

FEASIBILITY AND OPTIONS STUDY FOR TRAFFIC OPERATION IMPROVEMENTS























APPENDIX F: SYNCHRO ANALYSES (EXISTING AND FUTURE CONDITIONS)

October 1, 2014

## APPENDIX F: SYNCHRO ANALYSES (EXISTING AND FUTURE CONDITIONS)

HCM Unsignalized Intersection Capacity Analysis  
 1: Olympic Drive & Pleasant Hill Rd.

7/23/2014

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Sign Control	Stop			Stop			Stop			Stop					
Volume (vph)	503	262	0	0	265	399	3	12	2	263	4	309			
Peak Hour Factor	0.94	0.94	0.94	0.77	0.77	0.77	0.47	0.47	0.47	0.92	0.92	0.92			
Hourly flow rate (vph)	535	279	0	0	344	518	6	26	4	286	4	336			
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2	SB 3						
Volume Total (vph)	535	279	0	344	518	36	286	4	336						
Volume Left (vph)	535	0	0	0	0	6	286	0	0						
Volume Right (vph)	0	0	0	0	518	4	0	0	336						
Hadj (s)	0.53	0.03	0.00	0.03	-0.67	0.00	0.53	0.03	-0.67						
Departure Headway (s)	7.1	6.6	7.1	7.1	3.2	8.5	8.0	7.5	3.2						
Degree Utilization, x	1.06	0.51	0.00	0.68	0.46	0.09	0.64	0.01	0.30						
Capacity (veh/h)	512	536	504	491	1116	379	437	462	1113						
Control Delay (s)	82.3	15.2	8.9	22.7	7.7	12.3	23.0	9.4	6.4						
Approach Delay (s)	59.3		13.7			12.3	14.0								
Approach LOS	F		B			B	B								
Intersection Summary															
Delay			29.6												
Level of Service			D												
Intersection Capacity Utilization			79.7%				ICU Level of Service				D				
Analysis Period (min)			15												

# HCM Unsignalized Intersection Capacity Analysis

## 2: RSR & Olympic Drive

7/23/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↑	↗		↖
Sign Control	Stop		Stop			Stop
Volume (vph)	583	11	121	732	3	132
Peak Hour Factor	0.97	0.97	0.95	0.95	0.75	0.75
Hourly flow rate (vph)	601	11	127	771	4	176



















Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	612	127	771	180
Volume Left (vph)	601	0	0	4
Volume Right (vph)	11	0	771	0
Hadj (s)	0.22	0.03	-0.67	0.04
Departure Headway (s)	6.4	6.8	6.1	7.1
Degree Utilization, x	1.09	0.24	1.31	0.36
Capacity (veh/h)	554	520	598	501
Control Delay (s)	88.9	10.8	171.5	14.0
Approach Delay (s)	88.9	148.7		14.0
Approach LOS	F	F		B

Intersection Summary			
Delay		112.7	
Level of Service		F	
Intersection Capacity Utilization		65.3%	ICU Level of Service C
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 3: RSR & Beechwood

















7/23/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	1	19	1	3	9	32	834	3	5	684	27
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.65	0.65	0.65	0.97	0.97	0.97	0.94	0.94	0.94
Hourly flow rate (vph)	13	1	25	2	5	14	33	860	3	5	728	29
Pedestrians		7										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		1										
Right turn flare (veh)												
Median type								None			None	
Median storage veh												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1703	1689	749	1692	1701	861	763			863		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1703	1689	749	1692	1701	861	763			863		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	79	98	94	98	95	96	96			99		
cM capacity (veh/h)	64	89	409	66	87	355	844			779		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>	<b>SB 2</b>							
Volume Total	40	20	896	5	756							
Volume Left	13	2	33	5	0							
Volume Right	25	14	3	0	29							
cSH	140	173	844	779	1700							
Volume to Capacity	0.29	0.12	0.04	0.01	0.44							
Queue Length 95th (ft)	28	10	3	1	0							
Control Delay (s)	40.7	28.5	1.1	9.7	0.0							
Lane LOS	E	D	A	A								
Approach Delay (s)	40.7	28.5	1.1	0.1								
Approach LOS	E	D										
<b>Intersection Summary</b>												
Average Delay			1.9									
Intersection Capacity Utilization			90.2%		ICU Level of Service					E		
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 4: Las Trampas/Richelle & RSR

7/23/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	15	0	5	0	0	2	0	858	0	0	674	8
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.50	0.50	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	30	0	10	0	0	4	0	903	0	0	709	8
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1621	1617	714	1627	1621	903	718			903		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1621	1617	714	1627	1621	903	718			903		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	63	100	98	100	100	99	100			100		
cM capacity (veh/h)	82	104	431	80	103	336	883			753		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	40	4	903	718								
Volume Left	30	0	0	0								
Volume Right	10	4	0	8								
cSH	102	336	883	753								
Volume to Capacity	0.39	0.01	0.00	0.00								
Queue Length 95th (ft)	40	1	0	0								
Control Delay (s)	61.1	15.9	0.0	0.0								
Lane LOS	F	C										
Approach Delay (s)	61.1	15.9	0.0	0.0								
Approach LOS	F	C										
<b>Intersection Summary</b>												
Average Delay			1.5									
Intersection Capacity Utilization			65.1%		ICU Level of Service					C		
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 5: RSR & Glenside























7/23/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	223	15	10	648	540	112
Peak Hour Factor	0.93	0.93	0.96	0.96	0.93	0.93
Hourly flow rate (vph)	240	16	10	675	581	120
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	256	685	701			
Volume Left (vph)	240	10	0			
Volume Right (vph)	16	0	120			
Hadj (s)	0.18	0.04	-0.07			
Departure Headway (s)	7.2	5.9	5.8			
Degree Utilization, x	0.51	1.13	1.13			
Capacity (veh/h)	498	614	625			
Control Delay (s)	17.4	98.6	99.8			
Approach Delay (s)	17.4	98.6	99.8			
Approach LOS	C	F	F			
Intersection Summary						
Delay			86.4			
Level of Service			F			
Intersection Capacity Utilization			68.6%	ICU Level of Service		C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis  
 1: Olympic Drive & Pleasant Hill Rd.

7/23/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop			Stop		
Volume (vph)	393	216	0	1	194	320	1	4	1	393	9	386
Peak Hour Factor	0.94	0.94	0.94	0.77	0.77	0.77	0.47	0.47	0.47	0.92	0.92	0.92
Hourly flow rate (vph)	418	230	0	1	252	416	2	9	2	427	10	420
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2	SB 3			
Volume Total (vph)	418	230	1	252	416	13	427	10	420			
Volume Left (vph)	418	0	1	0	0	2	427	0	0			
Volume Right (vph)	0	0	0	0	416	2	0	0	420			
Hadj (s)	0.53	0.03	0.53	0.03	-0.67	-0.03	0.53	0.03	-0.67			
Departure Headway (s)	7.4	6.9	8.0	7.5	3.2	8.3	7.6	7.1	3.2			
Degree Utilization, x	0.86	0.44	0.00	0.52	0.37	0.03	0.90	0.02	0.37			
Capacity (veh/h)	478	507	433	455	1114	397	467	487	1114			
Control Delay (s)	40.3	14.1	9.8	17.3	6.9	11.5	47.5	9.1	6.9			
Approach Delay (s)	31.0		10.8			11.5	27.1					
Approach LOS	D		B			B	D					
Intersection Summary												
Delay			23.2									
Level of Service			C									
Intersection Capacity Utilization			76.8%		ICU Level of Service				D			
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 2: RSR & Olympic Drive

7/23/2014





















Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	573	10	14	594	4	14
Peak Hour Factor	0.97	0.97	0.95	0.95	0.75	0.75
Hourly flow rate (vph)	591	10	15	625	5	19
Direction, Lane #	WB 1	NB 1	NB 2	SB 1		
Volume Total (vph)	601	15	625	24		
Volume Left (vph)	591	0	0	5		
Volume Right (vph)	10	0	625	0		
Hadj (s)	0.22	0.03	-0.67	0.08		
Departure Headway (s)	6.0	6.6	5.9	7.2		
Degree Utilization, x	1.01	0.03	1.02	0.05		
Capacity (veh/h)	594	548	625	496		
Control Delay (s)	62.4	8.6	63.5	10.6		
Approach Delay (s)	62.4	62.3		10.6		
Approach LOS	F	F		B		
Intersection Summary						
Delay			61.3			
Level of Service			F			
Intersection Capacity Utilization			51.1%	ICU Level of Service	A	
Analysis Period (min)			15			



# HCM Unsignalized Intersection Capacity Analysis

## 3: RSR & Beechwood

















7/23/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	17	1	39	1	0	5	26	594	0	6	548	19
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.65	0.65	0.65	0.97	0.97	0.97	0.94	0.94	0.94
Hourly flow rate (vph)	23	1	52	2	0	8	27	612	0	6	583	20
Pedestrians		7										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		1										
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1287	1279	600	1314	1289	612	610			612		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1287	1279	600	1314	1289	612	610			612		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	83	99	90	99	100	98	97			99		
cM capacity (veh/h)	134	159	498	117	157	493	963			967		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>	<b>SB 2</b>							
Volume Total	76	9	639	6	603							
Volume Left	23	2	27	6	0							
Volume Right	52	8	0	0	20							
cSH	269	320	963	967	1700							
Volume to Capacity	0.28	0.03	0.03	0.01	0.35							
Queue Length 95th (ft)	28	2	2	0	0							
Control Delay (s)	23.5	16.6	0.7	8.7	0.0							
Lane LOS	C	C	A	A								
Approach Delay (s)	23.5	16.6	0.7	0.1								
Approach LOS	C	C										
<b>Intersection Summary</b>												
Average Delay			1.9									
Intersection Capacity Utilization			71.7%		ICU Level of Service					C		
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 4: Las Trampas/Richelle & RSR

7/23/2014

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	13	0	3	0	0	1	3	599	1	6	568	17
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.50	0.50	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	26	0	6	0	0	2	3	631	1	6	598	18
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1259	1257	607	1263	1266	631	616			632		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1259	1257	607	1263	1266	631	616			632		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	82	100	99	100	100	100	100			99		
cM capacity (veh/h)	146	169	496	144	167	481	964			951		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>SB 1</b>								
Volume Total	32	2	635	622								
Volume Left	26	0	3	6								
Volume Right	6	2	1	18								
cSH	168	481	964	951								
Volume to Capacity	0.19	0.00	0.00	0.01								
Queue Length 95th (ft)	17	0	0	1								
Control Delay (s)	31.4	12.5	0.1	0.2								
Lane LOS	D	B	A	A								
Approach Delay (s)	31.4	12.5	0.1	0.2								
Approach LOS	D	B										
<b>Intersection Summary</b>												
Average Delay			0.9									
Intersection Capacity Utilization			53.6%		ICU Level of Service					A		
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 5: RSR & Glenside

7/23/2014
























Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	58	24	17	546	492	58
Peak Hour Factor	0.93	0.93	0.96	0.96	0.93	0.93
Hourly flow rate (vph)	62	26	18	569	529	62
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	88	586	591			
Volume Left (vph)	62	18	0			
Volume Right (vph)	26	0	62			
Hadj (s)	0.00	0.04	-0.03			
Departure Headway (s)	6.6	5.0	4.9			
Degree Utilization, x	0.16	0.81	0.81			
Capacity (veh/h)	509	711	717			
Control Delay (s)	10.9	25.6	25.0			
Approach Delay (s)	10.9	25.6	25.0			
Approach LOS	B	D	D			
Intersection Summary						
Delay			24.3			
Level of Service			C			
Intersection Capacity Utilization			59.6%	ICU Level of Service		B
Analysis Period (min)			15			

# HCM Unsignalized Intersection Capacity Analysis

## 1: Olympic Drive & Pleasant Hill Rd.

7/30/2014

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Sign Control	Stop			Stop			Stop			Stop					
Volume (vph)	430	464	0	0	561	513	4	9	3	329	4	222			
Peak Hour Factor	0.94	0.94	0.94	0.77	0.77	0.77	0.47	0.47	0.47	0.92	0.92	0.92			
Hourly flow rate (vph)	457	494	0	0	729	666	9	19	6	358	4	241			
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2	SB 3						
Volume Total (vph)	457	494	0	729	666	34	358	4	241						
Volume Left (vph)	457	0	0	0	0	9	358	0	0						
Volume Right (vph)	0	0	0	0	666	6	0	0	241						
Hadj (s)	0.53	0.03	0.00	0.03	-0.67	-0.03	0.53	0.03	-0.67						
Departure Headway (s)	7.9	7.4	7.7	7.7	3.2	9.7	8.5	8.0	3.2						
Degree Utilization, x	1.00	1.01	0.00	1.57	0.59	0.09	0.84	0.01	0.21						
Capacity (veh/h)	457	494	463	469	1118	353	358	440	1122						
Control Delay (s)	70.2	70.6	9.5	283.7	9.5	13.6	41.8	9.9	5.9						
Approach Delay (s)	70.4		152.8			13.6	27.2								
Approach LOS	F		F			B	D								
Intersection Summary															
Delay			99.5												
Level of Service			F												
Intersection Capacity Utilization			96.7%				ICU Level of Service				F				
Analysis Period (min)			15												

# HCM Unsignalized Intersection Capacity Analysis

## 2: RSR & Olympic Drive

7/30/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	684	15	135	868	4	135
Peak Hour Factor	0.97	0.97	0.95	0.95	0.75	0.75
Hourly flow rate (vph)	705	15	142	914	5	180

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	721	142	914	185
Volume Left (vph)	705	0	0	5
Volume Right (vph)	15	0	914	0
Hadj (s)	0.22	0.03	-0.67	0.04
Departure Headway (s)	6.4	6.9	6.2	7.1
Degree Utilization, x	1.28	0.27	1.56	0.37
Capacity (veh/h)	556	520	590	501
Control Delay (s)	161.5	11.2	276.8	14.2
Approach Delay (s)	161.5	241.0		14.2
Approach LOS	F	F		B

Intersection Summary			
Delay		190.4	
Level of Service		F	
Intersection Capacity Utilization		74.9%	ICU Level of Service D
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 3: RSR & Beechwood

7/30/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↑		↖	↗	
Volume (veh/h)	12	1	20	1	4	10	34	983	4	6	782	31
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.65	0.65	0.65	0.97	0.97	0.97	0.94	0.94	0.94
Hourly flow rate (vph)	16	1	27	2	6	15	35	1013	4	6	832	33
Pedestrians		7										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		1										
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1972	1956	855	1958	1970	1015	872			1018		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1972	1956	855	1958	1970	1015	872			1018		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	59	98	93	96	90	95	95			99		
cM capacity (veh/h)	39	60	356	42	59	289	769			682		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	44	23	1053	6	865
Volume Left	16	2	35	6	0
Volume Right	27	15	4	0	33
cSH	86	118	769	682	1700
Volume to Capacity	0.51	0.20	0.05	0.01	0.51
Queue Length 95th (ft)	55	17	4	1	0
Control Delay (s)	84.3	42.7	1.4	10.3	0.0
Lane LOS	F	E	A	B	
Approach Delay (s)	84.3	42.7	1.4	0.1	
Approach LOS	F	E			

### Intersection Summary

Average Delay	3.1
Intersection Capacity Utilization	102.2%
ICU Level of Service	G
Analysis Period (min)	15

# HCM Unsignalized Intersection Capacity Analysis

## 4: Las Trampas/Richelle & RSR

7/30/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	16	0	6	0	0	3	0	1028	0	0	764	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.50	0.50	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	0	12	0	0	6	0	1082	0	0	804	9
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1897	1891	809	1903	1896	1082	814			1082		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1897	1891	809	1903	1896	1082	814			1082		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	38	100	97	100	100	98	100			100		
cM capacity (veh/h)	52	70	380	51	70	264	813			645		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	44	6	1082	814
Volume Left	32	0	0	0
Volume Right	12	6	0	9
cSH	68	264	813	645
Volume to Capacity	0.65	0.02	0.00	0.00
Queue Length 95th (ft)	71	2	0	0
Control Delay (s)	127.5	18.9	0.0	0.0
Lane LOS	F	C		
Approach Delay (s)	127.5	18.9	0.0	0.0
Approach LOS	F	C		

Intersection Summary			
Average Delay		2.9	
Intersection Capacity Utilization	75.2%	ICU Level of Service	D
Analysis Period (min)	15		

# HCM Unsignalized Intersection Capacity Analysis

## 5: RSR & Glenside

7/30/2014

























Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	266	17	11	774	618	128
Peak Hour Factor	0.93	0.93	0.96	0.96	0.93	0.93
Hourly flow rate (vph)	286	18	11	806	665	138
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	304	818	802			
Volume Left (vph)	286	11	0			
Volume Right (vph)	18	0	138			
Hadj (s)	0.19	0.04	-0.07			
Departure Headway (s)	7.2	6.1	6.0			
Degree Utilization, x	0.61	1.39	1.34			
Capacity (veh/h)	490	590	610			
Control Delay (s)	20.6	205.7	184.3			
Approach Delay (s)	20.6	205.7	184.3			
Approach LOS	C	F	F			
Intersection Summary						
Delay			167.5			
Level of Service			F			
Intersection Capacity Utilization			79.7%	ICU Level of Service		D
Analysis Period (min)			15			



HCM Unsignalized Intersection Capacity Analysis  
 1: Olympic Drive & Pleasant Hill Rd.

7/30/2014

															
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR			
Lane Configurations															
Sign Control	Stop			Stop				Stop			Stop				
Volume (vph)	330	364	0	1	373	476	1	4	1	450	9	296			
Peak Hour Factor	0.94	0.94	0.94	0.77	0.77	0.77	0.47	0.47	0.47	0.92	0.92	0.92			
Hourly flow rate (vph)	351	387	0	1	484	618	2	9	2	489	10	322			
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1	SB 2	SB 3						
Volume Total (vph)	351	387	1	484	618	13	489	10	322						
Volume Left (vph)	351	0	1	0	0	2	489	0	0						
Volume Right (vph)	0	0	0	0	618	2	0	0	322						
Hadj (s)	0.53	0.03	0.53	0.03	-0.67	-0.03	0.53	0.03	-0.67						
Departure Headway (s)	8.1	7.6	8.2	7.7	3.2	9.6	8.2	7.7	3.2						
Degree Utilization, x	0.79	0.82	0.00	1.03	0.55	0.03	1.11	0.02	0.29						
Capacity (veh/h)	437	466	432	472	1117	361	429	461	1112						
Control Delay (s)	34.6	35.9	10.0	77.5	8.8	13.0	102.9	9.6	6.3						
Approach Delay (s)	35.2		39.0			13.0		63.9							
Approach LOS	E		E			B		F							
Intersection Summary															
Delay			45.5												
Level of Service			E												
Intersection Capacity Utilization			86.9%				ICU Level of Service				E				
Analysis Period (min)			15												

# HCM Unsignalized Intersection Capacity Analysis

## 2: RSR & Olympic Drive

7/30/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Sign Control	Stop		Stop			Stop
Volume (vph)	659	11	15	656	5	16
Peak Hour Factor	0.97	0.97	0.95	0.95	0.75	0.75
Hourly flow rate (vph)	679	11	16	691	7	21

Direction, Lane #	WB 1	NB 1	NB 2	SB 1
Volume Total (vph)	691	16	691	28
Volume Left (vph)	679	0	0	7
Volume Right (vph)	11	0	691	0
Hadj (s)	0.22	0.03	-0.67	0.08
Departure Headway (s)	6.0	6.5	5.8	7.1
Degree Utilization, x	1.16	0.03	1.11	0.06
Capacity (veh/h)	585	548	628	496
Control Delay (s)	110.6	8.5	90.5	10.6
Approach Delay (s)	110.6	88.7		10.6
Approach LOS	F	F		B

Intersection Summary			
Delay		97.8	
Level of Service		F	
Intersection Capacity Utilization		55.4%	ICU Level of Service B
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 3: RSR & Beechwood

7/30/2014

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	19	1	42	1	0	6	27	609	0	7	658	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.65	0.65	0.65	0.97	0.97	0.97	0.94	0.94	0.94
Hourly flow rate (vph)	25	1	56	2	0	9	28	628	0	7	700	7
Pedestrians		7										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		1										
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1418	1409	711	1455	1413	628	714			628		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1418	1409	711	1455	1413	628	714			628		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	76	99	87	98	100	98	97			99		
cM capacity (veh/h)	108	132	431	90	132	483	881			954		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2							
Volume Total	83	11	656	7	707							
Volume Left	25	2	28	7	0							
Volume Right	56	9	0	0	7							
cSH	220	297	881	954	1700							
Volume to Capacity	0.38	0.04	0.03	0.01	0.42							
Queue Length 95th (ft)	41	3	2	1	0							
Control Delay (s)	30.8	17.6	0.8	8.8	0.0							
Lane LOS	D	C	A	A								
Approach Delay (s)	30.8	17.6	0.8	0.1								
Approach LOS	D	C										
Intersection Summary												
Average Delay			2.3									
Intersection Capacity Utilization			74.7%	ICU Level of Service	D							
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 4: Las Trampas/Richelle & RSR

7/30/2014



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	14	0	4	0	0	2	3	662	1	7	679	20
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.50	0.50	0.50	0.50	0.50	0.50	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	28	0	8	0	0	4	3	697	1	7	715	21
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1448	1444	725	1452	1454	697	736			698		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1448	1444	725	1452	1454	697	736			698		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	74	100	98	100	100	99	100			99		
cM capacity (veh/h)	107	130	425	105	129	441	870			898		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	36	4	701	743
Volume Left	28	0	3	7
Volume Right	8	4	1	21
cSH	129	441	870	898
Volume to Capacity	0.28	0.01	0.00	0.01
Queue Length 95th (ft)	27	1	0	1
Control Delay (s)	43.5	13.2	0.1	0.2
Lane LOS	E	B	A	A
Approach Delay (s)	43.5	13.2	0.1	0.2
Approach LOS	E	B		

Intersection Summary			
Average Delay		1.2	
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

# HCM Unsignalized Intersection Capacity Analysis

## 5: RSR & Glenside

7/30/2014



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	58	68	19	603	594	70
Peak Hour Factor	0.93	0.93	0.96	0.96	0.93	0.93
Hourly flow rate (vph)	62	73	20	628	639	75
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total (vph)	135	648	714			
Volume Left (vph)	62	20	0			
Volume Right (vph)	73	0	75			
Hadj (s)	-0.20	0.04	-0.03			
Departure Headway (s)	6.7	5.3	5.3			
Degree Utilization, x	0.25	0.96	1.04			
Capacity (veh/h)	524	670	688			
Control Delay (s)	12.0	47.3	68.8			
Approach Delay (s)	12.0	47.3	68.8			
Approach LOS	B	E	F			
Intersection Summary						
Delay			54.4			
Level of Service			F			
Intersection Capacity Utilization			67.8%	ICU Level of Service	C	
Analysis Period (min)			15			