenue	MP					•	•
48       Bay Road / Marsh Road       MP       Image: Constraint of the second secon	47	El Camino Real / Encinal Road	MP						_
49       Marsh Road / US 101 SB Off-Ramp       MP       Image: Constraint of the second sec	48	Bay Road / Marsh Road	MP						
DU marsh Road / US 101 NB Off-Ramp (MP)       MP       MP       MP       MP         51       Bay Road / Willow Road       MP             53       University Avenue / Bayfront Expressway       MP                53       University Avenue / Bayfront Expressway       MP	49	Marsh Road / US 101 SB Off-Ramp	MP						
101     Day road / vintow road     MP     Image: Constraint of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesistic of the synthesis of t	50	IMarsh Koad / US 101 NB Off-Ramp	I MP						
Dury norm Dynom	57	Bayfront Expressway / Willow Road	MP						
54       Bay Road / University Avenue       EPA <ul> <li></li></ul>	53	University Avenue / Bayfront Expresswav	MP				•		•
55       Donohoe Street / University Avenue       EPA <ul> <li>Melch Road / Quary Road</li> <li>PA</li> <li>PA<td>54</td><td>Bay Road / University Avenue</td><td>EPA</td><td></td><td></td><td></td><td>•</td><td></td><td></td></li></ul>	54	Bay Road / University Avenue	EPA				•		
56       Welch Road / Quarry Road       PA       Image: Constraint of the second sec	55	Donohoe Street / University Avenue	EPA	•					
57       Durand Way / Sand Hill Road       PA       C       C       C         58       Pasteur Drive NB / Welch Road       PA       C       C       C         59       Pasteur Drive SB / Welch Road       PA       C       C       C         60       Durand Way Extension / Welch Road       PA       C       C       C         61       Bowdoin Street / Stanford Road (unsignalized)       PA       C       C       C         62       Alpine Road / I-280 NB Off-Ramp (unsignalized)       PA       C       C       C         63       Alpine Road / I-280 NB Off-Ramp (unsignalized)       PA       C       C       C       C         64       Page Mill Road / I-280 NB Off-Ramp (unsignalized)       PA       C	56	Welch Road / Quarry Road	PA						
30       I PASteur Drive ND / Veich Road       PA       Image: Constraint of the second sec	57	Durand Way / Sand Hill Road	PA						
Indicate Date Of A Work Node       Image: Node of Node Of A Work Node       Image: Node Node Of A Node Node       Image: Node Node Node Node Node Node Node Node	58	Pasteur Drive NB / Welch Road	PA DA						
1       Bowdoin Street / Stanford Road (unsignalized)       PA       Image: Constraint of the standard of the standa	60	Durand Way Extension / Welch Road	PA						
62       Alpine Road / I-280 NB Off-Ramp (unsignalized)       PA       •	61	Bowdoin Street / Stanford Road (unsignalized)	PA						
63       Alpine Road / I-280 SB Off-Ramp (unsignalized)       PA       ●	62	Alpine Road / I-280 NB Off-Ramp (unsignalized)	PA	•	•	•	•	•	•
64       Page Mill Road / I-280 NB Off-Ramp (unsignalized)       PA <ul> <li>Main Road / I-280 SB Off-Ramp (unsignalized)</li> <li>PA</li> <li>PA</li> <li>Foothill Expressway / Arastradero Road</li> <li>SCC</li> <li>Intersection with Traffic Adaptive Technology</li> </ul> <ul> <li>PA Locations</li> <li>Intersection with Traffic Adaptive Technology</li> </ul> <ul> <li>PA Locations</li> <li>Intersection with Traffic Adaptive Technology</li> </ul> <ul> <li>Intersection with Traffic Adaptive Technology</li> <li>Intersection with Traffic Adaptive Technology</li> </ul> <ul> <li>Intersection with Traffic Adaptive Technology</li> <li>Intersection with Traffic Adaptive Technology</li> </ul>	63	Alpine Road / I-280 SB Off-Ramp (unsignalized)	PA	•	•	•			
bb  Page Mill Road / I-280 SB Ott-Ramp (unsignalized)       PA <ul> <li>PA</li> /ul>	64	Page Mill Road/ I-280 NB Off-Ramp (unsignalized)	PA	•					
Total Locations     Stol     Image: Constraint of the state o	65	Page Mill Road / I-280 SB Off-Ramp (unsignalized)	PA				•		
Image: rotal Excellations     I	00	Total Locations	300	4	F	E	+ 15	10	0
V Excession     3     4     6     4       (Diamond) Base     Intersection with Traffic Adaptive Technology     Intersection     Intersection     Intersection       Source: AECOM, 2010     Intersection     Intersection     Intersection     Intersection	<u> </u>	PA Locations	-	0 0	5	<u>з</u>	10	6	3
Chambridg base     Construction with Traffic Adaptive Technology     Source: AECOM, 2010	-	(Diamond) Page		3	5	-	U	v	-
Intersection with Traffic Adaptive Technology Source: AECOM, 2010		(Diamond) Base							
Source: AECOM. 2010		Intersection with Traffic Adaptive Technology	-						
	Soi	Irce: AFCOM, 2010							

 Table 21

 Summary of VC Impact With Traffic Adaptive Technology in 2025

Table 22 presents the summary of intersections impacted by this project alternative in 2025 after the two new undercrossings are built and traffic adaptive technology implemented. Appendix H presents the TRAFFIX details. During the AM peak hour of 2025, four intersections remain impacted by this project alternative. The intersections of El Camino Real / University Avenue -Palm Drive (#10) and El Camino Real / Page Mill Road – Oregon Expressway (#16) would no longer be impacted.

In the PM peak hour, nine out of the 12 intersections remain impacted. The intersections that would no longer be impacted are:

- El Camino Real / Ravenswood Avenue (#3)
- El Camino Real / Page Mill Road Oregon Expressway (#16)
- Middlefield Road / Lytton Avenue (#19)

SUMC shall contribute to the cost of construction of the Everett Avenue undercrossing of the Caltrain tracks in Palo Alto and the Middle Avenue undercrossing in Menlo Park. In Palo Alto, there is a Citywide Traffic Impact Fee program that the applicant will be required to contribute to. However, this fee is not structured to mitigate one hundred percent of these project related impacts and an additional fee could be imposed to mitigate the remaining share of the project impacts. In Menlo Park, the contribution should be tied to the amount of traffic added to study area intersections by the project.

#### 5.3 Transport Demand Management (TDM)

Details of the TDM plans have been presented in the main report and are not repeated here. One of the main elements of the TDM program is to provide eligible SUMC employees with Caltrain GO Passes to encourage the use of public transport to and from work. This is aimed at reducing drive-alone trips. As with the main report, the proportion of Caltrain users under this project alternative is assumed to reach the current university level of 15.8 percent. Table 23 presents the summary of intersections impacted by this project alternative after the implementing the TDM plans, building of the two new undercrossings and implementing the traffic adaptive technology in 2025. Appendix I presents the TRAFFIX details.

In the AM peak hour, no intersections would be impacted when all three mitigation measures are in place. In the PM peak hour of 2025, five of the 12 intersections remain impacted by the VC. The seven intersections no longer impacted are:

- El Camino Real / Ravenswood Avenue (#3)
- El Camino Real / University Avenue -Palm Drive (#10)
- El Camino Real / Page Mill Road-Oregon Expressway (#16)
- Middlefield Road / Lytton Avenue (#19)
- Junipero Serra Boulevard / Page Mill Road (#23)
- Junipero Serra Boulevard / Campus Drive West (#26)
- Alpine Road / I-280 NB Off-Ramp (#62) (unsignalized)

If GO Passes are provided to all hospital employees, the congestion levels at some intersections would be reduced to a less than significant level. The TDM measures proposed as mitigation measures would, however, increase transit ridership on some routes although probably to a less than significant level. At such time that ridership load factors during either the AM or PM peak exceed 1.0 on the U Line, headways shall be decreased to bring the load factor to less than 1.0. Load factor is the ratio of number of passenger versus the number of seats. A load factor of 1.0 means the number of passengers equals the number of seats and no passenger would be standing. Monitoring shall be conducted periodically to determine the current load factor. At such time that ridership load factors during either the AM or PM peak exceed 1.25 on Marguerite Line A or Line B Counter-Clockwise, headways shall be decreased to bring the load factor to less than 1.25. Monitoring shall be conducted periodically to determine the periodically to determine the current load factor.

	Intersection	1		2025 AM		2025 PM			
#		City	No Build	Impact With VC	With VC+ Undercrossings	No Build	Impac With VC	t With VC+ Undercrossings	
					+ Signal Adaptive			+ Signal Adaptive	
	Column		A	В	C	D	E	F	
1	El Camino Real/Valparaiso Avenue	MP							
2	El Camino Real/Santa Cruz Avenue	MP							
3	El Camino Real/Ravenswood Avenue	MP				•	•		
4	El Camino Real/Robie Avenue	MP							
5	El Camino Real/Middle Avenue	MP							
0	El Camino Real/Cambridge Avenue	IVIP							
8	El Camino Real/Quarry Rd	PA PA							
9	Alma Street/Lytton Avenue	PA							
10	El Camino Real/University Avenue-Palm Drive(Single Int)	PA	•						
11	El Camino Real/Embarcadero Road-Galvez Street	PA	Ť			•			
12	El Camino Real/Churchill Avenue	PA							
13	El Camino Real / Serra Street-Park Boulevard	PA							
14	El Camino Real / Stanford Avenue	PA							
15	El Camino Real / California Avenue	PA							
16	El Camino Real / Page Mill Road-Oregon Expressway	PA	•	•		•	•		
17	Woodland Avenue / University Avenue	EPA					_		
18	Middlefield Road / Willow Road	MP				•	•	•	
19	Middlefield Road / Lytton Avenue	PA					•		
20	Middlefield Road / University Avenue	PA							
21	Middlefield Road / Embarcadero Road	PA							
22	Alma Street / Churchill Avenue	PA							
23	Junipero Serra Boulevard-Foothill Expressway/Page Mill Road	PA	+			•	•	•	
24	Junipero Serra Boulevard / Stanford Avenue	SCC							
25	Junipero Serra Boulevard / Campus Drive East	SCC							
26	Junipero Serra Boulevard / Campus Drive West	SCC				•	•	•	
27	Junipero Serra Boulevard / Alpine Road-Santa Cruz Avenue	MP							
28	Sand Hill Cir- I-280 / Sand Hill Road	MP							
29	Sharon Park Drive / Sand Hill Road	MP							
30	Santa Cruz Avenue / Sand Hill Road	MP		•	•				
31	Oak Avenue / Sand Hill Road - Vine Street								
32	Stock Farm Road / Sand Hill Road	PA							
33	Arberstum Beed / Sand Hill Beed	PA							
35	Arboretum Road / Ouarry Road								
36	Arboretum Road / Balm Drive								
37	Arboretum Road / Galvez Street / (unsignalized)								
38	EL Camino Real / Charleston Road	PA							
39	Alma Street / Charleston Road	PA	•			•			
40	Middlefield Road / Charleston Road	PA							
41	Middlefield Road / Hamilton Avenue	PA							
42	Alma Street / Hamilton Avenue	PA							
43	University Drive / Santa Cruz Avenue	MP							
44	El Camino Real / Oak Grove Avenue	MP							
45	Middlefield Road / Ringwood Avenue	MP							
46	Middlefield Road / Ravenswood Avenue	MP					•	•	
47	El Camino Real / Encinal Road	MP							
48	Bay Road / Marsh Road	MP							
49	Marsh Road / US 101 SB Off-Ramp	MP							
50	Marsh Road / US 101 NB Off-Ramp	MP							
51	Bay Road / Willow Road	MP							
52	Bayfront Expressway / Willow Road	MP				•	•	•	
53	University Avenue / Bayfront Expressway	MP				•	•	•	
54	Bay Road / University Avenue	EPA				•			
55	Dononoe Street / University Avenue	LEPA	•						
56	vveicn koad / Quarry Road	PA							
5/	Durano way / Sano Hill Road	PA							
58	Pasteur Drive NB / Welch Road	PA DA							
60	rasieur Drive SD / Welch Road	DA		<u> </u>					
61	Bowdoin Street / Stanford Road (unsignalized)								
62	Alpine Road / L280 NB Off-Ramp (upsignalized)	DA		•			•		
63	Alpine Road / I-280 SB Off-Ramp (unsignalized)	PA PA						-	
64	Page Mill Road/ I-280 NB Off-Ramp (unsignalized)	PA							
65	Page Mill Road / I-280 SB Off-Ramp (unsignalized)	PA	-			<u> </u>			
66	Foothill Expressway / Arastradero Road	SCC				•	L		
	Total Locations		11	6	4	15	12	9	
<b>-</b>	PA Locations	-	۰. ۵	5		 8	- <u>12</u> 	<u>з</u> Л	
		-					J		
+	(Diamond) Base								
•	(Dot) VC Impact								
	intersection with frame Adaptive reenhology								

 Table 22

 Summary of VC Impact With New Undercrossings and Traffic Adaptive Technology in 2025

Source: AECOM, 2010

#### Table 23

#### Summary of VC Impact With TDM, New Undercrossings and Traffic Adaptive Technology in 2025

			2025 AM			2025 PM		
				Impact			Impact	
#	Intersection	City	No Build	With VC	With VC_TDM + Undercrossings + Signal Adaptive	No Build	With VC	With VC_ TDM + Undercrossings + Signal Adaptive
	Column		Α	В	C	D	E	F
1	El Camino Real/Valparaiso Avenue	MP						
2	El Camino Real/Santa Cruz Avenue	MP						
3	El Camino Real/Ravenswood Avenue	MP				•	•	
4	El Camino Real/Roble Avenue	MP						
5	El Camino Real/Middle Avenue	MP						
6	El Camino Real/Cambridge Avenue	MP						
/	El Camino Real/Sand Hill Road-Alma Street	PA DA						
0								
10	El Camino Real/University Avenue-Palm Drive(Single Int)	PA PA	-					
11	El Camino Real/Embarcadero Road-Galvez Street	PA		•			-	
12	El Camino Real/Churchill Avenue	PA						
13	El Camino Real / Serra Street-Park Boulevard	PA						
14	El Camino Real / Stanford Avenue	PA						
15	El Camino Real / California Avenue	PA						
16	El Camino Real / Page Mill Road-Oregon Expressway	PA	•	•		•	•	
17	Woodland Avenue / University Avenue	EPA						
18	Middlefield Road / Willow Road	MP				•	•	•
19	Middlefield Road / Lytton Avenue	PA					•	
20	Middlefield Road / University Avenue	PA						
21	Middlefield Road / Embarcadero Road	PA						
22	Alma Street / Churchill Avenue	PA						
23	Junipero Serra Boulevard-Foothill Expressway/Page Mill Road	PA	•			•	•	
24	Junipero Serra Boulevard / Stanford Avenue	SCC						
25	Junipero Serra Boulevard / Campus Drive East	SCC						
26	Junipero Serra Boulevard / Campus Drive West	SCC				•	•	
27	Junipero Serra Boulevard / Alpine Road-Santa Cruz Avenue	MP						
28	Sand Hill Cir- 1-280 / Sand Hill Road	MP						
29	Sharon Park Drive / Sand Hill Road	MD		•				
21	Oak Avenue / Sand Hill Read Vine Street	MD						
32	Stock Farm Road / Sand Hill Road							
33	Pasteur Drive / Sand Hill Road	PA						
34	Arboretum Road / Sand Hill Road	PA						
35	Arboretum Road / Quarry Road	PA						
36	Arboretum Road / Palm Drive	PA						
37	Arboretum Road / Galvez Street / (unsignalized)	PA	•	•		•	•	•
38	EL Camino Real / Charleston Road	PA				•		
39	Alma Street / Charleston Road	PA	•			•		
40	Middlefield Road / Charleston Road	PA						
41	Middlefield Road / Hamilton Avenue	PA						
42	Alma Street / Hamilton Avenue	PA						
43	University Drive / Santa Cruz Avenue	MP						
44	El Camino Real / Oak Grove Avenue	MP						
45	Middletield Road / Ringwood Avenue	MP						
46	Middlefield Road / Ravenswood Avenue	MP					•	•
47	El Camino Real / Encinal Road	MP						
48	Bay Koad / Marsh Koad							
49	Inviaish Ruad / US 101 SB Off-Ramp							
50	Inviaish Ruad / US TUT ND Ull-Railip							
52	Bayfront Expressway / Willow Road	MP						
53	University Avenue / Bayfront Expressway	MP						
54	Bay Road / University Avenue	EPA						
55	Donohoe Street / University Avenue	EPA	•			-		
56	Welch Road / Quarry Road	PA			1			
57	Durand Way / Sand Hill Road	PA						
58	Pasteur Drive NB / Welch Road	PA						
59	Pasteur Drive SB / Welch Road	PA						
60	Durand Way Extension / Welch Road	PA						
61	Bowdoin Street / Stanford Road (unsignalized)	PA						
62	Alpine Road / I-280 NB Off-Ramp (unsignalized)	PA	•	•		•	•	
63	Alpine Road / I-280 SB Off-Ramp (unsignalized)	PA	•	•				
64	Page Mill Road/ I-280 NB Off-Ramp (unsignalized)	PA	•					
65	Page Mill Road / I-280 SB Ott-Ramp (unsignalized)	PA	•			•		
66	Footnill Expressway / Arastradero Road	SCC	•				47	
┣—	Total Locations		11	6	0	15	12	5
L	PALOCATIONS		9	5	0	8	6	1
٠	(Diamond) Base							
	(Dot) VC Impact							
	Intersection with Traffic Adaptive Technology							

Source: AECOM, 2010
# 5.4 Transit Mitigation

Expansion of transit service in the study area provides an alternative to automobile travel. While the precise level of direct reduction in peak hour travel is difficult to quantify, current literature indicates that expanded transit service provides an overall benefit to the area by reducing the level of auto travel throughout the day, thus reducing both traffic and air quality impacts (including impacts associated with greenhouse gas emissions). VTA recently completed the Palo Alto Transit Service Market Analysis. That study developed Transit Competitive Factors. The Stanford Shopping Center and downtown Palo Alto were found to be Transit Competitive Origins. Strong transit linkages were found between these origins and destinations.

A detailed list of mitigation measures that should be implemented to reduce traffic congestion has been provided in the main report and can also be applied to the VC alternative.

#### 5.5 **Physical Intersection Improvements**

Table 24 lists the physical improvements that could mitigate all the impacted intersections under this project alternative. Most of the physical intersection improvements discussed below are infeasible because of the lack of right-of-way, the need to remove mature trees and prohibitive cost. They are therefore identified for information only. The feasible improvements are highlighted in Table 24. For intersections identified for improvement in the City of Menlo Park's General Plan, the General Plan improvements are evaluated to determine if they mitigate the project impact.

		Peak			
#	Intersection	Hour	Jurisdiction	Roadway Mitigation	Feasible?
10.	El Camino Real / University Avenue - Palm Drive	AM / PM	Caltrans	Provide an exclusive right-turn lane for eastbound and westbound Palm Drive-University Avenue, giving two lanes to the through movement along Palm Drive-University Avenue. While physically possible, this mitigation would require the acquisition of right-of-way, the construction of a retaining wall for the westbound right turn and the relocation of the entrance arch to Stanford for the eastbound right turn. This mitigation measure would be inconsistent with City General Plan Policy T-27.	No
16.	El Camino Real / Page Mill Road - Oregon Expressway	AM / PM	Caltrans	Provide an exclusive right-turn lane for westbound Oregon Expressway in addition to the two through lanes and increase the cycle length to 160 seconds. The westbound right turn lane is feasible, but would require right-of-way from the VTA park-and-ride lot. This mitigation is consistent with previous identified mitigation for the 1998-2010 Palo Alto Comprehensive Plan EIR.	Yes
62	Alpine Road / I-280 NB Off-Ramp	AM / PM	Caltrans	Signalize the intersection. Signalization of this intersection is feasible. Traffic signal warrants are met. Additionally, the left turn lane could be modified to a shared left/right lane.	Yes
63	Alpine Road / I-280 SB Off-Ramp	AM	Caltrans	Signalize the intersection. Signalization of this intersection is feasible. Traffic signal warrants are met.	Yes
37	Arboretum Road / Galvez Street	AM / PM	PA	Signalize the intersection. Signalization of this intersection is feasible. Traffic signal warrants are met. This mitigation measure was previously identified in the Sand Hill Road EIR	Yes

#### Table 24 Intersection Improvements

#	Intersection	Peak Hour	Jurisdiction	Roadway Mitigation	Feasible?
				and was also assumed as an improvement in the Cancer Center EIR.	
30	Santa Cruz Avenue / Sand Hill Road	АМ	MP	This intersection is fully built-out, additional improvements would be difficult to implement. Northbound Santa Cruz Avenue needs an additional right turn lane. The right-of-way requirements and cost make the improvements infeasible. This intersection is under the jurisdiction of Menlo Park. Any capacity improvements would require their approval.	No
3	El Camino Real / Ravenswood Avenue	PM	Caltrans	Under Menlo Park's General Plan, the proposed improvements are: to re-stripe the exclusive right-turn lane on southbound El Camino Real to shared through/right lane and to provide an additional through lane for northbound El Camino Real by removing the right-turn slip island. The general plan improvement also proposes to provide an exclusive right-turn lane for eastbound Menlo Avenue. This intersection is located in Menlo Park. Approval for implementation would be required from Caltrans and Menlo Park.	Yes
52	Bayfront Expressway / Willow Road	PM	Caltrans	Provide one more right-turn lane for eastbound Willow Road and make the right-turn movement for southbound Bayfront Expressway 'overlap' with the left-turn of eastbound Willow Road. The intersection has signals for the right-turn movement for southbound Bayfront but the 'overlap' phase is not implemented. The intersection performance will also improve with only the additional eastbound right-turn lane provision. Implementation is physically possible. This intersection is located in Menlo Park. Changes to the traffic signal would require consent from Caltrans and Menlo Park. The Peninsula Gateway transportation analysis suggested grade-separation of this intersection.	Yes
53	University Avenue / Bayfront Expressway	PM	Caltrans	Grade separate the northbound left-turn from Bayfront Expressway to University Avenue. This intersection is located in Menlo Park. Approval for implementation would be required from Caltrans and Menlo Park. The Peninsula Gateway transportation analysis also suggested grade-separation of this intersection.	No
23	Junipero Serra Boulevard – Foothill Expressway / Page Mill Road	PM	SCC	Provide three left-turn lanes for northbound Foothill Expressway onto westbound Page Mill Road. Page Mill Road must be widened to receive the three turn lanes. Though physically possible, it would be costly to widen Page Mill Road between Junipero Serra Boulevard and Old Page Mill Road (or Coyote Hill Road) and Foothill Expressway. This intersection is under the jurisdiction of Santa Clara County and implementation of any mitigation measures would require their approval.	No
18	Middlefield Road / Willow Road	PM	MP	Make the right-turn movement for northbound Middlefield Road 'overlap' with the left-turn of westbound Willow Road. To effectively utilize the additional capacity of right-turn signal overlap, the existing right-turn should be lengthened. This	No

		Peak			
#	Intersection	Hour	Jurisdiction	Roadway Mitigation	Feasible?
				measure is physically possible. However, extending the right- turn lane would require removal of the planter box and also removal of several on-street parking spaces in front of the grocery store. This intersection is under the jurisdiction of Menlo Park. Changes to the traffic signal and lengthening the right-turn lane would require consent from Menlo Park.	
19	Middlefield Road / Lytton Avenue	РМ	PA	Provide a new exclusive right-turn lane for southbound Middlefield Road. This will provide two southbound through lanes and a right turn lane. This mitigation is considered infeasible because of right-of-way required from the residences, removal of mature trees and reducing the width of already narrow front yards. Capacity improvements at this intersection would be contrary to the City's General Plan Policy T-27.	No
46	Middlefield Road / Ravenswood Avenue	РМ	MP	Under Menlo Park's General Plan, the proposed improvement for this intersection is to provide an additional exclusive left- turn lane for northbound Middlefield Road. This intersection is located in Menlo Park. Traffic capacity improvements would require their approval.	Yes

Source: AECOM, 2010

## 5.6 Remote Parking Lots

Another mitigation measure is available through the construction of remote parking lots near freeway interchanges. The regional employees for SUMC working typical weekday periods between 6am and 6pm who use I-280, US 101, and SR 84 would be required to park in the remote parking lots and use a shuttle bus to reach either the hospital/clinics or MOBs. Details of this mitigation measure have been presented in the main report.

Table 25 presents the summary of intersections still impacted by this project alternative after implementing remote parking, traffic adaptive technology and building two new pedestrian / bicycle undercrossings in 2025. Appendix J presents the TRAFFIX details.

During the AM peak hour in 2025, the intersection El Camino Real / University Avenue -Palm Drive (#10) and El Camino Real / Page Mill Road-Oregon Expressway (#16) would no longer be impacted. Four other intersections remain impacted. In the PM peak hour for 2025, eight intersections remain impacted under this project alternative. The four intersections that would no longer be impacted are:

- El Camino Real / Ravenswood Avenue (#3)
- El Camino Real / University Avenue-Palm Drive (#10)
- El Camino Real / Page Mill Road-Oregon Expressway (#16)
- Middlefield Road / Lytton Avenue (#19)

### 5.7 Palo Alto Residential Streets Mitigation

No study residential streets in Palo Alto would be impacted by the project as presented in Section 1.3. No mitigation is necessary.

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			ler no ot			2023 F M		
				Impact			Impact	
	Intersection				With VC_			With VC_
#					RParking +			RParking +
			No Build	With VC	Undercrossings	No Build	With VC	Undercrossings
			No Bulla	With VC	Cimal	No Bulla	Willin VC	Cimal
					+ Signai			+ Signai
					Adaptive			Adaptive
	Column		Α	В	C	D	E	F
1	El Camino Real/Valnaraiso Avenue	MP						
2	El Camino Real/Santa Cruz Avenue	MD						
2								
3	El Camino Real/Ravenswood Avenue	MP				•	•	
4	El Camino Real/Roble Avenue	MP						
5	El Camino Real/Middle Avenue	MP						
6	El Camino Real/Cambridge Avenue	MP						
7	EL Camino Real/Sand Hill Road-Alma Street	DΔ						
·								
0		PA						
9	Alma Street/Lytton Avenue	PA						
10	El Camino Real/University Avenue-Palm Drive(Single Int)	PA	•	•			•	
11	El Camino Real/Embarcadero Road-Galvez Street	PA				•		
12	El Camino Real/Churchill Avenue	PΔ						
12	El Camino Roal / Sarra Street Bark Baulovard							
13	El Camino Real / Stanford August							
14	El Camino Real / Stanford Avenue	PA						
15	El Camino Real / California Avenue	PA						
16	El Camino Real / Page Mill Road-Oregon Expressway	PA	•	•		•	•	
17	Woodland Avenue / University Avenue	EPA						
18	Middlefield Road / Willow Road	MP					•	•
10	Middlefield Road / Lytton Avenue							
19		FA					-	
20	Iviladieriela Road / University Avenue	PA						
21	Middlefield Road / Embarcadero Road	PA						
22	Alma Street / Churchill Avenue	PA						
23	Junipero Serra Boulevard-Foothill Expresswav/Page Mill Road	PA	•			•	•	•
24	Juninero Serra Boulevard / Stanford Avenue	SCC	-					-
24	Juniporo Sorra Boulovard / Compute Drive East	800		<u> </u>			<u> </u>	<u> </u>
25	Junipero Serra Boulevard / Campus Drive East	SUC						
26	Junipero Serra Boulevard / Campus Drive West	SCC				+	•	•
27	Junipero Serra Boulevard / Alpine Road-Santa Cruz Avenue	MP						
28	Sand Hill Cir- I-280 / Sand Hill Road	MP						
29	Sharon Park Drive / Sand Hill Road	MP						
30	Santa Cruz Avenue / Sand Hill Road	MP						
50								
31	Oak Avenue / Sand Hill Road - Vine Street	MP						
32	Stock Farm Road / Sand Hill Road	PA						
33	Pasteur Drive / Sand Hill Road	PA						
34	Arboretum Road / Sand Hill Road	PA						
35	Arboretum Road / Quarry Road	PA						
36	Arboretum Road / Palm Drive	PA						
37	Arboretum Road / Galvez Street / (unsignalized)	PA	•			•	•	
38	EL Camino Real / Charleston Road	PΔ						
20	Alma Street / Charloston Road							
40	Middlefield Dead / Chadesten Dead							
40		PA						
41	Middlefield Road / Hamilton Avenue	PA						
42	Alma Street / Hamilton Avenue	PA						
43	University Drive / Santa Cruz Avenue	MP						
44	El Camino Real / Oak Grove Avenue	MP						
45	Middlefield Road / Ringwood Avenue	MP						
40	Middlefield Bood / Revenue Averue							
40		IVIP						
47	El Camino Real / Encinal Road	MP						
48	Bay Road / Marsh Road	MP						
49	Marsh Road / US 101 SB Off-Ramp	MP						
50	Marsh Road / US 101 NB Off-Ramp	MP						
51	Bay Road / Willow Road	MP						
52	Bayfront Expressivay / Willow Road	MD					•	
52	Daynon Lypiessway / Willow Noau							
53	University Avenue / Baytront Expressway	MP				+	-	•
54	Bay Road / University Avenue	EPA				•		
55	Donohoe Street / University Avenue	EPA	•					
56	Welch Road / Quarry Road	PA						
57	Durand Way / Sand Hill Road	PA						
58	Pasteur Drive NB / Welch Road	PA						
50	Pasteur Drive SB / Welch Road	DA						
09		FA						
60	Duranu way Extension / weich Road	PA						
61	Bowdoin Street / Stanford Road (unsignalized)	PA						
62	Alpine Road / I-280 NB Off-Ramp (unsignalized)	PA	•	•	•	•	•	•
63	Alpine Road / I-280 SB Off-Ramp (unsignalized)	PA	•	•	•			
64	Page Mill Road/ I-280 NB Off-Ramp (unsignalized)	PA	•					
65	Page Mill Road / I-280 SB Off-Ramp (unsignalized)	PA				•		
66	Footbill Expressively / Arestradero Road	800						
00	Trach and the second of the second se	300		-			45	
<u> </u>	Iotal Locations		11	6	4	15	12	8
	PA Locations		9	5	3	8	6	3
	(Diamond) Base							
	(Dot) V/C Impact							
-	Loci vo impaci							
	intersection with franc Adaptive rechnology							
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Table 25Summary of VC Impact With Remote ParkingNew Undercrossings and Traffic Adaptive Technology in 2025

Source: AECOM, 2010

## 5.8 Menlo Park Roadway Mitigation

The ADT analysis presented in Section 1.4 found several roadway segments in Menlo Park significantly impacted by the project.

Table 26 presents the ADT analysis results with the provision of two additional pedestrian / bicycle undercrossings discussed earlier. Of the five roadways impacted by the proposed VC alternative, Ravenswood Avenue would no longer be significantly affected when the new pedestrian / bicycle undercrossings are in place. The other four roadways, as highlighted in Table 26, would still be impacted by SUMC in 2025 under this project alternative.

Roadway	Туре	Segment	No Build	With VC	Impact
Marsh Road	Minor Arterial	West of US.101	39454	39908	Y
Sand Hill Road	Minor Arterial	East of Santa Cruz Avenue	33407	35408	Y
Willow Bood	Minor Arterial	East of Middlefield Road	23823	24924	Y
WIIIOW ROad	Collector	West of Middlefield Road	6315	6315	N
Alpine Road	Minor Arterial	West of Junipero Serra Boulevard	25120	25647	Y
Middlefield Road	Minor Arterial	North of Ravenswood Avenue	14359	14679	Ν
	Minor Arterial	South of Ravenswood Avenue	25215	24941	Ν
Ravenswood Avenue	Minor Arterial	East of El Camino Real	22705	22716	N
Santa Cruz Avenue	Minor Arterial	West of El Camino Real	6530	6530	Ν
Valparaiso Avenue	Minor Arterial	West of EI Camino Real	16239	16319	Ν

 Table 26

 2025 Roadway ADT Analysis with Undercrossings Only (Menlo Park)

Source: AECOM, 2010

Table 27 presents the ADT analysis results with the TDM measures and the additional pedestrian / bicycle undercrossings being implemented.

Of the five roadways impacted by the VC, Ravenswood Avenue would no longer be significantly affected when the proposed TDM measures (including the GO Pass) and pedestrian / bicycle undercrossings are in place. The other four roadways, as highlighted in Table 27, would still be impacted by SUMC in 2025.

Table 28 presents the ADT analysis results with the proposed remote parking and the additional pedestrian / bicycle undercrossings being implemented under this project alternative.

Similarly, Ravenswood Avenue would no longer be significantly affected when the proposed remote parking and pedestrian / bicycle undercrossings are in place. Four other roadways, as highlighted in Table 28, would still be impacted by SUMC in 2025.

In Menlo Park, the contribution to roadway mitigation should be tied to the amount of traffic added to study area intersections by the project.

Roadway	Туре	Segment	No Build	With VC	Impact
Marsh Road	Minor Arterial	West of US.101	39454	39601	Y
Sand Hill Road	Minor Arterial	East of Santa Cruz Avenue	33407	34034	Y
Willow Road	Minor Arterial	East of Middlefield Road	23823	24163	Y
WIIIOW Road	Collector	West of Middlefield Road	6315	6315	Ν
Alpine Road	Minor Arterial	West of Junipero Serra Boulevard	25120	25280	Y
Middlofiold Road	Minor Arterial	North of Ravenswood Avenue	14359	14466	Ν
	Minor Arterial	South of Ravenswood Avenue	25215	24735	Ν
Ravenswood Avenue	Minor Arterial	East of EI Camino Real	22705	22329	Ν
Santa Cruz Avenue	Minor Arterial	West of EI Camino Real	6530	6530	Ν
Valparaiso Avenue	Minor Arterial	West of EI Camino Real	16239	16266	Ν

 Table 27

 2025 Roadway ADT Analysis with TDM and Undercrossings (Menlo Park)

Source: AECOM, 2010

 Table 28

 2025 Roadway ADT Analysis with Remote Parking and Undercrossings (Menlo Park)

Roadway	Туре	Segment	No Build	With SUMC	Impact
Marsh Road	Minor Arterial	West of US.101	39454	39741	Y
Sand Hill Road	Minor Arterial	East of Santa Cruz Avenue	33407	34767	Y
Willow Road	Minor Arterial	East of Middlefield Road	23823	24317	Y
	Collector	West of Middlefield Road	6315	6315	Ν
Alpine Road	Minor Arterial	West of Junipero Serra Boulevard	25120	25494	Y
Middlofiold Road	Minor Arterial	North of Ravenswood Avenue	14359	14579	Ν
	Minor Arterial	South of Ravenswood Avenue	25215	24781	Ν
Ravenswood Avenue	Minor Arterial	East of El Camino Real	22705	22456	Ν
Santa Cruz Avenue	Minor Arterial	West of EI Camino Real	6530	6530	Ν
Valparaiso Avenue	Minor Arterial	West of EI Camino Real	16239	16306	Ν

Source: AECOM, 2010

### 5.9 Freeway Mitigation

No study freeway segment would be impacted by the VC. No mitigation is necessary.

### 5.10 Parking Mitigation

Under the VC alternative, SUMC is sufficiently parked based on the City Zoning Ordinance. With a reduction in drive-alone employees, the proposed TDM measures, including the GO Pass, would eliminate the need for a total of about 680 parking spaces at SUMC. The remote parking plan would eliminate the need for about 500 parking spaces at SUMC.

# 5.11 **Project Site Local Circulation Mitigation**

The local circulation network will be enhanced by the proposed SUMC project and those enhancements will also occur with the VC alternative. Capacity will be added to Welch Road and to Pasteur Drive. However, the traffic projections for Welch Road indicate that it will be approaching capacity. The traffic volumes projected for Welch Road combined with the numerous turning vehicles, pedestrian movements across and along Welch Road and bicycle travel along Welch Road will potentially create a safety hazard which is a significant impact. Durand Way, Roth Way and Quarry Road will be extended to provide additional access. The local street network will be further enhanced with the connection of Sand Hill Road to Campus Drive West via Pasteur Drive, a currently designated private street, and Roth Way. The private street connection between Roth Way and Pasteur Drive should be designed to a cross section consistent with the adjoining public streets. After completion of Phase I of the hospital, Stanford shall fund an independent traffic evaluation, commissioned by the City, based on actual travel patterns, volumes and emergency access, with an emphasis on ease of circulation around and through the medical complex to determine if the private street connection between Roth Way and Pasteur Drive would improve circulation, it should be designated as a public street for all vehicular, bicycle, pedestrian and transit traffic.

# 5.12 Pedestrian and Bicycle Mitigation

The proposed pedestrian and bicycle improvements under this project alternative will provide an overall benefit to the project study area by reducing auto related traffic and providing infrastructure for an alternative travel choice to driving. Enhancements to the pedestrian and bicycle network can be made to reduce overall traffic, to further improve the linkages between the project and downtown Palo Alto and the surrounding residential neighborhoods and to improve air quality and reduce greenhouse gases by reducing vehicle miles traveled. The improved facilities would also mitigate the hazards to pedestrians and cyclists brought about by the increased vehicular traffic and congestions. A list of improvements has been presented in the main report and will not be repeated here.

# 5.13 Emergency Vehicle Access Mitigation

Install emergency vehicle traffic signal priority (Opticom) at all intersections significantly impacted under this project alternative.

# 5.14 Construction Mitigation

Project-related construction traffic could contribute to increased intersection delays and interference with pedestrians, bicyclists, and transit. During the construction period, impacts might arise from a substantial increase in heavy truck travel, as materials are brought in to the project sites, and demolished or excavated materials are hauled out. Temporary lane or road closures might be required for the construction and for underground utility work. Construction activities would lead to both temporary disruption of transportation system operation and permanent damage to elements of the system such as pavement and bridges.

A comprehensive construction mitigation plan has been identified and presented in the main report and will not be repeated here.

# 5.15 Vehicle Miles Traveled

VMT generated by the VC, including the proposed 490 housing units, is calculated to be approximately 280,200 daily vehicle miles. Details of the calculations are shown in Appendix K. The VC alternative gives a reduction of approximately 25,500 daily vehicle miles. Therefore, the VC alternative acts as a form of mitigation for the increase VMT caused by the proposed SUMC expansion.