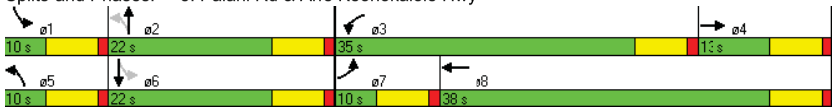
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	34	#124		#325	#477		44	51		9	45	
Internal Link Dist (ft)		920			920			920			3420	
Turn Bay Length (ft)				250			200			200		
Base Capacity (vph)	114	456		1390	881		255	1207		183	901	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.20	0.60		0.67	0.76		0.22	0.50		0.03	0.18	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 64.8			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 21.8		Intersection LOS: C	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	15	122	629	35	121	95	1159	244	129	1404	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		100	200		200	550		550	300		550
Storage Lanes	1		0	2		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1736	1611	0	3433	1863	1553	1770	4988	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1736	1611	0	3433	1863	1553	1770	4988	1583	1719	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		139				121			244			132
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			900	
Travel Time (s)		22.7			22.7			22.7			20.5	
Peak Hour Factor	0.82	0.92	0.88	0.77	0.43	1.00	0.72	0.93	1.00	0.88	0.92	0.77
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	155	0	817	81	121	132	1246	244	147	1526	132
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	18.0	10.0	0.0	29.0	21.0	21.0	17.0	32.0	32.0	19.0	34.0	34.0
Total Split (%)	20.0%	11.1%	0.0%	32.2%	23.3%	23.3%	18.9%	35.6%	35.6%	21.1%	37.8%	37.8%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.0	4.0		22.7	19.3	19.3	10.1	26.6	26.6	11.5	28.0	28.0
Actuated g/C Ratio	0.11	0.05		0.26	0.22	0.22	0.11	0.30	0.30	0.13	0.32	0.32
v/c Ratio	0.54	0.76		0.93	0.20	0.28	0.66	0.83	0.38	0.66	0.98	0.23
Control Delay	47.5	34.2		51.4	33.5	8.5	54.1	35.4	5.3	51.7	49.6	5.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.5	34.2		51.4	33.5	8.5	54.1	35.4	5.3	51.7	49.6	5.4
LOS	D	C		D	C	A	D	D	A	D	D	A
Approach Delay		39.5			44.9			32.4			46.5	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	56	9		234	40	0	72	244	0	79	315	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	96	#103		250	37	46	102	#305	53	137	#424	25
Internal Link Dist (ft)		920			920			920			820	
Turn Bay Length (ft)	100			200		200	550		550	300		550
Base Capacity (vph)	235	205		890	405	432	219	1496	646	252	1559	576
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.76		0.92	0.20	0.28	0.60	0.83	0.38	0.58	0.98	0.23

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 88.8			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.98			
Intersection Signal Delay: 40.9		Intersection LOS: D	
Intersection Capacity Utilization 78.7%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy

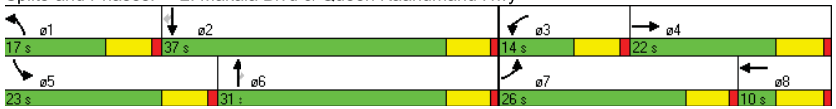
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	637	213	164	164	88	90	326	801	50	179	1397	497
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	200		0	400		400	400		400
Storage Lanes	2		0	2		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3327	0	3433	3246	0	3433	4988	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3327	0	3433	3246	0	3433	4988	1583	1719	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		155			90				51			547
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.93	0.78	0.90	1.00	0.96	1.00	1.00	0.99	0.98	1.00	0.81	0.85
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	685	455	0	164	182	0	326	809	51	179	1725	585
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6			2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0		10.0	10.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	26.0	22.0	0.0	14.0	10.0	0.0	17.0	31.0	31.0	23.0	37.0	37.0
Total Split (%)	28.9%	24.4%	0.0%	15.6%	11.1%	0.0%	18.9%	34.4%	34.4%	25.6%	41.1%	41.1%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None	None	None	None	None
Act Effct Green (s)	19.8	16.0		7.8	4.0		10.9	28.0	28.0	13.9	31.0	31.0
Actuated g/C Ratio	0.22	0.18		0.09	0.04		0.12	0.31	0.31	0.15	0.35	0.35
v/c Ratio	0.92	0.63		0.55	0.79		0.78	0.52	0.10	0.67	1.01	0.66
Control Delay	53.9	26.6		46.8	47.0		52.9	27.4	7.9	48.1	54.5	7.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.9	26.6		46.8	47.0		52.9	27.4	7.9	48.1	54.5	7.0
LOS	D	C		D	D		D	C	A	D	D	A
Approach Delay		43.0			46.9			33.6			42.9	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	196	82		46	27		94	139	0	96	~365	14

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#300	106		78	#82		#156	186	26	160	#392	70
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			200			400		400	400		400
Base Capacity (vph)	751	722		306	231		422	1556	529	326	1708	889
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.91	0.63		0.54	0.79		0.77	0.52	0.10	0.55	1.01	0.66

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 89.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.01
Intersection Signal Delay: 41.1 Intersection LOS: D
Intersection Capacity Utilization 79.8% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy

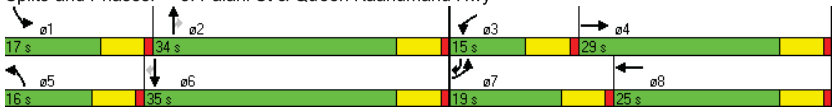


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	364	426	245	66	419	102	262	726	20	241	1281	638
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		200	200		200	400		400	400		400
Storage Lanes	2		0	1		0	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3334	0	1641	3221	0	3433	4988	1583	3335	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3334	0	1641	3221	0	3433	4988	1583	3335	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		139			28				25			43
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	1.00	0.91	1.00	0.89	0.89	1.00	0.91	0.80	1.00	0.85	1.00
Heavy Vehicles (%)	4%	2%	2%	10%	10%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	364	695	0	66	586	0	262	798	25	241	1507	638
Turn Type	Prot			Prot			Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases									2			6
Detector Phase	7	4		3	8		5	2	2	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	27.0		10.0	27.0		10.0	27.0	27.0	10.0	27.0	10.0
Total Split (s)	19.0	29.0	0.0	15.0	25.0	0.0	16.0	34.0	34.0	17.0	35.0	19.0
Total Split (%)	20.0%	30.5%	0.0%	15.8%	26.3%	0.0%	16.8%	35.8%	35.8%	17.9%	36.8%	20.0%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	Min	None	Min	None
Act Effct Green (s)	12.7	25.6		8.0	18.5		9.8	28.4	28.4	10.4	29.0	47.7
Actuated g/C Ratio	0.14	0.27		0.09	0.20		0.10	0.30	0.30	0.11	0.31	0.51
v/c Ratio	0.80	0.69		0.47	0.89		0.73	0.53	0.05	0.65	0.99	0.80
Control Delay	54.2	29.5		52.4	52.7		54.1	29.1	9.8	49.1	53.9	27.1
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.2	29.5		52.4	52.7		54.1	29.1	9.8	49.1	53.9	27.1
LOS	D	C		D	D		D	C	A	D	D	C
Approach Delay		38.0			52.7			34.7			46.3	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	110	165		38	173		80	147	0	72	331	287

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#176	233		80	#264		#131	188	16	111	#398	#461
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			200			400		400	400		400
Base Capacity (vph)	466	1008		157	674		365	1507	496	390	1524	806
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.78	0.69		0.42	0.87		0.72	0.53	0.05	0.62	0.99	0.79

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 94			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 42.9		Intersection LOS: D	
Intersection Capacity Utilization 77.4%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Palani St & Queen Kaahumanu Hwy

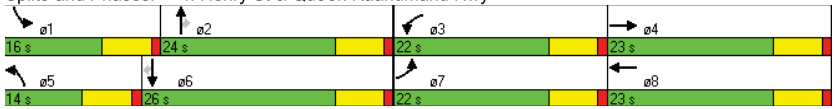


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	458	109	564	455	284	170	636	527	299	1081	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	330		350	370		400
Storage Lanes	1		0	2		0	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3451	0	3433	3348	0	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3451	0	3433	3348	0	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		25			114				444			272
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.76	0.84	1.00	0.97	0.90	1.00	0.73	1.00	0.81	1.00	1.00	0.78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	654	0	581	790	0	233	636	651	299	1081	272
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		22.0	22.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	22.0	23.0	0.0	22.0	23.0	0.0	14.0	24.0	24.0	16.0	26.0	26.0
Total Split (%)	25.9%	27.1%	0.0%	25.9%	27.1%	0.0%	16.5%	28.2%	28.2%	18.8%	30.6%	30.6%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	10.8	17.0		16.0	24.7		8.0	18.1	18.1	9.9	20.0	20.0
Actuated g/C Ratio	0.13	0.20		0.19	0.29		0.09	0.21	0.21	0.12	0.24	0.24
v/c Ratio	0.51	0.92		0.90	0.75		0.72	0.59	0.95	0.75	0.90	0.47
Control Delay	41.9	52.5		53.1	30.9		51.4	32.6	36.1	49.3	43.5	6.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.9	52.5		53.1	30.9		51.4	32.6	36.1	49.3	43.5	6.6
LOS	D	D		D	C		D	C	D	D	D	A
Approach Delay		50.9			40.3			37.0			38.5	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	58	175		157	180		63	112	117	80	206	0
Queue Length 95th (ft)	85	#246		#250	#318		80	150	#252	#136	#285	34

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150			200			330		350	370		400
Base Capacity (vph)	333	710		646	1055		323	1085	687	404	1197	580
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.92		0.90	0.75		0.72	0.59	0.95	0.74	0.90	0.47

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 85			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 40.3		Intersection LOS: D	
Intersection Capacity Utilization 78.0%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy



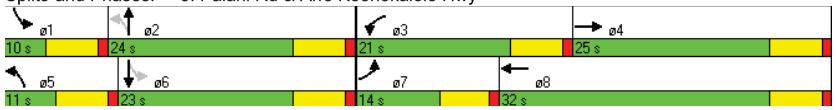
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	628	131	490	548	5	89	97	561	37	57	50
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	200		0	311		200
Storage Lanes	1		0	2		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3395	0	2993	1624	0	1770	3039	0	1770	3291	0
Flt Permitted	0.950			0.950			0.604			0.310		
Satd. Flow (perm)	1770	3395	0	2993	1624	0	1125	3039	0	577	3291	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			1			411			54	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			3376	
Travel Time (s)		22.7			22.7			22.7			76.7	
Peak Hour Factor	0.92	0.96	1.00	0.89	1.00	0.92	0.92	0.92	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	115	785	0	551	553	0	97	683	0	40	116	0
Turn Type	Prot			Prot			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	10.0		10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	14.0	25.0	0.0	21.0	32.0	0.0	11.0	24.0	0.0	10.0	23.0	0.0
Total Split (%)	17.5%	31.3%	0.0%	26.3%	40.0%	0.0%	13.8%	30.0%	0.0%	12.5%	28.8%	0.0%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	7.8	18.9		15.3	29.6		17.3	14.5		14.7	11.7	
Actuated g/C Ratio	0.11	0.26		0.21	0.41		0.24	0.20		0.20	0.16	
v/c Ratio	0.61	0.87		0.87	0.83		0.31	0.90dr		0.22	0.20	
Control Delay	48.9	38.9		47.2	38.5		21.8	15.7		20.9	16.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	48.9	38.9		47.2	38.5		21.8	15.7		20.9	16.6	
LOS	D	D		D	D		C	B		C	B	
Approach Delay		40.2			42.8			16.4			17.7	
Approach LOS		D			D			B			B	
Queue Length 50th (ft)	54	186		135	~264		33	61		13	13	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#128	#314		#239	#498		66	120		34	34	
Internal Link Dist (ft)		920			920			920			3296	
Turn Bay Length (ft)				250			200			311		
Base Capacity (vph)	199	926		631	663		314	1075		184	827	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.58	0.85		0.87	0.83		0.31	0.64		0.22	0.14	

Intersection Summary		
Area Type:	Other	
Cycle Length: 80		
Actuated Cycle Length: 72.5		
Natural Cycle: 80		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.87		
Intersection Signal Delay: 33.7	Intersection LOS: C	
Intersection Capacity Utilization 79.7%	ICU Level of Service D	
Analysis Period (min) 15		

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
dr Defacto Right Lane. Recode with 1 though lane as a right lane.

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy



TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED
KAMAKANA VILLAGES
AT KEAHUOLU

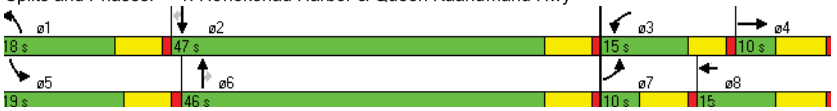
APPENDIX E
CAPACITY ANALYSIS WORKSHEETS
2029 PEAK HOUR TRAFFIC WITHOUT PROJECT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	19	62	311	30	205	116	1431	608	177	963	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		100	200		200	550		550	300		550
Storage Lanes	1		0	2		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1719	1658	0	3433	1863	1538	1770	4940	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1719	1658	0	3433	1863	1538	1770	4940	1583	1719	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		68				205			400			82
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			900	
Travel Time (s)		22.7			22.7			22.7			20.5	
Peak Hour Factor	1.00	0.75	0.91	0.93	1.00	1.00	1.00	0.96	0.70	0.75	0.81	1.00
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	49	93	0	334	30	205	116	1491	869	236	1189	82
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	10.0	10.0	0.0	15.0	15.0	15.0	18.0	46.0	46.0	19.0	47.0	47.0
Total Split (%)	11.1%	11.1%	0.0%	16.7%	16.7%	16.7%	20.0%	51.1%	51.1%	21.1%	52.2%	52.2%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	4.0	4.0		9.0	9.0	9.0	10.2	40.1	40.1	13.0	45.7	45.7
Actuated g/C Ratio	0.05	0.05		0.10	0.10	0.10	0.12	0.46	0.46	0.15	0.52	0.52
v/c Ratio	0.63	0.66		0.95	0.16	0.60	0.57	0.66	0.93	0.93	0.46	0.10
Control Delay	77.3	40.1		78.6	39.3	13.9	48.2	20.9	30.1	80.8	16.0	3.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.3	40.1		78.6	39.3	13.9	48.2	20.9	30.1	80.8	16.0	3.8
LOS	E	D		E	D	B	D	C	C	F	B	A
Approach Delay		53.0			53.2			25.4			25.5	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	28	14		99	16	0	63	239	281	135	168	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#86	#50		#185	42	64	116	291	235	#207	183	24
Internal Link Dist (ft)		920			920			920			820	
Turn Bay Length (ft)	100			200		200	550		550	300		550
Base Capacity (vph)	78	141		352	191	341	242	2251	939	254	2566	838
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.66		0.95	0.16	0.60	0.48	0.66	0.93	0.93	0.46	0.10

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 88		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.95		
Intersection Signal Delay: 29.6		Intersection LOS: C
Intersection Capacity Utilization 68.0%		ICU Level of Service C
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	616	146	54	22	163	83	196	1410	31	58	895	302
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	200		0	400		400	400		400
Storage Lanes	2		0	2		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	3401	0	3433	3300	0	3433	4940	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3335	3401	0	3433	3300	0	3433	4940	1583	1719	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		54			111				37			302
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	0.94	1.00	0.39	0.91	0.75	0.91	0.87	0.83	1.00	0.99	1.00
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	616	209	0	56	290	0	215	1621	37	58	904	302
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6			2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0		10.0	10.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	22.0	23.0	0.0	10.0	11.0	0.0	15.0	37.0	37.0	10.0	32.0	32.0
Total Split (%)	27.5%	28.8%	0.0%	12.5%	13.8%	0.0%	18.8%	46.3%	46.3%	12.5%	40.0%	40.0%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None	None	None	None	None
Act Effct Green (s)	15.9	21.1		4.0	5.0		8.6	30.9	30.9	4.0	24.0	24.0
Actuated g/C Ratio	0.20	0.27		0.05	0.06		0.11	0.40	0.40	0.05	0.31	0.31
v/c Ratio	0.90	0.22		0.31	0.91		0.56	0.82	0.06	0.65	0.59	0.44
Control Delay	49.8	19.0		41.6	58.2		39.6	26.0	5.8	72.0	24.4	4.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.8	19.0		41.6	58.2		39.6	26.0	5.8	72.0	24.4	4.9
LOS	D	B		D	E		D	C	A	E	C	A
Approach Delay		42.0			55.5			27.2			21.9	
Approach LOS		D			E			C			C	
Queue Length 50th (ft)	156	33		14	47		53	264	0	29	135	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#254	63		13	#124		87	309	15	#90	175	53
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			200			400		400	400		400
Base Capacity (vph)	690	964		178	317		400	1981	657	89	1662	718
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.22		0.31	0.91		0.54	0.82	0.06	0.65	0.54	0.42

Intersection Summary		
Area Type:	Other	
Cycle Length: 80		
Actuated Cycle Length: 77.6		
Natural Cycle: 80		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.91		
Intersection Signal Delay: 30.7	Intersection LOS: C	
Intersection Capacity Utilization 75.3%	ICU Level of Service D	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

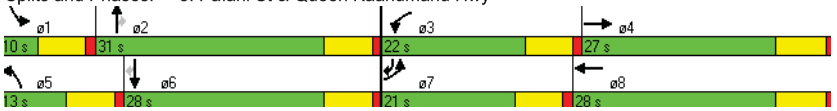
Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	454	252	154	250	543	5	156	1222	12	40	699	271
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		200	200		200	400		400	400		400
Storage Lanes	2		0	1		0	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	3300	0	1543	3083	0	3433	4940	1583	3335	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3335	3300	0	1543	3083	0	3433	4940	1583	3335	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		124			1				18			42
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	0.96	1.00	1.00	0.88	0.67	0.97	0.94	0.67	1.00	0.89	0.70
Heavy Vehicles (%)	5%	4%	2%	17%	17%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	454	416	0	250	624	0	161	1300	18	40	785	387
Turn Type	Prot			Prot			Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases									2			6
Detector Phase	7	4		3	8		5	2	2	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	27.0		10.0	27.0		10.0	27.0	27.0	10.0	27.0	10.0
Total Split (s)	21.0	27.0	0.0	22.0	28.0	0.0	13.0	31.0	31.0	10.0	28.0	21.0
Total Split (%)	23.3%	30.0%	0.0%	24.4%	31.1%	0.0%	14.4%	34.4%	34.4%	11.1%	31.1%	23.3%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	Min	None	Min	None
Act Effct Green (s)	14.4	19.3		15.7	20.6		7.0	27.1	27.1	4.0	19.8	40.2
Actuated g/C Ratio	0.17	0.22		0.18	0.24		0.08	0.32	0.32	0.05	0.23	0.47
v/c Ratio	0.81	0.50		0.89	0.84		0.58	0.83	0.04	0.26	0.69	0.52
Control Delay	48.2	22.5		68.6	43.6		48.2	34.9	10.9	45.7	34.0	17.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.2	22.5		68.6	43.6		48.2	34.9	10.9	45.7	34.0	17.3
LOS	D	C		E	D		D	C	B	D	C	B
Approach Delay		35.9			50.8			36.1			29.0	
Approach LOS		D			D			D			C	
Queue Length 50th (ft)	129	73		141	176		46	265	0	11	147	129

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#203	119		#282	#252		78	#359	10	27	187	143
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			200			400		400	400		400
Base Capacity (vph)	586	906		289	796		282	1557	511	156	1274	755
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.46		0.87	0.78		0.57	0.83	0.04	0.26	0.62	0.51

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 85.9	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.89	
Intersection Signal Delay: 37.0	Intersection LOS: D
Intersection Capacity Utilization 75.1%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 3: Palani St & Queen Kaahumanu Hwy



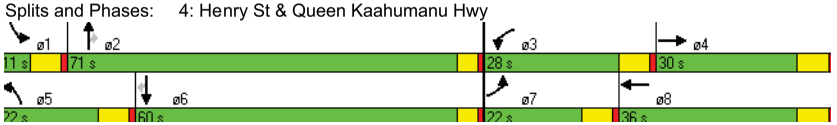
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	123	393	72	551	539	188	253	1080	893	128	813	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	330		350	370		400
Storage Lanes	1		0	2		0	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3454	0	3433	3376	0	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3454	0	3433	3376	0	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			45				394			173
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.70	0.68	0.65	0.95	1.00	0.80	1.00	0.96	0.86	1.00	0.96	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	176	689	0	580	774	0	253	1125	1038	128	847	173
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		22.0	22.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	22.0	30.0	0.0	28.0	36.0	0.0	22.0	71.0	71.0	11.0	60.0	60.0
Total Split (%)	15.7%	21.4%	0.0%	20.0%	25.7%	0.0%	15.7%	50.7%	50.7%	7.9%	42.9%	42.9%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	15.6	24.0		22.0	30.4		14.6	65.0	65.0	5.0	55.4	55.4
Actuated g/C Ratio	0.11	0.17		0.16	0.22		0.10	0.46	0.46	0.04	0.40	0.40
v/c Ratio	0.89	1.14		1.08	1.01		0.71	0.48	1.10	1.04	0.42	0.24
Control Delay	101.6	131.8		115.3	85.4		71.8	26.6	82.6	155.8	31.7	4.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	101.6	131.8		115.3	85.4		71.8	26.6	82.6	155.8	31.7	4.7
LOS	F	F		F	F		E	C	F	F	C	A
Approach Delay		125.7			98.2			55.4			41.4	
Approach LOS		F			F			E			D	
Queue Length 50th (ft)	160	~380		~302	~374		115	253	~865	~64	205	0
Queue Length 95th (ft)	186	#307		#422	#506		162	295	#1030	#135	247	48

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150			200			330		350	370		400
Base Capacity (vph)	202	604		539	768		392	2361	946	123	2013	731
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.87	1.14		1.08	1.01		0.65	0.48	1.10	1.04	0.42	0.24

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 140
Natural Cycle: 140
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.14
Intersection Signal Delay: 73.2 Intersection LOS: E
Intersection Capacity Utilization 87.1% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy

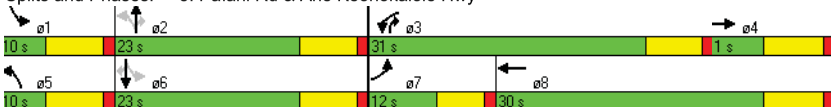


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	102	225	60	855	812	5	29	350	635	5	272	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	250		0	311		300	200		200
Storage Lanes	1		0	2		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3368	0	2993	3084	0	1770	3539	1553	1770	3539	1583
Flt Permitted	0.950			0.950			0.542			0.519		
Satd. Flow (perm)	1770	3368	0	2993	3084	0	1010	3539	1553	967	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		39			1				473			197
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			2500	
Travel Time (s)		22.7			22.7			22.7			56.8	
Peak Hour Factor	0.92	0.98	0.90	0.94	0.81	0.92	1.00	0.92	0.96	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	111	297	0	910	1007	0	29	380	661	5	296	197
Turn Type	Prot			Prot			pm+pt		pm+ov	pm+pt		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases							2		2	6		6
Detector Phase	7	4		3	8		5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0		10.0	22.0		10.0	22.0	10.0	10.0	22.0	22.0
Total Split (s)	12.0	11.0	0.0	31.0	30.0	0.0	10.0	23.0	31.0	10.0	23.0	23.0
Total Split (%)	16.0%	14.7%	0.0%	41.3%	40.0%	0.0%	13.3%	30.7%	41.3%	13.3%	30.7%	30.7%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None		None	None		None	Min	None	None	Min	Min
Act Effct Green (s)	6.1	6.5		23.8	24.3		14.5	13.8	43.7	13.4	12.0	12.0
Actuated g/C Ratio	0.10	0.10		0.37	0.38		0.23	0.22	0.68	0.21	0.19	0.19
v/c Ratio	0.66	0.79		0.82	0.86		0.11	0.50	0.55	0.02	0.45	0.43
Control Delay	52.5	46.3		27.1	30.3		17.9	24.6	3.3	16.6	26.0	7.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.5	46.3		27.1	30.3		17.9	24.6	3.3	16.6	26.0	7.5
LOS	D	D		C	C		B	C	A	B	C	A
Approach Delay		48.0			28.8			11.3			18.6	
Approach LOS		D			C			B			B	
Queue Length 50th (ft)	39	49		133	161		9	65	16	2	49	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#135	#155		#320	#321		25	121	83	8	96	49
Internal Link Dist (ft)		920			920			920			2420	
Turn Bay Length (ft)				250			311		300	200		200
Base Capacity (vph)	168	378		1182	1170		276	1013	1234	253	950	569
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.66	0.79		0.77	0.86		0.11	0.38	0.54	0.02	0.31	0.35

Intersection Summary		
Area Type:	Other	
Cycle Length: 75		
Actuated Cycle Length: 64.1		
Natural Cycle: 75		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.86		
Intersection Signal Delay: 24.7		Intersection LOS: C
Intersection Capacity Utilization 65.8%		ICU Level of Service C
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy



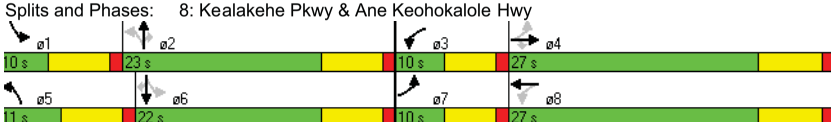
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	126	142	472	222	428	73	255	505	90	22	379	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	340		0	480		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1863	1583	1770	1822	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.197			0.631			0.387			0.447		
Satd. Flow (perm)	367	1863	1583	1175	1822	0	721	3539	1583	833	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			302		12				98			22
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			800			1000	
Travel Time (s)		22.7			22.7			18.2			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	137	154	513	241	544	0	277	549	98	24	412	22
Turn Type	pm+pt		Perm	pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	10.0	27.0	27.0	10.0	27.0	0.0	11.0	23.0	23.0	10.0	22.0	22.0
Total Split (%)	14.3%	38.6%	38.6%	14.3%	38.6%	0.0%	15.7%	32.9%	32.9%	14.3%	31.4%	31.4%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes			Yes	Yes		Yes			Yes	Yes	Yes
Recall Mode	None	None	None	None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	22.8	18.8	18.8	24.3	21.2		22.3	20.4	20.4	17.0	13.0	13.0
Actuated g/C Ratio	0.35	0.29	0.29	0.37	0.33		0.34	0.31	0.31	0.26	0.20	0.20
v/c Ratio	0.63	0.29	0.76	0.51	0.90		0.84	0.50	0.17	0.09	0.58	0.07
Control Delay	28.8	19.9	17.6	18.7	44.6		45.5	21.8	6.3	14.7	27.6	10.3
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.8	19.9	17.6	18.7	44.6		45.5	21.8	6.3	14.7	27.6	10.3
LOS	C	B	B	B	D		D	C	A	B	C	B
Approach Delay		20.0			36.6			27.3			26.1	
Approach LOS		B			D			C			C	
Queue Length 50th (ft)	31	47	68	58	210		84	87	0	6	82	0
Queue Length 95th (ft)	#84	94	#206	112	#422		#213	161	33	20	123	16

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			720			920	
Turn Bay Length (ft)	340			480			200		200	200		200
Base Capacity (vph)	216	607	719	475	602		328	1108	564	276	878	410
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.25	0.71	0.51	0.90		0.84	0.50	0.17	0.09	0.47	0.05

Intersection Summary

Area Type: Other
Cycle Length: 70
Actuated Cycle Length: 65.1
Natural Cycle: 70
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 27.6 Intersection LOS: C
Intersection Capacity Utilization 78.5% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Kealakehe Pkwy & Ane Keohokalole Hwy



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	100	5	5	452	453	118
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	109	5	5	491	492	128
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	813	310	621			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	813	310	621			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	65	99	99			
cM capacity (veh/h)	315	686	956			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	109	5	5	246	246	328	292
Volume Left	109	0	5	0	0	0	0
Volume Right	0	5	0	0	0	0	128
cSH	315	686	956	1700	1700	1700	1700
Volume to Capacity	0.35	0.01	0.01	0.14	0.14	0.19	0.17
Queue Length 95th (ft)	37	1	0	0	0	0	0
Control Delay (s)	22.4	10.3	8.8	0.0	0.0	0.0	0.0
Lane LOS	C	B	A				
Approach Delay (s)	21.8		0.1			0.0	
Approach LOS	C						

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	28.5%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	19	148	558	48	109	116	1322	170	148	1624	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		100	200		200	550		550	300		550
Storage Lanes	1		0	2		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1736	1615	0	3433	1863	1553	1770	4988	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1736	1615	0	3433	1863	1553	1770	4988	1583	1719	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		161				118			185			145
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			900	
Travel Time (s)		22.7			22.7			22.7			20.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	120	182	0	607	52	118	126	1437	185	161	1765	145
Turn Type	Prot			Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8			6			2
Detector Phase	7	4		3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	18.0	10.0	0.0	24.0	16.0	16.0	17.0	37.0	37.0	19.0	39.0	39.0
Total Split (%)	20.0%	11.1%	0.0%	26.7%	17.8%	17.8%	18.9%	41.1%	41.1%	21.1%	43.3%	43.3%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.4	4.0		17.6	14.0	14.0	9.9	31.2	31.2	11.8	33.0	33.0
Actuated g/C Ratio	0.12	0.05		0.20	0.16	0.16	0.11	0.35	0.35	0.13	0.37	0.37
v/c Ratio	0.59	0.80		0.89	0.18	0.34	0.64	0.82	0.27	0.71	0.96	0.22
Control Delay	49.5	36.6		51.5	38.1	10.6	52.7	31.1	4.5	54.4	41.6	4.4
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.5	36.6		51.5	38.1	10.6	52.7	31.1	4.5	54.4	41.6	4.4
LOS	D	D		D	D	B	D	C	A	D	D	A
Approach Delay		41.8			44.4			29.9			40.0	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	65	12		174	27	0	69	272	0	88	356	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	120	#117		#267	62	49	#129	332	43	#167	#471	37
Internal Link Dist (ft)		920			920			920			820	
Turn Bay Length (ft)	100			200		200	550		550	300		550
Base Capacity (vph)	235	227		698	294	344	220	1757	678	252	1841	664
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.51	0.80		0.87	0.18	0.34	0.57	0.82	0.27	0.64	0.96	0.22

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 88.6		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.96		
Intersection Signal Delay: 37.2	Intersection LOS: D	
Intersection Capacity Utilization 83.9%	ICU Level of Service E	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy

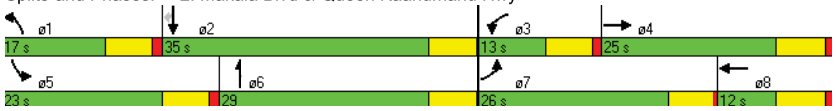
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	710	419	199	199	210	115	396	817	60	238	1420	574
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	200		0	400		400	400		400
Storage Lanes	2		0	2		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3369	0	3433	3329	0	3433	4988	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3369	0	3433	3329	0	3433	4988	1583	1719	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		80			88				65			498
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	772	671	0	216	353	0	430	888	65	259	1543	624
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6			2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		1.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0		10.0	10.0		7.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	26.0	25.0	0.0	13.0	12.0	0.0	17.0	29.0	29.0	23.0	35.0	35.0
Total Split (%)	28.9%	27.8%	0.0%	14.4%	13.3%	0.0%	18.9%	32.2%	32.2%	25.6%	38.9%	38.9%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None	None	None	None	None
Act Effct Green (s)	20.0	19.0		7.0	6.0		11.0	23.9	23.9	16.1	29.0	29.0
Actuated g/C Ratio	0.22	0.21		0.08	0.07		0.12	0.27	0.27	0.18	0.32	0.32
v/c Ratio	1.03	0.87		0.81	1.16		1.02	0.67	0.14	0.84	0.97	0.75
Control Delay	77.3	43.5		64.7	132.9		90.8	32.8	7.9	59.9	47.3	12.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.3	43.5		64.7	132.9		90.8	32.8	7.9	59.9	47.3	12.3
LOS	E	D		E	F		F	C	A	E	D	B
Approach Delay		61.5			107.0			49.7			39.7	
Approach LOS		E			F			D			D	
Queue Length 50th (ft)	~245	173		63	~100		~135	167	0	142	314	52

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#357	#268		#122	#190		#228	213	31	#264	#420	193
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			200			400		400	400		400
Base Capacity (vph)	748	774		267	304		420	1323	467	325	1592	833
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.03	0.87		0.81	1.16		1.02	0.67	0.14	0.80	0.97	0.75

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 90
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.16
Intersection Signal Delay: 54.0 Intersection LOS: D
Intersection Capacity Utilization 88.5% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy

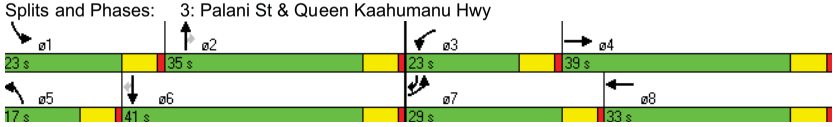


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	459	501	297	189	611	128	317	701	25	288	1332	727
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		200	200		200	400		400	400		400
Storage Lanes	2		0	1		0	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3341	0	1641	3227	0	3433	4988	1583	3335	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3341	0	1641	3227	0	3433	4988	1583	3335	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		100			19				27			16
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	10%	10%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	499	868	0	205	803	0	345	762	27	313	1448	790
Turn Type	Prot			Prot			Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases									2			6
Detector Phase	7	4		3	8		5	2	2	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	27.0		10.0	27.0		10.0	27.0	27.0	10.0	27.0	10.0
Total Split (s)	29.0	39.0	0.0	23.0	33.0	0.0	17.0	35.0	35.0	23.0	41.0	29.0
Total Split (%)	24.2%	32.5%	0.0%	19.2%	27.5%	0.0%	14.2%	29.2%	29.2%	19.2%	34.2%	24.2%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	Min	None	Min	None
Act Effct Green (s)	22.6	33.0		16.6	27.0		11.0	30.6	30.6	15.4	35.0	63.6
Actuated g/C Ratio	0.19	0.28		0.14	0.23		0.09	0.26	0.26	0.13	0.29	0.53
v/c Ratio	0.78	0.87		0.90	1.08		1.09	0.60	0.06	0.73	1.00	0.96
Control Delay	55.9	47.3		90.1	99.8		128.0	41.8	12.7	60.5	66.6	49.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	55.9	47.3		90.1	99.8		128.0	41.8	12.7	60.5	66.6	49.5
LOS	E	D		F	F		F	D	B	E	E	D
Approach Delay		50.4			97.9			67.3			60.6	
Approach LOS		D			F			E			E	
Queue Length 50th (ft)	190	304		158	~361		~155	193	0	120	~414	552

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	252	#413		#298	#490		#252	241	24	169	#526	#843
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			200			400		400	400		400
Base Capacity (vph)	647	995		233	743		316	1275	425	474	1445	830
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.87		0.88	1.08		1.09	0.60	0.06	0.66	1.00	0.95

Intersection Summary			
Area Type:	Other		
Cycle Length: 120			
Actuated Cycle Length: 119.6			
Natural Cycle: 120			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 65.8		Intersection LOS: E	
Intersection Capacity Utilization 90.0%		ICU Level of Service E	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Palani St & Queen Kaahumanu Hwy



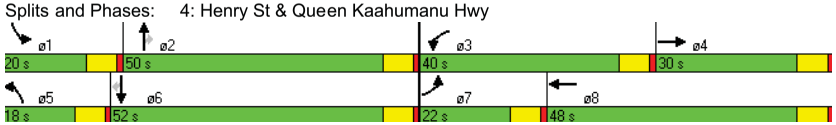
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	114	554	132	900	590	356	206	574	884	384	1194	238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	330		350	370		400
Storage Lanes	1		0	2		0	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3437	0	3433	3341	0	3433	5085	1583	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3437	0	3433	3341	0	3433	5085	1583	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			92				481			259
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	745	0	978	1028	0	224	624	961	417	1298	259
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		22.0	22.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	22.0	30.0	0.0	40.0	48.0	0.0	18.0	50.0	50.0	20.0	52.0	52.0
Total Split (%)	15.7%	21.4%	0.0%	28.6%	34.3%	0.0%	12.9%	35.7%	35.7%	14.3%	37.1%	37.1%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	13.9	24.0		34.0	44.1		11.8	44.0	44.0	14.0	46.2	46.2
Actuated g/C Ratio	0.10	0.17		0.24	0.32		0.08	0.31	0.31	0.10	0.33	0.33
v/c Ratio	0.71	1.23		1.17	0.92		0.78	0.39	1.16	1.22	0.77	0.37
Control Delay	82.4	165.1		136.3	55.9		81.3	38.4	108.1	172.0	46.0	5.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	82.4	165.1		136.3	55.9		81.3	38.4	108.1	172.0	46.0	5.4
LOS	F	F		F	E		F	D	F	F	D	A
Approach Delay		153.3			95.1			80.8			67.3	
Approach LOS		F			F			F			E	
Queue Length 50th (ft)	110	~434		~546	447		104	163	~717	~239	390	0
Queue Length 95th (ft)	180	#566		#679	#597		#162	201	#980	#346	449	62

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150			200			330		350	370		400
Base Capacity (vph)	202	604		834	1117		294	1598	827	343	1680	696
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.61	1.23		1.17	0.92		0.76	0.39	1.16	1.22	0.77	0.37

Intersection Summary	
Area Type:	Other
Cycle Length: 140	
Actuated Cycle Length: 140	
Natural Cycle: 140	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.23	
Intersection Signal Delay: 90.6	Intersection LOS: F
Intersection Capacity Utilization 100.2%	ICU Level of Service G
Analysis Period (min) 15	

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

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy



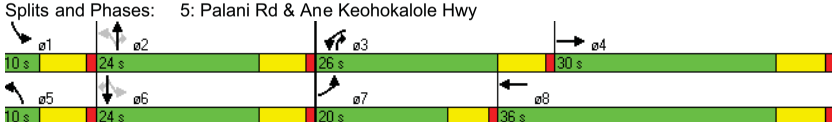
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	168	703	159	477	731	5	108	373	671	74	438	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		200	250		0	200		300	311		200
Storage Lanes	1		0	2		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3386	0	2993	3085	0	1770	3539	1553	1770	3539	1583
Flt Permitted	0.950			0.950			0.317			0.401		
Satd. Flow (perm)	1770	3386	0	2993	3085	0	590	3539	1553	747	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			1				89			230
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			2501	
Travel Time (s)		22.7			22.7			22.7			56.8	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	183	937	0	518	800	0	117	405	729	80	476	230
Turn Type	Prot			Prot			pm+pt		pm+ov	pm+pt		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases							2		2	6		6
Detector Phase	7	4		3	8		5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0		10.0	22.0		10.0	22.0	10.0	10.0	22.0	22.0
Total Split (s)	20.0	30.0	0.0	26.0	36.0	0.0	10.0	24.0	26.0	10.0	24.0	24.0
Total Split (%)	22.2%	33.3%	0.0%	28.9%	40.0%	0.0%	11.1%	26.7%	28.9%	11.1%	26.7%	26.7%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	None	None	Min	Min
Act Effct Green (s)	12.6	24.1		20.1	31.7		19.4	16.3	42.5	19.4	16.3	16.3
Actuated g/C Ratio	0.15	0.28		0.23	0.37		0.22	0.19	0.49	0.22	0.19	0.19
v/c Ratio	0.71	0.97		0.74	0.71		0.62	0.61	0.90	0.37	0.71	0.47
Control Delay	52.2	54.5		39.4	29.1		41.3	36.7	34.8	28.8	39.7	8.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	54.5		39.4	29.1		41.3	36.7	34.8	28.8	39.7	8.0
LOS	D	D		D	C		D	D	C	C	D	A
Approach Delay		54.1			33.1			36.0			29.3	
Approach LOS		D			C			D			C	
Queue Length 50th (ft)	99	~280		143	212		49	110	328	33	132	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#185	#416		#207	285		#98	158	#580	67	185	59
Internal Link Dist (ft)		920			920			920			2421	
Turn Bay Length (ft)				250			200		300	311		200
Base Capacity (vph)	288	967		697	1133		188	742	809	215	742	514
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.64	0.97		0.74	0.71		0.62	0.55	0.90	0.37	0.64	0.45

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 86.4			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.97			
Intersection Signal Delay: 38.5		Intersection LOS: D	
Intersection Capacity Utilization 85.2%		ICU Level of Service E	
Analysis Period (min) 15			

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

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (vph)	160	5	5	540	724	104
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0	200			0
Storage Lanes	1	1	1			0
Taper Length (ft)	100	100	100			100
Satd. Flow (prot)	1770	1583	1770	3539	3472	0
Flt Permitted	0.950		0.950			
Satd. Flow (perm)	1770	1583	1770	3539	3472	0
Link Speed (mph)	30			30	30	
Link Distance (ft)	2000			2501	875	
Travel Time (s)	45.5			56.8	19.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	174	5	5	587	900	0
Sign Control	Stop			Free	Free	

Intersection Summary		
Area Type:	Other	
Control Type: Unsignalized		
Intersection Capacity Utilization 38.9%		ICU Level of Service A
Analysis Period (min) 15		

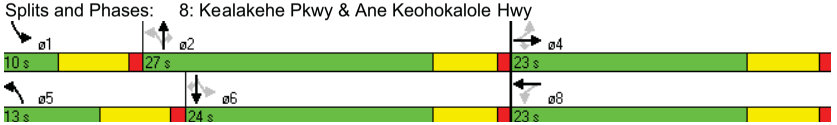
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	269	201	162	149	35	228	418	264	54	632	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	340		0	480		0	200		200	200		200
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1863	1583	1770	1809	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.632			0.480			0.245			0.490		
Satd. Flow (perm)	1177	1863	1583	894	1809	0	456	3539	1583	913	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			218		20				287			137
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			800			1000	
Travel Time (s)		22.7			22.7			18.2			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	292	218	176	200	0	248	454	287	59	687	137
Turn Type	Perm		Perm	Perm			pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	4	4	4	8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	23.0	23.0	23.0	23.0	23.0	0.0	13.0	27.0	27.0	10.0	24.0	24.0
Total Split (%)	38.3%	38.3%	38.3%	38.3%	38.3%	0.0%	21.7%	45.0%	45.0%	16.7%	40.0%	40.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	14.1	14.1	14.1	14.1	14.1		27.3	23.5	23.5	19.9	15.8	15.8
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25		0.49	0.42	0.42	0.36	0.29	0.29
v/c Ratio	0.21	0.61	0.38	0.77	0.42		0.63	0.30	0.34	0.15	0.68	0.25
Control Delay	18.5	24.7	5.3	44.5	18.6		17.5	13.3	3.5	8.9	21.7	5.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.5	24.7	5.3	44.5	18.6		17.5	13.3	3.5	8.9	21.7	5.0
LOS	B	C	A	D	B		B	B	A	A	C	A
Approach Delay		16.6			30.7			11.5			18.3	
Approach LOS		B			C			B			B	
Queue Length 50th (ft)	17	89	0	56	51		46	62	0	10	112	0
Queue Length 95th (ft)	44	157	42	#144	101		#105	96	43	25	163	33

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			720			920	
Turn Bay Length (ft)	340			480			200		200	200		200
Base Capacity (vph)	367	581	644	279	578		394	1501	837	391	1169	615
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.17	0.50	0.34	0.63	0.35		0.63	0.30	0.34	0.15	0.59	0.22

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 55.3
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.77
Intersection Signal Delay: 17.2 Intersection LOS: B
Intersection Capacity Utilization 73.2% ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Kealakehe Pkwy & Ane Keohokalole Hwy



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	160	5	5	540	724	104
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	174	5	5	587	787	113
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	1148	450	900			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1148	450	900			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	9	99	99			
cM capacity (veh/h)	191	556	751			

Direction, Lane #	EB 1	EB 2	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	174	5	5	293	293	525	375
Volume Left	174	0	5	0	0	0	0
Volume Right	0	5	0	0	0	0	113
cSH	191	556	751	1700	1700	1700	1700
Volume to Capacity	0.91	0.01	0.01	0.17	0.17	0.31	0.22
Queue Length 95th (ft)	177	1	1	0	0	0	0
Control Delay (s)	94.1	11.5	9.8	0.0	0.0	0.0	0.0
Lane LOS	F	B	A				
Approach Delay (s)	91.6		0.1			0.0	
Approach LOS	F						

Intersection Summary			
Average Delay	9.9		
Intersection Capacity Utilization	38.9%	ICU Level of Service	A
Analysis Period (min)	15		

TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED

KAMAKANA VILLAGES
AT KEAHUOLU

APPENDIX F

CAPACITY ANALYSIS WORKSHEETS

2014 PEAK HOUR TRAFFIC WITH PROJECT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	11	45	262	21	189	85	1068	472	156	806	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		200	550		550	300		550
Storage Lanes	0		0	0		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	0	1690	0	0	1781	1538	1770	3438	1583	1719	3438	1538
Flt Permitted		0.801			0.720		0.218			0.113		
Satd. Flow (perm)	0	1377	0	0	1341	1538	406	3438	1583	204	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49				133			674			57
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			900	
Travel Time (s)		22.7			22.7			22.7			20.5	
Peak Hour Factor	1.00	0.75	0.91	0.93	1.00	1.00	1.00	0.96	0.70	0.75	0.81	1.00
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	97	0	0	303	189	85	1112	674	208	995	57
Turn Type	Perm			Perm		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	4	4		8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	37.0	37.0	0.0	37.0	37.0	37.0	10.0	40.0	40.0	13.0	43.0	43.0
Total Split (%)	41.1%	41.1%	0.0%	41.1%	41.1%	41.1%	11.1%	44.4%	44.4%	14.4%	47.8%	47.8%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)		23.5			23.5	23.5	36.9	32.9	32.9	43.7	38.3	38.3
Actuated g/C Ratio		0.29			0.29	0.29	0.45	0.40	0.40	0.54	0.47	0.47
v/c Ratio		0.23			0.79	0.35	0.34	0.80	0.65	0.86	0.62	0.08
Control Delay		13.4			42.0	9.6	14.4	28.1	5.0	50.9	20.2	5.0
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		13.4			42.0	9.6	14.4	28.1	5.0	50.9	20.2	5.0
LOS		B			D	A	B	C	A	D	C	A
Approach Delay		13.4			29.6			19.2			24.6	
Approach LOS		B			C			B			C	
Queue Length 50th (ft)		18			144	21	19	264	0	57	210	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		40			238	69	46	#395	0	#140	267	22
Internal Link Dist (ft)		920			920			920			820	
Turn Bay Length (ft)						200	550		550	300		550
Base Capacity (vph)		559			515	673	251	1449	1057	241	1615	753
Starvation Cap Reductn		0			0	0	0	0	0	0	0	0
Spillback Cap Reductn		0			0	0	0	0	0	0	0	0
Storage Cap Reductn		0			0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.17			0.59	0.28	0.34	0.77	0.64	0.86	0.62	0.08

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 81.6		
Natural Cycle: 75		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.86		
Intersection Signal Delay: 22.3	Intersection LOS: C	
Intersection Capacity Utilization 75.4%	ICU Level of Service D	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy

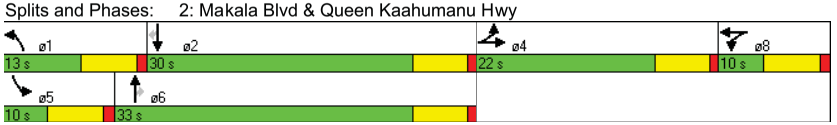
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	445	34	40	16	33	52	144	1094	23	40	743	271
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	0		0	400		400	400		400
Storage Lanes	2		0	1		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	1716	0	1681	1569	0	3433	3438	1583	1719	3438	1538
Flt Permitted	0.950			0.950	0.998		0.950			0.950		
Satd. Flow (perm)	3335	1716	0	1681	1569	0	3433	3438	1583	1719	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			69				28			271
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		400			1000			1000			1000	
Travel Time (s)		9.1			22.7			22.7			22.7	
Peak Hour Factor	1.00	0.94	1.00	0.39	0.91	0.75	0.91	0.87	0.83	1.00	0.99	1.00
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	445	76	0	37	109	0	158	1257	28	40	751	271
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		1	6		5	2	
Permitted Phases									6			2
Detector Phase	4	4		8	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		10.0	10.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	22.0	22.0	0.0	10.0	10.0	0.0	13.0	33.0	33.0	10.0	30.0	30.0
Total Split (%)	29.3%	29.3%	0.0%	13.3%	13.3%	0.0%	17.3%	44.0%	44.0%	13.3%	40.0%	40.0%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None	None	None	None	None
Act Effct Green (s)	13.8	13.8		4.1	4.1		7.0	29.1	29.1	4.1	24.8	24.8
Actuated g/C Ratio	0.20	0.20		0.06	0.06		0.10	0.43	0.43	0.06	0.36	0.36
v/c Ratio	0.66	0.20		0.36	0.68		0.45	0.86	0.04	0.38	0.60	0.37
Control Delay	31.2	15.3		44.6	40.4		36.0	29.1	6.7	45.6	22.8	4.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.2	15.3		44.6	40.4		36.0	29.1	6.7	45.6	22.8	4.4
LOS	C	B		D	D		D	C	A	D	C	A
Approach Delay		28.9			41.5			29.5			18.9	
Approach LOS		C			D			C			B	
Queue Length 50th (ft)	97	14		17	20		36	~310	0	18	157	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	143	47		20	#101		65	#428	14	#54	217	49
Internal Link Dist (ft)		320			920			920			920	
Turn Bay Length (ft)							400		400	400		400
Base Capacity (vph)	806	445		102	160		363	1466	691	104	1289	746
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.17		0.36	0.68		0.44	0.86	0.04	0.38	0.58	0.36

Intersection Summary

Area Type: Other
Cycle Length: 75
Actuated Cycle Length: 68.2
Natural Cycle: 75
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 26.4 Intersection LOS: C
Intersection Capacity Utilization 67.9% ICU Level of Service C
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy

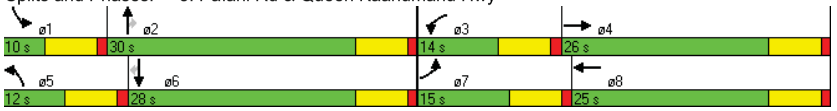


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	328	158	114	47	402	24	115	937	9	36	566	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	200		0	400		400	400		400
Storage Lanes	2		0	1		0	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	3285	0	1543	3075	0	3433	3438	1583	3335	3438	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3335	3285	0	1543	3075	0	3433	3438	1583	3335	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		114			10				13			321
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	0.96	1.00	1.00	0.88	0.67	0.97	0.94	0.67	1.00	0.89	0.70
Heavy Vehicles (%)	5%	4%	2%	17%	17%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	328	279	0	47	493	0	119	997	13	36	636	321
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	26.0		10.0	25.0		10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	15.0	26.0	0.0	14.0	25.0	0.0	12.0	30.0	30.0	10.0	28.0	28.0
Total Split (%)	18.8%	32.5%	0.0%	17.5%	31.3%	0.0%	15.0%	37.5%	37.5%	12.5%	35.0%	35.0%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	9.1	23.6		7.1	16.3		6.0	25.4	25.4	4.0	21.8	21.8
Actuated g/C Ratio	0.12	0.32		0.10	0.22		0.08	0.34	0.34	0.05	0.29	0.29
v/c Ratio	0.81	0.25		0.32	0.73		0.43	0.85	0.02	0.20	0.63	0.47
Control Delay	50.9	13.9		39.5	33.8		39.9	33.8	10.7	38.9	27.6	5.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.9	13.9		39.5	33.8		39.9	33.8	10.7	38.9	27.6	5.6
LOS	D	B		D	C		D	C	B	D	C	A
Approach Delay		33.9			34.3			34.2			20.9	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	84	34		22	115		29	253	0	9	146	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#156	65		55	162		55	#386	8	23	202	16
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			200			400		400	400		400
Base Capacity (vph)	407	1122		167	799		279	1186	555	181	1033	687
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.25		0.28	0.62		0.43	0.84	0.02	0.20	0.62	0.47

Intersection Summary		
Area Type:	Other	
Cycle Length: 80		
Actuated Cycle Length: 74.6		
Natural Cycle: 80		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.85		
Intersection Signal Delay: 30.1	Intersection LOS: C	
Intersection Capacity Utilization 70.5%	ICU Level of Service C	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 3: Palani Rd & Queen Kaahumanu Hwy



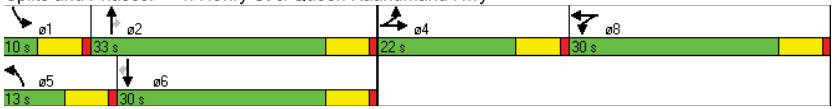
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	89	280	53	492	398	123	186	849	502	90	720	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	330		350	370		400
Storage Lanes	1		0	1		0	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3451	0	1610	3246	0	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950	0.989		0.950			0.950		
Satd. Flow (perm)	1770	3451	0	1610	3246	0	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		21			33				584			124
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.70	0.68	0.65	0.95	1.00	0.80	1.00	0.96	0.86	1.00	0.96	0.94
Shared Lane Traffic (%)				31%								
Lane Group Flow (vph)	127	494	0	357	713	0	186	884	584	90	750	124
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		22.0	22.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	22.0	22.0	0.0	30.0	30.0	0.0	13.0	33.0	33.0	10.0	30.0	30.0
Total Split (%)	23.2%	23.2%	0.0%	31.6%	31.6%	0.0%	13.7%	34.7%	34.7%	10.5%	31.6%	31.6%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	15.4	15.4		23.1	23.1		7.0	28.2	28.2	4.0	23.0	23.0
Actuated g/C Ratio	0.17	0.17		0.25	0.25		0.08	0.30	0.30	0.04	0.25	0.25
v/c Ratio	0.43	0.83		0.89	0.85		0.72	0.82	0.66	0.60	0.85	0.26
Control Delay	40.4	49.9		59.1	43.1		59.0	38.6	6.5	62.4	44.4	6.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	40.4	49.9		59.1	43.1		59.0	38.6	6.5	62.4	44.4	6.9
LOS	D	D		E	D		E	D	A	E	D	A
Approach Delay		48.0			48.5			29.6			41.2	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	69	146		227	215		57	266	0	28	225	0
Queue Length 95th (ft)	95	144		#402	#313		#107	#375	61	#61	#317	43

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150			200			330		350	370		400
Base Capacity (vph)	307	615		419	868		260	1078	888	149	920	503
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.41	0.80		0.85	0.82		0.72	0.82	0.66	0.60	0.82	0.25

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 92.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.89
Intersection Signal Delay: 39.5 Intersection LOS: D
Intersection Capacity Utilization 75.7% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy

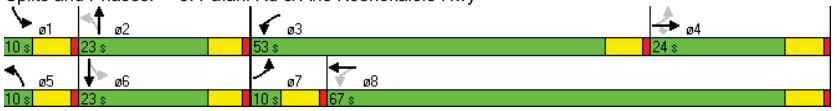


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	179	53	781	480	8	49	55	479	20	116	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	200		0	311		200
Storage Lanes	1		1	1		0	0		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1827	1583	1543	1624	0	0	3043	0	1770	3277	0
Flt Permitted	0.437			0.372				0.896		0.234		
Satd. Flow (perm)	814	1827	1583	604	1624	0	0	2737	0	436	3277	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			59		1			499			122	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.98	0.90	0.94	0.81	0.92	1.00	0.92	0.96	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	183	59	831	602	0	0	608	0	22	248	0
Turn Type	pm+pt		Perm	pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	10.0	24.0	24.0	53.0	67.0	0.0	10.0	23.0	0.0	10.0	23.0	0.0
Total Split (%)	9.1%	21.8%	21.8%	48.2%	60.9%	0.0%	9.1%	20.9%	0.0%	9.1%	20.9%	0.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	18.0	14.0	14.0	67.9	62.3			11.1		14.6	14.6	
Actuated g/C Ratio	0.19	0.15	0.15	0.72	0.66			0.12		0.15	0.15	
v/c Ratio	0.18	0.68	0.21	0.92	0.56			0.80		0.18	0.41	
Control Delay	20.5	53.2	12.5	31.8	14.7			17.1		36.0	19.4	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0		0.0	0.0	
Total Delay	20.5	53.2	12.5	31.8	14.7			17.1		36.0	19.4	
LOS	C	D	B	C	B			B		D	B	
Approach Delay		40.3			24.6			17.1			20.7	
Approach LOS		D			C			B			C	
Queue Length 50th (ft)	11	99	0	281	179			30		11	35	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	26	197	37	#783	345			97		33	71	
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)				250						311		
Base Capacity (vph)	196	353	353	907	1083			908		125	809	
Starvation Cap Reductn	0	0	0	0	0			0		0	0	
Spillback Cap Reductn	0	0	0	0	0			0		0	0	
Storage Cap Reductn	0	0	0	0	0			0		0	0	
Reduced v/c Ratio	0.18	0.52	0.17	0.92	0.56			0.67		0.18	0.31	

Intersection Summary		
Area Type:	Other	
Cycle Length: 110		
Actuated Cycle Length: 94.7		
Natural Cycle: 100		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.92		
Intersection Signal Delay: 24.1	Intersection LOS: C	
Intersection Capacity Utilization 98.0%	ICU Level of Service F	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	129	43	47	50	9	119
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	140	47	51	54	10	129
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	227	78			105	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	227	78			105	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	81	95			99	
cM capacity (veh/h)	756	982			1486	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	140	47	105	10	129
Volume Left	140	0	0	10	0
Volume Right	0	47	54	0	0
cSH	756	982	1700	1486	1700
Volume to Capacity	0.19	0.05	0.06	0.01	0.08
Queue Length 95th (ft)	17	4	0	0	0
Control Delay (s)	10.8	8.8	0.0	7.4	0.0
Lane LOS	B	A		A	
Approach Delay (s)	10.3		0.0	0.5	
Approach LOS	B				

Intersection Summary				
Average Delay	4.7			
Intersection Capacity Utilization	21.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	121	74	379	119	242	23	258	5	51	5	5	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	132	80	412	129	263	25	280	5	55	5	5	16
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	288			492			1090	1096	246	896	1290	276
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	288			492			1090	1096	246	896	1290	276
tC, single (s)	4.1			4.1			7.5	6.5	6.9	7.5	6.5	6.9
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 %	90			88			0	97	93	97	96	98
cM capacity (veh/h)	1271			1067			134	167	754	178	128	722

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	132	54	439	129	288	280	61	5	22
Volume Left	132	0	0	129	0	280	0	5	0
Volume Right	0	0	412	0	25	0	55	0	16
cSH	1271	1700	1700	1067	1700	134	574	178	334
Volume to Capacity	0.10	0.03	0.26	0.12	0.17	2.09	0.11	0.03	0.07
Queue Length 95th (ft)	9	0	0	10	0	572	9	2	5
Control Delay (s)	8.2	0.0	0.0	8.8	0.0	568.5	12.0	25.9	16.5
Lane LOS	A			A		F	B	D	C
Approach Delay (s)	1.7			2.7		469.2		18.4	
Approach LOS						F		C	

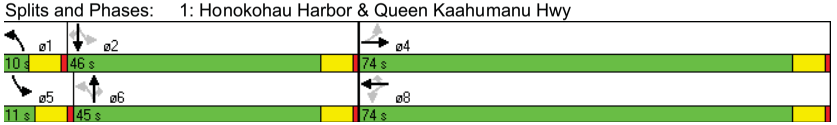
Intersection Summary				
Average Delay	115.5			
Intersection Capacity Utilization	51.9%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	72	13	109	523	29	124	85	990	194	145	1163	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		100	200		200	550		550	300		550
Storage Lanes	0		0	0		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	0	1679	0	0	1781	1553	1770	3471	1583	1719	3438	1538
Flt Permitted		0.334			0.594		0.103			0.100		
Satd. Flow (perm)	0	572	0	0	1106	1553	192	3471	1583	181	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		71				87			194			113
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			900	
Travel Time (s)		22.7			22.7			22.7			20.5	
Peak Hour Factor	0.82	0.92	0.88	0.77	0.43	1.00	0.72	0.93	1.00	0.88	0.92	0.77
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	226	0	0	746	124	118	1065	194	165	1264	113
Turn Type	Perm			Perm		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases		4			8		1	6		5	2	
Permitted Phases	4			8		8	6		6	2		2
Detector Phase	4	4		8	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	74.0	74.0	0.0	74.0	74.0	74.0	10.0	45.0	45.0	11.0	46.0	46.0
Total Split (%)	56.9%	56.9%	0.0%	56.9%	56.9%	56.9%	7.7%	34.6%	34.6%	8.5%	35.4%	35.4%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)		68.0			68.0	68.0	43.0	39.0	39.0	45.0	40.0	40.0
Actuated g/C Ratio		0.52			0.52	0.52	0.33	0.30	0.30	0.35	0.31	0.31
v/c Ratio		0.68			1.29	0.15	1.05	1.02	0.32	1.35	1.19	0.21
Control Delay		27.4			171.5	6.0	134.6	78.6	6.0	231.8	136.7	6.7
Queue Delay		0.0			0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay		27.4			171.5	6.0	134.6	78.6	6.0	231.8	136.7	6.7
LOS		C			F	A	F	E	A	F	F	A
Approach Delay		27.4			148.0			73.2			137.4	
Approach LOS		C			F			E			F	
Queue Length 50th (ft)		95			~800	15	~70	~501	0	~131	~677	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		213			265	47	#124	#637	56	#272	#816	27
Internal Link Dist (ft)		920			920			920			820	
Turn Bay Length (ft)						200	550		550	300		550
Base Capacity (vph)		333			579	854	112	1041	611	122	1058	551
Starvation Cap Reductn		0			0	0	0	0	0	0	0	0
Spillback Cap Reductn		0			0	0	0	0	0	0	0	0
Storage Cap Reductn		0			0	0	0	0	0	0	0	0
Reduced v/c Ratio		0.68			1.29	0.15	1.05	1.02	0.32	1.35	1.19	0.21

Intersection Summary		
Area Type:	Other	
Cycle Length: 130		
Actuated Cycle Length: 130		
Natural Cycle: 130		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 1.35		
Intersection Signal Delay: 111.4		Intersection LOS: F
Intersection Capacity Utilization 98.7%		ICU Level of Service F
Analysis Period (min) 15		
~ Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy



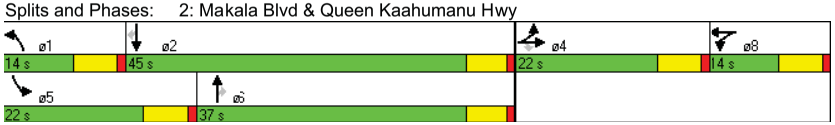
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	548	191	146	146	78	77	292	671	44	150	1158	415
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	200		0	400		400	400		400
Storage Lanes	2		1	1		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	1863	1583	1681	1630	0	3433	3471	1583	1719	3438	1538
Flt Permitted	0.950			0.950	0.996		0.950			0.950		
Satd. Flow (perm)	3367	1863	1583	1681	1630	0	3433	3471	1583	1719	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			162		33				45			488
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		400			1000			1000			1000	
Travel Time (s)		9.1			22.7			22.7			22.7	
Peak Hour Factor	0.93	0.78	0.90	1.00	0.96	1.00	1.00	0.99	0.98	1.00	0.81	0.85
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)				10%								
Lane Group Flow (vph)	589	245	162	131	173	0	292	678	45	150	1430	488
Turn Type	Split		Perm	Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		1	6		5	2	
Permitted Phases			4						6			2
Detector Phase	4	4	4	8	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	10.0	10.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	22.0	22.0	22.0	14.0	14.0	0.0	14.0	37.0	37.0	22.0	45.0	45.0
Total Split (%)	23.2%	23.2%	23.2%	14.7%	14.7%	0.0%	14.7%	38.9%	38.9%	23.2%	47.4%	47.4%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Act Effct Green (s)	16.0	16.0	16.0	8.0	8.0		8.0	34.0	34.0	13.0	39.0	39.0
Actuated g/C Ratio	0.17	0.17	0.17	0.08	0.08		0.08	0.36	0.36	0.14	0.41	0.41
v/c Ratio	1.04	0.78	0.40	0.92	1.04		1.01	0.55	0.08	0.64	1.01	0.53
Control Delay	88.1	56.4	9.1	102.9	116.2		100.5	26.9	7.4	51.0	56.3	4.1
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	88.1	56.4	9.1	102.9	116.2		100.5	26.9	7.4	51.0	56.3	4.1
LOS	F	E	A	F	F		F	C	A	D	E	A
Approach Delay		67.4			110.5			47.2			43.6	
Approach LOS		E			F			D			D	
Queue Length 50th (ft)	~198	143	0	84	~97		~93	171	0	86	~458	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#305	#193	54	#201	#236		#178	237	24	146	#507	44
Internal Link Dist (ft)		320			920			920			920	
Turn Bay Length (ft)				200			400		400	400		400
Base Capacity (vph)	567	314	401	142	167		289	1244	596	290	1411	919
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.04	0.78	0.40	0.92	1.04		1.01	0.55	0.08	0.52	1.01	0.53

Intersection Summary		
Area Type:	Other	
Cycle Length: 95		
Actuated Cycle Length: 95		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 1.04		
Intersection Signal Delay: 54.5		Intersection LOS: D
Intersection Capacity Utilization 84.4%		ICU Level of Service E
Analysis Period (min) 15		

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

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy

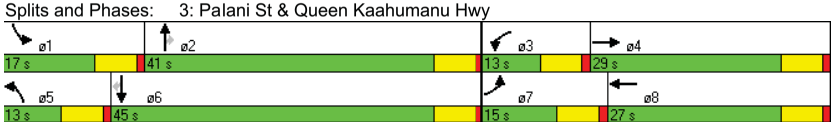


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	309	448	219	76	407	89	234	623	18	217	1083	539
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	200		0	400		400	400		400
Storage Lanes	2		0	1		0	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3355	0	1641	3225	0	3433	3471	1583	3335	3438	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3355	0	1641	3225	0	3433	3471	1583	3335	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		92			24				22			256
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	1.00	0.91	1.00	0.89	0.89	1.00	0.91	0.80	1.00	0.77	1.00
Heavy Vehicles (%)	4%	2%	2%	10%	10%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	309	689	0	76	557	0	234	685	22	217	1406	539
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases									2			6
Detector Phase	7	4		3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	27.0		10.0	27.0		10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	15.0	29.0	0.0	13.0	27.0	0.0	13.0	41.0	41.0	17.0	45.0	45.0
Total Split (%)	15.0%	29.0%	0.0%	13.0%	27.0%	0.0%	13.0%	41.0%	41.0%	17.0%	45.0%	45.0%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	9.0	24.6		6.9	19.9		7.0	35.7	35.7	10.3	39.0	39.0
Actuated g/C Ratio	0.09	0.25		0.07	0.20		0.07	0.36	0.36	0.10	0.39	0.39
v/c Ratio	1.01	0.76		0.67	0.84		0.96	0.55	0.04	0.62	1.04	0.71
Control Delay	99.8	37.1		73.4	48.5		96.6	27.6	9.0	50.9	65.1	18.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	99.8	37.1		73.4	48.5		96.6	27.6	9.0	50.9	65.1	18.8
LOS	F	D		E	D		F	C	A	D	E	B
Approach Delay		56.5			51.5			44.3			52.1	
Approach LOS		E			D			D			D	
Queue Length 50th (ft)	~105	192		48	171		78	184	0	69	~516	150

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#194	#267		#118	#234		#156	242	13	107	#472	283
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			200			400		400	400		400
Base Capacity (vph)	307	905		116	704		243	1253	585	371	1357	762
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.76		0.66	0.79		0.96	0.55	0.04	0.58	1.04	0.71

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 98.9		
Natural Cycle: 100		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 1.04		
Intersection Signal Delay: 51.4		Intersection LOS: D
Intersection Capacity Utilization 80.2%		ICU Level of Service D
Analysis Period (min) 15		
~ Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 3: Palani St & Queen Kaahumanu Hwy



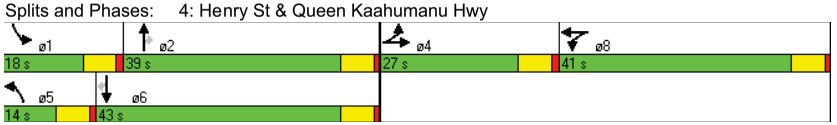
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	418	98	525	413	250	152	552	516	257	940	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		0	330		350	370		400
Storage Lanes	1		0	1		0	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3451	0	1610	3215	0	3433	3539	1583	3433	3539	1583
Flt Permitted	0.950			0.950	0.993		0.950			0.950		
Satd. Flow (perm)	1770	3451	0	1610	3215	0	3433	3539	1583	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		16			49				607			232
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.76	0.84	1.00	0.97	0.90	1.00	0.73	1.00	0.81	1.00	1.00	0.78
Shared Lane Traffic (%)				22%								
Lane Group Flow (vph)	96	596	0	422	828	0	208	552	637	257	940	232
Turn Type	Split			Split			Prot		Perm	Prot		Perm
Protected Phases	4	4		8	8		5	2		1	6	
Permitted Phases									2			6
Detector Phase	4	4		8	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		22.0	22.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	27.0	27.0	0.0	41.0	41.0	0.0	14.0	39.0	39.0	18.0	43.0	43.0
Total Split (%)	21.6%	21.6%	0.0%	32.8%	32.8%	0.0%	11.2%	31.2%	31.2%	14.4%	34.4%	34.4%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag							Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	21.0	21.0		34.7	34.7		8.0	32.4	32.4	11.8	36.2	36.2
Actuated g/C Ratio	0.17	0.17		0.28	0.28		0.06	0.26	0.26	0.10	0.29	0.29
v/c Ratio	0.32	1.00		0.94	0.89		0.94	0.60	0.74	0.79	0.91	0.37
Control Delay	49.0	86.0		73.1	52.6		103.9	43.2	9.9	72.7	55.8	5.9
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.0	86.0		73.1	52.6		103.9	43.2	9.9	72.7	55.8	5.9
LOS	D	F		E	D		F	D	A	E	E	A
Approach Delay		80.9			59.5			37.1			50.8	
Approach LOS		F			E			D			D	
Queue Length 50th (ft)	69	~252		367	335		88	205	18	106	384	0
Queue Length 95th (ft)	102	#336		#586	#451		#117	266	57	#168	#501	31

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150			200			330		350	370		400
Base Capacity (vph)	300	598		455	943		222	943	867	333	1058	636
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.32	1.00		0.93	0.88		0.94	0.59	0.73	0.77	0.89	0.36

Intersection Summary

Area Type: Other
Cycle Length: 125
Actuated Cycle Length: 123.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 53.4 Intersection LOS: D
Intersection Capacity Utilization 88.1% ICU Level of Service E
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy



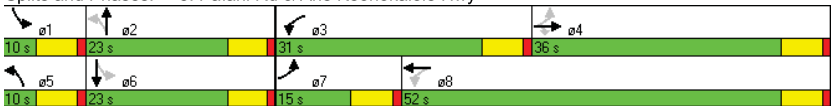
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	162	563	117	438	487	19	79	141	502	31	78	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	200		0	311		200
Storage Lanes	1		1	1		0	0		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1827	1583	1543	1623	0	0	3114	0	1770	3249	0
Flt Permitted	0.477			0.110				0.883		0.193		
Satd. Flow (perm)	889	1827	1583	179	1623	0	0	2766	0	360	3249	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			113		3			473			103	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.96	1.00	0.89	1.00	0.92	0.92	0.92	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	176	586	117	492	508	0	0	757	0	34	188	0
Turn Type	pm+pt		Perm	pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	15.0	36.0	36.0	31.0	52.0	0.0	10.0	23.0	0.0	10.0	23.0	0.0
Total Split (%)	15.0%	36.0%	36.0%	31.0%	52.0%	0.0%	10.0%	23.0%	0.0%	10.0%	23.0%	0.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	38.4	30.2	30.2	61.4	47.2			14.7		20.4	20.4	
Actuated g/C Ratio	0.41	0.32	0.32	0.65	0.50			0.16		0.22	0.22	
v/c Ratio	0.40	1.00	0.20	1.02	0.62			0.91		0.24	0.24	
Control Delay	13.7	71.2	6.5	74.3	22.9			30.7		32.0	14.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0			0.0		0.0	0.0	
Total Delay	13.7	71.2	6.5	74.3	22.9			30.7		32.0	14.2	
LOS	B	E	A	E	C			C		C	B	
Approach Delay		51.1			48.2			30.7			16.9	
Approach LOS		D			D			C			B	
Queue Length 50th (ft)	45	~416	2	~312	245			95		16	21	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	75	#626	42	#504	366			#204		41	48	
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)				250						311		
Base Capacity (vph)	457	588	586	483	817			891		139	865	
Starvation Cap Reductn	0	0	0	0	0			0		0	0	
Spillback Cap Reductn	0	0	0	0	0			0		0	0	
Storage Cap Reductn	0	0	0	0	0			0		0	0	
Reduced v/c Ratio	0.39	1.00	0.20	1.02	0.62			0.85		0.24	0.22	

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 93.9
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 42.0 Intersection LOS: D
Intersection Capacity Utilization 101.5% ICU Level of Service G
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	112	37	146	176	47	91
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	122	40	159	191	51	99
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	455	254			350	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	455	254			350	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	77	95			96	
cM capacity (veh/h)	539	784			1209	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	122	40	350	51	99
Volume Left	122	0	0	51	0
Volume Right	0	40	191	0	0
cSH	539	784	1700	1209	1700
Volume to Capacity	0.23	0.05	0.21	0.04	0.06
Queue Length 95th (ft)	22	4	0	3	0
Control Delay (s)	13.6	9.8	0.0	8.1	0.0
Lane LOS	B	A		A	
Approach Delay (s)	12.7		0.0	2.8	
Approach LOS	B				

Intersection Summary				
Average Delay	3.7			
Intersection Capacity Utilization	38.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	54	117	175	86	60	10	197	5	138	22	5	121
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	1.00	1.00	0.92	0.79	0.92	0.89	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	59	117	175	93	76	11	221	5	150	24	5	132
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	87			117			632	508	117	505	503	81
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	87			117			632	508	117	505	503	81
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 %	96			94			29	99	84	93	99	87
cM capacity (veh/h)	1509			1471			311	421	935	366	424	978

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	59	117	175	93	87	221	155	24	137
Volume Left	59	0	0	93	0	221	0	24	0
Volume Right	0	0	175	0	11	0	150	0	132
cSH	1509	1700	1700	1471	1700	311	897	366	930
Volume to Capacity	0.04	0.07	0.10	0.06	0.05	0.71	0.17	0.07	0.15
Queue Length 95th (ft)	3	0	0	5	0	127	16	5	13
Control Delay (s)	7.5	0.0	0.0	7.6	0.0	40.6	9.9	15.5	9.5
Lane LOS	A			A		E	A	C	A
Approach Delay (s)	1.3			3.9		27.9		10.4	
Approach LOS						D		B	

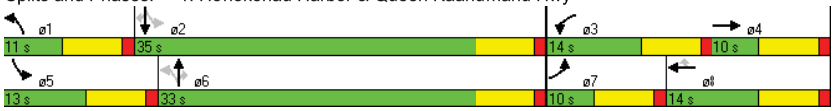
Intersection Summary				
Average Delay	12.5			
Intersection Capacity Utilization	40.1%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	11	45	262	21	189	85	1068	472	156	806	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	200		200	550		550	300		550
Storage Lanes	1		0	2		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1719	1649	0	3433	1863	1538	1770	3438	1583	1719	3438	1538
Flt Permitted	0.950			0.950			0.217			0.129		
Satd. Flow (perm)	1719	1649	0	3433	1863	1538	404	3438	1583	233	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		49				189			649			57
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			900	
Travel Time (s)		22.7			22.7			22.7			20.5	
Peak Hour Factor	1.00	0.75	0.91	0.93	1.00	1.00	1.00	0.96	0.70	0.75	0.81	1.00
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	33	64	0	282	21	189	85	1112	674	208	995	57
Turn Type	Prot			Prot		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8	6		6	2		2
Detector Phase	7	4		3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	10.0	10.0	0.0	14.0	14.0	14.0	11.0	33.0	33.0	13.0	35.0	35.0
Total Split (%)	14.3%	14.3%	0.0%	20.0%	20.0%	20.0%	15.7%	47.1%	47.1%	18.6%	50.0%	50.0%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	4.0	4.0		8.0	9.9	9.9	31.5	26.5	26.5	36.5	31.0	31.0
Actuated g/C Ratio	0.06	0.06		0.12	0.15	0.15	0.48	0.41	0.41	0.56	0.47	0.47
v/c Ratio	0.31	0.43		0.67	0.07	0.48	0.28	0.80	0.66	0.72	0.61	0.07
Control Delay	39.5	23.8		38.0	27.2	9.9	9.6	23.5	5.4	28.2	16.6	4.3
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.5	23.8		38.0	27.2	9.9	9.6	23.5	5.4	28.2	16.6	4.3
LOS	D	C		D	C	A	A	C	A	C	B	A
Approach Delay		29.2			26.7			16.3			17.9	
Approach LOS		C			C			B			B	
Queue Length 50th (ft)	14	6		61	7	0	15	222	7	40	178	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	40	30		#111	28	54	32	#313	10	#91	208	19
Internal Link Dist (ft)		920			920			920			820	
Turn Bay Length (ft)	100			200		200	550		550	300		550
Base Capacity (vph)	106	148		424	283	394	300	1432	1038	290	1634	761
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.31	0.43		0.67	0.07	0.48	0.28	0.78	0.65	0.72	0.61	0.07

Intersection Summary	
Area Type:	Other
Cycle Length: 70	
Actuated Cycle Length: 65.3	
Natural Cycle: 60	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.80	
Intersection Signal Delay: 18.6	Intersection LOS: B
Intersection Capacity Utilization 67.3%	ICU Level of Service C
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy



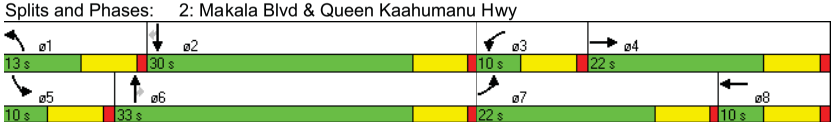
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	445	34	40	16	33	52	144	1094	23	40	743	271
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	300		0	400		400	400		400
Storage Lanes	2		0	2		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	3260	0	3433	3128	0	3433	3438	1583	1719	3438	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3335	3260	0	3433	3128	0	3433	3438	1583	1719	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40			69				28			271
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	0.94	1.00	0.39	0.91	0.75	0.91	0.87	0.83	1.00	0.99	1.00
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	445	76	0	41	105	0	158	1257	28	40	751	271
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6			2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		10.0	10.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	22.0	22.0	0.0	10.0	10.0	0.0	13.0	33.0	33.0	10.0	30.0	30.0
Total Split (%)	29.3%	29.3%	0.0%	13.3%	13.3%	0.0%	17.3%	44.0%	44.0%	13.3%	40.0%	40.0%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	None	None	None	None	None
Act Effct Green (s)	13.7	15.7		4.1	4.1		7.0	29.1	29.1	4.1	24.8	24.8
Actuated g/C Ratio	0.20	0.23		0.06	0.06		0.10	0.43	0.43	0.06	0.36	0.36
v/c Ratio	0.66	0.10		0.20	0.41		0.45	0.86	0.04	0.38	0.60	0.37
Control Delay	31.5	14.0		36.0	20.9		35.9	28.8	6.7	45.5	22.6	4.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	31.5	14.0		36.0	20.9		35.9	28.8	6.7	45.5	22.6	4.4
LOS	C	B		D	C		D	C	A	D	C	A
Approach Delay		28.9			25.2			29.2			18.8	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	97	6		9	8		36	~296	0	18	154	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	143	23		10	32		65	#428	14	#54	217	49
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			300			400		400	400		400
Base Capacity (vph)	808	883		208	254		364	1469	692	104	1292	747
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.09		0.20	0.41		0.43	0.86	0.04	0.38	0.58	0.36

Intersection Summary		
Area Type:	Other	
Cycle Length: 75		
Actuated Cycle Length: 68		
Natural Cycle: 75		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.86		
Intersection Signal Delay: 25.5		Intersection LOS: C
Intersection Capacity Utilization 67.9%		ICU Level of Service C
Analysis Period (min) 15		

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

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy

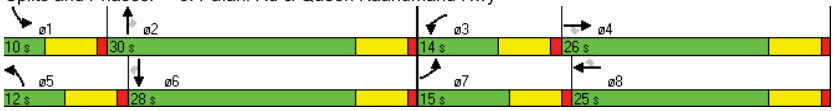


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	328	158	114	47	402	24	115	937	9	36	566	225
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		300	200		300	400		400	400		400
Storage Lanes	2		1	1		1	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	3471	1583	1543	3085	1538	3433	3438	1583	3335	3438	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3335	3471	1583	1543	3085	1538	3433	3438	1583	3335	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			114			36			13			321
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	0.96	1.00	1.00	0.88	0.67	0.97	0.94	0.67	1.00	0.89	0.70
Heavy Vehicles (%)	5%	4%	2%	17%	17%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	328	165	114	47	457	36	119	997	13	36	636	321
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	15.0	26.0	26.0	14.0	25.0	25.0	12.0	30.0	30.0	10.0	28.0	28.0
Total Split (%)	18.8%	32.5%	32.5%	17.5%	31.3%	31.3%	15.0%	37.5%	37.5%	12.5%	35.0%	35.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	9.1	23.3	23.3	7.1	15.9	15.9	6.0	25.4	25.4	4.0	21.8	21.8
Actuated g/C Ratio	0.12	0.31	0.31	0.10	0.21	0.21	0.08	0.34	0.34	0.05	0.29	0.29
v/c Ratio	0.80	0.15	0.20	0.32	0.69	0.10	0.42	0.85	0.02	0.20	0.63	0.47
Control Delay	50.2	22.2	6.3	39.4	33.4	9.5	39.6	33.4	10.7	38.8	27.4	5.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.2	22.2	6.3	39.4	33.4	9.5	39.6	33.4	10.7	38.8	27.4	5.6
LOS	D	C	A	D	C	A	D	C	B	D	C	A
Approach Delay		34.3			32.3			33.8			20.7	
Approach LOS		C			C			C			C	
Queue Length 50th (ft)	82	34	0	22	107	0	29	248	0	8	144	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#156	58	38	55	152	12	55	#386	8	23	202	16
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300		300	200		300	400		400	400		400
Base Capacity (vph)	409	1099	579	168	800	426	281	1192	558	182	1039	689
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.15	0.20	0.28	0.57	0.08	0.42	0.84	0.02	0.20	0.61	0.47

Intersection Summary		
Area Type:	Other	
Cycle Length: 80		
Actuated Cycle Length: 74.2		
Natural Cycle: 80		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.85		
Intersection Signal Delay: 29.7		Intersection LOS: C
Intersection Capacity Utilization 69.7%		ICU Level of Service C
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 3: Palani Rd & Queen Kaahumanu Hwy

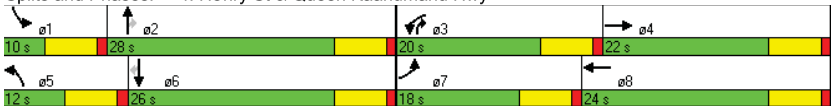


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	89	280	53	492	398	123	186	849	502	90	720	117
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		200	200		200	330		350	370		400
Storage Lanes	1		0	2		0	2		2	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3451	0	3433	3391	0	3433	3539	2787	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3451	0	3433	3391	0	3433	3539	2787	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		26			65				134			124
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.70	0.68	0.65	0.95	1.00	0.80	1.00	0.96	0.86	1.00	0.96	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	127	494	0	518	552	0	186	884	584	90	750	124
Turn Type	Prot			Prot			Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			6
Detector Phase	7	4		3	8		5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0		10.0	22.0		10.0	22.0	10.0	10.0	22.0	22.0
Total Split (s)	18.0	22.0	0.0	20.0	24.0	0.0	12.0	28.0	20.0	10.0	26.0	26.0
Total Split (%)	22.5%	27.5%	0.0%	25.0%	30.0%	0.0%	15.0%	35.0%	25.0%	12.5%	32.5%	32.5%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	None	None	Min	Min
Act Effct Green (s)	10.1	14.6		13.8	21.0		6.0	23.6	43.4	4.0	19.4	19.4
Actuated g/C Ratio	0.13	0.19		0.18	0.27		0.08	0.30	0.56	0.05	0.25	0.25
v/c Ratio	0.55	0.74		0.85	0.57		0.70	0.82	0.36	0.51	0.85	0.25
Control Delay	41.6	35.8		46.7	25.9		51.5	34.8	8.6	47.3	39.1	6.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	41.6	35.8		46.7	25.9		51.5	34.8	8.6	47.3	39.1	6.5
LOS	D	D		D	C		D	C	A	D	D	A
Approach Delay		37.0			36.0			27.4			35.7	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	60	115		130	115		47	224	67	23	187	0
Queue Length 95th (ft)	84	117		#213	171		#94	#335	98	#47	#280	39

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150			200			330		350	370		400
Base Capacity (vph)	274	732		620	964		265	1072	1622	177	912	500
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.46	0.67		0.84	0.57		0.70	0.82	0.36	0.51	0.82	0.25

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 77.8			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 32.8		Intersection LOS: C	
Intersection Capacity Utilization 70.3%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy

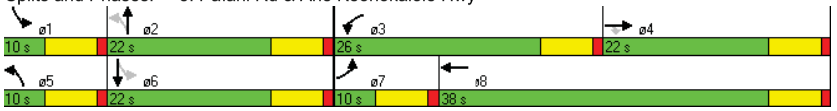


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	33	179	53	781	480	8	49	55	479	20	116	112
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	200		0	311		200
Storage Lanes	1		1	2		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1827	1583	2993	1624	0	1770	3012	0	1770	3277	0
Flt Permitted	0.950			0.950			0.560			0.388		
Satd. Flow (perm)	1770	1827	1583	2993	1624	0	1043	3012	0	723	3277	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			59		1			499			122	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.98	0.90	0.94	0.81	0.92	1.00	0.92	0.96	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	183	59	831	602	0	49	559	0	22	248	0
Turn Type	Prot		Perm	Prot			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4				2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	10.0	22.0	22.0	26.0	38.0	0.0	10.0	22.0	0.0	10.0	22.0	0.0
Total Split (%)	12.5%	27.5%	27.5%	32.5%	47.5%	0.0%	12.5%	27.5%	0.0%	12.5%	27.5%	0.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	4.1	11.8	11.8	20.7	35.3		12.4	11.0		11.2	9.1	
Actuated g/C Ratio	0.06	0.18	0.18	0.32	0.54		0.19	0.17		0.17	0.14	
v/c Ratio	0.32	0.55	0.18	0.88	0.69		0.20	0.61		0.12	0.44	
Control Delay	42.2	33.0	9.3	38.0	21.4		21.8	7.7		20.7	17.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	42.2	33.0	9.3	38.0	21.4		21.8	7.7		20.7	17.0	
LOS	D	C	A	D	C		C	A		C	B	
Approach Delay		29.2			31.0			8.8			17.3	
Approach LOS		C			C			A			B	
Queue Length 50th (ft)	15	71	0	173	161		15	10		7	25	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#50	143	30	#354	#398		41	55		23	59	
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)				250			200			311		
Base Capacity (vph)	112	461	444	944	876		243	1149		190	918	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.32	0.40	0.13	0.88	0.69		0.20	0.49		0.12	0.27	

Intersection Summary		
Area Type:	Other	
Cycle Length: 80		
Actuated Cycle Length: 65.5		
Natural Cycle: 80		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.88		
Intersection Signal Delay: 24.2		Intersection LOS: C
Intersection Capacity Utilization 72.1%		ICU Level of Service C
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy



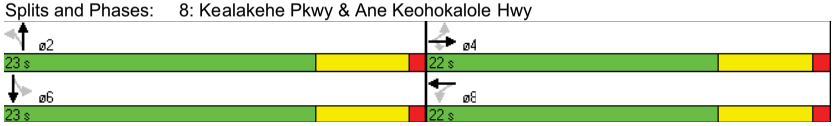
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	121	74	379	119	242	23	258	5	51	5	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	340		0	480		0	300		0	430		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1863	1583	1770	1839	0	1770	1608	0	1770	1650	0
Flt Permitted	0.583			0.705			0.744			0.718		
Satd. Flow (perm)	1086	1863	1583	1313	1839	0	1386	1608	0	1337	1650	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			412		12			55			16	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			800			1000	
Travel Time (s)		22.7			22.7			18.2			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	80	412	129	288	0	280	60	0	5	21	0
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0		22.0	22.0		22.0	22.0	
Total Split (s)	22.0	22.0	22.0	22.0	22.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Split (%)	48.9%	48.9%	48.9%	48.9%	48.9%	0.0%	51.1%	51.1%	0.0%	51.1%	51.1%	0.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	11.0	11.0	11.0	11.0	11.0		12.0	12.0		12.0	12.0	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31		0.34	0.34		0.34	0.34	
v/c Ratio	0.39	0.14	0.53	0.32	0.50		0.60	0.10		0.01	0.04	
Control Delay	14.3	10.1	4.4	12.5	13.4		16.4	4.3		8.6	5.8	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	14.3	10.1	4.4	12.5	13.4		16.4	4.3		8.6	5.8	
LOS	B	B	A	B	B		B	A		A	A	
Approach Delay		7.2			13.2			14.3			6.4	
Approach LOS		A			B			B			A	
Queue Length 50th (ft)	19	10	0	18	40		40	1		1	1	
Queue Length 95th (ft)	58	34	43	53	102		110	17		5	10	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			720			920	
Turn Bay Length (ft)	340			480			300			430		
Base Capacity (vph)	513	880	965	620	875		695	834		671	836	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.26	0.09	0.43	0.21	0.33		0.40	0.07		0.01	0.03	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 35.5
Natural Cycle: 45
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.60
Intersection Signal Delay: 10.7 Intersection LOS: B
Intersection Capacity Utilization 56.8% ICU Level of Service B
Analysis Period (min) 15

Splits and Phases: 8: Kealakehe Pkwy & Ane Keohokalole Hwy



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	72	13	109	523	29	124	85	990	194	145	1163	87
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		100	200		200	550		550	300		550
Storage Lanes	1		0	2		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1736	1611	0	3433	1863	1553	1770	3471	1583	1719	3438	1538
Flt Permitted	0.950			0.950			0.143			0.129		
Satd. Flow (perm)	1736	1611	0	3433	1863	1553	266	3471	1583	233	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		113				124			194			113
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			900	
Travel Time (s)		22.7			22.7			22.7			20.5	
Peak Hour Factor	0.82	0.92	0.88	0.77	0.43	1.00	0.72	0.93	1.00	0.88	0.92	0.77
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	88	138	0	679	67	124	118	1065	194	165	1264	113
Turn Type	Prot			Prot		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8	6		6	2		2
Detector Phase	7	4		3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	15.0	10.0	0.0	23.0	18.0	18.0	10.0	34.0	34.0	13.0	37.0	37.0
Total Split (%)	18.8%	12.5%	0.0%	28.8%	22.5%	22.5%	12.5%	42.5%	42.5%	16.3%	46.3%	46.3%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	8.1	4.0		17.0	15.2	15.2	32.0	28.0	28.0	38.0	31.0	31.0
Actuated g/C Ratio	0.10	0.05		0.21	0.19	0.19	0.40	0.35	0.35	0.48	0.39	0.39
v/c Ratio	0.50	0.73		0.93	0.19	0.31	0.65	0.88	0.29	0.68	0.95	0.17
Control Delay	43.8	35.8		52.6	31.6	8.7	30.9	34.4	4.2	28.7	40.2	4.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.8	35.8		52.6	31.6	8.7	30.9	34.4	4.2	28.7	40.2	4.1
LOS	D	D		D	C	A	C	C	A	C	D	A
Approach Delay		38.9			44.7			29.8			36.3	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	42	12		172	30	0	29	258	0	42	314	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	78	#97		#199	30	45	43	#375	41	#109	#457	20
Internal Link Dist (ft)		920			920			920			820	
Turn Bay Length (ft)	100			200		200	550		550	300		550
Base Capacity (vph)	195	188		730	354	396	182	1215	680	241	1332	665
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.73		0.93	0.19	0.31	0.65	0.88	0.29	0.68	0.95	0.17

Intersection Summary		
Area Type:	Other	
Cycle Length: 80		
Actuated Cycle Length: 80		
Natural Cycle: 80		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.95		
Intersection Signal Delay: 36.0		Intersection LOS: D
Intersection Capacity Utilization 79.2%		ICU Level of Service D
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

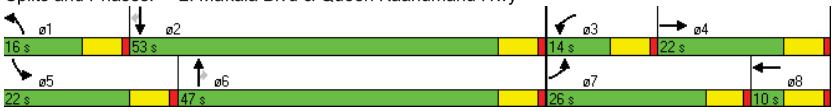
Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	548	191	146	146	78	77	292	671	44	150	1158	415
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	300		0	400		400	400		400
Storage Lanes	2		0	2		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3327	0	3433	3250	0	3433	3471	1583	1719	3438	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3327	0	3433	3250	0	3433	3471	1583	1719	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		126			77				45			488
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.93	0.78	0.90	1.00	0.96	1.00	1.00	0.99	0.98	1.00	0.81	0.85
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	589	407	0	146	158	0	292	678	45	150	1430	488
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6			2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		10.0	10.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	26.0	22.0	0.0	14.0	10.0	0.0	16.0	47.0	47.0	22.0	53.0	53.0
Total Split (%)	24.8%	21.0%	0.0%	13.3%	9.5%	0.0%	15.2%	44.8%	44.8%	21.0%	50.5%	50.5%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None	None	None	None	None
Act Effct Green (s)	19.9	16.0		7.8	4.0		10.0	43.5	43.5	13.5	47.0	47.0
Actuated g/C Ratio	0.19	0.15		0.07	0.04		0.10	0.41	0.41	0.13	0.45	0.45
v/c Ratio	0.92	0.66		0.57	0.80		0.89	0.47	0.07	0.68	0.93	0.51
Control Delay	63.7	34.4		56.1	54.7		76.4	24.2	6.4	58.9	39.2	3.7
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.7	34.4		56.1	54.7		76.4	24.2	6.4	58.9	39.2	3.7
LOS	E	C		E	D		E	C	A	E	D	A
Approach Delay		51.7			55.4			38.4			32.3	
Approach LOS		D			E			D			C	
Queue Length 50th (ft)	202	94		49	28		101	173	0	97	465	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#304	117		82	#84		#178	233	23	162	478	42
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			300			400		400	400		400
Base Capacity (vph)	642	616		262	198		327	1441	684	262	1541	959
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.66		0.56	0.80		0.89	0.47	0.07	0.57	0.93	0.51

Intersection Summary		
Area Type:	Other	
Cycle Length: 105		
Actuated Cycle Length: 104.9		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.93		
Intersection Signal Delay: 39.7		Intersection LOS: D
Intersection Capacity Utilization 80.6%		ICU Level of Service D
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy

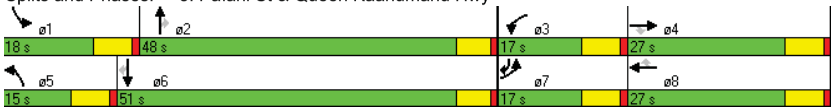


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	309	448	219	76	407	89	234	623	18	217	1083	539
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		300	200		300	400		400	400		400
Storage Lanes	2		1	1		1	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3539	1583	1641	3282	1553	3433	3471	1583	3335	3438	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3539	1583	1641	3282	1553	3433	3471	1583	3335	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			237			100			22			37
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	1.00	0.91	1.00	0.89	0.89	1.00	0.91	0.80	1.00	0.77	1.00
Heavy Vehicles (%)	4%	2%	2%	10%	10%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	309	448	241	76	457	100	234	685	22	217	1406	539
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	10.0
Total Split (s)	17.0	27.0	27.0	17.0	27.0	27.0	15.0	48.0	48.0	18.0	51.0	17.0
Total Split (%)	15.5%	24.5%	24.5%	15.5%	24.5%	24.5%	13.6%	43.6%	43.6%	16.4%	46.4%	15.5%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	None
Act Effct Green (s)	11.0	23.2	23.2	9.4	19.1	19.1	9.0	42.9	42.9	11.1	45.0	62.0
Actuated g/C Ratio	0.10	0.21	0.21	0.09	0.18	0.18	0.08	0.40	0.40	0.10	0.42	0.57
v/c Ratio	0.90	0.59	0.46	0.53	0.79	0.28	0.82	0.50	0.03	0.63	0.98	0.60
Control Delay	78.1	43.1	8.4	61.3	53.2	9.8	72.0	26.5	8.5	55.7	52.0	17.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.1	43.1	8.4	61.3	53.2	9.8	72.0	26.5	8.5	55.7	52.0	17.7
LOS	E	D	A	E	D	A	E	C	A	E	D	B
Approach Delay		45.6			47.3			37.4			43.8	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	113	154	2	52	161	0	85	193	0	76	513	223

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#196	211	69	100	216	44	#151	250	14	116	481	335
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300		300	200		300	400		400	400		400
Base Capacity (vph)	343	765	528	167	638	382	286	1379	642	370	1431	898
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.59	0.46	0.46	0.72	0.26	0.82	0.50	0.03	0.59	0.98	0.60

Intersection Summary		
Area Type:	Other	
Cycle Length: 110		
Actuated Cycle Length: 108.1		
Natural Cycle: 100		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.98		
Intersection Signal Delay: 43.4		Intersection LOS: D
Intersection Capacity Utilization 76.7%		ICU Level of Service D
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 3: Palani St & Queen Kaahumanu Hwy



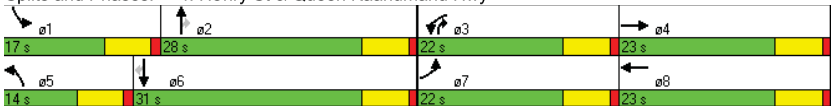
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	418	98	525	413	250	152	552	516	257	940	181
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		200	330		350	370		400
Storage Lanes	1		0	2		0	2		2	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3451	0	3433	3352	0	3433	3539	2787	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3451	0	3433	3352	0	3433	3539	2787	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			100				74			232
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.76	0.84	1.00	0.97	0.90	1.00	0.73	1.00	0.81	1.00	1.00	0.78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	96	596	0	541	709	0	208	552	637	257	940	232
Turn Type	Prot			Prot			Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			6
Detector Phase	7	4		3	8		5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0		10.0	22.0		10.0	22.0	10.0	10.0	22.0	22.0
Total Split (s)	22.0	23.0	0.0	22.0	23.0	0.0	14.0	28.0	22.0	17.0	31.0	31.0
Total Split (%)	24.4%	25.6%	0.0%	24.4%	25.6%	0.0%	15.6%	31.1%	24.4%	18.9%	34.4%	34.4%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	None	None	Min	Min
Act Effct Green (s)	10.2	16.8		16.0	25.1		8.0	22.5	44.6	10.4	25.0	25.0
Actuated g/C Ratio	0.11	0.19		0.18	0.28		0.09	0.25	0.50	0.12	0.28	0.28
v/c Ratio	0.48	0.90		0.88	0.70		0.68	0.62	0.45	0.64	0.95	0.38
Control Delay	44.6	52.6		54.1	31.2		52.1	33.7	14.2	45.8	52.5	5.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.6	52.6		54.1	31.2		52.1	33.7	14.2	45.8	52.5	5.6
LOS	D	D		D	C		D	C	B	D	D	A
Approach Delay		51.5			41.1			27.5			43.7	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	52	169		156	170		60	148	113	72	276	0
Queue Length 95th (ft)	80	#233		#246	#287		76	203	137	112	#403	31

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150			200			330		350	370		400
Base Capacity (vph)	316	672		612	1009		306	889	1420	421	985	608
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.89		0.88	0.70		0.68	0.62	0.45	0.61	0.95	0.38

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 89.8
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.95
Intersection Signal Delay: 39.4 Intersection LOS: D
Intersection Capacity Utilization 80.0% ICU Level of Service D
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy

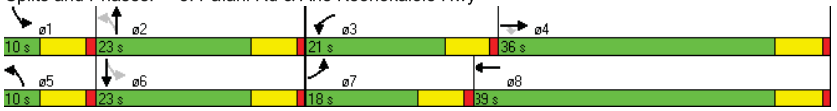


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	162	563	117	438	487	19	79	141	502	31	78	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	200		0	311		200
Storage Lanes	1		1	2		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1827	1583	2993	1623	0	1770	3082	0	1770	3249	0
Flt Permitted	0.950			0.950			0.598			0.299		
Satd. Flow (perm)	1770	1827	1583	2993	1623	0	1114	3082	0	557	3249	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			117		3			416			103	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			3376	
Travel Time (s)		22.7			22.7			22.7			76.7	
Peak Hour Factor	0.92	0.96	1.00	0.89	1.00	0.92	0.92	0.92	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	176	586	117	492	508	0	86	671	0	34	188	0
Turn Type	Prot		Perm	Prot			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4				2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	18.0	36.0	36.0	21.0	39.0	0.0	10.0	23.0	0.0	10.0	23.0	0.0
Total Split (%)	20.0%	40.0%	40.0%	23.3%	43.3%	0.0%	11.1%	25.6%	0.0%	11.1%	25.6%	0.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	11.3	28.9	28.9	15.3	32.9		16.4	14.2		15.2	12.1	
Actuated g/C Ratio	0.14	0.35	0.35	0.19	0.40		0.20	0.17		0.18	0.15	
v/c Ratio	0.72	0.91	0.19	0.88	0.78		0.34	0.77		0.21	0.33	
Control Delay	54.7	48.5	5.3	54.5	34.0		28.8	18.8		26.2	17.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	54.7	48.5	5.3	54.5	34.0		28.8	18.8		26.2	17.0	
LOS	D	D	A	D	C		C	B		C	B	
Approach Delay		43.9			44.1			19.9			18.4	
Approach LOS		D			D			B			B	
Queue Length 50th (ft)	96	314	0	142	252		36	68		14	21	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#197	#537	36	#242	#442		72	132		36	51	
Internal Link Dist (ft)		920			920			920			3296	
Turn Bay Length (ft)				250			200			311		
Base Capacity (vph)	263	680	663	557	667		255	978		163	766	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.67	0.86	0.18	0.88	0.76		0.34	0.69		0.21	0.25	

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 82.2		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.91		
Intersection Signal Delay: 35.6	Intersection LOS: D	
Intersection Capacity Utilization 85.6%	ICU Level of Service E	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy



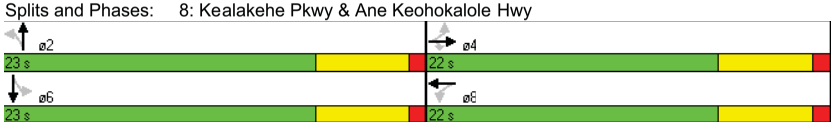
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	54	117	175	86	60	10	197	5	138	22	5	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	340		0	480		0	300		0	430		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1863	1583	1770	1827	0	1770	1593	0	1770	1593	0
Flt Permitted	0.701			0.682			0.669			0.659		
Satd. Flow (perm)	1306	1863	1583	1270	1827	0	1246	1593	0	1228	1593	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			175		11			150			132	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			800			1000	
Travel Time (s)		22.7			22.7			18.2			22.7	
Peak Hour Factor	0.92	1.00	1.00	0.92	0.79	0.92	0.89	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	117	175	93	87	0	221	155	0	24	137	0
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0		22.0	22.0		22.0	22.0	
Total Split (s)	22.0	22.0	22.0	22.0	22.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Split (%)	48.9%	48.9%	48.9%	48.9%	48.9%	0.0%	51.1%	51.1%	0.0%	51.1%	51.1%	0.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	8.0	8.0	8.0	8.0	8.0		15.8	15.8		15.8	15.8	
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25		0.49	0.49		0.49	0.49	
v/c Ratio	0.18	0.25	0.33	0.29	0.19		0.36	0.18		0.04	0.16	
Control Delay	11.6	11.7	4.5	13.1	10.2		10.2	2.7		7.3	2.7	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	11.6	11.7	4.5	13.1	10.2		10.2	2.7		7.3	2.7	
LOS	B	B	A	B	B		B	A		A	A	
Approach Delay		8.1			11.7			7.1			3.4	
Approach LOS		A			B			A			A	
Queue Length 50th (ft)	7	14	0	11	9		25	1		2	1	
Queue Length 95th (ft)	29	48	30	42	30		75	23		12	21	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			720			920	
Turn Bay Length (ft)	340			480			300			430		
Base Capacity (vph)	672	958	899	653	945		773	1045		762	1038	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.09	0.12	0.19	0.14	0.09		0.29	0.15		0.03	0.13	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 32
Natural Cycle: 45
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.36
Intersection Signal Delay: 7.6 Intersection LOS: A
Intersection Capacity Utilization 45.1% ICU Level of Service A
Analysis Period (min) 15

Splits and Phases: 8: Kealakehe Pkwy & Ane Keohokalole Hwy



TRAFFIC IMPACT ANALYSIS REPORT

FOR THE PROPOSED

KAMAKANA VILLAGES

AT KEAHUOLU

APPENDIX G

CAPACITY ANALYSIS WORKSHEETS

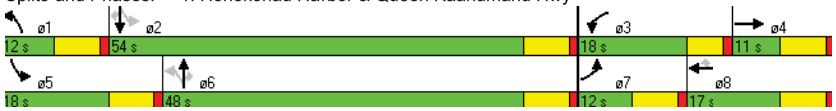
2019 PEAK HOUR TRAFFIC WITH PROJECT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	14	51	309	24	300	95	1258	593	201	927	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		0	200		200	550		550	300		550
Storage Lanes	1		0	2		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1719	1654	0	3433	1863	1538	1770	3438	1583	1719	3438	1538
Flt Permitted	0.950			0.950			0.195			0.082		
Satd. Flow (perm)	1719	1654	0	3433	1863	1538	363	3438	1583	148	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		56				192			636			66
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			900	
Travel Time (s)		22.7			22.7			22.7			20.5	
Peak Hour Factor	1.00	0.75	0.91	0.93	1.00	1.00	1.00	0.96	0.70	0.75	0.81	1.00
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	75	0	332	24	300	95	1310	847	268	1144	66
Turn Type	Prot			Prot		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8	6		6	2		2
Detector Phase	7	4		3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	12.0	11.0	0.0	18.0	17.0	17.0	12.0	48.0	48.0	18.0	54.0	54.0
Total Split (%)	12.6%	11.6%	0.0%	18.9%	17.9%	17.9%	12.6%	50.5%	50.5%	18.9%	56.8%	56.8%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	5.9	5.0		11.6	13.2	13.2	47.6	41.6	41.6	59.7	50.4	50.4
Actuated g/C Ratio	0.06	0.05		0.13	0.14	0.14	0.52	0.45	0.45	0.65	0.55	0.55
v/c Ratio	0.34	0.52		0.76	0.09	0.78	0.34	0.84	0.80	0.89	0.61	0.08
Control Delay	51.5	31.6		52.2	38.1	31.1	11.3	29.2	12.1	54.2	17.5	3.5
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.5	31.6		52.2	38.1	31.1	11.3	29.2	12.1	54.2	17.5	3.5
LOS	D	C		D	D	C	B	C	B	D	B	A
Approach Delay		38.3			42.0			22.0			23.5	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	22	11		101	13	63	20	363	92	111	256	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	55	40		#161	38	#212	39	462	59	#179	277	20
Internal Link Dist (ft)		920			920			920			820	
Turn Bay Length (ft)	100			200		200	550		550	300		550
Base Capacity (vph)	113	143		451	271	388	280	1579	1071	302	1886	874
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.52		0.74	0.09	0.77	0.34	0.83	0.79	0.89	0.61	0.08

Intersection Summary		
Area Type:	Other	
Cycle Length: 95		
Actuated Cycle Length: 91.9		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.89		
Intersection Signal Delay: 25.8	Intersection LOS: C	
Intersection Capacity Utilization 76.4%	ICU Level of Service D	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy

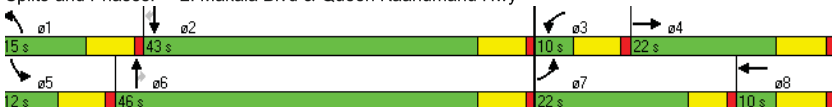


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	530	38	44	18	37	63	161	1313	25	46	865	311
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	300		0	400		400	400		400
Storage Lanes	2		0	2		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	3260	0	3433	3120	0	3433	3438	1583	1719	3438	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3335	3260	0	3433	3120	0	3433	3438	1583	1719	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			84				30			311
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	0.94	1.00	0.39	0.91	0.75	0.91	0.87	0.83	1.00	0.99	1.00
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	530	84	0	46	125	0	177	1509	30	46	874	311
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6			2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		10.0	10.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	22.0	22.0	0.0	10.0	10.0	0.0	15.0	46.0	46.0	12.0	43.0	43.0
Total Split (%)	24.4%	24.4%	0.0%	11.1%	11.1%	0.0%	16.7%	51.1%	51.1%	13.3%	47.8%	47.8%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes
Recall Mode	None	None		None	None		None	None	None	None	None	None
Act Effct Green (s)	15.7	20.1		4.0	4.0		8.4	40.4	40.4	5.9	32.7	32.7
Actuated g/C Ratio	0.18	0.24		0.05	0.05		0.10	0.48	0.48	0.07	0.38	0.38
v/c Ratio	0.86	0.10		0.28	0.55		0.52	0.92	0.04	0.38	0.66	0.40
Control Delay	50.3	17.6		45.8	26.6		43.2	33.4	5.5	49.5	24.3	3.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.3	17.6		45.8	26.6		43.2	33.4	5.5	49.5	24.3	3.8
LOS	D	B		D	C		D	C	A	D	C	A
Approach Delay		45.8			31.8			33.9			20.0	
Approach LOS		D			C			C			C	
Queue Length 50th (ft)	153	10		13	12		50	432	0	26	201	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#244	30		13	40		82	#566	13	61	264	48
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			300			400		400	400		400
Base Capacity (vph)	631	803		163	228		365	1635	768	122	1504	848
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.84	0.10		0.28	0.55		0.48	0.92	0.04	0.38	0.58	0.37

Intersection Summary	
Area Type:	Other
Cycle Length: 90	
Actuated Cycle Length: 85	
Natural Cycle: 90	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.92	
Intersection Signal Delay: 31.2	Intersection LOS: C
Intersection Capacity Utilization 76.4%	ICU Level of Service D
Analysis Period (min) 15	
# 95th percentile volume exceeds capacity, queue may be longer.	
Queue shown is maximum after two cycles.	

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy

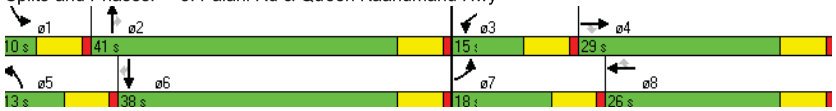


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	390	228	127	99	538	28	128	1114	10	42	657	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		300	200		300	400		400	400		400
Storage Lanes	2		1	1		1	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	3471	1583	1543	3085	1538	3433	3438	1583	3335	3438	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3335	3471	1583	1543	3085	1538	3433	3438	1583	3335	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127			42			15			323
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	0.96	1.00	1.00	0.88	0.67	0.97	0.94	0.67	1.00	0.89	0.70
Heavy Vehicles (%)	5%	4%	2%	17%	17%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	390	238	127	99	611	42	132	1185	15	42	738	371
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	27.0	27.0	10.0	26.0	26.0	10.0	27.0	27.0	10.0	27.0	27.0
Total Split (s)	18.0	29.0	29.0	15.0	26.0	26.0	13.0	41.0	41.0	10.0	38.0	38.0
Total Split (%)	18.9%	30.5%	30.5%	15.8%	27.4%	27.4%	13.7%	43.2%	43.2%	10.5%	40.0%	40.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	Min
Act Effct Green (s)	12.1	26.2	26.2	8.6	19.8	19.8	6.9	34.9	34.9	4.0	27.7	27.7
Actuated g/C Ratio	0.13	0.29	0.29	0.09	0.22	0.22	0.08	0.39	0.39	0.04	0.31	0.31
v/c Ratio	0.88	0.24	0.23	0.68	0.91	0.11	0.51	0.89	0.02	0.28	0.70	0.53
Control Delay	62.1	28.1	6.7	65.0	54.4	10.7	48.7	37.2	9.4	48.9	31.6	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	62.1	28.1	6.7	65.0	54.4	10.7	48.7	37.2	9.4	48.9	31.6	7.6
LOS	E	C	A	E	D	B	D	D	A	D	C	A
Approach Delay		42.1			53.4			38.1			24.5	
Approach LOS		D			D			D			C	
Queue Length 50th (ft)	121	61	0	59	192	0	40	357	0	12	195	20

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#208	95	44	#135	#288	15	70	#497	8	30	255	30
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300		300	200		300	400		400	400		400
Base Capacity (vph)	443	1004	549	154	684	374	266	1356	633	148	1220	754
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.88	0.24	0.23	0.64	0.89	0.11	0.50	0.87	0.02	0.28	0.60	0.49

Intersection Summary			
Area Type:	Other		
Cycle Length: 95			
Actuated Cycle Length: 90.6			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 37.8		Intersection LOS: D	
Intersection Capacity Utilization 80.1%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 3: Palani Rd & Queen Kaahumanu Hwy

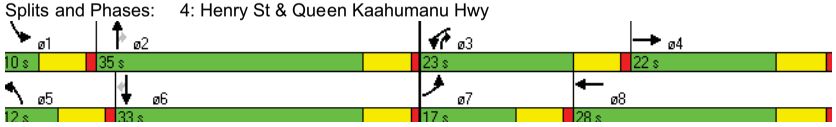


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	319	60	592	469	145	208	1002	620	102	842	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		200	200		200	330		350	370		400
Storage Lanes	1		0	2		0	2		2	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3451	0	3433	3391	0	3433	3539	2787	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3451	0	3433	3391	0	3433	3539	2787	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		22			60				61			146
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.70	0.68	0.65	0.95	1.00	0.80	1.00	0.96	0.86	1.00	0.96	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	151	561	0	623	650	0	208	1044	721	102	877	146
Turn Type	Prot			Prot			Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			6
Detector Phase	7	4		3	8		5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0		10.0	22.0		10.0	22.0	10.0	10.0	22.0	22.0
Total Split (s)	17.0	22.0	0.0	23.0	28.0	0.0	12.0	35.0	23.0	10.0	33.0	33.0
Total Split (%)	18.9%	24.4%	0.0%	25.6%	31.1%	0.0%	13.3%	38.9%	25.6%	11.1%	36.7%	36.7%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	None	None	Min	Min
Act Effct Green (s)	10.4	15.8		17.0	22.4		6.0	30.1	53.1	4.0	26.0	26.0
Actuated g/C Ratio	0.12	0.18		0.19	0.25		0.07	0.34	0.60	0.05	0.29	0.29
v/c Ratio	0.73	0.89		0.95	0.72		0.90	0.87	0.43	0.66	0.85	0.26
Control Delay	59.3	52.5		61.4	33.2		80.6	37.9	10.1	63.3	38.6	5.5
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.3	52.5		61.4	33.2		80.6	37.9	10.1	63.3	38.6	5.5
LOS	E	D		E	C		F	D	B	E	D	A
Approach Delay		53.9			47.0			32.2			36.5	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	84	159		182	163		61	297	110	29	243	0
Queue Length 95th (ft)	111	155		#290	227		#127	#422	144	#67	#321	42

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150			200			330		350	370		400
Base Capacity (vph)	219	641		658	899		232	1200	1692	155	1077	583
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.69	0.88		0.95	0.72		0.90	0.87	0.43	0.66	0.81	0.25

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 88.8			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 39.9		Intersection LOS: D	
Intersection Capacity Utilization 78.7%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy

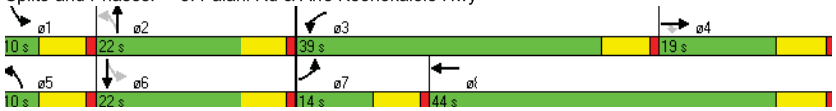


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	202	60	874	539	31	55	126	536	57	195	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	200		0	311		200
Storage Lanes	1		1	2		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1827	1583	2993	1623	0	1770	3066	0	1770	3235	0
Flt Permitted	0.950			0.950			0.315			0.296		
Satd. Flow (perm)	1770	1827	1583	2993	1623	0	587	3066	0	551	3235	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			67		4			558			285	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			2500	
Travel Time (s)		22.7			22.7			22.7			56.8	
Peak Hour Factor	0.92	0.98	0.90	0.94	0.81	0.92	1.00	0.92	0.96	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	206	67	930	699	0	55	695	0	62	497	0
Turn Type	Prot		Perm	Prot			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4				2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	14.0	19.0	19.0	39.0	44.0	0.0	10.0	22.0	0.0	10.0	22.0	0.0
Total Split (%)	15.6%	21.1%	21.1%	43.3%	48.9%	0.0%	11.1%	24.4%	0.0%	11.1%	24.4%	0.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	7.8	14.3	14.3	28.6	38.7		14.5	11.5		15.7	13.5	
Actuated g/C Ratio	0.10	0.18	0.18	0.36	0.48		0.18	0.14		0.20	0.17	
v/c Ratio	0.56	0.64	0.20	0.87	0.89		0.33	0.76		0.36	0.64	
Control Delay	52.4	45.2	10.9	35.5	39.3		30.0	13.5		31.1	18.0	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	52.4	45.2	10.9	35.5	39.3		30.0	13.5		31.1	18.0	
LOS	D	D	B	D	D		C	B		C	B	
Approach Delay		40.8			37.1			14.7			19.5	
Approach LOS		D			D			B			B	
Queue Length 50th (ft)	51	108	0	231	360		23	35		26	56	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#116	#225	36	#339	#533		51	92		57	107	
Internal Link Dist (ft)		920			920			920			2420	
Turn Bay Length (ft)				250			200			311		
Base Capacity (vph)	182	328	339	1273	797		167	1075		170	908	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.52	0.63	0.20	0.73	0.88		0.33	0.65		0.36	0.55	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 80.5			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 29.5		Intersection LOS: C	
Intersection Capacity Utilization 79.7%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy

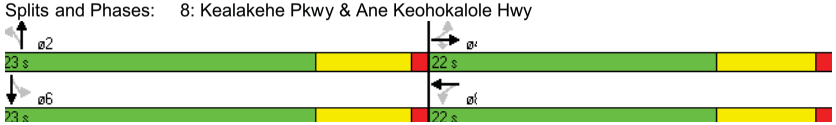


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	121	94	449	153	302	30	363	5	64	7	5	15
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	340		0	480		0	300		0	430		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1863	1583	1770	1837	0	1770	1602	0	1770	1650	0
Flt Permitted	0.515			0.691			0.744			0.708		
Satd. Flow (perm)	959	1863	1583	1287	1837	0	1386	1602	0	1319	1650	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			488		12			70			16	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			800			1000	
Travel Time (s)		22.7			22.7			18.2			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	132	102	488	166	361	0	395	75	0	8	21	0
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0		22.0	22.0		22.0	22.0	
Total Split (s)	22.0	22.0	22.0	22.0	22.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Split (%)	48.9%	48.9%	48.9%	48.9%	48.9%	0.0%	51.1%	51.1%	0.0%	51.1%	51.1%	0.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	12.5	12.5	12.5	12.5	12.5		14.6	14.6		14.6	14.6	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32		0.37	0.37		0.37	0.37	
v/c Ratio	0.44	0.17	0.59	0.41	0.61		0.77	0.12		0.02	0.03	
Control Delay	16.3	10.9	4.7	14.5	16.4		24.8	4.0		8.9	5.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	16.3	10.9	4.7	14.5	16.4		24.8	4.0		8.9	5.9	
LOS	B	B	A	B	B		C	A		A	A	
Approach Delay		7.7			15.8			21.5			6.7	
Approach LOS		A			B			C			A	
Queue Length 50th (ft)	25	17	0	30	69		77	1		1	1	
Queue Length 95th (ft)	61	41	46	68	131		#203	19		7	10	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			720			920	
Turn Bay Length (ft)	340			480			300			430		
Base Capacity (vph)	400	777	944	537	773		614	749		585	740	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.33	0.13	0.52	0.31	0.47		0.64	0.10		0.01	0.03	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 39.5			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.77			
Intersection Signal Delay: 13.8		Intersection LOS: B	
Intersection Capacity Utilization 66.2%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 8: Kealakehe Pkwy & Ane Keohokalole Hwy



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	170	57	186	58	11	343
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	185	62	202	63	12	373
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	599	202			265	
vC1, stage 1 conf vol	202					
vC2, stage 2 conf vol	397					
vCu, unblocked vol	599	202			265	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	70	93			99	
cM capacity (veh/h)	621	839			1299	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	185	62	202	63	12	373
Volume Left	185	0	0	0	12	0
Volume Right	0	62	0	63	0	0
cSH	621	839	1700	1700	1299	1700
Volume to Capacity	0.30	0.07	0.12	0.04	0.01	0.22
Queue Length 95th (ft)	31	6	0	0	1	0
Control Delay (s)	13.2	9.6	0.0	0.0	7.8	0.0
Lane LOS	B	A			A	
Approach Delay (s)	12.3		0.0		0.2	
Approach LOS	B					

Intersection Summary				
Average Delay		3.5		
Intersection Capacity Utilization	34.1%	ICU Level of Service		A
Analysis Period (min)		15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	190	64	118	125	24	164
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	207	70	128	136	26	178
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	427	196			264	
vC1, stage 1 conf vol	196					
vC2, stage 2 conf vol	230					
vCu, unblocked vol	427	196			264	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	71	92			98	
cM capacity (veh/h)	715	845			1300	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	207	70	264	26	178
Volume Left	207	0	0	26	0
Volume Right	0	70	136	0	0
cSH	715	845	1700	1300	1700
Volume to Capacity	0.29	0.08	0.16	0.02	0.10
Queue Length 95th (ft)	30	7	0	2	0
Control Delay (s)	12.1	9.6	0.0	7.8	0.0
Lane LOS	B	A		A	
Approach Delay (s)	11.5		0.0	1.0	
Approach LOS	B				

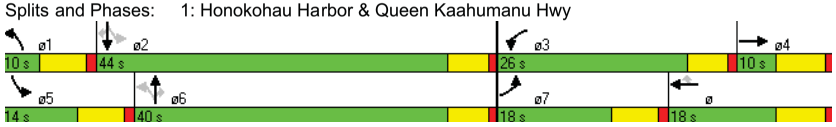
Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	37.1%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	15	122	629	35	179	95	1159	244	225	1404	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		100	200		200	550		550	300		550
Storage Lanes	1		0	2		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1736	1611	0	3433	1863	1553	1770	3471	1583	1719	3438	1538
Flt Permitted	0.950			0.950			0.118			0.105		
Satd. Flow (perm)	1736	1611	0	3433	1863	1553	220	3471	1583	190	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		91				179			244			132
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			900	
Travel Time (s)		22.7			22.7			22.7			20.5	
Peak Hour Factor	0.82	0.92	0.88	0.77	0.43	1.00	0.72	0.93	1.00	0.88	0.92	0.77
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	155	0	817	81	179	132	1246	244	256	1526	132
Turn Type	Prot			Prot		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases						8	6		6	2		2
Detector Phase	7	4		3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	18.0	10.0	0.0	26.0	18.0	18.0	10.0	40.0	40.0	14.0	44.0	44.0
Total Split (%)	20.0%	11.1%	0.0%	28.9%	20.0%	20.0%	11.1%	44.4%	44.4%	15.6%	48.9%	48.9%
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.0	4.0		20.0	16.5	16.5	38.0	34.0	34.0	46.0	38.0	38.0
Actuated g/C Ratio	0.11	0.04		0.22	0.18	0.18	0.42	0.38	0.38	0.51	0.42	0.42
v/c Ratio	0.54	0.97		1.07	0.24	0.42	0.81	0.95	0.33	1.10	1.05	0.18
Control Delay	47.8	87.7		88.3	36.8	9.1	52.5	43.7	3.9	111.0	65.3	3.7
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.8	87.7		88.3	36.8	9.1	52.5	43.7	3.9	111.0	65.3	3.7
LOS	D	F		F	D	A	D	D	A	F	E	A
Approach Delay		71.7			71.3			38.5			67.1	
Approach LOS		E			E			D			E	
Queue Length 50th (ft)	56	37		~268	42	0	36	355	0	~117	~503	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	96	#161		#293	39	58	#62	#501	46	#258	#637	21
Internal Link Dist (ft)		920			920			920			820	
Turn Bay Length (ft)	100			200		200	550		550	300		550
Base Capacity (vph)	231	159		763	341	430	162	1311	750	233	1452	726
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.97		1.07	0.24	0.42	0.81	0.95	0.33	1.10	1.05	0.18

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Natural Cycle: 90			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.10			
Intersection Signal Delay: 58.7		Intersection LOS: E	
Intersection Capacity Utilization 90.8%		ICU Level of Service E	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy



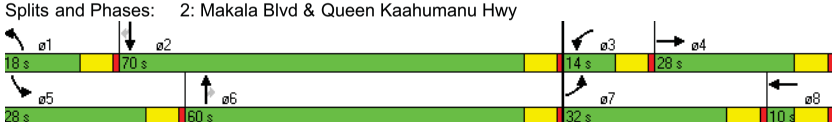
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	637	213	164	164	88	90	326	801	50	179	1397	497
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	300		0	400		400	400		400
Storage Lanes	2		0	2		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3327	0	3433	3246	0	3433	3471	1583	1719	3438	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3327	0	3433	3246	0	3433	3471	1583	1719	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		106			90				51			585
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.93	0.78	0.90	1.00	0.96	1.00	1.00	0.99	0.98	1.00	0.81	0.85
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	685	455	0	164	182	0	326	809	51	179	1725	585
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6			2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		10.0	10.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	32.0	28.0	0.0	14.0	10.0	0.0	18.0	60.0	60.0	28.0	70.0	70.0
Total Split (%)	24.6%	21.5%	0.0%	10.8%	7.7%	0.0%	13.8%	46.2%	46.2%	21.5%	53.8%	53.8%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None	None	None	None	None
Act Effct Green (s)	26.0	22.0		8.0	4.0		12.0	58.0	58.0	18.0	64.0	64.0
Actuated g/C Ratio	0.20	0.17		0.06	0.03		0.09	0.45	0.45	0.14	0.49	0.49
v/c Ratio	1.02	0.70		0.78	0.97		1.03	0.52	0.07	0.75	1.02	0.56
Control Delay	90.3	45.1		84.2	90.6		115.2	28.2	6.2	72.7	59.7	3.6
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	90.3	45.1		84.2	90.6		115.2	28.2	6.2	72.7	59.7	3.6
LOS	F	D		F	F		F	C	A	E	E	A
Approach Delay		72.3			87.6			51.1			47.5	
Approach LOS		E			F			D			D	
Queue Length 50th (ft)	~314	148		71	41		~151	257	0	146	~809	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#437	169		#128	#121		#248	334	26	223	727	40
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			300			400		400	400		400
Base Capacity (vph)	673	651		211	187		317	1548	734	291	1693	1054
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.02	0.70		0.78	0.97		1.03	0.52	0.07	0.62	1.02	0.56

Intersection Summary	
Area Type:	Other
Cycle Length: 130	
Actuated Cycle Length: 130	
Natural Cycle: 130	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 1.03	
Intersection Signal Delay: 56.5	Intersection LOS: E
Intersection Capacity Utilization 91.4%	ICU Level of Service F
Analysis Period (min) 15	

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

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy



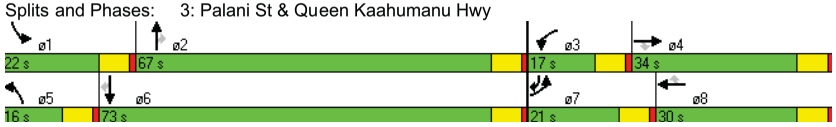
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	364	629	245	123	528	102	262	726	20	241	1282	638
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		300	200		300	400		400	400		400
Storage Lanes	2		1	1		1	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3539	1583	1641	3282	1553	3433	3471	1583	3335	3438	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3539	1583	1641	3282	1553	3433	3471	1583	3335	3438	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			158			115			25			9
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	1.00	0.91	1.00	0.89	0.89	1.00	0.91	0.80	1.00	0.77	1.00
Heavy Vehicles (%)	4%	2%	2%	10%	10%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	364	629	269	123	593	115	262	798	25	241	1665	638
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	10.0
Total Split (s)	21.0	34.0	34.0	17.0	30.0	30.0	16.0	67.0	67.0	22.0	73.0	21.0
Total Split (%)	15.0%	24.3%	24.3%	12.1%	21.4%	21.4%	11.4%	47.9%	47.9%	15.7%	52.1%	15.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	None
Act Effct Green (s)	15.0	28.0	28.0	11.0	24.0	24.0	10.0	62.5	62.5	14.5	67.0	88.0
Actuated g/C Ratio	0.11	0.20	0.20	0.08	0.17	0.17	0.07	0.45	0.45	0.10	0.48	0.63
v/c Ratio	1.01	0.89	0.61	0.95	1.05	0.32	1.07	0.51	0.03	0.70	1.01	0.66
Control Delay	110.7	70.1	26.9	130.9	107.5	10.9	136.9	29.6	8.0	71.8	61.4	20.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	110.7	70.1	26.9	130.9	107.5	10.9	136.9	29.6	8.0	71.8	61.4	20.3
LOS	F	E	C	F	F	B	F	C	A	E	E	C
Approach Delay		72.6			97.6			55.0			52.1	
Approach LOS		E			F			D			D	
Queue Length 50th (ft)	~175	296	91	114	~310	0	~135	274	0	110	~809	343

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#282	#397	190	#245	#424	54	#228	339	15	156	686	479
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300		300	200		300	400		400	400		400
Base Capacity (vph)	361	708	443	129	563	362	245	1550	721	381	1645	970
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.01	0.89	0.61	0.95	1.05	0.32	1.07	0.51	0.03	0.63	1.01	0.66

Intersection Summary			
Area Type:	Other		
Cycle Length: 140			
Actuated Cycle Length: 140			
Natural Cycle: 140			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.07			
Intersection Signal Delay: 63.8		Intersection LOS: E	
Intersection Capacity Utilization 87.9%		ICU Level of Service E	
Analysis Period (min) 15			

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

Splits and Phases: 3: Palani St & Queen Kaahumanu Hwy

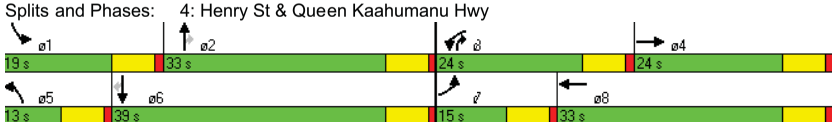


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	480	109	621	478	284	170	636	666	299	1138	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		0	200		200	330		350	370		400
Storage Lanes	1		0	2		0	2		2	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3454	0	3433	3355	0	3433	3539	2787	3433	3539	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3454	0	3433	3355	0	3433	3539	2787	3433	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		19			97				43			272
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.76	0.84	1.00	0.97	0.90	1.00	0.73	1.00	0.81	1.00	1.00	0.78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	680	0	640	815	0	233	636	822	299	1138	272
Turn Type	Prot			Prot			Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases									2			6
Detector Phase	7	4		3	8		5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0		10.0	22.0		10.0	22.0	10.0	10.0	22.0	22.0
Total Split (s)	15.0	24.0	0.0	24.0	33.0	0.0	13.0	33.0	24.0	19.0	39.0	39.0
Total Split (%)	15.0%	24.0%	0.0%	24.0%	33.0%	0.0%	13.0%	33.0%	24.0%	19.0%	39.0%	39.0%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	None	None	Min	Min
Act Effct Green (s)	8.7	18.0		18.0	27.3		7.0	27.7	51.7	12.3	33.0	33.0
Actuated g/C Ratio	0.09	0.18		0.18	0.27		0.07	0.28	0.52	0.12	0.33	0.33
v/c Ratio	0.74	1.07		1.04	0.83		0.97	0.65	0.56	0.71	0.97	0.39
Control Delay	72.5	94.1		86.8	38.5		98.9	35.8	17.5	51.8	54.8	4.8
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	72.5	94.1		86.8	38.5		98.9	35.8	17.5	51.8	54.8	4.8
LOS	E	F		F	D		F	D	B	D	D	A
Approach Delay		91.0			59.7			35.6			46.3	
Approach LOS		F			E			D			D	
Queue Length 50th (ft)	72	~248		~227	229		77	190	186	94	374	0
Queue Length 95th (ft)	#115	#325		#338	#311		#109	252	211	140	#519	30

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150			200			330		350	370		400
Base Capacity (vph)	159	637		618	985		240	980	1461	446	1168	705
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.72	1.07		1.04	0.83		0.97	0.65	0.56	0.67	0.97	0.39

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 100			
Natural Cycle: 100			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.07			
Intersection Signal Delay: 52.8		Intersection LOS: D	
Intersection Capacity Utilization 90.8%		ICU Level of Service E	
Analysis Period (min) 15			
~ Volume exceeds capacity, queue is theoretically infinite.			
Queue shown is maximum after two cycles.			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy



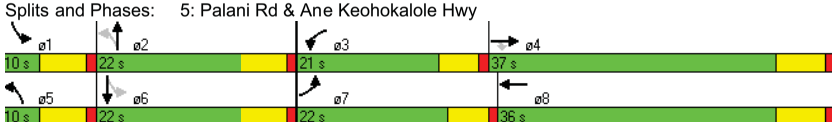
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	309	628	131	490	548	48	89	258	561	70	137	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	200		0	311		200
Storage Lanes	1		1	2		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1827	1583	2993	1621	0	1770	3140	0	1770	3214	0
Flt Permitted	0.950			0.950			0.417			0.252		
Satd. Flow (perm)	1770	1827	1583	2993	1621	0	777	3140	0	469	3214	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			131		6			418			235	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			2500	
Travel Time (s)		22.7			22.7			22.7			56.8	
Peak Hour Factor	0.92	0.96	1.00	0.89	1.00	0.92	0.92	0.92	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	336	654	131	551	600	0	97	858	0	76	384	0
Turn Type	Prot		Perm	Prot			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases			4				2			6		
Detector Phase	7	4	4	3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	10.0	10.0	10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	22.0	37.0	37.0	21.0	36.0	0.0	10.0	22.0	0.0	10.0	22.0	0.0
Total Split (%)	24.4%	41.1%	41.1%	23.3%	40.0%	0.0%	11.1%	24.4%	0.0%	11.1%	24.4%	0.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?							Yes	Yes		Yes	Yes	
Recall Mode	None	None	None	None	None		None	Min		None	Min	
Act Effct Green (s)	16.0	31.1	31.1	15.0	30.1		19.0	15.9		19.0	15.9	
Actuated g/C Ratio	0.18	0.35	0.35	0.17	0.34		0.22	0.18		0.22	0.18	
v/c Ratio	1.04	1.01	0.20	1.08	1.08		0.45	0.94		0.47	0.50	
Control Delay	98.7	69.5	4.8	98.8	90.2		33.2	38.3		35.2	15.3	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	98.7	69.5	4.8	98.8	90.2		33.2	38.3		35.2	15.3	
LOS	F	E	A	F	F		C	D		D	B	
Approach Delay		70.7			94.3			37.8			18.6	
Approach LOS		E			F			D			B	
Queue Length 50th (ft)	~214	~406	0	~185	~391		41	137		32	38	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#378	#614	37	#282	#599		80	#264		66	81	
Internal Link Dist (ft)		920			920			920			2420	
Turn Bay Length (ft)				250			200			311		
Base Capacity (vph)	323	646	644	512	558		214	915		161	779	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	1.04	1.01	0.20	1.08	1.08		0.45	0.94		0.47	0.49	

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 87.9
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 63.0 Intersection LOS: E
Intersection Capacity Utilization 98.0% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy

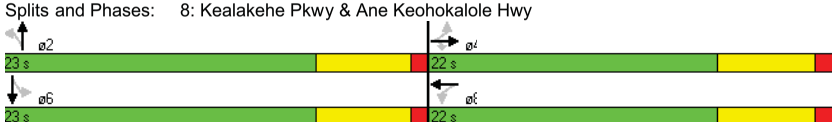


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	54	159	266	111	87	14	251	5	180	28	5	121
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	340		0	480		0	300		0	430		0
Storage Lanes	1		1	1		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1863	1583	1770	1829	0	1770	1591	0	1770	1593	0
Flt Permitted	0.677			0.656			0.669			0.632		
Satd. Flow (perm)	1261	1863	1583	1222	1829	0	1246	1591	0	1177	1593	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			266		15			196			132	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			800			1000	
Travel Time (s)		22.7			22.7			18.2			22.7	
Peak Hour Factor	0.92	1.00	1.00	0.92	0.79	0.92	0.89	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	59	159	266	121	125	0	282	201	0	30	137	0
Turn Type	Perm		Perm	Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Detector Phase	4	4	4	8	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0		22.0	22.0		22.0	22.0	
Total Split (s)	22.0	22.0	22.0	22.0	22.0	0.0	23.0	23.0	0.0	23.0	23.0	0.0
Total Split (%)	48.9%	48.9%	48.9%	48.9%	48.9%	0.0%	51.1%	51.1%	0.0%	51.1%	51.1%	0.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min		Min	Min	
Act Effct Green (s)	9.7	9.7	9.7	9.7	9.7		15.7	15.7		15.7	15.7	
Actuated g/C Ratio	0.26	0.26	0.26	0.26	0.26		0.42	0.42		0.42	0.42	
v/c Ratio	0.18	0.33	0.44	0.38	0.26		0.54	0.26		0.06	0.19	
Control Delay	11.8	12.7	4.6	14.8	10.9		14.3	3.0		8.4	3.2	
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	11.8	12.7	4.6	14.8	10.9		14.3	3.0		8.4	3.2	
LOS	B	B	A	B	B		B	A		A	A	
Approach Delay		8.1			12.8			9.6			4.1	
Approach LOS		A			B			A			A	
Queue Length 50th (ft)	8	24	0	18	16		39	1		3	1	
Queue Length 95th (ft)	28	60	35	52	39		114	29		16	24	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			720			920	
Turn Bay Length (ft)	340			480			300			430		
Base Capacity (vph)	548	810	839	531	804		607	876		574	844	
Starvation Cap Reductn	0	0	0	0	0		0	0		0	0	
Spillback Cap Reductn	0	0	0	0	0		0	0		0	0	
Storage Cap Reductn	0	0	0	0	0		0	0		0	0	
Reduced v/c Ratio	0.11	0.20	0.32	0.23	0.16		0.46	0.23		0.05	0.16	

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 37.7			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.54			
Intersection Signal Delay: 9.0		Intersection LOS: A	
Intersection Capacity Utilization 56.2%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 8: Kealakehe Pkwy & Ane Keohokalole Hwy



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	126	38	408	207	55	297
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	137	41	443	225	60	323
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	886	443			668	
vC1, stage 1 conf vol	443					
vC2, stage 2 conf vol	442					
vCu, unblocked vol	886	443			668	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	73	93			94	
cM capacity (veh/h)	502	614			921	

Direction, Lane #	WB 1	WB 2	NB 1	NB 2	SB 1	SB 2
Volume Total	137	41	443	225	60	323
Volume Left	137	0	0	0	60	0
Volume Right	0	41	0	225	0	0
cSH	502	614	1700	1700	921	1700
Volume to Capacity	0.27	0.07	0.26	0.13	0.06	0.19
Queue Length 95th (ft)	27	5	0	0	5	0
Control Delay (s)	14.8	11.3	0.0	0.0	9.2	0.0
Lane LOS	B	B			A	
Approach Delay (s)	14.0		0.0		1.4	
Approach LOS	B					

Intersection Summary				
Average Delay	2.5			
Intersection Capacity Utilization	41.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	180	58	203	243	68	172
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	196	63	221	264	74	187
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	688	353			485	
vC1, stage 1 conf vol	353					
vC2, stage 2 conf vol	335					
vCu, unblocked vol	688	353			485	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	66	91			93	
cM capacity (veh/h)	575	691			1078	

Direction, Lane #	WB 1	WB 2	NB 1	SB 1	SB 2
Volume Total	196	63	485	74	187
Volume Left	196	0	0	74	0
Volume Right	0	63	264	0	0
cSH	575	691	1700	1078	1700
Volume to Capacity	0.34	0.09	0.29	0.07	0.11
Queue Length 95th (ft)	37	8	0	6	0
Control Delay (s)	14.4	10.7	0.0	8.6	0.0
Lane LOS	B	B		A	
Approach Delay (s)	13.5		0.0	2.4	
Approach LOS	B				

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	49.3%	ICU Level of Service	A
Analysis Period (min)	15		

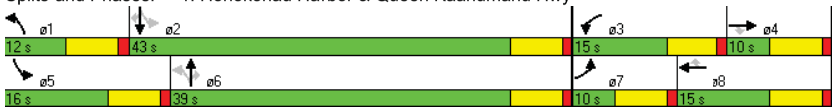
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	38	14	51	309	24	299	95	1258	593	201	927	66
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		100	200		200	550		550	300		550
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1719	1863	1583	3433	1863	1538	1770	4940	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.228			0.114		
Satd. Flow (perm)	1719	1863	1583	3433	1863	1538	425	4940	1583	206	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			56			201			570			66
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			900	
Travel Time (s)		22.7			22.7			22.7			20.5	
Peak Hour Factor	1.00	0.75	0.91	0.93	1.00	1.00	1.00	0.96	0.70	0.75	0.81	1.00
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	38	19	56	332	24	299	95	1310	847	268	1144	66
Turn Type	Prot		Perm	Prot		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8	6		6	2		2
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	10.0	10.0	10.0	15.0	15.0	15.0	12.0	39.0	39.0	16.0	43.0	43.0
Total Split (%)	12.5%	12.5%	12.5%	18.8%	18.8%	18.8%	15.0%	48.8%	48.8%	20.0%	53.8%	53.8%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	4.0	4.0	4.0	9.1	11.0	11.0	38.3	32.4	32.4	46.9	39.2	39.2
Actuated g/C Ratio	0.05	0.05	0.05	0.12	0.14	0.14	0.50	0.42	0.42	0.61	0.51	0.51
v/c Ratio	0.42	0.20	0.41	0.83	0.09	0.76	0.30	0.63	0.85	0.83	0.46	0.08
Control Delay	52.1	41.4	20.8	53.3	32.6	27.6	9.9	19.8	17.0	40.1	14.4	3.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.1	41.4	20.8	53.3	32.6	27.6	9.9	19.8	17.0	40.1	14.4	3.8
LOS	D	D	C	D	C	C	A	B	B	D	B	A
Approach Delay		34.8			40.8			18.3			18.6	
Approach LOS		C			D			B			B	
Queue Length 50th (ft)	19	9	0	85	11	47	17	186	119	78	140	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#55	25	35	#156	33	#184	35	232	98	#140	154	20
Internal Link Dist (ft)		920			920			920			820	
Turn Bay Length (ft)	100		100	200		200	550		550	300		550
Base Capacity (vph)	90	97	135	402	265	391	316	2121	1005	322	2504	812
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.20	0.41	0.83	0.09	0.76	0.30	0.62	0.84	0.83	0.46	0.08

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 77.3
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.85
Intersection Signal Delay: 22.1 Intersection LOS: C
Intersection Capacity Utilization 66.2% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy

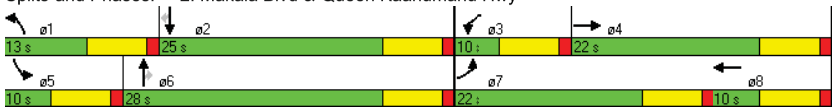


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	530	38	44	18	37	63	161	1313	25	46	865	311
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	300		0	400		400	400		400
Storage Lanes	2		0	2		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	3260	0	3433	3120	0	3433	4940	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3335	3260	0	3433	3120	0	3433	4940	1583	1719	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		44			84				30			311
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	0.94	1.00	0.39	0.91	0.75	0.91	0.87	0.83	1.00	0.99	1.00
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	530	84	0	46	125	0	177	1509	30	46	874	311
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6			2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		10.0	10.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	22.0	22.0	0.0	10.0	10.0	0.0	13.0	28.0	28.0	10.0	25.0	25.0
Total Split (%)	31.4%	31.4%	0.0%	14.3%	14.3%	0.0%	18.6%	40.0%	40.0%	14.3%	35.7%	35.7%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None	None	None	None	None
Act Effct Green (s)	14.4	16.3		4.1	4.1		7.0	24.7	24.7	4.1	20.5	20.5
Actuated g/C Ratio	0.22	0.25		0.06	0.06		0.11	0.38	0.38	0.06	0.32	0.32
v/c Ratio	0.71	0.10		0.21	0.45		0.47	0.80	0.05	0.42	0.55	0.44
Control Delay	30.1	12.6		33.9	19.5		34.1	25.2	7.2	44.7	22.2	5.2
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	30.1	12.6		33.9	19.5		34.1	25.2	7.2	44.7	22.2	5.2
LOS	C	B		C	B		C	C	A	D	C	A
Approach Delay		27.7			23.4			25.8			18.8	
Approach LOS		C			C			C			B	
Queue Length 50th (ft)	108	7		9	8		38	232	0	20	121	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	158	23		10	33		67	#314	15	#59	162	54
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			300			400		400	400		400
Base Capacity (vph)	857	947		221	279		386	1891	624	110	1575	702
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.09		0.21	0.45		0.46	0.80	0.05	0.42	0.55	0.44

Intersection Summary			
Area Type:	Other		
Cycle Length: 70			
Actuated Cycle Length: 64.4			
Natural Cycle: 70			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 23.7		Intersection LOS: C	
Intersection Capacity Utilization 65.5%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy



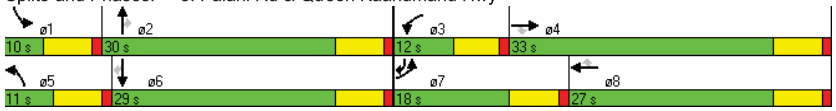
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	390	228	127	99	538	28	128	1114	10	42	657	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		300	200		300	400		400	400		400
Storage Lanes	2		1	2		1	2		1	2		2
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	3471	1583	2993	3085	1538	3433	4940	1583	3335	4940	2707
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3335	3471	1583	2993	3085	1538	3433	4940	1583	3335	4940	2707
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			127			42			15			73
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	0.96	1.00	1.00	0.88	0.67	0.97	0.94	0.67	1.00	0.89	0.70
Heavy Vehicles (%)	5%	4%	2%	17%	17%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	390	238	127	99	611	42	132	1185	15	42	738	371
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	10.0
Total Split (s)	18.0	33.0	33.0	12.0	27.0	27.0	11.0	30.0	30.0	10.0	29.0	18.0
Total Split (%)	21.2%	38.8%	38.8%	14.1%	31.8%	31.8%	12.9%	35.3%	35.3%	11.8%	34.1%	21.2%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	None
Act Effct Green (s)	11.7	27.8	27.8	6.0	19.3	19.3	5.0	25.1	25.1	4.0	19.6	37.4
Actuated g/C Ratio	0.15	0.35	0.35	0.08	0.24	0.24	0.06	0.31	0.31	0.05	0.25	0.47
v/c Ratio	0.80	0.20	0.20	0.44	0.82	0.10	0.61	0.76	0.03	0.25	0.61	0.28
Control Delay	47.7	20.6	5.2	44.0	39.7	9.0	51.5	30.1	11.1	42.6	29.1	11.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.7	20.6	5.2	44.0	39.7	9.0	51.5	30.1	11.1	42.6	29.1	11.0
LOS	D	C	A	D	D	A	D	C	B	D	C	B
Approach Delay		32.0			38.5			32.0			23.8	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)	105	48	0	26	161	0	36	217	0	11	123	50

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#177	76	37	51	#221	13	#74	#274	9	27	160	56
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300		300	200		300	400		400	400		400
Base Capacity (vph)	505	1224	640	226	817	439	216	1551	508	168	1434	1319
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.19	0.20	0.44	0.75	0.10	0.61	0.76	0.03	0.25	0.51	0.28

Intersection Summary

Area Type: Other
Cycle Length: 85
Actuated Cycle Length: 79.9
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.82
Intersection Signal Delay: 30.9 Intersection LOS: C
Intersection Capacity Utilization 70.9% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Palani Rd & Queen Kaahumanu Hwy

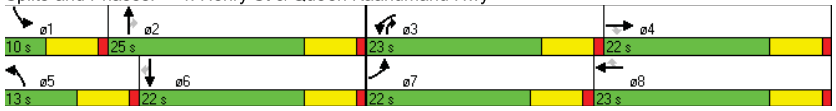


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	106	319	60	592	469	145	208	1002	620	102	842	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		200	200		200	330		350	370		400
Storage Lanes	1		1	2		1	2		2	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	5085	2787	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	5085	2787	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			92			181			91			146
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.70	0.68	0.65	0.95	1.00	0.80	1.00	0.96	0.86	1.00	0.96	0.94
Shared Lane Traffic (%)												
Lane Group Flow (vph)	151	469	92	623	469	181	208	1044	721	102	877	146
Turn Type	Prot		Perm	Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	22.0	22.0	22.0	23.0	23.0	23.0	13.0	25.0	23.0	10.0	22.0	22.0
Total Split (%)	27.5%	27.5%	27.5%	28.8%	28.8%	28.8%	16.3%	31.3%	28.8%	12.5%	27.5%	27.5%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	Min
Act Effct Green (s)	11.8	14.6	14.6	16.7	19.5	19.5	7.0	21.2	43.8	4.0	16.0	16.0
Actuated g/C Ratio	0.15	0.19	0.19	0.21	0.25	0.25	0.09	0.27	0.56	0.05	0.20	0.20
v/c Ratio	0.57	0.71	0.25	0.85	0.53	0.34	0.68	0.76	0.45	0.58	0.84	0.33
Control Delay	39.1	36.6	8.4	42.9	28.8	6.5	47.4	32.1	10.6	51.2	39.3	7.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	39.1	36.6	8.4	42.9	28.8	6.5	47.4	32.1	10.6	51.2	39.3	7.5
LOS	D	D	A	D	C	A	D	C	B	D	D	A
Approach Delay		33.5			32.5			25.9			36.3	
Approach LOS		C			C			C			D	
Queue Length 50th (ft)	71	114	0	155	105	0	53	183	104	26	156	0
Queue Length 95th (ft)	91	117	15	#241	162	34	#97	#254	141	#57	#222	45

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150		200	200		200	330		350	370		400
Base Capacity (vph)	362	724	397	747	879	529	307	1374	1612	176	1040	440
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.65	0.23	0.83	0.53	0.34	0.68	0.76	0.45	0.58	0.84	0.33

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 78.3			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.85			
Intersection Signal Delay: 30.9		Intersection LOS: C	
Intersection Capacity Utilization 68.4%		ICU Level of Service C	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	202	60	874	539	31	55	126	536	57	195	262
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		250	250		0	200		350	311		200
Storage Lanes	1		0	2		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3359	0	2993	3083	0	1770	3066	0	1770	3235	0
Flt Permitted	0.950			0.950			0.408			0.342		
Satd. Flow (perm)	1770	3359	0	2993	3083	0	760	3066	0	637	3235	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		57			9			558			285	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			2500	
Travel Time (s)		22.7			22.7			22.7			56.8	
Peak Hour Factor	0.92	0.98	0.90	0.94	0.81	0.92	1.00	0.92	0.96	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	95	273	0	930	699	0	55	695	0	62	497	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	7	4		3	8			2			6	
Permitted Phases							2			6		
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	10.0		10.0	22.0		22.0	22.0		22.0	22.0	
Total Split (s)	12.0	11.0	0.0	27.0	26.0	0.0	22.0	22.0	0.0	22.0	22.0	0.0
Total Split (%)	20.0%	18.3%	0.0%	45.0%	43.3%	0.0%	36.7%	36.7%	0.0%	36.7%	36.7%	0.0%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min		Min	Min	
Act Effct Green (s)	6.0	5.1		19.9	21.8		11.7	11.7		11.7	11.7	
Actuated g/C Ratio	0.11	0.09		0.36	0.40		0.21	0.21		0.21	0.21	
v/c Ratio	0.49	0.75		0.86	0.57		0.34	0.64		0.46	0.54	
Control Delay	35.4	36.9		27.4	17.1		24.3	7.2		30.2	10.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	35.4	36.9		27.4	17.1		24.3	7.2		30.2	10.4	
LOS	D	D		C	B		C	A		C	B	
Approach Delay		36.5			23.0			8.4			12.6	
Approach LOS		D			C			A			B	
Queue Length 50th (ft)	32	39		147	103		16	20		18	31	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#85	#100		#265	141		43	58		50	66	
Internal Link Dist (ft)		920			920			920			2420	
Turn Bay Length (ft)				250			200			311		
Base Capacity (vph)	196	362		1161	1233		225	1299		188	1157	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.48	0.75		0.80	0.57		0.24	0.54		0.33	0.43	

Intersection Summary

Area Type: Other
Cycle Length: 60
Actuated Cycle Length: 54.9
Natural Cycle: 60
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.86
Intersection Signal Delay: 19.4 Intersection LOS: B
Intersection Capacity Utilization 76.6% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	85	15	122	629	35	179	95	1159	244	225	1404	102
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		100	200		200	550		550	300		550
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1736	1863	1583	3433	1863	1553	1770	4988	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.145			0.119		
Satd. Flow (perm)	1736	1863	1583	3433	1863	1553	270	4988	1583	215	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			116			179			244			132
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			900	
Travel Time (s)		22.7			22.7			22.7			20.5	
Peak Hour Factor	0.82	0.92	0.88	0.77	0.43	1.00	0.72	0.93	1.00	0.88	0.92	0.77
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	104	16	139	817	81	179	132	1246	244	256	1526	132
Turn Type	Prot		Perm	Prot		Perm	pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8	6		6	2		2
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	18.0	10.0	10.0	29.0	21.0	21.0	11.0	34.0	34.0	17.0	40.0	40.0
Total Split (%)	20.0%	11.1%	11.1%	32.2%	23.3%	23.3%	12.2%	37.8%	37.8%	18.9%	44.4%	44.4%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	10.0	4.0	4.0	22.7	19.3	19.3	32.6	27.6	27.6	44.6	33.6	33.6
Actuated g/C Ratio	0.11	0.04	0.04	0.25	0.22	0.22	0.36	0.31	0.31	0.50	0.38	0.38
v/c Ratio	0.54	0.19	0.76	0.94	0.20	0.38	0.73	0.81	0.37	0.88	0.82	0.20
Control Delay	47.6	46.9	39.9	52.1	33.6	7.9	39.4	33.4	5.0	50.1	29.7	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	47.6	46.9	39.9	52.1	33.6	7.9	39.4	33.4	5.0	50.1	29.7	4.3
LOS	D	D	D	D	C	A	D	C	A	D	C	A
Approach Delay		43.4			43.4			29.6			30.7	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	56	9	13	234	40	0	39	236	0	93	281	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	96	30	#100	250	37	55	55	291	51	#221	341	22
Internal Link Dist (ft)		920			920			920			820	
Turn Bay Length (ft)	100		100	200		200	550		550	300		550
Base Capacity (vph)	233	84	182	884	402	476	182	1563	664	292	1880	667
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.19	0.76	0.92	0.20	0.38	0.73	0.80	0.37	0.88	0.81	0.20

Intersection Summary

Area Type: Other
Cycle Length: 90
Actuated Cycle Length: 89.4
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.94
Intersection Signal Delay: 33.8 Intersection LOS: C
Intersection Capacity Utilization 74.5% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy

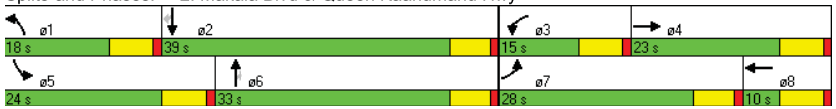
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	637	213	164	164	88	90	326	801	50	179	1397	497
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	300		0	400		400	400		400
Storage Lanes	2		0	2		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3327	0	3433	3246	0	3433	4988	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3327	0	3433	3246	0	3433	4988	1583	1719	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		147			90				51			565
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.93	0.78	0.90	1.00	0.96	1.00	1.00	0.99	0.98	1.00	0.81	0.85
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	685	455	0	164	182	0	326	809	51	179	1725	585
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6			2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0		10.0	10.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	28.0	23.0	0.0	15.0	10.0	0.0	18.0	33.0	33.0	24.0	39.0	39.0
Total Split (%)	29.5%	24.2%	0.0%	15.8%	10.5%	0.0%	18.9%	34.7%	34.7%	25.3%	41.1%	41.1%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None	None	None	None	None
Act Effct Green (s)	21.3	16.8		8.5	4.0		11.7	30.2	30.2	14.4	33.0	33.0
Actuated g/C Ratio	0.23	0.18		0.09	0.04		0.12	0.32	0.32	0.15	0.35	0.35
v/c Ratio	0.90	0.64		0.53	0.81		0.77	0.50	0.09	0.68	0.99	0.64
Control Delay	51.4	28.5		47.5	51.0		52.9	27.9	7.9	50.5	51.9	6.3
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.4	28.5		47.5	51.0		52.9	27.9	7.9	50.5	51.9	6.3
LOS	D	C		D	D		D	C	A	D	D	A
Approach Delay		42.3			49.3			33.9			41.1	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	206	90		49	29		99	145	0	102	~380	8

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#303	113		82	#87		#157	194	27	167	#389	61
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			300			400		400	400		400
Base Capacity (vph)	788	724		329	224		439	1604	543	329	1734	907
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.63		0.50	0.81		0.74	0.50	0.09	0.54	0.99	0.64

Intersection Summary

Area Type: Other
Cycle Length: 95
Actuated Cycle Length: 94
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.99
Intersection Signal Delay: 40.2 Intersection LOS: D
Intersection Capacity Utilization 79.8% ICU Level of Service D
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy



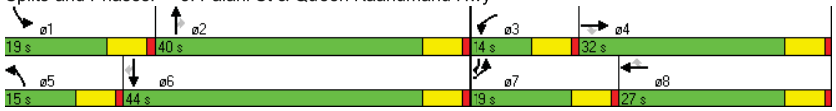
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	364	629	245	123	528	102	262	726	20	241	1282	638
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		300	200		300	400		400	400		400
Storage Lanes	2		1	2		1	2		1	2		2
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3539	1583	3183	3282	1553	3433	4988	1583	3335	4940	2707
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3539	1583	3183	3282	1553	3433	4988	1583	3335	4940	2707
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			214			115			25			32
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	1.00	0.91	1.00	0.89	0.89	1.00	0.91	0.80	1.00	0.77	1.00
Heavy Vehicles (%)	4%	2%	2%	10%	10%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	364	629	269	123	593	115	262	798	25	241	1665	638
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	10.0
Total Split (s)	19.0	32.0	32.0	14.0	27.0	27.0	15.0	40.0	40.0	19.0	44.0	19.0
Total Split (%)	18.1%	30.5%	30.5%	13.3%	25.7%	25.7%	14.3%	38.1%	38.1%	18.1%	41.9%	18.1%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	None
Act Effct Green (s)	13.0	25.9	25.9	7.7	20.7	20.7	9.0	35.1	35.1	11.9	38.0	57.0
Actuated g/C Ratio	0.12	0.25	0.25	0.07	0.20	0.20	0.09	0.34	0.34	0.11	0.36	0.54
v/c Ratio	0.87	0.72	0.49	0.52	0.92	0.29	0.89	0.48	0.05	0.64	0.93	0.43
Control Delay	67.0	41.4	11.5	55.1	61.5	8.7	78.6	29.0	9.6	52.3	42.5	14.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.0	41.4	11.5	55.1	61.5	8.7	78.6	29.0	9.6	52.3	42.5	14.5
LOS	E	D	B	E	E	A	E	C	A	D	D	B
Approach Delay		42.4			53.3			40.5			36.4	
Approach LOS		D			D			D			D	
Queue Length 50th (ft)	125	204	29	41	206	0	91	156	0	79	389	130

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#205	268	102	72	#302	45	#165	197	15	121	362	177
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300		300	200		300	400		400	400		400
Base Capacity (vph)	418	879	554	244	658	404	295	1674	548	414	1793	1489
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.87	0.72	0.49	0.50	0.90	0.28	0.89	0.48	0.05	0.58	0.93	0.43

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 104.7
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 41.0 Intersection LOS: D
Intersection Capacity Utilization 77.2% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 3: Palani St & Queen Kaahumanu Hwy

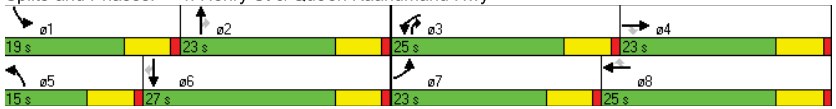


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	87	480	109	621	478	284	170	636	666	299	1138	212
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		200	200		200	330		350	370		400
Storage Lanes	1		1	2		1	2		2	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	5085	2787	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	5085	2787	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			109			284			62			272
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.76	0.84	1.00	0.97	0.90	1.00	0.73	1.00	0.81	1.00	1.00	0.78
Shared Lane Traffic (%)												
Lane Group Flow (vph)	114	571	109	640	531	284	233	636	822	299	1138	272
Turn Type	Prot		Perm	Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	23.0	23.0	23.0	25.0	25.0	25.0	15.0	23.0	25.0	19.0	27.0	27.0
Total Split (%)	25.6%	25.6%	25.6%	27.8%	27.8%	27.8%	16.7%	25.6%	27.8%	21.1%	30.0%	30.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	Min
Act Effct Green (s)	11.0	16.6	16.6	19.0	27.1	27.1	8.8	17.8	42.8	12.0	21.0	21.0
Actuated g/C Ratio	0.12	0.19	0.19	0.21	0.30	0.30	0.10	0.20	0.48	0.13	0.23	0.23
v/c Ratio	0.52	0.87	0.29	0.88	0.49	0.42	0.69	0.63	0.60	0.65	0.95	0.47
Control Delay	44.7	50.8	8.7	49.3	29.3	5.8	50.4	36.3	18.2	43.8	51.7	6.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	44.7	50.8	8.7	49.3	29.3	5.8	50.4	36.3	18.2	43.8	51.7	6.7
LOS	D	D	A	D	C	A	D	D	B	D	D	A
Approach Delay		44.1			33.5			29.4			43.2	
Approach LOS		D			C			C			D	
Queue Length 50th (ft)	62	166	0	182	134	0	67	124	176	82	234	0
Queue Length 95th (ft)	90	#223	43	#277	200	62	84	163	205	125	#327	34

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150		200	200		200	330		350	370		400
Base Capacity (vph)	336	672	389	730	1074	678	345	1016	1368	499	1195	580
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.85	0.28	0.88	0.49	0.42	0.68	0.63	0.60	0.60	0.95	0.47

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 89.4			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 36.7		Intersection LOS: D	
Intersection Capacity Utilization 77.8%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy

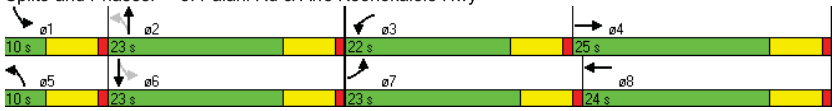


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	309	628	131	490	548	48	89	258	561	70	137	216
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		250	250		0	200		350	200		200
Storage Lanes	1		0	2		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3395	0	2993	3080	0	1770	3140	0	1770	3214	0
Flt Permitted	0.950			0.950			0.460			0.274		
Satd. Flow (perm)	1770	3395	0	2993	3080	0	857	3140	0	510	3214	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		27			11			519			235	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			2500	
Travel Time (s)		22.7			22.7			22.7			56.8	
Peak Hour Factor	0.92	0.96	1.00	0.89	1.00	0.92	0.92	0.92	0.97	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	336	785	0	551	600	0	97	858	0	76	384	0
Turn Type	Prot			Prot			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases							2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	10.0		10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	23.0	25.0	0.0	22.0	24.0	0.0	10.0	23.0	0.0	10.0	23.0	0.0
Total Split (%)	28.8%	31.3%	0.0%	27.5%	30.0%	0.0%	12.5%	28.8%	0.0%	12.5%	28.8%	0.0%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	16.4	19.0		15.7	18.3		17.6	14.6		17.6	14.6	
Actuated g/C Ratio	0.22	0.25		0.21	0.24		0.23	0.19		0.23	0.19	
v/c Ratio	0.87	0.90		0.88	0.79		0.39	0.84		0.40	0.47	
Control Delay	54.7	42.6		47.8	36.9		24.7	19.8		26.0	12.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	54.7	42.6		47.8	36.9		24.7	19.8		26.0	12.9	
LOS	D	D		D	D		C	B		C	B	
Approach Delay		46.2			42.1			20.3			15.0	
Approach LOS		D			D			C			B	
Queue Length 50th (ft)	164	197		140	149		34	81		26	32	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#313	#314		#229	#238		67	154		56	70	
Internal Link Dist (ft)		920			920			920			2420	
Turn Bay Length (ft)				250			200			200		
Base Capacity (vph)	407	892		648	760		250	1121		188	920	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.83	0.88		0.85	0.79		0.39	0.77		0.40	0.42	

Intersection Summary		
Area Type:	Other	
Cycle Length: 80		
Actuated Cycle Length: 75.1		
Natural Cycle: 80		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.90		
Intersection Signal Delay: 34.3		Intersection LOS: C
Intersection Capacity Utilization 84.6%		ICU Level of Service E
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy



TRAFFIC IMPACT ANALYSIS REPORT
FOR THE PROPOSED
KAMAKANA VILLAGES
AT KEAHUOLU

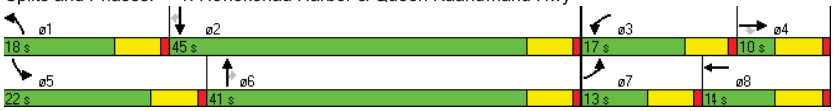
APPENDIX H
CAPACITY ANALYSIS WORKSHEETS
2029 PEAK HOUR TRAFFIC WITH PROJECT

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	49	19	62	311	30	261	116	1647	608	200	1006	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		100	200		200	550		550	300		550
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1719	1863	1583	3433	1863	1538	1770	4940	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1719	1863	1583	3433	1863	1538	1770	4940	1583	1719	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			67			284			552			89
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			853			900	
Travel Time (s)		22.7			22.7			19.4			20.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	53	21	67	338	33	284	126	1790	661	217	1093	89
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			Free			6			2
Detector Phase	7	4	4	3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	13.0	10.0	10.0	17.0	14.0	0.0	18.0	41.0	41.0	22.0	45.0	45.0
Total Split (%)	14.4%	11.1%	11.1%	18.9%	15.6%	0.0%	20.0%	45.6%	45.6%	24.4%	50.0%	50.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Act Effct Green (s)	6.7	4.0	4.0	10.8	11.0	86.2	10.4	35.3	35.3	14.3	42.3	42.3
Actuated g/C Ratio	0.08	0.05	0.05	0.13	0.13	1.00	0.12	0.41	0.41	0.17	0.49	0.49
v/c Ratio	0.40	0.24	0.49	0.79	0.14	0.18	0.59	0.89	0.68	0.76	0.45	0.11
Control Delay	48.7	48.4	23.7	51.9	38.8	0.3	48.7	31.4	8.1	53.0	17.1	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.7	48.4	23.7	51.9	38.8	0.3	48.7	31.4	8.1	53.0	17.1	4.0
LOS	D	D	C	D	D	A	D	C	A	D	B	A
Approach Delay		36.8			28.9			26.3			21.8	
Approach LOS		D			C			C			C	
Queue Length 50th (ft)	29	12	0	97	18	0	68	349	40	117	159	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	67	36	#42	#163	46	0	125	#458	156	#215	200	26
Internal Link Dist (ft)		920			920			773			820	
Turn Bay Length (ft)	100		100	200		200	550		550	300		550
Base Capacity (vph)	141	87	138	441	239	1538	248	2020	974	322	2422	799
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.38	0.24	0.49	0.77	0.14	0.18	0.51	0.89	0.68	0.67	0.45	0.11

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 86.2		
Natural Cycle: 75		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.89		
Intersection Signal Delay: 25.6		Intersection LOS: C
Intersection Capacity Utilization 73.4%		ICU Level of Service D
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy

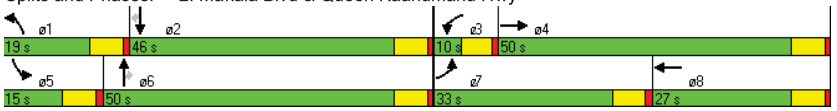


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	616	215	54	22	312	291	200	1418	31	94	902	302
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	300		0	400		400	400		400
Storage Lanes	2		0	2		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	3433	0	3433	3238	0	3433	4940	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3335	3433	0	3433	3238	0	3433	4940	1583	1719	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			146				34			328
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	670	293	0	24	655	0	217	1541	34	102	980	328
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6			2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0		10.0	10.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	33.0	50.0	0.0	10.0	27.0	0.0	19.0	50.0	50.0	15.0	46.0	46.0
Total Split (%)	26.4%	40.0%	0.0%	8.0%	21.6%	0.0%	15.2%	40.0%	40.0%	12.0%	36.8%	36.8%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None	None	None	None	None
Act Effct Green (s)	26.6	47.6		4.0	21.0		12.0	43.6	43.6	9.0	40.6	40.6
Actuated g/C Ratio	0.21	0.38		0.03	0.17		0.10	0.35	0.35	0.07	0.33	0.33
v/c Ratio	0.94	0.22		0.22	0.98		0.65	0.89	0.06	0.82	0.61	0.45
Control Delay	70.1	24.7		63.7	70.4		63.9	45.5	8.7	100.0	37.3	5.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	70.1	24.7		63.7	70.4		63.9	45.5	8.7	100.0	37.3	5.4
LOS	E	C		E	E		E	D	A	F	D	A
Approach Delay		56.3			70.1			47.0			34.4	
Approach LOS		E			E			D			C	
Queue Length 50th (ft)	276	78		9	224		88	427	0	83	245	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#389	114		25	#353		130	494	23	#185	294	66
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			300			400		400	400		400
Base Capacity (vph)	725	1333		111	668		359	1750	582	125	1616	724
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.92	0.22		0.22	0.98		0.60	0.88	0.06	0.82	0.61	0.45

Intersection Summary		
Area Type:	Other	
Cycle Length: 125		
Actuated Cycle Length: 124.2		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.98		
Intersection Signal Delay: 48.4		Intersection LOS: D
Intersection Capacity Utilization 88.1%		ICU Level of Service E
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy

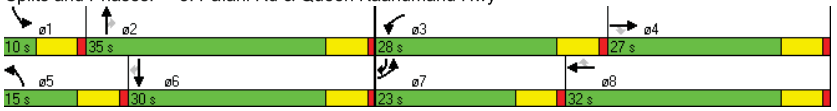


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	454	308	154	457	681	13	156	1222	12	47	699	271
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		300	200		200	400		400	400		400
Storage Lanes	2		1	2		1	2		1	2		2
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	3471	1583	2993	3085	1538	3433	4940	1583	3335	4940	2707
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3335	3471	1583	2993	3085	1538	3433	4940	1583	3335	4940	2707
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			129			19			18			57
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	1.00	0.96	1.00	1.00	0.88	0.67	0.97	0.94	0.67	1.00	0.89	0.70
Heavy Vehicles (%)	5%	4%	2%	17%	17%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	454	321	154	457	774	19	161	1300	18	47	785	387
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	10.0
Total Split (s)	23.0	27.0	27.0	28.0	32.0	32.0	15.0	35.0	35.0	10.0	30.0	23.0
Total Split (%)	23.0%	27.0%	27.0%	28.0%	32.0%	32.0%	15.0%	35.0%	35.0%	10.0%	30.0%	23.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	None
Act Effct Green (s)	16.2	23.1	23.1	19.0	25.9	25.9	8.5	30.3	30.3	4.0	21.5	43.7
Actuated g/C Ratio	0.17	0.24	0.24	0.20	0.27	0.27	0.09	0.31	0.31	0.04	0.22	0.45
v/c Ratio	0.81	0.39	0.32	0.77	0.93	0.04	0.53	0.83	0.04	0.34	0.71	0.31
Control Delay	51.5	33.7	10.9	46.4	54.7	12.4	49.6	37.5	11.5	53.3	38.5	14.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.5	33.7	10.9	46.4	54.7	12.4	49.6	37.5	11.5	53.3	38.5	14.6
LOS	D	C	B	D	D	B	D	D	B	D	D	B
Approach Delay		38.6			51.0			38.5			31.5	
Approach LOS		D			D			D			C	
Queue Length 50th (ft)	144	92	13	142	256	0	51	291	0	15	166	69

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#216	137	65	193	#366	11	84	#378	10	34	208	75
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300		300	200		200	400		400	400		400
Base Capacity (vph)	592	832	477	687	837	431	322	1557	511	139	1237	1286
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.77	0.39	0.32	0.67	0.92	0.04	0.50	0.83	0.04	0.34	0.63	0.30

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 96.2		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.93		
Intersection Signal Delay: 40.0	Intersection LOS: D	
Intersection Capacity Utilization 78.7%	ICU Level of Service D	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 3: Palani Rd & Queen Kaahumanu Hwy

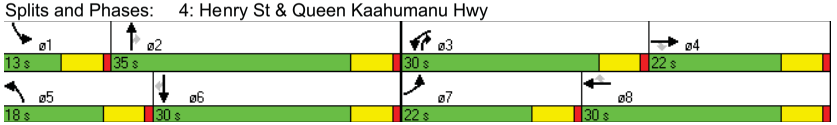


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	123	409	72	645	625	188	253	1080	1042	128	1020	163
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		200	200		200	330		350	370		400
Storage Lanes	1		1	2		1	2		2	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	5085	2787	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	5085	2787	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			78			204			72			177
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	134	445	78	701	679	204	275	1174	1133	139	1109	177
Turn Type	Prot		Perm	Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	22.0	22.0	22.0	22.0	22.0	22.0	10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	22.0	22.0	22.0	30.0	30.0	30.0	18.0	35.0	30.0	13.0	30.0	30.0
Total Split (%)	22.0%	22.0%	22.0%	30.0%	30.0%	30.0%	18.0%	35.0%	30.0%	13.0%	30.0%	30.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	Min
Act Effct Green (s)	12.3	15.3	15.3	23.5	26.5	26.5	11.4	28.5	58.0	6.9	24.1	24.1
Actuated g/C Ratio	0.13	0.16	0.16	0.24	0.27	0.27	0.12	0.29	0.59	0.07	0.25	0.25
v/c Ratio	0.60	0.81	0.25	0.85	0.71	0.35	0.69	0.80	0.68	0.57	0.89	0.34
Control Delay	52.2	52.6	11.0	47.6	38.1	6.4	51.8	37.2	15.4	54.7	46.6	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.2	52.6	11.0	47.6	38.1	6.4	51.8	37.2	15.4	54.7	46.6	6.8
LOS	D	D	B	D	D	A	D	D	B	D	D	A
Approach Delay		47.6			38.3			29.2			42.4	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	82	145	0	221	205	0	87	252	244	45	252	0
Queue Length 95th (ft)	138	#214	40	#312	282	56	130	307	324	76	#334	52

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150		200	200		200	330		350	370		400
Base Capacity (vph)	288	576	323	839	953	576	419	1502	1689	244	1244	521
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.47	0.77	0.24	0.84	0.71	0.35	0.66	0.78	0.67	0.57	0.89	0.34

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 98.3		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.89		
Intersection Signal Delay: 36.4		Intersection LOS: D
Intersection Capacity Utilization 76.6%		ICU Level of Service D
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy

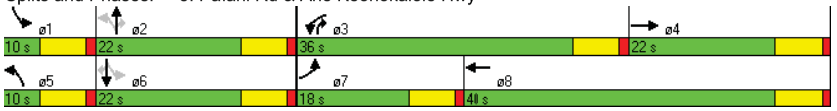


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	144	246	60	888	989	23	29	475	675	79	419	361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	200		300	311		200
Storage Lanes	1		0	2		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3383	0	2993	3085	0	1770	3539	1553	1770	3539	1583
Flt Permitted	0.950			0.950			0.368			0.265		
Satd. Flow (perm)	1770	3383	0	2993	3085	0	685	3539	1553	494	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		29			3				187			381
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1000			1000			1000	
Travel Time (s)		14.9			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	157	332	0	965	1100	0	32	516	734	86	455	392
Turn Type	Prot			Prot			pm+pt		pm+ov	pm+pt		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases							2		2	6		6
Detector Phase	7	4		3	8		5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0		10.0	22.0		10.0	22.0	10.0	10.0	22.0	22.0
Total Split (s)	18.0	22.0	0.0	36.0	40.0	0.0	10.0	22.0	36.0	10.0	22.0	22.0
Total Split (%)	20.0%	24.4%	0.0%	40.0%	44.4%	0.0%	11.1%	24.4%	40.0%	11.1%	24.4%	24.4%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	None	None	Min	Min
Act Effct Green (s)	11.0	14.2		29.9	33.1		18.3	15.3	51.3	19.5	17.2	17.2
Actuated g/C Ratio	0.13	0.17		0.35	0.39		0.21	0.18	0.60	0.23	0.20	0.20
v/c Ratio	0.69	0.56		0.92	0.92		0.16	0.81	0.73	0.50	0.64	0.63
Control Delay	53.5	34.3		43.2	39.2		25.4	46.2	14.9	36.0	37.1	9.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	53.5	34.3		43.2	39.2		25.4	46.2	14.9	36.0	37.1	9.4
LOS	D	C		D	D		C	D	B	D	D	A
Approach Delay		40.5			41.0			27.7			25.3	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	86	82		275	311		13	150	216	36	130	5

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#167	126		#406	#452		35	#227	374	73	182	88
Internal Link Dist (ft)		574			920			920			920	
Turn Bay Length (ft)				250			200		300	311		200
Base Capacity (vph)	253	667		1068	1249		199	673	1017	173	752	637
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.62	0.50		0.90	0.88		0.16	0.77	0.72	0.50	0.61	0.62

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 85.3		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.92		
Intersection Signal Delay: 34.3	Intersection LOS: C	
Intersection Capacity Utilization 73.6%	ICU Level of Service D	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy



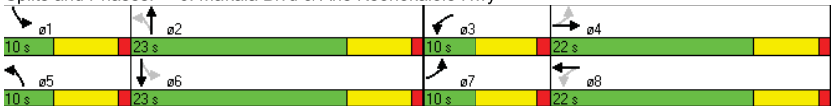
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	124	81	5	272	231	5	95	552	62	5	587	150
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	420		0	420		200
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1848	0	1770	1857	0	1770	3486	0	1770	3429	0
Flt Permitted	0.601			0.551			0.201			0.365		
Satd. Flow (perm)	1120	1848	0	1026	1857	0	374	3486	0	680	3429	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		4			1			18			47	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		847			873			1500			1000	
Travel Time (s)		19.3			19.8			34.1			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	135	93	0	296	256	0	103	667	0	5	801	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	22.0		10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	10.0	22.0	0.0	10.0	22.0	0.0	10.0	23.0	0.0	10.0	23.0	0.0
Total Split (%)	15.4%	33.8%	0.0%	15.4%	33.8%	0.0%	15.4%	35.4%	0.0%	15.4%	35.4%	0.0%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	14.6	12.3		15.8	12.9		22.5	21.8		19.2	16.4	
Actuated g/C Ratio	0.26	0.22		0.28	0.23		0.40	0.38		0.34	0.29	
v/c Ratio	0.40	0.23		0.83	0.61		0.40	0.49		0.02	0.78	
Control Delay	17.9	20.8		40.3	28.3		17.2	16.1		11.4	26.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	17.9	20.8		40.3	28.3		17.2	16.1		11.4	26.7	
LOS	B	C		D	C		B	B		B	C	
Approach Delay		19.1			34.7			16.2			26.6	
Approach LOS		B			C			B			C	
Queue Length 50th (ft)	34	28		82	88		23	86		1	141	
Queue Length 95th (ft)	67	62		#190	155		51	178		7	#245	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		767			793			1420			920	
Turn Bay Length (ft)	200			200			420			420		
Base Capacity (vph)	338	572		358	572		256	1484		315	1153	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.40	0.16		0.83	0.45		0.40	0.45		0.02	0.69	

Intersection Summary

Area Type: Other
Cycle Length: 65
Actuated Cycle Length: 56.7
Natural Cycle: 65
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.83
Intersection Signal Delay: 24.4 Intersection LOS: C
Intersection Capacity Utilization 65.9% ICU Level of Service C
Analysis Period (min) 15
\# 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 6: Makala Blvd & Ane Keohokalole Hwy

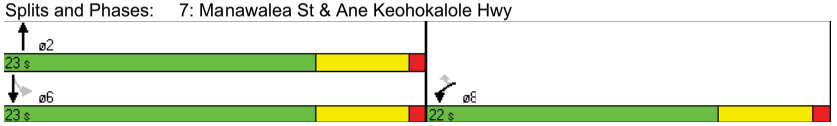


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	166	56	553	123	23	571
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	420	
Storage Lanes	1	1		0	1	
Taper Length (ft)	100	100		100	100	
Satd. Flow (prot)	1770	1583	3444	0	1770	3539
Flt Permitted	0.950				0.372	
Satd. Flow (perm)	1770	1583	3444	0	693	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		61	68			
Link Speed (mph)	30		30			30
Link Distance (ft)	856		1000			500
Travel Time (s)	19.5		22.7			11.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	180	61	735	0	25	621
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0
Minimum Split (s)	22.0	22.0	22.0		22.0	22.0
Total Split (s)	22.0	22.0	23.0	0.0	23.0	23.0
Total Split (%)	48.9%	48.9%	51.1%	0.0%	51.1%	51.1%
Yellow Time (s)	5.0	5.0	5.0		5.0	5.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min		Min	Min
Act Effct Green (s)	9.0	9.0	19.3		19.3	19.3
Actuated g/C Ratio	0.25	0.25	0.54		0.54	0.54
v/c Ratio	0.41	0.14	0.39		0.07	0.33
Control Delay	14.5	4.8	7.6		8.0	7.9
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	14.5	4.8	7.6		8.0	7.9
LOS	B	A	A		A	A
Approach Delay	12.1		7.6			7.9
Approach LOS	B		A			A
Queue Length 50th (ft)	27	0	44		3	40
Queue Length 95th (ft)	69	17	93		14	83

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Internal Link Dist (ft)	776		920			420
Turn Bay Length (ft)					420	
Base Capacity (vph)	805	753	1972		391	1996
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.22	0.08	0.37		0.06	0.31

Intersection Summary			
Area Type:	Other		
Cycle Length: 45			
Actuated Cycle Length: 35.9			
Natural Cycle: 45			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.41			
Intersection Signal Delay: 8.4		Intersection LOS: A	
Intersection Capacity Utilization 38.4%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 7: Manawalea St & Ane Keohokalole Hwy

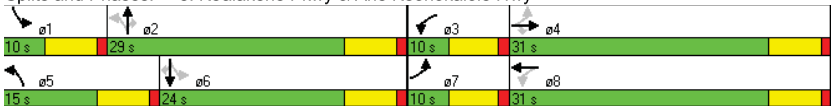


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	126	142	495	222	428	73	312	505	90	22	379	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	340		0	480		0	300		300	430		300
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1863	1583	1770	1822	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.165			0.659			0.330			0.447		
Satd. Flow (perm)	307	1863	1583	1228	1822	0	615	3539	1583	833	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			286		11				98			22
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			800			1000	
Travel Time (s)		22.7			22.7			18.2			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	137	154	538	241	544	0	339	549	98	24	412	22
Turn Type	pm+pt		Perm	pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	10.0	31.0	31.0	10.0	31.0	0.0	15.0	29.0	29.0	10.0	24.0	24.0
Total Split (%)	12.5%	38.8%	38.8%	12.5%	38.8%	0.0%	18.8%	36.3%	36.3%	12.5%	30.0%	30.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	28.3	24.3	24.3	28.3	24.3		28.7	25.3	25.3	18.1	14.1	14.1
Actuated g/C Ratio	0.37	0.32	0.32	0.37	0.32		0.38	0.34	0.34	0.24	0.19	0.19
v/c Ratio	0.71	0.26	0.76	0.49	0.91		0.91	0.46	0.16	0.10	0.63	0.07
Control Delay	38.1	21.0	19.4	20.1	47.8		51.1	22.4	5.9	16.0	32.8	11.4
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.1	21.0	19.4	20.1	47.8		51.1	22.4	5.9	16.0	32.8	11.4
LOS	D	C	B	C	D		D	C	A	B	C	B
Approach Delay		22.8			39.3			30.6			30.9	
Approach LOS		C			D			C			C	
Queue Length 50th (ft)	36	52	101	68	237		119	97	0	7	95	0
Queue Length 95th (ft)	#105	104	#282	127	#457		#219	170	33	21	140	18

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			720			920	
Turn Bay Length (ft)	340			480			300		300	430		300
Base Capacity (vph)	193	619	717	490	613		372	1198	601	249	846	395
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.71	0.25	0.75	0.49	0.89		0.91	0.46	0.16	0.10	0.49	0.06

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 75.5			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 30.8		Intersection LOS: C	
Intersection Capacity Utilization 81.7%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 8: Kealakehe Pkwy & Ane Keohokalole Hwy



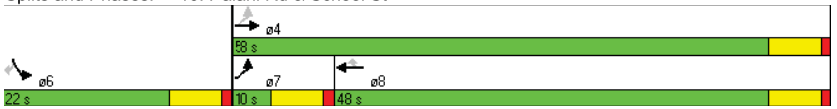
Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	62	937	1742	12	48	154
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			400	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	100			100	100	100
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.083				0.950	
Satd. Flow (perm)	155	3539	3539	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				13		102
Link Speed (mph)		30	30		30	
Link Distance (ft)		1000	1000		500	
Travel Time (s)		22.7	22.7		11.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	67	1018	1893	13	52	167
Turn Type	pm+pt			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Detector Phase	7	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	10.0	58.0	48.0	48.0	22.0	22.0
Total Split (%)	12.5%	72.5%	60.0%	60.0%	27.5%	27.5%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effct Green (s)	50.0	50.0	42.3	42.3	9.0	9.0
Actuated g/C Ratio	0.70	0.70	0.59	0.59	0.13	0.13
v/c Ratio	0.33	0.41	0.90	0.01	0.23	0.58
Control Delay	8.3	5.3	22.0	4.4	30.9	21.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.3	5.3	22.0	4.4	30.9	21.6
LOS	A	A	C	A	C	C
Approach Delay		5.5	21.9		23.8	
Approach LOS		A	C		C	
Queue Length 50th (ft)	7	75	364	0	22	27
Queue Length 95th (ft)	22	141	#648	8	51	82

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Internal Link Dist (ft)		920	920		420	
Turn Bay Length (ft)	200			400		
Base Capacity (vph)	201	2610	2108	948	402	438
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.33	0.39	0.90	0.01	0.13	0.38

Intersection Summary

Area Type: Other
Cycle Length: 80
Actuated Cycle Length: 71.1
Natural Cycle: 80
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 16.5 Intersection LOS: B
Intersection Capacity Utilization 67.7% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

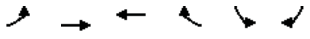
Splits and Phases: 10: Palani Rd & School St



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	106	603	39	0	859
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	115	655	42	0	934
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1000			
pX, platoon unblocked	0.90	0.90			0.90	
vC, conflicting volume	1143	349			655	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	939	56			397	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	87			100	
cM capacity (veh/h)	237	899			1043	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	115	437	261	467	467
Volume Left	0	0	0	0	0
Volume Right	115	0	42	0	0
cSH	899	1700	1700	1700	1700
Volume to Capacity	0.13	0.26	0.15	0.27	0.27
Queue Length 95th (ft)	11	0	0	0	0
Control Delay (s)	9.6	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.6	0.0		0.0	
Approach LOS	A				

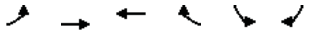
Intersection Summary				
Average Delay		0.6		
Intersection Capacity Utilization	31.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (veh/h)	0	985	1716	7	0	38
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1071	1865	8	0	41
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1000				
pX, platoon unblocked					0.95	
vC, conflicting volume	1873				2401	933
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1873				2366	933
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	85
cM capacity (veh/h)	317				28	268

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	535	535	933	933	8	41
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	8	41
cSH	1700	1700	1700	1700	1700	268
Volume to Capacity	0.31	0.31	0.55	0.55	0.00	0.15
Queue Length 95th (ft)	0	0	0	0	0	13
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	20.9
Lane LOS						C
Approach Delay (s)	0.0		0.0			20.9
Approach LOS						C

Intersection Summary				
Average Delay		0.3		
Intersection Capacity Utilization	57.4%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↱		↱
Volume (veh/h)	0	985	1704	18	0	19
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1071	1852	20	0	21
Pedestrians					19	
Lane Width (ft)					12.0	
Walking Speed (ft/s)					3.0	
Percent Blockage					2	
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1891				2406	945
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1891				2406	945
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	92
cM capacity (veh/h)	306				27	257

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	535	535	926	926	20	21
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	20	21
cSH	1700	1700	1700	1700	1700	257
Volume to Capacity	0.31	0.31	0.54	0.54	0.01	0.08
Queue Length 95th (ft)	0	0	0	0	0	6
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	20.2
Lane LOS						C
Approach Delay (s)	0.0		0.0			20.2
Approach LOS						C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	57.1%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↰↑	↑↑	↱	↰↑	↑↑	↱	↰↑	↑↑↑	↱	↰↑	↑↑↑	↱
Volume (vph)	616	215	54	22	312	291	200	1418	31	94	902	302
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		300	300		300	400		400	400		400
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3335	3539	1583	3433	3539	1538	3433	4940	1583	3335	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3335	3539	1583	3433	3539	1538	3433	4940	1583	3335	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			59			138			34			328
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	5%	2%	2%	2%	2%	5%	2%	5%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	670	234	59	24	339	316	217	1541	34	102	980	328
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			2
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	10.0	10.0	10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	29.0	39.0	39.0	12.0	22.0	22.0	16.0	37.0	37.0	12.0	33.0	33.0
Total Split (%)	29.0%	39.0%	39.0%	12.0%	22.0%	22.0%	16.0%	37.0%	37.0%	12.0%	33.0%	33.0%
Maximum Green (s)	23.0	33.0	33.0	6.0	16.0	16.0	10.0	31.0	31.0	6.0	27.0	27.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Walk Time (s)		5.0	5.0					5.0	5.0		5.0	5.0
Flash Dont Walk (s)		11.0	11.0					11.0	11.0		11.0	11.0
Pedestrian Calls (#/hr)		0	0					0	0		0	0
Act Effct Green (s)	21.9	38.1	38.1	5.9	14.8	14.8	9.6	32.1	32.1	6.0	25.7	25.7
Actuated g/C Ratio	0.23	0.40	0.40	0.06	0.15	0.15	0.10	0.33	0.33	0.06	0.27	0.27
v/c Ratio	0.88	0.17	0.09	0.11	0.62	0.90	0.63	0.93	0.06	0.49	0.74	0.50
Control Delay	51.1	20.9	6.8	45.9	44.2	51.5	51.6	44.3	8.7	53.6	36.5	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	51.1	20.9	6.8	45.9	44.2	51.5	51.6	44.3	8.7	53.6	36.5	6.3
LOS	D	C	A	D	D	D	D	D	A	D	D	A
Approach Delay		41.0			47.7			44.5			30.7	
Approach LOS		D			D			D			C	
Queue Length 50th (ft)	212	44	0	7	106	114	69	~362	0	32	208	0
Queue Length 95th (ft)	#309	85	28	21	154	#270	108	#473	22	60	258	65
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300		300	300		300	400		400	400		400
Base Capacity (vph)	804	1402	663	216	593	373	360	1650	551	210	1398	671
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.83	0.17	0.09	0.11	0.57	0.85	0.60	0.93	0.06	0.49	0.70	0.49

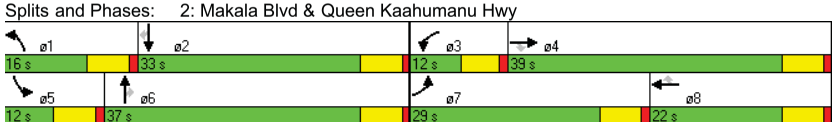
Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 96.1
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.93
Intersection Signal Delay: 40.2 Intersection LOS: D
Intersection Capacity Utilization 78.0% ICU Level of Service D
Analysis Period (min) 15

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

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

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy



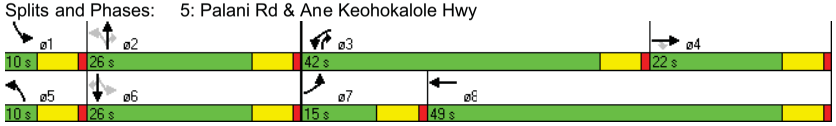
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	144	246	60	888	989	23	29	475	675	79	419	361
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	250		250	250		0	200		0	200		200
Storage Lanes	2		1	2		0	1		2	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3433	3471	1583	2993	3085	0	1770	3539	2733	1770	3539	1583
Flt Permitted	0.950			0.950			0.375			0.276		
Satd. Flow (perm)	3433	3471	1583	2993	3085	0	699	3539	2733	514	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			65		3				293			286
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1000			1000			1000	
Travel Time (s)		14.9			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	157	267	65	965	1100	0	32	516	734	86	455	392
Turn Type	Prot		Perm	Prot			pm+pt		pm+ov	pm+pt		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4				2		2	6		6
Detector Phase	7	4	4	3	8		5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0		10.0	22.0	10.0	10.0	22.0	22.0
Total Split (s)	15.0	22.0	22.0	42.0	49.0	0.0	10.0	26.0	42.0	10.0	26.0	26.0
Total Split (%)	15.0%	22.0%	22.0%	42.0%	49.0%	0.0%	10.0%	26.0%	42.0%	10.0%	26.0%	26.0%
Maximum Green (s)	9.0	16.0	16.0	36.0	43.0		4.0	20.0	36.0	4.0	20.0	20.0
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None		None	Min	None	None	Min	Min
Walk Time (s)		5.0	5.0		5.0			5.0			5.0	5.0
Flash Dont Walk (s)		11.0	11.0		11.0			11.0			11.0	11.0
Pedestrian Calls (#/hr)		0	0		0			0			0	0
Act Effct Green (s)	8.5	13.3	13.3	33.6	38.4		20.6	17.7	57.5	21.8	19.7	19.7
Actuated g/C Ratio	0.09	0.15	0.15	0.37	0.42		0.23	0.20	0.63	0.24	0.22	0.22
v/c Ratio	0.49	0.53	0.23	0.87	0.84		0.15	0.75	0.40	0.47	0.59	0.69
Control Delay	47.5	41.4	11.7	37.8	31.1		26.9	43.3	5.7	36.6	37.2	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Total Delay	47.5	41.4	11.7	37.8	31.1		26.9	43.3	5.7	36.6	37.2	17.8
LOS	D	D	B	D	C		C	D	A	D	D	B
Approach Delay		39.4			34.2			21.3			29.0	
Approach LOS		D			C			C			C	
Queue Length 50th (ft)	50	82	0	295	317		14	163	66	40	141	58
Queue Length 95th (ft)	82	123	37	#417	409		37	222	104	78	194	169
Internal Link Dist (ft)		574			920			920			920	
Turn Bay Length (ft)	250		250	250			200			200		200
Base Capacity (vph)	353	633	342	1229	1515		208	808	1938	182	859	601
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.44	0.42	0.19	0.79	0.73		0.15	0.64	0.38	0.47	0.53	0.65

Intersection Summary

Area Type: Other
Cycle Length: 100
Actuated Cycle Length: 90.6
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.87
Intersection Signal Delay: 30.3 Intersection LOS: C
Intersection Capacity Utilization 69.7% ICU Level of Service C
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy



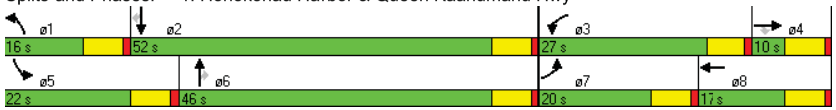
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	19	148	558	48	142	116	1415	170	195	1792	133
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	100		100	200		200	550		550	300		550
Storage Lanes	1		1	2		1	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1736	1863	1583	3433	1863	1553	1770	4988	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1736	1863	1583	3433	1863	1553	1770	4988	1583	1719	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			161			154			185			145
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			900	
Travel Time (s)		22.7			22.7			22.7			20.5	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	120	21	161	607	52	154	126	1538	185	212	1948	145
Turn Type	Prot		Perm	Prot		Free	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			Free			6			2
Detector Phase	7	4	4	3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	10.0	10.0	10.0	10.0		10.0	10.0	10.0	10.0	10.0	10.0
Total Split (s)	20.0	10.0	10.0	27.0	17.0	0.0	16.0	46.0	46.0	22.0	52.0	52.0
Total Split (%)	19.0%	9.5%	9.5%	25.7%	16.2%	0.0%	15.2%	43.8%	43.8%	21.0%	49.5%	49.5%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	None	None	None	None	None
Act Effct Green (s)	16.0	4.0	4.0	20.5	10.9	104.2	9.7	40.4	40.4	15.3	46.0	46.0
Actuated g/C Ratio	0.15	0.04	0.04	0.20	0.10	1.00	0.09	0.39	0.39	0.15	0.44	0.44
v/c Ratio	0.45	0.29	0.75	0.90	0.27	0.10	0.76	0.79	0.25	0.84	0.89	0.19
Control Delay	48.4	59.7	29.8	58.6	46.6	0.1	75.6	32.2	4.2	71.7	33.5	3.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	48.4	59.7	29.8	58.6	46.6	0.1	75.6	32.2	4.2	71.7	33.5	3.6
LOS	D	E	C	E	D	A	E	C	A	E	C	A
Approach Delay		39.3			46.8			32.4			35.2	
Approach LOS		D			D			C			D	
Queue Length 50th (ft)	77	14	0	205	32	0	84	334	0	140	434	0

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	136	40	#95	#301	71	0	#178	395	43	#261	507	35
Internal Link Dist (ft)		920			920			920			820	
Turn Bay Length (ft)	100		100	200		200	550		550	300		550
Base Capacity (vph)	283	72	215	692	214	1553	170	1935	728	264	2182	760
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.29	0.75	0.88	0.24	0.10	0.74	0.79	0.25	0.80	0.89	0.19

Intersection Summary

Area Type: Other
Cycle Length: 105
Actuated Cycle Length: 104.2
Natural Cycle: 90
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 0.90
Intersection Signal Delay: 36.2 Intersection LOS: D
Intersection Capacity Utilization 78.6% ICU Level of Service D
Analysis Period (min) 15
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Honokohau Harbor & Queen Kaahumanu Hwy



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	710	688	199	199	294	193	408	832	60	392	1434	574
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	300		0	400		400	400		400
Storage Lanes	2		0	2		0	2		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3419	0	3433	3305	0	3433	4988	1583	1719	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3419	0	3433	3305	0	3433	4988	1583	1719	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		33			113				65			461
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	772	964	0	216	530	0	443	904	65	426	1559	624
Turn Type	Prot			Prot			Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases									6			2
Detector Phase	7	4		3	8		1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0		10.0	10.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	31.0	36.0	0.0	14.0	19.0	0.0	20.0	27.0	27.0	33.0	40.0	40.0
Total Split (%)	28.2%	32.7%	0.0%	12.7%	17.3%	0.0%	18.2%	24.5%	24.5%	30.0%	36.4%	36.4%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	None	None	None	None	None
Act Effct Green (s)	25.0	30.0		8.0	13.0		14.0	21.0	21.0	27.0	34.0	34.0
Actuated g/C Ratio	0.23	0.27		0.07	0.12		0.13	0.19	0.19	0.25	0.31	0.31
v/c Ratio	1.01	1.01		0.86	1.08		1.01	0.95	0.18	1.01	1.02	0.79
Control Delay	77.6	70.2		81.7	100.9		94.7	63.7	10.6	88.4	66.5	17.0
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.6	70.2		81.7	100.9		94.7	63.7	10.6	88.4	66.5	17.0
LOS	E	E		F	F		F	E	B	F	E	B
Approach Delay		73.5			95.4			71.0			58.2	
Approach LOS		E			F			E			E	
Queue Length 50th (ft)	~286	~354		79	~181		~166	233	0	~307	~429	101

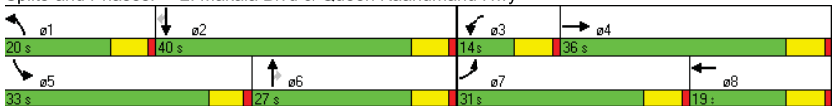
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#415	#497		#147	#293		#272	#319	37	#511	#525	266
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300			300			400		400	400		400
Base Capacity (vph)	765	956		250	490		437	952	355	422	1527	794
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	1.01	1.01		0.86	1.08		1.01	0.95	0.18	1.01	1.02	0.79

Intersection Summary

Area Type: Other
Cycle Length: 110
Actuated Cycle Length: 110
Natural Cycle: 110
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.08
Intersection Signal Delay: 69.3 Intersection LOS: E
Intersection Capacity Utilization 93.9% ICU Level of Service F
Analysis Period (min) 15

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

Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	459	690	297	365	753	155	317	701	25	303	1331	727
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		300	200		300	400		400	400		400
Storage Lanes	2		1	2		1	2		1	2		2
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3539	1583	3183	3282	1553	3433	4988	1583	3335	4940	2707
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3539	1583	3183	3282	1553	3433	4988	1583	3335	4940	2707
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			257			168			27			30
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	10%	10%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	499	750	323	397	818	168	345	762	27	329	1447	790
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		pm+ov
Protected Phases	7	4		3	8		5	2		1	6	7
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	2	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	27.0	10.0	27.0	10.0
Total Split (s)	29.0	42.0	42.0	29.0	42.0	42.0	23.0	42.0	42.0	27.0	46.0	29.0
Total Split (%)	20.7%	30.0%	30.0%	20.7%	30.0%	30.0%	16.4%	30.0%	30.0%	19.3%	32.9%	20.7%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	Min	None	Min	None
Act Effct Green (s)	22.7	37.6	37.6	21.1	36.0	36.0	16.5	38.2	38.2	18.3	40.0	68.8
Actuated g/C Ratio	0.16	0.27	0.27	0.15	0.26	0.26	0.12	0.27	0.27	0.13	0.29	0.49
v/c Ratio	0.91	0.78	0.52	0.82	0.96	0.32	0.85	0.56	0.06	0.75	1.02	0.58
Control Delay	78.6	54.3	13.3	72.0	74.3	7.4	79.3	45.6	13.5	69.3	77.7	26.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.6	54.3	13.3	72.0	74.3	7.4	79.3	45.6	13.5	69.3	77.7	26.3
LOS	E	D	B	E	E	A	E	D	B	E	E	C
Approach Delay		53.6			65.5			55.1			60.8	
Approach LOS		D			E			E			E	
Queue Length 50th (ft)	232	339	47	180	390	0	160	219	0	150	~513	274

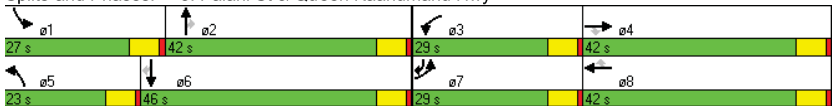
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#331	419	143	239	#526	57	#235	271	25	201	#610	346
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300		300	200		300	400		400	400		400
Base Capacity (vph)	556	956	616	526	848	526	419	1368	454	503	1419	1356
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.90	0.78	0.52	0.75	0.96	0.32	0.82	0.56	0.06	0.65	1.02	0.58

Intersection Summary

Area Type: Other
Cycle Length: 140
Actuated Cycle Length: 139.3
Natural Cycle: 100
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.02
Intersection Signal Delay: 59.1 Intersection LOS: E
Intersection Capacity Utilization 88.7% ICU Level of Service E
Analysis Period (min) 15

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

Splits and Phases: 3: Palani St & Queen Kaahumanu Hwy

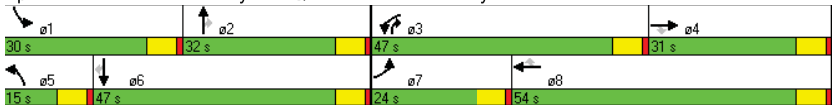


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	114	603	132	971	639	356	206	574	1196	384	1370	238
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	150		200	200		200	330		350	370		400
Storage Lanes	1		1	2		1	2		2	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3539	1583	3433	3539	1583	3433	5085	2787	3433	5085	1583
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	1770	3539	1583	3433	3539	1583	3433	5085	2787	3433	5085	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			117			372			38			259
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	124	655	143	1055	695	387	224	624	1300	417	1489	259
Turn Type	Prot		Perm	Prot		Perm	Prot		pm+ov	Prot		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases			4			8			2			6
Detector Phase	7	4	4	3	8	8	5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0	22.0	10.0	22.0	10.0	10.0	22.0	22.0
Total Split (s)	24.0	31.0	31.0	47.0	54.0	54.0	15.0	32.0	47.0	30.0	47.0	47.0
Total Split (%)	17.1%	22.1%	22.1%	33.6%	38.6%	38.6%	10.7%	22.9%	33.6%	21.4%	33.6%	33.6%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	Min	None	None	Min	Min
Act Effct Green (s)	14.5	25.0	25.0	41.0	51.5	51.5	9.0	28.6	75.6	21.4	41.0	41.0
Actuated g/C Ratio	0.10	0.18	0.18	0.29	0.37	0.37	0.06	0.20	0.54	0.15	0.29	0.29
v/c Ratio	0.67	1.04	0.38	1.05	0.53	0.47	1.01	0.60	0.85	0.80	1.00	0.40
Control Delay	78.0	100.7	16.0	89.7	37.2	5.8	127.7	53.8	33.9	68.8	72.5	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	78.0	100.7	16.0	89.7	37.2	5.8	127.7	53.8	33.9	68.8	72.5	6.1
LOS	E	F	B	F	D	A	F	D	C	E	E	A
Approach Delay		84.5			57.5			49.5			63.9	
Approach LOS		F			E			D			E	
Queue Length 50th (ft)	110	~337	20	~538	262	9	~108	191	550	190	498	0
Queue Length 95th (ft)	177	#462	84	#672	337	85	#198	241	698	245	#612	65

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	150		200	200		200	330		350	370		400
Base Capacity (vph)	228	632	379	1005	1301	817	221	1039	1523	589	1489	647
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.54	1.04	0.38	1.05	0.53	0.47	1.01	0.60	0.85	0.71	1.00	0.40

Intersection Summary		
Area Type:	Other	
Cycle Length: 140		
Actuated Cycle Length: 140		
Natural Cycle: 130		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 1.05		
Intersection Signal Delay: 60.4		Intersection LOS: E
Intersection Capacity Utilization 96.7%		ICU Level of Service F
Analysis Period (min) 15		
~ Volume exceeds capacity, queue is theoretically infinite.		
Queue shown is maximum after two cycles.		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 4: Henry St & Queen Kaahumanu Hwy



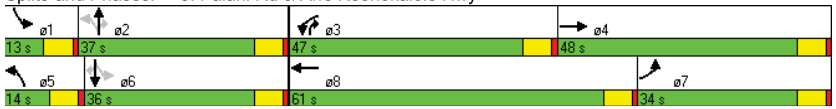
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	312	763	159	498	923	29	108	649	756	115	538	363
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	250		0	200		0	311		200
Storage Lanes	1		0	2		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	3392	0	2993	3082	0	1770	3539	1553	1770	3539	1583
Flt Permitted	0.950			0.950			0.167			0.135		
Satd. Flow (perm)	1770	3392	0	2993	3082	0	311	3539	1553	251	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			2				40			361
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1000			1000			1000	
Travel Time (s)		14.9			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	339	1002	0	541	1035	0	117	705	822	125	585	395
Turn Type	Prot			Prot			pm+pt		pm+ov	pm+pt		Perm
Protected Phases	7	4		3	8		5	2	3	1	6	
Permitted Phases							2		2	6		6
Detector Phase	7	4		3	8		5	2	3	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0		10.0	22.0		10.0	22.0	10.0	10.0	22.0	22.0
Total Split (s)	34.0	48.0	0.0	47.0	61.0	0.0	14.0	37.0	47.0	13.0	36.0	36.0
Total Split (%)	23.4%	33.1%	0.0%	32.4%	42.1%	0.0%	9.7%	25.5%	32.4%	9.0%	24.8%	24.8%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lag	Lag		Lead	Lead		Lead	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min	None	None	Min	Min
Act Effct Green (s)	30.1	42.0		41.0	52.9		38.6	30.6	77.6	36.6	29.6	29.6
Actuated g/C Ratio	0.21	0.29		0.28	0.37		0.27	0.21	0.54	0.25	0.20	0.20
v/c Ratio	0.92	1.00		0.64	0.92		0.71	0.94	0.96	0.91	0.81	0.65
Control Delay	86.6	79.4		49.4	56.7		63.5	77.2	54.4	99.0	64.5	12.4
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	86.6	79.4		49.4	56.7		63.5	77.2	54.4	99.0	64.5	12.4
LOS	F	E		D	E		E	E	D	F	E	B
Approach Delay		81.2			54.2			64.8			49.8	
Approach LOS		F			D			E			D	
Queue Length 50th (ft)	323	~501		231	477		83	347	700	89	278	26

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#529	#653		296	577		#135	#466	#1011	#195	351	135
Internal Link Dist (ft)		574			920			920			920	
Turn Bay Length (ft)				250			200			311		200
Base Capacity (vph)	369	998		848	1173		164	759	852	137	734	615
Starvation Cap Reductn	0	0		0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0		0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.92	1.00		0.64	0.88		0.71	0.93	0.96	0.91	0.80	0.64

Intersection Summary

Area Type: Other
Cycle Length: 145
Actuated Cycle Length: 144.6
Natural Cycle: 120
Control Type: Actuated-Uncoordinated
Maximum v/c Ratio: 1.00
Intersection Signal Delay: 62.8 Intersection LOS: E
Intersection Capacity Utilization 94.3% ICU Level of Service F
Analysis Period (min) 15
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy

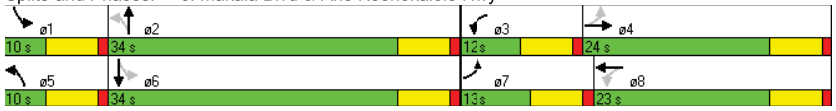


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	219	364	5	173	93	11	44	699	219	14	843	129
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	200		200	420		200	420		200
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1859	0	1770	1833	0	1770	3412	0	1770	3468	0
Flt Permitted	0.470			0.319			0.132			0.155		
Satd. Flow (perm)	875	1859	0	594	1833	0	246	3412	0	289	3468	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			7			57			23	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		847			873			1500			1000	
Travel Time (s)		19.3			19.8			34.1			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	238	401	0	188	113	0	48	998	0	15	1056	0
Turn Type	pm+pt			pm+pt			pm+pt			pm+pt		
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	10.0	22.0		10.0	22.0		10.0	22.0		10.0	22.0	
Total Split (s)	13.0	24.0	0.0	12.0	23.0	0.0	10.0	34.0	0.0	10.0	34.0	0.0
Total Split (%)	16.3%	30.0%	0.0%	15.0%	28.8%	0.0%	12.5%	42.5%	0.0%	12.5%	42.5%	0.0%
Yellow Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0	6.0	6.0	4.0
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		None	Min		None	Min	
Act Effct Green (s)	26.3	18.1		19.2	14.6		30.9	30.2		28.7	26.5	
Actuated g/C Ratio	0.35	0.24		0.26	0.20		0.42	0.41		0.39	0.36	
v/c Ratio	0.52	0.89		0.76	0.31		0.26	0.70		0.08	0.84	
Control Delay	23.7	53.0		40.4	26.8		15.2	20.9		12.3	30.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.7	53.0		40.4	26.8		15.2	20.9		12.3	30.0	
LOS	C	D		D	C		B	C		B	C	
Approach Delay		42.1			35.3			20.6			29.8	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	84	199		64	45		12	173		4	248	
Queue Length 95th (ft)	#151	#374		#116	89		30	299		13	#363	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		767			793			1420			920	
Turn Bay Length (ft)	200			200			420			420		
Base Capacity (vph)	459	455		249	429		185	1501		192	1333	
Starvation Cap Reductn	0	0		0	0		0	0		0	0	
Spillback Cap Reductn	0	0		0	0		0	0		0	0	
Storage Cap Reductn	0	0		0	0		0	0		0	0	
Reduced v/c Ratio	0.52	0.88		0.76	0.26		0.26	0.66		0.08	0.79	

Intersection Summary			
Area Type:	Other		
Cycle Length: 80			
Actuated Cycle Length: 74.3			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 29.8		Intersection LOS: C	
Intersection Capacity Utilization 79.8%		ICU Level of Service D	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

Splits and Phases: 6: Makala Blvd & Ane Keohokalole Hwy

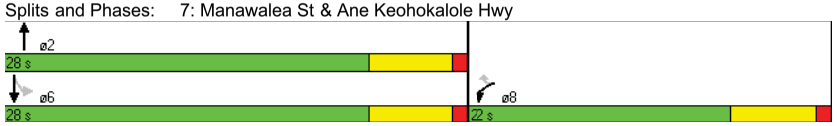


Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	180	52	708	222	69	806
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0	0		0	420	
Storage Lanes	1	1		0	1	
Taper Length (ft)	100	100		100	100	
Satd. Flow (prot)	1770	1583	3412	0	1770	3539
Flt Permitted	0.950				0.252	
Satd. Flow (perm)	1770	1583	3412	0	469	3539
Right Turn on Red		Yes		Yes		
Satd. Flow (RTOR)		57	106			
Link Speed (mph)	30		30			30
Link Distance (ft)	856		1000			500
Travel Time (s)	19.5		22.7			11.4
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	196	57	1011	0	75	876
Turn Type		Perm			Perm	
Protected Phases	8		2			6
Permitted Phases		8			6	
Detector Phase	8	8	2		6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0		4.0	4.0
Minimum Split (s)	22.0	22.0	22.0		22.0	22.0
Total Split (s)	22.0	22.0	28.0	0.0	28.0	28.0
Total Split (%)	44.0%	44.0%	56.0%	0.0%	56.0%	56.0%
Yellow Time (s)	5.0	5.0	5.0		5.0	5.0
All-Red Time (s)	1.0	1.0	1.0		1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	4.0	6.0	6.0
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	None	None	Min		Min	Min
Act Effct Green (s)	10.0	10.0	24.1		24.1	24.1
Actuated g/C Ratio	0.24	0.24	0.58		0.58	0.58
v/c Ratio	0.46	0.13	0.50		0.27	0.43
Control Delay	17.9	5.5	8.1		11.5	8.3
Queue Delay	0.0	0.0	0.0		0.0	0.0
Total Delay	17.9	5.5	8.1		11.5	8.3
LOS	B	A	A		B	A
Approach Delay	15.1		8.1			8.6
Approach LOS	B		A			A
Queue Length 50th (ft)	39	0	72		10	68
Queue Length 95th (ft)	87	19	143		41	130

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Internal Link Dist (ft)	776		920			420
Turn Bay Length (ft)					420	
Base Capacity (vph)	701	661	2089		281	2123
Starvation Cap Reductn	0	0	0		0	0
Spillback Cap Reductn	0	0	0		0	0
Storage Cap Reductn	0	0	0		0	0
Reduced v/c Ratio	0.28	0.09	0.48		0.27	0.41

Intersection Summary			
Area Type:	Other		
Cycle Length: 50			
Actuated Cycle Length: 41.5			
Natural Cycle: 50			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.50			
Intersection Signal Delay: 9.1		Intersection LOS: A	
Intersection Capacity Utilization 55.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 7: Manawalea St & Ane Keohokalole Hwy



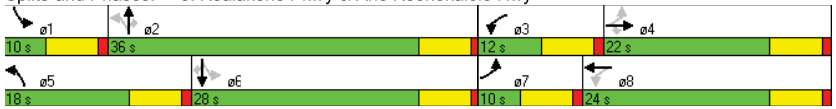
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	59	269	248	162	149	35	287	415	264	54	632	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	340		0	480		0	300		300	430		300
Storage Lanes	1		1	1		0	1		1	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	1770	1863	1583	1770	1809	0	1770	3539	1583	1770	3539	1583
Flt Permitted	0.632			0.295			0.191			0.491		
Satd. Flow (perm)	1177	1863	1583	550	1809	0	356	3539	1583	915	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			258		14				287			137
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			800			1000	
Travel Time (s)		22.7			22.7			18.2			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)												
Lane Group Flow (vph)	64	292	270	176	200	0	312	451	287	59	687	137
Turn Type	pm+pt		Perm	pm+pt			pm+pt		Perm	pm+pt		Perm
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2		2	6		6
Detector Phase	7	4	4	3	8		5	2	2	1	6	6
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0		10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	10.0	22.0	22.0	12.0	24.0	0.0	18.0	36.0	36.0	10.0	28.0	28.0
Total Split (%)	12.5%	27.5%	27.5%	15.0%	30.0%	0.0%	22.5%	45.0%	45.0%	12.5%	35.0%	35.0%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	4.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		None	Min	Min	None	Min	Min
Act Effct Green (s)	18.9	14.9	14.9	23.8	19.1		38.0	32.3	32.3	24.0	20.0	20.0
Actuated g/C Ratio	0.25	0.19	0.19	0.31	0.25		0.49	0.42	0.42	0.31	0.26	0.26
v/c Ratio	0.20	0.81	0.53	0.66	0.43		0.79	0.30	0.35	0.18	0.75	0.27
Control Delay	19.7	49.4	8.8	33.9	27.9		29.7	16.8	3.6	13.1	32.1	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	49.4	8.8	33.9	27.9		29.7	16.8	3.6	13.1	32.1	6.0
LOS	B	D	A	C	C		C	B	A	B	C	A
Approach Delay		28.9			30.7			17.0			26.8	
Approach LOS		C			C			B			C	
Queue Length 50th (ft)	21	139	5	62	81		89	83	0	14	162	0
Queue Length 95th (ft)	48	#261	66	#131	144		#208	120	47	33	222	39

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Internal Link Dist (ft)		920			920			720			920	
Turn Bay Length (ft)	340			480			300		300	430		300
Base Capacity (vph)	319	389	534	266	463		397	1483	830	329	1015	552
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.20	0.75	0.51	0.66	0.43		0.79	0.30	0.35	0.18	0.68	0.25

Intersection Summary	
Area Type:	Other
Cycle Length: 80	
Actuated Cycle Length: 77	
Natural Cycle: 70	
Control Type: Actuated-Uncoordinated	
Maximum v/c Ratio: 0.81	
Intersection Signal Delay: 24.2	Intersection LOS: C
Intersection Capacity Utilization 76.5%	ICU Level of Service D
Analysis Period (min) 15	

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

Splits and Phases: 8: Kealakehe Pkwy & Ane Keohokalole Hwy

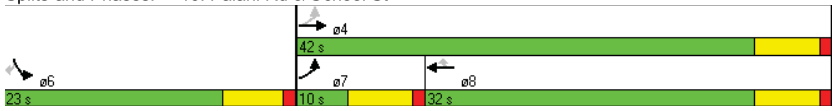


Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Volume (vph)	174	1448	1255	45	59	193
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200			400	0	0
Storage Lanes	1			1	1	1
Taper Length (ft)	100			100	100	100
Satd. Flow (prot)	1770	3539	3539	1583	1770	1583
Flt Permitted	0.125				0.950	
Satd. Flow (perm)	233	3539	3539	1583	1770	1583
Right Turn on Red				Yes		Yes
Satd. Flow (RTOR)				49		154
Link Speed (mph)		30	30		30	
Link Distance (ft)		1000	1000		500	
Travel Time (s)		22.7	22.7		11.4	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Shared Lane Traffic (%)						
Lane Group Flow (vph)	189	1574	1364	49	64	210
Turn Type	pm+pt			Perm		Perm
Protected Phases	7	4	8		6	
Permitted Phases	4			8		6
Detector Phase	7	4	8	8	6	6
Switch Phase						
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	22.0	22.0	22.0
Total Split (s)	10.0	42.0	32.0	32.0	23.0	23.0
Total Split (%)	15.4%	64.6%	49.2%	49.2%	35.4%	35.4%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead		Lag	Lag		
Lead-Lag Optimize?	Yes		Yes	Yes		
Recall Mode	None	None	None	None	Min	Min
Act Effct Green (s)	36.1	36.1	26.1	26.1	8.4	8.4
Actuated g/C Ratio	0.64	0.64	0.46	0.46	0.15	0.15
v/c Ratio	0.73	0.70	0.84	0.06	0.24	0.57
Control Delay	27.0	9.3	20.5	3.9	23.1	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.0	9.3	20.5	3.9	23.1	14.1
LOS	C	A	C	A	C	B
Approach Delay		11.2	20.0		16.2	
Approach LOS		B	B		B	
Queue Length 50th (ft)	20	140	191	0	19	17
Queue Length 95th (ft)	#90	280	#376	16	48	67

Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Internal Link Dist (ft)		920	920		420	
Turn Bay Length (ft)	200			400		
Base Capacity (vph)	258	2260	1632	756	534	585
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.70	0.84	0.06	0.12	0.36

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 56.5			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 15.2		Intersection LOS: B	
Intersection Capacity Utilization 62.7%		ICU Level of Service B	
Analysis Period (min) 15			
# 95th percentile volume exceeds capacity, queue may be longer.			
Queue shown is maximum after two cycles.			

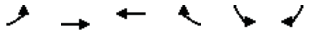
Splits and Phases: 10: Palani Rd & School St



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	0	74	891	98	0	1016
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	80	968	107	0	1104
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (ft)			1000			
pX, platoon unblocked	0.82	0.82			0.82	
vC, conflicting volume	1574	538			968	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1254	0			513	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	91			100	
cM capacity (veh/h)	134	886			857	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	80	646	429	552	552
Volume Left	0	0	0	0	0
Volume Right	80	0	107	0	0
cSH	886	1700	1700	1700	1700
Volume to Capacity	0.09	0.38	0.25	0.32	0.32
Queue Length 95th (ft)	7	0	0	0	0
Control Delay (s)	9.5	0.0	0.0	0.0	0.0
Lane LOS	A				
Approach Delay (s)	9.5	0.0		0.0	
Approach LOS	A				

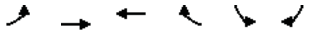
Intersection Summary				
Average Delay		0.3		
Intersection Capacity Utilization		39.0%	ICU Level of Service	A
Analysis Period (min)		15		



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↱		↱
Volume (veh/h)	0	1507	1269	17	0	30
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1638	1379	18	0	33
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (ft)		1000				
pX, platoon unblocked					0.65	
vC, conflicting volume	1398				2198	690
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1398				1767	690
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	92
cM capacity (veh/h)	485				49	388

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	819	819	690	690	18	33
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	18	33
cSH	1700	1700	1700	1700	1700	388
Volume to Capacity	0.48	0.48	0.41	0.41	0.01	0.08
Queue Length 95th (ft)	0	0	0	0	0	7
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	15.1
Lane LOS						C
Approach Delay (s)	0.0		0.0			15.1
Approach LOS						C

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization	45.1%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↑↑	↑↑	↱		↱
Volume (veh/h)	0	1507	1271	42	0	15
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	1638	1382	46	0	16
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	1427				2201	691
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1427				2201	691
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				100	96
cM capacity (veh/h)	472				38	387

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1
Volume Total	819	819	691	691	46	16
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	46	16
cSH	1700	1700	1700	1700	1700	387
Volume to Capacity	0.48	0.48	0.41	0.41	0.03	0.04
Queue Length 95th (ft)	0	0	0	0	0	3
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	14.7
Lane LOS						B
Approach Delay (s)	0.0		0.0			14.7
Approach LOS						B

Intersection Summary				
Average Delay		0.1		
Intersection Capacity Utilization	45.1%	ICU Level of Service		A
Analysis Period (min)	15			

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	710	688	199	199	294	193	408	832	60	392	1434	574
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		300	300		300	400		400	400		400
Storage Lanes	2		1	2		1	2		1	2		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3367	3539	1583	3433	3539	1553	3433	4988	1583	3335	4940	1538
Flt Permitted	0.950			0.950			0.950			0.950		
Satd. Flow (perm)	3367	3539	1583	3433	3539	1553	3433	4988	1583	3335	4940	1538
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			216			210			65			474
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		1000			1000			1000			1000	
Travel Time (s)		22.7			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	4%	2%	2%	2%	2%	4%	2%	4%	2%	5%	5%	5%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	772	748	216	216	320	210	443	904	65	426	1559	624
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Perm
Protected Phases	7	4		3	8		1	6		5	2	
Permitted Phases			4			8			6			2
Detector Phase	7	4	4	3	8	8	1	6	6	5	2	2
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	10.0	10.0	10.0	22.0	22.0	10.0	22.0	22.0
Total Split (s)	35.0	37.0	37.0	17.0	19.0	19.0	24.0	42.0	42.0	29.0	47.0	47.0
Total Split (%)	28.0%	29.6%	29.6%	13.6%	15.2%	15.2%	19.2%	33.6%	33.6%	23.2%	37.6%	37.6%
Yellow Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag	Lead	Lag	Lag
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None	None	None	None	None	None	None	None
Act Effct Green (s)	29.0	31.3	31.3	10.7	13.0	13.0	17.8	38.5	38.5	20.4	41.0	41.0
Actuated g/C Ratio	0.23	0.25	0.25	0.09	0.10	0.10	0.14	0.31	0.31	0.16	0.33	0.33
v/c Ratio	0.99	0.84	0.39	0.73	0.87	0.60	0.90	0.59	0.12	0.78	0.96	0.76
Control Delay	77.1	54.5	7.0	70.8	78.5	14.6	75.5	38.8	8.3	60.7	56.2	15.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	77.1	54.5	7.0	70.8	78.5	14.6	75.5	38.8	8.3	60.7	56.2	15.5
LOS	E	D	A	E	E	B	E	D	A	E	E	B
Approach Delay		58.6			58.3			48.9			47.2	
Approach LOS		E			E			D			D	
Queue Length 50th (ft)	322	304	0	89	136	0	184	227	0	171	452	104

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#454	#389	62	#138	#217	75	#276	281	34	224	#558	269
Internal Link Dist (ft)		920			920			920			920	
Turn Bay Length (ft)	300		300	300		300	400		400	400		400
Base Capacity (vph)	782	887	559	302	368	350	495	1537	533	615	1622	823
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.99	0.84	0.39	0.72	0.87	0.60	0.89	0.59	0.12	0.69	0.96	0.76

Intersection Summary		
Area Type:	Other	
Cycle Length: 125		
Actuated Cycle Length: 124.8		
Natural Cycle: 100		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.99		
Intersection Signal Delay: 51.9	Intersection LOS: D	
Intersection Capacity Utilization 87.7%	ICU Level of Service E	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

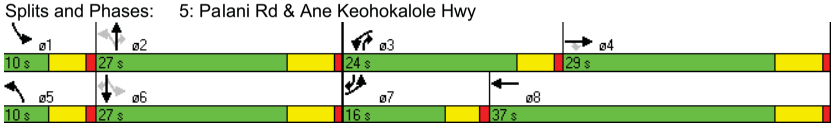
Splits and Phases: 2: Makala Blvd & Queen Kaahumanu Hwy

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	312	763	159	498	923	29	108	649	756	115	538	363
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	200		200	400		400	200		400	200		200
Storage Lanes	2		1	2		0	1		2	1		1
Taper Length (ft)	100		100	100		100	100		100	100		100
Satd. Flow (prot)	3433	3471	1583	2993	3082	0	1770	3539	2733	1770	3539	1583
Flt Permitted	0.950			0.950			0.258			0.195		
Satd. Flow (perm)	3433	3471	1583	2993	3082	0	481	3539	2733	363	3539	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)			168		4				92			68
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		654			1000			1000			1000	
Travel Time (s)		14.9			22.7			22.7			22.7	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	2%	4%	2%	17%	17%	2%	2%	2%	4%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	339	829	173	541	1035	0	117	705	822	125	585	395
Turn Type	Prot		Perm	Prot			pm+pt		pm+ov	pm+pt		pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases			4				2		2	6		6
Detector Phase	7	4	4	3	8		5	2	3	1	6	7
Switch Phase												
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		3.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	10.0	22.0	22.0	10.0	22.0		10.0	22.0	10.0	10.0	22.0	10.0
Total Split (s)	16.0	29.0	29.0	24.0	37.0	0.0	10.0	27.0	24.0	10.0	27.0	16.0
Total Split (%)	17.8%	32.2%	32.2%	26.7%	41.1%	0.0%	11.1%	30.0%	26.7%	11.1%	30.0%	17.8%
Yellow Time (s)	4.0	5.0	5.0	4.0	5.0		4.0	5.0	4.0	4.0	5.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	6.0	6.0	5.0	6.0	4.0	5.0	6.0	5.0	5.0	6.0	5.0
Lead/Lag	Lead	Lag	Lag	Lead	Lag		Lead	Lag	Lead	Lead	Lag	Lead
Lead-Lag Optimize?												
Recall Mode	None	None	None	None	None		Min	Min	None	None	Min	None
Act Effct Green (s)	10.9	23.3	23.3	18.6	31.0		26.5	20.5	45.1	26.5	20.5	37.4
Actuated g/C Ratio	0.12	0.26	0.26	0.21	0.35		0.30	0.23	0.50	0.30	0.23	0.42
v/c Ratio	0.81	0.92	0.32	0.87	0.97		0.54	0.87	0.58	0.67	0.72	0.56
Control Delay	54.7	48.9	6.7	50.4	50.5		31.5	46.0	15.4	41.3	37.6	19.8
Queue Delay	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.7	48.9	6.7	50.4	50.5		31.5	46.0	15.4	41.3	37.6	19.8
LOS	D	D	A	D	D		C	D	B	D	D	B
Approach Delay		44.9			50.5			29.7			31.7	
Approach LOS		D			D			C			C	
Queue Length 50th (ft)	98	242	2	153	301		45	202	153	49	161	136

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#165	#360	51	#239	#442		85	#295	214	#93	220	226
Internal Link Dist (ft)		574			920			920			920	
Turn Bay Length (ft)	200		200	400			200		400	200		200
Base Capacity (vph)	423	905	537	636	1071		215	831	1436	186	831	704
Starvation Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0		0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.92	0.32	0.85	0.97		0.54	0.85	0.57	0.67	0.70	0.56

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 89.4		
Natural Cycle: 90		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.97		
Intersection Signal Delay: 39.5	Intersection LOS: D	
Intersection Capacity Utilization 78.0%	ICU Level of Service D	
Analysis Period (min) 15		
# 95th percentile volume exceeds capacity, queue may be longer.		
Queue shown is maximum after two cycles.		

Splits and Phases: 5: Palani Rd & Ane Keohokalole Hwy



APPENDIX E MARKET STUDY, ECONOMIC ANALYSIS, AND PUBLIC COSTS/BENEFITS ASSESSMENT

Market Study,
Economic Impact Analysis, and
Public Costs/Benefits Assessment
of the

PROPOSED KAMAKANA VILLAGES AT KEAHUOLU COMMUNITY

Keahuolu, North Kona, Hawaii

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October 22, 2009

Mr. Race Randle
Forest City
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Honolulu, Hawaii 96818

Market Study, Economic Impact Analysis, and
Public Costs/Benefits Assessment of the Proposed
Kamakana Villages at Keahuolu Community
Keahuolu, North Kona, Hawaii

Dear Mr. Randle:

At your request, we have completed a series of market and econometric analyses associated with Kamakana Villages at Keahuolu, a proposed master-planned community to be located on 272.1 acres adjacent to the existing central Kailua-Kona urban area, in North Kona, Hawaii. The mixed-use residential and commercial project which will extend northerly from Palani Road, about one mile mauka of town, will include 2,330 residential units (single- and multi-family, affordable and market-priced), along with 197,000 square feet of commercial floor space, school sites, community facilities, utility areas, and extensive open space and archeological preserves.

Our study was primarily comprised of three elements:

1. **Market Study**. To ascertain whether there will exist sufficient demand in the greater Kailua-Kona residential and commercial real estate markets to successfully absorb the finished subject inventory in a timely manner given its characteristics and those of competing in-place and proposed regional development.

2. **Economic Impact Analysis**. To estimate the general and specific effects on the local economy which will result from the development of Kamakana Villages, including: construction and operating employment, wages and income; business profits; end-user expenditures; and other regional monetary and employment effects. And, to identify and determine specific effects associated with regional real property issues including population, affordable housing stock and property values.

3. **Public Cost/Benefit Assessment**. To quantify the impact on the public purse arising from the subject project in regards to tax/fee revenues which will be received by the State of Hawaii and Hawaii County due to the project's actualization, versus the implied costs of providing needed governmental services to the population of the development.

The subject property, identified on State of Hawaii Tax maps as Third Division Tax Map Key 7-4-21, Parcel 20, varies from gently to moderately sloping, has a desirable arid, generally mild with moderate wind climate, and offers superior ocean and mountain views. The site is irregularly-shaped, has extensive frontage along Palani Road and the soon-to-be constructed initial section of Ane Keohokalole Highway and runs from about the 250-foot elevation up the westerly flank of Hualalai to the 600-foot level. A mix of vacant lands and residential and educational uses abut the holding which is within the greater Kailua-Kona urban sphere.

As envisioned in the master plans developed by Group 70 International, Inc. and Calthorpe Associates in conjunction with Forest City and the Hawaii Housing Financing and Development Corporation, Kamakana Villages at Keahuolu will be a comprehensively-serviced, residential-oriented development containing 1,669 multifamily units (1,137 affordable and 532 market-priced), 661 single family homes (630 market and 31 affordable-priced), up to 197,000 square feet of commercial space, 12 acres of school sites, 30 acres of improved parks, over 27 acres of open and preserves spaces, and a variety of community features. With more than half of the units being dedicated to workforce housing/affordable units for local families, along with a variety of moderate market product types, full-time Big Island residents will comprise a primary target demographic for the project. Non-resident purchasers are anticipated to comprise only a minor group.

The pertinent results from our studies are presented within the following summary report, which focuses on a series of tables and models with brief narrative describing the research, analytical process and conclusions.

As part of our investigation program, we have viewed the subject property and its environs, researched the West Hawaii residential and commercial real property market sectors, interviewed knowledgeable parties active in the regional economy, reviewed government statistics, policies and publications, accessed on-line data bases, and compiled materials from published and private sources.

All conclusions presented herein are subject to the identified limiting conditions, assumptions and certifications of The Hallstrom Group, Inc., in addition to any others specifically set forth in the text. All work has been completed in conformance with the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute, and the Uniform Standards of Professional Appraisal Practice (USPAP).

Based on our investigation and analysis, we have concluded (all figures in 2009 dollars):

- There will be meaningful amounts of unmet demand for housing units in the Greater Kailua-Kona study area relative to proposed supply over the coming two decades despite the current down cycle status of island real estate and the number of preliminarily proposed projects.

- Kamakana Villages will have the attributes necessary to be strongly competitive in the regional residential sector by offering a wide-spectrum of pricing and unit types; particularly among those households with incomes at less than 140 percent of regional averages, a segment that is poorly serviced in the market. The 400 proposed affordable/workforce rental apartments will specifically address a chronic and destabilizing shortfall in the region.

- The community residents, as well as persons from neighboring subdivisions, area workers and intercept/passer-by customers, will create sufficient patronage to support the proposed commercial component of the project.

- We forecast the proposed 2,330 units of residential product will be fully absorbed within 18 years of offering; from commencement of pre-sales in 2011 until sell-out by 2028. The affordable-priced residences, comprising half the total number of homes, would sell-out more quickly, but the supply of inventory is limited by the infrastructure phasing process. The 197,000 square feet of neighborhood commercial space in the master plan should also be fully leased and operational within the projected absorption period.

- Construction of the community will provide some $734 million in investment into the Big Island economy, creating more than 11,000 "worker-years" of jobs during development and more than 900 full-time-equivalent stabilized employment positions after completion.

- The de facto population of Kamakana Villages at build-out will be 5,302 persons, of which circa 1,144 will be attending public school. The aggregate gross household income within the project will be $232 million annually, and on-site business activity will be some of $143 million per year.

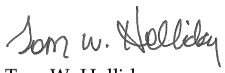
- The County of Hawaii will receive tax receipts of almost $7 million annually in real property taxes from the development. This is three-quarters of the cost to provide comprehensive County services to the community on a per capita contribution basis.

- The State of Hawaii will receive some $26.2 million per year in income and gross excise taxes, which is 90 percent of the cost to provide full State services to Kamakana Villages using an equitable per capita contribution allowance.

We appreciate the opportunity to be of service in regards to this well-located holding and significant project. Please contact us if further discussion or detail is required.

Respectfully submitted,

THE HALLSTROM GROUP, INC.



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THE HALLSTROM GROUP INC.
REAL ESTATE CONSULTANTS & APPRAISERS

Market Study,
Economic Impact Analysis, and
Public Costs/Benefits Assessment
of the

PROPOSED KAMAKANA VILLAGES AT

KEAHUOLU COMMUNITY

Located at

Keahuolu, North Kona, Hawaii

Prepared for

Forest City Hawaii, Kona, LLC

October 2009

ARBITRATION
VALUATION AND
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ASSIGNMENT AND PRESENTATION

Assignment

The Kamakana Villages at Keahuolu community will comprise approximately 272.1 acres of vacant lands located on the westerly flank of Hualalai, northerly-fronting Palani Road, approximately one mile northerly/mauka of central Kailua-Kona.

The subject property, identified on State of Hawaii Tax maps as Third Division Tax Map Key 7-4-21, Parcel 20, is moderately sloping, has a desirable arid, generally mild and calm climate, and offers superior ocean and mauka views. The site is irregularly-shaped, has extensive frontage along Palani Road and the soon-to-be constructed initial section of Ane Keohokalole Highway and runs from about the 250-foot elevation up the westerly flank of Hualalai to the 600-foot level. A mix of vacant lands and existing and proposed urban uses are in close proximity to the holding which is within the Greater Kailua-Kona economic sector and anticipated long-term urban environment.

The subject development is intended to be a leading edge master planned, sustainable, mixed-use community offering a spectrum of purchase opportunities for resident families within a development providing a comprehensive neighborhood lifestyle.

As envisioned in the master plans developed by Group 70 International, Inc. and Calthorpe Associates, in conjunction with Forest City and the Hawaii Housing Finance and Development Corporation, Kamakana Villages at Keahuolu will be a full-service, residential-oriented development containing 1,669 multifamily units (1,137 affordable and 532 market-priced), 661 single family homes (630 market and 31 affordable-priced), up to 197,000 square feet of commercial (retail and service/office) space, 12 acres of school sites, 30 acres of improved parks, over

27 acres of open and preserves spaces, and a variety of community features.

The workforce/affordable units will include up to 400 rental apartments for households having income at 140 percent or less than the West Hawaii median level, and 737 for-sale condominium units priced for households between the 80 percent and 140 percent median income mark. Offering a rare opportunity in the region, up to 31 single family homes will also be sold within the affordable pricing parameters.

If there is sufficient market demand, the underlying site will be transformed from a vacant bulk acreage holding having limited agricultural use potentials and nominal regional economic benefit, into an asset providing a meaningful number of much needed affordable/workforce housing units within modern neighborhoods, producing thousands of "worker years" of employment and wages, and attracting significant new capital investment during a recovery period.

Given its location in the Greater Kailua-Kona urban sphere, abutting/nearby land uses and evident planning and market trends, the proposed subject project (or a similar master planned development) is a "natural" outcome for the property, and is representative of a highest and best use of the holding.

The Hallstrom Appraisal Group, Inc., assignment was to analyze the proposed Kamakana Villages at Keahuolu community from a real estate perspective and to identify and quantify probable market and economic impacts associated with the master plan in light of competitive, regional, prevailing and forecast trends in order to answer four basic study questions:

1. Is there sufficient demand to absorb the various "marketable" components of the subject project during a reasonable exposure period given competing developments and projected statewide/regional market trends?

2. Will the subject be an appropriate use of the underlying site relative to market needs, standard land planning objectives, accepted master plan design characteristics, and the area environs?

3. What will be the general/specific and direct/indirect economic impacts on the Big Island resulting from the undertaking of the subject development via employment, wages, business operations, population, property values and other economic activity related to the real property asset?

4. What will be the effect on the state and county "public purse" from the project in regards to costs of services required to service the Kamakana Villages population versus increased primary tax/fee receipts?

These issues were addressed through a comprehensive research and inquiry process utilizing data from market investigation, governmental agencies, various Hawaii-based media, industry spokespersons/sources, on-line databases, and published public and private documents.

The indicators from our investigation and analysis were used to generate a series of models depicting the multi-decade "lifespan" of the subject project from ground-breaking through sales/build-out until the community reaches long-term stabilization. The models forecast absorption of the residential and commercial components based on their probable standing in the competitive market, the major economic and demographic impacts resulting from the development, and the public costs/benefits associated with its services.

Presentation

Our presentation opens with an ***Executive Summary*** highlighting the most pertinent results and forecasts of our study with concise narrative and two summary tables.

The remainder of the report is divided into seven tabular-oriented sections containing the primary data, analyses and modeling which generated our conclusions. Significant additional and supporting materials are on file.

1. **Economic Outlook and Regional Overview**

2. **The Subject Property and Proposed Project**

3. **Market Study of the Greater Kailua-Kona Residential Sector**

3. **Appropriateness of the Subject for Residential Use and Absorption Estimates**

5. **Quantification of Demand for Subject Commercial Uses**

6. **Analysis of the Economic Impacts of the Proposed Development**

7. **Assessment of the Public Costs/Benefits Associated With the Project**

The primary source information regarding the subject used in our study were maps, master plans, unit counts, density estimates and background materials provided by Group 70 International, Forest City and other members of the development team. The current Kona Community Development Plan and other State and County publications about West Hawaii were instrumental in our study, as were data from our files from numerous similar assignments completed in North Kona over the past three decades.

EXECUTIVE SUMMARY

Based on our analysis of the subject property, its environs, and envisioned development we have reached the following conclusions as of October 16, 2009 regarding the probable market standing and economic impacts of the proposed Kamakana Villages at Keahuolu community.

Economic Outlook

Although Hawaii is in the midst of a cyclical recession resulting in a down real estate market, the initial signs of stabilization and

the potentials for recovery are beginning to appear. Available mortgages at low interest rates, natural household growth, and pent up demand will again express itself via real estate as the island economy regains its vigor over the mid-term; an economic cycle which has been numerously repeated since Statehood.

Expectations are statewide real estate activity will show modest gains in 2010, albeit at lower prices and absorption levels than mid-decade highs, followed by movement towards the next growth cycle by 2011-12. Based on historic trending, by the mid to latter part of this decade hyper-appreciation and shortages of supply will again become concerns.

West Hawaii has been among the hardest hit regions in the islands during the recent recession, with tourism off by more than 20 percent, unemployment reaching double digits, household income and spending down several points, and numerous business closures. The affect of the slowdown has led to major declines in regional real estate sectors in regards to prices and transactions. Yet, there remains some on-going construction activity, several major projects are continuing to move forward, and there is a general feeling the bottom of the down cycle has been all but reached and stabilization is expected in 2010-11. It is anticipated the recovery of West Hawaii will lag behind that of the mainland and subsequently Oahu by several quarters to a year, but be into a recovery mode by 2011-12.

Regardless of the near-term issues, the extended and inexorable evolution of West Hawaii from an agrarian to a modern, urban, service and visitor-oriented society creates a foundation for a continuing need for a variety of urban, suburban, resort and rural land uses. As long as sufficient infrastructure, support systems and properties are made available, the natural growth of the Big Island's resident population, coupled with the world-wide demand for West Hawaii properties, will fuel market activity.

During the build-out period of Kamakana Villages there could be several economic/market cycles with periods of rapid

absorption and others stagnant. But the mid to long-term averages demonstrate a continuing market expansion in West Hawaii; a steady (if periodically erratic) upward continuum that forms the context in which the subject inventory will compete.

And, despite the current recession, there persists a chronic shortage of competitive quality, affordably-priced housing in Greater Kailua-Kona. This residential sector, which is critical to the sustainability of a community, is a specific target category for half the subject product.

The Greater Kailua-Kona Residential Market

The resident population of West Hawaii is forecast to increase by about 60 percent over the next two decades, reaching some 118,000 persons. In Greater Kailua-Kona, the primary study area stretching from Keahole to Keauhou, the resident population is projected to grow from a current level of just over 23,000 to circa 40,000 persons by 2030.

These additional residents will primarily result from the natural growth of existing Big Island families, with secondary contributors being intra-state migration from other islands, and in-migration of mainland and foreign persons. Non-resident purchasers will also be active in the market.

Combined, these persons will create demand for some 7,560 to 10,162 new housing units in Greater Kailua-Kona during the 2010 through 2030 projection period (mid-point of 8,861 units). About 44 percent of this demand will be for resident/workforce housing units meeting affordable pricing guidelines. Non-resort multifamily units will comprise an increasing percentage of the housing stock.

The presently down status of the study area residential market, is exacerbated by the current disconnect between demand segments and supply prices. There are interested buyers in the lower to middle segments but, despite declining prices, the available inventory remains beyond their reach. As the economy stabilizes and credit becomes more readily available, this demand will again be expressed.

Fortunately, there is less of an unsold product overhang in West Hawaii than during past recessionary periods.

We project it will take another year-plus (late 2010 through 2011) for the West Hawaii residential market to stabilize and begin moving into an upward trending environment, with full recovery and upcycle indicators by mid to late decade. By then, tourism will have rebounded, as will business creation and employment, with development capital and investment flowing again into the region.

There are significant numbers of potential residential units for North Kona which have applied for entitlements, been proposed, announced or otherwise discussed in the market, with nearly 11,000 units in major developments and another 1,200 in smaller projects.

However, few of the holdings have obtained entitlements, several of the proposed larger undertakings are not moving forward at this time, and others are for sale. Additionally, none of the proposed/discussed projects are expected to include as large an affordable priced component as Kamakana Villages (at over half of the total inventory).

We estimate that a maximum of 5,858 could reasonably be built in the study area by 2030, apart from the subject community.

The shortfall of housing units in Greater Kailua-Kona during the coming two decades, without Kamakana Villages, will range from a minimum of 1,700 units to upwards of 4,300 units (mid-point of 3,000).

The affordable-priced sector will continue to be the most underserviced during the study period, with the presently envisioned supply being only about half of the quantified demand.

Appropriateness of the Proposed Development

The subject property has a superior location for the proposed development in regards to its physical characteristics. The site has extensive frontage on Palani Road and the soon-to-be-constructed initial stretch of Ane Keohokalole Highway, which

will enable ease of access; regional infrastructure systems are available in the vicinity; and, the makai and mauka panoramas are highly desirable as is the climate.

The holding is also favorable from a market perspective. Nearby existing development is complimentary; it is proximate to supporting services, employment and businesses in central Kailua-Kona; and, is in an area the market considers as having urban use potentials.

The proposed master planned community will be among the first major self-contained projects in Greater Kailua-Kona oriented towards resident working families. In place of the piece-meal subdivision and limited amenity smaller developments which have traditionally provided most of the affordable and low-market priced housing stock in the area, Kamakana Villages will offer a sustainable environment with schools, parks, neighborhood retail businesses and services, and open spaces and preserves.

The subject property and proposed development will have the attributes necessary to be highly competitive in all its product sectors, and will capture a reasonable market share during its offering period. We consider the envisioned land use design to be exemplary of the current highest and best use potentials of the holding.

Subject Product Absorption Estimates

We have estimated the probable market acceptance levels and resulting absorption of the 2,330 housing units within Kamakana Villages using three methodologies.

- Gross Demand/Supply Comparison -- This technique assumes that if there is insufficient existing and planned supply to meet projected market gross demand levels during the projection period, the proposed subject lots and units will be absorbed in a reasonable manner, regardless of competitive qualities, as there are no other alternatives available. Application of the method indicates the subject units will be successfully absorbed within the 2010 through 2030 projection time-frame.

- The Residual Method -- In this technique, the competitive inventory planned for the study area over the projection period are placed on a time-line depicting their combined anticipated rates of absorption or assuming a reasonable market share. To the extent this supply of units falls short of the forecast demand for product in the study region or exceeds the total, a respective undersupply or oversupply situation is present. Application of this method indicates the subject inventory will require from 11 to more than 20 years to achieve sell-out, with the mid-point analysis at just over 17 years.

- The Market Shares Method -- This approach accounts for the probable competitiveness of the subject inventory regardless of the total level of product being otherwise offered on the market. In essence, it is an estimate of how much of the total forecast demand in the Greater Kailua-Kona residential sectors the subject could expect to capture on an annual basis in light of it's locational, pricing and amenity characteristics. This modeling technique provides a mid-point estimate for full subject absorption of 15.8 years of sales.

If sufficient inventory could be constructed in a timely manner, we conclude the 2,330 housing units of Kamakana Villages could be absorbed within a 16 to 17 year offering period commencing in 2011 as the initial infrastructure is being emplaced. The affordable-priced component would be absorbed faster than market-prices units.

However, due to infrastructure phasing issues, it is forecast that full implementation of the master plan will require six phases stretching over a total of some 19 years from ground-breaking in 2010-011 to build-out in 2028. We have extended our product absorption projections marginally (to 18 years) in order to reflect the phasing process.

The residents of Kamakana Villages will generate a demand for more than 110,000 square feet of proximate Neighborhood Commercial floor space comprised of retail, restaurant, service/support, business/office and medical uses based on

regional and statewide spatial demand trends. Additionally, subject commercial development would receive patronage from employees and day workers in the community, nearby residents in un-serviced subdivisions, and passer-bys and intercept customers.

We project the 197,000 square foot commercial component of the subject master plan can achieve full lease-up and operation within the project time-frame extending to 2028.

Our annualized mid-point absorption estimates for the subject product, as nominally adjusted to generally reflect master planning phasing expectations, are summarized on Table A. We again note there is market support for a slightly shorter absorption period than provided through the current phasing plan.

Economic Impacts from Development

Kamakana Villages will generate more than $734.4 million in capital investment into the Big Island economy.

The construction and on-going operations/maintenance of the single family homes, multi-family units, commercial village businesses, and community facilities will provide an estimated 11,131 "worker-years" of employment and $505 million in total wages over a 19-year build-out period. After completion the community will support some 933 permanent full-time-equivalent jobs with an annual payroll of about $35 million, and host an estimated $143 million in economic activity per year.

The major economic impacts and public costs/benefits (fiscal) conclusions associated with the subject project from ground-breaking in 2010 through build out and "stabilization" in 2028 are summarized on Table B. The column on the left summarizes the cumulative impacts during the initial 19-year construction and sales period, and the right hand column the annual impacts thereafter. All figures are expressed in constant 2009 dollars.

At build-out the de facto population of the project will be some 5,302 persons of which 5,139 (or 97 percent) will be full-time residents, with 1,144 being school-age children.

TABLE B

SUMMARY COMPARISON OF MAJOR ECONOMIC IMPACTS
AND PUBLIC COSTS/BENEFITS
Market Study of the Kamakana Villages Community
<u>Keahuolu, North Kona, Hawaii</u>
All Amounts Expressed in Constant, Uninflated 2009 Dollars

Analysis Item	Cumulative During 19-Year Build-Out/Absorption Period	Stabilized Annually Thereafter
Direct Capital Investment	$734,471,953	
Local Contractor's Profits	$73,447,195	
Local Supplier's Profits	$27,833,296	
Worker Years of Jobs	11,131	933
Employee Wages	$505,396,983	$34,820,827
De Facto Owner/Guest Population		5,302
School-Age Children (Using DOE Formula)		1,144
Full-Time Resident Household Income	$2,109,325,932	$232,141,392
Owners/Guest Expenditures (On & Off Site)	$1,388,005,609	$154,129,385
Total Operating Gross Receipts	$1,121,473,000	$142,903,000
Outside Patronage Expenditures	$475,305,600	$60,676,000
Total Big Island "Base" Economic Impact	$2,460,748,683	$249,626,212
Total Overall Statewide Economic Impact	$4,921,497,366	$499,252,424
County of Hawaii Gross Tax Receipts	$62,056,155	$6,837,724
State of Hawaii Gross Tax Receipts	$279,836,928	$26,169,043
County of Hawaii Costs of Services (per Capita)	$81,682,483	$9,015,127
State Costs of Services (per Capita)	$256,798,369	$28,342,307
County of Hawaii Net Benefits or (Loss)	($19,626,328)	($2,177,404)
State Net Benefits or (Loss)	$23,038,559	($2,173,265)

Source: The Hallstrom Group, Inc.

TABLE A

SUMMARY OF SUBJECT ABSORPTION PROJECTIONS BY PRODUCT TYPE
Market Study of the Kamakana Villages Community
<u>Keahuolu, North Kona, Hawaii</u>
Using Rounded Mid-Point Demand Estimates, Adjusted to Reflect Master Plan Phasing

Year		Development Phase	Residential: MF-Affordable (2)	MF-Market	SF - Affordable (2)	SF - Market	Total	Commercial (1) (in Sq. Ft.)
2011	(3)	Site Work	60	20		20	100	
2012	(4)	1	65	25	3	25	118	
2013		1	65	25		25	115	30,000
2014		1	65	25		25	115	12,000
2015		2	80	30	6	25	141	13,000
2016		2	80	30		25	135	12,000
2017		2	80	30		25	135	
2018		2	80	30		25	135	
2019		3	40	30	9	25	104	16,000
2020		3	40	30		35	105	16,000
2021		3	40	30		35	105	
2022		4	65	30	8	35	138	
2023		4	65	30		40	135	
2024		4	65	30		40	135	
2025		5	80	35	4	45	164	
2026		5	80	35		50	165	
2027		6	50	35	1	65	151	65,000
2028		6	37	32		65	134	33,000
Totals			**1,137**	**532**	**31**	**630**	**2,330**	**197,000**
Average Annual Rate of Absorption During Sales Period			**63 Units**	**30 Units**	**5 Homes**	**35 Homes**	**129 Units/Homes**	**14,071 Gross Sq. Ft.**

(1) This component is designed to provide for mixed commercial and residential use. For purposes of this assignment it is assumed that such sites will be used for commercial space with overall average Floor Area Ratio of .about .24. The speed of absorption reflects the master plan phasing, and could be faster than shown based on market support.
(2) Demand for the "affordable"-priced product is substantial and the 1,168 units/homes could be absorbed faster via higher annual sales levels if sufficient product were made available in a timely manner. The absorption speed reflected syncs with the phasing of the master plan.
(3) Initial pre-sales begin during 2011.
(4) First units are completed and closed in 2012.

Source: Forest City and The Hallstrom Group, Inc.

While Kamakana Villages is being developed solely to meet Big Island resident family housing needs, it is inevitable that some of the market-priced units will end up under non-resident ownership for part-time/second home use. Although expected to be minimal within the subject community, their economic impact is notable. As such, there will also be an average of 163 persons daily populating the community comprised of non-resident owners and their guests periodically using their "second" unit/home.

The total resident household income will be $232 million annually on a stabilized basis, and discretionary expenditures into West Hawaii businesses by the Kamakana Villages population will be some $154 million per year. Outside patronage of the subject commercial businesses will total nearly $61 million annually.

During its almost two decades of build-out, the project will have a base economic impact on the Big Island of some $2.5 billion with a stabilized annual benefit of $250 million; double that statewide.

The project will have nominal impacts on the socio-economic aspects of the Palani Road/Kealekehe subdivisions and within Greater Kailua-Kona that relate to real property issues. Property values in the study area are largely driven by external, cyclical economic factors and cumulative mass, not any single new project.

The envisioned prices of the subject product will be below the current average price range in North Kona, and the master plan calls for substantial numbers of affordable units (more than half the total inventory) which will fit in well with the nearby neighborhoods. There will be minimal direct in-migration as a direct result of the operating components of the community, and what is created (if any) will be readily met on-site by the proposed workforce/affordable housing product.

There are dedicated public school sites, parks and open space within the development which will reduce the "weight" of the Kamakana Villages population on regional real property

infrastructure, and will help service the existing area resident needs.

Public Fiscal Impacts

The County of Hawaii, beyond any impact fees which may be levied and assuming the properties are privately owned, will receive some $62 million in real property tax receipts during the construction period for the project, and annual collections of $6.8 million on a stabilized basis thereafter.

The equitable "per capita contribution" cost to provide county services to the Kamakana Villages de facto population will be circa $9 million per year or not one-third more than the taxes generated. The "actual" costs of additional services required as a result of the development could well be less than these "per capita contribution" estimates.

The State of Hawaii will receive an estimated $256 million in primary receipts from State Income and Gross Excise Taxes during the 19-year build-out, and a stabilized amount of $26.2 million annually.

The per capita costs to provide state services to the subject residents is projected at $28.3 million per year or less than 10 percent more than what is generated within the project.

ECONOMIC OUTLOOK AND REGIONAL OVERVIEW

Current Status

The Hawaii real estate market is typified by widely-swinging, multi-year cycles, with periods of extreme demand and hyper-appreciation followed by ones of recessionary pricing and low activity. Much of the market impetus is a result of external economic factors in conjunction with the limited island land base.

We are currently at the nadir of the cycle, in a down period showing soft demand and weak pricing. There are emerging signs the trend has bottomed-out and stabilization and

movement into recovery/growth is expected during the next several quarters.

Although omens of underlying mainland economic weakness and softening in a variety of real estate sectors began to appear on the Big Island by early to mid-2007, the critical event foreshadowing a broad downturn in the primary study area was the collapse of Aloha and ATA airlines in April 2008. This abruptly decimated tourism, leading to increasing unemployment, business failures, slackening of residential and contractor demand, and modified spending levels island wide.

Subsequent external events exacerbated the situation, including recessionary movement in the US and throughout the Pacific Basin, rapidly fluctuating fuel prices, a significant tightening of available credit, and a major decline in stock/equity markets.

As a result, the unemployment rate on the Big Island, traditionally among the bottom-half of the nation, has increased by more than fifty percent over the past year now standing at 10.8 percent of the workforce, up from the 6.6 percent rate of September 2008. Tourism indicators have declined by 15 to 25-plus percent, and gross total expenditures (residents and visitors) was down by more than three percent last year relative to 2007 with the annualized outlook for 2009 showing a similar decline. A previously fast growing population has been somewhat stabilized by out-migration and a stagnation of gross household income.

Inevitably, there has been a dramatic slowing in real estate across the spectrum, with commercial property cash flows weakened by slowed business activity and vacancies; lack of capital for investment/development opportunities; and a retreat by non-resident purchasers. One of the only sectors for which there remained demonstrable demand, the affordable resident housing segment, was stymied by stiffened loan requirements, job losses, limited lending capacities, and diminishing household income.

From a real property perspective, the current downturn is the most substantial since the 1981-82 recession, outpacing the 1990-

1994 decline in the aftermath of the "Japanese bubble", and the post-9/11 period.

Outlook

Notwithstanding the near-term turmoil, which will require many months to be resolved, mid to long-term indicators and foundational economic attributes remain favorable for both West Hawaii and the Greater Kailua-Kona study area. An increasing population base via natural growth and inevitable in-migration, coupled with the intrinsic worldwide demand for Big Island tourism and its limited urban land resources, will result in a renewal of the well-established, highly-cyclical nature of the local real estate market along historic trend lines.

Over the coming two decades, through 2030, the resident population of Greater Kailua-Kona is forecast to increase by more than 15,000 persons, a gain of 60-plus percent above current levels. These households will pump in excess of a quarter-billion dollars annually into the local economy. Visitor counts in West Hawaii will also recover and grow once again, as will their expenditures by an estimated $1 billion per year over the next two decades. These users/consumers and their discretionary spending will be the basis for expanding future economic activity and land use demand.

Additionally, as West Hawaii becomes a more diversified economic and urbanized community, new business opportunities will emerge outside the traditional fields.

The near-term focus is on when recovery can be expected in the Hawaii and Kona economies. Generally, the State lags behind the mainland by one to two quarters within the economic cycle; as demonstrated by Hawaii being one of the last areas of the country to move into the current recession. Similarly, it is expected that a return to growth will be delayed by several months behind the rest of the country during the coming recovery.

We anticipate that Hawaii will continue in its current malaise through the remainder of the year, reaching stabilization in its

downward move during the fourth quarter. Upward recovery is anticipated to begin by mid to late 2010, with a return to meaningful, if limited, growth in 2011.

In their third quarter 2009 *Outlook for the Economy*, the State Department of Business, Economic Development and Tourism (DBEDT) depict a slowdown on an annualized basis for 2009, but note the decline showed signs of ebbing by late summer, with the possibility of stabilization reached by year-end. For the first time in many quarters, DBEDT is moderating their projections.

> Overall, Hawaii's real GDP is projected to decrease 1.1 percent in 2009, compared with the previous forecast of negative 1.6 percent growth. This adjustment is due to lower projected inflation. Real GDP is expected to manage 0.4 percent growth in 2010.
>
> Beyond 2010 the gradual recovery is expected to continue with modest job growth of around 0.8 percent for 2011. Visitor arrivals should show a healthier, 4.3 percent increase in 2011. Hawaii's real GDP growth in 2011 is expected to reach 1.5 percent. This gradual recovery will continue into 2012, assuming national and international economic conditions continue to improve.

The DBEDT publication can be viewed at:

http://hawaii.gov/dbedt/info/economic/data_reports/qser/outlook-economy

Forecasts by the University of Hawaii Economic Research Organization (UHERO) throughout the recession have been slightly to moderately more pessimistic than the DBEDT estimates. Their modeling depicts a continuing flat to slightly-off economy in 2010 before notable gains commence in 2011-12. Yet, their mid-year perspective on the depth of the down-cycle and recovery potentials adopted a markedly more optimistic tone relative to prior reports:

> We are now approaching the point where the balance of risks is more evenly weighted between positive and negative. The cycle of job and income destruction is still ongoing, and certainly deeper near-term losses are

> possible. But recovery will come, and economic forecasters are notorious for their inability to predict when the economy will turn. Considering the size of the economic drop, it is possible that we may see a somewhat bigger bounce during recovery than currently anticipated.

The current UHERO economic forecast reports can be viewed at:

http://www.uhero.hawaii.edu/eis/eis_forecastarchive.html

Throughout our analyses, we have adopted the perspective that the Greater Kailua-Kona real estate market will remain slow for the remainder of 2009, with activity down more than half from historic annual averages, increasing slightly in 2010, and moving into the beginnings of a typical up cycle in 2011.

As Kamakana Villages residential and commercial product is not expected to be offered for pre-sale/lease until 2011, at the earliest, the current recession is not expected to have a meaningful impact on the marketability of the subject inventory. The real estate sectors are anticipated to be in full recovery mode by this time, and it is highly probable that during the decade-plus absorption period of the project another full economic cycle will transpire.

Regional Overview

"Greater Kailua-Kona", stretching some 15 miles from Keahole to Keauhou and from sea level to the 4,000 foot elevation on the lower southwesterly flanks of Hualalai, comprises the primary study area. The region, which encompasses the subject property, is one of the larger urbanized residential communities on the neighbor islands, as well as one of the most important visitor destinations in the State. It has been a focal point for a wide variety of urban land use development in West Hawaii several decades.

At present, there are some 23,000 full-time residents in Greater Kailua-Kona, housed in an estimated 11,800 units. Many residents work for community-serving businesses or within the

coastal destination resorts that extend towards Kawaihe. Kailua-Kona has traditionally been the primary commercial, economic and residential hub of West Hawaii and is planned to continue in that role into the long-term by providing a centralized housing location for workers throughout the island. The gross household income among area residents is estimated at about $1 billion.

The daily tourist population in West Hawaii averages more than 22,000 visitors, utilizing some 9,600 transient vacation units, and spending more than $1 billion annually (current dollars).

The attractions of North Kona for residents and visitors are its exceptional climate, extensive shoreline, central location, significant business activity, and comprehensive supporting facilities.

Greater Kailua-Kona has been among the most negatively impacted areas in the State during the recent downturn. There have been some business closures, many operations have cut back on staffing, and there are wide-spread concerns over viability should meaningful recovery not occur in 2010-11.

Following past off-cycles, West Hawaii has demonstrated the ability to rebound on par with most neighbor island sectors, a function of its large working-class resident population, economic prominence, and a significant and diverse tourism infrastructure. We anticipate regional recovery will lag behind the mainland (and subsequently Oahu) by several quarters, stabilizing over the coming year, then moving upward in concert with statewide trends by 2011.

The study area population and business activity is anticipated to continue growing over the coming two-plus decades (to 2030), albeit at a slightly slower rate than during the 1980s-90s. This growth will require additional lands be designated for residential, commercial, resort, recreational, park/open space and other uses in order to provide a sustainable, quality lifestyle for residents and visitors.

We have reviewed the County of Hawaii ***Kona Community Development Plan*** (September 2008) and it appendices as a primary source document for our analysis, and consider our models and indicators reasonably within the forecast ranges presented in the KCDP.

THE SUBJECT PROPERTY AND PROPOSED PROJECT

The Kamakana Villages at Keahuolu master plan comprises 272 gross acres used to create a comprehensive "lifestyle" environment which will contain 2,330 housing units, 197,000 square feet of commercial floor area, school sites, parks, open spaces and preserves. It will be among the first sustainable, planned communities in Kona oriented towards local resident families and designed to meet LEED neighborhood standards.

The current general land use design for the subject development is summarized in the following chart.

Land Use	Acres	Units	Density Per Acre
Single-Family Residential		661	
Multifamily Residential		1,169	
Total Residential	134	2,330	17.4 Units
Commercial Mixed-Use	19	197,000 SF	-
School Sites	12	Two	-
Parks	30	13 Sites	-
Open Space/Other	77		
Total	**272**	**2,330**	

Half of the residential units will be offered at workforce/affordable unit pricing guidelines; a larger component than found in any other major West Hawaii project. The remainder of the units will have low to mid-level market prices and also be oriented towards resident households. The neighborhood commercial space will service the daily needs of the residents of Kamakana Villages and nearby subdivisions.

The property, its characteristics, the envisioned land use plan and associated entitlement requirements, have been described in detail, and from a variety of perspectives, by others within the context of the Environmental Impact Statement preparation process. We assume the reader has access to those materials describing the terrain, climate, geology, ecosystems, history and planning/design specifications, and need not be recapitulated here.

From a market and economic perspective, we are primarily interested in three aspects of the master plan:

1. Residential Inventory -- Under the current land use design, the 2,330 subject units will be comprised of the general types shown in the following chart.

PROPOSED RESIDENTIAL UNIT BREAKDOWN	
Type	**Unit Count**
Affordable Multifamily	1,137
Market Multifamily	532
Affordable Single Family	31
Market Single Family	630
TOTAL	2,330

2. Commercial Product -- The 197,000 square feet of finished gross leasable floor area planned within the commercial buildings on the mixed-use properties which will contain neighborhood-oriented retail, restaurant, service, support, medical and office spaces.

3. Appropriateness -- Whether the site is an appropriate location and the master plan a well-designed alternative for the subject holding in consideration of market issues, probable acceptance levels, and compatibility with nearby uses.

The demand for the proposed residential and commercial components of Kamakana Villages, along with an analysis of the market appropriateness of the project, are specifically addressed in the subsequent sections of the market study.

THE GREATER-KAILUA KONA CORRIDOR RESIDENTIAL MARKET

Our analysis of the Greater Kailua-Kona residential market is divided between two perspectives:

- Macro Analysis -- Assessing the overall, long-term demand and supply trends in the competitive sector; and

- Micro Analysis -- Focusing on the current demand/supply levels in the subject segment.

The study opens with an analysis quantifying the demand for additional housing units in Greater Kailua-Kona (or the Keahole-Keauhou Corridor) based on population, buyer demographic, and real estate trends. Existing and proposed inventory supply is then discussed in regards to number of units, development timing and product type. To the extent mid to long-term demand exceeds supply in the study area, the general (or macro) climate for the proposed subject development is favorable.

The second part of the study reviews current market activity in the North Kona District, which encompasses the primary study region, including the status of the market cycle, pricing levels, and sales velocity. As noted, given the initial offerings of Kamakana Villages are up to two years in the future, the near-term indicators are not of substantial import relative to the mid to long-term macro forecasts. However, it does establish the level of "new" overhanging supply which has yet to be absorbed and a timely foundation for commencing projections.

Prior to the 1970s, Kailua-Kona was a small coastal village with fewer than 5,000 residents, its economy oriented towards supporting the surrounding agricultural uses, with limited resort-oriented and commercial development. During that decade, the development of Keauhou Resort and Kona Village and revitalization of the town core, coupled with numerous condominium projects along Alii Drive, served to create a desirable visitor destination.

By the mid-1980s, it was becoming acknowledged that Greater Kailua-Kona would be the focus of urban uses in West Hawaii over the long-term; providing an appropriately sufficient mix of residential, commercial, industrial, resort and supporting inventory to allow the regional economy to achieve sustainability.

While the near-makai areas continued to be dominated by resort/transient-oriented and non-resident use and ownership, the inland areas of North Kona were being developed at a rapid pace for local resident households and their daily needs.

Initially during this surge, most resident-oriented product was developed as vacant home sites which were then (for the most part) built-out individually as "custom" homes. However, over-time the trend was towards larger builders constructing spec tract homes. Today, about 77 percent of the residential inventory in the study area is of a single family type.

Some full-time residents did locate into makai multifamily units, and there were some resident-oriented interior condominium/apartment development, so that presently about 23 percent of regional households are in multifamily projects.

There are circa 11,800 residential (non-resort) units in Greater Kailua-Kona, and long-range planning indicates there will be a need for an increase of 70 to 90 percent more in order to service the anticipated demand created by community growth through 2030. It is expected that the division in product type will continue to favor single family homes/lots, but that condominium development will slightly increase as a percentage of the total market as available entitled, serviced land becomes further scarce and unit prices increase over time.

Until this decade, most of the interior subdivisions and multifamily development was purchased by resident households; the intended users from a planning perspective. But, given the desirability of the region among vacation home purchasers and the exceptionally high prices of in-resort units, well-capitalized non-resident buyers began to acquire homes

and units in mauka non-resort developments; often out-competing the local segment for scarce inventory.

Studies done for the County and which we have completed, indicate that circa 25 to 40-plus percent of demand for residential units in North Kona is now created by non-resident purchasers. This trend is anticipated to continue unabated apart from cyclical influences.

While purchaser restrictions can be/are applied to some categories of housing (specifically lower income and workforce housing types), there will always be competing non-resident purchaser pressure on the market-priced inventory. Thus, in order to achieve market stability and sufficient supply for resident families, it is necessary to provide suitable types and amounts of product to satiate this demand which will present itself within resident neighborhoods.

Notwithstanding brief periodic downturns, as is presently being experienced, residential construction in Greater Kailua-Kona has progressed at a generally consistent and fairly rapid pace over the past three decades; a trend we anticipate will continue as long as suitable lands are made available for development. Among the primary reasons for this conclusion are:

- The region provides for a quality, comprehensive, modern, suburban lifestyle.
- There is a scarcity of alternative, entitled acceptable development areas throughout the island.
- The in-community availability of a broad range of regional-serving commercial, industrial and service businesses.
- Central location on the island, between resort employment centers to north and residential subdivisions to south.

- A warm, leeward climate with a variety of distinct bands which provide for a range of highly desirable alternatives favored by residents and visitors.

- Superior view panoramas from many interior/upslope locations.

The balance between demand and supply in North Kona has always been cyclical, although there has been a generally continuing under-supply of inventory for resident families in the moderate to low income groups.

Macro Analysis

Projecting the probable mid to long-term regional demand for the residential units in the study area is a three-step process:

1. Quantification of Greater Kailua-Kona Housing Unit Demand -- Estimating the need for additional housing units in the study area based on population, demographic, vacancy and income characteristics.

2. Identification of Current and Proposed Inventory -- Quantification of unsold supply and planned residential development in the study area during the expected sales period for Kamakana Villages.

3. Indicated Conclusions -- Correlation of quantified market demand and supply indicators.

We have assumed the subject units will be priced as previously described, with 1,168 multi and single family units meeting County affordable/workforce housing guidelines, and the remainder priced at general market levels competitive with other new residential product in the study area and attracting typical buyers.

Within this macro analysis we have not differentiated between demand created by home buyers and long-term renters. An overview of the Greater Kailua-Kona residential rental market and the projected acceptance of the 400 proposed subject rental units is presented in Addenda Exhibit I.

Quantification of Greater Kailua-Kona Housing Unit Demand

We have projected the demand for residential units in the Greater Kailua-Kona study area using standardized formulae employing population forecasts, household size trends, and other market-based factors as follows:

RP/AHS = TRUR X (1 + (VA + NRPA)) = TMUD

Where:

RP is the Resident Population
AHS is the Average Household Size
TRUR is the Total Resident Units Required
VA is a Vacancy Allowance
NRPA is a Non-Resident Purchaser Allowance
TMUD is a Total Market Unit Demand

Each of the variables in the formula is based on historic statistics compiled by the Federal Home Loan Bank, U.S. Census Bureau, State of Hawaii DBEDT, County of Hawaii Planning Department, other recognized governmental sources, and researched market data. Of specific relevance were the Kona Community Development Plan (KCDP), adopted in September 2008, and its supporting materials, which contain housing unit demand projections for West Hawaii over the coming decades.

These compiled historic and prevailing indicators were translated into estimates based on temperate trending interpretations. Our emphasis was on letting the data "speak for itself" via our projections, as opposed to making large-scale adjustments for subjectively anticipated lifestyle or market evolutions.

In this regard, our forecasts bracket the most probable range for future housing requirements in Greater Kailua-Kona, with the mid-point providing a moderate, and most likely achievable, indicator. However, our conclusions could be understated if some movements continue as strongly as in recent years; such as the trend towards smaller household sizes and an increasing influx of non-resident purchasers into the market.

The "Total Market Unit Demand" conclusions resulting from application of the model are intended to quantify the total number of residential housing units of all types which will be needed in the study region over a 21-year projection period (2010 through 2030) in order to manifest a reasonably stable market with all purchaser/tenant demand segments served.

With the dramatic slow-down in activity during the recent recession, the North Kona housing market has fragmented in regards to the balance between demand and supply. The resort and high-end of the spectrum is oversupplied, with numerous unsold units and lots developed in response to the mid-decade boom period which have yet to be absorbed. Conversely, the affordable end of the market remains undersupplied relative to potential demand (assuming appropriate inventory and mortgage loans were competitively available).

The goal of our market demand model was to quantify the number, appropriate pricing levels, and types of units required.

The factors comprising our housing demand equation can be summarized as follows:

> Resident Population (RP) -- This variable utilizes correlated population and distribution estimates from the State, County and our firm for the study area. In order to be in concert with in-place County forecasts, we have incorporated the "Series C" population and dispersal projections contained in the General Plan, which extend through 2020, and extrapolated them for another decade (through 2030) using State DBEDT estimates.

Table 1 displays the historic and projected resident and de facto population estimates for the Big Island, North Kona and Greater Kailua-Kona from 1980 through 2030.

The government-based population projections, which have historically been nominally to moderately understated, served as the baseline of our housing demand modeling scenarios. We have also included forecasts based on market trending analysis as a maximum demand indicator. The difference between the two forecasts is not significant, ranging from a total resident population of 39,000 to 41,500 within Greater Kailua-Kona by 2030.

By correlating the two scenarios we arrived at a mid-point which is cited throughout the market study.

TABLE 1

HISTORIC AND PROJECTED RESIDENT AND DE FACTO POPULATION
FOR GENERAL AND PRIMARY STUDY AREAS 1980 TO 2030
Market Study of the Kamakana Villages Community
Kealhuolu, North Kona, Hawaii

Year	Historic Figures				Projected Figures				
	1980	1990	2000	2005	2010	2015	2020	2025	2030
1. County of Hawaii									
Resident Population (1)	92,053	120,317	148,677	164,462	176,714	199,488	221,862	242,642	261,758
% Annual Average Change		3.1%	2.4%	2.1%	1.5%	2.6%	2.2%	1.9%	1.6%
Tourism Population	6,647	12,885	18,396	23,206	24,000	26,000	28,000	30,000	32,000
% Annual Average Change		9.4%	4.3%	5.2%	0.7%	1.7%	1.5%	1.4%	1.3%
Total De Facto Population	98,700	133,202	167,073	187,668	200,714	225,488	249,862	272,642	293,758
% Annual Average Change		3.5%	2.5%	2.5%	1.4%	2.5%	2.2%	1.8%	1.5%
% of State Total	12.4%	12.7%	13.6%	14.8%	15.4%	16.5%	17.4%	18.3%	19.0%
2. West Hawaii (2)									
Resident Population	27,518	43,373	56,301	62,160	74,000	85,000	97,000	108,000	118,000
% Annual Average Change		5.8%	3.0%	2.1%	3.8%	3.0%	2.8%	2.3%	1.9%
% of County Total	29.9%	36.0%	37.9%	37.8%	41.9%	42.6%	43.7%	44.5%	45.1%
Tourism Population	5,583	11,468	16,372	21,582	22,440	24,375	26,320	28,275	30,240
% Annual Average Change		10.5%	4.3%	6.4%	0.8%	1.7%	1.6%	1.5%	1.4%
Total De Facto Population	33,101	54,841	72,673	83,742	96,440	109,375	123,320	136,275	148,240
% Annual Average Change		6.6%	3.3%	3.0%	3.0%	2.7%	2.5%	2.1%	1.8%
% of County Total	33.5%	41.2%	43.5%	44.6%	48.0%	48.5%	49.4%	50.0%	50.5%
3. Greater Kailua-Kona (3)									
A. Based on State/County Figures									
Estimated Resident Population	11,382	15,606	19,078	21,800	24,000	27,000	31,000	35,000	39,000
% Annual Average Change		3.7%	2.2%	2.9%	2.0%	2.5%	3.0%	2.6%	2.3%
% of County Total	11.5%	11.7%	11.4%	11.6%	12.0%	12.0%	12.4%	12.8%	13.3%
B. Based on Market Trending									
Estimated Resident Population					24,200	28,000	32,500	37,000	41,500
% Annual Average Change						3.1%	3.2%	2.8%	2.4%

(1) From State of Hawaii DBEDT "Population and Economic Projections for the State of Hawaii to 2035 - DBEDT Series 2035", July 2009.
(2) Using DBEDT forecast for total county population, and distribution percentage to individual districts from County of Hawaii General Plan, Table 1-9, Scenario C. Includes the Districts of North Kohala, South Kohala, North Kona and South Kona.
(3) Includes area from Keahole to Kealhou.
(4) Based on past market trending, potential supply islandwide, regional economic vitality and other factors.

Source: State of Hawaii, County of Hawaii and The Hallstrom Group, Inc.

Average Household Size (AHS) -- This factor was calculated using the data as provided by the above-cited sources and census figures. The 2000 US census indicated the average resident household size for the Big Island was 2.75 persons, and the census tracts within Greater Kailua-Kona ranged from about 2.6 to 3.0 persons per household. Currently, we estimate the study area AHS is at 2.86 persons.

We forecast average household sizes in West Hawaii will trend downward over the study period, declining to circa 2.74 persons by 2030. This is in keeping with national statistics. Most Hawaii-oriented sociologists contend the movement to smaller household sizes will continue into the future; forecasting longer life-spans, the influx of single persons attracted to the climate and employment opportunities, and the tendency towards fewer children.

The estimates were coupled with the minimum and maximum scenario models.

Total Resident Units Required (TRUR) -- This figure is arrived at by dividing the subject area resident population (RP) by the average household size (AHS). It is indicative of the minimum number of residences which would be required to meet basic market needs, assuming there were no vacant units, none uninhabitable due to on-going repair or deleterious conditions, and none purchased by non-resident persons.

For a market to be considered stable (and nominally operative) with acceptable appreciation rates and quality lifestyle opportunities, allowances for such factors must be made.

Vacancy Allowance (VA) – The West Hawaii residential market is no longer in a dramatic and continuing under-supply condition as it was two decades ago, but it remains very "tight" in regards to occupancy of available residential units.

According to HUD, the Urban Institute, and other sources, a "healthy" market has a minimum vacancy level of five to six-plus percent of the total number of units in the inventory. This allows for uninhabitable units, units under repair, seasonal fluctuations, a transitional housing margin, a degree of mobility potential, and the ability to service periodic unanticipated population increases. A "slack" in unit occupancy also serves as a margin to cushion against hyper-appreciation during strong demand periods.

Given the history of the North Kona housing market and its inability to keep an acceptable vacancy pool available on an on-going basis, we believe it will be exceptionally difficult for the desirable vacancy allowance of more than five percent to be achieved on the island during the foreseeable future.

In our "minimum" demand models we have used a nominal vacancy rate allowance of 3.0 percent of the total residential unit demand. In the "maximum" scenario formula, we have tested a more desirable vacancy rate allowance of five percent of the Total Resident Units Required figure.

Non-Resident Purchaser Allowance (NRPA) -- While some non-resident purchasers of non-resort housing units are investors who seek to rent them to residents to cover debt service obligations, an increasing number are buying Hawaii residential units for personal (family and friends) second-home use, business reasons, or other non full-time residential use.

These units are not available to meet resident housing demands and are effectively withdrawn from the inventory pool. An allowance must be made for these residences in the general community, which are not to be confused with those specifically intended for tourist-oriented transient rentals (i.e., within a condominium/hotel project in a resort-classified area).

On the neighbor islands and in Waikiki, there are many units in complexes or subdivisions designed for general residential use, which are owned by non-residents and may sit vacant the majority of the time.

Our research indicates most newer "residential" projects in neighbor island vacation (non-resort) communities such as Kailua-Kona, Kihei and Poipu have upwards of 30 percent non-resident, investor-owned units/homes. In many in-resort developments (particularly Hualalai, Mauna Kea Beach, Mauna Lani, and Kapalua), upwards of 90 percent of the residential inventory is held by non-residents. However, some resort communities have successfully bridged the gap between resident and non-resident ownerships, such as Wailea and Keauhou, and have 20 to 40 percent full-time resident occupancy in some projects.

Most neighbor island subdivisions and multifamily developments, no matter where they are located, have some level of non-resident ownership/use. This is particularly true in newer projects with proximity to the coastline and/or in leeward areas which are highly attractive to off-island buyers informed via the internet. Further, West Hawaii has an increasing number of oft-returning visitors who are comfortable away from the resorts and destination corridors and drawn to alternative "more local" areas.

The impact of these buyers on the market must be taken into consideration when projecting a region's housing unit needs, given the widespread interest in Hawaii real estate and typically greater financial resources of non-resident buyers. Failure to adequately account for their demand places extreme stress on island towns.

As noted, during the past 10 to 15 years, non-resident purchasers have shown greater interest in "standard" residential product in the interior Greater Kailua-Kona market, and comprised upwards of 50 percent of original

buyers in some recent subdivisions and multifamily projects.

Studies completed for the County Planning Department showed non-resident demand for residential inventory at 16 percent of all multifamily units and 10 percent of all single family homes island-wide were owned by non-residents. The large majority of these units are in West Hawaii, where they comprise more than a quarter of all residential units, and an increasing percentage over time.

Until recently in the islands, planning projections did not give full consideration to the impact of non-resort residential demand on the overall residential sector. However, now, what was once was deemed incidental, is recognized by all to be a legitimate, continuing segment of demand which must be addressed if market sustainability is to be achieved.

We have tested a non-resident allowance of 35 percent of total resident household demand in our minimum projections, and 40 percent in the maximum scenario.

Total Market Unit Demand (TMUD) -- The solution to our demand formula is quantified by adding the Vacancy Allowance (VA) and Non-Resident Purchaser Allowance (NRPA) to the Total Resident Units Required (TRUR) figure. This is the total number of units which will be needed in the study region in order to meet all reasonable market demands.

The application of the housing demand formula to the subject region using the minimum "Baseline" and maximum "Market Trending" population forecasts are shown on Table 2.

Extrapolation of 2000 census figures in combination with County building permit and tax data indicates there are currently some 11,800 existing non-resort residential housing units in Greater Kailua-Kona.

TABLE 2

QUANTIFICATION OF HOUSING UNIT DEMAND FOR THE GREATER KAILUA-KONA STUDY AREA 2010 to 2030
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii
Covering the Area from Keahole to Keauhou

	2010	2015	2020	2025	2030	Additional Units Required by 2030 (1)
Scenario One: Minimum Projections Extrapolated From State and County Population and Dispersal Projections and Conservative Allowance Factors						
Resident Population	24,000	27,000	31,000	35,000	39,000	
Average Household Size	2.86	2.84	2.82	2.80	2.78	
Total Resident Units Required	8,392	9,507	10,993	12,500	14,029	
Vacancy Allowance (3% of resident unit demand)	252	285	330	375	421	
Non-Resident Purchaser Allowance (35% of resident unit demand)	2,937	3,327	3,848	4,375	4,910	
TOTAL MARKET UNIT DEMAND	**11,580**	**13,120**	**15,170**	**17,250**	**19,360**	**7,560**
Scenario Two: Maximum Projections Using Market-Based Population Projections and Optimistic Allowance Factors						
Resident Population	24,200	28,000	32,500	37,000	41,500	
Average Household Size	2.86	2.83	2.80	2.77	2.74	
Total Resident Units Required	8,462	9,894	11,607	13,357	15,146	
Vacancy Allowance (5% of resident unit demand)	423	495	580	668	757	
Non-Resident Purchaser Allowance (40% of resident unit demand)	3,385	3,958	4,643	5,343	6,058	
TOTAL MARKET UNIT DEMAND	**12,269**	**14,346**	**16,830**	**19,368**	**21,962**	**10,162**

CONCLUDED HOUSING UNIT DEMAND RANGE

	2010	2011-2015	2016-2020	2021-2025	2026-2030	Totals
MINIMUM DEMAND						
Periodic	(220)	1,320	2,050	2,080	2,110	7,560
Cumulative	(220)	1,320	3,370	5,450	7,560	
Average Annual Demand (2)		264	410	416	422	
MAXIMUM DEMAND						
Periodic	469	2,546	2,484	2,538	2,593	10,162
Cumulative	469	2,546	5,030	7,568	10,162	
Average Annual Demand (2)		509	497	508	519	
MID-POINT DEMAND						
Periodic	125	1,933	2,267	2,309	2,352	8,861
Cumulative	125	1,933	4,200	6,509	8,861	
Average Annual Demand (2)		387	453	462	470	

(1) There were an estimated 11,800 housing units in Greater Kailua-Kona as of the fourth quarter 2009. The total number of non-resident units (many resort/oceanfront properties) is estimated at 5,300 as of the same date. This is equivalent to 45 percent of the resident inventory.
(2) Existing (or latent) demand/oversupply is assumed expressed in the marketplace by 2015.

Source: Various and The Hallstrom Group, Inc.

Our model indicates the actualization of a healthy and stable housing market in the study area will require the construction of between 7,560 (Scenario One: Minimum) to 10,162 (Scenario Two: Maximum) additional housing units in Greater Kailua-Kona by the Year 2030. The mid-point demand would be for 8,861 units, or 75 percent more than the in-place inventory, over the coming 21 years.

Conversion of our estimates of gross housing demand into pricing equivalents was completed using available data from the U.S. Census, Big Island Board of Realtors, and the U.S. Dept. of HUD, in conjunction with affordable/workforce housing pricing guidelines established by the County of Hawaii Planning Department. We have specifically relied upon the Affordable Sales Price Guidelines for 2009, as adjusted for current interest rates, in establishing the moderate to lower-end price points for housing demand.

Table 3 illustrates the striation of Greater Kailua-Kona regional housing requirements through 2030 into probable percentile demand by sales prices at current dollar levels. The figures correlate both historic actual buying trends and theoretical "affordability" quotients derived using government pricing criteria.

In theory, development in the study area should generally proceed according to these striated estimates in order to achieve desired market stability during the projection period.

Table 4 displays the calculations of housing price affordability for North Kona residents based on HUD/State/County and conventional financing guidelines.

Using the governmental income-based criteria for a four-person family, resident households are generally considered able to afford unit prices of:

- "Low Income" grouping, earning 80 percent or less of the regional median income, can afford a sales price, or rental equivalent, of about $225,000 (rounded) or less.

TABLE 4

ESTIMATE OF HOUSING PRICE AFFORDABILITY FOR WEST HAWAII RESIDENTS
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii

1. Based on General HUD/State/Hawaii County Criteria

Grouping	Low Income	Low-Moderate Income	Moderate	Moderate-Gap Group Income	Lower-Market Incomes
Household Income as a Percent of County Median	**80% or less**	**80% to 100%**	**100% to 120%**	**120% to 140%**	**140% to 180%**
Gross Household Monthly Income	$4,340	$5,425	$6,510	$7,595	$9,765
Maximum Mortgage/Housing Payment	$1,215	$1,519	$1,823	$2,127	$2,734
Maximum Mortgage Amount (2)	$213,988	$267,529	$321,070	$374,611	$481,517
Down payment at 5% of Sales Price	$11,263	$14,080	$16,898	$19,716	$25,343
Total Affordable Purchase Price	**$225,251**	**$281,609**	**$337,968**	**$394,327**	**$506,860**

2. Based on Conventional Financing Criteria

Grouping	Low Income	Low-Moderate Income	Moderate-Gap Group Income	Moderate-Gap Group Income	Near-Market Incomes
Gross Household Monthly Income	$4,340	$5,425	$6,510	$7,595	$9,765
Maximum Allowable Housing Expense (3)	$1,215	$1,519	$1,823	$2,127	$2,734
Maximum Mortgage Amount (4)	$228,931	$286,211	$343,491	$400,771	$515,143
Down payment at 20% of Sales Price	$57,233	$71,553	$85,873	$100,193	$128,786
Total Affordable Purchase Price	**$286,164**	**$357,764**	**$429,364**	**$500,964**	**$643,929**

Note: Median household income for West Hawaii estimated at $65,100 in 2009.

(1) Based on standard governmental affordability criteria at 28%.
(2) Assuming 5.5% annual interest and 30 year mortgage. Interest rate assumed to circa 1/2 point higher than prevailing market rates.
(3) Conventional financing with maximum monthly mortgage payment at 28% of gross income. No reserves or mortgage insurance required.
(4) Based on Bank of Hawaii published rates as of report publication date for standard (non-Jumbo) 30-year home mortgage loan of 4.9%.

Source: HUD, State of Hawaii, Hawaii County and The Hallstrom Group, Inc.

TABLE 3

STRIATED PROJECTIONS OF HOUSING UNIT DEMAND
BY SELLING PRICE IN GREATER KAILUA-KONA 2010 TO 2030
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii

Period	Periodic Demand (1) 2010 to 2015	2016 to 2020	2021 to 2025	2026 to 2030	Total Demand 2010-2030
1. Minimum Demand					
Less Than $250,000 (2)	**356**	**513**	**478**	**443**	**1,790**
Percent of Total Demand	27.00%	25.00%	23.00%	21.00%	23.68%
$250,000 to $550,000 (3)	**290**	**431**	**416**	**401**	**1,538**
Percent of Total Demand	22.00%	21.00%	20.00%	19.00%	20.34%
$500,000 to $750,000	**264**	**410**	**416**	**422**	**1,512**
Percent of Total Demand	20.00%	20.00%	20.00%	20.00%	20.00%
$750,000 to $1,000,000	**224**	**369**	**395**	**422**	**1,411**
Percent of Total Demand	17.00%	18.00%	19.00%	20.00%	18.66%
Over $1,000,000	**185**	**328**	**374**	**422**	**1,309**
Percent of Total Demand	14.00%	16.00%	18.00%	20.00%	17.32%
Total Market Demand	**1,320**	**2,050**	**2,080**	**2,110**	**7,560**
	100.00%	100.00%	100.00%	100.00%	100.00%
2. Maximum Demand					
Less Than $250,000 (2)	**687**	**621**	**584**	**545**	**2,437**
Percent of Total Demand	27.00%	25.00%	23.00%	21.00%	23.98%
$250,000 to $550,000 (3)	**560**	**522**	**508**	**493**	**2,082**
Percent of Total Demand	22.00%	21.00%	20.00%	19.00%	20.49%
$500,000 to $750,000	**509**	**497**	**508**	**519**	**2,032**
Percent of Total Demand	20.00%	20.00%	20.00%	20.00%	20.00%
$750,000 to $1,000,000	**433**	**447**	**482**	**519**	**1,881**
Percent of Total Demand	17.00%	18.00%	19.00%	20.00%	18.51%
Over $1,000,000	**356**	**397**	**457**	**519**	**1,729**
Percent of Total Demand	14.00%	16.00%	18.00%	20.00%	17.02%
Total Market Demand	**2,546**	**2,484**	**2,538**	**2,593**	**10,162**
	100.00%	100.00%	100.00%	100.00%	100.00%

Note: Estimates based on combination of resident household income analysis, median prices being paid for inventory, and evident trends in the Greater Kailua-Kona residential market. Non-resident buyers comprise a substantial portion of the upper-price tiers.

(1) Existing (or latent) demand/oversupply is assumed expressed in the marketplace by 2015.
(2) Generally comprising the "below 80% of median household income" group.
(3) Includes remainder of "Affordable Housing" qualified groups, assuming household incomes at from 100% to 180% of County median.

Source: Various and The Hallstrom Group, Inc.

- "Low-Moderate Income" households, earning 80 to 100 percent of median income, can afford home prices up to $281,000.

- "Moderate Income" households, at 100 to 120 percent of West Hawaii median income, can afford home prices up to $338,000.

- "Moderate – Gap Group Income" families, earning 120 to 140 percent of median income, can afford home prices up to $394,000.

- And, households having incomes which place them in the lower end of the market-pricing spectrum (at 140 to 180 percent of regional household averages) can afford prices up to $507,000.

Above this level, prices are considered to be fully outside the identified "affordable" pricing segments and into the middle and above average "market" price range.

We note, the selling prices indicated by our application of the affordability criteria are slightly higher than those estimated by the county in their mid-year calculations due to a decline in mortgage interest rates. Their formula employed an effective interest rate of six percent annually. Our projections assume a rate of 5.5 percent compounded annually, which is somewhat conservative given the market rate for mortgage funds of 4.9 percent as of the report date.

Using conventional financing criteria, which require a larger down payment, and results in a lower interest rate, the affordable housing prices for the respective groups increases by about 25 percent.

Inherently, a large portion of the demand is generated by lower- to middle-income groups who will have difficulty competing in the relatively high-priced Kailua-Kona marketplace. Upper-middle and above income households have more meaningful purchase alternatives.

About 44 percent of the regional units required through 2030 should be priced below a current level of $550,000, which would be generally affordable to the defined income housing income groups. Some 20 percent of demand will have price limits between $550,000 and $750,000 (the lower-end of the "market-priced" segment); and, 36 percent will seek properties having a price above $750,000 (high end).

Demand by unit type (multifamily unit, single family home or house lot) during the projection period is summarized on Table 5. The forecasts are based on historic and forecast development trends coupled with planned inventory additions to the regional supply.

We forecast that multi-family units will increase as a percentage of overall resident-oriented unit construction from a current level of just over 20 percent of the total inventory to 25 percent by 2030. Multifamily units could comprise a larger portion of future growth, if the proposed Transit-Oriented Development and Neighborhoods (TOD and TON) planning guidelines are actualized.

However, single family product will remain the focus of Greater Kailua Kona development, although we expect it will decline from the current level of comprising nearly 80 percent of the residential oriented sector to 75 percent by 2030.

The difference between multifamily and single family unit types will become somewhat skewed over time with the expected inclusion of more patio homes, detached multifamily units, duplexes and other models as community master plans evolve towards modern urban/suburban standards.

Identification of Planned Study Area Residential Projects

Precise quantification of probable additions to residential unit supply in the study area over the next 21 years is problematic, due to the size of the region, rapid urbanization and vast number of preliminarily envisioned developments. Table 6 provides a summary of proposed major residential projects in Greater Kailua-Kona (those having more than 50 units/homes) apart from Kamakana Villages.

TABLE 6

MAJOR PROPOSED RESIDENTIAL PROJECTS IN GREATER KAILUA-KONA
Market Study of Kamakana Villages Community
Keahuolu, North Kona, Hawaii

Project Name/Identification	No. of Units Single Family	No. of Units Multifamily	Total	Status/Comments
Ooma	450	500	950	Moving forward. Min Unit Count.
Kaloko				
Kaloko Heights			1,362	Mix undetermined. Proposed.
Kaloko Makai			5,000	Mix undetermined. Preliminary Only.
Kula Nei			270	Mix undetermined. Moving Forward.
Puaa	229	140	369	Moving Forward.
HuKoPa LLC	53		53	Moving Forward.
Hiluhilu			845	Proposed. Preliminary Only.
Villages @ Laiopua			1,130	Mix undetermined. Moving Forward.
Hualalai Village Phase II		70	70	In-Development
Honokohau Mauka				Announcement Pending.
Kai Maluna		144	144	In-Development
Kona Sea Crest		298	298	Approved
KKO Oasis LLC		97	97	Approved
Hale Nanea		92	92	Proposed
Betsil Bros.		170	170	Proposed
TOTAL PROPOSED UNITS WITHIN MAJOR PROJECTS			**10,850**	

Source: Various and The Hallstrom Group, Inc.

TABLE 5

DIVISION OF PROJECTED DEMAND BY UNIT TYPE
FOR HOUSING UNITS IN GREATER KAILUA-KONA 2010 TO 2030
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii

	Periodic Demand (1) 2010 to 2015	2016 to 2020	2021 to 2025	2026 to 2030	Total Demand 2010-2030	Comments
1. Using Minimum Demand Projections						
Single Family Homes	554	923	978	1,013	3,467	A limited segment of the market historically, it boomed in recent years as more developers/contractors sought to maximize potential returns in an upward moving market. High demand had mitigated risk. As the cost and difficulty of home building has escalated this alternative has gained ground. Also enables exploiting of non-resident market.
Percent of Total	42%	45%	47%	48%	46%	
Single Family Lots	462	636	582	549	2,228	Traditionally the way most non-resort residential property was marketed; with purchaser later building house (or spec by small-time contractor's in lesser numbers). Will always be major component in resort and age-oriented subdivisions, but losing ground to finished homes in last decade.
Percent of Total	35%	31%	28%	26%	29%	
Multifamily Units	304	492	520	549	1,864	Historically makai/resort oriented development focused towards non-resident buyers. In an effort to increase inventory and lower prices, coupled with developer's seeking out all density opportunities, more multi-family will be developed in the central areas of the region.
Percent of Total	23%	24%	25%	26%	25%	
Total	**1,320**	**2,050**	**2,080**	**2,110**	**7,560**	
	100%	100%	100%	100%	100%	
2. Using Maximum Demand Projections						
Single Family Homes	1,069	1,118	1,193	1,245	4,625	
Percent of Total	42%	45%	47%	48%	46%	
Single Family Lots	891	770	711	674	3,046	
Percent of Total	35%	31%	28%	26%	30%	
Multifamily Units	586	596	634	674	2,491	
Percent of Total	23%	24%	25%	26%	25%	
Total	**2,546**	**2,484**	**2,538**	**2,593**	**10,162**	
	100%	100%	100%	100%	100%	
Mid-Point						
Single Family Homes	812	1,020	1,085	1,129	**4,046**	
Single Family Lots	677	703	646	611	**2,637**	
Multifamily Units	445	544	577	611	**2,177**	
Total	**1,933**	**2,267**	**2,309**	**2,352**	**8,861**	

Source: The Hallstrom Group, Inc.

TABLE 7

NORTH KONA PROJECT/SUBDIVISION APPLICATIONS
Market Study of Kamakana Villages Community
Kwahuolu, North Kona, Hawaii
Since 2003, Ten Lots or More

APPLICANT	SUBDIVISION DESCRIPTION	AHUPUAA	DISTRICT	TMK	LOTS
NON-RESORT					
STATE-DHHL	Laiopua Village, Phase 4	Kealakehe	North Kona	7-4-021:010 & 012	259
SCHULER HOMES, LLC	Pualani Estates, Phase II	Puapuaaiki 1st & Puapuaanui 1st	North Kona	7-5-017:029	157
STATE-DHHL	Laiopua Village, Phase 5	Kealakehe	North Kona	7-4-021:006	116
SCHULER HOMES, LLC	Pualani Estates, Phase III	Puapuaaiki & Puapuaanui	North Kona	7-5-1:35	91
LEHUA LANI, LLC	Lehua Lani PUD	Puapuaa 2nd	North Kona	7-5-020:071 & 072	58
WESTPRO DEV INC	Subdivision of Lot 13 of Puuhonua Subdivision, Phase II	Kalaoa 5th	North Kona	7-3-10:48	55
WAINANI 42 LLC	Wainani Est S/D, Ph. 1	Kalaoa 5th	North Kona	7-3-10:27 & Por.49	52
WESTPRO DEV INC, et al.	Lokahi Makai Phase II	Kalaoa 5th	North Kona	7-3-10:Por. 48	52
327 KONA, LLC	Subdiv Lot 2-A into Lots 1-50	Honokohau 1st	North Kona	7-4-8:47	50
WESTPRO DEV INC, et al.	Consol of Lots 12 & R-2, Being a portion of Grant 2972	Kalaoa 5th	North Kona	7-3-10:47 & 49	49
WAINANI 42 LLC	Subdiv Lot 11-A Puuhonua S/D Ph.2 Incr.1-A (FP 2327)	Kalaoa 5th	North Kona	7-3-10:Por.27, 49	47
GAMREX, INC.	Consol/Resub into Lots 1-41, Incl., Lako St. Ext. & Rdway Lot	Holualoa 1st & 2nd	North Kona	7-6-21:15; 7-6-26:61; 7-6-27:36	41
COOK, Brian R. Dev., Inc./Kamehameha Schools	Mauna Loa Gardens Subdiv Lot 3-A-1 into Lots 1 thru 44.	Keauhou 2nd	North Kona	7-8-10:69	41
1250 OCEANSIDE PARTNERS	Consolidation of Lot B of Hokuli`a	Various	North/South Kona	8-1-4:3; 8-1-32:2-29, 38-42 & por.5	37
C L & D EIGHT LLC	Consol/Resub Lots 2-5 into Lots 1-37 Incl & Lot R-1	Kalaoa 4th	North Kona	7-3-5:31,Por.32,33, 85,95	37
KONA VISTA, LLC	Kona Vistas S/D, Unit 4	Holualoa 1&2	North Kona	7-6-021:015 (Por.)	26
PL III, LLC	Pu'u Lani Ranch Subd., III	Puuanahulu	North Kona	7-1-6:127	24
SONNY VENTURES, LLC	Lokahi Makai-Phase V	Kalaoa 5th	North Kona	7-3-10:Pors. 47&49	24
WESTPRO DEV INC., et al.	Lokahi Makai Phase III	Kalaoa 5	North Kona	7-3-10:Por. 48	23
TOWNE KEAUHOU LLC	Alii Heights, Unit 2, Phase V	Laaloa 1&2, Kapalaalaea 1	North Kona	7-7-8:Por.11	23
HUALALAI VISTAS LLC	Subdiv Lots 27 & 50 into Lots 1-46	Kohanaiki	North Kona	7-3-7:27, 50	46
ULUWEHI PROPERTIES, LLC	Sugar Cane Lane Subdivision	Puapuaanui	North Kona	7-5-17:21	21
CL&D NINE LLC, et al.	Consol/Resub Lots 4&5 into Lots 1-16	Hienaloli 2,3,4&5	North Kona	7-5-10:52,65	20
KONA VISTA, LLC	Kona Vistas S/D, Unit 3	Holualoa 1&2	North Kona	7-6-021:015 (Por.)	20
O'OMA, LLC	Consolidation and Resubdivision of Lots 55 & 53 Into Lots 1-19 Inclusive	O'oma 1st	North Kona	7-3-7:40, 41	19
AE'O LLC	Paul Legg S/D Subdiv of Lot 15-A into Lots 1-18	Holualoa 1st & 2nd	North Kona	7-6-21:6	18
IOKEPA ESTATES LLC	Proposed Consolidation of Lots 2 and 3	Kahului 1st & 2nd	North Kona	7-5-16:86,87	16
SURF & LAND LLC	PUD/Subdiv of Allotment 38-A Holualoa 1&2 Hui Partition (Beach Lots)	Holualoa 1st & 2nd	North Kona	7-6-17:68	14
NEARON ENTERPRISES		Kaumalumalu & Pahoehoe 1st	North Kona	7-7-4:37 & 7-7-8:61	13
YOUNG, Dennis, et al.	Proposed Subdivision of Lot 47-A-1,Into Lots 1 to 11 Inclusive	Kalaoa 4th	North Kona	7-3-10:29	11
	TOTAL PROPOSED LOTS (1)				**1,460**
	Total Generally Within Greater Kailua-Kona (TMK 7-3 through 7-8)				**1,399**
	Less Lots/Units Developed and Absorbed to Date (2)				**(380)**
	REMAINING PROPOSED AND POTENTIALLY AVAILABLE LOTS				**1,019**
RESORT					
KAUPULEHU DEVELOPMENTS, et al.	Subdiv Lot 4-A (SUB 7571) into Lots 1-48 Incl	Kaupulehu	North Kona	7-2-3:1	48
KAMEHAMEHA INV CORP	Subdivision of Portion of TMK (3) 7-8-010:050 Into Lots 1 through 45	Keauhou 1st	North Kona	7-8-10:Por.50	46
WB MANINIOWALI LLC	Maniniowali Phase II	Kukio 2nd & Maniniowali	North Kona	7-2-16:11	43
KAUPULEHU DEVELOPMENTS/WB KD Acquisiti	Subdiv Lot 4-A into Lots 1-42	Kaupulehu	North Kona	7-2-3:1	42
KAUPULEHU MAKAI VENTURE, et al.	Hualalai Resort Ph.2-C, S/D #3	Kaupulehu	North Kona	7-2-010:Por. 020 & 7-2-029:Pors. 0	34
WB MANINIOWALI LLC	Maniniowali Phase III S/D	Kukio 2nd & Maniniowali	North Kona	7-2-016:010 & 012	34
KAUPULEHU MAKAI VENTURE, et al.	Hualalai Resort Ph.2-C, S/D #2	Kaupulehu	North Kona	7-2-3:13 & 7-2-10:Por.8	33
WB MANINIOWALI LLC	Maniniowali Villa Subdivision	Kukio 2nd & Maniniowali	North Kona	7-2-16:10,12	30
KAUPULEHU MAKAI VENTURE, et al.	Hualalai Resort Phase 2-C, Subdivision No. 1	Kaupulehu	North Kona	7-2-3:13,14 & 7-2-10:Por.8	12
	TOTAL PROPOSED LOTS (1)				**322**
	Total Generally Within Greater Kailua-Kona (TMK 7-3 through 7-8)				**46**
	TOTAL NET PROPOSED LOTS IN GREATER KAILUA-KONA				**1,065**

(1) For larger projects having a mix of single family and multi-family (such as Lokahi Makai and Kona Vistas) the "lot" total includes multi-family units in that phase.
(2) Lots/Units which have been marketed subsequent to last County update and publication of this project list, notably within Pualani Estates, Laiopua Village and Lokahi Makai & Kona Vistas.
Estimate based on discussions with developers/brokers and investigation of MLS and Tax Office sales data.

Source: County of Hawaii and The Hallstrom Group, Inc.

The identified projects total some 10,850 proposed units. However, the list includes developments covering a broad status range, from fully approved to merely "announced". While several are apparently moving forward, others are on-hold or have been all but abandoned during the current recession, and the probable number of units likely to be built in some may be significantly altered downward.

There are more than 1,000 potential lots in the study area which have applied for subdivision since 2003; some of which are to be within the major projects, as shown on Table 7.

We have reviewed the probable development/sales time line for the major projects based on public pronouncements, EIS/entitlement documents, probability of actualization, and other factors, and estimate that at maximum fewer than 6,000 are likely to be built during the two decade demand projection period.

The results of our timing estimates are displayed on Table 8. We estimate that a maximum of 5,858 could reasonably be built in the study area by 2030, apart from the subject community.

Comparison of Demand and Supply Indicators

The demand for new housing opportunities in the Greater Kailua-Kona study area over the coming 21 years, 2010 through 2030, is estimated at between 7,560 and 10,162 total units (8,861 mid-point).

Apart from Kamakana Villages, the currently envisioned level of new residential additions during the same time frame will likely be between 4,000 and 6,000 units. Plus, there are an additional 100 to 200 unsold units/homes/lots of "overhanging" supply.

Therefore, the unsold and planned inventory will fall short of projected demand by from 1,500 to 6,000 units, or 20 to 60 percent of total required supply, during the modeling period. On a macro basis, there is substantial, quantifiable market demand in support of the subject community during its proposed offering period.

Micro Analysis

The Greater Kailua-Kona residential real estate market, like similar sectors throughout the state, is currently in the midst of slumping market cycle subsequent to reaching a upside peak in 2005-06. The up-cycle activity began in the late 1990s, was set back briefly by 9/11, and reached record levels during each year through mid-decade before retreating in late 2006 and further each following year to the present.

This trending is highly typical of real estate in Hawaii, as evidenced in the cycles of the late 70s/early 80s and late 80s/early 90s, with several years of increasing upward activity reaching a frantic pace in sales and appreciation then slumping dramatically for two to three years before stabilizing and commencing recovery into another upward movement.

In analyzing study region data it is necessary to account for the amount and quality of inventory available at any given time during the cycle, which has a tendency to impact the comparison of statistics from year to year.

Single family residential market activity data in the study area from 2002 through 2009 (extrapolated year-end figures), are summarized on Table 9. During this period sales volumes more than doubled to $475.3 million annually in 2005 before declining to a current level of $211 million (based on indicators through September), which is about even with the sales in 2002 at the commencement of the last, the post 9-11, economic cycle.

Average sales prices throughout the District, and thus open to upward skewing due to the impact of a relative few ultra high-end resort sales, peaked in 2007 at $870,460, before falling by nearly 40 percent in 2008, and stabilizing at $820,000 through the first three quarters of this year. Despite the sharp decline from the record high level, current average prices are still more than double those of 2002.

Multifamily indicators, as summarized on Table 10, have followed the same general trending as in the single family sector. Currently, the average price in the sector is at $401,000,

TABLE 8

ESTIMATED UNITS PRODUCTION/ABSORPTION LEVELS FOR PROPOSED RESIDENTIAL UNITS IN GREATER KAILUA-KONA FROM 2010 THROUGH 2030
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii

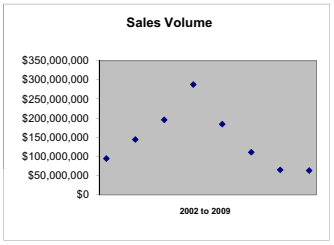
	Units Built and Absorbed				Totals		
Project	**2010 to 2015**	**2016 to 2020**	**2021 to 2025**	**2026 to 2030**	**Built/Absorbed Through 2030**	**Remaining Post-2030**	**Total Units in Project**
Ooma	200	350	400		950		950
Capture Rate of Proposed Inventory	23%	20%	25%		16%		9%
Kaloko Heights		300	400	400	1,100	262	1,362
Capture Rate of Proposed Inventory		17%	25%	25%	19%	5%	12%
Kaloko Makai				500	500	4,500	5,000
Capture Rate of Proposed Inventory				31%	9%	87%	45%
Kula Nei	100	170			270		270
Capture Rate of Proposed Inventory	12%	10%			5%		2%
Puaa	50	250	69		369		369
Capture Rate of Proposed Inventory	6%	14%	4%		6%		3%
HuKoPa LLC	53				53		53
Capture Rate of Proposed Inventory	6%				1%		0%
Hiluhilu			400	445	845		845
Capture Rate of Proposed Inventory			25%	28%	14%		8%
Villages @ Laiopua	100	200	200	200	700	430	1,130
Capture Rate of Proposed Inventory	12%	11%	12%	13%	12%	8%	10%
Hualalai Village Phase II	70				70		70
Capture Rate of Proposed Inventory	8%				1%		1%
Kai Maluna	144				144		144
Capture Rate of Proposed Inventory	17%				2%		1%
Kona Sea Crest	100	198			298		298
Capture Rate of Proposed Inventory	12%	11%			5%		3%
KKO Oasis LLC		97			97		97
Capture Rate of Proposed Inventory		5%			2%		1%
Hale Nanea		92			92		92
Capture Rate of Proposed Inventory		5%			2%		1%
Betsil Bros.		80	90		170		170
Capture Rate of Proposed Inventory		4%	6%		3%		2%
Misc. Minor Developments	50	50	50	50	200		200
Capture Rate of Proposed Inventory	6%	3%	3%	3%	3%		2%
TOTALS	**867**	**1,787**	**1,609**	**1,595**	**5,858**	**5,192**	**11,050**

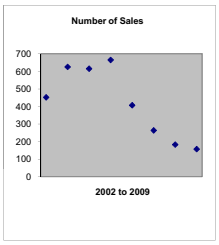
Source: County of Hawaii, Various Project Submittals, and The Hallstrom Group, Inc.

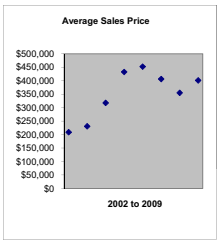
TABLE 10

SUMMARY OF NORTH KONA MULTI-FAMILY RESIDENTIAL MARKET ACTIVITY
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii

Year	2002	2003	2004	2005	2006	2007	2008	2009
Sales Volume	$94,429,398	$144,288,063	$195,512,654	$287,770,832	$184,202,364	$110,891,483	$64,998,564	$63,163,303
Percent Annual Change	29.1%	52.8%	35.5%	47.2%	-36.0%	-36.8%	-41.4%	-2.8%
Number of Sales	452	625	615	665	407	264	183	157
Percent Annual Change	14.1%	38.3%	-1.6%	8.1%	-38.8%	-29.6%	-30.7%	-14.0%
Average Sales Price	$208,915	$230,861	$317,907	$432,738	$452,586	$406,445	$355,183	$401,462
Percent Annual Change	13.1%	10.5%	37.7%	36.1%	4.6%	-10.2%	-12.6%	13.0%







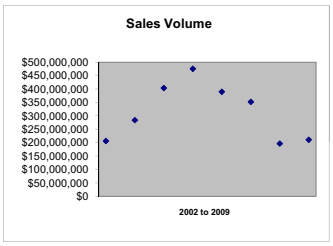
(1) 2009 year-end estimates based on data through September.

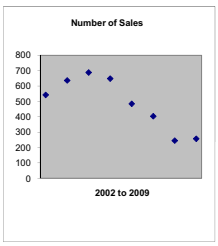
Source: Hawaii Information Service and The Hallstrom Group, Inc.

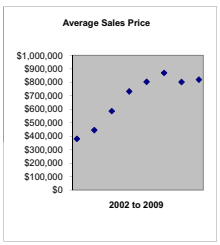
TABLE 9

SUMMARY OF NORTH KONA SINGLE FAMILY RESIDENTIAL MARKET ACTIVITY
Market Study of Kamakana Villages Community
Keahuolu, North Kona, Hawaii

Year	2002	2003	2004	2005	2006	2007	2008	2009
Sales Volume	$206,136,087	$283,622,541	$403,469,290	$475,349,510	$389,642,415	$351,666,022	$196,493,589	$211,023,400
Percent Annual Change	14.5%	37.6%	42.3%	17.8%	-18.0%	-9.7%	-44.1%	7.4%
Number of Sales	543	637	689	649	485	404	245	257
Percent Annual Change	6.7%	17.3%	8.2%	-5.8%	-25.3%	-16.7%	-39.4%	5.0%
Average Sales Price	$379,624	$445,247	$585,587	$732,434	$803,386	$870,460	$802,015	$820,039
Percent Annual Change	7.4%	17.3%	31.5%	25.1%	9.7%	8.3%	-7.9%	2.2%







(1) 2009 year-end estimates based on data through September.

Source: Hawaii Information Service and The Hallstrom Group, Inc.

which is off 15 percent from the peak of $453,000 achieved during 2006, but a gain of 13 percent from last year. More importantly, the number of sales has plummeted by more than three-quarters, falling from 665 in 2005 to an expected 157 for all of 2009.

Residential/vacant lot activity for the same period is displayed on Table 11. The trending lines are comparable with the other sectors.

While there are major short-term concerns in the market, such cyclical behavior is standard for West Hawaii real estate, and it is highly likely that during the mid-term (four to seven years) concerns will once again be hyper-appreciation, scarcity of product, and record setting activity levels. The cycle has run repeatedly over the past three decades. We project the softness to continue through 2009 and into 2010 before stabilizing and moving towards recovery in 2011-12 and an up cycle period by mid-decade.

APPROPRIATENESS OF THE SUBJECT PROPERTY FOR RESIDENTIAL USE AND ABSORPTION ESTIMATES

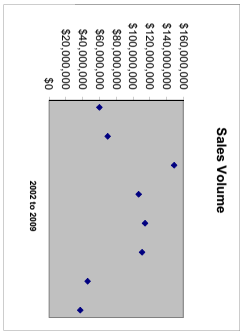
In light of the quantified market support for the proposed subject residential development, the next step in analysis is to assess whether the site and concept are appropriate from a market perspective, are in concert with macro demand trends, and forecast the probable standing of the Kamakana Villages inventory therein. These insights determine the competitiveness and resulting probable market shares for the residential components of the project.

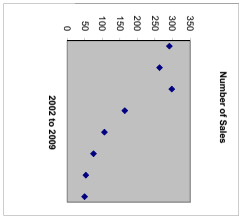
The master plan for the subject community is consistent with modern urban planning objectives, and will provide a quality, highly-competitive lifestyle environment for the 2,330 units proposed. Among the features we consider most relevant relative to maximizing market acceptance:

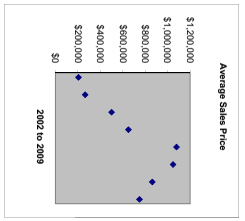
TABLE 11

SUMMARY OF NORTH KONA VACANT LAND MARKET ACTIVITY
Market Study of Kamakana Villages Community
Keahuolu, North Kona, Hawaii

Year	2002	2003	2004	2005	2006	2007	2008	2009
Sales Volume	$59,853,560	$69,750,534	$149,100,212	$106,721,011	$114,351,560	$110,834,400	$45,764,140	$36,950,665
Percent Annual Change	33.6%	16.5%	113.8%	-28.4%	7.1%	-37.7%	-58.7%	-19.3%
Number of Sales	291	263	298	164	106	75	53	49
Percent Annual Change	38.6%	-9.6%	13.3%	-45.0%	-35.4%	-35.9%	-29.3%	-6.9%
Average Sales Price	$205,682	$265,211	$500,336	$650,738	$1,078,788	$1,047,606	$863,474	$749,000
Percent Annual Change	-3.6%	28.9%	88.7%	30.1%	65.8%	-2.9%	-17.6%	-13.3%







(1) 2009 year-end estimates based on data through September.

Source: Hawaii Information Service and The Hallstrom Group, Inc.

- The diversity of subject residential product types will reach across the large majority of the market demand spectrum among resident families in Greater Kailua-Kona, creating a dynamic community with enhanced absorption potentials relative to other, smaller developments offering much more limited types. This will permit a more sustainable development posture over time (and through cycles), keeping fresh inventory before the public eye, and an on-going market status.

- The location of the project is favorable, with a superior climate, excellent view panoramas, and close proximity to public facilities, regional commercial and industrial services, and employment centers. The direct access onto Palani Road and the proposed Ane Keohokalole Highway will be valued commodities among residents, as will be the unique opportunity to purchase affordable and lower market-priced homes in a full-amenitied master planned community.

- The parks, open spaces and greenbelts are integrated into the design as to maximize the frontage offered to abutting developable residential sites. The use of "pocket parks", connected greenbelts, community features, school sites and preserves will provide the appearance of lesser densities and establish a thematic landscaping theme which will tie the development neighborhoods together. Virtually every development pod will abut some open space amenity/feature.

- The school sites, community center/facilities and commercial component will create central gathering spaces for residents, increasing the quality and comprehensiveness of lifestyle available in the project; creating an enhanced neighborhood ambience and "sense of place" that has historically been lacking within the North Kona residential market outside of the destination resorts.

- The large number and relatively small size of the single family and multifamily development pods will promote

a variety of intimate and distinct subdivisions and multifamily products, a major marketing benefit, and an asset in investment management and timing of construction efforts. Having smaller projects also decreases the economic exposure of the developers at any given time; as during slow periods, the amount of inventory overhang can be more readily controlled.

- Although the primary commercial spaces are intended to service the Kamakana Villages population, they will also help meet the daily shopping needs of residents in proximate, presently un-serviced, neighborhoods in the immediate trade area, and passer-bys. The master plan placement of the commercial pods at the intersection of the project's primary through road and Palani Road, and along the new mid-level highway frontage, is prudent.

The master plan is an appropriate use of the subject property from a market demand and economic acceptance perspective based on a variety of criteria, including:

- It will convert an agriculturally and economically non-productive lava and bunch grass "ranchland" holding into an integrally-designed development which will help in meeting future residential needs in the region, while providing a meaningful economic stimulus to the island.

- It is within and consistent with the urban node encompassing Greater Kailua-Kona, and will provide a desirable transition from the intensity of the town's central commercial/industrial district to the upslope lower density single family and agricultural uses.

- The master plan is well suited for the climate of the site, and will serve to attract residents, retirees, and non-resident buyers seeking the slightly cooler and better views available at elevations slightly above the central Kailua-Kona urban development.

- The site has favorable frontage/exposure traits along Palani Road and the Ane Keohokalole Highway, with

relative ease of access to vital transportation and supporting facilities in West Hawaii, and is nearby the primary business and employment centers.

- Favorable ocean and/or upslope panoramas will be available for many properties in Kamakana Villages, a highly desirable asset in the regional market.

- The subject will help simultaneously fill numerous market niches. A diversity of residential inventory is vital to a stable regional market.

Based on these attributes of the subject property, our analysis of the Greater Kailua-Kona residential sector, and the historic experience of housing projects in the regional marketplace, we have estimated the probable absorption velocity for the subject inventory using three methodologies:

Gross Demand/Supply Comparison -- This straight-forward technique assumes that if there is insufficient existing and planned supply to meet projected market gross demand levels during the projection period, the proposed subject lots and units will be absorbed in a reasonable manner, regardless of competitive qualities, as there are no other alternatives available.

Over the next two decades, without Kamakana Villages, there will be a shortfall of some 1,500 to 6,000 residential units in Greater Kailua-Kona, even if all the presently "planned" developments are built along probable current time lines to maximum densities. The undersupply condition will ensure there is sufficient to absorb the project within the projection timeframe.

The Residual Method -- In this technique, the "planned" inventory and in-place but unsold units are placed on a time-line depicting the combined probable sales absorption time. To the extent this supply of units falls short of the forecast demand for product in the study region or exceeds the total, a respective undersupply or oversupply situation is present.

Having accounted for the likely-to-be-developed units in the market, and acknowledging the unlikelihood of otherwise competitive product in the region to additionally be successfully pursued during the projection period, it can be asserted the subject development will capture a significant portion to all of any residual demand. This approach is generally conservative, as it assumes the subject will capture only what is left over after all other projects garner their share. Given the nature of the subject holding we believe it could be a regional market leader, not a follower.

We completed the residual modeling effort for residential units relative to both the minimum and maximum demand estimates, as shown on Table 12.

Even with a supply overhang of more than 100 recently constructed but unsold homes/units, there will still be a shortfall in the near-term as the market recovers and they are absorbed.

In the anticipated offering period for the subject inventory, commencing with pre-sales in 2011, there will be a shortfall of between 1,702 and 4,304 units over the subsequent twenty years (through 2030), with a mid-point of 3,003 units in unmet demand. This will be more than sufficient to absorb the 2,330 units of Kamakana Villages, resulting in an estimated sales period of from 11 to circa 23 years for this component using the residual method, with a mid-point of 17 years.

The Market Shares Method -- This approach accounts for the probable competitiveness of the subject inventory regardless of the total level of product being otherwise offered on the market. In essence, it is an estimate of how much of the total forecast demand in the Greater Kailua-Kona residential sector the subject could expect to capture on an annual basis in light of its locational, pricing and amenity characteristics.

Generally moderate in application, this technique tests "pure" competitiveness and is considered the classic methodology, but does require judgment in the selection of factors.

Table 13 displays the Market Shares Method for the Kamakana Villages inventory under conservative and optimistic demand and capture rate alternatives.

Because of the latent demand for and high-desirability of the subject affordable/workforce housing component, it will experience rapid absorption of the 1,168 units of this product type, resulting in an atypically high market share while this inventory lasts.

We forecast the subject will be able to achieve an average market penetration, or a share, from 36 to 38 percent of the total regional residential demand during its sales period, resulting in an absorption period of from 13 to 18 years, or a mid-point of 15.8 years.

Correlation

Based on absorption analysis, we estimate the full-absorption of the subject residential component will require about 17 years, averaging 130 units per year, with a maximum sales rate of 160 units annually reached in the final years of the development. The elapsed sales period could be shorter if more affordable units were made available earlier in the project as there will be substantial demand for this product type. It is our understanding that phasing issues may extend the build-out of the project beyond our market demand conclusions.

QUANTIFICATION OF DEMAND FOR SUBJECT COMMERCIAL USES

The proposed 197,000 square foot commercial component is intended to meet the "neighborhood" and daily goods and services needs of the Kamakana Villages community population, other users and employees, its immediate neighbors in up-slope subdivisions who have no commercial opportunities

TABLE 12

PROJECTION OF POTENTIAL SUBJECT RESIDENTIAL ABSORPTION USING THE RESIDUAL METHOD BASED ON TOTAL DEMAND FOR RESIDENTIAL UNITS IN THE GREATER KAILUA-KONA STUDY AREA
Market Study of the Kamakana Village Community
Keahuolu, North Kona Hawaii

Scenario Perspective	TOTAL UNITS	Sales Period 2010-2015	Sales Period 2016-2020	Sales Period 2020-2025	Sales Period 2026-2030	Totals: Built 2010-2030	Totals: Remaining Unbuilt
1. Scenario One: Minimum Demand							
Identified Supply (From Table 11)	11,350	867	1,787	1,609	1,595	5,858	5,192
Market Share Percentage of Total Demand		66%	87%	77%	76%	77%	
Regional Residential Unit Demand		**1,320**	**2,050**	**2,080**	**2,110**	**7,560**	
Shortage or (Excess) Supply		**453**	**263**	**471**	**515**	**1,702**	
Potential Residual Subject Unit Demand							
at 100% Capture Rate		453	263	471	515	1,702	
at 95% Capture Rate		430	250	447	489	1,617	
2. Scenario Two: Maximum Demand							
Identified Supply (From Table 11)	11,350	867	1,787	1,609	1,595	5,858	5,192
Market Share Percentage of Total Demand		34%	72%	63%	62%	58%	
Regional Residential Unit Demand		**2,546**	**2,484**	**2,538**	**2,593**	**10,162**	
Shortage or (Excess) Supply		**1,679**	**697**	**929**	**998**	**4,304**	
Potential Residual Subject Unit Demand							
at 100% Capture Rate		1,679	697	929	998	4,304	
at 95% Capture Rate		1,595	662	882	949	4,088	
Mid-Point Analysis							
Identified Supply	11,350	867	1,787	1,609	1,595	5,858	5,192
Market Share Percentage of Total Supply		100%	100%	100%	100%	100%	
Regional Residential Unit Demand		**1,933**	**2,267**	**2,309**	**2,352**	**8,861**	
Shortage or (Excess) Supply		**1,066**	**480**	**700**	**757**	**3,003**	
Potential Residual Subject Unit Demand							
at 100% Capture Rate		1,066	480	700	757	3,003	
at 95% Capture Rate		1,013	456	665	719	2,853	

Source: County of Hawaii, Developers/Agents, & The Hallstrom Group, Inc.

TABLE 13

SUMMARY OF PROJECTED DEMAND LEVELS FOR SUBJECT RESIDENTIAL UNITS USING THE MARKET SHARES METHOD
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii
Assuming Maximum Build-Out of 2,330 Units
With Pre-Sales to Begin in 2011; First Closings in 2012

Scenario One: Using Minimum Demand Assumptions

Sales Year		Total Greater Kailua-Kona Unit Demand	Effective Subject Share	Indicated Total Subject Absorption
1	(2011)	220	30.00%	66
2		220	40.00%	88
3		220	38.00%	84
4		220	38.00%	84
5		220	38.00%	84
6		410	38.00%	156
7		410	38.00%	156
8		410	38.00%	156
9		410	38.00%	156
10		410	38.00%	156
11		416	38.00%	158
12		416	38.00%	158
13		416	38.00%	158
14		416	38.00%	158
15		416	38.00%	158
16		422	38.00%	160
17		422	38.00%	160
18		422	8.00%	34
Totals		**6,496**	**35.85%**	**2,329**

17.2 year absorption period

Scenario Two: Using Maximum Demand Assumptions

Sales Year		Total Greater Kailua-Kona Unit Demand	Effective Subject Share	Indicated Total Subject Absorption
1	(2011)	424	35.00%	149
2		424	45.00%	191
3		424	40.00%	170
4		424	40.00%	170
5		424	40.00%	170
6		497	40.00%	199
7		497	40.00%	199
8		497	40.00%	199
9		497	40.00%	199
10		497	40.00%	199
11		508	40.00%	203
12		508	40.00%	203
13		508	16.00%	81
Totals		**6,129**	**38.01%**	**2,330**

12.4 year absorption period

ANALYSIS MID-POINT			
15.8 year absorption period	**6,312**	**36.90%**	**2,329**

Source: The Hallstrom Group, Inc

within their immediate trade area, and the passer-bys utilizing the Palani Road. It is not envisioned as serving any regional or major destination-based demand which may exist.

Therefore, our analysis is summary in nature and specifically assessing the reasonable level of demand for commercial floor space these identified user groups will express within the context of the subject mixed-use sites. The larger North Kona commercial market long-term demand and supply trends are not particularly relevant on a macro basis given the limited scale and targeted patronage.

For purposes of this portion of our analysis, it is assumed the mixed-use sites in the subject community will be used for commercial purposes and be the primary focus of business activity in the development.

As shown on Table 14, the demand for non-hotel retail and restaurant commercial space created by each person in the islands (de facto population) is about 20 square feet. On the Big Island the total is 18.8 square feet of space per capita.

This demand for space is divided among several use types, such as neighborhood, regional, big box, destination, specialized, in-resort, etc. The "neighborhood" retail and restaurant segment is the largest component at up to 55 percent of total demand; the grocery, drug store, restaurants, bank, salon, and other businesses patronized on a regular/daily basis.

To efficiently and effectively attract and service potential customers, the business has to be located on an easy access/high exposure property within the briefest possible travel time for its target patrons. To the extent it takes longer than five to eight minutes to reach a store or restaurant, it is outside the desirable limits of a typical "neighborhood" trade area.

Traffic interception within the trade area is also a meaningful attribute. And, neighborhood retailers generally look favorably on underserviced trade areas populated be 3,000 to 5,000 persons.

Within these broad demand parameters, the Kamakana Villages commercial component appears to be an appropriately supportable use, vital not only to the lifestyle of the subject community but also a well-placed attribute to the immediate trade area.

Table 15 contains a summary calculation of stabilized demand for general/neighborhood commercial uses which would likely seek location in the subject projects at build-out.

Starting with an estimate of daily de facto population of 5,139 persons (discussed in the Economic Impact Analysis section), the average per capita demand for neighborhood retail and restaurant space is quantified at 11.0 square feet. Added to this are allowances for other non-retail/restaurant uses found within modern suburban trade areas, including Service Commercial, Medical, Support Commercial, and Neighborhood Business Office.

The cumulative demand for local-oriented commercial space is estimated at 20.9 square feet per person within the subject community, or 110,808 square feet total. The subject businesses would be expected to capture virtually all of this residential neighborhood-based patronage.

Other patronage sources were estimated as a percentage of base subject population demand at:

- 25 percent for employees, day workers, and other daily visitors to the community.
- 50 percent for nearby populations within the trade area which are currently not-serviced. This is a moderate allowance given there are more than 5,000 in-place persons comprising the group, creating demand for circa 105,000 square feet of neighborhood-type businesses. We are assuming the subject centers capture only about half this demand even though they will be the most proximate and readily reachable alternative.

TABLE 14

SUMMARY OF EXISTING RETAIL/RESTAURANT COMMERCIAL SPACE DEVELOPMENT IN HAWAII
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii
As of Mid-2009, Major Islands Only

County	**C& C of Honolulu**	**Maui**	**Kauai**	**Hawaii**	**State Totals**
Resident Population	918,194	144,159	64,061	173,290	1,283,388
De Facto Population	1,000,194	189,159	84,061	198,290	1,471,704
1. Summary of Inventory					
Number of Major Retail Centers	123	51	16	36	226
Gross Leasable Area in Centers (1) (Square Feet)	16,555,631	3,875,941	1,218,989	3,110,518	24,761,079
Other Gross Leasable Area (2) (Square Feet)	3,475,000	510,000	192,500	625,000	4,802,500
Total Estimated Commercial GLA (Square Feet)	**20,030,631**	**4,385,941**	**1,411,489**	**3,735,518**	**29,563,579**
2. Per Capita Spatial Allowance (Square Feet per Person)					
Per Resident Population Member	21.82	30.42	22.03	21.56	23.04
Per De Facto Population Member	20.03	23.19	16.79	18.84	20.09

(1) Complexes with circa 50,000 square feet and up.
(2) Includes smaller projects and hotels. Does not include space within mixed-use, multi-tenant buildings located in Light Industrial parks.

Source: CB Richard Ellis, State DBEDT and The Hallstrom Group, Inc.

TABLE 15

SUMMARY OF NEIGHBORHOOD COMMERCIAL SPACE DEMAND
CREATED BY SUBJECT AND TRADE AREA RESIDENTS AT BUILD-OUT
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii

1. Stabilized Subject Population		
Full-Time Residents		5,139
Non-Full Time Resident Owners and Guests (1)		163
Total Daily De Facto Population		**5,302**
2. Per Capita Demand for Commercial Space (in Gross Square Feet per Person)		
Total for All Commercial Needs		20.0
"Neighborhood" Space Demand as Percent of Total (2)		55%
Total Per Capita "Neighborhood" Commercial Space Demand in Square Feet		**11.0**
Plus Additional Related Space Demands		
Allowance for "Service Commercial/Medical" Space		4.4
Allowance for "Support Commercial" Space		2.8
Allowance for "Neighborhood Business" Office Space		2.8
Total Per Capita Floor Space Demand for Local-Oriented Commercial Space		**20.9**
3. Indicated Subject Commercial Floor Space Demand		
From Community De Facto Population		110,808
Patronage From Other Sources	**% of Community Demand**	
Employees and Day Workers in Community	15%	16,621
Nearby Population in Non-Subject Projects (3)	50%	55,404
Passer-Bys/Intercept and Others	15%	16,621
Total Estimated Gross Floor Space Demand at Stabilization		**199,454**

(1) "Guests" are non-owners visiting units owned by residents and non-residents. There will be no Transient Vacation Rentals in the project.
(2) Subject developers are not seeking to attract significant levels of outside patrons via Regional, Specialty or Destination type commercial development, but to provide community residents and other users will proximate goods and services.
(3) The subject commercial space will be the most proximate full-service neighborhood shopping opportunity for those persons living northerly/mauka of the property forming an immediate trade area with a de facto population of several thousand persons.

Source: The Hallstrom Group, Inc.

- 15 percent for passer-bys on Palani Road (commuters, tourists, and others) exploiting the intercept potentials the subject will have by being the closest major neighborhood shopping opportunities for the upslope resident populations, and other incidental patronage groups.

The total quantified, specifically demonstrable demand for the Kamakana Villages commercial component is 199,500 square feet; or, commensurate with the 197,000 square feet proposed in the master plan.

ECONOMIC IMPACTS OF THE PROPOSED DEVELOPMENT

The development of Kamakana Villages will result in significant expenditures that will favorably impact the Big Island economy on both a direct and indirect basis, increasing the level of capital investment and capital flow in the region, which will in turn create employment and widen the tax base.

From a direct perspective, the proposed 661 single-family homes, 1,669 multi-family units, and 197,000 square foot of commercial space will create numerous construction, equipment operator and specialty trade jobs on- and off-site, directly and indirectly, during the planning and emplacement of the infrastructure, and building of the improvements.

After completion of the common systems, vertical construction, support facilities and amenities over a multi-phase, nearly two decade development period, there will be permanent employment positions created retail/commercial operations and the buildings themselves (landscape, service, maintenance, and renovation needs in the course of their use).

Numerous local businesses will see significant profit opportunities arising for contracting companies constructing the improvements, and for local businesses which would supply a substantial portion of the materials needed in the building efforts.

The general island economy also will benefit from the subject development, as its residents, non-resident owners/users, employees and businesses will spend large amounts of discretionary income in off-site shops, restaurants, and service establishments throughout West Hawaii, and in purchasing goods and services. Non-residents owners, users and their guests will generally be middle and above income households and have daily expenditures comparable with standard visitor spending levels.

Indirectly, as these wages, profits, and expenditures move through the regional economy, they will have a ripple, or "multiplier," effect which increases the amount of capital flowing to the entire community resulting from the development of the subject.

Construction, operational and other workers earning wages via Kamakana Villages development and associated off-site/supporting efforts will spend the majority of their income on living and entertainment expenses while supporting and patronizing other island businesses. Much of this spending would be re-directed by these businesses to other island industries, and significant portions of these secondary profits would in turn be put back through the region's economic and tax structure.

These substantial direct and indirect economic impacts associated with the proposed subject project, as quantified in the following sections, are all the result of the capital investment and entrepreneurship necessary to convert undeveloped, poor quality agricultural lands into a low intensity diverse residential community. The County of Hawaii economy will be meaningfully stimulated by the capital investments, population/user spending and business operations of the development.

We note, our economic modeling is based on a 19-year build-out and absorption period. The construction may take longer, particularly if large numbers of house lots are sold instead of finished homes. However, whether full development takes 15 or 25 years, the stabilized "operation" of the community and its

de facto population will be the same following completion. As constant, uninflated 2009 dollars are used throughout the model, time is not a significant variable in the analysis.

It is anticipated that final approvals, surveys and planning will require approximately six to 12 months year (into 2010), the initial phase of infrastructure and product development occurring over a 12 to 18 month period (2010-2011), with occupancy and use commencing at the beginning of 2012. Pre-sales would begin in mid-2011 with the first closings at year-end.

Infrastructure would be completed in a series of six distinct phases, which Forest City plans to spread over 17 total years (the last increment being undertaken in 2026), with finished inventory being delivered on a consistent basis from 2012 through build-out in 2028.

Capital Investment and Construction Costs

The subject will bring an estimated $754.4 million in direct development capital into West Hawaii over the 19 year build-out period for the project (2010 through 2028), as summarized on Table 16.

Infrastructure cost estimates prepared for Forest City are forecast at $154.6 million. The first phase of infrastructure would be finished during the initial two-year construction increment.

Unit/Home construction costs would total $525.7 million during the modeling period according to "current price" estimates by Forest City and The Hallstrom Group. This is based on average vertical construction costs per unit of:

- $138,750 for the affordable-priced multifamily units (average size of 750 square feet and construction cost of $185 per square foot, exclusive of land).

- $193,500 for the market-priced townhouse multifamily units (average size of 900 square feet at $215 per square foot).
- $258,000 for the affordable-priced single family homes units (1,200 square feet at $215 per square foot).
- $408,000 for the single family homes (average size of 1,700 square feet at $240 per square foot).

The estimates include allowances for landscaping and common element emplacement expenses.

Commercial construction is estimated to cost $54,175,000 total, all-in including any tenant allowances, which is based on a figure of $275 per square foot overall for the 197,000 square feet on the identified mixed use sites.

Kamakana Villages development will infuse on average an anticipated $38.7 million annually into the West Hawaii building industry, on average, over the build-out period. This will provide a significant near to mid-term boost for the construction trades, which have been hit particularly hard during the current recession.

Direct Business Profits From Construction

While a significant percentage of the materials needed to build the subject infrastructure and residential and commercial structures must be imported to Kailua-Kona, a portion of the construction costs spent in the development will directly flow to local businesses in the form of contractor profits and supplier profits.

Typically, within the industry net contractor profit margins are expected to be at 8 to 20 percent of total construction costs. We have used a conservative ten percent figure. Supplier profits were extrapolated at four percent of total costs. The estimates were shown along the bottom of Table 16.

TABLE 16

CONSTRUCTION COSTS AND CONTRACTOR AND SUPPLIER PROFIT ESTIMATES
Market Study of the Kamkana Villages Community
Keahuolu, North Kona, Hawaii
All Amounts Expressed in Constant, Uninflated 2009 Dollars

	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Development Year	1	2	3	4	5	6	7	8	9	10
	Infrastructure and Initial Product Completed During First Two Years		Occupancy & Use Begins							
Construction Costs (1)										
Infrastructure (2)	$30,911,641	$30,911,641			$18,546,984				$18,546,984	
Commercial Construction (3)			$8,085,000	$3,465,000	$3,437,500	$3,437,500				$4,400,000
Unit/Home Construction (4)		$20,355,000	$24,830,250	$24,056,250	$24,056,250	$28,653,000	$27,105,000	$27,105,000	$27,105,000	$23,877,000
TOTAL CONSTRUCTION COSTS	$30,911,641	$51,266,641	$32,915,250	$27,521,250	$46,040,734	$32,090,500	$27,105,000	$27,105,000	$45,651,984	$28,277,000
CONTRACTOR'S PROFIT	$3,091,164	$5,126,664	$3,291,525	$2,752,125	$4,604,073	$3,209,050	$2,710,500	$2,710,500	$4,565,198	$2,827,700
SUPPLIER'S PROFIT	$927,349	$1,741,549	$1,316,610	$1,100,850	$1,656,160	$1,283,620	$1,084,200	$1,084,200	$1,640,610	$1,131,080

	2020	2021	2022	2023	2024	2025	2026	2027	2028	
Development Year	11	12	13	14	15	16	17	18	19	Totals
Construction Costs (1)										
Infrastructure (2)		$18,546,984			$18,546,984		$18,546,984			$154,558,203
Commercial Construction (3)	$4,400,000						$17,875,000	$9,075,000		$54,175,000
Unit/Home Construction (4)	$25,635,000	$27,699,000	$29,103,750	$31,143,750	$31,143,750	$37,264,500	$38,272,500	$40,488,000	$37,845,750	$525,738,750
TOTAL CONSTRUCTION COSTS	$30,035,000	$46,245,984	$29,103,750	$31,143,750	$49,690,734	$37,264,500	$74,694,484	$49,563,000	$37,845,750	$734,471,953
CONTRACTOR'S PROFIT	$3,003,500	$4,624,598	$2,910,375	$3,114,375	$4,969,073	$3,726,450	$7,469,448	$4,956,300	$3,784,575	$73,447,195
SUPPLIER'S PROFIT	$1,201,400	$1,664,370	$1,164,150	$1,245,750	$1,802,160	$1,490,580	$2,802,310	$1,982,520	$1,513,830	$27,833,296

(1) Estimates for On and Off-Site Infrastructure provided by Forest City development team, may not include some minor traffic mitigation. Vertical construction estimates generated by The Hallstrom Group, Inc.
(2) Assuming on-going, multi-phase project of $154.6 million, with initial increment at 40% of total costs, and five subsequent phases at 12% of total costs each. Construction done in year prior before phase "opening".
(3) Commercial costs estimated at "all-in" expense of $275 per square foot of gross leasable area. (direct and indirect costs).
(4) Affordable multifamily units estimated to have average "all-in" construction costs of $150,000 per unit; market multifamily units at $230,000 per units, affordable single family homes at $276,000, and market single family homes at $477,000.

Source: As Cited, and The Hallstrom Group, Inc.

The total Contractor's Profit generated by Kamakana Villages for local building companies ranges from $2.7 to $7.5 million per year, with a cumulative profit of $73.4 million over the construction period. The total annual Supplier's Profit ranges from a low of $1.1 million to a high of $2.8 million, and equates to $27.8 million in aggregate.

Employment Opportunities Created

Based on indicators provided by the construction of comparable sized projects and Hawaii industry averages, we have estimated the demand for on- and off-site, direct and indirect, full-time equivalent employment positions associated with laying of initial infrastructure systems, construction of the units/homes and commercial spaces, operation of the on-going businesses in the project, and in providing continuing services to the occupied buildings.

The construction, maintenance, and indirect/off-site employment opportunities created by the subject development will not be "new" jobs requiring new West Hawaii residents, but will be vitally needed new opportunities for in-place resident construction trade workers and existing local businesses. The jobs associated with the commercial and owners association operations will represent an expansion of the employment pool; although, some tenants in the commercial centers may be relocating from elsewhere and not generate "new" positions.

It is assumed the off-site/indirect work created will be steered towards existing Kailua-Kona supply, equipment providers, and other service companies, which are experiencing a "lean" period following the large scale development activity earlier in the decade.

In this regard, the combination of employment types generated by the subject development with most going to support existing businesses, but providing a not insubstantial number of new employment opportunities, is what is needed on the Big Island over the coming five years.

Overall, unemployment on the island is presently at 10.8 percent, among the highest levels in this generation, with many businesses continuing to cut back workers. So there is a need to both bolster existing companies so they can recover "lost" jobs and to provide some new employment for the natural growth of the community. Each year in Hawaii County about 2,000 youths turn 18 and become potential entrants into the workforce, with most requiring either a job opportunity or facing out-migration.

Our employment estimates on are based on full-time "worker-years," although one worker-year (or circa 2,080 working hours) may be comprised of many employees involved in specialized tasks of a much shorter duration.

Our projections are founded on examples provided by various resort/residential developments undertaken on the neighbor islands over the past decade, and via formulae expressing relationships between total worker wages/benefits and construction task costs.

Infrastructure construction employment forecasts are taken from discussions with developers, review of project records and ratios of direct costs to job creation, which currently project one worker-year for every $400,000 in development costs expended for a project of this quality. The ratio of job creation to costs is somewhat low for these components due to the high equipment, materials and systems expenses associated with major site work.

Unit/home and commercial vertical construction, which are more labor intensive in regards to overall costs, are anticipated to require one worker-year per $200,000 in construction expenses.

Commercial operations in the mixed-use centers are forecast to generate one FTE for every 400 square feet of gross floor area.

The finished homes, condominium units, and community assets will require maintenance, landscaping, service, and renovation and repair workers and common element staff. We project

TABLE 17

EMPLOYEE JOB COUNT AND WAGE ESTIMATES
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii
All Amounts Expressed in Constant, Uninflated 2009 Dollars

	Infrastructure and Initial Product Built		Occupancy & Use Begins							
Development Year	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**
Worker Requirements (1)										
Infrastructure Construction (2)	77	77			46				46	
Commercial Construction (3)				17				0		
Unit/Home Construction (3)		102	124	120	120	143	136	136	136	119
Commercial Businesses Workers (4)				75	105	138	168	168	168	208
Maint. & Common Element Staff (5)			22	29	37	46	55	64	73	80
Off-Site Employees (6)	26	59	48	80	102	108	118	121	139	134
TOTAL EMPLOYMENT CREATED	**103**	**238**	**194**	**322**	**410**	**435**	**477**	**488**	**562**	**541**
Worker Wages										
Infrastructure (7)	$5,486,816	$5,486,816	$0	$0	$3,292,090	$0	$0	$0	$3,292,090	$0
Commercial Construction (7)	$0	$0	$0	$1,230,075	$0	$0	$0	$0	$0	$0
Unit/Home Construction (7)	$0	$7,226,025	$8,814,739	$8,539,969	$8,539,969	$10,171,815	$9,622,275	$9,622,275	$9,622,275	$8,476,335
Commercial Businesses Workers (8)	$0	$0	$0	$2,550,000	$3,570,000	$4,675,000	$5,695,000	$5,695,000	$5,695,000	$7,055,000
Maint. & Common Element Staff (9)	$0	$0	$882,867	$1,197,200	$1,511,533	$1,896,933	$2,265,933	$2,634,933	$3,003,933	$3,288,200
Off-Site Employees (9)	$1,045,586	$2,422,602	$1,971,112	$3,271,639	$4,174,213	$4,424,738	$4,847,686	$4,969,456	$5,718,578	$5,507,860
TOTAL ANNUAL WAGES PAID	**$6,532,402**	**$15,135,443**	**$11,668,718**	**$16,788,882**	**$21,087,805**	**$21,168,487**	**$22,430,895**	**$22,921,665**	**$27,331,876**	**$24,327,395**

(1) All job counts expressed as "full-time" equivalent positions.
(2) Based on one worker year for every $400,000 in construction costs.
(3) Based on one worker year for every $200,000 in construction costs.
(4) Ratio of one FTE worker for each 400 SF of GLA.
(5) Includes common element administration and maintenance staff of 7 jobs, and ratio of one full-time-equivalent landscaping/maintenance/repair worker for every 15 units.
(6) Off-site employees at 33% of on-site workers.
(7) Based on average annual wages of $71,000.
(8) Based on average annual wage of $34,000.
(9) Based on average annual wage of $41,000.

Source: Various, and The Hallstrom Group, Inc.

centralized community management and upkeep personnel of seven workers, with maintenance and common element staff at the equivalent of one FTE worker for every 15 completed residential units.

Off-site employees were estimated at 33 percent of on-site workers, and are comprised of three groups:

- Off-site building/trade industry positions will be enhanced by the subject development, including such jobs as administration, office help, material providers, equipment maintenance and specialty tasks.
- Off-site support businesses, including contractor/retail/counter sales, fuel providers, shipping, storage and professional services will also benefit.
- Each on-site worker creates demand for services (and related employment) during and directly attributable to the work day. These positions include food businesses, providers of tools and trade goods, payroll/financial and insurance businesses, medical requirements and other secondary indirect/off-site employment.

Application of these ratios to the proposed subject master plan is shown on the top half of Table 17, which is spread across two pages as are many of the tables in this section of the report.

During the 19-year modeling period the number of worker-years created on- and off-site, directly and indirectly, by the development varies from 103 to 1,173 positions annually, totaling 11,131 worker-years over the entire timeframe. Of this total 3,189 worker-years (an annual average of 168 positions) are direct construction-oriented, 5,180 (or 273 per year) are on-going, on-site business operating and maintenance positions; and 2,762 are off-site/indirect worker-year requirements.

On a stabilized basis, after the completion of construction (year 20 and beyond), the project will generate some 933 permanent full-time equivalent employment opportunities-- 654 directly

related to on-site activities, and 279 indirect positions throughout the island.

Wage Income Generated

In accordance with data compiled by the state Department of Labor and Industry Relations, as tempered through our analysis, we have estimated the personal income (in the form of wages) which will flow to Big Island workers as a result of Kamakana Villages construction and use. The results are presented along the bottom of Table 17 in correspondence to the estimate worker requirements.

The gross full-time equivalent wage estimates for a worker-year according to the identified employment categories for 2009 are as follows:

- Construction workers (covering all trades), $71,000 per year.
- Commercial businesses workers, $34,000.
- Maintenance/common element and off-site and indirect employment, $41,000.

Overall average wages paid via the subject development are equal to $45,405 per worker-year created during the modeling time-frame.

In the first year of development, the "Total Annual Wages Generated" by the subject development effort would be $6.5 million, increasing to as high as $48.3 million in year 19. After completion of all construction, the stabilized on-going commercial operations, maintenance/common element, off-site and indirect employment would result in total annual wages of $34.8 million thereafter in uninflated 2009 dollars. This is equates to an average wage of $37,306 per worker-year.

During the development period, on- and off-site, direct and indirect worker wages would total $505 million.

TABLE 17 -- Continued

EMPLOYEE JOB COUNT AND WAGE ESTIMATES
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii
All Amounts Expressed in Constant, Uninflated 2009 Dollars

Development Year	11	12	13	14	15	16	17	18	19	Total for Yrs 1 Through 19	Stabilized Annually Thereafter
Worker Requirements (1)											
Infrastructure Construction (2)		46			46		46			386	
Commercial Construction (3)	22						89	45		174	
Unit/Home Construction (3)	128	138	146	156	156	186	191	202	189	2,629	
Commercial Businesses Workers (4)	248	248	248	248	248	248	248	410	493	3,663	493
Maint. & Common Element Staff (5)	87	95	103	112	121	132	143	153	162	1,517	162
Off-Site Employees (6)	160	174	164	170	188	187	237	268	279	2,762	279
TOTAL EMPLOYMENT CREATED	**645**	**701**	**660**	**686**	**759**	**753**	**955**	**1,079**	**1,123**	**11,131**	**933**
Worker Wages											
Infrastructure (7)										$17,557,812	
Commercial Construction (7)										$1,230,075	
Unit/Home Construction (7)	$9,100,425	$9,833,145	$10,331,831	$11,056,031	$11,056,031	$13,228,898	$13,586,738	$14,373,240	$13,435,241	$186,637,256	
Commercial Businesses Workers (8)	$8,415,000	$8,415,000	$8,415,000	$8,415,000	$8,415,000	$8,415,000	$8,415,000	$13,940,000	$16,745,000	$124,525,000	$16,745,000
Maint. & Common Element Staff (9)	$3,575,200	$3,884,067	$4,239,400	$4,608,400	$4,977,400	$5,425,667	$5,876,667	$6,289,400	$6,655,667	$62,213,400	$6,655,667
Off-Site Employees (9)	$6,560,359	$7,131,606	$6,716,546	$6,976,322	$7,725,443	$7,660,088	$9,713,705	$10,975,739	$11,420,160	$113,233,439	$11,420,160
TOTAL ANNUAL WAGES PAID	**$27,650,984**	**$29,263,818**	**$29,702,777**	**$31,055,753**	**$32,173,875**	**$34,729,653**	**$37,592,109**	**$45,578,379**	**$48,256,068**	**$505,396,983**	**$34,820,827**

(1) All job counts expressed as "full-time" equivalent positions.
(2) Based on one worker year for every $400,000 in construction costs.
(3) Based on one worker year for every $200,000 in construction costs.
(4) Ratio of one FTE worker for each 400 SF of GLA.
(5) Includes common element administration and maintenance staff of 7 jobs, and ratio of one full-time-equivalent landscaping/maintenance/repair worker for every 15 units.
(6) Off-site employees at 33% of on-site workers.
(7) Based on average annual wages of $71,000.
(8) Based on average annual wage of $34,000.
(9) Based on average annual wage of $41,000.

Source: Various, and The Hallstrom Group, Inc.

TABLE 18

DE FACTO POPULATION AND DISCRETIONARY EXPENDITURES
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii
All Amounts Expressed in Constant, Uninflated 2009 Dollars

Development Year	2012 Occupancy Commences 3	4	5	6	7	8	9	10
Cumulative Unit/Home Development								
Affordable Multifamily Unit Development	125	190	255	335	415	495	575	615
Market Multifamily Unit Development	45	70	95	125	155	185	215	245
Affordable Single Family Home Development	3	3	3	9	9	9	9	18
Market Single Family Home Development	45	70	95	120	145	170	195	220
Total Finished Units/Homes	**218**	**333**	**448**	**589**	**724**	**859**	**994**	**1,098**
Use by Product type								
Full-Time Resident Multifamily Units (1)	161	246	331	435	539	643	747	811
Non-Resident Multifamily Units (2)	9	14	19	25	31	37	43	49
Full-Time Resident Single Family Homes (3)	39	59	79	105	125	145	165	194
Non-Resident Single Family Homes (4)	9	14	19	24	29	34	39	44
Total	**218**	**333**	**448**	**589**	**724**	**859**	**994**	**1,098**
Average Daily Resident/Guest Population								
Full-Time Residents (5)	490	747	1,005	1,323	1,627	1,931	2,234	2,462
Non-Residents and Their Guests (6)	13	20	27	34	42	50	57	65
Total De Facto Population	**503**	**767**	**1,031**	**1,357**	**1,669**	**1,980**	**2,292**	**2,527**
Total Full-Time Resident Population	490	747	1,005	1,323	1,627	1,931	2,234	2,462
Estimated Actual Public School Children								
Using DOE Formula (7)	103	157	211	277	339	401	463	515
Using Demographic Analysis (8)	108	164	221	291	358	425	492	542
FULL-TIME RESIDENT HOUSEHOLD INCOME (5)	**$22,134,000**	**$33,754,350**	**$45,374,700**	**$59,761,800**	**$73,484,880**	**$87,207,960**	**$100,931,040**	**$111,223,350**
OWNER/OCCUPANT DISCRETIONARY (TAXABLE) EXPENDITURES (6)	**$14,430,150**	**$22,041,110**	**$29,652,070**	**$38,986,955**	**$47,923,428**	**$56,859,901**	**$65,796,374**	**$72,674,385**

(1) Includes all affordable units and 80% of the market-priced units
(2) Estimated at 20% of the market-priced units
(3) Includes all affordable units and 80% of the market-priced units
(4) Estimated at 20% of the market-priced units
(5) Assumes 98% occupancy of units with average household size of 2.5 persons
(6) Assumes 25% occupancy with average party size of 2.8 persons
(7) Using DOE formula of .72 public school students per single family home (combining Elem. Mid and High grades) and .40 students per multifamily un
(8) Estimated at 22% of the resident population.
(4) Estimated at circa $110,670 annually per full-time resident household based on unit mix and pricing guidelines, or about 170% of the expected 2009 household average for North Kon
(5) Based on average daily expenditures of $250 daily for non-resident owners & guests, and 60% of resident household incomes

Source: Various, and The Hallstrom Group, Inc

Population, Income and Expenditures

The homes and units of Kamakana Villages will substantially be primary homes for resident families. However, it is inevitable in a project of this size, quality and location there will be some second home owners as previously discussed.

It is assumed there will be no Transient Vacation Units (TVUs) within the proposed community. If such were allowed, and we are not recommending it from a market perspective, the resulting daily population and demographic mix of the development would change as would the overall economic impact of the project.

The resident households, non-resident owners, and guests will constitute the de facto population of the community members, whose income and discretionary expenditures will create major positive impacts on the Big Island economy.

We have quantified these focal statistics within the modeling process. The results are shown on Table 18.

The top half of the table depicts the construction/absorption of the 2,330 residential units and their expected division between resident and non-resident ownership. We project that 2,098 (or 90 percent) of the subject units/homes, including virtually all of the multifamily units will be purchased by full-time residents, with the remaining 232 units bought by non-residents.

It is projected the average resident household size will be 2.5 persons, and that units will be occupied on average 98 percent of the time. This equates to a stabilized resident population of 5,139 persons upon build-out. These figures are taken from our macro demand analysis.

Based on investigation of similar quality projects on Maui and in West Hawaii, we estimate that the non-resident units will be occupied 25 percent of the time with an average party size of 2.8 persons. This generates an average daily non-resident population count of 163 persons.

The total de facto population at build-out is forecast to be 5,302 persons.

Of the full-time resident group, we estimate 22 percent, or 1,131 persons, will be of school age (5 to 18). This is consistent with the State Department of Education formula being applied to the subject of .72 public school students per single family home and .4 per multi-family unit.

Based on affordable-pricing guidelines coupled with the level of income necessary to support the purchase of the market-priced inventory, we estimate the average annual income for resident households at Kamakana Villages will be $110,670 in 2009 dollars. This is the equivalent of 170 percent of the North Kona average. During occupancy of the build-out period, the total resident household income will be $2.1 billion, and at $232.1 million annually thereafter.

The de facto population of the project will place significant discretionary expenditure dollars into the West Hawaii economy. This will be comprised of the year-round, daily expenditures by the full-time resident group, and the purchases made by non-resident owners and guests during use of their units. In light of the cost of the market-priced finished homes and units, the non-resident segment will be in the middle to upper-income bracket with meaningful available income for such spending.

We estimate that full-time resident households will spend about 60 percent of their total income on discretionary items, with the remainder going towards mortgage debt service and fixed expenses. The daily per capita spending by non-resident owners and their guests in the Big Island economy is estimated will be on average $250; or about 40 percent above what the typical Kona visitor spends daily. This pays for all food, entertainment, household goods, locally purchased fixtures and furnishings, utilities, clothing, and other daily items.

By build-out, the total de facto population discretionary expenditures made by subject project owners in the local market will be at $154.1 million annually on a stabilized basis, in 2009

TABLE 18 -- Continued

DE FACTO POPULATION AND DISCRETIONARY EXPENDITURES
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii
All Amounts Expressed in Constant, Uninflated 2009 Dollars

Development Year	11	12	13	14	15	16	17	18	Stabilized 19	Totals Years 1 Through 19
Cumulative Unit/Home Development										
Affordable Multifamily Unit Development	655	695	760	825	890	970	1,050	1,100	1,137	1,137
Market Multifamily Unit Development	275	305	335	365	395	430	465	500	532	532
Affordable Single Family Home Development	18	26	26	26	26	30	30	31	31	31
Market Single Family Home Development	255	290	325	365	405	450	500	565	630	630
Total Finished Units/Homes	1,203	1,316	1,446	1,581	1,716	1,880	2,045	2,196	2,330	2,330
Use by Product type										
Full-Time Resident Multifamily Units (1)	875	939	1,028	1,117	1,206	1,314	1,422	1,500	1,563	1,563
Non-Resident Multifamily Units (2)	55	61	67	73	79	86	93	100	106	106
Full-Time Resident Single Family Homes (3)	222	258	286	318	350	390	430	483	535	535
Non-Resident Single Family Homes (4)	51	58	65	73	81	90	100	113	126	126
Total	**1,203**	**1,316**	**1,446**	**1,581**	**1,716**	**1,880**	**2,045**	**2,196**	**2,330**	**2,330**
Average Daily Resident/Guest Population										
Full-Time Residents (5)	2,688	2,933	3,219	3,516	3,812	4,175	4,537	4,858	5,139	5,139
Non-Residents and Their Guests (6)	74	83	92	102	112	123	135	149	163	163
Total De Facto Population	**2,762**	**3,016**	**3,312**	**3,618**	**3,924**	**4,298**	**4,673**	**5,007**	**5,302**	**5,302**
Total Full-Time Resident Population	2,688	2,933	3,219	3,516	3,812	4,175	4,537	4,858	5,139	5,139
Estimated Actual Public School Children										
Using DOE Formula (7)	569	628	691	758	824	906	988	1,069	1,144	1,144
Using Demographic Analysis (8)	591	645	708	773	839	918	998	1,069	1,131	1,131
FULL-TIME RESIDENT HOUSEHOLD INCOME (5)	**$121,404,990**	**$132,471,990**	**$145,420,380**	**$158,811,450**	**$172,202,520**	**$188,581,680**	**$204,960,840**	**$219,458,610**	**$232,141,392**	**$2,109,325,932**
OWNER/OCCUPANT DISCRETIONARY (TAXABLE) EXPENDITURES (6)	**$79,613,744**	**$87,084,319**	**$95,683,728**	**$104,612,620**	**$113,541,512**	**$124,391,008**	**$135,304,379**	**$145,280,541**	**$154,129,385**	**$1,388,005,609**

(1) Includes all affordable units and 80% of the market-priced units.
(2) Estimated at 20% of the market-priced units.
(3) Includes all affordable units and 80% of the market-priced units.
(4) Estimated at 20% of the market-priced units.
(5) Assumes 98% occupancy of units with average household size of 2.5 persons.
(6) Assumes 25% occupancy with average party size of 2.8 persons.
(7) Using DOE formula of .72 public school students per single family home (combining Elem. Mid and High grades) and .40 students per multifamily unit.

dollars. During the 19-year development and stabilization model period, the total sum of these expenditures will be $1.4 billion.

While significant portions of these discretionary income will be spent in the on-site "neighborhood", much will also flow into other Greater Kailua-Kona and islandwide companies.

Operating Economic Activity

The estimated level of total gross on-site economic activity within the proposed Kamakana Villages community during the modeling period and on a stabilized basis is summarized on Table 19. The contributing activity includes:

- Commercial Operations in the 197,000 square feet of leasable area in the primary general/neighborhood mixed-use centers. Overall, these businesses are projected to have average sales volumes of $700 per square foot annually, of which an estimated 56 percent will be from the on-site population and 44 percent will be from outside project patronage.

- Maintenance/Landscaping/Renovations will be required by the residential components of the development. We have estimated these costs for the affordable-priced multifamily units will be an average $1,500 per year; at $2,000 per year for the market-priced multifamily units; $3,000 per year for the affordable single family product; and, $4,000 per year for the market-priced single family inventory. Overall, the proposed development will create taxable gross operating revenues of $142.9 million per year following stabilization, of which about $60.7 million will be from outside project patronage and $82.2 million will be spent by the on-site population. During the development period, this model projects total on-site sales of $1.1 billion.

TABLE 19

PROJECTION OF OPERATING ECONOMIC ACTIVITY
Market Study of the Kamakana Villages Community
Kealakaha, North Kona, Hawaii
All Amounts Expressed in Constant, Uninflated 2009 Dollars

Development Year	Operations Commence 3	4	5	6	7	8	9	10	11	12
1. Commercial Operations (1)										
Annual Gross Sales	$0	$21,000,000	$29,400,000	$38,500,000	$46,900,000	$46,900,000	$46,900,000	$58,100,000	$69,300,000	$96,670,000
In-Project Patronage Percentage	56%	56%	56%	56%	56%	56%	56%	56%	56%	56%
Outside Project Patronage Expenditures	$0	$9,240,000	$12,936,000	$16,940,000	$20,636,000	$20,636,000	$20,636,000	$25,564,000	$30,492,000	$42,534,800
2. Maintenance/Landscaping/Renovations (3)										
Total Sales/Year	$210,000	$466,500	$714,000	$961,500	$1,259,500	$1,539,500	$1,819,500	$2,099,500	$2,346,500	$2,606,500
In-Project Patronage Percentage	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
Outside Project Patronage Expenditures	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
ANNUAL OPERATING ECONOMIC ACTIVITY	$210,000	$21,466,500	$30,114,000	$39,461,500	$48,159,500	$48,439,500	$48,719,500	$60,199,500	$71,646,500	$99,276,500
Outside Project Patronage Expenditures	$0	$9,240,000	$12,936,000	$16,940,000	$20,636,000	$20,636,000	$20,636,000	$25,564,000	$30,492,000	$42,534,800

Development Year	13	14	15	16	17	18	19	Totals Years 1 Through 19	Stabilized Operations
2. Commercial Operations (1)									
Annual Gross Sales	$96,670,000	$69,300,000	$69,300,000	$69,300,000	$69,300,000	$114,800,000	$137,900,000	$1,080,240,000	$137,900,000
In-Project Patronage Percentage	56%	56%	56%	56%	56%	56%	56%	56%	56%
Outside Project Patronage Expenditures	$42,534,800	$30,492,000	$30,492,000	$30,492,000	$30,492,000	$50,512,000	$60,676,000	$475,305,600	$60,676,000
3. Maintenance/Landscaping/Renovations (2)									
Total Sales/Year	$2,890,500	$3,188,000	$3,505,500	$3,823,000	$4,205,000	$4,595,000	$5,003,000	$41,233,000	$5,003,000
In-Project Patronage Percentage	100%	100%	100%	100%	100%	100%	100%	100%	100%
Outside Project Patronage Expenditures	$0	$0	$0	$0	$0	$0	$0	$0	$0
ANNUAL OPERATING ECONOMIC ACTIVITY	$99,560,500	$72,488,000	$72,805,500	$73,123,000	$73,505,000	$119,395,000	$142,903,000	$1,121,473,000	$142,903,000
Outside Project Patronage Expenditures	$42,534,800	$30,492,000	$30,492,000	$30,492,000	$30,492,000	$50,512,000	$60,676,000	$475,305,600	$60,676,000

(1) Estimated average sales for all commercial uses at $700 per square foot of floor space, per year.
(2) Estimated at $1,500 per year for affordable multifamily units; $2,000 for market MF units; $3,000 for affordable single family homes; and $4,000 for market SF homes.

Source: The Hallstrom Group, Inc.

Summary of Direct, Local Economic Impacts

As correlated on Table 20, annual Total Base Economic Impact from the subject increases from $10.5 million in year 1 of the development effort to a peak of $268.4 million by year 19 (in 2009 dollars) before stabilizing after build-out at $249.6 million per year. During the development period, the aggregate total is $2.5 billion.

These dollars will be spent, than re-spent, on goods and services on the island, diminishing in impact on the local economy with each turnover as a portion flows off the Big Island for goods, services and financing commitments. First Hawaiian Bank studies have concluded the appropriate economic multiplier rates in Hawaii are from 1.2 to 3.5 times (or 20 to 250 percent) of the base impact amount. Mainland studies (by the Urban Institute and others) tend toward the upper end of this range, and reach multipliers as high as 4.0.

Due to the need to import more than 80-plus percent of supplies/goods used in Kona, the multiplier impact for the island is not as great as for mainland locales, particularly for construction-based expenditures. We have therefore tested multiplier rates at the mid-point of the market spectrum, ranging from 1.5 to 3.5 times.

On a conservative basis, using a relatively low-end multiplier effect ratio of 2.0, the total overall direct impact on the Hawaii County economy resulting from the Kamakana Villages project would be $4.9 billion over the 19-year projection period. On a stabilized annual basis thereafter, the overall impact would be at $499.2 million.

Ancillary Economic (Phase II) Impacts

From a real property/land use perspective, the subject development has the potential to present socio-economic impacts in the surrounding community. However, we do not believe the effect of the project will meaningfully escalate or negatively impact these issues, or that foregoing the project would mitigate the concerns in any notable way.

TABLE 20

SUMMARY OF ECONOMIC IMPACTS ASSOCIATED WITH DEVELOPMENT
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii
All Amounts Expressed in Constant, Uninflated 2009 Dollars

Development Year	1	2	3	4	5	6	7	8	9	10	11
ANNUAL WAGES GENERATED	$6,532,402	$15,135,443	$11,668,718	$16,788,882	$21,087,805	$21,168,487	$22,430,895	$22,921,665	$27,331,876	$24,327,395	$27,650,984
CONTRACTOR'S PROFIT	$3,091,164	$5,126,664	$3,291,525	$2,752,125	$4,604,073	$3,209,050	$2,710,500	$2,710,500	$4,565,198	$2,827,700	$3,003,500
SUPPLIER'S PROFIT	$927,349	$1,741,549	$1,316,610	$1,100,850	$1,656,160	$1,283,620	$1,084,200	$1,084,200	$1,640,610	$1,131,080	$1,201,400
OUTSIDE PATRONAGE SPENDING					$12,936,000	$16,940,000	$20,636,000	$20,636,000	$20,636,000	$25,564,000	$30,492,000
PROJECT POPULATION EXPENDITURES			$14,430,150	$22,041,110	$29,652,070	$38,986,955	$47,923,428	$56,859,901	$65,796,374	$72,674,385	$79,613,744
TOTAL BASE ECONOMIC IMPACT	$10,550,916	$22,003,656	$30,707,003	$42,682,967	$69,936,108	$81,588,112	$94,785,023	$104,212,266	$119,970,058	$126,524,560	$141,961,628
Multiplier Effect Ratio	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TOTAL OVERALL IMPACT	$21,101,831	$44,007,313	$61,414,006	$85,365,935	$139,872,216	$163,176,224	$189,570,045	$208,424,531	$239,940,116	$253,049,120	$283,923,256

Development Year	12	13	14	15	16	17	18	19	Totals Years 1 Through 19	Stabilized Operations
ANNUAL WAGES GENERATED	$29,263,818	$29,702,777	$31,055,753	$32,173,875	$34,729,653	$37,592,109	$45,578,379	$48,256,068	$505,396,983	$34,820,827
CONTRACTOR'S PROFIT	$4,624,598	$2,910,375	$3,114,375	$4,969,073	$3,726,450	$7,469,448	$4,956,300	$3,784,575	$73,447,195	
SUPPLIER'S PROFIT	$1,664,370	$1,164,150	$1,245,750	$1,802,160	$1,490,580	$2,802,310	$1,982,520	$1,513,830	$27,833,296	
OUTSIDE PATRONAGE SPENDING	$42,534,800	$42,534,800	$30,492,000	$30,492,000	$30,492,000	$30,492,000	$50,512,000	$60,676,000	$466,065,600	$60,676,000
PROJECT POPULATION EXPENDITURES	$87,084,319	$95,683,728	$104,612,620	$113,541,512	$124,391,008	$135,304,379	$145,280,541	$154,129,385	$1,388,005,609	$154,129,385
TOTAL BASE ECONOMIC IMPACT	$165,171,905	$171,995,830	$170,520,498	$182,978,620	$194,829,691	$213,660,246	$248,309,740	$268,359,858	$2,460,748,683	$249,626,212
Multiplier Effect Ratio	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
TOTAL OVERALL IMPACT	$330,343,809	$343,991,660	$341,040,996	$365,957,239	$389,659,381	$427,320,493	$496,619,480	$536,719,716	$4,921,497,366	$499,252,424

Source: Various, and The Hallstrom Group, Inc.

There are two potential negative market-based impacts:

- Real Property Values -- Demand for developable urban lands and residential units in Greater Kailua-Kona have been increasing over the long-term (within discrete market cycle) for more than three decades. During this period median prices have increased in some sectors by more than five-fold, surpassing compounded annual appreciation rates in excess of five percent.

  These trends exist externally to the subject property, and would be anticipated to continue reasonably unabated over the long-term regardless whether or not Kamakana Villages were developed. There is little rational or demonstrable market support suggesting regional demand and associated pricing trends will recede if the subject lands were left vacant.

  Conversely, the subject units will likely provide an overall stabilizing to slightly mitigating effect on price increases in the mauka neighborhoods north of town, by placing 1,168 affordable-priced units into an area where there are currently few. And, providing substantial amounts of new product will help ease buyer and pricing concerns due to an artificial scarcity of supply.

  Without the 2,330 proposed subject units/homes, which represent nearly 20 percent of all planned inventory additions in Greater Kailua-Kona over the next two decades, and is one of the few projects aggressively moving forward at this time, a significant undersupply situation would again develop in the area, laying the groundwork for a hyper-appreciation cycle of the type that has periodically plagued West Hawaii residents since the mid-1970s.

- Affordable Housing -- The inclusion 1,168 affordable-priced units on-site within Kamakana Villages, will constitute one of the largest proportionate allowances of affordable units within a new master-planned project in state history.

The subject development will be beyond full-compliance with Hawaii County affordable/workforce housing ordinances and guidelines, and will more than off-set any needs resulting from new job creation or in-migration associated with the community.

Again, the impact the subject will be positive on the study area in this regard.

PUBLIC COSTS/BENEFITS FROM THE PROPOSED DEVELOPMENT (FISCAL IMPACTS)

The purpose of this assessment is to delineate the direct areas in which the construction and long-term operation of Kamakana Villages will potentially impact the public "purse". Specifically, the goal is to quantify and compare the costs of providing expanded County and State services to the project and its population versus the economic benefits that accrue to governmental coffers via an increase in local and state tax payments arising from the new economic activity associated with the development.

Among the major direct potential costs to governmental services and programs are:

-- Police Protection
-- Fire Protection
-- Public Oversight Agencies
-- Infrastructure Systems
-- Recreational Demands
-- Educational Needs
-- County and State Oversight and Administration
-- Public Capital Improvements
-- Various Other Services and Financial Commitments

Primary direct tax benefits to the state and county funds will primarily flow from the project and its operation over time from three major sources:

-- Real Property Taxes
-- Gross Excise Tax Receipts
-- State Income Taxes

Some cost/benefit issues are considered as off-setting, or "a wash," as the cost of the services to the government is theoretically directly reimbursed in the form of user fees. Building permits and utility hook-up fees are two prime examples. Other such items include workers compensation premiums and benefits, utility operations and associated use billing rates, and business oversight/registration versus licensing fees. These items are excluded from this study.

As a privately built project using private capital for its major infrastructure components, some of identified public costs will not be directly increased on the state or county levels as a result of the proposed subject project.

The diversity of unit types and businesses within Kamakana Villages will result in a development which is highly reflective of the larger Kailua-Kona community in regards to population, use and household make-up, and as such it would be expected to carry its fair share of public costs burdens on a per capita contribution basis.

This perspective, where each person of the islandwide de facto population is responsible for a comparable cost contribution towards public services, either directly or indirectly as part of the commonwealth, is very appropriate for a development as the subject which will have some members in need of above-average amounts of services and others with below-average demands.

Government services are holistic in nature, providing a foundation throughout a community, regardless of any actual or specific impact on any given land holding. Parks and schools are essential to the residents (full or part-time), resident and non-residents, whether or not they specifically use them, as these facilities create the climate in which local businesses, the real estate market and the general economy operates. Similarly, government administration, capital projects and public welfare

items may have no direct relation to a particular development, but provide the economic underpinnings that enhances overall regional sustainability.

We have therefore looked at the public costs issue only from a per capita contribution allocation basis, and have not considered the estimating of actual costs as being an appropriate method for use in this specific analysis.

Public Costs

Per Capita Costs Contribution

The selected method for determining public costs was through assessment of per capita contributions to expenditures incurred by the State of Hawaii and County of Hawaii relative to the de facto population area of the jurisdiction. As noted foregoing, this is founded on the principal that each individual on the island equitably benefits from all governmental costs, regardless of type or focus throughout the day, with each new member of the community (whether resident or non-resident) creating a proportionate new cost burden on public services in their daily home and working life.

This is a typical application as most costs are viewed as accruing to residential aspects of a person's lifestyle and land use. We consider it as the best means of demonstrating the maximum overall public fiscal impact potential of the proposed subject project. We judge this method as setting the absolute upper limit on all public costs (actual, indirect and inferred).

According to their Financial Services/Budgeting database, the state expects to spend a total of $10.8 billion on services, salaries, infrastructure, and financing in the coming 2009-10 fiscal year. Of this figure, approximately $7.5 billion will be raised from taxation of persons in-state; the remainder from federal funds and other sources. The total de facto population in the state on an average daily basis at present is about 1,400,000 persons, including residents, tourists, and military personnel.

The per capita contributions by the Hawaii population towards expenditures by the state will thus be about $5,346 for this year ($7,484,000,000 divided by 1,400,000).

The average de facto population (residents, non-residents and their guests) at Kamakana Villages at build-out will be 5,302 persons, a figure reached in year 19 of the development process. The annual total "per capita fair contribution" to the State's public purse from the subject at stabilization would be $28.3 million in constant year 2009 dollars.

Analyzed on a similar basis, the County of Hawaii's budget for the island government in year 2009, calls for the County's population to contribute $328.2 million towards local services (the remainder coming from federal, state and other sources). The current de facto population on the Big Island is some 193,000 persons. The resulting de facto per capita contribution towards county expenditures for this year is therefore anticipated to be $1,700.

Application of this County-based per person fair contribution figure to the total on-site de facto population at subject build out would be $9.0 million annually in costs to the county government on a stabilized basis (5,302 population x $1,700).

Total Public Costs -- On a per capita fair contribution basis, at build-out the total governmental costs to the state and county would be $37.3 million annually.

Public Fiscal Benefits

Real Property Taxes -- Property taxes paid by landowners in the subject project were calculated using the 2009 tax rates for both land and buildings, improved and unimproved. The basis for the calculations were generally presented within the body of the report, and can be summarized as follows:

- *Affordable Multifamily Resident Units* were assumed to have an average assessed value of $268,870, with an associated owner/occupant tax rate of $5.55 per $1,000 in value.

- *Market Multifamily Resident Units* are projected to have an average assessed value of $390,908, and would also be taxed at the discounted owner/occupant rate of $5.5 per $1,000 in net assessment.

- *Market Multifamily Non-Resident Units* are projected to have an average assessed value of $390,908, and an effective tax rate of $8.10 per $1,000.

- *Affordable Single Family Resident Homes* are forecast to be assessed at an average of $493,304 and have a $5.55 per $1,000 tax rate.

- *Market Single Family Resident Homes* are assumed to be assessed at an average of $815,304 and an effective rate of $5.55 per $1,000.

- *Non-Resident Single Family Homes* are also assumed to be assessed at an average of $815,304 and an effective rate of $7.44 per $1,000.

- *Commercial Components* are forecast to have a total assessed value of $78,860,452 (land and improvements) and an effective tax rate of $9.00.

- *The Underlying, Fully-Entitled Site* was estimated to have a pre-development assessed value of $27.2 million, increasing to more than $175 million after infrastructure emplacement and subdivision, with an assessment rate of $8.10 per $1,000.

The total assessments and resulting taxes for the finished units and commercial components are added to the tax rolls as they are completed and absorbed. Conversely, the assessed value and taxes attributable to the underlying land diminishes as it is built-out and sold.

The total real property taxes to be paid to the County of Hawaii in 2009 dollars ranges from $220,401 in year 1 of development, to a stabilized level of $6.8 million at build-out in year 19 and

beyond. The aggregate taxes paid over the development modeling time-frame will be $62.1 million.

State Income Tax -- The state will receive income taxes from three sources:

- The wages of the workers associated with the construction, maintenance, and operation of the Kamakana Villages components;
- The corporate profits from contractors and suppliers serving the construction and maintenance phases of the development, and as generated by on-going commercial operations; and
- The income of full-time residents of the development.

According to DBEDT data, individual State of Hawaii income tax liability as a ratio to gross income has averaged ranged from about 5.6 to just over 5.80 percent during the past two decades, with the more current figures tending toward the mid to upper-end of the range. We have employed an effective tax rate of 5.80 percent of gross personal income for individual workers and full-time residents.

The effective tax rate for the corporate income is estimated at 2.00 percent of gross operating profits, based on available DBEDT statistics.

The total income tax revenues to be received by the state are projected at $386,916 in the first year of construction increasing to a maximum level at year 19 of $16.6 million. On a stabilized basis, after build-out, the permanent worker incomes, building maintenance and off-site workers, and operating businesses, would pay an annual state income tax of about $15.8 million.

Over the 19-year projection period, the cumulative income taxes paid are estimated at $154.1 million.

We have not included any corporate income or other taxes which will be paid by the developing venture as a result of its

profits from undertaking the subject development, or from the secondary jobs created by the discretionary spending of owners, workers and businesses. Such items have the potential to be substantial contributions to the state coffers.

State Gross Excise Tax -- This 4.166 percent of expenditures tax was applied against:

- The total estimated construction contract costs;
- Discretionary spending of wage income by workers associated with the project's construction and operation;
- Expenditures of Kamakana Villages unit owners and their guests on and off-site; and
- Non-resident patronage expenditures in the subject community businesses.

The anticipated state excise tax receipts arising from the subject development range from an estimated $1.5 million in the first year of development to a peak of $12.5 million. Over the 19-year study period, the receipts total $89.5 million and stabilize at circa $10.4 million per year.

We have not included any excise tax revenues associated with the direct, local "multiplier effect" expenditures on the Big Island, or those created in the secondary market by the suppliers to the operating businesses or secondary worker expenditures.

Total Public Benefits (Revenues) -- In constant 2009 dollars, the rounded aggregate annual tax revenues flowing from the subject development during the construction and at full project build-out range from:

- $220,401 to $6.8 million per year for the County of Hawaii, stabilizing over time at $6.8 million annually and totaling $62.1 million over the 19-year development projection time-frame;

TABLE 21

PUBLIC COSTS/BENEFITS SUMMARY TABLE
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii
All Amounts Expressed in Constant, Uninflated 2009 Dollars

Development Year	1	2	3	4	5	6	7	8	9	10	11
PUBLIC BENEFITS (Revenues)											
1. REAL PROPERTY TAXES											
Total Assessed Value	$27,210,000	$27,210,000	$150,069,452	$200,004,552	$249,899,777	$308,742,416	$359,640,856	$410,539,296	$461,437,736	$512,401,112	$567,077,792
TOTAL REAL PROPERTY TAXES (1)	**$220,401**	**$220,401**	**$1,021,064**	**$1,321,288**	**$1,621,153**	**$1,971,672**	**$2,260,906**	**$2,550,139**	**$2,839,372**	**$3,150,977**	**$3,486,272**
2. STATE INCOME TAXES											
Taxable Personal Income	$6,532,402	$15,135,443	$33,802,718	$50,543,232	$66,462,505	$80,930,287	$95,915,775	$110,129,625	$128,262,916	$135,550,745	$149,055,974
Taxable Corporate Profits	$401,851	$686,821	$481,814	$2,531,948	$3,637,423	$4,395,417	$5,195,420	$5,223,420	$5,492,531	$6,415,828	$7,585,140
Personal Taxes Paid	$378,879	$877,856	$1,960,558	$2,931,507	$3,854,825	$4,693,957	$5,563,115	$6,387,518	$7,439,249	$7,861,943	$8,645,246
Corporate Taxes Paid	$8,037	$13,736	$9,636	$50,639	$72,748	$87,908	$103,908	$104,468	$109,851	$128,317	$151,703
TOTAL STATE INCOME TAXES	**$386,916**	**$891,592**	**$1,970,194**	**$2,982,146**	**$3,927,574**	**$4,781,865**	**$5,667,023**	**$6,491,987**	**$7,549,100**	**$7,990,260**	**$8,796,949**
3. STATE GROSS EXCISE TAX											
Taxable Transactions											
Construction Contracts	$30,911,641	$51,266,641	$32,915,250	$27,521,250	$46,040,734	$32,090,500	$27,105,000	$27,105,000	$45,651,984	$28,277,000	$30,035,000
Worker Disposable Income Purchases	$3,919,441	$9,081,266	$7,001,231	$10,073,329	$12,652,683	$12,701,092	$13,458,537	$13,752,999	$16,399,126	$14,596,437	$27,650,984
Unit Owner/Guest Expenditures (on/off site)			$14,430,150	$22,041,110	$29,652,070	$38,986,955	$47,923,428	$56,859,901	$65,796,374	$72,674,385	$79,613,744
Non-Resident Patronage Expenditures					$12,936,000	$16,940,000	$20,636,000	$20,636,000	$20,636,000	$25,564,000	$30,492,000
Total Taxable Transactions	$34,831,082	$60,347,907	$54,346,631	$59,635,689	$101,281,487	$100,718,547	$109,122,965	$118,353,900	$148,483,484	$141,111,822	$167,791,728
TOTAL STATE EXCISE TAX	**$1,451,063**	**$2,514,094**	**$2,264,081**	**$2,484,423**	**$4,219,387**	**$4,195,935**	**$4,546,063**	**$4,930,623**	**$6,185,822**	**$5,878,719**	**$6,990,203**
TOTAL GROSS PUBLIC REVENUES											
To County of Hawaii (Item #1)	$220,401	$220,401	$1,021,064	$1,321,288	$1,621,153	$1,971,672	$2,260,906	$2,550,139	$2,839,372	$3,150,977	$3,486,272
To State (Items #2 & #3)	$1,837,979	$3,405,686	$4,234,275	$5,466,569	$8,146,961	$8,977,800	$10,213,086	$11,422,610	$13,734,922	$13,868,978	$15,787,153
AGGREGATE TAX REVENUES	**$2,058,380**	**$3,626,087**	**$5,255,339**	**$6,787,857**	**$9,768,113**	**$10,949,472**	**$12,473,992**	**$13,972,749**	**$16,574,294**	**$17,019,955**	**$19,273,425**
PUBLIC COSTS (Expenses)											
By County of Hawaii			$854,616	$1,303,944	$1,753,272	$2,307,939	$2,837,611	$3,367,282	$3,896,954	$4,297,481	$4,696,222
By State of Hawaii			$2,686,794	$4,099,419	$5,512,044	$7,255,840	$8,921,054	$10,586,267	$12,251,481	$13,510,681	$14,764,269
TOTAL PUBLIC COSTS			**$3,541,410**	**$5,403,363**	**$7,265,316**	**$9,563,780**	**$11,758,664**	**$13,953,549**	**$16,148,434**	**$17,808,162**	**$19,460,491**
TOTAL NET PUBLIC BENEFITS											
By County of Hawaii	$220,401	$220,401	$166,448	$17,344	($132,119)	($336,267)	($576,705)	($817,143)	($1,057,581)	($1,146,504)	($1,209,950)
To State of Hawaii	$1,837,979	$3,405,686	$1,547,481	$1,367,150	$2,634,917	$1,721,959	$1,292,032	$836,343	$1,483,441	$358,297	$1,022,884
AGGREGATE NET BENEFITS	**$2,058,380**	**$3,626,087**	**$1,713,929**	**$1,384,494**	**$2,502,797**	**$1,385,692**	**$715,327**	**$19,200**	**$425,860**	**($788,207)**	**($187,066)**

(1) Real property taxes include tax rates of $5.55 per $1,000 for homeowners/residents, $8.10 for non-resident multifamily and $7.44 for non-resident single famil
Underlying unsold land at rate of $8.10 per $1,000, with a value of $200,000 per acre upon entitlement.

Source: The Hallstrom Group, Inc.

- $1.8 million to $29.1 million annually for the State of Hawaii, stabilizing at $26.2 million per year, and cumulatively at $279.8 million over the modeling period; and
- $2.1 million to $35.9 million annually in total to the combined County and State public purse, stabilizing at about $33 million per year, and cumulatively at $341.9 million over the modeling period.

Correlation

Our public cost/benefit (fiscal impact) assessment model for Kamakana Villages is complied on Table 21, with the correlation of per capita public service fair contribution "costs" and the specifically anticipated tax revenue "benefits" shown on the bottom line. As construction activity (which generates tax revenues) is completed and the full de facto population is established (which results in increasing public costs), the net returns to governmental entities decrease.

The summarized indicators are as follows:

- The net fiscal benefit (revenue contributions less per capita costs) to Hawaii County from the development of the subject ranges from an annualized "gain" of $220,400 to a "loss" of $2.2 million per year, with stabilization at the latter figure and an aggregate "loss" of $19.6 million during the study period.
- The net fiscal benefit to the State of Hawaii ranges from a low of a $417,764 loss to a maximum net annual gain of $3.4 million, totaling $23 million during the modeling period. On a stabilized basis following build-out, the net loss to the State will also be $2.2 million annually.
- The overall yearly net benefit to local governmental agencies (state and county) varies from a $2.5 million loss to a peak gain of $3.6 million during development, with a cumulative "profit" figure of $3.4 million during construction. Annually, after stabilization is reached, the net combined governmental losses are $4.4 million

That the public purse shows a stabilized "operating" net annual loss is not unexpected. The large residential component with significant affordably-priced units, coupled with the limited amount of on-site business activity, serves to maximize governmental costs while minimizing the direct tax contributions of the community (the old adage applies "residences use services, businesses generate taxes").

If secondary taxes and fees were included, and the secondary/indirect economic and taxation activities were incorporated, it is likely the overall fiscal impact of Kamakana Villages would be a wash.

Limiting Conditions and Assumptions

The research, analysis, and conclusions for valuation or market studies, performed by The Hallstrom Group, Inc., are subject to and influenced by the following:

- The report expresses the opinion of the signers as of the date stated in the letter of transmittal, and in no way has been contingent upon the reporting of specified values or findings. It is based upon the then present condition of the national and local economy and the then purchasing power of the dollar.
- Legal descriptions used within the report are taken from official documents recorded with the State of Hawaii, Bureau of Conveyances, or have been furnished by the client, and are assumed to be correct. No survey is made for purposes of the report.
- Any sketches, maps, plot plans, and photographs included in the report are intended only to show spatial relationships and/or assist the reader in visualizing the property. They are not measured surveys or maps and we are not responsible for their accuracy or interpretive quality.
- It is assumed that the subject property is free and clear of any and all encumbrances other than those referred to

TABLE 21 -- Continued

PUBLIC COSTS/BENEFITS SUMMARY TABLE
Market Study of the Kamakana Villages Community
Keahuolu, North Kona, Hawaii
All Amounts Expressed in Constant, Uninflated 2009 Dollars

Development Year	12	13	14	15	16	17	18	19	Total Years 1 Through 19	Stabilized Operations
PUBLIC BENEFITS (Revenues)										
1. REAL PROPERTY TAXES										
Total Assessed Value	$619,320,904	$674,339,334	$733,434,284	$792,529,234	$863,661,510	$962,815,840	$1,053,866,934	$1,126,597,940		$1,126,597,940
TOTAL REAL PROPERTY TAXES (1)	**$3,786,050**	**$4,101,231**	**$4,440,578**	**$4,779,925**	**$5,188,617**	**$5,843,791**	**$6,414,594**	**$6,837,724**	**$62,056,155**	**$6,837,724**
2. STATE INCOME TAXES										
Taxable Personal Income	$161,735,808	$175,123,157	$189,867,203	$204,376,395	$223,311,333	$242,552,949	$265,036,989	$280,397,460	**$2,614,722,915**	$266,962,219
Taxable Corporate Profits	$10,556,547	$10,363,503	$7,684,813	$7,957,673	$7,834,003	$8,377,676	$12,633,382	$14,820,141	**$122,275,349**	$14,290,300
Personal Taxes Paid	$9,380,677	$10,157,143	$11,012,298	$11,853,831	$12,952,057	$14,068,071	$15,372,145	$16,263,053	**$151,653,929**	$15,483,809
Corporate Taxes Paid	$211,131	$207,270	$153,696	$159,153	$156,680	$167,554	$252,668	$296,403	**$2,445,507**	$285,806
TOTAL STATE INCOME TAXES	**$9,591,808**	**$10,364,413**	**$11,165,994**	**$12,012,984**	**$13,108,737**	**$14,235,625**	**$15,624,813**	**$16,559,455**	**$154,099,436**	**$15,769,615**
3. STATE GROSS EXCISE TAX										
Taxable Transactions										
Construction Contracts	$46,245,984	$29,103,750	$31,143,750	$49,690,734	$37,264,500	$74,694,484	$49,563,000	$37,845,750	**$734,471,953**	
Worker Disposable Income Purchases	$29,263,818	$29,702,777	$31,055,753	$32,173,875	$34,729,653	$37,592,109	$45,578,379	$48,256,068	**$429,639,555**	$34,820,827
Unit Owner/Guest Expenditures (on/off site)	$87,084,319	$95,683,728	$104,612,620	$113,541,512	$124,391,008	$135,304,379	$145,280,541	$154,129,385	**$1,388,005,609**	$154,129,385
Non-Resident Patronage Expenditures	$42,534,800	$42,534,800	$30,492,000	$30,492,000	$30,492,000	$30,492,000	$50,512,000	$60,676,000	**$466,065,600**	$60,676,000
Total Taxable Transactions	**$205,128,921**	**$197,025,055**	**$197,304,123**	**$225,898,121**	**$226,877,161**	**$278,082,973**	**$290,933,920**	**$300,907,203**	**$3,018,182,718**	**$249,626,212**
TOTAL STATE EXCISE TAX	**$8,545,671**	**$8,208,064**	**$8,219,690**	**$9,410,916**	**$9,451,703**	**$11,584,937**	**$12,120,307**	**$12,535,794**	**$89,496,454**	**$10,399,428**
TOTAL GROSS PUBLIC REVENUES										
To County of Hawaii (Item #1)	$3,786,050	$4,101,231	$4,440,578	$4,779,925	$5,188,617	$5,843,791	$6,414,594	$6,837,724	**$62,056,155**	$6,837,724
To State (Items #2 & 3))	$18,137,479	$18,572,477	$19,385,684	$21,423,900	$22,560,440	$25,820,561	$27,745,120	$29,095,250	**$279,836,928**	$26,169,043
AGGREGATE TAX REVENUES	**$21,923,529**	**$22,673,708**	**$23,826,262**	**$26,203,825**	**$27,749,056**	**$31,664,352**	**$34,159,714**	**$35,932,973**	**$341,893,083**	**$33,006,766**
PUBLIC COSTS (Expenses)										
By County of Hawaii	$5,128,291	$5,631,181	$6,151,926	$6,672,670	$7,308,276	$7,945,072	$8,514,618	$9,015,127	**$81,682,483**	$9,015,127
By State of Hawaii	$16,122,634	$17,703,652	$19,340,800	$20,977,948	$22,976,204	$24,978,202	$26,768,774	$28,342,307	**$256,798,369**	$28,342,307
TOTAL PUBLIC COSTS	**$21,250,925**	**$23,334,833**	**$25,492,725**	**$27,650,618**	**$30,284,480**	**$32,923,274**	**$35,283,392**	**$37,357,435**	**$338,480,852**	**$37,357,435**
TOTAL NET PUBLIC BENEFITS										
To County of Hawaii	($1,342,241)	($1,529,950)	($1,711,348)	($1,892,745)	($2,119,660)	($2,101,281)	($2,100,024)	($2,177,404)	**($19,626,328)**	($2,177,404)
To State of Hawaii	$2,014,844	$868,825	$44,884	$445,952	($415,764)	$842,359	$976,346	$752,942	**$23,038,559**	($2,173,265)
AGGREGATE NET BENEFITS	**$672,604**	**($661,125)**	**($1,666,463)**	**($1,446,793)**	**($2,535,423)**	**($1,258,922)**	**($1,123,678)**	**($1,424,462)**	**$3,412,231**	**($4,350,669)**

(1) Real property taxes include tax rates of $5.55 per $1,000 for homeowners/residents, $8.10 for non-resident multifamily and $7.44 for non-resident single family.
Underlying unsold land at rate of $8.10 per $1,000, with a value of $200,000 per acre upon entitlement.

Source: The Hallstrom Group, Inc.

herein, and no responsibility is assumed for matters of a legal nature. The report is not to be construed as rendering any opinion of title, which is assumed to be good and marketable. No title information or data regarding easements which might adversely affect the use, access, or development of the property, other than that referenced in the report, was found or provided. The property is analyzed as though under responsible ownership and competent management.

- Any architectural plans and/or specifications examined assume completion of the improvements in general conformance with those documents in a timely and workmanlike manner.

- Preparation for, attendance, or testimony at any court or administrative hearing in connection with this report shall not be required unless prior arrangements have been made therefor.

- If the report contains an allocation of value between land and improvements, such allocation applies only under the existing program of utilization. The separate valuations for land and building must not be used in conjunction with any other purpose and are invalid if so used.

- If the report contains a valuation relating to a geographical portion or tract of real estate, the value reported for such geographical portion relates to such portion only and should not be construed as applying with equal validity to other portions of the larger parcel or tract; and the value reported for such geographical portion plus the value of all other geographical portions may or may not equal the value of the entire parcel or tract considered as an entity.

- If the report contains a valuation relating to an estate in land that is less than the whole fee simple estate, the value reported for such estate relates to a fractional interest only in the real estate involved, and the value of

this fractional interest plus the value of all other fractional interest may or may not equal to the value of the entire fee simple estate considered as a whole.

- It is assumed that there are no hidden or inapparent conditions of the property, subsoil, or structures which would render it more or less valuable; we assume no responsibility for such conditions or for engineering which might be required to discover such factors.

- Nothing in the report should be deemed a certification or guaranty as to the structural and/or mechanical (electrical, heating, air-conditioning, and plumbing) soundness of the building(s) and associated mechanical systems, unless otherwise noted.

- Information, estimates, and opinions provided by third parties and contained in this report were obtained from sources considered reliable and believed to be true and correct. However, no responsibility is assumed for possible misinformation.

- Possession of the report, or a copy thereof, does not carry with it the right of publication, and the report may not be used by any person or organization except the client without the previous written consent of the appraiser, and then only in its entirety. If the client releases or disseminates the reports to others without the consent of the appraiser, the client hereby agrees to hold the appraiser harmless, and to indemnify the analysts from any liability, damages, or losses which the analysts might suffer, for any reason whatsoever, by reason of dissemination of the report by the client. Further, if legal action is brought against the analyst by a party other than the client concerning the report or the opinions stated therein, the client agrees, in addition to indemnifying the analysts for any damages or losses, to defend said analysts in said action at client's expense. However, nothing herein shall prohibit the client or analysts from disclosing said report or opinions contained therein as may be required by applicable law.

- Disclosure of the contents of this report is governed by the By-Laws and Regulations of the Appraisal Institute. Neither all nor any part of the contents of this report (especially any conclusions as to value, the identity of the appraisers or the firm which they are connected, or any reference to the Appraisal Institute or to the MAI designation) shall be disseminated to the public through advertising media, public relations media, news media, sales media, or any public means of communication without the prior consent and approval of the appraisers.

- Unless otherwise stated in this report, the existence of hazardous material, which may or may not be present on the property, was not observed by the appraiser. The appraiser has no knowledge of the existence of such materials on or in the property. The appraiser, however, is not qualified to detect such substances. The presence of substances such as asbestos, urea-formaldehyde foam insulation, or other potentially hazardous materials may affect the value of the property. The value estimate is predicated on the assumption that there is no such material on or in the property that would cause a loss in value. No responsibility is assumed for any such conditions, or for any expertise or engineering knowledge required to discover them. The client is urged to retain an expert in this field, if desired.

- The Americans with Disabilities Act (ADA) became effective January 26, 1992. We have not made a specific compliance survey and analysis of this property to determine whether or not it is in conformity with the various detailed requirements of the ADA. It is possible that a compliance survey together with a detailed analysis of the requirements of the ADA could reveal that the property is not in compliance with one or more of the requirements of the act. If so, this fact could have a negative effect upon the value of the property. We did not consider possible noncompliance with the requirements of ADA in estimating the value of the property.

- The function of this report is for the sole purpose(s) stated herein. It may not be used in connection with any proposed or future construction for a real estate syndicate(s), real estate investment trust(s) or limited partnership to solicit investors or limited partners, and may not be relied upon for such purposes.

- The appraiser's conclusion of value is based upon the assumption that there are no hidden or unapparent conditions of the property that might prevent buildability. The appraiser recommends that due diligence be conducted through the local building department or the municipality to investigate buildability and whether the property is suitable for its intended use. The appraiser makes no such representations, guarantees or warranties.

CERTIFICATION

The undersigned does hereby certify that, to the best of his knowledge and belief, the statements of fact contained in this report are true and correct. It is further certified that the reported analyses, opinions, and conclusions are limited only by the reported assumptions and limiting conditions, and are his personal, impartial, and unbiased professional analyses, opinions, conclusions and recommendations. He further certifies that he has no present or prospective interest in the property that is the subject of this report, and has no personal interest with respect to the parties involved. He has no bias with respect to the property that is the subject of this report or the parties involved with this assignment. His engagement in this assignment was not contingent upon developing or reporting predetermined results. His compensation for completing this assignment is not contingent upon the development or reporting of a predetermined value or direction in value that favors the cause of the client, the amount of the value opinion, the attainment of a stipulated result, or the occurrence of a subsequent event directly related to the

intended use of this report. The analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the requirements of the Uniform Standards of Professional Appraisal Practice. The use of this report is subject to the requirements of the Appraisal Institute relating to review by duly authorized representatives. The undersigned certifies that he has made a personal visit to the property that is the subject of this report.

Tom W. Holliday
Supervisor/Senior Analyst

/as

5013_R01

ADDENDA

THE HALLSTROM GROUP INC.
REAL ESTATE CONSULTANTS & APPRAISERS

PROFESSIONAL BACKGROUND AND SERVICES

The Hallstrom Group, Inc. is a Honolulu based independent professional organization that provides a wide scope of real estate consulting services throughout the State of Hawaii with particular emphasis on valuation studies. The purpose of the firm is to assist clients in formulating realistic real estate decisions. It provides solutions to complex issues by delivering thoroughly researched, objective analyses in a timely manner. Focusing on specific client problems and needs, and employing a broad range of tools including after-tax cash flow simulations and feasibility analyses, the firm minimizes the financial risks inherent in the real estate decision making process.

The principals and associates of the firm have been professionally trained, are experienced in Hawaiian real estate, and are actively associated with the Appraisal Institute and the Counselors of Real Estate, nationally recognized real estate appraisal and counseling organizations.

The real estate appraisals prepared by The Hallstrom Group accomplish a variety of needs and function to provide professional value opinions for such purposes as mortgage loans, investment decisions, lease negotiations and arbitrations, condemnations, assessment appeals, and the formation of policy decisions. Valuation assignments cover a spectrum of property types including existing and proposed resort and residential developments, industrial properties, high-rise office buildings and condominiums, shopping centers, subdivisions, apartments, residential leased fee conversions, special purpose properties, and vacant acreage, as well as property assemblages and portfolio reviews.

Market studies are research-intensive, analytical tools oriented to provide insight into investment opportunities and development challenges, and range in focus from highest and best use determinations for a specific site or improved property, to an evaluation of multiple (present and future) demand and supply characteristics for long-term, mixed-use projects. Market studies are commissioned for a variety of purposes where timely market information, insightful trends analyses, and perceptive conceptual conclusions or recommendations are critical. Uses include the formation of development strategies, bases for capital commitment decisions, evidence of appropriateness for state and county land use classification petitions, fiscal and social impact evaluations, and the identification of alternative economic use/conversion opportunities.

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PROFESSIONAL QUALIFICATIONS OF THOMAS W. HOLLIDAY

Business Background

Senior Analyst	The Hallstrom Group, Inc. Honolulu, Hawaii Since 1980
Former Staff Appraiser	Davis-Baker Appraisal Co. Avalon, Santa Catalina Island, California

Education

- B.A. (Communications/Journalism) 1978 California State University at Fullerton
- SREA Course 201- Principles of Income Property Appraising
- Expert witness testimony before State of Hawaii Land Use Commission and various state and county boards and agencies since 1983.
- Numerous professional seminars and clinics
- Contributing author to Hawaii Real Estate Investor, Honolulu Star Bulletin

On January 1, 1991, the American Institute of Real Estate Appraisers (AIREA) and the Society of Real Estate Appraisers (SREA) consolidated, forming the Appraisal Institute (AI).

Recent Kauai and Neighbor Island Assignments

- Market Study, Economic Impact Analyses and Public Costs/ Benefits Assessments
  - -- Village at Poipu (Resort/Residential)
  - -- Ocean Bay Plantation (Resort/Residential)
  - -- Waipono/Puhi (Mixed-Use Planned Development)
  - -- Eleele Commercial Expansion (Commercial)
  - -- Kona Kai Ola (Mixed-Use Resort Community)
  - -- Waikoloa Highlands (Residential)
  - -- Waikoloa Heights (Mixed-Use Residential Development)
  - -- Upcountry Town Center (Mixed-Use Planned Development)
  - -- Maui Lani (Residential and Industrial Components of Master Planned Community)
  - -- Maui Business Park, Phase II (Industrial/Commercial)
  - -- Four Seasons Private Estates and Residences Club (Resort/Residential)
  - -- Kualono Subdivision (Residential)
  - -- Kapalua Mauka (Master Planned Community)
  - -- Hailiimaile (Mixed-Use Master Planned Community)
  - -- Pulelehua (Master Planned Community)
  - -- Westin Kaanapali Ocean Villas Expansion (Resort/ Timeshare)

- Major Valuation Assignments

  -- Coco Palms Resort
  -- Grand Hyatt Kauai
  -- Islander on the Beach
  -- Waimea Plantation Cottages
  -- Coconut Beach Resort
  -- Keauhou Beach Hotel
  -- Sheraton Maui Hotel
  -- Outrigger Wailea Resort Hotel
  -- Maui Lu Hotel
  -- Coconut Grove Condominiums
  -- Palauea Bay Holdings
  -- Wailea Ranch
  -- Maui Coast Hotel
  -- Westin Maui Hotel
  -- Maui Marriott Hotel
  -- Waihee Beach
  -- Kapalua Bay Hotel and The Shops at Kapalua

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THE GREATER KAILUA-KONA RESIDENTIAL RENTAL MARKET

Overview

According to studies completed for the Hawaii County Planning Department in recent years, approximately one-third of West Hawaii resident families are currently housed in long-term rentals.[1] Extrapolating this figure equates to some 3,900 residential rental units within the Greater Kailua-Kona study area.

The percentage of renters in the overall housing market has generally decreased over the past two decades from about 40 percent in 1990 to 33 percent today in response to public policies promoting homeownership, development of more resident-oriented product, and liberal mortgage lending practices. However, it appears the recent recessionary cycle, which has produced both significant job losses and major credit/foreclosure impacts on homeowners will cause a near-term upswing in the number of households in the rental side of the residential market.

While "renter households" can be found across the economic spectrum, demand is strongly oriented towards the affordable/workforce segment of the market. Upwards of 75 percent of families with incomes below the median ("100 percent") level are long-term renters; many of which have limited prospects to obtain the resources or income levels necessary to achieve home-ownership.

The strong movement of non-resident, second/vacation home purchasers into the new residential developments of West Hawaii built during the past decade has exacerbated the situation for the moderate and below income households seeking both purchase and rental opportunities. Historically, non-resident buyers were focused on the resort communities and makai-oriented inventory along Alii Drive, but were comprising between 25 and upwards of 50 percent of the sales activity in the newer mauka subdivisions and condominium projects during the last up cycle.

While some of the non-resident purchasers placed their units into long-term residential rentals, a meaningful portion of this product, which was intended to be oriented towards local households when entitled, was effectively withdrawn from the sector and is now used for transient rentals, periodic vacations, or sitting vacant. Further, this buyer demographic typically has the ability to pay higher prices then resident families, has greater access to financing, is not under the stress of requiring immediate housing, and represents a relentless long-term "outside" demand segment in addition to "natural" community growth. As a result, developers focused on upscaling their

[1] Primary source materials from the County of Hawaii Department of Planning archives include the "Hawaii Housing Policy Study, 2006" and "2005 CP Final" documents.

inventory and increasing prices away from resident-driven parameters in order to capitalize on this emerging opportunity.

Equally impacting the availability of affordable/moderate-priced rental opportunities are the atypically high costs of land, infrastructure, the entitlement process and vertical construction in Greater Kailua-Kona, which also push developers towards the moderate to upper-end of the regional price range.

In a series of public hearings conducted throughout the Big Island in June 2004, "Affordable rental housing" was the number one housing need expressed by community participants, and in their 2005 review of *Housing and Special Needs Housing Goals* for federal reporting purposes, the County placed "Shortage of affordable rental units for low/moderate income households" as their first objective in the "promoting decent, affordable housing" category.

Quantification of Demand

A *Hawaii Housing Policy Study* completed by SMS, Inc., published in February 2007, estimated the Big Island would need some 1,444 additional rental units to be constructed from 2007-2011 in order meet existing and near–term community needs. Of this projected figure, 88 percent (or 1,268 total units) would be needed by households earning 120 percent or less of the HUD median income criteria, and 80 percent (1,149 units) would need to be directed towards families earning less than 80 percent of the median income.

SMS forecast the demand for units would be equitably split between single and multifamily product, if appropriate inventory opportunities were possible. Their historic data additionally demonstrated that increasing proportions of existing Big Island renter households would prefer to remain renters over time (rather than becoming "owners"), moving from 35.1 percent of all renters when surveyed in 1992 up to 45.3 percent by 2006. Additionally, from 6.2 to 12.5 percent of homeowners would prefer to become renters rather than continue being an owner.

Within our macro analysis of the Greater Kailua-Kona residential market we quantified a demand for between 3,328 and 4,519 housing units in the region over the coming two decades which would need to be priced according to total affordable/workforce grouping criteria; representing more than 44 percent of the total area demand during the period. Low-income households, with earnings at 80 percent or less of the West Hawaii median level, comprise nearly 24 percent of the market, and will create demand for between 1,790 and 2,437 units.

Given the maximum current sales price "affordable" to the low income group would be less than $250,000, and the median sales prices for existing inventory in 2009 for single family homes and multifamily units in North Kona were at $542,000 and $335,000, respectively, the prospects of homeownership for much of the low and low-moderate income groups are limited at this time. And, for the most part, newer product has even higher prices.

Difficulties in accruing down payments and obtaining reasonable mortgage financing further exacerbate the purchasing abilities of these households.

Based on our analysis of the rental sub-market and its relationship with total study area housing demand and pricing striations discussed in the body of this report, we estimate there will be a demand for between some 2,600 and 3,500 new/additional residential rental units in the Greater Kailua-Kona sector between 2010 and 2030. Of this total, we project that circa 2,000 to 2,800 will be for units with rents meeting established affordability guidelines, and some 1,400 to 2,000 for units affordable by low income households (80 percent or less of median income).

Greater shares of the market could also turn towards rentals if such concepts as "sustainable leases" and appealing Transit Oriented Development (TOD) communities favorably evolve in coming decades.

Availability of Additional Supply

The availability of rental units on the Big Island, generally, and in West Hawaii, specifically, has historically been limited, resulting in a shortfall of supply and an unbalanced sector. Governmental studies dating back to the early 1980s spoke to the acute undersupply situation, identifying West Hawaii (along with Maui) as among the "tightest" rental markets in the country, with rents and availability of units made worse by the strong visitor use and non-resident ownership segments in the region.

The continuing shortfall of supply in West Hawaii over the past decade-plus (since 1995) can best be demonstrated by the number of ads for rentals carried in local publications. We do acknowledge some landlords have begun to move away from traditional media to internet-based advertising (specifically Craig's List), but the evolution has been extremely slow in Kona which trails national norms in regards to computer ownership/use.

In the first quarter of 1995, there were more than 250 housing units (single and multifamily) listed as available for rent, or the equivalent of 4.2 percent of the entire residential housing stock. Currently, there are just over 200 units listed as available for rent in West Hawaii, equal to about 1.7 percent of the total area residential market.

The study area rental market remains clearly "tight", and certainly not over-supplied, even as some owners convert their units from transient accommodations to long-term residential rentals in response to the recent downturn in tourism.

The outlook for sufficient additional new rental unit supply is not favorable relative to projected demand.

Given high land, infrastructure, entitlement and construction costs, and that market-priced "for sale" units offer higher and faster returns than affordable/workforce rentals, few private developers have attempted to specifically target this demand sector in recent years, and they do not comprise meaningful components of approved (but unbuilt) projects.

Of the 5,858 total new housing units proposed for Greater Kailua-Kona apart from Kamakana Villages we identified as likely to be built by 2030 in our residential market study, fewer than

150 affordable/workforce housing units have been formally committed to/announced. While the developers of several major proposed projects, such as Ooma Village, have committed to meeting County guidelines in this regard, the extent, timing and pricing of such inventory is unknown at this time. And, there is no certainty these projects will move forward in a timely manner.

As current county guidelines call for only 20 percent of proposed housing units to meet affordable standards within major new projects, and developers typically seek to meet these criteria via for sale product, we estimate that at maximum perhaps 400 to 800 affordable/workforce rental units will be provided within the identified proposed developments; unless the County stiffens standards during the entitlement process. This equates to between 7 and 14 percent of the total proposed inventory.

Governmental agencies (notably the County of Hawaii), despite widely recognizing community needs, have also been unable to develop/assist sufficient levels of rental unit supply. The County expected to construct only 232 "affordable" rental units island-wide between 2004 and 2009; an acknowledged inadequate number to meet expressed demand. If the County was able to sustain this rate on an annualized basis over the projection period (47 units per year island-wide), they would generate a total of less than 1,000 affordable/workforce housing units; and at best perhaps as many as 400 to 500 would likely be sited within the Greater Kailua-Kona region.

Thus, even on moderate to optimistic basis, the potential supply of additional, new affordable residential rental opportunities in the primary study area would total from 800 to 1,300 units without Kamakana Villages. And, for the most part, this supply would not come on-line until late in the coming decade and beyond.

Correlation and Subject Absorption Conclusions

The current residential rental market in Greater Kailua-Kona continues to be tight/under-supplied, with average rents at or above governmental affordability criteria. The demand for additional affordable/workforce residential rental housing in the region through 2030 is estimated at 2,000 to 2,800 units.

Apart from the subject development, we estimate it is unlikely that more than 1,300 new affordable rental units (at maximum) will be added to the inventory over the next twenty years; most over the mid to long-term.

This market segment will therefore be undersupplied by a minimum of 700, and as many as 2,000, units during the projection period.

There is strong evident demand for the 400 affordable rental units within Kamakana Villages and we conclude they will be readily absorbed during its exposure period.

Given the near to mid-term timing envisioned for the commencement of the subject development, its central location, and that it will be offering affordable rental units within a

master planned, comprehensive lifestyle community (a unique opportunity in Kona), we expect that it would capture a substantial share of rental demand regardless of any competitive inventory built.

As the subject affordable rental units will be constructed in phases, and any given phase will take at least a year from announcement to completion, we expect the units will be able to achieve virtually full occupancy (or absorption) at or near the time each increment is opened. And, it is highly likely, based on the experiences of similar projects elsewhere in the islands, an extensive waiting list will be developed insuring rapid absorption of the units as they are finished.