

**APPENDIX D**  
**Sensitivity Analysis: Baldwin Street**

# HCM Unsignalized Intersection Capacity Analysis

## 5: Roebuck St & Baldwin St

9/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↖			↖
Volume (veh/h)	0	84	331	0	0	753
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	0	85	334	0	0	761
Pedestrians	5					
Lane Width (m)	3.4					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						55
pX, platoon unblocked	0.83					
vC, conflicting volume	1100	339			339	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1016	339			339	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	100	88			100	
cM capacity (veh/h)	219	687			1226	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	85	334	761
Volume Left	0	0	0
Volume Right	85	0	0
cSH	687	1700	1700
Volume to Capacity	0.12	0.20	0.45
Queue Length 95th (m)	3.4	0.0	0.0
Control Delay (s)	11.0	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.0	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		47.4%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 7: Cassels Rd W & Baldwin St

9/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔					↗	↘		↗	↘	↗
Volume (veh/h)	0	4	51	0	0	0	22	338	18	107	638	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	4	53	0	0	0	23	352	19	111	665	7
Pedestrians					5							
Lane Width (m)					0.0							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)											142	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	1285	1309	665	1355	1307	366	672			376		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1266	1292	587	1342	1289	366	595			376		
tC, single (s)	7.1	6.8	6.3	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	96	88	100	100	100	97			90		
cM capacity (veh/h)	123	119	456	94	133	683	889			1172		

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	57	23	371	111	665	7
Volume Left	0	23	0	111	0	0
Volume Right	53	0	19	0	0	7
cSH	378	889	1700	1172	1700	1700
Volume to Capacity	0.15	0.03	0.22	0.10	0.39	0.00
Queue Length 95th (m)	4.2	0.6	0.0	2.5	0.0	0.0
Control Delay (s)	16.2	9.2	0.0	8.4	0.0	0.0
Lane LOS	C	A		A		
Approach Delay (s)	16.2	0.5		1.2		
Approach LOS	C					

Intersection Summary		
Average Delay		1.7
Intersection Capacity Utilization	54.4%	ICU Level of Service
Analysis Period (min)		15
		A

# HCM Unsignalized Intersection Capacity Analysis

## 8: Cassels St E & Roebuck St

9/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕							
Volume (veh/h)	5	149	21	93	0	63	0	0	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	6	180	25	112	0	76	0	0	0	0	0	0
Pedestrians					2			1				
Lane Width (m)					3.8			0.0				
Walking Speed (m/s)					1.2			1.2				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	76			206			467	505	195	468	480	38
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	76			206			467	505	195	468	480	38
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			92			100	100	100	100	100	100
cM capacity (veh/h)	1536			1365			476	432	850	474	446	1040

Direction, Lane #	EB 1	WB 1
Volume Total	211	188
Volume Left	6	112
Volume Right	25	76
cSH	1536	1365
Volume to Capacity	0.00	0.08
Queue Length 95th (m)	0.1	2.1
Control Delay (s)	0.2	5.0
Lane LOS	A	A
Approach Delay (s)	0.2	5.0
Approach LOS		

Intersection Summary		
Average Delay		2.5
Intersection Capacity Utilization	27.2%	ICU Level of Service
Analysis Period (min)		15
		A

# HCM Unsignalized Intersection Capacity Analysis

## 5: Roebuck St & Baldwin St

9/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↙		↑			↘
Volume (veh/h)	5	105	310	0	0	753
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	5	106	313	0	0	761
Pedestrians	5					
Lane Width (m)	3.4					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						55
pX, platoon unblocked	0.85					
vC, conflicting volume	1079	318			318	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1003	318			318	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	98	85			100	
cM capacity (veh/h)	229	706			1248	



















Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	111	313	761
Volume Left	5	0	0
Volume Right	106	0	0
cSH	645	1700	1700
Volume to Capacity	0.17	0.18	0.45
Queue Length 95th (m)	5.0	0.0	0.0
Control Delay (s)	11.7	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.7	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization		58.2%	ICU Level of Service B
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 7: Cassels Rd W & Baldwin St
















9/25/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	4	51	0	0	0	24	310	26	107	638	7
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	4	53	0	0	0	25	323	27	111	665	7
Pedestrians					5							
Lane Width (m)					0.0							
Walking Speed (m/s)					1.2							
Percent Blockage					0							
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)											142	
pX, platoon unblocked	0.91	0.91	0.91	0.91	0.91		0.91					
vC, conflicting volume	1260	1292	665	1334	1286	341	672			355		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1237	1272	582	1318	1265	341	590			355		
tC, single (s)	7.1	6.8	6.3	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.2	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	97	88	100	100	100	97			91		
cM capacity (veh/h)	128	121	457	97	137	706	888			1193		
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3						
Volume Total	57	25	350	111	665	7						
Volume Left	0	25	0	111	0	0						
Volume Right	53	0	27	0	0	7						
cSH	380	888	1700	1193	1700	1700						
Volume to Capacity	0.15	0.03	0.21	0.09	0.39	0.00						
Queue Length 95th (m)	4.2	0.7	0.0	2.5	0.0	0.0						
Control Delay (s)	16.1	9.2	0.0	8.3	0.0	0.0						
Lane LOS	C	A		A								
Approach Delay (s)	16.1	0.6		1.2								
Approach LOS	C											
Intersection Summary												
Average Delay				1.7								
Intersection Capacity Utilization			54.4%		ICU Level of Service		A					
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 8: Cassels St E & Roebuck St

9/25/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	149	21	48	0	108	0	19	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	6	180	25	58	0	130	0	23	24	0	0	0
Pedestrians					2			1				
Lane Width (m)					3.7			4.2				
Walking Speed (m/s)					1.2			1.2				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	130			206			386	451	195	422	399	65
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	130			206			386	451	195	422	399	65
tC, single (s)	4.1			4.1			7.1	6.6	6.4	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.4	3.5	4.0	3.3
p0 queue free %	100			96			100	95	97	100	100	100
cM capacity (veh/h)	1468			1364			555	474	812	490	517	1005
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>									
Volume Total	211	188	47									
Volume Left	6	58	0									
Volume Right	25	130	24									
cSH	1468	1364	603									
Volume to Capacity	0.00	0.04	0.08									
Queue Length 95th (m)	0.1	1.1	2.0									
Control Delay (s)	0.2	2.6	11.5									
Lane LOS	A	A	B									
Approach Delay (s)	0.2	2.6	11.5									
Approach LOS			B									
<b>Intersection Summary</b>												
Average Delay			2.4									
Intersection Capacity Utilization			34.9%	ICU Level of Service						A		
Analysis Period (min)			15									

# HCM Unsignalized Intersection Capacity Analysis

## 2: Cassels St W & Baldwin St

9/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↑	↗
Volume (veh/h)	0	51	0	401	680	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	53	0	418	708	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)					150	
pX, platoon unblocked	0.91	0.91	0.91			
vC, conflicting volume	1126	708	716			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1091	634	642			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	100	88	100			
cM capacity (veh/h)	219	428	871			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	53	418	708	7
Volume Left	0	0	0	0
Volume Right	53	0	0	7
cSH	428	1700	1700	1700
Volume to Capacity	0.12	0.25	0.42	0.00
Queue Length 95th (m)	3.4	0.0	0.0	0.0
Control Delay (s)	14.6	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	14.6	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization	49.9%		ICU Level of Service A
Analysis Period (min)	15		



# HCM Unsignalized Intersection Capacity Analysis

## 14: Cassels St E & Baldwin St

5/12/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	42	63	376	25	107	645
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	44	66	392	26	111	672
Pedestrians	5					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						113
pX, platoon unblocked	0.89					
vC, conflicting volume	1304	410			423	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1279	410			423	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	70	90			90	
cM capacity (veh/h)	147	639			1121	

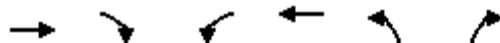
Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	44	66	418	111	672
Volume Left	44	0	0	111	0
Volume Right	0	66	26	0	0
cSH	147	639	1700	1121	1700
Volume to Capacity	0.30	0.10	0.25	0.10	0.40
Queue Length 95th (m)	9.3	2.7	0.0	2.6	0.0
Control Delay (s)	39.6	11.3	0.0	8.6	0.0
Lane LOS	E	B		A	
Approach Delay (s)	22.6		0.0	1.2	
Approach LOS	C				

Intersection Summary					
Average Delay			2.6		
Intersection Capacity Utilization			47.7%	ICU Level of Service	A
Analysis Period (min)			15		

# HCM Unsignalized Intersection Capacity Analysis

## 8: Cassels St E & Princess St

9/25/2013



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↔	↔
Volume (veh/h)	116	17	48	89	16	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	140	20	58	107	19	24
Pedestrians				2	1	
Lane Width (m)				3.8	3.8	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				0	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			161	374		153
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			161	374		153
tC, single (s)			4.1	6.4		6.4
tC, 2 stage (s)						
tF (s)			2.2	3.5		3.4
p0 queue free %			96	97		97
cM capacity (veh/h)			1416	605		858

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	160	165	43
Volume Left	0	58	19
Volume Right	20	0	24
cSH	1700	1416	723
Volume to Capacity	0.09	0.04	0.06
Queue Length 95th (m)	0.0	1.0	1.5
Control Delay (s)	0.0	2.9	10.3
Lane LOS	A		B
Approach Delay (s)	0.0	2.9	10.3
Approach LOS	B		

Intersection Summary			
Average Delay	2.5		
Intersection Capacity Utilization	30.3%	ICU Level of Service	A
Analysis Period (min)	15		

# HCM Unsignalized Intersection Capacity Analysis

## 5: Roebuck St & Baldwin St

9/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	5	121	294	5	107	646
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	5	122	297	5	108	653
Pedestrians	5					
Lane Width (m)	3.4					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						55
pX, platoon unblocked	0.86					
vC, conflicting volume	1173	304			307	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1120	304			307	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	97	83			91	
cM capacity (veh/h)	180	719			1216	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	127	302	108	653
Volume Left	5	0	108	0
Volume Right	122	5	0	0
cSH	642	1700	1216	1700
Volume to Capacity	0.20	0.18	0.09	0.38
Queue Length 95th (m)	5.9	0.0	2.3	0.0
Control Delay (s)	12.0	0.0	8.3	0.0
Lane LOS	B		A	
Approach Delay (s)	12.0	0.0	1.2	
Approach LOS	B			

Intersection Summary			
Average Delay		2.0	
Intersection Capacity Utilization		53.1%	ICU Level of Service
Analysis Period (min)		15	A

# HCM Unsignalized Intersection Capacity Analysis

## 7: Cassels Rd W & Baldwin St

9/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	4	51	24	293	644	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	4	53	25	305	671	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					142	
pX, platoon unblocked	0.92	0.92	0.92			
vC, conflicting volume	1026	671	678			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	982	594	602			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	98	88	97			
cM capacity (veh/h)	248	452	884			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	57	330	671	7
Volume Left	4	25	0	0
Volume Right	53	0	0	7
cSH	426	884	1700	1700
Volume to Capacity	0.13	0.03	0.39	0.00
Queue Length 95th (m)	3.7	0.7	0.0	0.0
Control Delay (s)	14.7	1.0	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	14.7	1.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay		1.1	
Intersection Capacity Utilization		49.6%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 8: Cassels St E & Roebuck St

9/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↑			↔	
Volume (veh/h)	1	21	3	48	0	108	0	18	20	98	14	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	1	25	4	58	0	130	0	22	24	118	17	0
Pedestrians					2			1				
Lane Width (m)					3.8			3.8				
Walking Speed (m/s)					1.2			1.2				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	130			30			220	276	30	247	213	65
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	130			30			220	276	30	247	213	65
tC, single (s)	4.1			4.1			7.1	6.6	6.4	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.4	3.5	4.1	3.3
p0 queue free %	100			96			100	96	98	82	97	100
cM capacity (veh/h)	1468			1582			704	601	1006	646	638	1005

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	30	188	46	135
Volume Left	1	58	0	118
Volume Right	4	130	24	0
cSH	1468	1582	762	645
Volume to Capacity	0.00	0.04	0.06	0.21
Queue Length 95th (m)	0.0	0.9	1.5	6.3
Control Delay (s)	0.3	2.5	10.0	12.0
Lane LOS	A	A	B	B
Approach Delay (s)	0.3	2.5	10.0	12.0
Approach LOS			B	B

Intersection Summary			
Average Delay		6.4	
Intersection Capacity Utilization	37.2%		ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 2: Cassels St W & Baldwin St

9/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↑	↓	↘
Volume (veh/h)	0	51	24	356	680	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	53	25	371	708	7
Pedestrians	5					
Lane Width (m)	3.8					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)					150	
pX, platoon unblocked	0.93	0.93	0.93			
vC, conflicting volume	1134	713	721			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1106	653	660			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	100	87	97			
cM capacity (veh/h)	211	422	849			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	53	25	371	708	7
Volume Left	0	25	0	0	0
Volume Right	53	0	0	0	7
cSH	422	849	1700	1700	1700
Volume to Capacity	0.13	0.03	0.22	0.42	0.00
Queue Length 95th (m)	3.4	0.7	0.0	0.0	0.0
Control Delay (s)	14.7	9.4	0.0	0.0	0.0
Lane LOS	B	A			
Approach Delay (s)	14.7	0.6		0.0	
Approach LOS	B				

Intersection Summary					
Average Delay			0.9		
Intersection Capacity Utilization		49.9%		ICU Level of Service	A
Analysis Period (min)		15			

# HCM Unsignalized Intersection Capacity Analysis

## 5: Roebuck St & Baldwin St

9/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗			↗
Volume (veh/h)	0	78	337	0	0	753
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	0	79	340	0	0	761
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						55
pX, platoon unblocked	0.83					
vC, conflicting volume	1101	340			340	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1019	340			340	
tC, single (s)	6.4	6.3			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.2	
p0 queue free %	100	89			100	
cM capacity (veh/h)	220	689			1230	
















Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	79	340	761
Volume Left	0	0	0
Volume Right	79	0	0
cSH	689	1700	1700
Volume to Capacity	0.11	0.20	0.45
Queue Length 95th (m)	3.1	0.0	0.0
Control Delay (s)	10.9	0.0	0.0
Lane LOS	B		
Approach Delay (s)	10.9	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		47.4%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 8: Cassels St E & Roebuck St

9/25/2013

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	7	109	17	48	48	60	1	18	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	8	131	20	58	58	72	1	22	24	0	0	0
Pedestrians					2			1				
Lane Width (m)					3.8			3.5				
Walking Speed (m/s)					1.2			1.2				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	130			153			369	405	145	405	379	94
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	130			153			369	405	145	405	379	94
tC, single (s)	4.1			4.1			7.1	6.6	6.4	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.4	3.5	4.1	3.3
p0 queue free %	99			96			100	96	97	100	100	100
cM capacity (veh/h)	1468			1427			570	504	867	500	509	968
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>									
Volume Total	160	188	47									
Volume Left	8	58	1									
Volume Right	20	72	24									
cSH	1468	1427	644									
Volume to Capacity	0.01	0.04	0.07									
Queue Length 95th (m)	0.1	1.0	1.9									
Control Delay (s)	0.4	2.6	11.0									
Lane LOS	A	A	B									
Approach Delay (s)	0.4	2.6	11.0									
Approach LOS			B									
<b>Intersection Summary</b>												
Average Delay			2.7									
Intersection Capacity Utilization			32.0%	ICU Level of Service						A		
Analysis Period (min)			15									



# HCM Unsignalized Intersection Capacity Analysis

## 14: Cassels St E & Baldwin St

9/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	43	7	330	26	107	645
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	45	7	344	27	111	672
Pedestrians	5					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						113
pX, platoon unblocked	0.89					
vC, conflicting volume	1257	362			376	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1228	362			376	
tC, single (s)	6.4	6.2			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.3	
p0 queue free %	72	99			90	
cM capacity (veh/h)	159	680			1115	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	52	371	111	672
Volume Left	45	0	111	0
Volume Right	7	27	0	0
cSH	178	1700	1115	1700
Volume to Capacity	0.29	0.22	0.10	0.40
Queue Length 95th (m)	9.2	0.0	2.7	0.0
Control Delay (s)	33.3	0.0	8.6	0.0
Lane LOS	D		A	
Approach Delay (s)	33.3	0.0	1.2	
Approach LOS	D			

Intersection Summary			
Average Delay		2.2	
Intersection Capacity Utilization		47.7%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 2: Cassels St W & Baldwin St

9/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	51	24	363	680	7
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	53	25	378	708	7
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (m)					150	
pX, platoon unblocked	0.92	0.92	0.92			
vC, conflicting volume	1140	712	716			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1110	646	649			
tC, single (s)	6.4	6.3	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.4	2.2			
p0 queue free %	100	88	97			
cM capacity (veh/h)	209	426	855			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	53	25	378	716
Volume Left	0	25	0	0
Volume Right	53	0	0	7
cSH	426	855	1700	1700
Volume to Capacity	0.12	0.03	0.22	0.42
Queue Length 95th (m)	3.4	0.7	0.0	0.0
Control Delay (s)	14.7	9.3	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	14.7	0.6		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	50.4%	ICU Level of Service	A
Analysis Period (min)	15		

# HCM Unsignalized Intersection Capacity Analysis

## 5: Roebuck St & Baldwin St

9/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↖			↗
Volume (veh/h)	0	78	343	0	0	753
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	0	79	346	0	0	761
Pedestrians	5					
Lane Width (m)	4.8					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						55
pX, platoon unblocked	0.83					
vC, conflicting volume	1112	351			351	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1032	351			351	
tC, single (s)	6.4	6.3			4.2	
tC, 2 stage (s)						
tF (s)	3.5	3.4			2.3	
p0 queue free %	100	88			100	
cM capacity (veh/h)	215	675			1168	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	79	346	761
Volume Left	0	0	0
Volume Right	79	0	0
cSH	675	1700	1700
Volume to Capacity	0.12	0.20	0.45
Queue Length 95th (m)	3.2	0.0	0.0
Control Delay (s)	11.0	0.0	0.0
Lane LOS	B		
Approach Delay (s)	11.0	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		47.4%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 8: Cassels St E & Roebuck St

9/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔				
Volume (veh/h)	7	109	17	48	48	60	1	18	20	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Hourly flow rate (vph)	8	131	20	58	58	72	1	22	24	0	0	0
Pedestrians					2			1				
Lane Width (m)					3.8			3.5				
Walking Speed (m/s)					1.2			1.2				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	130			153			369	405	145	405	379	94
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	130			153			369	405	145	405	379	94
tC, single (s)	4.1			4.1			7.1	6.6	6.4	7.1	6.6	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.1	3.4	3.5	4.1	3.3
p0 queue free %	99			96			100	96	97	100	100	100
cM capacity (veh/h)	1468			1427			570	504	867	500	509	968

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	160	188	47
Volume Left	8	58	1
Volume Right	20	72	24
cSH	1468	1427	644
Volume to Capacity	0.01	0.04	0.07
Queue Length 95th (m)	0.1	1.0	1.9
Control Delay (s)	0.4	2.6	11.0
Lane LOS	A	A	B
Approach Delay (s)	0.4	2.6	11.0
Approach LOS			B

Intersection Summary		
Average Delay		2.7
Intersection Capacity Utilization	32.0%	ICU Level of Service
Analysis Period (min)	15	A

# HCM Unsignalized Intersection Capacity Analysis

## 14: Cassels St E & Baldwin St

9/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W		T	R	L	T
Volume (veh/h)	43	8	335	26	107	645
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	45	8	349	27	111	672
Pedestrians	5					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						113
pX, platoon unblocked	0.89					
vC, conflicting volume	1249	354			381	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1219	354			381	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	72	99			90	
cM capacity (veh/h)	162	687			1162	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	53	349	27	111	672
Volume Left	45	0	0	111	0
Volume Right	8	0	27	0	0
cSH	184	1700	1700	1162	1700
Volume to Capacity	0.29	0.21	0.02	0.10	0.40
Queue Length 95th (m)	9.1	0.0	0.0	2.5	0.0
Control Delay (s)	32.4	0.0	0.0	8.4	0.0
Lane LOS	D			A	
Approach Delay (s)	32.4	0.0		1.2	
Approach LOS	D				

Intersection Summary					
Average Delay			2.2		
Intersection Capacity Utilization		47.7%		ICU Level of Service	A
Analysis Period (min)		15			

# HCM Unsignalized Intersection Capacity Analysis

## 5: Roebuck St & Baldwin St

9/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↖			↖
Volume (veh/h)	0	79	489	0	0	740
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	84	520	0	0	787
Pedestrians	21					
Lane Width (m)	3.4					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						55
pX, platoon unblocked	0.88					
vC, conflicting volume	1328	541			541	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1305	541			541	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	84			100	
cM capacity (veh/h)	154	534			1020	



















Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	84	520	787
Volume Left	0	0	0
Volume Right	84	0	0
cSH	534	1700	1700
Volume to Capacity	0.16	0.31	0.46
Queue Length 95th (m)	4.4	0.0	0.0
Control Delay (s)	13.0	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.0	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.8	
Intersection Capacity Utilization		46.6%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 7: Cassels Rd W & Baldwin St

9/25/2013

													
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (veh/h)	4	10	51	0	0	0	62	485	153	143	595	9	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Hourly flow rate (vph)	4	11	54	0	0	0	66	516	163	152	633	10	
Pedestrians					8			4					
Lane Width (m)					0.0			3.2					
Walking Speed (m/s)					1.2			1.2					
Percent Blockage					0			0					
Right turn flare (veh)													
Median type								None			None		
Median storage (veh)													
Upstream signal (m)												142	
pX, platoon unblocked	0.97	0.97	0.97	0.97	0.97		0.97						
vC, conflicting volume	1585	1756	637	1738	1684	605	643			687			
vC1, stage 1 conf vol													
vC2, stage 2 conf vol													
vCu, unblocked vol	1588	1765	607	1746	1690	605	613			687			
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 %	94	83	89	100	100	100	93			83			
cM capacity (veh/h)	70	64	482	42	71	501	944			917			
Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3							
Volume Total	69	66	679	152	633	10							
Volume Left	4	66	0	152	0	0							
Volume Right	54	0	163	0	0	10							
cSH	203	944	1700	917	1700	1700							
Volume to Capacity	0.34	0.07	0.40	0.17	0.37	0.01							
Queue Length 95th (m)	11.4	1.8	0.0	4.7	0.0	0.0							
Control Delay (s)	31.6	9.1	0.0	9.7	0.0	0.0							
Lane LOS	D	A		A									
Approach Delay (s)	31.6	0.8		1.9									
Approach LOS	D												
Intersection Summary													
Average Delay			2.6										
Intersection Capacity Utilization			63.4%		ICU Level of Service								B
Analysis Period (min)			15										

# HCM Unsignalized Intersection Capacity Analysis

## 8: Cassels St E & Roebuck St

9/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔							
Volume (veh/h)	9	242	46	31	0	82	0	0	0	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	9	255	48	33	0	86	0	0	0	0	0	0
Pedestrians					13			2				
Lane Width (m)					3.8			0.0				
Walking Speed (m/s)					1.2			1.2				
Percent Blockage					1			0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	86			305			408	451	294	419	433	43
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	86			305			408	451	294	419	433	43
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			97			100	100	100	100	100	100
cM capacity (veh/h)	1437			1267			543	490	742	528	502	1033

Direction, Lane #	EB 1	WB 1
Volume Total	313	119
Volume Left	9	33
Volume Right	48	86
cSH	1437	1267
Volume to Capacity	0.01	0.03
Queue Length 95th (m)	0.2	0.6
Control Delay (s)	0.3	2.3
Lane LOS	A	A
Approach Delay (s)	0.3	2.3
Approach LOS		

Intersection Summary		
Average Delay		0.8
Intersection Capacity Utilization	28.5%	ICU Level of Service
Analysis Period (min)		15
		A



# HCM Unsignalized Intersection Capacity Analysis

## 5: Roebuck St & Baldwin St

9/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔		↑			↑
Volume (veh/h)	1	98	470	0	0	740
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1	104	500	0	0	787
Pedestrians	21					
Lane Width (m)	3.4					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						55
pX, platoon unblocked	0.89					
vC, conflicting volume	1308	521			521	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1286	521			521	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	81			100	
cM capacity (veh/h)	161	548			1038	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	105	500	787
Volume Left	1	0	0
Volume Right	104	0	0
cSH	535	1700	1700
Volume to Capacity	0.20	0.29	0.46
Queue Length 95th (m)	5.8	0.0	0.0
Control Delay (s)	13.4	0.0	0.0
Lane LOS	B		
Approach Delay (s)	13.4	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization		56.7%	ICU Level of Service B
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 7: Cassels Rd W & Baldwin St

9/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔					↔	↔		↔	↔	↔
Volume (veh/h)	1	9	51	0	0	0	56	467	108	112	595	9
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1	10	54	0	0	0	60	497	115	119	633	10
Pedestrians					8			4				
Lane Width (m)					0.0			3.1				
Walking Speed (m/s)					1.2			1.2				
Percent Blockage					0			0				
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (m)												142
pX, platoon unblocked	0.96	0.96	0.96	0.96	0.96		0.96					
vC, conflicting volume	1487	1610	637	1616	1562	562	643			620		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1487	1615	601	1620	1565	562	607			620		
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 %	99	88	89	100	100	100	94			88		
cM capacity (veh/h)	86	83	482	56	89	530	942			971		

Direction, Lane #	EB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	65	60	612	119	633	10
Volume Left	1	60	0	119	0	0
Volume Right	54	0	115	0	0	10
cSH	270	942	1700	971	1700	1700
Volume to Capacity	0.24	0.06	0.36	0.12	0.37	0.01
Queue Length 95th (m)	7.3	1.6	0.0	3.3	0.0	0.0
Control Delay (s)	22.5	9.1	0.0	9.2	0.0	0.0
Lane LOS	C	A		A		
Approach Delay (s)	22.5	0.8		1.4		
Approach LOS	C					

Intersection Summary		
Average Delay		2.1
Intersection Capacity Utilization	57.2%	ICU Level of Service
Analysis Period (min)		15
		B

# HCM Unsignalized Intersection Capacity Analysis

## 8: Cassels St E & Roebuck St

9/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				
Volume (veh/h)	9	242	46	25	0	70	0	22	56	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	9	255	48	26	0	74	0	23	59	0	0	0
Pedestrians					13			2				
Lane Width (m)					3.7			4.2				
Walking Speed (m/s)					1.2			1.2				
Percent Blockage					1			0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	74			305			389	426	294	471	414	37
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	74			305			389	426	294	471	414	37
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			100	95	92	100	100	100
cM capacity (veh/h)	1453			1265			559	508	740	435	517	1041

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	313	100	82
Volume Left	9	26	0
Volume Right	48	74	59
cSH	1453	1265	656
Volume to Capacity	0.01	0.02	0.13
Queue Length 95th (m)	0.2	0.5	3.4
Control Delay (s)	0.3	2.2	11.3
Lane LOS	A	A	B
Approach Delay (s)	0.3	2.2	11.3
Approach LOS			B

Intersection Summary		
Average Delay		2.5
Intersection Capacity Utilization	35.8%	ICU Level of Service
Analysis Period (min)		15
		A

# HCM Unsignalized Intersection Capacity Analysis

## 2: Cassels Rd W & Baldwin St

9/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗		↑	↑	↗
Volume (veh/h)	0	51	0	624	595	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	54	0	664	633	10
Pedestrians	8			4		
Lane Width (m)	3.8			3.8		
Walking Speed (m/s)	1.2			1.2		
Percent Blockage	1			0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)					150	
pX, platoon unblocked	0.98	0.98	0.98			
vC, conflicting volume	1305	645	651			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1302	631	637			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	88	100			
cM capacity (veh/h)	175	472	935			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	54	664	633	10
Volume Left	0	0	0	0
Volume Right	54	0	0	10
cSH	472	1700	1700	1700
Volume to Capacity	0.12	0.39	0.37	0.01
Queue Length 95th (m)	3.1	0.0	0.0	0.0
Control Delay (s)	13.6	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	13.6	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay		0.5	
Intersection Capacity Utilization	47.7%		ICU Level of Service A
Analysis Period (min)	15		

# HCM Unsignalized Intersection Capacity Analysis

## 14: Cassels St E & Baldwin St

5/12/2014



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	12	62	558	87	190	604
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	13	66	594	93	202	643
Pedestrians	8					4
Lane Width (m)	3.5					3.3
Walking Speed (m/s)	1.2					1.2
Percent Blockage	1					0
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						113
pX, platoon unblocked	0.93					
vC, conflicting volume	1695	652			694	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1709	652			694	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	82	86			78	
cM capacity (veh/h)	73	467			905	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	13	66	686	202	643
Volume Left	13	0	0	202	0
Volume Right	0	66	93	0	0
cSH	73	467	1700	905	1700
Volume to Capacity	0.18	0.14	0.40	0.22	0.38
Queue Length 95th (m)	4.7	3.9	0.0	6.8	0.0
Control Delay (s)	64.9	14.0	0.0	10.1	0.0
Lane LOS	F	B		B	
Approach Delay (s)	22.2		0.0	2.4	
Approach LOS	C				

Intersection Summary					
Average Delay			2.4		
Intersection Capacity Utilization			64.9%	ICU Level of Service	C
Analysis Period (min)			15		

# HCM Unsignalized Intersection Capacity Analysis

## 8: Cassels St E & Princess St

9/25/2013



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↩			↩	↩	
Volume (veh/h)	247	30	25	70	21	56
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	260	32	26	74	22	59
Pedestrians				13	2	
Lane Width (m)				3.8	3.8	
Walking Speed (m/s)				1.2	1.2	
Percent Blockage				1	0	
Right turn flare (veh)						
Median type	None			None		
Median storage veh						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			294		404	291
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			294		404	291
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			98		96	92
cM capacity (veh/h)			1277		593	743

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	292	100	81
Volume Left	0	26	22
Volume Right	32	0	59
cSH	1700	1277	695
Volume to Capacity	0.17	0.02	0.12
Queue Length 95th (m)	0.0	0.5	3.2
Control Delay (s)	0.0	2.2	10.9
Lane LOS		A	B
Approach Delay (s)	0.0	2.2	10.9
Approach LOS			B

Intersection Summary			
Average Delay		2.3	
Intersection Capacity Utilization	40.8%		ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 5: Roebuck St & Baldwin St

9/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	1	89	479	23	143	597
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1	95	510	24	152	635
Pedestrians	21					
Lane Width (m)	3.4					
Walking Speed (m/s)	1.2					
Percent Blockage	2					
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						55
pX, platoon unblocked	0.85					
vC, conflicting volume	1482	543			555	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1479	543			555	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	82			85	
cM capacity (veh/h)	100	533			1009	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	96	534	152	635
Volume Left	1	0	152	0
Volume Right	95	24	0	0
cSH	508	1700	1009	1700
Volume to Capacity	0.19	0.31	0.15	0.37
Queue Length 95th (m)	5.5	0.0	4.2	0.0
Control Delay (s)	13.7	0.0	9.2	0.0
Lane LOS	B		A	
Approach Delay (s)	13.7	0.0	1.8	
Approach LOS	B			

Intersection Summary			
Average Delay		1.9	
Intersection Capacity Utilization		54.6%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 7: Cassels Rd W & Baldwin St

9/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	14	51	62	488	593	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	15	54	66	519	631	10
Pedestrians				4		
Lane Width (m)				3.8		
Walking Speed (m/s)				1.2		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)					142	
pX, platoon unblocked	0.91	0.91	0.91			
vC, conflicting volume	1282	635	640			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1259	546	552			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	91	89	93			
cM capacity (veh/h)	160	489	932			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	69	585	631	10
Volume Left	15	66	0	0
Volume Right	54	0	0	10
cSH	339	932	1700	1700
Volume to Capacity	0.20	0.07	0.37	0.01
Queue Length 95th (m)	6.0	1.8	0.0	0.0
Control Delay (s)	18.3	1.9	0.0	0.0
Lane LOS	C	A		
Approach Delay (s)	18.3	1.9	0.0	
Approach LOS	C			

Intersection Summary			
Average Delay		1.8	
Intersection Capacity Utilization	82.8%	ICU Level of Service	E
Analysis Period (min)	15		



# HCM Unsignalized Intersection Capacity Analysis

## 8: Cassels St E & Roebuck St

9/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Volume (veh/h)	2	54	10	25	0	70	0	20	56	139	27	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	2	57	11	26	0	74	0	21	59	146	28	0
Pedestrians					13			2				
Lane Width (m)					3.8			3.8				
Walking Speed (m/s)					1.2			1.2				
Percent Blockage					1			0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	74			69			172	195	77	238	163	37
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	74			69			172	195	77	238	163	37
tC, single (s)	4.2			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.3			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			98			100	97	94	77	96	100
cM capacity (veh/h)	1453			1542			758	690	976	643	718	1041

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	69	100	80	175
Volume Left	2	26	0	146
Volume Right	11	74	59	0
cSH	1453	1542	880	655
Volume to Capacity	0.00	0.02	0.09	0.27
Queue Length 95th (m)	0.0	0.4	2.4	8.6
Control Delay (s)	0.2	2.0	9.5	12.5
Lane LOS	A	A	A	B
Approach Delay (s)	0.2	2.0	9.5	12.5
Approach LOS			A	B

### Intersection Summary

Average Delay	7.5
Intersection Capacity Utilization	36.5%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
2: Cassels St W & Baldwin St

9/25/2013



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations		↗	↖	↑	↓	↙
Volume (vph)	0	51	62	562	595	9
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.8	3.8	3.8	3.8	3.3	3.3
Storage Length (m)	0.0	0.0	0.0			15.0
Storage Lanes	0	1	1			1
Taper Length (m)	7.5	7.5	7.5			7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt		0.865				0.850
Flt Protected			0.950			
Satd. Flow (prot)	0	1512	1661	1514	1418	1405
Flt Permitted			0.950			
Satd. Flow (perm)	0	1512	1661	1514	1418	1405
Link Speed (k/h)	50			50	50	
Link Distance (m)	89.7			51.2	37.2	
Travel Time (s)	6.5			3.7	2.7	
Confl. Peds. (#/hr)		4				
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	0%	1%	2%	0%
Parking (#/hr)				5	5	
Adj. Flow (vph)	0	54	66	598	633	10
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	54	66	598	633	10
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.8	3.8	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	1.31	1.41	1.19
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary

Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	53.2%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
 3: Campbell St & Baldwin St

9/25/2013



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	36	324	182	386	416	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.8	3.8	3.8	4.8	3.8	3.8
Storage Length (m)	0.0	40.0	20.0			10.0
Storage Lanes	1	1	0			1
Taper Length (m)	7.5	7.5	7.5			7.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	0.98	0.94				
Frt		0.850				0.850
Flt Protected	0.950			0.984		
Satd. Flow (prot)	1661	1486	0	1875	1500	1327
Flt Permitted	0.950			0.725		
Satd. Flow (perm)	1627	1395	0	1382	1500	1327
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		348				19
Link Speed (k/h)	50			50	50	
Link Distance (m)	117.5			55.3	55.7	
Travel Time (s)	8.5			4.0	4.0	
Confl. Peds. (#/hr)	9	19				
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	0%	0%	1%	2%	2%	12%
Parking (#/hr)					5	
Adj. Flow (vph)	39	348	196	415	447	28
Shared Lane Traffic (%)						
Lane Group Flow (vph)	39	348	0	611	447	28
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.8			0.0	0.0	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.11	1.11	1.11	0.97	1.31	1.11
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						

Lanes, Volumes, Timings  
 3: Campbell St & Baldwin St

9/25/2013



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Detector 2 Extend (s)				0.0	0.0	
Turn Type		Perm	Perm			Perm
Protected Phases	4			2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	2	2	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.7	22.7	22.7	22.7	22.7	22.7
Total Split (s)	22.7	22.7	57.3	57.3	57.3	57.3
Total Split (%)	28.4%	28.4%	71.6%	71.6%	71.6%	71.6%
Maximum Green (s)	18.0	18.0	52.6	52.6	52.6	52.6
Yellow Time (s)	3.3	3.3	3.3	3.3	3.3	3.3
All-Red Time (s)	1.4	1.4	1.4	1.4	1.4	1.4
Lost Time Adjust (s)	3.0	3.0	0.0	3.0	3.0	0.0
Total Lost Time (s)	7.7	7.7	4.7	7.7	7.7	4.7
Lead/Lag						
Lead-Lag Optimize?						
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	Max	Max	Max	Max
Walk Time (s)	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	10	10	10	10	10	10
Act Effect Green (s)	6.0	6.0		50.1	50.1	53.1
Actuated g/C Ratio	0.08	0.08		0.70	0.70	0.74
v/c Ratio	0.28	0.80		0.63	0.43	0.03
Control Delay	34.5	18.2		10.7	7.0	2.3
Queue Delay	0.0	0.0		0.0	0.0	0.0
Total Delay	34.5	18.2		10.7	7.0	2.3
LOS	C	B		B	A	A
Approach Delay	19.9			10.7	6.7	
Approach LOS	B			B	A	

Intersection Summary

Area Type:	CBD
Cycle Length:	80
Actuated Cycle Length:	71.6
Natural Cycle:	70
Control Type:	Semi Act-Uncoord
Maximum v/c Ratio:	0.80
Intersection Signal Delay:	11.8
Intersection Capacity Utilization	86.1%
Analysis Period (min)	15
Intersection LOS:	B
ICU Level of Service	E

Lanes, Volumes, Timings  
3: Campbell St & Baldwin St










9/25/2013

Splits and Phases: 3: Campbell St & Baldwin St


















Lanes, Volumes, Timings  
5: Roebuck St & Baldwin St

9/25/2013

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	0	70	498	0	0	740
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	4.8	4.8	3.5	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.865					
Flt Protected						
Satd. Flow (prot)	0	1660	1674	0	0	1492
Flt Permitted						
Satd. Flow (perm)	0	1660	1674	0	0	1492
Link Speed (k/h)	50		50		50	
Link Distance (m)	85.5		57.6		55.3	
Travel Time (s)	6.2		4.1		4.0	
Confl. Peds. (#/hr)				21	21	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	1%	1%	0%	0%	2%
Parking (#/hr)	0					
Adj. Flow (vph)	0	74	530	0	0	787
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	74	530	0	0	787
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	0.0		3.3		3.3	
Link Offset(m)	0.0		0.0		0.0	
Crosswalk Width(m)	4.8		4.8		4.8	
Two way Left Turn Lane						
Headway Factor	0.97	0.97	1.16	1.16	1.16	1.32
Turning Speed (k/h)	25		15		25	
Sign Control	Stop		Free		Free	
<b>Intersection Summary</b>						
Area Type:	CBD					
Control Type:	Unsignalized					
Intersection Capacity Utilization	46.6%			ICU Level of Service A		
Analysis Period (min)	15					

Lanes, Volumes, Timings  
8: Cassels St E & Roebuck St

9/25/2013

												
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	177	31	25	13	57	2	20	56	0	0	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.8	3.8	3.8	3.8	3.5	3.8	3.5	3.8	3.5	3.5	3.5
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor												
Frt		0.981			0.919			0.903				
Flt Protected		0.998			0.987			0.999				
Satd. Flow (prot)	0	1660	0	0	1567	0	0	1525	0	0	0	0
Flt Permitted		0.998			0.987			0.999				
Satd. Flow (perm)	0	1660	0	0	1567	0	0	1525	0	0	0	0
Link Speed (k/h)		50			50			50				50
Link Distance (m)		99.9			68.4			98.7				85.5
Travel Time (s)		7.2			4.9			7.1				6.2
Confl. Peds. (#/hr)			2	2					13	13		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	14%	3%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%
Parking (#/hr)							5		5			
Adj. Flow (vph)	11	186	33	26	14	60	2	21	59	0	0	0
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	230	0	0	100	0	0	82	0	0	0	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0				0.0
Link Offset(m)		0.0			0.0			0.0				0.0
Crosswalk Width(m)		4.8			4.8			4.8				4.8
Two way Left Turn Lane												
Headway Factor	1.16	1.11	1.11	1.11	1.11	1.16	1.11	1.16	1.11	1.16	1.16	1.16
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop				Stop
<b>Intersection Summary</b>												
Area Type:	CBD											
Control Type:	Unsignalized											
Intersection Capacity Utilization	32.6%						ICU Level of Service A					
Analysis Period (min)	15											

Lanes, Volumes, Timings  
 14: Cassels St E & Baldwin St

9/25/2013



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	12	12	486	75	143	604
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Width (m)	3.5	3.5	3.8	3.8	3.3	3.3
Storage Length (m)	0.0	0.0		0.0	25.0	
Storage Lanes	1	0		0	1	
Taper Length (m)	7.5	7.5		7.5	7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor						
Frt	0.932		0.982			
Flt Protected	0.976				0.950	
Satd. Flow (prot)	1538	0	1684	0	1570	1418
Flt Permitted	0.976				0.950	
Satd. Flow (perm)	1538	0	1684	0	1570	1418
Link Speed (k/h)	50		50			50
Link Distance (m)	99.9		37.2			57.6
Travel Time (s)	7.2		2.7			4.1
Confl. Peds. (#/hr)		4		8	8	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	0%	0%	1%	8%	0%	2%
Parking (#/hr)						5
Adj. Flow (vph)	13	13	517	80	152	643
Shared Lane Traffic (%)						
Lane Group Flow (vph)	26	0	597	0	152	643
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	3.5		3.3			3.3
Link Offset(m)	0.0		0.0			0.0
Crosswalk Width(m)	4.8		4.8			4.8
Two way Left Turn Lane						
Headway Factor	1.16	1.16	1.11	1.11	1.19	1.41
Turning Speed (k/h)	25	15		15	25	
Sign Control	Stop		Free			Free

**Intersection Summary**

Area Type:	CBD
Control Type:	Unsignalized
Intersection Capacity Utilization	57.0%
Analysis Period (min)	15
	ICU Level of Service B



# HCM Unsignalized Intersection Capacity Analysis

## 2: Cassels St W & Baldwin St

9/25/2013



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	0	51	62	562	595	9
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	54	66	598	633	10
Pedestrians				4		
Lane Width (m)				3.8		
Walking Speed (m/s)				1.2		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage veh						
Upstream signal (m)					150	
pX, platoon unblocked	0.98	0.98	0.98			
vC, conflicting volume	1368	642	643			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1365	627	628			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	89	93			
cM capacity (veh/h)	150	477	948			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	54	66	598	643
Volume Left	0	66	0	0
Volume Right	54	0	0	10
cSH	477	948	1700	1700
Volume to Capacity	0.11	0.07	0.35	0.38
Queue Length 95th (m)	3.1	1.8	0.0	0.0
Control Delay (s)	13.5	9.1	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	13.5	0.9		0.0
Approach LOS	B			

Intersection Summary			
Average Delay		1.0	
Intersection Capacity Utilization		53.8%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 5: Roebuck St & Baldwin St

9/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations		↗	↗			↗
Volume (veh/h)	0	70	498	0	0	740
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	0	74	530	0	0	787
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh						
Upstream signal (m)						55
pX, platoon unblocked	0.89					
vC, conflicting volume	1317	530			530	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1293	530			530	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	86			100	
cM capacity (veh/h)	161	551			1048	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	74	530	787
Volume Left	0	0	0
Volume Right	74	0	0
cSH	551	1700	1700
Volume to Capacity	0.14	0.31	0.46
Queue Length 95th (m)	3.7	0.0	0.0
Control Delay (s)	12.6	0.0	0.0
Lane LOS	B		
Approach Delay (s)	12.6	0.0	0.0
Approach LOS	B		

Intersection Summary			
Average Delay		0.7	
Intersection Capacity Utilization		46.6%	ICU Level of Service A
Analysis Period (min)		15	

# HCM Unsignalized Intersection Capacity Analysis

## 8: Cassels St E & Roebuck St

9/25/2013



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕				
Volume (veh/h)	10	177	31	25	13	57	2	20	56	0	0	0
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	186	33	26	14	60	2	21	59	0	0	0
Pedestrians					13			2				
Lane Width (m)					3.8			3.5				
Walking Speed (m/s)					1.2			1.2				
Percent Blockage					1			0				
Right turn flare (veh)												
Median type		None			None							
Median storage veh												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	74			221			322	352	218	402	338	44
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	74			221			322	352	218	402	338	44
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			100	96	93	100	100	100
cM capacity (veh/h)	1539			1358			620	560	816	490	570	1032

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	229	100	82
Volume Left	11	26	2
Volume Right	33	60	59
cSH	1539	1358	725
Volume to Capacity	0.01	0.02	0.11
Queue Length 95th (m)	0.2	0.5	3.0
Control Delay (s)	0.4	2.1	10.6
Lane LOS	A	A	B
Approach Delay (s)	0.4	2.1	10.6
Approach LOS			B

Intersection Summary		
Average Delay		2.9
Intersection Capacity Utilization	32.6%	ICU Level of Service
Analysis Period (min)		15
		A

# HCM Unsignalized Intersection Capacity Analysis

## 14: Cassels St E & Baldwin St

9/25/2013



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↶		↷	↷	↶	↷
Volume (veh/h)	12	12	486	75	143	604
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	13	13	517	80	152	643
Pedestrians	8					
Lane Width (m)	3.5					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (m)						113
pX, platoon unblocked	0.95					
vC, conflicting volume	1472	525			605	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1470	525			605	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	89	98			84	
cM capacity (veh/h)	113	553			977	

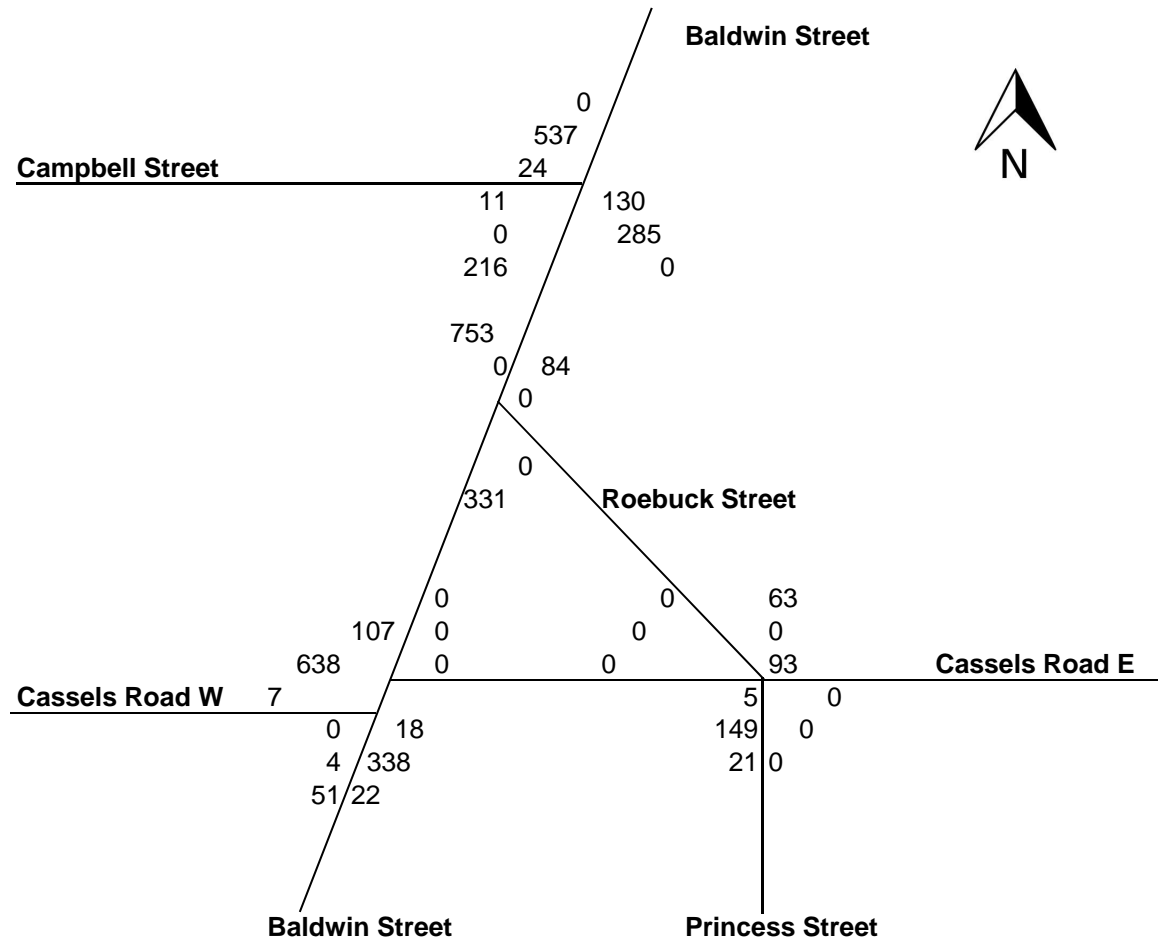
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	26	517	80	152	643
Volume Left	13	0	0	152	0
Volume Right	13	0	80	0	0
cSH	187	1700	1700	977	1700
Volume to Capacity	0.14	0.30	0.05	0.16	0.38
Queue Length 95th (m)	3.7	0.0	0.0	4.4	0.0
Control Delay (s)	27.3	0.0	0.0	9.4	0.0
Lane LOS	D			A	
Approach Delay (s)	27.3	0.0		1.8	
Approach LOS	D				

Intersection Summary					
Average Delay			1.5		
Intersection Capacity Utilization			50.6%	ICU Level of Service	A
Analysis Period (min)			15		

**Alternative 1 - Baldwin Street / Cassels Road to Roebuck Street**

Traffic Volumes

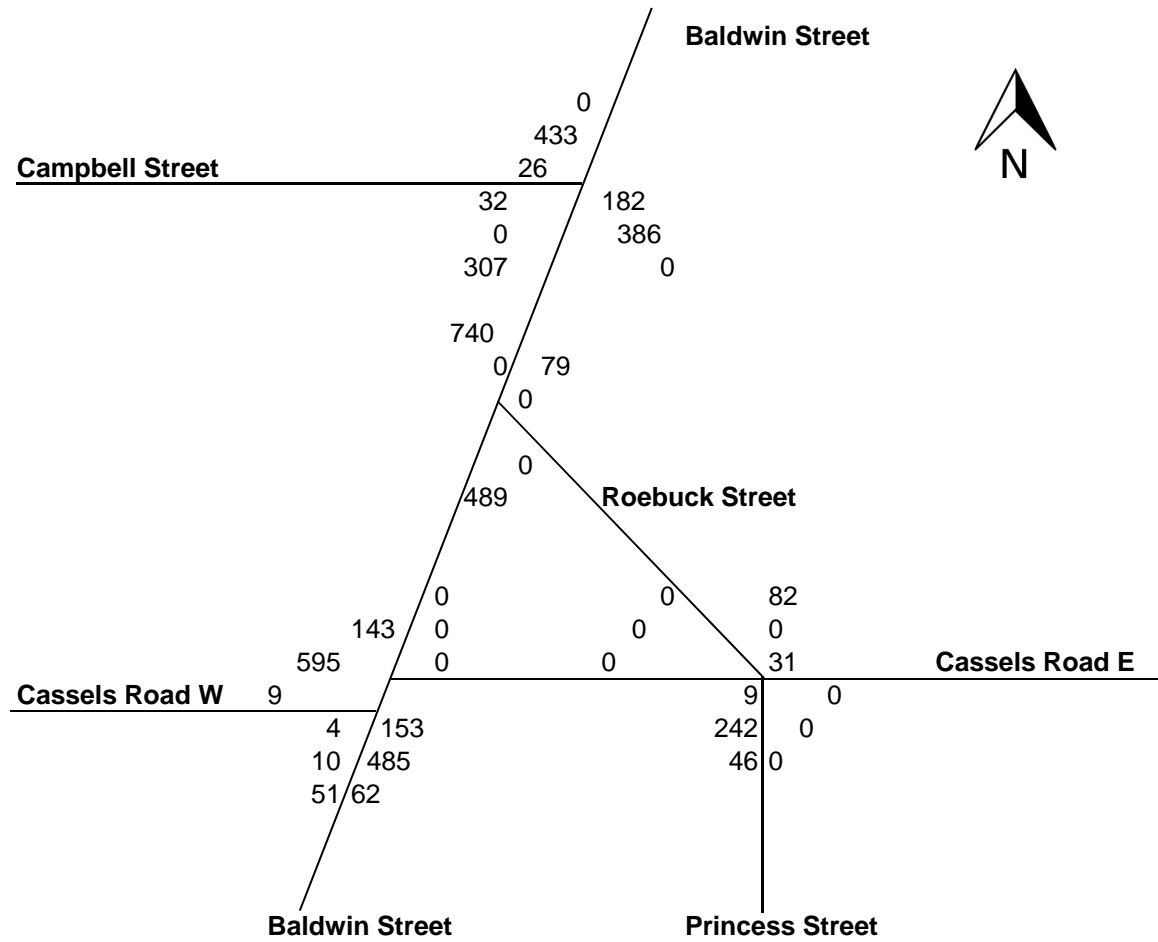
2016 Condition - AM Peak



**Alternative 1 - Baldwin Street / Cassels Road to Roebuck Street**

Traffic Volumes

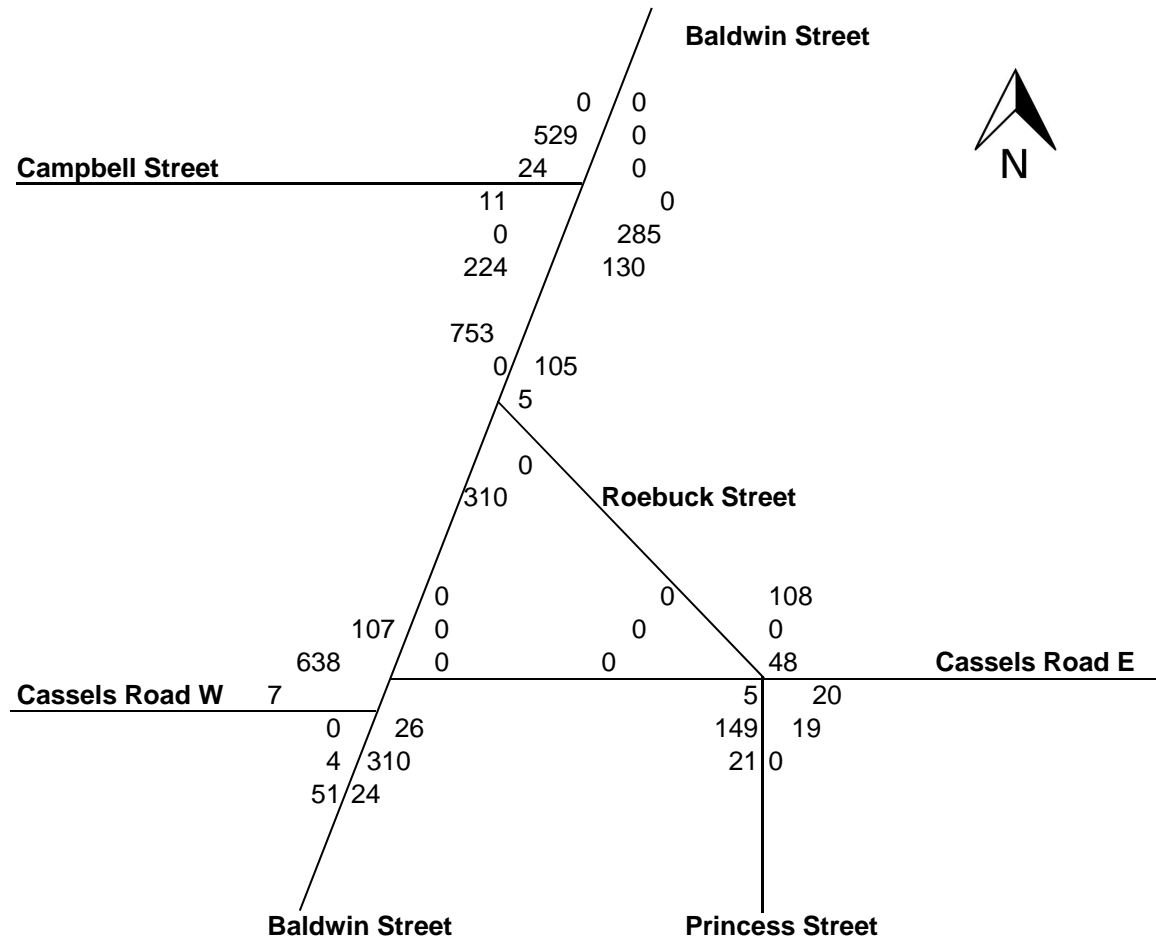
2016 Condition - PM Peak



**Alternative 2 - Baldwin Street / Cassels Road to Roebuck Street**

Traffic Volumes

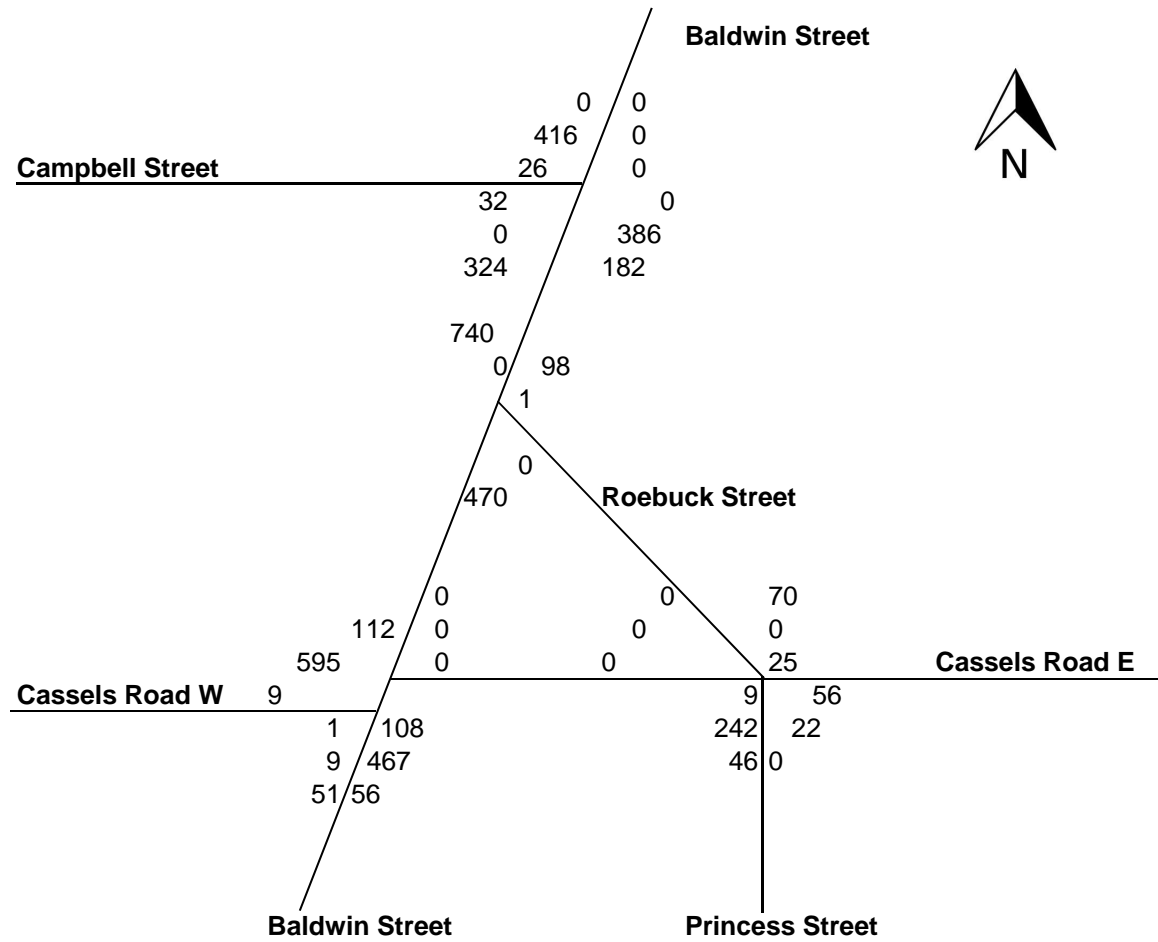
2016 Condition - AM Peak



**Alternative 2 - Baldwin Street / Cassels Road to Roebuck Street**

Traffic Volumes

2016 Condition - PM Peak

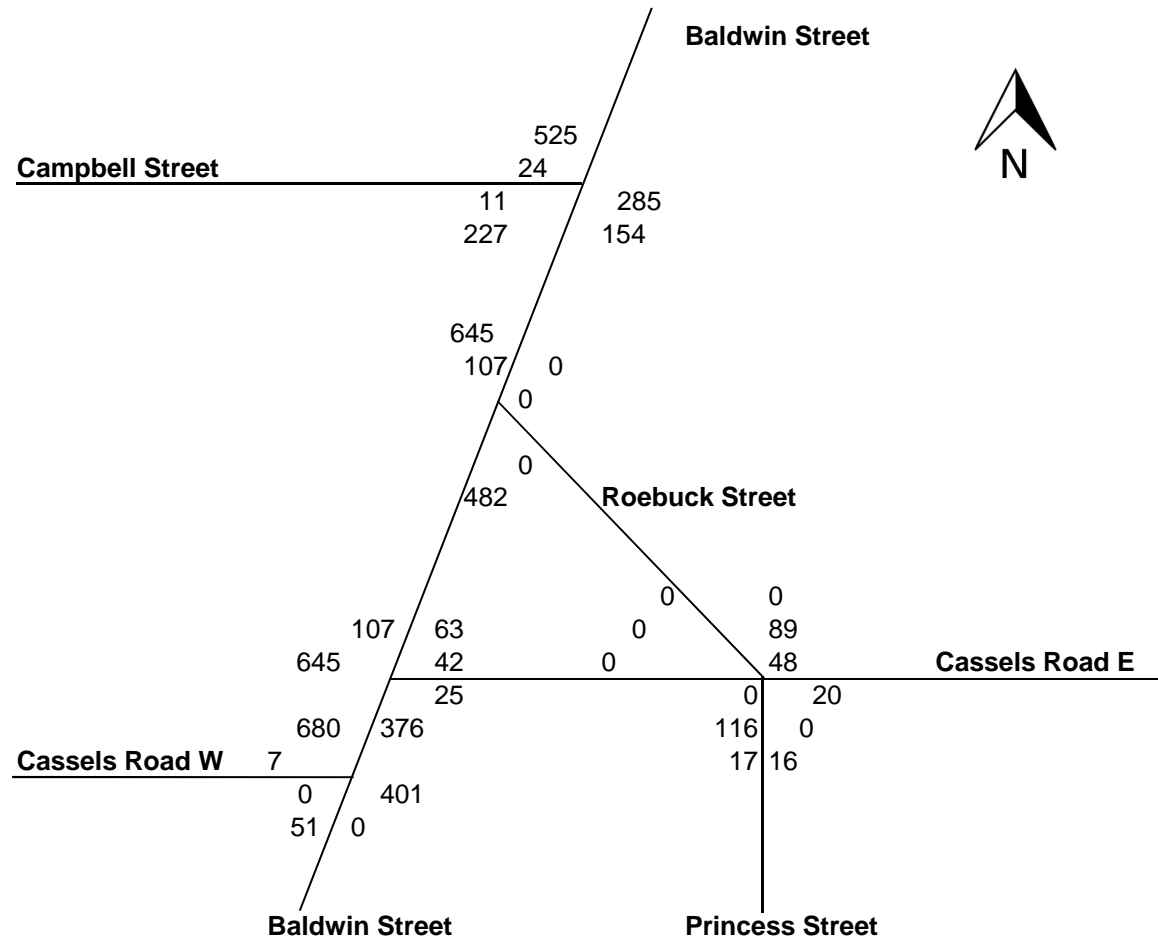




**Alternative 3 - Baldwin Street / Cassels Road to Roebuck Street**

Traffic Volumes

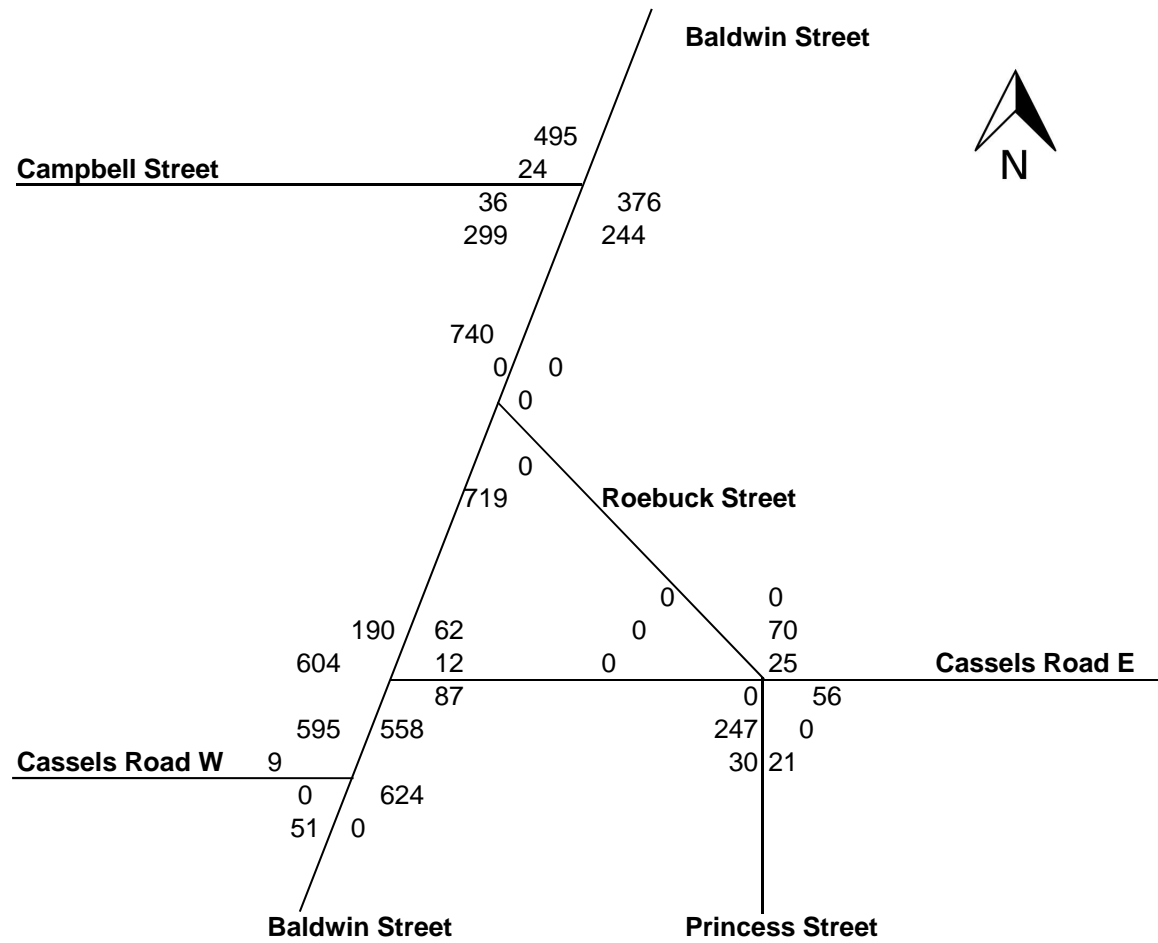
2016 Condition - AM Peak



**Alternative 3 - Baldwin Street / Cassels Road to Roebuck Street**

Traffic Volumes

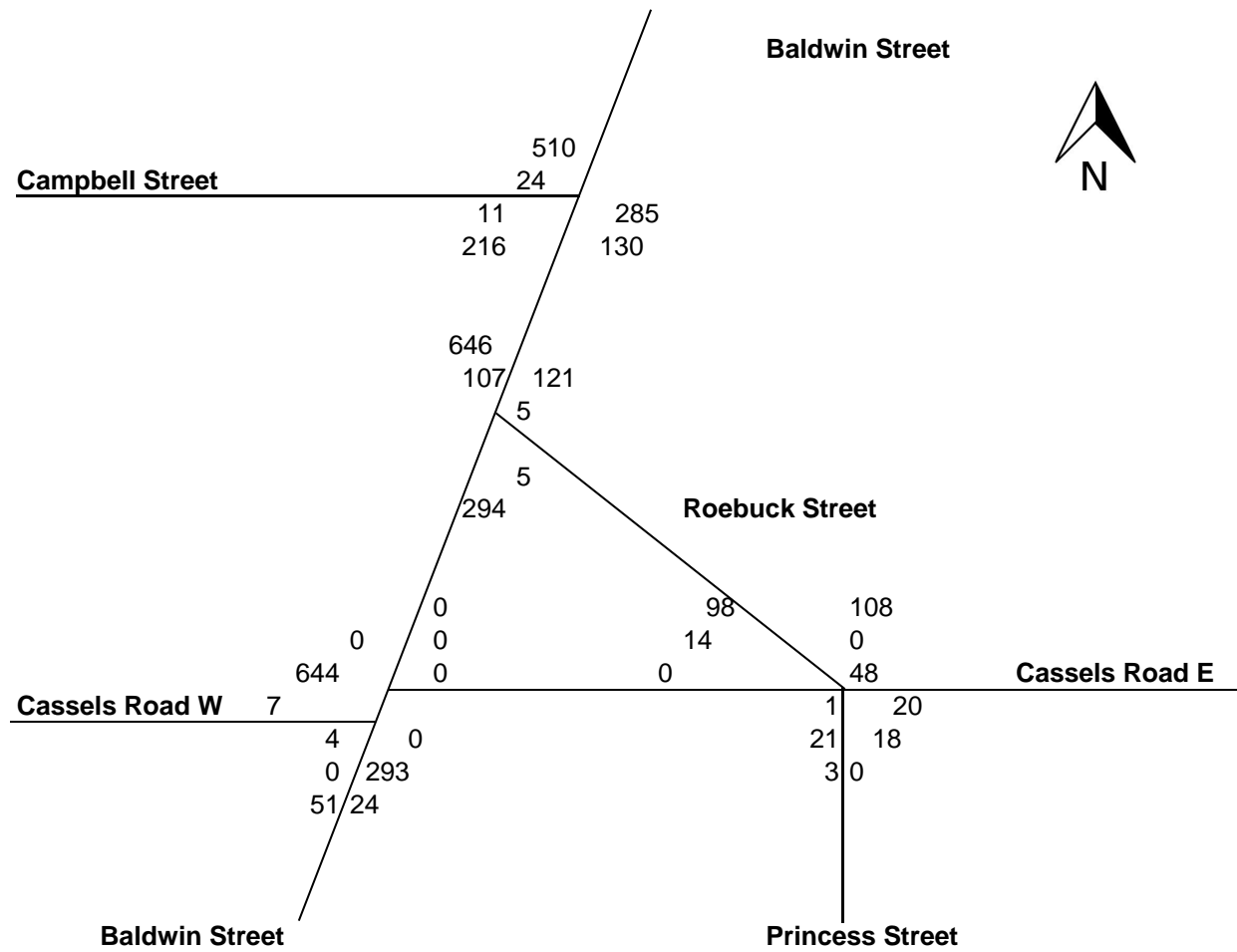
2016 Condition - PM Peak



**Alternative 4 - Baldwin Street / Cassels Road to Roebuck Street**

Traffic Volumes

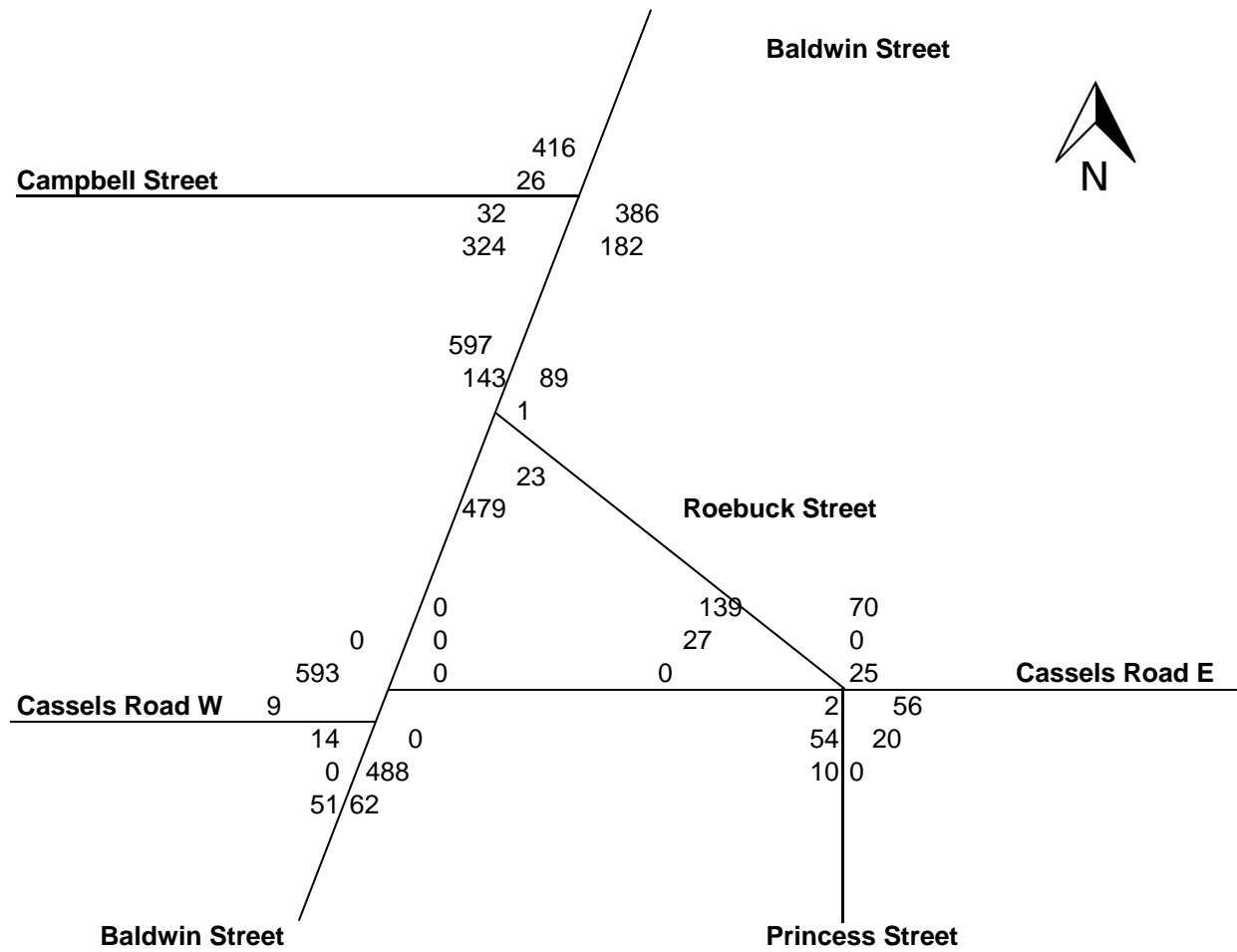
2016 Condition - AM Peak



**Alternative 4 - Baldwin Street / Cassels Road to Roebuck Street**

Traffic Volumes

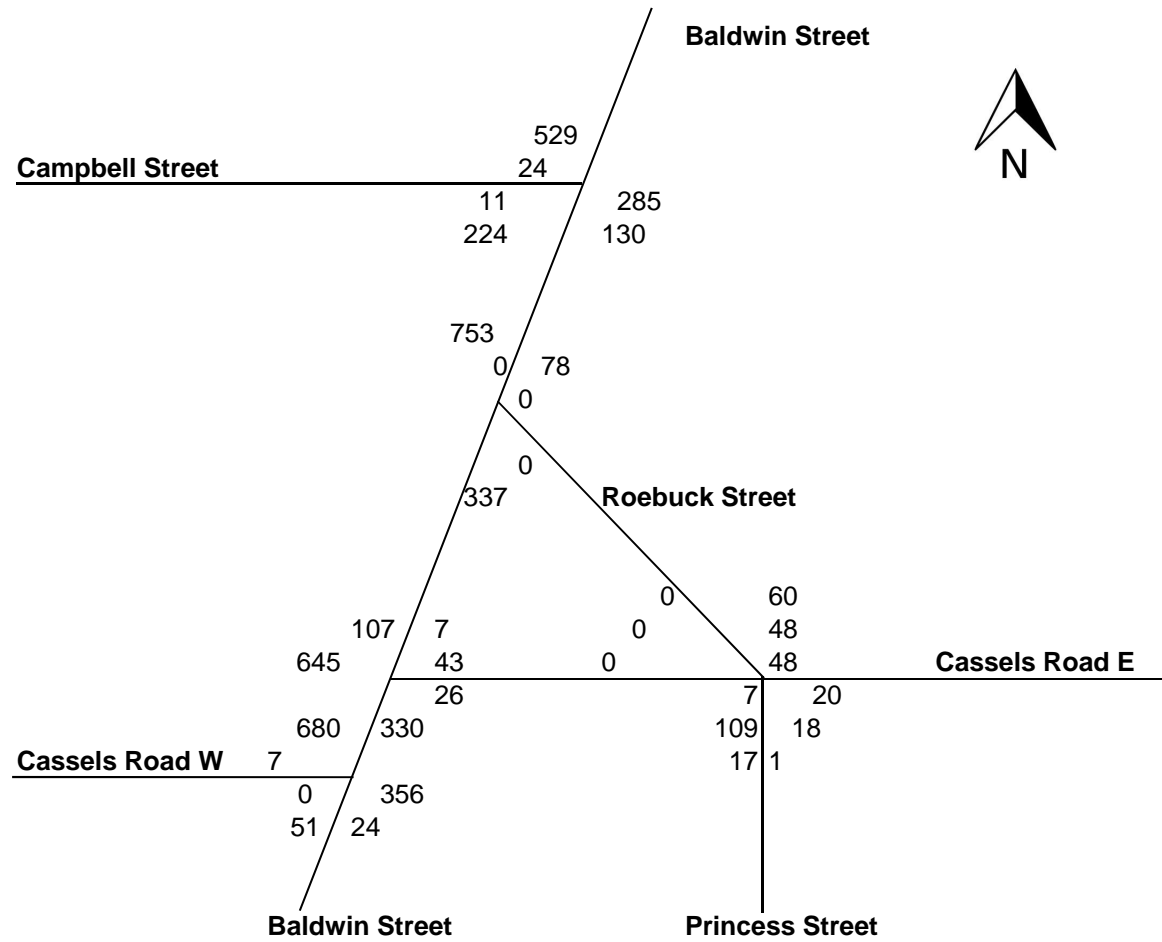
2016 Condition - PM Peak



**Alternative 5 - Baldwin Street / Cassels Road to Roebuck Street**

Traffic Volumes

2016 Condition - AM Peak



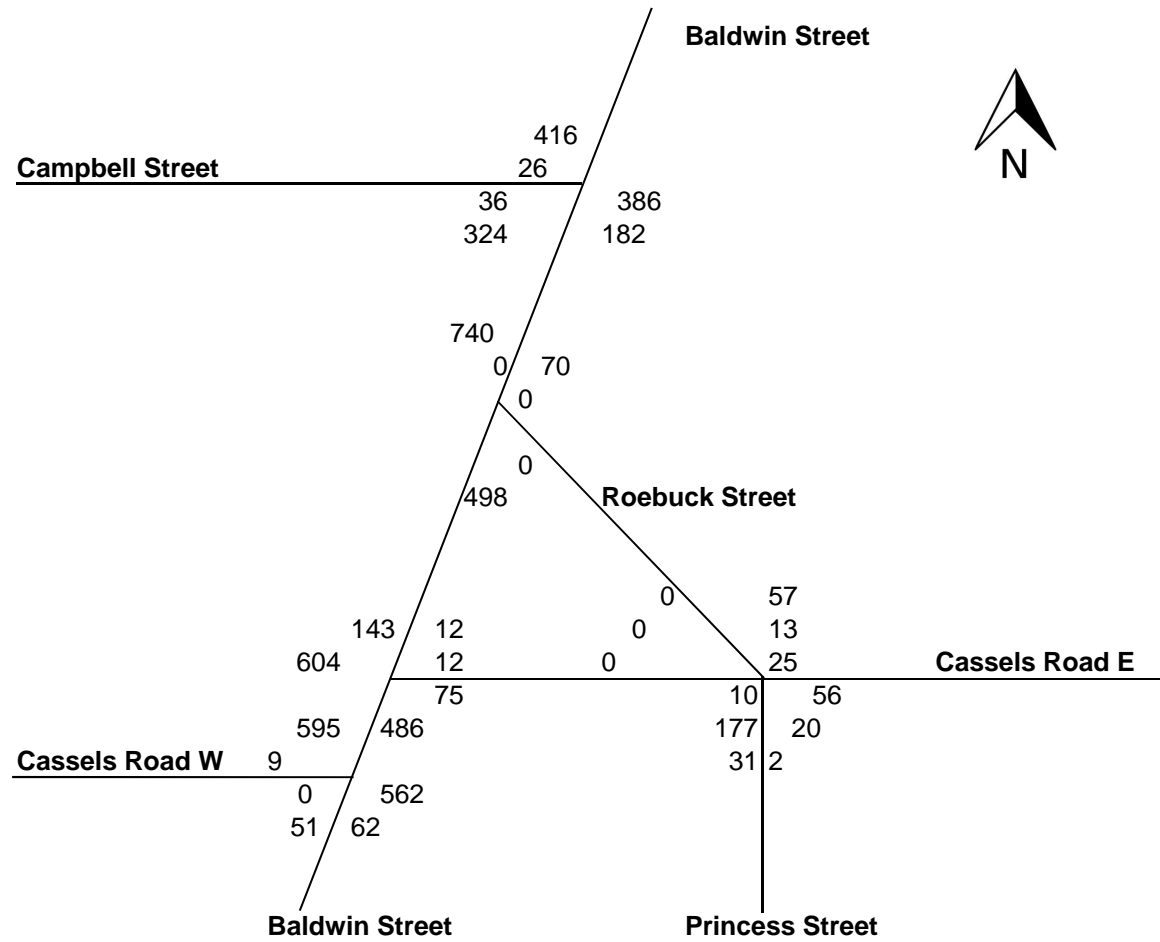




**Alternative 6 - Baldwin Street / Cassels Road to Roebuck Street**

Traffic Volumes

2016 Condition - PM Peak

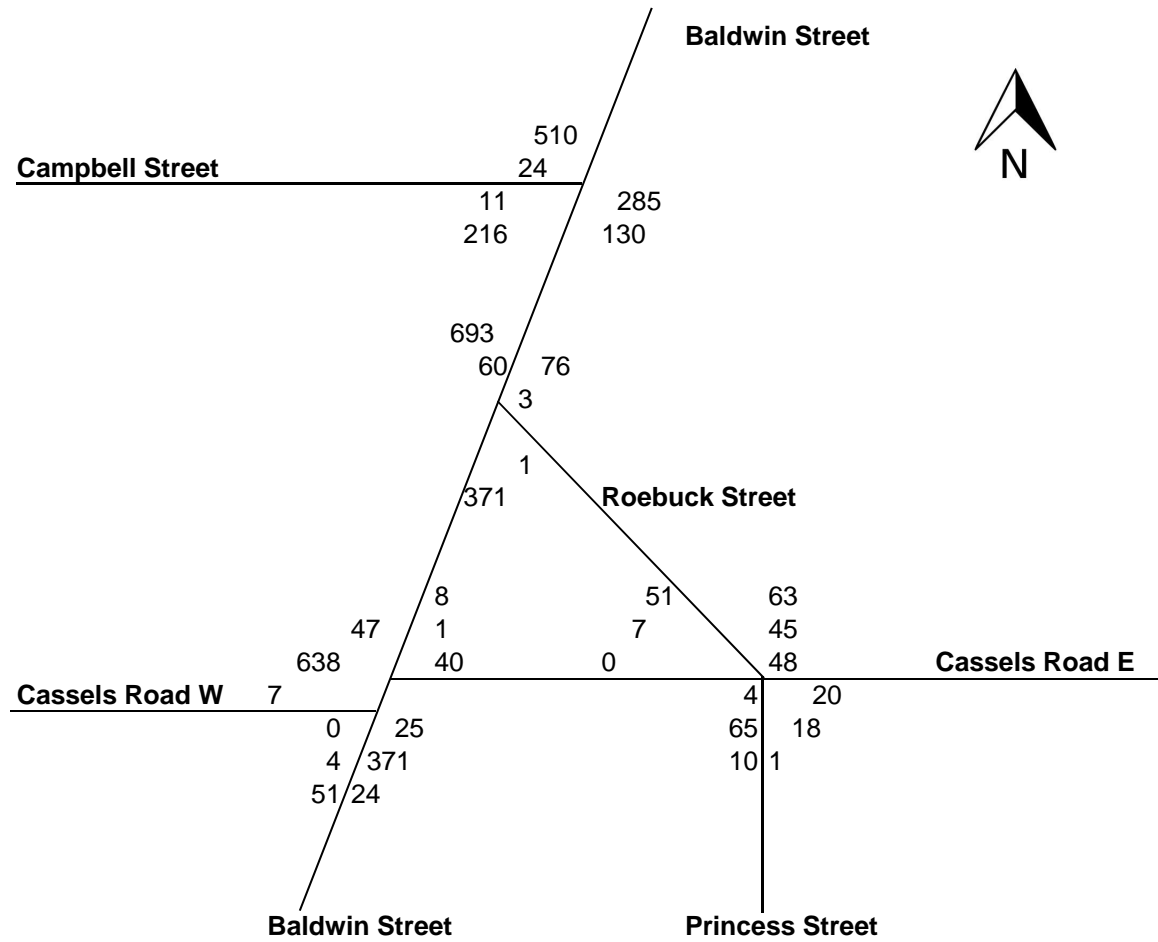




**Alternative 7 - Baldwin Street / Cassels Road to Roebuck Street**

Traffic Volumes

2016 Condition - AM Peak



**Alternative 7 - Baldwin Street / Cassels Road to Roebuck Street**

Traffic Volumes

2016 Condition - PM Peak

