Appendix 3.10-1

Transportation Supporting Data

FEHR PEERS

Transportation Chapter Appendix

The purpose of this appendix is to clarify analysis approach, assumptions, and results prepared for the Bayhill Specific Plan (Project) Environmental Impact Report. This appendix includes three sections:

- Trip Generation
- Vehicle Miles Traveled (VMT)
- Travel Demand Management (TDM)

It is followed by four corresponding attachments:

- Attachment A: VMT by Speedbin and Scenario
- Attachment B: TDM Calculation Worksheets
- Attachment C: Queue Summary
- Attachment D: LOS Summary

Trip Generation

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Estimates are created for the peak one-hour periods during the morning and evening commute periods when traffic volumes on the adjacent streets are the highest. For all alternatives, trip generation was estimated using a combination of rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual (*10th Edition) as well as Fehr & Peers' MainStreet Trip Generation tool.

The MainStreet trip generation tool, which is based on MXD methodology, developed for and approved by the US Environmental Protection Agency (EPA) for use in evaluating trip generation at mixed-use projects. The primary difference between the ITE and MXD methodologies is that the traditional ITE methodology relies on one factor—the project's land use type—to predict vehicle trip generation, while MXD incorporates local data and travel behaviors, as well as leading research in how density, mix of land uses, and other built environment factors affect vehicle trip generation.

The total square footage at buildout of each alternative was included in the MainStreet analysis to capture the full benefits of the land use mixture.

Trip generation estimates do not account for the travel demand management (TDM) programs proposed for or currently in place (i.e., private shuttle buses) at the Project Site since TDM programs are not permanent in the same way as built environment factors and land use diversity, and instead are tied to particular tenants, who often turnover during the life of a project. For this reason, the estimated net new trips presented in this analysis do not account for TDM strategies. The trip generation forecasts do account for use of BART or Caltrain by future employees.

Table 1 through 3 presents the weekday AM peak hour and PM peak hour trip generation for the Max Office, Max Housing, and Phase 1 Project scenarios, respectively.

Table 1: Max Office Project Vehicle Trip Generation

Land Use	Quantity[1]	Units	ITE Code[2]	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Office	3,880.48	ksf	710	3,206	521	3,727	616	3,232	3,848
Commercial	121.846	ksf	820	293	179	472	356	385	741
Civic Use	50	acres	590	40	16	56	102	111	213
Housing	--	units	221	--	--	--	--	--	--
Hotel	147	rooms	310	40	28	68	43	41	84
Sub-Total				*3,579*	*744*	*4,323*	*1,117*	*3,769*	*4,886*
Internalization[3]				-286	-60	-346	-222	-66	-288
Shift to Walk, Bike or Transit[4]				-515	-107	-623	-139	-467	-606
Total Reduction				*-802*	*-166*	*-968*	*-205*	*-689*	*-894*
Total				**2,777**	**578**	**3,355**	**912**	**3,080**	**3,992**

Notes:

1. Land use quantities include existing uses. Transportation analysis assumed 50 acres of civic use in place of the equivalent office square feet because a civic use is a more conservative (i.e. higher trip generating) land use than office space. Because of the land use swap, the office square footage shown here is lower than the number analyzed in some other chapters.
2. Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition)
3. Internalization refers to the estimated number of internal trips that occur within the site due to the relationship between land uses. For example, someone working in an office building may utilize the adjacent retail uses, as such, the trip occurs within the site. Internalization was calculated using Fehr & Peers' MainStreet Trip Generation Tool.
    a. AM Peak Hour: 8%
    b. PM Peak Hour: 5.9%
4. Shift to walk, bike or transit estimates the number of users that would choose to walk, bike or take transit, instead of drive to/from the site. It is calculated based on existing infrastructure and nearby transit options. For example, an employee at the Project site, may choose to take BART and SamTrans to the site, instead of drive. The shift to other modes was calculated using Fehr & Peers' MainStreet Trip Generation Tool.
    a. AM Peak Hour: 14.4%
    b. PM Peak Hour: 12.4%

Source: Fehr & Peers.

Table 2: Max Housing Project Vehicle Trip Generation

Land Use	Quantity[1]	Units	ITE Code[2]	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Office	3,500.743	ksf	710	2,899	471	3,370	556	2,921	3,477
Commercial	121.846	ksf	820	293	179	472	356	385	741
Civic Use	50	acres	590	40	16	56	102	111	213
Housing	489	units	221	42	122	164	128	81	209
Hotel	147	rooms	310	40	28	68	43	41	84
Sub-Total				*3,314*	*816*	*4,130*	*1,185*	*3,539*	*4,724*
Internalization[3]				-355	-87	-442	-94	-280	-373
Shift to Walk, Bike or Transit[4]				-404	-100	-504	-132	-393	-524
Total Reduction				*-758*	*-187*	*-945*	*-226*	*-673*	*-899*
Total				**2,556**	**629**	**3,185**	**959**	**2,866**	**3,825**

Notes:

1. Land use quantities include existing uses. Transportation analysis assumed 50 acres of civic use in place of the equivalent number of housing units because a civic use is a more conservative (i.e. higher trip generating) land use than housing. Because of the land use swap, the number of housing units shown here is lower than the number analyzed in some other chapters.
2. Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition)
3. Internalization refers to the estimated number of internal trips that occur within the site due to the relationship between land uses. For example, someone working in an office building may utilize the adjacent retail uses, as such, the trip occurs within the site. Internalization was calculated using Fehr & Peers' MainStreet Trip Generation Tool.
    a. AM Peak Hour: 10.7%
    b. PM Peak Hour: 7.9%
4. Shift to walk, bike or transit estimates the number of users that would choose to walk, bike or take transit, instead of drive to/from the site. It is calculated based on existing infrastructure and nearby transit options. For example, an employee at the Project site, may choose to take BART and SamTrans to the site, instead of drive. The shift to other modes was calculated using Fehr & Peers' MainStreet Trip Generation Tool.
    a. AM Peak Hour: 12.2%
    b. PM Peak Hour: 11.1%

Source: Fehr & Peers.

Table 3: Phase 1 Project Vehicle Trip Generation

Land Use	Quantity	Units	ITE Code[1]	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Office[2]	440	ksf	710	378	62	440	74	391	465
Internalization[3]				-27	-4	-31	-4	-21	-25
Shift to Walk, Bike or Transit[4]				-26	-4	-30	-4	-23	-27
Total Reduction				*-53*	*-9*	*-62*	*-8*	*-44*	*-52*
Total				**325**	**53**	**378**	**66**	**347**	**413**

Notes:

1. Institute of Transportation Engineers (ITE) Trip Generation Manual (10th Edition)
2. Analysis of Phase I assumes the net new office land use and no demolition of the "Lakes" Buildings; as a result, the findings are likely more conservative than if the analysis had included the reduction in employee trips associated with the "Lakes" buildings.
3. Internalization refers to the estimated number of internal trips that occur within the site due to the relationship between land uses. For example, someone working in an office building may utilize the adjacent retail uses, as such, the trip occurs within the site. Internalization was calculated using Fehr & Peers' MainStreet Trip Generation Tool.
    a. AM Peak Hour: 7.1%
    b. PM Peak Hour: 5.4%
4. Shift to walk, bike or transit estimates the number of users that would choose to walk, bike or take transit, instead of drive to/from the site. It is calculated based on existing infrastructure and nearby transit options. For example, an employee at the Project site, may choose to take BART and SamTrans to the site, instead of drive. The shift to other modes was calculated using Fehr & Peers' MainStreet Trip Generation Tool.
    a. AM Peak Hour: 6.9%
    b. PM Peak Hour: 5.9%

Source: Fehr & Peers.

As shown in the footnotes of Tables 1 and 2, the internalization varies between the time of day and by the mix of land use. Between the two land use scenarios, the Max Housing scenario results in a slightly higher internalization due to the greater mix of land uses (e.g. more housing). The shift to walk, bike, and transit, is dependent on the available pedestrian and bicycle infrastructure, such as the presence of sidewalks and bike lanes. Additionally, it's based on the proximity to transit. Based on the existing site and its proximity to El Camino Real, BART, and Caltrain, the Max Office and Max Housing scenarios are expected to shift 5 to 15 percent of users to walk, bike or transit. Similarly, the Phase 1 project is expected to result in some internalization and shift to other modes. The total reduction for the Phase 1 Project ranges from approximately 5 to 10 percent.

Table 4 summarizes the total trip generation used in the EIR assessment. Comparing the Max Office and Max Housing scenarios, the Max office is expected to generate more trips during the AM and PM peak hours. Therefore, the Max Office scenario was further evaluated in this analysis.

Table 4: Vehicle Trip Generation Summary

Scenario	AM Peak Hour[1]			PM Peak Hour[1]		
	In	Out	Total	In	Out	Total
Max Office	2,780	580	3,360	910	3,080	3,990
Max Housing	2,560	630	3,190	960	2,870	3,830
Phase I (Net New)[1]	330	50	380	70	350	420

Notes:
1. Trip generation values rounded to the nearest 10.

Source: Fehr & Peers.

Vehicle Miles Traveled (VMT) Analysis

With the passage of SB 743 (September 27, 2013) and the subsequent adoption of revised California Environmental Quality Act (CEQA) Guidelines (December 28, 2018), level of service (LOS) can no longer be used as a criterion for identifying significant transportation impacts for most projects under CEQA effective July 1, 2020. LOS measures the average amount of delay experienced by vehicle drivers at an intersection during the most congested time of day, while the new metric vehicle miles traveled (VMT) measures the total number of daily miles traveled by vehicles on the roadway network and thereby the impacts on the environment from those miles traveled.

In other words, SB 743 changes the focus of transportation impact analysis in CEQA from measuring impacts ***to*** drivers, to measuring the impact ***of*** driving.

VMT measures the total number of daily miles traveled by vehicles on the roadway network and thereby the impacts on the environment from those miles traveled. For the purpose of this analysis, two VMT metrics were prepared:

- Total VMT: the amount of VMT generated by the Project
- VMT per Service Population: the total VMT represented by a per-capita metric

To calculate the Project generated VMT, a select zone analysis was performed for the Project transportation analysis zone (TAZ). This type of analysis isolates all the trips with at least one trip origin or end at the TAZ and organizes the trips into an origin-destination (OD) trip matrix format. These trips are then multiplied by trip lengths between each OD pair based upon the final model trip assignment representing congested travel times, speeds, and costs. The trip lengths are also reported in an OD matrix format and the two matrices are multiplied to estimate VMT. The project generated total VMT per service population is the difference in the TAZ VMT estimate between the No Project and Plus Project model runs divided by the Project population plus employment (and any other trip generating populations such as students or visitors). VMT forecasts were prepared using the San Mateo City/County Association of Governments (C/CAG) Travel Demand Model. The model was refined to account for No Project and Plus Project conditions. The total VMT and VMT per service population results are provided in **Table 5 and 6**, respectively. Total VMT was reported by speedbin for air quality calculations and is included in **Attachment A** of this appendix.

Table 5: Project Site VMT

Scenario	Project Site Total VMT			Project Added Total VMT	
	No Project[1]	Plus Project[2]	Plus Phase I Development	Project	Phase I Development
Existing Conditions	97,163	356,588	153,039	259,425	55,876
Cumulative Conditions	94,305	338,248	148,371	243,943	54,066

Notes:
1. The analysis assumes the existing land use program Under No Project conditions.
2. The Project is defined as the Max Office alternative.

Source: C/CAG-VTA Travel Model, 2019.

Table 6: VMT per Service Population

Scenario	Project Site Total VMT per Service Population			Project VMT Threshold	Project Added Total VMT per Service Population[1]	
	No Project[2]	Plus Project[3]	Plus Phase I Development		Project	Phase I Development
Existing Conditions	37.5	29.9	35.2	21.7	**27.8**	**31.8**
Cumulative Conditions	36.2	28.3	34.0	21.7	**26.1**	**30.7**

Notes:
Bold: Project VMT per Service Population exceeds the VMT per Service Population threshold
1. The Project Added Total VMT per Service Population is the change in VMT as a result of the Project over the change in Service Population.
2. The analysis assumes the existing land use program Under No Project conditions.
3. The Project is defined as the Max Office alternative.

Source: C/CAG-VTA Travel Model, 2019.

As shown, the Project would increase VMT, but decrease the VMT per service population compared to No Project conditions. However, the Project VMT per service population would still exceed the 21.7 VMT per service population threshold[1]. The Project would require a 22 percent and 17 percent reduction in VMT per service population to meet the threshold under Existing Plus Project and Cumulative Plus Project scenarios, respectively. And the Phase I Development would require a 32 percent and 29 percent reduction in VMT per service population to meet the threshold under Existing Plus Project and Cumulative Plus Project scenarios, respectively.

As described in the EIR, Mitigation Measure TRA-1 was proposed, which would require property owners of new developments within the Specific Plan to prepare and implement a TDM program that would achieve the 21.7 VMT per Capita threshold. The VMT per Capita threshold equates to no more than 43-percent of trips occurring by single occupancy vehicles (SOV). The 43-percent SOV target was calculated based on the reduction of the Project VMT and "target" VMT. The "target" VMT was calculated by multiplying the change in population by the 21.7 VMT per service population threshold. A summary of the calculations is included in **Table 7**.

[1] See section 3.10 of the EIR for a detailed narrative of the VMT methodology and significant threshold.

Table 7: Cumulative Plus Project VMT and Mode Split Target

Total VMT	Target VMT	Delta (Total – Target)	Percent Reduction	SOV Mode Split	SOV Target Mode Split with Reduction
243,943	202,678	41,265	17%	53%	**43%**

Source: Fehr & Peers, 2019.

As shown in **Table 7**, the Project would require a VMT reduction 17 percent. The VMT reduction would correspond to the same SOV target reduction, resulting in a maximum SOV mode of 43 percent. The applicant or building owners can shift SOV users to other modes through implementation of a TDM program,– described in greater detail below.

Transportation Demand Management (TDM)

The Specific Plan provides a list of TDM programs and services, but developers and property managers may tailor their own list of measures to fit their unique workforce culture and schedule.

Project Scenario

In the near term, before buildout of the Transit Corridors Plan, it may be challenging to reliably achieve a SOV percentage of no more than 43 percent. Even with TDM implementation, a standard employer or property manager may struggle to consistently reduce the Project's effect on VMT per service population to a less-than-significant level. As such, the EIR notes that the TDM Program will strive for the VMT per Capita threshold but acknowledge reasonable limitations on TDM program success due to surrounding transportation and land use context in the near-term. Program expectations may be less stringent for an initial occupancy period but will become more stringent over time and will ultimately require each employer or property manager to meet the VMT per Capita threshold or associated drive-alone goal.

Based on guidance provided by the California Air Pollution Control Officers Association (CAPCOA), the maximum vehicle trip reduction for urban low-transit[2] areas such as the proposed Project is generally accepted to be 15-percent. Thus, it is expected that even with implementation of the

[2] Urban low transit areas refer to somewhat dense urban areas with good accessibility but lower levels of transit use compared to core and high transit areas like Downtown San Francisco.

comprehensive TDM program as described in the Specific Plan, the VMT reduction would not reduce by more than 15-percent. However, Fehr & Peers prepared a quantitative assessment of the TDM strategies proposed in the Specific Plan, included in Attachment C, using their TDM+ tool[3]. As shown, implementation of the program is expected to result in a VMT reduction ranging from 15 percent to 20 percent. As described in the EIR, the Project requires a reduction of 23 percent under current conditions; therefore, implementation of a TDM program would not result in a significant reduction that would meet the VMT per Capita threshold. However, under Cumulative conditions, the Project would require a reduction of 17 percent, which falls within the expected range of VMT reduction with implementation of a TDM program.

Therefore, it is unlikely that implementation of a TDM program would result in meeting the VMT per Capita threshold under Existing Plus Project conditions; however, would meet the threshold under Cumulative Plus Project conditions.

Phase I

Phase I Development is composed entirely of YouTube-owned parcels, and all- trip generation associated with Phase I Development would be YouTube generated. YouTube operates a robust TDM program today that, if continued is expected to meet or perform below the 21.7 VMT per service population threshold. A summary of the YouTube travel surveys is included in **Table 8.**

Table 8: YouTube Employee Mode Split

Mode	2017	2018
Drive Alone (SOVs)	42.4%	42.7%
Carpool, Vanpool, TNCs, Drop-off (2+ passengers)	4.1%	4.0%
G-Shuttle	40.3%	39.1%
Transit	5.0%	3.5%
Bike	1.6%	1.2%
Walk	1.9%	2.5%
Other (Work from home, different office, etc.)	4.7%	7.0%

Source: YouTube Employee Travel Survey Data

[3] TDM+ is based on CAPCOA VMT reduction strategy research in *Quantifying Greenhouse Gas Mitigation Measures* (2010).

As shown, approximately 40 percent of employees drive alone to work, whereas the 60 percent use the G-shuttle, employee owned and operated shuttle system, take transit, bike, carpool or other mode. YouTube's current drive alone performance is below the 43 percent drive threshold, therefore, if the current or similar YouTube TDM program continues to be implemented with the addition of Phase I, it is expected that the Phase I Project would result in a VMT per service population under the 21.7 threshold.

Queue Summary

Attachment C of this appendix includes queue summary calculations, which were prepared to evaluate the possibility of hazardous operations at freeway off-ramp termini intersections. Synchro software was used to evaluate the Project's impact to queue lengths at off-ramp termini intersections to understand if the Project would cause substantial queueing that would extend beyond the available ramp storage length. The Project's impact was evaluated using 95th percentile queues. The 95th percentile queue represents a queue length that has a five percent probability of being exceeded during the analysis time period. Therefore, the 95th percentile represents a more conservative queue length, greater than typical or average conditions.

LOS Summary

Attachment D of this appendix includes an additional memo and LOS summary. As discussed above, Senate Bill 743 and the resulting CEQA Guidelines update completed in early 2019 replaces the use of LOS for determining transportation impacts with an evaluation of VMT. However, a LOS analysis was prepared to understand if the Project would perform under acceptable LOS thresholds established by the City of San Bruno's General Plan and C/CAG CMP. **Attachment D** documents the analysis assumptions and findings.

Attachments

This appendix is followed by four corresponding attachments:

- Attachment A: VMT by Speedbin and Scenario
- Attachment B: TDM Calculation Worksheets
- Attachment C: Queue Summary
- Attachment D: LOS Summary

Transportation Model Worksheets

Existing VMT by Speed Bin

Daily Vehicle Miles Travelled by Speed Bin							
Speed Bin		Entire Model					
		Totals			Project		
Start	End	No Project	Bayhill Phase 1	Bayhill Max Office	No Project	Bayhill Phase 1	Bayhill Max Office
0	5	172	295	563		123	391
5	10	63	92	262		29	199
10	15	469	667	1,601		197	1,132
15	20	7,477	11,596	26,381		4,119	18,904
20	25	6,606	10,265	25,223		3,659	18,617
25	30	8,214	13,078	29,518		4,864	21,305
30	35	5,691	8,867	20,799		3,176	15,108
35	40	3,262	5,699	14,129		2,436	10,866
40	45	10,073	15,190	34,533		5,117	24,460
45	50	8,016	13,603	33,541		5,587	25,524
50	55	11,062	16,181	34,109		5,120	23,047
55	60	22,076	34,919	79,334		12,843	57,258
60	65	13,809	22,301	55,825		8,492	42,016
65	9999	172	285	770		113	598
Total		**97,163**	**153,039**	**356,588**	**0**	**55,875**	**259,425**

Existing VMT by Speed Bin with Mitigation

Daily Vehicle Miles Travelled by Speed Bin						With YouTube TDM Mitigation					
Speed Bin		Entire Model				Entire Model					
		Totals		Project		Reduction		Total With Mitigation		Project	
Start	End	No Project	Bayhill Phase 1	No Project	Bayhill Phase 1	No Project	Bayhill Phase 1	No Project	Bayhill Phase 1	No Project	Bayhill Phase 1
0	5	172	295		123		64		231		59
5	10	63	92		29		15		77		14
10	15	469	667		197		103		564		95
15	20	7,477	11,596		4,119		2,142		9,454		1,977
20	25	6,606	10,265		3,659		1,903		8,362		1,756
25	30	8,214	13,078		4,864		2,529		10,549		2,335
30	35	5,691	8,867		3,176		1,651		7,216		1,524
35	40	3,262	5,699		2,436		1,267		4,432		1,169
40	45	10,073	15,190		5,117		2,661		12,529		2,456
45	50	8,016	13,603		5,587		2,905		10,698		2,682
50	55	11,062	16,181		5,120		2,662		13,519		2,457
55	60	22,076	34,919		12,843		6,678		28,240		6,165
60	65	13,809	22,301		8,492		4,416		17,885		4,076
65	9999	172	285		113		59		226		54
Total		**97,163**	**153,039**	**0**	**55,875**	**0**	**29,055**	**0**	**123,984**	**0**	**26,820**

2040 VMT by Speed Bin

Daily Vehicle Miles Travelled by Speed Bin									
Speed Bin		Entire Model							
		Totals				Project			
Start	End	No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel	No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel
0	5	173	266	603	591		92	430	418
5	10	111	174	454	512		62	343	401
10	15	790	1,220	2,638	2,621		430	1,848	1,831
15	20	8,005	12,130	26,877	27,253		4,125	18,872	19,248
20	25	6,564	10,675	24,531	24,346		4,111	17,967	17,782
25	30	8,676	13,574	30,696	31,044		4,898	22,020	22,368
30	35	9,277	13,820	32,970	33,104		4,543	23,693	23,827
35	40	7,517	12,028	25,734	25,193		4,511	18,217	17,676
40	45	7,998	14,054	31,251	31,171		6,056	23,253	23,173
45	50	7,345	9,114	20,327	21,223		1,769	12,982	13,879
50	55	12,711	21,502	47,739	47,204		8,791	35,028	34,493
55	60	17,850	28,996	67,348	67,637		11,145	49,498	49,787
60	65	7,165	10,610	26,473	26,386		3,445	19,308	19,222
65	9999	123	210	608	611		87	485	488
Total		**94,305**	**148,371**	**338,248**	**338,898**	**0**	**54,066**	**243,943**	**244,593**

2040 VMT by Speed Bin with Mitigation

Daily Vehicle Miles Travelled by Speed Bin With TDM Mitigation											
Entire Model											
Reduction				Total with Mitigation				Project			
No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel	No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel	No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel
	35	78	77		231	525	514		58	352	341
	23	59	67		151	395	446		40	284	335
	159	343	341		1,061	2,295	2,281		271	1,505	1,490
	1,577	3,494	3,543		10,553	23,383	23,710		2,548	15,378	15,705
	1,388	3,189	3,165		9,287	21,342	21,181		2,723	14,778	14,617
	1,765	3,990	4,036		11,809	26,705	27,008		3,133	18,030	18,333
	1,797	4,286	4,304		12,024	28,684	28,800		2,746	19,407	19,523
	1,564	3,345	3,275		10,464	22,389	21,918		2,947	14,872	14,401
	1,827	4,063	4,052		12,227	27,188	27,119		4,229	19,190	19,121
	1,185	2,643	2,759		7,929	17,685	18,464		585	10,340	11,120
	2,795	6,206	6,137		18,707	41,533	41,068		5,996	28,822	28,357
	3,769	8,755	8,793		25,226	58,593	58,844		7,376	40,743	40,994
	1,379	3,441	3,430		9,230	23,031	22,956		2,066	15,867	15,792
	27	79	79		183	529	531		60	406	408
	19,288	**43,972**	**44,057**		**129,083**	**294,276**	**294,841**		**34,778**	**199,971**	**200,536**

VTA Model - SB 743 Total VMT Calculations - 2013 Scenario								
Year	Total VMT				Pop+Emp			
	No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel	No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel
Project TAZ	97,163	153,039	356,588		2,593	4,352	11,933	

VTA Model - SB 743 Total VMT Calculations - 2013 Scenario								
Year	Total VMT/Serv Pop (Total)				VMT/Serv Pop (Diff)			
	No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel	No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel
Project TAZ	37.5	35.2	29.9			31.8	27.8	

VTA Model - SB 743 Total VMT Calculations - 2040 Scenario								
Year	Total VMT				Pop+Emp			
	No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel	No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel
Project TAZ	94,305	148,371	338,248	338,898	2,602	4,361	11,942	11,967

VTA Model - SB 743 Total VMT Calculations - 2040 Scenario								
Year	Total VMT/Serv Pop (Total)				VMT/Serv Pop (Diff)			
	No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel	No Project	Bayhill Phase 1	Bayhill Max Office	Bayhill Max Office+Hotel
Project TAZ	36.2	34.0	28.3	28.3		30.7	26.1	26.1

TDM Reduction Summary Report: Bayhill Specific Plan

Overall VMT Reduction: 15% to 40%

	VMT % Reduction by Land Use			
Parking				
Parking1A: Increased Off-Street Fees				
Parking1B: Increased On-Street Fees				
Parking1D: Unbundled Parking				
Parking1E: Pay-as-you-Go Parking Rates				
Parking 2: Parking Supply	up to 3%		up to 3%	up to 3%
Transit				
Transit 1: Subsidies				
Transit 2A: Transit Frequency	up to 2%		up to 2%	up to 2%
Transit 2B: Transit Coverage	-		-	-
Transit 3A: Private Point-to-Point Shuttles	up to 6%		up to 1%	up to 2%
Transit 3B: Last Mile Shuttle	2% to 10%		up to 10%	up to 10%
Commute Programs				
Commute 1A: Commuter Incentives	12% to 12%		up to 2%	up to 5%
Commute 2: Commute Marketing Program	2% to 16%		up to 3%	up to 7%
Commute 3: ERH	up to 1%		-	-
Commute 4: TNC Partnerships	up to 3%		up to 1%	up to 1%
Bike and Walk				
BikeWalk1: Secure Parking	up to 1%		up to 1%	up to 1%
BikeWalk2: Showers & Lockers	-		-	-
BikeWalk3: End of Trip Repair Stations	up to 1%		up to 1%	up to 1%
BikeWalk 4: Pedestrian-Oriented Design	up to 2%		up to 2%	up to 2%
BikeWalk 5: Bikeshare System & Subsidies	up to 1%		up to 1%	up to 1%
Rideshare				
Rideshare 1: Carpool/Vanpool Incentives	up to 4%	up to 4%	up to 4%	up to 4%
Rideshare 2: Ridematch Program				
Rideshare 3: Carshare	up to 1%	up to 1%	up to 1%	up to 1%
Rideshare 4: Carshare Subsidy				
Total				
Total of all Measures	17% to 40%		1% to 24%	2% to 32%

Prepared by Fehr Peers
using TDM+ 2019

Report generated on 2/27/2020

Project Name: Bayhill Specific Plan

Place Type: Urban Low Transit

Land Use: ☑ Office 90 % ☐ Residential 0 % ☑ Retail 8 % ☑ Other 2 % ☑ User specify VMT generated by land Use 100 % Total

tdm+

TDM Strategies

Parking | Transit | Commute | Bike/Walk | Rideshare

Selected | Strategies

☐ PARKING PRICING

	Baseline	Proposed
Off-Street ($)	0	0
On-Street ($)	0	0
Reserved Residential ($)	0	0

☐ Unbundled Parking (Resid

☐ Pay-per-Use Parking

☑ PARKING SUPPLY

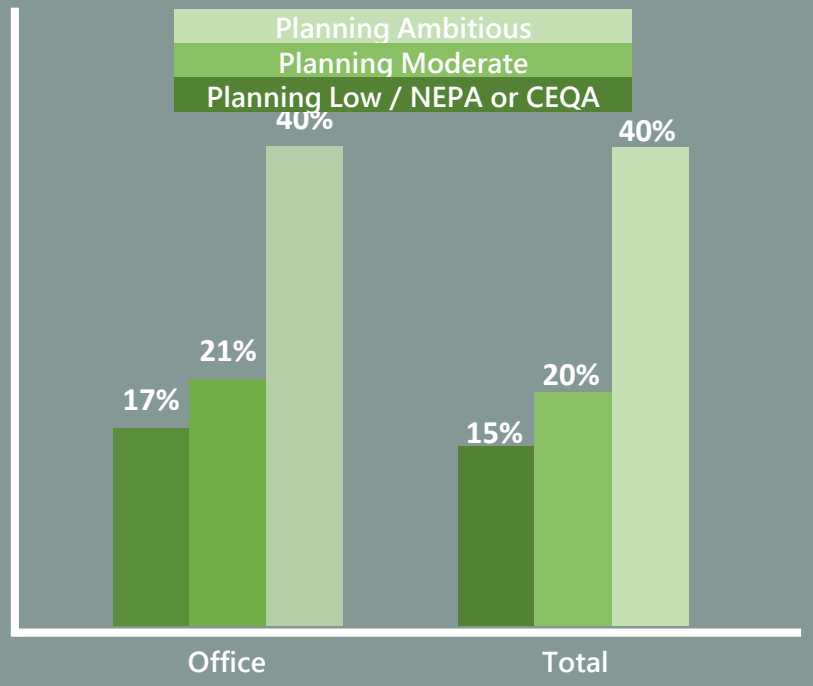
	Baseline	Proposed
Parking Supply (# of Spaces)	3.5	3

Reset Current Strategy Category

Reset All Input & Strategies

Reduction Summary

Office | Residential | Retail | Other



FEHR & PEERS

View Report Summary

Project Name: Bayhill Specific Plan

Place Type: Urban Low Transit

Land Use: ☑ Office 90 % ☐ Residential 0 % ☑ Retail 8 % ☑ Other 2 % ☑ User specify VMT generated by land Use 100 % Total

tdm+

TDM Strategies

Parking | Transit | Commute | Bike/Walk | Rideshare

10 Transit Existing Mode Share (% of all modes)

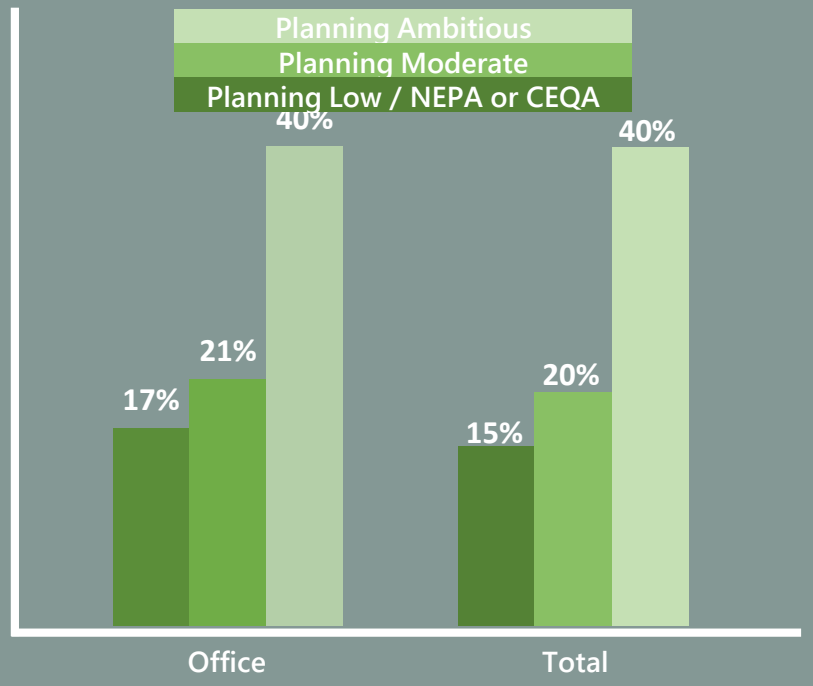
Selected	Strategies	Employees	Residents	Visitors
☐	SUBSIDIES			
	% Subsidized	100	0	0
☑	TRANSIT SYSTEM	Baseline	Proposed	
	Frequency (minutes)	20	10	
	Coverage (% coverage)	15	15	
☑	PRIVATE SHUTTLES	Employees	Residents	Visitors
	Point-to-Point	☑	☐	☐
	Last Mile	☑	☐	☑

Reset Current Strategy Category

Reset All Input & Strategies

Reduction Summary

Office | Residential | Retail | Other



FEHR PEERS

View Report Summary

Project Name: Bayhill Specific Plan

Place Type: Urban Low Transit

Land Use: ☑ Office 90 % ☐ Residential 0 % ☑ Retail 8 % ☑ Other 2 % ☑ User specify VMT generated by land Use 100 % Total

tdm+

TDM Strategies

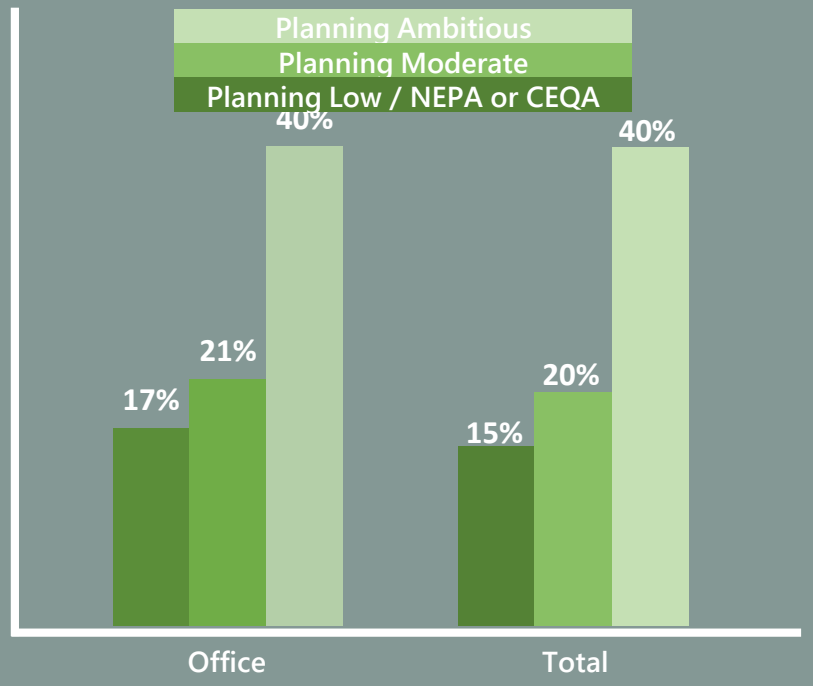
Parking | Transit | Commute | Bike/Walk | Rideshare

Selected	Strategies			
☑	COMMUTER INCENTIVES			
	Financial Incentive ($)	200	per	Month
	Average Baseline Commute Cost ($)	200	per	Month
☑	COMMUTE MARKETING PROGRAM	Employees ☑	Residents ☐	Visitors ☐
☑	EMERGENCY RIDE HOME	Employees ☑	Residents ☐	Visitors ☐
☑	TNC PARTNERSHIPS	Employees ☑	Residents ☐	Visitors ☐

Reset Current Strategy Category

Reduction Summary

Office | Residential | Retail | Other



Reset All Input & Strategies

FEHR & PEERS

View Report Summary

Project Name: Bayhill Specific Plan

Place Type: Urban Low Transit

Land Use: ☑ Office 90 % ☐ Residential 0 % ☑ Retail 8 % ☑ Other 2 % ☑ User specify VMT generated by land Use 100 % Total

tdm+

TDM Strategies

Parking | Transit | Commute | Bike/Walk | Rideshare

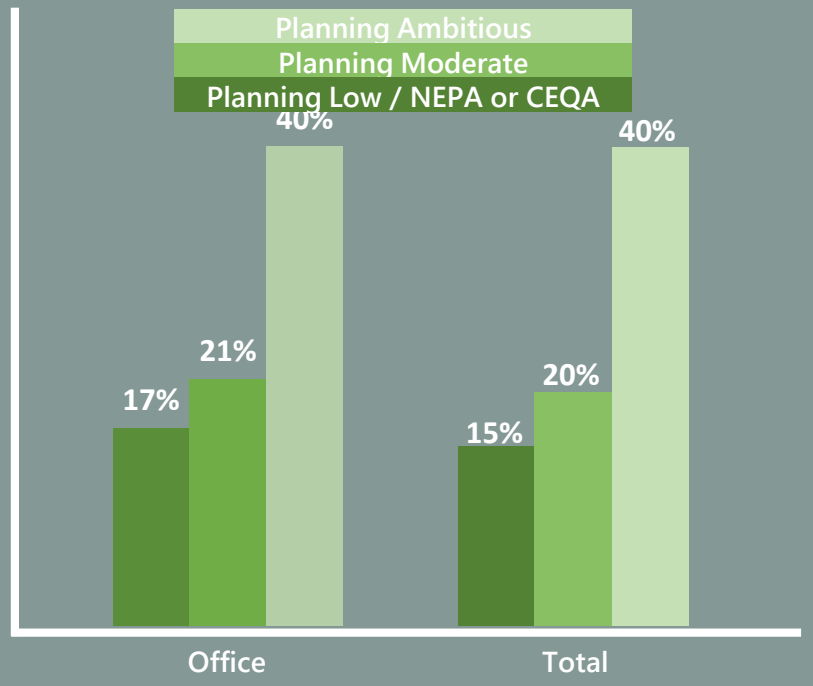
Selected	Strategies	Employees	Residents	Visitors
☑	SECURE BICYCLE PARKING	☑	☐	☑
☑	SHOWERS & LOCKERS	☑	☐	☐
☑	PUBLIC REPAIR STATIONS	☑	☐	☑
☑	PEDESTRIAN-ORIENTED DESIGN	☑	☑	☑
☑	BIKESHARE SYSTEM	☑	☐	☑
	% with Subsidies	0	0	0

Reset Current Strategy Category

Reset All Input & Strategies

Reduction Summary

Office | Residential | Retail | Other



FEHR & PEERS

View Report Summary

Project Name: Bayhill Specific Plan

Place Type: Urban Low Transit

Land Use: ☑ Office 90 % ☐ Residential 0 % ☑ Retail 8 % ☑ Other 2 % ☑ User specify VMT generated by land Use 100 % Total

tdm+

TDM Strategies

Parking | Transit | Commute | Bike/Walk | Rideshare

Selected | Strategies

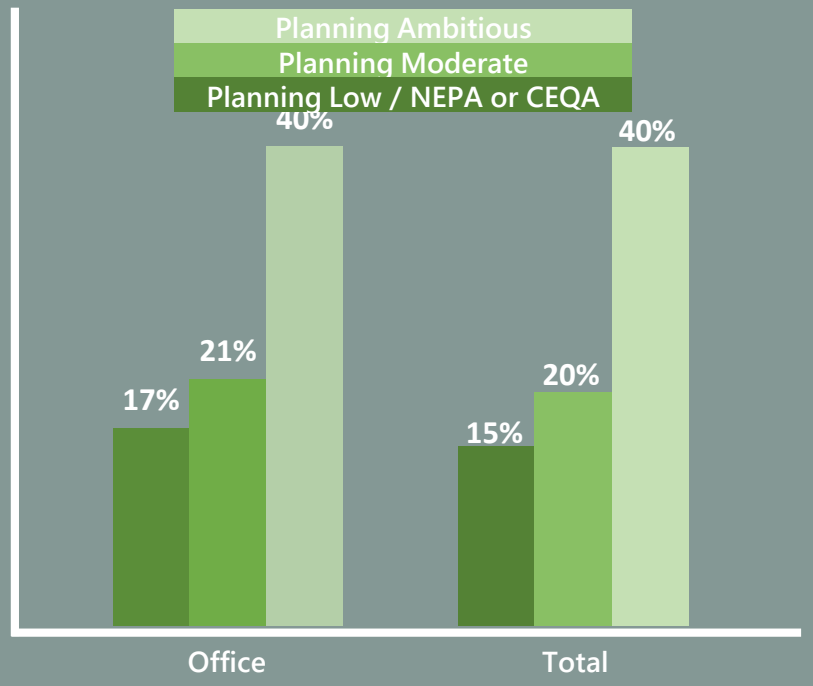
Selected	Strategies	Employees	Residents	Visitors
☑	CARPOOL/VANPOOL INCENTIVES	☑	☐	☐
	Subsidy Amount ($/month)	50	0	0
☐	RIDEMATCH PROGRAM	☑	☐	☐
	Population size	0	0	0
☑	CARSHARE AVAILABLE	☑	☑	☑
☐	CARSHARE SUBSIDIZED			
	% Subsidized	0	0	0

Reset Current Strategy Category

Reset All Input & Strategies

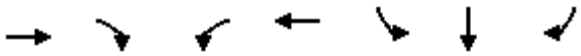
Reduction Summary

Office | Residential | Retail | Other



FEHR & PEERS

View Report Summary



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	893	365	212	405	233	480	157
v/c Ratio	0.35	0.41	0.44	0.17	0.67	0.70	0.37
Control Delay	14.7	8.2	44.2	3.6	41.4	37.6	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.7	8.2	44.2	3.6	41.4	37.6	8.5
Queue Length 50th (ft)	104	47	68	22	135	147	6
Queue Length 95th (ft)	160	130	m105	m33	197	183	54
Internal Link Dist (ft)	465			331		328	
Turn Bay Length (ft)					120		80
Base Capacity (vph)	2585	896	481	2434	480	943	530
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.41	0.44	0.17	0.49	0.51	0.30

Intersection Summary

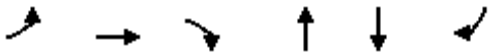
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	328	881	492	264	104	379	342
v/c Ratio	1.35	0.41	0.33	0.33	0.22	0.85	0.82
Control Delay	213.2	4.8	18.4	5.1	24.9	48.9	46.5
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	213.2	4.9	18.4	5.1	24.9	48.9	46.5
Queue Length 50th (ft)	~132	80	125	20	46	217	185
Queue Length 95th (ft)	#220	93	78	31	85	#334	284
Internal Link Dist (ft)		331	999			438	
Turn Bay Length (ft)				130	230		50
Base Capacity (vph)	243	2162	1494	804	541	516	484
Starvation Cap Reductn	0	344	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.35	0.48	0.33	0.33	0.19	0.73	0.71

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

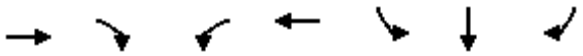


Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	94	92	87	1644	1557	1140
v/c Ratio	0.72	0.57	0.54	0.42	0.37	0.80
Control Delay	81.6	40.6	38.2	3.6	1.9	8.3
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	81.6	40.6	38.2	3.8	1.9	8.3
Queue Length 50th (ft)	75	36	30	43	53	157
Queue Length 95th (ft)	131	92	83	63	86	355
Internal Link Dist (ft)		1043		319	799	
Turn Bay Length (ft)	520		500			500
Base Capacity (vph)	416	411	408	3889	4260	1432
Starvation Cap Reductn	0	0	0	988	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.22	0.21	0.57	0.37	0.80

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	508	694	801	315	2155	241
v/c Ratio	0.85	0.67	0.26	0.31	0.56	0.20
Control Delay	61.7	28.0	10.6	2.5	7.3	1.0
Queue Delay	0.0	0.0	0.0	0.0	1.7	0.0
Total Delay	61.7	28.0	10.6	2.5	9.0	1.0
Queue Length 50th (ft)	198	194	111	3	221	0
Queue Length 95th (ft)	246	248	119	15	315	22
Internal Link Dist (ft)			799		345	
Turn Bay Length (ft)	140			400		300
Base Capacity (vph)	1076	1397	3034	1025	3815	1210
Starvation Cap Reductn	0	0	0	0	1414	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.50	0.26	0.31	0.90	0.20

Intersection Summary



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	507	160	461	916	162	318	146
v/c Ratio	0.21	0.19	1.15	0.34	0.65	0.55	0.42
Control Delay	15.4	3.6	117.9	2.9	47.1	22.1	9.3
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	15.4	3.6	117.9	3.0	47.1	22.1	9.3
Queue Length 50th (ft)	59	0	~167	53	96	54	0
Queue Length 95th (ft)	94	37	m#263	m73	153	90	51
Internal Link Dist (ft)	465			331		328	
Turn Bay Length (ft)					120		80
Base Capacity (vph)	2413	828	400	2682	394	833	463
Starvation Cap Reductn	0	0	0	535	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.19	1.15	0.43	0.41	0.38	0.32

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

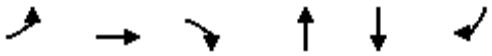
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	160	549	1073	673	262	606	289
v/c Ratio	0.69	0.27	0.66	0.88	0.48	1.11	0.60
Control Delay	55.9	6.2	30.1	40.0	28.0	104.0	31.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.9	6.2	30.1	40.0	28.0	104.0	31.8
Queue Length 50th (ft)	29	50	312	343	124	~437	144
Queue Length 95th (ft)	#94	64	365	#539	202	#660	233
Internal Link Dist (ft)		331	999			438	
Turn Bay Length (ft)				130	230		50
Base Capacity (vph)	231	2025	1628	768	547	545	483
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.27	0.66	0.88	0.48	1.11	0.60

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



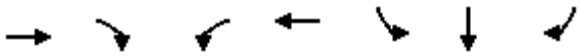
Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	240	227	222	2219	1514	741
v/c Ratio	0.91	0.77	0.75	0.59	0.38	0.54
Control Delay	96.8	58.9	56.2	6.0	7.2	2.8
Queue Delay	0.0	0.8	0.7	0.2	0.5	0.1
Total Delay	96.8	59.7	56.9	6.2	7.6	2.8
Queue Length 50th (ft)	245	165	152	95	183	38
Queue Length 95th (ft)	340	263	245	284	218	81
Internal Link Dist (ft)		1043		319	799	
Turn Bay Length (ft)	520		500			500
Base Capacity (vph)	339	355	359	3754	4023	1363
Starvation Cap Reductn	0	0	0	668	0	75
Spillback Cap Reductn	0	24	24	0	1832	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.69	0.66	0.72	0.69	0.58

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	500	1263	1634	331	1727	367
v/c Ratio	0.74	0.96	0.66	0.37	0.45	0.29
Control Delay	64.3	55.1	32.0	4.9	6.1	1.2
Queue Delay	0.0	0.0	0.2	0.0	0.1	0.3
Total Delay	64.3	55.1	32.2	4.9	6.2	1.5
Queue Length 50th (ft)	238	655	506	74	86	0
Queue Length 95th (ft)	303	#834	432	55	100	0
Internal Link Dist (ft)			799		345	
Turn Bay Length (ft)	140			400		300
Base Capacity (vph)	693	1332	2473	893	3864	1264
Starvation Cap Reductn	0	0	0	0	766	414
Spillback Cap Reductn	0	0	188	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.95	0.72	0.37	0.56	0.43

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	927	365	212	405	273	559	157
v/c Ratio	0.38	0.42	0.44	0.17	0.71	0.74	0.36
Control Delay	16.1	8.8	42.4	3.8	41.4	37.6	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	8.8	42.4	3.8	41.4	37.6	10.3
Queue Length 50th (ft)	118	51	68	22	156	169	17
Queue Length 95th (ft)	167	130	m104	m33	232	216	65
Internal Link Dist (ft)	465			331		328	
Turn Bay Length (ft)					120		80
Base Capacity (vph)	2468	865	481	2353	480	937	515
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	17	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.42	0.44	0.17	0.57	0.60	0.30

Intersection Summary

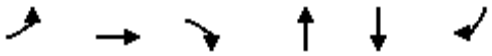
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	328	1031	492	264	104	492	458
v/c Ratio	1.35	0.51	0.37	0.35	0.19	0.98	0.95
Control Delay	212.8	8.3	21.2	5.6	23.3	66.8	61.2
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	212.8	8.4	21.2	5.6	23.3	66.8	61.2
Queue Length 50th (ft)	~132	112	128	21	44	301	265
Queue Length 95th (ft)	#220	132	83	32	85	#524	#466
Internal Link Dist (ft)		331	999			438	
Turn Bay Length (ft)				130	230		50
Base Capacity (vph)	243	2005	1336	747	541	504	484
Starvation Cap Reductn	0	246	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.35	0.59	0.37	0.35	0.19	0.98	0.95

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

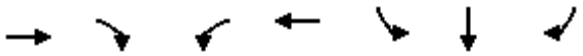


Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	120	122	123	1644	1964	1140
v/c Ratio	0.74	0.77	0.75	0.43	0.47	0.80
Control Delay	77.9	72.9	70.6	5.6	2.6	7.5
Queue Delay	0.0	0.1	0.1	0.2	0.0	0.0
Total Delay	77.9	73.0	70.7	5.7	2.6	7.5
Queue Length 50th (ft)	96	86	83	134	72	109
Queue Length 95th (ft)	156	151	146	198	160	287
Internal Link Dist (ft)		1043		319	799	
Turn Bay Length (ft)	520		500			500
Base Capacity (vph)	416	376	387	3811	4167	1425
Starvation Cap Reductn	0	0	0	965	0	0
Spillback Cap Reductn	0	22	22	0	32	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.29	0.34	0.34	0.58	0.47	0.80

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	871	747	801	315	2186	241
v/c Ratio	0.92	0.58	0.32	0.35	0.66	0.22
Control Delay	57.7	20.4	18.9	5.2	14.3	1.7
Queue Delay	0.0	0.0	0.0	0.0	10.2	0.0
Total Delay	57.7	20.4	18.9	5.2	24.5	1.7
Queue Length 50th (ft)	335	182	155	41	352	0
Queue Length 95th (ft)	398	232	206	108	447	30
Internal Link Dist (ft)			799		345	
Turn Bay Length (ft)	140			400		300
Base Capacity (vph)	1076	1397	2522	906	3303	1080
Starvation Cap Reductn	0	0	0	0	1117	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.53	0.32	0.35	1.00	0.22

Intersection Summary



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	508	160	538	922	165	319	149
v/c Ratio	0.21	0.19	1.34	0.34	0.65	0.55	0.42
Control Delay	15.5	3.6	193.7	2.8	47.1	22.4	9.2
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	15.5	3.6	193.7	2.9	47.1	22.4	9.2
Queue Length 50th (ft)	60	0	~217	50	98	55	0
Queue Length 95th (ft)	95	37	m#319	m69	156	91	51
Internal Link Dist (ft)	465			331		328	
Turn Bay Length (ft)					120		80
Base Capacity (vph)	2404	825	400	2676	394	831	466
Starvation Cap Reductn	0	0	0	578	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.19	1.34	0.44	0.42	0.38	0.32

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

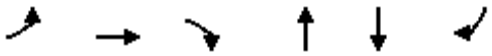
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	160	557	1153	711	262	608	302
v/c Ratio	0.69	0.28	0.71	0.93	0.48	1.12	0.63
Control Delay	56.0	6.3	31.1	44.6	28.0	105.3	32.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.0	6.3	31.1	44.6	28.0	105.3	32.7
Queue Length 50th (ft)	29	52	337	367	124	~440	151
Queue Length 95th (ft)	#94	66	m385	m#539	202	#664	246
Internal Link Dist (ft)		331	999			438	
Turn Bay Length (ft)				130	230		50
Base Capacity (vph)	231	2025	1628	768	547	545	483
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.28	0.71	0.93	0.48	1.12	0.63

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



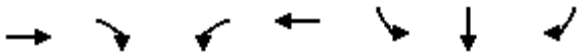
Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	240	230	225	2384	1542	762
v/c Ratio	0.91	0.79	0.77	0.64	0.38	0.56
Control Delay	96.8	62.2	59.2	5.3	7.3	3.0
Queue Delay	0.0	0.9	0.7	0.3	0.5	0.1
Total Delay	96.8	63.0	60.0	5.7	7.9	3.1
Queue Length 50th (ft)	245	173	160	184	175	41
Queue Length 95th (ft)	340	273	253	245	233	87
Internal Link Dist (ft)		1043		319	799	
Turn Bay Length (ft)	520		500			500
Base Capacity (vph)	339	352	356	3738	4023	1368
Starvation Cap Reductn	0	0	0	649	0	74
Spillback Cap Reductn	0	23	23	0	1849	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.70	0.68	0.77	0.71	0.59

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	526	1265	1642	368	1750	367
v/c Ratio	0.78	0.96	0.66	0.40	0.45	0.29
Control Delay	66.2	55.3	30.0	4.1	5.8	1.1
Queue Delay	0.0	0.0	0.2	0.0	0.1	0.3
Total Delay	66.2	55.3	30.3	4.1	6.0	1.4
Queue Length 50th (ft)	253	657	435	42	89	0
Queue Length 95th (ft)	320	#838	453	85	101	0
Internal Link Dist (ft)			799		345	
Turn Bay Length (ft)	140			400		300
Base Capacity (vph)	693	1332	2472	911	3862	1263
Starvation Cap Reductn	0	0	0	0	756	413
Spillback Cap Reductn	0	0	237	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.95	0.73	0.40	0.56	0.43

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	897	365	222	406	243	501	157
v/c Ratio	0.35	0.41	0.46	0.17	0.68	0.71	0.37
Control Delay	15.1	8.5	43.6	3.6	41.0	37.3	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.1	8.5	43.6	3.6	41.0	37.3	9.0
Queue Length 50th (ft)	109	50	71	22	139	151	9
Queue Length 95th (ft)	161	133	m108	m33	206	191	58
Internal Link Dist (ft)	465			331		328	
Turn Bay Length (ft)					120		80
Base Capacity (vph)	2547	884	481	2408	480	942	526
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.35	0.41	0.46	0.17	0.51	0.53	0.30

Intersection Summary

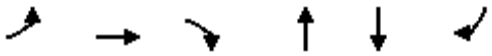
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	328	915	503	270	104	415	377
v/c Ratio	1.36	0.43	0.35	0.34	0.21	0.89	0.85
Control Delay	217.8	5.8	19.4	5.4	24.0	52.3	48.9
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	217.8	5.9	19.4	5.4	24.0	52.3	48.9
Queue Length 50th (ft)	~133	88	132	36	44	236	202
Queue Length 95th (ft)	#221	103	79	31	85	#404	#350
Internal Link Dist (ft)		331	999			438	
Turn Bay Length (ft)				130	230		50
Base Capacity (vph)	241	2105	1436	786	541	512	484
Starvation Cap Reductn	0	304	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.36	0.51	0.35	0.34	0.19	0.81	0.78

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

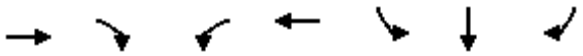


Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	106	102	99	1668	1696	1144
v/c Ratio	0.74	0.64	0.61	0.43	0.40	0.80
Control Delay	81.0	52.2	50.1	5.1	2.0	8.4
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	81.0	52.2	50.2	5.2	2.0	8.4
Queue Length 50th (ft)	85	56	50	129	60	149
Queue Length 95th (ft)	144	116	107	186	96	322
Internal Link Dist (ft)		1043		319	799	
Turn Bay Length (ft)	520		500			500
Base Capacity (vph)	416	395	398	3857	4221	1429
Starvation Cap Reductn	0	0	0	942	0	0
Spillback Cap Reductn	0	6	6	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.26	0.25	0.57	0.40	0.80

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	635	704	802	321	2164	241
v/c Ratio	0.87	0.62	0.28	0.33	0.60	0.21
Control Delay	59.0	24.6	14.6	4.0	9.6	1.3
Queue Delay	0.0	0.0	0.0	0.0	2.7	0.0
Total Delay	59.0	24.6	14.6	4.0	12.3	1.3
Queue Length 50th (ft)	246	187	140	40	267	0
Queue Length 95th (ft)	295	235	193	95	372	26
Internal Link Dist (ft)			799		345	
Turn Bay Length (ft)	140			400		300
Base Capacity (vph)	1076	1397	2842	983	3623	1161
Starvation Cap Reductn	0	0	0	0	1300	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.59	0.50	0.28	0.33	0.93	0.21

Intersection Summary



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	508	160	538	922	165	319	149
v/c Ratio	0.21	0.19	1.34	0.34	0.65	0.55	0.42
Control Delay	15.5	3.6	193.7	2.8	47.1	22.4	9.2
Queue Delay	0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Delay	15.5	3.6	193.7	2.9	47.1	22.4	9.2
Queue Length 50th (ft)	60	0	~217	50	98	55	0
Queue Length 95th (ft)	95	37	m#319	m69	156	91	51
Internal Link Dist (ft)	465			331		328	
Turn Bay Length (ft)					120		80
Base Capacity (vph)	2404	825	400	2676	394	831	466
Starvation Cap Reductn	0	0	0	578	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.19	1.34	0.44	0.42	0.38	0.32

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

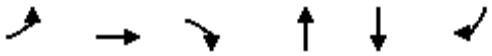
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	160	557	1153	711	262	608	302
v/c Ratio	0.69	0.28	0.71	0.93	0.48	1.12	0.63
Control Delay	56.0	6.3	31.1	44.6	28.0	105.3	32.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	56.0	6.3	31.1	44.6	28.0	105.3	32.7
Queue Length 50th (ft)	29	52	337	367	124	~440	151
Queue Length 95th (ft)	#94	66	m385	m#539	202	#664	246
Internal Link Dist (ft)		331	999			438	
Turn Bay Length (ft)				130	230		50
Base Capacity (vph)	231	2025	1628	768	547	545	483
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.28	0.71	0.93	0.48	1.12	0.63

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



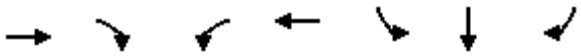
Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	240	230	225	2384	1542	762
v/c Ratio	0.91	0.79	0.77	0.64	0.38	0.56
Control Delay	96.8	62.2	59.2	5.3	7.3	3.0
Queue Delay	0.0	0.9	0.7	0.3	0.5	0.1
Total Delay	96.8	63.0	60.0	5.7	7.9	3.1
Queue Length 50th (ft)	245	173	160	184	175	41
Queue Length 95th (ft)	340	273	253	245	233	87
Internal Link Dist (ft)		1043		319	799	
Turn Bay Length (ft)	520		500			500
Base Capacity (vph)	339	352	356	3738	4023	1368
Starvation Cap Reductn	0	0	0	649	0	74
Spillback Cap Reductn	0	23	23	0	1849	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.70	0.68	0.77	0.71	0.59

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	526	1265	1642	368	1750	367
v/c Ratio	0.78	0.96	0.66	0.40	0.45	0.29
Control Delay	66.2	55.3	30.0	4.1	5.8	1.1
Queue Delay	0.0	0.0	0.2	0.0	0.1	0.3
Total Delay	66.2	55.3	30.3	4.1	6.0	1.4
Queue Length 50th (ft)	253	657	435	42	89	0
Queue Length 95th (ft)	320	#838	453	85	101	0
Internal Link Dist (ft)			799		345	
Turn Bay Length (ft)	140			400		300
Base Capacity (vph)	693	1332	2472	911	3862	1263
Starvation Cap Reductn	0	0	0	0	756	413
Spillback Cap Reductn	0	0	237	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.95	0.73	0.40	0.56	0.43

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	989	368	337	547	260	537	161
v/c Ratio	0.43	0.47	0.56	0.23	0.68	0.72	0.36
Control Delay	18.4	13.6	41.6	4.0	40.3	36.6	9.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	13.6	41.6	4.0	40.3	36.6	9.4
Queue Length 50th (ft)	135	82	108	27	148	162	14
Queue Length 95th (ft)	195	182	m152	37	217	202	61
Internal Link Dist (ft)	465			331		328	
Turn Bay Length (ft)					120		80
Base Capacity (vph)	2314	789	597	2364	498	982	538
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.47	0.56	0.23	0.52	0.55	0.30

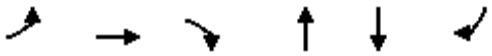
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	397	887	732	268	130	445	404
v/c Ratio	0.74	0.45	0.58	0.38	0.24	0.85	0.82
Control Delay	37.1	4.0	18.2	3.6	21.5	43.3	41.1
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	4.0	18.2	3.6	21.5	43.3	41.1
Queue Length 50th (ft)	119	73	119	16	54	248	212
Queue Length 95th (ft)	#175	86	125	25	92	358	312
Internal Link Dist (ft)		331	999			438	
Turn Bay Length (ft)				130	230		50
Base Capacity (vph)	534	1980	1273	713	653	619	584
Starvation Cap Reductn	0	143	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.48	0.58	0.38	0.20	0.72	0.69

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	159	153	145	2808	1564	1606
v/c Ratio	1.10	0.94	0.69	0.71	0.37	1.12
Control Delay	156.0	100.3	40.0	5.3	2.0	77.8
Queue Delay	0.0	0.0	0.0	0.3	0.0	0.0
Total Delay	156.0	100.3	40.0	5.6	2.0	77.8
Queue Length 50th (ft)	~147	103	44	200	60	~1302
Queue Length 95th (ft)	#294	#251	#137	265	69	#1572
Internal Link Dist (ft)		1043		319	799	
Turn Bay Length (ft)	520		500			500
Base Capacity (vph)	144	162	210	3933	4221	1429
Starvation Cap Reductn	0	0	0	488	0	0
Spillback Cap Reductn	0	0	0	0	12	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.10	0.94	0.69	0.82	0.37	1.12

Intersection Summary

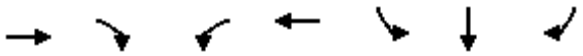
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBL	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	515	701	1144	1000	2216	309
v/c Ratio	0.78	0.84	0.34	0.75	0.60	0.26
Control Delay	54.3	42.1	11.0	6.2	8.7	1.2
Queue Delay	0.2	0.0	0.0	0.4	2.3	0.6
Total Delay	54.5	42.1	11.0	6.6	11.0	1.8
Queue Length 50th (ft)	195	230	154	53	261	0
Queue Length 95th (ft)	241	294	m194	m117	360	26
Internal Link Dist (ft)			799		345	
Turn Bay Length (ft)	140			400		300
Base Capacity (vph)	833	963	3405	1334	3724	1205
Starvation Cap Reductn	0	0	0	66	1321	544
Spillback Cap Reductn	44	0	0	0	108	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.65	0.73	0.34	0.79	0.92	0.47

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	549	165	621	1033	230	455	206
v/c Ratio	0.33	0.27	0.54	0.42	0.67	0.68	0.53
Control Delay	25.1	5.9	12.6	4.1	41.8	34.6	19.7
Queue Delay	0.0	0.0	0.0	0.2	0.0	0.0	0.0
Total Delay	25.1	5.9	12.6	4.3	41.8	34.6	19.7
Queue Length 50th (ft)	86	0	75	57	132	128	54
Queue Length 95th (ft)	132	49	m76	m63	194	164	115
Internal Link Dist (ft)	465			331		328	
Turn Bay Length (ft)					120		80
Base Capacity (vph)	1659	622	1147	2478	503	973	522
Starvation Cap Reductn	0	0	0	641	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.27	0.54	0.56	0.46	0.47	0.39

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

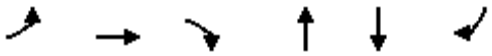
Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	174	783	1293	674	303	940	518
v/c Ratio	1.13	0.52	1.09	1.16	0.38	1.19	0.74
Control Delay	144.9	16.6	77.4	110.6	17.4	123.9	27.5
Queue Delay	0.0	1.2	0.0	0.0	0.0	0.0	0.0
Total Delay	144.9	17.8	77.4	110.6	17.4	123.9	27.5
Queue Length 50th (ft)	~40	233	~444	~429	113	~716	243
Queue Length 95th (ft)	#130	299	m#540	m#536	180	#969	382
Internal Link Dist (ft)		331	999			438	
Turn Bay Length (ft)				130	230		50
Base Capacity (vph)	154	1509	1191	580	792	789	699
Starvation Cap Reductn	0	467	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.13	0.75	1.09	1.16	0.38	1.19	0.74

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

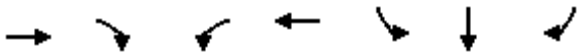


Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	286	275	260	2895	1979	884
v/c Ratio	0.90	0.89	0.86	0.80	0.51	0.64
Control Delay	88.4	83.9	78.6	23.7	2.6	3.7
Queue Delay	0.0	0.2	0.2	5.0	1.8	0.6
Total Delay	88.4	84.1	78.7	28.7	4.4	4.4
Queue Length 50th (ft)	290	270	242	688	39	0
Queue Length 95th (ft)	381	368	332	834	218	714
Internal Link Dist (ft)		1043		319	799	
Turn Bay Length (ft)	520		500			500
Base Capacity (vph)	423	401	395	3628	3861	1374
Starvation Cap Reductn	0	0	0	675	929	191
Spillback Cap Reductn	0	6	6	0	1642	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.70	0.67	0.98	0.89	0.75

Intersection Summary

Lane Group	WBL	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	656	1271	1875	865	2177	500
v/c Ratio	0.43	0.93	0.79	0.75	0.83	0.51
Control Delay	30.3	47.8	37.4	8.2	22.3	3.6
Queue Delay	0.0	0.0	0.4	0.1	3.0	0.7
Total Delay	30.3	47.8	37.8	8.3	25.3	4.3
Queue Length 50th (ft)	221	625	499	99	378	6
Queue Length 95th (ft)	274	755	616	335	373	72
Internal Link Dist (ft)			799		345	
Turn Bay Length (ft)	140			400		300
Base Capacity (vph)	1557	1412	2366	1156	2626	984
Starvation Cap Reductn	0	0	0	13	339	211
Spillback Cap Reductn	9	0	148	0	7	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.90	0.85	0.76	0.95	0.65

Intersection Summary



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	1024	368	337	547	298	618	161
v/c Ratio	0.47	0.49	0.56	0.24	0.72	0.76	0.35
Control Delay	20.0	14.5	38.7	4.1	40.1	36.7	10.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.0	14.5	38.7	4.1	40.1	36.7	10.9
Queue Length 50th (ft)	148	87	108	27	169	186	21
Queue Length 95th (ft)	204	182	m152	m37	251	238	72
Internal Link Dist (ft)	465			331		328	
Turn Bay Length (ft)					120		80
Base Capacity (vph)	2199	756	597	2284	498	977	525
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	4	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.49	0.56	0.24	0.60	0.63	0.31

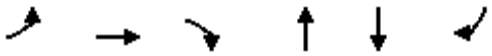
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	397	1036	732	268	130	562	516
v/c Ratio	0.74	0.57	0.67	0.41	0.20	0.95	0.91
Control Delay	37.1	7.2	30.9	6.5	19.5	55.1	48.4
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	37.1	7.2	30.9	6.5	19.5	55.1	48.4
Queue Length 50th (ft)	120	106	192	8	50	328	282
Queue Length 95th (ft)	#176	124	255	64	92	#557	#484
Internal Link Dist (ft)		331	999			438	
Turn Bay Length (ft)				130	230		50
Base Capacity (vph)	534	1804	1096	648	653	607	584
Starvation Cap Reductn	0	63	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.60	0.67	0.41	0.20	0.93	0.88

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	192	181	176	2808	1970	1606
v/c Ratio	1.33	1.08	1.04	0.71	0.47	1.12
Control Delay	231.7	130.4	118.6	5.3	2.0	74.3
Queue Delay	0.0	4.6	3.9	0.4	0.0	0.0
Total Delay	231.7	135.0	122.4	5.7	2.0	74.3
Queue Length 50th (ft)	~203	~134	~117	200	71	~1306
Queue Length 95th (ft)	#361	#297	#273	272	m77	m#1476
Internal Link Dist (ft)		1043		319	799	
Turn Bay Length (ft)	520		500			500
Base Capacity (vph)	144	168	170	3933	4221	1429
Starvation Cap Reductn	0	0	0	500	0	0
Spillback Cap Reductn	0	2	2	0	356	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.33	1.09	1.05	0.82	0.51	1.12

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.

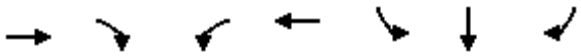
Lane Group	WBL	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	878	755	1144	1000	2247	309
v/c Ratio	1.05	0.78	0.36	0.76	0.65	0.27
Control Delay	90.2	36.1	14.1	6.8	11.6	1.3
Queue Delay	0.0	0.0	0.0	0.5	10.2	0.6
Total Delay	90.2	36.1	14.1	7.2	21.8	1.9
Queue Length 50th (ft)	~383	243	190	52	324	0
Queue Length 95th (ft)	#510	328	m189	m50	368	26
Internal Link Dist (ft)			799		345	
Turn Bay Length (ft)	140			400		300
Base Capacity (vph)	833	963	3147	1309	3466	1143
Starvation Cap Reductn	0	0	0	68	1220	507
Spillback Cap Reductn	0	0	0	0	259	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.05	0.78	0.36	0.81	1.00	0.49

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	549	165	856	1070	230	455	206
v/c Ratio	0.33	0.27	0.75	0.43	0.67	0.68	0.54
Control Delay	25.1	5.9	31.8	7.7	41.8	34.6	21.0
Queue Delay	0.0	0.0	0.6	0.6	0.0	0.0	0.0
Total Delay	25.1	5.9	32.4	8.3	41.8	34.6	21.0
Queue Length 50th (ft)	86	0	221	123	132	128	59
Queue Length 95th (ft)	132	49	290	214	194	164	119
Internal Link Dist (ft)	465			331		328	
Turn Bay Length (ft)					120		80
Base Capacity (vph)	1659	622	1147	2478	503	973	517
Starvation Cap Reductn	0	0	79	914	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.27	0.80	0.68	0.46	0.47	0.40

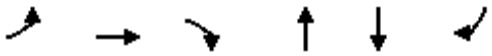
Intersection Summary

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	174	783	1563	809	303	940	518
v/c Ratio	1.31	0.47	1.11	1.22	0.39	1.21	0.75
Control Delay	229.5	25.3	99.3	144.2	24.8	136.8	37.1
Queue Delay	0.0	2.5	0.0	0.0	0.0	0.0	0.0
Total Delay	229.5	27.8	99.3	144.2	24.8	136.8	37.1
Queue Length 50th (ft)	~96	234	~794	~792	172	~1057	370
Queue Length 95th (ft)	#173	291	#934	#1043	252	#1336	528
Internal Link Dist (ft)		331	999			438	
Turn Bay Length (ft)				130	230		50
Base Capacity (vph)	133	1649	1402	663	783	780	691
Starvation Cap Reductn	0	709	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.31	0.83	1.11	1.22	0.39	1.21	0.75

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	286	275	260	3342	1979	961
v/c Ratio	0.90	0.89	0.86	0.93	0.51	0.69
Control Delay	88.4	83.9	78.6	23.3	2.4	5.6
Queue Delay	0.0	0.2	0.2	45.0	2.1	0.8
Total Delay	88.4	84.1	78.7	68.3	4.5	6.4
Queue Length 50th (ft)	290	270	242	745	38	0
Queue Length 95th (ft)	381	368	332	m#1248	204	828
Internal Link Dist (ft)		1043		319	799	
Turn Bay Length (ft)	520		500			500
Base Capacity (vph)	423	401	395	3592	3861	1393
Starvation Cap Reductn	0	0	0	663	944	183
Spillback Cap Reductn	0	6	6	0	1674	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.70	0.67	1.14	0.90	0.79

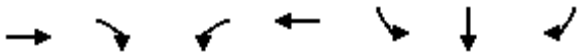
Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	WBL	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	656	1271	1907	955	2253	500
v/c Ratio	0.43	0.93	0.81	0.79	0.86	0.51
Control Delay	30.3	47.8	38.7	7.8	23.6	4.1
Queue Delay	0.0	0.0	0.5	0.1	5.5	0.8
Total Delay	30.3	47.8	39.2	7.9	29.1	4.9
Queue Length 50th (ft)	221	625	542	61	408	7
Queue Length 95th (ft)	274	755	630	m233	458	84
Internal Link Dist (ft)			799		345	
Turn Bay Length (ft)	140			400		300
Base Capacity (vph)	1557	1412	2366	1205	2626	978
Starvation Cap Reductn	0	0	33	14	329	218
Spillback Cap Reductn	8	0	151	0	27	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.90	0.86	0.80	0.98	0.66

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	EBR	WBL	WBT	SBL	SBT	SBR
Lane Group Flow (vph)	994	368	347	548	268	560	161
v/c Ratio	0.43	0.47	0.58	0.23	0.69	0.73	0.36
Control Delay	18.7	13.9	40.6	4.0	40.2	37.0	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.7	13.9	40.6	4.0	40.2	37.0	9.9
Queue Length 50th (ft)	138	84	111	26	152	169	16
Queue Length 95th (ft)	197	183	m156	m37	224	212	64
Internal Link Dist (ft)	465			331		328	
Turn Bay Length (ft)					120		80
Base Capacity (vph)	2287	780	597	2346	498	979	534
Starvation Cap Reductn	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.47	0.58	0.23	0.54	0.57	0.30

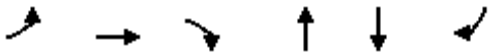
Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	397	921	743	274	130	479	441
v/c Ratio	0.74	0.48	0.61	0.40	0.22	0.88	0.85
Control Delay	37.2	4.7	28.1	6.4	20.8	45.8	43.4
Queue Delay	0.0	0.1	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	4.7	28.1	6.4	20.8	45.8	43.4
Queue Length 50th (ft)	119	82	190	10	52	264	230
Queue Length 95th (ft)	#175	96	260	68	92	#430	#358
Internal Link Dist (ft)		331	999			438	
Turn Bay Length (ft)				130	230		50
Base Capacity (vph)	534	1926	1218	693	653	615	584
Starvation Cap Reductn	0	118	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.74	0.51	0.61	0.40	0.20	0.78	0.76

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	171	163	157	2833	1702	1610
v/c Ratio	1.19	0.92	0.81	0.72	0.40	1.13
Control Delay	181.1	87.1	60.1	5.5	2.0	77.7
Queue Delay	0.0	0.8	0.3	0.4	0.0	0.0
Total Delay	181.1	87.9	60.4	5.8	2.0	77.7
Queue Length 50th (ft)	~167	95	69	202	64	~1310
Queue Length 95th (ft)	#318	#245	#192	301	73	#1582
Internal Link Dist (ft)		1043		319	799	
Turn Bay Length (ft)	520		500			500
Base Capacity (vph)	144	177	193	3934	4221	1429
Starvation Cap Reductn	0	0	0	502	0	0
Spillback Cap Reductn	0	1	1	0	131	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	1.19	0.93	0.82	0.83	0.42	1.13

Intersection Summary

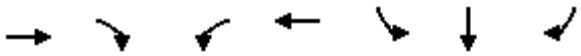
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	WBL	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	642	711	1145	1005	2226	309
v/c Ratio	0.91	0.82	0.34	0.76	0.61	0.26
Control Delay	63.3	39.5	11.7	6.2	9.4	1.2
Queue Delay	0.0	0.0	0.0	0.4	3.2	0.6
Total Delay	63.3	39.5	11.7	6.6	12.6	1.8
Queue Length 50th (ft)	250	230	162	51	279	0
Queue Length 95th (ft)	308	300	m190	m51	361	26
Internal Link Dist (ft)			799		345	
Turn Bay Length (ft)	140			400		300
Base Capacity (vph)	833	963	3330	1329	3649	1188
Starvation Cap Reductn	0	0	0	67	1291	533
Spillback Cap Reductn	0	0	0	0	243	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.74	0.34	0.80	0.94	0.47

Intersection Summary

m Volume for 95th percentile queue is metered by upstream signal.



Lane Group	EBT	EBR	WBL	WBT	SBL	SBR
Lane Group Flow (vph)	551	165	698	1038	233	458	206
v/c Ratio	0.33	0.27	0.61	0.42	0.68	0.67	0.53
Control Delay	25.3	5.9	28.1	7.6	41.8	34.5	19.7
Queue Delay	0.0	0.0	0.0	0.5	0.0	0.0	0.0
Total Delay	25.3	5.9	28.1	8.2	41.8	34.5	19.7
Queue Length 50th (ft)	86	0	170	118	135	129	54
Queue Length 95th (ft)	133	49	227	207	196	165	115
Internal Link Dist (ft)	465			331		328	
Turn Bay Length (ft)					120		80
Base Capacity (vph)	1653	620	1147	2473	503	974	522
Starvation Cap Reductn	0	0	0	921	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.27	0.61	0.67	0.46	0.47	0.39

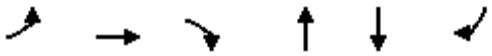
Intersection Summary

Lane Group	EBL	EBT	WBT	WBR	NBL	NBT	NBR
Lane Group Flow (vph)	174	790	1374	712	303	941	532
v/c Ratio	1.31	0.48	0.98	1.07	0.39	1.21	0.77
Control Delay	229.5	25.4	58.8	90.2	24.8	137.3	38.3
Queue Delay	0.0	2.6	0.0	0.0	0.0	0.0	0.0
Total Delay	229.5	28.0	58.8	90.2	24.8	137.3	38.3
Queue Length 50th (ft)	~96	237	595	~620	172	~1059	386
Queue Length 95th (ft)	#173	294	#760	#863	252	#1338	550
Internal Link Dist (ft)		331	999			438	
Turn Bay Length (ft)				130	230		50
Base Capacity (vph)	133	1649	1402	663	783	780	691
Starvation Cap Reductn	0	707	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	1.31	0.84	0.98	1.07	0.39	1.21	0.77

Intersection Summary

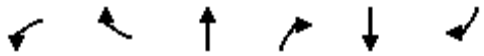
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.



Lane Group	EBL	EBT	EBR	NBT	SBT	SBR
Lane Group Flow (vph)	286	277	264	3059	2007	905
v/c Ratio	0.89	0.90	0.87	0.85	0.52	0.66
Control Delay	88.1	85.5	80.9	18.3	2.6	4.0
Queue Delay	0.0	0.2	0.2	21.4	2.3	0.6
Total Delay	88.1	85.7	81.1	39.7	4.9	4.6
Queue Length 50th (ft)	290	274	247	650	41	0
Queue Length 95th (ft)	381	372	340	835	221	757
Internal Link Dist (ft)		1043		319	799	
Turn Bay Length (ft)	520		500			500
Base Capacity (vph)	423	400	394	3614	3859	1379
Starvation Cap Reductn	0	0	0	675	912	182
Spillback Cap Reductn	0	6	6	0	1659	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.70	0.68	1.04	0.91	0.76

Intersection Summary



Lane Group	WBL	WBR	NBT	NBR	SBT	SBR
Lane Group Flow (vph)	682	1273	1882	901	2200	500
v/c Ratio	0.45	0.93	0.80	0.77	0.84	0.51
Control Delay	30.6	48.0	37.5	8.0	22.7	3.8
Queue Delay	0.0	0.0	0.5	0.1	3.6	0.7
Total Delay	30.6	48.0	37.9	8.1	26.2	4.5
Queue Length 50th (ft)	232	627	514	48	386	7
Queue Length 95th (ft)	286	758	623	338	401	76
Internal Link Dist (ft)			799		345	
Turn Bay Length (ft)	140			400		300
Base Capacity (vph)	1557	1412	2365	1175	2625	982
Starvation Cap Reductn	0	0	0	13	336	213
Spillback Cap Reductn	8	0	151	0	11	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.90	0.85	0.78	0.96	0.65

Intersection Summary

FEHR PEERS

APPENDIX: BAYHILL SPECIFIC PLAN EIR LEVEL OF SERVICE CALCULATIONS

This appendix summarizes the level of service (LOS) transportation analysis of the Max Office and Phase 1 Projects proposed for the Bayhill Specific Plan. With the passage of SB 743 (September 27, 2013) and the subsequent adoption of revised California Environmental Quality Act (CEQA) Guidelines (December 28, 2018), level of service (LOS) can no longer be used as a criterion for identifying significant transportation impacts for most projects under CEQA effective July 1, 2020. Therefore, the findings included in this assessment are provided for informational and planning purposes.

Study Area

Intersections are generally the critical capacity-controlling elements of suburban roadway networks. Therefore, the operations of critical intersections surrounding the project site are used as indicators of the adequacy of the vehicular circulation system. 15 intersections surrounding the Project site were selected by City of San Bruno staff for the evaluation of the Project. The intersections selected are deemed those most likely to be affected by the project and thus warranting analysis. The study intersections include:

1. I-280 Southbound Ramps/San Bruno Avenue
2. I-280 Northbound Ramps/San Bruno Avenue
3. Cherry Avenue/San Bruno Avenue
4. Traeger Avenue/San Bruno Avenue
5. Elm Avenue/San Bruno Avenue
6. El Camino Real/San Bruno Avenue
7. El Camino Real/Bayhill Drive
8. I-380 Eastbound/El Camino Real
9. I-380 Westbound/El Camino Real
10. Cherry Avenue/Bayhill Drive
11. Cherry Avenue/Sneath Lane
12. I-280 Northbound Ramp/Sneath Lane
13. I-280 Southbound Ramp/Sneath Lane
14. El Camino Real/Tanforan Way/Commodore Drive
15. El Camino Real /Sneath Lane

Analysis Scenarios

The analysis includes an evaluation of transportation conditions during a typical weekday AM and PM peak hour, occurring between 7:00 to 9:00 AM and 4:00 to 6:00 PM, when the surrounding transportation network is at its most congested. This report presents the analysis of the following scenarios:

- Existing No Project– Based on recently collected traffic counts.
- Existing Plus Phase I Project– Traffic volumes from existing conditions plus traffic volume estimates for the proposed Phase I Project.
- Existing Plus Max Office Project – Traffic volumes from existing conditions plus traffic volume estimates for the proposed Max Office Project.
- Cumulative No Project– Traffic estimates for development patterns as proposed by 2040 (see Cumualtive traffic forecast section for additional details).
- Cumulative Plus Max Office Project– Traffic volumes from the Cumulative No Project conditions plus traffic volume estimates for the proposed Max Office Project
- Cumulative Plus Max Housing Project– Traffic volumes from the Cumulative No Project conditions plus traffic volume estimates for the proposed Max Housing Project

Cumulative Traffic Forecasts

As documented in the Data Collection and Assumptions letter (September 2017), the Bayhill Specific Plan will be evaluated for the future horizon year of 2040. 2040 forecasts were developed using the C/CAG-VTA Travel Demand Model. 2040 land uses were reviewed to confirm consistency with the proposed land uses in the City of San Bruno General Plan and Transit Corridors Plan.

Travel demand models provide volume outputs that need to be adjusted in order to develop volume forecasts for the scenario being tested. In principle, raw volume outputs from a travel demand model should rarely be applied directly in analysis, only being used after adjustments are made. Adjustments to forecasted volumes are usually based on the difference between or ratio of volumes observed in the field and the model's own prediction of existing volumes.

The rationale for adjusting raw model volume outputs is that observed travel behavior is the result of a highly complex mixture of variables, only some of which are included in any given travel demand model, and so an adjustment is needed to account for variables not captured by the model itself. The adjustment takes the form of changing the model outputs to correct for discrepancies

between actual field counts and estimated base year model volumes identified during the local calibration process, as it is assumed that the discrepancy will likely affect all scenarios in the same order of magnitude. This can be done several ways, as defined in the National Cooperative Highway Research Program Report 255: Highway Traffic Data for Urbanized Area Project Planning and Design, Transportation Research Board (December 1982). For the purpose of this assessment, the difference method was applied.

The difference method is the difference between the base year field count and the base year model volume, which is added to the output model volume to develop the forecasted volume for the scenario being tested. For example, if the base year model volume for a roadway segment was 650 ADT while the field count was 700 ADT, then the difference method would suggest the output model volume on that roadway segment should be increased by 50 ADT to develop the forecasted volume for the scenario being tested. The difference method adjustment is summarized in the formula below.

Scenario Forecast = Output Model Volume + (Field Count – Base Year Model Volume)

Study Methodology

This section describes the study methodology for evaluating intersection operations and describes the significance criteria applied to identify significant traffic impacts for each alternative.

Analysis Methods

Intersection results will be summarized by Level of Service (LOS). LOS is a qualitative description of operations ranging from LOS A, when the roadway facility has excess capacity and vehicles experience little or no delay, to LOS F, where the volume of vehicles exceeds the capacity, resulting in long queues and excessive delays. Typically, LOS E represents "at-capacity" conditions and LOS F represents "over-capacity" conditions. Intersection LOS were established based on traffic analysis of the study intersections, conducted using a method documented by the Transportation Research Board (TRB) in the 2010 Highway Capacity Manual (HCM).

Study Intersections

The traffic analysis software Synchro was used for this study and was based on the City's existing traffic model. For signalized intersections, the LOS is based on the average delay experienced by all vehicles passing through the intersection. This methodology uses various intersection

characteristics (such as traffic volumes, lane geometry, and signal phasing) to estimate the delay per vehicle. The delay is the portion of the total delay attributed to the signal operations and includes initial deceleration, queue move up time, time stopped, and acceleration.

At unsignalized intersections, operations are defined by the average control delay per vehicle (measured in seconds) for each stop-controlled movement. This incorporates delay associated with deceleration, acceleration, stopping, and moving up in the queue. For side-street stop-controlled intersections, LOS is not defined for the intersection as a whole. Instead, the average delay and associated LOS reported in this study is for the worst-case controlled approach. For all-way stop-controlled intersections, the LOS is represented by the average control delay for the whole intersection.

Table 1 shows the correlation of average control delays and LOS designations for signalized and unsignalized intersections.

Table 1: Intersection LOS Criteria

Level of Service	Average Control Delay (seconds/vehicle)	
	Signalized	Unsignalized
A	< 10.0	< 10.0
B	> 10.0 to 20.0	> 10.0 – 15.0
C	> 20.0 to 35.0	> 15.0 – 25.0
D	> 35.0 to 55.0	> 25.0 – 35.0
E	> 55.0 to 80.0	> 35.0 – 50.0
F	> 80.0	> 50.0

Source: 2010 Highway Capacity Manual.

Level of Service (LOS) Standards

As described in the Data Collection & Study Assumptions memo, three agencies govern intersection operations in the study area: the City of San Bruno, C/CAG (San Mateo County), and Caltrans. **Table 2** summarizes the acceptable LOS standard for the study intersections.

General Plan Policy T-B, requires an acceptable LOS for all City intersections, both signalized and unsignalized. This is defined as LOS D for a full signalized intersection or for the worst-approach for an unsignalized intersection. If a signalized intersection is at an unacceptable level under existing conditions, an impact would occur if the critical movement delay increases by four or more seconds. If an unsignalized intersection is at an unacceptable level under existing conditions, an impact would occur if the project would add ten or more vehicles trips to the critical movement or if the intersection meets California MUTCD signal warrant after completion.

Table 2: Level of Service Standard for Study Intersections

Study Intersection	Control	Jurisdiction(s)	LOS Standard
1. I-280 Southbound Ramps/San Bruno Avenue	Signal	San Bruno	D
2. I-280 Northbound Ramps/San Bruno Avenue	Signal	San Bruno	D
3. Cherry Avenue/San Bruno Avenue	Signal	San Bruno	D
4. Traeger Avenue/San Bruno Avenue	SSSC[1]	San Bruno	D
5. Elm Avenue/San Bruno Avenue	Signal	San Bruno	D
6. El Camino Real/San Bruno Avenue	Signal	San Bruno C/CAG[2]	D E
7. El Camino Real/Bayhill Drive	Signal	San Bruno	D
8. I-380 Eastbound/El Camino Real	Signal	San Bruno	D
9. I-380 Westbound/El Camino Real	Signal	San Bruno	D
10. Cherry Avenue/Bayhill Drive	Signal	San Bruno	D
11. Cherry Avenue/Sneath Lane	Signal	San Bruno	D
12. I-280 Northbound Ramp/Sneath Lane	Signal	San Bruno	D
13. I-280 Southbound Ramp/Sneath Lane	Signal	San Bruno	D
14. El Camino Real/Tanforan Way/Commodore Drive	Signal	Caltrans San Bruno	D
15. El Camino Real /Sneath Lane	Signal	San Bruno	D

Notes:
[1] SSSC = Side Street Stop Controlled. Worst approach is noted in parentheses ( ) for side street stop-controlled intersections.
[2] Intersection is part of the Congestion Management Program.

If the addition of the Project would result in a LOS below the standard described in Table 2, the intersection would warrant consideration of a potential improvement. A potential improvement includes operational or infrastructure changes that would result in better traffic operations at the intersection.

Land Use Scenarios

The Specific Plan Project would allow for the development of up to 2.46 million net new square feet of office uses. The Specific Plan would also establish housing and mixed-use overlay zones on a total of 20.56 acres in the southern portion of the Project Site that would allow for the development

of up to 573 multi-family residential units. There are two overlay districts in the Plan Area that would allow for housing development. Office uses would continue to be allowed in the housing overlay zone, and a mix of both use types could be developed as long as the maximum permitted density is not exceeded. To account for the variability resulting from the housing and mixed-use overlay zones, two different buildout scenarios have been developed for purposes of the analysis. The Maximum Office Scenario assumes that no residential construction occurs within the housing and mixed-use overlay zones. The Maximum Housing Scenario assumes that housing is constructed within the furthest range allowable under the Specific Plan, resulting in 573 multi-family residential units. In this scenario, the amount of office development is decreased on the land area within the housing overlay zone where housing is constructed. Additionally, the Specific Plan would also allow for an up to 50,000-sf civic use to be developed on a 2.1 acre parcel bordering San Bruno Avenue West. If the civic use were to be developed, the overall capacity of the Specific Plan area to accommodate office and housing uses would be reduced.

The Phase I Development includes construction of new office uses as well as demolition of existing office uses in the middle north section of the site bound by I-380, Cherry Avenue, and Bayhill Drive. Net new office land use is approximately 301,500 sf under Phase I buildout.

Table 3 describes the three land use scenarios.

Table 3: Land Use Scenario

Land Use Category	Phase I (net new)	Max Office Total[1]	Max Housing Total [2]
Office	301.5 ksf	3,881 ksf	3,501 ksf
Commercial/Retail	--	122 ksf	122 ksf
Civic Uses	--	50 ksf	50 ksf
Housing	--	--	489 dwelling units
Hotel	--	147 rooms	147 rooms

Notes:

1. For purposes of this assessment, the land use alternatives are shown with the Civic Uses; however, if civic uses are omitted, the maximum amount of office allowed under the Max Office scenario is 4,018 ksf.
2. For purposes of this assessment, the land use alternatives are shown with the Civic Uses; however, if civic uses are omitted, the maximum amount of housing allowed under the Max Housing scenario is 573 units.

Trip Generation & Trip Distribution

Trip generation refers to the process of estimating the amount of vehicular traffic a project would add to the surrounding roadway system. Estimates are created for the peak one-hour periods during the morning and evening commute periods when traffic volumes on the adjacent streets are the highest. For all alternatives, trip generation was estimated using a combination of rates from the Institute of Transportation Engineers (ITE) *Trip Generation Manual (*10th Edition) as well as Fehr & Peers' MainStreet Trip Generation tool.

The MainStreet trip generation tool, which is based on MXD methodology, developed for and approved by the US Environmental Protection Agency (EPA) for use in evaluating trip generation at mixed-use projects. The primary difference between the ITE and MXD methodologies is that the traditional ITE methodology relies on one factor—the project's land use type—to predict vehicle trip generation, while MXD incorporates local data and travel behaviors, as well as leading research in how density, mix of land uses, and other built environment factors affect vehicle trip generation. The total square footage at buildout of each alternative was included in the MainStreet analysis to capture the full benefits of the land use mixture.

Trip generation estimates do not account for the travel demand management (TDM) programs proposed for or currently in place (i.e., private shuttle buses) at the Project Site since TDM programs are not permanent in the same way as built environment factors and land use diversity, and instead are tied to particular tenants, who often turnover during the life of a project. For this reason, the estimated net new trips presented in this analysis do not account for TDM strategies. The trip generation forecasts do account for use of BART or Caltrain by future employees.

Table 4 summarizes the weekday AM peak hour and PM peak hour trip generation for each scenario described in **Table 3**.

Table 4: Vehicle Trip Generation by Scenario

Scenario	AM Peak Hour			PM Peak Hour		
	Total	In	Out	Total	In	Out
Max Office	**3,360**	**2,780**	**580**	**3,990**	**910**	**3,080**
Max Housing	3,190	2,560	630	3,830	960	2,870
Phase I (Net New)[1]	380	330	50	420	70	350

Source: ITE Trip Generation Manual 10th Edition and Fehr & Peers MainStreet with MXD+
Notes: **Bold** text = highest trip generating scenario.

1. Analysis of Phase I assumes no demolition of the "Lakes" Buildings; as a result, the findings are likely more conservative than if the analysis had included the reduction in employee trips associated with the "Lakes" buildings.

As shown in Table 4, the Phase I Project is expected to generate 380 new AM peak hour vehicle trips and 420 new PM peak hour vehicle trips. The Max Office scenario is expected to generate approximately 3,400 AM peak hour vehicle trips and 4,000 PM peak hour vehicle trips. The Max Housing scenario is expected to generate fewer AM and PM peak hour trips compared to the Max Office scenario at 3,200 trips and 3,800 trips, respectively.

Using the trip generation results presented in Table 4, Project trips were distributed to each study intersection based on the trip distribution assumptions illustrated in **Figure 1**. Trip distribution assumptions were based on C/CAG's model regional distributions and locally available employee survey data.

Analysis Results

This section describes the analysis results using the methodology and trip generation estimates described above. If an intersection performs worst than the LOS standard, a potential improvement was identified. The improvements identified are conceptual only and engineering analysis and design is required before construction.

Existing Conditions

Existing and Existing Plus Project LOS results are summarized in **Tables 5 and 6** for the AM and PM peak hour, respectively. Based on discussion with City staff, only the Phase I and Max Office scenarios were evaluated under existing conditions. Max office was the only full build project scenario evaluated because it generates the highest number of trips. Therefore, it is assumed that the results from the Max Office scenario represents a worst-case scenario.

Existing delay is based on observed volumes at Bayhill collected in Fall 2017. These volumes reflect current TDM efforts by Bayhill tenants including YouTube and Walmart. Plus, project scenarios do not incorporate a TDM credit and therefore reflect "worst case" delay projections for the site.

AM Peak Hour

As shown in **Table 5**, all intersections perform at the LOS standard under No Project and Plus Project conditions with exception to the Cherry Avenue/San Bruno Avenue and I-280 Southbound

Ramp/Sneath Lane intersections. The Cherry Avenue/San Bruno Avenue intersection operates above the LOS standard under No Project and Plus Phase I conditions; however, worsens to LOS E with the addition of the Max Office scenario. To improve conditions, a potential improvement would include modifying the signal cycle length to accommodate the additional vehicular traffic. The I-280 Southbound Ramp/Sneath Lane intersection operates under the LOS D standard under existing conditions. The addition of the Phase I and Max Office Project would worsen conditions; however, optimizing signal timing plans would result in improved intersection operations that operate at the LOS D standard.

PM Peak Hour

As shown in **Table 6**, all intersections perform at the LOS standard under No Project and Plus Project conditions with exception to the following intersections:

- Cherry Avenue/San Bruno Avenue
- Traeger Avenue/San Bruno Avenue
- El Camino Real/San Bruno Avenue
- I-380 Westbound/El Camino Real

The Cherry Avenue/San Bruno Avenue, El Camino Real/San Bruno Avenue, and I-380 Westbound/El Camino Real intersections would operate at the LOS standard (LOS D) or better by modifying signal timings. The Traeger Avenue/San Bruno Avenue operates acceptable under No Project condition; however, the addition of the Phase I and Max Office Project would worsen the side street stop-controlled approach, such that the intersection would operate under the LOS D standard. To improve operations, the Traeger Avenue/San Bruno Avenue intersection should be signalized. Note, that the intersection currently meets the peak hour signal warrant for a traffic signal.

Table 5: Existing + Project AM Peak LOS and Delay Results

Study Intersection	Control	Jurisdiction(s)	LOS Standard	Existing No Project		Potential Improvement	Existing + Phase 1		With Improvement		Existing + Max Office		With Improvement	
				LOS	Delay		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. I-280 Southbound Ramps/San Bruno Avenue	Signal	San Bruno	D	C	21	n/a	C	22	-	-	C	22	-	-
2. I-280 Northbound Ramps/San Bruno Avenue	Signal	San Bruno	D	C	21	n/a	C	22	-	-	C	24	-	-
3. Cherry Avenue/San Bruno Avenue	Signal	San Bruno	D	D	36	1) Modify cycle length to 100 seconds.	D	41	-	-	***E***	***72***	D	39
4. Traeger Avenue/San Bruno Avenue	SSSC[1]	San Bruno	D	A (B)	1 (16)	n/a	A (C)	1 (20)	-	-	A (C)	2 (21)	-	-
5. Elm Avenue/San Bruno Avenue	Signal	San Bruno	D	B	14	n/a	B	15	-	-	B	17	-	-
6. El Camino Real/San Bruno Avenue	Signal	San Bruno C/CAG[2]	D E	D	36	n/a	D	36	-	-	D	36	-	-
7. El Camino Real/Bayhill Drive	Signal	San Bruno	D	A	4	n/a	A	5	-	-	A	8	-	-
8. I-380 Eastbound/El Camino Real	Signal	San Bruno	D	A	5	n/a	A	5	-	-	A	6	-	-
9. I-380 Westbound/El Camino Real	Signal	San Bruno	D	B	18	n/a	B	20	-	-	C	24	-	-
10. Cherry Avenue/Bayhill Drive	Signal	San Bruno	D	C	22	n/a	C	23	-	-	C	29	-	-
11. Cherry Avenue/Sneath Lane	Signal	San Bruno	D	A	8	n/a	A	8	-	-	A	10	-	-
12. I-280 Northbound Ramp/Sneath Lane	Signal	San Bruno	D	B	16	n/a	B	17	-	-	B	17	-	-
13. I-280 Southbound Ramp/Sneath Lane	Signal	San Bruno	D	**E**	**57**	1) Optimize splits.	***E***	***58***	D	48	***E***	***65***	D	52
14. El Camino Real/Tanforan Way/Commodore Drive	Signal	Caltrans San Bruno	D	C	21	n/a	C	21	-	-	C	21	-	-
15. El Camino Real /Sneath Lane	Signal	San Bruno	D	C	33	n/a	C	33	-	-	C	33	-	-

Notes:
[1] SSSC = Side Street Stop Controlled. Worst approach is noted in parentheses () for side street stop-controlled intersections.
[2] Intersection is part of the Congestion Management Program.
Delay rounded to the nearest second.
Bold = Intersection performs below LOS standard. ***Italicized*** = Intersection results in an impact.

Table 6: Existing + Project PM Peak LOS and Delay Results

Study Intersection	Control	Jurisdiction(s)	LOS Standard	Existing No Project		Potential Improvement	Existing + Phase 1		With Improvement		Existing + Max Office		With Improvement	
				LOS	Delay		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. I-280 Southbound Ramps/San Bruno Avenue	Signal	San Bruno	D	B	15	n/a	B	15	-	-	B	15	-	-
2. I-280 Northbound Ramps/San Bruno Avenue	Signal	San Bruno	D	C	29	n/a	C	30	-	-	C	31	-	-
3. Cherry Avenue/San Bruno Avenue	Signal	San Bruno	D	D	50	1) Optimize splits.	***E***	***64***	D	36	***F***	***86***	D	41
4. Traeger Avenue/San Bruno Avenue	SSSC[1]	San Bruno	D	A (C)	3 (23)	1) Signalize intersection; make EB left protected and cycle length 75 seconds.	***A (E)***	***6 (40)***	B	19	***C (F)***	***33 (>80)***	B	20
5. Elm Avenue/San Bruno Avenue	Signal	San Bruno	D	B	15	n/a	B	17	-	-	B	19	-	-
6. El Camino Real/San Bruno Avenue	Signal	San Bruno C/CAG[2]	D E	**E**	**56**	1) Optimize splits.	***E***	***56***	D	46	***E***	***57***	D	49
7. El Camino Real/Bayhill Drive	Signal	San Bruno	D	C	32	n/a	C	34	-	-	C	35	-	-
8. I-380 Eastbound/El Camino Real	Signal	San Bruno	D	B	15	n/a	B	15	-	-	B	14	-	-
9. I-380 Westbound/El Camino Real	Signal	San Bruno	D	**F**	**>80**	1) Optimize splits.	***F***	***>80***	C	30	***F***	***>80***	C	30
10. Cherry Avenue/Bayhill Drive	Signal	San Bruno	D	C	25	n/a	C	26	-	-	C	30	-	-
11. Cherry Avenue/Sneath Lane	Signal	San Bruno	D	B	12	n/a	B	13	-	-	B	15	-	-
12. I-280 Northbound Ramp/Sneath Lane	Signal	San Bruno	D	B	19	n/a	B	20	-	-	B	20	-	-
13. I-280 Southbound Ramp/Sneath Lane	Signal	San Bruno	D	B	18	n/a	B	18	-	-	B	18	-	-
14. El Camino Real/Tanforan Way/Commodore Drive	Signal	San Bruno	D	B	17	n/a	B	18	-	-	B	18	-	-
15. El Camino Real /Sneath Lane	Signal	San Bruno	D	D	47	n/a	D	47	-	-	D	47	-	-

Notes:
[1] SSSC = Side Street Stop Controlled. Worst approach is noted in parentheses () for side street stop-controlled intersections.
[2] Intersection is part of the Congestion Management Program.
Delay rounded to the nearest second.
Bold = Intersection performs below LOS standard. ***Italicized*** = Intersection results in an impact.

Cumulative Conditions

Cumulative and Cumulative Plus Project LOS results are summarized in **Tables 7 and 8** for the AM and PM peak hour, respectively. The Cumulative volumes do not incorporate a TDM credit and therefore reflect "worst case" delay projections for the site.

AM Peak Hour

As shown in **Table 7**, all intersections perform at the LOS standard under No Project and Plus Project conditions with exception to the following intersections.

- Cherry Avenue/San Bruno Avenue
- Traeger Avenue/San Bruno Avenue
- I-280 Southbound Ramp/Sneath Lane

The Cherry Avenue/San Bruno Avenue intersection operates above the LOS standard under No Project conditions; however, worsens to LOS E with the addition of the Max Office and Max Housing scenarios. Modifying the intersection cycle length with the addition of the Project would improve operations to LOS D. At the Traeger Avenue/San Bruno intersection, the side street stop-controlled intersection deteriorates in the cumulative year. The addition of the Project worsens conditions due to the side street stop-controlled approach. To improve operations, the Traeger Avenue/San Bruno Avenue intersection should be signalized.

The I-280 Southbound Ramp/Sneath Lane intersection exceeds the LOS D standard at the intersection under No Project conditions. The addition of the project would worsen conditions. Intersection operations would slightly improve by modifying the northbound (off-ramp) approach to include a left turn-pocket, thru lane, and free right turn, and modifying the signal cycle length to 150 seconds. Implementing these potential improvements would not improve conditions such that the intersection operates at or better the LOS standard (LOS D).

PM Peak Hour

As shown in **Table 8**, all intersections perform at the LOS standard under No Project and Plus Project conditions with exception to the following intersections:

- I-280 Northbound Ramps/San Bruno Avenue
- Cherry Avenue/San Bruno Avenue
- Traeger Avenue/San Bruno Avenue

- El Camino Real/San Bruno Avenue
- El Camino Real /Sneath Lane

To improve intersection operations, the following improvements could be considered at each of the intersections:

- I-280 Northbound Ramps/San Bruno Avenue: Add a third westbound through lane with a turn pocket at the intersection and modify the signal cycle length to 130 seconds.
- Cherry Avenue/San Bruno Avenue: Convert southbound through lane to a shared thru-right and add a westbound right turn only pocket. The signal cycle length should be modified to 150 seconds and the northbound and southbound left turn lanes should be modified to provide protected left turns.
- Traeger Avenue/San Bruno Avenue: signalize the intersection and provide a protected eastbound left turn lane at San Bruno Avenue.
- El Camino Real/San Bruno Avenue: optimize signal timings.
- El Camino Real /Sneath Lane: optimize signal timings and convert the eastbound and westbound left turns into a protected left turn with a westbound leading phase.

The addition of the above improvements would improve intersection operations such that the intersections operate at or better than the LOS standard.

Table 7: 2040 + Project AM Peak LOS and Delay Results

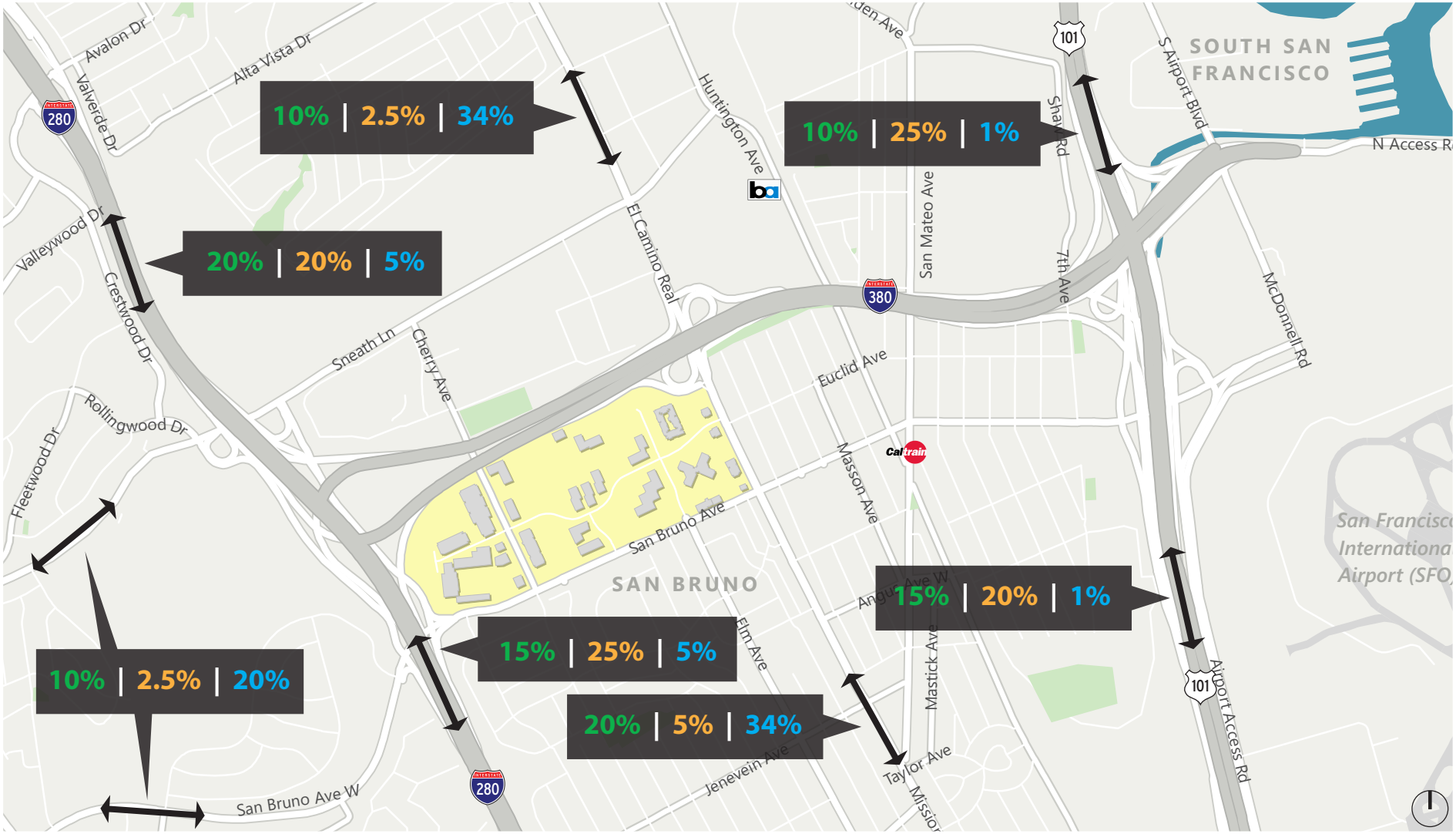
Study Intersection	Control	Jurisdiction(s)	LOS Standard	2040 No Project		Potential Improvement	2040 + Max Office		With Improvement		2040 + Max Housing		With Improvement	
				LOS	Delay		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. I-280 Southbound Ramps/San Bruno Avenue	Signal	San Bruno	D	C	21	n/a	C	23	-	-	C	22	-	-
2. I-280 Northbound Ramps/San Bruno Avenue	Signal	San Bruno	D	C	24	n/a	C	25	-	-	C	25	-	-
3. Cherry Avenue/San Bruno Avenue	Signal	San Bruno	D	D	36	1) Modify cycle length to 100 seconds.	***E***	***72***	D	46	***E***	***67***	D	40
4. Traeger Avenue/San Bruno Avenue	SSSC[1]	San Bruno	D	**A (F)**	**2 (56)**	1) Signalize intersection; make EB left protected and cycle length 75 seconds.	***A (F)***	***6 (>80)***	C	26	***A (F)***	***5 (>80)***	C	23
5. Elm Avenue/San Bruno Avenue	Signal	San Bruno	D	C	21	n/a	C	32	-	-	C	27	-	-
6. El Camino Real/San Bruno Avenue	Signal	San Bruno C/CAG[2]	D E	D	53	1) Modify cycle length to 140 seconds.	***E***	***55***	D	54	D	54	-	-
7. El Camino Real/Bayhill Drive	Signal	San Bruno	D	A	4	n/a	A	8	-	-	A	5	-	-
8. I-380 Eastbound/El Camino Real	Signal	San Bruno	D	A	7	n/a	B	13	-	-	B	11	-	-
9. I-380 Westbound/El Camino Real	Signal	San Bruno	D	B	18	n/a	C	30	-	-	C	25	-	-
10. Cherry Avenue/Bayhill Drive	Signal	San Bruno	D	C	25	n/a	D	37	-	-	D	36	-	-
11. Cherry Avenue/Sneath Lane	Signal	San Bruno	D	A	10	n/a	B	12	-	-	B	12	-	-
12. I-280 Northbound Ramp/Sneath Lane	Signal	San Bruno	D	C	21	n/a	C	22	-	-	C	22	-	-
13. I-280 Southbound Ramp/Sneath Lane	Signal	San Bruno	D	**E**	**67**	1) Modify NB approach to include left turn-pocket, thru lane, and free right turn. 2) Modify cycle length to 150 seconds.	***E***	***74***	***E***	***67***	***E***	***73***	***E***	***70***
14. El Camino Real/Tanforan Way/Commodore Drive	Signal	San Bruno	D	C	23	n/a	C	23	-	-	C	23	-	-
15. El Camino Real /Sneath Lane	Signal	San Bruno	D	C	35	n/a	D	35	-	-	C	35	-	-

Notes:
[1] SSSC = Side Street Stop Controlled. Worst approach is noted in parentheses ( ) for side street stop-controlled intersections.
[2] Intersection is part of the Congestion Management Program.
Delay rounded to the nearest second.
Bold = Intersection performs below LOS standard. ***Italicized*** = Intersection results in an impact. ***TEXT*** = intersection remains above the LOS D threshold, even with improvement.

Table 8: 2040 + Project PM Peak LOS and Delay Results

Study Intersection	Control	Jurisdiction(s)	LOS Standard	2040 No Project		Potential Improvement	2040 + Max Office		With Improvement		2040 + Max Housing		With Improvement	
				LOS	Delay		LOS	Delay	LOS	Delay	LOS	Delay	LOS	Delay
1. I-280 Southbound Ramps/San Bruno Avenue	Signal	San Bruno	D	B	16	n/a	B	15	-	-	B	15	-	-
2. I-280 Northbound Ramps/San Bruno Avenue	Signal	San Bruno	D	D	46	1) Add a third WB thru lane with a pocket at the intersection. 2) Modify cycle length to 130 seconds.	***F***	***82***	D	46	***E***	***75***	D	45
3. Cherry Avenue/San Bruno Avenue	Signal	San Bruno	D	D	54	1) Modify cycle length to 150 seconds. 2) Convert SB thru lane to a shared thru-right. And make SB and NB lefts protected. 3) Add WB right-turn pocket (100').	***E***	***76***	D	41	***E***	***68***	D	40
4. Traeger Avenue/San Bruno Avenue	SSSC[1]	San Bruno	D	A (E)	5 (48)	1) Signalize intersection; make EB left protected and cycle length 75 seconds.	***E (F)***	***77 (>80)***	B	15	***D (F)***	***50 (>80)***	B	20
5. Elm Avenue/San Bruno Avenue	Signal	San Bruno	D	B	18	n/a	C	24	-	-	C	23	-	-
6. El Camino Real/San Bruno Avenue	Signal	San Bruno C/CAG[2]	D E	D	47	1) Optimize splits.	***E***	***58***	D	54	**E**	**55**	D	52
7. El Camino Real/Bayhill Drive	Signal	San Bruno	D	C	30	n/a	C	34	-	-	C	32	-	-
8. I-380 Eastbound/El Camino Real	Signal	San Bruno	D	B	14	n/a	B	15	-	-	B	14	-	-
9. I-380 Westbound/El Camino Real	Signal	San Bruno	D	C	31	n/a	C	31	-	-	C	31	-	-
10. Cherry Avenue/Bayhill Drive	Signal	San Bruno	D	C	29	n/a	D	38	-	-	D	37	-	-
11. Cherry Avenue/Sneath Lane	Signal	San Bruno	D	B	15	n/a	B	18	-	-	B	18	-	-
12. I-280 Northbound Ramp/Sneath Lane	Signal	San Bruno	D	C	23	n/a	C	24	-	-	C	24	-	-
13. I-280 Southbound Ramp/Sneath Lane	Signal	San Bruno	D	C	29	n/a	C	30	-	-	C	30	-	-
14. El Camino Real/Tanforan Way/Commodore Drive	Signal	San Bruno	D	C	25	n/a	C	25	-	-	C	25	-	-
15. El Camino Real /Sneath Lane	Signal	San Bruno	D	**E**	**56**	1) Optimize splits; protected EB/ WB lefts with WB lead.	***E***	***57***	D	50	***E***	***57***	D	50

Notes:
[1] SSSC = Side Street Stop Controlled. Worst approach is noted in parentheses ( ) for side street stop controlled intersections.
[2] Intersection is part of the Congestion Management Program.
Delay rounded to the nearest second.
Bold = Intersection performs below LOS standard. ***Italicized*** = Intersection results in an impact.



LEGEND

- Project Site
- XX% Non-YouTube Employment & Residential
- XX% YouTube Employment
- XX% Commercial

Figure 1

Trip Distribution

\\Fpsf03.fpainc.local\data\Projects\2017_Projects\SF17-0931_San Bruno Bayhill Specific Plan\Graphics\AI\Fig3_TripDistributiont