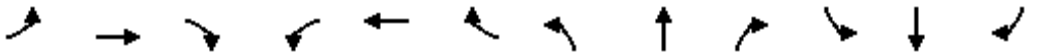
EXISTING CONDITIONS

SYNCHRO REPORTS

HCM Signalized Intersection Capacity Analysis
16: Ocean & Kahlo

04/30/2020



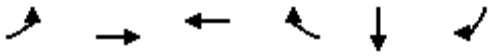
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	651	275	0	752	561	0	0	0	58	250	94
Future Volume (vph)	183	651	275	0	752	561	0	0	0	58	250	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.5			4.5	4.5					7.0	6.0
Lane Util. Factor	1.00	0.95			0.95	1.00					0.95	1.00
Frpb, ped/bikes	1.00	0.93			1.00	0.83					1.00	0.88
Flpb, ped/bikes	1.00	1.00			1.00	1.00					1.00	1.00
Frt	1.00	0.96			1.00	0.85					1.00	0.85
Flt Protected	0.95	1.00			1.00	1.00					0.99	1.00
Satd. Flow (prot)	1711	3020			3292	1248					3181	1325
Flt Permitted	0.95	1.00			1.00	1.00					0.99	1.00
Satd. Flow (perm)	1711	3020			3292	1248					3181	1325
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	723	306	0	836	623	0	0	0	64	278	104
RTOR Reduction (vph)	0	52	0	0	0	422	0	0	0	0	0	69
Lane Group Flow (vph)	203	977	0	0	836	201	0	0	0	0	342	35
Confl. Peds. (#/hr)	76		142			76						102
Confl. Bikes (#/hr)			6			3						3
Heavy Vehicles (%)	2%	3%	2%	0%	6%	4%	5%	3%	0%	16%	7%	4%
Turn Type	Prot	NA			NA	Perm				Perm	NA	Perm
Protected Phases	5	13			6						4	
Permitted Phases						6				4		4
Actuated Green, G (s)	11.5	42.5			28.0	28.0					29.0	29.0
Effective Green, g (s)	12.5	43.5			29.0	29.0					29.0	30.0
Actuated g/C Ratio	0.14	0.48			0.32	0.32					0.32	0.33
Clearance Time (s)	6.0	5.5			5.5	5.5					7.0	7.0
Lane Grp Cap (vph)	237	1459			1060	402					1024	441
v/s Ratio Prot	c0.12	0.32			c0.25							
v/s Ratio Perm						0.16					0.11	0.03
v/c Ratio	0.86	0.67			0.79	0.50					0.33	0.08
Uniform Delay, d1	37.9	17.8			27.7	24.6					23.2	20.5
Progression Factor	1.31	1.07			1.09	3.06					0.84	2.12
Incremental Delay, d2	28.7	2.3			5.6	4.1					0.8	0.3
Delay (s)	78.2	21.2			35.9	79.4					20.2	43.9
Level of Service	E	C			D	E					C	D
Approach Delay (s)		30.6			54.4			0.0			25.8	
Approach LOS		C			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	41.0	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
16: Ocean & Kahlo

04/30/2020



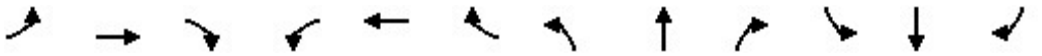
Lane Group	EBL	EBT	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	203	1029	836	623	342	104
v/c Ratio	0.86	0.68	0.79	0.76	0.33	0.19
Control Delay	79.2	19.7	36.4	13.9	20.5	3.1
Queue Delay	0.0	0.0	51.2	11.6	0.0	0.0
Total Delay	79.2	19.7	87.6	25.6	20.5	3.1
Queue Length 50th (ft)	124	142	251	75	56	0
Queue Length 95th (ft)	#243	251	318	187	100	15
Internal Link Dist (ft)		442	102		248	
Turn Bay Length (ft)	190					
Base Capacity (vph)	237	1510	1060	824	1025	547
Starvation Cap Reductn	0	9	437	115	0	0
Spillback Cap Reductn	0	4	0	182	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.69	1.34	0.97	0.33	0.19

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis
16: Phelan/Kahlo & Ocean

05/14/2020



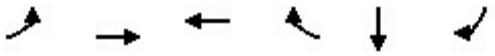
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	564	303	0	723	484	0	0	0	110	291	139
Future Volume (vph)	122	564	303	0	723	484	0	0	0	110	291	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.5			4.5	4.5					6.0	5.0
Lane Util. Factor	1.00	0.95			0.95	1.00					0.95	1.00
Frpb, ped/bikes	1.00	0.94			1.00	0.77					1.00	0.88
Flpb, ped/bikes	1.00	1.00			1.00	1.00					1.00	1.00
Frt	1.00	0.95			1.00	0.85					1.00	0.85
Flt Protected	0.95	1.00			1.00	1.00					0.99	1.00
Satd. Flow (prot)	1711	2999			3355	1163					3253	1359
Flt Permitted	0.95	1.00			1.00	1.00					0.99	1.00
Satd. Flow (perm)	1711	2999			3355	1163					3253	1359
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.90	0.90	0.90	0.94	0.94	0.94
Adj. Flow (vph)	130	600	322	0	769	515	0	0	0	117	310	148
RTOR Reduction (vph)	0	79	0	0	0	335	0	0	0	0	0	97
Lane Group Flow (vph)	130	843	0	0	769	180	0	0	0	0	427	51
Confl. Peds. (#/hr)	108		107			108						104
Confl. Bikes (#/hr)			8			7						6
Heavy Vehicles (%)	2%	4%	2%	0%	4%	3%	2%	2%	2%	8%	5%	1%
Turn Type	Prot	NA			NA	Perm				Perm	NA	Perm
Protected Phases	5	13			6						4	
Permitted Phases						6				4		4
Actuated Green, G (s)	9.0	42.5			30.5	30.5					30.0	30.0
Effective Green, g (s)	10.0	43.5			31.5	31.5					30.0	31.0
Actuated g/C Ratio	0.11	0.48			0.35	0.35					0.33	0.34
Clearance Time (s)	6.0	5.5			5.5	5.5					6.0	6.0
Lane Grp Cap (vph)	190	1449			1174	407					1084	468
v/s Ratio Prot	c0.08	0.28			c0.23							
v/s Ratio Perm						0.16					0.13	0.04
v/c Ratio	0.68	0.58			0.66	0.44					0.39	0.11
Uniform Delay, d1	38.5	16.7			24.7	22.5					23.0	20.1
Progression Factor	1.24	0.44			1.05	2.45					1.29	2.65
Incremental Delay, d2	16.2	1.5			2.7	3.3					0.9	0.4
Delay (s)	63.8	8.8			28.7	58.4					30.7	53.8
Level of Service	E	A			C	E					C	D
Approach Delay (s)		15.6			40.6			0.0			36.6	
Approach LOS		B			D			A			D	

Intersection Summary			
HCM 2000 Control Delay	30.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
16: Phelan/Kahlo & Ocean

07/29/2020



Lane Group	EBL	EBT	WBT	WBR	SBT	SBR
Lane Group Flow (vph)	130	922	769	515	427	148
v/c Ratio	0.68	0.60	0.66	0.70	0.39	0.26
Control Delay	64.9	7.7	29.1	11.3	31.0	9.8
Queue Delay	0.0	0.0	51.7	1.8	0.0	0.0
Total Delay	64.9	7.7	80.8	13.1	31.0	9.8
Queue Length 50th (ft)	69	35	209	50	99	14
Queue Length 95th (ft)	m#159	124	280	171	148	54
Internal Link Dist (ft)		442	102		248	
Turn Bay Length (ft)	190					
Base Capacity (vph)	190	1529	1174	741	1084	571
Starvation Cap Reductn	0	0	499	104	0	0
Spillback Cap Reductn	0	12	0	62	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.68	0.61	1.14	0.81	0.39	0.26

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.

CONCEPT 1

SYNCHRO REPORTS

HCM Signalized Intersection Capacity Analysis
16: Ocean & Kahlo

10/09/2020

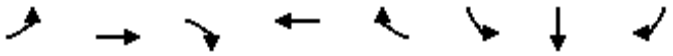
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	651	275	0	752	561	0	0	0	58	250	94
Future Volume (vph)	183	651	275	0	752	561	0	0	0	58	250	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.5	5.5		4.5	4.5				6.0	7.0	6.0
Lane Util. Factor	1.00	1.00	1.00		0.95	1.00				1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.61		1.00	0.83				1.00	1.00	0.88
Flpb, ped/bikes	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	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	1711	1783	932		3292	1248				1504	1717	1325
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	1711	1783	932		3292	1248				1504	1717	1325
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	723	306	0	836	623	0	0	0	64	278	104
RTOR Reduction (vph)	0	0	0	0	0	422	0	0	0	0	0	69
Lane Group Flow (vph)	203	723	306	0	836	201	0	0	0	64	278	35
Confl. Peds. (#/hr)	76		142			76						102
Confl. Bikes (#/hr)			6			3						3
Heavy Vehicles (%)	2%	3%	2%	0%	6%	4%	5%	3%	0%	16%	7%	4%
Turn Type	Prot	NA	Perm		NA	Perm				Perm	NA	Perm
Protected Phases	5	13			6						4	
Permitted Phases			13			6				4		4
Actuated Green, G (s)	11.5	41.5	41.5		28.0	28.0				29.0	29.0	29.0
Effective Green, g (s)	12.5	42.5	41.5		29.0	29.0				30.0	29.0	30.0
Actuated g/C Ratio	0.14	0.47	0.46		0.32	0.32				0.33	0.32	0.33
Clearance Time (s)	6.0	5.5	5.5		5.5	5.5				7.0	7.0	7.0
Lane Grp Cap (vph)	237	841	429		1060	402				501	553	441
v/s Ratio Prot	0.12	c0.41			c0.25						c0.16	
v/s Ratio Perm			0.33			0.16				0.04		0.03
v/c Ratio	0.86	0.86	0.71		0.79	0.50				0.13	0.50	0.08
Uniform Delay, d1	37.9	21.1	19.5		27.7	24.6				20.9	24.7	20.5
Progression Factor	1.00	1.01	1.08		0.84	1.98				0.87	0.82	1.87
Incremental Delay, d2	28.7	10.3	8.9		5.6	4.1				0.5	2.9	0.3
Delay (s)	66.7	31.5	29.9		28.8	52.8				18.7	23.2	38.7
Level of Service	E	C	C		C	D				B	C	D
Approach Delay (s)		36.9			39.0			0.0			26.2	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	36.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
16: Ocean & Kahlo

10/09/2020



Lane Group	EBL	EBT	EBR	WBT	WBR	SBL	SBT	SBR
Lane Group Flow (vph)	203	723	306	836	623	64	278	104
v/c Ratio	0.86	0.86	0.71	0.79	0.76	0.13	0.50	0.19
Control Delay	68.7	32.8	31.6	29.2	11.1	19.1	23.7	3.3
Queue Delay	0.0	5.6	0.0	51.2	2.2	0.2	1.0	0.0
Total Delay	68.7	38.5	31.6	80.4	13.3	19.3	24.7	3.3
Queue Length 50th (ft)	109	288	115	220	75	19	90	0
Queue Length 95th (ft)	#231	#563	#201	280	187	m46	166	15
Internal Link Dist (ft)		442		102			248	
Turn Bay Length (ft)	190		75					
Base Capacity (vph)	237	841	429	1060	824	501	553	543
Starvation Cap Reductn	0	0	0	437	97	0	106	0
Spillback Cap Reductn	0	79	0	0	18	166	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.95	0.71	1.34	0.86	0.19	0.62	0.19

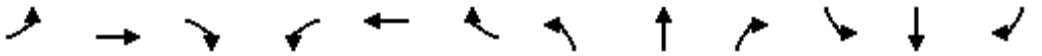
Intersection Summary

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
16: Phelan/Kahlo & Ocean

10/09/2020



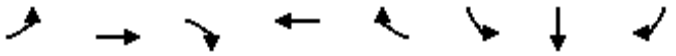
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	564	303	0	723	484	0	0	0	110	291	139
Future Volume (vph)	122	564	303	0	723	484	0	0	0	110	291	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.5	5.5		4.5	4.5				5.0	6.0	5.0
Lane Util. Factor	1.00	1.00	1.00		0.95	1.00				1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.70		1.00	0.77				1.00	1.00	0.88
Flpb, ped/bikes	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	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	1711	1766	1068		3355	1163				1616	1749	1359
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	1711	1766	1068		3355	1163				1616	1749	1359
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.90	0.90	0.90	0.94	0.94	0.94
Adj. Flow (vph)	130	600	322	0	769	515	0	0	0	117	310	148
RTOR Reduction (vph)	0	0	0	0	0	335	0	0	0	0	0	97
Lane Group Flow (vph)	130	600	322	0	769	180	0	0	0	117	310	51
Confl. Peds. (#/hr)	108		107			108						104
Confl. Bikes (#/hr)			8			7						6
Heavy Vehicles (%)	2%	4%	2%	0%	4%	3%	2%	2%	2%	8%	5%	1%
Turn Type	Prot	NA	Perm		NA	Perm				Perm	NA	Perm
Protected Phases	5	13			6						4	
Permitted Phases			13			6				4		4
Actuated Green, G (s)	9.0	41.5	41.5		30.5	30.5				30.0	30.0	30.0
Effective Green, g (s)	10.0	42.5	41.5		31.5	31.5				31.0	30.0	31.0
Actuated g/C Ratio	0.11	0.47	0.46		0.35	0.35				0.34	0.33	0.34
Clearance Time (s)	6.0	5.5	5.5		5.5	5.5				6.0	6.0	6.0
Lane Grp Cap (vph)	190	833	492		1174	407				556	583	468
v/s Ratio Prot	0.08	c0.34			c0.23						c0.18	
v/s Ratio Perm			0.30			0.16				0.07		0.04
v/c Ratio	0.68	0.72	0.65		0.66	0.44				0.21	0.53	0.11
Uniform Delay, d1	38.5	19.0	18.7		24.7	22.5				20.9	24.3	20.1
Progression Factor	0.73	0.53	0.57		0.87	1.53				1.30	1.27	2.54
Incremental Delay, d2	16.2	4.7	5.9		2.7	3.3				0.8	3.0	0.4
Delay (s)	44.2	14.8	16.5		24.2	37.7				27.8	34.0	51.5
Level of Service	D	B	B		C	D				C	C	D
Approach Delay (s)		18.9			29.7			0.0			37.2	
Approach LOS		B			C			A			D	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
16: Phelan/Kahlo & Ocean

10/09/2020



Lane Group	EBL	EBT	EBR	WBT	WBR	SBL	SBT	SBR
Lane Group Flow (vph)	130	600	322	769	515	117	310	148
v/c Ratio	0.68	0.72	0.65	0.66	0.70	0.21	0.53	0.26
Control Delay	46.0	15.2	17.1	24.6	9.0	28.4	34.7	10.3
Queue Delay	29.9	0.9	0.0	51.7	1.4	0.3	1.2	0.0
Total Delay	75.9	16.1	17.1	76.2	10.3	28.6	35.9	10.3
Queue Length 50th (ft)	62	133	73	182	50	42	140	14
Queue Length 95th (ft)	m#150	308	189	247	94	87	225	56
Internal Link Dist (ft)		442		102			248	
Turn Bay Length (ft)	190		75					
Base Capacity (vph)	190	833	492	1174	741	556	583	567
Starvation Cap Reductn	0	10	0	499	89	0	115	0
Spillback Cap Reductn	56	72	0	0	45	142	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.79	0.65	1.14	0.79	0.28	0.66	0.26

Intersection Summary

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

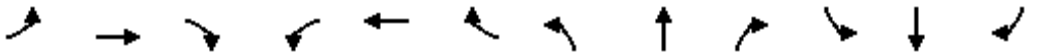
m Volume for 95th percentile queue is metered by upstream signal.

CONCEPT 2

SYNCHRO REPORTS

HCM Signalized Intersection Capacity Analysis
16: Ocean & Kahlo

10/09/2020



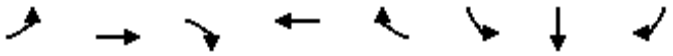
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	183	651	275	0	752	561	0	0	0	58	250	94
Future Volume (vph)	183	651	275	0	752	561	0	0	0	58	250	94
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.5	5.5		4.5	4.5				6.0	7.0	6.0
Lane Util. Factor	1.00	1.00	1.00		0.95	1.00				1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.61		1.00	0.83				1.00	1.00	0.88
Flpb, ped/bikes	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	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	1711	1783	932		3292	1248				1504	1717	1325
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	1711	1783	932		3292	1248				1504	1717	1325
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	203	723	306	0	836	623	0	0	0	64	278	104
RTOR Reduction (vph)	0	0	0	0	0	422	0	0	0	0	0	69
Lane Group Flow (vph)	203	723	306	0	836	201	0	0	0	64	278	35
Confl. Peds. (#/hr)	76		142			76						102
Confl. Bikes (#/hr)			6			3						3
Heavy Vehicles (%)	2%	3%	2%	0%	6%	4%	5%	3%	0%	16%	7%	4%
Turn Type	Prot	NA	Perm		NA	Perm				Perm	NA	Perm
Protected Phases	5	13			6						4	
Permitted Phases			13			6				4		4
Actuated Green, G (s)	11.5	41.5	41.5		28.0	28.0				29.0	29.0	29.0
Effective Green, g (s)	12.5	42.5	41.5		29.0	29.0				30.0	29.0	30.0
Actuated g/C Ratio	0.14	0.47	0.46		0.32	0.32				0.33	0.32	0.33
Clearance Time (s)	6.0	5.5	5.5		5.5	5.5				7.0	7.0	7.0
Lane Grp Cap (vph)	237	841	429		1060	402				501	553	441
v/s Ratio Prot	0.12	c0.41			c0.25						c0.16	
v/s Ratio Perm			0.33			0.16				0.04		0.03
v/c Ratio	0.86	0.86	0.71		0.79	0.50				0.13	0.50	0.08
Uniform Delay, d1	37.9	21.1	19.5		27.7	24.6				20.9	24.7	20.5
Progression Factor	1.00	1.01	1.08		0.84	1.98				0.87	0.82	1.87
Incremental Delay, d2	28.7	10.3	8.9		5.6	4.1				0.5	2.9	0.3
Delay (s)	66.7	31.5	29.9		28.8	52.8				18.7	23.2	38.7
Level of Service	E	C	C		C	D				B	C	D
Approach Delay (s)		36.9			39.0			0.0			26.2	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM 2000 Control Delay	36.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.73		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	66.3%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Queues
16: Ocean & Kahlo

10/09/2020



Lane Group	EBL	EBT	EBR	WBT	WBR	SBL	SBT	SBR
Lane Group Flow (vph)	203	723	306	836	623	64	278	104
v/c Ratio	0.86	0.86	0.71	0.79	0.76	0.13	0.50	0.19
Control Delay	68.7	32.8	31.6	29.2	11.1	19.1	23.7	3.3
Queue Delay	0.0	5.6	0.0	51.2	2.2	0.2	1.0	0.0
Total Delay	68.7	38.5	31.6	80.4	13.3	19.3	24.7	3.3
Queue Length 50th (ft)	109	288	115	220	75	19	90	0
Queue Length 95th (ft)	#231	#563	#201	280	187	m46	166	15
Internal Link Dist (ft)		442		102			248	
Turn Bay Length (ft)	190		75					
Base Capacity (vph)	237	841	429	1060	824	501	553	543
Starvation Cap Reductn	0	0	0	437	97	0	106	0
Spillback Cap Reductn	0	79	0	0	18	166	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.95	0.71	1.34	0.86	0.19	0.62	0.19

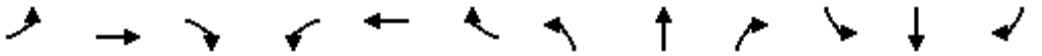
Intersection Summary

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
16: Phelan/Kahlo & Ocean

10/09/2020



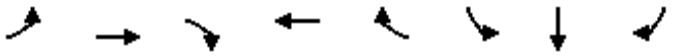
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	122	564	303	0	723	484	0	0	0	110	291	139
Future Volume (vph)	122	564	303	0	723	484	0	0	0	110	291	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.5	5.5		4.5	4.5				5.0	6.0	5.0
Lane Util. Factor	1.00	1.00	1.00		0.95	1.00				1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	0.70		1.00	0.77				1.00	1.00	0.88
Flpb, ped/bikes	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	0.85				1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (prot)	1711	1766	1068		3355	1163				1616	1749	1359
Flt Permitted	0.95	1.00	1.00		1.00	1.00				0.95	1.00	1.00
Satd. Flow (perm)	1711	1766	1068		3355	1163				1616	1749	1359
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.90	0.90	0.90	0.94	0.94	0.94
Adj. Flow (vph)	130	600	322	0	769	515	0	0	0	117	310	148
RTOR Reduction (vph)	0	0	0	0	0	335	0	0	0	0	0	97
Lane Group Flow (vph)	130	600	322	0	769	180	0	0	0	117	310	51
Confl. Peds. (#/hr)	108		107			108						104
Confl. Bikes (#/hr)			8			7						6
Heavy Vehicles (%)	2%	4%	2%	0%	4%	3%	2%	2%	2%	8%	5%	1%
Turn Type	Prot	NA	Perm		NA	Perm				Perm	NA	Perm
Protected Phases	5	13			6						4	
Permitted Phases			13			6				4		4
Actuated Green, G (s)	9.0	41.5	41.5		30.5	30.5				30.0	30.0	30.0
Effective Green, g (s)	10.0	42.5	41.5		31.5	31.5				31.0	30.0	31.0
Actuated g/C Ratio	0.11	0.47	0.46		0.35	0.35				0.34	0.33	0.34
Clearance Time (s)	6.0	5.5	5.5		5.5	5.5				6.0	6.0	6.0
Lane Grp Cap (vph)	190	833	492		1174	407				556	583	468
v/s Ratio Prot	0.08	c0.34			c0.23						c0.18	
v/s Ratio Perm			0.30			0.16				0.07		0.04
v/c Ratio	0.68	0.72	0.65		0.66	0.44				0.21	0.53	0.11
Uniform Delay, d1	38.5	19.0	18.7		24.7	22.5				20.9	24.3	20.1
Progression Factor	0.73	0.53	0.57		0.87	1.53				1.30	1.27	2.54
Incremental Delay, d2	16.2	4.7	5.9		2.7	3.3				0.8	3.0	0.4
Delay (s)	44.2	14.8	16.5		24.2	37.7				27.8	34.0	51.5
Level of Service	D	B	B		C	D				C	C	D
Approach Delay (s)		18.9			29.7			0.0			37.2	
Approach LOS		B			C			A			D	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	18.5
Intersection Capacity Utilization	61.3%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Queues
16: Phelan/Kahlo & Ocean

10/09/2020



Lane Group	EBL	EBT	EBR	WBT	WBR	SBL	SBT	SBR
Lane Group Flow (vph)	130	600	322	769	515	117	310	148
v/c Ratio	0.68	0.72	0.65	0.66	0.70	0.21	0.53	0.26
Control Delay	46.0	15.2	17.1	24.6	9.0	28.4	34.7	10.3
Queue Delay	29.9	0.9	0.0	51.7	1.4	0.3	1.2	0.0
Total Delay	75.9	16.1	17.1	76.2	10.3	28.6	35.9	10.3
Queue Length 50th (ft)	62	133	73	182	50	42	140	14
Queue Length 95th (ft)	m#150	308	189	247	94	87	225	56
Internal Link Dist (ft)		442		102			248	
Turn Bay Length (ft)	190		75					
Base Capacity (vph)	190	833	492	1174	741	556	583	567
Starvation Cap Reductn	0	10	0	499	89	0	115	0
Spillback Cap Reductn	56	72	0	0	45	142	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.97	0.79	0.65	1.14	0.79	0.28	0.66	0.26

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.