



Date: Monday, September 21, 2020

Attn: Charmine Solla, PE, TE, PTOE  
Senior Transportation Engineer, Public Works  
City of Hayward  
Email: Charmine.Solla@hayward.ca.gov  
(510) 583-4783

**Subject: Traffic Operational Analysis for Huntwood Avenue Road Diet Study**

Dear Ms. Solla,

This brief technical memorandum summarizes Advanced Mobility Group's (AMG) traffic operational and safety analysis for the Huntwood Avenue Road Diet Study between the intersections of Huntwood Avenue/Industrial Parkway and Huntwood Avenue/Sandoval Way. As a part of the Huntwood Avenue Road Diet project, the City will be installing Class II and Class IV bike lanes along Huntwood Avenue in both directions. This will result in lane reduction in the southbound direction along Huntwood Avenue within the project study area and lane geometry reconfiguration at the study intersections.

The purpose of the operational and safety analysis is to develop short-term and long-term lane configuration and signal phasing recommendations at the two study intersections to enhance bicycle and pedestrian safety, safety of vehicles maneuvering through the intersections, optimize traffic flow, and minimize spillover of traffic queues on the railroad tracks on Huntwood Avenue, south of Sandoval Way.

## Analysis

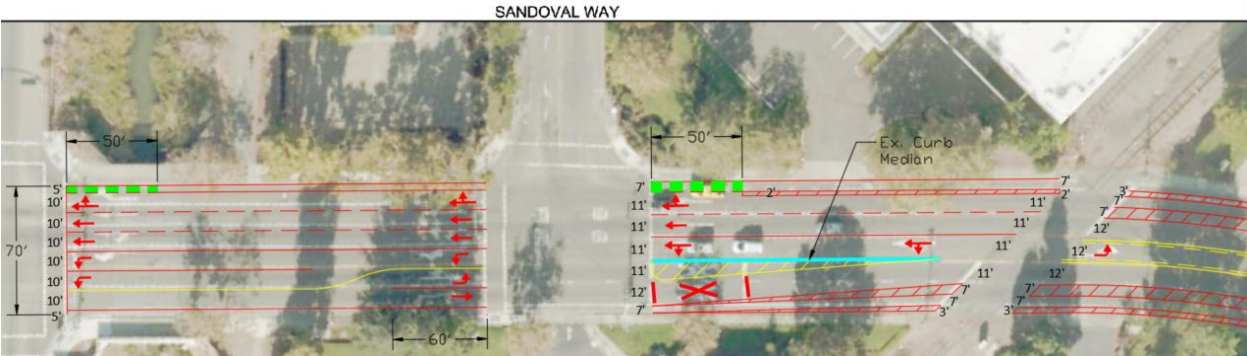
AMG developed existing conditions traffic simulation models using Synchro/SimTraffic software using existing lane configuration, traffic signal timings and traffic volumes provided by the City and available historical data. Existing conditions level of service (LOS), delay and 95<sup>th</sup> percentile queue length in feet were evaluated for the weekday a.m. and p.m. peak periods. Upon existing conditions analysis, AMG developed proposed conditions traffic simulation models to evaluate the two alternatives summarized below. The proposed lane configurations were selected for analysis, since these alternatives provides Class II and Class IV bike lanes along Huntwood Avenue.

### **1. Alternative 1: Lane Geometry Reconfiguration at Huntwood Avenue/Industrial Parkway and Huntwood Avenue/Sandoval Way**

Alternative 1 is a short-term alternative which can be implemented with limited funding and minor modifications to existing roadway infrastructure and traffic signal equipment. Alternative 1 reconfigures existing northbound Huntwood Avenue approach at the intersection of Huntwood Avenue/Industrial Parkway and southbound approach at the intersection of Huntwood Avenue/Sandoval Way. Under existing conditions, the northbound approach at Huntwood Avenue/Industrial Parkway provides an exclusive left-turn lane, a shared through and left-turn lane, a through lane and an exclusive right-turn lane. The proposed lane configuration converts the existing northbound approach to two exclusive left-turn lanes, two through lanes and a shared through and right-turn lane.

Under existing conditions, the southbound approach at Huntwood Avenue/Sandoval Way provides a shared through and left-turn lane and a shared through and right-turn lane. The proposed lane configuration reduces the number of through lanes from two through lanes to one and provides an exclusive left-turn pocket and a shared through and right-turn lane. No lane geometry changes are recommended at the remaining approaches at Huntwood Avenue/Industrial Parkway and Huntwood Avenue/Sandoval Way. AMG developed signal timing recommendations with existing signal phasing to improve traffic flow and reduce spillover on the railroad tracks on Huntwood Avenue, south of Sandoval Way. **Figure 1** illustrates the proposed lane configuration.

**Figure 1: Alternative 1 Proposed Lane Configuration**



**2. Alternative 2: Lane Geometry and Signal Phasing Modification at Huntwood Avenue/Industrial Parkway and Huntwood Avenue/Sandoval Way**

Alternative 2 is a long-term alternative which reconfigures the northbound and southbound approaches at the study intersections. The proposed lane configuration under Alternative 2 provides the same lane configuration as Alternative 1 for the northbound Huntwood Avenue approach at the intersection of Huntwood Avenue/Industrial Parkway and southbound approach at the intersection of Huntwood Avenue/Sandoval Way. Additionally, the northbound approach at Huntwood Avenue/Sandoval Way is reconfigured from existing shared through and left-turn lane, through lane and a shared through and right-turn lane to an exclusive left-turn lane, two through lanes and a shared through and right-turn lane.

Currently, the intersection of Huntwood Avenue/Industrial Parkway operates with protected left-turn phasing along Industrial Parkway and split phasing along Huntwood Avenue. With the proposed lane configuration, it is recommended to convert the split phasing along Huntwood Avenue to protected left turn phasing. This allows the intersection to operate as an eight-phase signal permitting non-conflicting movements to be served simultaneously.

Under existing conditions, the intersection of Huntwood Avenue/Sandoval Way operates with split phasing for all four approaches. With the proposed lane configuration, AMG recommends converting Huntwood Avenue approaches to protected-permissive left-turn phasing and Sandoval Way and Driveway approaches to permissive phasing. This allows the intersection to operate as a six-phase signal permitting non-conflicting movements to be served simultaneously. **Figure 2** illustrates the proposed lane configuration.

**Figure 2: Alternative 2 Proposed Lane Configuration**



**Tables 1 and 2** summarize the results of our preliminary analysis. **Appendix A** contains Synchro and SimTraffic analysis reports.

Based on the results of the preliminary analysis conducted, Alternative 2 proposed lane configuration and AMG’s recommended signal phasing and timing changes reduces the delay experienced at Huntwood Avenue/Sandoval Way considerably during both a.m. and p.m. peak periods. Additionally, it is expected to facilitate reduction in traffic queue spillovers on the railroad track, south of Sandoval Way.

**Table 1: LOS & Delay Comparison**

#	Intersection	Peak Period	Synchro						SimTraffic					
			Existing Conditions		Alternative 1		Alternative 2		Existing Conditions		Alternative 1		Alternative 2	
			Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS	Average Delay (sec)	LOS
1	Industrial Parkway/Huntwood Avenue	AM	60.8	<b>E</b>	86.2	<b>F</b>	58.7	<b>E</b>	71.3	<b>E</b>	103.1	<b>F</b>	89.1	<b>F</b>
		PM	54.8	D	53.6	D	66.2	<b>E</b>	63.9	<b>E</b>	134.9	<b>F</b>	83.5	<b>E</b>
2	Huntwood Avenue/Sandoval Way	AM	98.8	<b>F</b>	52.4	D	10.5	B	17.2	B	22.4	B	11.4	B
		PM	26.6	C	40.6	D	11.5	B	51.7	D	29.7	C	19.4	B

**Notes:**

**Bold** represents unacceptable LOS E or F.

SimTraffic results were based on an average of five simulation runs.

**Table 2: 95th percentile Queue length Comparison in feet (ft)**

#	Intersection	Peak Period	Synchro						SimTraffic					
			Existing Conditions		Alternative 1		Alternative 2		Existing Conditions		Alternative 1		Alternative 2	
			NBT	SBT	NBT	SBT	NBT	SBT	NBT	SBT	NBT	SBT	NBT	SBT
1	Industrial Parkway/Huntwood Avenue	AM	152	508	2	508	43	374	209	635	78	553	94	599
		PM	<b>396</b>	145	<b>331</b>	144	<b>303</b>	118	<b>249</b>	187	<b>269</b>	314	<b>251</b>	188
2	Hundwood Avenue/Sandoval Way	AM	95	<b>741</b>	160	<b>1211</b>	39	110	134	<b>277</b>	<b>225</b>	<b>277</b>	139	154
		PM	<b>406</b>	154	<b>328</b>	<b>488</b>	151	74	<b>384</b>	140	<b>308</b>	237	228	33

**Notes:**

**Bold** represents traffic queue spillover at upstream intersection.

Storage length between Huntwood Avenue/Industrial Parkway and Huntwood Avenue/Sandoval Way is approximately 240 feet. Storage Length between Huntwood Avenue/Sandoval Way and railroad tracks is approximately 185 feet.

SimTraffic results were based on an average of five simulation runs.

Additionally, AMG conducted denied vehicle analysis using SimTraffic which estimates the number of vehicles denied entry into the network due to capacity or operational constraints. Table 3 summarizes the results of the analysis. Based on the analysis conducted, Alternative 2 significantly reduces the number of denied vehicles in the system compared to existing conditions and Alternative 1. this is especially critical given the southbound approach lane reduction, south of Huntwood Avenue/Industrial Parkway.

**Table 3: Denied Vehicles in the Network**

Peak Period	SimTraffic		
	Existing Conditions	Alternative 1	Alternative 2
AM	464	521	312
PM	739	773	407

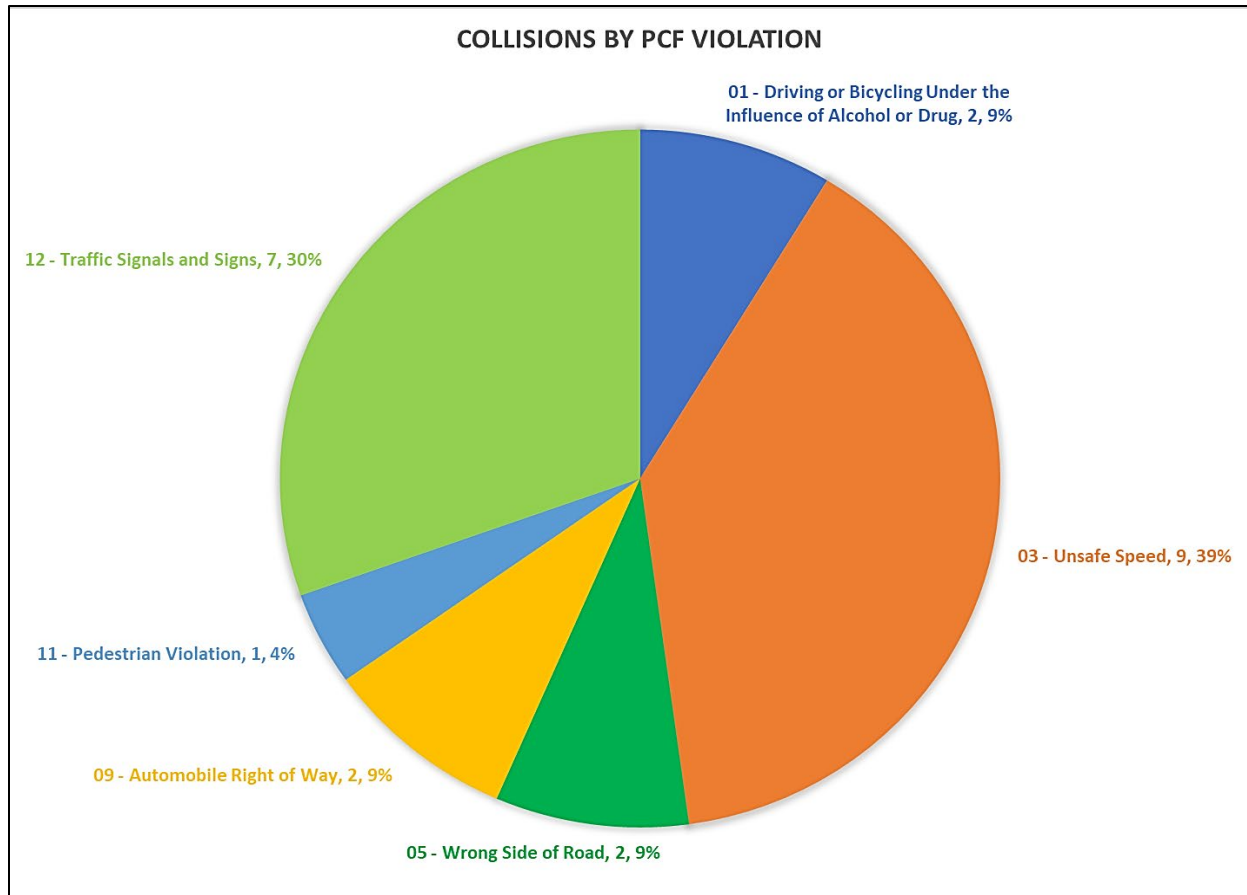
**Note:**

SimTraffic results were based on an average of five simulation runs.

## Collision Analysis

AMG conducted collision analysis at the two study intersections from January 2015 to December 2019 using the Transportation Injury Mapping System (TIMS) collision database. During the five-year period, there were 23 collisions at the study intersections with 21 collisions at Huntwood Avenue/Industrial Parkway and two collisions at Huntwood Avenue/Sandoval Way. The collisions were evaluated based on the primary collision factor (PCF) violation and type of collision. **Figure 3** illustrates collisions based on PCF violation.

**Figure 3: Collisions by PCF Violation Category**



**Note:** Data labels in Figure 3 reflect PCF Violation, Number of PCF Violation Accidents, Percentage PCF Violation.

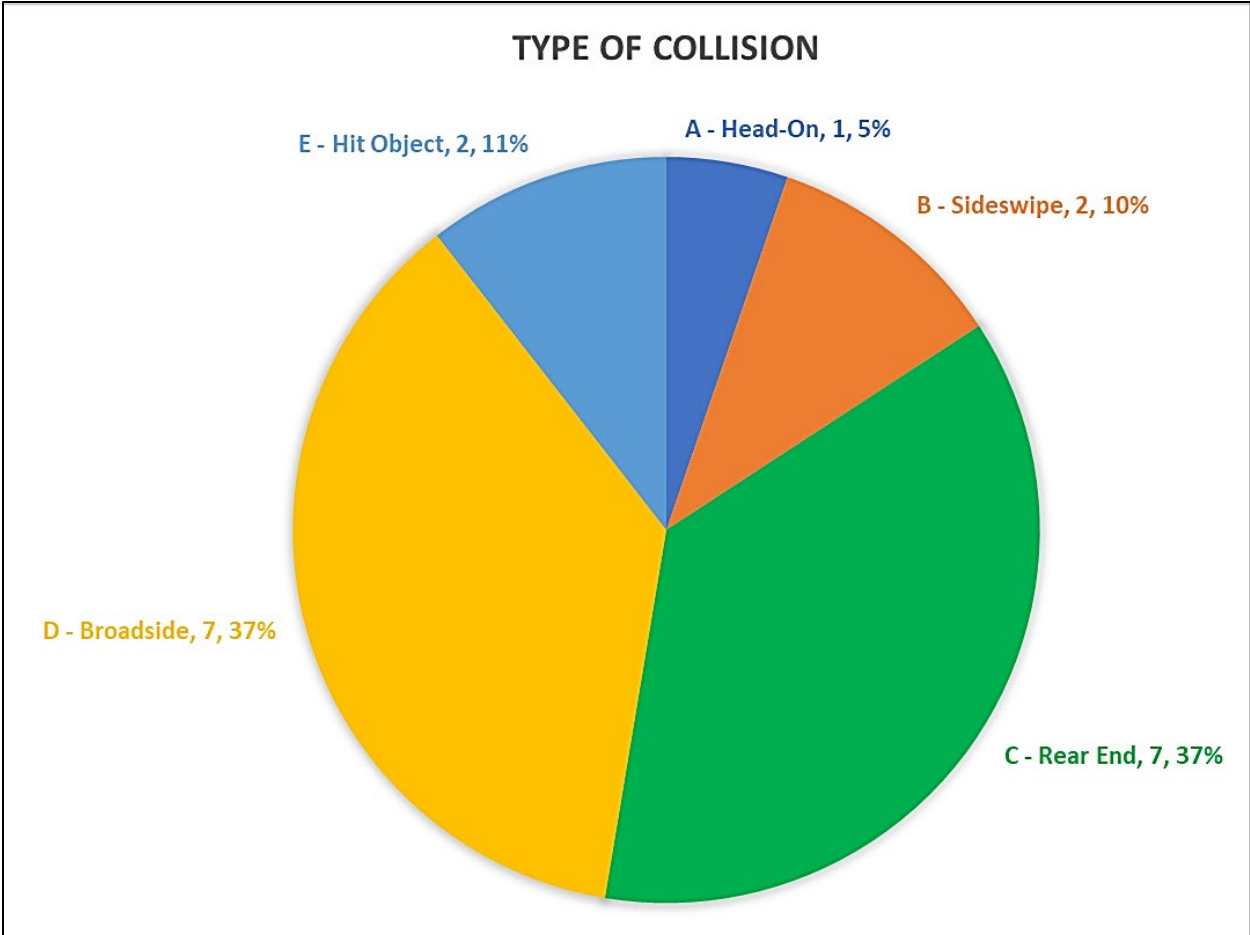
Based on the PCF violation collision analysis, majority of the collisions at the two study intersections were attributed to traffic signals and signs (30%) and unsafe speed (39%).

As mentioned above, collisions at the two study intersections were evaluated based on type of collisions as well. PCF violation categories 1 – Driving or bicycling under influence of alcohol or drug and 5 – Wrong side of the road were excluded from this analysis. **Figure 4** illustrates collisions based on type of collision.

Based on the type of collision analysis, majority of the collisions at the two study intersections were attributed to broadside (37%) and rear end (37%) collisions. Typically, broadside collisions occur

because of non-adherence of traffic signal indications, stop signs, and ignoring other traffic devices. Most rear end collisions occur because of unsafe speeding.

Figure 4: Collisions by Type of Collision



Note: Data labels in Figure 4 reflect Type of Collision, Number of Accidents, Percentage.

As discussed in previous sections, the intersection of Huntwood Avenue/Industrial Parkway operates with split phasing signal operation along Huntwood Avenue for the north and south approaches and protected left-turn phasing along Industrial Parkway for the east and west approaches. The intersection of Huntwood Avenue/Sandoval Way operates with split phasing on all four approaches. Split phase traffic signal operations often result in higher delays at the intersection. This is because split phase signal operation serves relevant phases exclusively and does not permit other non-conflicting or permissive phases to be served. As a result of the split phase signal operation and heavy through and turning traffic demands, the two study intersections experience significant traffic delays which is affirmed by field observations and existing conditions traffic analysis. Higher traffic delays often lead to driver frustration, non-adherence to traffic controls such as red lights and speeding to get through the intersection during yellow signal indications, resulting in broadside and rear end collisions.

Broadside collisions and rear end collisions are rectifiable by signal phasing modifications and reducing traffic delays at the study intersection. This can be achieved by modifying existing signal phasing as recommended in Alternative 2 which in turn will reduce traffic signal cycle lengths and delays. This improves overall safety for vehicles, pedestrians, and bicycles at the two intersections. Shorter cycle

lengths achieved because of the recommended signal phasing will allow for concurrent movements and pedestrian phases to be served simultaneously which will also dissuade pedestrians and bicycles from disregarding traffic signal indications. The analysis period showed one pedestrian/vehicle head on collision due to pedestrian non-adherence of traffic signal indication and one vehicle/bicycle broadside collision at the intersection of Huntwood Avenue/Industrial Parkway.

### Other Safety Considerations

A major safety concern experienced within the project study area is the presence of Union Pacific railroad tracks across Huntwood Avenue, south of the intersection of Huntwood Avenue/Sandoval Way. The railroad tracks are located approximately 185 feet from the study intersection and do not have gates or traffic/preemption signal to clear existing traffic on the railroad tracks. This creates a hazardous situation for vehicles travelling northbound on Huntwood Avenue especially during the p.m. peak period where northbound direction is the peak direction of traffic with approximately 1,150 vehicles per hour. Under existing conditions, northbound traffic queues spillover past the railroad tracks due to the limited vehicle throughput through both study intersections.

Additionally, the proposed lane configuration provided by the City reduces the number of through lanes in the southbound direction from two through lanes to one to provide Class II bike lanes along Huntwood Avenue. The lane reduction with existing signal phasing is expected to impact westbound left-turn movement at the intersection of Huntwood Avenue/Industrial Parkway during the a.m. peak period resulting in spillover of westbound left-turning vehicles into the through lanes. The lane reduction is expected to result in significant traffic queueing for the eastbound right-turning vehicles during the p.m. peak period.

Alternative 2 recommended signal phasing will allow for concurrent northbound and southbound through vehicles to be served simultaneously at both study intersections allowing for higher vehicle throughput and queue clearance.

### Conclusion

Based on the analysis conducted, Alternative 2 lane configuration and signal phasing improvements at the intersections of Huntwood Avenue/Industrial Parkway and Huntwood Avenue/Sandoval Way would help facilitate reduction in delay, and traffic queues at the study intersections, especially spillover of traffic queues on the railroad tracks. However, implementation of Alternative 2 signal phasing will require considerable signal modifications at both study intersections.

The intersection of Huntwood Avenue/Industrial Parkway will require replacing existing split phase shared signal faces for the north and south approaches to protected left-turn signal face and through movement signal faces. Existing detection system will need to be upgraded. AMG recommends installing video detection at this intersection since video detection provides better detection for bicycles. This would improve the bicycle detection for the new Class II and Class IV bike lanes that are proposed with the Huntwood Avenue Road Diet project. Installing longer mast arm to support protected left-turn phasing and through movement signal heads and signage may be needed.

The intersection of Huntwood Avenue/Sandoval Way will require replacing existing split phase shared signal faces for all approaches to protected left-turn signal face and through movement signal faces for the north and south approaches along Huntwood Avenue and permissive signal phasing signal heads for

the east and west approaches. Video detection is recommended at this intersection to provide bicycle detection for the Class II and Class IV bike lanes installed as a part of the Huntwood Avenue Road Diet project. Additional mast arm to support proposed signal phasing signal heads and signage may be needed.

It is also recommended to install queue clearance detectors and peer to peer communication, north of the railroad tracks to ensure that traffic queues do not spillover onto the railroad tracks.

AMG recommends implementing Alternative 1 improvements as an interim measure and Alternative 2 once funding is available for signal upgrades. Additionally, it is recommended to monitor the intersections on a pre-determined basis (monthly/quarterly) to observe traffic conditions.

If you should have any questions or need additional information, please feel free to contact me at (415) 688-0024 or via e-mail at [joy@amobility.com](mailto:joy@amobility.com).

Best Regards,

A handwritten signature in cursive script that reads "Joy Bhattacharya".

Joy Bhattacharya

Vice President, Director of Innovative Transportation Solutions (AMG)





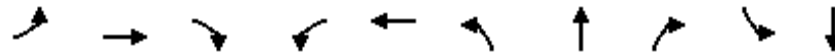
## Appendix A – Synchro/SimTraffic Analysis Reports

Queues

Existing Conditions

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	88	652	435	437	1391	110	228	126	85	697
v/c Ratio	0.49	0.72	0.62	1.07	0.71	0.48	0.48	0.38	0.23	0.95
Control Delay	73.0	56.0	9.1	116.3	41.0	65.5	61.9	11.4	51.9	78.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.0
Total Delay	73.0	56.0	9.1	116.3	41.0	65.5	61.9	11.5	51.9	78.5
Queue Length 50th (ft)	83	307	14	~470	414	112	115	0	68	343
Queue Length 95th (ft)	142	381	117	#638	456	173	152	56	120	#508
Internal Link Dist (ft)		1351			504		245			496
Turn Bay Length (ft)	250			245					155	
Base Capacity (vph)	295	902	705	410	1951	310	640	403	371	735
Starvation Cap Reductn	0	0	0	0	0	0	0	25	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.72	0.62	1.07	0.71	0.35	0.36	0.33	0.23	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.

HCM Signalized Intersection Capacity Analysis  
 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Existing Conditions  
 Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	626	418	376	1165	31	201	127	122	71	468	118
Future Volume (vph)	84	626	418	376	1165	31	201	127	122	71	468	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0	6.0	4.5	6.0		5.5	5.5	5.5	5.5	5.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		0.91	0.91	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	1.00	0.85	1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (prot)	1736	3471	1530	1736	4966		1579	3256	1532	1736	3367	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	0.98	1.00	0.95	1.00	
Satd. Flow (perm)	1736	3471	1530	1736	4966		1579	3256	1532	1736	3367	
Peak-hour factor, PHF	0.96	0.96	0.96	0.86	0.86	0.86	0.97	0.97	0.97	0.84	0.84	0.84
Adj. Flow (vph)	88	652	435	437	1355	36	207	131	126	85	557	140
RTOR Reduction (vph)	0	0	308	0	2	0	0	0	108	0	14	0
Lane Group Flow (vph)	88	652	127	437	1389	0	110	228	18	85	683	0
Confl. Peds. (#/hr)			2			2			1			
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2						4			
Actuated Green, G (s)	15.6	39.0	39.0	35.5	58.9		21.9	21.9	21.9	32.1	32.1	
Effective Green, g (s)	15.6	39.0	39.0	35.5	58.9		21.9	21.9	21.9	32.1	32.1	
Actuated g/C Ratio	0.10	0.26	0.26	0.24	0.39		0.15	0.15	0.15	0.21	0.21	
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0		5.5	5.5	5.5	5.5	5.5	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	3.0		2.0	2.0	2.0	3.0	3.0	
Lane Grp Cap (vph)	180	902	397	410	1949		230	475	223	371	720	
v/s Ratio Prot	0.05	0.19		c0.25	c0.28		0.07	c0.07		0.05	c0.20	
v/s Ratio Perm			0.08						0.01			
v/c Ratio	0.49	0.72	0.32	1.07	0.71		0.48	0.48	0.08	0.23	0.95	
Uniform Delay, d1	63.4	50.6	44.8	57.2	38.4		58.8	58.8	55.4	48.7	58.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	5.0	2.1	63.0	2.3		0.6	0.3	0.1	0.3	21.5	
Delay (s)	65.5	55.6	46.9	120.3	40.7		59.4	59.1	55.4	49.0	79.7	
Level of Service	E	E	D	F	D		E	E	E	D	E	
Approach Delay (s)		53.1			59.7			58.2			76.3	
Approach LOS		D			E			E			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			60.8				HCM 2000 Level of Service				E	
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)				21.5	
Intersection Capacity Utilization			96.6%				ICU Level of Service				F	
Analysis Period (min)			15									
c Critical Lane Group												

Queues  
2: Huntwood Ave. & Sandoval Way.

Existing Conditions  
Timing Plan: AM Peak



Lane Group	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	4	34	93	383	1368
v/c Ratio	0.02	0.09	0.23	0.32	1.14
Control Delay	29.0	24.0	5.0	21.7	99.9
Queue Delay	0.0	0.0	0.0	0.0	0.1
Total Delay	29.0	24.0	5.0	21.7	100.0
Queue Length 50th (ft)	1	10	0	39	~308
Queue Length 95th (ft)	6	30	7	95	#741
Internal Link Dist (ft)	163	318		275	245
Turn Bay Length (ft)			80		
Base Capacity (vph)	443	841	802	1748	1197
Starvation Cap Reductn	0	0	0	0	39
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.01	0.04	0.12	0.22	1.18

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.

# HCM Signalized Intersection Capacity Analysis

## 2: Huntwood Ave. & Sandoval Way.

Existing Conditions  
Timing Plan: AM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	0	1	1	24	0	65	0	324	25	69	1077	3
Future Volume (vph)	0	1	1	24	0	65	0	324	25	69	1077	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00			1.00	1.00		0.91			0.95	
Frbp, ped/bikes		1.00			1.00	0.99		1.00			1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	
Frt		0.93			1.00	0.85		0.99			1.00	
Flt Protected		1.00			0.95	1.00		1.00			1.00	
Satd. Flow (prot)		1704			1736	1533		4919			3459	
Flt Permitted		1.00			0.95	1.00		1.00			1.00	
Satd. Flow (perm)		1704			1736	1533		4919			3459	
Peak-hour factor, PHF	0.50	0.50	0.50	0.70	0.70	0.70	0.91	0.91	0.91	0.84	0.84	0.84
Adj. Flow (vph)	0	2	2	34	0	93	0	356	27	82	1282	4
RTOR Reduction (vph)	0	2	0	0	0	79	0	8	0	0	0	0
Lane Group Flow (vph)	0	2	0	0	34	14	0	375	0	0	1368	0
Confl. Peds. (#/hr)	1					1			6	6		
Confl. Bikes (#/hr)									10			18
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type		NA		Split	NA	Perm		NA		Split	NA	
Protected Phases	1	1		2	2		4	4		3	3	
Permitted Phases						2						
Actuated Green, G (s)		0.9			9.8	9.8		15.0			21.6	
Effective Green, g (s)		0.9			9.8	9.8		15.0			21.6	
Actuated g/C Ratio		0.01			0.15	0.15		0.23			0.33	
Clearance Time (s)		4.0			5.0	5.0		5.0			5.0	
Vehicle Extension (s)		2.0			2.0	2.0		6.0			6.0	
Lane Grp Cap (vph)		23			256	226		1112			1126	
v/s Ratio Prot		c0.00			c0.02			c0.08			c0.40	
v/s Ratio Perm						0.01						
v/c Ratio		0.09			0.13	0.06		0.34			1.21	
Uniform Delay, d1		32.3			24.6	24.3		21.5			22.3	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		0.6			0.1	0.0		0.5			105.0	
Delay (s)		32.9			24.6	24.3		22.0			127.4	
Level of Service		C			C	C		C			F	
Approach Delay (s)		32.9			24.4			22.0			127.4	
Approach LOS		C			C			C			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			98.8				HCM 2000 Level of Service			F		
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			66.3				Sum of lost time (s)		19.0			
Intersection Capacity Utilization			63.6%				ICU Level of Service			B		
Analysis Period (min)			15									
c Critical Lane Group												

SimTraffic Performance Report  
Existing Conditions

AM Peak

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.7	0.2	0.3	271.7	278.2	285.6	0.7	0.2	0.4	46.6	41.8	43.3
Total Del/Veh (s)	81.2	49.6	26.0	208.6	26.6	13.6	63.0	60.4	9.2	122.4	142.6	126.9

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W Performance by movement

Movement	All
Denied Del/Veh (s)	122.7
Total Del/Veh (s)	71.3

2: Huntwood Ave. & Sandoval Way. Performance by movement

Movement	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.2	4.1	0.2	0.2	0.0	0.0	0.0	0.2
Total Del/Veh (s)	32.2	13.5	26.9	5.1	13.5	4.9	18.4	18.9	14.1	17.2

Total Network Performance

Denied Del/Veh (s)	121.3
Total Del/Veh (s)	79.8

Queuing and Blocking Report  
Existing Conditions

AM Peak

Intersection: 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	TR	L	LT	T	R
Maximum Queue (ft)	274	387	350	350	270	577	535	342	200	221	210	104
Average Queue (ft)	97	239	216	167	269	543	394	99	100	136	82	42
95th Queue (ft)	217	363	330	320	273	581	662	258	177	209	166	80
Link Distance (ft)		1385	1385	1385		526	526	526	213	213	213	213
Upstream Blk Time (%)						80	0		0	1	0	
Queuing Penalty (veh)						0	0		0	1	0	
Storage Bay Dist (ft)	250				245							
Storage Blk Time (%)	0	9			81	2						
Queuing Penalty (veh)	1	8			316	8						

Intersection: 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	180	562	548
Average Queue (ft)	97	419	391
95th Queue (ft)	218	635	629
Link Distance (ft)		517	517
Upstream Blk Time (%)		27	23
Queuing Penalty (veh)		0	0
Storage Bay Dist (ft)	155		
Storage Blk Time (%)	0	66	
Queuing Penalty (veh)	0	47	

Intersection: 2: Huntwood Ave. & Sandoval Way.

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LTR	LT	R	LT	T	TR	LT	TR
Maximum Queue (ft)	30	56	63	132	178	121	257	254
Average Queue (ft)	3	16	28	6	71	43	196	200
95th Queue (ft)	18	43	54	51	134	88	277	272
Link Distance (ft)	202	325			326	326	213	213
Upstream Blk Time (%)							6	7
Queuing Penalty (veh)							39	43
Storage Bay Dist (ft)			80	155				
Storage Blk Time (%)		0	0	0	1			
Queuing Penalty (veh)		0	0	0	1			

Network Summary

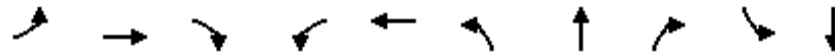
Network wide Queuing Penalty: 464

Queues

Existing Conditions

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Group Flow (vph)	275	1319	221	151	995	310	645	320	99	302
v/c Ratio	0.77	0.91	0.32	0.72	0.64	0.83	0.82	0.53	0.57	0.72
Control Delay	72.2	53.2	17.2	81.1	46.0	72.7	63.2	7.6	76.5	50.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	57.6	52.3	1.0	0.0	0.0
Total Delay	72.2	53.2	17.2	81.1	46.0	130.3	115.5	8.6	76.5	50.6
Queue Length 50th (ft)	256	618	62	144	308	313	324	0	94	97
Queue Length 95th (ft)	#472	#933	153	214	361	437	396	80	152	145
Internal Link Dist (ft)		1325			504		245			496
Turn Bay Length (ft)	250			245					155	
Base Capacity (vph)	355	1450	682	318	1545	415	872	638	260	576
Starvation Cap Reductn	0	0	0	0	0	147	326	134	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.91	0.32	0.47	0.64	1.16	1.18	0.63	0.38	0.52
























Intersection Summary

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



HCM Signalized Intersection Capacity Analysis  
 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Existing Conditions  
 Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	1200	201	142	812	123	353	583	314	92	158	123
Future Volume (vph)	250	1200	201	142	812	123	353	583	314	92	158	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0	6.0	4.5	6.0		5.5	5.5	5.5	5.5	5.5	
Lane Util. Factor	1.00	*1.00	1.00	1.00	0.91		0.91	0.91	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	1.00	0.98	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85	1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1736	3654	1533	1736	4881		1579	3312	1528	1736	3223	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00	0.95	1.00	
Satd. Flow (perm)	1736	3654	1533	1736	4881		1579	3312	1528	1736	3223	
Peak-hour factor, PHF	0.91	0.91	0.91	0.94	0.94	0.94	0.98	0.98	0.98	0.93	0.93	0.93
Adj. Flow (vph)	275	1319	221	151	864	131	360	595	320	99	170	132
RTOR Reduction (vph)	0	0	75	0	13	0	0	0	244	0	99	0
Lane Group Flow (vph)	275	1319	146	151	982	0	310	645	76	99	203	0
Confl. Peds. (#/hr)									1			
Confl. Bikes (#/hr)			2			1			3			1
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA	Perm	Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2						4			
Actuated Green, G (s)	30.7	59.6	59.6	18.3	47.2		35.6	35.6	35.6	15.0	15.0	
Effective Green, g (s)	30.7	59.6	59.6	18.3	47.2		35.6	35.6	35.6	15.0	15.0	
Actuated g/C Ratio	0.20	0.40	0.40	0.12	0.31		0.24	0.24	0.24	0.10	0.10	
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0		5.5	5.5	5.5	5.5	5.5	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	3.0		2.0	2.0	2.0	3.0	3.0	
Lane Grp Cap (vph)	355	1451	609	211	1535		374	786	362	173	322	
v/s Ratio Prot	c0.16	c0.36		0.09	0.20		c0.20	0.19		0.06	c0.06	
v/s Ratio Perm			0.10						0.05			
v/c Ratio	0.77	0.91	0.24	0.72	0.64		0.83	0.82	0.21	0.57	0.63	
Uniform Delay, d1	56.4	42.6	30.1	63.3	44.1		54.3	54.2	45.9	64.4	64.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.1	10.0	0.9	11.0	2.1		13.4	6.6	0.1	4.5	4.0	
Delay (s)	66.5	52.6	31.0	74.3	46.2		67.7	60.7	46.0	69.0	68.8	
Level of Service	E	D	C	E	D		E	E	D	E	E	
Approach Delay (s)		52.1			49.9			58.7			68.9	
Approach LOS		D			D			E			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			54.8				HCM 2000 Level of Service				D	
HCM 2000 Volume to Capacity ratio			0.85									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)				21.5	
Intersection Capacity Utilization			85.6%				ICU Level of Service				E	
Analysis Period (min)			15									
c Critical Lane Group												

Queues

2: Huntwood Ave. & Sandoval Way.

Existing Conditions

Timing Plan: PM Peak



Lane Group	EBT	WBT	WBR	NBT	SBT
Lane Group Flow (vph)	24	29	115	1307	426
v/c Ratio	0.08	0.09	0.29	0.80	0.48
Control Delay	0.5	26.9	7.9	29.5	26.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	0.5	26.9	7.9	29.5	26.2
Queue Length 50th (ft)	0	9	0	162	68
Queue Length 95th (ft)	0	33	35	#406	154
Internal Link Dist (ft)	33	318		275	245
Turn Bay Length (ft)			80		
Base Capacity (vph)	499	777	750	1632	1101
Starvation Cap Reductn	0	0	0	0	12
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.05	0.04	0.15	0.80	0.39


















Intersection Summary

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

# HCM Signalized Intersection Capacity Analysis

## 2: Huntwood Ave. & Sandoval Way.

Existing Conditions  
Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	7	25	0	99	3	1143	18	24	311	10
Future Volume (vph)	10	0	7	25	0	99	3	1143	18	24	311	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			5.0	5.0		5.0			5.0	
Lane Util. Factor		1.00			1.00	1.00		0.91			0.95	
Frbp, ped/bikes		1.00			1.00	0.99		1.00			1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00			1.00	
Frt		0.94			1.00	0.85		1.00			1.00	
Flt Protected		0.97			0.95	1.00		1.00			1.00	
Satd. Flow (prot)		1675			1736	1533		4972			3441	
Flt Permitted		0.97			0.95	1.00		1.00			1.00	
Satd. Flow (perm)		1675			1736	1533		4972			3441	
Peak-hour factor, PHF	0.71	0.71	0.71	0.86	0.86	0.86	0.89	0.89	0.89	0.81	0.81	0.81
Adj. Flow (vph)	14	0	10	29	0	115	3	1284	20	30	384	12
RTOR Reduction (vph)	0	23	0	0	0	99	0	1	0	0	2	0
Lane Group Flow (vph)	0	1	0	0	29	16	0	1306	0	0	424	0
Confl. Peds. (#/hr)	1					1			6	6		
Confl. Bikes (#/hr)									14			8
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	1		2	2		4	4		3	3	
Permitted Phases						2						
Actuated Green, G (s)		2.2			9.8	9.8		22.1			17.4	
Effective Green, g (s)		2.2			9.8	9.8		22.1			17.4	
Actuated g/C Ratio		0.03			0.14	0.14		0.31			0.25	
Clearance Time (s)		4.0			5.0	5.0		5.0			5.0	
Vehicle Extension (s)		2.0			2.0	2.0		6.0			6.0	
Lane Grp Cap (vph)		52			241	213		1558			849	
v/s Ratio Prot		c0.00			c0.02			c0.26			c0.12	
v/s Ratio Perm						0.01						
v/c Ratio		0.01			0.12	0.08		0.84			0.50	
Uniform Delay, d1		33.1			26.6	26.4		22.5			22.8	
Progression Factor		1.00			1.00	1.00		1.00			1.00	
Incremental Delay, d2		0.0			0.1	0.1		4.8			1.3	
Delay (s)		33.1			26.7	26.5		27.3			24.1	
Level of Service		C			C	C		C			C	
Approach Delay (s)		33.1			26.5			27.3			24.1	
Approach LOS		C			C			C			C	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			26.6				HCM 2000 Level of Service			C		
HCM 2000 Volume to Capacity ratio			0.55									
Actuated Cycle Length (s)			70.5				Sum of lost time (s)		19.0			
Intersection Capacity Utilization			48.8%				ICU Level of Service			A		
Analysis Period (min)			15									
c	Critical Lane Group											

SimTraffic Performance Report  
Existing Conditions

PM Peak

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	4.3	2.3	1.6	2.6	0.1	0.2	0.0	0.0	0.0	3.6	0.2	0.3
Total Del/Veh (s)	140.8	92.6	8.2	73.7	38.5	20.9	56.4	65.8	27.1	59.4	58.0	22.0

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W Performance by movement

Movement	All
Denied Del/Veh (s)	1.2
Total Del/Veh (s)	63.9

2: Huntwood Ave. & Sandoval Way. Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.5	4.0	140.7	185.6	193.7	0.0	0.0	0.0	121.2
Total Del/Veh (s)	41.8	6.5	25.6	21.0	43.6	73.3	68.9	16.0	11.9	11.3	51.7

Total Network Performance

Denied Del/Veh (s)	51.4
Total Del/Veh (s)	85.4

Queuing and Blocking Report  
Existing Conditions

PM Peak

Intersection: 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	TR	L	LT	T	R
Maximum Queue (ft)	275	1065	1034	608	270	444	373	256	245	256	247	223
Average Queue (ft)	249	696	661	227	152	253	207	143	190	225	218	133
95th Queue (ft)	323	1351	1316	971	272	362	305	231	258	249	247	227
Link Distance (ft)		1354	1354	1354		526	526	526	216	216	216	216
Upstream Blk Time (%)		8	6	4		0			8	30	29	3
Queuing Penalty (veh)		0	0	0		0			24	95	91	10
Storage Bay Dist (ft)	250				245							
Storage Blk Time (%)	21	33			1	8						
Queuing Penalty (veh)	129	82			2	12						

Intersection: 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Movement	SB	SB	SB
Directions Served	L	T	TR
Maximum Queue (ft)	177	228	226
Average Queue (ft)	83	111	98
95th Queue (ft)	158	187	186
Link Distance (ft)		514	514
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)	155		
Storage Blk Time (%)	3	3	
Queuing Penalty (veh)	2	2	

Intersection: 2: Huntwood Ave. & Sandoval Way.

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LTR	LT	R	LT	T	TR	LT	TR
Maximum Queue (ft)	56	114	100	180	376	378	176	200
Average Queue (ft)	15	19	50	175	341	343	65	70
95th Queue (ft)	44	59	87	203	365	384	138	140
Link Distance (ft)	71	325			324	324	216	216
Upstream Blk Time (%)	0				48	64		0
Queuing Penalty (veh)	0				0	0		0
Storage Bay Dist (ft)			80	155				
Storage Blk Time (%)		0	3	2	73			
Queuing Penalty (veh)		0	1	7	282			

Network Summary

Network wide Queuing Penalty: 739

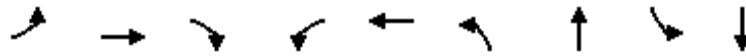
## Alternative 1 Synchro/SimTraffic Analysis Reports

Queues

Proposed Conditions

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	88	652	435	437	1391	207	257	85	697
v/c Ratio	0.50	0.86	0.65	1.24	0.87	0.23	0.19	0.30	1.23
Control Delay	74.0	68.3	9.2	178.5	55.0	10.8	0.5	58.5	168.9
Queue Delay	0.0	0.0	1.1	3.6	0.0	0.0	0.0	0.0	1.8
Total Delay	74.0	68.3	10.3	182.1	55.0	10.8	0.5	58.5	170.7
Queue Length 50th (ft)	83	322	2	~528	463	19	0	74	~436
Queue Length 95th (ft)	143	398	103	#697	501	25	2	120	#508
Internal Link Dist (ft)		1351			504		245		496
Turn Bay Length (ft)	250			245		100		155	
Base Capacity (vph)	190	786	678	352	1614	911	1333	283	565
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	86	93	0	0	0	0	110
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.83	0.73	1.69	0.86	0.23	0.19	0.30	1.53

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.

HCM Signalized Intersection Capacity Analysis  
 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Proposed Conditions  
 Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	626	418	376	1165	31	201	127	122	71	468	118
Future Volume (vph)	84	626	418	376	1165	31	201	127	122	71	468	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0	6.0	4.5	6.0		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		0.97	0.91		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3471	1514	1736	4966		3367	4590		1736	3367	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	3471	1514	1736	4966		3367	4590		1736	3367	
Peak-hour factor, PHF	0.96	0.96	0.96	0.86	0.86	0.86	0.97	0.97	0.97	0.84	0.84	0.84
Adj. Flow (vph)	88	652	435	437	1355	36	207	131	126	85	557	140
RTOR Reduction (vph)	0	0	338	0	2	0	0	92	0	0	15	0
Lane Group Flow (vph)	88	652	97	437	1389	0	207	165	0	85	682	0
Confl. Peds. (#/hr)			2			2			1			
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2									
Actuated Green, G (s)	15.3	32.9	32.9	30.5	48.1		40.6	40.6		24.5	24.5	
Effective Green, g (s)	15.3	32.9	32.9	30.5	48.1		40.6	40.6		24.5	24.5	
Actuated g/C Ratio	0.10	0.22	0.22	0.20	0.32		0.27	0.27		0.16	0.16	
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	3.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	177	761	332	352	1592		911	1242		283	549	
v/s Ratio Prot	0.05	0.19		c0.25	c0.28		c0.06	0.04		0.05	c0.20	
v/s Ratio Perm			0.06									
v/c Ratio	0.50	0.86	0.29	1.24	0.87		0.23	0.13		0.30	1.24	
Uniform Delay, d1	63.7	56.3	48.8	59.8	48.1		42.5	41.4		55.2	62.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.24	0.01		1.00	1.00	
Incremental Delay, d2	2.2	10.7	1.4	130.5	5.6		0.6	0.2		0.6	123.8	
Delay (s)	65.9	67.0	50.2	190.3	53.6		10.7	0.6		55.8	186.5	
Level of Service	E	E	D	F	D		B	A		E	F	
Approach Delay (s)		60.7			86.3			5.1			172.3	
Approach LOS		E			F			A			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			86.2				HCM 2000 Level of Service				F	
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			21.5		
Intersection Capacity Utilization			90.7%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												



Queues  
2: Huntwood Ave. & Sandoval Way.

Proposed Conditions  
Timing Plan: AM Peak



Lane Group	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	4	34	93	383	82	1286
v/c Ratio	0.05	0.30	0.49	0.56	0.07	1.04
Control Delay	56.0	73.8	21.5	61.9	2.7	38.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	25.5
Total Delay	56.0	73.8	21.5	61.9	2.7	63.5
Queue Length 50th (ft)	2	32	0	127	7	~870
Queue Length 95th (ft)	8	55	26	160	m9	m#1211
Internal Link Dist (ft)	163	318		275		245
Turn Bay Length (ft)			80		100	
Base Capacity (vph)	92	115	188	1151	1179	1241
Starvation Cap Reductn	0	0	0	0	0	184
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.30	0.49	0.33	0.07	1.22

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.

# HCM Signalized Intersection Capacity Analysis

## 2: Huntwood Ave. & Sandoval Way.

Proposed Conditions  
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations		↕			↕	↕		↕↕↕		↕	↕		
Traffic Volume (vph)	0	1	1	24	0	65	0	324	25	69	1077	3	
Future Volume (vph)	0	1	1	24	0	65	0	324	25	69	1077	3	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0			5.0	5.0		5.0		5.0	5.0		
Lane Util. Factor		1.00			1.00	1.00		0.91		1.00	1.00		
Frbp, ped/bikes		1.00			1.00	0.99		1.00		1.00	1.00		
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00		
Frt		0.93			1.00	0.85		0.99		1.00	1.00		
Flt Protected		1.00			0.95	1.00		1.00		0.95	1.00		
Satd. Flow (prot)		1704			1736	1532		4912		1736	1826		
Flt Permitted		1.00			0.95	1.00		1.00		0.95	1.00		
Satd. Flow (perm)		1704			1736	1532		4912		1736	1826		
Peak-hour factor, PHF	0.50	0.50	0.50	0.70	0.70	0.70	0.91	0.91	0.91	0.84	0.84	0.84	
Adj. Flow (vph)	0	2	2	34	0	93	0	356	27	82	1282	4	
RTOR Reduction (vph)	0	2	0	0	0	87	0	6	0	0	0	0	
Lane Group Flow (vph)	0	2	0	0	34	6	0	377	0	82	1286	0	
Confl. Peds. (#/hr)	1					1			6	6			
Confl. Bikes (#/hr)									10			18	
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	
Turn Type		NA		Split	NA	Perm		NA		Split	NA		
Protected Phases	1	1		2	2		4	4		3	3		
Permitted Phases						2							
Actuated Green, G (s)		1.4			10.0	10.0		20.8		98.8	98.8		
Effective Green, g (s)		1.4			10.0	10.0		20.8		98.8	98.8		
Actuated g/C Ratio		0.01			0.07	0.07		0.14		0.66	0.66		
Clearance Time (s)		4.0			5.0	5.0		5.0		5.0	5.0		
Vehicle Extension (s)		2.0			2.0	2.0		6.0		6.0	6.0		
Lane Grp Cap (vph)		15			115	102		681		1143	1202		
v/s Ratio Prot		c0.00			c0.02			c0.08		0.05	c0.70		
v/s Ratio Perm						0.00							
v/c Ratio		0.13			0.30	0.06		0.55		0.07	1.07		
Uniform Delay, d1		73.7			66.6	65.6		60.3		9.2	25.6		
Progression Factor		1.00			1.00	1.00		1.00		0.28	0.70		
Incremental Delay, d2		1.5			0.5	0.1		2.1		0.0	33.4		
Delay (s)		75.2			67.2	65.7		62.4		2.6	51.2		
Level of Service		E			E	E		E		A	D		
Approach Delay (s)		75.2			66.1			62.4			48.3		
Approach LOS		E			E			E			D		
<b>Intersection Summary</b>													
HCM 2000 Control Delay			52.4		HCM 2000 Level of Service						D		
HCM 2000 Volume to Capacity ratio			0.92										
Actuated Cycle Length (s)			150.0		Sum of lost time (s)						19.0		
Intersection Capacity Utilization			74.4%		ICU Level of Service						D		
Analysis Period (min)			15										
c Critical Lane Group													

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.5	0.2	0.3	260.4	261.2	257.6	0.1	0.0	0.0	968.3	944.0	983.8
Total Del/Veh (s)	70.7	68.8	54.0	192.1	43.5	30.2	18.8	17.0	8.1	325.9	423.5	421.8

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W Performance by movement

Movement	All
Denied Del/Veh (s)	274.2
Total Del/Veh (s)	103.1

2: Huntwood Ave. & Sandoval Way. Performance by movement

Movement	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.3	4.1	0.2	0.2	0.0	0.0	0.0	0.2
Total Del/Veh (s)	74.1	17.5	63.5	5.8	57.9	32.6	9.2	9.8	13.2	22.4

Total Network Performance

Denied Del/Veh (s)	271.0
Total Del/Veh (s)	111.5

Queuing and Blocking Report  
Proposed Conditions

AM Peak

Intersection: 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	TR	L	L	T	T
Maximum Queue (ft)	274	467	450	532	270	579	530	419	100	127	72	60
Average Queue (ft)	113	281	254	270	268	540	433	179	17	47	15	5
95th Queue (ft)	258	406	379	483	273	584	614	396	64	102	50	31
Link Distance (ft)		1379	1379	1379		520	520	520		212	212	212
Upstream Blk Time (%)						82	1	0				
Queuing Penalty (veh)						0	0	0				
Storage Bay Dist (ft)	250				245				100			
Storage Blk Time (%)	0	15			81	2			0	1		
Queuing Penalty (veh)	0	13			316	8			0	1		

Intersection: 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Movement	NB	SB	SB	SB
Directions Served	TR	L	T	TR
Maximum Queue (ft)	112	180	570	563
Average Queue (ft)	33	101	536	537
95th Queue (ft)	78	240	553	553
Link Distance (ft)	212		518	518
Upstream Blk Time (%)			86	94
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)		155		
Storage Blk Time (%)		0	97	
Queuing Penalty (veh)		0	69	

Intersection: 2: Huntwood Ave. & Sandoval Way.

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LTR	LT	R	LT	T	TR	L	TR
Maximum Queue (ft)	35	64	77	283	184	221	124	228
Average Queue (ft)	2	22	32	116	72	99	13	169
95th Queue (ft)	16	55	59	225	143	180	66	277
Link Distance (ft)	208	319		327	327	327		212
Upstream Blk Time (%)				0				8
Queuing Penalty (veh)				0				99
Storage Bay Dist (ft)			80				100	
Storage Blk Time (%)		0	0				0	21
Queuing Penalty (veh)		0	0				0	15

Network Summary

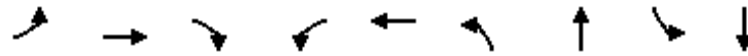
Network wide Queuing Penalty: 521

Queues

Proposed Conditions

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	275	1319	221	151	995	360	915	99	302
v/c Ratio	0.83	0.97	0.34	0.73	0.67	0.41	0.70	0.57	0.72
Control Delay	78.9	63.7	16.4	82.9	48.9	35.4	38.5	76.6	50.4
Queue Delay	0.0	0.0	4.9	0.0	0.0	1.2	3.9	0.0	0.4
Total Delay	78.9	63.7	21.2	82.9	48.9	36.7	42.4	76.6	50.8
Queue Length 50th (ft)	260	635	60	143	308	161	293	94	96
Queue Length 95th (ft)	355	#878	141	222	#404	203	331	152	144
Internal Link Dist (ft)		1325			504		245		496
Turn Bay Length (ft)	250			245		100		155	
Base Capacity (vph)	367	1362	647	218	1487	886	1303	283	619
Starvation Cap Reductn	0	0	0	0	0	320	298	0	0
Spillback Cap Reductn	0	0	353	0	0	0	0	0	74
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.75	0.97	0.75	0.69	0.67	0.64	0.91	0.35	0.55

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis  
 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Proposed Conditions  
 Timing Plan: PM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	250	1200	201	142	812	123	353	583	314	92	158	123
Future Volume (vph)	250	1200	201	142	812	123	353	583	314	92	158	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0	6.0	4.5	6.0		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	*1.00	1.00	1.00	0.91		0.97	0.91		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3654	1519	1736	4881		3367	4700		1736	3223	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	3654	1519	1736	4881		3367	4700		1736	3223	
Peak-hour factor, PHF	0.91	0.91	0.91	0.94	0.94	0.94	0.98	0.98	0.98	0.93	0.93	0.93
Adj. Flow (vph)	275	1319	221	151	864	131	360	595	320	99	170	132
RTOR Reduction (vph)	0	0	81	0	12	0	0	65	0	0	100	0
Lane Group Flow (vph)	275	1319	140	151	983	0	360	850	0	99	202	0
Confl. Peds. (#/hr)									1			
Confl. Bikes (#/hr)			2			1			3			1
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Split	NA		Split	NA	
Protected Phases	5	2		1	6		4	4		3	3	
Permitted Phases			2									
Actuated Green, G (s)	28.6	56.0	56.0	18.0	45.4		39.5	39.5		15.0	15.0	
Effective Green, g (s)	28.6	56.0	56.0	18.0	45.4		39.5	39.5		15.0	15.0	
Actuated g/C Ratio	0.19	0.37	0.37	0.12	0.30		0.26	0.26		0.10	0.10	
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	3.0		2.0	2.0		3.0	3.0	
Lane Grp Cap (vph)	330	1364	567	208	1477		886	1237		173	322	
v/s Ratio Prot	c0.16	c0.36		0.09	0.20		0.11	c0.18		0.06	c0.06	
v/s Ratio Perm			0.09									
v/c Ratio	0.83	0.97	0.25	0.73	0.67		0.41	0.69		0.57	0.63	
Uniform Delay, d1	58.4	46.1	32.4	63.6	45.7		45.6	49.7		64.4	64.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.75	0.79		1.00	1.00	
Incremental Delay, d2	16.3	17.4	0.6	11.9	1.1		1.2	2.8		4.5	3.8	
Delay (s)	74.7	63.5	33.1	75.5	46.8		35.2	42.1		69.0	68.6	
Level of Service	E	E	C	E	D		D	D		E	E	
Approach Delay (s)		61.5			50.6			40.2			68.7	
Approach LOS		E			D			D			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			53.6				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			21.5		
Intersection Capacity Utilization			93.6%				ICU Level of Service			F		
Analysis Period (min)			15									
c Critical Lane Group												

Queues  
2: Huntwood Ave. & Sandoval Way.

Proposed Conditions  
Timing Plan: PM Peak



Lane Group	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	24	29	115	1307	30	396
v/c Ratio	0.15	0.25	0.55	0.49	0.07	0.87
Control Delay	1.9	72.3	21.3	23.0	58.5	85.8
Queue Delay	0.0	0.0	0.7	0.2	0.0	51.9
Total Delay	1.9	72.3	22.0	23.2	58.5	137.7
Queue Length 50th (ft)	0	27	0	328	21	307
Queue Length 95th (ft)	0	60	56	328	m41	#488
Internal Link Dist (ft)	33	318		275		245
Turn Bay Length (ft)			80		100	
Base Capacity (vph)	171	115	209	2741	438	458
Starvation Cap Reductn	0	0	0	0	0	126
Spillback Cap Reductn	0	0	13	617	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.25	0.59	0.62	0.07	1.19

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.

# HCM Signalized Intersection Capacity Analysis

## 2: Huntwood Ave. & Sandoval Way.

Proposed Conditions  
Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	7	25	0	99	3	1143	18	24	311	10
Future Volume (vph)	10	0	7	25	0	99	3	1143	18	24	311	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			5.0	5.0		5.0		5.0	5.0	
Lane Util. Factor		1.00			1.00	1.00		0.91		1.00	1.00	
Frbp, ped/bikes		1.00			1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.94			1.00	0.85		1.00		1.00	1.00	
Flt Protected		0.97			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1675			1736	1532		4972		1736	1817	
Flt Permitted		0.97			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (perm)		1675			1736	1532		4972		1736	1817	
Peak-hour factor, PHF	0.71	0.71	0.71	0.86	0.86	0.86	0.89	0.89	0.89	0.81	0.81	0.81
Adj. Flow (vph)	14	0	10	29	0	115	3	1284	20	30	384	12
RTOR Reduction (vph)	0	23	0	0	0	107	0	1	0	0	1	0
Lane Group Flow (vph)	0	1	0	0	29	8	0	1306	0	30	395	0
Confl. Peds. (#/hr)	1					1			6	6		
Confl. Bikes (#/hr)									14			8
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Split	NA		Split	NA	Perm	Split	NA		Split	NA	
Protected Phases	1	1		2	2		4	4		3	3	
Permitted Phases						2						
Actuated Green, G (s)		4.2			10.0	10.0		79.2		37.6	37.6	
Effective Green, g (s)		4.2			10.0	10.0		79.2		37.6	37.6	
Actuated g/C Ratio		0.03			0.07	0.07		0.53		0.25	0.25	
Clearance Time (s)		4.0			5.0	5.0		5.0		5.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0		6.0		6.0	6.0	
Lane Grp Cap (vph)		46			115	102		2625		435	455	
v/s Ratio Prot		c0.00			c0.02			c0.26		0.02	c0.22	
v/s Ratio Perm						0.01						
v/c Ratio		0.01			0.25	0.08		0.50		0.07	0.87	
Uniform Delay, d1		70.9			66.5	65.7		22.7		42.9	53.8	
Progression Factor		1.00			1.00	1.00		1.00		1.34	1.28	
Incremental Delay, d2		0.0			0.4	0.1		0.7		0.2	16.3	
Delay (s)		70.9			66.9	65.8		23.3		57.5	85.2	
Level of Service		E			E	E		C		E	F	
Approach Delay (s)		70.9			66.0			23.3			83.3	
Approach LOS		E			E			C			F	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			40.6				HCM 2000 Level of Service			D		
HCM 2000 Volume to Capacity ratio			0.57									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			19.0		
Intersection Capacity Utilization			48.8%				ICU Level of Service			A		
Analysis Period (min)			15									
c	Critical Lane Group											



SimTraffic Performance Report  
Proposed Conditions

PM Peak

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	210.8	205.8	211.1	40.6	33.4	31.3	0.0	0.0	0.0	3.6	0.2	0.2
Total Del/Veh (s)	271.7	253.1	381.2	258.1	58.7	31.1	34.3	33.6	26.9	68.7	96.0	52.6

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W Performance by movement

Movement	All
Denied Del/Veh (s)	86.8
Total Del/Veh (s)	134.9

2: Huntwood Ave. & Sandoval Way. Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.4	4.0	0.8	0.3	0.3	0.0	0.0	0.0	0.4
Total Del/Veh (s)	91.1	23.4	72.8	21.7	15.7	19.1	17.1	63.3	54.8	66.9	29.7

Total Network Performance

Denied Del/Veh (s)	85.8
Total Del/Veh (s)	146.7

Queuing and Blocking Report  
Proposed Conditions

PM Peak

Intersection: 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	TR	L	L	T	T
Maximum Queue (ft)	275	1402	1393	1322	270	536	492	380	125	240	236	220
Average Queue (ft)	252	1294	1280	1172	223	403	328	200	102	164	191	166
95th Queue (ft)	331	1591	1595	1789	333	606	539	350	151	254	269	243
Link Distance (ft)		1349	1349	1349		520	520	520		214	214	214
Upstream Blk Time (%)		58	57	40		23	0	0		5	8	1
Queuing Penalty (veh)		0	0	0		0	0	0		16	26	4
Storage Bay Dist (ft)	250				245				100			
Storage Blk Time (%)	14	62			39	16			7	23		
Queuing Penalty (veh)	82	156			106	23			12	40		

Intersection: 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Movement	NB	SB	SB	SB
Directions Served	TR	L	T	TR
Maximum Queue (ft)	227	179	320	311
Average Queue (ft)	187	92	147	148
95th Queue (ft)	255	177	307	314
Link Distance (ft)	214		514	514
Upstream Blk Time (%)	10		0	0
Queuing Penalty (veh)	31		0	0
Storage Bay Dist (ft)		155		
Storage Blk Time (%)		1	13	
Queuing Penalty (veh)		1	12	

Intersection: 2: Huntwood Ave. & Sandoval Way.

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LTR	LT	R	LT	T	TR	L	TR
Maximum Queue (ft)	60	128	101	276	296	336	124	235
Average Queue (ft)	20	31	50	121	157	169	17	217
95th Queue (ft)	50	87	91	230	274	308	74	237
Link Distance (ft)	79	319		325	325	325		214
Upstream Blk Time (%)	1			0	0	1		49
Queuing Penalty (veh)	0			0	0	0		246
Storage Bay Dist (ft)			80				100	
Storage Blk Time (%)		1	4					63
Queuing Penalty (veh)		1	1					15

Network Summary

Network wide Queuing Penalty: 773

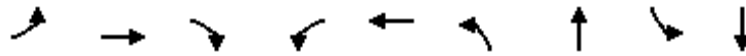
## Alternative 2 - Synchro/SimTraffic Analysis Reports

Queues

Proposed Conditions

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Timing Plan: AM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	88	652	435	437	1391	207	257	85	697
v/c Ratio	0.34	0.88	0.82	0.92	0.83	0.61	0.18	0.58	0.76
Control Delay	61.9	71.6	34.9	78.0	50.4	78.2	19.8	81.6	55.8
Queue Delay	0.0	0.0	0.4	9.0	0.0	0.0	0.0	0.0	0.0
Total Delay	61.9	71.6	35.3	87.0	50.4	78.2	19.8	81.6	55.8
Queue Length 50th (ft)	77	329	169	407	458	108	28	81	330
Queue Length 95th (ft)	142	#441	#351	#520	451	146	43	130	374
Internal Link Dist (ft)		1351			504		245		496
Turn Bay Length (ft)	250			245		100		155	
Base Capacity (vph)	260	739	531	515	1987	347	1399	179	919
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	8	57	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.88	0.83	0.95	0.70	0.60	0.18	0.47	0.76

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis  
 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Proposed Conditions  
 Timing Plan: AM Peak

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	84	626	418	376	1165	31	201	127	122	71	468	118
Future Volume (vph)	84	626	418	376	1165	31	201	127	122	71	468	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0	6.0	4.5	6.0		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	0.95	1.00	1.00	0.91		0.97	0.91		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00		1.00	0.93		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3471	1514	1736	4966		3367	4590		1736	3367	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	3471	1514	1736	4966		3367	4590		1736	3367	
Peak-hour factor, PHF	0.96	0.96	0.96	0.86	0.86	0.86	0.97	0.97	0.97	0.84	0.84	0.84
Adj. Flow (vph)	88	652	435	437	1355	36	207	131	126	85	557	140
RTOR Reduction (vph)	0	0	209	0	2	0	0	90	0	0	15	0
Lane Group Flow (vph)	88	652	226	437	1389	0	207	167	0	85	682	0
Confl. Peds. (#/hr)			2			2			1			
Confl. Bikes (#/hr)						2						
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	22.5	31.9	31.9	41.1	50.5		15.2	42.8		12.7	40.3	
Effective Green, g (s)	22.5	31.9	31.9	41.1	50.5		15.2	42.8		12.7	40.3	
Actuated g/C Ratio	0.15	0.21	0.21	0.27	0.34		0.10	0.29		0.08	0.27	
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	260	738	321	475	1671		341	1309		146	904	
v/s Ratio Prot	0.05	c0.19		c0.25	0.28		c0.06	0.04		0.05	c0.20	
v/s Ratio Perm			0.15									
v/c Ratio	0.34	0.88	0.70	0.92	0.83		0.61	0.13		0.58	0.75	
Uniform Delay, d1	57.1	57.2	54.7	52.9	45.8		64.5	39.8		66.1	50.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.09	0.91		1.00	1.00	
Incremental Delay, d2	0.8	13.5	9.9	23.1	3.7		3.0	0.2		5.8	3.2	
Delay (s)	57.9	70.7	64.5	76.0	49.5		73.1	36.3		71.9	53.5	
Level of Service	E	E	E	E	D		E	D		E	D	
Approach Delay (s)		67.5			55.8			52.7			55.5	
Approach LOS		E			E			D			E	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			58.7				HCM 2000 Level of Service			E		
HCM 2000 Volume to Capacity ratio			0.82									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)			21.5		
Intersection Capacity Utilization			90.7%				ICU Level of Service			E		
Analysis Period (min)			15									
c Critical Lane Group												

Queues  
2: Huntwood Ave. & Sandoval Way.

Proposed Conditions  
Timing Plan: AM Peak



Lane Group	EBT	WBT	WBR	NBT	SBL	SBT
Lane Group Flow (vph)	4	34	93	383	82	1286
v/c Ratio	0.03	0.37	0.49	0.10	0.10	0.81
Control Delay	52.5	79.2	21.5	4.4	0.7	8.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.9
Total Delay	52.5	79.2	21.5	4.4	0.7	10.9
Queue Length 50th (ft)	2	32	0	29	2	218
Queue Length 95th (ft)	7	55	26	39	m6	110
Internal Link Dist (ft)	163	318		275		245
Turn Bay Length (ft)			80		100	
Base Capacity (vph)	126	91	188	3743	854	1583
Starvation Cap Reductn	0	0	0	0	0	195
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.37	0.49	0.10	0.10	0.93

Intersection Summary

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

# HCM Signalized Intersection Capacity Analysis

## 2: Huntwood Ave. & Sandoval Way.

Proposed Conditions  
Timing Plan: AM Peak



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕	↕	↕	↕↕↕		↕	↕	
Traffic Volume (vph)	0	1	1	24	0	65	0	324	25	69	1077	3
Future Volume (vph)	0	1	1	24	0	65	0	324	25	69	1077	3
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			5.0	5.0		5.0		4.0	5.0	
Lane Util. Factor		1.00			1.00	1.00		0.91		1.00	1.00	
Frbp, ped/bikes		1.00			1.00	0.99		1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00		1.00		1.00	1.00	
Frt		0.93			1.00	0.85		0.99		1.00	1.00	
Flt Protected		1.00			0.95	1.00		1.00		0.95	1.00	
Satd. Flow (prot)		1704			1736	1532		4920		1727	1826	
Flt Permitted		1.00			0.76	1.00		1.00		0.50	1.00	
Satd. Flow (perm)		1704			1380	1532		4920		907	1826	
Peak-hour factor, PHF	0.50	0.50	0.50	0.70	0.70	0.70	0.91	0.91	0.91	0.84	0.84	0.84
Adj. Flow (vph)	0	2	2	34	0	93	0	356	27	82	1282	4
RTOR Reduction (vph)	0	2	0	0	0	87	0	6	0	0	0	0
Lane Group Flow (vph)	0	2	0	0	34	6	0	377	0	82	1286	0
Confl. Peds. (#/hr)	1					1			6	6		
Confl. Bikes (#/hr)									10			18
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type		NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		6			2		7	4		3	8	
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)		11.0			10.0	10.0		114.0		130.0	130.0	
Effective Green, g (s)		11.0			10.0	10.0		114.0		130.0	130.0	
Actuated g/C Ratio		0.07			0.07	0.07		0.76		0.87	0.87	
Clearance Time (s)		4.0			5.0	5.0		5.0		4.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0		6.0		2.0	6.0	
Lane Grp Cap (vph)		124			92	102		3739		851	1582	
v/s Ratio Prot		0.00						0.08		0.01	c0.70	
v/s Ratio Perm					c0.02	0.00				0.08		
v/c Ratio		0.02			0.37	0.06		0.10		0.10	0.81	
Uniform Delay, d1		64.5			67.0	65.6		4.7		1.5	4.5	
Progression Factor		1.00			1.00	1.00		1.00		0.47	1.04	
Incremental Delay, d2		0.0			0.9	0.1		0.1		0.1	2.7	
Delay (s)		64.5			67.9	65.7		4.7		0.8	7.4	
Level of Service		E			E	E		A		A	A	
Approach Delay (s)		64.5			66.3			4.7			7.0	
Approach LOS		E			E			A			A	

### Intersection Summary

HCM 2000 Control Delay	10.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	150.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	74.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	2.5	0.2	0.3	5.5	2.8	2.6	0.8	0.1	0.2	234.8	225.5	231.5
Total Del/Veh (s)	63.3	62.1	89.9	80.3	46.2	27.9	72.1	36.5	10.5	237.1	250.0	244.8

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W Performance by movement

Movement	All
Denied Del/Veh (s)	40.9
Total Del/Veh (s)	89.1

2: Huntwood Ave. & Sandoval Way. Performance by movement

Movement	EBT	EBR	WBL	WBR	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.3	4.0	0.2	0.2	0.0	0.0	0.0	0.2
Total Del/Veh (s)	62.8	9.0	77.1	6.0	12.8	7.4	5.6	3.0	2.6	6.4

Total Network Performance

Denied Del/Veh (s)	40.4
Total Del/Veh (s)	92.5



Queuing and Blocking Report  
Proposed Conditions

AM Peak

Intersection: 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	TR	L	L	T	T
Maximum Queue (ft)	274	446	412	666	270	568	546	424	124	226	125	103
Average Queue (ft)	94	272	245	405	259	472	382	225	94	139	55	20
95th Queue (ft)	233	405	368	700	310	623	541	377	152	206	109	71
Link Distance (ft)		1379	1379	1379		520	520	520		212	212	212
Upstream Blk Time (%)						16	1	0		2		
Queuing Penalty (veh)						0	0	0		2		
Storage Bay Dist (ft)	250				245				100			
Storage Blk Time (%)	0	14			32	15			7	33		
Queuing Penalty (veh)	0	11			125	58			7	33		

Intersection: 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Movement	NB	SB	SB	SB
Directions Served	TR	L	T	TR
Maximum Queue (ft)	118	180	562	567
Average Queue (ft)	44	139	530	525
95th Queue (ft)	94	248	585	599
Link Distance (ft)	212		518	518
Upstream Blk Time (%)			76	77
Queuing Penalty (veh)			0	0
Storage Bay Dist (ft)		155		
Storage Blk Time (%)		2	94	
Queuing Penalty (veh)		6	67	

Intersection: 2: Huntwood Ave. & Sandoval Way.

Movement	EB	WB	WB	NB	NB	NB	SB	SB
Directions Served	LTR	LT	R	T	T	TR	L	TR
Maximum Queue (ft)	30	88	80	232	116	160	90	200
Average Queue (ft)	3	24	29	44	21	33	14	51
95th Queue (ft)	16	61	60	139	70	97	50	154
Link Distance (ft)	208	319		327	327	327		212
Upstream Blk Time (%)								0
Queuing Penalty (veh)								1
Storage Bay Dist (ft)			80				100	
Storage Blk Time (%)		0	0	3			0	3
Queuing Penalty (veh)		0	0	0			0	2

Network Summary

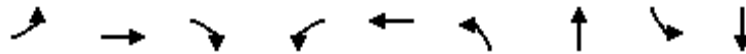
Network wide Queuing Penalty: 312

Queues

Proposed Conditions

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Timing Plan: PM Peak



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	275	1319	221	151	995	360	915	99	302
v/c Ratio	0.77	1.08	0.37	0.81	0.85	0.66	0.58	0.65	0.34
Control Delay	72.3	95.6	17.2	95.2	60.9	59.5	34.2	85.1	27.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	2.0	1.3	0.0	0.0
Total Delay	72.3	95.6	17.2	95.2	60.9	61.5	35.5	85.1	27.7
Queue Length 50th (ft)	259	~732	63	145	334	126	246	95	73
Queue Length 95th (ft)	#424	#866	139	#251	383	183	303	158	118
Internal Link Dist (ft)		1325			504		245		496
Turn Bay Length (ft)	250			245		100		155	
Base Capacity (vph)	356	1225	596	202	1281	549	1590	179	899
Starvation Cap Reductn	0	0	0	0	0	85	436	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	1.08	0.37	0.75	0.78	0.78	0.79	0.55	0.34

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.

HCM Signalized Intersection Capacity Analysis  
 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Proposed Conditions  
 Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		 			  		 	  			 	
Traffic Volume (vph)	250	1200	201	142	812	123	353	583	314	92	158	123
Future Volume (vph)	250	1200	201	142	812	123	353	583	314	92	158	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.5	6.0	6.0	4.5	6.0		5.5	5.5		5.5	5.5	
Lane Util. Factor	1.00	*1.00	1.00	1.00	0.91		0.97	0.91		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3654	1518	1736	4881		3367	4700		1736	3225	
Flt Permitted	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1736	3654	1518	1736	4881		3367	4700		1736	3225	
Peak-hour factor, PHF	0.91	0.91	0.91	0.94	0.94	0.94	0.98	0.98	0.98	0.93	0.93	0.93
Adj. Flow (vph)	275	1319	221	151	864	131	360	595	320	99	170	132
RTOR Reduction (vph)	0	0	87	0	14	0	0	63	0	0	93	0
Lane Group Flow (vph)	275	1319	134	151	981	0	360	852	0	99	209	0
Confl. Peds. (#/hr)									1			
Confl. Bikes (#/hr)			2			1			3			1
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Prot	NA	Perm	Prot	NA		Prot	NA		Prot	NA	
Protected Phases	5	2		1	6		7	4		3	8	
Permitted Phases			2									
Actuated Green, G (s)	30.8	50.3	50.3	16.2	35.7		24.5	48.7		13.3	37.5	
Effective Green, g (s)	30.8	50.3	50.3	16.2	35.7		24.5	48.7		13.3	37.5	
Actuated g/C Ratio	0.21	0.34	0.34	0.11	0.24		0.16	0.32		0.09	0.25	
Clearance Time (s)	4.5	6.0	6.0	4.5	6.0		5.5	5.5		5.5	5.5	
Vehicle Extension (s)	3.0	6.0	6.0	3.0	3.0		3.0	2.0		3.0	2.0	
Lane Grp Cap (vph)	356	1225	509	187	1161		549	1525		153	806	
v/s Ratio Prot	0.16	c0.36		0.09	c0.20		c0.11	c0.18		0.06	0.06	
v/s Ratio Perm			0.09									
v/c Ratio	0.77	1.08	0.26	0.81	0.85		0.66	0.56		0.65	0.26	
Uniform Delay, d1	56.3	49.9	36.3	65.4	54.5		58.8	41.8		66.1	45.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00		0.91	0.86		1.00	1.00	
Incremental Delay, d2	10.0	49.0	0.8	21.9	5.8		5.7	1.4		9.1	0.1	
Delay (s)	66.3	98.9	37.1	87.3	60.3		59.2	37.5		75.1	45.2	
Level of Service	E	F	D	F	E		E	D		E	D	
Approach Delay (s)		86.4			63.9			43.6			52.6	
Approach LOS		F			E			D			D	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			66.2			HCM 2000 Level of Service				E		
HCM 2000 Volume to Capacity ratio			0.84									
Actuated Cycle Length (s)			150.0			Sum of lost time (s)			21.5			
Intersection Capacity Utilization			93.6%			ICU Level of Service				F		
Analysis Period (min)			15									
c Critical Lane Group												

Queues  
2: Huntwood Ave. & Sandoval Way.

Proposed Conditions  
Timing Plan: PM Peak



Lane Group	EBT	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	24	29	115	3	1304	30	396
v/c Ratio	0.16	0.28	0.55	0.00	0.34	0.08	0.26
Control Delay	8.1	74.0	21.3	1.7	6.1	1.3	2.0
Queue Delay	0.0	0.0	0.3	0.0	0.0	0.0	0.8
Total Delay	8.1	74.0	21.6	1.7	6.1	1.3	2.8
Queue Length 50th (ft)	0	28	0	0	134	1	23
Queue Length 95th (ft)	1	60	56	1	151	m5	74
Internal Link Dist (ft)	33	318			275		245
Turn Bay Length (ft)			80	155		100	
Base Capacity (vph)	146	103	209	878	3781	397	1550
Starvation Cap Reductn	0	0	0	0	0	0	835
Spillback Cap Reductn	0	0	6	0	274	0	0
Storage Cap Reductn	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.28	0.57	0.00	0.37	0.08	0.55






















Intersection Summary

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

# HCM Signalized Intersection Capacity Analysis

## 2: Huntwood Ave. & Sandoval Way.

Proposed Conditions  
Timing Plan: PM Peak

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	0	7	25	0	99	3	1143	18	24	311	10
Future Volume (vph)	10	0	7	25	0	99	3	1143	18	24	311	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			5.0	5.0	4.0	5.0		4.0	5.0	
Lane Util. Factor		1.00			1.00	1.00	1.00	0.91		1.00	1.00	
Frbp, ped/bikes		1.00			1.00	0.99	1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00			1.00	1.00	1.00	1.00		1.00	1.00	
Frt		0.94			1.00	0.85	1.00	1.00		1.00	1.00	
Flt Protected		0.97			0.95	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1674			1736	1532	1736	4973		1735	1817	
Flt Permitted		0.84			0.85	1.00	0.53	1.00		0.18	1.00	
Satd. Flow (perm)		1445			1554	1532	965	4973		327	1817	
Peak-hour factor, PHF	0.71	0.71	0.71	0.86	0.86	0.86	0.89	0.89	0.89	0.81	0.81	0.81
Adj. Flow (vph)	14	0	10	29	0	115	3	1284	20	30	384	12
RTOR Reduction (vph)	0	22	0	0	0	107	0	1	0	0	1	0
Lane Group Flow (vph)	0	2	0	0	29	8	3	1303	0	30	395	0
Confl. Peds. (#/hr)	1					1			6	6		
Confl. Bikes (#/hr)									14			8
Heavy Vehicles (%)	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%	4%
Turn Type	Perm	NA		Perm	NA	Perm	pm+pt	NA		pm+pt	NA	
Protected Phases		6			2		7	4		3	8	
Permitted Phases	6			2		2	4			8		
Actuated Green, G (s)		11.0			10.0	10.0	115.2	114.0		130.0	124.8	
Effective Green, g (s)		11.0			10.0	10.0	115.2	114.0		130.0	124.8	
Actuated g/C Ratio		0.07			0.07	0.07	0.77	0.76		0.87	0.83	
Clearance Time (s)		4.0			5.0	5.0	4.0	5.0		4.0	5.0	
Vehicle Extension (s)		2.0			2.0	2.0	2.0	6.0		2.0	6.0	
Lane Grp Cap (vph)		105			103	102	747	3779		396	1511	
v/s Ratio Prot							0.00	c0.26		c0.01	c0.22	
v/s Ratio Perm		0.00			c0.02	0.01	0.00			0.06		
v/c Ratio		0.02			0.28	0.08	0.00	0.34		0.08	0.26	
Uniform Delay, d1		64.5			66.6	65.7	4.0	5.9		1.9	2.7	
Progression Factor		1.00			1.00	1.00	1.00	1.00		0.80	0.70	
Incremental Delay, d2		0.0			0.5	0.1	0.0	0.3		0.3	0.4	
Delay (s)		64.5			67.1	65.8	4.0	6.1		1.8	2.3	
Level of Service		E			E	E	A	A		A	A	
Approach Delay (s)		64.5			66.0			6.1			2.3	
Approach LOS		E			E			A			A	
<b>Intersection Summary</b>												
HCM 2000 Control Delay			10.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.33									
Actuated Cycle Length (s)			150.0				Sum of lost time (s)				14.0	
Intersection Capacity Utilization			48.8%				ICU Level of Service				A	
Analysis Period (min)			15									
c Critical Lane Group												

SimTraffic Performance Report  
Proposed Conditions

PM Peak

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W Performance by movement

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Denied Del/Veh (s)	7.2	5.7	5.0	2.5	0.2	0.3	0.0	0.0	0.0	3.4	0.2	0.2
Total Del/Veh (s)	167.7	160.5	15.7	98.9	53.6	27.4	65.4	32.2	22.6	69.8	46.2	17.3

1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W Performance by movement

Movement	All
Denied Del/Veh (s)	2.4
Total Del/Veh (s)	83.5

2: Huntwood Ave. & Sandoval Way. Performance by movement

Movement	EBL	EBR	WBL	WBR	NBL	NBT	NBR	SBL	SBT	SBR	All
Denied Del/Veh (s)	0.1	0.1	0.5	4.0	2.7	1.3	0.8	0.0	0.0	0.0	1.1
Total Del/Veh (s)	84.8	11.8	68.2	37.9	6.4	11.2	8.0	13.5	1.7	1.1	11.4

Total Network Performance

Denied Del/Veh (s)	2.8
Total Del/Veh (s)	88.7

Queuing and Blocking Report  
Proposed Conditions

PM Peak

Intersection: 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	TR	L	L	T	T
Maximum Queue (ft)	275	1383	1372	1082	270	496	425	286	125	239	236	217
Average Queue (ft)	239	1034	991	263	196	322	262	183	111	191	176	151
95th Queue (ft)	353	1522	1491	1056	309	456	380	277	152	265	251	224
Link Distance (ft)		1349	1349	1349		520	520	520		214	214	214
Upstream Blk Time (%)		12	9	5		0	0			17	2	0
Queuing Penalty (veh)		0	0	0		0	0			55	6	1
Storage Bay Dist (ft)	250				245				100			
Storage Blk Time (%)	4	58			4	19			17	52		
Queuing Penalty (veh)	21	144			12	27			30	92		

Intersection: 1: Huntwood Ave. & Industrial Pkwy/Industrial Pkwy W

Movement	NB	SB	SB	SB
Directions Served	TR	L	T	TR
Maximum Queue (ft)	225	179	238	220
Average Queue (ft)	160	91	103	90
95th Queue (ft)	245	159	188	174
Link Distance (ft)	214		514	514
Upstream Blk Time (%)	3			
Queuing Penalty (veh)	11			
Storage Bay Dist (ft)		155		
Storage Blk Time (%)		3	2	
Queuing Penalty (veh)		2	2	

Intersection: 2: Huntwood Ave. & Sandoval Way.

Movement	EB	WB	WB	NB	NB	NB	NB	SB	SB
Directions Served	LTR	LT	R	L	T	T	TR	L	TR
Maximum Queue (ft)	60	187	104	58	299	249	282	36	62
Average Queue (ft)	17	41	58	3	99	91	100	11	7
95th Queue (ft)	46	132	103	30	228	187	221	32	33
Link Distance (ft)	78	319			325	325	325		214
Upstream Blk Time (%)	1				2	1	1		
Queuing Penalty (veh)	0				0	0	0		
Storage Bay Dist (ft)			80	155				100	
Storage Blk Time (%)		0	12		5				0
Queuing Penalty (veh)		0	3		0				0

Network Summary

Network wide Queuing Penalty: 407