

MACARTHUR TRANSIT VILLAGE PROJECT

Volume 3. Draft Environmental Impact Report
(Appendix F)

SCH No. 2006022075



Prepared for:
City of Oakland

January 2008

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January 2008



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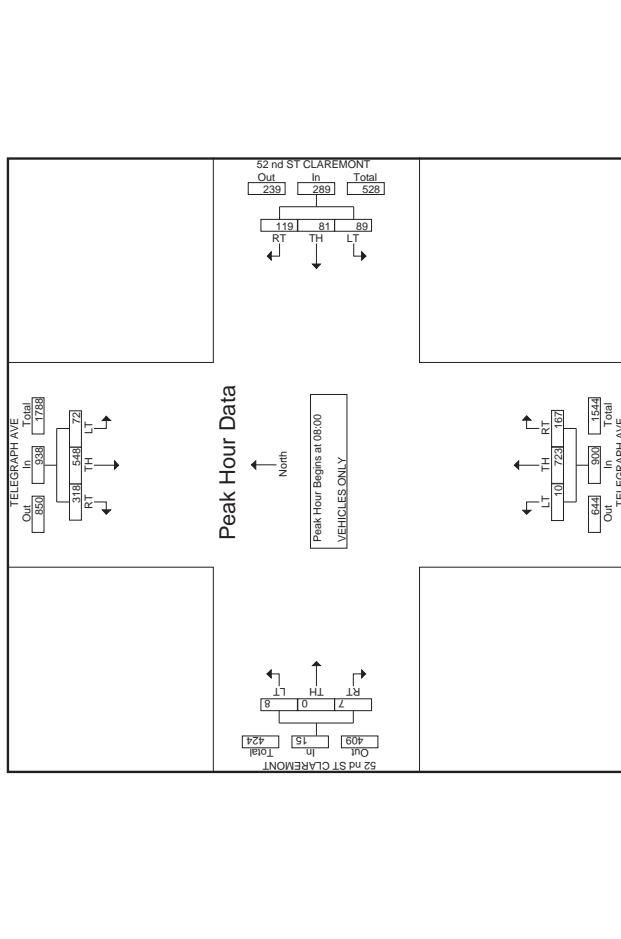
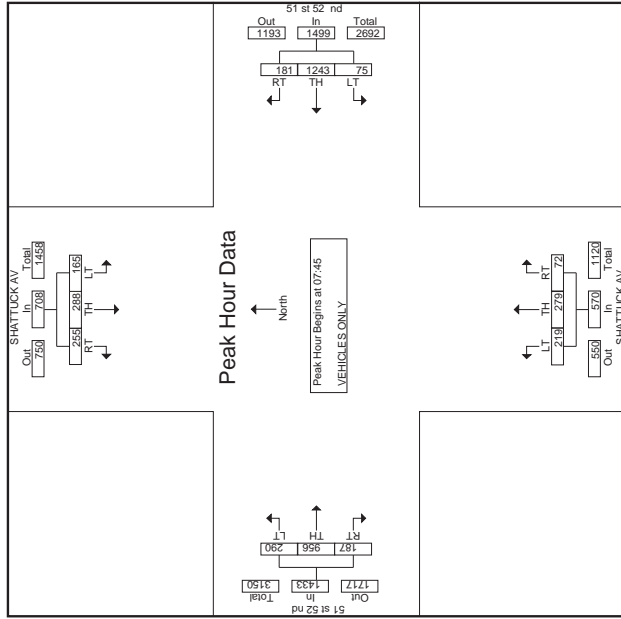
**APPENDIX A:
INTERSECTION TURNING MOVEMENT COUNTS**

MARKS TRAFFIC DATA

Start Time	SHATTUCK AV Southbound				SHATTUCK AV Northbound				51 st 52 nd Westbound				51 st 52 nd Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	144	204	107	455	126	1054	78	1258	73	201	125	389	124	889	172	1185
08:05	68	79	42	189	52	397	30	369	20	81	69	159	67	256	79	402
08:10	72	72	38	183	45	325	19	308	15	77	68	160	43	238	61	342
08:15	62	69	37	168	38	309	16	363	9	52	49	110	28	212	88	328
08:20	43	52	29	124	30	288	11	329	6	49	31	86	32	200	60	292
08:25	246	272	146	664	166	1159	65	1449	50	259	206	515	170	906	288	1364
08:30	390	476	253	1119	231	2273	143	2707	123	460	331	914	294	1795	460	2549
08:35	34.9	42.5	22.6	10.7	84	5.3	37.1	13.5	50.3	36.2	4.5	12.5	11.5	70.4	18	7.8
08:40	5.4	6.5	3.5	15.4	4	31.2	2	37.1	1.7	6.3	4.5	12.5	4	24.6	6.3	35
Grand Total	390	476	253	1119	231	2273	143	2707	123	460	331	914	294	1795	460	2549
Approach %	34.9	42.5	22.6	10.7	84	5.3	37.1	13.5	50.3	36.2	4.5	12.5	11.5	70.4	18	7.8
Total %	5.4	6.5	3.5	15.4	4	31.2	2	37.1	1.7	6.3	4.5	12.5	4	24.6	6.3	35

MARKS TRAFFIC DATA

Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				52 nd ST CLAREMONT Westbound				52 nd ST CLAREMONT Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	165	336	35	536	60	36	35	131	87	443	7	537	3	4	2	9
08:05	62	113	18	193	26	24	15	65	22	139	0	184	0	1	0	1
08:10	85	138	19	242	38	24	25	87	42	196	0	239	0	3	5	573
08:15	78	150	14	242	27	20	25	72	53	201	3	257	3	0	3	6
08:20	93	147	21	261	28	13	24	65	50	187	3	240	1	0	1	2
08:25	318	548	72	938	119	81	89	289	167	723	10	900	7	0	8	15
08:30	483	884	107	1474	179	117	124	420	254	1166	17	1437	10	4	10	24
08:35	32.8	60	7.3	43.9	42.6	27.9	29.5	3.7	12.5	7.6	34.8	0.5	42.8	0.3	0.1	0.3
08:40	14.4	26.3	3.2	43.9	5.3	3.5	3.7	12.5	7.6	34.8	0.5	42.8	0.3	0.1	0.3	0.7
Grand Total	483	884	107	1474	179	117	124	420	254	1166	17	1437	10	4	10	24
Approach %	32.8	60	7.3	43.9	42.6	27.9	29.5	3.7	12.5	7.6	34.8	0.5	42.8	0.3	0.1	0.3
Total %	14.4	26.3	3.2	43.9	5.3	3.5	3.7	12.5	7.6	34.8	0.5	42.8	0.3	0.1	0.3	0.7

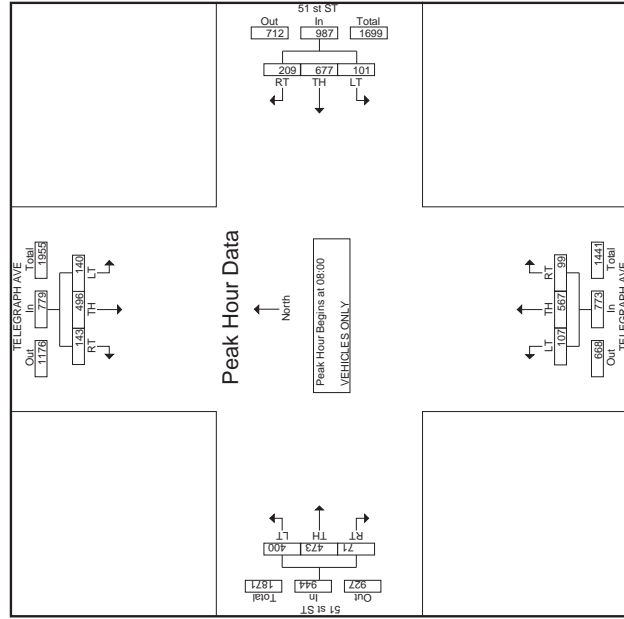


Groups Printed- VEHICLES ONLY

Start Time	TELEGRAPH AVE Southbound			TELEGRAPH AVE Northbound			51 st ST Westbound			51 st ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	11	11	108	11	13	143	0	9	69	6	0	52
07:15	14	83	29	30	115	9	56	9	115	6	80	181
07:30	18	99	156	27	127	23	113	19	153	11	99	72
07:45	29	107	41	177	39	132	29	200	16	129	20	165
Total	72	380	126	578	117	487	79	683	57	416	59	389
Grand Total	20	115	44	179	51	161	30	242	22	152	34	208
Approach %	15.8	64.6	19.6	67.9	19.5	69.7	10.8	27.9	2.6	16.4	2.8	21.8
Total %	3.6	14.7	4.5	22.7	5.5	19.5	3	27.9	1.2	7.5	12.7	18.8

Peak Hour Analysis From 07:00 to 08:45 - Peak of 1
 Peak Hour Begins at 08:00

Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
08:00	20	115	44	179	51	161	30	242	22	152	34	208	14
08:15	39	129	36	204	62	182	31	275	31	130	29	190	19
08:30	44	131	31	206	52	171	19	242	27	144	23	194	22
08:45	40	121	29	190	44	153	21	228	19	141	21	181	16
Total	143	496	140	779	209	677	101	987	99	567	107	773	71
Grand Total	215	876	266	1357	326	1164	180	1670	156	683	166	1305	110
Approach %	15.8	64.6	19.6	67.9	19.5	69.7	10.8	27.9	2.6	16.4	2.8	21.8	1.8
Total %	3.6	14.7	4.5	22.7	5.5	19.5	3	27.9	1.2	7.5	12.7	18.8	14.4

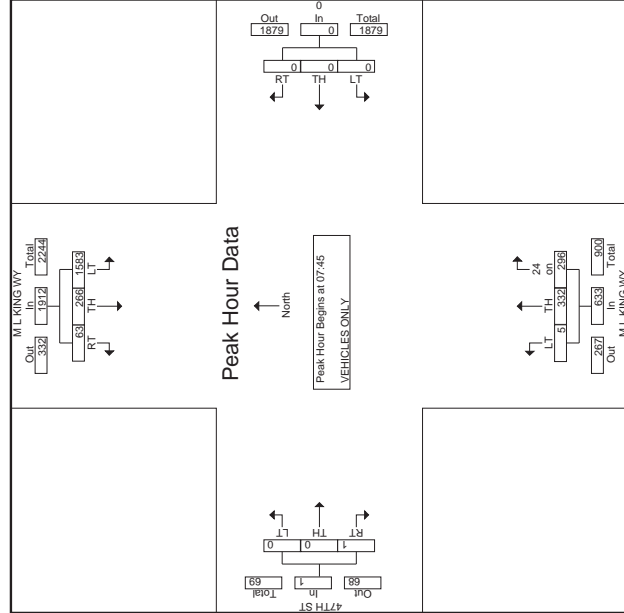


Groups Printed- VEHICLES ONLY

Start Time	M L KING WY Southbound			M L KING WY Northbound			47TH ST Westbound			47TH ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	18	63	309	0	0	0	0	0	0	0	0	0
08:15	22	63	403	0	0	0	0	0	0	0	0	0
08:30	11	68	415	0	0	0	0	0	0	0	0	0
08:45	5	52	368	0	0	0	0	0	0	0	0	0
Total	56	265	1585	0	0	0	0	0	0	0	0	0
Grand Total	80	448	2896	0	0	0	0	0	0	0	0	0
Approach %	2.3	13.1	84.6	0	0	0	0	0	0	0	0	0
Total %	1.8	9.8	63.4	0	0	0	0	0	0	0	0	0

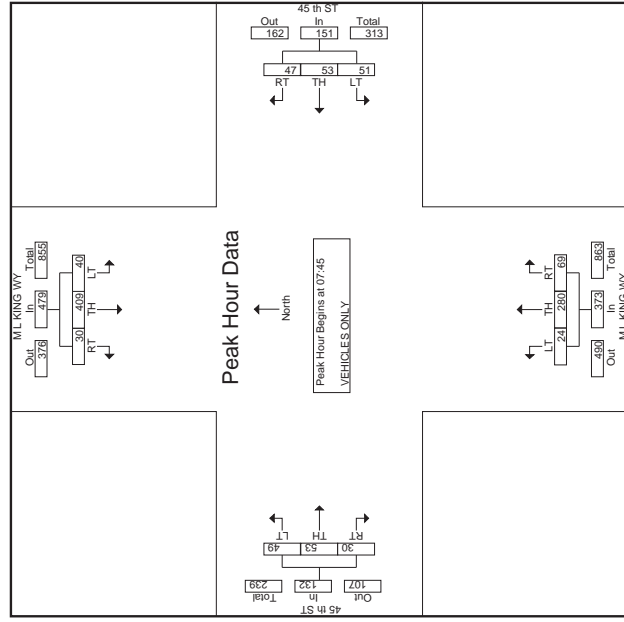
Peak Hour Analysis From 07:00 to 08:45 - Peak of 1
 Peak Hour Begins at 07:45

Start Time	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	Int. Total
07:45	12	53	366	431	0	0	0	0	0	0	0	0	0
08:00	18	62	399	479	0	0	0	0	0	0	0	0	0
08:15	22	83	403	508	0	0	0	0	0	0	0	0	0
08:30	11	68	415	494	0	0	0	0	0	0	0	0	0
Total	63	266	1583	1912	0	0	0	0	0	0	0	0	0
Grand Total	80	448	2896	3424	0	0	0	0	0	0	0	0	0
Approach %	2.3	13.1	84.6	74.9	0	0	0	0	0	0	0	0	0
Total %	1.8	9.8	63.4	74.9	0	0	0	0	0	0	0	0	0



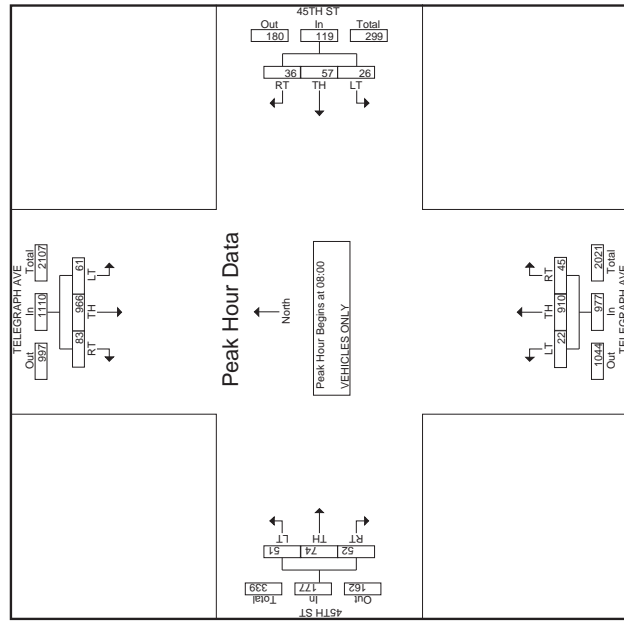
Start Time	M L KING WY Southbound				M L KING WY Northbound				45th ST Westbound				45th ST Eastbound				
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	
08:00	7	89	3	79	4	9	21	45	0	6	2	8	151	8	142	10	161
07:15	3	71	3	84	2	11	12	48	1	5	6	16	191	4	138	3	145
07:30	6	77	11	94	2	8	23	52	5	6	22	208	7	182	7	191	
07:45	7	89	7	103	9	15	9	33	9	10	12	35	244	8	188	4	197
Total	23	316	30	369	22	43	37	102	32	199	12	243	19	32	30	81	795
Grand Total	10	67	11	118	11	17	14	42	18	74	8	100	10	14	11	35	295
Approach %	6	108	12	126	15	12	18	45	23	78	8	109	7	16	15	38	318
Approach %	7	115	10	132	12	9	10	31	19	69	3	91	3	11	10	24	278
Approach %	5	99	8	112	9	6	9	24	20	64	4	88	3	9	8	20	244
Total	28	419	41	488	47	44	51	142	80	285	23	388	23	50	44	117	1135
Grand Total	51	735	71	857	69	87	88	244	112	484	35	631	42	82	74	188	1830
Approach %	6	85.8	8.3	28.3	35.7	36.1	17.7	76.7	5.5	25.1	1.8	32.7	2.2	4.2	3.8	10.3	
Total %	2.6	38.1	3.7	44.4	3.6	4.5	4.6	12.6	5.8	25.1	1.8	32.7	2.2	4.2	3.8	10.3	

Start Time	M L KING WY Southbound				M L KING WY Northbound				45th ST Westbound				45th ST Eastbound				
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	
08:00	10	97	11	118	11	17	14	42	18	74	8	100	10	14	11	35	244
08:15	6	108	12	126	15	12	18	45	23	78	8	109	7	16	15	38	295
08:30	7	115	10	132	12	9	10	31	19	69	3	91	3	11	10	24	278
08:45	5	99	8	112	9	6	9	24	20	64	4	88	3	9	8	20	244
Total	28	419	41	488	47	44	51	142	80	285	23	388	23	50	44	117	1135
Grand Total	51	735	71	857	69	87	88	244	112	484	35	631	42	82	74	188	1830
Approach %	6	85.8	8.3	28.3	35.7	36.1	17.7	76.7	5.5	25.1	1.8	32.7	2.2	4.2	3.8	10.3	
Total %	2.6	38.1	3.7	44.4	3.6	4.5	4.6	12.6	5.8	25.1	1.8	32.7	2.2	4.2	3.8	10.3	



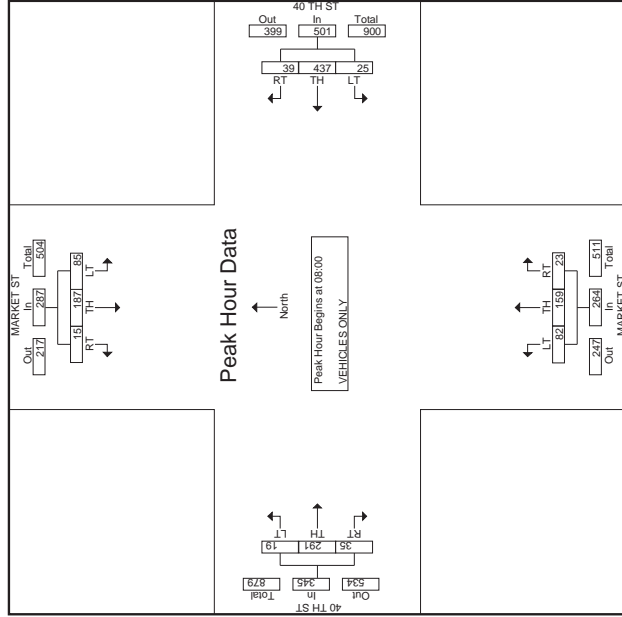
Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				45TH ST Westbound				45TH ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	17	211	7	235	9	11	3	23	12	221	4	237	10	12	12	34
08:15	18	238	3	259	10	14	8	32	15	241	7	263	12	16	9	37
08:30	24	268	50	342	6	17	10	33	8	239	8	255	14	21	15	50
08:45	24	249	1	274	11	15	5	31	10	209	3	222	16	25	15	56
Total	83	968	61	1110	36	57	26	119	45	910	22	977	52	74	51	177
Grand Total	123	1620	82	1825	61	86	34	181	69	1591	36	1686	88	100	75	263
Approach %	6.7	88.8	4.5	33.7	47.5	16.8	4.1	93.8	2.1	40.1	0.9	42.8	2.2	2.5	1.9	6.6
Total %	3.1	40.9	2.1	46	1.5	2.2	0.9	4.6	1.7	40.1	0.9	42.8	2.2	2.5	1.9	6.6

Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				45TH ST Westbound				45TH ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	17	211	7	235	9	11	3	23	12	221	4	237	10	12	12	34
08:15	18	238	3	259	10	14	8	32	15	241	7	263	12	16	9	37
08:30	24	268	50	342	6	17	10	33	8	239	8	255	14	21	15	50
08:45	24	249	1	274	11	15	5	31	10	209	3	222	16	25	15	56
Total	83	968	61	1110	36	57	26	119	45	910	22	977	52	74	51	177
Grand Total	123	1620	82	1825	61	86	34	181	69	1591	36	1686	88	100	75	263
Approach %	6.7	88.8	4.5	33.7	47.5	16.8	4.1	93.8	2.1	40.1	0.9	42.8	2.2	2.5	1.9	6.6
Total %	3.1	40.9	2.1	46	1.5	2.2	0.9	4.6	1.7	40.1	0.9	42.8	2.2	2.5	1.9	6.6



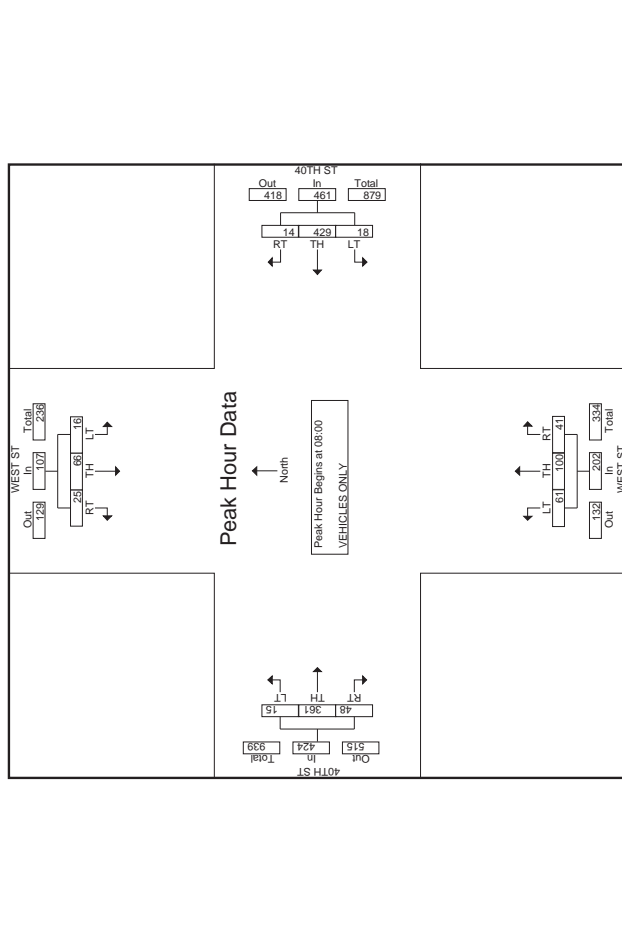
MARKS TRAFFIC DATA

Start Time	MARKET ST Southbound			MARKET ST Northbound			40 TH ST Westbound			40 TH ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	10	107	59	17	122	54	18	211	15	244		
08:15	3	50	25	8	112	37	21	64	9	72	0	81
08:30	4	67	16	10	121	3	48	21	72	10	84	8
08:45	5	35	21	59	12	107	1	120	8	44	24	76
09:00	5	187	85	287	39	437	25	501	23	159	62	264
Total	25	294	143	462	48	703	31	782	40	281	136	457
Grand Total	5.4	63.6	31	89.9	4	34.1	1.7	12.3	5.9	20	2.3	21.9
Approach %	1.1	12.8	6.2	20.2	2.1	30.7	1.4	34.1	1.7	12.3	5.9	20
Total %												
Grand Total	25	294	143	462	48	703	31	782	40	281	136	457
Approach %	5.4	63.6	31	89.9	4	34.1	1.7	12.3	5.9	20	2.3	21.9
Total %	1.1	12.8	6.2	20.2	2.1	30.7	1.4	34.1	1.7	12.3	5.9	20



MARKS TRAFFIC DATA

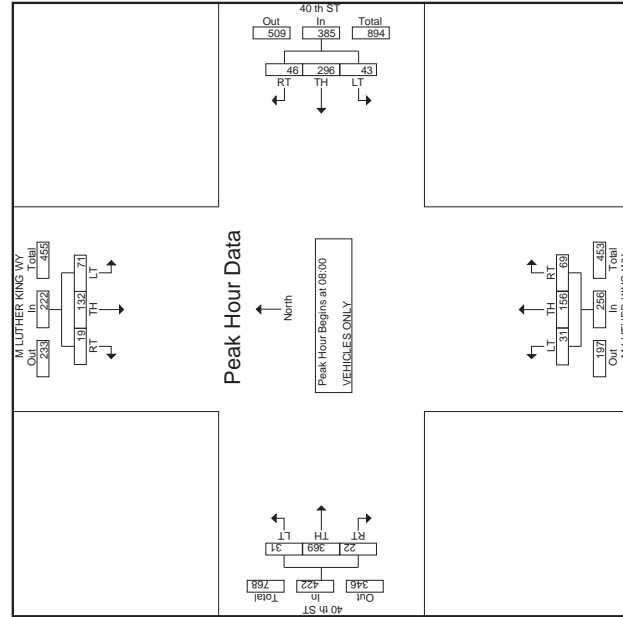
Start Time	WEST ST Southbound			WEST ST Northbound			40TH ST Westbound			40TH ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	24	33	13	70	3	240	7	250	26	46	41	113
08:15	5	14	5	24	6	83	7	106	11	34	10	55
08:30	6	14	6	26	4	104	7	115	7	20	22	49
08:45	7	15	3	25	2	126	1	129	12	22	14	48
09:00	25	66	16	107	14	429	18	461	41	100	61	202
Total	49	99	29	177	17	689	25	711	67	146	102	315
Grand Total	27.7	55.9	16.4	94.1	3.5	34.8	1.3	37	3.5	7.6	5.3	16.4
Approach %	2.6	5.2	1.5	9.2	0.9	34.8	1.3	37	3.5	7.6	5.3	16.4
Total %												
Grand Total	49	99	29	177	17	689	25	711	67	146	102	315
Approach %	27.7	55.9	16.4	94.1	3.5	34.8	1.3	37	3.5	7.6	5.3	16.4
Total %	2.6	5.2	1.5	9.2	0.9	34.8	1.3	37	3.5	7.6	5.3	16.4



MARKS TRAFFIC DATA

Start Time	Gangs Printed- VEHICLES ONLY																			
	M LUTHER KING WY Southbound						M LUTHER KING WY Northbound						40th ST Eastbound							
	RT	TH	L.T.	App.Total	LT	TH	L.T.	App.Total	RT	TH	L.T.	App.Total	RT	TH	L.T.	App.Total	In.	Total	Int.	Total
07:00	0	11	15	26	7	32	10	49	11	17	2	30	0	49	4	53	0	53	158	158
07:05	0	2	14	16	7	24	6	31	17	29	7	53	0	62	7	69	0	69	213	213
07:30	4	23	14	37	15	22	37	59	32	5	63	5	66	6	72	0	72	281	281	281
07:45	3	43	18	64	13	80	4	97	17	38	7	63	5	66	6	77	0	77	281	281
Total	9	76	61	146	42	176	22	240	63	117	21	201	11	230	22	263	0	263	850	850
08:00	2	25	18	45	7	45	13	65	19	54	9	82	8	77	13	90	0	90	290	290
08:05	4	35	14	53	12	106	7	124	9	34	9	52	5	98	6	109	0	109	335	335
08:30	4	26	20	50	11	78	6	84	22	33	5	60	2	95	4	101	0	101	335	335
08:45	9	46	19	74	16	78	6	100	22	33	5	60	2	95	4	101	0	101	335	335
Total	19	132	71	222	46	296	43	385	69	156	31	256	22	369	31	422	0	422	1285	1285
Grand Total	28	208	102	388	86	472	65	625	130	673	62	457	33	659	53	685	0	685	2135	2135
App. %	7.8	58.5	30.3	94.3	14.1	75.5	10.4	92.2	28.3	59.7	11.4	11.4	4.8	87.4	7.7	17.2	0	17.2	32.1	32.1
Total %	1.3	9.7	6.2	17.2	4.1	22.1	3	29.3	6.2	12.8	2.4	21.4	1.5	28.1	2.5	32.1	0	32.1		

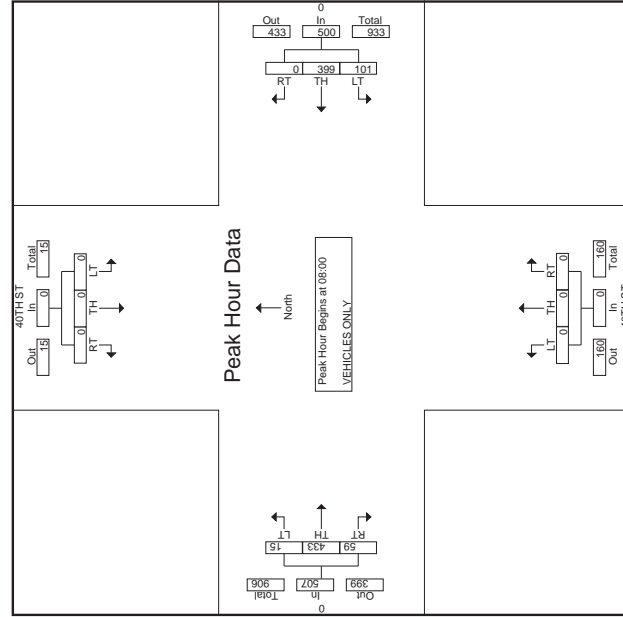
Start Time	M LUTHER KING WY Southbound												M LUTHER KING WY Northbound												40th ST Eastbound											
	RT	TH	L.T.	App.Total	LT	TH	L.T.	App.Total	RT	TH	L.T.	App.Total	RT	TH	L.T.	App.Total	RT	TH	L.T.	App.Total	In.	Total														
	07:00	0	11	15	26	7	32	10	49	11	17	2	30	0	49	4	53	0	53	158	158															
07:05	0	2	14	16	7	24	6	31	17	29	7	53	0	62	7	69	0	69	213	213																
07:30	4	23	14	37	15	22	37	59	32	5	63	5	66	6	72	0	72	281	281																	
07:45	3	43	18	64	13	80	4	97	17	38	7	63	5	66	6	77	0	77	281	281																
Total	9	76	61	146	42	176	22	240	63	117	21	201	11	230	22	263	0	263	850	850																
08:00	2	25	18	45	7	45	13	65	19	54	9	82	8	77	13	90	0	90	290	290																
08:05	4	35	14	53	12	106	7	124	9	34	9	52	5	98	6	109	0	109	335	335																
08:30	4	26	20	50	11	78	6	84	22	33	5	60	2	95	4	101	0	101	335	335																
08:45	9	46	19	74	16	78	6	100	22	33	5	60	2	95	4	101	0	101	335	335																
Total	19	132	71	222	46	296	43	385	69	156	31	256	22	369	31	422	0	422	1285	1285																
Grand Total	28	208	102	388	86	472	65	625	130	673	62	457	33	659	53	685	0	685	2135	2135																
App. %	7.8	58.5	30.3	94.3	14.1	75.5	10.4	92.2	28.3	59.7	11.4	11.4	4.8	87.4	7.7	17.2	0	17.2	32.1	32.1																
Total %	1.3	9.7	6.2	17.2	4.1	22.1	3	29.3	6.2	12.8	2.4	21.4	1.5	28.1	2.5	32.1	0	32.1																		



MARKS TRAFFIC DATA

Start Time	Gangs Printed- VEHICLES ONLY																							
	40TH ST Southbound						Westbound						40TH ST Northbound						Eastbound					
	RT	TH	L.T.	App.Total	LT	TH	L.T.	App.Total	RT	TH	L.T.	App.Total	RT	TH	L.T.	App.Total	RT	TH	L.T.	App.Total	In.	Total		
07:00	0	0	0	0	0	52	16	68	0	0	0	0	14	62	1	77	0	77	145	145				
07:05	0	0	0	0	0	60	22	82	0	0	0	0	16	70	2	86	0	86	178	178				
07:30	0	0	0	0	0	99	28	127	0	0	0	0	17	82	2	101	0	101	228	228				
07:45	0	0	0	0	0	261	86	347	0	0	0	0	63	274	7	344	0	344	691	691				
Total	0	0	0	0	0	713	232	945	0	0	0	0	180	788	12	999	0	999	2042	2042				
08:00	0	0	0	0	0	71	34	105	0	0	0	0	16	92	4	112	0	112	217	217				
08:05	0	0	0	0	0	125	14	139	0	0	0	0	20	115	3	138	0	138	279	279				
08:30	0	0	0	0	0	105	26	131	0	0	0	0	8	122	3	133	0	133	264	264				
08:45	0	0	0	0	0	389	101	500	0	0	0	0	59	433	15	507	0	507	1007	1007				
Total	0	0	0	0	0	1216	178	1395	0	0	0	0	103	1042	25	1167	0	1167	3607	3607				
Grand Total	0	0	0	0	0	1929	410	1740	0	0	0	0	183	1830	37	1967	0	1967	5654	5654				
App. %	0	0	0	0	0	7.9	2.8	11.9	0	0	0	0	1.4	17.2	2.6	19.8	0	19.8	31.1	31.1				
Total %	0	0	0	0	0	38.9	11	48.9	0	0	0	0	7.2	41.6	1.3	50.1	0	50.1						

Start Time	M LUTHER KING WY Southbound												M LUTHER KING WY Northbound												40th ST Eastbound											
	RT	TH	L.T.	App.Total	LT	TH	L.T.	App.Total	RT	TH	L.T.	App.Total	RT	TH	L.T.	App.Total	RT	TH	L.T.	App.Total	In.	Total														
	07:00	0	11	15	26	7	32	10	49	11	17	2	30	0	49	4	53	0	53	158	158															
07:05	0	2	14	16	7	24	6	31	17	29	7	53	0	62	7	69	0	69	213	213																
07:30	4	23	14	37	15	22	37	59	32	5	63	5	66	6	72	0	72	281	281																	
07:45	3	43	18	64	13	80	4	97	17	38	7	63	5	66	6	77	0	77	281	281																
Total	9	76	61	146	42	176	22	240	63	117	21	201	11	230	22	263	0	263	850	850																
08:00	2	25	18	45	7	45	13	65	19	54	9	82	8	77	13	90	0	90	290	290																
08:05	4	35	14	53	12	106	7	124	9	34	9	52	5	98	6	109	0	109	335	335																
08:30	4	26	20	50	11	78	6	84	22	33	5	60	2	95	4	101	0	101	335	335																
08:45	9	46	19	74	16	78	6	100	22	33	5	60	2	95	4	101	0	101	335	335																
Total	19	132	71	222	46	296	43	385	69	156	31	256	22	369	31	422	0	422	1285	1285																
Grand Total	28	208	102	388	86	472	65	625	130	673	62	457	33	659	53	685	0	685	2135	2135																
App. %	7.8	58.5	30.3	94.3	14.1	75.5	10.4	92.2	28.3	59.7	11.4	11.4	4.8	87.4	7.7	17.2	0	17.2	32.1	32.1																
Total %	1.3	9.7	6.2	17.2	4.1	22.1	3	29.3	6.2	12.8	2.4	21.4	1.5	28.1	2.5	32.1	0	32.1																		



MARKS TRAFFIC DATA

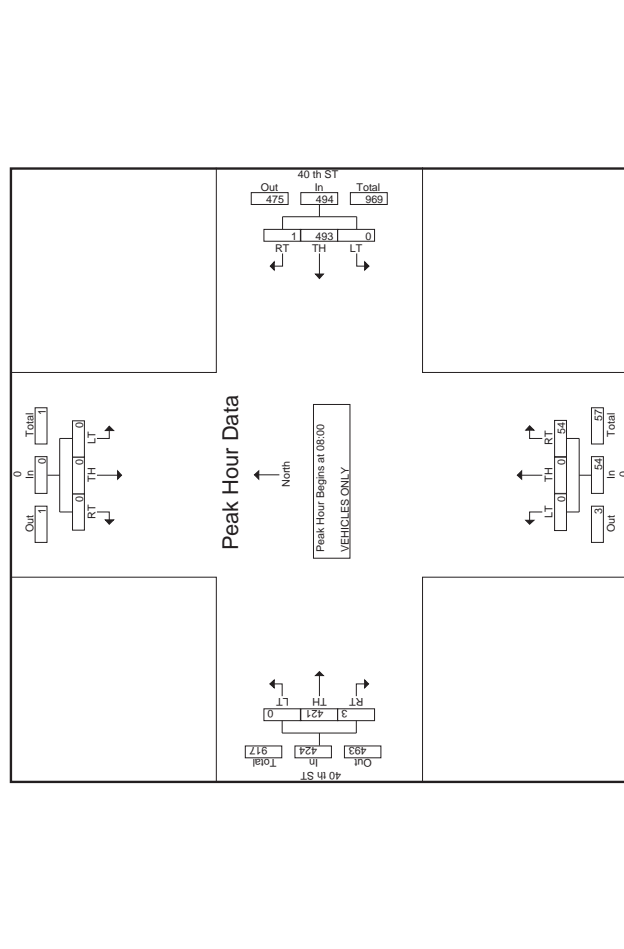
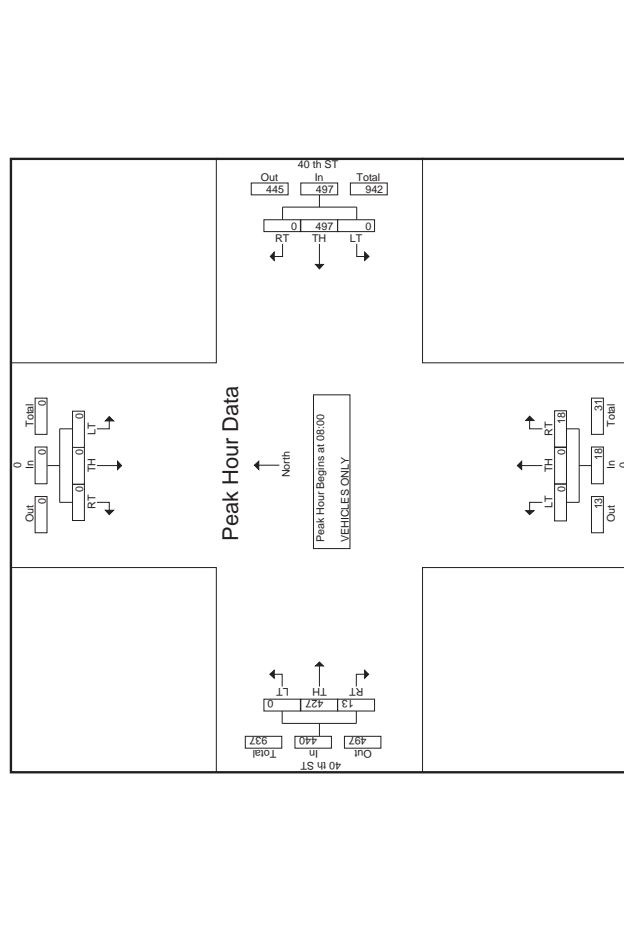
MARKS TRAFFIC DATA

Start Time	0			40 th ST			0			40 th ST			0		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	0			40 th ST			0			40 th ST			0		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	0			40 th ST			0			40 th ST			0		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	0			40 th ST			0			40 th ST			0		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



MARKS TRAFFIC DATA

MARKS TRAFFIC DATA

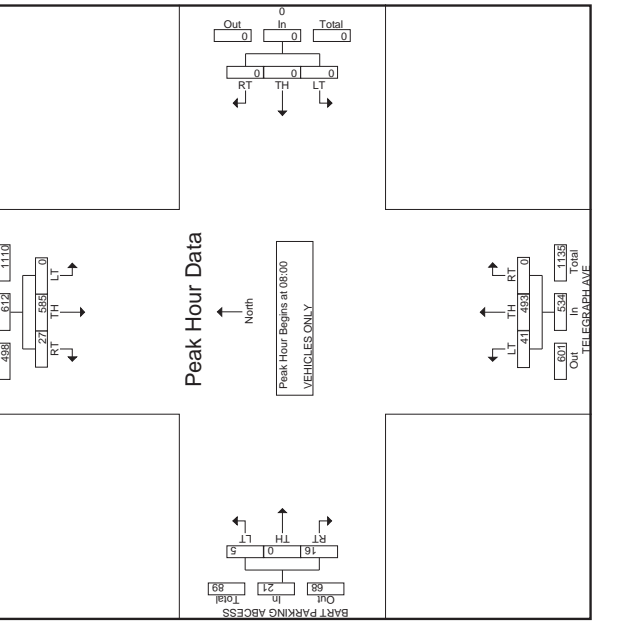
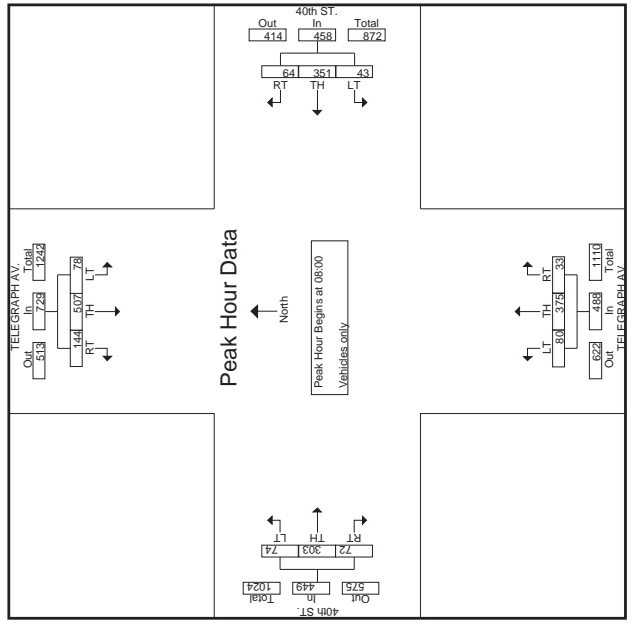
Start Time	0 Groups Printed - VEHICLES ONLY											
	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				BART PARKING ACCESS Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
07:00	10	8	8	26	0	0	0	0	0	0	0	0
07:15	8	6	6	20	0	0	0	0	0	0	0	0
07:30	11	8	8	27	0	0	0	0	0	0	0	0
07:45	8	12	0	20	0	0	0	0	0	0	0	0
Total	43	34	22	99	0	0	0	0	0	0	0	0
08:00	11	10	0	21	0	0	0	0	0	0	0	0
08:15	5	15	0	20	0	0	0	0	0	0	0	0
08:30	7	15	0	22	0	0	0	0	0	0	0	0
08:45	4	16	0	20	0	0	0	0	0	0	0	0
Total	27	56	0	83	0	0	0	0	0	0	0	0
Grand Total	70	92	0	162	0	0	0	0	0	0	0	0
Approach %	7	93	0	100	0	0	0	0	0	0	0	0
Total %	3.6	47.2	0	50.8	0	0	0	0	0	0	0	0

Start Time	0 Groups Printed - VEHICLES ONLY											
	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				BART PARKING ACCESS Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	11	10	0	21	0	0	0	0	0	0	0	0
08:15	5	15	0	20	0	0	0	0	0	0	0	0
08:30	7	15	0	22	0	0	0	0	0	0	0	0
08:45	4	16	0	20	0	0	0	0	0	0	0	0
Total	27	56	0	83	0	0	0	0	0	0	0	0
Grand Total	70	92	0	162	0	0	0	0	0	0	0	0
Approach %	7	93	0	100	0	0	0	0	0	0	0	0
Total %	3.6	47.2	0	50.8	0	0	0	0	0	0	0	0

Start Time	0 Groups Printed - VEHICLES ONLY											
	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				BART PARKING ACCESS Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	11	10	0	21	0	0	0	0	0	0	0	0
08:15	5	15	0	20	0	0	0	0	0	0	0	0
08:30	7	15	0	22	0	0	0	0	0	0	0	0
08:45	4	16	0	20	0	0	0	0	0	0	0	0
Total	27	56	0	83	0	0	0	0	0	0	0	0
Grand Total	70	92	0	162	0	0	0	0	0	0	0	0
Approach %	7	93	0	100	0	0	0	0	0	0	0	0
Total %	3.6	47.2	0	50.8	0	0	0	0	0	0	0	0

Start Time	0 Groups Printed - VEHICLES ONLY											
	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				BART PARKING ACCESS Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	11	10	0	21	0	0	0	0	0	0	0	0
08:15	5	15	0	20	0	0	0	0	0	0	0	0
08:30	7	15	0	22	0	0	0	0	0	0	0	0
08:45	4	16	0	20	0	0	0	0	0	0	0	0
Total	27	56	0	83	0	0	0	0	0	0	0	0
Grand Total	70	92	0	162	0	0	0	0	0	0	0	0
Approach %	7	93	0	100	0	0	0	0	0	0	0	0
Total %	3.6	47.2	0	50.8	0	0	0	0	0	0	0	0

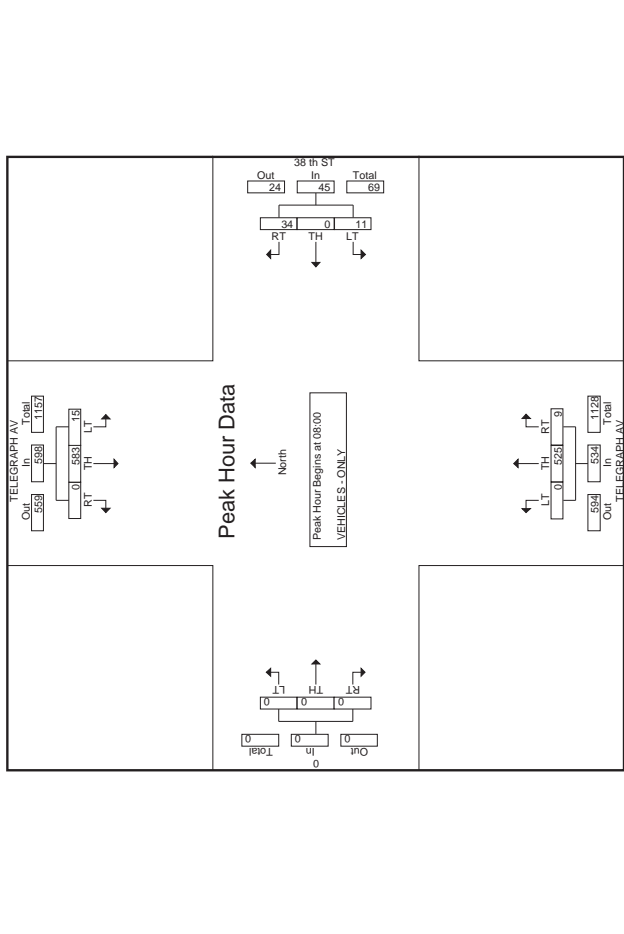
Start Time	0 Groups Printed - VEHICLES ONLY											
	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				BART PARKING ACCESS Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
08:00	11	10	0	21	0	0	0	0	0	0	0	0
08:15	5	15	0	20	0	0	0	0	0	0	0	0
08:30	7	15	0	22	0	0	0	0	0	0	0	0
08:45	4	16	0	20	0	0	0	0	0	0	0	0
Total	27	56	0	83	0	0	0	0	0	0	0	0
Grand Total	70	92	0	162	0	0	0	0	0	0	0	0
Approach %	7	93	0	100	0	0	0	0	0	0	0	0
Total %	3.6	47.2	0	50.8	0	0	0	0	0	0	0	0



MARKS TRAFFIC DATA

Start Time	TELEGRAPH AV Southbound			38 th ST Westbound			TELEGRAPH AV Northbound			Eastbound			Int. Total	
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT		
07:00	0	58	2	60	3	0	1	113	0	118	0	0	0	182
07:15	0	68	1	69	4	0	1	87	0	87	0	0	0	161
07:30	0	91	3	94	11	0	1	96	0	100	0	0	0	206
07:45	0	171	11	182	20	0	5	387	0	402	0	0	0	772
Total	0	331	12	343	27	0	5	387	0	402	0	0	0	1177
08:00	0	110	3	113	8	0	1	117	0	117	0	0	0	239
08:15	0	154	6	160	12	0	3	151	0	152	0	0	0	327
08:30	0	155	2	157	8	0	2	164	0	169	0	0	0	326
08:45	0	133	1	134	6	0	1	134	0	139	0	0	0	276
Total	0	593	15	598	34	0	11	45	3	523	0	0	0	1177
Grand Total	0	914	27	941	61	0	16	77	24	912	0	0	0	1954
Approach %	0	97.1	2.9	97.1	79.2	0	20.8	3.9	1.2	46.7	0	0	0	47.9
Total %	0	46.8	1.4	48.2	3.1	0	0.8	3.9	1.2	46.7	0	0	0	117.7

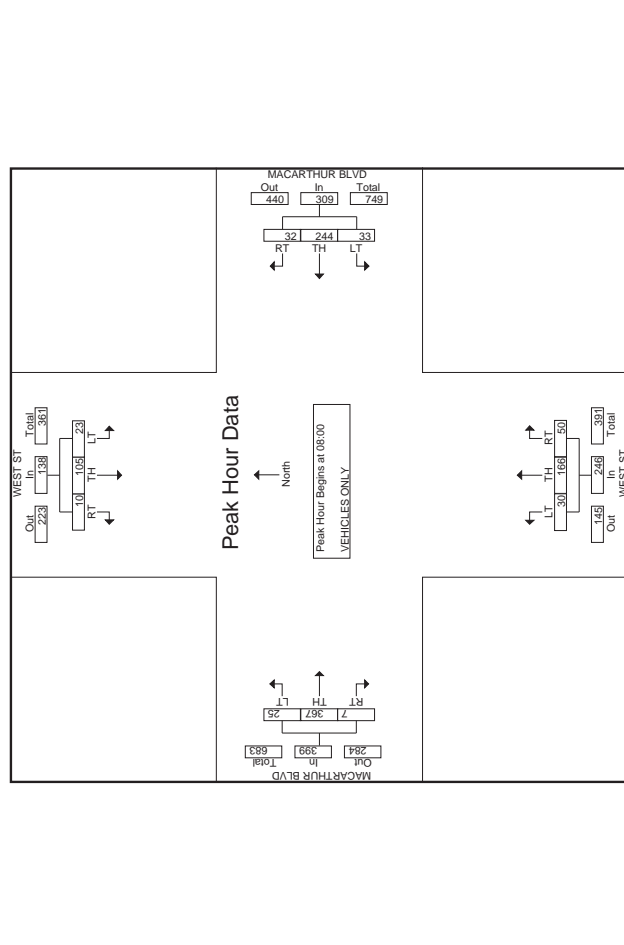
Start Time	TELEGRAPH AV Southbound			38 th ST Westbound			TELEGRAPH AV Northbound			Eastbound			Int. Total	
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT		
07:00	0	110	3	113	8	0	1	9	0	117	0	0	0	239
08:15	0	154	6	160	12	0	3	151	0	152	0	0	0	327
08:30	0	155	2	157	8	0	2	164	0	169	0	0	0	326
08:45	0	133	1	134	6	0	1	134	0	139	0	0	0	276
Total	0	593	15	598	34	0	11	45	3	523	0	0	0	1177
Grand Total	0	914	27	941	61	0	16	77	24	912	0	0	0	1954
Approach %	0	97.1	2.9	97.1	79.2	0	20.8	3.9	1.2	46.7	0	0	0	47.9
Total %	0	46.8	1.4	48.2	3.1	0	0.8	3.9	1.2	46.7	0	0	0	117.7



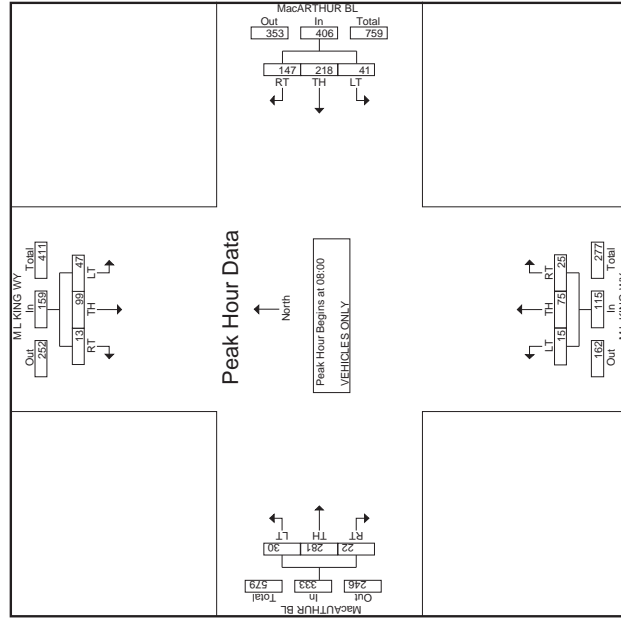
MARKS TRAFFIC DATA

Start Time	WEST ST Southbound			MACARTHUR BLVD Westbound			WEST ST Northbound			MACARTHUR BLVD Eastbound			Int. Total	
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT		
07:00	1	1	2	4	7	0	3	5	0	24	3	2	77	
07:15	1	1	2	4	7	0	3	5	0	24	3	2	77	
07:30	0	12	7	19	5	0	3	23	0	34	4	82	189	
07:45	2	22	4	28	3	0	5	25	0	34	4	82	189	
Total	4	54	14	72	15	0	11	53	0	64	11	14	309	
08:00	2	27	7	36	8	0	6	26	0	30	5	10	104	
08:15	6	26	3	35	8	0	7	25	0	30	5	10	104	
08:30	2	31	6	39	9	0	7	25	0	30	5	10	104	
08:45	0	21	5	26	7	0	5	22	0	24	2	8	86	
Total	10	105	23	138	32	0	33	309	0	246	7	25	399	
Grand Total	14	159	37	210	47	0	39	351	0	300	23	25	708	
Approach %	67	75.7	17.6	75.7	13	0	21.3	66.9	11.8	21.6	1.3	35.7	39.2	
Total %	0.8	8.8	2	11.6	2.6	0	27.7	4.6	14.4	2.5	21.6	1.3	35.7	39.2

Start Time	WEST ST Southbound			MACARTHUR BLVD Westbound			WEST ST Northbound			MACARTHUR BLVD Eastbound			Int. Total	
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT		
07:00	1	1	2	4	7	0	3	5	0	24	3	2	77	
08:15	6	26	3	35	8	0	7	25	0	30	5	10	104	
08:30	2	31	6	39	9	0	7	25	0	30	5	10	104	
08:45	0	21	5	26	7	0	5	22	0	24	2	8	86	
Total	10	105	23	138	32	0	33	309	0	246	7	25	399	
Grand Total	14	159	37	210	47	0	39	351	0	300	23	25	708	
Approach %	67	75.7	17.6	75.7	13	0	21.3	66.9	11.8	21.6	1.3	35.7	39.2	
Total %	0.8	8.8	2	11.6	2.6	0	27.7	4.6	14.4	2.5	21.6	1.3	35.7	39.2

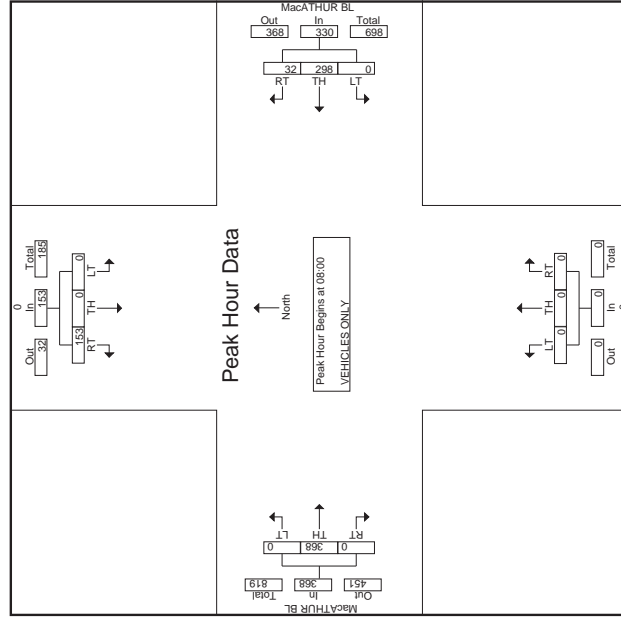


Start Time	M L KING WY Southbound				MacARTHUR BL Westbound				M L KING WY Northbound				MacARTHUR BL Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
07:00	3	18	7	28	24	30	5	59	1	13	2	16	4	59	6	69
07:05	2	14	4	20	32	37	7	72	5	19	2	22	4	53	2	62
07:30	1	16	4	21	36	41	7	78	4	18	2	22	3	49	11	69
07:45	1	26	17	44	22	41	6	69	7	29	4	40	3	75	5	83
Total	8	74	32	114	98	148	21	267	14	75	10	99	17	270	36	323
08:00	3	23	17	43	42	61	11	114	5	14	6	25	6	79	7	92
08:05	2	22	11	35	37	50	5	92	6	17	3	26	2	74	8	84
08:15	2	22	11	35	37	50	5	92	6	17	3	26	2	74	8	84
08:30	2	29	9	40	36	50	15	101	5	20	4	29	9	67	10	86
08:45	6	25	10	41	32	57	10	99	9	24	2	35	5	61	5	71
Total	13	99	47	159	147	218	41	406	25	75	15	115	22	281	30	333
Grand Total	21	173	79	273	245	366	62	673	39	150	25	214	39	651	66	656
App. %	77	63.4	28.9	77	36.4	50.2	9.2	37.1	2.1	8.3	11.4	11.8	2.1	30.3	3.6	36.1
Total %	1.2	9.5	4.4	15	13.5	20.2	3.4	37.1	2.1	8.3	11.4	11.8	2.1	30.3	3.6	36.1



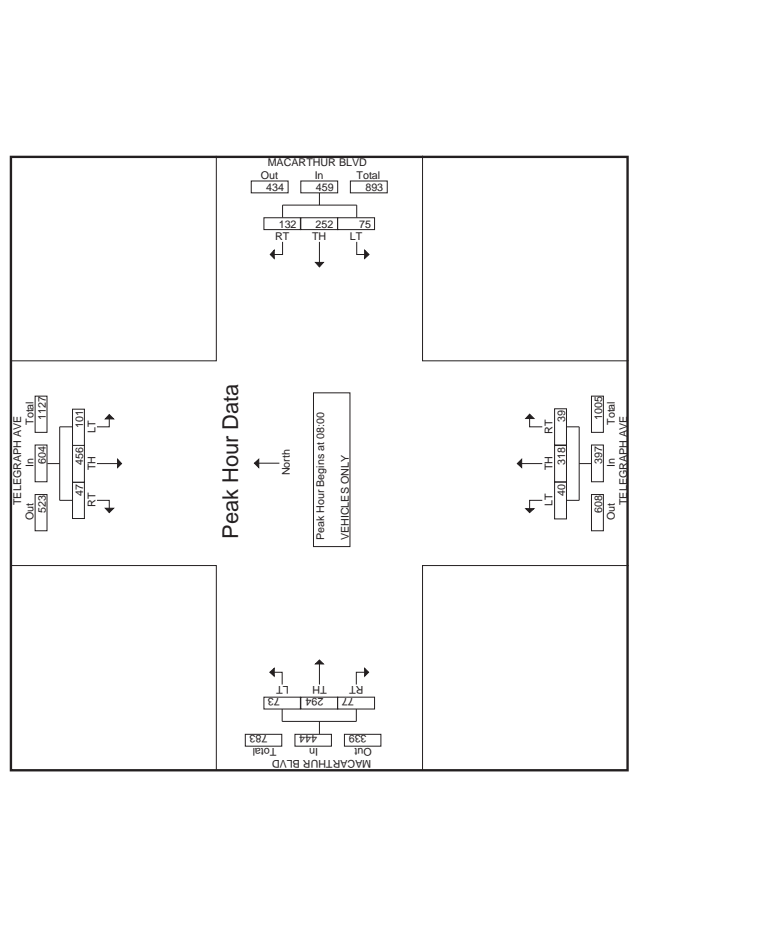
MARKS TRAFFIC DATA

Start Time	0 Southbound				MacARTHUR BL Westbound				0 Northbound				MacARTHUR BL Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
07:00	22	0	0	22	15	31	0	46	0	0	0	0	0	62	0	62
07:05	15	0	0	15	14	0	0	14	0	0	0	0	0	17	0	17
07:30	26	0	0	26	3	5	0	8	0	0	0	0	0	69	0	69
07:45	29	0	0	29	9	44	0	53	0	0	0	0	0	95	0	95
Total	114	0	0	114	40	168	0	208	0	0	0	0	0	323	0	323
08:00	46	0	0	46	10	81	0	91	0	0	0	0	0	102	0	102
08:05	33	0	0	33	5	38	0	43	0	0	0	0	0	49	0	49
08:15	33	0	0	33	10	72	0	82	0	0	0	0	0	81	0	81
08:30	31	0	0	31	7	77	0	84	0	0	0	0	0	86	0	86
08:45	153	0	0	153	32	298	0	330	0	0	0	0	0	368	0	368
Total	597	0	0	597	72	468	0	538	0	0	0	0	0	691	0	691
Grand Total	100	0	0	100	13.4	86.6	0	36	0	0	0	0	0	46.2	0	46.2
App. %	17.8	0	0	17.8	4.8	31.1	0	36	0	0	0	0	0	46.2	0	46.2
Total %	17.8	0	0	17.8	4.8	31.1	0	36	0	0	0	0	0	46.2	0	46.2



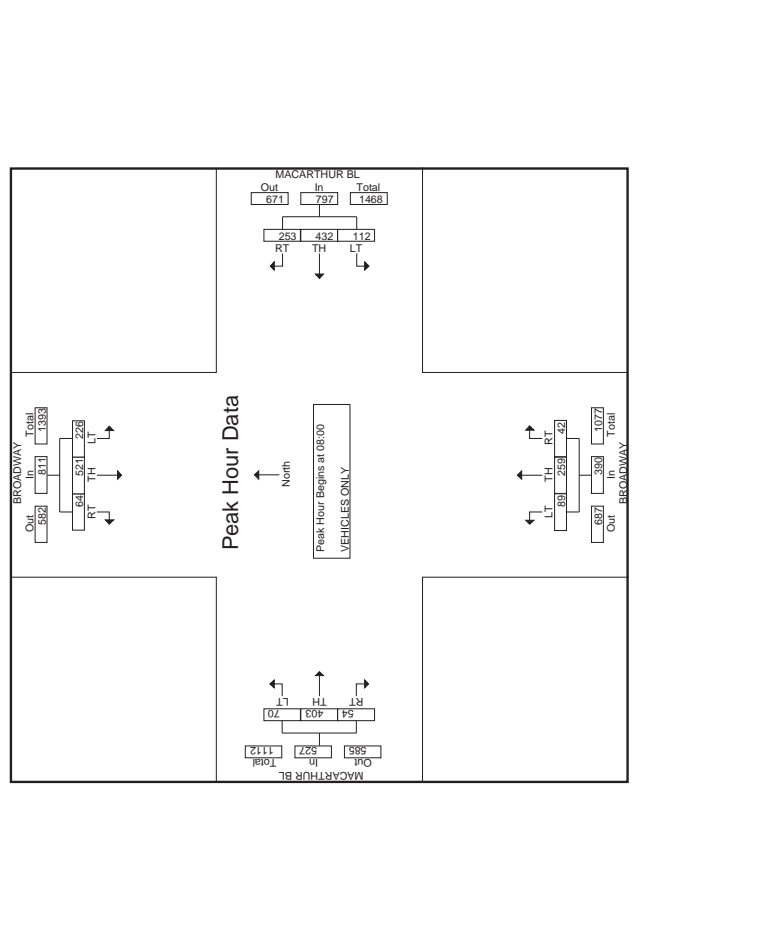
MARKS TRAFFIC DATA

Start Time	TELEGRAPH AVE Southbound						TELEGRAPH AVE Northbound						MACARTHUR BLVD Westbound						MACARTHUR BLVD Eastbound										
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total					
08:00	4	11	12	27	0	57	0	57	7	11	10	28	62	16	17	21	84	297	7	11	10	28	62	16	17	21	84	297	
07:15	1	40	12	53	67	32	99	6	49	7	56	69	126	16	16	21	53	307	6	49	7	56	69	126	16	16	21	53	307
07:30	7	62	17	86	27	40	16	83	6	57	10	73	19	59	18	86	338	6	57	10	73	19	59	18	86	338			
07:45	8	81	21	110	33	42	11	86	9	63	16	88	22	76	18	116	400	9	63	16	88	22	76	18	116	400			
Total	30	224	65	319	132	182	45	359	28	219	37	284	72	241	75	388	1350	28	219	37	284	72	241	75	388	1350			
08:00	8	85	20	113	22	61	10	103	10	75	4	89	16	77	19	112	417	10	75	4	89	16	77	19	112	417			
08:15	8	109	30	147	42	60	19	121	6	77	11	94	28	71	17	116	478	6	77	11	94	28	71	17	116	478			
08:30	9	135	33	177	25	61	18	104	8	74	16	98	13	75	23	111	490	8	74	16	98	13	75	23	111	490			
08:45	22	127	18	167	33	70	28	131	15	92	9	116	20	71	14	105	519	15	92	9	116	20	71	14	105	519			
Total	47	456	101	604	132	252	75	459	39	318	40	387	77	294	73	444	1904	39	318	40	387	77	294	73	444	1904			
Grand Total	77	680	166	923	264	434	120	618	67	537	77	681	149	635	148	832	3254	67	537	77	681	149	635	148	832	3254			
Approach %	8.3	73.7	18	28.4	8.1	13.3	3.7	25.1	2.1	16.5	2.4	20.9	4.6	16.4	4.5	25.6		2.1	16.5	2.4	20.9	4.6	16.4	4.5	25.6				
Total %	2.4	20.9	5.1	28.4	8.1	13.3	3.7	25.1	2.1	16.5	2.4	20.9	4.6	16.4	4.5	25.6		2.1	16.5	2.4	20.9	4.6	16.4	4.5	25.6				



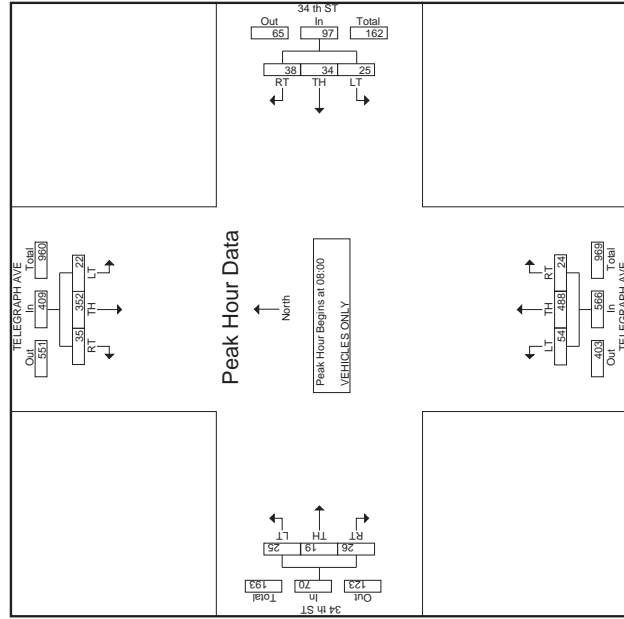
MARKS TRAFFIC DATA

Start Time	BROADWAY Southbound						BROADWAY Northbound						MACARTHUR BL Westbound						MACARTHUR BL Eastbound																	
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total												
08:00	1	1	1	3	33	77	111	151	1	1	1	3	33	77	111	151	1	1	1	3	33	77	111	151												
07:15	8	22	4	34	46	121	171	242	4	8	22	34	46	121	171	242	4	8	22	34	46	121	171	242												
07:30	9	66	46	121	55	83	14	152	10	44	9	63	9	73	22	104	440	9	66	46	121	55	83	14	152	104	440									
07:45	13	64	54	161	50	105	18	173	10	55	21	86	12	83	26	121	541	13	64	54	161	50	105	18	173	121	541									
Total	41	265	174	480	177	341	72	590	38	170	41	249	45	271	80	386	1715	38	170	41	249	45	271	80	386	1715										
08:00	9	118	56	183	57	83	24	174	12	62	28	102	12	92	16	120	579	9	118	56	183	57	83	24	174	120	579									
08:15	21	146	63	230	95	112	23	230	10	70	23	103	14	121	22	157	720	21	146	63	230	95	112	23	230	157	720									
08:30	18	141	58	217	43	90	33	166	6	62	24	92	9	107	12	128	603	18	141	58	217	43	90	33	166	128	603									
08:45	16	16	16	48	181	58	137	32	227	14	65	14	93	19	83	20	122	623	16	16	16	48	181	58	137	32	227	14	65	14	93	19	83	20	122	623
Total	64	521	226	811	253	432	112	797	42	259	89	390	54	403	70	527	2525	42	259	89	390	54	403	70	527	2525										
Grand Total	105	786	400	1291	430	773	184	1387	80	429	130	639	99	674	150	923	4240	80	429	130	639	99	674	150	923	4240										
Approach %	8.1	60.9	31	30.4	10.1	18.2	4.3	32.7	1.9	10.1	3.1	15.1	2.3	15.9	3.5	21.8		1.9	10.1	3.1	15.1	2.3	15.9	3.5	21.8											
Total %	2.5	18.5	9.4	30.4	10.1	18.2	4.3	32.7	1.9	10.1	3.1	15.1	2.3	15.9	3.5	21.8		1.9	10.1	3.1	15.1	2.3	15.9	3.5	21.8											



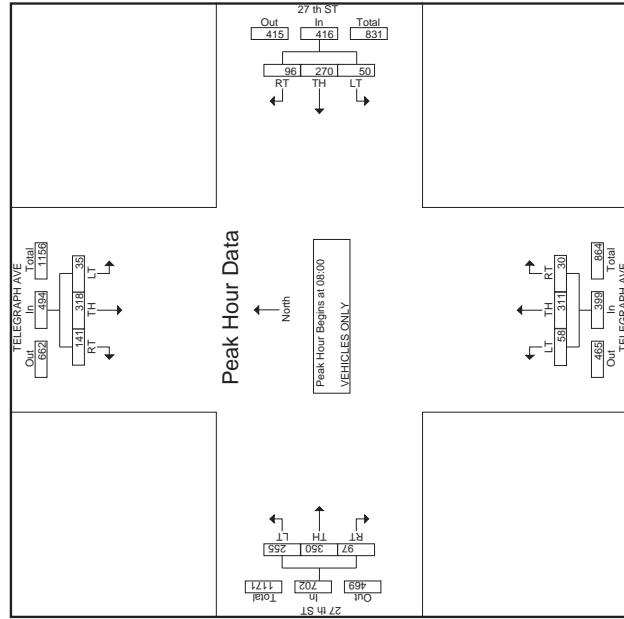
Start Time	TELEGRAPH AVE Southbound			TELEGRAPH AVE Northbound			34 th ST Westbound			34 th ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Factor	38	2	43	12	6	75	3	3	10	65	146	146
07:15	38	2	43	12	6	75	3	3	10	65	146	146
07:30	9	55	4	68	7	2	16	5	2	17	24	184
07:45	10	66	2	78	6	20	3	108	9	120	6	240
Total	36	190	10	236	16	29	22	301	38	360	18	62
08:00	10	83	7	100	11	9	26	5	86	18	119	262
08:15	10	87	5	112	12	5	22	8	118	13	139	7
08:30	11	87	3	101	7	9	6	22	6	119	12	137
08:45	4	85	7	96	8	11	8	27	5	155	11	171
Total	35	352	22	409	38	34	25	97	24	488	54	566
Grand Total	71	542	32	645	54	63	47	164	45	789	92	936
Approach %	11	84	5	32.9	38.4	28.7	4.9	85.2	9.9	41.8	4.9	48.1
Total %	3.8	28.7	1.7	34.2	2.9	3.3	2.5	8.7	2.4	41.8	4.9	48.1

Start Time	TELEGRAPH AVE Southbound			TELEGRAPH AVE Northbound			34 th ST Westbound			34 th ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Factor	10	83	7	100	11	9	26	5	96	18	119	262
08:15	10	87	5	112	12	5	22	8	118	13	139	7
08:30	11	87	3	101	7	9	6	22	6	119	12	137
08:45	4	85	7	96	8	11	8	27	5	155	11	171
Total	35	352	22	409	38	34	25	97	24	488	54	566
Grand Total	71	542	32	645	54	63	47	164	45	789	92	936
Approach %	11	84	5	32.9	38.4	28.7	4.9	85.2	9.9	41.8	4.9	48.1
Total %	3.8	28.7	1.7	34.2	2.9	3.3	2.5	8.7	2.4	41.8	4.9	48.1



Start Time	TELEGRAPH AVE Southbound			TELEGRAPH AVE Northbound			27 th ST Westbound			27 th ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Factor	33	38	4	66	5	77	5	38	4	43	18	19
07:15	33	38	4	66	5	77	5	38	4	43	18	19
07:30	9	55	4	68	7	2	16	5	2	17	24	184
07:45	10	66	2	78	6	20	3	108	9	120	6	240
Total	36	190	10	236	16	29	22	301	38	360	18	62
08:00	10	83	7	100	11	9	26	5	96	18	119	262
08:15	10	87	5	112	12	5	22	8	118	13	139	7
08:30	11	87	3	101	7	9	6	22	6	119	12	137
08:45	4	85	7	96	8	11	8	27	5	155	11	171
Total	35	352	22	409	38	34	25	97	24	488	54	566
Grand Total	71	542	32	645	54	63	47	164	45	789	92	936
Approach %	11	84	5	32.9	38.4	28.7	4.9	85.2	9.9	41.8	4.9	48.1
Total %	3.8	28.7	1.7	34.2	2.9	3.3	2.5	8.7	2.4	41.8	4.9	48.1

Start Time	TELEGRAPH AVE Southbound			TELEGRAPH AVE Northbound			27 th ST Westbound			27 th ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
08:00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Factor	33	38	4	66	5	77	5	38	4	43	18	19
07:15	33	38	4	66	5	77	5	38	4	43	18	19
07:30	9	55	4	68	7	2	16	5	2	17	24	184
07:45	10	66	2	78	6	20	3	108	9	120	6	240
Total	36	190	10	236	16	29	22	301	38	360	18	62
08:00	10	83	7	100	11	9	26	5	96	18	119	262
08:15	10	87	5	112	12	5	22	8	118	13	139	7
08:30	11	87	3	101	7	9	6	22	6	119	12	137
08:45	4	85	7	96	8	11	8	27	5	155	11	171
Total	35	352	22	409	38	34	25	97	24	488	54	566
Grand Total	71	542	32	645	54	63	47	164	45	789	92	936
Approach %	11	84	5	32.9	38.4	28.7	4.9	85.2	9.9	41.8	4.9	48.1
Total %	3.8	28.7	1.7	34.2	2.9	3.3	2.5	8.7	2.4	41.8	4.9	48.1



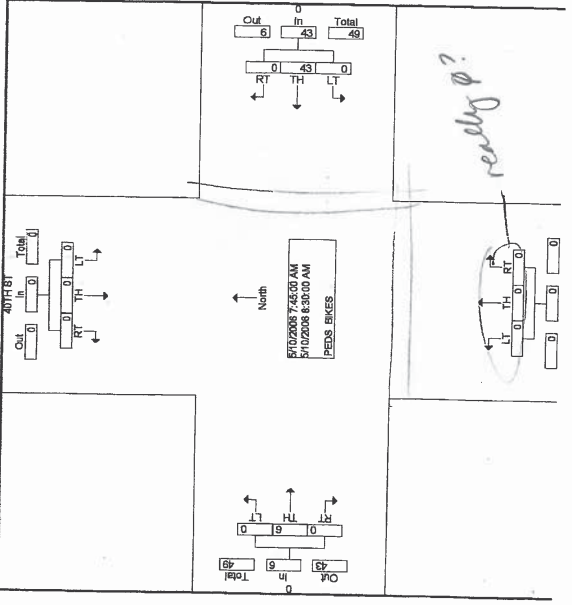
MARKS TRAFFIC DATA

#16 P15
 An

Groups Printed: PEDS, BIKES

Start Time	40TH ST Southbound					40TH ST Northbound					Eastbound					Incl. Total	Int. Total		
	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total				
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	40TH ST Southbound					Westbound					Northbound					Eastbound								
	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total				
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	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	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



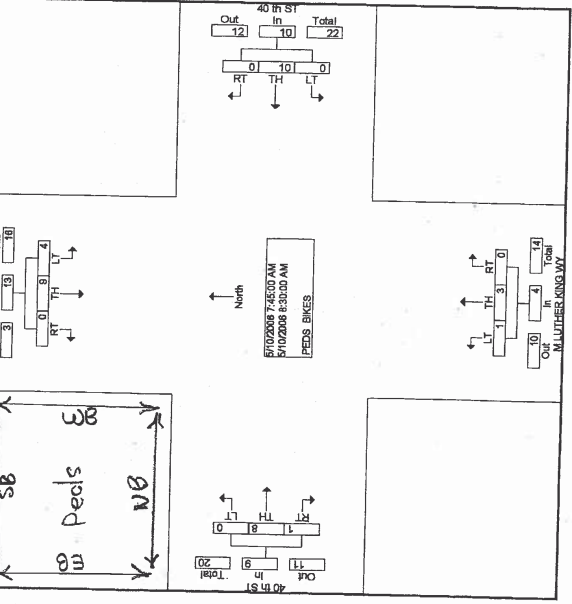
MARKS TRAFFIC DATA

#15 P1B
 An

Groups Printed: PEDS, BIKES

Start Time	40th ST Southbound					M LUTHER KING WY Northbound					40th ST Eastbound					Incl. Total	Int. Total		
	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total				
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	40th ST Southbound					M LUTHER KING WY Northbound					40th ST Eastbound								
	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total	RT	TH	LT	PED	App. Total				
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



FROM : MJD

FXR NO. : 915 364 7987

Jun. 14. 2006 07:59AM PB

AM 20
OAKLAND
FPW P

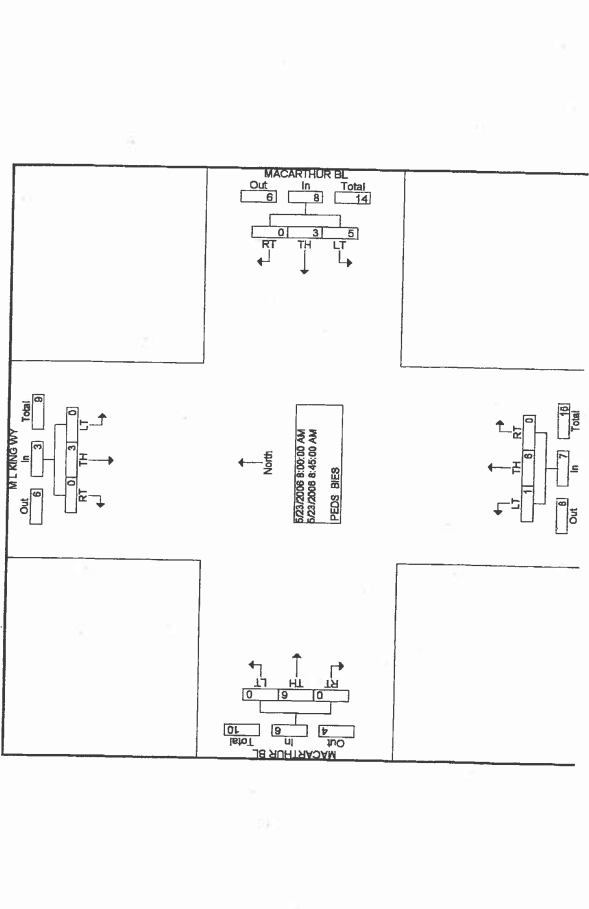
MARKS TRAFFIC DATA

File Name : ml-king-wy-macarthur-a
Site Code : 00000000
Start Date : 5/23/2006
Page No : 1

#24
PB
AM

Start Time	M L KING WY Southbound				MACARTHUR BL Westbound				M L KING WY Northbound				MACARTHUR BL Eastbound				Int. Total
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Total %	0.0	16.2	0.0	0.0	18.2	2.7	18.9	13.5	35.1	0.0	18.9	8.1	27.0	0.0	21.8	0.0	21.6
21.6	78.0	22.0															

Start Time	M L KING WY Southbound				MACARTHUR BL Westbound				M L KING WY Northbound				MACARTHUR BL Eastbound				Int. Total
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0
Total %	0.0	16.2	0.0	0.0	18.2	2.7	18.9	13.5	35.1	0.0	18.9	8.1	27.0	0.0	21.8	0.0	21.6
78.0	22.0																



FROM : MJD

FXR NO. : 915 364 7987

Jun. 14. 2006 08:00AM P10

AM 21
OAKLAND
FPW P

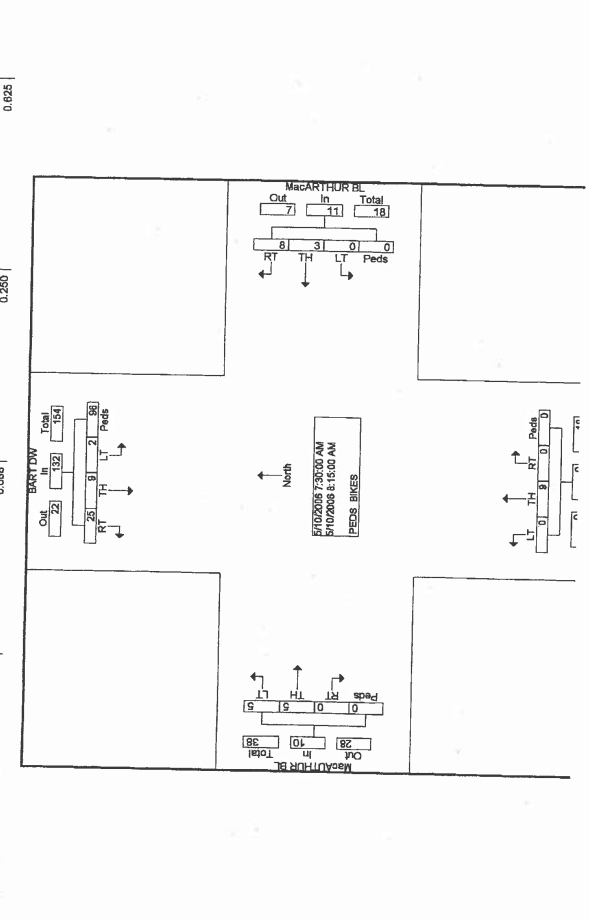
MARKS TRAFFIC DATA

File Name : pd-bart-dw-macarthur-a
Site Code : 00000000
Start Date : 5/10/2006
Page No : 1

#25
PB
AM

Start Time	BART DW Southbound				MACARTHUR BL Westbound				Northbound				MACARTHUR BL Eastbound				Int. Total
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	18.3	4.1	0.9	78.7	80.0	40.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	57.1	42.9	0.0	14
Total %	15.3	3.4	0.8	84.1	83.8	4.6	3.1	0.0	0.0	3.4	0.0	0.0	0.0	3.1	2.3	0.0	5.3

Start Time	BART DW Southbound				MACARTHUR BL Westbound				Northbound				MACARTHUR BL Eastbound				Int. Total
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	18.3	4.1	0.9	78.7	80.0	40.0	0.0	0.0	0.0	100.0	0.0	0.0	0.0	57.1	42.9	0.0	14
Total %	15.3	3.4	0.8	84.1	83.8	4.6	3.1	0.0	0.0	3.4	0.0	0.0	0.0	3.1	2.3	0.0	5.3



MARKS TRAFFIC DATA

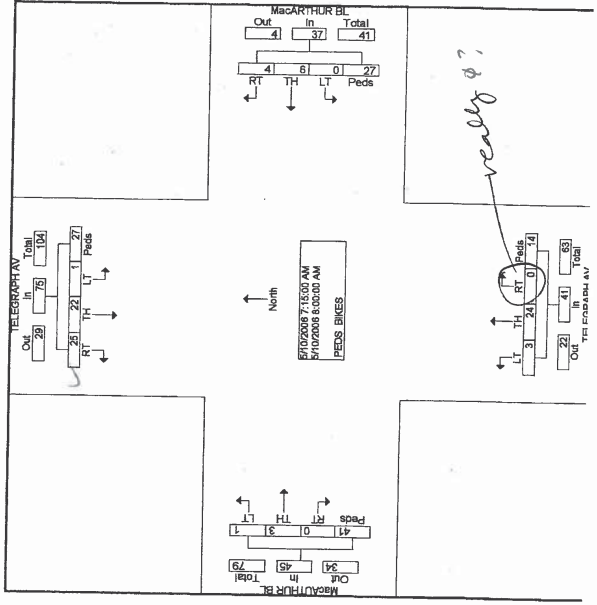
Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				38TH ST Westbound				TELEGRAPH AVE Eastbound				Int. Total
	RT	TH	LT	Peds	RT	TH	LT	Peds	RT	TH	LT	Peds	RT	TH	LT	Peds	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				38TH ST Westbound				TELEGRAPH AVE Eastbound				Int. Total
	RT	TH	LT	Peds	RT	TH	LT	Peds	RT	TH	LT	Peds	RT	TH	LT	Peds	
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MARKS TRAFFIC DATA

Start Time	TELEGRAPH AVE Southbound				MacARTHUR BL Westbound				TELEGRAPH AVE Northbound				MacARTHUR BL Eastbound				Int. Total
	RT	TH	LT	Peds	RT	TH	LT	Peds	RT	TH	LT	Peds	RT	TH	LT	Peds	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	TELEGRAPH AVE Southbound				MacARTHUR BL Westbound				TELEGRAPH AVE Northbound				MacARTHUR BL Eastbound				Int. Total
	RT	TH	LT	Peds	RT	TH	LT	Peds	RT	TH	LT	Peds	RT	TH	LT	Peds	
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
08:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



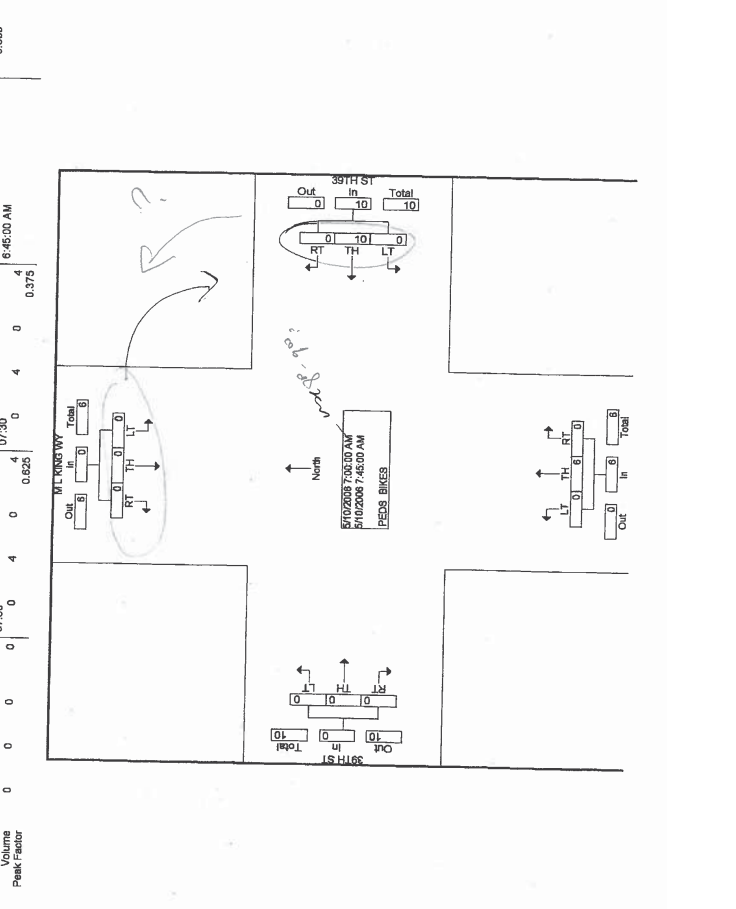
MARKS TRAFFIC DATA

MARKS TRAFFIC DATA

Start Time	SHATTUCK AV Southbound			SHATTUCK AV Northbound			51 ST 52 ND Westbound			51 ST 52 ND Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
16:00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
16:00	28	162	36	47	259	8	42	20	90	31	14	37
16:30	26	152	17	24	241	3	42	25	76	38	14	52
16:45	71	60	30	161	28	219	21	268	100	42	268	106
Total	283	194	110	597	91	857	64	1012	352	175	936	362
Grand Total	68	69	39	293	32	231	30	293	22	63	44	139
Approach %	17.45	50	51	24	125	21	251	21	43	26	80	21
Total %	259	256	133	648	138	958	80	1176	79	225	165	469
Grand Total	552	450	243	1245	229	1815	144	2188	123	394	304	821
Approach %	44.3	36.1	19.5	10.5	8.3	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Total %	7.4	6.1	3.3	16.7	3.1	24.4	1.9	23.4	1.7	5.3	4.1	11

Start Time	M L KING WY Southbound			M L KING WY Northbound			39TH ST Westbound			39TH ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
07:00	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	SHATTUCK AV Southbound			SHATTUCK AV Northbound			51 ST 52 ND Westbound			51 ST 52 ND Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
16:00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
16:00	69	69	39	177	28	219	21	268	12	52	36	100
16:30	61	63	39	163	41	228	22	291	19	50	39	108
16:45	79	73	31	183	44	248	19	311	27	69	56	152
Total	209	205	109	523	85	715	60	870	58	181	151	460
Grand Total	552	450	243	1245	229	1815	144	2188	123	394	304	821
Approach %	44.3	36.1	19.5	10.5	8.3	6.6	6.6	6.6	6.6	6.6	6.6	6.6
Total %	7.4	6.1	3.3	16.7	3.1	24.4	1.9	23.4	1.7	5.3	4.1	11



MARKS TRAFFIC DATA

File Name : telegraph-51st.p
 Site Code : 00000000
 Start Date : 5/23/2006
 Page No. : 1

PM 05
 OAKLAND
 FFW C
 TTTO [916] 715-4006

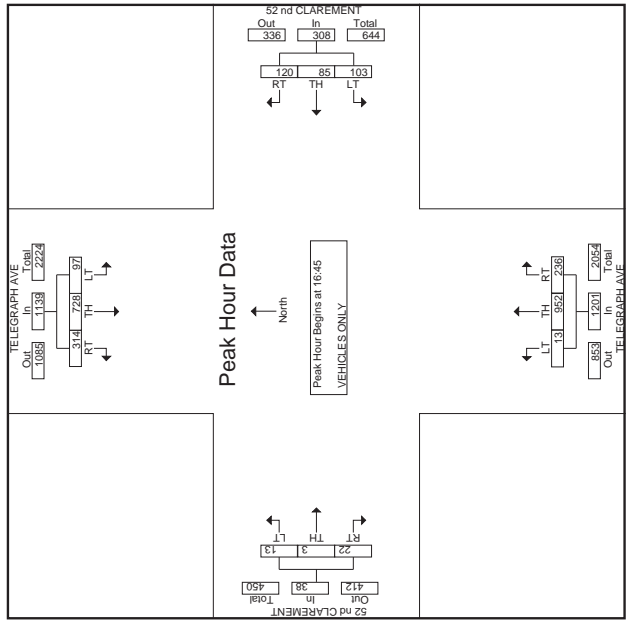
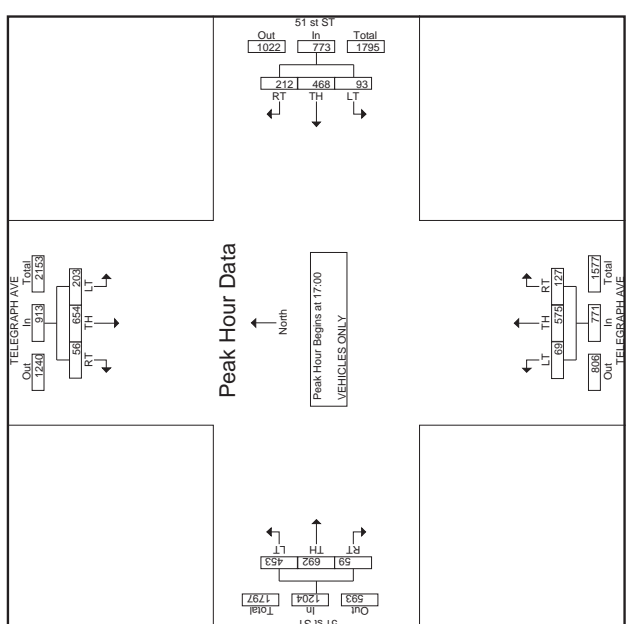
Start Time Factor	TELEGRAPH AVE Southbound						TELEGRAPH AVE Northbound						51 st ST Eastbound						51 st ST Westbound										
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total					
	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0					
16:00	22	168	60	258	48	119	18	185	20	154	20	194	22	175	108	305	48	119	18	185	20	154	20	194	22	175	108	305	
17:00	11	173	44	228	60	121	30	211	41	155	19	215	12	181	112	314	12	181	112	314	12	181	112	314	12	181	112	314	
17:45	9	151	32	192	49	111	19	179	33	121	13	166	9	162	112	283	9	162	112	283	9	162	112	283	9	162	112	283	
Total	68	511	145	724	122	405	53	580	66	400	104	570	43	569	317	929	43	569	317	929	43	569	317	929	43	569	317	929	
Grand Total	124	1165	348	1637	334	873	146	1353	133	875	173	1341	102	1261	770	2133	102	1261	770	2133	102	1261	770	2133	102	1261	770	2133	
Approach %	7.6	71.2	21.3	24.7	64.5	10.8	20.9	5.2	25.3	5.2	13.5	2.3	20.9	3	15.1	2.7	20.7	3	15.1	2.7	20.7	3	15.1	2.7	20.7	3	15.1	2.7	20.7
Total %	1.9	18	5.4	25.3	5.2	13.5	2.3	20.9	5.2	13.5	2.3	20.9	3	15.1	2.7	20.7	3	15.1	2.7	20.7	3	15.1	2.7	20.7	3	15.1	2.7	20.7	

MARKS TRAFFIC DATA

File Name : telegraph-52nd.p
 Site Code : 00000000
 Start Date : 5/11/2006
 Page No. : 1

PM 04
 OAKLAND
 FFW H
 TTTO [916] 715-4006

Start Time Factor	TELEGRAPH AVE Southbound						TELEGRAPH AVE Northbound						52 nd CLAREMENT Eastbound						52 nd CLAREMENT Westbound										
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total					
	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0					
16:00	22	168	60	258	48	119	18	185	20	154	20	194	22	175	108	305	48	119	18	185	20	154	20	194	22	175	108	305	
17:00	11	173	44	228	60	121	30	211	41	155	19	215	12	181	112	314	12	181	112	314	12	181	112	314	12	181	112	314	
17:45	9	151	32	192	49	111	19	179	33	121	13	166	9	162	112	283	9	162	112	283	9	162	112	283	9	162	112	283	
Total	68	511	145	724	122	405	53	580	66	400	104	570	43	569	317	929	43	569	317	929	43	569	317	929	43	569	317	929	
Grand Total	124	1165	348	1637	334	873	146	1353	133	875	173	1341	102	1261	770	2133	102	1261	770	2133	102	1261	770	2133	102	1261	770	2133	
Approach %	7.6	71.2	21.3	24.7	64.5	10.8	20.9	5.2	25.3	5.2	13.5	2.3	20.9	3	15.1	2.7	20.7	3	15.1	2.7	20.7	3	15.1	2.7	20.7	3	15.1	2.7	20.7
Total %	1.9	18	5.4	25.3	5.2	13.5	2.3	20.9	5.2	13.5	2.3	20.9	3	15.1	2.7	20.7	3	15.1	2.7	20.7	3	15.1	2.7	20.7	3	15.1	2.7	20.7	



MARKS TRAFFIC DATA

File Name : m-king-45th-p
 Site Code : 00000000
 Start Date : 5/16/2006
 Page No : 1

PM 07
 OAKLAND
 FFW A
 TITO [916] 715-4006

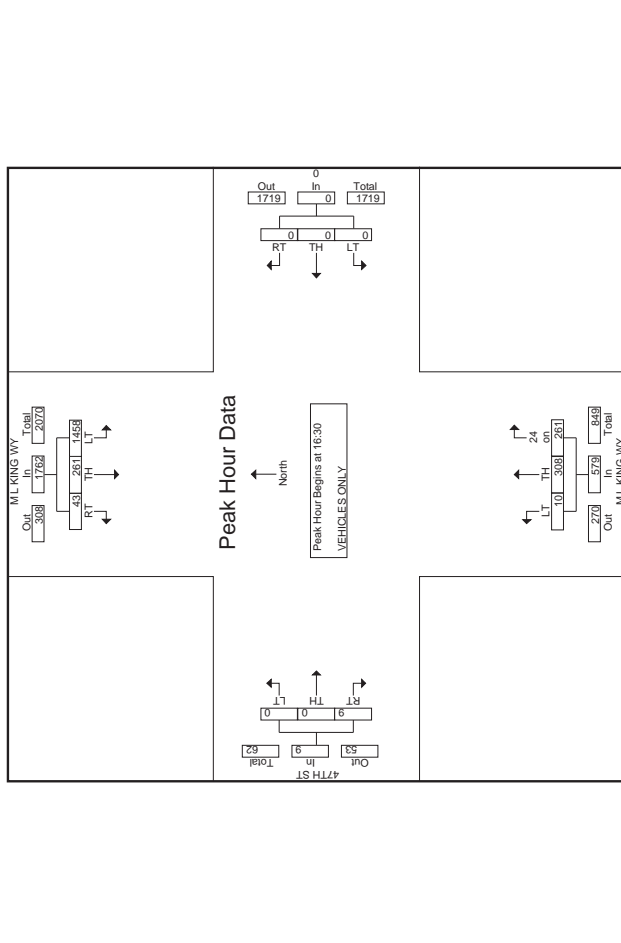
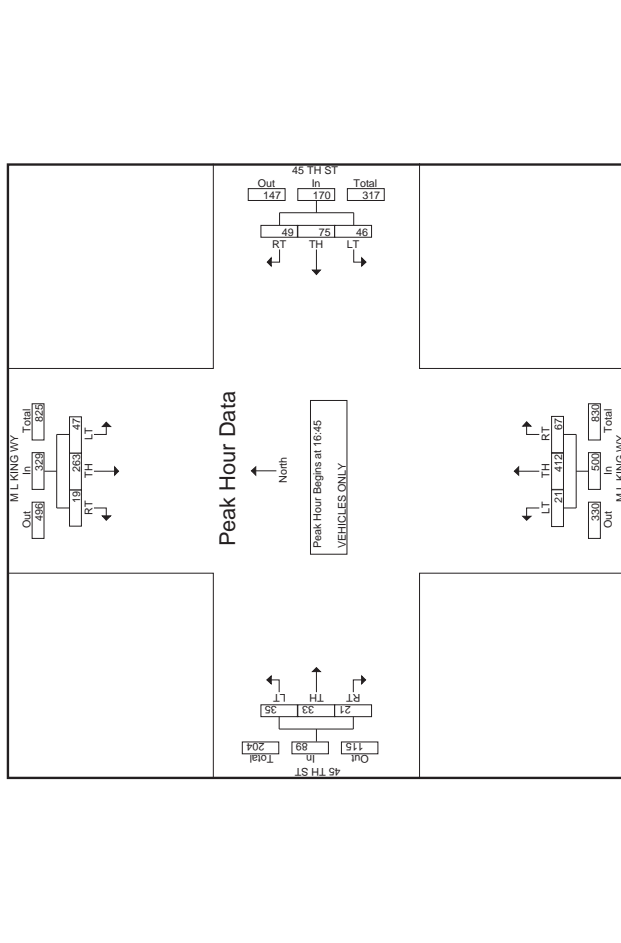
Start Time	45 TH ST												45 TH ST																	
	ML KING WY Southbound						ML KING WY Northbound						ML KING WY Westbound						ML KING WY Eastbound											
	RT	TH	LT	App. Total	L.T.	LT	RT	TH	LT	App. Total	L.T.	LT	RT	TH	LT	App. Total	L.T.	LT	RT	TH	LT	App. Total	L.T.	LT						
16:00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	
16:30	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	
16:45	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	
Total	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	
Grand Total	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	25	
Approach %	4.4	81.1	14.6	29.6	41.9	26.5	11.9	84.7	3.3	22.2	38.5	39.3	1.6	2.8	2.9	7.3														
Total %	1.4	25	4.5	30.9	4.3	6.1	4.2	14.6	5.6	40	1.6	47.2																		

MARKS TRAFFIC DATA

File Name : m-king-47th-p
 Site Code : 00000000
 Start Date : 5/11/2006
 Page No : 1

PM 06
 OAKLAND
 FFW C
 TITO [916] 715-4006

Start Time	47TH ST												47TH ST																
	ML KING WY Southbound						ML KING WY Northbound						ML KING WY Westbound						ML KING WY Eastbound										
	RT	TH	LT	App. Total	L.T.	LT	RT	TH	LT	App. Total	L.T.	LT	RT	TH	LT	App. Total	L.T.	LT	RT	TH	LT	App. Total	L.T.	LT					
16:00	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Factor	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
16:30	4	82	460	462	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	10	50	331	391	0	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	21	245	1461	1727	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	85	526	2891	3502	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	2.4	15	82.6	63.9	77.4	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 %	1.9	11.6	63.9	77.4	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



MARKS TRAFFIC DATA

Start Time	MARKET ST Southbound				40TH ST Westbound				MARKET ST Northbound				40TH ST Eastbound				
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	
16:00	4	19	6	73	16	10	3	70	3	4	3	70	11	131	9	151	
16:05	5	51	11	68	15	97	2	49	2	49	23	74	7	155	41	461	
16:30	5	49	14	68	21	68	21	87	26	115	7	140	8	155	461	1815	
16:45	4	66	17	87	22	109	3	134	7	86	39	132	11	148	5	184	
Total	18	216	60	294	72	405	28	505	14	276	101	391	39	557	29	625	
17:00	3	65	19	71	13	148	5	166	9	113	32	154	10	179	9	198	
17:15	6	57	21	84	23	109	15	147	7	107	29	143	12	153	6	171	
17:30	5	62	23	90	16	104	9	129	9	81	19	109	11	158	5	174	
17:45	5	48	25	78	21	120	8	149	13	87	29	129	12	165	6	183	
Total	19	222	88	329	73	481	37	591	38	368	109	535	45	655	26	726	
Grand Total	37	438	148	623	145	886	65	1096	52	664	210	926	84	1212	55	1351	
Approach %	5.9	70.3	23.8	13.2	80.8	5.9	5.6	71.7	22.7	1.3	16.6	5.3	23.2	2.1	30.3	1.4	33.8
Total %	0.9	11	3.7	15.6	3.6	22.2	1.6	27.4	1.3	16.6	5.3	23.2	2.1	30.3	1.4	33.8	

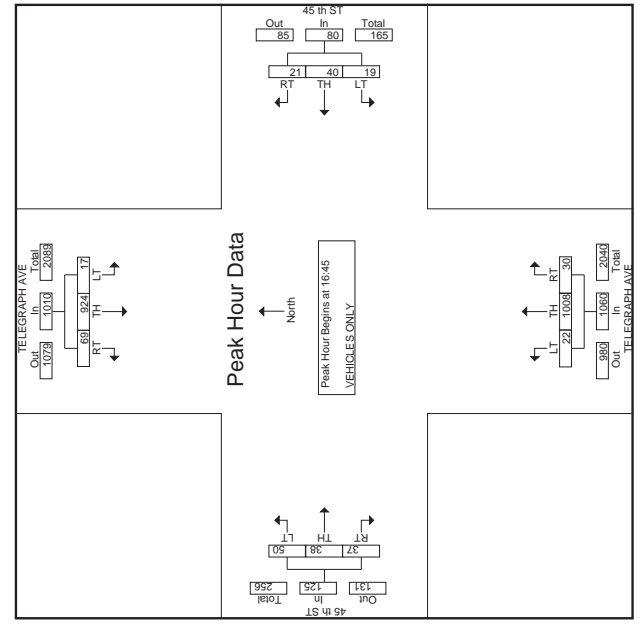
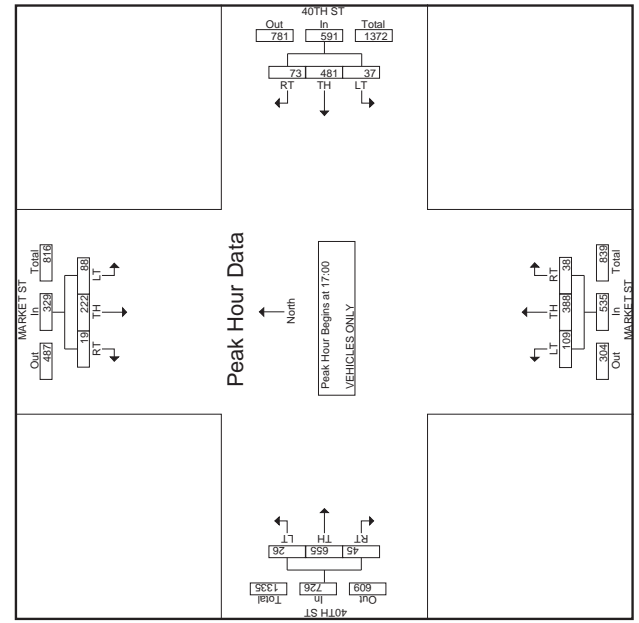
Start Time	TELEGRAPH AVE Southbound				45th ST Westbound				TELEGRAPH AVE Northbound				45th ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	8	190	2	190	3	14	2	162	4	189	7	5	8	20	293	
16:05	13	190	3	196	6	12	4	199	7	171	3	9	22	243	481	
16:30	2	199	3	204	8	2	1	212	3	216	6	3	12	21	552	
16:45	17	250	2	269	4	5	17	2	239	4	245	5	2	14	21	552
Total	40	808	8	856	23	34	18	75	5	802	16	823	29	12	43	84
17:00	17	232	6	251	5	9	9	23	11	250	3	264	8	7	15	30
17:15	15	210	4	231	4	11	5	20	5	258	7	270	5	9	17	31
17:30	20	232	4	256	8	12	0	20	12	261	8	281	19	20	4	43
17:45	15	199	3	217	4	9	3	16	9	249	6	264	7	13	10	30
Total	67	873	18	958	21	41	17	79	37	1018	24	1079	39	49	46	134
Grand Total	107	1681	26	1814	44	75	35	154	42	1820	40	1902	68	61	89	218
Approach %	5.9	92.7	1.4	28.6	48.7	22.7	2.2	95.7	2.1	44.5	1	46.5	1.7	1.5	2.2	5.3
Total %	2.6	41.1	0.6	44.4	1.1	1.8	0.9	3.8	1	44.5	1	46.5	1.7	1.5	2.2	5.3

MARKS TRAFFIC DATA

Start Time	TELEGRAPH AVE Southbound				45th ST Westbound				TELEGRAPH AVE Northbound				45th ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:45	17	250	2	269	4	5	17	2	239	4	245	5	2	14	21	552
17:00	17	232	2	254	5	9	23	11	250	3	264	8	7	15	30	571
17:15	15	210	4	231	4	11	5	20	5	258	7	270	5	9	17	31
17:30	20	232	4	256	8	12	0	20	12	261	8	281	19	20	4	43
17:45	15	199	3	217	4	9	3	16	9	249	6	264	7	13	10	30
Total	67	873	18	958	21	41	17	79	37	1018	24	1079	39	49	46	134
Grand Total	107	1681	26	1814	44	75	35	154	42	1820	40	1902	68	61	89	218
Approach %	5.9	92.7	1.4	28.6	48.7	22.7	2.2	95.7	2.1	44.5	1	46.5	1.7	1.5	2.2	5.3
Total %	2.6	41.1	0.6	44.4	1.1	1.8	0.9	3.8	1	44.5	1	46.5	1.7	1.5	2.2	5.3

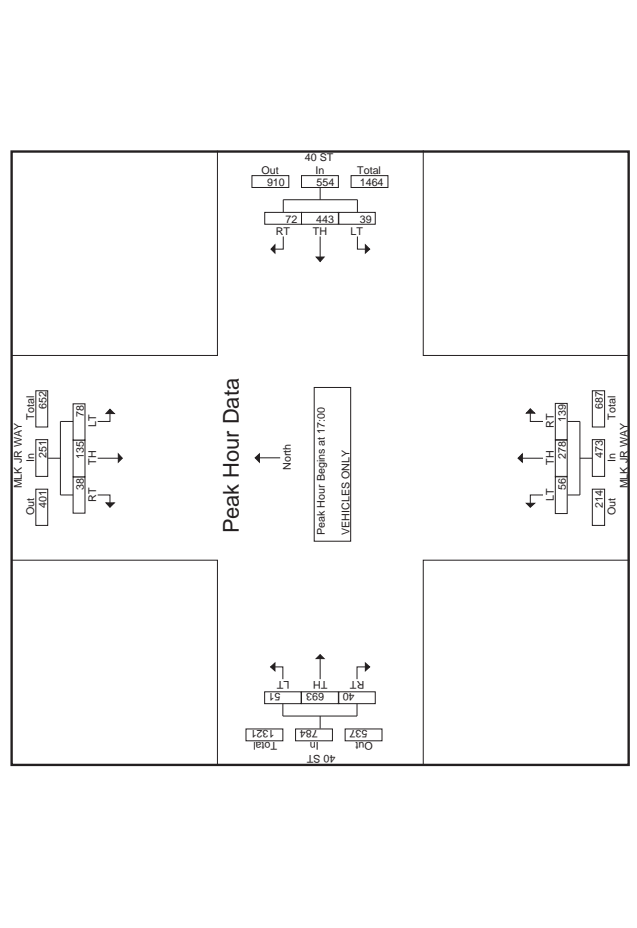
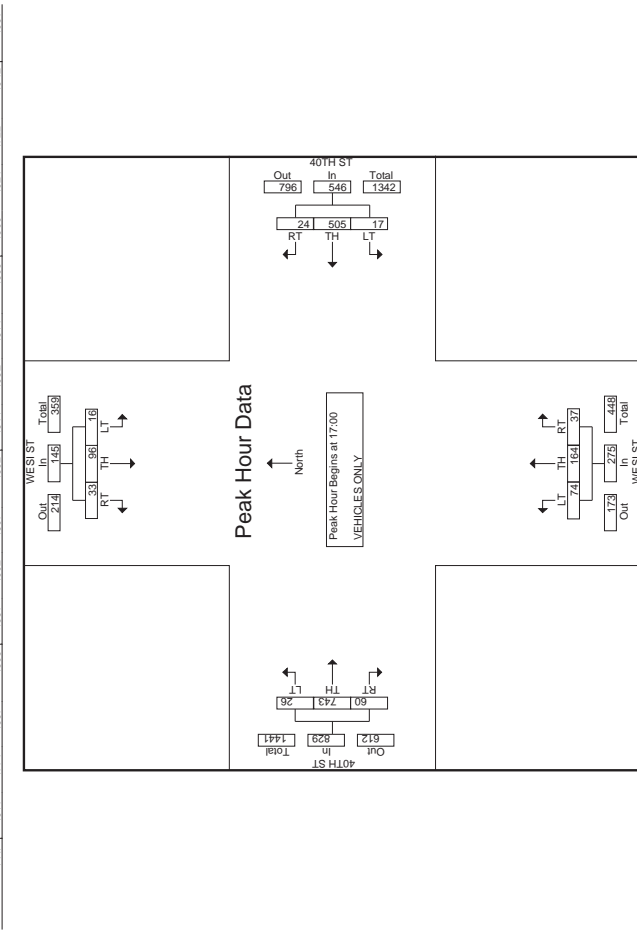
Start Time	MARKET ST Southbound				40TH ST Westbound				MARKET ST Northbound				40TH ST Eastbound				
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	
17:00	13	148	5	166	9	113	32	154	10	179	9	198	595				
17:15	6	57	21	84	23	109	15	147	7	107	29	143	12	153	6	171	
17:30	5	62	23	90	16	104	9	129	9	81	19	109	11	158	5	174	
17:45	5	48	25	78	21	120	8	149	13	87	29	129	12	165	6	183	
Total	19	222	88	329	73	481	37	591	38	368	109	535	45	655	26	726	
Grand Total	37	438	148	623	145	886	65	1096	52	664	210	926	84	1212	55	1351	
Approach %	5.9	70.3	23.8	13.2	80.8	5.9	5.6	71.7	22.7	1.3	16.6	5.3	23.2	2.1	30.3	1.4	33.8
Total %	0.9	11	3.7	15.6	3.6	22.2	1.6	27.4	1.3	16.6	5.3	23.2	2.1	30.3	1.4	33.8	

Start Time	TELEGRAPH AVE Southbound				45th ST Westbound				TELEGRAPH AVE Northbound				45th ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:45	17	250	2	269	4	5	17	2	239	4	245	5	2	14	21	552
17:00	17	232	2	254	5	9	23	11	250	3	264	8	7	15	30	571
17:15	15	210	4	231	4	11	5	20	5	258	7	270	5	9	17	31
17:30	20	232	4	256	8	12	0	20	12	261	8	281	19	20	4	43
17:45	15	199	3	217	4	9	3	16	9	249	6	264	7	13	10	30
Total	67	873	18	958	21	41	17	79	37	1018	24	1079	39	49	46	134
Grand Total	107	1681	26	1814	44	75	35	154	42	1820	40	1902	68	61	89	218
Approach %	5.9	92.7	1.4	28.6	48.7	22.7	2.2	95.7	2.1	44.5	1	46.5	1.7	1.5	2.2	5.3
Total %	2.6	41.1	0.6	44.4	1.1	1.8	0.9	3.8	1	44.5	1	46.5	1.7	1.5	2.2	5.3



Start Time	WESI ST Southbound				WESI ST Northbound				40TH ST Westbound				40TH ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	1	0	1	1	1	0	1	1	1	0	1	1	1	0	1	1
16:15	3	2	5	10	2	4	28	34	6	10	6	16	17	13	5	36
16:30	7	15	3	25	5	10	11	26	3	3	14	20	11	14	14	39
16:45	4	23	4	31	4	11	7	22	4	3	16	23	10	15	14	39
Total	26	89	18	133	18	42	28	47	20	12	29	52	27	23	23	65
Grand Total	59	185	34	278	42	93	45	180	57	293	155	505	112	1320	49	1481
Approach %	21.2	66.5	12.2	79.9	11.3	58	30.7	44.4	11.3	58	30.7	44.4	7.6	89.1	3.3	45.1
Total %	1.8	5.6	1	8.5	1.3	28.4	1.4	31	1.7	8.9	4.7	15.4	3.4	40.2	1.5	45.1

Start Time	MLK IR WAY Southbound				MLK IR WAY Northbound				40 ST Westbound				40 ST Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	9	33	17	59	23	121	10	154	25	56	10	91	9	129	12	150
16:15	10	23	15	48	15	108	11	134	23	62	12	97	14	137	6	157
16:30	2	35	22	59	21	101	10	132	29	84	10	123	4	138	6	148
16:45	2	35	22	59	21	101	10	132	29	84	10	123	4	138	6	148
Total	28	126	72	226	79	445	45	569	95	280	45	400	33	543	35	611
Grand Total	66	261	150	477	151	888	84	1123	254	538	101	873	73	1266	86	1513
Approach %	13	57	3.9	74.8	26	67	7.2	100	45	11.6	2.6	11.6	5.7	8.6	0.2	11.6
Total %	1.7	6.7	3.9	12.3	3.9	23	2.2	29	6	13.9	2.6	22.6	1.9	32	2.2	36.1



MARKS TRAFFIC DATA

Start Time		Southbound			Westbound			Northbound			Eastbound				
RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	0	0	0	0	0	0	137	4	0	0	4	2	127	0	129
16:05	0	0	0	0	0	0	182	0	0	0	0	16	133	0	149
16:10	0	0	0	0	0	0	190	0	0	0	0	5	143	0	148
16:15	0	0	0	0	0	0	183	0	0	0	0	8	135	0	143
16:20	0	0	0	0	0	0	153	0	0	0	0	17	135	0	152
16:45	0	0	0	0	0	0	572	29	0	0	29	42	544	0	586
Total	0	0	0	0	0	0	171	12	0	0	12	21	161	0	182
17:00	0	0	0	0	0	0	162	0	0	0	0	22	176	0	198
17:05	0	0	0	0	0	0	182	2	0	0	2	24	176	0	200
17:10	0	0	0	0	0	0	159	24	0	0	24	15	197	0	212
17:15	0	0	0	0	0	0	638	71	0	0	71	78	688	0	766
Total	0	0	0	0	0	0	1210	100	0	100	120	120	1252	0	1352
Grand Total	0	0	0	0	0	0	45.5	3.8	0	0	3.8	4.5	46.3	0	50.8
App. %															
Total %															

MARKS TRAFFIC DATA

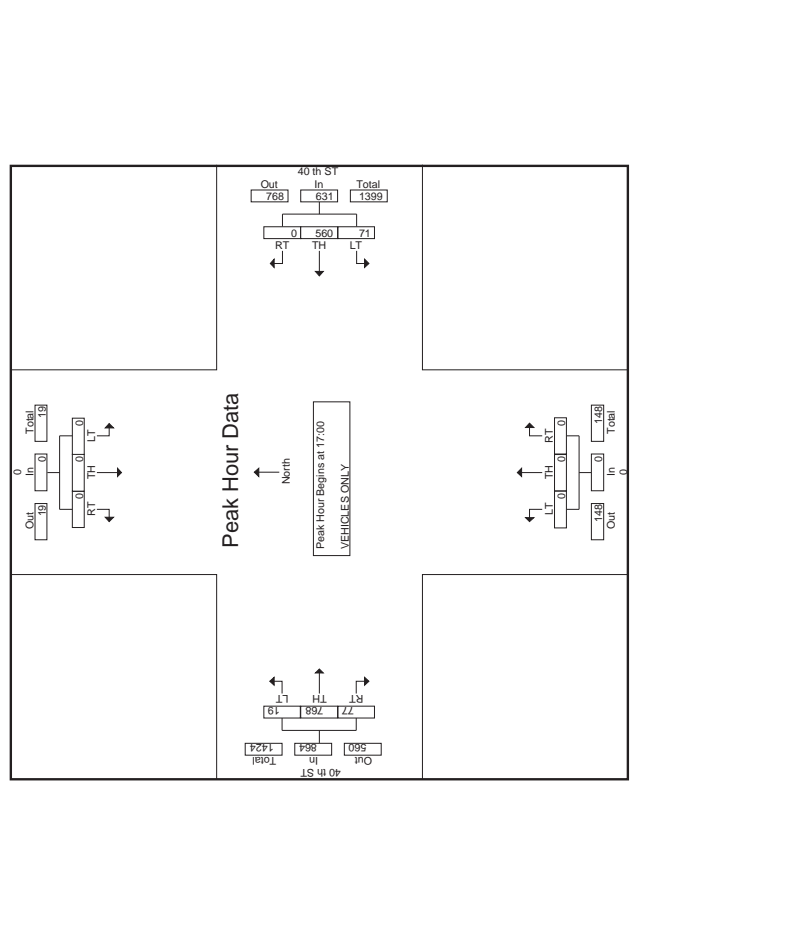
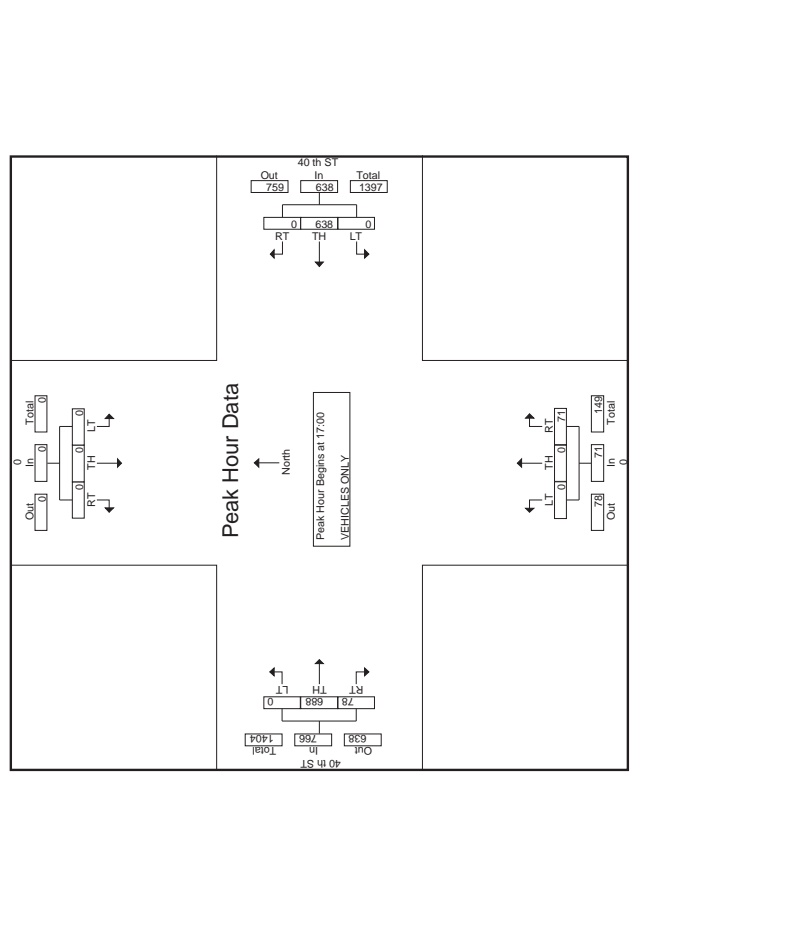
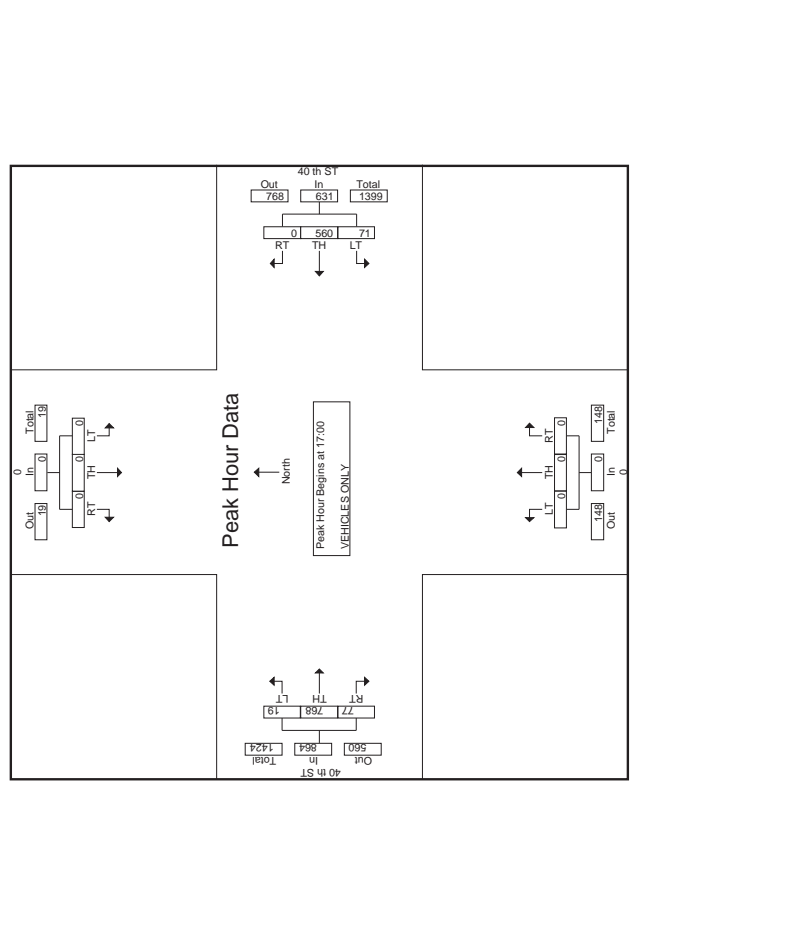
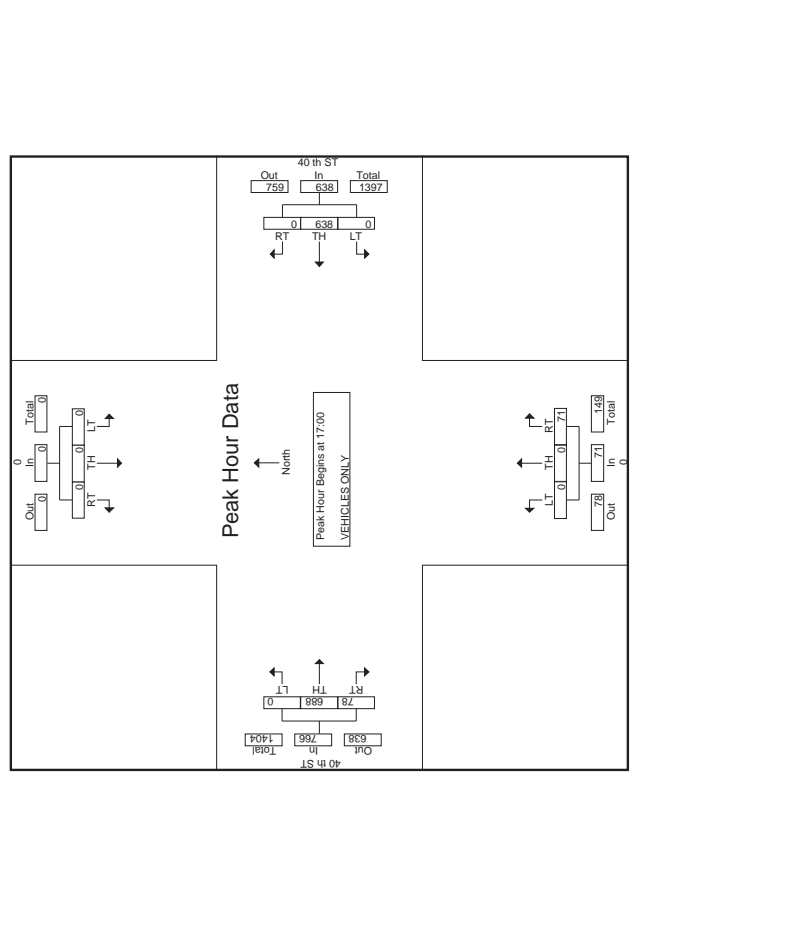
Start Time		Southbound			Westbound			Northbound			Eastbound				
RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	0	0	0	0	0	0	145	1	0	0	1	15	129	0	135
16:05	0	0	0	0	0	0	182	0	0	0	0	18	141	0	159
16:10	0	0	0	0	0	0	186	0	0	0	0	22	182	0	204
16:15	0	0	0	0	0	0	151	0	0	0	0	22	182	0	204
16:45	0	0	0	0	0	0	570	0	0	0	0	76	617	16	709
Total	0	0	0	0	0	0	159	174	0	0	174	19	183	7	209
17:00	0	0	0	0	0	0	141	0	0	0	0	18	201	4	213
17:05	0	0	0	0	0	0	129	21	0	0	21	13	212	3	228
17:10	0	0	0	0	0	0	560	71	0	0	71	77	768	19	854
17:15	0	0	0	0	0	0	1109	101	0	0	101	153	1385	35	1573
17:45	0	0	0	0	0	0	916	84	0	0	84	92	886	23	941
Total	0	0	0	0	0	0	397	316	0	0	316	5.5	489	1.3	567
Grand Total	0	0	0	0	0	0	43.3	0	0	0	43.3	5.5	48.9	1.3	56.7
App. %															
Total %															

MARKS TRAFFIC DATA

Start Time		Southbound			Westbound			Northbound			Eastbound				
RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	0	0	0	0	0	0	146	1	0	0	1	15	129	0	135
16:05	0	0	0	0	0	0	182	0	0	0	0	18	141	0	159
16:10	0	0	0	0	0	0	186	0	0	0	0	22	182	0	204
16:15	0	0	0	0	0	0	151	0	0	0	0	22	182	0	204
16:45	0	0	0	0	0	0	570	0	0	0	0	76	617	16	709
Total	0	0	0	0	0	0	159	174	0	0	174	19	183	7	209
17:00	0	0	0	0	0	0	141	0	0	0	0	18	201	4	213
17:05	0	0	0	0	0	0	129	21	0	0	21	13	212	3	228
17:10	0	0	0	0	0	0	560	71	0	0	71	77	768	19	854
17:15	0	0	0	0	0	0	1109	101	0	0	101	153	1385	35	1573
17:45	0	0	0	0	0	0	916	84	0	0	84	92	886	23	941
Total	0	0	0	0	0	0	397	316	0	0	316	5.5	489	1.3	567
Grand Total	0	0	0	0	0	0	43.3	0	0	0	43.3	5.5	48.9	1.3	56.7
App. %															
Total %															

MARKS TRAFFIC DATA

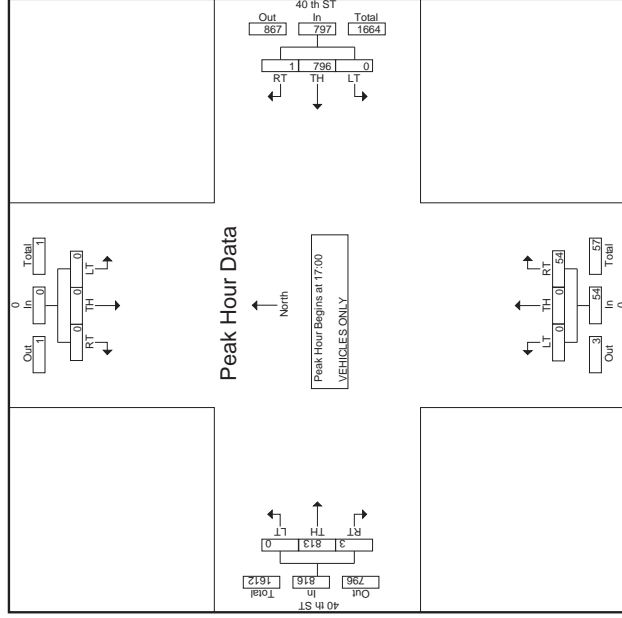
Start Time		Southbound			Westbound			Northbound			Eastbound				
RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	0	0	0	0	0	0	145	1	0	0	1	15	129	0	135
16:05	0	0	0	0	0	0	182	0	0	0	0	18	141	0	159
16:10	0	0	0	0	0	0	186	0	0	0	0	22	182	0	204
16:15	0	0	0	0	0	0	151	0	0	0	0	22	182	0	204
16:45	0	0	0	0	0	0	570	0	0	0	0	76	617	16	709
Total	0	0	0	0	0	0	159	174	0	0	174	19	183	7	209
17:00	0	0	0	0	0	0	141	0	0	0	0	18	201	4	213
17:05	0	0	0	0	0	0	129	21	0	0	21	13	212	3	228
17:10	0	0	0	0	0	0	560	71	0	0	71	77	768	19	854
17:15	0	0	0	0	0	0	1109	101	0	0	101	153	1385	35	1573
17:45	0	0	0	0	0	0	916	84	0	0	84	92	886	23	941
Total	0	0	0	0	0	0	397	316	0	0	316	5.5	489	1.3	567
Grand Total	0	0	0	0	0	0	43.3	0	0	0	43.3	5.5	48.9	1.3	56.7
App. %															
Total %															



MARKS TRAFFIC DATA

Start Time	0															
	Southbound				Westbound				Northbound				Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

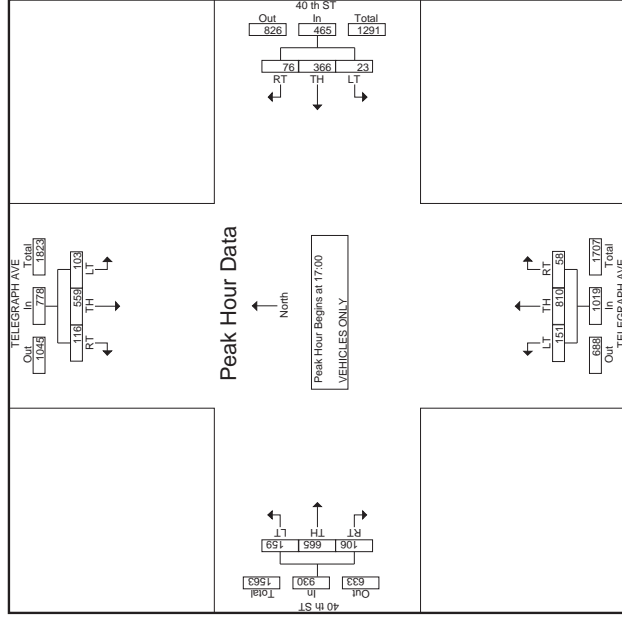
Start Time	0															
	Southbound				Westbound				Northbound				Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



MARKS TRAFFIC DATA

Start Time	40th ST															
	Southbound				Westbound				Northbound				Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	33	129	15	177	24	80	11	115	4	143	30	177	22	107	25	154
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	36	128	27	191	18	62	9	109	11	170	37	218	28	138	43	209
Total	136	521	95	752	76	329	33	438	30	651	123	804	109	469	143	721
17:00	31	198	22	211	21	95	7	123	15	203	35	253	23	120	36	179
17:15	32	184	22	208	22	92	8	122	14	212	32	254	25	172	40	237
17:30	36	141	31	208	18	86	6	110	11	211	46	272	24	184	34	242
17:45	27	128	17	172	19	91	5	115	18	184	38	240	34	189	49	272
Total	116	559	103	778	76	366	23	465	58	810	151	1019	106	665	159	930
18:00	39	144	52	235	16	83	8	107	15	159	25	199	29	134	39	202
18:15	281	1224	220	1735	169	779	64	1010	103	1829	269	2022	244	1298	341	1855
Grand Total	16.8	70.5	12.7	26.2	6.3	26.2	2.5	11.8	1.6	24.5	4.5	30.5	3.7	19.2	5.2	28
Approach %	16.8	70.5	12.7	26.2	6.3	26.2	2.5	11.8	1.6	24.5	4.5	30.5	3.7	19.2	5.2	28
Total %	4.4	18.5	3.3	26.2	6.3	26.2	2.5	11.8	1.6	24.5	4.5	30.5	3.7	19.2	5.2	28

Start Time	40th ST															
	Southbound				Westbound				Northbound				Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	21	158	31	211	21	95	7	123	15	203	35	253	23	120	36	179
17:15	22	132	33	187	18	94	5	117	14	212	46	272	24	184	34	242
17:30	36	141	31	208	18	86	6	110	11	211	46	272	25	172	40	237
17:45	27	128	17	172	19	91	5	115	18	184	38	240	34	189	49	272
Total	116	559	103	778	76	366	23	465	58	810	151	1019	106	665	159	930
18:00	39	144	52	235	16	83	8	107	15	159	25	199	29	134	39	202
18:15	281	1224	220	1735	169	779	64	1010	103	1829	269	2022	244	1298	341	1855
Grand Total	16.8	70.5	12.7	26.2	6.3	26.2	2.5	11.8	1.6	24.5	4.5	30.5	3.7	19.2	5.2	28
Approach %	16.8	70.5	12.7	26.2	6.3	26.2	2.5	11.8	1.6	24.5	4.5	30.5	3.7	19.2	5.2	28
Total %	4.4	18.5	3.3	26.2	6.3	26.2	2.5	11.8	1.6	24.5	4.5	30.5	3.7	19.2	5.2	28



MARKS TRAFFIC DATA

Start Time	TELEGRAPH AV Southbound						TELEGRAPH AV Northbound						TELEGRAPH AV Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
16:00	0	159	2	161	4	0	4	7	170	0	177	0	0	0	0	0	342	
16:15	0	159	1	160	5	0	5	6	179	0	183	0	0	0	0	0	349	
16:30	0	148	3	151	12	0	12	17	201	0	212	0	0	0	0	0	380	
16:45	0	143	9	152	11	0	11	11	196	0	207	0	0	0	0	0	389	
Total	0	622	12	634	30	0	30	29	666	0	635	0	0	0	0	0	1507	
Grand Total	0	156	3	159	10	0	10	4	210	0	214	0	0	0	0	0	384	
Approach %	0	143	6	149	8	0	8	11	10	229	0	239	0	0	0	0	399	
Total %	0	150	2	152	10	0	10	7	205	0	212	0	0	0	0	0	395	
Total %	0	630	15	645	32	0	32	31	915	0	946	0	0	0	0	0	1830	

Start Time	TELEGRAPH AV Southbound						TELEGRAPH AV Northbound						TELEGRAPH AV Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
16:00	1	157	0	158	0	0	0	184	4	188	9	192	0	0	0	13	359	
16:15	0	173	0	173	0	0	0	238	4	242	18	260	0	0	0	4	420	
16:30	0	184	0	184	0	0	0	218	4	222	11	233	0	0	0	3	400	
16:45	4	160	0	164	0	0	0	216	2	218	15	233	0	0	0	18	400	
Total	14	669	0	683	0	0	0	826	16	842	56	902	11	67	0	67	1592	
Grand Total	3	185	0	188	0	0	0	250	6	256	14	270	3	17	0	17	461	
Approach %	2	174	0	176	0	0	0	264	4	268	18	282	0	0	0	24	466	
Total %	5	172	0	177	0	0	0	224	7	231	17	248	4	21	0	21	429	
Total %	14	692	0	706	0	0	0	1017	23	1040	72	1112	17	89	0	89	1835	

MARKS TRAFFIC DATA

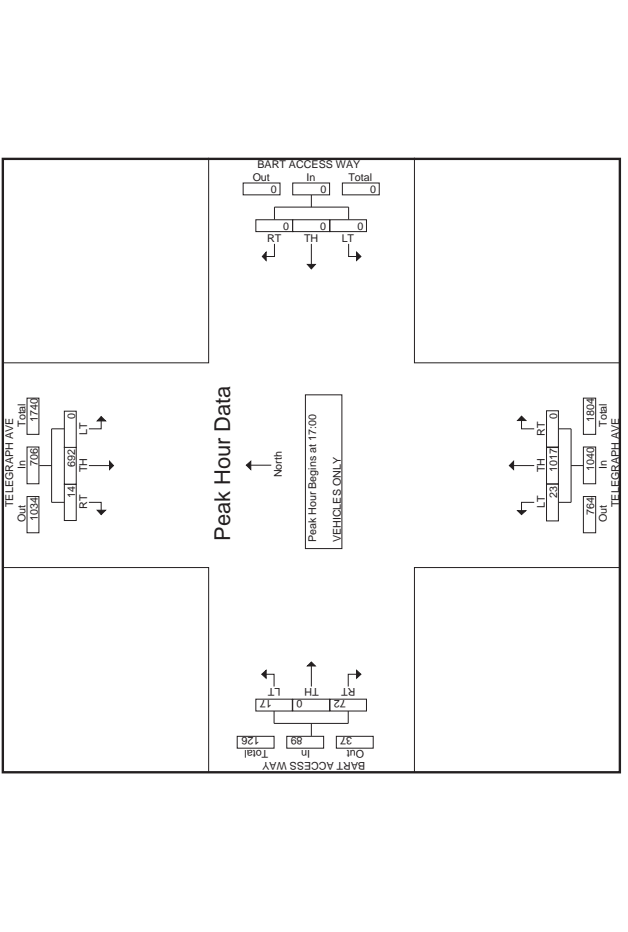
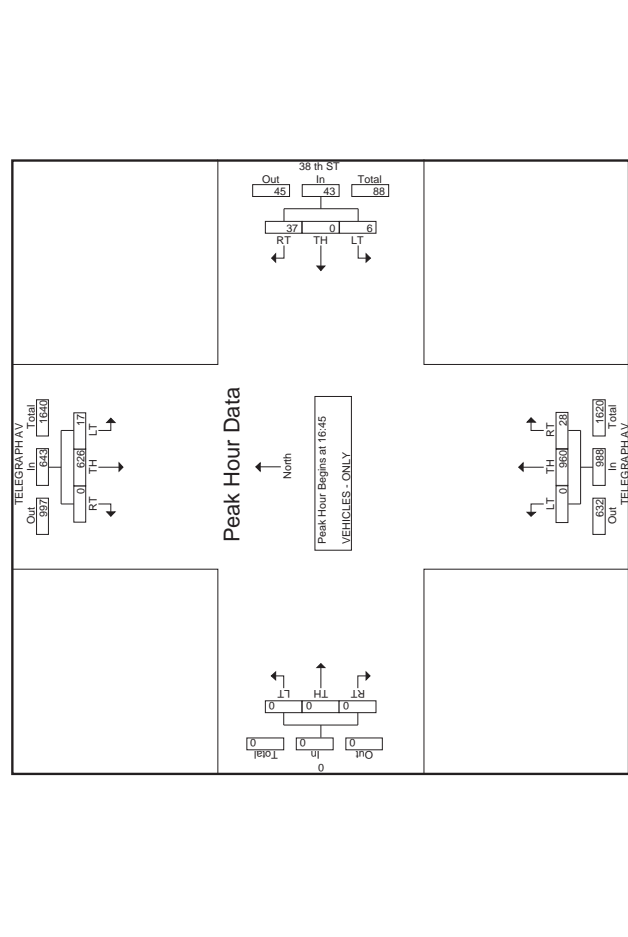
Start Time	BART ACCESS WAY Westbound						BART ACCESS WAY Eastbound						
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	
16:00	0	0	0	0	0	0	0	188	9	192	0	13	359
16:15	0	0	0	0	0	0	0	238	4	242	18	260	420
16:30	0	0	0	0	0	0	0	218	4	222	11	233	400
16:45	0	0	0	0	0	0	0	216	2	218	15	233	400
Total	0	0	0	0	0	0	0	826	16	842	56	902	1592
Grand Total	0	0	0	0	0	0	0	250	6	256	14	270	461
Approach %	0	0	0	0	0	0	0	264	4	268	18	282	466
Total %	0	0	0	0	0	0	0	224	7	231	17	248	429
Total %	0	0	0	0	0	0	0	1017	23	1040	72	1112	1835

Start Time	BART ACCESS WAY Westbound						BART ACCESS WAY Eastbound						
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	
16:00	0	0	0	0	0	0	0	188	9	192	0	13	359
16:15	0	0	0	0	0	0	0	238	4	242	18	260	420
16:30	0	0	0	0	0	0	0	218	4	222	11	233	400
16:45	0	0	0	0	0	0	0	216	2	218	15	233	400
Total	0	0	0	0	0	0	0	826	16	842	56	902	1592
Grand Total	0	0	0	0	0	0	0	250	6	256	14	270	461
Approach %	0	0	0	0	0	0	0	264	4	268	18	282	466
Total %	0	0	0	0	0	0	0	224	7	231	17	248	429
Total %	0	0	0	0	0	0	0	1017	23	1040	72	1112	1835

Start Time	TELEGRAPH AV Southbound						TELEGRAPH AV Northbound						TELEGRAPH AV Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
16:00	0	156	3	159	10	0	10	4	210	0	214	0	0	0	0	0	384	
16:15	0	143	6	149	8	0	8	11	10	229	0	239	0	0	0	0	399	
16:30	0	150	2	152	10	0	10	7	205	0	212	0	0	0	0	0	380	
16:45	0	143	9	152	11	0	11	11	196	0	207	0	0	0	0	0	389	
Total	0	630	15	645	32	0	32	31	915	0	946	0	0	0	0	0	1830	
Grand Total	0	152	27	179	62	0	62	15	77	60	172	0	178	0	0	0	3137	
Approach %	0	97.9	2.1	100	80.5	0	80.5	0	19.5	3.4	96.6	0	3.4	0	0	0	3137	
Total %	0	39.9	0.9	40.8	2	0	2	0.5	2.5	1.9	54.9	0	56.8	0	0	0	3137	

Start Time	TELEGRAPH AV Southbound						TELEGRAPH AV Northbound						TELEGRAPH AV Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
16:00	0	156	6	162	9	0	9	2	11	7	256	0	263	0	0	0	436	
16:15	0	156	3	159	10	0	10	3	11	4	210	0	214	0	0	0	384	
16:30	0	143	3	146	8	0	8	3	10	2	229	0	239	0	0	0	399	
16:45	0	143	9	152	11	0	11	6	10	10	229	0	239	0	0	0	399	
Total	0	630	17	647	32	0	32	6	43	28	960	0	968	0	0	0	1874	
Grand Total	0	97.4	2.6	100	86	0	86	0	14	2.8	97.2	0	98.8	0	0	0	1874	
Approach %	0	97.9	2.1	100	80.5	0	80.5	0	19.5	3.4	96.6	0	3.4	0	0	0	3137	
Total %	0	39.9	0.9	40.8	2	0	2	0.5	2.5	1.9	54.9	0	56.8	0	0	0	3137	

Start Time	TELEGRAPH AV Southbound						TELEGRAPH AV Northbound						TELEGRAPH AV Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
16:00	0	156	6	162	9	0	9	2	11	7	256	0	263	0	0	0	436	
16:15	0	156	3	159	10	0	10	3	11	4	210	0	214	0	0	0	384	
16:30	0	143	3	146	8	0	8	3	10	2	229	0	239	0	0	0	399	
16:45	0	143	9	152	11	0	11	6	10	10	229	0	239	0	0	0	399	
Total	0	630	17	647	32	0	32	6	43	28	960	0	968	0	0	0	1874	
Grand Total	0	97.4	2.6	100	86	0	86	0	14	2.8	97.2	0	98.8	0	0	0	1874	
Approach %	0	97.9	2.1	100	80.5	0	80.5	0	19.5	3.4	96.6	0	3.4	0	0	0	3137	
Total %	0	39.9	0.9	40.8	2	0	2	0.5	2.5	1.9	54.9	0	56.8	0	0	0	3137	

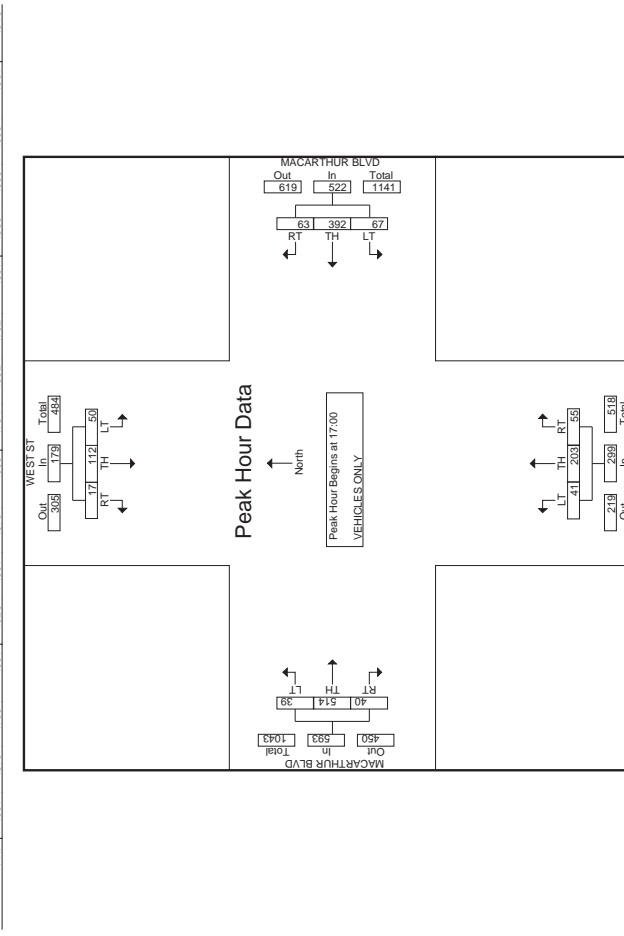
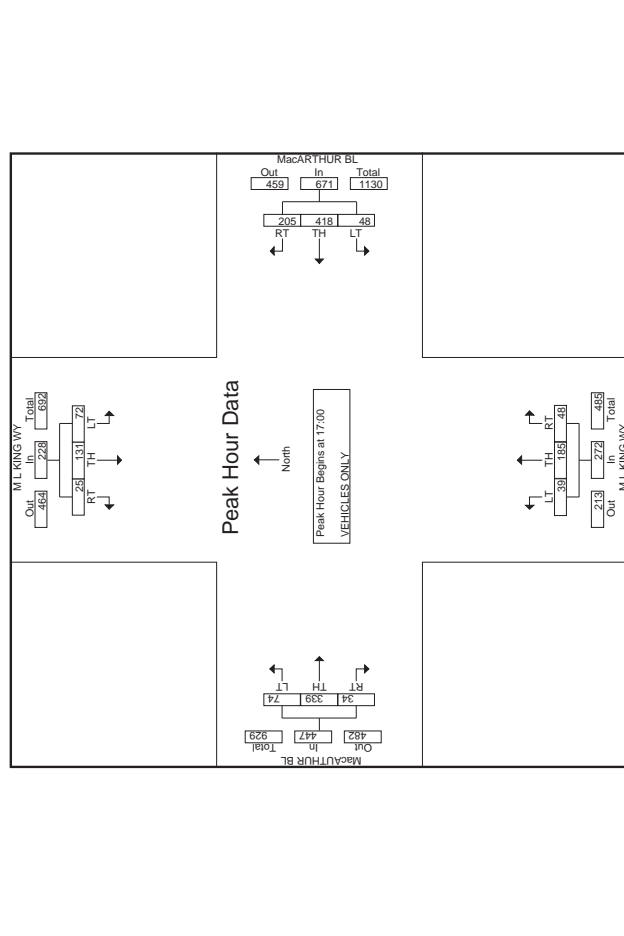


MARKS TRAFFIC DATA

Start Time	ML KING WY Southbound						MacARTHUR BL Westbound						ML KING WY Northbound						MacARTHUR BL Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
16:00	9	35	11	55	38	89	9	137	15	48	4	67	7	79	8	94								
16:05	2	15	5	22	12	33	17	52	12	39	7	56	9	30	1	40								
16:10	5	35	11	51	20	50	16	86	11	45	9	60	8	15	10	33								
16:15	10	27	7	44	54	99	13	166	19	48	11	78	11	76	19	106								
16:45	36	127	40	203	152	310	65	517	61	191	33	285	36	322	53	411								
17:00	4	34	13	51	57	127	11	195	17	53	9	79	6	65	14	85								
17:05	5	35	18	62	56	95	11	162	10	40	7	57	7	93	12	119								
17:10	5	33	30	68	54	91	13	158	10	46	8	64	10	86	19	115								
17:45	25	131	72	228	205	418	48	671	48	185	39	272	34	339	74	447								
Grand Total	61	268	112	431	557	793	103	1168	109	676	72	857	70	851	127	1054								
Approach %	14.2	59.8	3.6	14.2	11.3	24	3.4	39.2	3.6	12.4	2.4	18.4	2.3	21.8	4.2	28.3								
Total %	2	8.5	3.7	14.2	11.3	24	3.4	39.2	3.6	12.4	2.4	18.4	2.3	21.8	4.2	28.3								

MARKS TRAFFIC DATA

Start Time	WEST ST Southbound						MACARTHUR BLVD Westbound						WEST ST Northbound						MACARTHUR BLVD Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
16:00	7	33	8	50	6	24	13	43	4	13	3	20	5	13	8	26								
16:05	4	38	7	50	8	24	11	43	7	16	7	30	6	16	7	29								
16:10	3	38	7	48	8	23	12	43	5	16	7	28	6	16	7	29								
16:15	2	29	10	41	10	107	13	130	9	41	7	57	16	92	9	117								
16:45	16	146	33	195	44	372	78	494	47	177	31	255	37	340	35	412								
17:00	7	32	13	52	16	100	14	130	11	49	8	68	8	96	8	112								
17:05	3	29	17	49	17	87	25	129	18	61	11	90	9	106	9	124								
17:10	3	25	11	39	14	103	9	126	10	44	14	68	11	160	14	185								
17:45	4	26	9	39	16	102	19	137	16	49	8	73	12	152	8	172								
Total	17	112	50	179	63	392	67	522	55	203	41	299	40	514	39	593								
Grand Total	33	268	83	374	107	764	145	1016	102	380	72	554	77	854	74	1005								
Approach %	8.8	69	22.2	12.7	10.5	75.2	14.3	18.4	68.6	13	3.5	12.9	2.4	18.8	2.6	29								
Total %	1.1	8.7	2.8	12.7	3.6	25.9	4.9	34.5	3.5	12.9	2.4	18.8	2.6	29	2.5	34.1								



MARKS TRAFFIC DATA

File Name : telegraph-macathur-p20
 Site Code : 00000000
 Start Date : 6/20/2006
 Page No : 1

PM 22
 OAKLAND
 FPW J
 TTTO [916] 715-4006

Start Time	Cross-Street - VEHICLES ONLY															
	TELEGRAPH AV Southbound				MacARTHUR BL Westbound				TELEGRAPH AV Northbound				MacARTHUR BL Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	14	111	37	162	50	75	15	140	18	128	20	166	15	71	16	102
16:05	15	117	37	169	50	75	15	140	19	134	20	169	15	71	16	102
16:10	16	114	37	167	43	75	15	133	19	131	20	169	12	84	9	95
16:15	16	114	38	168	43	75	15	133	17	113	25	155	9	73	18	100
16:45	57	439	142	638	168	325	71	564	80	629	91	700	48	293	87	428
Total	15	106	22	143	45	101	17	163	20	147	18	185	14	46	30	90
Grand Total	89	618	270	1288	328	652	113	1093	142	1122	184	1448	89	570	202	871
%App. Time	7.7	71.4	2.1	27.4	7	13.9	2.4	23.3	3	23.9	3.9	30.8	2.1	12.1	4.3	18.5

Start Time	Cross-Street - VEHICLES ONLY															
	TELEGRAPH AV Southbound				MacARTHUR BL Westbound				TELEGRAPH AV Northbound				MacARTHUR BL Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	89	618	270	1288	328	652	113	1093	142	1122	184	1448	89	570	202	871
%App. Time	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

MARKS TRAFFIC DATA

File Name : bart-dw-macathur-p20
 Site Code : 00000000
 Start Date : 6/20/2006
 Page No : 1

PM 21
 OAKLAND
 FPW H
 TTTO [916] 715-4006

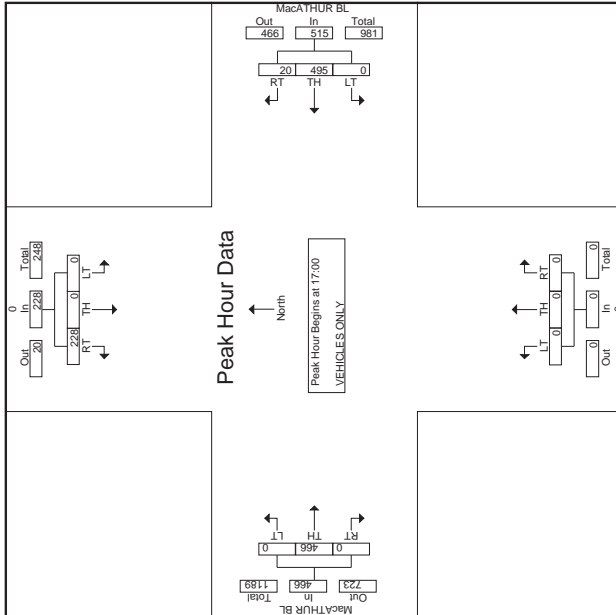
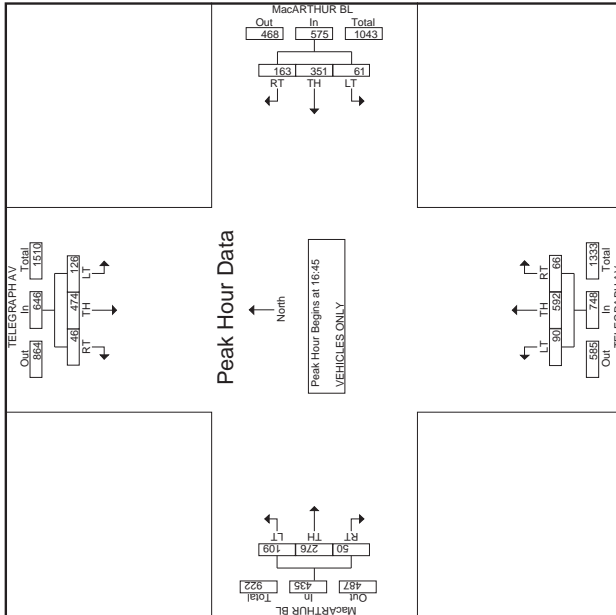
Start Time	Cross-Street - VEHICLES ONLY															
	TELEGRAPH AV Southbound				MacARTHUR BL Westbound				TELEGRAPH AV Northbound				MacARTHUR BL Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	28	0	0	28	2	116	0	118	0	0	0	0	0	0	0	0
16:05	28	0	0	28	3	125	0	128	0	0	0	0	0	0	0	0
16:10	42	0	0	42	3	125	0	128	0	0	0	0	0	0	0	0
16:15	36	0	0	36	6	143	0	149	0	0	0	0	0	0	0	0
16:45	133	0	0	133	19	491	0	510	0	0	0	0	0	0	0	0
Total	46	0	0	46	1	158	0	159	0	0	0	0	0	0	0	0
Grand Total	228	0	0	228	20	495	0	515	0	0	0	0	0	0	0	0
%App. Time	15.7	0	0	15.7	1.7	42.8	0	44.5	0	0	0	0	0	0	0	0

Start Time	Cross-Street - VEHICLES ONLY															
	TELEGRAPH AV Southbound				MacARTHUR BL Westbound				TELEGRAPH AV Northbound				MacARTHUR BL Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
%App. Time	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	Cross-Street - VEHICLES ONLY															
	TELEGRAPH AV Southbound				MacARTHUR BL Westbound				TELEGRAPH AV Northbound				MacARTHUR BL Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	14	111	37	162	50	75	15	140	18	128	20	166	15	71	16	102
16:05	15	117	37	169	50	75	15	140	19	134	20	169	15	71	16	102
16:10	16	114	37	167	43	75	15	133	19	131	20	169	12	84	9	95
16:15	16	114	38	168	43	75	15	133	17	113	25	155	9	73	18	100
16:45	57	439	142	638	168	325	71	564	80	629	91	700	48	293	87	428
Total	15	106	22	143	45	101	17	163	20	147	18	185	14	46	30	90
Grand Total	89	618	270	1288	328	652	113	1093	142	1122	184	1448	89	570	202	871
%App. Time	7.7	71.4	2.1	27.4	7	13.9	2.4	23.3	3	23.9	3.9	30.8	2.1	12.1	4.3	18.5

Start Time	Cross-Street - VEHICLES ONLY															
	TELEGRAPH AV Southbound				MacARTHUR BL Westbound				TELEGRAPH AV Northbound				MacARTHUR BL Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
%App. Time	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	Cross-Street - VEHICLES ONLY															
	TELEGRAPH AV Southbound				MacARTHUR BL Westbound				TELEGRAPH AV Northbound				MacARTHUR BL Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:05	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:10	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
%App. Time	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



MARKS TRAFFIC DATA

MARKS TRAFFIC DATA

Groups Printed - VEHICLES ONLY

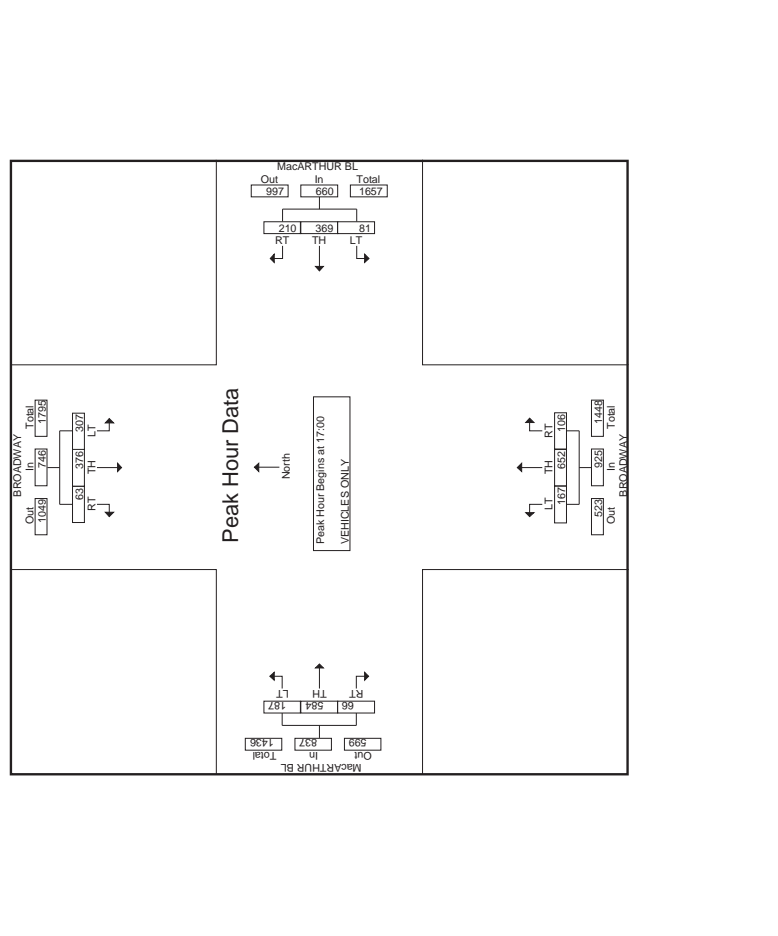
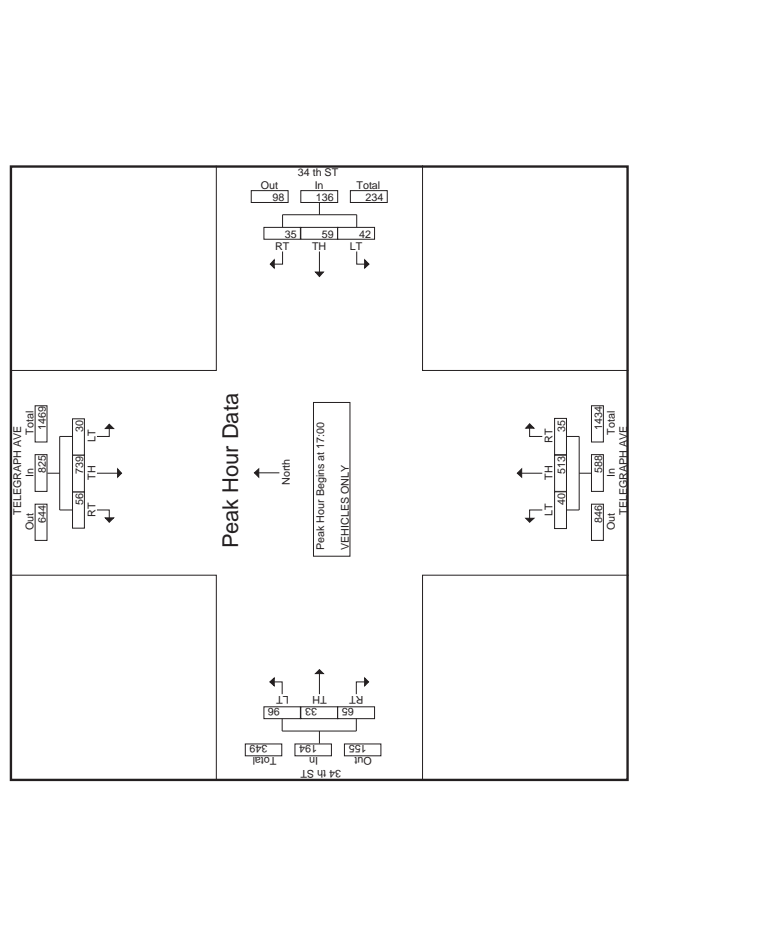
Start Time	TELEGRAPH AVE Southbound			TELEGRAPH AVE Northbound			34 th ST Westbound			34 th ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
16:00	13	12	12	14	14	14	12	12	12	12	12	12
16:30	13	12	12	14	14	14	12	12	12	12	12	12
16:45	13	12	12	14	14	14	12	12	12	12	12	12
Total	49	585	32	666	31	41	43	115	26	518	30	574
Grand Total	105	1324	62	1491	66	100	85	251	61	1031	70	1162
Approach %	7	86.8	4.2	26.3	39.8	33.9	5.2	88.7	6	5.2	88.7	6
Total %	3.2	40.5	1.9	45.6	2	3.1	2.6	7.7	1.9	31.5	2.1	35.6

Groups Printed - VEHICLES ONLY

Start Time	BROADWAY Southbound			BROADWAY Northbound			MacARTHUR BL Westbound			MacARTHUR BL Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
16:00	16	92	16	13	13	13	15	15	15	15	15	15
16:30	16	92	16	13	13	13	15	15	15	15	15	15
16:45	16	92	16	13	13	13	15	15	15	15	15	15
Total	73	385	273	701	264	117	765	97	504	152	753	643
Grand Total	136	731	580	1447	474	753	1088	1425	203	1156	319	1678
Approach %	9.4	50.5	40.1	33.3	52.8	13.9	12.1	68.9	19	19.2	6.3	27.8
Total %	2.3	12.1	9.6	24	7.9	12.5	3.3	23.6	3.4	19.2	5.3	24.5

Peak Hour Analysis From 16:00 to 17:45 - Peak of 1
 Peak Hour Begins at 17:00

Start Time	RT	TH	LT	App. Total
17:00	17	203	12	229
17:15	12	202	10	224
17:30	15	177	4	196
17:45	12	157	7	176
Total	56	739	30	825
Grand Total	105	1324	62	1491
Approach %	7	86.8	4.2	26.3
Total %	3.2	40.5	1.9	45.6



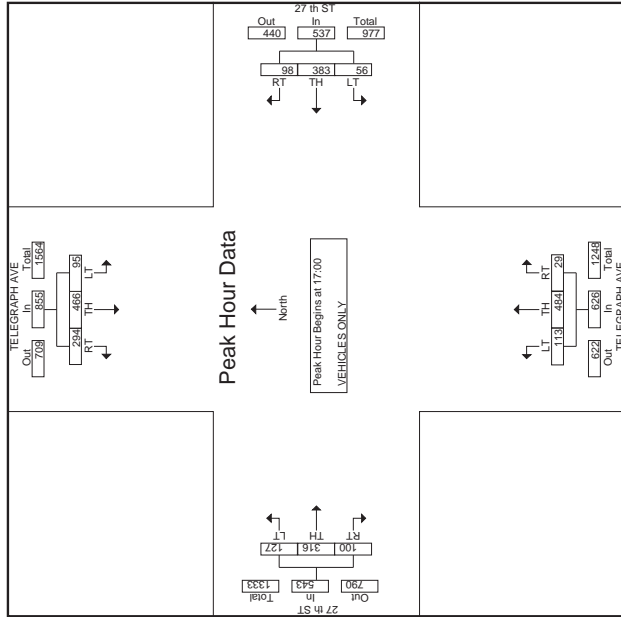
Peak Hour Analysis From 16:00 to 17:45 - Peak of 1
 Peak Hour Begins at 17:00

Start Time	RT	TH	LT	App. Total
17:00	14	99	79	192
17:15	21	96	74	191
17:30	13	99	79	191
17:45	15	82	75	172
Total	63	376	307	746
Grand Total	136	731	580	1447
Approach %	9.4	50.5	40.1	33.3
Total %	2.3	12.1	9.6	24

MARKS TRAFFIC DATA

Start Time	TELEGRAPH AVE Southbound						TELEGRAPH AVE Northbound						27th St Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
16:00	1	0	1	2	1	0	1	2	1	0	1	2	1	0	1	2		
16:15	1	0	1	2	1	0	1	2	1	0	1	2	1	0	1	2		
16:30	1	0	1	2	1	0	1	2	1	0	1	2	1	0	1	2		
16:45	89	95	35	219	22	91	124	7	91	21	119	25	66	32	123	585		
Total	351	430	103	884	104	380	36	520	33	399	116	548	75	241	139	2407		
17:00	83	105	18	206	20	104	16	140	9	122	21	152	15	82	31	138	656	
17:15	76	94	21	191	23	119	16	158	11	122	28	161	25	70	27	122	632	
17:30	74	110	24	208	26	85	8	119	5	126	37	168	26	80	51	157	652	
17:45	61	127	32	220	29	75	16	120	4	114	27	145	34	84	18	136	621	
Total	294	466	95	855	98	383	56	537	29	484	113	626	100	316	127	543	2561	
Grand Total	645	896	198	1739	202	763	82	1057	62	883	229	1174	175	557	266	988	4988	
Approach %	37.1	51.5	11.4		19.1	72.2	8.7		5.3	75.2	18.5		17.5	55.8	26.7		20.1	
Total %	13	18	4		35	4.1	15.4	1.9	21.3	1.2	17.8	4.6	23.6	3.5	11.2	5.4		

Start Time	TELEGRAPH AVE Southbound						TELEGRAPH AVE Northbound						27th St Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total		
17:00	83	105	18	206	20	104	16	140	9	122	21	152	15	82	31	138	656	
17:15	76	94	21	191	23	119	16	158	11	122	28	161	25	70	27	122	632	
17:30	74	110	24	208	26	85	8	119	5	126	37	168	26	80	51	157	652	
17:45	61	127	32	220	29	75	16	120	4	114	27	145	34	84	18	136	621	
Total	294	466	95	855	98	383	56	537	29	484	113	626	100	316	127	543	2561	
Grand Total	645	896	198	1739	202	763	82	1057	62	883	229	1174	175	557	266	988	4988	
Approach %	37.1	51.5	11.4		19.1	72.2	8.7		5.3	75.2	18.5		17.5	55.8	26.7		20.1	



MARKS TRAFFIC DATA

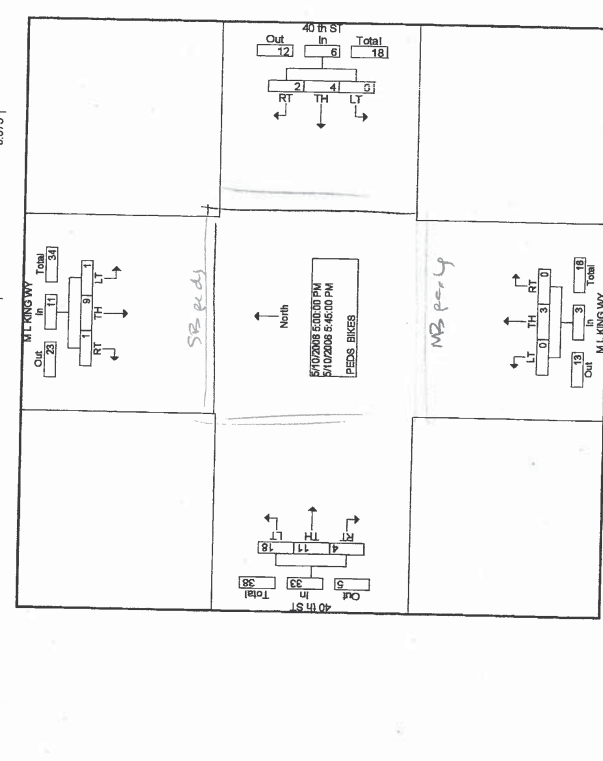
PM 11
 OAKLAND
 FFWA
 TITO [9/6] 715-4006

MARKS TRAFFIC DATA

File Name : Mlt-king-40th-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

Start Time	M L KING WY Southbound						M L KING WY Northbound						40th St Westbound						40th St Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
16:00	1	1	0	2	1	0	1	2	1	0	1	2	1	0	1	2	1	0	1	2				
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
16:45	1	7	1	9	1	8	1	10	2	4	0	6	1	1	0	2	0	0	0	0				
Total	1	8	1	10	2	16	2	22	3	22	1	22	1	1	1	3	1	0	0	0				
17:00	0	1	0	1	1	0	1	2	1	0	1	2	1	0	1	2	1	0	1	2				
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
17:45	1	7	1	9	1	8	1	10	2	4	0	6	1	1	0	2	0	0	0	0				
Total	1	8	1	10	2	16	2	22	3	22	1	22	1	1	1	3	1	0	0	0				
Grand Total	2	12	4	16	4	10	0	14	0	3	0	3	4	27	28	0	59	182	84	276				
Approach %	11.1	86.7	2.2		28.6	71.4	0.0		0.0	100.0	0.0		6.8	46.8	47.5		3.2	4.3	23.7	26.8				
Total %	2.1	12.8	4.3		19.1	4.3	10.6	0.0	14.9	0.0	3.2	0.0	4.3	23.7	26.8	62.8	85.9	34.1						

Start Time	M L KING WY Southbound						M L KING WY Northbound						40th St Westbound						40th St Eastbound					
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total				
16:00	1	1	0	2	1	0	1	2	1	0	1	2	1	0	1	2	1	0	1	2				
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
16:45	1	7	1	9	1	8	1	10	2	4	0	6	1	1	0	2	0	0	0	0				
Total	1	8	1	10	2	16	2	22	3	22	1	22	1	1	1	3	1	0	0	0				
17:00	0	1	0	1	1	0	1	2	1	0	1	2	1	0	1	2	1	0	1	2				
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0				
17:45	1	7	1	9	1	8	1	10	2	4	0	6	1	1	0	2	0	0	0	0				
Total	1	8	1	10	2	16	2	22	3	22	1	22	1	1	1	3	1	0	0	0				
Grand Total	2	12	4	16	4	10	0	14	0	3	0	3	4	27	28	0	59	182	84	276				
Approach %	11.1	86.7	2.2		28.6	71.4	0.0		0.0	100.0	0.0		6.8	46.8	47.5		3.2	4.3	23.7	26.8				
Total %	2.1	12.8	4.3		19.1	4.3	10.6	0.0	14.9	0.0	3.2	0.0	4.3	23.7	26.8	62.8	85.9	34.1						

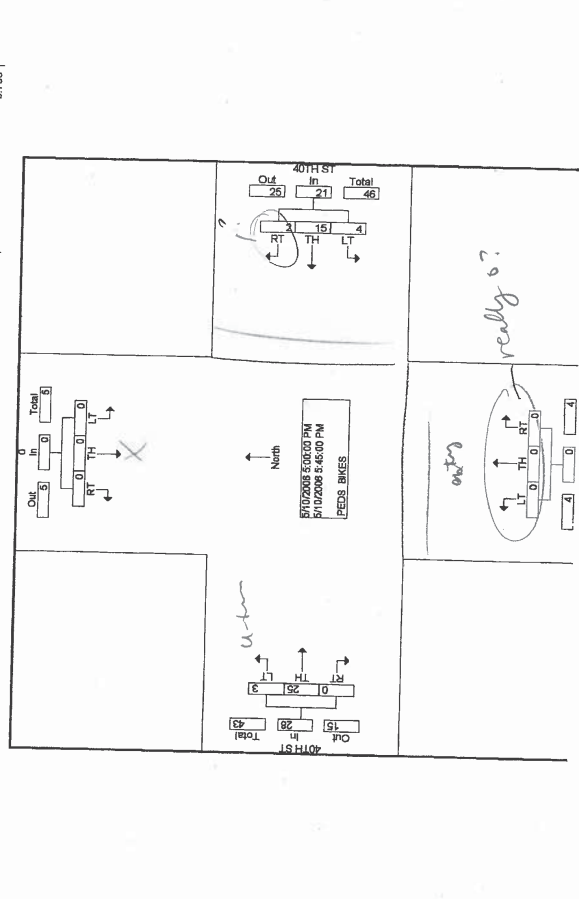


FROM : MJD FAX NO. : 916 364 7967 Jun. 14 2006 07:57AM P5

PM 12 OAKLAND File Name : dwt12-40th-p
 FWPC Site Code : 00000000 #16 P1B PM
 TTTO [9/16] 715-4006 MARKS TRAFFIC DATA #16 P1B PM
 Start Date : 5/10/2006 Page No : 1

Start Time	Southbound			Westbound			Northbound			Eastbound			Exclu. Total	Inclu. Total	Int. Total
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT			
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	Southbound			Westbound			Northbound			Eastbound			App. Total	LT	Int. Total
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT			
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour from 16:00 to 17:45 - Peak 1 of 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45 Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Factor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
High Int.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Factor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

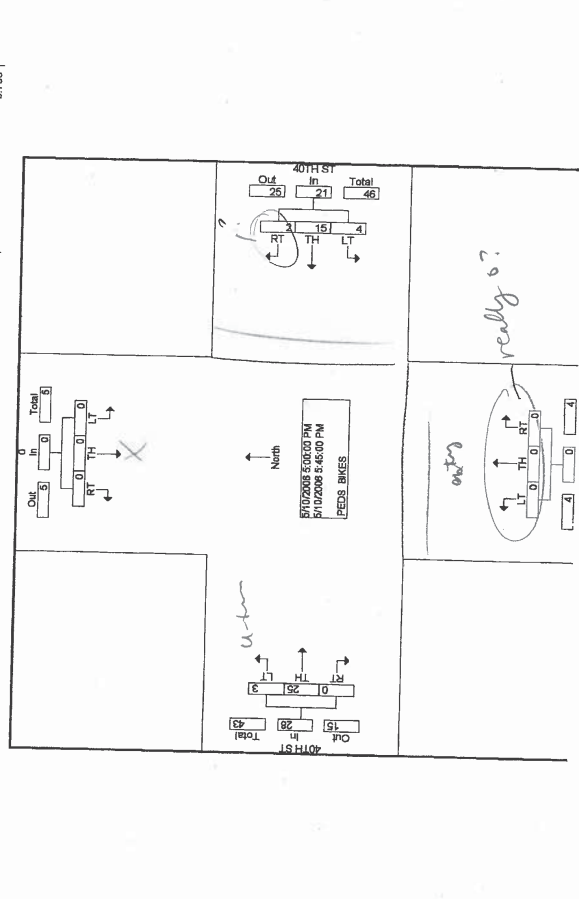


FROM : MJD FAX NO. : 916 364 7967 Jun. 14 2006 07:57AM P5

PM 12 OAKLAND File Name : dwt12-40th-p
 FWPC Site Code : 00000000 #16 P1B PM
 TTTO [9/16] 715-4006 MARKS TRAFFIC DATA #16 P1B PM
 Start Date : 5/10/2006 Page No : 1

Start Time	Southbound			Westbound			Northbound			Eastbound			Exclu. Total	Inclu. Total	Int. Total
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT			
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	Southbound			Westbound			Northbound			Eastbound			App. Total	LT	Int. Total
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT			
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour from 16:00 to 17:45 - Peak 1 of 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45 Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Factor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
High Int.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Factor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



FROM : MJD FAX NO. : 916 364 7967 Jun. 14 2006 07:57AM P7

PM 13 OAKLAND File Name : dwt13-40th-p
 FWPC Site Code : 00000000 #17 P1B PM
 TTTO [9/16] 715-4006 MARKS TRAFFIC DATA #17 P1B PM
 Start Date : 5/10/2006 Page No : 1

Start Time	Southbound			Westbound			Northbound			Eastbound			Exclu. Total	Inclu. Total	Int. Total
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT			
16:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	0.0	0.0	0.0	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	Southbound			Westbound			Northbound			Eastbound			App. Total	LT	Int. Total
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT			
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Hour from 16:00 to 17:45 - Peak 1 of 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45 Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Factor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
High Int.	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Volume	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Peak Factor	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



#19
 #19
 PM
 Bike / Ped
 File Name: telegraph-40-p
 Site Code: 00000000
 Start Date: 5/10/2006
 Page No: 1

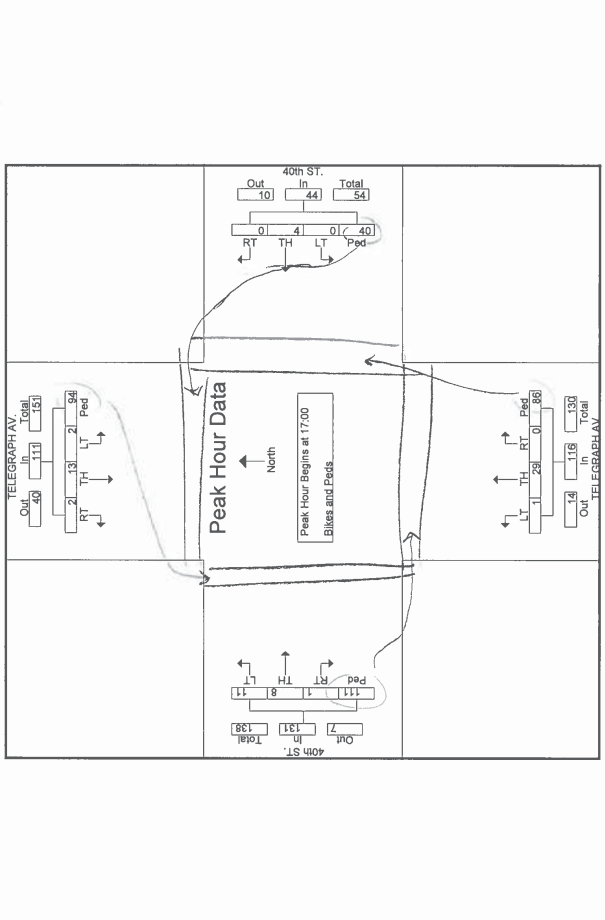
MARKS TRAFFIC DATA

CITY OF OAKLAND
 PP
 AM 15

Groups Printed: Bikes and Peds

Start Time	TELEGRAPH AV. Southbound				TELEGRAPH AV. Northbound				40th ST. Westbound				40th ST. Eastbound			
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED
16:00	4	1	15	21	0	3	2	19	24	1	3	0	24	28	85	
16:15	0	8	0	15	23	1	2	0	18	26	4	1	29	35	90	
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	
16:45	2	5	1	17	23	0	0	0	12	27	2	4	0	24	98	
Total	3	21	2	58	84	1	8	0	33	42	0	19	2	88	109	382
17:00	1	6	0	9	16	0	3	0	5	8	0	4	0	12	16	1
17:15	1	3	0	38	42	0	0	0	18	18	0	6	0	27	34	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	2	1	28	31	0	4	0	40	44	0	29	1	35	45	0
Total	2	13	2	94	111	0	4	0	40	44	0	29	1	86	116	1
Grand Total	5	34	4	152	195	1	12	0	73	86	0	48	3	174	225	9
Approach %	2.6	17.4	2.1	77.9	1.2	14	0	84.9	0.1	1.5	0	9.3	11	0	6.1	0.4
Total %	0.6	4.3	0.5	19.4	24.9	0.1	1.5	0	9.3	11	0	6.1	0.4	22.2	28.7	1.1

Start Time	TELEGRAPH AV. Southbound				TELEGRAPH AV. Northbound				40th ST. Westbound				40th ST. Eastbound			
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED
17:00	1	6	0	9	16	0	3	0	5	8	0	4	0	12	16	1
17:15	0	2	1	19	22	0	0	0	18	18	0	6	0	27	34	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	2	1	28	31	0	4	0	40	44	0	29	1	35	45	0
Total	2	13	2	94	111	0	4	0	40	44	0	29	1	86	116	1
Grand Total	5	34	4	152	195	1	12	0	73	86	0	48	3	174	225	9
Approach %	2.6	17.4	2.1	77.9	1.2	14	0	84.9	0.1	1.5	0	9.3	11	0	6.1	0.4
Total %	0.6	4.3	0.5	19.4	24.9	0.1	1.5	0	9.3	11	0	6.1	0.4	22.2	28.7	1.1



FROM: MTD

PM 20
 OAKLAND
 FFWWE
 TTTO [9]16] 715-4006

MARKS TRAFFIC DATA

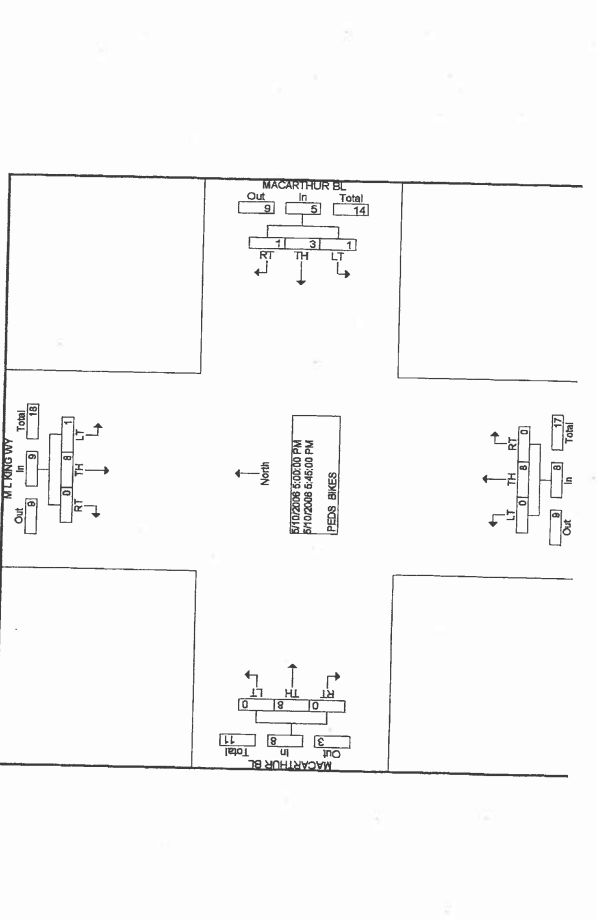
File Name: ml-king-macarthur-p
 Site Code: 00000000
 Start Date: 5/10/2006
 Page No: 1

FAX NO.: 515 364 7957
 Jun. 14 2006 08:00AM P9

Groups Printed: Peds, Bikes

Start Time	MACARTHUR BL. Southbound				MACARTHUR BL. Westbound				M L KING WY Northbound				MACARTHUR BL. Eastbound			
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED
16:00	0	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	1	1	0	16	2	2	6	12	9	0	1	2	14	3	0	6
Total	0	2	0	16	2	2	6	12	9	0	1	2	14	3	0	6
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1	9	1	25	11	3	9	22	14	0	8	2	31	11	0	14
Approach %	9.1	81.8	9.1	21.4	64.3	14.3	28.0	0.0	18.0	4.0	22.0	0.0	18.0	4.0	22.0	0.0
Total %	2.0	18.0	2.0	22.0	6.0	18.0	4.0	22.0	0.0	18.0	4.0	22.0	0.0	18.0	4.0	22.0

Start Time	MACARTHUR BL. Southbound				MACARTHUR BL. Westbound				M L KING WY Northbound				MACARTHUR BL. Eastbound			
	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED	RT	TH	LT	PED
17:00	0	8	1	9	6	1	3	1	0	8	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	8	1	9	6	1	3	1	0	8	0	0	0	0	0	0
Grand Total	1	9	1	25	11	3	9	22	14	0	8	2	31	11	0	14
Approach %	9.1	81.8	9.1	21.4	64.3	14.3	28.0	0.0	18.0	4.0	22.0	0.0	18.0	4.0	22.0	0.0
Total %	2.0	18.0	2.0	22.0	6.0	18.0	4.0	22.0	0.0	18.0	4.0	22.0	0.0	18.0	4.0	22.0



FROM : MTD
 PM 18
 OAKLAND
 FFW P
 TITO [9/16] 715-4006

MARKS TRAFFIC DATA

File Name : telegraph-38th-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

MARKS TRAFFIC DATA

File Name : pd-bart-dw-macauther-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

MARKS TRAFFIC DATA

File Name : telegraph-38th-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

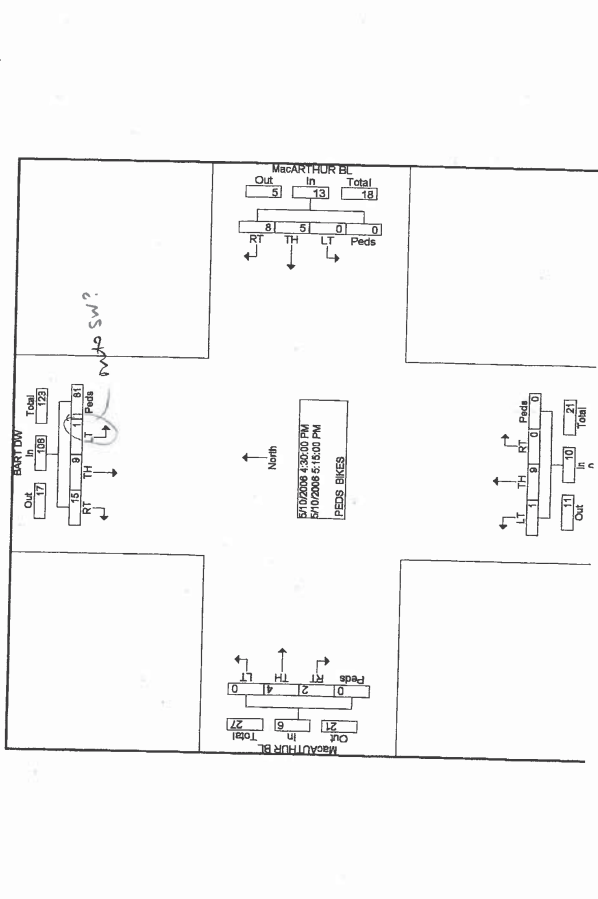
MARKS TRAFFIC DATA

Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				38TH ST Westbound				TELEGRAPH AVE Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	TELEGRAPH AVE Southbound				TELEGRAPH AVE Northbound				38TH ST Westbound				TELEGRAPH AVE Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	BART DW Southbound				MacARTHUR BL Westbound				Northbound				MacARTHUR BL Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0

Start Time	BART DW Southbound				MacARTHUR BL Westbound				Northbound				MacARTHUR BL Eastbound			
	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total	RT	TH	LT	App. Total
16:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
App. Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total %	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0



PM 22 OAKLAND
 FFW B
 TTTO [9/16] 715-4006

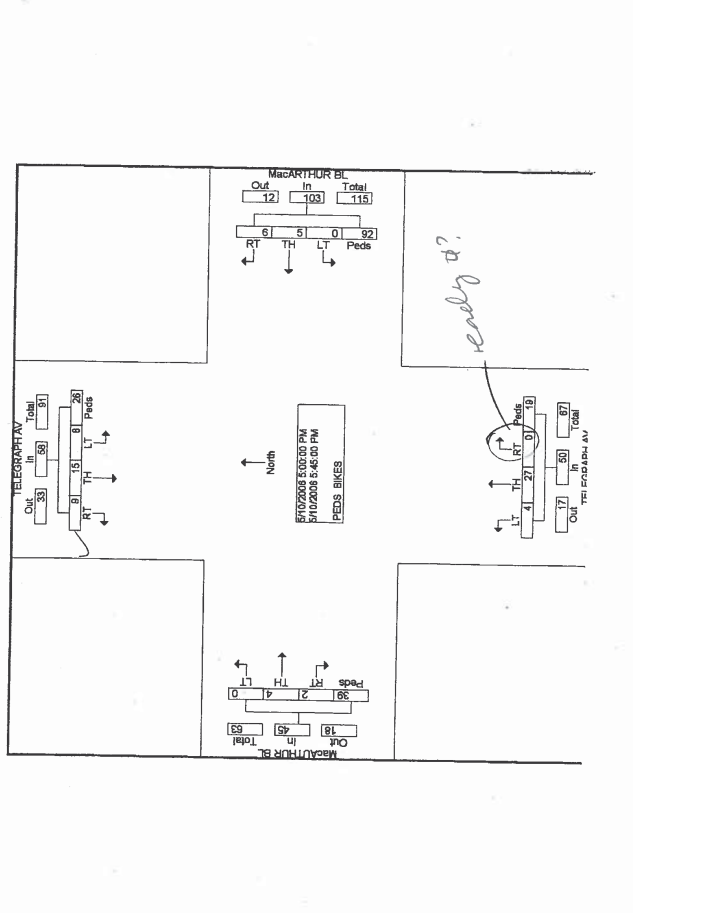
MARKS TRAFFIC DATA #28 P/B RM

File Name : pt:telegraph-macarthur-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

Groups Printed: PEDS BIKES

Start Time	TELEGRAPH AV Southbound			TELEGRAPH AV Northbound			MacARTHUR BL Westbound			MacARTHUR BL Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
16:00	1	0	1	1	0	1	1	0	1	1	0	1
16:15	3	0	0	13	0	0	15	1	0	0	9	10
16:30	3	0	0	13	0	0	15	1	0	0	9	10
16:45	3	0	0	13	0	0	15	1	0	0	9	10
Total	25	24	1	39	3	23	4	3	23	4	3	35
17:00	0	2	4	0	16	18	0	1	7	8	0	16
17:15	0	0	0	0	11	11	0	0	1	0	0	1
17:30	0	0	0	0	10	17	0	10	2	12	1	2
17:45	0	0	0	0	5	5	0	7	2	14	1	1
Total	9	15	8	26	36	55	0	8	14	21	1	17
Grand Total	34	39	15	65	39	108	0	27	4	19	50	2
Approach %	29.2	11.3	3.6	59.9	0.0	87.5	3.1	61.5	4.1	41.2	5.6	8.9
Total %	7.4	8.4	3.2	28.4	2.2	17.7	0.0	27.3	31.2	0.6	10.8	0.9

Start Time	TELEGRAPH AV Southbound			TELEGRAPH AV Northbound			MacARTHUR BL Westbound			MacARTHUR BL Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
17:00	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	34	39	15	65	39	108	0	27	4	19	50	2
Approach %	29.2	11.3	3.6	59.9	0.0	87.5	3.1	61.5	4.1	41.2	5.6	8.9
Total %	7.4	8.4	3.2	28.4	2.2	17.7	0.0	27.3	31.2	0.6	10.8	0.9



PM 27 OAKLAND
 FFW B
 TTTO [9/16] 715-4006

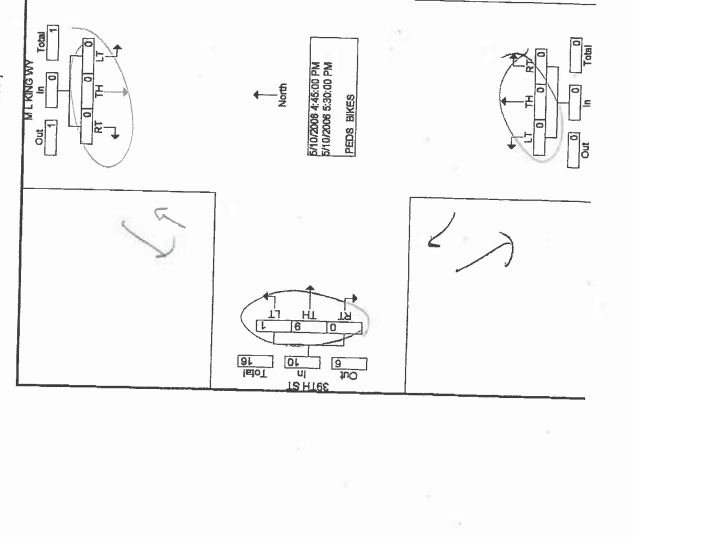
MARKS TRAFFIC DATA #50 P/B RM

File Name : mt:king-39th-p
 Site Code : 00000000
 Start Date : 5/10/2006
 Page No : 1

Groups Printed: PEDS BIKES

Start Time	M L KING WY Southbound			M L KING WY Northbound			39TH ST Westbound			39TH ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
16:00	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
17:00	0	0	0	0	0	0	0	0	0	0	0	0
17:15	0	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Start Time	M L KING WY Southbound			M L KING WY Northbound			39TH ST Westbound			39TH ST Eastbound		
	RT	TH	LT	RT	TH	LT	RT	TH	LT	RT	TH	LT
16:00	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	0	0	0	0	0	0	0	0	0	0	0
16:30	0	0	0	0	0	0	0	0	0	0	0	0
16:45	0	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	0	0	0	0	0	0	0	0	0	0	0	0
Approach %	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 %	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0



**APPENDIX B:
EXISTING CONDITIONS INTERSECTION
LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
 1: 52nd St & Shattuck Ave.

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	1.00	0.98	1.00	0.99	0.99	0.99	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.98	0.98	0.99	0.99	0.95	1.00	0.95
Satd. Flow (prot)	1770	4937	1764	4973	2032	1955	1955	1955	1955	1955	1955	1955
Flt Permitted	0.95	1.00	0.24	1.00	0.48	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Satd. Flow (perm)	1770	4937	443	4973	1254	1529	1529	1529	1529	1529	1529	1529
Volume (vph)	288	906	170	65	1219	165	206	259	50	146	272	246
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	303	954	179	68	1283	174	217	273	53	154	286	259
RTOR Reduction (vph)	0	27	0	0	17	0	0	10	0	0	60	0
Lane Group Flow (vph)	303	1106	0	68	1440	0	0	533	0	0	639	0
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		8	8	2	2				6	
Permitted Phases												6
Actuated Green, G (s)	21.0	56.0	31.0	31.0	31.0	37.5	37.5	37.5	37.5	37.5	37.5	37.5
Effective Green, g (s)	21.0	56.0	31.0	31.0	31.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Actuated g/C Ratio	0.21	0.56	0.31	0.31	0.31	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5
Lane Grp Cap (vph)	372	2765	137	1542	477	581	581	581	581	581	581	581
v/s Ratio Prot	c0.17	0.22		c0.29								
v/s Ratio Perm	0.81	0.40	0.15	0.50	0.93	c0.43	c0.43	c0.43	c0.43	c0.43	c0.43	c0.43
v/c Ratio	37.6	12.5	28.1	33.5	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	17.6	0.4	12.3	11.8	77.4	67.9	67.9	67.9	67.9	67.9	67.9	67.9
Delay (s)	55.2	12.9	40.4	45.3	108.4	98.9	98.9	98.9	98.9	98.9	98.9	98.9
Level of Service	E	B	D	D	F	F	F	F	F	F	F	F
Approach Delay (s)	21.8		45.1	45.1	108.4	98.9	98.9	98.9	98.9	98.9	98.9	98.9
Approach LOS	C		D	D	F	F	F	F	F	F	F	F

Intersection Summary	
HCM Average Control Delay	54.3
HCM Volume to Capacity ratio	0.98
Actuated Cycle Length (s)	100.0
Intersection Capacity Utilization	102.8%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 2: 52nd St & Telegraph Ave.

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.94	1.00	1.00	0.92	1.00	0.97	1.00	0.95	1.00	0.95	1.00
Frt	1.00	0.97	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1699	1681	1607	1681	1607	3406	3406	3406	3406	1770	3200	3200
Flt Permitted	0.80	0.75	1.00	0.75	1.00	0.94	0.94	0.94	0.94	0.95	1.00	0.95
Satd. Flow (perm)	1404	1404	1321	1607	3215	1770	3200	3200	3200	1770	3200	3200
Volume (vph)	8	0	7	109	95	119	10	966	224	72	654	358
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	9	0	8	117	102	128	11	1039	241	77	703	385
RTOR Reduction (vph)	0	8	0	0	61	0	0	14	0	0	50	0
Lane Group Flow (vph)	0	9	0	117	169	0	0	1277	0	77	1038	0
Confl. Peds. (#/hr)	4	4	4	4	4	4	4	4	4	12	12	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	7			8	8	2	2			1	6	
Permitted Phases												6
Actuated Green, G (s)	3.3	13.0	13.0	13.0	13.0	48.7	48.7	48.7	48.7	7.0	60.2	60.2
Effective Green, g (s)	3.8	13.5	13.5	13.5	13.5	49.2	49.2	49.2	49.2	7.5	60.7	60.7
Actuated g/C Ratio	0.04	0.15	0.15	0.15	0.15	0.55	0.55	0.55	0.55	0.08	0.67	0.67
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	59	198	241	1758	1758	148	2158	2158	2158	0.04	c0.32	c0.32
v/s Ratio Prot	c0.01	0.09	0.11	0.09	0.11	c0.40	c0.40	c0.40	c0.40	0.52	0.48	0.48
v/s Ratio Perm	0.16	0.59	0.70	0.59	0.70	0.73	0.73	0.73	0.73	0.52	0.48	0.48
Uniform Delay, d1	41.6	35.7	36.3	35.7	36.3	15.3	15.3	15.3	15.3	39.5	7.1	7.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.06	1.06	1.06	1.06	1.00	1.00	1.00
Incremental Delay, d2	0.5	3.1	7.3	3.1	7.3	1.4	1.4	1.4	1.4	1.5	0.8	0.8
Delay (s)	42.0	38.8	43.6	38.8	43.6	17.7	17.7	17.7	17.7	41.0	7.8	7.8
Level of Service	D	D	D	D	D	B	B	B	B	D	A	A
Approach Delay (s)	42.0		42.0	42.0	42.0	17.7	17.7	17.7	17.7	10.0	10.0	10.0
Approach LOS	D		D	D	D	B	B	B	B	D	B	B

Intersection Summary	
HCM Average Control Delay	17.7
HCM Volume to Capacity ratio	0.68
Actuated Cycle Length (s)	90.0
Intersection Capacity Utilization	77.6%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
4: 47th St. & Martin Luther King Jr Way

Existing AM
1/11/2008

Existing AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	1.00	0.97	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3433	1770	3398	1770	3437	1770	3437	1770	3350	1770	3350
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3433	1770	3398	1770	3437	1770	3437	1770	3350	1770	3350
Volume (vph)	450	533	85	101	677	209	107	567	99	140	496	143
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	469	555	89	105	705	218	111	591	103	146	517	149
RTOR Reduction (vph)	0	14	0	0	32	0	0	16	0	0	28	0
Lane Group Flow (vph)	469	630	0	105	891	0	111	678	0	146	638	0
Confl. Peds. (#/hr)			24			6			28			36
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases												
Actuated Green, G (s)	13.0	30.6		7.9	25.5		8.0	24.4		10.1		26.5
Effective Green, g (s)	12.5	31.6		7.4	26.5		7.5	25.4		9.6		27.5
Actuated g/C Ratio	0.14	0.35		0.08	0.29		0.08	0.28		0.11		0.31
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5		5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	477	1205		146	1001		148	970		189		1024
v/s Ratio Prot	c0.14	0.18		0.06	c0.26		0.06	c0.20		c0.08		0.19
v/c Ratio	0.98	0.52		0.72	0.89		0.75	0.70		0.77		0.62
Uniform Delay, d1	38.6	23.2		40.3	30.4		40.3	28.9		39.1		26.8
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.12		0.82
Incremental Delay, d2	36.5	0.2		13.2	9.5		17.1	4.2		14.6		2.5
Delay (s)	75.2	23.4		53.4	39.9		57.4	33.1		58.3		24.6
Level of Service	E	C		D	D		E	C		E		C
Approach Delay (s)			45.2		41.3			36.4			30.7	
Approach LOS			D		D			D			C	
Intersection Summary												
HCM Average Control Delay	39.1											
HCM Volume to Capacity ratio	0.82											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	78.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & Martin Luther King Jr Way

Existing AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	4.0 4.0 4.0 4.0 4.0 4.0											
Ideal Flow (vphpl)	1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900											
Total Lost time (s)	4.0 4.0 4.0 4.0 4.0 4.0											
Lane Util. Factor	1.00 1.00 1.00 0.95 0.95 0.95 0.95 0.95 0.95 0.95 0.95 0.95											
Frbp, ped/bikes	0.97 0.96 0.96 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00											
Flpb, ped/bikes	0.98 0.94 0.98 0.98 0.98 0.98 0.98 0.98 0.98 0.98 0.98 0.98											
Frt	0.98 0.98 0.98 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00											
Flt Protected	1676 1596 1596 0.88 0.88 0.88 0.88 0.88 0.88 0.88 0.88 0.88											
Satd. Flow (prot)	1364 1419 1419 3137 3137 3137 3137 3137 3137 3137 3137 3137											
Flt Permitted	69 50 23 51 44 72 23 437 80 41 419 28											
Satd. Flow (perm)	0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90											
Volume (vph)	77 56 26 57 49 80 26 486 89 46 466 31											
Peak-hour factor, PHF	0 15 0 0 53 0 0 31 0 0 10 0											
Adj. Flow (vph)	0 144 0 0 133 0 0 570 0 0 533 0											
RTOR Reduction (vph)	100 100 100 100 100 100 100 100 100 100 100 100											
Lane Group Flow (vph)	100 100 100 100 100 100 100 100 100 100 100 100											
Conf. Ped. (#/hr)	Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm											
Turn Type	Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm											
Protected Phases	4 8 8 2 2 2 2 2 2 2 2 2											
Permitted Phases	4 8 8 2 2 2 2 2 2 2 2 2											
Actuated Green, G (s)	15.0 15.0 15.0 22.0 22.0 22.0 22.0 22.0 22.0 22.0 22.0 22.0											
Effective Green, g (s)	0.33 0.33 0.33 0.49 0.49 0.49 0.49 0.49 0.49 0.49 0.49 0.49											
Actuated g/C Ratio	4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0 4.0											
Clearance Time (s)	455 473 473 1534 1534 1534 1534 1534 1534 1534 1534 1534											
Vehicle Extension (s)	c0.11 0.09 0.09 0.37 0.37 0.37 0.37 0.37 0.37 0.37 0.37 0.37											
Lane Grip Cap (vph)	0.32 0.28 0.28 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97 0.97											
v/s Ratio Prot	11.2 11.0 11.0 7.2 7.2 7.2 7.2 7.2 7.2 7.2 7.2 7.2											
v/s Ratio Perm	1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00											
v/c Ratio	1.8 1.5 1.5 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7 0.7											
Uniform Delay, d1	13.0 12.5 12.5 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9											
Progression Factor	B B B A A A A A A A A A											
Incremental Delay, d2	13.0 12.5 12.5 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9											
Delay (s)	B B B A A A A A A A A A											
Level of Service	B B B A A A A A A A A A											
Approach Delay (s)	13.0 12.5 12.5 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9 7.9											
Approach LOS	B B B A A A A A A A A A											
Intersection Summary												
HCM Average Control Delay	9.0 HCM Level of Service A											
HCM Volume to Capacity ratio	0.35											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	60.5% ICU Level of Service B											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

Existing AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	4.0 4.0 4.0 4.0 4.0 4.0											
Ideal Flow (vphpl)	1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900 1900											
Total Lost time (s)	4.0 4.0 4.0 4.0 4.0 4.0											
Lane Util. Factor	1.00 1.00 1.00 0.95 0.95 0.95 0.95 0.95 0.95 0.95 0.95 0.95											
Frbp, ped/bikes	0.96 0.96 0.96 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00											
Flpb, ped/bikes	0.97 0.96 0.96 0.98 0.98 0.98 0.98 0.98 0.98 0.98 0.98 0.98											
Frt	0.96 0.96 0.96 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00 1.00											
Flt Protected	1641 1659 1659 3456 3456 3456 3456 3456 3456 3456 3456 3456											
Satd. Flow (prot)	1371 1422 1422 3135 3135 3135 3135 3135 3135 3135 3135 3135											
Flt Permitted	51 74 52 26 57 36 22 910 45 61 966 83											
Satd. Flow (perm)	0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90 0.90											
Volume (vph)	57 82 58 29 63 40 24 1011 50 68 1073 92											
Peak-hour factor, PHF	0 24 0 0 26 0 0 2 0 0 0 0 0											
Adj. Flow (vph)	0 173 0 0 106 0 0 1083 0 0 1227 0											
RTOR Reduction (vph)	100 100 100 100 100 100 100 100 100 100 100 100											
Lane Group Flow (vph)	100 100 100 100 100 100 100 100 100 100 100 100											
Conf. Ped. (#/hr)	Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm											
Turn Type	Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm Perm											
Protected Phases	4 4 4 4 4 4 4 4 4 4 4 4											
Permitted Phases	4 4 4 4 4 4 4 4 4 4 4 4											
Actuated Green, G (s)	13.1 13.1 13.1 62.9 62.9 62.9 62.9 62.9 62.9 62.9 62.9 62.9											
Effective Green, g (s)	0.16 0.16 0.16 0.75 0.75 0.75 0.75 0.75 0.75 0.75 0.75 0.75											
Actuated g/C Ratio	4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5 4.5											
Clearance Time (s)	2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0 2.0											
Vehicle Extension (s)	219 228 228 2338 2338 2338 2338 2338 2338 2338 2338 2338											
Lane Grip Cap (vph)	c0.13 0.07 0.07 0.35 0.35 0.35 0.35 0.35 0.35 0.35 0.35 0.35											
v/s Ratio Prot	0.79 0.46 0.46 0.46 0.46 0.46 0.46 0.46 0.46 0.46 0.46 0.46											
v/s Ratio Perm	34.3 32.4 32.4 4.2 4.2 4.2 4.2 4.2 4.2 4.2 4.2 4.2											
Uniform Delay, d1	1.00 1.00 1.00 1.50 1.50 1.50 1.50 1.50 1.50 1.50 1.50 1.50											
Progression Factor	15.8 15.8 15.8 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5 0.5											
Incremental Delay, d2	50.1 32.9 32.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9											
Delay (s)	D D D C C C C C C C C C											
Level of Service	D D D C C C C C C C C C											
Approach Delay (s)	50.1 32.9 32.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9 6.9											
Approach LOS	D D D C C C C C C C C C											
Intersection Summary												
HCM Average Control Delay	10.3 HCM Level of Service B											
HCM Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	85.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	87.2% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

Existing AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.98	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.99	1.00	1.00	0.98	1.00	0.99
Flt	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fit Protected	1730	3474	1756	3474	1766	3474	1766	1819	1733	1841	1733
Satd. Flow (prot)	0.33	1.00	0.48	1.00	0.62	1.00	0.62	1.00	0.63	1.00	0.63
Fit Permitted	606	3474	879	3474	1145	1819	1145	1819	1154	1841	1154
Satd. Flow (perm)	19	291	35	25	437	39	82	159	23	85	187
Volume (vph)	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Peak-hour factor, PHF	21	320	38	27	480	43	90	175	25	93	205
Adj. Flow (vph)	0	11	0	0	9	0	0	7	0	0	3
RTOR Reduction (vph)	21	347	0	27	514	0	90	183	0	93	218
Lane Group Flow (vph)	30	12	12	30	6	54	54	54	54	54	6
Confl. Peds. (#/hr)	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Turn Type	4	4	4	4	4	4	4	4	4	4	4
Protected Phases	8	8	8	8	8	8	8	8	8	8	8
Permitted Phases	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Actuated Green, G (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Effective Green, g (s)	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Actuated g/C Ratio	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Clearance Time (s)	174	999	253	999	701	1114	701	1114	707	1128	707
Lane Grp Cap (vph)	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10	0.10
v/s Ratio Prot	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
v/s Ratio Perm	0.12	0.35	0.11	0.51	0.13	0.17	0.13	0.17	0.13	0.19	0.19
v/c Ratio	21.0	22.6	20.9	23.8	6.5	6.7	6.5	6.7	6.5	6.8	6.8
Uniform Delay, d1	1.00	1.00	0.91	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.4	1.0	0.8	1.9	0.4	0.3	0.4	0.3	0.4	0.4	0.4
Incremental Delay, d2	22.5	23.5	20.0	25.3	6.9	7.1	6.9	7.1	6.9	7.2	7.2
Delay (s)	C	C	B	C	A	A	A	A	A	A	A
Level of Service	C	C	B	C	A	A	A	A	A	A	A
Approach Delay (s)	23.5	25.1	25.1	25.1	7.0	7.1	7.0	7.1	7.1	7.1	7.1
Approach LOS	C	C	B	C	A	A	A	A	A	A	A
Intersection Summary											
HCM Average Control Delay	17.6										
HCM Volume to Capacity ratio	0.30										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	75.5%										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

Existing AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.99	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.98	1.00	0.95
Flt	1.00	0.98	1.00	0.99	1.00	0.99	1.00	1.00	0.97	1.00	0.97
Fit Protected	1759	3457	1736	3519	1736	3519	1736	3519	1736	3519	1736
Satd. Flow (prot)	0.45	1.00	0.48	1.00	0.48	1.00	0.48	1.00	0.48	1.00	0.48
Fit Permitted	839	3457	871	3519	871	3519	871	3519	871	3519	871
Satd. Flow (perm)	15	361	48	18	429	14	61	100	41	16	66
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	16	380	51	19	452	15	64	105	43	17	69
Adj. Flow (vph)	0	13	0	0	3	0	0	25	0	0	15
RTOR Reduction (vph)	16	418	0	19	464	0	0	187	0	0	97
Lane Group Flow (vph)	18	54	54	18	4	18	4	18	18	18	4
Confl. Peds. (#/hr)	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Turn Type	4	4	4	4	4	4	4	4	4	4	4
Protected Phases	8	8	8	8	8	8	8	8	8	8	8
Permitted Phases	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Actuated Green, G (s)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Effective Green, g (s)	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Actuated g/C Ratio	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	409	1685	425	1716	425	1716	425	1716	425	1716	425
Lane Grp Cap (vph)	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12	0.12
v/s Ratio Prot	0.04	0.25	0.04	0.27	0.04	0.27	0.04	0.27	0.04	0.27	0.04
v/s Ratio Perm	10.7	12.0	10.7	12.1	10.7	12.1	10.7	12.1	10.7	12.1	10.7
Uniform Delay, d1	0.93	1.05	0.93	1.05	0.93	1.05	0.93	1.05	0.93	1.05	0.93
Progression Factor	0.2	0.2	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4	0.2
Incremental Delay, d2	10.1	12.9	15.4	18.0	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Delay (s)	B	B	B	B	B	B	B	B	B	B	B
Level of Service	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	12.8	17.9	17.9	17.9	6.2	6.2	6.2	6.2	6.2	6.2	6.2
Approach LOS	B	B	B	B	A	A	A	A	A	A	A
Intersection Summary											
HCM Average Control Delay	13.8										
HCM Volume to Capacity ratio	0.22										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	51.8%										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & Martin Luther King Jr Way

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99
Satd. Flow (prot)	1758	3499	1727	3453	1727	3453	3395	3395	3434	3434	3434	3434	3434
Flt Permitted	0.47	1.00	0.50	1.00	0.50	1.00	0.91	0.91	0.80	0.80	0.80	0.80	0.80
Satd. Flow (perm)	869	3499	904	3453	904	3453	3093	3093	2788	2788	2788	2788	2788
Volume (vph)	31	369	22	54	373	58	31	248	69	71	212	29	29
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	32	384	23	56	389	60	32	258	72	74	221	30	30
RTOR Reduction (vph)	0	5	0	0	15	0	0	27	0	0	10	0	0
Lane Group Flow (vph)	32	402	0	56	434	0	0	335	0	0	315	0	0
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22	22
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	6	6	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	6	6	6	6	6
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp. Cap (vph)	445	1793	463	1770	463	1770	1199	1199	1080	1080	1080	1080	1080
v/s Ratio Prot	0.11	0.11	0.11	0.13	0.13	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
v/s Ratio Perm	0.07	0.22	0.12	0.25	0.25	0.28	0.28	0.28	0.29	0.29	0.29	0.29	0.29
Uniform Delay, d1	9.9	10.7	10.1	10.9	10.9	16.8	16.8	16.8	16.9	16.9	16.9	16.9	16.9
Progression Factor	1.33	1.43	1.00	1.00	1.00	0.70	0.70	0.70	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.3	0.5	0.3	0.3	0.6	0.6	0.6	0.7	0.7	0.7	0.7	0.7
Delay (s)	13.4	15.7	10.7	11.2	11.2	12.4	12.4	12.4	17.6	17.6	17.6	17.6	17.6
Level of Service	B	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	15.5	15.5	11.1	11.1	11.1	12.4	12.4	12.4	17.6	17.6	17.6	17.6	17.6
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B	B

Intersection Summary	
HCM Average Control Delay	13.9 HCM Level of Service B
HCM Volume to Capacity ratio	0.27
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	100.0% ICU Level of Service F
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

Existing AM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	440	59	101	472	0	0
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	484	65	111	519	0	0
Pedestrians					266	
Lane Width (ft)					0.0	
Walking Speed (ft/s)					4.0	
Percent Blockage					0	
Right turn flare (veh)					None	
Median type					None	
Median storage (veh)					487	
Upstream signal (ft)	673					
pX, platoon unblocked					0.99	
vC, conflicting volume		814			1263	540
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol		814			1257	540
IC, single (s)		4.1			6.8	6.9
IC, 2 stage (s)						
IF (s)		2.2			3.5	3.3
p0 queue free %		86			100	100
cM capacity (veh/h)		809			140	486
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	
Volume Total	322	226	111	259	259	
Volume Left	0	0	111	0	0	
Volume Right	0	65	0	0	0	
cSH	1700	1700	809	1700	1700	
Volume to Capacity	0.19	0.13	0.14	0.15	0.15	
Queue Length 95th (ft)	0	0	12	0	0	
Control Delay (s)	0.0	0.0	10.2	0.0	0.0	
Lane LOS			B			
Approach Delay (s)	0.0	0.0	1.8			
Approach LOS			B			

Intersection Summary	
Average Delay	1.0
Intersection Capacity Utilization	27.1% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 11: 40th St. & BART parking

Existing AM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	427	13	0	573	0	18
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	459	14	0	616	0	19
Pedestrians	123	123	123	123	123	123
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	10	10	10	10	10	10
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	754			406		
pX, platoon unblocked						0.92
VC, conflicting volume	596			897		483
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	596			801		483
IC, single (s)	4.1			6.8		6.9
IC, 2 stage (s)						
tF (s)	2.2			3.5		3.3
p0 queue free %	100			100		95
cM capacity (veh/h)	876			266		427
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	306	167	308	308	19	19
Volume Left	0	0	0	0	0	0
Volume Right	0	14	0	0	19	19
cSH	1700	1700	1700	1700	427	427
Volume to Capacity	0.18	0.10	0.18	0.18	0.05	0.05
Queue Length 95th (ft)	0	0	0	0	4	4
Control Delay (s)	0.0	0.0	0.0	0.0	13.8	13.8
Lane LOS					B	B
Approach Delay (s)	0.0	0.0	0.0	13.8		
Approach LOS				B		
Intersection Summary						
Average Delay	0.2			0.2		
Intersection Capacity Utilization	35.7%			35.7%		
Analysis Period (min)	15			15		
ICU Level of Service	A			A		

HCM Unsignalized Intersection Capacity Analysis
 12: 40th St. & BART parking

Existing AM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	442	3	0	573	0	54
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	460	3	0	597	0	56
Pedestrians	123	123	123	123	123	123
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	10	10	10	10	10	10
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	971			189		
pX, platoon unblocked						0.90
VC, conflicting volume	587			883		478
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	587			755		478
IC, single (s)	4.1			6.8		6.9
IC, 2 stage (s)						
tF (s)	2.2			3.5		3.3
p0 queue free %	100			100		87
cM capacity (veh/h)	884			277		430
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	307	157	298	298	56	56
Volume Left	0	0	0	0	0	0
Volume Right	0	3	0	0	56	56
cSH	1700	1700	1700	1700	430	430
Volume to Capacity	0.18	0.09	0.18	0.18	0.13	0.13
Queue Length 95th (ft)	0	0	0	0	11	11
Control Delay (s)	0.0	0.0	0.0	0.0	14.6	14.6
Lane LOS					B	B
Approach Delay (s)	0.0	0.0	0.0	14.6		
Approach LOS				B		
Intersection Summary						
Average Delay	0.7			0.7		
Intersection Capacity Utilization	35.7%			35.7%		
Analysis Period (min)	15			15		
ICU Level of Service	A			A		

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave.

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	0.96	1.00	0.97	1.00	0.99	1.00	1.00	1.00	1.00	0.97
Frbp, ped/bikes	0.93	1.00	0.92	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.97
Flt	1.00	0.97	1.00	0.98	1.00	0.99	1.00	0.99	1.00	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1650	3317	1633	3367	1770	3464	1770	3464	1770	3334	1770
Flt Permitted	0.30	1.00	0.30	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	520	3317	517	3367	1770	3464	1770	3464	1770	3334	1770
Volume (vph)	82	335	79	43	351	64	80	402	33	78	507
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	91	372	88	48	390	71	89	447	37	87	563
RTOR Reduction (vph)	0	28	0	0	20	0	0	5	0	0	21
Lane Group Flow (vph)	91	432	0	48	441	0	89	479	0	87	702
Confl. Peds. (#/hr)	72	137	137	72	137	72	137	137	72	137	137
Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	8	8	8	8	8	8	8	8	8	8
Permitted Phases	4	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6	16.6
Effective Green, g (s)	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1	17.1
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	105	667	104	677	165	1960	165	1960	162	1883	162
v/s Ratio Prot	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.17	0.65	0.46	0.65	0.54	0.24	0.54	0.24	0.54	0.37	0.37
Uniform Delay, d1	32.8	31.2	29.9	31.2	36.8	9.3	36.8	9.3	36.9	10.2	36.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.49	1.00	1.49	1.33	0.70	1.33
Incremental Delay, d2	46.8	1.6	1.2	1.7	1.6	0.3	1.6	0.3	1.6	0.5	1.6
Delay (s)	79.7	32.8	31.1	32.9	27.4	14.1	27.4	14.1	50.5	7.7	50.5
Level of Service	E	C	C	C	C	B	C	B	D	A	A
Approach Delay (s)	40.6	32.8	32.8	32.8	32.8	16.2	32.8	16.2	12.3	12.3	12.3
Approach LOS	D	C	C	C	C	B	C	B	B	B	B

Intersection Summary	
HCM Average Control Delay	23.8
HCM Level of Service	C
HCM Volume to Capacity ratio	0.51
Actuated Cycle Length (s)	85.0
Sum of lost time (s)	12.0
Intersection Capacity Utilization	58.5%
ICU Level of Service	B
Analysis Period (min)	15

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
 14: Apgar St. & Telegraph Ave.

Existing AM
 1/11/2008

Movement	EBL	EBR	NBL	NBT	SBL	SBR
Lane Configurations	W	W	W	W	W	W
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	5	16	41	544	585	27
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	6	18	46	604	650	30
Pedestrians	100	100	100	100	100	100
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	8	8	8	8	8	8
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	0.97	0.97	0.97	0.97	0.97	0.97
Upstream signal (ft)	1258	540	780	780	780	780
pX, platoon unblocked	129	425	765	765	765	765
VC, conflicting volume	1235	493	741	741	741	741
VC1, stage 1 cont vol	6.8	6.9	4.1	4.1	4.1	4.1
VC2, stage 2 cont vol	3.5	3.3	2.2	2.2	2.2	2.2
vCu, unblocked vol	96	96	94	94	94	94
IC, 2 stage (s)	129	425	765	765	765	765
IF (s)	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
cM capacity (veh/h)	23	46	302	302	433	247
Volume Total	6	46	0	0	0	0
Volume Left	18	0	0	0	0	30
Volume Right	275	765	1700	1700	1700	1700
cSH	0.08	0.06	0.18	0.18	0.25	0.15
Volume to Capacity	7	5	0	0	0	0
Queue Length 95th (ft)	19.3	10.0	0.0	0.0	0.0	0.0
Control Delay (s)	C	B	C	B	C	B
Lane LOS	C	B	C	B	C	B
Approach Delay (s)	19.3	0.7	0.0	0.0	0.0	0.0
Approach LOS	C	B	C	B	C	B

Intersection Summary	
Average Delay	0.7
Intersection Capacity Utilization	43.7%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

Existing AM
 1/11/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	Free	Free	Free	Free
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	11	34	551	9	15	583
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	38	612	10	17	648
Pedestrians	34	33				34
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	3	3				3
Right turn flare (veh)	None					
Median type	None					
Median storage (veh)			230			791
Upstream signal (ft)	0.97	0.97				0.97
pX, platoon unblocked						
VC, conflicting volume	1041	379				656
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	1015	335				620
IC, single (s)	6.8	6.9				4.1
IC, 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	94	94				98
cM capacity (veh/h)	212	607				905
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	50	408	214	17	324	324
Volume Left	12	0	0	17	0	0
Volume Right	38	0	10	0	0	0
cSH	417	1700	1700	905	1700	1700
Volume to Capacity	0.12	0.24	0.13	0.02	0.19	0.19
Queue Length 95th (ft)	10	0	0	1	0	0
Control Delay (s)	14.8	0.0	0.0	9.1	0.0	0.0
Lane LOS	B	A	A	A	A	A
Approach Delay (s)	14.8	0.0	0.2			
Approach LOS	B	A	A			

Intersection Summary		
Average Delay	0.7	
Intersection Capacity Utilization	33.4%	ICU Level of Service A
Analysis Period (min)	15	

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	1.00	0.97	1.00	0.98	1.00	0.99	1.00	1.00	1.00
Frt	0.99	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.99	1.00	1.00	1.00
Flt Protected	0.99	0.95	1.00	0.99	0.99	1.00	0.99	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4983	1753	3416	1774	3416	1774	1774	1774	1774	1724	1842	1842
Flt Permitted	0.88	0.53	1.00	0.88	0.53	1.00	0.88	0.53	1.00	0.44	1.00	1.00
Satd. Flow (perm)	4407	985	3416	1586	3416	1586	1586	1586	1586	807	1842	1842
Volume (vph)	34	263	25	50	262	66	58	171	49	64	185	12
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	286	27	54	285	72	63	186	53	70	201	13
RTOR Reduction (vph)	0	10	0	0	26	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	340	0	54	331	0	0	293	0	70	211	0
Conf. Peds. (#/hr)	24	18	18	24	24	24	24	48	48	48	48	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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
Lane Grp Cap (vph)	2696	603	2090	466						237		542
v/s Ratio Prot		0.05		c0.10						0.09		0.11
v/s Ratio Perm	0.08	0.13	0.09	0.16	0.09	0.16	0.63	0.30	0.30	0.39	0.30	0.39
Uniform Delay, d1	6.9	6.8	7.1	26.0	6.8	7.1	23.2	23.9	23.9	23.9	23.9	23.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3	0.2	6.3	0.3	0.2	3.2	3.2	3.2	3.2	3.2	3.2
Delay (s)	7.0	7.1	7.3	32.3	7.1	7.3	26.3	26.0	26.0	26.0	26.0	26.0
Level of Service	A	A	A	C	A	A	C	C	C	C	C	C
Approach Delay (s)	7.0	7.2	7.2	32.3	7.2	7.2	26.1	26.1	26.1	26.1	26.1	26.1
Approach LOS	A	A	A	C	A	A	C	C	C	C	C	C

Intersection Summary		
HCM Average Control Delay	16.8	HCM Level of Service B
HCM Volume to Capacity ratio	0.31	
Actuated Cycle Length (s)	85.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	92.5%	ICU Level of Service F
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5050	4990	4990	4990	4990	4990	4990	4990	4990	4990	4990
Flt Permitted	0.90	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Satd. Flow (perm)	4563	4418	4418	4418	4418	4418	4418	4418	4418	4418	4418
Volume (vph)	25	367	7	33	323	32	30	166	50	23	105
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	399	8	36	351	35	33	180	54	25	114
RTOR Reduction (vph)	0	2	0	0	12	0	0	13	0	0	4
Lane Group Flow (vph)	0	432	0	0	410	0	33	221	0	25	121
Confl. Peds. (#/hr)	18	18	18	18	18	18	18	18	18	18	18
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2937	2844	2844	2844	2844	2844	2844	2844	2844	2844	2844
v/s Ratio Prot											
v/s Ratio Perm	c0.09	0.09	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03	0.03
v/c Ratio	0.15	0.14	0.11	0.11	0.48	0.11	0.48	0.11	0.11	0.26	0.26
Uniform Delay, d1	5.6	5.6	22.7	25.3	22.8	23.7	22.8	23.7	22.8	23.7	23.7
Progression Factor	1.00	1.00	0.78	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	0.7	3.6	1.0	1.3	1.0	1.3	1.0	1.3	1.3
Delay (s)	5.7	4.5	23.4	28.9	24.2	25.2	24.2	25.2	24.2	25.2	25.2
Level of Service	A	A	C	C	C	C	C	C	C	C	C
Approach Delay (s)	5.7	4.5	28.2	28.2	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Approach LOS	A	A	C	C	C	C	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	12.3
HCM Level of Service	B
HCM Volume to Capacity ratio	0.24
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	50.1%
ICU Level of Service	A
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & Martin Luther King Jr Way

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5002	4827	4827	4827	4827	4827	4827	4827	4827	4827	4827
Flt Permitted	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Satd. Flow (perm)	4253	4193	4193	4193	4193	4193	4193	4193	4193	4193	4193
Volume (vph)	43	378	28	48	369	156	15	154	25	53	198
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	47	411	30	52	401	170	16	167	27	58	215
RTOR Reduction (vph)	0	9	0	0	61	0	0	14	0	0	4
Lane Group Flow (vph)	0	479	0	0	562	0	0	196	0	0	283
Confl. Peds. (#/hr)	17	17	17	17	17	17	17	17	17	17	17
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2738	2699	2699	2699	2699	2699	2699	2699	2699	2699	2699
v/s Ratio Prot											
v/s Ratio Perm	0.11	0.11	c0.13	0.21	0.24	0.24	0.24	0.24	0.24	0.24	0.24
v/c Ratio	0.17	0.17	0.17	0.21	0.21	0.21	0.21	0.21	0.21	0.21	0.21
Uniform Delay, d1	5.7	5.7	5.9	5.9	23.6	24.5	23.6	24.5	23.6	24.5	24.5
Progression Factor	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	0.2	0.2	0.7	0.7	0.2	0.7	0.2	0.7	0.7
Delay (s)	4.7	4.7	6.0	6.0	24.3	24.3	6.0	24.3	6.0	24.3	24.3
Level of Service	A	A	A	A	C	C	A	C	A	C	C
Approach Delay (s)	4.7	4.7	6.0	6.0	24.3	24.3	6.0	24.3	6.0	24.3	24.3
Approach LOS	A	A	A	A	C	C	A	C	A	C	C

Intersection Summary	
HCM Average Control Delay	9.0
HCM Level of Service	A
HCM Volume to Capacity ratio	0.25
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.4%
ICU Level of Service	E
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

Existing AM
 1/11/2008

Movement	EBL	EBT	WBT	WBR	SBL	SBR					
Lane Configurations	Free	Free	Free	Free	Stop	Stop					
Sign Control	Free	Free	Free	Free	Stop	Stop					
Grade	0%	0%	0%	0%	0%	0%					
Volume (veh/h)	0	469	414	32	0	153					
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90					
Hourly flow rate (vph)	0	521	460	36	0	170					
Pedestrians	98				98						
Lane Width (ft)	12.0				12.0						
Walking Speed (ft/s)	4.0				4.0						
Percent Blockage	8				8						
Right turn flare (veh)					None						
Median type					None						
Median storage (veh)											
Upstream signal (ft)	698	473									
pX, platoon unblocked											
VC, conflicting volume	594				732	349					
VC1, stage 1 cont vol											
VC2, stage 2 cont vol											
vCu, unblocked vol	594				732	349					
IC, single (s)	4.1				6.8	6.9					
IC, 2 stage (s)											
tF (s)	2.2				3.5	3.3					
p0 queue free %	100				100	69					
cM capacity (veh/h)	899				327	545					
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	174	174	174	153	153	153	36	170			
Volume Left	0	0	0	0	0	0	0	0			
Volume Right	0	0	0	0	0	0	36	170			
cSH	1700	1700	1700	1700	1700	1700	1700	545			
Volume to Capacity	0.10	0.10	0.10	0.09	0.09	0.09	0.02	0.31			
Queue Length 95th (ft)	0	0	0	0	0	0	0	0			
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.6			
Lane LOS								B			
Approach Delay (s)	0.0			0.0				14.6			
Approach LOS				B				B			

Intersection Summary		
Average Delay	2.1	
Intersection Capacity Utilization	35.2%	ICU Level of Service
Analysis Period (min)	15	A

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	4894	4894	4894	4894	4894	4894	4894	4894	4894	4894	4894
Flt Permitted	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72	0.72
Satd. Flow (perm)	3547	3547	3547	3547	3547	3547	3547	3547	3547	3547	3547
Volume (vph)	73	324	77	79	365	143	40	343	39	101	456
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	79	352	84	86	397	155	43	373	42	110	496
RTOR Reduction (vph)	0	50	0	0	118	0	0	5	0	0	4
Lane Group Flow (vph)	0	465	0	0	520	0	43	410	0	110	543
Conf. Peds. (#/hr)	40		9		40	25		31		31	25
Turn Type	Perm	Perm	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	8				2		6	
Permitted Phases	4							2		6	
Actuated Green, G (s)	18.7			18.7				55.8		55.8	
Effective Green, g (s)	20.2			20.2				56.8		56.8	
Actuated g/C Ratio	0.24			0.24				0.67		0.67	
Clearance Time (s)	5.5			5.5				5.0		5.0	
Vehicle Extension (s)	2.0			2.0				2.0		2.0	
Lane Grp Cap (vph)	843			869				537		2324	
v/s Ratio Prot								0.12			
v/s Ratio Perm	0.13			c0.14				0.05		0.12	
v/c Ratio	0.55			1.00br				0.08		0.18	
Uniform Delay, d1	28.4			28.8				4.9		5.3	
Progression Factor	1.00			1.00				1.24		1.55	
Incremental Delay, d2	0.4			0.7				0.3		0.2	
Delay (s)	28.9			29.5				6.4		8.8	
Level of Service	C			C				A		A	
Approach Delay (s)	28.9			29.5				6.6		9.0	
Approach LOS	C			C				A		A	

Intersection Summary		
HCM Average Control Delay	18.8	HCM Level of Service
HCM Volume to Capacity ratio	0.33	B
Actuated Cycle Length (s)	85.0	Sum of lost time (s)
Intersection Capacity Utilization	69.3%	ICU Level of Service
Analysis Period (min)	15	C

dr Defacto Right Lane. Recode with 1 though lane as a right lane.
 c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.88	0.88	0.95	0.95	0.95	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.92	0.92	1.00	0.94	0.94	0.94
Frt	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.85	1.00	0.94	0.94	0.94
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	1.00	0.97	0.97	0.97
Satd. Flow (prot)	5048	4927	4927	4927	4927	4927	1631	1395	1523	1523	1523	1523
Flt Permitted	0.89	0.89	0.89	0.89	0.89	0.89	0.83	0.83	1.00	0.86	0.86	0.86
Satd. Flow (perm)	4497	4497	4497	4497	4497	4497	1420	1395	1349	1349	1349	1349
Volume (vph)	25	460	6	24	565	75	12	1	13	47	1	41
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	27	505	7	26	621	82	13	1	14	52	1	45
RTOR Reduction (vph)	0	2	0	0	20	0	0	0	0	10	0	32
Lane Group Flow (vph)	0	537	0	0	709	0	0	14	4	0	66	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	2	2	6
Permitted Phases	4	8	8	8	8	8	2	2	2	2	2	6
Actuated Green, G (s)	48.0	48.0	48.0	48.0	48.0	48.0	23.0	23.0	23.0	23.0	23.0	23.0
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	2726	2726	2726	2726	2726	2726	417	410	410	396	396	396
v/s Ratio Prot	0.12	0.12	0.12	0.12	0.12	0.12	0.01	0.01	0.00	c0.05	c0.05	c0.05
v/s Ratio Perm	0.20	0.20	0.20	0.20	0.20	0.20	0.03	0.01	0.01	0.17	0.17	0.17
v/c Ratio	7.0	7.4	7.4	7.4	7.4	7.4	20.2	20.0	20.0	21.0	21.0	21.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.2	0.2	0.2	0.2	0.2	0.2	0.1	0.0	0.0	0.9	0.9	0.9
Incremental Delay, d2	7.2	7.6	7.6	7.6	7.6	7.6	20.3	20.1	20.1	21.9	21.9	21.9
Delay (s)	A	A	A	A	A	A	C	C	C	C	C	C
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	7.2	7.6	7.6	7.6	7.6	7.6	20.2	20.2	20.2	21.9	21.9	21.9
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	8.7 HCM Level of Service A											
HCM Volume to Capacity ratio	0.23											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	81.7% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

Existing AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	0.91	0.91
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	0.98
Frt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	1.00	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4943	1770	4735	1770	4735	1770	4943	1770	4981	1770	4981
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4943	1770	4735	1770	4735	1770	4943	1770	4981	1770	4981
Volume (vph)	70	403	54	112	432	253	89	259	42	226	521	64
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	448	60	124	480	281	99	288	47	251	579	71
RTOR Reduction (vph)	0	18	0	0	111	0	0	25	0	0	17	0
Lane Group Flow (vph)	78	490	0	124	650	0	99	311	0	251	633	0
Confl. Peds. (#/hr)	66	66	66	66	66	66	23	23	38	38	38	26
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	4	4	3	4	4	1	2	1	2	1	2
Permitted Phases	3	4	4	3	4	4	1	2	1	2	1	2
Actuated Green, G (s)	10.5	26.5	10.5	26.5	10.5	26.5	9.0	26.0	9.0	26.0	9.0	26.0
Effective Green, g (s)	10.5	27.5	10.5	27.5	10.5	27.5	9.0	27.0	9.0	27.0	9.0	27.0
Actuated g/C Ratio	0.12	0.31	0.12	0.31	0.12	0.31	0.10	0.30	0.10	0.30	0.10	0.30
Clearance Time (s)	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	207	1510	207	1447	207	1447	177	1483	177	1494	177	1494
v/s Ratio Prot	0.04	0.10	0.04	0.10	0.04	0.10	0.06	0.06	0.06	0.14	0.14	0.13
v/s Ratio Perm	0.38	0.32	0.38	0.32	0.38	0.32	0.56	0.21	0.56	0.21	0.56	0.21
v/c Ratio	36.7	24.1	37.8	25.2	38.6	23.5	40.5	25.3	40.5	25.3	40.5	25.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.4	0.6	0.4	0.6	0.4	0.6	0.2	0.3	0.2	0.3	0.2	0.3
Incremental Delay, d2	37.1	24.7	39.2	26.5	40.8	23.8	258.4	26.1	258.4	26.1	258.4	26.1
Delay (s)	D	C	D	D	D	D	D	C	D	C	F	C
Level of Service	D	C	D	D	D	D	D	C	D	C	F	C
Approach Delay (s)	26.3	26.3	26.3	26.3	26.3	26.3	49.8	27.7	49.8	27.7	90.9	27.7
Approach LOS	C	C	C	C	C	C	D	C	D	C	F	C
Intersection Summary												
HCM Average Control Delay	54.7 HCM Level of Service D											
HCM Volume to Capacity ratio	0.58											
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	72.9% ICU Level of Service C											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
23: 34th St & Telegraph Ave.

Existing AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	0.93	0.95	0.96	0.91	1.00	0.92	1.00	0.98	1.00	0.95	1.00
Ftbp, ped/bikes	0.97	0.95	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.95
Flt Protected	0.98	0.99	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1568	1599	1599	1602	3484	1631	3432	1631	3432	1631	3432
Flt Permitted	0.76	0.90	0.90	0.90	1.00	0.44	1.00	0.44	1.00	0.44	1.00
Satd. Flow (perm)	1205	1455	1455	1455	3484	762	3432	762	3432	762	3432
Volume (vph)	25	19	26	25	34	38	54	488	24	22	352
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	21	28	27	37	41	59	530	26	24	383
RTOR Reduction (vph)	0	26	0	0	35	0	0	2	0	0	4
Lane Group Flow (vph)	0	50	0	0	70	0	59	554	0	24	417
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	6	6
Actuated Green, G (s)	7.2	7.2	7.2	7.2	7.2	7.2	70.8	70.8	70.8	70.8	70.8
Effective Green, g (s)	6.7	6.7	6.7	6.7	6.7	6.7	70.3	70.3	70.3	70.3	70.3
Actuated g/C Ratio	0.08	0.08	0.08	0.08	0.08	0.08	0.83	0.83	0.83	0.83	0.83
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	95	115	115	115	705	2881	630	2838	630	2838	2838
v/s Ratio Prot							c0.16				0.12
v/s Ratio Perm	0.04	0.05	0.07	0.07	0.07	0.07	0.03	0.03	0.03	0.03	0.12
v/c Ratio	0.53	0.61	0.61	0.61	0.08	0.19	0.04	0.15	0.04	0.15	0.15
Uniform Delay, d1	37.6	37.9	37.9	37.9	1.4	1.5	1.3	1.4	1.3	1.4	1.4
Progression Factor	1.00	1.00	1.00	1.00	0.45	0.43	0.40	0.37	0.40	0.37	0.37
Incremental Delay, d2	2.4	6.1	6.1	6.1	0.2	0.1	0.1	0.1	0.1	0.1	0.1
Delay (s)	40.1	44.0	44.0	44.0	0.8	0.8	0.6	0.6	0.6	0.6	0.6
Level of Service	D	D	D	D	A	A	A	A	A	A	A
Approach Delay (s)	40.1	44.0	44.0	44.0	0.8	0.8	0.6	0.6	0.6	0.6	0.6
Approach LOS	D	D	D	D	A	A	A	A	A	A	A
Intersection Summary											
HCM Average Control Delay	6.8										
HCM Volume to Capacity ratio	0.23										
Actuated Cycle Length (s)	85.0										
Intersection Capacity Utilization	54.6%										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
24: 27th St & Telegraph Ave.

Existing AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.97	1.00	1.00	0.94	1.00	0.99	1.00	0.95	1.00	0.95
Ftbp, ped/bikes	1.00	1.00	1.00	1.00	0.96	1.00	0.99	1.00	0.99	1.00	0.95
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3330	1770	3213	1770	3213	1642	3461	1673	3195	1673
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.42	1.00	0.51	1.00	0.51
Satd. Flow (perm)	1770	3330	1770	3213	1770	3213	732	3461	897	3195	897
Volume (vph)	255	350	97	50	270	96	58	311	30	35	318
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	283	389	108	56	300	107	64	346	33	39	353
RTOR Reduction (vph)	0	28	0	0	47	0	0	7	0	0	48
Lane Group Flow (vph)	283	469	0	56	360	0	64	372	0	39	462
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	4	3	8	8	2	2	2	6	6
Permitted Phases	7	4	4	3	8	8	2	2	2	6	6
Actuated Green, G (s)	16.5	26.6	26.6	4.9	15.0	40.0	40.0	40.0	40.0	40.0	40.0
Effective Green, g (s)	17.0	26.1	26.1	5.4	14.5	41.5	41.5	41.5	41.5	41.5	41.5
Actuated g/C Ratio	0.20	0.31	0.31	0.06	0.17	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	354	1023	354	112	548	357	1690	438	1560	438	1560
v/s Ratio Prot	c0.16	0.14	0.14	0.03	c0.11	0.09	0.11	0.09	0.11	0.09	c0.14
v/s Ratio Perm	0.80	0.46	0.46	0.50	0.66	0.18	0.22	0.09	0.30	0.09	0.30
Uniform Delay, d1	32.4	23.8	23.8	38.5	32.9	12.2	12.5	11.6	13.0	11.6	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.2	0.1	0.1	1.3	2.2	1.1	0.3	0.4	0.5	0.4	0.5
Delay (s)	43.6	23.9	23.9	39.8	35.1	13.3	12.8	8.5	9.8	8.5	9.8
Level of Service	D	C	C	D	D	B	B	A	A	A	A
Approach Delay (s)	31.0	31.0	31.0	35.7	35.7	12.8	12.8	9.7	9.7	9.7	9.7
Approach LOS	C	C	C	D	D	B	B	A	A	A	A
Intersection Summary											
HCM Average Control Delay	23.1										
HCM Volume to Capacity ratio	0.48										
Actuated Cycle Length (s)	85.0										
Intersection Capacity Utilization	72.2%										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 1: 52nd Street & Shattuck Avenue

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	12	12	12	12	16	16	16	16	16	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	0.99	1.00	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt	1.00	0.98	1.00	1.00	0.98	1.00	0.98	0.99	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1770	4938	1751	4971	2007	1943	1943	1943	1943	1943	1943	1943	
Flt Permitted	0.95	1.00	0.29	1.00	0.29	1.00	0.80	0.80	0.80	0.80	0.80	0.80	
Satd. Flow (perm)	1770	4938	527	4971	1254	1579	1579	1579	1579	1579	1579	1579	
Volume (vph)	322	1226	163	80	988	138	165	225	79	133	256	259	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	339	1291	172	84	1008	145	174	237	83	140	269	273	
RTOR Reduction (vph)	0	24	0	0	27	0	0	10	0	0	52	0	
Lane Group Flow (vph)	339	1439	0	84	1126	0	0	484	0	0	630	0	
Confl. Peds. (#/hr)	32	32	4	12	4	12	24	24	24	24	12	12	
Parking (#/hr)													
Turn Type	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	7	4		8			2				6		
Permitted Phases													
Actuated Green, G (s)	18.0	36.0	14.0	14.0	27.5	27.5	27.5	27.5	27.5	27.5	27.5	27.5	
Effective Green, g (s)	18.0	36.0	14.0	14.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	28.0	
Actuated g/C Ratio	0.26	0.51	0.20	0.20	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	
Clearance Time (s)	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Lane Grp Cap (vph)	455	2540	105	994	502	632	632	632	632	632	632	632	
v/s Ratio Prot	c0.19	0.29		c0.23			0.39				c0.40		
v/s Ratio Perm	0.75	0.57	0.80	1.13	0.96	1.00	0.96	0.96	0.96	0.96	1.00	1.00	
Uniform Delay, d1	23.9	11.7	26.7	28.0	20.5	21.0	21.0	21.0	21.0	21.0	21.0	21.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	10.6	0.9	45.5	72.4	32.4	35.2	35.2	35.2	35.2	35.2	35.2	35.2	
Delay (s)	34.5	12.6	72.2	100.4	52.9	56.2	56.2	56.2	56.2	56.2	56.2	56.2	
Level of Service	C	B	E	F	D	E	E	E	E	E	E	E	
Approach Delay (s)	16.7		98.5		52.9	56.2	56.2	56.2	56.2	56.2	56.2	56.2	
Approach LOS	B		F		D	E	E	E	E	E	E	E	
Intersection Summary													
HCM Average Control Delay	51.3											HCM Level of Service	D
HCM Volume to Capacity ratio	0.95												
Actuated Cycle Length (s)	70.0											Sum of lost time (s)	10.0
Intersection Capacity Utilization	93.5%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 2: 52nd Street & Telegraph Ave.

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	1.00	0.95	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt	0.92	1.00	0.92	1.00	0.92	1.00	0.97	1.00	0.95	1.00	0.95	1.00	
Flt Protected	0.98	0.95	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1670	1681	1573	3373	3373	1770	3190	3190	3190	1770	3190	3190	
Flt Permitted	0.48	0.73	1.00	0.94	0.94	0.95	1.00	1.00	0.95	1.00	1.00	1.00	
Satd. Flow (perm)	814	1296	1573	3176	3176	1770	3190	3190	3190	1770	3190	3190	
Volume (vph)	12	3	21	98	102	118	10	984	279	98	784	388	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	13	3	22	103	107	124	11	1036	294	103	825	419	
RTOR Reduction (vph)	0	21	0	0	45	0	0	19	0	0	49	0	
Lane Group Flow (vph)	0	17	0	103	186	0	0	1322	0	103	1195	0	
Confl. Peds. (#/hr)	36			36	48			16	16	16	16	48	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	7			8			2				1		
Permitted Phases													
Actuated Green, G (s)	5.1	15.4	15.4	52.8	52.8	52.8	52.8	52.8	52.8	52.8	52.8	52.8	
Effective Green, g (s)	5.6	15.9	15.9	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	53.3	
Actuated g/C Ratio	0.06	0.16	0.16	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	46	206	250	1693	1693	163	2121	2121	2121	163	2121	2121	
v/s Ratio Prot	c0.02	0.08	0.12	c0.42	c0.42	c0.06	c0.37				c0.37		
v/s Ratio Perm	0.37	0.50	0.74	0.78	0.78	0.63	0.56				0.56		
Uniform Delay, d1	45.5	38.4	40.1	18.7	18.7	43.8	9.0	9.0	9.0	9.0	9.0	9.0	
Progression Factor	1.00	1.00	1.00	0.79	0.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.9	0.7	9.9	2.0	2.0	5.8	1.1	1.1	1.1	1.1	1.1	1.1	
Delay (s)	47.4	39.1	50.0	16.9	16.9	49.5	10.1	10.1	10.1	10.1	10.1	10.1	
Level of Service	D	D	D	B	B	D	B	B	B	D	B	B	
Approach Delay (s)	47.4		46.7	16.9	16.9	13.1	13.1	13.1	13.1	13.1	13.1	13.1	
Approach LOS	D		D	B	B	D	B	B	B	D	B	B	
Intersection Summary													
HCM Average Control Delay	18.8											HCM Level of Service	B
HCM Volume to Capacity ratio	0.73												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	98.5%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
3: 51st St & Telegraph Ave.

Existing PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3463	1770	3340	1770	3395	1770	3395	1770	3416	1770	3416
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3463	1770	3340	1770	3395	1770	3395	1770	3416	1770	3416
Volume (vph)	508	822	69	93	468	212	69	575	127	203	654	56
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	535	865	73	98	493	223	73	605	134	214	688	59
RTOR Reduction (vph)	0	6	0	0	52	0	0	19	0	0	7	0
Lane Group Flow (vph)	535	932	0	98	664	0	73	720	0	214	740	0
Confl. Peds. (#/hr)	15	48	48	15	123	48	48	48	48	48	123	48
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases												
Actuated Green, G (s)	16.0	30.2	8.0	22.2	7.5	23.2	4.5	33.8	11.5	40.8	11.5	40.8
Effective Green, g (s)	15.5	31.2	7.5	23.2	7.5	23.2	4.5	33.8	11.5	40.8	11.5	40.8
Actuated g/C Ratio	0.16	0.31	0.08	0.23	0.08	0.23	0.04	0.34	0.12	0.41	0.12	0.41
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	532	1080	133	775	80	1148	204	1394	204	1394	204	1394
v/s Ratio Prot	c0.16	c0.27	0.06	0.20	0.04	0.21	c0.12	0.22	c0.12	0.22	c0.12	0.22
v/c Ratio Perm	1.01	0.86	0.74	0.86	0.91	0.63	0.91	0.63	1.05	0.53	1.05	0.53
Uniform Delay, d1	42.2	32.4	45.3	36.8	47.6	27.8	44.2	22.4	44.2	22.4	44.2	22.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.18	0.77	1.18	0.77
Incremental Delay, d2	40.4	7.0	16.6	8.9	70.5	2.6	71.4	1.2	71.4	1.2	71.4	1.2
Delay (s)	82.7	39.4	61.9	45.7	118.0	30.4	123.5	18.5	123.5	18.5	123.5	18.5
Level of Service	F	D	E	D	F	C	F	C	F	B	F	B
Approach Delay (s)	55.1		47.6		36.3		41.9		41.9		41.9	
Approach LOS	E		D		D		D		D		D	
Intersection Summary												
HCM Average Control Delay	47.1											
HCM Volume to Capacity ratio	0.81											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	79.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

Existing PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frt	0.86			0.93			0.93			0.97		0.97
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1611			3295			3295			3433		3440
Flt Permitted	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1611			3118			3118			3433		3440
Volume (vph)	0	0	6	0	0	0	10	280	241	1430	281	64
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	7	0	0	0	11	304	262	1584	305	70
RTOR Reduction (vph)	0	7	0	0	0	0	21	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	556	0	1554	375	0	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	0.0	0.0	13.0	0.0	0.0	13.0	0.0	29.0	29.0	50.0	0.0	50.0
Effective Green, g (s)	0.0	0.0	13.0	0.0	0.0	13.0	0.0	29.0	29.0	50.0	0.0	50.0
Actuated g/C Ratio	0.00	0.00	0.26	0.00	0.00	0.26	0.00	0.58	0.58	1.00	0.00	1.00
Clearance Time (s)			4.0			4.0		4.0	4.0	2.0		2.0
Lane Grp Cap (vph)	0	0	811	0	0	811	0	1991	1991	3440	0	3440
v/s Ratio Prot			c0.18			c0.18		c0.45	c0.45	0.11		0.11
v/c Ratio Perm	0.00	0.00	0.69	0.00	0.00	0.69	0.00	0.78	0.78	0.11	0.00	0.11
Uniform Delay, d1	25.0	25.0	16.7	8.1	0.0	16.7	8.1	8.1	8.1	0.0	1.00	1.00
Progression Factor	1.00	1.00	0.77	1.00	1.00	0.77	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.0	4.5	0.1	0.0	4.5	0.1	3.1	3.1	0.1	0.0	0.1
Delay (s)	25.0	25.0	17.3	8.1	0.0	17.3	8.1	11.2	11.2	0.1	0.0	0.1
Level of Service	C	C	B	B	B	B	B	B	B	A	A	A
Approach Delay (s)	25.0	0.0	17.3	0.0	0.0	17.3	0.0	9.0	9.0	0.0	0.0	0.0
Approach LOS	C		B			B		A	A			A
Intersection Summary												
HCM Average Control Delay	11.0											
HCM Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	50.0											
Intersection Capacity Utilization	69.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																				
Lane Configurations																																
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900																				
Total Lost time (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																				
Lane Util. Factor	1.00	1.00	1.00	0.95	0.98	0.99	0.98	0.99	0.98	0.99	0.99	0.98																				
Frpb, ped/bikes	0.96	0.97	0.96	1.00	0.98	0.99	0.98	0.99	0.98	0.99	0.99	0.98																				
Flpb, ped/bikes	0.96	0.96	0.96	0.98	0.98	0.99	0.98	0.99	0.98	0.99	0.99	0.98																				
Flt	0.98	0.99	0.99	1.00	0.99	0.99	0.98	0.99	0.98	0.99	0.99	0.98																				
Fit Protected	1647	1649	1649	3398	3436	3436	3398	3436	3398	3436	3436	3398																				
Satd. Flow (prot)	0.88	0.91	0.91	0.94	0.86	0.86	0.94	0.86	0.94	0.86	0.86	0.94																				
Fit Permitted	1473	1519	1519	3197	2962	2962	3197	2962	3197	2962	2962	3197																				
Satd. Flow (perm)	26	27	20	48	72	50	17	399	66	43	257	20																				
Volume (vph)	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90																				
Peak-hour factor, PHF	29	30	22	53	80	56	19	443	73	48	286	22																				
Adj. Flow (vph)	0	15	0	0	30	0	0	25	0	0	10	0																				
RTOR Reduction (vph)	0	66	0	0	159	0	0	510	0	0	347	0																				
Lane Group Flow (vph)	100	100	100	100	100	100	100	100	100	100	100	100																				
Conf. Peds. (#/hr)	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm																				
Turn Type	4	8	8	2	2	2	2	2	2	2	2	2																				
Protected Phases	4	8	8	2	2	2	2	2	2	2	2	2																				
Permitted Phases	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0																				
Actuated Green, G (s)	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50	0.50																				
Effective Green, g (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																				
Actuated g/C Ratio	501	516	516	1599	1481	1481	1599	1481	1599	1481	1481	1599																				
Clearance Time (s)	0.05	0.10	0.10	0.16	0.12	0.12	0.16	0.12	0.16	0.12	0.12	0.16																				
Vehicle Extension (s)	0.13	0.31	0.31	0.32	0.23	0.23	0.32	0.23	0.32	0.23	0.23	0.32																				
Lane Grip Cap (vph)	11.4	12.2	12.2	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4																				
v/s Ratio Prot	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00																				
v/s Ratio Perm	0.5	1.5	1.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5																				
Uniform Delay, d1	12.0	13.7	13.7	8.0	7.4	7.4	8.0	7.4	8.0	7.4	7.4	8.0																				
Progression Factor	B	B	B	A	A	A	A	A	A	A	A	A																				
Incremental Delay, d2	12.0	13.7	13.7	8.0	7.4	7.4	8.0	7.4	8.0	7.4	7.4	8.0																				
Delay (s)	B	B	B	A	A	A	A	A	A	A	A	A																				
Level of Service	B	B	B	A	A	A	A	A	A	A	A	A																				
Approach Delay (s)	12.0	13.7	13.7	8.0	7.4	7.4	8.0	7.4	8.0	7.4	7.4	8.0																				
Approach LOS	B	B	B	A	A	A	A	A	A	A	A	A																				
Intersection Summary	<table border="1"> <tr> <td>HCM Average Control Delay</td> <td>9.0</td> <td>HCM Level of Service</td> <td>A</td> </tr> <tr> <td>HCM Volume to Capacity ratio</td> <td>0.31</td> <td></td> <td></td> </tr> <tr> <td>Actuated Cycle Length (s)</td> <td>50.0</td> <td>Sum of lost time (s)</td> <td>8.0</td> </tr> <tr> <td>Intersection Capacity Utilization</td> <td>62.5%</td> <td>ICU Level of Service</td> <td>B</td> </tr> <tr> <td>Analysis Period (min)</td> <td>15</td> <td></td> <td></td> </tr> </table>												HCM Average Control Delay	9.0	HCM Level of Service	A	HCM Volume to Capacity ratio	0.31			Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0	Intersection Capacity Utilization	62.5%	ICU Level of Service	B	Analysis Period (min)	15		
HCM Average Control Delay	9.0	HCM Level of Service	A																													
HCM Volume to Capacity ratio	0.31																															
Actuated Cycle Length (s)	50.0	Sum of lost time (s)	8.0																													
Intersection Capacity Utilization	62.5%	ICU Level of Service	B																													
Analysis Period (min)	15																															
<p>c Critical Lane Group</p>																																

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																				
Lane Configurations																																
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900																				
Total Lost time (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																				
Lane Util. Factor	1.00	1.00	1.00	0.96	0.96	0.96	0.99	0.99	0.98	0.98	0.98	0.98																				
Frpb, ped/bikes	0.96	0.96	0.96	0.98	0.98	0.98	1.00	1.00	0.99	0.99	0.99	0.98																				
Flpb, ped/bikes	0.96	0.96	0.96	0.98	0.98	0.98	1.00	1.00	0.99	0.99	0.99	0.98																				
Flt	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	0.99	0.99	0.99	0.98																				
Fit Protected	1631	1681	1681	3476	4918	4918	3476	4918	3476	4918	4918	3476																				
Satd. Flow (prot)	0.86	0.87	0.87	0.92	0.91	0.91	0.92	0.91	0.92	0.91	0.91	0.92																				
Fit Permitted	1426	1485	1485	3187	4480	4480	3187	4480	3187	4480	4480	3187																				
Satd. Flow (perm)	46	49	39	17	41	21	24	1018	37	18	873	67																				
Volume (vph)	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94																				
Peak-hour factor, PHF	49	52	41	18	44	22	26	1083	39	19	929	71																				
Adj. Flow (vph)	0	28	0	0	19	0	0	1	0	0	4	0																				
RTOR Reduction (vph)	0	114	0	0	65	0	0	1147	0	0	1015	0																				
Lane Group Flow (vph)	100	100	100	100	100	100	100	100	100	100	100	100																				
Conf. Peds. (#/hr)	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm																				
Turn Type	4	4	4	4	4	4	4	4	4	4	4	4																				
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4																				
Permitted Phases	8.6	9.1	8.6	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4	62.4																				
Actuated Green, G (s)	0.11	0.11	0.11	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79																				
Effective Green, g (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5																				
Actuated g/C Ratio	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																				
Clearance Time (s)	162	169	169	2506	3522	3522	162	2506	162	169	3522	162																				
Vehicle Extension (s)	c0.08	0.04	0.04	c0.36	0.23	0.23	c0.08	0.04	c0.36	0.23	0.23	c0.08																				
Lane Grip Cap (vph)	0.70	0.38	0.38	0.46	0.29	0.29	0.70	0.38	0.38	0.46	0.29	0.70																				
v/s Ratio Prot	34.1	32.8	32.8	2.9	2.4	2.4	34.1	32.8	32.8	2.9	2.4	34.1																				
v/s Ratio Perm	1.00	1.00	1.00	1.20	1.00	1.00	1.00	1.00	1.00	1.20	1.00	1.00																				
Uniform Delay, d1	10.6	0.5	0.5	0.5	0.2	0.2	10.6	0.5	0.5	0.5	0.2	10.6																				
Progression Factor	44.8	D	D	C	A	A	44.8	D	D	C	A	44.8																				
Incremental Delay, d2	44.8	D	D	C	A	A	44.8	D	D	C	A	44.8																				
Delay (s)	44.8	D	D	C	A	A	44.8	D	D	C	A	44.8																				
Level of Service	D	D	D	C	A	A	D	D	D	C	A	D																				
Approach Delay (s)	44.8	33.4	33.4	3.9	2.6	2.6	44.8	33.4	33.4	3.9	2.6	44.8																				
Approach LOS	D	D	D	C	A	A	D	D	D	C	A	D																				
Intersection Summary	<table border="1"> <tr> <td>HCM Average Control Delay</td> <td>6.8</td> <td>HCM Level of Service</td> <td>A</td> </tr> <tr> <td>HCM Volume to Capacity ratio</td> <td>0.49</td> <td></td> <td></td> </tr> <tr> <td>Actuated Cycle Length (s)</td> <td>80.0</td> <td>Sum of lost time (s)</td> <td>8.0</td> </tr> <tr> <td>Intersection Capacity Utilization</td> <td>80.9%</td> <td>ICU Level of Service</td> <td>D</td> </tr> <tr> <td>Analysis Period (min)</td> <td>15</td> <td></td> <td></td> </tr> </table>												HCM Average Control Delay	6.8	HCM Level of Service	A	HCM Volume to Capacity ratio	0.49			Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0	Intersection Capacity Utilization	80.9%	ICU Level of Service	D	Analysis Period (min)	15		
HCM Average Control Delay	6.8	HCM Level of Service	A																													
HCM Volume to Capacity ratio	0.49																															
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0																													
Intersection Capacity Utilization	80.9%	ICU Level of Service	D																													
Analysis Period (min)	15																															
<p>c Critical Lane Group</p>																																

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

Existing PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	0.99	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	0.99	1.00	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1760	3500	1765	3453	1739	1835	1764	1835	1764	1835	1764
Flt Permitted	0.30	1.00	0.25	1.00	0.56	1.00	0.37	1.00	0.37	1.00	0.37
Satd. Flow (perm)	561	3500	469	3453	1017	1835	695	1835	695	1835	695
Volume (vph)	26	655	45	41	534	81	109	388	38	88	222
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	712	49	45	580	88	118	422	41	96	241
RTOR Reduction (vph)	0	6	0	0	15	0	0	5	0	0	4
Lane Group Flow (vph)	28	755	0	45	653	0	118	459	0	96	258
Confl. Peds. (#/hr)	12	12	12	12	12	12	42	12	12	12	42
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	2	2	2	2	6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	224	1400	188	1381	188	1381	509	918	348	918	1400
v/s Ratio Prot	c0.22						c0.25				0.14
v/s Ratio Perm	0.05	0.10	0.10	0.10	0.12	0.12	0.12	0.14	0.14	0.14	0.14
v/c Ratio	0.12	0.54	0.24	0.47	0.23	0.50	0.23	0.50	0.28	0.28	0.28
Uniform Delay, d1	15.2	18.4	15.9	17.8	11.3	13.3	11.6	11.6	11.6	11.6	11.6
Progression Factor	1.00	1.00	1.95	2.03	1.83	1.86	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.1	1.5	2.6	1.0	0.7	1.3	2.0	0.8	2.0	0.8	2.0
Delay (s)	16.3	19.9	33.7	37.1	21.4	26.1	13.6	12.4	13.6	12.4	12.4
Level of Service	B	B	C	D	C	C	B	B	B	B	B
Approach Delay (s)	19.7	19.7	36.9	36.9	25.2	25.2	12.7	12.7	12.7	12.7	12.7
Approach LOS	B	B	D	D	C	C	B	B	B	B	B

Intersection Summary	25.0	HCM Level of Service	C
HCM Average Control Delay	17.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.0%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

Existing PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	0.99	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	0.99	1.00	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (prot)	1754	3474	1737	3509	1737	3509	3412	3509	3412	3509	3387
Flt Permitted	0.26	1.00	0.16	1.00	0.26	1.00	0.84	1.00	0.84	1.00	0.92
Satd. Flow (perm)	489	3474	292	3509	292	3509	2912	3509	2912	3509	3126
Volume (vph)	26	743	60	20	597	28	74	164	37	16	96
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	27	766	62	21	615	29	76	169	38	16	99
RTOR Reduction (vph)	0	8	0	0	4	0	0	8	0	0	14
Lane Group Flow (vph)	27	820	0	21	640	0	0	275	0	0	135
Confl. Peds. (#/hr)	24	78	78	24	8	24	8	6	6	6	8
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	2	6
Permitted Phases	4	8	8	8	8	8	2	2	2	2	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	46.0	46.0	46.0	46.0	46.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	153	1086	91	1097	91	1097	1711	1711	1711	1711	1837
v/s Ratio Prot	c0.24						0.18				0.04
v/s Ratio Perm	0.06	0.76	0.23	0.58	0.23	0.58	0.16	0.16	0.16	0.16	0.07
v/c Ratio	0.18	0.76	0.23	0.58	0.23	0.58	0.16	0.16	0.16	0.16	0.07
Uniform Delay, d1	20.0	24.7	20.4	23.1	20.4	23.1	7.5	7.5	7.5	7.5	7.1
Progression Factor	0.45	0.49	0.91	0.97	0.45	0.49	1.29	1.29	1.29	1.29	1.00
Incremental Delay, d2	2.2	4.3	5.4	2.1	2.2	4.3	0.2	0.2	0.2	0.2	0.1
Delay (s)	11.3	16.3	23.8	24.5	11.3	16.3	9.8	9.8	9.8	9.8	7.2
Level of Service	B	B	C	C	B	B	A	A	A	A	A
Approach Delay (s)	16.2	16.2	24.5	24.5	16.2	16.2	9.8	9.8	9.8	9.8	7.2
Approach LOS	B	B	C	C	B	B	A	A	A	A	A

Intersection Summary	17.4	HCM Level of Service	B
HCM Average Control Delay	0.37		
HCM Volume to Capacity ratio	80.0	Sum of lost time (s)	8.0
Actuated Cycle Length (s)	59.5%	ICU Level of Service	B
Intersection Capacity Utilization	15		
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBL	SBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T	4T
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.98	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1764	3505	1756	3446	1756	3446	3326	3427	3326	3427	3427	3427	3427
Flt Permitted	0.31	1.00	0.26	1.00	0.88	1.00	0.88	0.76	0.88	0.76	0.88	0.76	0.88
Satd. Flow (perm)	567	3505	473	3446	2934	3446	2934	2629	2934	2629	2629	2629	2629
Volume (vph)	51	744	40	54	586	101	56	278	150	82	205	38	38
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	52	752	40	55	592	102	57	281	152	83	207	38	38
RTOR Reduction (vph)	0	5	0	0	17	0	0	47	0	0	13	0	0
Lane Group Flow (vph)	52	788	0	55	677	0	0	443	0	0	315	0	0
Confl. Peds. (#/hr)	8	39	39	8	25	25	25	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	8	8	8	2	2	6	6	6	6	6
Permitted Phases	4	8	8	8	8	8	2	2	6	6	6	6	6
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	35.5	37.0	37.0	38.0	38.0	37.0	37.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0	37.0	37.0	38.0	38.0	37.0	37.0	38.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp. Cap (vph)	248	1533	207	1508	1357	1357	1357	1216	1357	1216	1357	1216	1357
v/s Ratio Prot	c0.22	0.20	0.20	0.20	0.20	0.20	0.15	0.12	0.15	0.12	0.15	0.12	0.15
v/s Ratio Perm	0.09	0.12	0.12	0.12	0.12	0.12	0.33	0.33	0.33	0.26	0.26	0.26	0.26
v/c Ratio	0.21	0.51	0.27	0.45	0.45	0.45	0.33	0.33	0.33	0.26	0.26	0.26	0.26
Uniform Delay, d1	13.9	16.3	14.3	15.7	13.6	13.6	13.6	13.1	13.6	13.1	13.6	13.1	13.6
Progression Factor	0.93	1.08	1.75	1.86	0.78	0.78	0.78	1.00	0.78	1.00	0.78	1.00	0.78
Incremental Delay, d2	1.4	0.9	2.6	0.8	0.6	0.6	0.6	0.5	0.6	0.5	0.6	0.5	0.6
Delay (s)	14.3	18.6	27.8	30.2	11.3	11.3	11.3	13.6	11.3	13.6	11.3	13.6	11.3
Level of Service	B	B	C	C	C	C	B	B	B	B	B	B	B
Approach Delay (s)	18.3	30.0	30.0	11.3	11.3	11.3	11.3	13.6	11.3	13.6	11.3	13.6	11.3
Approach LOS	B	B	C	C	C	C	B	B	B	B	B	B	B

Intersection Summary	
HCM Average Control Delay	19.9 HCM Level of Service B
HCM Volume to Capacity ratio	0.42
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	84.3% ICU Level of Service E
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

Existing PM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBR
Lane Configurations	4T	4T	4T	4T	4T	4T	4T
Sign Control	Free	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	886	77	71	725	0	0	0
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Hourly flow rate (vph)	913	79	73	747	0	0	0
Pedestrians							348
Lane Width (ft)							0.0
Walking Speed (ft/s)							4.0
Percent Blockage							0
Right turn flare (veh)							None
Median type							None
Median storage (veh)							None
Upstream signal (ft)	673			487			
pX, platoon unblocked				0.86			0.89
vC, conflicting volume				1341			1821
VC1, stage 1 cont vol							844
VC2, stage 2 cont vol							
vCu, unblocked vol				1232			1587
IC, single (s)				4.1			6.8
IC, 2 stage (s)							
IF (s)				2.2			3.5
p0 queue free %				85			100
cM capacity (veh/h)				482			74
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3		
Volume Total	609	384	73	374	374		
Volume Left	0	0	73	0	0		
Volume Right	0	79	0	0	0		
cSH	1700	1700	482	1700	1700		
Volume to Capacity	0.36	0.23	0.15	0.22	0.22		
Queue Length 95th (ft)	0	0	13	0	0		
Control Delay (s)	0.0	0.0	13.8	0.0	0.0		
Lane LOS			B				
Approach Delay (s)	0.0	1.2					
Approach LOS							

Intersection Summary	
Average Delay	0.6
Intersection Capacity Utilization	54.3% ICU Level of Service A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 11: 40th St. & BART parking

Existing PM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	808	78	0	796	0	71
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	869	84	0	856	0	76
Pedestrians	109	109				
Lane Width (ft)	12.0	12.0				
Walking Speed (ft/s)	4.0	4.0				
Percent Blockage				9	9	
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	754			406		
pX, platoon unblocked			0.88		0.94	0.88
VC, conflicting volume			1062		1448	694
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol			939		1085	524
IC, single (s)			4.1		6.8	6.9
IC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	79
cM capacity (veh/h)			583		180	364
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	579	373	428	428	76	76
Volume Left	0	0	0	0	0	0
Volume Right	0	84	0	0	76	76
cSH	1700	1700	1700	1700	364	364
Volume to Capacity	0.34	0.22	0.25	0.25	0.21	0.21
Queue Length 95th (ft)	0	0	0	0	0	19
Control Delay (s)	0.0	0.0	0.0	0.0	17.5	17.5
Lane LOS					C	C
Approach Delay (s)	0.0	0.0	0.0	0.0	17.5	17.5
Approach LOS					C	C
Intersection Summary						
Average Delay	0.7					
Intersection Capacity Utilization	45.3%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 12: 40th St. & BART parking

Existing PM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	876	3	0	796	0	54
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	952	3	0	865	0	59
Pedestrians	109	109				
Lane Width (ft)	12.0	12.0				
Walking Speed (ft/s)	4.0	4.0				
Percent Blockage				9	9	
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	971			189		
pX, platoon unblocked			0.94		0.91	0.94
VC, conflicting volume			1064		1495	696
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol			1006		1251	614
IC, single (s)			4.1		6.8	6.9
IC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			100		100	83
cM capacity (veh/h)			586		136	338
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	635	321	433	433	59	59
Volume Left	0	0	0	0	0	0
Volume Right	0	3	0	0	59	59
cSH	1700	1700	1700	1700	338	338
Volume to Capacity	0.37	0.19	0.25	0.25	0.17	0.17
Queue Length 95th (ft)	0	0	0	0	0	15
Control Delay (s)	0.0	0.0	0.0	0.0	17.9	17.9
Lane LOS					C	C
Approach Delay (s)	0.0	0.0	0.0	0.0	17.9	17.9
Approach LOS					C	C
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	44.2%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.97
Frbp, ped/bikes	0.93	1.00	0.98	1.00	0.98	1.00	1.00	0.99	1.00	1.00	0.97	1.00
Flt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1641	3413	1728	3364	1770	3483	1770	3483	1770	3335	1770	3335
Flt Permitted	0.32	1.00	0.17	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	552	3413	306	3364	1770	3483	1770	3483	1770	3335	1770	3335
Volume (vph)	159	665	106	23	463	76	191	810	58	103	559	147
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	162	679	108	23	472	78	195	827	59	105	570	150
RTOR Reduction (vph)	0	17	0	0	18	0	0	6	0	0	0	27
Lane Group Flow (vph)	162	770	0	23	532	0	195	880	0	105	693	0
Confl. Peds. (#/hr)	94	86	86	94	94	94	94	94	40	94	94	111
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	8	8	5	2	2	1	6	1	6	6	6
Actuated Green, G (s)	23.3	23.3	23.3	23.3	23.3	23.3	11.7	35.3	7.9	31.5	31.5	31.5
Effective Green, g (s)	23.8	23.8	23.8	23.8	23.8	23.8	12.2	35.8	8.4	32.0	32.0	32.0
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.15	0.45	0.11	0.40	0.40	0.40
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	164	1015	91	1001	270	1559	186	1334	186	1334	1334	1334
v/s Ratio Prot	0.23	0.16	0.16	c0.11	c0.25	0.06	0.21	0.06	0.21	0.06	0.21	0.21
v/s Ratio Perm	0.29	0.08	0.08	0.08	0.53	0.72	0.56	0.56	0.56	0.52	0.52	0.52
v/c Ratio	0.99	0.76	0.25	0.53	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Uniform Delay, d1	28.0	25.5	21.3	23.5	32.3	16.3	34.1	18.2	34.1	18.2	18.2	18.2
Progression Factor	1.18	1.26	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	63.8	2.8	0.5	0.3	7.8	1.5	2.3	1.4	2.3	1.4	1.4	1.4
Delay (s)	96.9	34.8	21.9	23.7	40.1	17.8	34.3	19.9	34.3	19.9	19.9	19.9
Level of Service	F	C	C	C	D	B	C	B	C	B	C	B
Approach Delay (s)	45.4	23.7	23.7	23.7	21.8	21.8	21.8	21.8	21.8	21.8	21.8	21.8
Approach LOS	D	C	C	C	C	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	28.6		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.75											
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		12.0							
Intersection Capacity Utilization	72.1%		ICU Level of Service		C							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 14: Apgar St. & Telegraph Ave. Existing PM
 1/11/2008

Movement	EBL	EBR	NBL	NBT	SBL	SBR
Lane Configurations	W	W	W	W	W	W
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	17	72	23	1017	692	14
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	18	75	24	1059	721	15
Pedestrians	100	100	100	100	100	100
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	8	8	8	8	8	8
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	None	None	None	None	None	None
Upstream signal (ft)	0.94	0.91	0.91	0.91	0.91	0.91
pX, platoon unblocked	1506	568	835	1506	568	835
VC, conflicting volume	1506	568	835	1506	568	835
VC1, stage 1 cont vol	1506	568	835	1506	568	835
VC2, stage 2 cont vol	1506	568	835	1506	568	835
vCu, unblocked vol	1188	426	720	1188	426	720
IC, single (s)	6.8	6.9	4.1	6.8	6.9	4.1
IC, 2 stage (s)	3.5	3.3	2.2	3.5	3.3	2.2
IF (s)	87	83	97	87	83	97
p0 queue free %	138	441	732	138	441	732
cM capacity (veh/h)	138	441	732	138	441	732
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	93	24	530	530	481	255
Volume Left	18	24	0	0	0	0
Volume Right	75	0	0	0	0	15
cSH	311	732	1700	1700	1700	1700
Volume to Capacity	0.30	0.03	0.31	0.31	0.28	0.15
Queue Length 95th (ft)	30	3	0	0	0	0
Control Delay (s)	21.4	10.1	0.0	0.0	0.0	0.0
Lane LOS	C	B	C	C	B	C
Approach Delay (s)	21.4	0.2	0.0	0.0	0.0	0.0
Approach LOS	C	C	C	C	C	C
Intersection Summary						
Average Delay	1.2		ICU Level of Service		A	
Intersection Capacity Utilization	48.0%					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

Existing PM
 1/11/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	↑↑	↑↑	↑↑	↑↑
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	7	32	1005	31	15	750
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	8	36	1117	34	17	833
Pedestrians	52		52		45	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4		4		4	
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			791
pX, platoon unblocked	0.88	0.86			0.86	
VC, conflicting volume	1688	673			1203	
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	1477	452			1071	
IC, single (s)	6.8	6.9			4.1	
IC, 2 stage (s)						
IF (s)	3.5	3.3			2.2	
p0 queue free %	91	92			97	
cM capacity (veh/h)	91	438			531	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	43	744	407	17	417	417
Volume Left	8	0	0	17	0	0
Volume Right	36	0	34	0	0	0
cSH	261	1700	1700	531	1700	1700
Volume to Capacity	0.17	0.44	0.24	0.03	0.25	0.25
Queue Length 95th (ft)	15	0	0	2	0	0
Control Delay (s)	211.6	0.0	0.0	12.0	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	211.6	0.0	0.2			
Approach LOS	C					

Intersection Summary		
Average Delay		0.6
Intersection Capacity Utilization	47.1%	ICU Level of Service
Analysis Period (min)	15	A

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑	↑↑↑	↑↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.99	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.99	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5011	1768	3328	1800	3328	1800	1763	1841				
Flt Permitted	0.80	0.34	1.00	0.82	1.00	0.82	0.27	1.00				
Satd. Flow (perm)	4019	624	3328	1486	3328	1486	503	1841				
Volume (vph)	112	609	27	63	316	167	58	359	84	65	285	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	114	621	28	64	322	170	59	366	86	66	291	20
RTOR Reduction (vph)	0	5	0	0	70	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	758	0	64	422	0	0	502	0	66	308	0
Conf. Peds. (#/hr)	24	4	4	4	24	24	24	12	12	12	12	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6	6
Actuated Green, G (s)	46.0	46.0	46.0	46.0	46.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Clearance 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
Lane Grp Cap (vph)	2361	367	1955	464	1955	464	157	575				
v/s Ratio Prot				0.13								
v/s Ratio Perm	0.19	0.10	0.10	0.34	0.10	0.34	0.13	0.13				
v/c Ratio	0.32	0.17	0.22	0.42	0.17	0.22	0.13	0.13				
Uniform Delay, d1	8.4	7.6	7.8	27.5	7.6	7.8	21.8	22.7				
Progression Factor	1.00	1.47	1.72	1.00	1.47	1.72	1.00	0.75	0.75	0.75	0.75	0.75
Incremental Delay, d2	0.4	1.0	0.3	65.7	1.0	0.3	7.9	3.5				
Delay (s)	8.7	12.2	13.7	93.2	12.2	13.7	24.1	20.4				
Level of Service	A	B	B	F	B	B	C	C				
Approach Delay (s)	8.7	13.5	93.2	21.1	13.5	93.2	21.1	21.1				
Approach LOS	A	B	F	C	B	F	C	C				

Intersection Summary		
HCM Average Control Delay	31.6	HCM Level of Service
HCM Volume to Capacity ratio	0.58	C
Actuated Cycle Length (s)	80.0	Sum of lost time (s)
Intersection Capacity Utilization	137.4%	ICU Level of Service
Analysis Period (min)	15	H
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

Existing PM
 1/11/2008

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	0.99	0.99	1.00	0.96	1.00	0.98	1.00	0.98	1.00	0.98
Flt	1.00	1.00	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5010	4958	4958	1770	1787	1763	1826	1763	1826	1763	1826
Flt Permitted	0.88	0.80	0.80	0.64	1.00	0.38	1.00	0.64	1.00	0.38	1.00
Satd. Flow (perm)	4433	4012	4012	1196	1787	714	1826	1196	1787	714	1826
Volume (vph)	39	549	40	67	392	63	41	203	65	56	112
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	578	42	71	413	66	43	214	68	59	118
RTOR Reduction (vph)	0	10	0	0	22	0	0	14	0	0	7
Lane Group Flow (vph)	0	651	0	0	528	0	43	268	0	59	129
Confl. Peds. (#/hr)	12	12	12	12	12	12	6	6	6	6	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	2854	2854	2854	2583	2583	2583	306	458	183	468	468
v/s Ratio Prot	c0.15	c0.15	c0.15	0.13	0.04	0.04	c0.15	0.08	0.08	0.08	0.07
v/s Ratio Perm	0.23	0.23	0.23	0.20	0.14	0.14	0.68	0.32	0.32	0.28	0.28
Uniform Delay, d1	6.0	6.0	6.0	5.8	23.0	26.0	24.1	23.8	24.1	23.8	23.8
Progression Factor	1.25	1.25	1.25	1.04	1.00	1.00	1.19	1.22	1.19	1.22	1.22
Incremental Delay, d2	0.2	0.2	0.2	0.2	1.0	5.4	4.5	1.4	4.5	1.4	1.4
Delay (s)	7.6	7.6	7.6	6.3	23.9	31.4	33.2	30.4	33.2	30.4	30.4
Level of Service	A	A	A	A	C	C	C	C	C	C	C
Approach Delay (s)	7.6	7.6	7.6	6.3	30.4	31.2	31.2	31.2	31.2	31.2	31.2
Approach LOS	A	A	A	A	C	C	C	C	C	C	C
Intersection Summary											
HCM Average Control Delay	14.1										
HCM Volume to Capacity ratio	0.33										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	68.5%										
Analysis Period (min)	15										
c Critical Lane Group											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.99	0.99	0.99	1.00	0.95	1.00	0.97	1.00	0.99	1.00	0.99
Flt	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	5012	4810	4810	3385	3438	3438	3438	3438	3438	3438	3438
Flt Permitted	0.80	0.80	0.80	0.85	0.87	0.79	0.85	0.87	0.79	0.85	0.79
Satd. Flow (perm)	4041	4096	4096	2967	2746	2746	2967	2746	2967	2746	2746
Volume (vph)	74	582	34	52	449	220	39	185	58	77	201
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	75	588	34	53	454	222	39	187	59	78	203
RTOR Reduction (vph)	0	7	0	0	79	0	0	29	0	0	8
Lane Group Flow (vph)	0	690	0	0	650	0	0	256	0	0	298
Confl. Peds. (#/hr)	9	17	17	9	12	10	10	10	10	10	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2801	2801	2801	2637	2637	2637	760	760	760	760	760
v/s Ratio Prot	c0.17	c0.17	c0.17	0.16	0.16	0.16	0.09	0.09	0.09	0.09	0.11
v/s Ratio Perm	0.27	0.27	0.27	0.25	0.25	0.25	0.34	0.34	0.34	0.34	0.42
Uniform Delay, d1	6.1	6.1	6.1	6.0	6.0	6.0	24.2	24.2	24.2	24.2	24.8
Progression Factor	1.46	1.46	1.46	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.59
Incremental Delay, d2	0.2	0.2	0.2	0.2	0.2	0.2	1.2	1.2	1.2	1.2	1.8
Delay (s)	9.2	9.2	9.2	6.3	6.3	6.3	25.4	25.4	25.4	25.4	16.5
Level of Service	A	A	A	A	A	A	C	C	C	C	B
Approach Delay (s)	9.2	9.2	9.2	6.3	6.3	6.3	25.4	25.4	25.4	25.4	16.5
Approach LOS	A	A	A	A	A	A	C	C	C	C	B
Intersection Summary											
HCM Average Control Delay	11.5										
HCM Volume to Capacity ratio	0.31										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	101.9%										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

Existing PM
 1/11/2008

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	0%	0%	0%	0%	0%	0%
Grade	0	746	485	20	0	228
Volume (veh/h)	0.96	0.96	0.96	0.96	0.96	0.96
Peak Hour Factor	0	777	516	21	0	238
Hourly flow rate (vph)	79				79	
Pedestrians	12.0				12.0	
Lane Width (ft)	4.0				4.0	
Walking Speed (ft/s)	7				7	
Percent Blockage						
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	698	473				
pX, platoon unblocked						
VC, conflicting volume	615				864	340
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
VCu, unblocked vol	615				864	340
IC, single (s)	4.1				6.8	6.9
IC, 2 stage (s)						
IF (s)	2.2				3.5	3.3
p0 queue free %	100				100	58
cM capacity (veh/h)	897				274	572
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3
Volume Total	259	259	259	206	206	124
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	21
cSH	1700	1700	1700	1700	1700	572
Volume to Capacity	0.15	0.15	0.15	0.12	0.12	0.07
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	15.7
Lane LOS	C					C
Approach Delay (s)	0.0			0.0		15.7
Approach LOS						C

Intersection Summary		
Average Delay	2.4	
Intersection Capacity Utilization	39.2%	ICU Level of Service
Analysis Period (min)	15	A

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1	4+1+1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Frt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	4972	4769	4769	4769	4769	4769	4769	4769	4769	4769	4769
Frt Permitted	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.71
Satd. Flow (perm)	3575	3716	3716	3716	3716	3716	3716	3716	3716	3716	3716
Volume (vph)	138	566	50	61	351	191	90	709	98	152	569
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	153	629	56	68	390	212	100	788	109	169	632
RTOR Reduction (vph)	0	7	0	0	15	0	0	7	0	0	4
Lane Group Flow (vph)	0	831	0	0	655	0	100	890	0	169	679
Conf. Peds. (#/hr)	26	19			39			26	39	92	92
Turn Type	Perm	Perm	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	8	2	2	6	6	6	6	6
Permitted Phases	4	4	3	8	2	2	6	6	6	6	6
Actuated Green, G (s)	19.3	20.8	19.3	19.3	34.2	34.2	34.2	34.2	34.2	34.2	34.2
Effective Green, g (s)	20.8	20.8	20.8	20.8	35.2	35.2	35.2	35.2	35.2	35.2	35.2
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Clearance Time (s)	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grip Cap (vph)	1162	1208	1208	361	1892	263	1919	263	1919	263	1919
v/s Ratio Prot					0.15	0.26				0.35	0.19
v/s Ratio Perm	0.23	0.71	0.18	0.18	0.28	0.47				0.64	0.35
v/c Ratio	19.0	17.7	17.7	7.6	8.7	10.0	8.0	10.0	10.0	10.0	10.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.8	1.8	1.8	1.8	1.9	1.9	1.8	1.9	1.8	1.9	1.8
Incremental Delay, d2	20.8	20.8	20.8	18.0	9.5	9.6	21.5	8.6	21.5	8.6	8.6
Delay (s)	C	C	C	B	A	A	C	A	C	A	A
Level of Service	C	C	C	B	A	A	C	A	C	A	A
Approach Delay (s)	20.8	18.0	18.0	18.0	9.6	9.6	11.1	9.6	11.1	9.6	11.1
Approach LOS	C	C	C	B	A	A	B	A	C	A	B

Intersection Summary		
HCM Average Control Delay	14.4	HCM Level of Service
HCM Volume to Capacity ratio	0.67	B
Actuated Cycle Length (s)	64.0	Sum of lost time (s)
Intersection Capacity Utilization	78.7%	ICU Level of Service
Analysis Period (min)	15	D

- d1 Defacto Left Lane. Recode with 1 through lane as a left lane.
- dr Defacto Right Lane. Recode with 1 through lane as a right lane.
- c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5027	4980	4980	4980	4980	4980	1780	1406	1582	1582	1582	1582
Fit Permitted	0.89	0.77	0.77	0.77	0.77	0.77	0.87	1.00	0.92	0.92	0.92	0.92
Satd. Flow (perm)	4503	3870	3870	3870	3870	3870	1577	1406	1469	1469	1469	1469
Volume (vph)	36	764	26	82	523	28	49	88	191	33	33	68
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	36	772	26	83	528	28	49	89	193	33	33	69
RTOR Reduction (vph)	0	4	0	0	6	0	0	0	94	0	47	0
Lane Group Flow (vph)	0	830	0	0	633	0	0	138	99	0	88	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	49.5	49.5	49.5	49.5	49.5	49.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (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
Lane Grp Cap (vph)	2730	2730	2730	2730	2730	2730	463	413	432	432	432	432
v/s Ratio Prot	c0.18	0.16	0.16	0.16	0.16	0.16	c0.09	0.07	0.06	0.06	0.06	0.06
v/s Ratio Perm	0.30	0.27	0.27	0.27	0.27	0.27	0.30	0.24	0.20	0.20	0.20	0.20
v/c Ratio	7.6	7.4	7.4	7.4	7.4	7.4	21.9	21.5	21.2	21.2	21.2	21.2
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.3	0.3	0.3	0.3	0.3	0.3	1.6	1.4	1.1	1.1	1.1	1.1
Incremental Delay, d2	7.9	7.7	7.7	7.7	7.7	7.7	23.5	22.8	22.3	22.3	22.3	22.3
Delay (s)	A	A	A	A	A	A	C	C	C	C	C	C
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	7.9	7.7	7.7	7.7	7.7	7.7	23.1	23.1	22.3	22.3	22.3	22.3
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	11.4 HCM Level of Service B											
HCM Volume to Capacity ratio	0.30											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	96.6% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.91	1.00	0.91	0.91	0.91
Frpb, ped/bikes	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit	1.00	0.98	0.98	1.00	0.95	0.95	1.00	0.98	1.00	0.98	1.00	0.98
Fit Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4941	4941	1770	4738	4738	1770	4931	1770	4933	1770	4933
Fit Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4941	4941	1770	4738	4738	1770	4931	1770	4933	1770	4933
Volume (vph)	187	684	83	81	369	210	167	652	106	307	376	63
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	205	752	91	89	405	231	184	716	116	337	413	69
RTOR Reduction (vph)	0	15	0	0	101	0	0	22	0	0	23	0
Lane Group Flow (vph)	205	828	0	89	535	0	184	810	0	337	459	0
Confl. Peds. (#/hr)	81	81	81	81	81	81	22	22	50	50	43	43
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	4	4	3	4	4	1	2	1	2	1	2
Permitted Phases	3	4	4	3	4	4	1	2	1	2	1	2
Actuated Green, G (s)	11.0	24.1	24.1	11.0	24.1	24.1	20.9	26.0	20.9	26.0	20.9	26.0
Effective Green, g (s)	11.0	25.1	25.1	11.0	25.1	25.1	20.9	27.0	20.9	27.0	20.9	27.0
Actuated g/C Ratio	0.11	0.25	0.25	0.11	0.25	0.25	0.21	0.27	0.21	0.27	0.21	0.27
Clearance Time (s)	4.0	5.0	5.0	4.0	5.0	5.0	4.0	5.0	4.0	5.0	4.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	195	1240	1240	195	1189	1189	370	1331	370	1332	370	1332
v/s Ratio Prot	c0.12	c0.17	c0.17	0.05	0.11	0.11	0.10	c0.16	0.19	0.09	0.19	0.09
v/s Ratio Perm	1.05	0.67	0.67	0.46	0.45	0.45	0.50	0.61	0.50	0.61	0.50	0.61
v/c Ratio	44.5	33.7	33.7	41.7	31.6	31.6	34.9	31.9	38.6	29.4	38.6	29.4
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	78.6	2.9	2.9	0.6	1.2	1.2	0.4	2.1	25.5	0.7	25.5	0.7
Delay (s)	123.1	36.6	36.6	42.3	32.9	32.9	35.3	34.0	64.1	30.1	64.1	30.1
Level of Service	F	D	D	D	C	C	D	C	E	C	E	C
Approach Delay (s)	53.5	53.5	53.5	34.0	34.0	34.0	34.2	34.2	44.1	44.1	44.1	44.1
Approach LOS	D	D	D	C	C	C	C	C	D	D	D	D
Intersection Summary												
HCM Average Control Delay	42.0 HCM Level of Service D											
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	81.5% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 23: 34th St & Telegraph Ave.

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	0.94	0.97	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flpb, ped/bikes	0.96	0.97	1.00	0.93	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flt	0.95	0.97	1.00	0.90	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.98	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1562	1661	1684	3464	1638	3455	1638	3455	1638	3455	1638	3455
Flt Permitted	0.71	0.84	0.31	1.00	0.43	1.00	0.43	1.00	0.43	1.00	0.43	1.00
Satd. Flow (perm)	1140	1415	556	3464	735	3455	735	3455	735	3455	735	3455
Volume (vph)	96	33	65	42	59	35	40	513	35	30	739	56
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	102	35	69	45	63	37	43	546	37	32	786	60
RTOR Reduction (vph)	0	25	0	0	16	0	0	4	0	0	5	0
Lane Group Flow (vph)	0	181	0	0	129	0	43	579	0	32	841	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9	15.9
Effective Green, g (s)	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	207	256	403	2510	533	2504	533	2504	533	2504	533	2504
v/s Ratio Prot	c0.16	0.09	0.08	0.08	0.17	0.08	0.17	0.08	0.17	0.08	0.17	0.08
v/s Ratio Perm	0.88	0.50	0.11	0.23	0.11	0.23	0.11	0.23	0.11	0.23	0.11	0.23
Uniform Delay, d1	33.9	31.3	3.5	3.9	3.4	4.3	3.4	4.3	3.4	4.3	3.4	4.3
Progression Factor	1.00	1.00	0.93	0.84	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	30.5	0.6	0.5	0.2	0.2	0.4	0.2	0.4	0.2	0.4	0.2	0.4
Delay (s)	64.4	31.9	3.7	3.5	3.6	4.6	3.6	4.6	3.6	4.6	3.6	4.6
Level of Service	E	C	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	64.4	31.9	3.5	3.5	3.5	4.6	3.5	4.6	3.5	4.6	3.5	4.6
Approach LOS	E	C	A	A	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	13.0											
HCM Volume to Capacity ratio	0.44											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	56.8%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: 27th St & Telegraph Ave.

Existing PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.97	1.00	0.96	1.00	0.96	1.00	0.99	1.00	0.99	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.99	1.00	0.96	1.00	0.94
Flt	1.00	0.96	1.00	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.94	0.94
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	3308	1770	3285	1688	3488	1688	3488	1688	3488	1688	3488
Flt Permitted	0.95	1.00	0.95	1.00	0.30	1.00	0.30	1.00	0.30	1.00	0.43	1.00
Satd. Flow (perm)	1770	3308	1770	3285	1770	3285	535	3488	535	3488	763	3109
Volume (vph)	127	316	100	56	383	98	113	484	29	95	466	284
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	130	322	102	57	391	100	115	494	30	97	476	300
RTOR Reduction (vph)	0	36	0	0	29	0	0	5	0	0	101	0
Lane Group Flow (vph)	130	388	0	57	462	0	115	519	0	97	675	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	3	8	8	2	2	2	2	6	6
Permitted Phases	7	4	4	3	8	8	2	2	2	2	6	6
Actuated Green, G (s)	9.2	21.6	21.6	5.1	17.5	17.5	44.8	44.8	44.8	44.8	44.8	44.8
Effective Green, g (s)	9.7	21.1	21.1	5.6	17.0	17.0	46.3	46.3	46.3	46.3	46.3	46.3
Actuated g/C Ratio	0.11	0.25	0.25	0.07	0.20	0.20	0.54	0.54	0.54	0.54	0.54	0.54
Clearance Time (s)	4.5	3.5	3.5	4.5	3.5	3.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	202	821	117	657	291	1900	416	1693	416	1693	416	1693
v/s Ratio Prot	c0.07	0.12	0.12	0.03	0.14	0.14	0.15	0.15	0.15	0.15	0.15	0.15
v/s Ratio Perm	0.64	0.47	0.47	0.49	0.70	0.70	0.22	0.22	0.22	0.22	0.22	0.22
Uniform Delay, d1	36.0	27.2	27.2	38.3	31.7	31.7	11.2	10.4	10.1	11.3	11.3	11.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	5.2	0.2	0.2	1.2	2.8	2.8	4.0	0.4	0.4	1.2	0.7	0.7
Delay (s)	41.2	27.4	27.4	39.5	34.5	34.5	15.2	10.7	13.1	15.7	15.7	15.7
Level of Service	D	C	C	D	C	C	B	B	B	B	B	B
Approach Delay (s)	30.6	30.6	30.6	35.0	35.0	35.0	11.5	11.5	11.5	15.4	15.4	15.4
Approach LOS	C	C	C	C	C	C	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	21.8											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	69.5%											
Analysis Period (min)	15											
c Critical Lane Group												

**APPENDIX C:
PROJECT TRIP GENERATION**



MEMORANDUM

Date: September 5, 2007

To: Lynette Dias and Charity Wagner, RRM Design Group

From: Sam Tabibnia and Emily Johnson

Subject: MacArthur Transit Village Trip Generation

WC06-2279

This memorandum presents the methodology used to estimate trip generation that we propose to use for the MacArthur Transit Village project.

The proposed MacArthur Transit Village is a mixed-use transit-oriented development (TOD) that includes 675 residential units, up to 44,000 square feet of retail, and 5,000 square feet of community space, to be developed on the existing MacArthur BART station surface parking lot and seven adjacent parcels. Approximately half of the existing 600 surface parking spaces would be removed, and the remaining 300 spaces would be replaced in a parking garage.

PROJECT TRIP GENERATION

Trip generation for the project would include trips related to the residential, retail, and community space components, as well as any change in trips related to the loss of 300 BART parking spaces. The trip generation will be adjusted to account for the project's transit-oriented location and other factors as applicable. Each of these project components is described below.

Residential Trips

The proposed MacArthur BART Transit Village includes 675 residential units, which includes a mix of below market rate rental units and market-rate for-sale condominiums. We have estimated the residential trip generation using the ITE regression equation for Condominiums for the entire 675 units. Given the development's location adjacent to the BART station, we have applied a transit-oriented trip reduction factor. To determine an appropriate trip reduction factor, we reviewed data from comparable sites as well as datasets of transit-oriented development travel patterns.

Fehr & Peers TOD Trip Generation Survey

In 2006, Fehr & Peers surveyed two transit-oriented developments (TODs) adjacent to BART stations as well as a two-block neighborhood within ½ mile of the MacArthur BART station to quantify the differences between standard ITE trip generation rates and those for transit-oriented developments. The sites that were surveyed are described below:

- **La Terrazza Apartments** is a 153-unit apartment complex located at 7800 El Camino Real in Colma, CA, 0.1 miles from the Colma BART station in San Mateo County. The apartment complex is positioned to the east of the Colma BART station and sits atop a

residential parking garage and a 1,095 sq. ft. Subway sandwich shop. Vehicle access to the parking garage is located on El Camino Real and there is direct pedestrian access to the east side of the Colma BART station, via the station transit mall, located on D Street. At the time of the trip generation observations, 110 apartments (72 percent) were occupied.

- **Park Regency Apartments** is an 892-unit apartment complex located at 3128 Oak Road in Walnut Creek, CA, 0.2 miles from the Pleasant Hill BART station in Contra Costa County. The apartment complex is situated to the north of the Pleasant Hill BART station and has both underground and on-street parking available for residents. The apartment complex has three gated vehicle and pedestrian access points. Two of the access points are located on Oak Road and the third access point is located on Las Juntas Road. Pedestrians that use the Las Juntas Road access point can cross the road and enter the northern parking lot at the Pleasant Hill BART station. The two vehicle driveways on Oak Road are shared with a commercial development that is adjacent to the apartment complex. The commercial development includes a Subway sandwich shop, a local deli, a 7-11 convenience store, a dry cleaner, a tanning salon, and a Taco Bell restaurant. Trips to the retail were counted separately from trips to the residential units. At the time of the trip generation observations, 746 apartments (84 percent) were occupied.
- **36th and 37th Street** is a two-block section of the Mosswood neighborhood located between Telegraph Avenue and Webster Avenue in Oakland, CA, near the MacArthur BART station in Alameda County. This section of Mosswood has 54 single-family dwelling units and 149 multi-family dwelling units (townhouses and condominiums) and is located approximately 0.35 miles away from the MacArthur BART station. There are four vehicle and pedestrian access points at the intersections of 36th and 37th Streets with Telegraph Avenue and Webster Street. At the time of the trip generation observations, all of the residences appeared to be occupied.

Peak period traffic counts (7:00 to 9:00 AM and 4:00 to 6:00 PM) of vehicle, pedestrian, bicycle, and transit use were conducted at the developments' access points during typical weekdays in May 2006, when local schools were in session. The count data is shown in Table 1. The weather was sunny or partly sunny during all survey days. Note that transit trips were not recorded for the 36th and 37th Street neighborhood because there are no AC Transit or BART stops within the neighborhood boundaries. Any transit trips were most likely recorded as pedestrian trips, given there are AC Transit stops located along Telegraph Avenue and the MacArthur BART station is approximately 1/3 of a mile away. Some transit trips were also potentially recorded as vehicle trips that began in the neighborhood and ended in the MacArthur BART station parking lot.

As shown in Table 1, the vehicle mode share for the three projects was fairly consistent in the AM peak hour at between 63 percent and 75 percent of all trips, and varied more widely in the PM peak hour, from 64 to 83 percent of all trips. The transit mode share for the two apartment buildings was fairly consistent at between 20 and 28 percent in the AM peak hour and 10 to 11 percent in the PM peak hour.

**TABLE 1
 SURVYED SITES: TRIP GENERATION DATA**

Trips	Vehicles			Transit (BART)/Bicycles ¹			Pedestrians			Total		
	In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
La Terraza Apartments												
AM Peak Hour	4	26	30	0	12	12	0	0	0	4	38	42
PM Peak Hour	25	18	43	2	3	5	3	0	3	30	21	51
Trip % of Total												
AM Peak Hour	10%	62%	72%	0%	28%	28%	0%	0%	0%	10%	90%	100%
PM Peak Hour	49%	34%	83%	4%	6%	11%	6%	0%	6%	60%	40%	100%
Park Regency Apartments												
AM Peak Hour	52	193	245	1	70	71	10	7	17	63	270	333
PM Peak Hour	172	85	257	34	1	35	41	40	81	247	126	373
Trip % of Total												
AM Peak Hour	16%	59%	75%	0%	20%	20%	2%	2%	5%	18%	82%	100%
PM Peak Hour	47%	22%	69%	10%	0%	10%	10%	10%	20%	67%	33%	100%
36th & 37th Streets (Single-Family Housing and Condominiums/Townhomes)												
AM Peak Hour	30	49	79	0	4	4	11	32	43	41	85	126
PM Peak Hour	49	56	105	5	3	8	30	22	52	84	81	165
Trip % of Total												
AM Peak Hour	24%	39%	63%	0%	3%	3%	8%	26%	34%	32%	68%	100%
PM Peak Hour	30%	35%	64%	2%	1%	4%	19%	14%	32%	51%	49%	100%

¹ Transit trips for the apartment complexes; bicycle trips for the 36th & 37th Street residences.
 Source: Fehr & Peers, 2006.

The observed vehicle trips were compared to trips estimated based on trip generation data published in *Trip Generation, 7th Edition* (Institute of Transportation Engineers, 2004), consistent with the method presented in *Trip Generation Handbook 2nd Edition* (ITE, 2004). The ITE trip generation is based on data collected at sites across the country, most of which are in suburban settings with minimal transit access, where all trips are made with private vehicles. As shown in Table 2, the observed vehicle trip generation is between 33 percent and 48 percent lower than the ITE -based vehicle trip generation during the AM peak hour and between 28 percent and 45 percent lower than the ITE -based vehicle trip generation during the PM peak hour. On average, vehicle trips at the surveyed sites are 38 percent lower than the vehicle trips estimated by the ITE method. Considering that the ITE rates are based on typical suburban developments with minimal transit access and that the surveyed sites are well served by transit, it is reasonable to assume that TODs would generate 38 percent fewer trips.

**TABLE 2
 SURVYED SITES TRIP GENERATION VS ITE DATA**

Site	Observed Trip Generation ¹		ITE-Based Estimated Trip Generation ²		Percent Difference ³	
	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour	AM Peak Hour	PM Peak Hour
La Terraza Apartments	30	43	58	78	-48%	-45%
Park Regency Apartments	245	257	371	430	-34%	-40%
36 th & 37 th Streets	79	105	118 ⁴	145 ⁴	-33%	-28%
Average Difference					-38%	-38%

¹ Based on surveys conducted by Fehr & Peers in May 2006 and detailed in Table 1.
² Trip generation estimated based on ITE *Trip Generation Handbook, 2nd Edition* method and *Trip Generation, 7th Edition* data.
³ Calculated as 1-(surveyed trips/ITE-based trip generation).
⁴ Sum of trips based on ITE equations for Single Family Detached Housing (Land Use 210) for 54 units and Residential Condominium/Townhouse (Land Use 230) for 149 units.
 Source: Fehr & Peers, 2007.

Dowling Associates TOD Trip Generation Memorandum

Fehr & Peers reviewed the *Recommended Trip Generation Adjustments for Transit-Oriented Developments in Oakland* memorandum prepared by Dowling Associates and dated April 6, 2006. Dowling Associates uses Bay Area Travel Survey (BATS) 2000 data for TODs at the Hayward and Pleasant Hill BART Stations as well as Census Transportation Planning Package (CTPP) data on journey to work mode share for residents adjacent to the El Cerrito del Norte BART station to determine appropriate adjustments to ITE trip generation rates. The El Cerrito del Norte BART station is at or near parking capacity, has basic pedestrian facilities, and is surrounded by typical suburban development with retail uses setback from the street, and surrounded by parking lots.

Based on their research, Dowling recommends using the ITE regression equation for condominiums and reducing the trip generation by 40 percent for a development at a BART station where there is off-street parking available for residents.

BATS 2000 Data

The Bay Area Travel Survey collects data about travel patterns and demographics for nearly 35,000 persons, including those living within 1 mile and ½ mile of various transit operators, and persons not living near transit. Fehr & Peers reviewed the BATS 2000 data on trip patterns for persons living within ½ mile of BART stations. As shown in Table 3, the transit mode share for households living within ½ mile of BART was close to 36 percent. This is consistent with the findings from Fehr & Peers' trip generation surveys and the Dowling memorandum. While the BATS data is not reported separately for households adjacent to BART, it is likely that their transit mode share would be higher than those living ½ mile from BART.

**TABLE 3
 BATS 2000 DATA:
 HOME-BASED WORK MODE SHARE FOR HOUSEHOLDS WITHIN ½ MILE OF BART**

Mode	Share
In-Vehicle Person	48.3%
Vehicle Driver	41.9%
Vehicle Passenger	6.4%
Total Transit	35.5%
BART	22.5%
Other Transit	13.0%
Bicycle	3.5%
Walk	9.8%
Other	3.0%

Source: *Characteristics of Rail and Ferry Station Area Residents in the San Francisco Bay Area: Evidence from the 2000 Bay Area Travel Survey*, Appendix P, Table P2, Metropolitan Transportation Commission, September, 2006.

The analysis completed by Dowling Associates and the BATS 2000 data are consistent with our recommendation to apply a 38 percent reduction to the residential vehicle trip generation (using the ITE Condominium regression equations) for the MacArthur BART Transit Village.

Other Factors

Vehicle Ownership

Based on the latest project description received in June 2007, the proposed project would provide between 700 and 775 residential, retail and community use parking spaces. Research on travel patterns in TODs finds that households with fewer vehicles have higher transit ridership than those with more vehicles. For example, as cited in the Dowling memorandum, Cervero and Duncan found that for residents who live and work within ½ mile of a rail station, the probability of commuting by rail was 85 percent for households with zero vehicles, 44 percent for households with one vehicle, 25 percent for households with two vehicles, and 13 percent for households with three vehicles.

Similarly, the BATS 2000 data for residents living within ¼ mile of the El Cerrito del Norte BART station (summarized in the Dowling memorandum and Table 4 below) shows that the percentage of residents commuting by transit drops from 70 percent for households with zero vehicles, to 33 percent for households with one vehicle, to 21 percent for households with two vehicles, to 13 percent for households with 3 vehicles. Assuming that the number of off-street parking spaces provided for each unit influences vehicle availability, the relatively low ratio of 1.0 parking spaces per unit for the proposed residential units should encourage transit ridership.

TABLE 4 PERCENTAGE COMMUTE BY TRANSIT, HOUSING LOCATION AND VEHICLES AVAILABILITY		
Number of Vehicles Available	Reside within ¼ mile of BART station	Reside between ¼ and ½ mile of BART Station
0	70%	45%
1	33%	21%
2	21%	9%
3	13%	10%
4+	16%	9%

Source: *Recommended Trip Generation Adjustments for Transit-Oriented Developments in Oakland*, Dowling Associates memorandum to Natalie Fay, City of Oakland, April 6, 2006 (provided by Natalie Fay)

Household Income

Lower-income households tend to have higher transit use than higher-income households, generally due to lower vehicle ownership rates. Therefore, residents of the 113 below-market units in the proposed project may have higher transit use (and lower vehicle trip generation) than assumed.

Retail Trips

The proposed MacArthur BART Transit Village includes up to 44,000 square feet of commercial space, which most likely be neighborhood-serving retail space. Although up to 10,000 square-feet of commercial space may be converted to live/work units, this analysis assumes that all commercial space would be used as retail space.

Because the retail space is relatively small and intended to serve primarily BART commuters and nearby residents, we have used the ITE trip generation rates for Specialty Retail, rather than Shopping Center. Based on Oakland’s TIA guidelines, it is appropriate to use Specialty Retail for 25,000 square feet or more of retail, but a pass-by reduction cannot be taken. Because there is no AM data for Specialty Retail, we used the PM rate and reversed the in/out split. This is likely conservative, as the retail may not be open during the AM peak hour.

Literature on mode share for trips to transit-oriented retail locations shows a range from five percent to over twenty percent transit share for shoppers and up to forty percent transit share for retail employees, depending on the size of the retail center, its location, the transit service, and parking availability. Given that the retail proposed for the MacArthur BART Transit Village is relatively small and neighborhood-serving, most of the trips are likely to come from BART patrons and residents of the adjacent housing, who will likely walk or combine the trip with their commute trip. To be conservative, we have applied a five percent transit reduction to the ITE rates. This is consistent with the low end of the TOD research on retail trips.

BART Parking Lot Trips

The proposed MacArthur BART Transit Village project includes removing approximately 300 of the existing 600 parking spaces in the BART lot. This reduction will likely have an effect on peak hour vehicle trips, and travel patterns may change in several ways. Patrons that currently drive to the station and park may shift to a variety of modes, including local bus, walk, or bicycle. Others may carpool or be dropped off at the station. Others may continue to drive and park on-street or in other lots in the area. Others may drive to a different BART station, or drive to their end destination rather than take BART.

As described in the *MacArthur BART Station Access Plan Existing Conditions Report*, the daily fee spaces in the lot currently fill by 7:30 AM. Between half and three-quarters of the 154 monthly reserved spaces are filled by 9:00 AM, leaving between 38 and 77 spaces available. It is likely that with fewer BART parking spaces, the parking lot will fill earlier. Based on recent traffic counts, the AM peak hour for traffic is 8:00 to 9:00 AM. Therefore, any change in vehicle trips to the parking lot in the morning will most likely occur before the peak hour.

Based on recent traffic counts adjacent to the site, the PM peak hour occurs between 5:00 and 6:00 PM. During this hour, approximately 430 vehicles enter and exit the BART parking lot (138 enter, 294 exit). With the reduction in parking spaces, the lot may empty earlier in the evening, if BART patrons who arrive earlier to park would also leave earlier. Therefore, some of the current exits in the PM peak hour may shift to earlier times and reduce the the PM peak hour trip generation. However, to be conservative, we assume that BART patrons currently exiting the lot during the PM peak hour will continue to do so. We assume that patrons entering the lot during the PM peak hour would also continue to do so. We have made no adjustment to the trip generation for additional or reduced trips to and from the BART parking lot during peak hours.

The proposed project may include a Residential Permit Parking (RPP) program for the area within $\frac{1}{4}$ mile of the BART station. Under the RPP program, residents would receive a permit to park on-street, but non-residents would not be able to park on-street for more than two hours. The RPP program would therefore reduce the amount of on-street parking available to BART commuters. According to the *MacArthur BART Station Neighborhood Street Parking and Transit Analysis* (Nelson\Nygaard, May 2006), approximately 470 vehicles enter the proposed RPP area between 6:30 and 9:00 AM to park. This includes BART commuters as well as local workers and other non-residents. With the RPP program, BART commuters who currently park on-street would either park outside the RPP area and walk to the station, shift to transit, bicycle, or carpool, get dropped off at the station, drive to another BART station, or drive to their end destination instead of taking BART. Depending on the magnitude of these mode shifts, up to 470 fewer vehicles may enter the project area in the morning.

If the program were designed to allow non-residents to purchase a permit, most BART commuters who currently park on-street would likely continue to do so, and some BART commuters who currently park in the BART lot would shift to parking on-street. If the RPP were not implemented, BART commuters who currently park on-street would continue to do so, and some BART commuters who currently park in the BART lot would shift to parking on-street. According to the Nelson\Nygaard analysis, the maximum parking occupancy within a $\frac{1}{4}$ mile radius of the station is 65 percent, which occurs at 4:00 PM. Therefore, at least 35 percent of the on-street parking (or about 430 spaces) are available during the day. Given the uncertainty of shifts in travel patterns due to the RPP program, we conservatively assume no net change in trip generation.

Trip Generation Summary

Table 5 summarizes the proposed project's vehicle trip generation. Based on the transit reductions and parking lot trip assumptions described above, the project would generate approximately 4,265 new daily vehicle trips, 325 AM peak hour vehicle trips, and 358 PM peak hour vehicle trips.

**TABLE 5
 PROJECT VEHICLE TRIP GENERATION**

Land Use	ITE Code	Amount	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Condominium ¹	230	675 DU	3,254	40	197	237	193	95	288
Residential Transit Reduction ²		Daily 19% Peak Hr. 38%	-618	-15	-75	-90	-73	-36	-109
Total Residential Trips			2,636	25	122	147	120	59	179
Retail ³	814	44 ksf	1,950	67	52	119	52	67	119
Retail Transit Reduction ⁴		5%	-98	-3	-3	-6	-3	-3	-6
Total Retail Trips			1,852	64	49	113	49	64	113
Community Space ⁵	565	5 ksf	396	34	30	64	31	35	66
BART Parking lot ⁶		-300 spaces	0	0	0	0	0	0	0
Total Trip Generation			4,884	123	201	324	200	158	358

Notes: du = dwelling unit; ksf = 1,000 square feet.

¹ Trip generation based on the regression equations for Residential Condominium/Townhouse (Land Use 230) in the Institute of Transportation Engineers' (ITE) *Trip Generation* (7th Edition), as presented below.

Daily Equation: $\ln(T) = 0.85 \ln(X) + 2.55$
 AM Equation: $\ln(T) = 0.80 \ln(X) + 0.26$ (inbound = 17%, outbound = 83%)
 PM Equation: $\ln(T) = 0.82 \ln(X) + 0.32$ (inbound = 67%, outbound = 33%)
 Where: T = trip ends, Ln = natural logarithm, and X = number of dwelling units

² Residential transit reduction based on trip generation surveys at Bay Area TODs adjacent to BART stations; confirmed by data presented in *Recommended Trip Generation Adjustments for Transit-Oriented Developments in Oakland* (Dowling Inc., April 2006) as well as Bay Area Transportation Surveys (BATS) 2000 data for households within 1/2 mile of BART stations. Transit reduction for daily trip generation is lower to account for lower transit mode share for non-work trips.

³ Daily and PM trip generation based on rates for Specialty Retail (Land Use 814) in the ITE *Trip Generation* (7th Edition) as presented below.

Daily Rate: $(T) = 44.32 (X)$
 PM Rate: $(T) = 2.71 (X)$ (inbound = 44%, outbound = 56%)
 Where: T = trip ends and X = 1,000 square feet
 AM trip generation based on PM trip rate, with reversed inbound/outbound splits.

⁴ Retail transit reduction based on TOD literature on retail trips, including *Travel Characteristics of Transit-Oriented Development in California* (Lund, Cervero, and Wilson, 2004), and *Ridership Impacts of Transit-Focused Development in California* (Cervero, 1993)

⁵ Trip generation based on average rates for Day Care Center (Land Use 565) in the ITE *Trip Generation* (7th Edition) as presented below.

Daily Rate: $(T) = 79.26 (X)$
 AM Rate: $(T) = 12.79 (X)$ (inbound = 53%, outbound = 47%)
 PM Rate: $(T) = 13.18 (X)$ (inbound = 47%, outbound = 53%)
 Where: T = trip ends and X = 1,000 square feet

⁶ The project includes removing approximately 300 of the existing 618 parking spaces in the BART lot. In the AM peak hour, any change in trips to the parking lot will most likely continue to occur before the peak hour. To be conservative, we assume that BART patrons currently entering and exiting the lot in the PM peak hour will continue to do so.

Source: Fehr & Peers, 2007.

ALTERNATE TRIP GENERATION

Table 6 presents an alternate method for estimating trip generation and compares it to the original trip generation presented in Table 5.

The key differences are as follows:

- The residential trip generation reduction is reduced from 38 percent in both the AM and PM peak hours to 33 percent in the AM peak hour and 28 percent in the PM peak hour.
- The retail trip generation is based on the ITE regression equation for Shopping Center rather than Specialty Retail. A pass-by reduction of 56 percent is applied for the PM peak hour. This is based on data in Table 5.4 of the ITE *Trip Generation Handbook*, which shows an average pass-by percentage of 56 percent for shopping centers of 50,000 square feet or less). The daily pass-by rate is assumed to be 28 percent, or about half the PM rate.
- A trip reduction was taken to account for the loss of 300 of the existing 600 spaces in the BART parking lot. No reduction was taken for the AM peak hour because the daily fee spaces fill before the AM peak hour. The PM peak hour and daily reductions are based on the existing number of trips to and from the lot, available on-street parking in the surrounding neighborhood, and estimated shifts to pick-up/drop-off and other modes. The BART parking lot currently generates about 380 trips during the PM peak hour and 1,350 daily trips. There are approximately 140 non-restricted parking spaces available in the neighborhood within walking distance of the station at 9:00 AM that BART parkers could potentially use. Pick-up and drop off trips currently represent about 17 percent of non-drive-alone access to the station. It is estimated that reducing the BART parking supply by 50 percent would result in 50 percent of the current vehicle trips to continue using the BART lot, 23 percent to shift to parking on the surrounding neighborhood streets, 9 percent to shift to pick-up/drop offs, and 18 percent to shift to other modes or not use the MacArthur BART Station. This 18 percent represents the expected reduction in BART parking lot trip generation.

As shown in Table 6, the alternate trip generation is approximately 750 trips higher than the original trip generation on a daily basis, and about six trips lower in the AM peak hour and about 7 trips higher during the PM peak hour. Since the AM and PM peak hour trip generation is about the same as the original trip generation and the traffic analysis will be completed for the AM and PM peak hours, we intend to use the original trip generation for the EIR analysis.

Please contact us with any questions or comments.

**TABLE 6
 ALTERNATIVE PROJECT VEHICLE TRIP GENERATION**

Land Use	ITE Code	Amount	Daily	AM Peak Hour			PM Peak Hour		
				In	Out	Total	In	Out	Total
Condominium ¹	230	675 DU	3,254	40	197	237	193	95	288
Residential Transit Reduction ²		19% Daily, 33% AM, 28% PM	<u>-618</u>	<u>-13</u>	<u>-65</u>	<u>-79</u>	<u>-54</u>	<u>-27</u>	<u>-81</u>
Total Residential Trips			2,638	27	132	159	139	68	207
Retail ³	814	44 ksf	3,983	58	37	96	175	189	364
Retail Pass-By Reduction ⁴		28% Daily 56% PM	-1,115	0	0	0	-8	-06	-04
Total Retail Trips			2868	58	37	96	77	83	160
Community Space ⁵	565	5 ksf	396	34	30	64	31	35	66
BART Parking lot ⁶		-300 spaces	-263	0	0	0	-13	-55	-69
Total Trip Generation			5,636	119	200	319	233	131	365
Total Original Trip Generation			4,884	123	202	325	200	158	358
Difference			752	-3	-3	-6	33	-27	7

Notes: du = dwelling unit; ksf = 1,000 square feet.

¹ Trip generation based on the regression equations for Residential Condominium/Townhouse (Land Use 230) in the Institute of Transportation Engineers' (ITE) *Trip Generation* (7th Edition), as presented below.

Daily Equation: $\ln(T) = 0.85 \ln(X) + 2.55$
 AM Equation: $\ln(T) = 0.80 \ln(X) + 0.26$ (inbound = 17%, outbound = 83%)
 PM Equation: $\ln(T) = 0.82 \ln(X) + 0.32$ (inbound = 67%, outbound = 33%)
 Where: T = trip ends, Ln = natural logarithm, and X = number of dwelling units

² Residential transit reduction based on trip generation surveys at Bay Area TODs adjacent to BART stations; confirmed by data presented in *Recommended Trip Generation Adjustments for Transit-Oriented Developments in Oakland* (Dowling Inc., April 2006) as well as Bay Area Transportation Surveys (BATS) 2000 data for households within 1/2 mile of BART stations.

³ Daily and PM trip generation based on the equation for Shopping Center (Land Use 820) in the Institute of Transportation Engineers' (ITE) *Trip Generation* (7th Edition), as presented below.

Daily Equation: $\ln(T) = 0.65 \ln(X) + 5.83$
 AM Equation: $\ln(T) = 0.60 \ln(X) + 2.29$ (inbound = 61%, outbound = 39%)
 PM Equation: $\ln(T) = 0.66 \ln(X) + 3.4$ (inbound = 48%, outbound = 52%)
 Where: T = trip ends, Ln = natural logarithm, and X = Thousand square feet of retail space

⁴ Pass-By Reduction based on Table 5.4 in the ITE *Trip Generation Handbook*, which shows an average pass-by percentage of 56 percent for shopping centers of 50,000 square feet or less. The daily pass-by rate is assumed to be about half the PM rate.

⁵ Trip generation based on the average rates for Day Care Center (Land Use 565) in the ITE *Trip Generation* (7th Edition), as presented below.

Daily Rate: $(T) = 79.26 (X)$
 AM Rate: $(T) = 12.79 (X)$ (inbound = 53%, outbound = 47%)
 PM Rate: $(T) = 13.18 (X)$ (inbound = 47%, outbound = 53%)
 Where: T = trip ends and X = 1,000 square feet

⁶ The project includes removing approximately 300 of the existing 600 parking spaces in the BART lot. In the AM peak hour, any change in trips to the parking lot will most likely continue to occur before the peak hour. To be conservative, we assume that BART patrons currently entering and exiting the lot in the PM peak hour will continue to do so.

Source: Fehr & Peers, 2007.

**APPENDIX D:
EXISTING PLUS PROJECT CONDITIONS INTERSECTION
LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
 1: 52nd Street & Shattuck Ave.

HCM Signalized Intersection Capacity Analysis
 2: 52nd Street & Telegraph Ave.

Existing+Project AM
 1/21/2008

Existing+Project AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	16
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98
Fipb, ped/bikes	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4922	1770	4965	1770	4965	2006	2048	1984	1926	1984	1926
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.11	1.00	0.46	1.00	0.46	1.00
Satd. Flow (perm)	1770	4922	1770	4965	1770	4965	222	2048	968	1926	968	1926
Volume (vph)	288	907	175	65	1219	165	206	268	50	146	277	246
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	303	955	184	68	1283	174	217	282	53	154	292	259
RTOR Reduction (vph)	0	20	0	0	14	0	0	6	0	0	0	28
Lane Group Flow (vph)	303	1119	0	68	1443	0	217	329	0	154	523	0
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	3	8	5	2	6	6	6	6	6	6
Permitted Phases												
Actuated Green, G (s)	17.0	56.4	8.6	48.0	44.5	44.5	35.5	35.5	35.5	35.5	35.5	35.5
Effective Green, g (s)	17.0	56.4	8.6	48.0	45.0	45.0	36.0	36.0	36.0	36.0	36.0	36.0
Actuated g/C Ratio	0.14	0.47	0.07	0.40	0.38	0.38	0.30	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5
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
Lane Grp Cap (vph)	251	2313	127	1986	187	768	290	578	290	578	290	578
v/s Ratio Prot	c0.17	0.23	0.04	c0.29	c0.07	0.16	c0.27	c0.27	c0.27	c0.27	c0.27	c0.27
v/s Ratio Perm							0.16	0.16	0.16	0.16	0.16	0.16
v/c Ratio	1.21	0.48	0.54	0.73	1.16	0.43	0.53	0.90	0.53	0.90	0.53	0.90
Uniform Delay, d1	51.5	21.8	53.8	30.5	33.9	27.9	35.0	40.4	35.0	40.4	35.0	40.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	124.5	0.7	4.3	2.4	115.7	0.4	1.9	17.6	1.9	17.6	1.9	17.6
Delay (s)	176.0	22.5	58.1	32.8	149.5	28.3	36.8	58.0	36.8	58.0	36.8	58.0
Level of Service	F	C	E	C	F	C	D	E	D	E	D	E
Approach Delay (s)	54.8		33.9		76.0		53.4		53.4		53.4	
Approach LOS	D		C		E		D		D		D	
Intersection Summary												
HCM Average Control Delay	49.8											
HCM Volume to Capacity ratio	0.88											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	98.2%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

Existing+Project AM
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.98	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3432	1770	3398	1770	3441	1770	3441	1770	3353	1770	3353
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3432	1770	3398	1770	3441	1770	3441	1770	3353	1770	3353
Volume (vph)	450	533	86	101	677	209	107	591	99	140	509	143
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	469	555	90	105	705	218	111	616	103	146	530	149
RTOR Reduction (vph)	0	14	0	0	32	0	0	15	0	0	27	0
Lane Group Flow (vph)	469	631	0	105	891	0	111	704	0	146	652	0
Confl. Peds. (#/hr)	6	24	24	24	24	6	36	28	28	28	28	36
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Actuated Green, G (s)	13.0	30.6	7.9	25.5	8.0	24.4	10.1	26.5				
Effective Green, g (s)	12.5	31.6	7.4	26.5	7.5	25.4	9.6	27.5				
Actuated g/C Ratio	0.14	0.35	0.08	0.29	0.08	0.28	0.11	0.31				
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	477	1205	146	1001	148	971	189	1025				
v/s Ratio Prot	c0.14	0.18	0.06	c0.26	0.06	c0.20	c0.08	0.19				
v/s Ratio Perm	0.98	0.52	0.72	0.89	0.75	0.72	0.77	0.64				
Uniform Delay, d1	38.6	23.2	40.3	30.4	40.3	29.1	39.1	26.9				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.11	0.82				
Incremental Delay, d2	36.5	0.2	13.2	9.5	17.1	4.7	14.5	2.7				
Delay (s)	75.2	23.4	53.4	39.9	57.4	33.9	58.1	24.8				
Level of Service	E	C	D	D	E	C	E	C				
Approach Delay (s)	45.2		41.3		37.0		30.7					
Approach LOS	D		D		D		C					
Intersection Summary												
HCM Average Control Delay	39.2 HCM Level of Service D											
HCM Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	79.3% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr Way

Existing+Project AM
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.86	0.86	1.00	0.95	0.95	0.95	0.93	0.93	1.00	0.97	1.00	0.97
Frt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1611	1611	3285	3433	3447	1611	3285	3433	3447	1611	3285	3433
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1611	1611	3285	3433	3447	1611	3285	3433	3447	1611	3285	3433
Volume (vph)	0	0	7	0	0	0	7	322	287	1585	289	56
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	8	0	0	0	8	350	323	1723	292	61
RTOR Reduction (vph)	0	8	0	0	0	0	0	24	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	657	0	1723	353	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases							2	1	6			
Permitted Phases												
Actuated Green, G (s)	0.0	0.0	8.0	8.0	29.0	45.0	8.0	29.0	45.0	8.0	29.0	45.0
Effective Green, g (s)	0.0	0.0	8.0	8.0	29.0	45.0	8.0	29.0	45.0	8.0	29.0	45.0
Actuated g/C Ratio	0.00	0.00	0.18	0.18	0.64	1.00	0.18	0.64	1.00	0.18	0.64	1.00
Clearance Time (s)			4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	0	0	554	554	2212	3447	554	2212	3447	554	2212	3447
v/s Ratio Prot			c0.21	c0.21	0.78	1.00	c0.21	0.78	1.00	c0.21	0.78	1.00
v/s Ratio Perm	0.00	0.00	11.14dr	11.14dr	5.7	0.0	11.14dr	5.7	0.0	11.14dr	5.7	0.0
Uniform Delay, d1	22.5	22.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5	18.5
Progression Factor	1.00	1.00	0.76	0.76	1.00	1.00	0.76	1.00	1.00	0.76	1.00	1.00
Incremental Delay, d2	0.0	0.0	100.0	100.0	2.8	0.1	100.0	2.8	0.1	100.0	2.8	0.1
Delay (s)	22.5	22.5	114.1	114.1	8.5	0.1	114.1	8.5	0.1	114.1	8.5	0.1
Level of Service	C	C	F	F	A	A	F	A	A	F	A	A
Approach Delay (s)	22.5	22.5	114.1	114.1	7.1	0.1	114.1	7.1	0.1	114.1	7.1	0.1
Approach LOS	C	C	F	F	A	A	F	A	A	F	A	A
Intersection Summary												
HCM Average Control Delay	33.5 HCM Level of Service C											
HCM Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	77.2% ICU Level of Service D											
Analysis Period (min)	15											
dr Defacto Right Lane. Recode with 1 through lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

Existing+Project AM
 1/21/2008




Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.97	0.96	0.96	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Fipb, ped/bikes	0.97	0.96	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.94	0.94	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1674	1596	1596	3393	3393	3393	3459	3459	3459	3459	3459	3459
Flt Permitted	0.80	0.88	0.88	0.92	0.92	0.92	0.88	0.88	0.88	0.88	0.88	0.88
Satd. Flow (perm)	1364	1419	1419	3144	3144	3144	3048	3048	3048	3048	3048	3048
Volume (vph)	69	50	24	51	44	72	24	468	80	41	423	28
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	77	56	27	57	49	80	27	520	89	46	470	31
RTOR Reduction (vph)	0	16	0	0	53	0	0	29	0	0	10	0
Lane Group Flow (vph)	0	144	0	0	133	0	0	607	0	0	537	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (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
Lane Grp Cap (vph)	455	455	455	473	473	473	1537	1537	1537	1537	1490	1490
v/s Ratio Prot	c0.11	c0.11	c0.11	0.09	0.09	0.09	c0.19	c0.19	c0.19	c0.19	0.18	0.18
v/s Ratio Perm	0.32	0.32	0.32	0.28	0.28	0.28	0.39	0.39	0.39	0.39	0.36	0.36
v/c Ratio	11.2	11.2	11.2	11.0	11.0	11.0	7.3	7.3	7.3	7.3	7.1	7.1
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.8	1.8	1.8	1.5	1.5	1.5	0.8	0.8	0.8	0.8	0.7	0.7
Incremental Delay, d2	13.0	13.0	13.0	12.5	12.5	12.5	8.0	8.0	8.0	8.0	7.8	7.8
Delay (s)	B	B	B	B	B	B	A	A	A	A	A	A
Level of Service	B	B	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	13.0	13.0	13.0	12.5	12.5	12.5	8.0	8.0	8.0	8.0	7.8	7.8
Approach LOS	B	B	B	B	B	B	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.0											
HCM Volume to Capacity ratio	0.36											
Actuated Cycle Length (s)	45.0											
Intersection Capacity Utilization	60.5%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.96	0.96	0.96	0.96	0.96	0.96	0.98	0.98	0.98	0.98	0.98	0.98
Fipb, ped/bikes	0.97	0.97	0.97	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.96	0.96	0.96	0.96	0.96	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1641	1658	1658	3456	3456	3456	4887	4887	4887	4887	4887	4887
Flt Permitted	0.82	0.82	0.82	0.83	0.83	0.83	0.91	0.91	0.91	0.91	0.81	0.81
Satd. Flow (perm)	1366	1366	1366	1392	1392	1392	3134	3134	3134	3134	3979	3979
Volume (vph)	51	74	52	29	29	36	22	943	47	61	991	83
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	57	82	58	32	32	40	24	1048	52	68	1101	92
RTOR Reduction (vph)	0	24	0	0	25	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	173	0	0	110	0	0	1122	0	0	1256	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	2	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	2	6	6
Actuated Green, G (s)	13.1	13.1	13.1	13.1	13.1	13.1	62.9	62.9	62.9	62.9	62.9	62.9
Effective Green, g (s)	13.6	13.6	13.6	13.6	13.6	13.6	63.4	63.4	63.4	63.4	63.4	63.4
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.75	0.75	0.75	0.75	0.75	0.75
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	219	219	219	223	223	223	2338	2338	2338	2338	2968	2968
v/s Ratio Prot	c0.13	c0.13	c0.13	0.08	0.08	0.08	c0.36	c0.36	c0.36	c0.36	0.32	0.32
v/s Ratio Perm	0.79	0.79	0.79	0.49	0.49	0.49	0.48	0.48	0.48	0.48	0.42	0.42
v/c Ratio	34.3	34.3	34.3	32.6	32.6	32.6	4.3	4.3	4.3	4.3	4.0	4.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.18	1.18	1.18	1.18	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.6	0.6	0.6	0.6	0.4	0.4
Incremental Delay, d2	15.8	15.8	15.8	15.8	15.8	15.8	33.2	33.2	33.2	33.2	5.8	5.8
Delay (s)	D	D	D	D	D	D	C	C	C	C	A	A
Level of Service	D	D	D	D	D	D	C	C	C	C	A	A
Approach Delay (s)	50.1	50.1	50.1	33.2	33.2	33.2	5.8	5.8	5.8	5.8	4.5	4.5
Approach LOS	D	D	D	C	C	C	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.7											
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	88.6%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 7: 40th St. & Market St.


HCM Signalized Intersection Capacity Analysis
 8: 40th St. & West St.

Existing+Project AM
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.98	1.00	1.00
Ftpb, ped/bikes	0.98	1.00	0.98	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00
Frt	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1731	3475	1757	3471	1766	1813	1734	1841				
Flt Permitted	0.32	1.00	0.47	1.00	0.47	1.00	0.62	1.00	0.63	1.00	0.63	1.00
Satd. Flow (perm)	574	3475	862	3471	1145	1813	1148	1841				
Volume (vph)	19	300	35	28	454	43	82	160	26	88	187	15
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	21	330	38	31	499	47	90	176	29	97	205	16
RTOR Reduction (vph)	0	11	0	0	9	0	0	7	0	0	0	3
Lane Group Flow (vph)	21	357	0	31	537	0	90	198	0	97	218	0
Confl. Peds. (#/hr)	30		12	12	30	6	54	54	6			6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4					8		2			6	
Permitted Phases		4		8			2		2		6	
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	165	999	248	998	701	1110	703	1128				
v/s Ratio Prot	0.10						c0.15				c0.12	
v/s Ratio Perm	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.11	0.08	0.11	0.08	0.11
v/c Ratio	0.13	0.36	0.12	0.54	0.12	0.54	0.13	0.18	0.14	0.19	0.14	0.19
Uniform Delay, d1	21.1	22.6	21.1	24.0	21.1	24.0	6.5	6.7	6.6	6.8	6.6	6.8
Progression Factor	1.00	1.00	1.00	0.97	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.0	1.0	2.0	1.0	2.0	0.4	0.4	0.4	0.4	0.4	0.4
Delay (s)	22.7	23.6	22.1	25.5	22.1	25.5	6.9	7.1	7.0	7.2	7.0	7.2
Level of Service	C	C	C	C	C	C	A	A	A	A	A	A
Approach Delay (s)	23.6		23.6	25.2	23.6	25.2	7.0	7.1	7.1	7.1	7.1	7.1
Approach LOS	C		C	C	C	C	A	A	A	A	A	A

Intersection Summary	
HCM Average Control Delay	17.8
HCM Level of Service	B
HCM Volume to Capacity ratio	0.30
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.1%
ICU Level of Service	D
Analysis Period (min)	15
Critical Lane Group	



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00
Ftpb, ped/bikes	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97	0.97
Frt	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1759	3460	1736	3518	1736	3518	3354	3373				
Flt Permitted	0.44	1.00	0.47	1.00	0.47	1.00	0.85	1.00	0.85	1.00	0.85	1.00
Satd. Flow (perm)	808	3460	852	3518	852	3518	2882	3055				
Volume (vph)	15	376	48	32	453	16	61	101	45	19	66	25
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	396	51	34	477	17	64	106	47	20	69	26
RTOR Reduction (vph)	0	12	0	0	3	0	0	28	0	0	15	0
Lane Group Flow (vph)	16	435	0	34	491	0	0	189	0	0	100	0
Confl. Peds. (#/hr)	18		54	54	18	4	18	18	18	18	18	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4						8		2		6	
Permitted Phases		4		8			2		2		6	
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	38.0	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.41	0.41	0.41	0.41	0.41	0.41
Clearance 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
Lane Grp Cap (vph)	394	1687	415	1715	415	1715	1189	1260				
v/s Ratio Prot	0.13						c0.14				c0.12	
v/s Ratio Perm	0.02	0.13	0.02	0.04	0.02	0.04	c0.07		0.03	0.03	0.03	0.03
v/c Ratio	0.04	0.26	0.04	0.08	0.04	0.08	0.16	0.16	0.08	0.08	0.08	0.08
Uniform Delay, d1	10.7	12.0	10.9	12.2	10.9	12.2	14.8	14.8	14.3	14.3	14.3	14.3
Progression Factor	0.91	1.04	0.91	1.38	0.91	1.43	0.40	0.40	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.4	0.2	0.4	0.2	0.4	0.3	0.3	0.1	0.1	0.1	0.1
Delay (s)	10.9	12.4	11.1	12.6	11.1	12.6	15.1	15.1	14.4	14.4	14.4	14.4
Level of Service	A	B	A	B	A	B	A	A	B	B	B	B
Approach Delay (s)	12.8		12.8	17.8	12.8	17.8	6.2	6.2	14.4	14.4	14.4	14.4
Approach LOS	B		B	B	B	B	A	A	B	B	B	B

Intersection Summary	
HCM Average Control Delay	13.8
HCM Level of Service	B
HCM Volume to Capacity ratio	0.23
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	53.2%
ICU Level of Service	A
Analysis Period (min)	15
Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

Existing+Project AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	1.00	1.00	0.98	1.00	1.00	1.00	0.97	1.00	0.99	1.00	0.99
Frt	1.00	0.99	1.00	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1759	3496	1729	3402	3396	3396	3435	3435	3435	3435	3435	3435
Flt Permitted	0.41	1.00	0.48	1.00	0.90	1.00	0.90	1.00	0.81	1.00	0.81	1.00
Satd. Flow (perm)	759	3496	876	3402	3087	3087	2819	2819	2819	2819	2819	2819
Volume (vph)	31	389	25	89	414	112	30	226	62	71	217	29
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	32	405	26	93	431	117	31	235	65	74	228	30
RTOR Reduction (vph)	0	6	0	0	31	0	0	27	0	0	9	0
Lane Group Flow (vph)	32	425	0	93	517	0	0	304	0	0	321	0
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.97	1.00	1.00	1.00	1.00	0.96	1.00
Flt Protected	1.00	0.95	1.00	0.96	1.00	0.96	1.00
Satd. Flow (prot)	3130	1770	3539	1733	1733	1733	1733
Flt Permitted	1.00	0.95	1.00	0.96	1.00	0.96	1.00
Satd. Flow (perm)	3130	1770	3539	1733	1733	1733	1733
Volume (vph)	432	94	73	501	116	41	41
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	475	103	80	551	127	45	45
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	578	0	80	551	172	0	0
Confl. Peds. (#/hr)	146	266	266	146	146	146	146

Turn Type	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	6
Permitted Phases	4	8	8	2	6
Actuated Green, G (s)	41.5	41.5	41.5	32.0	32.0
Effective Green, g (s)	41.0	41.0	41.0	31.0	31.0
Actuated g/C Ratio	0.51	0.51	0.51	0.39	0.39
Clearance Time (s)	3.5	3.5	3.5	3.0	3.0
Lane Grp Cap (vph)	389	1792	449	1744	1092
v/s Ratio Prot	0.12	0.11	0.11	0.10	0.11
v/s Ratio Perm	0.08	0.24	0.21	0.30	0.29
v/c Ratio	9.9	10.8	10.6	11.2	16.9
Uniform Delay, d1	1.33	1.43	1.00	1.00	1.00
Progression Factor	0.4	0.3	1.0	0.4	0.7
Incremental Delay, d2	13.6	15.8	11.7	11.6	17.6
Delay (s)	B	B	B	B	B
Level of Service	B	B	B	B	B
Approach Delay (s)	15.6	11.6	12.2	17.6	17.6
Approach LOS	B	B	B	B	B

Turn Type	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	3	8	2	2
Permitted Phases	4	3	8	2	2
Actuated Green, G (s)	48.0	12.8	64.8	12.2	12.2
Effective Green, g (s)	48.0	12.8	64.8	12.2	12.2
Actuated g/C Ratio	0.56	0.15	0.76	0.14	0.14
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1768	267	2698	249	249
v/s Ratio Prot	c0.18	c0.05	0.16	c0.10	c0.10
v/s Ratio Perm	0.33	0.30	0.20	0.69	0.69
v/c Ratio	9.9	32.1	2.8	34.6	34.6
Uniform Delay, d1	1.00	0.89	0.55	1.12	1.12
Progression Factor	1.00	0.89	0.55	1.12	1.12
Incremental Delay, d2	0.5	0.5	0.1	8.0	8.0
Delay (s)	10.4	29.0	1.7	46.8	46.8
Level of Service	B	C	A	D	D
Approach Delay (s)	10.4	5.2	46.8	46.8	46.8
Approach LOS	B	A	D	D	D

Intersection Summary	
HCM Average Control Delay	13.9
HCM Volume to Capacity ratio	0.30
Actuated Cycle Length (s)	80.0
Intersection Capacity Utilization	101.6%
Analysis Period (min)	15
c Critical Lane Group	

Intersection Summary	
HCM Average Control Delay	12.5
HCM Volume to Capacity ratio	0.38
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	39.2%
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave.

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

Existing+Project AM
 1/21/2008

Existing+Project AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fpb, ped/bikes	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Fipb, ped/bikes	0.93	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1650	3361	1628	3370	1770	3450	1770	3450	1770	3369	1770	3369
Flt Permitted	0.33	1.00	0.35	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (pperm)	577	3361	599	3370	1770	3450	1770	3450	1770	3369	1770	3369
Volume (vph)	68	343	62	53	357	64	95	451	45	78	555	124
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	76	381	69	59	397	71	106	501	50	87	617	138
RTOR Reduction (vph)	0	19	0	0	19	0	0	7	0	0	0	17
Lane Group Flow (vph)	76	431	0	59	449	0	106	544	0	87	738	0
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	58	92
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4			8			5		2		1	6
Permitted Phases	4		8									
Actuated Green, G (s)	19.6	19.6	19.6	19.6	19.6	19.6	8.3	45.0	6.9	43.6	6.9	43.6
Effective Green, g (s)	20.1	20.1	20.1	20.1	20.1	20.1	8.8	45.5	7.4	44.1	7.4	44.1
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24	0.24	0.10	0.54	0.09	0.52	0.09	0.52
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grip Cap (vph)	136	795	142	797	183	1847	154	1748	154	1748	154	1748
v/s Ratio Prot	0.13			c0.13			c0.06	0.16	0.05	c0.22		
v/s Ratio Perm	0.13		0.10				0.58	0.29	0.56	0.42		
v/c Ratio	0.56	0.54	0.42	0.56			36.3	10.9	37.3	12.6		
Uniform Delay, d1	28.5	28.4	27.5	28.6			0.73	1.37	1.25	0.77		
Progression Factor	0.56	0.60	1.00	1.00			2.7	0.4	2.5	0.7		
Incremental Delay, d2	2.7	0.4	0.7	0.5			29.2	15.3	49.1	10.3		
Delay (s)	18.7	17.6	18.2	17.6			17.5	17.5	17.5	14.3		
Level of Service	B	B	C	C			C	B	D	B		
Approach Delay (s)	17.7		17.7		29.0		17.5		17.5	14.3		
Approach LOS	B		B		C		B		B	B		
Intersection Summary												
HCM Average Control Delay	18.9											
HCM Volume to Capacity ratio	0.48											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	59.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

Existing+Project AM
 1/21/2008

Existing+Project AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.99	1.00	0.97	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99
Frt	0.99	1.00	0.97	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.99	1.00
Flt Protected	0.99	0.95	1.00	0.99	0.99	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4986	1754	3419	1775	1725	1842	1775	1725	1842	1775	1725	1842
Flt Permitted	0.88	0.53	1.00	0.88	0.88	0.44	1.00	0.88	0.44	1.00	0.88	0.44
Satd. Flow (perm)	4407	976	3419	1579	1579	801	1842	1579	801	1842	1579	801
Volume (vph)	34	272	25	51	276	67	58	174	49	64	188	12
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	296	27	55	300	73	63	189	53	70	204	13
RTOR Reduction (vph)	0	10	0	0	25	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	350	0	55	348	0	0	296	0	70	214	0
Conf. Peds. (#/hr)	24	18	18	18	24	24	24	48	48	48	48	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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
Lane Grp Cap (vph)	2696	597	2092	464	464	236	542	464	236	542	464	236
v/s Ratio Prot				c0.10								0.12
v/s Ratio Perm	0.08	0.06	0.06	0.09	0.09	0.09	0.19	0.09	0.09	0.09	0.09	0.12
v/c Ratio	0.13	0.09	0.17	0.09	0.17	0.09	0.30	0.30	0.30	0.30	0.30	0.40
Uniform Delay, d1	7.0	6.8	7.1	23.2	24.0	24.0	23.2	24.0	24.0	24.0	24.0	24.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3	0.2	6.6	3.2	2.2	3.2	2.2	2.2	2.2	2.2	2.2
Delay (s)	7.1	7.1	7.3	32.6	26.4	26.1	26.4	26.1	26.1	26.1	26.1	26.1
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	7.1	7.3	7.3	32.6	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	16.8											
HCM Level of Service	B											
HCM Volume to Capacity ratio	0.32											
Actuated Cycle Length (s)	85.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	92.5%											
ICU Level of Service	F											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.99	1.00	0.99
Frt	1.00	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.96	1.00	0.99	1.00
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5050	4992	4992	1750	1782	1746	1837	1750	1782	1746	1837	1750
Flt Permitted	0.90	0.88	0.88	0.63	1.00	0.63	1.00	0.63	1.00	0.45	1.00	0.63
Satd. Flow (perm)	4560	4415	4415	1169	1782	829	1837	1169	1782	829	1837	1169
Volume (vph)	25	376	7	34	340	33	30	170	53	23	119	10
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	409	8	37	370	36	33	185	58	25	129	11
RTOR Reduction (vph)	0	2	0	0	13	0	0	14	0	0	4	0
Lane Group Flow (vph)	0	442	0	0	430	0	33	229	0	25	136	0
Conf. Peds. (#/hr)	18	18	18	18	18	12	18	18	18	18	18	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2936	2842	2842	300	457	471	60.13	60.13	60.13	212	471	0.07
v/s Ratio Prot				c0.10								0.12
v/s Ratio Perm	0.10	0.15	0.15	0.11	0.11	0.11	0.50	0.50	0.50	0.12	0.29	0.29
v/c Ratio	0.15	0.15	0.15	0.11	0.11	0.11	0.50	0.50	0.50	0.12	0.29	0.29
Uniform Delay, d1	5.6	5.6	5.6	22.8	25.4	22.8	25.4	22.8	25.4	22.8	23.9	23.9
Progression Factor	1.00	1.00	1.00	0.80	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96
Incremental Delay, d2	0.1	0.1	0.1	0.1	0.1	0.1	3.9	3.9	3.9	1.1	1.5	1.5
Delay (s)	5.7	5.7	5.7	4.6	4.6	4.6	23.5	29.3	23.0	24.4	24.4	24.4
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	5.7	5.7	5.7	4.6	4.6	4.6	28.6	24.2	24.2	24.2	24.2	24.2
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	12.4											
HCM Level of Service	B											
HCM Volume to Capacity ratio	0.25											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	51.3%											
ICU Level of Service	A											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr Way

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

Existing+Project AM
1/21/2008

Existing+Project AM
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	0.97	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5003	4863	4863	3426	3426	3421	3421	3421	3421	3421	3421	3421
Flt Permitted	0.85	0.86	0.86	0.92	0.92	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Satd. Flow (perm)	4267	4215	4215	3153	3153	2910	2910	2910	2910	2910	2910	2910
Volume (vph)	45	389	28	46	363	122	15	156	31	61	209	37
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	423	30	50	395	133	16	170	34	66	227	40
RTOR Reduction (vph)	0	9	0	0	47	0	0	19	0	0	13	0
Lane Group Flow (vph)	0	493	0	0	531	0	0	201	0	0	320	0
Conf. Peds. (#/hr)	17	19	19	17	12	16	16	16	16	16	16	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6
Permitted Phases	4	8	8	50.0	50.0	19.0	19.0	19.0	19.0	6	6	6
Actuated Green, G (s)	50.0	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	19.0	19.0	19.0
Effective Green, g (s)	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Actuated g/C Ratio	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Clearance Time (s)	2.747	2.713	2.713	0.13	0.13	0.06	0.06	0.06	0.06	0.11	0.11	0.11
Lane Grp Cap (vph)	0.12	0.18	0.18	0.20	0.20	0.25	0.25	0.25	0.25	0.43	0.43	0.43
v/s Ratio Prot	5.7	5.7	5.7	5.8	5.8	23.6	23.6	23.6	23.6	24.9	24.9	24.9
v/s Ratio Perm	0.80	0.80	0.80	1.00	1.00	1.00	1.00	1.00	1.00	0.53	0.53	0.53
Uniform Delay, d1	0.1	0.2	0.2	0.7	0.7	1.8	1.8	1.8	1.8	14.9	14.9	14.9
Progression Factor	A	A	A	A	A	C	C	C	C	B	B	B
Incremental Delay, d2	4.7	4.7	4.7	6.0	6.0	24.4	24.4	24.4	24.4	14.9	14.9	14.9
Delay (s)	A	A	A	A	A	C	C	C	C	B	B	B
Level of Service	4.7	6.0	6.0	6.0	6.0	24.4	24.4	24.4	24.4	14.9	14.9	14.9
Approach Delay (s)	A	A	A	A	A	C	C	C	C	B	B	B
Approach LOS	A	A	A	A	A	C	C	C	C	B	B	B
Intersection Summary												
HCM Average Control Delay	9.9											
HCM Volume to Capacity ratio	0.26											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	80.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

Existing+Project AM
 1/21/2008

Existing+Project AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Fipb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Frt	0.97	0.97	0.97	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97	1.00
Flt Protected	0.99	0.99	0.99	0.99	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4869	4823	4823	1753	3471	1738	3394					
Flt Permitted	0.69	0.74	0.74	0.38	1.00	0.51	1.00					
Satd. Flow (perm)	3386	3583	3583	700	3471	927	3394					
Volume (vph)	109	337	94	79	382	132	60	348	39	100	475	134
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	118	366	102	86	415	143	65	378	42	109	516	146
RTOR Reduction (vph)	0	55	0	0	108	0	0	5	0	0	15	0
Lane Group Flow (vph)	0	531	0	0	536	0	65	415	0	109	647	0
Confl. Peds. (#/hr)	40	9	9	pm+pt	40	25	31	31	31	31	31	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	3	8									6
Permitted Phases	4	8		2								6
Actuated Green, G (s)	19.2			19.2			55.3	55.3	55.3	55.3		55.3
Effective Green, g (s)	20.7			20.7			56.3	56.3	56.3	56.3		56.3
Actuated g/C Ratio	0.24			0.24			0.66	0.66	0.66	0.66		0.66
Clearance Time (s)	5.5			5.5			5.0	5.0	5.0	5.0		5.0
Vehicle Extension (s)	2.0			2.0			2.0	2.0	2.0	2.0		2.0
Lane Grp Cap (vph)	825			873			464	2299	614	2248		
v/s Ratio Prot							0.12					0.19
v/s Ratio Perm	0.16			0.15			0.09	0.12	0.12	0.12		0.19
v/c Ratio	0.64			0.61			0.14	0.18	0.18	0.18		0.29
Uniform Delay, d1	28.8			28.6			5.3	5.5	5.5	5.5		6.0
Progression Factor	0.85			1.00			1.26	1.22	1.22	1.22		0.18
Incremental Delay, d2	1.3			0.9			0.6	0.2	0.6	0.6		0.3
Delay (s)	25.7			29.5			7.4	6.9	7.4	7.4		1.4
Level of Service	C			C			A	A	A	A		A
Approach Delay (s)	25.7			29.5			7.0	6.9	7.0	7.0		1.5
Approach LOS	C			C			A	A	A	A		A
Intersection Summary												
HCM Average Control Delay	15.5 HCM Level of Service B											
HCM Volume to Capacity ratio	0.38											
Actuated Cycle Length (s)	85.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	70.3% ICU Level of Service C											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

HCM Signalized Intersection Capacity Analysis
 23: 34th St & Telegraph Ave.

Existing+Project AM
 1/21/2008

Existing+Project AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Fp/b, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Ft	1.00	0.98	1.00	0.94	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4943	1770	4737	1770	4943	1770	4943	1770	4981	1770	4981
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4943	1770	4737	1770	4943	1770	4943	1770	4981	1770	4981
Volume (vph)	70	410	55	112	436	253	89	260	42	226	522	64
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	456	61	124	484	281	99	289	47	251	580	71
RTOR Reduction (vph)	0	18	0	0	111	0	0	25	0	0	17	0
Lane Group Flow (vph)	78	499	0	124	654	0	99	312	0	251	634	0
Confl. Peds. (#/hr)			66			23			38			26
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	4		3	4		1	2		1	2	
Permitted Phases												
Actuated Green, G (s)	10.5	26.5		10.5	26.5		9.0	26.0		9.0	26.0	
Effective Green, g (s)	10.5	27.5		10.5	27.5		9.0	27.0		9.0	27.0	
Actuated g/C Ratio	0.12	0.31		0.12	0.31		0.10	0.30		0.10	0.30	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	207	1510		207	1447		177	1483		177	1494	
v/s Ratio Prot	0.04	0.10		0.07	0.14		0.06	0.06		0.04	0.13	
v/s Ratio Perm												
v/c Ratio	0.38	0.33		0.60	0.45		0.56	0.21		1.42	0.42	
Uniform Delay, d1	36.7	24.1		37.8	25.2		38.6	23.5		40.5	25.3	
Progression Factor	1.00	1.00		0.97	2.02		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.6		2.4	0.8		2.2	0.3		217.9	0.9	
Delay (s)	37.1	24.7		39.2	51.6		40.8	23.9		258.4	26.2	
Level of Service	D	C		D	D		D	C		F	C	
Approach Delay (s)	26.4		C	49.8		D	27.7		C	90.8		F
Approach LOS	C		C	D		D	C		C	F		F
Intersection Summary												
HCM Average Control Delay	54.6 HCM Level of Service D											
HCM Volume to Capacity ratio	0.58											
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	72.9% ICU Level of Service C											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: 27th St & Telegraph Ave., Existing+Project AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.97	1.00	0.94	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Frt	1.00	0.97	1.00	1.00	1.00	1.00	0.93	1.00	0.99	1.00	0.95	1.00
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.96	1.00	0.95	1.00	0.99	1.00	0.95	1.00
Satd. Flow (perm)	1770	3330	1770	3191	1770	3191	1647	3464	1675	3209	1675	3209
Volume (vph)	255	350	97	50	270	105	58	322	30	47	338	141
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	283	389	108	56	300	117	64	358	33	52	376	157
RTOR Reduction (vph)	0	28	0	0	55	0	0	7	0	0	43	0
Lane Group Flow (vph)	283	469	0	56	362	0	64	384	0	52	490	0
Confl. Peds. (#/hr)	100			100			100		100		100	
Turn Type	Prot	Prot	Prot	Prot	Perm	Perm	Prot	Perm	Perm	Perm	Prot	Perm
Protected Phases	7	4		3	8		2		2		6	
Actuated Green, G (s)	16.5	26.7	4.9	15.1	39.9	39.9	41.4	41.4	39.9	39.9	41.4	39.9
Effective Green, g (s)	17.0	26.2	5.4	14.6	41.4	41.4	0.49	0.49	41.4	41.4	0.49	41.4
Actuated g/C Ratio	0.20	0.31	0.06	0.17	0.49	0.49	0.06	0.06	0.49	0.49	0.06	0.49
Clearance Time (s)	4.5	3.5	4.5	3.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	354	1026	112	548	346	1687	430	1563	430	1563	430	1563
v/s Ratio Prot	c0.16	0.14	0.03	c0.11	0.09	0.11	0.06	0.15	0.06	0.15	0.06	0.15
v/s Ratio Perm	0.80	0.46	0.50	0.66	0.18	0.23	0.12	0.31	0.12	0.31	0.12	0.31
Uniform Delay, d1	32.4	23.7	38.5	32.9	12.3	12.6	11.9	13.2	11.9	13.2	11.9	13.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.68	0.71	0.68	0.71	0.68
Incremental Delay, d2	11.2	0.1	1.3	2.3	1.2	0.3	0.6	0.5	0.6	0.5	0.6	0.5
Delay (s)	43.6	23.8	39.8	35.2	13.5	12.9	9.0	9.4	9.0	9.4	9.0	9.4
Level of Service	D	C	D	D	B	B	A	A	A	A	A	A
Approach Delay (s)	31.0			35.8			13.0		13.0		9.4	
Approach LOS	C			D			B		B		A	
Intersection Summary												
HCM Average Control Delay	22.9											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	72.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave., Existing+Project AM
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95
Frt	0.91	1.00	1.00	1.00	1.00	0.98
Frt Protected	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1670	1770	3539	3482		
Satd. Flow (perm)	1670	1770	3539	3482		
Volume (vph)	67	126	58	558	597	73
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	73	137	63	607	649	79
RTOR Reduction (vph)	81	0	0	0	10	0
Lane Group Flow (vph)	129	0	63	607	718	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	30.2	7.1	46.8	35.7		
Effective Green, g (s)	30.2	7.1	46.8	35.7		
Actuated g/C Ratio	0.36	0.08	0.55	0.42		
Clearance Time (s)	4.0	4.0	4.0	4.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	593	148	1949	1462		
v/s Ratio Prot	c0.08	c0.04	0.17	c0.21		
v/s Ratio Perm	0.22	0.43	0.31	0.49		
Uniform Delay, d1	19.1	37.0	10.4	18.0		
Progression Factor	1.00	1.15	0.47	1.09		
Incremental Delay, d2	0.8	1.9	0.4	1.1		
Delay (s)	20.0	44.4	5.3	20.7		
Level of Service	B	D	A	C		
Approach Delay (s)	20.0		9.0	20.7		
Approach LOS	B		A	C		
Intersection Summary						
HCM Average Control Delay	15.7					
HCM Volume to Capacity ratio	0.37					
Actuated Cycle Length (s)	85.0					
Intersection Capacity Utilization	43.6%					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 1: 52nd Street & Shattuck Avenue

HCM Signalized Intersection Capacity Analysis
 2: 52nd Street & Telegraph Ave.

Existing PM + Project
 1/24/2008

Existing PM + Project
 1/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	16
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	0.98
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Flt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4930	1770	4971	1770	4971	2006	2001	1956	1917	1956	1917
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.13	1.00	0.56	1.00	0.56	1.00
Satd. Flow (perm)	1770	4930	1770	4971	1770	4971	269	2001	1159	1917	1159	1917
Volume (vph)	322	1228	174	80	958	138	165	232	79	133	265	259
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	339	1293	183	84	1008	145	174	244	83	140	279	273
RTOR Reduction (vph)	0	17	0	0	18	0	0	13	0	0	36	0
Lane Group Flow (vph)	339	1459	0	84	1135	0	174	314	0	140	516	0
Confl. Peds. (#/hr)	32	32	32	32	32	32	4	12	24	24	24	12
Parking (#/hr)												
Turn Type	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		3	8		5	2				6
Permitted Phases						2						6
Actuated Green, G (s)	20.0	40.0	7.7	27.7	41.8	41.8	28.9	28.9	29.4	29.4	28.9	28.9
Effective Green, g (s)	20.0	40.0	7.7	27.7	42.3	42.3	29.4	29.4	29.4	29.4	29.4	29.4
Actuated g/C Ratio	0.20	0.40	0.08	0.28	0.42	0.42	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5
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
Lane Grp Cap (vph)	354	1972	136	1377	303	846	341	564				564
v/s Ratio Prot	c0.19	0.30	0.05	c0.23	c0.06	0.16		c0.27				
v/s Ratio Perm			0.18				0.12					
v/c Ratio	0.96	0.74	0.62	0.82	0.57	0.37	0.41	0.91				
Uniform Delay, d1	39.6	25.6	44.7	33.9	23.1	19.8	28.3	34.1				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	36.4	2.5	8.1	5.7	2.6	0.3	0.8	19.5				
Delay (s)	75.9	28.1	52.8	39.6	25.7	20.0	29.1	53.6				
Level of Service	E	C	D	D	C	C	C	D				
Approach Delay (s)	37.0		40.5		22.0		48.6					
Approach LOS	D		D		C		D					
Intersection Summary												
HCM Average Control Delay	38.2 HCM Level of Service D											
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	92.3% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

Existing PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.98	1.00	0.98	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.99	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3429	1770	3221	1770	3221	1770	3357	1770	3434	1770	3434	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (pbrm)	3433	3429	1770	3221	1770	3221	1770	3357	1770	3434	1770	3434	
Volume (vph)	508	822	71	93	468	212	69	593	127	203	678	56	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	535	865	75	98	493	223	73	624	134	214	714	59	
RTOR Reduction (vph)	0	6	0	0	52	0	0	18	0	0	6	0	
Lane Group Flow (vph)	535	934	0	98	664	0	73	740	0	214	767	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Permitted Phases													
Actuated Green, G (s)	16.0	30.5	8.0	22.5	5.0	32.5	12.0	39.5					
Effective Green, g (s)	15.5	31.5	7.5	23.5	4.5	33.5	11.5	40.5					
Actuated g/C Ratio	0.16	0.32	0.08	0.24	0.04	0.34	0.12	0.40					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grp Cap (vph)	532	1080	133	757	80	1125	204	1391					
v/s Ratio Prot	c0.16	c0.27	0.06	0.21	0.04	c0.22	c0.12	0.22					
v/s Ratio Perm	1.01	0.86	0.74	0.88	0.91	0.66	1.05	0.55					
Uniform Delay, d1	42.2	32.2	45.3	36.9	47.6	28.4	44.2	22.8					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.17	0.79					
Incremental Delay, d2	40.4	7.1	16.6	10.9	70.5	3.0	70.9	1.3					
Delay (s)	82.7	39.4	61.9	47.7	118.0	31.4	122.7	19.4					
Level of Service	F	D	E	D	F	C	F	B					
Approach Delay (s)	55.1	E	49.4	D	39.0	D	41.8	D					
Approach LOS	E	E	D	D	D	D	D	D					
Intersection Summary													
HCM Average Control Delay	47.5											HCM Level of Service	D
HCM Volume to Capacity ratio	0.82												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.2%											ICU Level of Service	E
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 4: 47th St. & MLK Jr. Way

Existing PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.86	0.86	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.97	1.00	0.97	
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1611	1611	3289	3433	3442	1611	3289	3433	3442	1611	3289	3433	
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (pbrm)	1611	1611	3289	3433	3442	1611	3289	3433	3442	1611	3289	3433	
Volume (vph)	0	0	6	0	0	0	10	285	258	1430	287	64	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	7	0	0	0	11	310	280	1554	312	70	
RTOR Reduction (vph)	0	7	0	0	0	0	0	21	0	0	0	0	
Lane Group Flow (vph)	0	0	0	0	0	0	0	580	0	1554	382	0	
Turn Type							Perm	Prot					
Protected Phases							2	1	6				
Permitted Phases													
Actuated Green, G (s)	0.0	0.0	13.0	13.0	29.0	50.0	13.0	29.0	50.0	13.0	29.0	50.0	
Effective Green, g (s)	0.0	0.0	13.0	13.0	29.0	50.0	13.0	29.0	50.0	13.0	29.0	50.0	
Actuated g/C Ratio	0.00	0.00	0.26	0.26	0.58	1.00	0.26	0.58	1.00	0.26	0.58	1.00	
Clearance Time (s)			4.0	4.0	4.0	2.0	4.0	4.0	2.0	4.0	4.0	2.0	
Lane Grp Cap (vph)	0	0	809	1991	3442	809	1991	3442	809	1991	3442	809	
v/s Ratio Prot			c0.19	0.72	0.78	0.11	c0.19	0.72	0.78	0.11	c0.19	0.72	
v/s Ratio Perm	0.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay, d1	25.0	25.0	16.8	16.8	8.1	0.0	16.8	8.1	0.0	16.8	8.1	0.0	
Progression Factor	1.00	1.00	0.75	0.75	3.1	0.1	0.75	3.1	0.1	0.75	3.1	0.1	
Incremental Delay, d2	0.0	0.0	5.2	5.2	11.2	0.1	5.2	11.2	0.1	5.2	11.2	0.1	
Delay (s)	25.0	25.0	17.9	17.9	11.2	0.1	17.9	11.2	0.1	17.9	11.2	0.1	
Level of Service	C	C	B	B	B	A	B	B	A	B	B	A	
Approach Delay (s)	25.0	0.0	17.9	0.0	11.2	0.1	17.9	0.0	11.2	17.9	0.0	11.2	
Approach LOS	C	A	B	A	B	A	B	A	B	B	A	B	
Intersection Summary													
HCM Average Control Delay	11.1											HCM Level of Service	B
HCM Volume to Capacity ratio	0.76												
Actuated Cycle Length (s)	50.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.6%											ICU Level of Service	C
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis

5: 45th St. & MLK Jr. Way

Existing PM + Project
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.96	0.96	0.96	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Fipb, ped/bikes	0.98	0.98	0.98	1.00	1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.99
Frt	0.96	0.96	0.96	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1643	1643	1643	1649	1649	1649	3403	3438	3438	3438	3438	3438
Flt Permitted	0.88	0.88	0.88	0.91	0.91	0.91	0.94	0.94	0.94	0.94	0.85	0.85
Satd. Flow (perm)	1471	1471	1471	1519	1519	1519	3200	3200	3200	3200	2957	2957
Volume (vph)	26	27	21	48	72	50	18	420	66	43	263	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	30	23	53	80	56	20	467	73	48	292	22
RTOR Reduction (vph)	0	15	0	0	30	0	0	24	0	0	10	0
Lane Group Flow (vph)	0	67	0	0	159	0	0	537	0	0	353	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (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
Lane Grp Cap (vph)	500	500	500	516	516	516	1600	1600	1600	1600	1479	1479
v/s Ratio Prot	0.05	0.05	0.05	c0.10	c0.10	c0.10	c0.17	c0.17	c0.17	c0.17	0.12	0.12
v/c Ratio Perm	0.13	0.13	0.13	0.31	0.31	0.31	0.34	0.34	0.34	0.34	0.24	0.24
v/c Ratio	11.4	11.4	11.4	12.2	12.2	12.2	7.5	7.5	7.5	7.5	7.1	7.1
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.6	0.6	0.6	1.5	1.5	1.5	0.6	0.6	0.6	0.6	0.4	0.4
Incremental Delay, d2	12.0	12.0	12.0	13.7	13.7	13.7	8.1	8.1	8.1	8.1	7.5	7.5
Delay (s)	B	B	B	B	B	B	A	A	A	A	A	A
Level of Service	B	B	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	12.0	12.0	12.0	13.7	13.7	13.7	8.1	8.1	8.1	8.1	7.5	7.5
Approach LOS	B	B	B	B	B	B	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.1 HCM Level of Service A											
HCM Volume to Capacity ratio	0.32											
Actuated Cycle Length (s)	50.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	62.8% ICU Level of Service B											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis

6: 45th St. & Telegraph Ave.

Existing PM + Project
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.96	0.96	0.96	0.96	0.96	0.96	0.98	0.98	0.98	0.98	0.98	0.98
Fipb, ped/bikes	0.97	0.97	0.97	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.96	0.96	0.97	0.97	0.97	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1631	1631	1631	1680	1680	1680	3475	3475	3475	3475	4926	4926
Flt Permitted	0.86	0.86	0.86	0.86	0.86	0.86	0.91	0.91	0.91	0.91	0.91	0.91
Satd. Flow (perm)	1420	1420	1420	1459	1459	1459	3180	3180	3180	3180	4488	4488
Volume (vph)	46	49	39	19	41	21	24	1042	39	18	919	67
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	49	52	41	20	44	22	26	1109	41	19	978	71
RTOR Reduction (vph)	0	28	0	0	19	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	114	0	0	67	0	0	1175	0	0	1064	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	2	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	2	6	6
Actuated Green, G (s)	8.6	8.6	8.6	8.6	8.6	8.6	62.4	62.4	62.4	62.4	62.4	62.4
Effective Green, g (s)	9.1	9.1	9.1	9.1	9.1	9.1	62.9	62.9	62.9	62.9	62.9	62.9
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.11	0.79	0.79	0.79	0.79	0.79	0.79
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	162	162	166	166	166	2500	2500	2500	2500	3529	3529
v/s Ratio Prot	c0.08	c0.08	c0.08	0.05	0.05	0.05	c0.37	c0.37	c0.37	c0.37	0.24	0.24
v/c Ratio Perm	0.70	0.70	0.70	0.40	0.40	0.40	0.47	0.47	0.47	0.47	0.30	0.30
v/c Ratio	34.1	34.1	34.1	32.9	32.9	32.9	2.9	2.9	2.9	2.9	2.4	2.4
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.36	1.36	1.36	1.36	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.6	0.6	0.6	0.6	0.2	0.2
Incremental Delay, d2	10.6	10.6	10.6	13.5	13.5	13.5	4.5	4.5	4.5	4.5	2.6	2.6
Delay (s)	44.8	44.8	44.8	44.8	44.8	44.8	4.5	4.5	4.5	4.5	2.6	2.6
Level of Service	D	D	D	C	C	C	A	A	A	A	A	A
Approach Delay (s)	44.8	44.8	44.8	33.5	33.5	33.5	4.5	4.5	4.5	4.5	2.6	2.6
Approach LOS	D	D	D	C	C	C	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	7.0 HCM Level of Service A											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	81.6% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West Street

Existing PM + Project
1/21/2008

Existing PM + Project
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔ ↕ ↔ ↔ ↕ ↔ ↔ ↕ ↔ ↔ ↕ ↔ ↔											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	0.96	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.97	1.00	0.97	1.00
Frt	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1693	3486	1731	3401	1697	1822	1720	1830	1720	1830	1720	1830
Flt Permitted	0.29	1.00	0.24	1.00	0.24	1.00	0.56	1.00	0.37	1.00	0.37	1.00
Satd. Flow (perm)	523	3486	444	3401	523	3486	982	1822	667	1830	667	1830
Volume (vph)	26	671	45	44	546	84	109	389	43	93	222	19
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	729	49	48	593	91	118	423	47	101	241	21
RTOR Reduction (vph)	0	6	0	0	15	0	0	5	0	0	4	0
Lane Group Flow (vph)	28	772	0	48	669	0	118	465	0	101	258	0
Conf. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	209	1394		178	1360		496	911		334	915	
v/s Ratio Prot	c0.22			0.20			c0.26			0.14		
v/s Ratio Perm	0.05	0.11		0.12			0.12			0.15		
v/c Ratio	0.13	0.55		0.27	0.49		0.24	0.51		0.30	0.28	
Uniform Delay, d1	15.2	18.5		16.1	17.9		11.4	13.4		11.8	11.6	
Progression Factor	1.00	1.00		1.94	2.02		1.81	1.85		1.00	1.00	
Incremental Delay, d2	1.3	1.6		3.2	1.1		0.7	1.3		2.3	0.8	
Delay (s)	16.5	20.1		34.4	37.3		21.2	26.1		14.1	12.4	
Level of Service	B	C		C	D		C	C		B	B	
Approach Delay (s)	20.0			37.1			25.1			12.9		
Approach LOS	B	B		D			C			B		

Intersection Summary		
HCM Average Control Delay	25.2	HCM Level of Service C
HCM Volume to Capacity ratio	0.53	
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	81.0%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔ ↕ ↔ ↔ ↕ ↔ ↔ ↕ ↔ ↔ ↕ ↔ ↔											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	0.97	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.98	1.00	0.98	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1709	3471	1730	3494	1730	3494	3343	3337	3343	3337	3343	3337
Flt Permitted	0.25	1.00	0.16	1.00	0.16	1.00	0.84	0.84	0.84	0.84	0.84	0.91
Satd. Flow (perm)	450	3471	291	3494	291	3494	2857	3043	2857	3043	2857	3043
Volume (vph)	26	769	60	29	615	31	74	165	44	19	96	33
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	27	793	62	30	634	32	76	170	45	20	99	34
RTOR Reduction (vph)	0	7	0	0	5	0	0	6	0	0	12	0
Lane Group Flow (vph)	27	848	0	30	661	0	0	285	0	0	141	0
Conf. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	46.0	46.0	46.0	46.0	46.0	46.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.59	0.59	0.59	0.59	0.59	0.59
Clearance 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
Lane Grp Cap (vph)	141	1085		91	1092		1678			1788		
v/s Ratio Prot	c0.24			0.19			c0.10			0.05		
v/s Ratio Perm	0.06	0.78		0.33	0.61		0.17			0.08		
v/c Ratio	0.19	0.78		0.21	0.33		0.17			0.08		
Uniform Delay, d1	20.1	25.0		21.1	23.3		7.6			7.1		
Progression Factor	0.45	0.50		0.87	0.89		1.25			1.00		
Incremental Delay, d2	2.6	4.9		8.5	2.2		0.2			0.1		
Delay (s)	11.7	17.3		26.8	23.1		9.6			7.2		
Level of Service	B	B		C	C		A			A		
Approach Delay (s)	17.1			23.2			9.6			7.2		
Approach LOS	B	B		C			A			A		

Intersection Summary		
HCM Average Control Delay	17.4	HCM Level of Service B
HCM Volume to Capacity ratio	0.38	
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	60.8%	ICU Level of Service B
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

Existing PM + Project
 1/21/2008

Existing PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.97	1.00	0.96	1.00	0.96	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1765	3482	1757	3431	1757	3431	3354	3354	3433	3433	3433	3433
Flt Permitted	0.27	1.00	0.24	1.00	0.24	1.00	0.88	0.88	0.78	0.78	0.78	0.78
Satd. Flow (perm)	510	3482	440	3431	440	3431	2954	2954	2724	2724	2724	2724
Volume (vph)	51	751	70	106	619	128	53	273	117	75	219	38
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	52	759	71	107	625	129	54	276	118	76	221	38
RTOR Reduction (vph)	0	9	0	0	22	0	0	45	0	0	12	0
Lane Group Flow (vph)	52	821	0	107	732	0	0	403	0	0	323	0
Confl. Peds. (#/hr)	8	39	39	8	25	25	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	6	6	6	6	6	6
Permitted Phases	4	8	8	2	2	2	6	6	6	6	6	6
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	35.5	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	223	1523	193	1501	193	1501	1366	1366	1260	1260	1260	1260
v/s Ratio Prot	0.10	0.24	0.24	0.21	0.21	0.21	0.14	0.14	0.12	0.12	0.12	0.12
v/s Ratio Perm	0.23	0.54	0.55	0.49	0.29	0.29	0.26	0.26	0.26	0.26	0.26	0.26
v/c Ratio	14.1	16.6	16.7	16.1	13.4	13.4	13.1	13.1	13.1	13.1	13.1	13.1
Uniform Delay, d1	0.93	1.07	1.00	1.00	0.77	0.77	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.7	0.9	11.0	1.1	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.5
Incremental Delay, d2	14.8	18.7	27.7	17.2	10.8	10.8	13.6	13.6	13.6	13.6	13.6	13.6
Delay (s)	B	B	C	B	B	B	B	B	B	B	B	B
Level of Service	B	B	C	B	B	B	B	B	B	B	B	B
Approach Delay (s)	18.5	18.5	18.5	18.5	18.5	18.5	13.6	13.6	13.6	13.6	13.6	13.6
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	16.5 HCM Level of Service B											
HCM Volume to Capacity ratio	0.42											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	87.0% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave.

Existing PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↕	↔	↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.98	
Fpb, ped/bikes	1.00	0.99	1.00	0.97	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.97	
Fpb, ped/bikes	0.93	1.00	0.98	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1644	3419	1727	3367	1770	3466	1770	3466	1770	3362	1770	3362	
Flt Permitted	0.30	1.00	0.18	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	518	3419	323	3367	1770	3466	1770	3466	1770	3362	1770	3362	
Volume (vph)	128	659	99	36	472	76	186	868	82	103	618	136	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	131	672	101	37	482	78	190	886	84	105	631	139	
RTOR Reduction (vph)	0	16	0	0	17	0	0	8	0	0	0	21	
Lane Group Flow (vph)	131	757	0	37	543	0	190	962	0	105	749	0	
Conf. Peds. (#/hr)	94		86	86		94			40			111	
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	4			8			5		2			1	
Permitted Phases	4		8				11.5		36.6			7.9	
Actuated Green, G (s)	22.0	22.0	22.0	22.0	22.0	22.0	12.0	37.1	12.0	37.1	8.4	33.5	
Effective Green, g (s)	22.5	22.5	22.5	22.5	22.5	22.5	0.15	0.46	0.15	0.46	0.11	0.42	
Actuated g/C Ratio	0.28	0.28	0.28	0.28	0.28	0.28	0.15	0.46	0.15	0.46	0.11	0.42	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grip Cap (vph)	146	962	91	947	266	1607					186	1408	
v/s Ratio Prot	0.22		0.16				c0.11		c0.28		0.06	0.22	
v/s Ratio Perm	c0.25	0.11		0.11			0.71	0.60		0.56	0.53		
v/c Ratio	0.90	0.79	0.41	0.57			32.4	15.9	34.1	17.4		17.4	
Uniform Delay, d1	27.6	26.5	23.3	24.6			1.00	1.00	1.00	0.94	1.03		
Progression Factor	1.00	1.00	1.00	1.00			7.4	1.7		2.3	1.4		
Incremental Delay, d2	44.2	4.0	1.1	0.5			39.7	17.6		34.1	19.2		
Delay (s)	71.8	30.5	24.4	25.2			D	B		C	B		
Level of Service	E	C	C	C			D	B		C	B		
Approach Delay (s)	36.5		25.1				21.2			21.0			
Approach LOS	D		C				C			C			
Intersection Summary													
HCM Average Control Delay	25.7											HCM Level of Service	C
HCM Volume to Capacity ratio	0.73												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.5%											ICU Level of Service	C
Analysis Period (min)	15												
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

Existing PM + Project
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↕
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	7	33	1070	31	15	806
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	8	37	1189	34	17	896
Pedestrians	52					45
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4		4		4	4
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	230					
pX, platoon unblocked	0.91					
VC, conflicting volume	1791					
VC1, stage 1 conf vol	709					
VC2, stage 2 conf vol						
vCu, unblocked vol	1618					
tC, single (s)	6.8					
tC, 2 stage (s)	6.9					
tF (s)	3.5					
p0 queue free %	90					
cM capacity (veh/h)	76					
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	44	793	431	17	448	448
Volume Left	8	0	0	17	0	0
Volume Right	37	0	34	0	0	0
cSH	227	1700	1700	497	1700	1700
Volume to Capacity	0.20	0.47	0.25	0.03	0.26	0.26
Queue Length 95th (ft)	18	0	0	3	0	0
Control Delay (s)	24.6	0.0	0.0	12.5	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	24.6	0.0	0.0	0.2		
Approach LOS	C					
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	48.9%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

Existing PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98
Fipb, ped/bikes	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.98
Frt	0.99	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.99	0.99	0.95	1.00	0.99	0.99	0.99	0.95	1.00	0.95	1.00	0.99
Satd. Flow (prot)	4984	1719	3287	1766	1714	1832	1766	1714	1832	1766	1714	1832
Flt Permitted	0.80	0.33	1.00	0.82	0.82	0.27	1.00	0.82	0.27	1.00	0.82	0.27
Satd. Flow (perm)	3996	591	3287	1449	1449	482	1832	1449	482	1832	1449	482
Volume (vph)	112	629	27	64	326	168	58	364	84	65	288	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	114	642	28	65	333	171	59	371	86	66	294	20
RTOR Reduction (vph)	0	5	0	0	38	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	779	0	65	466	0	0	507	0	66	311	0
Conf. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31
Clearance 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
Lane Grp Cap (vph)	2348	347	1931	347	1931	453	151	573	151	573	151	573
v/s Ratio Prot				0.14								
v/s Ratio Perm	c0.19	0.11		0.11			c0.35	0.14			0.14	
v/c Ratio	0.33	0.19	0.24	0.19	0.24	0.12	1.12	0.44	0.44	0.54	0.44	0.54
Uniform Delay, d1	8.5	7.6	7.9	7.6	7.9	27.5	21.9	22.8	21.9	22.8	21.9	22.8
Progression Factor	1.00	1.37	1.44	1.37	1.44	1.00	0.75	0.75	0.75	0.75	0.75	0.75
Incremental Delay, d2	0.4	1.2	0.3	1.2	0.3	79.0	8.7	3.6	8.7	3.6	8.7	3.6
Delay (s)	8.8	11.6	11.7	11.6	11.7	106.5	25.1	20.6	25.1	20.6	25.1	20.6
Level of Service	A	B	B	B	B	F	F	C	F	C	C	C
Approach Delay (s)	8.8			11.7		106.5		21.4			21.4	
Approach LOS	A			B		F		C			C	

Intersection Summary	
HCM Average Control Delay	34.1
HCM Level of Service	C
HCM Volume to Capacity ratio	0.61
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	138.5%
ICU Level of Service	H
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West Street

Existing PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.98	1.00	0.98
Fipb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.94	1.00	0.98
Frt	0.99	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.96	1.00	0.98	1.00
Flt Protected	1.00	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4969	1605	4882	1605	1733	1658	1733	1658	1733	1658	1733	1799
Flt Permitted	0.88	0.80	0.80	0.80	0.63	1.00	0.63	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	4397	3937	4397	3937	1057	1733	1057	1733	628	1799	628	1799
Volume (vph)	39	569	40	68	404	64	41	210	72	56	121	17
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	599	42	72	425	67	43	221	76	59	127	18
RTOR Reduction (vph)	0	9	0	0	21	0	0	16	0	0	7	0
Lane Group Flow (vph)	0	673	0	0	543	0	43	281	0	59	138	0
Conf. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (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
Lane Grp Cap (vph)	2831	2534	2831	2534	271	444	271	444	161	461	161	461
v/s Ratio Prot					0.14							
v/s Ratio Perm	c0.15	0.14		0.14			c0.16	0.09			0.09	
v/c Ratio	0.24	0.21	0.21	0.21	0.16	0.63	0.16	0.63	0.37	0.30	0.37	0.30
Uniform Delay, d1	6.0	5.9	5.9	5.9	23.1	26.4	23.1	26.4	24.4	24.0	24.4	24.0
Progression Factor	1.25	0.90	0.90	0.90	1.00	1.00	1.00	1.00	1.21	1.23	1.21	1.23
Incremental Delay, d2	0.2	0.2	0.2	0.2	1.2	6.7	1.2	6.7	6.1	1.6	6.1	1.6
Delay (s)	7.7	7.7	7.7	7.7	24.3	33.2	24.3	33.2	35.6	31.1	35.6	31.1
Level of Service	A	A	A	A	C	C	C	C	D	C	D	C
Approach Delay (s)	7.7			7.7		32.0		32.0			32.4	
Approach LOS	A			A		C		C			C	

Intersection Summary	
HCM Average Control Delay	14.4
HCM Level of Service	B
HCM Volume to Capacity ratio	0.35
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	87.0%
ICU Level of Service	E
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

Existing PM + Project
1/21/2008

Existing PM + Project
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.95	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	0.96	0.96	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	5019	4819	3363	3377								
Satd. Flow (prot)	0.83	0.85	0.86	0.86	0.73							
Flt Permitted	4206	4116	2900	2507								
Satd. Flow (perm)	61	621	34	48	422	195	39	181	72	121	212	66
Volume (vph)	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Peak-hour factor, PHF	62	627	34	48	426	197	39	183	73	122	214	67
Adj. Flow (vph)	0	7	0	0	70	0	0	40	0	0	21	0
RTOR Reduction (vph)	0	716	0	0	601	0	0	255	0	0	382	0
Lane Group Flow (vph)	9	17	17	17	9	12	10	10	10	10	10	12
Confl. Peds. (#/hr)												
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2				6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)	50.0			50.0			19.0				19.0	
Effective Green, g (s)	51.5			51.5			20.5				20.5	
Actuated g/C Ratio	0.64			0.64			0.26				0.26	
Clearance Time (s)	5.5			5.5			5.5				5.5	
Lane Grp Cap (vph)	2708			2650			743				642	
v/s Ratio Prot	c0.17			0.15			0.09				c0.15	
v/s Ratio Perm	0.26			0.23			0.34				0.60	
v/c Ratio	6.1			5.9			24.3				26.1	
Uniform Delay, d1	1.49			1.00			1.00				0.73	
Progression Factor	0.2			0.2			1.3				4.0	
Incremental Delay, d2	9.3			6.1			25.5				23.2	
Delay (s)	A			A			C				C	
Level of Service	A			A			C				C	
Approach Delay (s)	9.3			6.1			25.5				23.2	
Approach LOS	A			A			C				C	
Intersection Summary												
HCM Average Control Delay	13.3 HCM Level of Service B											
HCM Volume to Capacity ratio	0.36											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	94.1% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

Existing PM + Project
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.98	
Frt	0.99	0.99	0.99	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	
Flt Protected	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	4925	4748	4748	1740	3426	1725	3484						
Flt Permitted	0.67	0.69	0.69	0.36	1.00	0.26	1.00						
Satd. Flow (pbrm)	3325	3269	3269	666	3426	480	3484						
Volume (vph)	224	594	81	61	358	195	100	737	98	134	567	46	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	249	660	90	68	398	217	111	819	109	149	630	51	
RTOR Reduction (vph)	0	12	0	0	14	0	0	5	0	0	3	0	
Lane Group Flow (vph)	0	987	0	0	669	0	111	923	0	149	678	0	
Confl. Peds. (#/hr)	26	19	19	pm+pt	26	39	92	92	92	92	92	39	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	3	8	8	2	2	2	2	2	2	6	6	
Permitted Phases	4	8	26.5	26.5	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	
Actuated Green, G (s)	28.0	28.0	28.0	28.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	
Effective Green, g (s)	0.27	0.27	0.27	0.27	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	
Actuated g/C Ratio	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Clearance Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Vehicle Extension (s)	904	889	889	433	2229	312	2266						
Lane Grp Cap (vph)	c0.30	0.20	0.17	0.17	0.27	0.27	0.27	0.27	0.27	0.27	0.27	0.19	
v/s Ratio Prot	1.23dl	0.88dl	0.26	0.41	0.48	0.30	0.30	0.30	0.30	0.30	0.30	0.30	
v/s Ratio Perm	37.5	34.3	34.3	7.6	8.6	9.1	7.8						
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	58.3	95.8	95.8	37.6	9.0	9.2	14.3	8.1	8.1	8.1	8.1	8.1	
Incremental Delay, d2	F	D	D	A	A	A	B	A	B	A	B	A	
Delay (s)	95.8	37.6	37.6	9.0	9.2	14.3	8.1	8.1	8.1	8.1	8.1	8.1	
Level of Service	F	D	D	A	A	A	B	A	B	A	B	A	
Approach Delay (s)	95.8	37.6	37.6	9.0	9.2	14.3	8.1	8.1	8.1	8.1	8.1	8.1	
Approach LOS	F	D	D	A	A	A	B	A	B	A	B	A	
Intersection Summary													
HCM Average Control Delay	39.0											HCM Level of Service	D
HCM Volume to Capacity ratio	0.66												
Actuated Cycle Length (s)	103.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.2%											ICU Level of Service	D
Analysis Period (min)	15												
dl Defacto Left Lane. Recode with 1 through lane as a left lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

Existing PM + Project
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	0.89	1.00	0.89	1.00	0.89	1.00	0.89	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.97	1.00	0.98	1.00	
Frt	0.99	0.99	0.99	0.99	0.99	1.00	0.85	1.00	0.85	1.00	0.93	1.00	
Flt Protected	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	
Satd. Flow (prot)	5022	4982	4982	1777	1406	1583							
Flt Permitted	0.89	0.89	0.89	0.77	0.86	1.00	0.82						
Satd. Flow (pbrm)	4498	3868	3868	1561	1406	1466							
Volume (vph)	36	771	30	82	530	28	53	92	191	33	33	68	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Adj. Flow (vph)	36	779	30	83	535	28	54	93	193	33	33	69	
RTOR Reduction (vph)	0	5	0	0	6	0	0	0	93	0	47	0	
Lane Group Flow (vph)	0	840	0	0	640	0	0	147	100	0	88	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	8	8	2	2	2	2	2	2	6	6	
Permitted Phases	4	8	26.5	26.5	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	
Actuated Green, G (s)	28.0	28.0	28.0	28.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	
Effective Green, g (s)	0.27	0.27	0.27	0.27	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	
Actuated g/C Ratio	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Clearance Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Vehicle Extension (s)	904	889	889	433	2229	312	2266						
Lane Grp Cap (vph)	c0.19	0.31	0.27	0.27	0.32	0.24	0.24	0.24	0.24	0.24	0.20	0.20	
v/s Ratio Perm	7.6	7.6	7.6	7.4	22.0	21.5	21.2	21.2	21.2	21.2	21.2	21.2	
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	0.3	0.3	0.3	0.3	0.3	1.8	1.4	1.1	1.1	1.1	1.1	1.1	
Incremental Delay, d2	7.9	7.9	7.9	7.7	23.9	22.9	22.3	22.3	22.3	22.3	22.3	22.3	
Delay (s)	A	A	A	A	C	C	C	C	C	C	C	C	
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A	
Approach Delay (s)	7.9	7.9	7.9	7.7	23.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A	
Intersection Summary													
HCM Average Control Delay	11.5											HCM Level of Service	B
HCM Volume to Capacity ratio	0.31												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.6%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

Existing PM + Project
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4940	1770	4742	1770	4932	1770	4933	1770	4933	1770	4933
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4940	1770	4742	1770	4932	1770	4933	1770	4933	1770	4933
Volume (vph)	187	689	84	81	376	210	167	653	106	307	377	63
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	205	757	92	89	413	231	184	718	116	337	414	69
RTOR Reduction (vph)	0	15	0	0	100	0	0	22	0	0	23	0
Lane Group Flow (vph)	205	834	0	89	544	0	184	812	0	337	460	0
Confl. Peds. (#/hr)			81			22			50			43
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	4		3	4		1	2		1	2	
Permitted Phases												
Actuated Green, G (s)	11.0	24.1		11.0	24.1		20.9	26.0		20.9	26.0	
Effective Green, g (s)	11.0	25.1		11.0	25.1		20.9	27.0		20.9	27.0	
Actuated g/C Ratio	0.11	0.25		0.11	0.25		0.21	0.27		0.21	0.27	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	195	1240		195	1190		370	1332		370	1332	
v/s Ratio Prot	c0.12	c0.17		0.05	0.11		0.10	c0.16		c0.19	0.09	
v/s Ratio Perm	1.05	0.67		0.46	0.46		0.50	0.61		0.91	0.35	
Uniform Delay, d1	44.5	33.7		41.7	31.7		34.9	31.9		38.6	29.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	78.6	2.9		0.6	1.3		0.4	2.1		25.5	0.7	
Delay (s)	123.1	36.7		42.3	33.0		35.3	34.0		64.1	30.1	
Level of Service	F	D		D	C		D	C		E	C	
Approach Delay (s)		53.5			34.1			34.2			44.1	
Approach LOS		D			C			C			D	
Intersection Summary												
HCM Average Control Delay	42.0			HCM Level of Service			D					
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	100.0			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	81.5%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
23: 34th St & Telegraph Ave.

Existing PM + Project
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	0.94	0.94	0.94	0.97	0.97	0.97	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	0.96	0.96	0.96	0.97	0.97	0.97	1.00	0.99	1.00	0.99	1.00	0.99
Frt	0.95	0.95	0.95	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1563	1657	1657	1657	1657	1657	1688	3468	1645	3454	1645	3454
Flt Permitted	0.71	0.71	0.71	0.84	0.84	0.84	0.30	1.00	0.41	1.00	0.41	1.00
Satd. Flow (perm)	1132	1418	1418	1418	1418	1418	538	3468	709	3454	709	3454
Volume (vph)	97	33	65	42	59	38	40	546	35	32	763	59
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	103	35	69	45	63	40	43	581	37	34	812	63
RTOR Reduction (vph)	0	24	0	0	18	0	0	4	0	0	5	0
Lane Group Flow (vph)	0	183	0	0	130	0	43	614	0	34	870	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			4			2			2		6
Permitted Phases												
Actuated Green, G (s)	16.1			16.1			61.9	61.9		61.9		61.9
Effective Green, g (s)	15.6			15.6			61.4	61.4		61.4		61.4
Actuated g/C Ratio	0.18			0.18			0.72	0.72		0.72		0.72
Clearance Time (s)	3.5			3.5			3.5	3.5		3.5		3.5
Vehicle Extension (s)	2.0			2.0			2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	208			260			389	2505		512		2495
v/s Ratio Prot	c0.16			0.09			0.08	0.18		0.05		c0.25
v/s Ratio Perm	0.88			0.50			0.11	0.25		0.07		0.35
Uniform Delay, d1	33.8			31.2			3.6	4.0		3.4		4.4
Progression Factor	1.00			1.00			0.99	0.89		1.00		1.00
Incremental Delay, d2	30.5			0.6			0.5	0.2		0.2		0.4
Delay (s)	64.3			31.7			4.1	3.8		3.7		4.8
Level of Service	E			C			A	A		A		A
Approach Delay (s)	64.3			31.7			3.8	3.8		4.7		4.7
Approach LOS	E			C			A	A		A		A
Intersection Summary												
HCM Average Control Delay	12.9			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.46											
Actuated Cycle Length (s)	85.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	57.6%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave. Existing PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.93	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.96	1.00	0.96	1.00
Frt	1.00	0.96	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.94	1.00	0.94
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3308	1770	3258	1690	3490	1690	3490	1696	3117	1696	3117
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.29	1.00	0.42	1.00	0.42	1.00
Satd. Flow (perm)	1770	3308	1770	3258	1770	3258	522	3490	742	3117	742	3117
Volume (vph)	127	316	100	56	383	112	113	504	29	105	480	294
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	130	322	102	57	391	114	115	514	30	107	490	300
RTOR Reduction (vph)	0	36	0	0	34	0	0	4	0	0	0	95
Lane Group Flow (vph)	130	388	0	57	471	0	115	540	0	107	695	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		2	2		6		6
Permitted Phases							2			6		6
Actuated Green, G (s)	9.2	22.0		5.1	17.9		44.4	44.4		44.4		44.4
Effective Green, g (s)	9.7	21.5		5.6	17.4		45.9	45.9		45.9		45.9
Actuated g/C Ratio	0.11	0.25		0.07	0.20		0.54	0.54		0.54		0.54
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5		5.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	202	837		117	667		282	1885		401		1683
v/s Ratio Prot	c0.07	0.12		0.03	c0.14		0.22	0.15		0.22		c0.22
v/s Ratio Perm	0.64	0.46		0.49	0.71		0.41	0.29		0.27		0.41
Uniform Delay, d1	36.0	26.9		38.3	31.4		11.5	10.6		10.5		11.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.18		1.33
Incremental Delay, d2	5.2	0.1		1.2	2.8		4.3	0.4		1.5		0.7
Delay (s)	41.2	27.0		39.5	34.2		15.9	11.0		13.9		16.1
Level of Service	D	C		D	C		B	B		B		B
Approach Delay (s)	30.3			34.7			11.9			15.8		
Approach LOS	C			C			B			B		B
Intersection Summary												
HCM Average Control Delay	21.8		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.51								C			
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0							
Intersection Capacity Utilization	69.8%		ICU Level of Service		C							
Analysis Period (min)	15								15			
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave. Existing PM + Project
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frbp, ped/bikes	0.91	1.00	1.00	1.00	0.94	0.94
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.91	1.00	1.00	1.00	0.98	0.98
Flt Protected	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1521	1770	3539	3250		
Flt Permitted	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1521	1770	3539	3250		
Volume (vph)	42	92	89	1069	615	118
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	44	96	93	1114	641	123
RTOR Reduction (vph)	87	0	0	0	11	0
Lane Group Flow (vph)	53	0	93	1114	753	0
Confl. Peds. (#/hr)	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	2	3	8	4		
Permitted Phases						
Actuated Green, G (s)	8.4	8.4	68.6	56.2		
Effective Green, g (s)	8.4	8.4	68.6	56.2		
Actuated g/C Ratio	0.10	0.10	0.81	0.66		
Clearance Time (s)	4.0	4.0	4.0	4.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	150	175	2856	2149		
v/s Ratio Prot	c0.04	c0.05	c0.31	0.23		
v/s Ratio Perm	0.36	0.53	0.39	0.35		
Uniform Delay, d1	35.8	36.4	2.3	6.4		
Progression Factor	1.00	1.00	1.00	1.00		
Incremental Delay, d2	1.5	3.1	0.4	0.5		
Delay (s)	37.2	39.5	2.7	6.8		
Level of Service	D	D	A	A		
Approach Delay (s)	37.2		5.5	6.8		
Approach LOS	D		A	A		
Intersection Summary						
HCM Average Control Delay	8.1		HCM Level of Service		A	
HCM Volume to Capacity ratio	0.39					
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		8.0	
Intersection Capacity Utilization	54.8%		ICU Level of Service		A	
Analysis Period (min)	15					
c Critical Lane Group						

**APPENDIX E:
YEAR 2015 NO PROJECT CONDITIONS INTERSECTION
LEVEL OF SERVICE CALCULATION WORKSHEETS**

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	16	16	16	16	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00
Frt	1.00	0.97	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.94	1.00	0.94
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4910	1770	4953	2006	2041	1984	1955	1984	1955	1984	1955
Fit Permitted	0.95	1.00	0.95	1.00	0.10	1.00	0.46	1.00	0.46	1.00	0.46	1.00
Satd. Flow (perm)	1770	4910	1770	4953	201	2041	954	1955	954	1955	954	1955
Volume (vph)	300	950	200	90	1330	200	200	280	60	160	410	270
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	1000	211	95	1400	211	211	295	63	168	432	284
RTOR Reduction (vph)	0	25	0	0	16	0	0	7	0	0	0	20
Lane Group Flow (vph)	316	1186	0	95	1595	0	211	351	0	168	696	0
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Prot	Prot	Prot	Prot	pm	pt	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		3	8		5	2				6
Permitted Phases							2					6
Actuated Green, G (s)	17.0	49.4		11.6	44.0		48.5	48.5		39.5		39.5
Effective Green, g (s)	17.0	49.4		11.6	44.0		49.0	49.0		40.0		40.0
Actuated g/C Ratio	0.14	0.41		0.10	0.37		0.41	0.41		0.33		0.33
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5		2.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	251	2021		171	1816		187	833		318		652
v/s Ratio Prot	c0.18	0.24		0.05	c0.32		c0.07	0.17		0.18		c0.36
v/s Ratio Perm							0.39			0.53		1.07
v/c Ratio	1.26	0.59		0.56	0.88		1.13	0.42		0.32		4.00
Uniform Delay, d1	51.5	27.4		51.7	35.5		58.7	25.4		1.00		1.00
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	144.6	1.3		3.9	6.4		104.5	0.3		1.6		54.6
Delay (s)	196.1	28.6		55.6	41.9		163.2	25.7		34.0		94.6
Level of Service	F	C		E	D		F	C		C		F
Approach Delay (s)	63.3			42.7			76.7			83.1		
Approach LOS	E			D			E			F		
Intersection Summary												
HCM Average Control Delay	61.1											
HCM Volume to Capacity ratio	1.01											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	109.8%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	1.00	0.99	0.95	1.00	0.99	1.00	0.96	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.95	1.00	1.00	0.91	0.98	1.00	0.98	1.00	0.96	1.00	0.96
Frt	0.98	0.98	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Fit Protected	1748	1681	1596	1681	1596	3421	1770	3266	1770	3266	1770	3266
Satd. Flow (prot)	0.48	0.74	1.00	0.74	1.00	0.93	0.95	1.00	0.95	1.00	0.95	1.00
Fit Permitted	846	1302	1596	1302	1596	3197	1770	3266	1770	3266	1770	3266
Satd. Flow (perm)	10	10	10	10	10	10	10	1140	230	100	1140	450
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	11	11	11	11	11	11	11	1200	242	105	1200	474
Adj. Flow (vph)	0	10	0	0	68	0	13	0	0	0	33	0
RTOR Reduction (vph)	0	23	0	179	216	0	0	1440	0	105	1641	0
Lane Group Flow (vph)	0	23	0	179	216	0	0	1440	0	105	1641	0
Confl. Peds. (#/hr)	4			4	44		4	44		12	12	44
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	7			8			2					6
Permitted Phases												6
Actuated Green, G (s)	5.1			16.0	16.0		43.2			7.7		55.4
Effective Green, g (s)	5.6			16.5	16.5		43.7			8.2		55.9
Actuated g/C Ratio	0.06			0.18	0.18		0.49			0.09		0.62
Clearance Time (s)	4.5			4.5	4.5		4.5			4.5		4.5
Vehicle Extension (s)	2.0			2.0	2.0		2.0			2.0		2.0
Lane Grp Cap (vph)	53			239	293		1552			161		2029
v/s Ratio Prot	c0.03			c0.14	0.14		c0.45			0.06		c0.50
v/s Ratio Perm	0.43			0.75	0.74		0.93			0.65		0.81
Uniform Delay, d1	40.7			34.8	34.7		21.7			39.5		13.0
Progression Factor	1.00			1.00	1.00		1.03			1.00		1.00
Incremental Delay, d2	2.0			10.7	8.1		4.7			7.0		3.6
Delay (s)	42.7			45.5	42.8		27.1			46.5		16.6
Level of Service	D			D	D		C			D		B
Approach Delay (s)	42.7			43.8			27.1			18.4		
Approach LOS	D			D			C			B		
Intersection Summary												
HCM Average Control Delay	25.1											
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	107.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.97	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3438	1770	3356	1770	3356	1770	3431	1770	3393	1770	3393
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3438	1770	3356	1770	3356	1770	3431	1770	3393	1770	3393
Volume (vph)	480	590	90	120	700	310	110	640	120	280	870	180
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	615	94	125	729	323	115	667	125	292	906	188
RTOR Reduction (vph)	0	13	0	0	56	0	0	17	0	0	19	0
Lane Group Flow (vph)	479	696	0	125	996	0	115	775	0	292	1075	0
Confl. Peds. (#/hr)	6	24	24	6	6	6	28	28	28	36	36	36
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Permitted Phases												
Actuated Green, G (s)	13.0	28.9	9.6	25.5	8.1	23.5	11.0	26.4				
Effective Green, g (s)	12.5	29.9	9.1	26.5	7.6	24.5	10.5	27.4				
Actuated g/C Ratio	0.14	0.33	0.10	0.29	0.08	0.27	0.12	0.30				
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	477	1142	179	988	149	934	207	1033				
v/s Ratio Prot	c0.14	c0.20	0.07	c0.30	0.06	0.23	c0.17	c0.32				
v/c Ratio	1.00	0.61	0.70	1.01	0.77	0.83	1.41	1.04				
Uniform Delay, d1	38.8	25.2	39.1	31.8	40.4	30.8	39.8	31.3				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.87				
Incremental Delay, d2	42.2	0.6	9.2	30.7	19.9	8.4	201.2	33.2				
Delay (s)	81.0	25.8	48.3	62.4	60.2	39.2	246.7	60.5				
Level of Service	F	C	D	E	E	D	F	E				
Approach Delay (s)	48.1		60.9		41.9		99.7					
Approach LOS	D		E		D		F					
Intersection Summary												
HCM Average Control Delay	65.5						HCM Level of Service			E		
HCM Volume to Capacity ratio	1.13											
Actuated Cycle Length (s)	90.0						Sum of lost time (s)			20.0		
Intersection Capacity Utilization	93.4%						ICU Level of Service			F		
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2015 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1611	1611	1611	3292	3292	3433	3474	3474	3433	3474	3433	3474
Flt Permitted	1.00	1.00	1.00	0.94	0.94	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1611	1611	1611	3100	3100	3433	3474	3474	3433	3474	3433	3474
Volume (vph)	0	0	10	0	0	0	10	340	300	1600	430	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	11	0	0	0	11	358	316	1684	453	63
RTOR Reduction (vph)	0	11	0	0	0	0	26	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	659	0	1684	516	0	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	0.0	0.0	8.0	0.0	0.0	8.0	29.0	45.0				
Effective Green, g (s)	0.0	0.0	8.0	0.0	0.0	8.0	29.0	45.0				
Actuated g/C Ratio	0.00	0.00	0.18	0.00	0.00	0.18	0.64	1.00				
Clearance Time (s)			4.0			4.0	4.0	2.0				
Lane Grp Cap (vph)	0	0	551	0	0	551	2212	3474				
v/s Ratio Prot			c0.21			c0.49	0.15					
v/c Ratio	0.00	0.00	9.888dr	0.00	0.00	9.888dr	0.76	0.15				
Uniform Delay, d1	22.5	22.5	18.5	0.0	0.0	18.5	5.6	0.0				
Progression Factor	1.00	1.00	0.78	1.00	1.00	0.78	1.00	1.00				
Incremental Delay, d2	0.0	0.0	103.8	0.0	0.0	103.8	2.5	0.1				
Delay (s)	22.5	22.5	118.3	0.0	0.0	118.3	8.1	0.1				
Level of Service	C	C	F	A	A	F	A	A				
Approach Delay (s)	22.5	22.5	118.3	0.0	0.0	118.3	6.2	0.1				
Approach LOS	C	C	F	A	A	F	A	A				
Intersection Summary												
HCM Average Control Delay	32.8						HCM Level of Service			C		
HCM Volume to Capacity ratio	0.86											
Actuated Cycle Length (s)	45.0						Sum of lost time (s)			8.0		
Intersection Capacity Utilization	78.3%						ICU Level of Service			D		
Analysis Period (min)	15											
dr Defacto Right Lane. Recode with 1 through lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2015 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.97	0.96	0.97	1.00	0.98	0.98	1.00	0.98	0.98	1.00	0.98	0.98
Flpb, ped/bikes	0.98	0.97	0.98	1.00	0.98	0.98	1.00	0.98	0.98	1.00	0.98	0.98
Frt	0.98	0.94	0.98	1.00	0.98	0.98	1.00	0.98	0.98	1.00	0.98	0.98
Flt Protected	0.98	0.99	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1695	1605	1695	3393	3471	3471	3393	3471	3471	3471	3471	3471
Flt Permitted	0.83	0.87	0.83	0.91	0.88	0.88	0.91	0.88	0.88	0.88	0.88	0.88
Satd. Flow (perm)	1438	1419	1438	3083	3070	3070	3083	3070	3070	3070	3070	3070
Volume (vph)	70	80	30	60	60	90	30	470	80	50	580	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	84	32	63	63	95	32	495	84	53	611	32
RTOR Reduction (vph)	0	16	0	0	0	60	0	28	0	0	8	0
Lane Group Flow (vph)	0	174	0	0	161	0	0	583	0	0	688	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.0			15.0			22.0			22.0		
Effective Green, g (s)	15.0			15.0			22.0			22.0		
Actuated g/C Ratio	0.33			0.33			0.49			0.49		
Clearance Time (s)	4.0			4.0			4.0			4.0		
Lane Grp Cap (vph)	479			473			1507			1501		
v/s Ratio Prot	c0.12			0.11			0.19			c0.22		
v/s Ratio Perm	0.36			0.34			0.39			0.46		
v/c Ratio	11.4			11.3			7.2			7.6		
Uniform Delay, d1	1.00			1.00			1.00			1.00		
Progression Factor	2.1			2.0			0.8			1.0		
Incremental Delay, d2	13.5			13.2			8.0			8.6		
Delay (s)	B			B			A			A		
Level of Service	B			B			A			A		
Approach Delay (s)	13.5			13.2			8.0			8.6		
Approach LOS	B			B			A			A		
Intersection Summary												
HCM Average Control Delay	9.5 HCM Level of Service											
HCM Volume to Capacity ratio	0.42 HCM Level of Service											
Actuated Cycle Length (s)	45.0 Sum of lost time (s)											
Intersection Capacity Utilization	63.8% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group	A											

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2015 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.95	0.95	0.95	1.00	0.98	0.98	1.00	0.98	0.98	1.00	0.98	0.98
Flpb, ped/bikes	0.96	0.97	0.96	1.00	0.98	0.98	1.00	0.98	0.98	1.00	0.98	0.98
Frt	0.96	0.96	0.96	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.99	0.99
Flt Protected	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1626	1650	1626	3443	3443	3443	3443	3443	3443	3443	3443	3443
Flt Permitted	0.79	0.83	0.79	0.83	0.84	0.84	0.83	0.84	0.84	0.82	0.82	0.82
Satd. Flow (perm)	1302	1389	1302	2893	2893	2893	2893	2893	2893	4054	4054	4054
Volume (vph)	70	80	70	40	40	70	50	30	1000	60	70	1530
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	84	74	42	42	74	53	32	1053	63	74	1611
RTOR Reduction (vph)	0	6	0	0	0	26	0	0	3	0	0	5
Lane Group Flow (vph)	0	226	0	0	143	0	0	1145	0	0	1785	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	4			4			2			6		
Permitted Phases	4			4			2			6		
Actuated Green, G (s)	16.6			16.6			59.4			59.4		
Effective Green, g (s)	17.1			17.1			59.9			59.9		
Actuated g/C Ratio	0.20			0.20			0.70			0.70		
Clearance Time (s)	4.5			4.5			4.5			4.5		
Vehicle Extension (s)	2.0			2.0			2.0			2.0		
Lane Grp Cap (vph)	262			279			2039			2857		
v/s Ratio Prot	c0.17			0.10			0.40			c0.44		
v/s Ratio Perm	0.86			0.51			0.56			0.62		
v/c Ratio	32.8			30.2			6.1			6.6		
Uniform Delay, d1	1.00			1.00			1.00			1.00		
Progression Factor	2.1			2.0			0.8			1.0		
Incremental Delay, d2	23.2			0.7			1.1			1.0		
Delay (s)	56.0			30.9			7.3			7.7		
Level of Service	E			C			A			A		
Approach Delay (s)	56.0			30.9			7.3			7.7		
Approach LOS	E			C			A			A		
Intersection Summary												
HCM Average Control Delay	12.1 HCM Level of Service											
HCM Volume to Capacity ratio	0.68 HCM Level of Service											
Actuated Cycle Length (s)	85.0 Sum of lost time (s)											
Intersection Capacity Utilization	101.9% ICU Level of Service											
Analysis Period (min)	15											
c Critical Lane Group	A											

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flpb, ped/bikes	1.00	0.97	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1746	3430	1759	3464	1767	3481	1736	3481	1736	3481	1736
Flt Permitted	0.17	1.00	0.37	1.00	0.44	1.00	0.60	1.00	0.60	1.00	0.60
Satd. Flow (perm)	320	3430	691	3464	810	1817	1092	1841	1092	1841	1092
Volume (vph)	30	370	80	70	670	70	90	200	30	80	400
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	389	84	74	705	74	95	211	32	84	421
RTOR Reduction (vph)	0	23	0	0	10	0	0	7	0	0	3
Lane Group Flow (vph)	32	450	0	74	769	0	95	236	0	84	450
Confl. Peds. (#/hr)	30	12	12	12	30	6	54	54	54	54	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	92	986	199	986	496	1113	669	1128	669	1128	669
v/s Ratio Prot	0.13	0.13	0.11	0.11	0.12	0.13	0.08	0.13	0.08	0.13	0.08
v/s Ratio Perm	0.10	0.46	0.37	0.77	0.19	0.21	0.13	0.40	0.13	0.40	0.13
v/c Ratio	22.6	23.4	22.7	26.1	6.8	6.9	6.5	7.9	6.5	7.9	6.5
Uniform Delay, d1	1.00	1.00	0.88	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	10.1	1.5	4.9	5.4	0.9	0.4	0.4	1.1	0.9	0.4	1.1
Incremental Delay, d2	32.7	24.9	24.9	29.4	7.7	7.3	6.9	9.0	6.9	9.0	6.9
Delay (s)	C	C	C	C	A	A	A	A	A	A	A
Level of Service	C	C	C	C	A	A	A	A	A	A	A
Approach Delay (s)	25.4	25.4	29.0	29.0	7.4	7.4	8.7	8.7	7.4	8.7	8.7
Approach LOS	C	C	C	C	A	A	A	A	A	A	A

Intersection Summary	20.0	HCM Level of Service	C
HCM Average Control Delay	20.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.7%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flpb, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.98	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1763	3424	1739	3514	1739	3514	1739	3514	1739	3514	1739
Flt Permitted	0.29	1.00	0.43	1.00	0.43	1.00	0.79	1.00	0.79	1.00	0.85
Satd. Flow (perm)	533	3424	786	3514	786	3514	2719	3514	2719	3514	2919
Volume (vph)	30	400	80	50	700	30	70	170	50	60	240
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	421	84	53	737	32	74	179	53	63	253
RTOR Reduction (vph)	0	21	0	0	4	0	0	22	0	0	17
Lane Group Flow (vph)	32	484	0	53	765	0	0	284	0	0	352
Confl. Peds. (#/hr)	18	54	54	18	4	18	18	18	18	18	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	260	1669	383	1713	383	1713	1122	1713	1122	1713	1204
v/s Ratio Prot	0.14	0.14	0.14	0.22	0.22	0.10	0.10	0.10	0.10	0.10	0.12
v/s Ratio Perm	0.06	0.12	0.29	0.14	0.45	0.25	0.25	0.25	0.25	0.25	0.29
v/c Ratio	11.2	12.2	11.3	13.4	15.4	15.4	15.4	15.7	15.4	15.7	15.7
Uniform Delay, d1	0.97	1.04	1.41	1.52	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Progression Factor	11.7	13.1	16.6	21.2	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Incremental Delay, d2	11.7	13.1	16.6	21.2	10.4	10.4	10.4	10.4	10.4	10.4	10.4
Delay (s)	B	B	B	C	C	C	B	B	B	B	B
Level of Service	B	B	B	C	C	C	B	B	B	B	B
Approach Delay (s)	13.0	13.0	20.9	20.9	10.4	10.4	16.3	16.3	16.3	16.3	16.3
Approach LOS	B	B	C	C	B	B	B	B	B	B	B

Intersection Summary	16.4	HCM Level of Service	B
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

2015 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (prot)	1763	3479	1733	3472	1733	3472	3386	3450	3386	3450	3386	3450	3386
Flt Permitted	0.29	1.00	0.44	1.00	0.44	1.00	0.87	0.74	0.87	0.74	0.87	0.74	0.87
Satd. Flow (perm)	531	3479	799	3472	799	3472	2952	2585	2952	2585	2952	2585	2952
Volume (vph)	40	440	40	70	680	80	40	260	80	120	340	30	30
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	458	42	73	708	83	42	271	83	125	354	31	31
RTOR Reduction (vph)	0	9	0	0	11	0	0	30	0	0	6	0	0
Lane Group Flow (vph)	42	491	0	73	780	0	0	366	0	0	504	0	0
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22	22
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6	6
Permitted Phases	4	8	4	8	4	8	2	2	2	6	6	6	6
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	272	1783	409	1779	1779	1779	1144	1002	1144	1002	1002	1002	1002
v/s Ratio Prot	0.14	0.14	0.14	0.22	0.22	0.22	0.12	0.12	0.12	0.12	0.12	0.12	0.12
v/s Ratio Perm	0.08	0.08	0.08	0.12	0.12	0.12	0.09	0.09	0.09	0.09	0.09	0.09	0.09
v/c Ratio	0.45	0.28	0.18	0.44	0.44	0.44	0.32	0.32	0.32	0.32	0.32	0.32	0.32
Uniform Delay, d1	10.3	11.1	10.5	12.3	12.3	12.3	17.1	17.1	17.1	17.1	17.1	17.1	17.1
Progression Factor	1.27	1.31	1.00	1.00	1.00	1.00	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Incremental Delay, d2	1.2	0.4	1.0	0.8	0.8	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Delay (s)	14.3	14.9	11.4	13.0	13.0	13.0	11.6	11.6	11.6	11.6	11.6	11.6	11.6
Level of Service	B	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	14.8	14.8	12.9	12.9	12.9	12.9	11.6	11.6	11.6	11.6	11.6	11.6	11.6
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B	B

Intersection Summary	
HCM Average Control Delay	14.8 HCM Level of Service B
HCM Volume to Capacity ratio	0.47
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	100.5% ICU Level of Service G
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2015 AM
 1/11/2008

Movement	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	0.97	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.99
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3385	1770	3385	1770	3385	1770	3385	1770
Flt Permitted	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3385	1770	3385	1770	3385	1770	3385	1770
Volume (vph)	560	60	100	810	0	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	589	63	105	853	0	0	0	0
RTOR Reduction (vph)	13	0	0	0	0	0	0	0
Lane Group Flow (vph)	639	0	105	853	0	0	0	0
Confl. Peds. (#/hr)	146	266	146	266	0	0	0	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	4	4	4	4	4	4
Permitted Phases	4	3	4	3	4	3	4	3
Actuated Green, G (s)	22.0	30.0	22.0	30.0	22.0	30.0	22.0	30.0
Effective Green, g (s)	22.0	30.0	22.0	30.0	22.0	30.0	22.0	30.0
Actuated g/C Ratio	0.37	0.50	0.37	0.50	0.37	0.50	0.37	0.50
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1241	885	1241	885	1241	885	1241	885
v/s Ratio Prot	0.19	0.06	0.19	0.06	0.19	0.06	0.19	0.06
v/s Ratio Perm	0.51	0.12	0.51	0.12	0.51	0.12	0.51	0.12
v/c Ratio	14.8	8.0	14.8	8.0	14.8	8.0	14.8	8.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.5	0.3	1.5	0.3	1.5	0.3	1.5	0.3
Incremental Delay, d2	16.4	8.2	16.4	8.2	16.4	8.2	16.4	8.2
Delay (s)	16.4	8.2	16.4	8.2	16.4	8.2	16.4	8.2
Level of Service	B	A	B	A	B	A	B	A
Approach Delay (s)	16.4	1.0	16.4	1.0	16.4	1.0	16.4	1.0
Approach LOS	B	A	B	A	B	A	B	A

Intersection Summary	
HCM Average Control Delay	7.2 HCM Level of Service A
HCM Volume to Capacity ratio	0.35
Actuated Cycle Length (s)	60.0 Sum of lost time (s) 4.0
Intersection Capacity Utilization	30.3% ICU Level of Service A
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
11: 40th St. & BART parking

2015 AM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	540	20	0	910	0	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	568	21	0	958	0	21
Pedestrians	123	123	123	123	123	123
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	10	10	10	10	10	10
Right turn flare (veh)						
Median type	None					
Median storage (veh)	None					
Upstream signal (ft)	81			406		
pX, platoon unblocked	0.86			0.86		0.86
VC, conflicting volume	712			1181		541
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	498			694		298
IC, single (s)	4.1			6.8		6.9
IC, 2 stage (s)						
tF (s)	2.2			3.5		3.3
p0 queue free %	100			100		96
cM capacity (veh/h)	817			312		482
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	379	211	479	479	21	21
Volume Left	0	0	0	0	0	0
Volume Right	0	21	0	0	21	0
cSH	1700	1700	1700	1700	482	482
Volume to Capacity	0.22	0.12	0.28	0.28	0.04	0.04
Queue Length 95th (ft)	0	0	0	0	0	3
Control Delay (s)	0.0	0.0	0.0	0.0	12.8	B
Lane LOS	B					
Approach Delay (s)	0.0	0.0	0.0	12.8		B
Approach LOS	B					
Intersection Summary						
Average Delay	0.2					
Intersection Capacity Utilization	45.0%					
Analysis Period (min)	15					
ICU Level of Service	A					

HCM Unsignalized Intersection Capacity Analysis
12: 40th St. & BART parking

2015 AM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	550	10	0	910	0	60
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	573	10	0	948	0	62
Pedestrians	123	123	123	123	123	123
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	10	10	10	10	10	10
Right turn flare (veh)						
Median type	None					
Median storage (veh)	None					
Upstream signal (ft)	298			189		
pX, platoon unblocked	0.88			0.88		0.88
VC, conflicting volume	706			1175		538
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	531			712		340
IC, single (s)	4.1			6.8		6.9
IC, 2 stage (s)						
tF (s)	2.2			3.5		3.3
p0 queue free %	100			100		87
cM capacity (veh/h)	816			302		466
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	382	201	474	474	62	62
Volume Left	0	0	0	0	0	0
Volume Right	0	10	0	0	62	0
cSH	1700	1700	1700	1700	466	466
Volume to Capacity	0.22	0.12	0.28	0.28	0.13	0.13
Queue Length 95th (ft)	0	0	0	0	0	12
Control Delay (s)	0.0	0.0	0.0	0.0	13.9	B
Lane LOS	B					
Approach Delay (s)	0.0	0.0	0.0	13.9		B
Approach LOS	B					
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	45.0%					
Analysis Period (min)	15					
ICU Level of Service	A					

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave.

2015 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.95	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00
Frt	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.96	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1681	3245	1637	3406	1770	3477	1770	3477	1770	3319	1770
Flt Permitted	0.27	1.00	0.36	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	479	3245	626	3406	1770	3477	1770	3477	1770	3319	1770
Volume (vph)	140	350	120	80	520	70	110	450	30	140	900
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	147	368	126	84	547	74	116	474	32	147	947
RTOR Reduction (vph)	0	40	0	0	12	0	0	5	0	0	31
Lane Group Flow (vph)	147	454	0	84	609	0	116	501	0	147	1211
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	92
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	4	8	8	5	2	2	1	1	6
Permitted Phases	4	8	8	8	8	8	2	2	1	1	6
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	8.2	35.1	35.1	10.9	37.8	37.8
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	8.7	35.6	35.6	11.4	38.3	38.3
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.10	0.42	0.42	0.13	0.45	0.45
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	147	993	191	1042	181	1456	237	1496	c0.08	c0.36	
v/s Ratio Prot	0.14	0.14	0.14	0.18	0.18	0.07	0.14	0.14			
v/s Ratio Perm	c0.31	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
v/c Ratio	1.00	0.46	0.44	0.58	0.64	0.34	0.64	0.34	0.62	0.81	0.81
Uniform Delay, d1	29.5	23.8	23.7	24.9	36.6	16.8	34.8	16.8	34.8	20.2	20.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	0.89	1.30	1.30	1.00	1.00	1.00
Incremental Delay, d2	74.2	0.1	0.6	0.5	5.1	0.6	3.6	4.8	3.6	4.8	4.8
Delay (s)	103.7	23.9	24.2	25.5	37.9	22.3	38.4	25.0	38.4	25.0	25.0
Level of Service	F	C	C	C	D	C	D	C	D	C	C
Approach Delay (s)	42.2	C	25.3	C	25.2	C	26.4	C	26.4	C	C
Approach LOS	D	D	C	C	C	C	D	C	D	C	C

Intersection Summary	
HCM Average Control Delay	29.0
HCM Volume to Capacity ratio	0.87
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	79.6%
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
 14: Apgar St. & Telegraph Ave.

2015 AM
 1/11/2008

Movement	EBL	EBR	NBL	NBT	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	20	40	610	1050	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	21	42	642	1105	32
Pedestrians	100	100	100	100	100	100
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	8	8	8	8	8	8
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	0.75	0.75	0.75	396	625	625
Upstream signal (ft)	0.75	0.75	0.75	396	625	625
pX, platoon unblocked	1726	768	1237			
vC, conflicting volume	1726	768	1237			
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	1593	355	981			
IC, single (s)	6.8	6.9	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	81	95	91			
cM capacity (veh/h)	57	403	480			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	32	42	321	321	737	400
Volume Left	11	42	0	0	0	0
Volume Right	21	0	0	0	0	32
cSH	133	480	1700	1700	1700	1700
Volume to Capacity	0.24	0.09	0.19	0.19	0.43	0.24
Queue Length 95th (ft)	22	7	0	0	0	0
Control Delay (s)	40.4	13.2	0.0	0.0	0.0	0.0
Lane LOS	E	B	B	B	B	B
Approach Delay (s)	40.4	0.8			0.0	
Approach LOS	E	B			B	

Intersection Summary	
Average Delay	1.0
Intersection Capacity Utilization	53.0%
Analysis Period (min)	15
ICU Level of Service	A

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

2015 AM
 1/11/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	↑↑	↑↑	↑↑	↑↑
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	30	620	10	20	1050
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	32	653	11	21	1105
Pedestrians	34	33				34
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	3	3	3	3	3	3
Right turn flare (veh)	None					
Median type	None					
Median storage (veh)						
Upstream signal (ft)	0.82	0.95	230			791
pX, platoon unblocked						0.95
VC, conflicting volume	1320	400				697
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	997	322				634
IC, single (s)	6.8	6.9				4.1
IC, 2 stage (s)						
IF (s)	3.5	3.3				2.2
p0 queue free %	94	95				98
cM capacity (veh/h)	181	606				876
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	42	435	228	21	563	563
Volume Left	11	0	0	21	0	0
Volume Right	32	0	11	0	0	0
cSH	382	1700	1700	876	1700	1700
Volume to Capacity	0.11	0.26	0.13	0.02	0.33	0.33
Queue Length 95th (ft)	9	0	0	2	0	0
Control Delay (s)	15.6	0.0	0.0	9.2	0.0	0.0
Lane LOS	C	A	A	A	A	A
Approach Delay (s)	15.6	0.0	0.2	0.2		
Approach LOS	C	A	A	A		

Intersection Summary		
Average Delay		0.5
Intersection Capacity Utilization	46.2%	ICU Level of Service
Analysis Period (min)	15	A

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2015 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Frb, ped/bikes	1.00	0.99	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Frt	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.95	1.00
Fit Protected	1.00	0.95	1.00	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00
Satd. Flow (prot)	4993	1758	3468	1774	3468	1774	3468	1774	3468	1774	3468	1774
Fit Permitted	0.83	0.42	1.00	0.83	0.42	1.00	0.83	0.42	1.00	0.83	0.42	1.00
Satd. Flow (perm)	4178	777	3468	984	3468	984	3468	984	3468	984	3468	984
Volume (vph)	50	460	40	60	610	80	70	200	60	200	310	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	484	42	63	642	84	74	211	63	211	326	53
RTOR Reduction (vph)	0	10	0	0	12	0	0	9	0	0	7	0
Lane Group Flow (vph)	0	569	0	63	714	0	0	339	0	211	372	0
Conf. Peds. (#/hr)	18	18	24	24	24	24	24	48	48	48	24	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	8	8	2	2	6	6	6	6
Permitted Phases	4	4	8	8	8	8	2	2	6	6	6	6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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
Lane Grp Cap (vph)	2556	475	2122	289	2122	289	534	534	534	534	534	534
v/s Ratio Prot	0.14	0.08					0.29	0.29	0.29	0.29	0.29	0.29
v/s Ratio Perm	0.22	0.13	0.34				1.17	1.17	1.17	0.97	0.70	0.70
Uniform Delay, d1	7.4	7.0	8.1				30.0	30.0	29.7	26.6	26.6	26.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.6	0.4				108.0	108.0	54.3	7.3	7.3	7.3
Delay (s)	7.6	7.6	8.5				138.0	138.0	84.0	34.0	34.0	34.0
Level of Service	A	A	A	A	A	A	F	F	F	F	F	F
Approach Delay (s)	7.6	8.4	8.4				51.9	51.9	51.9	51.9	51.9	51.9
Approach LOS	A	A	A	A	A	A	D	D	D	D	D	D

Intersection Summary		
HCM Average Control Delay	38.9	HCM Level of Service
HCM Volume to Capacity ratio	0.61	D
Actuated Cycle Length (s)	85.0	Sum of lost time (s)
Intersection Capacity Utilization	99.9%	ICU Level of Service
Analysis Period (min)	15	F
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2015 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.96	1.00	0.98	1.00	0.98	1.00	1.00
Flt	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	5046	4978	4978	1757	1787	1770	1827	1770	1827	1770	1827
Flt Permitted	0.88	0.85	0.85	0.34	1.00	0.40	1.00	0.34	1.00	0.40	1.00
Satd. Flow (perm)	4467	4231	4231	637	1787	742	1827	637	1787	742	1827
Volume (vph)	30	690	20	50	650	90	50	190	70	90	260
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	726	21	53	684	95	53	200	74	95	274
RTOR Reduction (vph)	0	4	0	0	20	0	0	16	0	0	5
Lane Group Flow (vph)	0	775	0	0	812	0	53	258	0	95	301
Conf. Peds. (#/hr)	18	18	18	12	12	12	12	12	12	12	18
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2876	2724	2724	163	458	190	468	163	458	190	468
v/s Ratio Prot	0.17	0.19	0.19	0.08	0.14	0.13	0.16	0.08	0.14	0.13	0.16
v/s Ratio Perm	0.27	0.30	0.30	0.33	0.56	0.50	0.64	0.33	0.56	0.50	0.64
Uniform Delay, d1	6.1	6.3	6.3	24.1	25.9	25.4	26.5	24.1	25.9	25.4	26.5
Progression Factor	1.00	0.67	0.67	1.00	1.00	1.22	1.24	1.00	1.00	1.22	1.24
Incremental Delay, d2	0.2	0.3	0.3	5.2	4.9	8.9	6.5	5.2	4.9	8.9	6.5
Delay (s)	6.4	4.5	4.5	29.4	30.8	39.9	39.3	29.4	30.8	39.9	39.3
Level of Service	A	A	A	C	C	D	D	C	C	D	D
Approach Delay (s)	6.4	4.5	4.5	30.6	30.6	39.4	39.4	30.6	30.6	39.4	39.4
Approach LOS	A	A	A	C	C	D	D	C	C	D	D

Intersection Summary	
HCM Average Control Delay	14.7
HCM Volume to Capacity ratio	0.40
Actuated Cycle Length (s)	80.0
Intersection Capacity Utilization	62.6%
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

2015 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.97	1.00	0.97	1.00	0.97	1.00	1.00
Flt	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	5027	4919	4919	3403	3403	3458	3403	3403	3458	3403	3458
Flt Permitted	0.83	0.83	0.83	0.83	0.83	0.86	0.83	0.83	0.86	0.83	0.86
Satd. Flow (perm)	4168	4082	4082	2939	2939	2774	2939	2939	2774	2939	2774
Volume (vph)	50	770	40	60	750	170	30	160	40	100	300
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	811	42	63	789	179	32	168	42	105	316
RTOR Reduction (vph)	0	6	0	0	41	0	0	22	0	0	4
Lane Group Flow (vph)	0	900	0	0	990	0	0	220	0	0	438
Conf. Peds. (#/hr)	17	17	17	12	12	12	12	12	12	12	17
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2883	2628	2628	163	458	190	468	163	458	190	468
v/s Ratio Prot	0.22	0.24	0.24	0.24	0.38	0.29	0.16	0.22	0.24	0.24	0.38
v/s Ratio Perm	0.34	0.34	0.34	0.38	0.38	0.29	0.16	0.34	0.34	0.34	0.38
Uniform Delay, d1	6.5	6.7	6.7	23.9	23.9	26.3	26.3	23.9	23.9	26.3	26.3
Progression Factor	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.4	0.4	7.1	7.1	12.8	12.8	7.1	7.1	12.8	12.8
Delay (s)	5.2	7.1	7.1	24.9	24.9	39.3	39.3	24.9	24.9	39.3	39.3
Level of Service	A	A	A	C	C	B	B	C	C	B	B
Approach Delay (s)	5.2	7.1	7.1	24.9	24.9	39.3	39.3	24.9	24.9	39.3	39.3
Approach LOS	A	A	A	C	C	B	B	C	C	B	B

Intersection Summary	
HCM Average Control Delay	9.1
HCM Volume to Capacity ratio	0.44
Actuated Cycle Length (s)	80.0
Intersection Capacity Utilization	102.5%
Analysis Period (min)	15
c Critical Lane Group	

Movement	EBL	EBT	WBT	WBR	SBL	SBR					
Lane Configurations	Free	Free	Free	Free	Stop	Stop					
Sign Control	Free	Free	Free	Free	Stop	Stop					
Grade	0%	0%	0%	0%	0%	0%					
Volume (veh/h)	0	920	830	30	0	150					
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95					
Hourly flow rate (vph)	0	968	874	32	0	158					
Pedestrians	98				98						
Lane Width (ft)	12.0				12.0						
Walking Speed (ft/s)	4.0				4.0						
Percent Blockage	8				8						
Right turn flare (veh)					None						
Median type					None						
Median storage (veh)											
Upstream signal (ft)	698		473								
pX, platoon unblocked	0.94				0.94	0.94					
VC, conflicting volume	1003				1294	487					
VC1, stage 1 cont vol											
VC2, stage 2 cont vol											
VCu, unblocked vol	885				1193	338					
IC, single (s)	4.1				6.8	6.9					
IC, 2 stage (s)											
IF (s)	2.2				3.5	3.3					
p0 queue free %	100				100	70					
cM capacity (veh/h)	659				156	524					
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	WB 4	SB 1	SB 2	SB 3	SB 4
Volume Total	323	323	323	291	291	291	32	158			
Volume Left	0	0	0	0	0	0	0	0			
Volume Right	0	0	0	0	0	0	32	158			
cSH	1700	1700	1700	1700	1700	1700	1700	524			
Volume to Capacity	0.19	0.19	0.19	0.17	0.17	0.17	0.02	0.30			
Queue Length 95th (ft)	0	0	0	0	0	0	0	0			
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	14.8			
Lane LOS								B			
Approach Delay (s)	0.0			0.0				14.8			
Approach LOS								B			
Intersection Summary											
Average Delay	1.2										
Intersection Capacity Utilization	37.9%										
Analysis Period (min)	15										
ICU Level of Service	A										

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.98	0.98	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.98
Flt Protected	1.00	1.00	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	1.00
Satd. Flow (prot)	4967	4853	4853	4853	4853	4853	1758	3413	1741	3447	1741
Flt Permitted	0.72	0.69	0.69	0.69	0.69	0.69	0.27	1.00	0.47	1.00	0.47
Satd. Flow (perm)	3577	3355	3355	3355	3355	3355	507	3413	860	3447	860
Volume (vph)	80	750	100	110	700	200	50	350	80	280	680
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	789	105	116	737	211	53	368	84	295	716
RTOR Reduction (vph)	0	21	0	0	78	0	0	16	0	0	10
Lane Group Flow (vph)	0	957	0	0	986	0	53	436	0	295	822
Conf. Peds. (#/hr)	40				25		40	25	31	31	25
Turn Type	Perm	Perm	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	8	2	2				6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	29.9	29.9	29.9	29.9	29.9	29.9	44.6	44.6	44.6	44.6	44.6
Effective Green, g (s)	31.4	31.4	31.4	31.4	31.4	31.4	45.6	45.6	45.6	45.6	45.6
Actuated g/C Ratio	0.37	0.37	0.37	0.37	0.37	0.37	0.54	0.54	0.54	0.54	0.54
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grip Cap (vph)	1321	1239	1239	1239	1239	1239	272	1831	461	1849	461
v/s Ratio Prot							0.13				0.24
v/s Ratio Perm	0.27	0.27	0.27	0.27	0.27	0.27	0.10	0.10	0.10	0.10	0.10
v/c Ratio	0.72	0.72	0.72	0.72	0.72	0.72	0.19	0.24	0.19	0.24	0.19
Uniform Delay, d1	23.1	23.1	23.1	23.1	23.1	23.1	10.2	10.5	10.2	10.5	10.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.40	1.39	1.40	1.39	1.40
Incremental Delay, d2	1.7	1.7	1.7	1.7	1.7	1.7	1.5	0.3	1.5	0.3	1.5
Delay (s)	24.8	24.8	24.8	24.8	24.8	24.8	15.8	14.8	15.8	14.8	15.8
Level of Service	C	C	C	C	C	C	B	B	C	B	C
Approach Delay (s)	24.8			27.3			14.9		16.7		16.7
Approach LOS	C			C			B		B		B
Intersection Summary											
HCM Average Control Delay	21.7										
HCM Volume to Capacity ratio	0.70										
Actuated Cycle Length (s)	85.0										
Intersection Capacity Utilization	89.2%										
Analysis Period (min)	15										
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.											
d2 Defacto Right Lane. Recode with 1 through lane as a right lane.											
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

2015 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5042	4983	4983	4983	4983	4983	1770	1395	1606	1606	1606	1606
Flt Permitted	0.88	0.88	0.88	0.88	0.88	0.88	1.00	1.00	0.83	0.83	0.83	0.83
Satd. Flow (perm)	4452	4375	4375	4375	4375	4375	1592	1395	1360	1360	1360	1360
Volume (vph)	30	1080	30	30	980	80	20	30	20	80	30	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	1137	32	32	1032	84	21	32	21	84	32	42
RTOR Reduction (vph)	0	4	0	0	11	0	0	0	0	15	0	16
Lane Group Flow (vph)	0	1197	0	0	1137	0	0	53	6	0	142	0
Conf. Ped. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	2	6	6
Permitted Phases	4	8	8	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	48.0	48.0	48.0	48.0	48.0	48.0	23.0	23.0	23.0	23.0	23.0	23.0
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	2699	2699	2699	2699	2699	2699	468	410	400	400	400	400
v/s Ratio Prot	c0.27	0.26	0.26	0.26	0.26	0.26	0.03	0.00	c0.10	c0.10	c0.10	c0.10
v/s Ratio Perm	0.44	0.43	0.43	0.43	0.43	0.43	0.11	0.02	0.35	0.35	0.35	0.35
v/c Ratio	8.5	8.4	8.4	8.4	8.4	8.4	20.6	20.0	22.3	22.3	22.3	22.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.1	0.5	0.1	0.5	0.1
Incremental Delay, d2	9.0	8.9	8.9	8.9	8.9	8.9	21.1	20.1	24.7	24.7	24.7	24.7
Delay (s)	A	A	A	A	A	A	C	C	C	C	C	C
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	9.0	8.9	8.9	8.9	8.9	8.9	20.8	20.8	24.7	24.7	24.7	24.7
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	10.3 HCM Level of Service B											
HCM Volume to Capacity ratio	0.41											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	81.7% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2015 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑	←↑↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4908	1770	4817	1770	4817	1770	3539	1511	1770	3539	1523
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4908	1770	4817	1770	4817	1770	3539	1511	1770	3539	1523
Volume (vph)	160	890	140	150	750	280	110	300	110	310	1150	150
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	168	937	147	158	789	295	116	316	116	326	1211	158
RTOR Reduction (vph)	0	17	0	0	56	0	0	0	0	51	0	33
Lane Group Flow (vph)	168	1067	0	158	1028	0	116	316	65	326	1211	125
Conf. Ped. (#/hr)	66	66	66	66	66	66	23	23	38	38	26	26
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	4	4	4	5	2	2	3	1	6
Permitted Phases	7	4	4	4	4	4	5	2	2	3	1	6
Actuated Green, G (s)	12.0	34.0	13.6	35.6	10.4	31.4	45.0	25.0	45.0	25.0	46.0	58.0
Effective Green, g (s)	11.0	35.0	12.6	36.6	9.4	32.4	45.0	24.0	47.0	24.0	47.0	58.0
Actuated g/C Ratio	0.09	0.29	0.10	0.31	0.08	0.27	0.38	0.20	0.39	0.48	0.20	0.39
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	3.0	3.0	3.0	3.0	3.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	1432	186	1469	139	956	617	354	1386	787	354	1386
v/s Ratio Prot	c0.09	c0.22	0.09	0.21	0.07	0.09	0.01	c0.18	c0.34	0.01	c0.18	c0.34
v/s Ratio Perm	1.04	0.75	0.85	0.70	0.83	0.33	0.11	0.92	0.87	0.16	0.92	0.87
v/c Ratio	54.5	38.5	52.8	36.8	54.5	35.1	24.4	47.1	33.8	17.3	47.1	33.8
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	80.8	3.6	27.6	2.8	31.8	0.9	0.0	28.3	7.9	0.0	28.3	7.9
Delay (s)	135.3	42.0	80.4	39.6	86.3	36.0	24.4	75.3	41.6	17.4	75.3	41.6
Level of Service	F	D	F	D	F	D	F	D	C	E	D	B
Approach Delay (s)	54.5	54.5	54.5	54.5	54.5	54.5	44.8	44.8	45.9	45.9	45.9	45.9
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	47.7 HCM Level of Service D											
HCM Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	82.4% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2015 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	0.93			0.96			1.00	0.99			1.00	0.99
Ftbp, ped/bikes	0.98			0.96			1.00	0.92			1.00	0.99
Frt	0.95			0.95			1.00	0.99			1.00	0.99
Flt Protected	0.98			0.99			0.95	1.00			0.95	1.00
Satd. Flow (prot)	1578			1610			1658	3453			1635	3468
Flt Permitted	0.74			0.85			0.38	1.00			0.43	1.00
Satd. Flow (perm)	1189			1395			664	3453			746	3468
Volume (vph)	40	30	40	50	60	60	60	510	40	30	620	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	32	42	53	63	63	63	537	42	32	653	42
RTOR Reduction (vph)	0	28	0	0	27	0	0	4	0	0	4	0
Lane Group Flow (vph)	0	88	0	0	152	0	63	575	0	32	691	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	2	2	4	6	6
Permitted Phases	4	4	4	4	4	4	4	2	2	4	6	6
Actuated Green, G (s)	12.6			12.6			65.4	65.4			65.4	65.4
Effective Green, g (s)	12.1			12.1			64.9	64.9			64.9	64.9
Actuated g/C Ratio	0.14			0.14			0.76	0.76			0.76	0.76
Clearance Time (s)	3.5			3.5			3.5	3.5			3.5	3.5
Vehicle Extension (s)	2.0			2.0			2.0	2.0			2.0	2.0
Lane Grp Cap (vph)	169			199			507	2636			570	2648
v/s Ratio Prot				c0.11			0.09	0.17			0.04	c0.20
v/s Ratio Perm	0.07			0.76			0.12	0.22			0.06	0.26
v/c Ratio	0.52			35.1			2.6	2.9			2.5	3.0
Uniform Delay, d1	33.8			1.00			1.00	1.00			1.00	0.27
Progression Factor	1.00			1.00			0.5	0.2			0.2	0.2
Incremental Delay, d2	1.1			49.3			3.1	3.0			0.9	1.0
Delay (s)	34.9			D			A	A			A	A
Level of Service	C			D			A	A			A	A
Approach Delay (s)	34.9			49.3			3.1	3.1			1.0	1.0
Approach LOS	C			D			A	A			A	A

Intersection Summary	
HCM Average Control Delay	9.4
HCM Level of Service	A
HCM Volume to Capacity ratio	0.34
Actuated Cycle Length (s)	85.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.8%
ICU Level of Service	A
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

2015 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.95	1.00
Ftbp, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.96	1.00
Frt	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	0.95
Flt Protected	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Satd. Flow (prot)	1770	3347		1770	3235		1688	3443		1675	3212	1675
Flt Permitted	0.95	1.00		0.95	1.00		0.28	1.00		0.50	1.00	1.00
Satd. Flow (perm)	1770	3347		1770	3235		503	3443		879	3212	879
Volume (vph)	260	400		100	70		120	330		40	80	510
Peak-hour factor, PHF	0.95	0.95		0.95	0.95		0.95	0.95		0.95	0.95	0.95
Adj. Flow (vph)	274	421		105	74		126	347		42	84	537
RTOR Reduction (vph)	0	24		0	0		0	9		0	0	44
Lane Group Flow (vph)	274	502		0	74		475	380		0	84	714
Confl. Peds. (#/hr)	100	100		100	100		100	100		100	100	100
Turn Type	Prot	Prot		Prot	Prot		Perm	Perm		Perm	Perm	Perm
Protected Phases	7	4		3	8		2	2		6	6	6
Permitted Phases	7	4		3	8		2	2		6	6	6
Actuated Green, G (s)	16.1	26.4		6.8	17.1		38.3	38.3		38.3	38.3	38.3
Effective Green, g (s)	16.6	25.9		7.3	16.6		39.8	39.8		39.8	39.8	39.8
Actuated g/C Ratio	0.20	0.30		0.09	0.20		0.47	0.47		0.47	0.47	0.47
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	346	1020		152	632		236	1612		412	1504	1504
v/s Ratio Prot	c0.15	0.15		0.04	c0.15		0.11	0.11		0.10	c0.22	c0.22
v/s Ratio Perm	0.79	0.49		0.49	0.75		0.31	0.24		0.20	0.47	0.47
v/c Ratio	32.6	24.2		37.1	32.3		14.1	13.5		13.3	15.5	15.5
Uniform Delay, d1	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Progression Factor	1.00	1.00		0.9	4.5		3.4	0.3		1.1	1.1	1.1
Incremental Delay, d2	43.5	24.3		38.0	36.7		17.5	13.9		14.4	16.5	16.5
Delay (s)	D	C		D	D		B	B		B	B	B
Level of Service	D	C		D	D		B	B		B	B	B
Approach Delay (s)	30.9	30.9		36.9	36.9		14.4	14.4		16.3	16.3	16.3
Approach LOS	C	C		D	D		B	B		B	B	B

Intersection Summary	
HCM Average Control Delay	24.8
HCM Level of Service	C
HCM Volume to Capacity ratio	0.61
Actuated Cycle Length (s)	85.0
Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.9%
ICU Level of Service	C
Analysis Period (min)	15

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	12	16	16	16	16	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.98	1.00	1.00	0.98	1.00	0.98	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.93	1.00	0.93
Flt Protected	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	4933	1770	4968	2006	1993	1958	1915	1958	1915	1958	1915
Flt Permitted	0.95	1.00	0.95	1.00	1.00	0.12	1.00	0.55	1.00	0.55	1.00	0.55
Satd. Flow (perm)	1770	4933	1770	4968	264	1993	1138	1915	1993	1138	1915	1915
Volume (vph)	340	1230	170	90	1020	150	170	240	90	140	270	270
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	358	1295	179	95	1074	158	179	253	95	147	284	284
RTOR Reduction (vph)	0	17	0	0	19	0	0	14	0	0	0	37
Lane Group Flow (vph)	358	1457	0	95	1213	0	179	334	0	147	531	0
Confl. Peds. (#/hr)			32	32		4	12		24	24		12
Parking (#/hr)												0
Turn Type	Prot	4	4	Prot	3	8	pm	pt	2	2	Perm	6
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	20.0	39.2	7.8	27.0	42.5	42.5	29.5	29.5	29.5	29.5	29.5	29.5
Effective Green, g (s)	20.0	39.2	7.8	27.0	43.0	43.0	30.0	30.0	30.0	30.0	30.0	30.0
Actuated g/C Ratio	0.20	0.39	0.08	0.27	0.43	0.43	0.30	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5
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
Lane Grp Cap (vph)	354	1934	138	1341	305	857	341	575	341	575	341	575
v/s Ratio Prot	c0.20	0.30	0.05	c0.24	c0.06	0.17						c0.28
v/s Ratio Perm												
v/c Ratio	1.01	0.75	0.69	0.90	0.59	0.39	0.43	0.92	0.43	0.92	0.43	0.92
Uniform Delay, d1	40.0	26.2	44.9	35.3	43.5	19.5	28.1	33.9	19.5	28.1	33.9	33.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	50.7	2.8	13.4	10.3	2.9	0.3	0.9	20.6	2.9	0.3	0.9	20.6
Delay (s)	90.7	29.0	58.3	45.5	46.4	19.8	29.0	54.5	19.8	29.0	54.5	54.5
Level of Service	F	C	E	D	D	B	C	D	B	C	D	D
Approach Delay (s)	41.1			46.4			28.8				49.2	
Approach LOS	D			D			C				D	
Intersection Summary												
HCM Average Control Delay	42.5 HCM Level of Service D											
HCM Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	96.0% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	1.00	0.97	0.98	1.00	0.98	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	0.93	1.00	0.92	1.00	0.96	1.00	0.96	1.00	0.95	1.00	0.95
Flt	1.00	0.99	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1705	1681	1578	1681	1578	3315	1770	3188	1770	3188	1770	3188
Flt Permitted	0.36	0.73	1.00	0.36	0.73	1.00	0.36	0.73	1.00	0.36	0.73	1.00
Satd. Flow (perm)	619	1290	1578	619	1290	1578	3128	3128	1770	3188	1770	3188
Volume (vph)	10	10	20	110	110	120	10	1120	480	120	800	410
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	11	21	116	116	126	11	1179	505	126	842	432
RTOR Reduction (vph)	0	20	0	0	43	0	0	39	0	0	53	0
Lane Group Flow (vph)	0	23	0	116	199	0	0	1656	0	126	1221	0
Confl. Peds. (#/hr)			36			36	48		16	16		48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Perm	Prot	Prot	Prot	6
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	7	8	8	16.0	16.0	16.0	48.7	48.7	10.8	64.0	64.0	64.0
Effective Green, g (s)	7.0	16.5	16.5	16.5	16.5	16.5	49.2	49.2	11.3	64.5	64.5	64.5
Actuated g/C Ratio	0.07	0.16	0.16	0.16	0.16	0.16	0.49	0.49	0.11	0.64	0.64	0.64
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	43	213	260	1539	1539	1539	200	2056	200	2056	200	2056
v/s Ratio Prot												
v/s Ratio Perm	c0.04	0.09	0.13	0.54	0.77	1.08						c0.38
v/c Ratio	0.55	38.3	39.9	25.4	25.4	25.4	0.63	0.59	0.63	0.59	0.63	0.59
Uniform Delay, d1	45.0	38.3	39.9	25.4	25.4	25.4	42.4	10.2	42.4	10.2	42.4	10.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.4	1.5	11.5	37.9	37.9	37.9	4.7	1.3	4.7	1.3	4.7	1.3
Delay (s)	52.3	39.8	51.4	53.2	53.2	53.2	47.0	11.5	47.0	11.5	47.0	11.5
Level of Service	D	D	D	D	D	D	D	B	D	D	B	B
Approach Delay (s)	52.3			47.7			14.7				14.7	
Approach LOS	D			D			B				B	
Intersection Summary												
HCM Average Control Delay	37.2 HCM Level of Service D											
HCM Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	110.5% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98
Flt. Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.99	1.00	0.99
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3458	1770	3308	1770	3359	1770	3359	1770	3410	1770	3410
Volume (vph)	480	880	80	120	510	290	90	880	260	220	660	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	926	84	126	537	305	95	926	274	232	695	63
RTOR Reduction (vph)	0	6	0	0	79	0	0	27	0	0	7	0
Lane Group Flow (vph)	484	1004	0	126	763	0	95	1173	0	232	751	0
Conf. Ped. (#/hr)	15	48	48	15	123	15	48	48	48	48	123	123
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Permitted Phases												
Actuated Green, G (s)	15.7	28.3	10.0	22.6	5.0	32.7	12.0	39.7				
Effective Green, g (s)	15.2	29.3	9.5	23.6	4.5	33.7	11.5	40.7				
Actuated g/C Ratio	0.15	0.29	0.10	0.24	0.04	0.34	0.12	0.41				
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	522	1013	168	781	80	1132	204	1388				
v/s Ratio Prot	c0.14	c0.29	0.07	0.23	0.05	c0.35	c0.13	0.22				
v/c Ratio	0.93	0.99	0.75	0.98	1.19	1.04	1.14	0.54				
Uniform Delay, d1	41.9	35.2	44.1	37.9	47.8	33.1	44.2	22.6				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.74				
Incremental Delay, d2	22.3	25.9	15.3	26.1	159.7	36.5	98.9	1.2				
Delay (s)	64.2	61.1	59.4	64.0	207.4	69.7	153.0	18.0				
Level of Service	E	E	E	E	F	E	F	B				
Approach Delay (s)	62.1		63.4		79.8		49.6					
Approach LOS	E		E		E		D					
Intersection Summary												
HCM Average Control Delay	64.6						HCM Level of Service			E		
HCM Volume to Capacity ratio	1.00											
Actuated Cycle Length (s)	100.0						Sum of lost time (s)			12.0		
Intersection Capacity Utilization	96.1%						ICU Level of Service			F		
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2015 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt. Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611
Satd. Flow (perm)	3433	3451	1611	3325	3433	3451	3433	3451	3433	3451	3433	3451
Volume (vph)	0	0	10	0	0	0	10	410	280	1500	300	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	11	0	0	0	11	432	295	1579	316	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	20	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	718	0	1579	379	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	0.0	0.0	13.0	0.0	0.0	13.0	0.0	29.0	29.0	50.0	50.0	50.0
Effective Green, g (s)	0.0	0.0	13.0	0.0	0.0	13.0	0.0	29.0	29.0	50.0	50.0	50.0
Actuated g/C Ratio	0.00	0.00	0.26	0.00	0.00	0.26	0.00	0.58	0.58	1.00	1.00	1.00
Clearance Time (s)			4.0			4.0		4.0	4.0	2.0	2.0	2.0
Lane Grp Cap (vph)	0	0	819	0	0	819	0	1991	1991	3451	3451	3451
v/s Ratio Prot			c0.23			c0.23		c0.46	c0.46	0.11	0.11	0.11
v/c Ratio	0.00	0.00	0.88	0.00	0.00	0.88	0.00	0.79	0.79	0.11	0.11	0.11
Uniform Delay, d1	25.0	25.0	17.7	25.0	25.0	17.7	25.0	8.2	8.2	0.0	0.0	0.0
Progression Factor	1.00	1.00	0.75	1.00	1.00	0.75	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.0	12.1	0.0	0.0	12.1	0.0	3.3	3.3	0.1	0.1	0.1
Delay (s)	25.0	25.0	25.3	25.0	25.0	25.3	25.0	11.5	11.5	0.1	0.1	0.1
Level of Service	C	C	C	C	C	C	C	B	B	A	A	A
Approach Delay (s)	25.0		25.3			25.3		11.5		0.1		
Approach LOS	C		C			C		B		A		
Intersection Summary												
HCM Average Control Delay	13.7						HCM Level of Service			B		
HCM Volume to Capacity ratio	0.82											
Actuated Cycle Length (s)	50.0						Sum of lost time (s)			8.0		
Intersection Capacity Utilization	76.7%						ICU Level of Service			D		
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations	4		4		4		4		4		4			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (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		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95		
Frbp, ped/bikes	0.97	0.97	0.97	1.00	0.97	1.00	0.99	0.99	0.99	0.99	0.99	0.99		
Frt	0.97	0.97	0.96	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99		
Flt Protected	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Satd. Flow (prot)	1698	1658	1658	1658	1658	1658	3406	3406	3406	3439	3439	3439		
Flt Permitted	0.88	0.88	0.92	0.92	0.92	0.92	0.93	0.93	0.93	0.82	0.82	0.82		
Satd. Flow (perm)	1519	1519	1540	1540	1540	1540	3173	3173	2855	2855	2855	2855		
Volume (vph)	30	50	20	50	100	70	30	540	80	50	270	20		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	32	53	21	53	105	74	32	568	84	53	284	21		
RTOR Reduction (vph)	0	14	0	0	34	0	0	22	0	0	9	0		
Lane Group Flow (vph)	0	92	0	0	198	0	0	662	0	0	349	0		
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100		
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm		
Protected Phases	4	8	8	8	8	8	2	2	2	6	6	6		
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6		
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0		
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0		
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50		
Clearance Time (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		
Lane Grp Cap (vph)	516	516	524	524	524	524	1587	1587	1428	1428	1428	1428		
v/s Ratio Prot	0.06	0.13	c0.13	c0.13	c0.13	c0.13	c0.21	c0.21	0.12	0.12	0.12	0.12		
v/s Ratio Perm	0.18	0.38	0.38	0.38	0.38	0.42	0.42	0.42	0.24	0.24	0.24	0.24		
v/c Ratio	11.6	12.5	12.5	12.5	12.5	7.9	7.9	7.9	7.1	7.1	7.1	7.1		
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Progression Factor	0.8	2.1	2.1	2.1	2.1	0.8	0.8	0.8	0.4	0.4	0.4	0.4		
Incremental Delay, d2	12.4	14.6	14.6	14.6	14.6	8.7	8.7	8.7	7.5	7.5	7.5	7.5		
Delay (s)	B	B	B	B	B	A	A	A	A	A	A	A		
Level of Service	B	B	B	B	B	A	A	A	A	A	A	A		
Approach Delay (s)	12.4	14.6	14.6	14.6	14.6	8.7	8.7	8.7	7.5	7.5	7.5	7.5		
Approach LOS	B	B	B	B	B	A	A	A	A	A	A	A		
Intersection Summary														
HCM Average Control Delay	9.7		9.7		9.7		9.7		9.7		9.7		HCM Level of Service	A
HCM Volume to Capacity ratio	0.40		0.40		0.40		0.40		0.40		0.40		HCM Level of Service	A
Actuated Cycle Length (s)	50.0		50.0		50.0		50.0		50.0		50.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization	68.5%		68.5%		68.5%		68.5%		68.5%		68.5%		ICU Level of Service	C
Analysis Period (min)	15		15		15		15		15		15		ICU Level of Service	C
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations	4		4		4		4		4		4			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (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		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95		
Frbp, ped/bikes	0.95	0.95	0.95	0.97	0.97	0.97	0.99	0.99	0.99	0.99	0.99	0.98		
Ftp, ped/bikes	0.97	0.97	0.98	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	1.00		
Frt	0.95	0.95	0.95	0.97	0.97	0.97	0.99	0.99	0.99	0.99	0.99	0.99		
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00		
Satd. Flow (prot)	1618	1681	1681	1681	1681	1681	3467	3467	3467	4923	4923	4923		
Flt Permitted	0.80	0.80	0.83	0.83	0.83	0.83	0.87	0.87	0.85	0.85	0.85	0.85		
Satd. Flow (perm)	1318	1318	1420	1420	1420	1420	3023	3023	4195	4195	4195	4195		
Volume (vph)	60	60	60	30	60	30	60	30	1480	60	30	930		
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Adj. Flow (vph)	63	63	63	32	63	32	63	32	1558	63	32	979		
RTOR Reduction (vph)	0	32	0	0	5	0	0	0	2	0	0	5		
Lane Group Flow (vph)	0	157	0	0	122	0	0	1672	0	0	1080	0		
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100		
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm		
Protected Phases	4	4	4	4	4	4	2	2	2	6	6	6		
Permitted Phases	4	4	4	4	4	4	2	2	2	6	6	6		
Actuated Green, G (s)	11.9	11.9	11.9	11.9	11.9	11.9	59.1	59.1	59.1	59.1	59.1	59.1		
Effective Green, g (s)	12.4	12.4	12.4	12.4	12.4	12.4	59.6	59.6	59.6	59.6	59.6	59.6		
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.75	0.75	0.75	0.75	0.75	0.75		
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5		
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0		
Lane Grp Cap (vph)	204	204	220	220	220	220	2252	2252	3125	3125	3125	3125		
v/s Ratio Prot	c0.12	0.12	0.09	0.09	0.09	0.09	c0.55	c0.55	0.26	0.26	0.26	0.26		
v/s Ratio Perm	0.77	0.77	0.55	0.55	0.55	0.74	0.74	0.74	0.35	0.35	0.35	0.35		
Uniform Delay, d1	32.4	32.4	31.2	31.2	31.2	5.8	5.8	5.8	3.5	3.5	3.5	3.5		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	14.4	14.4	1.7	1.7	1.7	2.3	2.3	2.3	0.3	0.3	0.3	0.3		
Delay (s)	46.9	46.9	33.0	33.0	33.0	8.1	8.1	8.1	3.8	3.8	3.8	3.8		
Level of Service	D	D	C	C	C	A	A	A	A	A	A	A		
Approach Delay (s)	46.9	46.9	33.0	33.0	33.0	8.1	8.1	8.1	3.8	3.8	3.8	3.8		
Approach LOS	D	D	C	C	C	A	A	A	A	A	A	A		
Intersection Summary														
HCM Average Control Delay	10.0		10.0		10.0		10.0		10.0		10.0		HCM Level of Service	A
HCM Volume to Capacity ratio	0.75		0.75		0.75		0.75		0.75		0.75		HCM Level of Service	A
Actuated Cycle Length (s)	80.0		80.0		80.0		80.0		80.0		80.0		Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.6%		102.6%		102.6%		102.6%		102.6%		102.6%		ICU Level of Service	G
Analysis Period (min)	15		15		15		15		15		15		ICU Level of Service	G
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1761	3486	1766	3440	1738	3440	1738	1821	1764	1817	1764
Fit Permitted	0.29	1.00	0.17	1.00	0.57	1.00	0.57	1.00	0.37	1.00	0.37
Satd. Flow (perm)	534	3486	309	3440	1050	3440	1050	1821	678	1817	678
Volume (vph)	40	820	80	560	100	130	390	60	100	200	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	863	84	589	105	137	411	63	105	211	32
RTOR Reduction (vph)	0	9	0	0	18	0	0	7	0	0	7
Lane Group Flow (vph)	42	938	0	53	676	0	137	467	0	105	236
Confl. Peds. (#/hr)	12	12	12	12	42	12	42	12	12	12	42
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	6	6	6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	214	1394	124	1376	525	911	339	909	339	909	124
v/s Ratio Prot	c0.27	c0.27	c0.27	0.20	0.20	0.20	c0.26	c0.26	0.13	0.13	0.13
v/s Ratio Perm	0.08	0.17	0.17	0.13	0.13	0.13	0.26	0.26	0.15	0.15	0.15
v/c Ratio	0.20	0.67	0.43	0.49	0.26	0.51	0.26	0.51	0.31	0.26	0.26
Uniform Delay, d1	15.6	19.7	17.4	17.9	11.5	13.4	11.8	11.5	11.8	11.5	11.5
Progression Factor	1.00	1.00	1.80	1.92	1.73	1.78	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.0	2.6	8.8	1.1	0.4	0.8	2.4	0.7	2.4	0.7	2.4
Delay (s)	17.7	22.3	40.0	35.5	20.3	24.6	14.2	12.2	14.2	12.2	14.2
Level of Service	B	C	D	D	C	C	B	B	B	B	B
Approach Delay (s)	22.1	22.1	22.1	35.8	23.7	23.7	12.8	12.8	12.8	12.8	12.8
Approach LOS	C	C	C	D	C	C	B	B	B	B	B
Intersection Summary	Intersection Summary										
HCM Average Control Delay	25.1 HCM Level of Service C										
HCM Volume to Capacity ratio	0.58										
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0										
Intersection Capacity Utilization	82.2% ICU Level of Service E										
Analysis Period (min)	15										
c Critical Lane Group	c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	0.99
Satd. Flow (prot)	1756	3469	1749	3489	1749	3489	3429	3429	3429	3429	3429
Fit Permitted	0.23	1.00	0.16	1.00	0.23	1.00	0.81	0.81	0.81	0.81	0.81
Satd. Flow (perm)	433	3469	295	3489	295	3489	2820	2820	2820	2820	3034
Volume (vph)	50	900	80	50	620	50	100	280	50	30	180
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	928	82	52	639	52	103	289	52	31	186
RTOR Reduction (vph)	0	8	0	0	8	0	0	4	0	0	17
Lane Group Flow (vph)	52	1002	0	52	683	0	0	440	0	0	241
Confl. Peds. (#/hr)	24	24	78	78	24	8	6	6	6	6	8
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	6	6	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	46.0	46.0	46.0	46.0	46.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.59	0.59	0.59	0.59	0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	135	1084	92	1090	92	1090	1657	1657	1657	1657	1782
v/s Ratio Prot	c0.29	c0.29	c0.29	0.20	0.20	0.20	c0.16	c0.16	0.08	0.08	0.08
v/s Ratio Perm	0.12	0.39	0.92	0.57	0.63	0.63	0.27	0.27	0.14	0.14	0.14
v/c Ratio	0.19	0.67	0.57	0.57	0.63	0.63	0.27	0.27	0.14	0.14	0.14
Uniform Delay, d1	21.5	26.6	23.0	23.5	23.5	23.5	8.1	8.1	7.4	7.4	7.4
Progression Factor	0.47	0.50	0.90	0.89	0.89	0.89	1.01	1.01	1.00	1.00	1.00
Incremental Delay, d2	6.5	11.9	20.3	2.4	2.4	2.4	0.3	0.3	0.2	0.2	0.2
Delay (s)	16.7	25.2	40.9	23.3	23.3	23.3	8.5	8.5	7.6	7.6	7.6
Level of Service	B	C	D	D	C	C	A	A	A	A	A
Approach Delay (s)	24.7	24.7	24.5	24.5	24.5	24.5	7.6	7.6	7.6	7.6	7.6
Approach LOS	C	C	C	C	C	C	A	A	A	A	A
Intersection Summary	Intersection Summary										
HCM Average Control Delay	20.0 HCM Level of Service C										
HCM Volume to Capacity ratio	0.49										
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0										
Intersection Capacity Utilization	71.2% ICU Level of Service C										
Analysis Period (min)	15										
c Critical Lane Group	c Critical Lane Group										

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBT	SBR	
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	←	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	4.0	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.98	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99	1.00	
Satd. Flow (prot)	1765	3504	1759	3441	1759	3441	3371	3371	3426	3426	3426	3426	3426	
Flt Permitted	0.26	1.00	0.26	1.00	0.26	1.00	0.87	0.87	0.70	0.70	0.70	0.70	0.70	
Satd. Flow (perm)	488	3504	488	338	3441	2948	2948	2948	2447	2447	2447	2447	2447	
Volume (vph)	70	900	50	60	650	120	70	410	150	90	210	40	40	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Adj. Flow (vph)	71	909	51	61	657	121	71	414	152	91	212	40	40	
RTOR Reduction (vph)	0	5	0	0	19	0	0	28	0	0	13	0	0	
Lane Group Flow (vph)	71	955	0	61	759	0	0	609	0	0	330	0	0	
Confl. Peds. (#/hr)	8	39	39	8	8	25	25	25	25	25	25	25	25	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6	6	
Permitted Phases	4	8	8	8	8	2	2	2	2	6	6	6	6	
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	37.0	37.0	37.0	37.0	38.0	38.0	38.0	38.0	
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46	
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	214	1533	148	1505	148	1505	1363	1363	1132	1132	1132	1132	1132	
v/s Ratio Prot	c0.27	c0.27	c0.27	0.22	0.22	c0.21	c0.21	c0.21	0.13	0.13	0.13	0.13	0.13	
v/s Ratio Perm	0.33	0.62	0.41	0.50	0.50	0.45	0.45	0.45	0.29	0.29	0.29	0.29	0.29	
Uniform Delay, d1	14.8	17.4	15.4	16.2	16.2	14.6	14.6	14.6	13.4	13.4	13.4	13.4	13.4	
Progression Factor	0.94	1.04	1.00	1.00	1.00	1.51	1.51	1.51	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	2.1	1.0	8.3	1.2	1.2	0.9	0.9	0.9	0.7	0.7	0.7	0.7	0.7	
Delay (s)	15.9	19.0	23.7	17.4	17.4	22.9	22.9	22.9	14.0	14.0	14.0	14.0	14.0	
Level of Service	B	B	C	B	B	C	C	C	B	B	B	B	B	
Approach Delay (s)	18.8	17.9	17.9	17.9	17.9	22.9	22.9	22.9	14.0	14.0	14.0	14.0	14.0	
Approach LOS	B	B	B	B	B	C	C	C	B	B	B	B	B	
Intersection Summary														
HCM Average Control Delay	18.9												HCM Level of Service	B
HCM Volume to Capacity ratio	0.53													
Actuated Cycle Length (s)	80.0												Sum of lost time (s)	8.0
Intersection Capacity Utilization	85.2%												ICU Level of Service	E
Analysis Period (min)	15													
c Critical Lane Group														

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2015 PM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR		
Lane Configurations	←	←	←	←	←	←	←	←		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900		
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00		
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00		
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00		
Satd. Flow (prot)	3400	1770	3400	1770	3400	1770	3400	3539		
Flt Permitted	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00		
Satd. Flow (perm)	3400	1770	3400	1770	3400	1770	3400	3539		
Volume (vph)	1050	80	80	820	0	0	0	0		
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97		
Adj. Flow (vph)	1082	82	82	845	0	0	0	0		
RTOR Reduction (vph)	9	0	0	0	0	0	0	0		
Lane Group Flow (vph)	1155	0	82	845	0	0	0	0		
Confl. Peds. (#/hr)	213	348	348	348	348	348	348	348		
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot		
Protected Phases	4	3	3	8	8	8	8	8		
Permitted Phases	4	3	3	8	8	8	8	8		
Actuated Green, G (s)	27.0	25.0	25.0	60.0	60.0	60.0	60.0	60.0		
Effective Green, g (s)	27.0	25.0	25.0	60.0	60.0	60.0	60.0	60.0		
Actuated g/C Ratio	0.45	0.42	0.42	1.00	1.00	1.00	1.00	1.00		
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		
Lane Grp Cap (vph)	1530	738	3539	3539	3539	3539	3539	3539		
v/s Ratio Prot	c0.34	c0.05	c0.24	c0.24	c0.24	c0.24	c0.24	c0.24		
v/s Ratio Perm	0.75	0.11	0.24	0.24	0.24	0.24	0.24	0.24		
Uniform Delay, d1	13.7	10.7	0.0	0.0	0.0	0.0	0.0	0.0		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	3.5	0.3	0.2	0.2	0.2	0.2	0.2	0.2		
Delay (s)	17.2	11.0	0.2	0.2	0.2	0.2	0.2	0.2		
Level of Service	B	B	A	A	A	A	A	A		
Approach Delay (s)	17.2	1.1	0.0	0.0	0.0	0.0	0.0	0.0		
Approach LOS	B	A	A	A	A	A	A	A		
Intersection Summary										
HCM Average Control Delay	10.1								HCM Level of Service	B
HCM Volume to Capacity ratio	0.49									
Actuated Cycle Length (s)	60.0								Sum of lost time (s)	4.0
Intersection Capacity Utilization	43.2%								ICU Level of Service	A
Analysis Period (min)	15									
c Critical Lane Group										

HCM Unsignalized Intersection Capacity Analysis
11: 40th St. & BART parking

2015 PM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	970	80	0	900	0	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1021	84	0	947	0	74
Pedestrians				109	109	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage				9	9	
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)	81			406		
pX, platoon unblocked		0.72		0.77		0.72
VC, conflicting volume		1214		1646		771
VC1, stage 1 cont vol						
VC2, stage 2 cont vol		904		1117		285
vCu, unblocked vol		4.1		6.8		6.9
IC, single (s)						
IC, 2 stage (s)		2.2		3.5		3.3
p0 queue free %		100		100		83
cM capacity (veh/h)		488		141		422
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	681	425	474	474	74	74
Volume Left	0	0	0	0	0	0
Volume Right	0	84	0	0	74	74
cSH	1700	1700	1700	1700	422	422
Volume to Capacity	0.40	0.25	0.28	0.28	0.17	0.17
Queue Length 95th (ft)	0	0	0	0	0	16
Control Delay (s)	0.0	0.0	0.0	0.0	15.3	15.3
Lane LOS					C	C
Approach Delay (s)	0.0	0.0	0.0	0.0	15.3	15.3
Approach LOS					C	C
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	49.8%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis
12: 40th St. & BART parking

2015 PM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1030	10	0	900	0	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1084	11	0	947	0	63
Pedestrians				109	109	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage				9	9	
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)	298			189		
pX, platoon unblocked		0.74		0.74		0.80
VC, conflicting volume		1204		1672		765
VC1, stage 1 cont vol						
VC2, stage 2 cont vol		919		1103		323
vCu, unblocked vol		4.1		6.8		6.9
IC, single (s)						
IC, 2 stage (s)		2.2		3.5		3.3
p0 queue free %		100		100		85
cM capacity (veh/h)		494		150		409
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	723	372	474	474	63	63
Volume Left	0	0	0	0	0	0
Volume Right	0	11	0	0	63	63
cSH	1700	1700	1700	1700	409	409
Volume to Capacity	0.43	0.22	0.28	0.28	0.15	0.15
Queue Length 95th (ft)	0	0	0	0	0	14
Control Delay (s)	0.0	0.0	0.0	0.0	15.4	15.4
Lane LOS					C	C
Approach Delay (s)	0.0	0.0	0.0	0.0	15.4	15.4
Approach LOS					C	C
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	48.8%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.98	1.00	0.96	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.97
Frbp, ped/bikes	0.94	1.00	0.98	1.00	1.00	1.00	1.00	0.99	1.00	0.97	1.00	0.97
Flt	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1655	3408	1734	3313	1770	3486	1770	3486	1770	3313	1770	3313
Flt Permitted	0.29	1.00	0.15	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	513	3408	281	3313	1770	3486	1770	3486	1770	3313	1770	3313
Volume (vph)	250	720	120	40	490	110	230	1200	80	110	600	180
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	255	735	122	41	500	112	235	1224	82	112	612	184
RTOR Reduction (vph)	0	17	0	0	24	0	0	5	0	0	34	0
Lane Group Flow (vph)	255	840	0	41	588	0	235	1301	0	112	762	0
Confl. Peds. (#/hr)	94	86	86	94	86	86	94	86	94	86	86	94
Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	8	8	5	2	1	6					
Permitted Phases	4	8	8	5	2	1	6					
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	25.5	12.6	32.8	8.2	28.4	28.4	28.4
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	26.0	13.1	33.3	8.7	28.9	28.9	28.9
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.16	0.42	0.11	0.36	0.36	0.36
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	167	1108	91	1077	290	1451	192	1197	0.06	0.23	0.23	0.23
v/s Ratio Prot	0.25	0.18	0.18	0.18	0.18	0.18	0.03	0.37	0.06	0.23	0.23	0.23
v/s Ratio Perm	0.50	0.15	0.15	0.15	0.15	0.15	0.81	0.90	0.58	0.64	0.64	0.64
v/c Ratio	1.53	0.76	0.45	0.55	0.45	0.55	0.81	0.90	0.58	0.64	0.64	0.64
Uniform Delay, d1	27.0	24.2	21.4	22.2	32.3	21.7	33.9	21.2	33.9	21.2	21.2	21.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	265.1	2.7	1.3	0.3	14.9	9.0	2.9	2.6	36.8	23.8	23.8	23.8
Delay (s)	292.1	26.9	22.6	22.5	47.1	30.7	36.8	23.8	36.8	23.8	23.8	23.8
Level of Service	F	C	C	C	D	C	D	C	D	C	D	C
Approach Delay (s)	87.7	22.5	22.5	22.5	33.2	25.4	25.4	25.4	25.4	25.4	25.4	25.4
Approach LOS	F	C	C	C	D	C	D	C	D	C	D	C
Intersection Summary												
HCM Average Control Delay	44.2	HCM Level of Service										
HCM Volume to Capacity ratio	1.09	D										
Actuated Cycle Length (s)	80.0	Sum of lost time (s)										
Intersection Capacity Utilization	87.3%	ICU Level of Service										
Analysis Period (min)	15	E										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 14: Apgar St. & Telegraph Ave. 2015 PM
 1/11/2008

Movement	EBL	EBR	NBL	NBT	SBL	SBR
Lane Configurations	W	W	Free	Free	Free	Free
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	80	20	1460	760	20
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	21	83	21	1521	792	21
Pedestrians	100	100	100	100	100	100
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	8	8	8	8	8	8
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	0.82	0.88	0.88	396	625	625
Upstream signal (ft)	0.82	0.88	0.88	396	625	625
pX, platoon unblocked	1804	606	912			
VC, conflicting volume	1804	606	912			
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	1327	417	765			
IC, single (s)	6.8	6.9	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	79	81	97			
cM capacity (veh/h)	98	432	681			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	104	21	760	760	528	285
Volume Left	21	21	0	0	0	0
Volume Right	83	0	0	0	0	21
cSH	258	681	1700	1700	1700	1700
Volume to Capacity	0.40	0.03	0.45	0.45	0.31	0.17
Queue Length 95th (ft)	46	2	0	0	0	0
Control Delay (s)	28.2	10.5	0.0	0.0	0.0	0.0
Lane LOS	D	B	B	B	B	B
Approach Delay (s)	28.2	0.1	0.0	0.0	0.0	0.0
Approach LOS	D	D	D	D	D	D
Intersection Summary						
Average Delay	1.3					
Intersection Capacity Utilization	60.3%					
Analysis Period (min)	15					
ICU Level of Service	B					

HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2015 PM
1/11/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	↑↑	↑↑	↑↑	↑↑
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	40	1440	30	20	820
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	42	1516	32	21	863
Pedestrians	52	52				45
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4	4				4
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			791
pX, platoon unblocked	0.79	0.75				0.75
VC, conflicting volume	2109	871				1599
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	1864	499				1468
IC, single (s)	6.8	6.9				4.1
IC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	52	88				94
cM capacity (veh/h)	43	358				328
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	63	1011	537	21	432	432
Volume Left	21	0	0	21	0	0
Volume Right	42	0	32	0	0	0
cSH	105	1700	1700	328	1700	1700
Volume to Capacity	0.60	0.59	0.32	0.06	0.25	0.25
Queue Length 95th (ft)	73	0	0	5	0	0
Control Delay (s)	81.3	0.0	0.0	16.7	0.0	0.0
Lane LOS	F	C	C	C	C	C
Approach Delay (s)	81.3	0.0	0.4			
Approach LOS	F					

Intersection Summary		
Average Delay	2.2	
Intersection Capacity Utilization	59.2%	ICU Level of Service B
Analysis Period (min)	15	

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2015 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑	↑↑↑	↑↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑	↑	↑
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Flt	0.99	1.00	0.96	1.00	0.96	1.00	0.98	1.00	1.00	1.00	1.00	0.98
Flt Protected	0.99	1.00	0.95	1.00	0.99	1.00	0.99	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	5017	1768	3395	1768	3395	1768	1797	1768	1768	1809	1809	1809
Flt Permitted	0.74	0.31	1.00	0.74	0.31	1.00	0.70	0.70	0.26	1.00	1.00	1.00
Satd. Flow (perm)	3726	569	3395	569	3395	1274	1274	486	1809	1809	1809	1809
Volume (vph)	110	680	30	90	650	200	80	370	90	70	270	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	694	31	92	663	204	82	378	92	71	276	51
RTOR Reduction (vph)	0	5	0	0	36	0	0	9	0	0	8	0
Lane Group Flow (vph)	0	832	0	92	831	0	0	543	0	71	319	0
Conf. Peds. (#/hr)	24	4	4	24	24	24	12	12	12	12	12	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	2	2	6	6	6	6
Permitted Phases	4	4	8	8	46.0	46.0	24.0	24.0	24.0	24.0	24.0	24.0
Actuated Green, G (s)	46.0	47.0	47.0	47.0	25.0	25.0	0.31	0.31	0.31	0.31	0.31	0.31
Effective Green, g (s)	47.0	47.0	47.0	47.0	25.0	25.0	0.31	0.31	0.31	0.31	0.31	0.31
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	334	1995	398	152	565	565
Lane Grp Cap (vph)	2189	0.22	0.16	0.16	c0.24	c0.43	0.15	0.15	0.15	0.15	0.15	0.18
v/s Ratio Prot	0.22	0.38	0.28	0.42	1.36	0.47	0.56	0.56	0.56	0.56	0.56	0.56
v/s Ratio Perm	0.38	8.8	6.1	9.0	27.5	22.1	23.0	23.0	23.0	23.0	23.0	23.0
Uniform Delay, d1	1.00	1.73	1.81	1.00	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Progression Factor	0.5	1.9	0.6	1.9	0.6	1.9	0.6	1.9	0.6	1.9	0.6	1.9
Incremental Delay, d2	9.3	16.0	16.9	207.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0	27.0
Delay (s)	A	B	B	B	B	B	F	F	F	C	C	C
Level of Service	A	B	B	B	B	B	F	F	F	C	C	C
Approach Delay (s)	9.3	16.8	16.8	207.0	27.0	27.0	27.0	27.0	27.0	22.8	22.8	22.8
Approach LOS	A	B	B	F	F	F	F	F	F	C	C	C

Intersection Summary		
HCM Average Control Delay	53.6	HCM Level of Service D
HCM Volume to Capacity ratio	0.75	
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	139.6%	ICU Level of Service H
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5004	5004	5004	4946	4946	4946	1770	1789	1763	1829	1829
Flt Permitted	0.76	0.76	0.76	0.81	0.81	0.81	0.42	0.42	0.33	0.33	0.33
Satd. Flow (perm)	3811	3811	3811	4041	4041	4041	773	1789	609	1829	1829
Volume (vph)	80	590	40	80	750	150	60	230	70	70	220
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	621	42	84	789	158	63	242	74	74	232
RTOR Reduction (vph)	0	8	0	0	32	0	0	14	0	0	6
Lane Group Flow (vph)	0	739	0	0	999	0	63	302	0	74	258
Conf. Ped. (#/hr)				12	12				6	6	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	2453	2453	2453	2601	2601	2601	198	458	156	469	469
v/s Ratio Prot							c0.17				0.14
v/s Ratio Perm	0.19	0.19	0.19	c0.25	c0.25	c0.25	0.08	0.08	0.12	0.12	0.14
v/c Ratio	0.30	0.30	0.30	0.38	0.38	0.38	0.32	0.66	0.47	0.55	0.55
Uniform Delay, d1	6.3	6.3	6.3	6.7	6.7	6.7	24.1	26.6	25.2	25.8	25.8
Progression Factor	1.27	1.27	1.27	1.69	1.69	1.69	1.00	1.00	1.12	1.13	1.13
Incremental Delay, d2	0.3	0.3	0.3	0.4	0.4	0.4	4.2	7.3	9.4	4.3	4.3
Delay (s)	8.3	8.3	8.3	11.8	11.8	11.8	28.3	33.9	37.7	33.5	33.5
Level of Service	A	A	A	B	B	B	C	C	C	D	C
Approach Delay (s)	8.3	8.3	8.3	11.8	11.8	11.8	32.9	32.9	34.4	34.4	34.4
Approach LOS	A	A	A	B	B	B	C	C	C	C	C
Intersection Summary											
HCM Average Control Delay	17.0										
HCM Volume to Capacity ratio	0.46										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	79.8%										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.99	0.99	0.99	1.00	1.00	1.00	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.99	0.99	0.99	1.00	1.00	1.00	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	5009	5009	5009	4893	4893	4893	3423	3423	3415	3415	3415
Flt Permitted	0.74	0.74	0.74	0.86	0.86	0.86	0.85	0.85	0.70	0.70	0.70
Satd. Flow (perm)	3749	3749	3749	4198	4198	4198	2926	2926	2414	2414	2414
Volume (vph)	80	630	40	80	870	250	60	300	60	80	200
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	81	636	40	81	879	253	61	303	61	81	202
RTOR Reduction (vph)	0	7	0	0	61	0	0	17	0	0	14
Lane Group Flow (vph)	0	750	0	0	1132	0	0	408	0	0	309
Conf. Ped. (#/hr)	9	17	17	17	17	17	9	12	10	10	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2413	2413	2413	2702	2702	2702	750	750	619	619	619
v/s Ratio Prot							c0.14				0.13
v/s Ratio Perm	0.20	0.20	0.20	c0.27	c0.27	c0.27	0.54	0.54	0.50	0.50	0.50
v/c Ratio	0.31	0.31	0.31	0.42	0.42	0.42	25.7	25.7	25.4	25.4	25.4
Uniform Delay, d1	6.3	6.3	6.3	7.0	7.0	7.0	25.7	25.7	25.4	25.4	25.4
Progression Factor	1.48	1.48	1.48	1.00	1.00	1.00	1.00	1.00	1.28	1.28	1.28
Incremental Delay, d2	0.3	0.3	0.3	0.5	0.5	0.5	2.8	2.8	2.8	2.8	2.8
Delay (s)	9.7	9.7	9.7	7.4	7.4	7.4	28.5	28.5	35.2	35.2	35.2
Level of Service	A	A	A	A	A	A	C	C	D	D	D
Approach Delay (s)	9.7	9.7	9.7	7.4	7.4	7.4	28.5	28.5	35.2	35.2	35.2
Approach LOS	A	A	A	A	A	A	C	C	D	D	D
Intersection Summary											
HCM Average Control Delay	14.7										
HCM Volume to Capacity ratio	0.45										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	107.3%										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Unsignalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2015 PM
1/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	Free	Free	0%	0%
Grade	0%	0%	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	800	950	20	0	230	0	230
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	833	890	21	0	240	0	240
Pedestrians	79						79	
Lane Width (ft)	12.0						12.0	
Walking Speed (ft/s)	4.0						4.0	
Percent Blockage	7						7	
Right turn flare (veh)								
Median type							None	
Median storage (veh)								
Upstream signal (ft)	698	473						
pX, platoon unblocked								
VC, conflicting volume	1089						1357	498
VC1, stage 1 conf vol								
VC2, stage 2 conf vol								
VCU, unblocked vol	1089						1357	498
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	47
cM capacity (veh/h)	594						131	452
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 1
Volume Total	278	278	278	396	396	219	240	240
Volume Left	0	0	0	0	0	0	0	0
Volume Right	0	0	0	0	0	21	240	240
cSH	1700	1700	1700	1700	1700	1700	1700	452
Volume to Capacity	0.16	0.16	0.16	0.23	0.23	0.13	0.53	0.53
Queue Length 95th (ft)	0	0	0	0	0	0	0	76
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0	21.6	21.6
Lane LOS							C	C
Approach Delay (s)	0.0			0.0			21.6	
Approach LOS				C			C	

Intersection Summary	
Average Delay	2.5
Intersection Capacity Utilization	45.1%
ICU Level of Service	A
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2015 PM
1/25/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free	Free
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Fit Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	4959	4959	4959	4760	4760	4760	1747	3449	1743	3473	1743	3473
Fit Permitted	0.66	0.66	0.66	0.79	0.79	0.79	0.32	1.00	0.16	1.00	0.16	1.00
Satd. Flow (perm)	3332	3332	3332	3771	3771	3771	595	3449	297	3473	297	3473
Volume (vph)	180	570	60	90	780	420	100	870	100	220	570	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	600	63	95	821	442	105	916	105	232	600	63
RTOR Reduction (vph)	0	7	0	0	7	0	0	7	0	0	7	0
Lane Group Flow (vph)	0	845	0	0	1351	0	105	1014	0	232	656	0
Conf. Peds. (#/hr)	26			19			26	39		92		39
Turn Type	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	8	2	2						6
Permitted Phases	4	4	8	8	2	2						6
Actuated Green, G (s)	35.1	35.1	35.1	35.1	34.4	34.4	34.4	34.4	34.4	34.4	34.4	34.4
Effective Green, g (s)	36.6	36.6	36.6	36.6	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
Clearance Time (s)	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	1524	1524	1725	1725	263	1526	131	1537	131	1537	131	1537
v/s Ratio Prot					0.18	0.18	0.29			0.18		0.18
v/s Ratio Perm	0.25	0.25	0.25	0.25	0.40	0.40	0.66	0.66	0.66	0.43	0.43	0.43
v/c Ratio	1.14dl	1.14dl	1.14dl	1.14dl	1.14dl	1.14dl	1.14dl	1.14dl	1.14dl	1.14dl	1.14dl	1.14dl
Uniform Delay, d1	15.8	15.8	15.8	15.8	15.1	15.1	17.6	17.6	17.6	15.3	15.3	15.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Delay (s)	16.0	16.0	16.0	16.0	16.0	16.0	19.9	19.9	19.9	16.2	16.2	16.2
Level of Service	B	B	B	B	B	B	B	B	B	F	F	B
Approach Delay (s)	16.0			20.6			19.9		19.9	115.3		115.3
Approach LOS	B			C			B		B	F		F

Intersection Summary	
HCM Average Control Delay	39.5
HCM Level of Service	D
HCM Volume to Capacity ratio	1.27
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	98.0%
ICU Level of Service	F
Analysis Period (min)	15
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5031	5031	5031	5031	5031	5031	5031	5031	5031	5031	5031	5031
Flt Permitted	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Satd. Flow (perm)	4236	4236	4236	4236	4236	4236	4236	4236	4236	4236	4236	4236
Volume (vph)	40	850	30	100	1160	40	90	90	200	30	30	80
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	40	859	30	101	1172	40	91	91	202	30	30	81
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	77	0	37	0
Lane Group Flow (vph)	0	925	0	0	1309	0	0	182	125	0	104	0
Conf. Ped. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	49.5	49.5	49.5	49.5	49.5	49.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (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
Lane Grp Cap (vph)	2568	2568	2568	2390	2390	2390	429	413	413	428	428	428
v/s Ratio Prot	0.22	0.33	0.33	c0.33	c0.33	c0.33	c0.12	0.09	0.07	0.07	0.07	0.07
v/s Ratio Perm	0.36	0.55	0.55	0.55	0.55	0.55	0.42	0.30	0.24	0.24	0.24	0.24
v/c Ratio	7.9	9.3	9.3	9.3	9.3	9.3	22.8	21.9	21.5	21.5	21.5	21.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.4	0.9	0.9	0.9	0.9	0.9	3.1	1.9	1.3	1.3	1.3	1.3
Incremental Delay, d2	8.3	10.2	10.2	10.2	10.2	10.2	25.8	23.8	22.8	22.8	22.8	22.8
Delay (s)	A	B	B	B	B	B	C	C	C	C	C	C
Level of Service	A	B	B	B	B	B	C	C	C	C	C	C
Approach Delay (s)	8.3	10.2	10.2	10.2	10.2	10.2	24.8	22.8	22.8	22.8	22.8	22.8
Approach LOS	A	B	B	B	B	B	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	12.2 HCM Level of Service B											
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	108.2% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.99	1.00	1.00	0.94	1.00	1.00	0.95
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	1.00	0.97	1.00	0.97	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (prot)	1770	4919	1770	4884	1770	4884	1770	3539	1488	1770	3539	1497
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)	1770	4919	1770	4884	1770	4884	1770	3539	1488	1770	3539	1497
Volume (vph)	200	750	100	110	930	240	230	850	180	380	420	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	789	105	116	979	253	242	895	189	400	442	116
RTOR Reduction (vph)	0	14	0	0	38	0	0	0	24	0	0	69
Lane Group Flow (vph)	211	880	0	116	1194	0	242	895	165	400	442	47
Conf. Ped. (#/hr)	81	81	81	81	81	81	81	81	81	81	81	81
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	3	8	8	5	2	3	1	6	7
Permitted Phases	7	4	4	3	8	8	5	2	3	1	6	7
Actuated Green, G (s)	12.0	34.0	34.0	12.0	34.0	34.0	21.0	33.0	45.0	25.0	37.0	49.0
Effective Green, g (s)	11.0	35.0	35.0	11.0	35.0	35.0	20.0	34.0	45.0	24.0	38.0	49.0
Actuated g/C Ratio	0.09	0.29	0.29	0.09	0.29	0.29	0.17	0.28	0.38	0.20	0.32	0.41
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	3.0	3.0	5.0	3.0
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
Lane Grp Cap (vph)	162	1435	162	1425	162	1425	295	1003	608	354	1121	661
v/s Ratio Prot	c0.12	0.18	0.18	0.07	c0.24	c0.24	0.14	c0.25	0.02	c0.23	c0.12	0.01
v/s Ratio Perm	1.30	0.61	0.61	0.72	0.84	0.84	0.82	0.89	0.27	1.13	0.39	0.07
Uniform Delay, d1	54.5	36.7	36.7	53.0	39.8	39.8	48.3	41.2	26.1	48.0	32.0	21.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	173.6	2.0	2.0	14.0	6.0	6.0	16.5	11.9	0.2	87.9	1.0	0.0
Delay (s)	228.1	38.6	38.6	67.0	45.9	45.9	64.7	53.2	26.3	135.9	33.1	21.7
Level of Service	F	D	D	E	D	D	E	D	C	F	C	C
Approach Delay (s)	74.8	74.8	74.8	47.7	47.7	47.7	51.5	51.5	74.6	74.6	74.6	74.6
Approach LOS	E	E	E	D	D	D	D	D	D	E	E	E
Intersection Summary												
HCM Average Control Delay	60.5 HCM Level of Service E											
HCM Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 20.0											
Intersection Capacity Utilization	92.7% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	0.94	0.96	0.97	0.95	1.00	0.99	1.00	0.99	1.00	0.94	1.00	0.99	
Fltp, ped/bikes	0.96	0.97	0.97	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	
Flt Protected	0.98	0.98	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1590	1639	1639	1639	3454	1669	3454	1669	3454	1669	3454	1669	
Flt Permitted	0.67	0.81	0.81	0.30	1.00	0.35	1.00	0.35	1.00	0.35	1.00	0.35	
Satd. Flow (perm)	1094	1355	1355	527	3454	616	3454	616	3454	616	3454	616	
Volume (vph)	110	50	70	60	70	60	140	650	50	40	770	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	116	53	74	63	74	63	147	684	53	42	811	63	
RTOR Reduction (vph)	0	20	0	0	21	0	0	6	0	0	6	0	
Lane Group Flow (vph)	0	223	0	0	179	0	147	731	0	42	868	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4	
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4	
Actuated Green, G (s)	19.1	19.1	19.1	19.1	19.1	19.1	58.9	58.9	58.9	58.9	58.9	58.9	
Effective Green, g (s)	18.6	18.6	18.6	18.6	18.6	18.6	58.4	58.4	58.4	58.4	58.4	58.4	
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.69	0.69	0.69	0.69	0.69	0.69	
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	239	297	297	362	2373	423	2373	423	2373	423	2373	423	
v/s Ratio Prot													
v/s Ratio Perm	0.20	0.13	0.13	0.28	0.28	0.21	0.21	0.21	0.21	0.07	0.25	0.25	
v/c Ratio	0.93	0.60	0.60	0.41	0.31	0.31	0.31	0.31	0.31	0.10	0.37	0.37	
Uniform Delay, d1	32.6	29.9	29.9	5.8	5.3	4.5	5.3	4.5	5.3	4.5	5.6	5.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	39.4	2.4	2.4	3.4	0.3	0.5	0.4	0.5	0.4	0.5	0.4	0.4	
Delay (s)	72.0	32.2	32.2	9.1	5.6	4.9	6.0	4.9	6.0	4.9	6.0	6.0	
Level of Service	E	C	C	A	A	A	A	A	A	A	A	A	
Approach Delay (s)	72.0	32.2	32.2	32.2	6.2	6.2	6.2	6.2	6.2	5.9	6.2	6.2	
Approach LOS	E	C	C	C	A	A	A	A	A	A	A	A	
Intersection Summary													
HCM Average Control Delay	15.5											HCM Level of Service	B
HCM Volume to Capacity ratio	0.53												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	63.8%											ICU Level of Service	B
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

2015 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.97	1.00	1.00	1.00	0.94	1.00	0.99	1.00	0.97	1.00	0.93	
Fltp, ped/bikes	1.00	0.97	1.00	1.00	1.00	0.96	1.00	0.99	1.00	0.97	1.00	0.94	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1770	3340	1770	3179	1770	3179	1695	3474	1770	3179	1770	3179	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.28	1.00	0.28	1.00	0.33	1.00	
Satd. Flow (perm)	1770	3340	1770	3179	1770	3179	491	3474	491	3474	589	3122	
Volume (vph)	140	420	110	70	440	180	170	640	50	110	500	300	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	143	429	112	71	449	184	173	653	51	112	510	306	
RTOR Reduction (vph)	0	28	0	0	55	0	0	6	0	0	96	0	
Lane Group Flow (vph)	143	513	0	71	578	0	173	698	0	112	720	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	7	4	4	3	8	8	2	2	2	2	6	6	
Permitted Phases	7	4	4	3	8	8	2	2	2	2	6	6	
Actuated Green, G (s)	9.5	22.2	6.7	19.4	42.6	42.6	42.6	42.6	42.6	42.6	42.6	42.6	
Effective Green, g (s)	10.0	21.7	7.2	18.9	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	
Actuated g/C Ratio	0.12	0.26	0.08	0.22	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	
Clearance Time (s)	4.5	3.5	4.5	3.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	208	853	150	707	255	1802	306	1620	306	1620	1620	1620	
v/s Ratio Prot	c0.08	c0.15	0.04	0.18	0.04	0.18	0.20	0.20	0.20	0.23	0.23	0.23	
v/s Ratio Perm	0.69	0.60	0.47	0.82	0.68	0.39	0.37	0.44	0.37	0.44	0.44	0.44	
Uniform Delay, d1	36.0	27.8	37.1	31.4	15.2	12.3	12.1	12.8	12.1	12.8	12.8	12.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.3	0.8	0.9	6.9	13.6	0.6	3.4	0.9	3.4	0.9	0.9	0.9	
Delay (s)	43.3	28.7	38.0	38.3	28.8	12.9	15.5	13.7	12.9	13.7	13.7	13.7	
Level of Service	D	C	D	D	D	D	C	B	B	B	B	B	
Approach Delay (s)	31.7	31.7	38.3	38.3	38.3	38.3	16.1	13.9	16.1	13.9	13.9	13.9	
Approach LOS	C	C	D	D	D	D	B	B	B	B	B	B	
Intersection Summary													
HCM Average Control Delay	23.7											HCM Level of Service	C
HCM Volume to Capacity ratio	0.75												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	75.8%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

**APPENDIX F:
YEAR 2015 PLUS PROJECT CONDITIONS INTERSECTION
LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave. 2015 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	16
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98
Frt	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.94	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4907	1770	4953	1770	4953	2006	2043	1985	1956	1985	1956
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.10	1.00	0.45	1.00	0.45	1.00
Satd. Flow (perm)	1770	4907	1770	4953	1770	4953	201	2043	930	1956	930	1956
Volume (vph)	300	951	205	90	1330	200	200	289	60	160	415	270
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	1001	216	95	1400	211	211	304	63	168	437	284
RTOR Reduction (vph)	0	26	0	0	16	0	0	7	0	0	19	0
Lane Group Flow (vph)	316	1191	0	95	1595	0	211	360	0	168	702	0
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Prot	Prot	Prot	Prot	pm+pt	Perm						
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases												6
Actuated Green, G (s)	17.0	49.4		11.6	44.0		48.5	48.5		39.5	39.5	
Effective Green, g (s)	17.0	49.4		11.6	44.0		49.0	49.0		40.0	40.0	
Actuated g/C Ratio	0.14	0.41		0.10	0.37		0.41	0.41		0.33	0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	2020		171	1816		187	834		310	652	
v/s Ratio Prot	c0.18	0.24		0.05	c0.32		c0.07	0.18		c0.36		
v/s Ratio Perm							0.39			0.18		
Uniform Delay, d1	1.26	0.59		0.56	0.88		1.13	0.43		0.54	1.08	
Progression Factor	1.00	1.00		1.00	1.00		58.7	25.5		32.5	40.0	
Incremental Delay, d2	144.6	1.3		3.9	6.4		104.5	0.4		1.9	57.5	
Delay (s)	196.1	28.7		55.6	41.9		163.2	25.9		34.5	97.5	
Level of Service	F	C		E	D		F	C		C	F	
Approach Delay (s)	63.2			42.7			76.0			85.6		
Approach LOS	E			D			E			F		

Intersection Summary	
HCM Average Control Delay	61.6 HCM Level of Service E
HCM Volume to Capacity ratio	1.02
Actuated Cycle Length (s)	120.0 Sum of lost time (s) 12.0
Intersection Capacity Utilization	110.0% ICU Level of Service H
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave. 2015 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00	0.96
Fipb, ped/bikes	1.00	0.95	1.00	0.91	1.00	0.91	1.00	0.97	1.00	0.96	1.00	0.96
Frt	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	1748	1681	1596	1681	1596	1681	3420	3268	1770	3268	1770	3268
Satd. Flow (prot)	0.48	0.74	1.00	0.74	1.00	0.93	0.93	1.00	0.95	1.00	0.95	1.00
Flt Permitted	846	1302	1596	1302	1596	3197	1770	3268	1770	3268	1770	3268
Satd. Flow (perm)	10	10	10	10	10	10	1158	236	10	1149	450	450
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	11	11	11	183	116	168	11	1219	248	105	1209	474
Adj. Flow (vph)	0	10	0	0	68	0	14	0	0	0	33	0
RTOR Reduction (vph)	0	23	0	183	216	0	0	1464	0	105	1650	0
Lane Group Flow (vph)	0	23	0	183	216	0	0	1464	0	105	1650	0
Confl. Peds. (#/hr)	4			4	44		12				44	
Turn Type	Perm	Perm	Perm	Perm	Perm	Prot						
Protected Phases	7			8			2				1	6
Permitted Phases												6
Actuated Green, G (s)	5.1	16.2	16.2	16.2	16.2	43.0	7.7	55.2				
Effective Green, g (s)	5.6	16.7	16.7	16.7	16.7	43.5	8.2	55.7				
Actuated g/C Ratio	0.06	0.19	0.19	0.19	0.19	0.48	0.09	0.62				
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	53	242	296	242	296	1545	161	2023				
v/s Ratio Prot	c0.03	c0.14	0.14	c0.14	0.14	c0.46	0.06	c0.51				
v/s Ratio Perm	0.43	0.76	0.73	0.76	0.73	0.95	0.65	0.82				
Uniform Delay, d1	40.7	34.7	34.5	34.7	34.5	22.2	39.5	13.2				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.01	1.00	1.00				
Incremental Delay, d2	2.0	11.3	7.8	11.3	7.8	5.8	7.0	3.8				
Delay (s)	42.7	46.0	42.3	46.0	42.3	28.1	46.5	17.0				
Level of Service	D	D	D	D	D	C	D	D				
Approach Delay (s)	42.7			43.8		28.1	18.7					
Approach LOS	D			D		C	B					

Intersection Summary	
HCM Average Control Delay	25.7 HCM Level of Service C
HCM Volume to Capacity ratio	0.87
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 16.0
Intersection Capacity Utilization	107.6% ICU Level of Service G
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 AM + Project
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Frlp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.97	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3437	1770	3356	1770	3418	1770	3395	1770	3395	1770	3395	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3437	1770	3356	1770	3418	1770	3395	1770	3395	1770	3395	
Volume (vph)	460	590	91	120	700	310	110	664	120	280	883	180	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	479	615	95	125	729	323	115	692	125	292	920	188	
RTOR Reduction (vph)	0	13	0	0	56	0	0	17	0	0	18	0	
Lane Group Flow (vph)	479	697	0	125	996	0	115	800	0	292	1090	0	
Confl. Peds. (#/hr)	6	24	24	6	36	6	36	28	28	28	28	36	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Actuated Green, G (s)	13.0	28.9	9.6	25.5	8.1	23.5	11.0	26.4					
Effective Green, g (s)	12.5	29.9	9.1	26.5	7.6	24.5	10.5	27.4					
Actuated g/C Ratio	0.14	0.33	0.10	0.29	0.08	0.27	0.12	0.30					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grp Cap (vph)	477	1142	179	988	149	930	207	1034					
v/s Ratio Prot	c0.14	c0.20	0.07	c0.30	0.06	0.23	c0.17	c0.32					
v/s Ratio Perm	1.00	0.61	0.70	1.01	0.77	0.86	1.41	1.05					
Uniform Delay, d1	38.8	25.2	39.1	31.8	40.4	31.1	39.8	31.3					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.88					
Incremental Delay, d2	42.2	0.7	9.2	30.7	19.9	10.3	201.0	37.4					
Delay (s)	81.0	25.8	48.3	62.4	60.2	41.4	246.5	64.9					
Level of Service	F	C	D	E	E	D	F	E					
Approach Delay (s)	48.1			60.9		43.7	102.8						
Approach LOS	D			E		D	F						
Intersection Summary													
HCM Average Control Delay	66.7											HCM Level of Service	E
HCM Volume to Capacity ratio	1.14												
Actuated Cycle Length (s)	90.0											Sum of lost time (s)	20.0
Intersection Capacity Utilization	94.0%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2015 AM + Project
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.86	0.86	1.00	0.95	0.95	0.95	1.00	0.95	0.95	1.00	0.98	0.95	
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1611	1611	1611	3283	3433	3475	1611	3283	3433	3475	1611	3283	
Flt Permitted	1.00	1.00	1.00	0.94	0.95	1.00	1.00	0.94	0.95	1.00	1.00	0.95	
Satd. Flow (perm)	1611	1611	1611	3094	3433	3475	1611	3094	3433	3475	1611	3094	
Volume (vph)	0	0	10	0	0	0	10	346	325	1600	434	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	11	0	0	0	11	364	342	1684	457	63	
RTOR Reduction (vph)	0	11	0	0	0	0	0	26	0	0	0	0	
Lane Group Flow (vph)	0	0	0	0	0	0	0	691	0	1684	520	0	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases								2	1	6			
Permitted Phases													
Actuated Green, G (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	8.0	29.0	45.0	45.0	
Effective Green, g (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	8.0	29.0	45.0	45.0	
Actuated g/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0.64	1.00	1.00	
Clearance Time (s)								4.0	4.0	4.0	2.0	2.0	
Lane Grp Cap (vph)	0	0	0	0	0	0	0	550	2212	3475	60.49	0.15	
v/s Ratio Prot								c0.22		0.76	0.15		
v/s Ratio Perm								10.69dr		5.6	0.0		
Uniform Delay, d1								18.5	0.76	1.00	1.00		
Progression Factor								1.00	1.00	1.00	1.00		
Incremental Delay, d2								0.0	0.0	128.5	2.5	0.1	
Delay (s)								22.5	142.7	8.1	0.1		
Level of Service								C	F	A	A		
Approach Delay (s)								22.5	0.0	142.7	6.2		
Approach LOS								C	A	F	A		
Intersection Summary													
HCM Average Control Delay	39.6											HCM Level of Service	D
HCM Volume to Capacity ratio	0.87												
Actuated Cycle Length (s)	45.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.3%											ICU Level of Service	D
Analysis Period (min)	15												
dr Defacto Right Lane. Recode with 1 through lane as a right lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2015 AM + Project
 1/21/2008

2015 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.96	0.96	0.96	0.98	0.98	0.99	0.99	0.99	0.99
Frbp, ped/bikes	0.97	0.97	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.98	0.94	0.94	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1693	1605	1605	3400	3400	3472	3472	3472	3472	3472	3472	3472
Flt Permitted	0.83	0.87	0.87	0.91	0.91	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Satd. Flow (perm)	1437	1419	1419	3088	3088	3060	3060	3060	3060	3060	3060	3060
Volume (vph)	70	80	31	60	60	90	31	501	80	50	584	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	84	33	63	63	95	33	527	84	53	615	32
RTOR Reduction (vph)	0	17	0	0	60	0	0	27	0	0	8	0
Lane Group Flow (vph)	0	174	0	0	161	0	0	617	0	0	692	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	8	8	8	2	2	2	2	6	6	6
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (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
Lane Grp Cap (vph)	479	479	473	473	473	1510	1510	1510	1510	1496	1496	1496
v/s Ratio Prot	c0.12	0.11	0.11	0.11	0.11	0.20	0.20	0.20	0.20	c0.23	c0.23	c0.23
v/c Ratio	0.36	0.34	0.34	0.34	0.34	0.41	0.41	0.41	0.41	0.46	0.46	0.46
Uniform Delay, d1	11.4	11.3	11.3	11.3	11.3	7.3	7.3	7.3	7.3	7.6	7.6	7.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	2.0	2.0	2.0	2.0	0.8	0.8	0.8	0.8	1.0	1.0	1.0
Delay (s)	13.5	13.2	13.2	13.2	13.2	8.2	8.2	8.2	8.2	8.6	8.6	8.6
Level of Service	B	B	B	B	B	A	A	A	A	A	A	A
Approach Delay (s)	13.5	13.2	13.2	13.2	13.2	8.2	8.2	8.2	8.2	8.6	8.6	8.6
Approach LOS	B	B	B	B	B	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.6 HCM Level of Service A											
HCM Volume to Capacity ratio	0.42											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	63.9% ICU Level of Service B											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 AM + Project
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00
Frt	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1748	3432	1759	3463	1767	3483	1767	1813	1736	1841		
Flt Permitted	0.17	1.00	0.37	1.00	0.37	1.00	0.44	1.00	0.59	1.00		
Satd. Flow (perm)	320	3432	676	3463	810	3463	810	1813	1086	1841		
Volume (vph)	30	379	80	73	687	74	90	201	33	83	400	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	399	84	77	723	78	95	212	35	87	421	32
RTOR Reduction (vph)	0	22	0	0	10	0	0	7	0	0	3	0
Lane Group Flow (vph)	32	461	0	77	791	0	95	240	0	87	450	0
Conf. Peds. (#/hr)	30	12	12	12	12	30	6	6	54	54		6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2		2			6
Permitted Phases	4			8			2		2			6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	92	987	194	194	996	496	1110	665	1128			1128
v/s Ratio Prot	0.13			c0.23			0.13		c0.24			
v/s Ratio Perm	0.10	0.47	0.11	0.11	0.11	0.12	0.12	0.08	0.08	0.13	0.40	0.40
v/c Ratio	0.35	0.47	0.40	0.40	0.79	0.19	0.22	0.22	0.13	0.13	0.40	0.40
Uniform Delay, d1	22.6	23.5	22.9	26.3	6.8	6.9	6.9	6.5	7.9	6.5	7.9	7.9
Progression Factor	1.00	1.00	0.87	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.1	1.6	5.5	6.0	0.9	0.4	0.4	0.4	1.1	0.4	1.1	1.1
Delay (s)	32.7	25.0	25.5	30.0	7.7	7.4	7.4	7.4	6.9	9.0	9.0	9.0
Level of Service	C	C	C	C	A	A	A	A	A	A	A	A
Approach Delay (s)	25.5			29.6			7.4		8.7			8.7
Approach LOS	C	C	C	C	A	A	A	A	A	A	A	A

Intersection Summary		Intersection Summary	
HCM Average Control Delay	20.4	HCM Level of Service	C
HCM Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	83.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 AM + Project
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	0.97	1.00	0.98	1.00
Frt	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	1.00
Satd. Flow (prot)	1763	3427	1740	3513	1740	3513	3385		3421			
Flt Permitted	0.27	1.00	0.42	1.00	0.42	1.00	0.79		0.84			
Satd. Flow (perm)	510	3427	768	3513	768	3513	2717		2899			
Volume (vph)	30	415	80	64	724	32	70	171	54	63	240	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	437	84	67	762	34	74	180	57	66	253	53
RTOR Reduction (vph)	0	20	0	0	4	0	0	24	0	0	16	0
Lane Group Flow (vph)	32	501	0	67	792	0	0	287	0	0	356	0
Conf. Peds. (#/hr)	18	18	54	54	18	4	18	18	18	18	18	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2		2			6
Permitted Phases	4			8			2		2			6
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	38.0	32.0		32.0			32.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	33.0		33.0			33.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.41		0.41			0.41
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0		5.0			5.0
Lane Grp Cap (vph)	249	1671	374	1713	374	1713	1121		1196			1196
v/s Ratio Prot	0.06	0.15		c0.23			0.11		c0.12			
v/s Ratio Perm	0.13	0.30	0.18	0.46	0.18	0.46	0.26		0.30			0.30
Uniform Delay, d1	11.2	12.3	11.5	13.6	11.5	13.6	15.4		15.7			15.7
Progression Factor	0.96	1.03	1.39	1.49	1.39	1.49	0.64		0.64			0.64
Incremental Delay, d2	1.0	0.4	0.9	0.8	0.9	0.8	0.5		0.5			0.5
Delay (s)	11.8	13.1	16.9	21.0	16.9	21.0	10.4		16.4			16.4
Level of Service	B	B	B	C	B	C	B		B			B
Approach Delay (s)	13.1			20.7			10.4		16.4			16.4
Approach LOS	B	B	B	C	B	C	B		B			B

Intersection Summary		Intersection Summary	
HCM Average Control Delay	16.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.5%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2015 AM + Project
 1/21/2008

2015 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1764	3452	1735	3438	3381	3381	3451	3451	3451	3451	3451	3451
Flt Permitted	0.24	1.00	0.42	1.00	0.86	0.86	0.76	0.76	0.76	0.76	0.76	0.76
Satd. Flow (perm)	452	3452	774	3438	2939	2939	2642	2642	2642	2642	2642	2642
Volume (vph)	40	442	61	105	721	134	39	238	77	119	346	30
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	460	64	109	751	140	41	248	80	124	360	31
RTOR Reduction (vph)	0	14	0	0	19	0	0	32	0	0	6	0
Lane Group Flow (vph)	42	510	0	109	872	0	0	337	0	0	509	0
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	232	1769	397	1762	1139	1139	1024	1024	1024	1024	1024	1024
v/s Ratio Prot	0.15			c0.25								
v/s Ratio Perm	0.09	0.14	0.14	0.14	0.14	0.11	c0.19	c0.19	c0.19	c0.19	c0.19	c0.19
v/c Ratio	0.18	0.29	0.27	0.49	0.30	0.30	0.50	0.50	0.50	0.50	0.50	0.50
Uniform Delay, d1	10.5	11.2	11.1	12.7	17.0	17.0	18.6	18.6	18.6	18.6	18.6	18.6
Progression Factor	1.28	1.31	1.00	1.00	0.65	0.65	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.4	1.7	1.0	0.6	0.6	1.7	1.7	1.7	1.7	1.7	1.7
Delay (s)	15.1	15.0	12.8	13.7	11.6	11.6	20.3	20.3	20.3	20.3	20.3	20.3
Level of Service	B	B	B	B	B	B	C	C	C	C	C	C
Approach Delay (s)	15.0			13.6			20.3	20.3	20.3	20.3	20.3	20.3
Approach LOS	B			B			C	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	15.1
HCM Level of Service	B
HCM Volume to Capacity ratio	0.50
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.5%
ICU Level of Service	G
Analysis Period (min)	15
Critical Lane Group	15

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2015 AM + Project
 1/24/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fpb, ped/bikes	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Fipb, ped/bikes	0.95	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1683	3268	1635	3407	1770	3451	1770	3451	1770	3339	1770	3339
Flt Permitted	0.26	1.00	0.36	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	453	3268	627	3407	1770	3451	1770	3451	1770	3339	1770	3339
Volume (vph)	126	351	107	90	526	70	125	499	49	140	948	260
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	133	369	113	95	554	74	132	525	52	147	998	274
RTOR Reduction (vph)	0	35	0	0	13	0	0	8	0	0	26	0
Lane Group Flow (vph)	133	447	0	95	615	0	132	569	0	147	1246	0
Conf. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	58	92
Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	8	8	5	2	1	6					
Permitted Phases	4	8	8	5	2	1	6					
Actuated Green, G (s)	24.4	24.4	24.4	24.4	24.4	24.4	10.3	36.6	10.5	36.8	10.5	36.8
Effective Green, g (s)	24.9	24.9	24.9	24.9	24.9	24.9	10.8	37.1	11.0	37.3	11.0	37.3
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.13	0.44	0.13	0.44	0.13	0.44
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grip Cap (vph)	133	957	184	998	225	1506	229	1465	229	1465	229	1465
v/s Ratio Prot	0.14	0.14	0.15	0.15	0.18	0.18	0.07	0.16	0.08	0.37	0.08	0.37
v/s Ratio Perm	0.29	0.29	0.29	0.29	0.29	0.29	0.13	0.44	0.13	0.44	0.13	0.44
v/c Ratio	1.00	0.47	0.52	0.62	0.59	0.38	0.59	0.38	0.64	0.85	0.64	0.85
Uniform Delay, d1	30.1	24.6	25.0	25.9	35.0	16.2	35.1	21.4	35.1	21.4	35.1	21.4
Progression Factor	0.74	0.68	1.00	1.00	0.73	1.51	1.28	0.72	1.28	0.72	1.28	0.72
Incremental Delay, d2	76.5	0.1	1.0	0.8	2.5	0.7	3.4	4.9	3.4	4.9	3.4	4.9
Delay (s)	98.7	16.8	26.1	26.7	28.0	25.1	48.6	20.2	48.6	20.2	48.6	20.2
Level of Service	F	B	C	C	C	C	D	C	D	C	D	C
Approach Delay (s)	34.5	26.6	26.6	26.6	26.6	26.6	25.6	25.6	25.6	23.2	23.2	23.2
Approach LOS	C	C	C	C	C	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	26.4 HCM Level of Service C											
HCM Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	85.0 Sum of lost time (s)											
Intersection Capacity Utilization	80.3% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. 2015 AM + Project
 1/24/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	31	659	10	20	1119
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	33	694	11	21	1178
Pedestrians	34	33	33	34	34	34
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	3	3	3	3	3	3
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	230					
pX, platoon unblocked	0.87 0.95					
VC, conflicting volume	1397 420					
VC-1, stage 1 conf vol	738					
VC-2, stage 2 conf vol						
vCu, unblocked vol	1140 340					
tC, single (s)	6.8 6.9					
tC, 2 stage (s)						
tF (s)	3.5 3.3					
p0 queue free %	93 94					
cM capacity (veh/h)	156 589					
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	43	462	242	21	589	589
Volume Left	11	0	0	21	0	0
Volume Right	33	0	11	0	0	0
cSH	351	1700	1700	844	1700	1700
Volume to Capacity	0.12	0.27	0.14	0.02	0.35	0.35
Queue Length 95th (ft)	10	0	0	2	0	0
Control Delay (s)	16.7	0.0	0.0	9.4	0.0	0.0
Lane LOS	C	A	A	A	A	A
Approach Delay (s)	16.7	0.0	0.2	0.2	0.0	0.0
Approach LOS	C	C	C	C	C	C
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	48.2% ICU Level of Service A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2015 AM + Project
 1/21/2008

2015 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.99	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Frt	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.95	1.00	0.95	1.00
Flt Protected	1.00	0.95	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	4994	1758	3469	1774	3469	1774	1774	1729	1815	1729	1815	1815
Flt Permitted	0.83	0.41	1.00	0.41	1.00	0.54	0.54	0.40	1.00	0.40	1.00	1.00
Satd. Flow (perm)	4175	768	3469	775	3469	975	975	732	1815	732	1815	1815
Volume (vph)	50	469	40	61	624	81	70	203	60	200	313	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	53	494	42	64	657	85	74	214	63	211	329	53
RTOR Reduction (vph)	0	10	0	0	12	0	0	9	0	0	7	0
Lane Group Flow (vph)	0	579	0	64	730	0	0	342	0	211	375	0
Confl. Peds. (#/hr)	24	18	18	24	24	24	24	48	48	48	48	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2				6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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
Lane Grp Cap (vph)	2554	470	2122	470	2122	287	287	215	534	215	534	215
v/s Ratio Prot				c0.21								0.21
v/s Ratio Perm	0.14	0.08	0.14	0.34	0.08	0.35	0.35	0.29	0.29	0.29	0.29	0.29
v/c Ratio	0.23	0.14	0.14	0.34	0.14	0.34	0.19	0.19	0.19	0.19	0.19	0.19
Uniform Delay, d1	7.4	7.0	7.0	8.1	7.0	8.1	30.0	29.8	29.8	29.8	26.7	26.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.6	0.6	0.4	0.6	0.4	115.2	56.8	7.5	56.8	7.5	7.5
Delay (s)	7.6	7.6	7.6	8.6	7.6	8.6	145.2	86.5	34.2	86.5	34.2	34.2
Level of Service	A	A	A	A	A	A	F	F	F	F	C	C
Approach Delay (s)	7.6	8.5	8.5	8.5	8.5	8.5	145.2	52.8	52.8	52.8	52.8	52.8
Approach LOS	A	A	A	A	A	A	F	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	40.0											
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	100.7%											
Analysis Period (min)	15											
c Critical Lane Group	Critical Lane Group											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.99	1.00	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Frt	1.00	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.98	1.00
Flt Protected	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5046	4979	4979	1757	1770	1770	1749	1830	1749	1830	1749	1830
Flt Permitted	0.88	0.85	1.00	0.85	1.00	0.85	0.32	1.00	0.39	1.00	0.39	1.00
Satd. Flow (perm)	4463	4224	4224	595	1770	1770	711	1830	711	1830	711	1830
Volume (vph)	30	699	20	51	667	91	50	194	73	90	274	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	736	21	54	702	96	53	204	77	95	288	32
RTOR Reduction (vph)	0	4	0	0	20	0	0	17	0	0	5	0
Lane Group Flow (vph)	0	785	0	0	832	0	53	264	0	95	315	0
Confl. Peds. (#/hr)	18	18	18	18	18	18	12	18	18	18	18	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2				6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2873	2719	2719	152	454	454	182	469	182	469	182	469
v/s Ratio Prot				c0.20								c0.17
v/s Ratio Perm	0.18	0.27	0.27	0.31	0.31	0.35	0.58	0.52	0.52	0.52	0.67	0.67
v/c Ratio	0.27	0.27	0.27	0.31	0.31	0.35	0.58	0.52	0.52	0.52	0.67	0.67
Uniform Delay, d1	6.2	6.2	6.2	6.3	6.3	6.3	24.3	26.0	25.5	26.7	26.7	26.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.3	0.3	0.3	0.3	0.3	6.2	5.4	10.1	7.3	7.3	7.3
Delay (s)	6.4	6.4	6.4	4.5	4.5	4.5	30.5	31.4	40.5	39.6	39.6	39.6
Level of Service	A	A	A	A	A	A	C	C	D	D	D	D
Approach Delay (s)	6.4	4.5	4.5	4.5	4.5	4.5	31.2	31.2	39.8	39.8	39.8	39.8
Approach LOS	A	A	A	A	A	A	C	C	D	D	D	D
Intersection Summary												
HCM Average Control Delay	15.0											
HCM Volume to Capacity ratio	0.41											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	64.0%											
Analysis Period (min)	15											
c Critical Lane Group	Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2015 AM + Project
1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.95	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	0.98	0.97	0.98	0.97	0.99	0.97	0.97	0.99	0.99	0.99	0.99
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5026	4944	3399	4944	3399	3426	3426	3426	3426	3426	3426	3426
Flt Permitted	0.82	0.83	0.84	0.83	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Satd. Flow (perm)	4152	4101	2857	4101	2857	2691	2691	2691	2691	2691	2691	2691
Volume (vph)	54	779	40	58	744	136	30	164	44	127	311	44
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	57	820	42	61	783	143	32	173	46	134	327	46
RTOR Reduction (vph)	0	6	0	0	29	0	0	24	0	0	10	0
Lane Group Flow (vph)	0	913	0	0	958	0	0	227	0	0	497	0
Confl. Peds. (#/hr)	17	19	19	17	12	16	16	16	16	16	16	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	2	2	2	2	2	6
Permitted Phases	4	8	8	2	2	2	2	2	2	2	2	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2673	2640	2640	2640	2640	732	732	732	732	732	690	690
v/s Ratio Prot	0.22	0.23	0.23	0.23	0.23	0.08	0.08	0.08	0.08	0.08	0.18	0.18
v/s Ratio Perm	0.34	0.36	0.36	0.36	0.36	0.31	0.31	0.31	0.31	0.31	0.72	0.72
v/c Ratio	6.5	6.6	6.6	6.6	6.6	24.0	24.0	24.0	24.0	24.0	27.1	27.1
Uniform Delay, d1	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.48	0.48
Progression Factor	0.3	0.4	0.4	0.4	0.4	1.1	1.1	1.1	1.1	1.1	6.2	6.2
Incremental Delay, d2	5.2	7.0	7.0	7.0	7.0	25.1	25.1	25.1	25.1	25.1	19.3	19.3
Delay (s)	A	A	A	A	A	C	C	C	C	C	B	B
Level of Service	A	A	A	A	A	C	C	C	C	C	B	B
Approach Delay (s)	5.2	7.0	7.0	7.0	7.0	25.1	25.1	25.1	25.1	25.1	19.3	19.3
Approach LOS	A	A	A	A	A	C	C	C	C	C	B	B
Intersection Summary												
HCM Average Control Delay	10.4 HCM Level of Service B											
HCM Volume to Capacity ratio	0.46											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	100.3% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2015 AM + Project
1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5069	4868	1695	4868	1695	1589	1589	1589	1589	1589	1589	1589
Flt Permitted	0.88	0.93	0.87	0.93	0.87	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Satd. Flow (perm)	4471	4517	1510	4517	1510	1404	1404	1404	1404	1404	1404	1404
Volume (vph)	31	928	10	10	865	98	10	10	54	0	73	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	33	977	11	11	911	103	11	11	57	0	77	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	9	0	0	0
Lane Group Flow (vph)	0	1020	0	0	1025	0	0	13	0	0	134	0
Confl. Peds. (#/hr)	0	0	0	0	0	98	0	0	0	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	2	2	2	2	2	6
Permitted Phases	4	8	8	2	2	2	2	2	2	2	2	6
Actuated Green, G (s)	62.1	62.1	62.1	62.1	62.1	14.9	14.9	14.9	14.9	14.9	14.9	14.9
Effective Green, g (s)	62.1	62.1	62.1	62.1	62.1	14.9	14.9	14.9	14.9	14.9	14.9	14.9
Actuated g/C Ratio	0.73	0.73	0.73	0.73	0.73	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Clearance Time (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
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
Lane Grp Cap (vph)	3266	3300	3300	3300	3300	265	265	265	246	246	246	246
v/s Ratio Prot	c0.23	0.23	0.23	0.23	0.23	0.01	0.01	0.01	0.01	0.01	c0.10	c0.10
v/s Ratio Perm	0.31	0.31	0.31	0.31	0.31	0.05	0.05	0.05	0.05	0.05	0.54	0.54
v/c Ratio	4.0	4.0	4.0	4.0	4.0	29.2	29.2	29.2	29.2	29.2	32.0	32.0
Uniform Delay, d1	1.00	1.55	1.00	1.55	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.98
Progression Factor	0.3	0.2	0.3	0.2	0.2	0.1	0.1	0.1	0.1	0.1	2.3	2.3
Incremental Delay, d2	4.2	6.4	4.2	6.4	4.2	29.2	29.2	29.2	29.2	29.2	33.6	33.6
Delay (s)	A	A	A	A	A	C	C	C	C	C	C	C
Level of Service	A	A	A	A	A	C	C	C	C	C	C	C
Approach Delay (s)	4.2	6.4	4.2	6.4	4.2	29.2	29.2	29.2	29.2	29.2	33.6	33.6
Approach LOS	A	A	A	A	A	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	7.3 HCM Level of Service A											
HCM Volume to Capacity ratio	0.36											
Actuated Cycle Length (s)	85.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	71.2% ICU Level of Service C											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

2015 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.98	0.97	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97	
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Satd. Flow (prot)	4954	4866	4866	1760	3415	1741	3408						
Flt Permitted	0.66	0.68	0.68	0.23	1.00	0.46	1.00						
Satd. Flow (pbrm)	3272	3323	3323	431	3415	852	3408						
Volume (vph)	127	758	107	110	717	189	70	355	80	284	709	176	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	134	798	113	116	755	199	74	374	84	299	746	185	
RTOR Reduction (vph)	0	21	0	0	67	0	0	15	0	0	17	0	
Lane Group Flow (vph)	0	1024	0	0	1003	0	74	443	0	299	914	0	
Confl. Peds. (#/hr)	40		9		pm+pt	40	25	31	31			25	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	3	8	8	2	2	6					6	
Permitted Phases	4	8	30.4	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	
Actuated Green, G (s)	30.4	31.9	31.9	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	
Effective Green, g (s)	0.38	0.38	0.38	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	
Actuated g/C Ratio	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Clearance Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Vehicle Extension (s)	1228	1247	1247	229	1812	452	1808						
Lane Grp Cap (vph)	c0.31	0.83	0.80	0.32	0.24	0.66	0.51						
v/s Ratio Perm	24.1	23.8	11.3	10.8	14.4	12.8							
v/s Ratio	1.42	1.00	1.41	1.38	1.12	1.16							
Uniform Delay, d1	4.6	39.0	27.4	3.6	0.3	6.6	0.9						
Progression Factor	D	C	C	B	B	C	B						
Incremental Delay, d2	39.0	27.4	27.4	19.5	15.1	22.7	15.7						
Delay (s)	D	C	C	B	B	C	B						
Level of Service	D	C	C	B	B	C	B						
Approach Delay (s)	39.0	27.4	27.4	15.7	17.4								
Approach LOS	D	C	C	B	B								
Intersection Summary													
HCM Average Control Delay	25.8											HCM Level of Service	C
HCM Volume to Capacity ratio	0.73												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.5%											ICU Level of Service	E
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

2015 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.99	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.96	
Flt Protected	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.97	
Satd. Flow (prot)	5040	4983	4983	1770	1395	1606							
Flt Permitted	0.88	0.88	0.88	0.88	0.88	0.88	1.00	0.82	1.00	0.82	1.00	0.82	
Satd. Flow (pbrm)	4451	4372	4372	1585	1395	1357							
Volume (vph)	30	1089	33	30	984	80	22	33	20	80	30	40	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	32	1146	35	32	1036	84	23	35	21	84	32	42	
RTOR Reduction (vph)	0	4	0	0	11	0	0	0	0	15	0	16	
Lane Group Flow (vph)	0	1209	0	0	1141	0	0	58	6	0	142	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	8	8	8	2	2	6					6	
Permitted Phases	4	48.0	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	
Actuated Green, G (s)	48.0	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	
Effective Green, g (s)	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Clearance Time (s)	2698	2651	2651	466	410	399							
Lane Grp Cap (vph)	c0.27	0.45	0.43	0.26	0.12	0.02	0.00	c0.10					
v/s Ratio Perm	8.5	8.4	8.4	20.7	20.0	22.3							
v/s Ratio	1.00	1.00	1.00	1.00	1.00	1.00							
Uniform Delay, d1	0.5	0.5	0.5	0.5	0.5	0.1							
Progression Factor	A	A	A	A	A	C							
Incremental Delay, d2	9.1	8.9	8.9	21.3	20.1	24.7							
Delay (s)	A	A	A	C	C	C							
Level of Service	A	A	A	C	C	C							
Approach Delay (s)	9.1	8.9	8.9	21.0	24.7								
Approach LOS	A	A	A	C	C	C							
Intersection Summary													
HCM Average Control Delay	10.3											HCM Level of Service	B
HCM Volume to Capacity ratio	0.42												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.7%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2015 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.96	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.85	1.00	1.00	1.00	0.85	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1770	4908	1770	4832	1770	3539	1513	1770	3725	1523	1523	1523	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (pbrm)	1770	4908	1770	4832	1770	3539	1513	1770	3725	1523	1523	1523	
Volume (vph)	160	897	141	150	754	260	110	261	50	400	1221	150	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	168	944	148	158	794	274	116	275	53	421	1285	158	
RTOR Reduction (vph)	0	17	0	0	52	0	0	0	31	0	0	32	
Lane Group Flow (vph)	168	1075	0	158	1016	0	116	275	22	421	1285	126	
Confl. Peds. (#/hr)			66			23			38			26	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	pm+ov	
Protected Phases	7	4		3	8		5	2	3	1	6	7	
Permitted Phases												6	
Actuated Green, G (s)	12.0	33.4		13.6	35.0		10.4	28.0	41.6	29.0	46.6	58.6	
Effective Green, g (s)	11.0	34.4		12.6	36.0		9.4	29.0	41.6	28.0	47.6	58.6	
Actuated g/C Ratio	0.09	0.29		0.10	0.30		0.08	0.24	0.35	0.23	0.40	0.49	
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	162	1407		186	1450		139	855	575	413	1478	794	
v/s Ratio Prot	c0.09	c0.22		0.09	0.21		0.07	0.08	0.00	c0.24	c0.34	0.01	
v/s Ratio Perm	1.04	0.76		0.85	0.70		0.83	0.32	0.04	1.02	0.87	0.16	
Uniform Delay, d1	54.5	39.1		52.8	37.2		54.5	37.4	26.0	46.0	33.3	17.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	80.8	4.0		27.6	2.8		31.8	1.0	0.0	49.3	7.2	0.0	
Delay (s)	135.3	43.1		80.4	40.1		86.3	38.4	26.0	95.3	40.6	17.1	
Level of Service	F	D		F	D		F	D	C	F	D	B	
Approach Delay (s)	55.4			45.3			49.4				50.9		
Approach LOS	E			D			D				D		
Intersection Summary													
HCM Average Control Delay	50.5											HCM Level of Service	D
HCM Volume to Capacity ratio	0.87												
Actuated Cycle Length (s)	120.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	87.0%											ICU Level of Service	E
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2015 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Frbp, ped/bikes	0.93	0.93	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	0.99	1.00	
Fipb, ped/bikes	0.97	0.96	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	0.93	1.00	
Frt	0.95	0.95	0.95	0.95	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00	
Flt Protected	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1580	1580	1606	1606	1606	3456	1664	3456	1639	3468	1639	3468	
Flt Permitted	0.72	0.72	0.86	0.86	0.86	1.00	0.37	1.00	0.42	1.00	0.42	1.00	
Satd. Flow (pbrm)	1164	1164	1395	1395	1395	640	3456	640	3456	731	3468	731	
Volume (vph)	42	30	40	50	60	64	60	529	40	32	652	42	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	44	32	42	53	63	67	63	557	42	34	686	44	
RTOR Reduction (vph)	0	28	0	0	29	0	0	4	0	0	4	0	
Lane Group Flow (vph)	0	90	0	0	154	0	63	595	0	34	726	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4			4			4			4		6	
Permitted Phases												6	
Actuated Green, G (s)	12.7			12.7			65.3	65.3	65.3	65.3		65.3	
Effective Green, g (s)	12.2			12.2			64.8	64.8	64.8	64.8		64.8	
Actuated g/C Ratio	0.14			0.14			0.76	0.76	0.76	0.76		0.76	
Clearance Time (s)	3.5			3.5			3.5	3.5	3.5	3.5		3.5	
Vehicle Extension (s)	2.0			2.0			2.0	2.0	2.0	2.0		2.0	
Lane Grp Cap (vph)	167			200			488	2635	557	2644		2644	
v/s Ratio Prot	0.08			c0.11			0.10	0.17	0.17	0.17		c0.21	
v/s Ratio Perm	0.54			0.77			0.13	0.23	0.23	0.23		0.06	
Uniform Delay, d1	33.8			35.0			2.7	2.9	2.9	2.9		3.0	
Progression Factor	1.00			1.00			1.00	1.00	1.00	1.00		0.55	
Incremental Delay, d2	1.7			14.7			0.5	0.2	0.2	0.2		0.2	
Delay (s)	35.4			49.8			3.2	3.1	3.1	3.1		1.5	
Level of Service	D			D			A	A	A	A		A	
Approach Delay (s)	35.4			49.8			3.1				1.7		
Approach LOS	D			D			A				A		
Intersection Summary													
HCM Average Control Delay	9.6											HCM Level of Service	A
HCM Volume to Capacity ratio	0.35												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.8%											ICU Level of Service	A
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

2015 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↕	↔	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95
Fllb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.95	1.00	0.96
Flt Protected	1.00	0.97	1.00	0.96	1.00	0.96	1.00	0.98	1.00	0.95	1.00	0.96
Satd. Flow (prot)	1770	3347	1770	3217	1770	3217	1692	3445	1677	3221	1770	3347
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.27	1.00	0.49	1.00	0.49	1.00
Satd. Flow (perm)	1770	3347	1770	3217	1770	3217	484	3445	864	3221	484	3221
Volume (vph)	260	400	100	70	370	129	70	341	40	92	530	210
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	421	105	74	389	136	74	359	42	97	558	221
RTOR Reduction (vph)	0	24	0	0	45	0	0	9	0	0	42	0
Lane Group Flow (vph)	274	502	0	74	480	0	74	392	0	97	737	0
Confl. Peds. (#/hr)	100			100			100		100		100	100
Turn Type	Prot			Prot			Perm		Perm		Perm	
Protected Phases	7	4		3	8		2		2		6	
Actuated Green, G (s)	16.1	26.6		6.8	17.3		38.1		38.1		38.1	
Effective Green, g (s)	16.6	26.1		7.3	16.8		39.6		39.6		39.6	
Actuated g/C Ratio	0.20	0.31		0.09	0.20		0.47		0.47		0.47	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5		5.5		5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	346	1028		152	636		225		1605		403	
v/s Ratio Prot	c0.15	0.15		0.04	c0.15		0.11		0.11		c0.23	
v/s Ratio Perm	0.79	0.49		0.49	0.75		0.33		0.24		0.49	
Uniform Delay, d1	32.6	24.0		37.1	32.2		14.3		13.7		15.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2	11.0	0.1		0.9	4.5		3.9		0.4		1.4	
Delay (s)	43.5	24.1		38.0	36.7		18.2		14.0		15.1	
Level of Service	D	C		D	D		B		B		B	
Approach Delay (s)	30.8			36.8			14.7		16.7			
Approach LOS	C			D			B		B		B	
Intersection Summary												
HCM Average Control Delay												24.8
HCM Volume to Capacity ratio												0.62
Actuated Cycle Length (s)												85.0
Intersection Capacity Utilization												73.6%
Analysis Period (min)												15
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave.

2015 AM + Project
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↕	↕	↕
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.95	1.00	0.99
Flt Protected	0.98	0.98	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1670	1670	1770	3539	3503	1670
Flt Permitted	0.98	0.98	0.95	1.00	1.00	1.00
Satd. Flow (perm)	1670	1670	1770	3539	3503	1670
Volume (vph)	67	126	58	635	1067	78
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	71	133	61	668	1123	82
RTOR Reduction (vph)	94	0	0	0	0	3
Lane Group Flow (vph)	110	0	61	668	1202	0
Turn Type	Prot		Prot			
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	10.5		5.3	66.5	57.2	
Effective Green, g (s)	10.5		5.3	66.5	57.2	
Actuated g/C Ratio	0.12		0.06	0.78	0.67	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	206		110	2769	2357	
v/s Ratio Prot	c0.07		c0.03	0.19	c0.34	
v/s Ratio Perm	0.54		0.55	0.24	0.51	
Uniform Delay, d1	35.0		38.7	2.5	6.9	
Progression Factor	1.00		1.07	0.54	1.10	
Incremental Delay, d2	2.7		5.3	0.2	0.6	
Delay (s)	37.6		46.8	1.5	8.3	
Level of Service	D		D	A	A	
Approach Delay (s)	37.6		5.3	8.3		
Approach LOS	D		A	A	A	
Intersection Summary						
HCM Average Control Delay						10.1
HCM Volume to Capacity ratio						0.52
Actuated Cycle Length (s)						85.0
Intersection Capacity Utilization						56.8%
Analysis Period (min)						15
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2015 PM + Project
 1/21/2008

2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	16
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	1.00	0.98
Flt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	4924	1770	4968	1770	4968	2006	1995	1958	1918	1918	1918
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)	1770	4924	1770	4968	1770	4968	261	1995	1131	1918	1918	1918
Volume (vph)	340	1232	181	90	1020	150	170	247	90	140	279	270
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	358	1297	191	95	1074	158	179	260	95	147	294	284
RTOR Reduction (vph)	0	18	0	0	19	0	0	14	0	0	35	0
Lane Group Flow (vph)	358	1470	0	95	1213	0	179	341	0	147	543	0
Confl. Peds. (#/hr)	32	32	32	32	32	32	4	12	24	24	24	12
Parking (#/hr)												
Turn Type	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		3	8	5	2					6
Permitted Phases						2						6
Actuated Green, G (s)	20.0	38.8	7.8	26.6	42.9	42.9	42.9	29.9	29.9	29.9	29.9	29.9
Effective Green, g (s)	20.0	38.8	7.8	26.6	43.4	43.4	43.4	30.4	30.4	30.4	30.4	30.4
Actuated g/C Ratio	0.20	0.39	0.08	0.27	0.43	0.43	0.43	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5
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
Lane Grp Cap (vph)	354	1911	138	1321	305	866	344	583				583
v/s Ratio Prot	c0.20	0.30	0.05	c0.24	c0.06	0.17		c0.28				
v/s Ratio	1.01	0.77	0.69	0.92	0.59	0.39	0.43	0.93				
Uniform Delay, d1	40.0	26.7	44.9	35.6	43.5	19.3	27.8	33.8				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	50.7	3.0	13.4	11.6	2.9	0.3	0.9	21.7				
Delay (s)	F	C	E	D	D	B	C	E				
Level of Service	F	C	E	D	D	B	C	E				
Approach Delay (s)	41.6		48.1		28.6			50.0				
Approach LOS	D		D		C			D				
Intersection Summary												
HCM Average Control Delay	43.3											
HCM Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	96.5%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
 4: 47th St. & MLK Jr. Way

2015 PM + Project
 1/21/2008

2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.98	
Fllb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99	1.00	0.95	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3456	1770	3308	1770	3322	1770	3414	1770	3414	1770	3414	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3456	1770	3308	1770	3322	1770	3414	1770	3414	1770	3414	
Volume (vph)	460	880	82	120	510	290	90	898	260	220	684	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	484	926	86	126	537	305	95	945	274	232	720	63	
RTOR Reduction (vph)	0	7	0	0	79	0	0	27	0	0	0	7	
Lane Group Flow (vph)	484	1005	0	126	763	0	95	1192	0	232	776	0	
Confl. Peds. (#/hr)	15	48	48	48	15	123	48	48	48	48	48	123	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Actuated Green, G (s)	15.7	28.3	10.0	22.6	5.0	32.7	12.0	39.7					
Effective Green, g (s)	15.2	29.3	9.5	23.6	4.5	33.7	11.5	40.7					
Actuated g/C Ratio	0.15	0.29	0.10	0.24	0.04	0.34	0.12	0.41					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grp Cap (vph)	522	1013	168	781	80	1120	204	1389					
v/s Ratio Prot	c0.14	c0.29	0.07	0.23	0.05	c0.36	c0.13	0.23					
v/s Ratio Perm	0.93	0.99	0.75	0.98	1.19	1.06	1.14	0.56					
Uniform Delay, d1	41.9	35.2	44.1	37.9	47.8	33.1	44.2	22.8					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.74					
Incremental Delay, d2	22.3	26.2	15.3	26.1	159.7	45.9	98.6	1.3					
Delay (s)	64.2	61.4	59.4	64.0	207.4	79.0	152.5	18.2					
Level of Service	E	E	E	E	F	E	F	B					
Approach Delay (s)	62.3	E	63.4	E	88.3	F	48.9	D					
Approach LOS	E	E	E	E	F	F	B	D					
Intersection Summary													
HCM Average Control Delay	66.8											HCM Level of Service	E
HCM Volume to Capacity ratio	1.01												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.6%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2015 PM + Project
 1/21/2008

2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.97	0.97	0.97	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.99	0.99
Ft	0.97	0.97	0.97	0.96	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	0.99	1.00	1.00	3410	3442				
Std. Flow (prot)	1695	1658	1658	1658	3410	3410	3442					
Flt Permitted	0.88	0.92	0.92	0.92	0.93	0.93	3175	2850				
Std. Flow (perm)	1518	1540	1540	1540	3175	3175	2850					
Volume (vph)	30	50	21	50	100	70	31	561	80	50	276	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	53	22	53	105	74	33	591	84	53	291	21
RTOR Reduction (vph)	0	15	0	0	34	0	0	21	0	0	9	0
Lane Group Flow (vph)	0	92	0	0	198	0	0	687	0	0	356	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (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
Lane Grp Cap (vph)	516	516	516	524	524	524	1588	1425				
v/s Ratio Prot	0.06	0.06	0.06	c0.13	c0.13	c0.13	c0.22	0.12				
v/s Ratio Perm	0.18	0.18	0.18	0.38	0.38	0.38	0.43	0.25				
v/c Ratio	11.6	11.6	11.6	12.5	12.5	12.5	8.0	7.1				
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Progression Factor	0.8	0.8	0.8	2.1	2.1	2.1	0.9	0.4				
Incremental Delay, d2	12.4	12.4	12.4	14.6	14.6	14.6	8.8	7.6				
Delay (s)	B	B	B	B	B	B	A	A				
Level of Service	B	B	B	B	B	B	A	A				
Approach Delay (s)	12.4	12.4	12.4	14.6	14.6	14.6	8.8	7.6				
Approach LOS	B	B	B	B	B	B	A	A				
Intersection Summary												
HCM Average Control Delay	9.7											
HCM Level of Service	A											
HCM Volume to Capacity ratio	0.41											
Actuated Cycle Length (s)	50.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	68.6%											
ICU Level of Service	C											
Analysis Period (min)	15											
Critical Lane Group	c											

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 PM + Project
1/21/2008

2015 PM + Project
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1761	3487	1766	3440	1738	3418	1764	1817	1764	1817	1764	1817
Flt Permitted	0.28	1.00	0.16	1.00	0.57	1.00	0.36	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	518	3487	296	3440	1050	1818	669	1817	669	1817	669	1817
Volume (vph)	40	836	80	53	572	103	130	391	65	105	200	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	880	84	56	602	108	137	412	68	111	211	32
RTOR Reduction (vph)	0	9	0	0	18	0	0	8	0	0	0	7
Lane Group Flow (vph)	42	955	0	56	692	0	137	473	0	111	236	0
Conf. Peds. (#/hr)	12	12	12	12	12	12	12	12	12	12	12	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	207	1395	118	1376	525	909	335	909	335	909	335	909
v/s Ratio Prot	c0.27			0.20			c0.26			0.13		0.13
v/s Ratio Perm	0.08	0.19	0.19	0.50	0.26	0.52	0.33	0.26	0.33	0.26	0.33	0.26
v/c Ratio	0.20	0.68	0.47	0.50	0.26	0.52	0.33	0.26	0.33	0.26	0.33	0.26
Uniform Delay, d1	15.7	19.8	17.8	18.0	11.5	13.5	12.0	11.5	12.0	11.5	12.0	11.5
Progression Factor	1.00	1.00	1.77	1.92	1.73	1.78	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	2.7	10.8	1.1	0.4	0.7	2.6	0.7	2.6	0.7	2.6	0.7
Delay (s)	17.9	22.6	42.4	35.6	20.2	24.8	14.6	12.2	14.6	12.2	14.6	12.2
Level of Service	B	C	D	D	C	C	B	B	B	B	B	B
Approach Delay (s)	22.4			36.1			23.8		23.8		12.9	
Approach LOS	C			D			C		C		B	

Intersection Summary		Intersection Summary	
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2015 PM + Project
 1/21/2008

2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99
Satd. Flow (prot)	1765	3482	1760	3426	1760	3426	3398	3398	3433	3433	3433	3433
Flt Permitted	0.23	1.00	0.17	1.00	0.17	1.00	0.87	0.87	0.75	0.75	0.75	0.75
Satd. Flow (perm)	432	3482	312	3426	312	3426	2975	2975	2588	2588	2588	2588
Volume (vph)	70	903	84	114	685	149	65	403	113	81	226	40
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	71	912	85	115	692	151	66	407	114	82	228	40
RTOR Reduction (vph)	0	8	0	0	23	0	0	26	0	0	12	0
Lane Group Flow (vph)	71	989	0	115	820	0	0	561	0	0	338	0
Confl. Peds. (#/hr)	8	39	39	8	8	8	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	8	8	8	2	2	2	6	6	6
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	35.5	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	189	1523	137	1499	137	1499	1376	1376	1197	1197	1197	1197
v/s Ratio Prot	0.16	0.28	0.28	0.24	0.24	0.24	0.19	0.19	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.38	0.65	0.84	0.55	0.84	0.55	0.41	0.41	0.28	0.28	0.28	0.28
v/c Ratio	15.1	17.7	20.0	16.6	20.0	16.6	14.2	14.2	13.3	13.3	13.3	13.3
Uniform Delay, d1	0.96	1.03	0.84	0.84	0.84	0.84	1.37	1.37	1.00	1.00	1.00	1.00
Progression Factor	2.7	1.0	41.4	1.4	41.4	1.4	0.8	0.8	0.6	0.6	0.6	0.6
Incremental Delay, d2	17.1	19.3	58.1	15.4	58.1	15.4	20.3	20.3	13.9	13.9	13.9	13.9
Delay (s)	B	B	E	B	E	B	C	C	B	B	B	B
Level of Service	B	B	E	B	E	B	C	C	B	B	B	B
Approach Delay (s)	19.1	19.1	20.5	20.5	20.5	20.3	20.3	20.3	13.9	13.9	13.9	13.9
Approach LOS	B	B	C	C	C	C	C	C	B	B	B	B
Intersection Summary												
HCM Average Control Delay	19.2 HCM Level of Service B											
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	87.9% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group	15											

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.98	1.00	1.00	1.00	0.96	1.00	0.96	1.00	0.96	1.00
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.96	1.00	0.96	1.00	0.96
Satd. Flow (prot)	3305	1770	3539	1732	3305	1770	3539	1732	3305	1770
Flt Permitted	1.00	0.95	1.00	0.96	1.00	0.96	1.00	0.96	1.00	0.96
Satd. Flow (perm)	3305	1770	3539	1732	3305	1770	3539	1732	3305	1770
Volume (vph)	996	112	56	833	126	46	46	46	46	46
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1027	115	58	859	130	47	47	47	47	47
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	1142	0	58	859	177	0	0	0	0	0
Confl. Peds. (#/hr)	213	348	348	213	348	348	213	348	348	348
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	3	8	2	2	2	2	2	2	2
Permitted Phases	4	3	8	2	2	2	2	2	2	2
Actuated Green, G (s)	48.9	5.7	58.6	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Effective Green, g (s)	48.9	5.7	58.6	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Actuated g/C Ratio	0.61	0.07	0.73	0.17	0.17	0.17	0.17	0.17	0.17	0.17
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2020	126	2592	290	290	290	290	290	290	290
v/s Ratio Prot	0.35	0.03	0.24	0.10	0.10	0.10	0.10	0.10	0.10	0.10
v/s Ratio Perm	0.57	0.46	0.33	0.61	0.61	0.61	0.61	0.61	0.61	0.61
v/c Ratio	9.2	35.7	3.8	30.9	30.9	30.9	30.9	30.9	30.9	30.9
Uniform Delay, d1	0.49	1.30	0.45	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Progression Factor	0.9	2.0	0.3	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Incremental Delay, d2	5.5	48.4	2.0	33.7	33.7	33.7	33.7	33.7	33.7	33.7
Delay (s)	A	D	A	C	C	C	C	C	C	C
Level of Service	A	D	A	C	C	C	C	C	C	C
Approach Delay (s)	5.5	4.9	33.7	33.7	33.7	33.7	33.7	33.7	33.7	33.7
Approach LOS	A	A	A	C	C	C	C	C	C	C
Intersection Summary										
HCM Average Control Delay	7.5 HCM Level of Service A									
HCM Volume to Capacity ratio	0.57									
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 12.0									
Intersection Capacity Utilization	55.0% ICU Level of Service B									
Analysis Period (min)	15									
c Critical Lane Group	15									

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.97
Lane Util. Factor	0.94	1.00	0.98	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1657	3417	1732	3316	1770	3474	1770	3474	1770	3344	1770	3344
Flt Permitted	0.29	1.00	0.16	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (iperm)	505	3417	292	3316	1770	3474	1770	3474	1770	3344	1770	3344
Volume (vph)	219	714	109	54	498	110	226	1258	104	110	663	165
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	223	729	111	55	508	112	231	1284	106	112	677	168
RTOR Reduction (vph)	0	15	0	0	24	0	0	7	0	0	0	27
Lane Group Flow (vph)	223	825	0	55	596	0	231	1383	0	112	818	0
Confl. Peds. (#/hr)	94		86	86		94			40			111
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4		8	5	2	1	6					
Permitted Phases	4		8	5	2	1	6					
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	25.5	12.6	32.8	8.2	28.4	8.2	28.4
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	26.0	13.1	33.3	8.7	28.9	8.7	28.9
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.16	0.42	0.11	0.36	0.11	0.36
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	164	1111	95	1078	290	1446	192	1208	192	1208	192	1208
v/s Ratio Prot	0.24		0.18		c0.13	c0.40			0.06	0.24		
v/s Ratio Perm	c0.44		0.19		0.80	0.96			0.58	0.68		
v/c Ratio	1.36	0.74	0.58	0.55	22.4	22.2	32.2	22.6	33.9	21.6	33.9	21.6
Uniform Delay, d1	27.0	24.0	22.4	22.2	1.00	1.00	1.44	0.64	0.89	1.37	0.89	1.37
Progression Factor	1.65	1.73	1.00	1.00	1.00	1.00	1.44	0.64	0.89	1.37	0.89	1.37
Incremental Delay, d2	191.5	2.0	5.2	0.4	7.9	10.2	7.9	10.2	2.7	2.8	2.7	2.8
Delay (s)	236.1	43.6	27.7	22.6	54.1	24.6	54.1	24.6	32.9	32.4	32.9	32.4
Level of Service	F	D	C	C	D	C	D	C	C	C	C	C
Approach Delay (s)	84.0		F		23.0		C		28.8		C	32.5
Approach LOS			F		C		C		C		C	C
Intersection Summary												
HCM Average Control Delay	42.3 HCM Level of Service D											
HCM Volume to Capacity ratio	1.05											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	88.2% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. 2015 PM + Project
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	41	1562	0	20	801
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	43	1644	0	21	843
Pedestrians	52		52		45	45
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4		4		4	4
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	230					
pX, platoon unblocked	0.84 0.76					
VC, conflicting volume	2212 919					
VC1, stage 1 conf vol	1696					
VC2, stage 2 conf vol						
vCu, unblocked vol	1646 577					
tC, single (s)	6.8 6.9					
tC, 2 stage (s)						
tF (s)	3.5 3.3					
p0 queue free %	67 87					
cM capacity (veh/h)	65 322					
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	64	1096	548	21	422	422
Volume Left	21	0	0	21	0	0
Volume Right	43	0	0	0	0	0
cSH	140	1700	1700	294	1700	1700
Volume to Capacity	0.46	0.64	0.32	0.07	0.25	0.25
Queue Length 95th (ft)	52	0	0	6	0	0
Control Delay (s)	51.0	0.0	0.0	18.2	0.0	0.0
Lane LOS	F	C	C	C	C	C
Approach Delay (s)	51.0	0.0	0.0	0.4		
Approach LOS	F			C		
Intersection Summary						
Average Delay	1.4					
Intersection Capacity Utilization	61.6% ICU Level of Service B					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	1.00	0.96	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Flt Protected	0.99	0.95	1.00	1.00	0.99	0.99	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5018	1768	3396	1794	1764	1803	1764	1803	1764	1803	1764	1803
Flt Permitted	0.74	0.30	1.00	0.30	1.00	0.70	0.70	1.00	0.26	1.00	0.26	1.00
Satd. Flow (perm)	3724	555	3396	1263	480	1803	1263	480	1803	1263	480	1803
Volume (vph)	110	700	30	91	660	201	80	375	90	70	273	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	714	31	93	673	205	82	383	92	71	279	51
RTOR Reduction (vph)	0	5	0	0	36	0	0	9	0	0	0	8
Lane Group Flow (vph)	0	852	0	93	842	0	0	548	0	71	322	0
Conf. Peds. (#/hr)	24	4	4	4	4	24	48	12	12	12	12	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8		8		2		2		6
Permitted Phases	4			8		8		2		2		6
Actuated Green, G (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31
Clearance 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
Lane Grp Cap (vph)	2188	326	1995	c0.25	1995	395	150	563	150	563	150	563
v/s Ratio Prot												
v/s Ratio Perm	0.23	0.17	0.17	c0.25	0.17	c0.43	0.15	0.15	0.15	0.15	0.15	0.15
v/c Ratio	0.39	0.29	0.42	0.29	0.42	1.39	0.47	0.57	0.47	0.57	0.47	0.57
Uniform Delay, d1	8.8	8.2	9.1	8.2	9.1	27.5	22.2	23.0	22.2	23.0	22.2	23.0
Progression Factor	1.00	1.68	1.76	1.00	1.76	1.00	0.79	0.78	0.79	0.78	0.79	0.78
Incremental Delay, d2	0.5	2.1	0.6	2.1	0.6	189.4	9.9	4.0	9.9	4.0	9.9	4.0
Delay (s)	9.3	15.8	16.6	15.8	16.6	216.9	27.3	22.0	27.3	22.0	27.3	22.0
Level of Service	A	B	B	A	B	F	C	C	C	C	C	C
Approach Delay (s)	9.3			16.5		216.9		23.0				23.0
Approach LOS	A			B		F		C				C

Intersection Summary	
HCM Average Control Delay	55.3
HCM Level of Service	E
HCM Volume to Capacity ratio	0.76
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	139.8%
ICU Level of Service	H
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.98	1.00
Flt Protected	0.99	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5007	4947	4947	1770	1786	1764	1830	1770	1786	1764	1830	1770
Flt Permitted	0.76	0.81	1.00	0.81	1.00	0.40	1.00	0.31	1.00	0.31	1.00	0.31
Satd. Flow (perm)	3812	4025	4025	745	1786	566	1830	745	1786	566	1830	745
Volume (vph)	80	610	40	81	762	151	60	237	77	70	229	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	642	42	85	802	159	63	249	81	74	241	32
RTOR Reduction (vph)	0	8	0	0	32	0	0	15	0	0	0	6
Lane Group Flow (vph)	0	760	0	0	1014	0	63	315	0	74	267	0
Conf. Peds. (#/hr)	12	12	12	12	12	12	6	6	6	6	6	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8		8		2		2		6
Permitted Phases	4			8		8		2		2		6
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (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
Lane Grp Cap (vph)	2454	2591	2591	191	458	145	469	191	458	145	469	191
v/s Ratio Prot												
v/s Ratio Perm	0.20	0.31	0.31	c0.25	0.31	0.33	0.69	0.13	0.33	0.69	0.13	0.15
v/c Ratio	0.31	0.31	0.31	0.39	0.39	0.33	0.69	0.51	0.33	0.69	0.51	0.57
Uniform Delay, d1	6.3	6.3	6.3	6.8	6.8	24.2	26.9	25.5	24.2	26.9	25.5	25.9
Progression Factor	1.27	2.02	2.02	1.13	1.13	1.00	1.00	1.14	1.00	1.00	1.14	1.14
Incremental Delay, d2	0.3	0.4	0.4	0.4	0.4	4.6	8.2	11.4	4.6	8.2	11.4	4.6
Delay (s)	8.3	14.1	14.1	14.1	14.1	28.7	35.1	40.2	28.7	35.1	40.2	34.1
Level of Service	A	B	B	A	B	C	D	D	A	B	D	C
Approach Delay (s)	8.3			14.1		34.0		35.4				35.4
Approach LOS	A			B		C		D				D

Intersection Summary	
HCM Average Control Delay	18.3
HCM Level of Service	B
HCM Volume to Capacity ratio	0.48
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.9%
ICU Level of Service	D
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

2015 PM + Project
 1/21/2008

2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fp/b, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.99	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	1.00	1.00	1.00	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	5017	4905	3405	3405	3405	3405	3405	3405	3405	3405	3405	3405
Flt Permitted	0.78	0.84	0.84	0.79	0.79	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Satd. Flow (perm)	3934	4112	2703	2703	2703	2703	2703	2703	2703	2703	2703	2703
Volume (vph)	64	672	40	69	843	221	60	295	75	130	212	82
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	65	679	40	70	852	223	61	298	76	131	214	83
RTOR Reduction (vph)	0	7	0	0	51	0	0	22	0	0	26	0
Lane Group Flow (vph)	0	777	0	0	1094	0	0	413	0	0	402	0
Confl. Peds. (#/hr)	9	17	17	9	12	10	10	10	10	10	10	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	2	2	2	2	2	6
Permitted Phases	4	8	8	2	2	2	2	2	2	2	2	6
Actuated Green, G (s)	50.0	51.5	51.5	20.5	20.5	20.5	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Actuated g/C Ratio	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Clearance Time (s)	2533	2647	2647	693	693	693	693	693	693	693	693	693
Lane Grp Cap (vph)	0.20	0.31	0.41	0.60	0.60	0.60	0.15	0.15	0.15	0.15	0.15	0.18
v/s Ratio Prot	0.31	6.3	6.9	26.1	26.1	26.1	0.71	0.71	0.71	0.71	0.71	0.71
v/s Ratio Perm	1.49	0.75	0.75	1.00	1.00	1.00	1.13	1.13	1.13	1.13	1.13	1.13
Uniform Delay, d1	0.3	0.4	0.4	3.7	3.7	3.7	7.4	7.4	7.4	7.4	7.4	7.4
Progression Factor	9.7	5.6	5.6	29.9	29.9	29.9	37.9	37.9	37.9	37.9	37.9	37.9
Incremental Delay, d2	A	A	A	C	C	C	D	D	D	D	D	D
Delay (s)	9.7	5.6	5.6	29.9	29.9	29.9	37.9	37.9	37.9	37.9	37.9	37.9
Level of Service	A	A	A	C	C	C	D	D	D	D	D	D
Approach Delay (s)	9.7	5.6	5.6	29.9	29.9	29.9	37.9	37.9	37.9	37.9	37.9	37.9
Approach LOS	A	A	A	C	C	C	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	15.5 HCM Level of Service B											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	112.6% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave. 2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	
Fipb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	
Frt	0.99	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.98	
Flt Protected	0.99	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.98	
Satd. Flow (prot)	4925	4756	4756	1747	3451	1745	3464						
Flt Permitted	0.67	0.76	0.76	0.31	1.00	0.14	1.00						
Satd. Flow (perm)	3352	3623	3623	575	3451	260	3464						
Volume (vph)	269	605	91	90	784	427	110	898	100	195	568	67	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	283	637	96	95	825	449	116	945	105	205	598	71	
RTOR Reduction (vph)	0	9	0	0	6	0	0	7	0	0	7	0	
Lane Group Flow (vph)	0	1007	0	0	1363	0	116	1043	0	205	662	0	
Confl. Peds. (#/hr)	26	19	19	pm+pt	26	39	92	92	92	92	92	39	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	3	8	2	2	2	2	2	2	2	6	
Permitted Phases	4	4	8	8	2	2	2	2	2	2	2	6	
Actuated Green, G (s)	37.9	37.9	37.9	34.4	34.4	34.4	34.4	34.4	34.4	34.4	34.4	34.4	
Effective Green, g (s)	39.4	39.4	39.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	35.4	
Actuated g/C Ratio	0.48	0.48	0.48	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	
Clearance Time (s)	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	1595	1724	1724	246	1475	111	1481						
v/s Ratio Prot				0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.30	0.19	
v/s Ratio Perm	0.30	0.30	0.30	0.38	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.19	
v/c Ratio	1.64dl	0.79	0.79	0.47	0.71	0.71	0.71	0.71	0.71	0.71	0.71	0.45	
Uniform Delay, d1	16.3	18.2	18.2	17.0	19.4	23.7	16.8						
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	2.4	2.4	6.4	2.9	413.7	1.0						
Delay (s)	16.9	20.6	20.6	23.4	22.3	437.4	17.7						
Level of Service	B	C	C	C	C	F	B						
Approach Delay (s)	16.9	20.6	20.6	22.4	22.4	116.2							
Approach LOS	B	C	C	C	C	F							
Intersection Summary													
HCM Average Control Delay	39.1											HCM Level of Service	D
HCM Volume to Capacity ratio	1.29												
Actuated Cycle Length (s)	82.8											Sum of lost time (s)	8.0
Intersection Capacity Utilization	99.4%											ICU Level of Service	F
Analysis Period (min)	15												
dl Defacto Left Lane. Recode with 1 though lane as a left lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St. 2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.99	1.00	0.94	
Fipb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.96	1.00	0.96	1.00	0.98	0.98	
Frt	0.99	0.99	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.92	0.92	
Flt Protected	1.00	1.00	1.00	0.98	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99	
Satd. Flow (prot)	5026	5019	5019	1748	1406	1566							
Flt Permitted	0.84	0.78	0.78	0.81	1.00	0.82							
Satd. Flow (perm)	4232	3937	3937	1453	1406	1455							
Volume (vph)	40	857	34	100	1167	40	94	200	30	30	80	80	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Adj. Flow (vph)	40	866	34	101	1179	40	95	95	202	30	81	81	
RTOR Reduction (vph)	0	5	0	0	4	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	935	0	0	1316	0	0	190	126	0	104	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	8	8	2	2	2	2	2	2	6	
Permitted Phases	4	4	8	8	2	2	2	2	2	2	2	6	
Actuated Green, G (s)	49.5	49.5	49.5	48.5	48.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29	
Clearance Time (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	
Lane Grp Cap (vph)	2566	2387	2387	427	413	427	413	427	413	427	427	427	
v/s Ratio Prot				0.33	0.33	0.13	0.09	0.07	0.07	0.07	0.07	0.07	
v/s Ratio Perm	0.22	0.36	0.36	0.55	0.55	0.44	0.31	0.24	0.24	0.24	0.24	0.24	
v/c Ratio	8.0	9.3	9.3	23.0	21.9	21.9	21.9	21.5	21.5	21.5	21.5	21.5	
Uniform Delay, d1	1.00	1.00	1.00	10.0	10.0	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	0.4	0.9	0.9	3.3	1.9	1.4	1.4	1.4	1.4	1.4	1.4	1.4	
Incremental Delay, d2	8.4	10.2	10.2	26.3	23.8	22.9	22.9	22.9	22.9	22.9	22.9	22.9	
Delay (s)	A	B	B	C	C	C	C	C	C	C	C	C	
Level of Service	A	B	B	B	B	B	B	B	B	B	B	B	
Approach Delay (s)	8.4	10.2	10.2	25.0	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	
Approach LOS	A	B	B	B	B	B	B	B	B	B	B	B	
Intersection Summary													
HCM Average Control Delay	12.3											HCM Level of Service	B
HCM Volume to Capacity ratio	0.52												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	108.2%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.94	1.00	0.94	1.00	1.00	0.99	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.97	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	4919	1770	4885	1770	3539	1488	1770	3539	1497	1770	4919
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (pbrm)	1770	4919	1770	4885	1770	3539	1488	1770	3539	1497	1770	4919
Volume (vph)	200	755	101	110	937	240	230	851	180	380	421	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	795	106	116	986	253	242	896	189	400	443	116
RTOR Reduction (vph)	0	14	0	0	38	0	0	0	24	0	0	69
Lane Group Flow (vph)	211	887	0	116	1201	0	242	896	165	400	443	47
Confl. Peds. (#/hr)	Prot	7	4	Prot	3	8	Prot	5	2	3	1	6
Turn Type	Prot	7	4	Prot	3	8	Prot	5	2	3	1	6
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	12.0	34.0	12.0	34.0	12.0	34.0	21.0	33.0	45.0	25.0	37.0	49.0
Effective Green, g (s)	11.0	35.0	11.0	35.0	11.0	35.0	20.0	34.0	45.0	24.0	38.0	49.0
Actuated g/C Ratio	0.09	0.29	0.09	0.29	0.09	0.29	0.17	0.28	0.38	0.20	0.32	0.41
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0	3.0	3.0	5.0	3.0
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
Lane Grp Cap (vph)	162	1435	162	1425	162	1425	295	1003	608	354	1121	661
v/s Ratio Prot	c0.12	0.18	0.07	c0.25	0.14	c0.25	0.14	c0.25	0.02	c0.23	0.13	0.01
v/s Ratio Perm	1.30	0.62	0.72	0.84	0.82	0.89	0.82	0.89	0.27	1.13	0.40	0.07
Uniform Delay, d1	54.5	36.7	53.0	39.9	48.3	41.3	26.1	48.0	32.0	21.6	48.0	32.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	173.6	2.0	14.0	6.2	16.5	12.0	0.2	87.9	1.0	0.0	87.9	1.0
Delay (s)	228.1	38.7	67.0	46.2	64.7	53.3	26.3	135.9	33.1	21.7	135.9	33.1
Level of Service	F	D	E	D	E	D	C	F	C	F	C	C
Approach Delay (s)	74.7		47.9		47.9		51.5		D	74.6		E
Approach LOS	E		D		D		D		D	E		E
Intersection Summary												
HCM Average Control Delay	60.6			HCM Level of Service			E					
HCM Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	120.0			Sum of lost time (s)			20.0					
Intersection Capacity Utilization	92.9%			ICU Level of Service			F					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	0.94	0.94	0.94	0.96	0.96	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Fipb, ped/bikes	0.97	0.97	0.97	0.97	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Frt	0.96	0.96	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.98	0.98	0.98	0.98	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1590	1590	1590	1636	1636	1693	3458	1675	3453	1675	3453	1675
Flt Permitted	0.67	0.67	0.67	0.82	0.82	0.29	1.00	0.34	1.00	0.34	1.00	0.34
Satd. Flow (pbrm)	1088	1088	1088	1368	1368	509	3458	592	3453	592	3453	592
Volume (vph)	111	50	70	60	70	63	140	683	50	42	794	63
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	117	53	74	63	74	66	147	719	53	44	836	66
RTOR Reduction (vph)	0	20	0	0	22	0	0	5	0	0	6	0
Lane Group Flow (vph)	0	224	0	0	181	0	147	767	0	44	896	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	2	2	4	6	6
Permitted Phases	4	4	4	4	4	4	4	2	2	4	6	6
Actuated Green, G (s)	19.3	19.3	19.3	19.3	19.3	19.3	58.7	58.7	58.7	58.7	58.7	58.7
Effective Green, g (s)	18.8	18.8	18.8	18.8	18.8	18.8	58.2	58.2	58.2	58.2	58.2	58.2
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.68	0.68	0.68	0.68	0.68	0.68
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	241	241	241	300	300	349	2368	405	2364	405	2364	405
v/s Ratio Prot	c0.21	0.13	0.13	c0.29	0.13	c0.29	0.22	0.07	0.26	0.07	0.26	0.07
v/s Ratio Perm	0.93	0.60	0.60	0.42	0.42	0.32	0.32	0.11	0.38	0.11	0.38	0.11
Uniform Delay, d1	32.4	29.8	29.8	29.8	29.8	5.4	5.4	4.6	5.7	4.6	5.7	4.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	38.0	2.3	2.3	3.7	3.7	0.4	0.5	0.5	0.5	0.5	0.5	0.5
Delay (s)	70.5	32.1	32.1	32.1	32.1	9.6	5.8	5.1	6.2	5.1	6.2	5.1
Level of Service	E	C	C	E	C	C	A	A	A	A	A	A
Approach Delay (s)	70.5		32.1		32.1		6.4		6.1		6.1	
Approach LOS	E		C		C		A		A		A	
Intersection Summary												
HCM Average Control Delay	15.3			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.55											
Actuated Cycle Length (s)	85.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	64.9%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave. 2015 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.94
Frbp, ped/bikes	1.00	0.97	1.00	0.94	1.00	0.99	1.00	0.99	1.00	0.94	1.00	0.97
Frt	1.00	0.97	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.94	1.00	0.94
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3340	1770	3160	1697	3476	1716	3129	1716	3129	1716	3129
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3340	1770	3160	1697	3476	1716	3129	1716	3129	1716	3129
Volume (vph)	140	420	110	70	440	194	170	660	50	120	514	300
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	429	112	71	449	198	173	673	51	122	524	306
RTOR Reduction (vph)	0	27	0	0	61	0	0	6	0	0	91	0
Lane Group Flow (vph)	143	514	0	71	586	0	173	718	0	122	739	0
Confl. Peds. (#/hr)	100			100			100		100		100	100
Turn Type	Prot			Prot			Perm		Perm		Perm	
Protected Phases	7	4		3	8		2		2		6	
Actuated Green, G (s)	9.5	22.5		6.7	19.7		42.3	42.3	42.3		42.3	42.3
Effective Green, g (s)	10.0	22.0		7.2	19.2		43.8	43.8	43.8		43.8	43.8
Actuated g/C Ratio	0.12	0.26		0.08	0.23		0.52	0.52	0.52		0.52	0.52
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5	5.5		5.5	5.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	208	864		150	714		246	1791	294		1612	
v/s Ratio Prot	c0.08	c0.15		0.04	c0.19		c0.36	0.21	0.21		0.24	
v/s Ratio Perm	0.69	0.59		0.47	0.82		0.70	0.40	0.41		0.46	
Uniform Delay, d1	36.0	27.6		37.1	31.3		15.7	12.6	12.7		13.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	7.3	0.7		0.9	7.2		15.5	0.7	4.3		0.9	
Delay (s)	43.3	28.3		38.0	38.4		31.2	13.3	17.0		14.0	
Level of Service	D	C		D	D		C	B	B		B	B
Approach Delay (s)	31.5			38.4			16.7		14.4			
Approach LOS	C			D			B		B			
Intersection Summary												
HCM Average Control Delay	23.9											
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	76.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave. 2015 PM + Project
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.91	1.00	1.00	1.00	0.98	0.98
Flt Protected	0.99	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1662	1770	3539	3459		
Flt Permitted	0.99	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1662	1770	3539	3459		
Volume (vph)	43	98	89	1515	702	124
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	45	103	94	1595	739	131
RTOR Reduction (vph)	67	0	0	0	18	0
Lane Group Flow (vph)	81	0	94	1595	852	0
Turn Type			Prot			
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	27.5		9.0	44.0	30.5	
Effective Green, g (s)	28.0		9.0	44.0	31.0	
Actuated g/C Ratio	0.35		0.11	0.55	0.39	
Clearance Time (s)	4.5		4.0	4.0	4.5	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	582		199	1946	1340	
v/s Ratio Prot	c0.05		0.05	c0.45	0.25	
v/s Ratio Perm	0.14		0.47	0.82	0.64	
Uniform Delay, d1	17.8		33.3	14.7	19.9	
Progression Factor	1.00		1.00	1.00	0.50	
Incremental Delay, d2	0.5		7.8	4.0	1.7	
Delay (s)	18.3		41.1	18.8	11.6	
Level of Service	B		D	B	B	
Approach Delay (s)	18.3		20.0	11.6		
Approach LOS	B		B	B	B	
Intersection Summary						
HCM Average Control Delay	17.2					
HCM Volume to Capacity ratio	0.55					
Actuated Cycle Length (s)	80.0					
Intersection Capacity Utilization	57.0%					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 3:51st St. & Telegraph Ave. 2015 PM Project Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.98	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97	1.00	1.00	1.00	0.98
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.99
Flt	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.97	1.00	1.00	1.00	0.99
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3433	3456	1770	3308	1770	3308	1770	3322	1770	3414	1770	3414
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3433	3456	1770	3308	1770	3308	1770	3322	1770	3414	1770	3414
Volume (vph)	480	880	82	120	510	290	90	898	260	220	684	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	926	86	126	537	305	95	945	274	232	720	63
RTOR Reduction (vph)	0	7	0	0	79	0	0	27	0	0	6	0
Lane Group Flow (vph)	484	1005	0	126	763	0	95	1192	0	232	777	0
Confl. Peds. (#/hr)	15	48	48	15	123	48	48	48	48	48	123	123
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases												
Actuated Green, G (s)	15.5	28.5		9.0	22.0		8.3	33.5		12.0		37.2
Effective Green, g (s)	15.0	29.5		8.5	23.0		7.8	34.5		11.5		38.2
Actuated g/C Ratio	0.15	0.29		0.08	0.23		0.08	0.34		0.12		0.38
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5		5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	515	1020		150	761		138	1146		204		1304
v/s Ratio Prot	c0.14	c0.29		0.07	0.23		0.05	c0.36		c0.13		c0.23
v/c Ratio	0.94	0.99		0.84	1.00		0.69	1.04		1.14		0.60
Uniform Delay, d1	42.1	35.0		45.1	38.5		44.9	32.8		44.2		24.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	24.9	24.3		30.7	33.2		10.8	37.6		98.6		1.6
Delay (s)	66.9	59.4		75.7	71.7		55.7	70.4		148.9		19.2
Level of Service	E	E		E	E		E	E		F		B
Approach Delay (s)	61.8			72.2			69.3			48.9		
Approach LOS	E			E			E			D		
Intersection Summary												
HCM Average Control Delay	63.2 HCM Level of Service E											
HCM Volume to Capacity ratio	1.03											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	96.6% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St. 2015 PM Project Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.99	0.99	1.00	0.96	1.00	0.96	1.00	0.98	1.00	1.00	1.00	0.98
Flt Protected	0.99	0.99	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95
Satd. Flow (prot)	5018	5018	1768	3395	1768	3395	1793	1793	1763	1801	1763	1801
Flt Permitted	0.71	0.71	1.00	0.28	1.00	0.28	1.00	0.81	1.00	0.32	1.00	0.32
Satd. Flow (perm)	3610	3610	528	3395	528	3395	1456	1456	599	1801	599	1801
Volume (vph)	110	700	30	91	660	201	80	375	90	70	273	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	714	31	93	673	205	82	383	92	71	279	51
RTOR Reduction (vph)	0	4	0	0	32	0	0	8	0	0	7	0
Lane Group Flow (vph)	0	853	0	93	846	0	0	549	0	71	323	0
Confl. Peds. (#/hr)	24	4	4	4	24	48	12	12	12	12	48	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases												
Actuated Green, G (s)	46.0			46.0			34.0			34.0		
Effective Green, g (s)	47.0			47.0			35.0			35.0		
Actuated g/C Ratio	0.52			0.52			0.39			0.39		
Clearance Time (s)	5.0			5.0			5.0			5.0		
Lane Grp Cap (vph)	1885			276	1773		566			233		700
v/s Ratio Prot	0.24			0.18			c0.38			0.12		
v/c Ratio	0.45			0.34			0.97			0.30		0.46
Uniform Delay, d1	13.4			12.5			27.0			19.1		20.5
Progression Factor	1.00			1.00			1.00			1.00		1.00
Incremental Delay, d2	0.8			3.3			31.1			3.3		2.2
Delay (s)	14.2			15.7			58.1			22.4		22.7
Level of Service	B			B			E			C		C
Approach Delay (s)	14.2			14.7			58.1			22.6		
Approach LOS	B			B			E			C		
Intersection Summary												
HCM Average Control Delay	24.4 HCM Level of Service C											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	139.8% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group												

**APPENDIX G:
YEAR 2030 NO PROJECT CONDITIONS INTERSECTION
LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.99	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	
Flt	1.00	0.97	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.94	1.00	0.94	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4903	1770	4953	2006	2034	1986	1950	1986	1950	1986	1950	
Flt Permitted	0.95	1.00	0.95	1.00	0.10	1.00	0.43	1.00	0.43	1.00	0.43	1.00	
Satd. Flow (perm)	1770	4903	1770	4953	201	2034	899	1950	899	1950	899	1950	
Volume (vph)	310	1000	220	120	1660	250	200	290	70	180	420	290	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	326	1053	232	126	1747	263	211	305	74	189	442	305	
RTOR Reduction (vph)	0	28	0	0	16	0	0	7	0	0	0	21	
Lane Group Flow (vph)	326	1257	0	126	1994	0	211	372	0	189	726	0	
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10	
Turn Type	Prot	Prot	Prot	Prot	pm	pt	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	7	4	3	8	8	5	2	6	6	6	6	6	
Permitted Phases	17.0	47.9	13.1	44.0	48.5	48.5	39.5	39.5	39.5	39.5	39.5	39.5	
Actuated Green, G (s)	17.0	47.9	13.1	44.0	49.0	49.0	40.0	40.0	40.0	40.0	40.0	40.0	
Effective Green, g (s)	0.14	0.40	0.11	0.37	0.41	0.41	0.33	0.33	0.33	0.33	0.33	0.33	
Actuated g/C Ratio	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5	2.5	
Clearance Time (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	
Vehicle Extension (s)	251	1957	193	1816	187	831	300	650	300	650	300	650	
Lane Grp Cap (vph)	c0.18	c0.26	0.07	c0.40	c0.07	0.18	0.21	0.37	0.21	0.37	0.21	0.37	
v/s Ratio Prot	1.30	0.64	0.65	1.10	1.13	0.45	0.63	1.12	0.63	1.12	0.63	1.12	
v/s Ratio Perm	51.5	29.1	51.3	38.0	58.7	25.7	33.8	40.0	33.8	40.0	33.8	40.0	
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	160.6	1.6	7.7	53.2	104.5	0.4	4.3	72.1	4.3	72.1	4.3	72.1	
Incremental Delay, d2	212.1	30.8	59.0	91.2	163.2	26.1	38.0	112.1	38.0	112.1	38.0	112.1	
Delay (s)	F	C	E	F	F	C	D	F	D	F	D	F	
Level of Service	E	C	E	F	F	C	D	F	D	F	D	F	
Approach Delay (s)	67.4	89.3	89.3	75.1	75.1	75.1	97.2	97.2	75.1	75.1	97.2	97.2	
Approach LOS	E	F	F	F	F	F	F	F	F	F	F	F	
Intersection Summary													
HCM Average Control Delay	82.4											HCM Level of Service	F
HCM Volume to Capacity ratio	1.15												
Actuated Cycle Length (s)	120.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.6%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt	0.95	0.95	1.00	0.91	1.00	0.97	1.00	0.97	1.00	0.96	1.00	0.96	
Flt Protected	0.98	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1749	1749	1681	1597	1749	1597	1770	3290	1770	3290	1770	3290	
Flt Permitted	0.48	0.48	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.95	1.00	0.95	
Satd. Flow (perm)	847	847	1302	1597	1302	1597	2535	1770	3290	1770	3290	1770	
Volume (vph)	10	10	10	350	330	470	10	1150	240	110	1320	460	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	11	11	11	368	347	495	11	1211	253	116	1389	484	
RTOR Reduction (vph)	0	10	0	0	0	0	0	18	0	0	36	0	
Lane Group Flow (vph)	0	23	0	368	785	0	0	1457	0	116	1837	0	
Confl. Peds. (#/hr)	4	4	4	44	44	44	4	44	12	12	12	44	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	7	8	8	8	2	2	1	6	6	6	6	
Permitted Phases	7	7	26.5	26.5	26.5	32.5	32.5	7.9	44.9	44.9	44.9	44.9	
Actuated Green, G (s)	5.1	5.1	27.0	27.0	27.0	33.0	33.0	8.4	45.4	45.4	45.4	45.4	
Effective Green, g (s)	0.06	0.06	0.30	0.30	0.30	0.37	0.37	0.09	0.50	0.50	0.50	0.50	
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Clearance Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Vehicle Extension (s)	53	391	479	930	165	1660	0.07	c0.56	0.07	c0.56	0.07	c0.56	
Lane Grp Cap (vph)	c0.03	0.43	0.94	1.64	1.57	1.57	0.70	1.11	1.11	1.11	1.11	1.11	
v/s Ratio Prot	40.7	30.7	31.5	28.5	28.5	28.5	39.6	22.3	22.3	22.3	22.3	22.3	
v/s Ratio Perm	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Uniform Delay, d1	2.0	30.5	296.4	256.6	256.6	256.6	10.5	57.5	57.5	57.5	57.5	57.5	
Progression Factor	42.7	61.2	327.9	284.9	284.9	284.9	50.1	79.8	79.8	79.8	79.8	79.8	
Incremental Delay, d2	D	E	F	F	F	F	D	E	E	E	E	E	
Delay (s)	D	E	F	F	F	F	D	E	E	E	E	E	
Level of Service	D	E	F	F	F	F	D	E	E	E	E	E	
Approach Delay (s)	42.7	246.8	284.9	284.9	284.9	284.9	78.0	78.0	78.0	78.0	78.0	78.0	
Approach LOS	D	F	F	F	F	F	F	F	F	F	F	F	
Intersection Summary													
HCM Average Control Delay	186.0											HCM Level of Service	F
HCM Volume to Capacity ratio	1.48												
Actuated Cycle Length (s)	90.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	137.7%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Ftbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.98	1.00	0.98
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3428	1770	3372	1770	3417	1770	3417	1770	3403	1770	3403
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3428	1770	3372	1770	3417	1770	3417	1770	3403	1770	3403
Volume (vph)	480	650	110	140	820	320	120	650	140	320	1150	220
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	677	115	146	854	333	125	677	146	333	1198	229
RTOR Reduction (vph)	0	15	0	0	46	0	0	20	0	0	17	0
Lane Group Flow (vph)	479	777	0	146	1141	0	125	803	0	333	1410	0
Confl. Peds. (#/hr)	6	24	24	6	36	6	36	28	28	28	36	36
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Permitted Phases												
Actuated Green, G (s)	13.0	28.4	10.1	25.5	9.6	23.5	11.0	24.9				
Effective Green, g (s)	12.5	29.4	9.6	26.5	9.1	24.5	10.5	25.9				
Actuated g/C Ratio	0.14	0.33	0.11	0.29	0.10	0.27	0.12	0.29				
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	477	1120	189	993	179	930	207	979				
v/s Ratio Prot	c0.14	c0.23	0.08	c0.34	0.07	0.23	c0.19	c0.41				
v/c Ratio	1.00	0.69	0.77	1.15	0.70	0.86	1.61	1.44				
Uniform Delay, d1	38.8	26.4	39.1	31.8	39.1	31.2	39.8	32.0				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.19	0.86				
Incremental Delay, d2	42.2	1.5	16.2	79.0	9.2	10.4	276.0	198.6				
Delay (s)	81.0	27.9	55.3	110.7	48.3	41.6	323.2	226.2				
Level of Service	F	C	E	F	D	D	F	F				
Approach Delay (s)	47.9		104.7		42.5		244.5					
Approach LOS	D		F		D		F					
Intersection Summary												
HCM Average Control Delay	126.3 HCM Level of Service F											
HCM Volume to Capacity ratio	1.30											
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	105.5% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT	TT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.93	1.00	0.99	1.00	0.99
Frbp, ped/bikes	1.00	0.86	1.00	0.99	1.00	0.99	1.00	0.93	1.00	0.95	1.00	0.99
Ftbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.98	1.00	0.98
Fit Protected	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.97	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3433	3428	1770	3372	1770	3417	1770	3417	1770	3403	1770	3403
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3428	1770	3372	1770	3417	1770	3417	1770	3403	1770	3403
Volume (vph)	0	0	10	0	0	0	10	360	320	1600	660	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	11	0	0	0	11	379	337	1684	695	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	701	0	1684	758	0
Confl. Peds. (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	0.0	0.0	8.0	0.0	8.0	0.0	8.0	29.0	45.0	0.0	45.0	0.0
Effective Green, g (s)	0.0	0.0	8.0	0.0	8.0	0.0	8.0	29.0	45.0	0.0	45.0	0.0
Actuated g/C Ratio	0.00	0.00	0.18	0.00	0.18	0.00	0.18	0.64	1.00	0.00	1.00	0.00
Clearance Time (s)			4.0		4.0		4.0	2.0	4.0		2.0	
Lane Grp Cap (vph)	0	0	548	0	548	0	2212	3495				
v/s Ratio Prot			c0.23		c0.23		c0.49	0.22				
v/c Ratio	0.00	0.00	10.53dr	0.00	10.53dr	0.00	0.76	0.22				
Uniform Delay, d1	22.5	22.5	18.5	0.0	18.5	0.0	5.6	0.0				
Progression Factor	1.00	1.00	0.80	1.00	0.80	1.00	1.00	1.00				
Incremental Delay, d2	0.0	0.0	138.0	0.0	138.0	0.0	2.5	0.1				
Delay (s)	22.5	22.5	152.7	0.0	152.7	0.0	8.1	0.1				
Level of Service	C	C	F	A	F	A	A	A				
Approach Delay (s)	22.5		152.7		152.7		5.6					
Approach LOS	C		F	A	F	A	A					
Intersection Summary												
HCM Average Control Delay	39.3 HCM Level of Service D											
HCM Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	79.5% ICU Level of Service D											
Analysis Period (min)	15											
d Deract Right Lane. Recode with 1 through lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.99	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.98	1.00
Flt	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fit Protected	1770	3370	1763	3455	1768	1837	1745	1815	1745	1815	1745
Satd. Flow (prot)	0.17	1.00	0.19	1.00	0.24	1.00	0.45	1.00	0.45	1.00	0.45
Fit Permitted	324	3370	353	3455	449	1837	828	1815	828	1815	828
Satd. Flow (perm)	180	500	190	90	920	110	160	380	30	200	600
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	189	526	200	95	968	116	168	400	32	211	632
Adj. Flow (vph)	0	49	0	0	11	0	0	3	0	0	3
RTOR Reduction (vph)	189	677	0	95	1073	0	168	429	0	211	745
Lane Group Flow (vph)	30	12	12	30	6	54	54	54	54	54	6
Confl. Peds. (#/hr)											
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	93	969	101	983	275	1125	507	1112	507	1112	60.41
v/s Ratio Prot	0.20	0.20	0.20	0.31	0.31	0.23	0.23	0.23	0.23	0.23	0.23
v/s Ratio Perm	0.27	0.27	0.27	0.37	0.37	0.37	0.37	0.37	0.37	0.37	0.25
v/c Ratio	2.03	0.70	0.94	1.08	0.61	0.38	0.61	0.38	0.61	0.42	0.67
Uniform Delay, d1	28.5	25.4	27.8	28.5	9.6	7.8	8.1	10.2	8.1	10.2	10.2
Progression Factor	1.00	1.00	0.88	0.90	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	489.9	4.2	65.2	50.1	9.7	1.0	2.5	3.2	2.5	3.2	3.2
Delay (s)	528.4	29.6	89.8	75.7	19.3	8.8	10.6	13.4	10.6	13.4	13.4
Level of Service	F	C	F	E	B	A	B	B	B	B	B
Approach Delay (s)	132.6	132.6	132.6	76.8	76.8	11.8	11.8	12.8	11.8	12.8	12.8
Approach LOS	F	F	F	E	E	B	B	B	B	B	B

Intersection Summary	63.3	HCM Level of Service	E
HCM Average Control Delay	63.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	103.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.98	1.00
Flt	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	0.99	0.99
Fit Protected	1766	3407	1748	3496	1748	3496	3403	3427	3403	3427	3403
Satd. Flow (prot)	0.17	1.00	0.31	1.00	0.31	1.00	0.65	0.71	0.65	0.71	0.65
Fit Permitted	314	3407	576	3496	576	3496	2241	2472	2241	2472	2241
Satd. Flow (perm)	80	550	130	60	940	70	120	280	70	120	380
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	84	579	137	63	989	74	126	285	74	126	400
Adj. Flow (vph)	0	26	0	0	7	0	0	18	0	0	14
RTOR Reduction (vph)	84	690	0	63	1056	0	0	477	0	0	586
Lane Group Flow (vph)	18	54	54	18	4	18	18	18	18	18	4
Confl. Peds. (#/hr)											
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	39.0	39.0	39.0	39.0	39.0	39.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.41	0.49	0.41	0.41
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	153	1661	281	1704	c0.30	924	924	1020	924	1020	1020
v/s Ratio Prot	0.27	0.20	0.20	0.11	0.11	0.21	0.21	0.21	0.21	0.21	0.24
v/s Ratio Perm	0.55	0.42	0.22	0.62	0.62	0.52	0.52	0.57	0.52	0.57	0.57
Uniform Delay, d1	14.3	13.2	11.8	15.1	15.1	17.5	17.5	18.1	17.5	18.1	18.1
Progression Factor	1.00	0.91	1.35	1.45	1.45	0.57	0.57	1.00	0.57	1.00	1.00
Incremental Delay, d2	11.0	0.6	1.5	1.4	1.4	1.4	1.4	2.4	1.4	2.4	2.4
Delay (s)	25.0	12.6	17.4	23.2	23.2	11.4	11.4	20.5	11.4	20.5	20.5
Level of Service	C	B	B	C	C	B	B	C	B	C	C
Approach Delay (s)	13.9	13.9	22.9	22.9	22.9	11.4	11.4	20.5	11.4	20.5	20.5
Approach LOS	B	B	C	C	C	B	B	C	B	C	C

Intersection Summary	18.1	HCM Level of Service	B
HCM Average Control Delay	18.1	HCM Level of Service	B
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.8%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.99	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1765	3498	1745	3481	1745	3481	3390	3390	3424	3424	3424	3424	3424
Flt Permitted	0.19	1.00	0.31	1.00	0.31	1.00	0.80	0.80	0.72	0.80	0.72	0.80	0.72
Satd. Flow (perm)	348	3498	577	3481	577	3481	2722	2722	2504	2504	2504	2504	2504
Volume (vph)	50	660	40	90	90	90	50	270	80	150	470	80	80
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	688	42	94	948	94	52	281	83	156	490	83	83
RTOR Reduction (vph)	0	5	0	0	0	0	0	28	0	0	12	0	0
Lane Group Flow (vph)	52	725	0	94	1033	0	0	388	0	0	717	0	0
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22	22
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6			6
Permitted Phases	4			8			2			6			6
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	178	1793	296	1784	1784	1784	1065	1065	970	970	970	970	970
v/s Ratio Prot	0.21			c0.30									
v/s Ratio Perm	0.15	0.16	0.16	0.16	0.14	0.14	c0.29	c0.29	0.29	0.29	0.29	0.29	0.29
v/c Ratio	0.29	0.40	0.32	0.58	0.37	0.37	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Uniform Delay, d1	11.2	12.0	11.4	13.5	17.5	17.5	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Progression Factor	1.19	1.20	1.00	1.00	0.66	0.66	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.7	0.6	2.8	1.4	0.9	0.9	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Delay (s)	17.0	15.0	14.2	14.9	12.6	12.6	26.1	26.1	26.1	26.1	26.1	26.1	26.1
Level of Service	B	B	B	B	B	B	C	C	C	C	C	C	C
Approach Delay (s)	15.2		14.8		12.6		26.1	26.1	26.1	26.1	26.1	26.1	26.1
Approach LOS	B		B		B		C	C	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	17.3 HCM Level of Service B
HCM Volume to Capacity ratio	0.65
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	101.7% ICU Level of Service G
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2030 AM
 1/11/2008

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Lane Configurations	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	0.99	1.00
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	3433	3433	1770	3539	1770	3539	1770	3539
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (perm)	3433	3433	1770	3539	1770	3539	1770	3539
Volume (vph)	810	60	100	1070	0	0	0	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	853	63	105	1126	0	0	0	0
RTOR Reduction (vph)	9	0	0	0	0	0	0	0
Lane Group Flow (vph)	907	0	105	1126	0	0	0	0
Confl. Peds. (#/hr)	146	266	146	266	146	266	146	266
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4			3			8	
Permitted Phases	4			3			8	
Actuated Green, G (s)	22.0			30.0			60.0	
Effective Green, g (s)	22.0			30.0			60.0	
Actuated g/C Ratio	0.37			0.50			1.00	
Clearance Time (s)	4.0			4.0			4.0	
Lane Grp Cap (vph)	1259			885			3539	
v/s Ratio Prot	c0.26			0.06			c0.32	
v/s Ratio Perm				0.12			0.32	
v/c Ratio	0.72			0.12			0.32	
Uniform Delay, d1	16.4			8.0			0.0	
Progression Factor	1.00			1.00			1.00	
Incremental Delay, d2	3.6			0.3			0.2	
Delay (s)	19.9			8.2			0.2	
Level of Service	B			A			A	
Approach Delay (s)	19.9			0.9			0.0	
Approach LOS	B			A			A	

Intersection Summary	
HCM Average Control Delay	9.0 HCM Level of Service A
HCM Volume to Capacity ratio	0.48
Actuated Cycle Length (s)	60.0 Sum of lost time (s) 4.0
Intersection Capacity Utilization	37.0% ICU Level of Service A
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
11: 40th St. & BART parking

2030 AM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	790	20	0	1170	0	20
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	832	21	0	1232	0	21
Pedestrians				123	123	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				10	10	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	81			406		
pX, platoon unblocked	0.77			0.88	0.77	
VC, conflicting volume	976			1581	672	
VC1, stage 1 cont vol						
VC2, stage 2 cont vol				677	819	285
vCu, unblocked vol				4.1	6.8	6.9
IC, single (s)						
IC, 2 stage (s)				2.2	3.5	3.3
tF (s)				100	100	95
p0 queue free %				633	247	444
cM capacity (veh/h)						
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	554	298	616	616	21	21
Volume Left	0	0	0	0	0	0
Volume Right	0	21	0	0	21	21
cSH	1700	1700	1700	1700	444	444
Volume to Capacity	0.33	0.18	0.36	0.36	0.05	0.05
Queue Length 95th (ft)	0	0	0	0	0	4
Control Delay (s)	0.0	0.0	0.0	0.0	13.5	B
Lane LOS					B	B
Approach Delay (s)	0.0	0.0	0.0	13.5		
Approach LOS				B		

Intersection Summary		
Average Delay	0.1	
Intersection Capacity Utilization	52.2%	ICU Level of Service A
Analysis Period (min)	15	

HCM Unsignalized Intersection Capacity Analysis
12: 40th St. & BART parking

2030 AM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	800	10	0	1170	0	60
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	833	10	0	1219	0	62
Pedestrians				123	123	
Lane Width (ft)				12.0	12.0	
Walking Speed (ft/s)				4.0	4.0	
Percent Blockage				10	10	
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)	298			189		
pX, platoon unblocked	0.79			0.89	0.79	
VC, conflicting volume	967			1571	668	
VC1, stage 1 cont vol						
VC2, stage 2 cont vol				688	803	309
vCu, unblocked vol				4.1	6.8	6.9
IC, single (s)						
IC, 2 stage (s)				2.2	3.5	3.3
tF (s)				100	100	86
p0 queue free %				638	257	436
cM capacity (veh/h)						
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	556	288	609	609	62	62
Volume Left	0	0	0	0	0	0
Volume Right	0	10	0	0	62	62
cSH	1700	1700	1700	1700	436	436
Volume to Capacity	0.33	0.17	0.36	0.36	0.14	0.14
Queue Length 95th (ft)	0	0	0	0	0	12
Control Delay (s)	0.0	0.0	0.0	0.0	14.6	B
Lane LOS					B	B
Approach Delay (s)	0.0	0.0	0.0	14.6		
Approach LOS				B		

Intersection Summary		
Average Delay	0.4	
Intersection Capacity Utilization	52.2%	ICU Level of Service A
Analysis Period (min)	15	

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.93	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.95
Frbp, ped/bikes	0.97	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00
Flt	1.00	0.94	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1718	3083	1692	3413	1770	3461	1770	3461	1770	3343	1770	3343
Flt Permitted	0.15	1.00	0.20	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	278	3083	351	3413	1770	3461	1770	3461	1770	3343	1770	3343
Volume (vph)	160	420	280	110	710	90	120	460	40	100	1270	340
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	168	442	295	116	747	95	126	484	42	105	1337	358
RTOR Reduction (vph)	0	135	0	0	12	0	0	7	0	0	26	0
Lane Group Flow (vph)	168	602	0	116	830	0	126	519	0	105	1669	0
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	92	92
Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	8	8	5	2	1	6	6	6	6	6	6
Permitted Phases	4	8	8	5	2	1	6	6	6	6	6	6
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	25.5	9.1	37.9	8.1	36.9	8.1	36.9
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	26.0	9.6	38.4	8.6	37.4	8.6	37.4
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.11	0.45	0.10	0.44	0.10	0.44
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	85	943	107	1044	200	1564	179	1471	0.06	c0.50	0.06	c0.50
v/s Ratio Prot	0.20	0.20	0.24	0.24	0.24	0.24	c0.07	0.15	0.06	c0.50	0.06	c0.50
v/s Ratio Perm	c0.60	0.33	0.33	0.33	0.33	0.33	0.63	0.33	0.59	1.13	0.59	1.13
v/c Ratio	1.98	0.64	1.08	0.80	0.63	0.33	0.63	0.33	0.59	1.13	0.59	1.13
Uniform Delay, d1	29.5	25.4	29.5	27.1	36.0	15.0	36.0	15.0	36.5	23.8	36.5	23.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.88	1.00	1.00	1.00	1.00
Incremental Delay, d2	478.8	1.1	111.5	4.0	3.9	0.5	3.9	0.5	3.1	69.6	3.1	69.6
Delay (s)	508.3	26.5	141.0	31.0	48.0	13.7	48.0	13.7	39.6	93.4	39.6	93.4
Level of Service	F	C	F	C	D	B	D	B	D	F	D	F
Approach Delay (s)	115.9	F	44.3	D	20.3	C	20.3	C	20.3	F	90.3	F
Approach LOS	F	F	D	D	D	C	D	C	D	F	F	F

Intersection Summary	
HCM Average Control Delay	74.9
HCM Volume to Capacity ratio	1.37
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	99.1%
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
 14: Apgar St. & Telegraph Ave. 2030 AM
 1/11/2008

Movement	EBL	EBR	NBL	NBT	SBL	SBR
Lane Configurations	W	W	Free	Free	Free	Free
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	10	20	40	640	1610	30
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	11	21	42	674	1695	32
Pedestrians	100	100	100	100	100	100
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	8	8	8	8	8	8
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	0.63	0.60	0.60	0.60	0.60	0.60
Upstream signal (ft)	2332	1063	1826	1826	1826	1826
pX, platoon unblocked	0.63	0.60	0.60	0.60	0.60	0.60
VC, conflicting volume	2332	1063	1826	1826	1826	1826
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	2297	445	1712	1712	1712	1712
IC, single (s)	6.8	6.9	4.1	4.1	4.1	4.1
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2	2.2	2.2	2.2
p0 queue free %	23	93	79	79	79	79
cM capacity (veh/h)	14	284	203	203	203	203
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	32	42	337	337	1130	596
Volume Left	11	42	0	0	0	0
Volume Right	21	0	0	0	0	32
cSH	37	203	1700	1700	1700	1700
Volume to Capacity	0.85	0.21	0.20	0.20	0.66	0.35
Queue Length 95th (ft)	78	19	0	0	0	0
Control Delay (s)	261.9	27.4	0.0	0.0	0.0	0.0
Lane LOS	F	D	D	D	D	D
Approach Delay (s)	261.9	1.6	1.6	1.6	0.0	0.0
Approach LOS	F	F	F	F	F	F

Intersection Summary	
Average Delay	3.8
Intersection Capacity Utilization	65.3%
Analysis Period (min)	15
ICU Level of Service	C

HCM Unsignalized Intersection Capacity Analysis
15: 38th St. & Telegraph Ave.

2030 AM
1/11/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	↑↑	↑↑	↓	↓
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	30	650	20	20	1610
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	32	684	21	21	1695
Pedestrians	34	33				34
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	3	3	3	3	3	3
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)						
Upstream signal (ft)			230			791
pX, platoon unblocked	0.66	0.92				0.92
VC, conflicting volume	1651	421				739
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	1099	279				626
IC, single (s)	6.8	6.9				4.1
IC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	83	95				98
cM capacity (veh/h)	126	622				848
Direction, Lane #	WB 1	NB 2	NB 2	SB 1	SB 2	SB 3
Volume Total	53	456	249	21	847	847
Volume Left	21	0	0	21	0	0
Volume Right	32	0	21	0	0	0
cSH	242	1700	1700	848	1700	1700
Volume to Capacity	0.22	0.27	0.15	0.02	0.50	0.50
Queue Length 95th (ft)	20	0	0	2	0	0
Control Delay (s)	24.0	0.0	0.0	9.4	0.0	0.0
Lane LOS	C			A		
Approach Delay (s)	24.0	0.0	0.1			
Approach LOS	C			B		

Intersection Summary		
Average Delay	61.7%	ICU Level of Service
Intersection Capacity Utilization	0.6	B
Analysis Period (min)	15	

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 AM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑	↑↑↑	↑↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↓	↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	0.98	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	0.99	1.00	1.00	0.98	1.00	0.97	1.00	0.96	1.00	0.96	1.00
Flt Protected	0.99	0.95	1.00	0.95	1.00	0.99	0.99	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4980	1763	3448	1750	3448	1750	3448	1750	3448	1750	3448	1750
Flt Permitted	0.65	0.25	1.00	0.40	1.00	0.40	1.00	0.40	1.00	0.40	1.00	1.00
Satd. Flow (perm)	3272	459	3448	180	3448	180	3448	180	3448	180	3448	1763
Volume (vph)	210	700	50	70	1080	190	100	180	90	200	490	200
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	737	53	74	1137	200	105	189	95	211	516	211
RTOR Reduction (vph)	0	7	0	0	17	0	0	13	0	0	18	0
Lane Group Flow (vph)	0	1004	0	74	1320	0	0	376	0	211	709	0
Conf. Peds. (#/hr)	24	18	18	24	24	24	24	48	48	48	48	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	2	2	6	6	6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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
Lane Grp Cap (vph)	2002	281	2109	c0.38	53	213	519	0.40	0.40	0.40	0.40	0.40
v/s Ratio Prot	0.31	0.16	0.16	c2.08	7.09	0.99	1.37	0.29	0.29	0.29	0.29	0.29
v/s Ratio Perm	1.366d	0.26	0.63	7.09	0.99	1.37	0.29	0.29	0.29	0.29	0.29	0.29
Uniform Delay, d1	9.2	7.6	10.4	30.0	30.0	29.9	30.0	30.0	30.0	29.9	30.0	30.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	2.3	1.4	2777.9	59.3	177.1	177.1	177.1	177.1	177.1	177.1	177.1
Delay (s)	10.1	9.9	11.8	2807.9	89.2	207.1	207.1	207.1	207.1	207.1	207.1	207.1
Level of Service	B	A	B	F	F	F	F	F	F	F	F	F
Approach Delay (s)	10.1	11.7	2807.9	180.6	180.6	180.6	180.6	180.6	180.6	180.6	180.6	180.6
Approach LOS	B	B	F	F	F	F	F	F	F	F	F	F

Intersection Summary		
HCM Average Control Delay	343.7	HCM Level of Service
HCM Volume to Capacity ratio	2.73	F
Actuated Cycle Length (s)	85.0	Sum of lost time (s)
Intersection Capacity Utilization	158.4%	ICU Level of Service
Analysis Period (min)	15	H

d1 Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.97
Flt	1.00	1.00	1.00	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00
Fit Protected	5033	5008	5008	1762	1792	1755	1802	1755	1802	1755	1802	1755
Satd. Flow (prot)	0.74	0.81	0.81	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20	0.20
Fit Permitted	3730	4071	4071	362	1792	360	1802	360	1802	360	1802	360
Satd. Flow (perm)	80	900	30	70	1170	110	70	300	80	150	350	80
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	84	947	32	74	1232	116	74	316	84	158	368	84
Adj. Flow (vph)	0	4	0	0	13	0	0	12	0	0	10	0
RTOR Reduction (vph)	0	1059	0	0	1409	0	74	388	0	158	442	0
Lane Group Flow (vph)	18	18	18	12	12	12	18	18	18	18	18	12
Confl. Peds. (#/hr)	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Turn Type	4	4	4	8	8	8	2	2	6	6	6	6
Protected Phases	4	4	4	8	8	8	2	2	6	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	6	6	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2401	2401	2401	2621	2621	2621	93	459	92	462	462	2401
v/s Ratio Prot	0.28	0.35	0.35	0.20	0.20	0.20	0.22	0.22	0.44	0.44	0.25	0.25
v/s Ratio Perm	0.44	0.44	0.44	0.54	0.54	0.54	0.80	0.85	1.72	1.72	0.96	0.96
v/c Ratio	7.1	7.1	7.1	7.8	7.8	7.8	27.8	28.2	29.8	29.8	29.3	29.3
Uniform Delay, d1	1.00	1.00	1.00	0.56	0.56	0.56	1.00	1.00	1.20	1.20	1.20	1.20
Progression Factor	0.6	0.6	0.6	0.6	0.6	0.6	49.1	17.2	359.8	29.7	359.8	29.7
Incremental Delay, d2	7.7	7.7	7.7	5.0	5.0	5.0	76.9	45.5	395.3	65.0	395.3	65.0
Delay (s)	A	A	A	A	A	A	E	D	F	E	E	E
Level of Service	A	A	A	A	A	A	E	D	F	E	E	E
Approach Delay (s)	7.7	7.7	7.7	5.0	5.0	5.0	50.4	50.4	150.6	150.6	150.6	150.6
Approach LOS	A	A	A	A	A	A	D	D	F	F	F	F

Intersection Summary	
HCM Average Control Delay	36.7 HCM Level of Service
HCM Volume to Capacity ratio	0.87
Actuated Cycle Length (s)	80.0 Sum of lost time (s)
Intersection Capacity Utilization	88.9% ICU Level of Service
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99
Flt	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fit Protected	5023	5023	5023	4971	4971	3408	3456	3456	3456	3456	3456	3456
Satd. Flow (prot)	0.77	0.77	0.77	0.80	0.80	0.73	0.85	0.85	0.85	0.85	0.85	0.85
Fit Permitted	3880	3880	3880	4004	4004	2491	2959	2959	2959	2959	2959	2959
Satd. Flow (perm)	60	1020	60	70	1270	180	40	170	40	80	450	50
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	63	1074	63	74	1337	189	42	179	42	84	474	53
Adj. Flow (vph)	0	7	0	0	21	0	0	19	0	0	9	0
RTOR Reduction (vph)	0	1193	0	0	1579	0	0	244	0	0	602	0
Lane Group Flow (vph)	17	17	17	19	19	17	12	12	16	16	12	12
Confl. Peds. (#/hr)	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Turn Type	4	4	4	8	8	8	2	2	6	6	6	6
Protected Phases	4	4	4	8	8	8	2	2	6	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	6	6	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2498	2498	2498	2578	2578	2578	638	638	638	638	638	2498
v/s Ratio Prot	0.31	0.39	0.39	0.20	0.20	0.20	0.10	0.10	0.20	0.20	0.20	0.20
v/s Ratio Perm	0.48	0.48	0.48	0.61	0.61	0.61	0.38	0.38	0.79	0.79	0.79	0.79
v/c Ratio	7.3	7.3	7.3	8.4	8.4	8.4	24.5	24.5	27.8	27.8	27.8	27.8
Uniform Delay, d1	0.66	0.66	0.66	1.00	1.00	1.00	1.00	1.00	0.34	0.34	0.34	0.34
Progression Factor	0.5	0.5	0.5	1.1	1.1	1.1	1.7	1.7	7.8	7.8	7.8	7.8
Incremental Delay, d2	5.3	5.3	5.3	9.5	9.5	9.5	26.3	26.3	17.3	17.3	17.3	17.3
Delay (s)	A	A	A	A	A	A	C	C	B	B	B	B
Level of Service	A	A	A	A	A	A	C	C	B	B	B	B
Approach Delay (s)	5.3	5.3	5.3	9.5	9.5	9.5	26.3	26.3	17.3	17.3	17.3	17.3
Approach LOS	A	A	A	A	A	A	C	C	B	B	B	B

Intersection Summary	
HCM Average Control Delay	10.6 HCM Level of Service
HCM Volume to Capacity ratio	0.66
Actuated Cycle Length (s)	80.0 Sum of lost time (s)
Intersection Capacity Utilization	122.1% ICU Level of Service
Analysis Period (min)	15
c Critical Lane Group	

HCM Unsignalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2030 AM
1/25/2008



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	1250	1370	30	0	150
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	1316	1442	32	0	158
Pedestrians	98				98	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	8				8	
Right turn flare (veh)					None	
Median type					None	
Median storage (veh)						
Upstream signal (ft)	698	473				
pX, platoon unblocked	0.86				0.88	0.86
VC, conflicting volume	1572				1979	677
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
VCU, unblocked vol	1330				1584	283
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	69
cM capacity (veh/h)	404				80	515
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3
Volume Total	439	439	439	481	481	481
Volume Left	0	0	0	0	0	0
Volume Right	0	0	0	0	0	0
cSH	1700	1700	1700	1700	1700	1700
Volume to Capacity	0.26	0.26	0.26	0.28	0.28	0.28
Queue Length 95th (ft)	0	0	0	0	0	0
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Lane LOS	C	C	C	C	C	C
Approach Delay (s)	0.0			0.0		
Approach LOS				C		
Intersection Summary						
Average Delay	0.8					
Intersection Capacity Utilization	48.3%					
Analysis Period (min)	15					
ICU Level of Service	A					

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

2030 AM
1/25/2008



Movement	EBL	EBT	WBL	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.98	0.98	0.98	0.98	0.98	0.98
Fit Protected	1.00	1.00	0.99	0.99	1.00	1.00
Satd. Flow (prot)	4940	4917	4917	4917	1744	3452
Fit Permitted	0.68	0.64	0.64	0.13	1.00	0.40
Satd. Flow (perm)	3365	3182	3182	242	3406	734
Volume (vph)	100	980	180	200	100	370
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	105	1032	189	211	105	389
RTOR Reduction (vph)	0	23	0	0	26	0
Lane Group Flow (vph)	0	1303	0	0	1585	0
Conf. Peds. (#/hr)	40				40	25
Turn Type	Perm	Perm	pm+pt	Perm	Perm	Perm
Protected Phases	4	4	3	8	2	2
Permitted Phases	4	4	8	2	2	6
Actuated Green, G (s)	44.7	44.7	44.7	29.8	29.8	29.8
Effective Green, g (s)	46.2	46.2	46.2	30.8	30.8	30.8
Actuated g/C Ratio	0.54	0.54	0.54	0.36	0.36	0.36
Clearance Time (s)	5.5	5.5	5.5	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	1829	1730	1730	88	1234	266
v/s Ratio Prot	0.39	0.39	0.39	0.43	0.14	0.39
v/s Ratio Perm	0.71	0.71	0.71	1.19	0.37	0.52
v/c Ratio	14.4	17.6	17.6	27.1	20.0	1.42
Uniform Delay, d1	1.00	1.00	1.00	1.27	1.29	27.1
Progression Factor	1.1	1.1	1.1	155.4	0.8	193.2
Incremental Delay, d2	15.6	15.6	15.6	189.8	26.6	224.0
Delay (s)	B	B	B	C	C	F
Level of Service	B	B	B	C	C	F
Approach Delay (s)	15.6	25.5	25.5	55.7	55.7	97.9
Approach LOS	B	C	C	E	E	F
Intersection Summary						
HCM Average Control Delay	50.2					
HCM Volume to Capacity ratio	1.12					
Actuated Cycle Length (s)	85.0					
Intersection Capacity Utilization	111.2%					
Analysis Period (min)	15					
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.	H					
c Critical Lane Group	H					

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←←←	←←←	←←←	←←←	←←←	←←←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.88	0.88	0.97	0.97	0.97	0.97
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.97	0.97	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	0.85	0.85	0.96	0.96	0.96	0.96
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.98	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5060	5005	5005	5005	5005	5005	1769	1395	1602	1602	1602	1602
Flt Permitted	0.83	0.83	0.83	0.83	0.83	0.83	0.84	1.00	0.81	0.81	0.81	0.81
Satd. Flow (perm)	4209	4111	4111	4111	4111	4111	1517	1395	1338	1338	1338	1338
Volume (vph)	40	1400	20	50	1470	90	30	40	30	100	40	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	1474	21	53	1547	95	32	42	32	105	42	63
RTOR Reduction (vph)	0	2	0	0	8	0	0	0	0	18	0	16
Lane Group Flow (vph)	0	1535	0	0	1687	0	0	74	14	0	194	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	2	2	6
Permitted Phases	4	8	8	8	8	8	2	2	2	2	2	6
Actuated Green, G (s)	48.0	48.0	48.0	48.0	48.0	48.0	23.0	23.0	23.0	23.0	23.0	23.0
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lane Grp Cap (vph)	2552	2492	2492	2492	2492	2492	446	410	393	393	393	393
v/s Ratio Prot	0.36	c0.41	c0.41	c0.41	c0.41	c0.41	0.05	0.01	c0.15	c0.15	c0.15	c0.15
v/s Ratio Perm	0.60	0.68	0.68	0.68	0.68	0.68	0.17	0.03	0.49	0.49	0.49	0.49
v/c Ratio	9.8	10.5	10.5	10.5	10.5	10.5	21.0	20.1	23.3	23.3	23.3	23.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.1	1.1	1.1	1.1	1.1	1.1	0.8	0.2	4.4	4.4	4.4	4.4
Incremental Delay, d2	10.8	12.0	12.0	12.0	12.0	12.0	21.8	20.3	27.7	27.7	27.7	27.7
Delay (s)	B	B	B	B	B	B	C	C	C	C	C	C
Level of Service	B	B	B	B	B	B	C	C	C	C	C	C
Approach Delay (s)	10.8	12.0	12.0	12.0	12.0	12.0	21.3	20.3	27.7	27.7	27.7	27.7
Approach LOS	B	B	B	B	B	B	C	C	C	C	C	C

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Average Control Delay	12.7	HCM Level of Service										
HCM Volume to Capacity ratio	0.62	B										
Actuated Cycle Length (s)	80.0	Sum of lost time (s)										
Intersection Capacity Utilization	93.9%	8.0										
Analysis Period (min)	15	F										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←←←	←←←	←←←	←←←	←←←	←←←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	0.91	1.00	0.91	0.91	1.00	0.95	1.00	1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.96	1.00	1.00	0.96	1.00
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	0.98	1.00	0.96	0.96	1.00	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4923	4923	1770	4839	4839	1770	3539	1515	1770	3539	1523
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4923	4923	1770	4839	4839	1770	3539	1515	1770	3539	1523
Volume (vph)	170	1200	170	210	1140	380	120	420	130	390	1440	280
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1263	179	221	1200	400	126	442	137	411	1516	263
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	31	0	0	21
Lane Group Flow (vph)	179	1427	0	221	1550	0	126	442	106	411	1516	242
Confl. Peds. (#/hr)	66	66	66	66	66	66	23	23	38	38	26	26
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	7	4	4	5	2	3	1	6	7
Permitted Phases	7	4	4	7	4	4	5	2	3	1	6	7
Actuated Green, G (s)	12.0	32.0	32.0	15.0	35.0	35.0	10.6	28.0	43.0	29.0	46.4	58.4
Effective Green, g (s)	11.0	33.0	33.0	14.0	36.0	36.0	9.6	29.0	43.0	28.0	47.4	58.4
Actuated g/C Ratio	0.09	0.28	0.28	0.12	0.30	0.30	0.08	0.24	0.36	0.23	0.39	0.49
Clearance Time (s)	3.0	5.0	5.0	3.0	5.0	5.0	3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	1354	1354	207	1452	1452	142	855	593	413	1398	792
v/s Ratio Prot	0.10	0.29	0.29	c0.12	c0.32	c0.32	0.07	0.12	0.02	c0.23	c0.43	0.03
v/s Ratio Perm	1.10	1.05	1.05	1.07	1.07	1.07	0.89	0.52	0.18	1.00	1.08	0.31
Uniform Delay, d1	54.5	43.5	43.5	53.0	42.0	42.0	54.7	39.4	26.4	45.9	36.3	18.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	101.6	40.0	40.0	81.6	44.0	44.0	42.6	2.2	0.1	42.7	50.4	0.1
Delay (s)	156.1	83.5	83.5	134.6	86.0	86.0	97.2	41.7	26.5	88.6	86.7	18.7
Level of Service	F	F	F	F	F	F	F	D	C	F	F	B
Approach Delay (s)	91.5	91.9	91.9	91.9	91.9	91.9	48.6	48.6	78.9	78.9	78.9	78.9
Approach LOS	F	F	F	F	F	F	D	D	D	D	D	E

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
HCM Average Control Delay	82.5	HCM Level of Service										
HCM Volume to Capacity ratio	1.10	F										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	100.3%	16.0										
Analysis Period (min)	15	G										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	0.94	0.96	0.96	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00
Flpb, ped/bikes	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.98	0.98	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1607	1636	1636	1731	3427	1654	3472	1654	3472	1654	3472	1654
Flt Permitted	0.72	0.78	0.78	0.18	1.00	0.39	1.00	0.39	1.00	0.39	1.00	0.39
Satd. Flow (perm)	1175	1305	1305	320	3427	678	3472	678	3472	678	3472	678
Volume (vph)	60	50	50	70	80	60	80	570	60	50	1170	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	53	53	74	84	63	84	600	63	53	1232	74
RTOR Reduction (vph)	0	22	0	0	20	0	0	7	0	0	4	0
Lane Group Flow (vph)	0	147	0	0	201	0	84	656	0	53	1302	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7	15.7
Effective Green, g (s)	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2	15.2
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18	0.18
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	210	233	233	233	2492	493	2524	493	2524	493	2524	493
v/s Ratio Prot	0.12	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15	0.15
v/s Ratio Perm	0.70	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Uniform Delay, d1	32.8	33.9	33.9	33.9	33.9	33.9	33.9	33.9	33.9	33.9	33.9	33.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.9	25.8	25.8	4.3	0.3	4.3	0.3	0.0	0.1	4.3	0.3	0.1
Delay (s)	40.7	59.7	59.7	8.6	4.2	8.6	4.2	3.4	4.6	8.6	4.2	4.6
Level of Service	D	E	E	A	A	A	A	A	A	A	A	A
Approach Delay (s)	40.7	59.7	59.7	59.7	59.7	59.7	59.7	4.7	4.5	59.7	59.7	4.5
Approach LOS	D	D	D	E	E	E	E	A	A	E	E	A

Intersection Summary	
HCM Average Control Delay	11.9
HCM Volume to Capacity ratio	0.58
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	69.2%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

2030 AM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.98	1.00	0.95	1.00	0.97
Flpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.97	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3379	1770	3276	1770	3276	1746	3409	1770	3276	1683	3335
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.12	1.00	0.95	1.00	0.45	1.00
Satd. Flow (perm)	1770	3379	1770	3276	1770	3276	216	3409	1770	3276	800	3335
Volume (vph)	270	500	100	140	710	190	70	350	60	160	1000	220
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	526	105	147	747	200	74	368	63	168	1053	232
RTOR Reduction (vph)	0	18	0	0	28	0	0	16	0	0	21	0
Lane Group Flow (vph)	284	613	0	147	919	0	74	415	0	168	1264	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	4	3	8	8	2	2	2	2	6	6
Permitted Phases	7	4	4	3	8	8	2	2	2	2	6	6
Actuated Green, G (s)	16.5	28.0	11.0	22.5	11.0	22.5	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	17.0	27.5	11.5	22.0	11.5	22.0	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.20	0.32	0.14	0.26	0.14	0.26	0.40	0.40	0.40	0.40	0.40	0.40
Clearance Time (s)	4.5	3.5	4.5	3.5	4.5	3.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	354	1093	239	848	239	848	86	1364	320	1334	320	1334
v/s Ratio Prot	0.16	0.18	0.08	0.28	0.08	0.28	0.12	0.12	0.12	0.12	0.12	0.12
v/s Ratio Perm	0.80	0.56	0.62	1.08	0.62	1.08	0.86	0.30	0.86	0.30	0.53	0.95
Uniform Delay, d1	32.4	23.8	34.7	31.5	23.3	31.5	17.4	17.4	19.4	24.6	19.4	24.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	11.7	0.4	3.3	56.1	63.9	0.6	6.0	14.9	6.0	14.9	6.0	14.9
Delay (s)	44.1	24.2	37.9	87.6	87.3	18.0	25.4	39.6	25.4	39.6	25.4	39.6
Level of Service	D	C	D	F	D	F	B	C	D	C	D	D
Approach Delay (s)	30.3	30.3	30.3	80.9	80.9	80.9	28.2	37.9	28.2	37.9	28.2	37.9
Approach LOS	C	C	C	F	F	F	C	D	C	D	C	D

Intersection Summary	
HCM Average Control Delay	46.8
HCM Volume to Capacity ratio	0.95
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	95.2%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Lane Width	12	12	12	12	12	12	12	12	12	12	12	12	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.98	1.00	1.00	1.00	0.98	1.00	0.98	
Fltb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.93	1.00	0.93	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4933	1770	4960	2006	1987	1959	1915	1959	1915	1915	1915	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1770	4933	1770	4960	2006	1987	1959	1915	1959	1915	1915	1915	
Volume (vph)	350	1300	180	120	1070	170	200	250	100	160	280	280	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	368	1368	189	126	1126	179	211	263	105	168	295	295	
RTOR Reduction (vph)	0	18	0	0	21	0	0	15	0	0	37	0	
Lane Group Flow (vph)	368	1539	0	126	1284	0	211	353	0	168	553	0	
Confl. Peds. (#/hr)	32	32	32	4	12	4	12	24	24	24	12	0	
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	
Turn Type	Prot	4	4	Prot	8	8	pm pt	5	2	2	Perm	6	
Protected Phases	7	4	4	3	3	3	8	8	8	8	2	6	
Permitted Phases	7	4	4	3	3	3	8	8	8	8	2	6	
Actuated Green, G (s)	20.0	36.8	20.0	9.6	26.4	43.1	43.1	43.1	30.1	30.1	30.1	30.1	
Effective Green, g (s)	20.0	36.8	20.0	9.6	26.4	43.6	43.6	43.6	30.6	30.6	30.6	30.6	
Actuated g/C Ratio	0.20	0.37	0.10	0.10	0.26	0.44	0.44	0.44	0.31	0.31	0.31	0.31	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5	
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	
Lane Grp Cap (vph)	354	1815	170	1309	305	866	342	586	342	586	342	586	
v/s Ratio Prot	c0.21	0.31	0.07	c0.26	c0.08	0.18	c0.29	0.29	0.18	0.18	c0.29	0.29	
v/s Ratio Perm	1.04	0.85	0.74	0.98	0.69	0.41	0.49	0.94	0.41	0.41	0.49	0.94	
v/c Ratio	40.0	29.0	44.0	36.5	44.3	19.3	28.3	33.9	19.3	19.3	28.3	33.9	
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	58.5	5.1	15.9	20.7	6.6	0.3	1.1	24.0	0.3	0.3	24.0	24.0	
Delay (s)	98.5	34.2	59.9	57.2	50.9	19.7	29.5	57.9	19.7	19.7	57.9	57.9	
Level of Service	F	C	E	E	E	D	B	C	E	E	C	E	
Approach Delay (s)	46.5	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	57.4	
Approach LOS	D	E	E	E	E	E	C	C	E	E	C	D	
Intersection Summary													
HCM Average Control Delay	48.7											HCM Level of Service	D
HCM Volume to Capacity ratio	0.94												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	100.8%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1	1	1	1	1	1	1	1	1	1	1	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fltb, ped/bikes	1.00	0.93	1.00	0.93	1.00	0.93	1.00	0.93	1.00	0.93	1.00	0.93	
Frt	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Flt Protected	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1705	4933	1705	4960	2006	1987	1959	1915	1959	1915	1915	1915	
Flt Permitted	0.36	0.73	0.36	0.73	1.00	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Satd. Flow (perm)	619	1290	619	1290	1586	3087	3087	3087	1770	3204	3204	3204	
Volume (vph)	10	10	20	120	120	120	10	1100	610	200	880	420	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	11	11	21	126	126	126	11	1158	642	211	926	442	
RTOR Reduction (vph)	0	20	0	0	39	0	0	65	0	0	47	0	
Lane Group Flow (vph)	0	23	0	126	213	0	0	1746	0	211	1321	0	
Confl. Peds. (#/hr)	36	36	36	36	48	48	16	16	16	16	48	48	
Turn Type	Perm	7	7	Perm	8	8	2	2	2	2	1	6	
Protected Phases	7	7	7	8	8	8	2	2	2	2	1	6	
Permitted Phases	7	7	7	8	8	8	2	2	2	2	1	6	
Actuated Green, G (s)	6.5	16.7	16.7	16.7	16.7	16.7	45.7	45.7	45.7	45.7	13.1	63.3	
Effective Green, g (s)	7.0	17.2	17.2	17.2	17.2	17.2	46.2	46.2	46.2	46.2	13.6	63.8	
Actuated g/C Ratio	0.07	0.17	0.17	0.17	0.17	0.17	0.46	0.46	0.46	0.46	0.14	0.64	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	43	222	273	222	273	273	1426	1426	241	2044	241	2044	
v/s Ratio Prot	c0.04	0.10	0.13	0.10	0.13	0.13	c0.57	0.57	0.12	0.12	c0.12	0.41	
v/s Ratio Perm	0.55	0.57	0.78	0.57	0.78	0.78	1.22	1.22	0.88	0.88	0.88	0.65	
v/c Ratio	45.0	38.0	39.6	38.0	39.6	39.6	26.9	26.9	42.4	42.4	11.1	11.1	
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	7.4	2.0	12.5	2.0	12.5	101.7	118.5	118.5	27.1	27.1	1.6	1.6	
Delay (s)	52.3	40.0	52.1	40.0	52.1	118.5	118.5	118.5	69.5	69.5	12.7	12.7	
Level of Service	D	D	D	D	D	D	F	F	E	E	B	B	
Approach Delay (s)	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	52.3	
Approach LOS	D	D	D	D	D	D	F	F	E	E	C	C	
Intersection Summary													
HCM Average Control Delay	70.1											HCM Level of Service	E
HCM Volume to Capacity ratio	1.02												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	116.9%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3420	1770	3299	1770	3299	1770	3324	1770	3411	1770	3411
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3420	1770	3299	1770	3299	1770	3324	1770	3411	1770	3411
Volume (vph)	480	930	130	160	580	350	100	930	350	300	670	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	979	137	168	611	368	105	979	368	316	705	63
RTOR Reduction (vph)	0	11	0	0	90	0	0	39	0	0	7	0
Lane Group Flow (vph)	484	1105	0	168	889	0	105	1308	0	316	761	0
Confl. Peds. (#/hr)	15	48	48	15	123	48	48	48	48	48	123	123
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Permitted Phases												
Actuated Green, G (s)	15.7	27.5	10.9	22.7	5.0	32.6	12.0	39.6				
Effective Green, g (s)	15.2	28.5	10.4	23.7	4.5	33.6	11.5	40.6				
Actuated g/C Ratio	0.15	0.28	0.10	0.24	0.04	0.34	0.12	0.41				
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	522	975	184	782	80	1117	204	1385				
v/s Ratio Prot	c0.14	c0.32	0.09	0.27	0.06	c0.39	c0.18	0.22				
v/c Ratio	0.93	1.13	0.91	1.14	1.31	1.17	1.55	0.55				
Uniform Delay, d1	41.9	35.8	44.4	38.1	47.8	33.2	44.2	22.7				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.20	0.76				
Incremental Delay, d2	22.3	73.0	41.7	76.9	205.3	86.9	265.0	1.2				
Delay (s)	64.2	108.8	86.0	115.0	253.1	120.1	318.2	18.4				
Level of Service	E	F	F	F	F	F	F	B				
Approach Delay (s)	95.3	110.8	110.8	129.7	129.7	105.8	105.8	105.8				
Approach LOS	F	F	F	F	F	F	F	F				
Intersection Summary												
HCM Average Control Delay	110.3 HCM Level of Service F											
HCM Volume to Capacity ratio	1.15											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	108.8% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT	HT
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.86	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.95	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.95	1.00	0.95
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1611	1611	1611	3341	3341	3341	3341	3341	3341	3433	3462	3462
Fit Permitted	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	1611	1611	1611	3341	3341	3341	3341	3341	3341	3433	3462	3462
Volume (vph)	0	0	10	0	0	0	10	550	330	1550	350	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	11	0	0	0	11	579	347	1632	368	63
RTOR Reduction (vph)	0	11	0	0	0	0	18	0	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	919	0	1632	431	0
Confl. Peds. (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases												
Permitted Phases												
Actuated Green, G (s)	0.0	0.0	13.0	0.0	0.0	13.0	29.0	50.0				
Effective Green, g (s)	0.0	0.0	13.0	0.0	0.0	13.0	29.0	50.0				
Actuated g/C Ratio	0.00	0.00	0.26	0.00	0.00	0.26	0.58	1.00				
Clearance Time (s)			4.0			4.0	4.0	2.0				
Lane Grp Cap (vph)	0	0	824	0	0	824	1991	3462				
v/s Ratio Prot			c0.48			c0.48	0.12	0.12				
v/c Ratio	0.00	0.00	1.12	0.00	0.00	1.12	0.82	0.12				
Uniform Delay, d1	25.0	25.0	18.5	8.4	0.0	18.5	8.4	0.0				
Progression Factor	1.00	1.00	0.72	1.00	1.00	0.72	1.00	1.00				
Incremental Delay, d2	0.0	0.0	66.5	3.9	0.1	66.5	3.9	0.1				
Delay (s)	25.0	25.0	79.8	12.3	0.1	79.8	12.3	0.1				
Level of Service	C	C	E	B	A	E	B	A				
Approach Delay (s)	25.0	25.0	79.8	79.8	79.8	79.8	79.8	79.8				
Approach LOS	C	C	E	B	A	E	B	A				
Intersection Summary												
HCM Average Control Delay	31.6 HCM Level of Service C											
HCM Volume to Capacity ratio	0.91											
Actuated Cycle Length (s)	50.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	83.6% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
5: 45th St. & MLK Jr. Way

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Frbp, ped/bikes	0.96	0.97	0.97	1.00	1.00	1.00	0.98	0.99	0.99	0.99	0.99	0.99
Frt	0.97	0.96	0.96	0.98	0.98	0.98	1.00	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	1.00	1.00	1.00	3419	3425	3425	3425	3425	3425
Satd. Flow (prot)	1697	1688	1688	0.90	0.92	0.92	3160	2700	2700	2700	2700	2700
Flt Permitted	0.87	0.87	0.87	0.90	0.92	0.92	3160	2700	2700	2700	2700	2700
Satd. Flow (perm)	1502	1515	1515	1515	1515	1515	3160	2700	2700	2700	2700	2700
Volume (vph)	40	70	30	70	140	90	40	700	90	60	300	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	74	32	74	147	95	42	737	95	63	316	32
RTOR Reduction (vph)	0	20	0	0	31	0	0	19	0	0	13	0
Lane Group Flow (vph)	0	128	0	0	285	0	0	856	0	0	399	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (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
Lane Grp Cap (vph)	511	511	511	515	515	515	1580	1350	1350	1350	1350	1350
v/s Ratio Prot	0.09	0.09	0.09	c0.19	c0.19	c0.19	c0.27	0.15	0.15	0.15	0.15	0.15
v/s Ratio Perm	0.25	0.25	0.25	0.55	0.55	0.55	0.54	0.30	0.30	0.30	0.30	0.30
v/c Ratio	11.9	13.4	13.4	13.4	13.4	13.4	8.6	7.3	7.3	7.3	7.3	7.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.2	1.2	1.2	4.2	4.2	4.2	1.3	0.6	0.6	0.6	0.6	0.6
Incremental Delay, d2	13.1	17.7	17.7	17.7	17.7	17.7	9.9	7.9	7.9	7.9	7.9	7.9
Delay (s)	B	B	B	B	B	B	A	A	A	A	A	A
Level of Service	B	B	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	13.1	17.7	17.7	17.7	17.7	17.7	9.9	7.9	7.9	7.9	7.9	7.9
Approach LOS	B	B	B	B	B	B	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	11.1 HCM Level of Service B											
HCM Volume to Capacity ratio	0.55											
Actuated Cycle Length (s)	50.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	77.5% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
6: 45th St. & Telegraph Ave.

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔			↔			↔			↔		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.96	0.96	0.96	0.99	0.99	0.99	0.99	0.99	0.99
Frbp, ped/bikes	0.96	0.96	0.96	0.97	0.97	0.97	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.96	0.96	0.96	0.96	0.96	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1623	1623	1623	1668	1668	1668	3453	4903	4903	4903	4903	4903
Flt Permitted	0.74	0.74	0.74	0.89	0.89	0.89	0.77	0.80	0.80	0.80	0.80	0.80
Satd. Flow (perm)	1222	1222	1222	1494	1494	1494	2667	3920	3920	3920	3920	3920
Volume (vph)	80	70	70	30	80	50	90	1640	80	40	1050	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	74	74	32	84	53	95	1726	84	42	1105	95
RTOR Reduction (vph)	0	21	0	0	3	0	0	2	0	0	7	0
Lane Group Flow (vph)	0	211	0	0	166	0	0	1903	0	0	1235	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	6	6	6
Actuated Green, G (s)	15.2	15.2	15.2	15.2	15.2	15.2	55.8	55.8	55.8	55.8	55.8	55.8
Effective Green, g (s)	15.7	15.7	15.7	15.7	15.7	15.7	56.3	56.3	56.3	56.3	56.3	56.3
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.70	0.70	0.70	0.70	0.70	0.70
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	240	240	240	293	293	293	1877	2759	2759	2759	2759	2759
v/s Ratio Prot	c0.17	c0.17	c0.17	0.11	0.11	0.11	c0.71	0.32	0.32	0.32	0.32	0.32
v/s Ratio Perm	0.88	0.88	0.88	0.57	0.57	0.57	1.01	0.45	0.45	0.45	0.45	0.45
Uniform Delay, d1	31.2	31.2	31.2	29.1	29.1	29.1	11.9	5.1	5.1	5.1	5.1	5.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	27.8	27.8	27.8	1.5	1.5	1.5	24.2	0.5	0.5	0.5	0.5	0.5
Delay (s)	59.0	59.0	59.0	30.6	30.6	30.6	36.1	5.7	5.7	5.7	5.7	5.7
Level of Service	E	E	E	C	C	C	D	A	A	A	A	A
Approach Delay (s)	59.0	59.0	59.0	30.6	30.6	30.6	36.1	5.7	5.7	5.7	5.7	5.7
Approach LOS	E	E	E	C	C	C	D	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	26.7 HCM Level of Service C											
HCM Volume to Capacity ratio	0.98											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	112.1% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	0.98	1.00	1.00	0.98	1.00	1.00	0.99	1.00	0.98	1.00
Flt	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Fit Protected	1765	3463	1768	3455	1741	1832	1766	1825	1766	1825	1766
Satd. Flow (prot)	0.12	1.00	0.12	1.00	0.52	1.00	0.22	1.00	0.22	1.00	0.22
Fit Permitted	232	3463	233	3455	960	1832	412	1825	412	1825	412
Satd. Flow (perm)	90	1100	160	880	130	180	560	60	100	250	30
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	95	1158	168	84	926	137	189	589	63	105	263
Adj. Flow (vph)	0	14	0	0	14	0	0	5	0	0	6
RTOR Reduction (vph)	95	1312	0	84	1049	0	189	647	0	105	290
Lane Group Flow (vph)	12	12	12	12	12	42	12	12	12	12	42
Confl. Peds. (#/hr)											
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	93	1385	93	1382	480	916	206	913	206	913	206
v/s Ratio Prot	c0.41	0.38	0.36	0.30	0.30	c0.35	0.25	0.25	0.25	0.16	0.16
v/s Ratio Perm	1.02	0.95	0.90	0.76	0.76	0.39	0.71	0.51	0.51	0.32	0.32
v/c Ratio	24.0	23.2	22.5	20.7	12.5	15.5	13.4	11.9	13.4	11.9	11.9
Uniform Delay, d1	1.00	1.00	1.73	1.80	1.64	1.64	1.00	1.00	1.00	1.00	1.00
Progression Factor	89.3	14.5	41.3	1.8	0.2	0.4	8.7	0.9	8.7	0.9	0.9
Incremental Delay, d2	123.3	37.6	80.1	39.0	20.6	25.7	22.2	12.8	22.2	12.8	12.8
Delay (s)	F	D	F	D	C	C	C	B	C	B	B
Level of Service	F	D	F	D	C	C	C	B	C	B	B
Approach Delay (s)	43.4	43.4	43.4	42.0	24.6	24.6	15.3	15.3	15.3	15.3	15.3
Approach LOS	D	D	D	D	C	C	B	B	C	B	B
Intersection Summary											
HCM Average Control Delay	35.9 HCM Level of Service										
HCM Volume to Capacity ratio	0.85										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	95.9%										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 PM
1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.98	1.00	0.97	1.00
Flt	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.99	0.99
Fit Protected	1764	3456	1770	3501	1770	3501	3442	3442	3442	3395	3395
Satd. Flow (prot)	0.16	1.00	0.16	1.00	0.16	1.00	0.84	0.84	0.84	0.88	0.88
Fit Permitted	297	3456	298	3501	298	3501	2917	2917	2917	2995	2995
Satd. Flow (perm)	90	1130	120	60	1000	60	90	330	50	30	160
Volume (vph)	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Peak-hour factor, PHF	61	1141	121	61	1010	61	91	333	51	30	162
Adj. Flow (vph)	0	10	0	0	6	0	0	1	0	0	4
RTOR Reduction (vph)	61	1252	0	61	1066	0	0	474	0	0	239
Lane Group Flow (vph)	24	24	78	78	24	8	6	6	6	6	8
Confl. Peds. (#/hr)											
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	93	1080	93	1094	93	1094	1714	1714	1714	1760	1760
v/s Ratio Prot	c0.36	c0.36	c0.36	0.20	0.20	0.20	c0.16	c0.16	c0.16	0.08	0.08
v/s Ratio Perm	0.66	1.16	0.66	0.66	0.66	0.97	0.28	0.28	0.28	0.14	0.14
v/c Ratio	23.8	27.5	23.8	23.8	23.8	27.2	8.1	8.1	8.1	7.4	7.4
Uniform Delay, d1	0.63	0.56	0.63	0.56	0.63	0.84	1.06	1.06	1.06	1.00	1.00
Progression Factor	14.0	76.2	14.0	76.2	20.2	16.1	0.2	0.2	0.2	0.2	0.2
Incremental Delay, d2	29.0	91.6	29.0	91.6	39.4	38.9	8.8	8.8	8.8	7.6	7.6
Delay (s)	C	F	C	F	D	D	A	A	A	A	A
Level of Service	C	F	C	F	D	D	A	A	A	A	A
Approach Delay (s)	88.7	88.7	88.7	39.0	39.0	8.8	7.6	7.6	7.6	7.6	7.6
Approach LOS	F	F	F	D	D	A	A	A	A	A	A
Intersection Summary											
HCM Average Control Delay	52.8 HCM Level of Service										
HCM Volume to Capacity ratio	0.58										
Actuated Cycle Length (s)	80.0										
Intersection Capacity Utilization	79.0%										
Analysis Period (min)	15										
c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

2030 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.98	1.00	0.99	1.00	0.98	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (prot)	1767	3510	1763	3463	1763	3463	3395	3413	1763	3413	1763	3413	1763
Flt Permitted	0.11	1.00	0.11	1.00	0.11	1.00	0.86	0.63	0.11	1.00	0.86	0.63	0.11
Satd. Flow (perm)	213	3510	212	3463	212	3463	2925	2174	213	3510	212	3463	212
Volume (vph)	90	1110	50	60	1020	140	80	550	160	100	240	60	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	1168	53	63	1074	147	84	579	168	105	253	63	63
RTOR Reduction (vph)	0	4	0	0	14	0	0	12	0	0	18	0	0
Lane Group Flow (vph)	95	1217	0	63	1208	0	0	819	0	0	403	0	0
Confl. Peds. (#/hr)	8	39	39	8	8	8	25	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	8	8	8	2	2	6	6	6	6	6
Permitted Phases	4	8	8	8	8	8	2	2	6	6	6	6	6
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	35.5	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	93	1536	93	1515	1353	1353	1005	1005	1005	1005	1005	1005	1005
v/s Ratio Prot	0.35	0.35	0.35	0.35	0.35	0.35	0.28	0.28	0.28	0.28	0.28	0.28	0.28
v/s Ratio Perm	0.45	0.79	0.68	0.80	0.61	0.61	0.40	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	22.5	19.4	18.0	19.4	16.0	16.0	14.2	14.2	14.2	14.2	14.2	14.2	14.2
Uniform Delay, d1	1.04	1.05	1.00	1.00	1.31	1.31	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.4	33.5	4.4	33.1	4.4	1.8	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Incremental Delay, d2	56.9	20.6	51.1	23.9	22.8	22.8	15.4	15.4	15.4	15.4	15.4	15.4	15.4
Delay (s)	E	C	D	C	C	C	B	B	B	B	B	B	B
Level of Service	E	C	D	C	C	C	B	B	B	B	B	B	B
Approach Delay (s)	23.3	25.2	22.8	22.8	22.8	15.4	15.4	15.4	15.4	15.4	15.4	15.4	15.4
Approach LOS	C	C	C	C	C	C	B	B	B	B	B	B	B

Intersection Summary	23.0	HCM Level of Service	C
HCM Average Control Delay	23.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	92.5%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2030 PM
 1/11/2008

Movement	EBT	EBR	WBT	WBR	NBT	NBR	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.98
Flt Protected	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (prot)	3424	3424	1770	3539	1770	3539	3424	3424
Flt Permitted	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3424	3424	1770	3539	1770	3539	3424	3424
Volume (vph)	1280	80	80	1210	0	0	0	0
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1320	82	82	1247	0	0	0	0
RTOR Reduction (vph)	8	0	0	0	0	0	0	0
Lane Group Flow (vph)	1394	0	82	1247	0	0	0	0
Confl. Peds. (#/hr)	213	348	348	213	348	348	213	348
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	3	3	8	8	8	8	8
Permitted Phases	4	3	3	8	8	8	8	8
Actuated Green, G (s)	27.0	25.0	25.0	60.0	60.0	60.0	60.0	60.0
Effective Green, g (s)	27.0	25.0	25.0	60.0	60.0	60.0	60.0	60.0
Actuated g/C Ratio	0.45	0.42	0.42	1.00	1.00	1.00	1.00	1.00
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	1541	738	3539	1541	1541	1541	1541	1541
v/s Ratio Prot	0.41	0.05	0.35	0.35	0.35	0.35	0.35	0.35
v/s Ratio Perm	0.90	0.11	0.35	0.35	0.35	0.35	0.35	0.35
v/c Ratio	15.3	10.7	0.0	0.0	0.0	0.0	0.0	0.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	9.1	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Incremental Delay, d2	24.5	11.0	0.3	0.3	0.3	0.3	0.3	0.3
Delay (s)	C	B	A	A	A	A	A	A
Level of Service	C	B	A	A	A	A	A	A
Approach Delay (s)	24.5	0.9	0.0	0.0	0.0	0.0	0.0	0.0
Approach LOS	C	A	A	A	A	A	A	A

Intersection Summary	13.0	HCM Level of Service	B
HCM Average Control Delay	13.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	60.0	Sum of lost time (s)	4.0
Intersection Capacity Utilization	49.5%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
11: 40th St. & BART parking

2030 PM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1200	80	0	1290	0	70
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1263	84	0	1358	0	74
Pedestrians	109	109				
Lane Width (ft)	12.0	12.0				
Walking Speed (ft/s)	4.0	4.0				
Percent Blockage			9	9		
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)	81			406		
pX, platoon unblocked		0.62		0.68		0.62
VC, conflicting volume		1456		2093		892
VC1, stage 1 cont vol						
VC2, stage 2 cont vol		1120		1555		205
vCu, unblocked vol		4.1		6.8		6.9
IC, single (s)						
IC, 2 stage (s)		2.2		3.5		3.3
p0 queue free %		100		100		82
cM capacity (veh/h)		348		64		409
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	842	505	679	679	74	74
Volume Left	0	0	0	0	0	0
Volume Right	0	84	0	0	74	74
cSH	1700	1700	1700	1700	409	409
Volume to Capacity	0.50	0.30	0.40	0.40	0.18	0.18
Queue Length 95th (ft)	0	0	0	0	16	16
Control Delay (s)	0.0	0.0	0.0	0.0	15.7	15.7
Lane LOS					C	C
Approach Delay (s)	0.0	0.0	0.0	0.0	15.7	15.7
Approach LOS					C	C
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	56.0%					
Analysis Period (min)	15					
ICU Level of Service	B					

HCM Unsignalized Intersection Capacity Analysis
12: 40th St. & BART parking

2030 PM
1/11/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑
Sign Control	Free	Free	Free	Free	Stop	Stop
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	1260	10	0	1290	0	60
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	1326	11	0	1358	0	63
Pedestrians	109	109				
Lane Width (ft)	12.0	12.0				
Walking Speed (ft/s)	4.0	4.0				
Percent Blockage			9	9		
Right turn flare (veh)						
Median type						None
Median storage (veh)						
Upstream signal (ft)	298			189		
pX, platoon unblocked		0.63		0.70		0.63
VC, conflicting volume		1446		2120		886
VC1, stage 1 cont vol						
VC2, stage 2 cont vol		1119		1527		230
vCu, unblocked vol		4.1		6.8		6.9
IC, single (s)						
IC, 2 stage (s)		2.2		3.5		3.3
p0 queue free %		100		100		84
cM capacity (veh/h)		355		69		402
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2
Volume Total	884	453	679	679	63	63
Volume Left	0	0	0	0	0	0
Volume Right	0	11	0	0	63	63
cSH	1700	1700	1700	1700	402	402
Volume to Capacity	0.52	0.27	0.40	0.40	0.16	0.16
Queue Length 95th (ft)	0	0	0	0	14	14
Control Delay (s)	0.0	0.0	0.0	0.0	15.6	15.6
Lane LOS					C	C
Approach Delay (s)	0.0	0.0	0.0	0.0	15.6	15.6
Approach LOS					C	C
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	55.4%					
Analysis Period (min)	15					
ICU Level of Service	B					

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave.

2030 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.97	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.96
Frbp, ped/bikes	0.94	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1669	3433	1770	3334	1770	3482	1770	3482	1770	3247	1770	3247
Flt Permitted	0.26	1.00	0.15	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	449	3433	287	3334	1770	3482	1770	3482	1770	3247	1770	3247
Volume (vph)	280	920	120	60	550	110	470	1390	100	130	630	270
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	286	939	122	61	561	112	480	1418	102	133	643	276
RTOR Reduction (vph)	0	13	0	0	21	0	0	6	0	0	27	0
Lane Group Flow (vph)	286	1048	0	61	652	0	480	1514	0	133	892	0
Confl. Peds. (#/hr)	94	86	86	94	94	94	94	94	40	40	111	111
Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	8	8	5	2	2	1	1	6	6	6
Actuated Green, G (s)	25.5	25.5	25.5	25.5	13.5	32.2	13.5	32.2	8.8	27.5	8.8	27.5
Effective Green, g (s)	26.0	26.0	26.0	26.0	14.0	32.7	14.0	32.7	9.3	28.0	9.3	28.0
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.18	0.41	0.18	0.41	0.12	0.35	0.12	0.35
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	146	1116	93	1084	310	1423	310	1423	206	1136	206	1136
v/s Ratio Prot	0.31	0.20	0.20	0.20	c0.27	c0.43	0.08	0.27	0.08	0.27	0.08	0.27
v/c Ratio Perm	c0.64	0.21	0.21	0.21	0.66	0.60	1.55	1.06	0.65	0.79	0.65	0.79
v/c Ratio	1.96	0.94	0.66	0.60	23.2	22.7	33.0	23.6	33.8	23.3	33.8	23.3
Uniform Delay, d1	27.0	26.2	23.2	22.7	33.0	23.6	33.0	23.6	33.8	23.3	33.8	23.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	455.4	14.3	12.0	0.6	262.2	42.9	262.2	42.9	5.1	5.5	5.1	5.5
Delay (s)	482.4	40.5	35.1	23.3	295.2	66.6	295.2	66.6	38.9	28.8	38.9	28.8
Level of Service	F	D	D	C	F	E	F	E	D	C	D	C
Approach Delay (s)	134.3	134.3	24.3	24.3	121.4	121.4	121.4	121.4	30.1	30.1	30.1	30.1
Approach LOS	F	F	C	C	F	F	F	F	C	C	C	C

Intersection Summary	
HCM Average Control Delay	92.2
HCM Volume to Capacity ratio	1.46
Actuated Cycle Length (s)	80.0
Intersection Capacity Utilization	102.5%
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 14: Apgar St. & Telegraph Ave.

2030 PM
 1/11/2008

Movement	EBL	EBR	NBL	NBT	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Sign Control	Stop	Stop	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	80	20	1920	810	20
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	21	83	21	2000	844	21
Pedestrians	100	100	100	100	100	100
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	8	8	8	8	8	8
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	0.73	0.87	0.87	396	625	625
Upstream signal (ft)	0.73	0.87	0.87	396	625	625
pX, platoon unblocked	2096	632	965			
VC, conflicting volume	2096	632	965			
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	1606	431	812			
IC, single (s)	6.8	6.9	4.1			
IC, 2 stage (s)						
IF (s)	3.5	3.3	2.2			
p0 queue free %	64	80	97			
cM capacity (veh/h)	57	419	647			
Direction, Lane #	EB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	104	21	1000	1000	562	302
Volume Left	21	21	0	0	0	0
Volume Right	83	0	0	0	0	21
cSH	185	647	1700	1700	1700	1700
Volume to Capacity	0.56	0.03	0.59	0.59	0.33	0.18
Queue Length 95th (ft)	75	2	0	0	0	0
Control Delay (s)	47.0	10.7	0.0	0.0	0.0	0.0
Lane LOS	E	B	E	B	E	B
Approach Delay (s)	47.0	0.1	0.0	0.0	0.0	0.0
Approach LOS	E	E	E	E	E	E

Intersection Summary	
Average Delay	1.7
Intersection Capacity Utilization	73.0%
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

2030 PM
 1/11/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	W	W	↑↑	↑↑	↓	↓
Sign Control	Stop	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	30	40	1900	40	20	870
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	42	2000	42	21	916
Pedestrians	52	52				45
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4	4				4
Right turn flare (veh)	None	None				
Median type	None	None				
Median storage (veh)						
Upstream signal (ft)			230			791
pX, platoon unblocked	0.69	0.66				0.66
VC, conflicting volume	2625	1118				2094
VC1, stage 1 cont vol						
VC2, stage 2 cont vol						
vCu, unblocked vol	2675	672				2142
IC, single (s)	6.8	6.9				4.1
IC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	0	83				87
cM capacity (veh/h)	10	244				158
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	74	1333	709	21	458	458
Volume Left	32	0	0	21	0	0
Volume Right	42	0	42	0	0	0
cSH	22	1700	1700	158	1700	1700
Volume to Capacity	3.39	0.78	0.42	0.13	0.27	0.27
Queue Length 95th (ft)	Err	0	0	11	0	0
Control Delay (s)	F	0.0	0.0	31.2	0.0	0.0
Lane LOS	F	D	D	D	D	D
Approach Delay (s)	Err	0.0	0.7			
Approach LOS	F	F	F	F	F	F

Intersection Summary		
Average Delay	241.6	
Intersection Capacity Utilization	72.3%	ICU Level of Service C
Analysis Period (min)	15	

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2030 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↑↑↑	↑↑↑	↑↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↑↑	↓	↓	↓
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt Protected	0.99	1.00	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5012	1768	3452	1793	1793	1793	1793	1793	1793	1770	1805	1805
Frt Permitted	0.65	0.23	1.00	0.28	0.28	0.28	0.28	0.28	0.28	0.24	1.00	1.00
Satd. Flow (perm)	3269	427	3452	511	511	511	511	511	511	444	1805	1805
Volume (vph)	160	840	40	90	1330	220	190	520	120	80	400	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	857	41	92	1357	224	194	531	122	82	408	71
RTOR Reduction (vph)	0	5	0	0	17	0	0	8	0	0	8	0
Lane Group Flow (vph)	0	1056	0	92	1565	0	0	839	0	82	471	0
Conf. Peds. (#/hr)	24	4	4	4	4	24	48	12	12	12	48	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	2	2	2	6	6	6
Permitted Phases	4	4	8	8	46.0	46.0	24.0	24.0	24.0	24.0	24.0	24.0
Actuated Green, G (s)	46.0	46.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31
Actuated g/C Ratio	0.59	0.59	0.59	0.59	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Clearance 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
Lane Grp Cap (vph)	1921	251	2028	c0.45	160	139	564	0.18	0.18	0.18	0.18	0.18
v/s Ratio Prot	0.32	0.22	0.22	0.37	0.77	5.25	5.25	5.25	5.25	5.25	5.25	5.25
v/s Ratio Perm	1.66d1	10.1	8.7	12.4	27.5	23.2	25.6	25.6	25.6	25.6	25.6	25.6
Uniform Delay, d1	1.00	1.60	1.65	1.00	0.77	0.79	14.3	11.6	11.6	11.6	11.6	11.6
Incremental Delay, d2	1.1	3.2	2.3	1.1	1924.7	1924.7	32.1	32.0	32.0	32.0	32.0	32.0
Delay (s)	11.2	17.0	22.8	11.2	1952.2	1952.2	32.1	32.0	32.0	32.0	32.0	32.0
Level of Service	B	B	C	B	F	F	C	C	C	C	C	C
Approach Delay (s)	11.2	22.5	22.5	1952.2	1952.2	32.0	32.0	32.0	32.0	32.0	32.0	32.0
Approach LOS	B	C	C	F	F	F	C	C	C	C	C	C

Intersection Summary		
HCM Average Control Delay	415.5	HCM Level of Service F
HCM Volume to Capacity ratio	2.33	
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	167.0%	ICU Level of Service H
Analysis Period (min)	15	

d1 Defacto Left Lane. Recode with 1 though lane as a left lane.
 c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2030 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	4996	4996	4996	4996	4996	4996	4996	4996	4996	4996	4996
Flt Permitted	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76
Satd. Flow (perm)	3798	3798	3798	3798	3798	3798	3798	3798	3798	3798	3798
Volume (vph)	60	780	70	100	1360	110	140	330	100	90	220
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	821	74	105	1432	116	147	347	105	95	232
RTOR Reduction (vph)	0	12	0	0	11	0	0	13	0	0	8
Lane Group Flow (vph)	0	946	0	0	1642	0	147	439	0	95	266
Confl. Peds. (#/hr)	12	12	12	12	12	12	12	12	6	6	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Grp Cap (vph)	2445	2445	2445	2445	2445	2445	2445	2445	2445	2445	2445
v/s Ratio Prot	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
v/s Ratio Perm	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
v/c Ratio	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8	6.8
Uniform Delay, d1	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18	1.18
Progression Factor	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incremental Delay, d2	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0
Delay (s)	A	B	B	D	E	E	D	E	F	F	D
Level of Service	A	B	B	D	E	E	D	E	F	F	D
Approach Delay (s)	8.0	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2	18.2
Approach LOS	A	B	B	D	E	E	D	E	F	F	D

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
HCM Average Control Delay	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6	26.6
HCM Volume to Capacity ratio	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Actuated Cycle Length (s)	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Intersection Capacity Utilization	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%	99.3%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15
Critical Lane Group	C	C	C	C	C	C	C	C	C	C	C

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

2030 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB	4TB
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5015	5015	5015	5015	5015	5015	5015	5015	5015	5015	5015
Flt Permitted	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Satd. Flow (perm)	3498	3498	3498	3498	3498	3498	3498	3498	3498	3498	3498
Volume (vph)	90	850	50	70	1430	270	80	430	60	90	210
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	91	859	51	71	1444	273	81	434	61	91	212
RTOR Reduction (vph)	0	7	0	0	32	0	0	11	0	0	17
Lane Group Flow (vph)	0	994	0	0	1756	0	0	565	0	0	337
Confl. Peds. (#/hr)	9	9	9	9	9	9	9	9	10	10	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2252	2252	2252	2252	2252	2252	2252	2252	2252	2252	2252
v/s Ratio Prot	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28	0.28
v/s Ratio Perm	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44	0.44
v/c Ratio	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1	7.1
Uniform Delay, d1	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61	1.61
Progression Factor	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6
Incremental Delay, d2	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Delay (s)	B	B	B	B	B	B	B	B	B	B	B
Level of Service	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
Approach LOS	B	B	B	B	B	B	B	B	B	B	B

Intersection Summary	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
HCM Average Control Delay	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7	17.7
HCM Volume to Capacity ratio	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Actuated Cycle Length (s)	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0	80.0
Intersection Capacity Utilization	126.2%	126.2%	126.2%	126.2%	126.2%	126.2%	126.2%	126.2%	126.2%	126.2%	126.2%
Analysis Period (min)	15	15	15	15	15	15	15	15	15	15	15
Critical Lane Group	C	C	C	C	C	C	C	C	C	C	C

HCM Unsignalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

2030 PM
 1/25/2008



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Stop	Stop
Sign Control	Free	Free	Free	Free	0%	0%
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	0	1030	1540	20	0	230
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96
Hourly flow rate (vph)	0	1073	1604	21	0	240
Pedestrians	79				79	
Lane Width (ft)	12.0				12.0	
Walking Speed (ft/s)	4.0				4.0	
Percent Blockage	7				7	
Right turn flare (veh)						
Median type					None	
Median storage (veh)						
Upstream signal (ft)	698	473				
pX, platoon unblocked	0.84				0.84	0.84
VC, conflicting volume	1704				2051	703
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
vC2, unblocked vol	1453				1849	258
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	56
cM capacity (veh/h)	361				52	541
Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3 SB 1 SB 2
Volume Total	358	358	358	642	642	342 240
Volume Left	0	0	0	0	0	0 0
Volume Right	0	0	0	0	0	21 240
cSH	1700	1700	1700	1700	1700	1700 541
Volume to Capacity	0.21	0.21	0.21	0.38	0.38	0.20 0.44
Queue Length 95th (ft)	0	0	0	0	0	0 56
Control Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0 16.8
Lane LOS						C C
Approach Delay (s)	0.0			0.0		16.8
Approach LOS				C		C
Intersection Summary						
Average Delay	1.4					
Intersection Capacity Utilization	56.5%					
Analysis Period (min)	15					
ICU Level of Service	B					

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

2030 PM
 1/25/2008



Movement	EBL	EBT	WBL	WBR	SBL	SBR
Lane Configurations	Free	Free	Free	Free	Free	Free
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.99	0.99	0.99	0.99	0.99	0.99
Fit Protected	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	4939	4810	1748	3458	1770	3444
Fit Permitted	0.67	0.73	0.23	1.00	0.11	1.00
Satd. Flow (perm)	3368	3541	422	3458	212	3444
Volume (vph)	300	660	80	110	1170	460
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	695	84	116	1232	484
RTOR Reduction (vph)	0	6	0	0	0	0
Lane Group Flow (vph)	0	1089	0	0	1831	0
Conf. Peds. (#/hr)	26	19	26	39	92	92
Turn Type	Perm	Perm	pm+pt	Perm	Perm	Perm
Protected Phases	4	4	3	8	2	2
Permitted Phases	4	4	8	8	2	6
Actuated Green, G (s)	55.9	55.9	55.9	34.1	34.1	34.1
Effective Green, g (s)	57.4	57.4	57.4	35.1	35.1	35.1
Actuated g/C Ratio	0.57	0.57	0.57	0.35	0.35	0.35
Clearance Time (s)	5.5	5.5	5.5	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	1918	2022	147	1208	74	1203
v/s Ratio Prot						
v/s Ratio Perm	0.32	c0.52	0.67	0.39	c1.09	0.21
v/c Ratio	2.07dl	0.91	1.93	1.12	3.14	0.60
Uniform Delay, d1	13.7	19.1	32.7	32.7	32.7	26.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	6.1	443.4	65.0	995.3	2.2
Delay (s)	13.9	25.2	476.1	97.7	1028.0	29.0
Level of Service	B	C	F	F	F	C
Approach Delay (s)	13.9	25.2	163.1	270.7	270.7	270.7
Approach LOS	B	C	F	F	F	F
Intersection Summary						
HCM Average Control Delay	106.5					
HCM Volume to Capacity ratio	1.75					
Actuated Cycle Length (s)	100.5					
Intersection Capacity Utilization	118.7%					
Analysis Period (min)	15					
ICU Level of Service	H					
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.						
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

2030 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5033	5033	5033	5033	5033	5033	5033	5033	5033	5033	5033	5033
Fit Permitted	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Satd. Flow (perm)	3946	3946	3946	3946	3946	3946	3946	3946	3946	3946	3946	3946
Volume (vph)	50	920	30	110	1590	50	100	100	200	40	40	90
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	51	929	30	111	1606	51	101	101	202	40	40	91
RTOR Reduction (vph)	0	4	0	0	4	0	0	0	66	0	13	0
Lane Group Flow (vph)	0	1006	0	0	1764	0	0	202	136	0	158	0
Conf. Ped. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	48.5	48.5	48.5	48.5	48.5	48.5	48.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (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
Lane Grp Cap (vph)	2392	2392	2392	2392	2392	2392	2392	2392	2392	2392	2392	2392
v/s Ratio Prot	0.25	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
v/s Ratio Perm	0.42	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
v/c Ratio	8.3	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2	11.2
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.5	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
Incremental Delay, d2	8.9	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Delay (s)	A	B	B	B	B	B	B	B	B	B	B	B
Level of Service	A	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	8.9	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4	13.4
Approach LOS	A	B	B	B	B	B	B	B	B	B	B	B

Intersection Summary	14.1	HCM Level of Service	B
HCM Average Control Delay	0.66		
HCM Volume to Capacity ratio	80.0		
Actuated Cycle Length (s)	111.0%	Sum of lost time (s)	8.0
Intersection Capacity Utilization	15	ICU Level of Service	H
Analysis Period (min)			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	4912	1770	4912	1770	4912	1770	4912	1770	4912	1770	4912
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4912	1770	4912	1770	4912	1770	4912	1770	4912	1770	4912
Volume (vph)	230	790	110	130	1230	360	310	1180	290	510	510	180
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	832	116	137	1295	379	326	1242	305	537	537	189
RTOR Reduction (vph)	0	15	0	0	44	0	0	0	11	0	0	45
Lane Group Flow (vph)	242	933	0	137	1630	0	326	1242	294	537	537	144
Conf. Ped. (#/hr)	81	81	81	81	81	81	81	81	81	81	81	81
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	7	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	12.0	33.2	12.8	34.0	25.4	33.0	45.8	25.0	32.6	44.6	32.6	44.6
Effective Green, g (s)	11.0	34.2	11.8	35.0	24.4	34.0	45.8	24.0	33.6	44.6	33.6	44.6
Actuated g/C Ratio	0.09	0.29	0.10	0.29	0.20	0.28	0.38	0.20	0.28	0.37	0.28	0.37
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0	3.0	5.0
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
Lane Grp Cap (vph)	162	1400	174	1418	360	1003	618	354	991	607	991	607
v/s Ratio Prot	0.14	0.19	0.08	0.34	0.18	0.35	0.05	0.30	0.15	0.02	0.07	0.02
v/s Ratio Perm	1.49	0.67	0.79	1.15	0.91	1.24	0.48	1.52	0.54	0.24	0.24	0.24
Uniform Delay, d1	54.5	37.9	52.9	42.5	46.7	43.0	28.0	48.0	36.7	26.0	26.0	26.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	251.9	2.5	20.6	76.0	25.3	115.9	0.6	246.7	2.1	0.2	0.2	0.2
Delay (s)	F	D	F	F	E	F	E	F	C	F	D	C
Level of Service	F	D	F	F	E	F	E	F	C	F	D	C
Approach Delay (s)	94.5	94.5	94.5	94.5	94.5	94.5	94.5	94.5	94.5	94.5	94.5	94.5
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F

Intersection Summary	119.7	HCM Level of Service	F
HCM Average Control Delay	1.21		
HCM Volume to Capacity ratio	119.2%	Sum of lost time (s)	8.0
Actuated Cycle Length (s)	15	ICU Level of Service	H
Intersection Capacity Utilization			
Analysis Period (min)			

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2030 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.93	0.96	0.97	0.96	0.96	0.96	0.99	0.99	0.99	0.99	0.99	0.99
Frbp, ped/bikes	0.98	0.97	0.98	0.97	0.97	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1584	1618	1618	1618	1618	1618	1702	3486	1726	3447	1726	3447
Flt Permitted	0.66	0.71	0.71	0.71	0.71	0.71	0.26	1.00	0.18	1.00	0.18	1.00
Satd. Flow (perm)	1068	1178	1178	1178	1178	1178	461	3486	336	3447	336	3447
Volume (vph)	130	60	100	120	80	100	50	1070	50	40	830	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	137	63	105	126	84	105	53	1126	53	42	874	74
RTOR Reduction (vph)	0	23	0	0	22	0	0	4	0	0	7	0
Lane Group Flow (vph)	0	282	0	0	293	0	53	1175	0	42	941	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	6	6	6
Actuated Green, G (s)	23.6	23.6	23.1	23.1	23.1	23.1	53.9	53.9	53.9	53.9	53.9	53.9
Effective Green, g (s)	0.27	0.27	0.27	0.27	0.27	0.27	0.63	0.63	0.63	0.63	0.63	0.63
Actuated g/C Ratio	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Clearance Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Vehicle Extension (s)	290	320	292	2211	2186	2186	0.034	0.13	0.13	0.27	0.27	0.27
Lane Grp Cap (vph)	60.26	0.97	30.7	30.0	30.0	30.0	6.4	8.6	6.5	7.8	7.8	7.8
v/s Ratio Perm	0.97	0.92	0.92	0.92	0.92	0.92	0.18	0.53	0.20	0.43	0.43	0.43
v/c Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay, d1	45.2	29.1	29.1	29.1	29.1	29.1	1.4	0.9	2.1	0.6	0.6	0.6
Incremental Delay, d2	75.8	59.1	59.1	59.1	59.1	59.1	7.8	9.5	8.6	8.4	8.4	8.4
Level of Service	E	E	E	E	E	E	A	A	A	A	A	A
Approach Delay (s)	75.8	59.1	59.1	59.1	59.1	59.1	9.4	9.4	8.5	8.5	8.5	8.5
Approach LOS	E	E	E	E	E	E	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	21.7											
HCM Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	69.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

2030 PM
 1/11/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	0.93	0.96	0.97	0.96	0.96	0.96	0.99	0.99	0.99	0.99	0.99	0.99
Frbp, ped/bikes	0.98	0.97	0.98	0.97	0.97	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.95	0.95	0.95	0.95	0.95	0.95	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1770	3370	3370	1770	3154	3154	1702	3488	1732	3129	1732	3129
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.24	1.00	0.23	1.00	0.23	1.00
Satd. Flow (perm)	1170	3370	3370	1170	3154	3154	427	3488	411	3129	411	3129
Volume (vph)	230	560	120	90	530	240	200	820	50	220	530	310
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	235	571	122	92	541	245	204	837	51	224	541	316
RTOR Reduction (vph)	0	20	0	0	48	0	0	5	0	0	99	0
Lane Group Flow (vph)	235	673	0	92	738	0	204	883	0	224	758	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	4	3	8	8	2	2	2	6	6	6
Permitted Phases	7	4	4	3	8	8	2	2	2	6	6	6
Actuated Green, G (s)	10.5	25.8	7.3	22.6	38.4	38.4	38.4	38.4	38.4	38.4	38.4	38.4
Effective Green, g (s)	11.0	25.3	7.8	22.1	39.9	39.9	39.9	39.9	39.9	39.9	39.9	39.9
Actuated g/C Ratio	0.13	0.30	0.09	0.26	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	4.5	3.5	4.5	3.5	3.5	3.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	229	1003	162	820	200	1637	193	1469	193	1469	193	1469
v/s Ratio Prot	0.13	0.20	0.05	0.23	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25
v/s Ratio Perm	1.03	0.67	0.57	0.90	1.02	0.54	1.16	0.52	1.16	0.52	1.16	0.52
Uniform Delay, d1	37.0	26.2	37.0	30.4	22.6	16.0	22.6	16.0	22.6	16.0	22.6	16.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	66.4	1.4	2.7	12.4	68.9	1.3	114.7	1.3	114.7	1.3	114.7	1.3
Delay (s)	103.4	27.6	39.7	42.8	91.5	17.3	137.3	17.3	137.3	17.3	137.3	17.3
Level of Service	F	C	D	D	D	D	F	B	F	B	F	B
Approach Delay (s)	46.8	46.8	42.5	42.5	42.5	42.5	31.2	42.0	42.0	42.0	42.0	42.0
Approach LOS	D	D	D	D	D	D	C	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	40.2											
HCM Volume to Capacity ratio	1.10											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	88.1%											
Analysis Period (min)	15											
c Critical Lane Group												

**APPENDIX H:
YEAR 2030 PLUS PROJECT CONDITIONS INTERSECTION
LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave. 2030 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	16	
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	
Fipb, ped/bikes	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.98	1.00	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4900	1770	4953	1770	4953	2006	2036	1986	1951			
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.10	1.00	0.42	1.00			
Satd. Flow (perm)	1770	4900	1770	4953	1770	4953	201	2036	874	1951			
Volume (vph)	310	1001	225	120	1660	250	200	299	70	180	425	290	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	326	1054	237	126	1747	263	211	315	74	189	447	305	
RTOR Reduction (vph)	0	29	0	0	16	0	0	7	0	0	0	21	
Lane Group Flow (vph)	326	1262	0	126	1994	0	211	382	0	189	731	0	
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10	
Turn Type	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	7	4		3	8		5	2		6		6	
Permitted Phases													
Actuated Green, G (s)	17.0	47.9		13.1	44.0		48.5	48.5		39.5		39.5	
Effective Green, g (s)	17.0	47.9		13.1	44.0		49.0	49.0		40.0		40.0	
Actuated g/C Ratio	0.14	0.40		0.11	0.37		0.41	0.41		0.33		0.33	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5		2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0	
Lane Grp Cap (vph)	251	1956		193	1816		187	831		291		650	
v/s Ratio Prot	c0.18	c0.26		0.07	c0.40		c0.07	0.19		c0.37		c0.37	
v/s Ratio Perm							0.39			0.22			
Uniform Delay, d1	1.30	0.65		0.65	1.10		1.13	0.46		0.65		1.13	
Progression Factor	1.00	1.00		1.00	1.00		0.97	0.97		1.00		1.00	
Incremental Delay, d2	160.6	1.7		7.7	53.2		104.5	0.4		4.9		75.0	
Delay (s)	212.1	30.8		59.0	91.2		163.2	26.3		39.0		115.0	
Level of Service	F	C		E	F		F	C		D		F	
Approach Delay (s)	67.4			89.3			74.4			99.7			
Approach LOS	E			F			E			F		F	
Intersection Summary													
HCM Average Control Delay	82.8											HCM Level of Service	F
HCM Volume to Capacity ratio	1.15												
Actuated Cycle Length (s)	120.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.9%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave. 2030 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97	
Fipb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.96	
Flt Protected	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1749	1749	1681	1597	1681	1597	3417	3417	1770	3291			
Flt Permitted	0.48	0.87	0.74	1.00	0.74	1.00	0.74	0.74	0.95	1.00			
Satd. Flow (perm)	847	1302	1597		1302	1597	2535	2535	1770	3291			
Volume (vph)	10	10	10	354	330	470	10	1168	246	110	1329	460	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	11	11	11	373	347	495	11	1229	259	116	1399	484	
RTOR Reduction (vph)	0	10	0	0	0	57	0	18	0	0	36	0	
Lane Group Flow (vph)	0	23	0	373	785	0	0	1481	0	116	1847	0	
Confl. Peds. (#/hr)	4			4	44		4	44	12	12	12	44	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot	
Protected Phases	7			8			2			1		6	
Permitted Phases													
Actuated Green, G (s)	5.1			26.5	26.5		32.5			7.9		44.9	
Effective Green, g (s)	5.6			27.0	27.0		33.0			8.4		45.4	
Actuated g/C Ratio	0.06			0.30	0.30		0.37			0.09		0.50	
Clearance Time (s)	4.5			4.5	4.5		4.5			4.5		4.5	
Vehicle Extension (s)	2.0			2.0	2.0		2.0			2.0		2.0	
Lane Grp Cap (vph)	53			391	479		930			165		1660	
v/s Ratio Prot	c0.03			0.29	0.49		c0.58			0.07		c0.56	
v/s Ratio Perm	0.43			0.95	1.64		1.59			0.70		1.11	
Uniform Delay, d1	40.7			30.9	31.5		28.5			39.6		22.3	
Progression Factor	1.00			1.00	1.00		0.97			1.00		1.00	
Incremental Delay, d2	2.0			33.3	296.4		268.1			10.5		59.9	
Delay (s)	42.7			64.2	327.9		295.7			50.1		82.2	
Level of Service	D			E	F		F			D		F	
Approach Delay (s)	42.7			247.0			295.7			80.3			
Approach LOS	D			F			F			F		F	
Intersection Summary													
HCM Average Control Delay	190.8											HCM Level of Service	F
HCM Volume to Capacity ratio	1.49												
Actuated Cycle Length (s)	90.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	137.8%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

2030 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fllp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.97	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3427	1770	3372	1770	3372	1770	3403	1770	3404	1770	3404
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3427	1770	3372	1770	3372	1770	3403	1770	3404	1770	3404
Volume (vph)	460	650	111	140	820	320	120	674	140	320	1163	220
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	677	116	146	854	333	125	702	146	333	1211	229
RTOR Reduction (vph)	0	15	0	0	46	0	0	20	0	0	17	0
Lane Group Flow (vph)	479	778	0	146	1141	0	125	828	0	333	1423	0
Confl. Peds. (#/hr)	6	24	24	24	6	36	28	28	28	28	28	36
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Actuated Green, G (s)	13.0	28.4	10.1	25.5	9.6	23.5	11.0	24.9				
Effective Green, g (s)	12.5	29.4	9.6	26.5	9.1	24.5	10.5	25.9				
Actuated g/C Ratio	0.14	0.33	0.11	0.29	0.10	0.27	0.12	0.29				
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	477	1119	189	993	179	926	207	980				
v/s Ratio Prot	c0.14	c0.23	0.08	c0.34	0.07	0.24	c0.19	c0.42				
v/s Ratio Perm	1.00	0.69	0.77	1.15	0.70	0.89	1.61	1.45				
Uniform Delay, d1	38.8	26.4	39.1	31.8	39.1	31.5	39.8	32.0				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.19	0.86				
Incremental Delay, d2	42.2	1.5	16.2	79.0	9.2	13.0	276.0	203.9				
Delay (s)	81.0	27.9	55.3	110.7	48.3	44.5	323.2	231.5				
Level of Service	F	C	E	F	D	D	F	F				
Approach Delay (s)	47.9		104.7				248.7					
Approach LOS	D		F				D					
Intersection Summary												
HCM Average Control Delay	128.1 HCM Level of Service F											
HCM Volume to Capacity ratio	1.30											
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	105.8% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: 47th St. & MLK Jr. Way

2030 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.86	0.86	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1611	1611	3283	3433	3495	1611	3283	3433	3495	1611	3283	3433
Flt Permitted	1.00	1.00	0.94	0.95	1.00	0.94	0.95	1.00	0.94	0.95	1.00	0.94
Satd. Flow (perm)	1611	1611	3074	3433	3495	1611	3074	3433	3495	1611	3074	3433
Volume (vph)	0	0	10	0	0	0	10	366	345	1600	664	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	0	0	11	0	0	0	11	385	363	1684	699	63
RTOR Reduction (vph)	0	11	0	0	0	0	0	26	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	733	0	1684	762	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases								2	1	6		
Permitted Phases												
Actuated Green, G (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	8.0	29.0	45.0	45.0
Effective Green, g (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	8.0	29.0	45.0	45.0
Actuated g/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0.64	1.00	1.00
Clearance Time (s)								4.0	4.0	4.0	2.0	2.0
Lane Grp Cap (vph)	0	0	0	0	0	0	0	546	546	2212	3495	3495
v/s Ratio Prot								c0.24	c0.24	0.76	0.22	0.22
v/s Ratio Perm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	11.34dr	11.34dr	0.76	0.22	0.22
Uniform Delay, d1	22.5	22.5	22.5	22.5	22.5	22.5	22.5	18.5	18.5	5.6	0.0	0.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.78	0.78	1.00	1.00	1.00
Incremental Delay, d2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	164.9	164.9	2.5	0.1	0.1
Delay (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	179.3	179.3	8.1	0.1	0.1
Level of Service	C	C	C	C	C	C	C	F	F	A	A	A
Approach Delay (s)	22.5	22.5	22.5	22.5	22.5	22.5	22.5	179.3	179.3	5.6	0.1	0.1
Approach LOS	C	C	C	C	C	C	C	F	F	A	A	A
Intersection Summary												
HCM Average Control Delay	46.7 HCM Level of Service D											
HCM Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	80.5% ICU Level of Service D											
Analysis Period (min)	15											
dr Defacto Right Lane. Recode with 1 through lane as a right lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2030 AM + Project
 1/21/2008

2030 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Fipb, ped/bikes	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Frt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1710	1606	3390	3476	3476	3476	3476	3476	3476	3476	3476	3476
Flt Permitted	0.83	0.88	0.88	0.87	0.87	0.88	0.87	0.87	0.88	0.88	0.88	0.88
Satd. Flow (perm)	1455	1427	2949	3055	3055	3055	3055	3055	3055	3055	3055	3055
Volume (vph)	80	100	31	60	70	110	41	511	90	60	794	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	105	33	63	74	116	43	538	95	63	836	42
RTOR Reduction (vph)	0	14	0	0	68	0	0	29	0	0	8	0
Lane Group Flow (vph)	0	208	0	0	185	0	0	647	0	0	933	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (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
Lane Grp Cap (vph)	485	485	476	476	476	1442	1442	1442	1442	1494	1494	1494
v/s Ratio Prot	c0.14	0.13	0.13	0.13	0.13	0.22	0.22	0.22	0.22	c0.31	c0.31	c0.31
v/s Ratio Perm	0.43	0.39	0.39	0.39	0.39	0.45	0.45	0.45	0.45	0.62	0.62	0.62
v/c Ratio	11.7	11.5	11.5	11.5	11.5	7.5	7.5	7.5	7.5	8.5	8.5	8.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.8	2.4	2.4	2.4	2.4	1.0	1.0	1.0	1.0	2.0	2.0	2.0
Incremental Delay, d2	14.4	13.9	13.9	13.9	13.9	8.5	8.5	8.5	8.5	10.4	10.4	10.4
Delay (s)	B	B	B	B	B	A	A	A	A	B	B	B
Level of Service	B	B	B	B	B	A	A	A	A	B	B	B
Approach Delay (s)	14.4	13.9	13.9	13.9	13.9	8.5	8.5	8.5	8.5	10.4	10.4	10.4
Approach LOS	B	B	B	B	B	A	A	A	A	B	B	B
Intersection Summary												
HCM Average Control Delay	10.7 HCM Level of Service B											
HCM Volume to Capacity ratio	0.55											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	73.6% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group	15											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.96	0.96	0.96	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Fipb, ped/bikes	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Frt	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1639	1645	3432	3432	3432	3432	3432	3432	3432	3432	3432	3432
Flt Permitted	0.76	0.81	0.81	0.81	0.81	0.76	0.76	0.76	0.76	0.80	0.80	0.80
Satd. Flow (perm)	1260	1345	2613	2613	2613	2613	2613	2613	2613	3975	3975	3975
Volume (vph)	80	100	80	53	90	70	40	1063	72	80	1925	100
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	105	84	56	95	74	42	1119	76	84	2026	105
RTOR Reduction (vph)	0	2	0	0	25	0	0	4	0	0	4	0
Lane Group Flow (vph)	0	271	0	0	200	0	0	1233	0	0	2211	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	6	6	6
Actuated Green, G (s)	19.4	19.4	19.4	19.4	19.4	19.4	56.6	56.6	56.6	56.6	56.6	56.6
Effective Green, g (s)	19.9	19.9	19.9	19.9	19.9	19.9	57.1	57.1	57.1	57.1	57.1	57.1
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.23	0.67	0.67	0.67	0.67	0.67	0.67
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	295	295	315	315	315	1755	1755	1755	1755	2670	2670	2670
v/s Ratio Prot	c0.22	0.15	0.15	0.15	0.15	0.47	0.47	0.47	0.47	c0.56	c0.56	c0.56
v/s Ratio Perm	0.92	0.64	0.64	0.64	0.64	0.70	0.70	0.70	0.70	0.83	0.83	0.83
v/c Ratio	31.8	29.3	29.3	29.3	29.3	8.7	8.7	8.7	8.7	10.3	10.3	10.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	31.9	3.1	3.1	3.1	3.1	2.4	2.4	2.4	2.4	3.1	3.1	3.1
Incremental Delay, d2	63.7	32.4	32.4	32.4	32.4	11.1	11.1	11.1	11.1	13.4	13.4	13.4
Delay (s)	E	C	C	C	C	B	B	B	B	B	B	B
Level of Service	E	C	C	C	C	B	B	B	B	B	B	B
Approach Delay (s)	63.7	32.4	32.4	32.4	32.4	11.1	11.1	11.1	11.1	13.4	13.4	13.4
Approach LOS	E	C	C	C	C	B	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	17.2 HCM Level of Service B											
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	85.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	112.3% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 7: 40th St. & Market St.

2030 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.99	1.00	0.99	1.00
Frt	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3372	1763	3454	1768	3454	1788	1835	1745	1815	1745	1815
Flt Permitted	0.17	1.00	0.18	1.00	0.24	1.00	0.24	1.00	0.45	1.00	0.45	1.00
Satd. Flow (perm)	324	3372	341	3454	449	1835	449	1835	823	1815	823	1815
Volume (vph)	180	509	190	93	937	114	160	381	33	203	600	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	536	200	98	986	120	168	401	35	214	632	116
RTOR Reduction (vph)	0	48	0	0	11	0	0	4	0	0	3	0
Lane Group Flow (vph)	189	688	0	98	1095	0	168	432	0	214	745	0
Conf. Peds. (#/hr)	30	12	12	12	30	6	30	6	54	54	6	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4											
Permitted Phases	8											
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	93	969	98	993	275	1124	275	1124	504	1112	504	1112
v/s Ratio Prot	0.20											
v/s Ratio Perm	0.32											
v/c Ratio	0.58	0.71	1.00	1.10	0.29	0.37	0.61	0.38	0.26	0.67	0.42	0.67
Uniform Delay, d1	28.5	25.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5	28.5
Progression Factor	1.00	1.00	0.87	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	499.9	4.4	80.4	58.1	9.7	1.0	1.0	1.0	2.6	3.2	10.7	13.4
Delay (s)	528.4	29.9	105.2	83.5	19.3	8.9	8.9	8.9	10.7	13.4	10.7	13.4
Level of Service	F	C	F	F	F	F	B	A	B	B	B	B
Approach Delay (s)	131.8											
Approach LOS	F											

Intersection Summary		E	
HCM Average Control Delay	66.0	HCM Level of Service	E
HCM Volume to Capacity ratio	1.10	Sum of lost time (s)	8.0
Actuated Cycle Length (s)	80.0	ICU Level of Service	G
Intersection Capacity Utilization	104.4%	Analysis Period (min)	15
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 8: 40th St. & West St.

2030 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.99	1.00	0.99	1.00
Frt	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1766	3409	1749	3496	1766	3409	1749	3496	1766	3409	1749	3496
Flt Permitted	0.16	1.00	0.30	1.00	0.30	1.00	0.65	1.00	0.65	1.00	0.65	1.00
Satd. Flow (perm)	297	3409	561	3496	297	3409	561	3496	297	3409	561	3496
Volume (vph)	80	565	130	74	964	72	120	281	74	123	380	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	595	137	78	1015	76	126	296	78	129	400	74
RTOR Reduction (vph)	0	25	0	0	7	0	0	19	0	0	14	0
Lane Group Flow (vph)	84	707	0	78	1084	0	0	481	0	0	589	0
Conf. Peds. (#/hr)	18	54	54	54	18	4	18	4	18	18	18	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4											
Permitted Phases	8											
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Clearance 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
Lane Grp Cap (vph)	145	1662	273	1704	145	1662	273	1704	923	1009	1009	1009
v/s Ratio Prot	0.21											
v/s Ratio Perm	0.31											
v/c Ratio	0.28	0.43	0.29	0.64	0.28	0.43	0.29	0.64	0.22	0.52	0.58	0.58
Uniform Delay, d1	14.6	13.3	12.2	15.2	14.6	13.3	12.2	15.2	17.6	18.2	18.2	18.2
Progression Factor	0.97	0.91	1.39	1.44	0.97	0.91	1.39	1.44	0.53	0.53	0.53	0.53
Incremental Delay, d2	12.8	0.6	2.1	1.5	2.1	1.5	2.1	1.5	1.4	2.5	2.5	2.5
Delay (s)	27.1	12.7	19.1	23.4	27.1	12.7	19.1	23.4	10.8	20.7	20.7	20.7
Level of Service	C	B	B	C	C	B	B	C	B	C	C	C
Approach Delay (s)	14.1											
Approach LOS	B											

Intersection Summary		B	
HCM Average Control Delay	18.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.61	Sum of lost time (s)	8.0
Actuated Cycle Length (s)	80.0	ICU Level of Service	D
Intersection Capacity Utilization	78.0%	Analysis Period (min)	15
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2030 AM + Project
 1/21/2008

2030 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1766	3478	1745	3454	1745	3454	3385	3424	1745	3454	3424	1745
Flt Permitted	0.15	1.00	0.30	1.00	0.30	1.00	0.80	1.00	0.80	1.00	0.74	1.00
Satd. Flow (perm)	288	3478	556	3454	2709	3454	2709	3454	2709	3454	2554	2709
Volume (vph)	50	662	61	125	951	144	49	248	77	149	476	80
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	690	64	130	991	150	51	258	80	155	496	83
RTOR Reduction (vph)	0	9	0	0	15	0	0	29	0	0	12	0
Lane Group Flow (vph)	52	745	0	130	1126	0	0	360	0	0	722	0
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	148	1782	285	1770	1050	1770	1050	990	1050	990	990	990
v/s Ratio Prot	0.21			c0.33								
v/s Ratio Perm	0.18	0.21	0.23	0.23	0.23	0.13	0.13	0.13	0.13	0.28	0.28	0.28
v/c Ratio	0.35	0.42	0.46	0.64	0.64	0.34	0.34	0.34	0.34	0.73	0.73	0.73
Uniform Delay, d1	11.6	12.1	12.4	14.1	14.1	17.3	17.3	17.3	17.3	20.9	20.9	20.9
Progression Factor	1.20	1.20	1.56	1.51	1.51	0.61	0.61	0.61	0.61	1.00	1.00	1.00
Incremental Delay, d2	5.8	0.7	4.7	1.6	1.6	0.9	0.9	0.9	0.9	4.7	4.7	4.7
Delay (s)	19.7	15.2	24.1	22.9	22.9	11.4	11.4	11.4	11.4	25.6	25.6	25.6
Level of Service	B	B	C	C	C	B	B	B	B	C	C	C
Approach Delay (s)	15.5			23.0			11.4			25.6		
Approach LOS	B			C			B			C		
Intersection Summary												
HCM Average Control Delay	20.3		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.68		Sum of lost time (s)		8.0							
Actuated Cycle Length (s)	80.0		ICU Level of Service		G							
Intersection Capacity Utilization	103.6%		Analysis Period (min)		15							
Analysis Period (min)	15		Critical Lane Group		c							

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	0.96	1.00	0.96	1.00	0.96	1.00	0.96	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	1.00	0.98	1.00	0.98	1.00	0.97	1.00
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.96	1.00	0.96
Satd. Flow (prot)	3342	1770	3539	1734	3342	1770	3539	1734
Flt Permitted	1.00	0.95	1.00	0.96	1.00	0.95	1.00	0.96
Satd. Flow (perm)	3342	1770	3539	1734	3342	1770	3539	1734
Volume (vph)	793	95	72	1099	121	41	793	95
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	835	100	76	1157	127	43	835	100
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	935	0	76	1157	170	0	935	0
Confl. Peds. (#/hr)	146			266			146	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4			3			8	
Permitted Phases	4			3			8	
Actuated Green, G (s)	48.1			7.6			59.7	
Effective Green, g (s)	48.1			7.6			59.7	
Actuated g/C Ratio	0.60			0.09			0.75	
Clearance Time (s)	4.0			4.0			4.0	
Vehicle Extension (s)	3.0			3.0			3.0	
Lane Grp Cap (vph)	2009			168			267	
v/s Ratio Prot	c0.28			0.04			c0.33	
v/s Ratio Perm	0.47			0.45			0.44	
v/c Ratio	8.8			34.2			3.8	
Uniform Delay, d1	1.67			1.00			1.00	
Progression Factor	0.7			1.9			0.5	
Incremental Delay, d2	15.5			36.2			4.4	
Delay (s)	15.5			36.2			4.4	
Level of Service	B			D			A	
Approach Delay (s)	15.5			6.3			35.6	
Approach LOS	B			A			D	
Intersection Summary								
HCM Average Control Delay	12.1		HCM Level of Service		B			
HCM Volume to Capacity ratio	0.50		Sum of lost time (s)		12.0			
Actuated Cycle Length (s)	80.0		ICU Level of Service		A			
Intersection Capacity Utilization	48.9%		Analysis Period (min)		15			
Analysis Period (min)	15		Critical Lane Group		c			

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2030 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Lane Util. Factor	1.00	0.93	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Fipb, ped/bikes	0.97	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	0.94	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3096	1690	3414	1770	3437	1770	3357	1770	3357	1770	3357	
Flt Permitted	0.15	1.00	0.20	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (pperm)	278	3096	365	3414	1770	3437	1770	3357	1770	3357	1770	3357	
Volume (vph)	146	421	267	120	716	90	135	509	59	100	1318	320	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	154	443	281	126	754	95	142	536	62	105	1387	337	
RTOR Reduction (vph)	0	119	0	0	11	0	9	0	0	0	23	0	
Lane Group Flow (vph)	154	605	0	126	838	0	142	589	0	105	1701	0	
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	58	92	
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	4	8	8	5	2	1	6	1	6	1	6	1	
Permitted Phases	4	8	8	5	2	1	6	1	6	1	6	1	
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	10.7	37.9	8.1	35.3	8.1	35.3	8.1	
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	11.2	38.4	8.6	35.8	8.6	35.8	8.6	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.13	0.45	0.10	0.42	0.10	0.42	0.10	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grip Cap (vph)	85	947	112	1044	233	1553	179	1414	179	1414	179	1414	
v/s Ratio Prot	0.20	0.25	0.25	c0.08	c0.17	0.06	c0.51	0.06	c0.51	0.06	c0.51	0.06	
v/s Ratio Perm	c0.55	0.35	0.35	0.61	0.38	0.59	1.20	0.59	1.20	0.59	1.20	0.59	
v/c Ratio	1.81	0.64	1.12	0.80	0.61	0.38	0.59	1.20	0.59	1.20	0.59	1.20	
Uniform Delay, d1	29.5	25.5	29.5	27.1	34.8	15.4	36.5	24.6	36.5	24.6	36.5	24.6	
Progression Factor	1.00	1.00	1.00	1.00	1.00	0.96	1.34	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	407.6	1.1	122.6	4.3	3.0	0.7	3.1	98.3	3.1	98.3	3.1	98.3	
Delay (s)	437.1	26.5	152.1	31.4	36.3	21.3	39.6	122.9	39.6	122.9	39.6	122.9	
Level of Service	F	C	F	C	D	C	D	F	D	F	D	F	
Approach Delay (s)	98.5	F	47.0	D	24.2	C	118.1	F	118.1	F	118.1	F	
Approach LOS	F	D	D	C	C	C	F	F	F	F	F	F	
Intersection Summary													
HCM Average Control Delay	82.8											HCM Level of Service	F
HCM Volume to Capacity ratio	1.40												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	99.9%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. 2030 AM + Project
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	31	689	20	20	1679
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	33	725	21	21	1767
Pedestrians	34	33	33	33	34	34
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	3	3	3	3	3	3
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	None	None	None	None	None	None
Upstream signal (ft)	None	None	230	None	None	471
pX, platoon unblocked	0.62	0.92	0.92	0.92	0.92	0.92
VC, conflicting volume	1729	441	780	441	780	780
VC1, stage 1 conf vol	None	None	None	None	None	None
VC2, stage 2 conf vol	None	None	None	None	None	None
vCu, unblocked vol	1156	300	670	300	670	670
tC, single (s)	6.8	6.9	4.1	6.9	4.1	4.1
tC, 2 stage (s)	None	None	None	None	None	None
tF (s)	3.5	3.3	2.2	3.3	2.2	2.2
p0 queue free %	80	95	97	95	97	97
cM capacity (veh/h)	108	603	816	603	816	816
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	54	484	263	21	884	884
Volume Left	21	0	0	21	0	0
Volume Right	33	0	21	0	0	0
cSH	215	1700	1700	816	1700	1700
Volume to Capacity	0.25	0.28	0.15	0.03	0.52	0.52
Queue Length 95th (ft)	24	0	0	2	0	0
Control Delay (s)	27.2	0.0	0.0	9.5	0.0	0.0
Lane LOS	D	A	A	A	A	A
Approach Delay (s)	27.2	0.0	0.1	0.1	0.0	0.0
Approach LOS	D	D	D	D	D	D
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	63.7%					
ICU Level of Service	B					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2030 AM + Project
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	0.98	1.00	0.97	1.00	0.96	1.00	0.96	1.00	0.96	1.00
Frt	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.95	1.00	0.95	1.00
Flt Protected	4981	1763	3448	1763	3448	1763	1763	1763	1763	1763	1763	1763
Satd. Flow (prot)	0.65	0.24	1.00	0.24	1.00	0.10	0.39	1.00	0.39	1.00	0.39	1.00
Flt Permitted	3273	454	3448	454	3448	180	718	1763	718	1763	454	3448
Satd. Flow (perm)	210	709	50	71	1094	191	100	183	90	200	493	200
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	221	746	53	75	1152	201	105	193	95	211	519	211
Adj. Flow (vph)	0	7	0	0	17	0	13	0	0	0	17	0
RTOR Reduction (vph)	0	1013	0	75	1336	0	0	380	0	211	713	0
Lane Group Flow (vph)	24	18	18	24	24	24	48	48	48	48	48	24
Conf. Peds. (#/hr)	Perm											
Turn Type	Perm											
Protected Phases	4											
Permitted Phases	4											
Actuated Green, G (s)	51.0											
Effective Green, g (s)	52.0											
Actuated g/C Ratio	0.61											
Clearance Time (s)	5.0											
Lane Grp Cap (vph)	2002											
v/s Ratio Prot	c0.39											
v/s Ratio Perm	0.31											
v/c Ratio	1.40dl											
Uniform Delay, d1	9.3											
Progression Factor	1.00											
Incremental Delay, d2	0.9											
Delay (s)	10.2											
Level of Service	B											
Approach Delay (s)	10.2											
Approach LOS	B											

Intersection Summary	
HCM Average Control Delay	348.2
HCM Volume to Capacity ratio	2.76
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	158.7%
Analysis Period (min)	15
dl Defacto Left Lane. Recode with 1 through lane as a left lane.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2030 AM + Project
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Frt	1.00	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	5033	1763	3448	1763	3448	1763	1763	1763	1763	1763	1763	1763
Satd. Flow (prot)	0.74	0.24	1.00	0.24	1.00	0.10	0.39	1.00	0.39	1.00	0.39	1.00
Flt Permitted	3725	461	3448	461	3448	180	718	1763	718	1763	461	3448
Satd. Flow (perm)	80	909	30	71	1187	111	70	304	83	150	364	80
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	84	957	32	75	1249	117	74	320	87	158	383	84
Adj. Flow (vph)	0	4	0	0	13	0	12	0	0	0	10	0
RTOR Reduction (vph)	0	1069	0	0	1428	0	74	395	0	158	457	0
Lane Group Flow (vph)	18	18	18	18	18	12	12	12	12	12	12	18
Conf. Peds. (#/hr)	Perm											
Turn Type	Perm											
Protected Phases	4											
Permitted Phases	4											
Actuated Green, G (s)	50.0											
Effective Green, g (s)	51.5											
Actuated g/C Ratio	0.64											
Clearance Time (s)	5.5											
Lane Grp Cap (vph)	2398											
v/s Ratio Prot	c0.35											
v/s Ratio Perm	0.45											
v/c Ratio	7.1											
Uniform Delay, d1	7.8											
Progression Factor	1.00											
Incremental Delay, d2	0.6											
Delay (s)	7.7											
Level of Service	A											
Approach Delay (s)	7.7											
Approach LOS	A											

Intersection Summary	
HCM Average Control Delay	36.2
HCM Volume to Capacity ratio	0.87
Actuated Cycle Length (s)	80.0
Intersection Capacity Utilization	89.4%
Analysis Period (min)	15
dl Defacto Left Lane. Recode with 1 through lane as a left lane.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2030 AM + Project
1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←←←→→→←←←											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Fp/b, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5022	4988	4988	3403	3432	3432	3403	3403	3432	3432	3403	3432
Flt Permitted	0.77	0.80	0.80	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69	0.69
Satd. Flow (perm)	3858	4020	4020	2377	2377	2377	2377	2377	2377	2377	2377	2377
Volume (vph)	64	1029	60	68	1264	146	40	174	44	107	461	74
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	67	1083	63	72	1331	154	42	183	46	113	485	78
RTOR Reduction (vph)	0	7	0	0	17	0	0	22	0	0	13	0
Lane Group Flow (vph)	0	1206	0	0	1540	0	0	249	0	0	663	0
Conf. Peds. (#/hr)	17	19	19	17	12	16	16	16	16	16	16	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2484	2588	2588	2588	2588	2588	609	609	609	609	716	716
v/s Ratio Prot	0.31	0.31	0.31	0.38	0.38	0.38	0.10	0.10	0.10	0.10	0.24	0.24
v/s Ratio Perm	0.49	0.49	0.49	0.60	0.60	0.60	0.41	0.41	0.41	0.41	0.93	0.93
v/c Ratio	7.4	7.4	7.4	8.2	8.2	8.2	24.7	24.7	24.7	24.7	29.0	29.0
Uniform Delay, d1	0.66	1.14	1.14	1.14	1.14	1.14	1.00	1.00	1.00	1.00	0.48	0.48
Progression Factor	0.5	0.9	0.9	0.9	0.9	0.9	2.0	2.0	2.0	2.0	19.0	19.0
Incremental Delay, d2	5.4	10.3	10.3	10.3	10.3	10.3	26.8	26.8	26.8	26.8	33.0	33.0
Delay (s)	A	B	B	B	B	B	C	C	C	C	C	C
Level of Service	A	B	B	B	B	B	C	C	C	C	C	C
Approach Delay (s)	5.4	10.3	10.3	10.3	10.3	10.3	26.8	26.8	26.8	26.8	33.0	33.0
Approach LOS	A	B	B	B	B	B	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	14.0 HCM Level of Service B											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	121.4% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2030 AM + Project
1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←←←→→→←←←											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Fp/b, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5073	4947	4947	1695	1695	1695	1695	1695	1695	1695	1594	1594
Flt Permitted	0.86	0.93	0.93	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87	0.87
Satd. Flow (perm)	4368	4590	4590	1510	1510	1510	1510	1510	1510	1510	1409	1409
Volume (vph)	31	1258	10	10	1405	100	10	10	10	54	0	73
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	33	1324	11	11	1479	105	11	11	11	57	0	77
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	9	0	0
Lane Group Flow (vph)	0	1367	0	0	1595	0	0	13	0	0	134	0
Conf. Peds. (#/hr)	17	19	19	17	12	16	16	16	16	16	12	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	57.7	57.7	57.7	57.7	57.7	57.7	14.3	14.3	14.3	14.3	14.3	14.3
Effective Green, g (s)	57.7	57.7	57.7	57.7	57.7	57.7	14.3	14.3	14.3	14.3	14.3	14.3
Actuated g/C Ratio	0.72	0.72	0.72	0.72	0.72	0.72	0.18	0.18	0.18	0.18	0.18	0.18
Clearance Time (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
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
Lane Grp Cap (vph)	3150	3311	3311	3311	3311	3311	270	270	270	252	252	252
v/s Ratio Prot	0.31	0.31	0.31	0.35	0.35	0.35	0.01	0.01	0.01	0.01	0.10	0.10
v/s Ratio Perm	0.43	0.43	0.43	0.48	0.48	0.48	0.05	0.05	0.05	0.05	0.53	0.53
v/c Ratio	4.5	4.5	4.5	4.8	4.8	4.8	27.2	27.2	27.2	29.8	29.8	29.8
Uniform Delay, d1	1.38	1.38	1.38	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.04	1.04
Progression Factor	0.4	0.4	0.4	0.5	0.5	0.5	0.1	0.1	0.1	2.0	2.0	2.0
Incremental Delay, d2	6.6	6.6	6.6	5.3	5.3	5.3	27.3	27.3	27.3	32.9	32.9	32.9
Delay (s)	A	A	A	A	A	A	C	C	C	C	C	C
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	6.6	6.6	6.6	5.3	5.3	5.3	27.3	27.3	27.3	32.9	32.9	32.9
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	7.2 HCM Level of Service A											
HCM Volume to Capacity ratio	0.49											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	77.2% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave. 2030 AM + Project
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	4933	4925	4925	1770	3408	1744	3425					
Flt Permitted	0.64	0.64	0.64	0.13	1.00	0.39	1.00					
Satd. Flow (pbrm)	3169	3174	3174	244	3408	723	3425					
Volume (vph)	147	988	187	200	1146	190	120	375	90	364	1139	239
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	155	1040	197	211	1206	200	126	395	95	383	1199	252
RTOR Reduction (vph)	0	23	0	0	24	0	0	23	0	0	19	0
Lane Group Flow (vph)	0	1369	0	0	1593	0	126	467	0	383	1432	0
Confl. Peds. (#/hr)	40		9		40	25	31	31		31		25
Turn Type	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4		3	8				2			6	
Permitted Phases	4		8			2		2		6		
Actuated Green, G (s)	45.0		45.0		45.0		29.5	29.5		29.5		29.5
Effective Green, g (s)	46.5		46.5		46.5		30.5	30.5		30.5		30.5
Actuated g/C Ratio	0.55		0.55		0.55		0.36	0.36		0.36		0.36
Clearance Time (s)	5.5		5.5		5.5		5.0	5.0		5.0		5.0
Vehicle Extension (s)	2.0		2.0		2.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	1734		1736		1736		88	1223		259		1229
v/s Ratio Prot								0.14				0.42
v/s Ratio Perm	0.43		0.50		0.52		0.52	0.52		0.53		0.53
v/c Ratio	0.98dl		1.55dl		1.43		0.38	0.38		1.48		1.16
Uniform Delay, d1	15.3		17.5		27.2		20.2	27.2		27.2		27.2
Progression Factor	1.00		1.00		1.27		1.29	0.62		0.62		0.61
Incremental Delay, d2	2.3		8.0		245.4		0.9	228.1		80.2		80.2
Delay (s)	17.6		25.5		279.9		26.9	245.0		96.9		96.9
Level of Service	B		C		F		C	F		F		F
Approach Delay (s)	17.6		25.5		25.5		78.7	127.8		127.8		127.8
Approach LOS	B		C		C		E	F		F		F

Intersection Summary	
HCM Average Control Delay	63.9
HCM Volume to Capacity ratio	1.14
Actuated Cycle Length (s)	85.0
Intersection Capacity Utilization	116.7%
Analysis Period (min)	15
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	H
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St. 2030 AM + Project
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5058	5005	5005	1770	1395	1603						
Flt Permitted	0.83	0.83	0.83	0.82	0.82	0.84	1.00	0.81				
Satd. Flow (pbrm)	4208	4107	4107	1512	1395	1334						
Volume (vph)	40	1409	23	50	1474	90	32	43	30	100	40	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	1483	24	53	1552	95	34	45	32	105	42	63
RTOR Reduction (vph)	0	2	0	0	8	0	0	0	0	18	0	15
Lane Group Flow (vph)	0	1547	0	0	1692	0	0	79	14	0	195	0
Confl. Peds. (#/hr)	100		100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4		4		8		2			2		6
Permitted Phases	4		4		8		2			2		6
Actuated Green, G (s)	48.0		48.0		48.0		23.0	23.0		23.0		23.0
Effective Green, g (s)	48.5		48.5		48.5		23.5	23.5		23.5		23.5
Actuated g/C Ratio	0.61		0.61		0.61		0.29	0.29		0.29		0.29
Clearance Time (s)	4.5		4.5		4.5		4.5	4.5		4.5		4.5
Lane Grp Cap (vph)	2551		2551		2490		444	410		410		392
v/s Ratio Prot								0.05		0.01		0.15
v/s Ratio Perm	0.37		0.61		0.68		0.18	0.18		0.03		0.50
v/c Ratio	9.8		9.8		10.5		21.1	20.2		20.2		23.4
Uniform Delay, d1	1.00		1.00		1.00		1.00	1.00		1.00		1.00
Progression Factor	1.1		1.1		1.5		0.9	0.2		0.2		0.2
Incremental Delay, d2	10.9		12.1		12.1		21.9	20.3		27.8		27.8
Delay (s)	B		B		B		C	C		C		C
Level of Service	B		B		B		C	C		C		C
Approach Delay (s)	10.9		12.1		12.1		21.5	27.8		27.8		27.8
Approach LOS	B		B		B		C	C		C		C

Intersection Summary	
HCM Average Control Delay	12.8
HCM Volume to Capacity ratio	0.62
Actuated Cycle Length (s)	80.0
Intersection Capacity Utilization	94.0%
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.96	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.85	1.00	1.00	0.85	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1770	4923	1770	4839	1770	3539	1515	1770	3539	1523	1770	3539	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (pbrm)	1770	4923	1770	4839	1770	3539	1515	1770	3539	1523	1770	3539	
Volume (vph)	170	1207	171	210	1144	380	140	421	130	390	1441	250	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	179	1271	180	221	1204	400	147	443	137	411	1517	263	
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	33	0	0	13	
Lane Group Flow (vph)	179	1436	0	221	1554	0	147	443	104	411	1517	250	
Confl. Peds. (#/hr)			66			23			38			26	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	pm+ov	
Protected Phases	7	4		3	8		5	2	3	1	6	7	
Permitted Phases												6	
Actuated Green, G (s)	12.0	32.0		15.0	35.0		11.0	28.0	43.0	29.0	46.0	58.0	
Effective Green, g (s)	11.0	33.0		14.0	36.0		10.0	29.0	43.0	28.0	47.0	58.0	
Actuated g/C Ratio	0.09	0.28		0.12	0.30		0.08	0.24	0.36	0.23	0.39	0.48	
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	162	1354		207	1452		148	855	593	413	1386	736	
v/s Ratio Prot	0.10	0.29		c0.12	c0.32		c0.08	0.13	0.02	0.23	c0.43	0.03	
v/s Ratio Perm	1.10	1.06		1.07	1.07		0.99	0.52	0.18	1.00	1.09	0.34	
Uniform Delay, d1	54.5	43.5		53.0	42.0		55.0	39.4	26.4	45.9	36.5	19.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	101.6	42.2		81.6	45.0		71.6	2.2	0.1	42.7	54.3	0.1	
Delay (s)	156.1	85.7		134.6	87.0		126.5	41.7	26.4	88.6	90.8	19.3	
Level of Service	F	F		F	F		F	D	C	F	F	B	
Approach Delay (s)	93.4			92.7			56.0				81.8		
Approach LOS	F			F			E				F		
Intersection Summary													
HCM Average Control Delay	85.0											HCM Level of Service	F
HCM Volume to Capacity ratio	1.09												
Actuated Cycle Length (s)	120.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.5%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2030 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Frbp, ped/bikes	0.94	0.94	0.94	0.97	0.96	0.96	1.00	0.98	1.00	0.98	1.00	0.99	
Fipb, ped/bikes	0.98	0.98	0.98	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	1.00	
Frt	0.96	0.96	0.96	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	1.00	
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	1.00	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1608	1608	1608	1632	1632	1632	1733	3430	1657	3472	1657	3472	
Flt Permitted	0.71	0.71	0.71	0.79	0.79	0.79	1.00	0.17	1.00	0.38	1.00	1.00	
Satd. Flow (pbrm)	1159	1159	1159	1311	1311	1311	305	3430	663	3472	663	3472	
Volume (vph)	62	50	50	70	80	64	80	589	60	52	1202	72	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	65	53	53	74	84	67	84	620	63	55	1285	76	
RTOR Reduction (vph)	0	22	0	0	20	0	0	7	0	0	0	4	
Lane Group Flow (vph)	0	149	0	0	205	0	84	676	0	55	1337	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	4	4	4	2	2	2	2	6	6	
Permitted Phases												6	
Actuated Green, G (s)	15.9	15.9	15.9	15.9	15.9	15.9	62.1	62.1	62.1	62.1	62.1	62.1	
Effective Green, g (s)	15.4	15.4	15.4	15.4	15.4	15.4	61.6	61.6	61.6	61.6	61.6	61.6	
Actuated g/C Ratio	0.18	0.18	0.18	0.18	0.18	0.18	0.72	0.72	0.72	0.72	0.72	0.72	
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	210	210	210	238	238	221	2486	480	2516	480	2516	480	
v/s Ratio Prot	0.13	0.13	0.13	c0.16	c0.16	c0.16	0.28	0.20	0.08	0.08	c0.39	0.08	
v/s Ratio Perm	0.71	0.71	0.71	0.86	0.86	0.86	0.38	0.27	0.11	0.11	0.53	0.53	
Uniform Delay, d1	32.7	32.7	32.7	33.7	33.7	33.7	4.4	4.0	3.5	3.5	5.2	5.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.90	
Incremental Delay, d2	8.6	8.6	8.6	24.4	24.4	24.4	4.9	0.3	0.0	0.0	0.1	0.1	
Delay (s)	41.3	41.3	41.3	58.1	58.1	58.1	9.4	4.3	3.4	3.4	4.8	4.8	
Level of Service	D	D	D	E	E	E	A	A	A	A	A	A	
Approach Delay (s)	41.3	41.3	41.3	58.1	58.1	58.1	4.8	4.8	4.8	4.8	4.7	4.7	
Approach LOS	D	D	D	E	E	E	A	A	A	A	A	A	
Intersection Summary													
HCM Average Control Delay	11.9											HCM Level of Service	B
HCM Volume to Capacity ratio	0.60												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.2%											ICU Level of Service	C
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

2030 AM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.97
Frbp, ped/bikes	1.00	0.98	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Frt	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.95	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3379	1770	3267	1770	3412	1770	3412	1685	3338	1770	3379
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3379	1770	3267	1770	3412	1770	3412	1685	3338	1770	3379
Volume (vph)	270	500	100	140	710	199	70	361	60	172	1020	220
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	526	105	147	747	209	74	380	63	181	1074	232
RTOR Reduction (vph)	0	18	0	0	30	0	0	15	0	0	20	0
Lane Group Flow (vph)	284	613	0	147	926	0	74	428	0	181	1286	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		3	8		2		2		6	
Actuated Green, G (s)	16.5	28.0		11.0	22.5		32.5		32.5		32.5	
Effective Green, g (s)	17.0	27.5		11.5	22.0		34.0		34.0		34.0	
Actuated g/C Ratio	0.20	0.32		0.14	0.26		0.40		0.40		0.40	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5		5.5		5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	354	1093		239	846		88		1365		314	
v/s Ratio Prot	c0.16	0.18		0.08	c0.28		0.13		0.13		c0.39	
v/s Ratio Perm	0.80	0.56		0.62	1.09		0.34		0.23		0.23	
Uniform Delay, d1	32.4	23.8		34.7	31.5		23.1		17.5		19.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2	11.7	0.4		3.3	59.8		59.2		0.6		7.5	
Delay (s)	44.1	24.2		37.9	91.3		82.2		18.1		27.4	
Level of Service	D	C		D	F		F		B		C	D
Approach Delay (s)	30.3		C	84.2		F	27.3		C		40.3	
Approach LOS	C		C	F		F	C		C		D	
Intersection Summary												
HCM Average Control Delay	48.4											
HCM Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	96.0%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave.

2030 AM + Project
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.99
Frt	0.91	1.00	1.00	1.00	0.99	1.00
Flt Protected	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1670	1770	3539	3514	1670	1770
Flt Permitted	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1670	1770	3539	3514	1670	1770
Volume (vph)	67	126	58	665	1627	78
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.95
Adj. Flow (vph)	71	133	61	672	1643	82
RTOR Reduction (vph)	96	0	0	0	3	0
Lane Group Flow (vph)	108	0	61	672	1722	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	15.7		7.4	61.3	49.9	
Effective Green, g (s)	15.7		7.4	61.3	49.9	
Actuated g/C Ratio	0.18		0.09	0.72	0.59	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	308		154	2552	2063	
v/s Ratio Prot	c0.06		c0.03	0.19	c0.49	
v/s Ratio Perm	0.35		0.40	0.26	0.83	
Uniform Delay, d1	30.2		36.7	4.1	14.2	
Progression Factor	1.00		0.99	1.79	1.10	
Incremental Delay, d2	0.7		1.4	0.2	0.4	
Delay (s)	30.9		37.8	7.5	16.0	
Level of Service	C		D	A	B	
Approach Delay (s)	30.9		10.0	16.0	16.0	
Approach LOS	C		B	B	B	
Intersection Summary						
HCM Average Control Delay	15.5					
HCM Volume to Capacity ratio	0.69					
Actuated Cycle Length (s)	85.0					
Intersection Capacity Utilization	66.3%					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

2030 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	16
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Flt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.95	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4925	1770	4960	1770	4960	2006	1990	1960	1918	1918	1918
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.12	1.00	0.54	1.00	1.00	1.00
Satd. Flow (perm)	1770	4925	1770	4960	1770	4960	257	1990	1110	1918	1918	1918
Volume (vph)	350	1302	191	120	1070	170	200	257	100	160	289	280
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	368	1371	201	126	1126	179	211	271	105	168	304	295
RTOR Reduction (vph)	0	19	0	0	21	0	0	14	0	0	35	0
Lane Group Flow (vph)	368	1553	0	126	1284	0	211	362	0	168	564	0
Confl. Peds. (#/hr)	32	32	32	32	32	32	4	12	24	24	24	12
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	4	3	8	5	2	2	2	2	6	6
Permitted Phases												
Actuated Green, G (s)	20.0	36.6	9.6	26.2	43.3	43.3	43.3	43.3	30.3	30.3	30.3	30.3
Effective Green, g (s)	20.0	36.6	9.6	26.2	43.8	43.8	43.8	43.8	30.8	30.8	30.8	30.8
Actuated g/C Ratio	0.20	0.37	0.10	0.26	0.44	0.44	0.44	0.44	0.31	0.31	0.31	0.31
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5
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
Lane Grp Cap (vph)	354	1803	170	1300	305	872	342	591	342	591	591	591
v/s Ratio Prot	c0.21	0.32	0.07	c0.26	c0.08	0.18	c0.29	0.23	0.15	0.15	0.29	0.29
v/s Ratio Perm	1.04	0.86	0.74	0.99	0.69	0.42	0.49	0.95	0.49	0.95	0.95	0.95
Uniform Delay, d1	40.0	29.4	44.0	36.7	44.3	19.3	28.2	33.9	28.2	33.9	33.9	33.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	58.5	5.7	15.9	22.1	6.6	0.3	1.1	25.8	1.1	25.8	25.8	25.8
Delay (s)	98.5	35.0	59.9	58.9	50.9	19.6	29.3	59.7	29.3	59.7	59.7	59.7
Level of Service	F	D	E	E	D	B	C	E	C	E	E	E
Approach Delay (s)	47.1	47.1	47.1	59.0	47.1	30.9	53.1	53.1	53.1	53.1	53.1	53.1
Approach LOS	D	D	D	E	E	C	D	D	C	D	D	D
Intersection Summary												
HCM Average Control Delay	49.6											
HCM Volume to Capacity ratio	0.94											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	101.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2030 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.93	1.00	0.93	1.00	0.93	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.99	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1705	1705	1681	1586	1705	1681	3275	3275	1770	3208	3208	3208
Flt Permitted	0.36	0.36	0.73	1.00	0.73	1.00	0.94	0.94	0.95	1.00	0.95	1.00
Satd. Flow (perm)	619	619	1290	1586	619	1290	3087	3087	1770	3208	3208	3208
Volume (vph)	10	10	20	126	120	120	10	1113	615	200	898	420
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	11	21	133	126	126	11	1172	647	211	945	442
RTOR Reduction (vph)	0	20	0	0	39	0	0	64	0	0	46	0
Lane Group Flow (vph)	0	23	0	133	213	0	0	1766	0	211	1341	0
Confl. Peds. (#/hr)	36	36	36	36	36	36	48	16	16	16	16	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	7	7	7	8	8	8	2	2	2	1	1	6
Permitted Phases												
Actuated Green, G (s)	6.5	6.5	16.7	16.7	16.7	16.7	45.7	45.7	13.1	63.3	63.3	63.3
Effective Green, g (s)	7.0	7.0	17.2	17.2	17.2	17.2	46.2	46.2	13.6	63.8	63.8	63.8
Actuated g/C Ratio	0.07	0.07	0.17	0.17	0.17	0.17	0.46	0.46	0.14	0.64	0.64	0.64
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	43	43	222	273	273	273	1426	1426	241	2047	2047	2047
v/s Ratio Prot	c0.04	c0.04	0.10	0.13	0.13	0.13	c0.57	c0.57	0.12	0.42	0.42	0.42
v/s Ratio Perm	0.55	0.55	0.60	0.78	0.78	0.78	1.24	1.24	0.88	0.66	0.66	0.66
Uniform Delay, d1	45.0	45.0	38.2	39.6	39.6	39.6	26.9	26.9	42.4	11.3	11.3	11.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.62	0.62	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.4	7.4	2.9	12.5	12.5	12.5	107.9	107.9	27.1	1.7	1.7	1.7
Delay (s)	52.3	52.3	41.1	52.1	52.1	52.1	124.5	124.5	69.5	12.9	12.9	12.9
Level of Service	D	D	D	D	D	D	F	F	E	B	B	B
Approach Delay (s)	52.3	52.3	48.3	48.3	48.3	48.3	124.5	124.5	20.4	20.4	20.4	20.4
Approach LOS	D	D	D	D	D	D	F	F	C	C	C	C
Intersection Summary												
HCM Average Control Delay	72.9											
HCM Volume to Capacity ratio	1.03											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	118.1%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave. 2030 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frb, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.98	
Fllb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.94	1.00	0.96	1.00	0.96	1.00	0.99	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3418	1770	3299	1770	3280	1770	3416	1770	3416	1770	3416	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (iperm)	3433	3418	1770	3299	1770	3280	1770	3416	1770	3416	1770	3416	
Volume (vph)	460	930	132	160	580	350	100	948	350	300	694	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	484	979	139	168	611	368	105	998	368	316	731	63	
RTOR Reduction (vph)	0	11	0	0	90	0	0	38	0	0	7	0	
Lane Group Flow (vph)	484	1107	0	168	889	0	105	1328	0	316	787	0	
Confl. Peds. (#/hr)	15	48	48	48	15	123	48	48	48	48	48	123	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Actuated Green, G (s)	15.7	27.5	10.9	22.7	5.0	32.6	12.0	39.6					
Effective Green, g (s)	15.2	28.5	10.4	23.7	4.5	33.6	11.5	40.6					
Actuated g/C Ratio	0.15	0.28	0.10	0.24	0.04	0.34	0.12	0.41					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grp Cap (vph)	522	974	184	782	80	1102	204	1387					
v/s Ratio Prot	c0.14	c0.32	0.09	0.27	0.06	c0.40	c0.18	0.23					
v/s Ratio Perm	0.93	1.14	0.91	1.14	1.31	1.21	1.55	0.57					
Uniform Delay, d1	41.9	35.8	44.4	38.1	47.8	33.2	44.2	22.9					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.20	0.76					
Incremental Delay, d2	22.3	74.0	41.7	76.9	205.3	101.1	264.8	1.3					
Delay (s)	64.2	109.8	86.0	115.0	253.1	134.3	317.7	18.8					
Level of Service	E	F	F	F	F	F	F	B					
Approach Delay (s)	96.0	F	F	110.8	F	142.8	F	103.9					
Approach LOS	F	F	F	F	F	F	F	F					
Intersection Summary													
HCM Average Control Delay	113.7											HCM Level of Service	F
HCM Volume to Capacity ratio	1.16												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.3%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 4: 47th St. & MLK Jr. Way 2030 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.86	0.86	1.00	0.97	0.95	1.00	0.95	0.97	0.95	1.00	0.98	0.95	
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1611	1611	3335	3433	3463	1611	3335	3433	3463	1611	3335	3463	
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (iperm)	1611	1611	3335	3433	3463	1611	3335	3433	3463	1611	3335	3463	
Volume (vph)	0	0	10	0	0	0	10	555	347	1550	356	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	11	0	0	0	11	584	365	1632	375	63	
RTOR Reduction (vph)	0	11	0	0	0	0	0	18	0	0	0	0	
Lane Group Flow (vph)	0	0	0	0	0	0	0	942	0	1632	438	0	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases							2	2	1	6			
Actuated Green, G (s)	0.0	0.0	13.0	0.0	0.0	13.0	29.0	50.0					
Effective Green, g (s)	0.0	0.0	13.0	0.0	0.0	13.0	29.0	50.0					
Actuated g/C Ratio	0.00	0.00	0.26	0.00	0.00	0.26	0.58	1.00					
Clearance Time (s)			4.0			4.0	4.0	2.0					
Lane Grp Cap (vph)	0	0	823	0	0	823	1991	3463					
v/s Ratio Prot			c0.30			c0.48	0.13						
v/s Ratio Perm	0.00	0.00	1.14	0.00	0.00	1.14	0.82	0.13					
Uniform Delay, d1	25.0	25.0	18.5	8.4	0.0	18.5	1.00	1.00					
Progression Factor	1.00	1.00	0.71	1.00	1.00	0.71	1.00	1.00					
Incremental Delay, d2	0.0	0.0	77.8	3.9	0.1	77.8	3.9	0.1					
Delay (s)	25.0	25.0	90.9	12.3	0.1	90.9	12.3	0.1					
Level of Service	C	C	F	B	A	F	B	A					
Approach Delay (s)	25.0	0.0	90.9	0.0	0.0	90.9	12.3	0.1					
Approach LOS	C	A	F	A	A	F	B	A					
Intersection Summary													
HCM Average Control Delay	35.4											HCM Level of Service	D
HCM Volume to Capacity ratio	0.92												
Actuated Cycle Length (s)	50.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.3%											ICU Level of Service	E
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2030 PM + Project
 1/21/2008

2030 PM + Project
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.96	0.96	0.96	0.97	0.97	0.97	0.99	0.99	0.99	0.99	0.99	0.98
Fipb, ped/bikes	0.99	0.97	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.97	0.96	0.96	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	1.00	1.00	1.00	3422	3422	3422	3422	3422	3422
Std. Flow (prot)	1694	1668	1668	3422	3422	3422	3422	3422	3422	3422	3422	3422
Flt Permitted	0.87	0.90	0.90	0.92	0.92	0.92	0.78	0.78	0.78	0.78	0.78	0.78
Std. Flow (perm)	1501	1515	1515	3161	3161	3161	2695	2695	2695	2695	2695	2695
Volume (vph)	40	70	31	70	140	90	41	721	90	60	306	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	74	33	74	147	95	43	759	95	63	322	32
RTOR Reduction (vph)	0	20	0	0	31	0	0	18	0	0	13	0
Lane Group Flow (vph)	0	129	0	0	285	0	0	879	0	0	405	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (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
Lane Grp Cap (vph)	510	510	510	515	515	515	1581	1581	1581	1581	1348	1348
v/s Ratio Prot	0.09	0.09	0.09	c0.19	c0.19	c0.19	c0.28	c0.28	c0.28	c0.28	0.15	0.15
v/c Ratio Perm	0.25	0.25	0.25	0.55	0.55	0.55	0.56	0.56	0.56	0.56	0.30	0.30
v/c Ratio	11.9	11.9	11.9	13.4	13.4	13.4	8.7	8.7	8.7	8.7	7.4	7.4
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.2	1.2	1.2	4.2	4.2	4.2	1.4	1.4	1.4	1.4	0.6	0.6
Incremental Delay, d2	13.1	13.1	13.1	17.7	17.7	17.7	10.1	10.1	10.1	10.1	7.9	7.9
Delay (s)	B	B	B	B	B	B	B	B	B	B	A	A
Level of Service	B	B	B	B	B	B	B	B	B	B	A	A
Approach Delay (s)	13.1	13.1	13.1	17.7	17.7	17.7	10.1	10.1	10.1	10.1	7.9	7.9
Approach LOS	B	B	B	B	B	B	B	B	B	B	A	A
Intersection Summary												
HCM Average Control Delay	11.2											
HCM Volume to Capacity ratio	0.55											
Actuated Cycle Length (s)	50.0											
Intersection Capacity Utilization	78.1%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.91	0.91
Frbp, ped/bikes	0.96	0.96	0.96	0.96	0.96	0.96	0.99	0.99	0.99	0.99	0.98	0.98
Fipb, ped/bikes	0.97	0.97	0.97	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.96	0.96	0.96	0.96	0.96	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Std. Flow (prot)	1623	1623	1623	1667	1667	1667	3453	3453	3453	3453	4910	4910
Flt Permitted	0.74	0.74	0.74	0.88	0.88	0.88	0.76	0.76	0.76	0.76	0.80	0.80
Std. Flow (perm)	1224	1224	1224	1481	1481	1481	2644	2644	2644	2644	3911	3911
Volume (vph)	80	70	70	32	32	32	80	50	90	1664	82	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	74	74	34	34	34	84	53	95	1752	86	42
RTOR Reduction (vph)	0	18	0	0	0	0	3	0	2	0	0	0
Lane Group Flow (vph)	0	214	0	0	168	0	0	1931	0	0	1284	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	2	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	2	6	6
Actuated Green, G (s)	15.3	15.3	15.3	15.3	15.3	15.3	55.7	55.7	55.7	55.7	55.7	55.7
Effective Green, g (s)	15.8	15.8	15.8	15.8	15.8	15.8	56.2	56.2	56.2	56.2	56.2	56.2
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.70	0.70	0.70	0.70	0.70	0.70
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	242	242	242	292	292	292	1857	1857	1857	1857	2747	2747
v/s Ratio Prot	c0.17	c0.17	c0.17	0.11	0.11	0.11	c0.73	c0.73	c0.73	c0.73	0.33	0.33
v/c Ratio Perm	0.88	0.88	0.88	0.57	0.57	0.57	1.04	1.04	1.04	1.04	0.47	0.47
v/c Ratio	31.2	31.2	31.2	29.1	29.1	29.1	11.9	11.9	11.9	11.9	5.3	5.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	28.5	28.5	28.5	1.7	1.7	1.7	32.0	32.0	32.0	32.0	0.6	0.6
Delay (s)	E	E	E	C	C	C	C	C	C	C	A	A
Level of Service	E	E	E	C	C	C	C	C	C	C	A	A
Approach Delay (s)	59.7	59.7	59.7	30.8	30.8	30.8	43.9	43.9	43.9	43.9	5.8	5.8
Approach LOS	E	E	E	C	C	C	C	C	C	C	A	A
Intersection Summary												
HCM Average Control Delay	30.7											
HCM Volume to Capacity ratio	1.01											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	113.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 PM + Project
1/21/2008

2030 PM + Project
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1765	3464	1768	3454	1741	1830	1766	1825				
Flt Permitted	0.12	1.00	0.12	1.00	0.52	1.00	0.22	1.00				
Satd. Flow (perm)	232	3464	233	3454	960	1830	402	1825				
Volume (vph)	90	1116	160	83	892	133	180	561	65	105	250	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	1175	168	87	939	140	189	591	68	111	263	32
RTOR Reduction (vph)	0	14	0	0	15	0	0	5	0	0	6	0
Lane Group Flow (vph)	95	1329	0	87	1064	0	189	654	0	111	290	0
Conf. Peds. (#/hr)	12	12	12	12	42	12	42	12	12	12	12	42
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	93	1386	93	1382	480	915	480	915	201	913		
v/s Ratio Prot	c0.41			0.37			0.20		c0.36			
v/s Ratio Perm	1.02	0.96	0.94	0.77	0.39	0.71	0.55	0.32				
Uniform Delay, d1	24.0	23.4	23.0	20.8	12.5	15.6	13.8	11.9				
Progression Factor	1.00	1.00	1.72	1.79	1.64	1.63	1.00	1.00				
Incremental Delay, d2	99.3	16.2	45.2	1.8	0.2	0.4	10.5	0.9				
Delay (s)	123.3	39.5	84.7	39.1	20.6	25.9	24.3	12.8				
Level of Service	F	D	F	D	C	C	C	B				
Approach Delay (s)	F	D	F	D	C	C	C	B				
Approach LOS	D	D	D	D	D	D	D	B				

Intersection Summary	
HCM Average Control Delay	36.7 HCM Level of Service D
HCM Volume to Capacity ratio	0.85
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	96.5% ICU Level of Service F
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & BART Access

2030 PM + Project
 1/21/2008

2030 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1768	3493	1764	3452	1764	3418	1764	3418	1764	3419	1764	3419
Flt Permitted	0.11	1.00	0.11	1.00	0.11	1.00	0.11	1.00	0.11	1.00	0.11	1.00
Satd. Flow (perm)	213	3493	212	3452	212	3452	212	3452	212	3452	212	3452
Volume (vph)	90	1113	84	114	1055	169	75	543	123	91	256	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	1172	88	120	1111	178	79	572	129	96	269	63
RTOR Reduction (vph)	0	7	0	0	16	0	0	12	0	0	18	0
Lane Group Flow (vph)	95	1253	0	120	1273	0	0	768	0	0	410	0
Confl. Peds. (#/hr)	8	39	39	8	39	39	8	25	25	25	8	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	35.5	38.0	37.0	37.0	38.0	37.0	37.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	38.0	37.0	37.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	93	1528	93	1510	1363	1066						
v/s Ratio Prot	0.45	0.36		0.37			0.26			0.18		
v/s Ratio Perm	1.02	0.82		0.84			0.56			0.38		
v/c Ratio	22.5	19.7		22.5			15.6			14.1		
Uniform Delay, d1	1.04	1.04		1.43			1.29			1.00		
Progression Factor	33.5	0.5		185.7			5.4			1.4		
Incremental Delay, d2	57.0	21.1		217.8			21.6			15.1		
Delay (s)	E	C		F			C			B		
Level of Service	E	C		F			C			B		
Approach Delay (s)	23.6			50.0			21.6			15.1		
Approach LOS	C			D			C			B		
Intersection Summary												
HCM Average Control Delay	31.7 HCM Level of Service C											
HCM Volume to Capacity ratio	0.92											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	95.0% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2030 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔ ↕ ↖ ↗ ↘ ↙ ↚ ↛ ↜ ↝ ↞ ↠ ↡ ↢ ↣ ↤ ↥ ↦ ↧ ↨ ↩ ↪ ↫ ↬ ↭ ↮ ↯ ↰ ↱ ↲ ↳ ↴ ↵ ↶ ↷ ↸ ↹ ↺ ↻ ↼ ↽ ↾ ↿ ⇀ ⇁ ⇂ ⇃ ⇄ ⇅ ⇆ ⇇ ⇈ ⇉ ⇊ ⇋ ⇌ ⇍ ⇎ ⇏ ⇐ ⇑ ⇒ ⇓ ⇔ ⇕ ⇖ ⇗ ⇘ ⇙ ⇚ ⇛ ⇜ ⇝ ⇞ ⇟ ⇠ ⇡ ⇢ ⇣ ⇤ ⇥ ⇦ ⇧ ⇨ ⇩ ⇪ ⇫ ⇬ ⇭ ⇮ ⇯ ⇰ ⇱ ⇲ ⇳ ⇴ ⇵ ⇶ ⇷ ⇸ ⇹ ⇺ ⇻ ⇼ ⇽ ⇾ ⇿ ⇀ ⇁ ⇂ ⇃ ⇄ ⇅ ⇆ ⇇ ⇈ ⇉ ⇊ ⇋ ⇌ ⇍ ⇎ ⇏ ⇐ ⇑ ⇒ ⇓ ⇔ ⇕ ⇖ ⇗ ⇘ ⇙ ⇚ ⇛ ⇜ ⇝ ⇞ ⇟ ⇠ ⇡ ⇢ ⇣ ⇤ ⇥ ⇦ ⇧ ⇨ ⇩ ⇪ ⇫ ⇬ ⇭ ⇮ ⇯ ⇰ ⇱ ⇲ ⇳ ⇴ ⇵ ⇶ ⇷ ⇸ ⇹ ⇺ ⇻ ⇼ ⇽ ⇾ ⇿												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.96	1.00	0.96	
Fipb, ped/bikes	1.00	0.99	1.00	0.97	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	0.94	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.96	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1671	3441	1748	3336	1770	3472	1770	3472	1770	3277	1770	3277	
Flt Permitted	0.25	1.00	0.15	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (iperm)	440	3441	283	3336	1770	3472	1770	3472	1770	3277	1770	3277	
Volume (vph)	249	914	109	74	558	110	466	1448	124	130	693	255	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	254	933	111	76	569	112	476	1478	127	133	707	260	
RTOR Reduction (vph)	0	11	0	0	20	0	0	7	0	0	0	26	
Lane Group Flow (vph)	254	1033	0	76	661	0	476	1598	0	133	941	0	
Confl. Peds. (#/hr)	94	86	86	86	86	94	40	40	40	111	111	111	
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	4	8	8	5	2	1	6	1	6	1	6	1	
Permitted Phases	4	8	8	5	2	1	6	1	6	1	6	1	
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	25.5	13.5	32.2	8.8	27.5	8.8	27.5	
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	26.0	14.0	32.7	9.3	28.0	9.3	28.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.18	0.41	0.12	0.35	0.12	0.35	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grip Cap (vph)	143	1118	92	1084	310	1419	206	1147	206	1147	206	1147	
v/s Ratio Prot	0.30	0.20	0.20	c0.27	c0.46	0.08	0.29	0.08	0.29	0.08	0.29	0.08	
v/s Ratio Perm	c0.58	0.27	0.27	0.83	0.61	1.54	1.13	0.65	0.82	0.65	0.82	0.65	
v/c Ratio	1.78	0.92	0.83	0.61	1.54	1.13	0.65	0.82	0.65	0.82	0.65	0.82	
Uniform Delay, d1	27.0	26.0	24.9	22.7	33.0	23.6	33.8	23.7	33.8	23.7	33.8	23.7	
Progression Factor	1.33	1.34	1.00	1.00	1.00	0.96	0.92	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	371.1	10.3	41.2	0.7	249.4	62.2	5.1	6.6	5.1	6.6	5.1	6.6	
Delay (s)	407.0	45.2	66.1	23.4	281.0	84.0	38.9	30.3	38.9	30.3	38.9	30.3	
Level of Service	F	D	E	C	F	F	D	C	D	C	D	C	
Approach Delay (s)	116.0	F	27.7	C	129.0	F	31.4	C	31.4	C	31.4	C	
Approach LOS	F	F	C	C	F	F	D	D	D	D	D	D	
Intersection Summary													
HCM Average Control Delay	90.6											HCM Level of Service	F
HCM Volume to Capacity ratio	1.42												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.8%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. 2030 PM + Project
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔ ↕ ↖ ↗ ↘ ↙ ↚ ↛ ↜ ↝ ↞ ↠ ↡ ↢ ↣ ↤ ↥ ↦ ↧ ↨ ↩ ↪ ↫ ↬ ↭ ↮ ↯ ↰ ↱ ↲ ↳ ↴ ↵ ↶ ↷ ↸ ↹ ↺ ↻ ↼ ↽ ↾ ↿ ⇀ ⇁ ⇂ ⇃ ⇄ ⇅ ⇆ ⇇ ⇈ ⇉ ⇊ ⇋ ⇌ ⇍ ⇎ ⇏ ⇐ ⇑ ⇒ ⇓ ⇔ ⇕ ⇖ ⇗ ⇘ ⇙ ⇚ ⇛ ⇜ ⇝ ⇞ ⇟ ⇠ ⇡ ⇢ ⇣ ⇤ ⇥ ⇦ ⇧ ⇨ ⇩ ⇪ ⇫ ⇬ ⇭ ⇮ ⇯ ⇰ ⇱ ⇲ ⇳ ⇴ ⇵ ⇶ ⇷ ⇸ ⇹ ⇺ ⇻ ⇼ ⇽ ⇾ ⇿					
Sign Control	Free					
Grade	0%					
Volume (veh/h)	30	41	2023	40	20	860
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	43	2129	42	21	905
Pedestrians	52	52	52	52	45	45
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4	4	4	4	4	4
Right turn flare (veh)	None					
Median type	None					
Median storage (veh)	None					
Upstream signal (ft)	230					
pX, platoon unblocked	0.73					
VC, conflicting volume	2749					
VC1, stage 1 conf vol	1183					
VC2, stage 2 conf vol	2467					
vCu, unblocked vol	763					
tC, single (s)	6.8					
tC, 2 stage (s)	3.5					
tF (s)	0					
p0 queue free %	80					
cM capacity (veh/h)	14					
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	75	1420	752	21	453	453
Volume Left	32	0	0	21	0	0
Volume Right	43	0	42	0	0	0
cSH	30	1700	1700	132	1700	1700
Volume to Capacity	2.46	0.84	0.44	0.16	0.27	0.27
Queue Length 95th (ft)	219	0	0	14	0	0
Control Delay (s)	942.2	0.0	0.0	37.5	0.0	0.0
Lane LOS	F	E	E	D	C	C
Approach Delay (s)	942.2	0.0	0.0	0.9	0.0	0.0
Approach LOS	F	F	F	D	D	D
Intersection Summary						
Average Delay	22.4					
Intersection Capacity Utilization	75.7%					
ICU Level of Service	D					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2030 PM + Project
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Frt	0.99	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00
Flt Protected	5013	1768	3452	1793	1770	1806						
Satd. Flow (prot)	0.65	0.22	1.00	0.28	0.28	0.24	1.00					
Satd. Flow (perm)	3268	416	3452	501	442	1806						
Volume (vph)	160	860	40	91	1340	221	190	525	120	80	403	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	878	41	93	1367	226	194	536	122	82	411	71
RTOR Reduction (vph)	0	5	0	0	17	0	0	8	0	0	8	0
Lane Group Flow (vph)	0	1077	0	93	1577	0	0	844	0	82	474	0
Confl. Peds. (#/hr)	24	4	4	4	24	48	12	12	12	12	12	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2				6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)	46.0	46.0	46.0	46.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31
Clearance 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
Lane Grp Cap (vph)	1920	244	2028	c0.46			157			138	564	
v/s Ratio Prot	0.33	0.22	0.22	c1.69			0.19			0.19	0.26	
v/s Ratio Perm	1.66dl	0.38	0.78	5.38			0.59			0.59	0.84	
Uniform Delay, d1	10.2	8.8	12.5	27.5			23.2			23.2	25.6	
Progression Factor	1.00	1.58	1.63	1.00			0.77			0.77	0.79	
Incremental Delay, d2	1.2	3.4	2.3	1984.3			14.5			11.9	11.9	
Delay (s)	11.3	17.3	22.8	2011.8			32.3			32.3	32.2	
Level of Service	B	B	C	F			C			C	C	
Approach Delay (s)	11.3		22.5	2011.8			32.3			32.3	32.3	
Approach LOS	B		C	F			C			C	C	

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	426.0	HCM Level of Service	F
HCM Volume to Capacity ratio	2.38		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	167.7%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 through lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2030 PM + Project
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	0.99	1.00	0.99	1.00	1.00	0.96	1.00	1.00	0.98	1.00
Frt	0.99	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	4998	5015	1770	1787			1766	1821				
Satd. Flow (prot)	0.76	0.79	0.79	0.38	1.00	0.20	1.00					
Satd. Flow (perm)	3800	3953	714	1787			363	1821				
Volume (vph)	60	800	70	101	1372	111	140	337	107	90	229	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	842	74	106	1444	117	147	355	113	95	241	42
RTOR Reduction (vph)	0	12	0	0	11	0	0	14	0	0	8	0
Lane Group Flow (vph)	0	967	0	0	1656	0	147	454	0	95	275	0
Confl. Peds. (#/hr)	12	12	12	12	12	12	6	6	6	6	6	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2				6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (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
Lane Grp Cap (vph)	2446	2545	183	458			93	467			0.15	
v/s Ratio Prot	0.25	0.42	0.21				0.26			0.26	0.15	
v/s Ratio Perm	0.40	0.65	0.80	0.99			1.02			1.02	0.59	
Uniform Delay, d1	6.8	8.7	27.9	29.7			29.8			29.8	26.1	
Progression Factor	1.17	2.04	1.00	1.00			1.20			1.20	1.20	
Incremental Delay, d2	0.0	1.0	30.0	39.9			90.4			4.4	4.4	
Delay (s)	8.0	18.8	57.9	69.5			126.1			35.7	35.7	
Level of Service	A	B	E	E			F			F	D	
Approach Delay (s)	8.0	18.8	57.9	69.5			126.1			35.7	35.7	
Approach LOS	A	B	E	E			F			F	D	

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	28.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.4%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 19: MacArthur Blvd. & BART Access

2030 PM + Project
 1/21/2008

2030 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.95	1.00	1.00	0.99	1.00	1.00	1.00	1.00	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	0.98	0.98	1.00	0.98	0.98	0.98	0.98	0.98	0.98	0.97	0.97
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5021	4955	3433	3357	3357	3357	3357	3357	3357	3357	3357	3357
Flt Permitted	0.73	0.82	0.82	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.57	0.57
Satd. Flow (perm)	3659	4065	2829	1942	1942	1942	1942	1942	1942	1942	1942	1942
Volume (vph)	74	892	50	79	1403	241	80	425	75	140	222	92
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	75	901	51	80	1417	243	81	429	76	141	224	93
RTOR Reduction (vph)	0	7	0	0	28	0	0	15	0	0	28	0
Lane Group Flow (vph)	0	1020	0	0	1712	0	0	571	0	0	430	0
Confl. Peds. (#/hr)	9	17	17	17	9	12	10	10	10	10	10	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2355	2617	2617	2617	2617	2617	648	648	648	498	498	498
v/s Ratio Prot	0.28	0.42	0.42	0.42	0.42	0.42	0.23	0.23	0.23	0.22	0.22	0.22
v/s Ratio Perm	0.43	0.65	0.65	0.65	0.65	0.65	0.88	0.88	0.88	0.94	0.94	0.94
Uniform Delay, d1	7.0	8.8	8.8	8.8	8.8	8.8	28.6	28.6	28.6	28.4	28.4	28.4
Progression Factor	1.60	2.10	2.10	2.10	2.10	2.10	1.00	1.00	1.00	1.18	1.18	1.18
Incremental Delay, d2	11.8	19.4	19.4	19.4	19.4	19.4	44.5	44.5	44.5	51.1	51.1	51.1
Delay (s)	B	B	B	B	B	B	D	D	D	D	D	D
Level of Service	B	B	B	B	B	B	D	D	D	D	D	D
Approach Delay (s)	11.8	19.4	19.4	19.4	19.4	19.4	44.5	44.5	44.5	51.1	51.1	51.1
Approach LOS	B	B	B	B	B	B	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	25.0 HCM Level of Service C											
HCM Volume to Capacity ratio	0.72											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	126.7% ICU Level of Service H											
Analysis Period (min)	15											
d1 Defacto Left Lane. Recode with 1 though lane as a left lane.	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave. 2030 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	
Fipb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	
Frt	0.99	0.99	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	0.98	
Flt Protected	0.98	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.98	
Satd. Flow (prot)	4915	4807	4807	1748	3459	1770	3437						
Flt Permitted	0.68	0.71	0.71	0.22	1.00	0.11	1.00						
Satd. Flow (pbrm)	3380	3420	3420	413	3459	213	3437						
Volume (vph)	389	695	111	110	1174	467	280	1208	110	195	598	97	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	409	732	117	116	1236	492	295	1272	116	205	629	102	
RTOR Reduction (vph)	0	7	0	0	1	0	0	7	0	0	12	0	
Lane Group Flow (vph)	0	1251	0	0	1843	0	295	1381	0	205	719	0	
Confl. Peds. (#/hr)	26	19	19	pm+pt	26	39	92	92	92	92	92	39	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	3	8	8	2	2	6	6	6	6	6	6	
Permitted Phases	4	8	8	8	2	2	6	6	6	6	6	6	
Actuated Green, G (s)	56.6	56.6	56.6	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	
Effective Green, g (s)	58.1	58.1	58.1	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0	
Actuated g/C Ratio	0.57	0.57	0.57	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35	
Clearance Time (s)	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	1942	1965	1965	143	1197	74	1190						
v/s Ratio Prot													
v/s Ratio Perm	0.37	0.54	0.71	0.71	0.40	0.40	0.21						
v/c Ratio	2.56dl	0.94	2.06	1.15	2.77	0.60							
Uniform Delay, d1	14.5	19.8	33.0	33.0	33.0	27.3							
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00							
Incremental Delay, d2	0.6	9.1	501.6	79.2	833.0	2.3							
Delay (s)	15.1	28.9	534.7	112.3	866.1	29.6							
Level of Service	B	C	F	F	F	F	C						
Approach Delay (s)	15.1	28.9	186.3			212.8							
Approach LOS	B	C	F			F							
Intersection Summary													
HCM Average Control Delay	102.3											HCM Level of Service	F
HCM Volume to Capacity ratio	1.63												
Actuated Cycle Length (s)	101.1											Sum of lost time (s)	8.0
Intersection Capacity Utilization	121.5%											ICU Level of Service	H
Analysis Period (min)	15												
dl Defacto Left Lane. Recode with 1 though lane as a left lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St. 2030 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	0.89	1.00	0.89	1.00	0.89	1.00	0.89	1.00	0.94	
Fipb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.93	
Flt Protected	1.00	1.00	1.00	0.98	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99	
Satd. Flow (prot)	5029	5027	5027	1753	1406	1580							
Flt Permitted	0.78	0.78	0.78	0.77	1.00	0.90							
Satd. Flow (pbrm)	3943	3928	3928	1384	1406	1438							
Volume (vph)	50	927	34	110	1597	50	104	200	40	40	40	90	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Adj. Flow (vph)	51	936	34	111	1613	51	105	105	202	40	40	91	
RTOR Reduction (vph)	0	4	0	0	4	0	0	4	0	0	64	0	
Lane Group Flow (vph)	0	1017	0	0	1771	0	0	210	138	0	158	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	8	8	2	2	6	6	6	6	6	6	
Permitted Phases	4	8	8	8	2	2	6	6	6	6	6	6	
Actuated Green, G (s)	49.5	49.5	49.5	49.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	
Effective Green, g (s)	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	
Clearance Time (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	
Lane Grp Cap (vph)	2390	2381	2381	407	413	422							
v/s Ratio Prot													
v/s Ratio Perm	0.26	0.43	0.74	0.74	0.52	0.33							
v/c Ratio	8.4	11.3	23.5	22.1	22.4	22.4							
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00							
Progression Factor	0.6	0.6	0.6	0.6	0.6	0.6							
Incremental Delay, d2	8.9	13.4	28.1	24.3	24.9	24.9							
Delay (s)	A	B	C	C	C	C							
Level of Service	A	B	C	C	C	C							
Approach Delay (s)	8.9	13.4	26.2	24.9	24.9	24.9							
Approach LOS	A	B	C	C	C	C							
Intersection Summary													
HCM Average Control Delay	14.2											HCM Level of Service	B
HCM Volume to Capacity ratio	0.67												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	111.8%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.94	1.00	0.94	1.00	1.00	0.99	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.97	1.00	0.85	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4912	1770	4864	1770	3539	1489	1770	3539	1489	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (pbrm)	1770	4912	1770	4864	1770	3539	1489	1770	3539	1489	1770	3539
Volume (vph)	230	795	111	130	1237	360	310	1181	290	510	511	180
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	837	117	137	1302	379	326	1243	305	537	538	189
RTOR Reduction (vph)	0	15	0	0	44	0	0	0	11	0	0	45
Lane Group Flow (vph)	242	939	0	137	1637	0	326	1243	294	537	538	144
Confl. Peds. (#/hr)		81			22				50			43
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	Prot
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases												
Actuated Green, G (s)	12.0	33.2		12.8	34.0		25.4	33.0	45.8	25.0	32.6	44.6
Effective Green, g (s)	11.0	34.2		11.8	35.0		24.4	34.0	45.8	24.0	33.6	44.6
Actuated g/C Ratio	0.09	0.29		0.10	0.29		0.20	0.28	0.38	0.20	0.28	0.37
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	162	1400		174	1419		360	1003	618	354	991	607
v/s Ratio Prot	c0.14	0.19		0.08	c0.34		0.18	c0.35	0.05	c0.30	0.15	0.02
v/s Ratio Perm	1.49	0.67		0.79	1.15		0.91	1.24	0.48	1.52	0.54	0.24
Uniform Delay, d1	54.5	37.9		52.9	42.5		46.7	43.0	28.0	48.0	36.7	26.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	251.9	2.6		20.6	77.6		25.3	116.3	0.6	246.7	2.1	0.2
Delay (s)	306.4	40.5		73.4	120.1		71.9	159.3	28.6	294.7	38.8	26.2
Level of Service	F	D		E	F		E	F	C	F	D	C
Approach Delay (s)	94.3			116.6			122.8			145.6		
Approach LOS	F			F			F			F		
Intersection Summary												
HCM Average Control Delay	120.1	HCM Level of Service										
HCM Volume to Capacity ratio	1.21	F										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	119.4%	ICU Level of Service										
Analysis Period (min)	15	H										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2030 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	0.93	0.96	1.00	0.96	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	0.98	0.97	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Frt	0.95	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.98	0.98	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1585	1816	1729	1616	1705	3487	1729	3487	1729	3446	1729	3446
Flt Permitted	0.66	0.72	0.25	0.72	0.25	1.00	0.17	1.00	0.17	1.00	0.17	1.00
Satd. Flow (pbrm)	1063	1181	444	1181	444	3487	318	3446	318	3446	318	3446
Volume (vph)	131	60	100	120	100	103	50	1103	50	42	854	73
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	138	63	105	126	84	108	53	1161	53	44	899	77
RTOR Reduction (vph)	0	23	0	0	22	0	0	4	0	0	7	0
Lane Group Flow (vph)	0	283	0	0	296	0	53	1210	0	44	969	0
Confl. Peds. (#/hr)	100		100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4		4		4		2		2		6	
Permitted Phases												
Actuated Green, G (s)	23.7		23.7		23.7		54.3		54.3		54.3	
Effective Green, g (s)	23.2		23.2		23.2		53.8		53.8		53.8	
Actuated g/C Ratio	0.27		0.27		0.27		0.63		0.63		0.63	
Clearance Time (s)	3.5		3.5		3.5		3.5		3.5		3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	290		322		322		281		2207		201	2181
v/s Ratio Prot	c0.27		0.25		0.25		0.12		c0.35		0.14	0.28
v/s Ratio Perm	0.98		0.92		0.92		0.19		0.55		0.22	0.44
Uniform Delay, d1	30.6		30.0		30.0		6.5		8.8		6.6	8.0
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	1.00
Incremental Delay, d2	46.0		29.5		29.5		1.5		1.0		2.5	0.7
Delay (s)	76.6		59.5		59.5		8.0		9.8		9.1	8.6
Level of Service	E		E		E		A		A		A	A
Approach Delay (s)	76.6		59.5		59.5		9.7		9.7		8.6	8.6
Approach LOS	E		E		E		A		A		A	A
Intersection Summary												
HCM Average Control Delay	21.8	HCM Level of Service										
HCM Volume to Capacity ratio	0.68	C										
Actuated Cycle Length (s)	85.0	Sum of lost time (s)										
Intersection Capacity Utilization	71.0%	ICU Level of Service										
Analysis Period (min)	15	C										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave. 2030 PM + Project
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↕	↔	↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.98	1.00	0.93	1.00	0.99	1.00	0.99	1.00	0.94	1.00	0.94	
Frt	1.00	0.97	1.00	1.00	1.00	1.00	0.96	1.00	0.98	1.00	0.98	1.00	
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1770	3370	1770	3139	1770	3139	1704	3489	1733	3135	1770	3370	
Volume (vph)	230	560	120	90	530	254	200	840	50	230	544	310	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	235	571	122	92	541	259	204	857	51	235	555	316	
RTOR Reduction (vph)	0	20	0	0	46	0	0	5	0	0	95	0	
Lane Group Flow (vph)	235	673	0	92	754	0	204	903	0	235	776	0	
Confl. Peds. (#/hr)	100			100	100	100	100	100	100	100	100	100	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4		3	8		2		2		6		
Actuated Green, G (s)	10.5	26.0		7.3	22.8		38.2	38.2	38.2		38.2	38.2	
Effective Green, g (s)	11.0	25.5		7.8	22.3		39.7	39.7	39.7		39.7	39.7	
Actuated g/C Ratio	0.13	0.30		0.09	0.26		0.47	0.47	0.47		0.47	0.47	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5	5.5		5.5	5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	229	1011		162	824		194	1630	184		1464		
v/s Ratio Prot	c0.13	c0.20		0.05	c0.24		0.26		0.26		0.25		
v/s Ratio Perm	1.03	0.67		0.57	0.92		0.49		0.60		0.60		
Uniform Delay, d1	37.0	26.0		37.0	30.4		22.6	16.3	22.6		16.0	5.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	66.4	1.3		2.7	14.4		78.9	1.4	159.9		1.4	1.4	
Delay (s)	103.4	27.3		39.7	44.8		101.5	17.6	182.5		17.4	17.4	
Level of Service	F	C		D	D		F	B	F		B	B	
Approach Delay (s)	46.6			44.3			33.0		52.5				
Approach LOS	D			D			C		D				
Intersection Summary													
HCM Average Control Delay	44.0											HCM Level of Service	D
HCM Volume to Capacity ratio	1.18												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	89.0%											ICU Level of Service	E
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 25: Transit Village Driveway & Telegraph Ave. 2030 PM + Project
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR	
Lane Configurations	↔	↔	↔	↕	↕	↕	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	
Frt	1.00	0.85	1.00	1.00	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00	
Satd. Flow (prot)	1770	1583	1770	3539	3464	1770	
Satd. Flow (perm)	1770	1583	1770	3539	3464	1770	
Volume (vph)	43	98	89	1975	752	124	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	45	103	94	2079	792	131	
RTOR Reduction (vph)	0	80	0	0	13	0	
Lane Group Flow (vph)	45	23	94	2079	910	0	
Turn Type	Perm	Prot	Prot				
Protected Phases	2		3	8	4		
Permitted Phases		2					
Actuated Green, G (s)	17.7	17.7	7.2	53.8	42.1		
Effective Green, g (s)	18.2	18.2	7.2	53.8	42.6		
Actuated g/C Ratio	0.23	0.23	0.09	0.67	0.53		
Clearance Time (s)	4.5	4.5	4.0	4.0	4.5		
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	403	360	159	2380	1845		
v/s Ratio Prot	c0.03	0.01	0.05	c0.59	0.26		
v/s Ratio Perm	0.11	0.07	0.59	0.87	0.49		
Uniform Delay, d1	24.5	24.2	35.0	10.4	11.9		
Progression Factor	1.00	1.00	1.00	1.00	1.38		
Incremental Delay, d2	0.1	0.1	5.8	4.8	0.5		
Delay (s)	24.6	24.3	40.8	15.2	16.9		
Level of Service	C	C	D	B	B		
Approach Delay (s)	24.4		16.3	16.9			
Approach LOS	C		B	B			
Intersection Summary							
HCM Average Control Delay	16.9					HCM Level of Service	B
HCM Volume to Capacity ratio	0.68						
Actuated Cycle Length (s)	80.0					Sum of lost time (s)	8.0
Intersection Capacity Utilization	64.6%					ICU Level of Service	C
Analysis Period (min)	15						
c Critical Lane Group							

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave.

2030 AM Project Mitigations
 1/21/2008

2030 AM Project Mitigations
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	1.00	0.99	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt, ped/bikes	0.95	1.00	0.91	1.00	0.97	0.97	1.00	0.96	1.00	0.97	1.00	0.97
Flt Protected	0.98	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1749	1681	1597	1681	1597	1681	1770	3291	1681	1597	1770	3291
Flt Permitted	0.53	0.74	1.00	0.74	1.00	1.00	0.75	1.00	0.74	1.00	0.75	1.00
Satd. Flow (perm)	948	1302	1597	1302	1597	1302	2556	1770	1302	1597	2556	1770
Volume (vph)	10	10	10	354	330	470	10	1168	246	110	1329	480
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	11	11	373	347	495	11	1229	259	116	1399	484
RTOR Reduction (vph)	0	10	0	0	0	0	0	18	0	0	0	36
Lane Group Flow (vph)	0	23	0	373	785	0	0	1481	0	116	1847	0
Confl. Peds. (#/hr)	4			4	44			12	12	12	44	
Turn Type	Perm	Perm	Perm	Perm	Perm	Prot						
Protected Phases	7	7	7	8	8	2						6
Permitted Phases	7	4	4	8	8	2						6
Actuated Green, G (s)	4.5	26.5	26.5	27.0	27.0	36.5						45.5
Effective Green, g (s)	5.0	27.0	27.0	30.0	30.0	36.5						46.0
Actuated g/C Ratio	0.06	0.30	0.30	0.30	0.30	0.41						0.51
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5						4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0						2.0
Lane Grp Cap (vph)	53	391	479	1037	1037	108						1882
v/s Ratio Prot	c0.02	0.29	0.49	c0.07	c0.07	c0.56						
v/s Ratio Perm	0.43	0.95	1.64	1.43	1.43	1.07						1.10
Uniform Delay, d1	41.1	30.9	31.5	26.8	26.8	42.2						22.0
Progression Factor	1.00	1.00	1.00	1.02	1.02	1.00						1.00
Incremental Delay, d2	2.0	33.3	296.4	194.0	194.0	108.0						54.0
Delay (s)	43.1	64.2	327.9	221.3	221.3	150.2						76.0
Level of Service	D	E	F	F	F	F						E
Approach Delay (s)	43.1	247.0	221.3	221.3	221.3	80.3						
Approach LOS	D	F	F	F	F	F						F
Intersection Summary												
HCM Average Control Delay	167.3											
HCM Volume to Capacity ratio	1.43											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	137.8%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.98	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.90	0.90	1.00	0.97	0.97	1.00	0.98	1.00	0.97	1.00	0.97
Frt, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.97
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3005	1770	3390	1770	3390	1770	3421	1770	3390	1770	3328
Flt Permitted	0.13	1.00	1.00	0.13	1.00	1.00	0.06	1.00	0.06	1.00	0.37	1.00
Satd. Flow (perm)	248	3005	248	3390	248	3390	120	3421	120	3390	674	3328
Volume (vph)	146	421	267	120	716	90	135	509	59	100	1318	320
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	154	443	281	126	754	95	142	536	62	105	1387	337
RTOR Reduction (vph)	0	82	0	0	8	0	0	7	0	0	18	0
Lane Group Flow (vph)	154	642	0	126	841	0	142	581	0	105	1706	0
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	92	92
Turn Type	pm	pt	pm	pt	pm	pt						
Protected Phases	7	4	4	8	8	2						6
Permitted Phases	4	4	4	8	8	2						6
Actuated Green, G (s)	35.5	29.5	29.5	35.5	29.5	67.0						61.5
Effective Green, g (s)	36.0	30.0	30.0	36.0	30.0	68.0						62.0
Actuated g/C Ratio	0.30	0.25	0.25	0.30	0.25	0.57						0.52
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5						4.5
Vehicle Extension (s)	3.0	2.0	2.0	3.0	2.0	2.0						2.0
Lane Grp Cap (vph)	151	751	151	848	151	1768						1719
v/s Ratio Prot	c0.05	0.21	0.21	0.04	0.25	c0.05						c0.51
v/s Ratio Perm	c0.26	0.86	0.86	0.21	0.99	0.49						0.12
v/c Ratio	1.02	0.86	0.83	0.83	0.99	0.94						0.24
Uniform Delay, d1	39.8	42.9	34.9	44.9	31.2	16.9						12.3
Progression Factor	1.08	1.12	1.00	1.00	1.00	1.57						1.00
Incremental Delay, d2	74.2	8.1	30.9	28.6	54.1	0.5						20.0
Delay (s)	117.4	56.2	65.8	73.5	103.2	19.4						48.8
Level of Service	F	E	E	E	E	B						D
Approach Delay (s)	66.9	66.9	66.9	72.5	72.5	35.5						46.7
Approach LOS	E	E	E	E	E	D						D
Intersection Summary												
HCM Average Control Delay	54.5											
HCM Volume to Capacity ratio	1.00											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	99.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

2030 AM Project Mitigations
 1/21/2008

2030 AM Project Mitigations
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.95	1.00	1.00	1.00	1.00	0.97	1.00	0.99	1.00	0.99
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.96	1.00	0.96
Frbp, ped/bikes	0.99	1.00	0.98	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	4980	1762	3446	1770	1726	1703	1759					
Satd. Flow (prot)	0.66	0.21	1.00	0.10	1.00	0.50	1.00					
Flt Permitted	3327	391	3446	189	1726	891	1759					
Satd. Flow (perm)	210	709	50	71	1094	191	100	183	90	200	493	200
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	221	746	53	75	1152	201	105	193	95	211	519	211
Adj. Flow (vph)	0	5	0	0	13	0	0	16	0	0	13	0
RTOR Reduction (vph)	0	1015	0	75	1340	0	105	272	0	211	717	0
Lane Group Flow (vph)	24	18	18	24	24	24	48	48	48	48	24	24
Confl. Peds. (#/hr)												
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	6	6	6	6	6	6
Permitted Phases	51.0	51.0	51.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated Green, G (s)	52.0	52.0	52.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	0.47	0.47	0.47	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Actuated g/C Ratio	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	1573	185	1629	86	785	405	800	0.41	0.19	0.19	0.16	0.24
Lane Grp Cap (vph)	0.31	3.03dl	0.41	0.82	1.22	0.35	0.52	0.90	0.41	0.41	0.16	0.24
v/s Ratio Prot	22.0	18.9	25.0	30.0	19.4	21.4	27.6	0.24	0.19	0.19	0.16	0.24
v/s Ratio Perm	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay, d1	2.1	6.5	4.8	167.9	1.2	4.7	14.8	0.90	0.41	0.41	0.16	0.24
Progression Factor	24.1	25.4	29.9	197.9	20.6	26.2	42.4	0.90	0.41	0.41	0.16	0.24
Incremental Delay, d2	C	C	C	F	C	C	D	0.90	0.41	0.41	0.16	0.24
Delay (s)	24.1	25.4	29.9	197.9	20.6	26.2	42.4	0.90	0.41	0.41	0.16	0.24
Level of Service	C	C	C	F	C	C	D	0.90	0.41	0.41	0.16	0.24
Approach Delay (s)	24.1	25.4	29.9	197.9	20.6	26.2	42.4	0.90	0.41	0.41	0.16	0.24
Approach LOS	C	C	C	F	C	C	D	0.90	0.41	0.41	0.16	0.24
Intersection Summary	34.4 HCM Level of Service C											
HCM Average Control Delay	1.02 HCM Level of Service 8.0											
HCM Volume to Capacity ratio	142.6% Sum of lost time (s) 8.0											
Actuated Cycle Length (s)	15 ICU Level of Service H											
Intersection Capacity Utilization	15											
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 through lane as a left lane.	c Critical Lane Group											

2030 AM Project Mitigations
 HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway
 1/2-1/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.96	1.00	0.96	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.96
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.85	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4923	1770	4839	1770	4839	1770	3539	1515	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4923	1770	4839	1770	4839	1770	3539	1515	1770	3539
Volume (vph)	170	1207	171	210	1144	380	140	421	130	390	1441
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1271	180	221	1204	400	147	443	137	411	1517
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	33	0	0
Lane Group Flow (vph)	179	1436	0	221	1554	0	147	443	104	411	1517
Confl. Peds. (#/hr)		66			23			38			26
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm	ov	Prot	pm	ov
Protected Phases	7	4	3	8	5	2	3	1	6	7	
Permitted Phases											6
Actuated Green, G (s)	12.0	32.0	15.0	35.0	11.0	28.0	43.0	29.0	46.0	58.0	
Effective Green, g (s)	11.0	33.0	14.0	36.0	10.0	29.0	43.0	28.0	47.0	58.0	
Actuated g/C Ratio	0.09	0.28	0.12	0.30	0.08	0.24	0.36	0.23	0.39	0.48	
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	3.0	5.0	3.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	162	1354	207	1452	148	855	593	413	1386	736	
v/s Ratio Prot	0.10	0.29	c0.12	c0.32	c0.08	0.13	0.02	0.23	c0.43	0.03	
v/s Ratio Perm	1.10	1.06	1.07	1.07	0.99	0.52	0.18	1.00	1.09	0.34	
Uniform Delay, d1	54.5	43.5	53.0	42.0	55.0	39.4	26.4	45.9	36.5	19.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	101.6	42.2	81.6	45.0	71.6	2.2	0.1	42.7	54.3	0.1	
Delay (s)	156.1	85.7	134.6	87.0	126.5	41.7	26.4	88.6	90.8	19.3	
Level of Service	F	F	F	F	F	D	C	F	F	F	B
Approach Delay (s)		93.4		92.7		56.0		81.8			
Approach LOS		F		F		E		F			F

Intersection Summary	
HCM Average Control Delay	85.0
HCM Volume to Capacity ratio	1.09
Actuated Cycle Length (s)	120.0
Intersection Capacity Utilization	101.5%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

2030 PM Project Mitigations
 1/21/2008

2030 PM Project Mitigations
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	0.95	1.00	0.97	0.98	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	0.93	1.00	0.93	1.00	0.93	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	1.704	1.681	1.586	1.770	1.586	3275	1.770	3208	1.770	3208	1.770	3208
Satd. Flow (prot)	0.56	0.73	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	963	1290	1586	1770	1586	3275	1770	3208	1770	3208	1770	3208
Satd. Flow (perm)	10	20	126	120	120	0	1113	615	200	898	420	420
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	11	11	21	133	126	126	0	1172	647	211	945	442
Adj. Flow (vph)	0	20	0	0	38	0	0	67	0	0	48	0
RTOR Reduction (vph)	0	23	0	133	214	0	0	1752	0	211	1339	0
Lane Group Flow (vph)	36	Perm	Perm	36	48	16	16	16	16	16	48	48
Conf. Ped. (#/hr)	7	7	7	8	8	2	2	1	1	1	6	6
Turn Type	7	7	7	8	8	2	2	1	1	1	6	6
Protected Phases	7	7	7	8	8	2	2	1	1	1	6	6
Permitted Phases	4.0	16.5	16.5	52.0	52.0	9.5	66.0	66.0	66.0	66.0	66.0	66.0
Actuated Green, G (s)	4.5	17.0	17.0	52.5	52.5	10.0	66.5	66.5	66.5	66.5	66.5	66.5
Effective Green, g (s)	0.04	0.17	0.17	0.52	0.52	0.10	0.66	0.66	0.66	0.66	0.66	0.66
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Clearance Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Vehicle Extension (s)	43	219	270	1719	1719	0.53	0.42	0.42	0.42	0.42	0.42	0.42
Lane Grp Cap (vph)	60.02	0.10	0.13	1.02	1.02	1.19	0.63	0.63	0.63	0.63	0.63	0.63
v/s Ratio Prot	0.53	0.61	0.79	23.8	23.8	45.0	9.6	9.6	9.6	9.6	9.6	9.6
v/s Ratio Perm	46.7	38.4	39.8	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay, d1	1.00	1.00	1.00	3.2	13.7	12.1	128.8	1.4	1.4	1.4	1.4	1.4
Progression Factor	6.2	41.7	53.5	26.5	26.5	173.8	11.0	11.0	11.0	11.0	11.0	11.0
Incremental Delay, d2	53.0	D	D	D	D	F	B	B	B	B	B	B
Delay (s)	D	D	D	49.4	49.4	26.5	32.5	32.5	32.5	32.5	32.5	32.5
Level of Service	D	D	D	D	D	C	C	C	C	C	C	C
Approach Delay (s)	D	D	D	D	D	C	C	C	C	C	C	C
Approach LOS	D	D	D	D	D	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	31.6											
HCM Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	89.4%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.98	0.95	1.00	0.99	0.98	1.00	0.95	1.00	0.95	1.00	0.98
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	0.93	1.00	0.93	1.00	0.93	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	1.704	1.681	1.586	1.770	1.586	3275	1.770	3208	1.770	3208	1.770	3208
Satd. Flow (prot)	0.56	0.73	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Permitted	963	1290	1586	1770	1586	3275	1770	3208	1770	3208	1770	3208
Satd. Flow (perm)	10	20	126	120	120	0	1113	615	200	898	420	420
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	11	11	21	133	126	126	0	1172	647	211	945	442
Adj. Flow (vph)	0	20	0	0	38	0	0	67	0	0	48	0
RTOR Reduction (vph)	0	23	0	133	214	0	0	1752	0	211	1339	0
Lane Group Flow (vph)	36	Perm	Perm	36	48	16	16	16	16	16	48	48
Conf. Ped. (#/hr)	7	7	7	8	8	2	2	1	1	1	6	6
Turn Type	7	7	7	8	8	2	2	1	1	1	6	6
Protected Phases	7	7	7	8	8	2	2	1	1	1	6	6
Permitted Phases	15.5	29.0	29.0	8.5	22.0	8.6	32.0	32.0	32.0	32.0	36.9	36.9
Actuated Green, G (s)	15.0	30.0	30.0	8.0	23.0	8.1	33.0	33.0	33.0	33.0	37.9	37.9
Effective Green, g (s)	0.15	0.30	0.30	0.08	0.23	0.08	0.33	0.33	0.33	0.33	0.38	0.38
Actuated g/C Ratio	3.5	5.0	5.0	3.5	5.0	3.5	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Vehicle Extension (s)	515	1025	142	759	143	1082	230	1295	230	1295	230	1295
Lane Grp Cap (vph)	c0.14	c0.32	c0.09	0.27	0.06	c0.41	c0.18	0.23	c0.18	0.23	c0.18	0.23
v/s Ratio Prot	0.94	1.08	1.18	1.17	0.73	1.23	1.37	0.61	1.37	0.61	1.37	0.61
v/s Ratio Perm	42.1	35.0	46.0	38.5	44.9	33.5	43.5	25.1	43.5	25.1	43.5	25.1
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	24.9	52.2	133.1	90.8	15.4	110.8	188.4	1.7	188.4	1.7	188.4	1.7
Incremental Delay, d2	66.9	87.2	179.1	129.3	60.3	144.3	241.2	20.1	241.2	20.1	241.2	20.1
Delay (s)	E	F	F	F	F	E	F	C	F	C	F	C
Level of Service	E	F	F	F	F	E	F	C	F	C	F	C
Approach Delay (s)	81.1											
Approach LOS	F											
Intersection Summary												
HCM Average Control Delay	109.2											
HCM Volume to Capacity ratio	1.14											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	109.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 8: 40th St. & West St. 2030 PM Project Mitigations
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1762	3458	1752	3500	1752	3500	3431	3390	3431	3390	3431	3390
Flt Permitted	0.21	1.00	0.16	1.00	0.16	1.00	0.83	0.85	0.83	0.85	0.83	0.85
Satd. Flow (perm)	394	3458	291	3500	291	3500	2874	2908	2874	2908	2874	2908
Volume (vph)	60	1156	120	69	1018	63	90	331	57	33	160	50
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	61	1168	121	70	1028	64	91	334	58	33	162	51
RTOR Reduction (vph)	0	10	0	0	6	0	0	13	0	0	30	0
Lane Group Flow (vph)	61	1279	0	70	1086	0	0	470	0	0	217	0
Confl. Peds. (#/hr)	24	78	78	24	8	24	8	6	6	6	6	8
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	2	6	6
Permitted Phases	4	8	8	8	8	2	2	2	2	2	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	20.0	20.0	20.0	20.0	20.0	20.0	20.0
Effective Green, g (s)	51.0	51.0	51.0	51.0	51.0	21.0	21.0	21.0	21.0	21.0	21.0	21.0
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance 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
Lane Grp Cap (vph)	251	2204	186	2231	186	2231	754	763	754	763	763	763
v/s Ratio Prot	c0.37	c0.37	0.15	0.24	0.24	0.31	0.16	0.16	0.16	0.16	0.07	0.07
v/s Ratio Perm	0.24	0.58	0.38	0.49	0.38	0.49	0.62	0.62	0.62	0.62	0.28	0.28
Uniform Delay, d1	6.2	8.3	6.9	7.6	6.9	7.6	26.0	26.0	26.0	26.0	23.5	23.5
Progression Factor	0.55	0.44	0.38	0.25	0.38	0.25	0.73	0.73	0.73	0.73	1.00	1.00
Incremental Delay, d2	0.9	0.4	0.33	0.4	0.33	0.4	2.0	2.0	2.0	2.0	0.9	0.9
Delay (s)	4.3	4.1	5.9	2.4	5.9	2.4	21.1	21.1	21.1	21.1	24.4	24.4
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	4.1	2.6	2.6	2.6	2.6	2.6	21.1	21.1	21.1	21.1	24.4	24.4
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C

Intersection Summary	7.6	HCM Level of Service	A
HCM Average Control Delay	7.6	HCM Level of Service	A
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2030 PM Project Mitigations
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.99	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.96	1.00	0.96
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3429	1766	3303	1770	3303	1770	3466	1770	3466	1770	3243
Flt Permitted	0.15	1.00	0.17	1.00	0.17	1.00	0.12	1.00	0.12	1.00	0.13	1.00
Satd. Flow (perm)	274	3429	320	3303	320	3303	220	3466	220	3466	250	3243
Volume (vph)	249	914	109	74	558	110	466	1448	124	130	693	255
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	254	933	111	76	569	112	476	1478	127	133	707	260
RTOR Reduction (vph)	0	8	0	0	16	0	0	6	0	0	36	0
Lane Group Flow (vph)	254	1036	0	76	665	0	476	1599	0	133	931	0
Confl. Peds. (#/hr)	94	86	86	94	86	94	40	40	40	40	111	111
Turn Type	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt
Protected Phases	7	4	7	3	8	8	5	2	2	2	1	6
Permitted Phases	4	4	4	8	8	2	2	2	2	2	6	6
Actuated Green, G (s)	39.2	32.1	39.2	26.8	23.2	26.8	23.2	57.8	47.8	57.8	29.8	29.8
Effective Green, g (s)	39.2	32.1	39.2	26.3	23.2	26.3	23.2	57.8	47.8	57.8	29.8	29.8
Actuated g/C Ratio	0.37	0.31	0.37	0.25	0.22	0.25	0.22	0.55	0.46	0.55	0.34	0.28
Clearance Time (s)	3.5	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	273	1048	273	730	475	1578	475	1578	172	172	920	920
v/s Ratio Prot	c0.11	c0.30	c0.11	0.02	0.20	0.02	0.20	c0.23	c0.46	0.04	0.29	0.29
v/s Ratio Perm	0.24	0.93	0.24	0.14	0.14	0.14	0.14	0.32	0.22	0.22	0.22	0.22
Uniform Delay, d1	26.6	36.3	26.6	34.5	39.9	31.3	28.6	31.3	28.6	28.6	37.6	37.6
Progression Factor	0.97	0.76	0.97	1.00	1.00	1.00	1.00	1.22	0.66	1.00	1.00	1.00
Incremental Delay, d2	31.9	22.1	31.9	8.9	15.4	33.4	21.4	33.4	21.4	17.6	32.7	32.7
Delay (s)	57.6	49.7	57.6	43.4	55.3	71.7	40.3	46.3	40.3	46.3	70.3	70.3
Level of Service	E	D	E	D	E	D	E	D	E	D	E	E
Approach Delay (s)	51.2	D	51.2	54.1	D	54.1	D	47.5	D	47.5	67.4	67.4
Approach LOS	D	D	D	D	D	D	D	D	D	D	E	E

Intersection Summary	53.5	HCM Level of Service	D
HCM Average Control Delay	53.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	105.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.8%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

2030 PM Project Mitigations
 HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St. 1/2-1/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	1.00	0.98	1.00	0.98	1.00	1.00	0.97	1.00	0.98	1.00	0.98
Flt Protected	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	5013	1768	3451	1737	1802	1770	1804	1770	1804	1770	1804	1770
Flt Permitted	0.65	0.21	1.00	0.25	1.00	0.12	1.00	0.12	1.00	0.12	1.00	0.12
Satd. Flow (perm)	3298	392	3451	460	1802	219	1804	219	1804	219	1804	219
Volume (vph)	160	860	40	91	1340	221	190	525	120	80	403	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	878	41	93	1367	226	194	536	122	82	411	71
RTOR Reduction (vph)	0	5	0	0	15	0	0	9	0	0	7	0
Lane Group Flow (vph)	0	1077	0	93	1578	0	194	649	0	82	475	0
Confl. Peds. (#/hr)	24	4	4	24	48	12	12	48	12	12	48	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	6	6	6	6	6	6	6
Permitted Phases	4	8	8	2	2	6	6	6	6	6	6	6
Actuated Green, G (s)	47.0	47.0	47.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0	33.0
Effective Green, g (s)	48.0	48.0	48.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Actuated g/C Ratio	0.53	0.53	0.53	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38	0.38
Clearance 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
Lane Grp. Cap (vph)	1759	209	1841	174	681	83	682	83	682	83	682	83
v/s Ratio Prot	0.33	0.24	c0.46	c0.42	c0.36	0.37	0.26	0.37	0.26	0.37	0.26	0.37
v/s Ratio Perm	1.87d1	0.44	0.86	1.11	0.95	0.99	0.70	0.99	0.70	0.99	0.70	0.99
Uniform Delay, d1	14.6	12.8	18.1	28.0	27.2	27.8	23.6	27.8	23.6	27.8	23.6	27.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	6.7	5.4	102.4	24.6	95.5	5.8	95.5	5.8	95.5	5.8	95.5
Delay (s)	16.2	19.6	23.5	130.4	51.8	123.3	29.5	123.3	29.5	123.3	29.5	123.3
Level of Service	B	B	C	F	D	F	C	F	D	F	C	C
Approach Delay (s)	16.2	23.3	23.3	69.7	43.1	43.1	43.1	43.1	43.1	43.1	43.1	43.1
Approach LOS	B	C	C	E	D	D	D	D	D	D	D	D

Intersection Summary	
HCM Average Control Delay	33.6 HCM Level of Service
HCM Volume to Capacity ratio	0.96
Actuated Cycle Length (s)	90.0 Sum of lost time (s)
Intersection Capacity Utilization	135.7% ICU Level of Service
Analysis Period (min)	15
d1 - Defacto Left Lane. Recode with 1 though lane as a left lane.	
c - Critical Lane Group	

**APPENDIX I:
CMA ANALYSIS CALCULATIONS**

Appendix I - 1
 MTS Roadway System Analysis Summary - 2015 AM

Link Location	Segment Limits	# Lanes	No Project Volume	Project Volume	With Project Volume	% Increase	V/C Ratio - No Project	V/C Ratio - With Project	No Project LOS	With Project LOS	Change in V/C >3%	Change in LOS
Freeway Segments												
I-80												
Between	I-580 Powell Street	5	5,955	10	5,965	0%	0.60	0.60	C	C	No	no change
Between	I-580 Powell Street	5	9,404	4	9,408	0%	0.94	0.94	E	E	No	no change
I-880												
Between	Madison St 5th Ave	4	6,322	0	6,322	0%	0.79	0.79	D	D	No	no change
Between	5th Ave Madison St	4	7,157	0	7,157	0%	0.89	0.89	D	D	No	no change
I-980												
Between	I-880 Grand Ave	3	2,733	4	2,737	0%	0.46	0.46	B	B	No	no change
Between	Grand Ave SR 24 @ 580	5	2,816	4	2,820	0%	0.28	0.28	A	A	No	no change
Between	SR 24 @ 580 Grand Ave	5	5,272	7	5,279	0%	0.53	0.53	B	B	No	no change
Between	Grand Ave I-880	3	4,439	7	4,446	0%	0.74	0.74	C	C	No	no change
I-580												
Between	I-80 SR 24	5	5,481	2	5,483	0%	0.55	0.55	B	B	No	no change
Between	SR 24 Oakland Ave	5	5,098	20	5,118	0%	0.51	0.51	B	B	No	no change
Between	Oakland Ave SR 24	5	8,412	6	8,418	0%	0.84	0.84	D	D	No	no change
Between	SR 24 I-80	5	8,864	12	8,876	0%	0.89	0.89	D	D	No	no change
SR 24												
Between	I-580 Ramps Caldecott Tunnel	4	2,666	11	2,677	0%	0.33	0.33	A	A	No	no change
Between	Caldecott Tunnel I-580 Ramps	4	7,568	5	7,573	0%	0.95	0.95	E	E	No	no change
Arterials												
Martin Luther King Jr. Way												
Between	I-580 MacArthur Blvd	2	14	7	21	50%	0.01	0.01	A	A	No	no change
Between	MacArthur Blvd 40th Street	2	1	12	13	1200%	0	0.01	A	A	No	no change
Between	40th Street 45th Street	2	9	32	41	356%	0.01	0.03	A	A	No	no change
Between	45th Street 40th Street	2	52	5	57	10%	0.03	0.04	A	A	No	no change
Between	40th Street MacArthur Blvd	2	-	9	9	0%	0	0.01	A	A	No	no change
Between	MacArthur Blvd I-580	2	8	6	14	75%	0.01	0.01	A	A	No	no change
Telegraph Ave												
Between	I-580 MacArthur Blvd	2	116	25	141	22%	0.07	0.09	A	A	No	no change
Between	MacArthur Blvd 40th Street	2	440	35	475	8%	0.28	0.3	A	A	No	no change
Between	40th Street 45th Street	2	466	35	501	8%	0.29	0.31	A	A	No	no change
Between	45th Street 51st Street	2	325	33	358	10%	0.2	0.22	A	A	No	no change
Between	51st Street SR 24	2	1,419	18	1,437	1%	0.89	0.9	D	D	No	no change
Between	SR 24 51st Street	2	1,626	6	1,632	0%	1.02	1.02	F	F	No	no change
Between	51st Street 45th Street	2	1,116	25	1,141	2%	0.7	0.71	C	C	No	no change
Between	45th Street 40th Street	2	1,592	28	1,620	2%	1.00	1.01	F	F	No	no change
Between	40th Street MacArthur Blvd	2	1,076	32	1,108	3%	0.67	0.69	C	C	No	no change
Between	MacArthur Blvd I-580	2	790	36	826	5%	0.49	0.52	B	B	No	no change
Adeline Street												
Between	San Pablo Avenue Stanford Avenue	2	93	0	93	0%	0.06	0.06	A	A	No	no change
Between	Stanford Avenue San Pablo Avenue	2	386	0	386	0%	0.24	0.24	A	A	No	no change
Shattuck Avenue												
Between	Telegraph Avenue 52nd Street	2	126	6	132	5%	0.08	0.08	A	A	No	no change
Between	52nd Street Alcatraz Avenue	1	727	6	733	1%	0.91	0.92	E	E	No	no change
Between	Alcatraz Avenue 52nd Street	1	884	5	889	1%	1.11	1.11	F	F	No	no change
Between	52nd Street Telegraph Avenue	2	436	11	447	3%	0.27	0.28	A	A	No	no change
West MacArthur Blvd.												
Between	San Pablo Avenue MLK Jr. Way	3	701	13	714	2%	0.29	0.3	A	A	No	no change
Between	MLK Jr. Way Telegraph Avenue	3	707	8	715	1%	0.29	0.3	A	A	No	no change
Between	Telegraph Avenue Broadway	3	1,079	12	1,091	1%	0.45	0.45	B	B	No	no change
Between	Broadway Telegraph Avenue	3	938	6	944	1%	0.39	0.39	B	B	No	no change
Between	Telegraph Avenue MLK Jr. Way	3	554	21	575	4%	0.23	0.24	A	A	No	no change
Between	MLK Jr. Way San Pablo Avenue	3	572	18	590	3%	0.24	0.25	A	A	No	no change
51st Street												
Between	Telegraph Avenue Broadway	2	607	0	607	0%	0.38	0.38	B	B	No	no change
Between	Broadway Telegraph Avenue	2	1,045	0	1,045	0%	0.65	0.65	C	C	No	no change
Claremont Avenue												
Between	Telegraph Avenue College Avenue	2	913	6	919	1%	0.57	0.57	B	B	No	no change
Between	College Avenue Telegraph Avenue	2	1,333	4	1,337	0%	0.83	0.84	D	D	No	no change

Fehr & Peers, 2007.

Appendix I - 2
MTS Roadway System Analysis Summary - 2015 PM

Link Location	Segment Limits	# Lanes	No Project Volume	Project Volume	With Project Volume	% Increase	V/C Ratio - No Project	V/C Ratio - With Project	No Project LOS	With Project LOS	Change in V/C >3%	Change in LOS
Freeway Segments												
I-80												
Between	I-880 Powell Street	5	8,575	6	8,581	0%	0.86	0.86	D	D	No	no change
Between	I-580 Powell Street	5	6,724	9	6,733	0%	0.67	0.67	C	C	No	no change
I-880												
Between	Madison St 5th Ave	4	7,417	0	7,417	0%	0.93	0.93	E	E	No	no change
Between	5th Ave Madison St	4	6,544	0	6,544	0%	0.82	0.82	D	D	No	no change
I-980												
Between	I-880 Grand Ave	3	3,914	7	3,921	0%	0.65	0.65	C	C	No	no change
Between	Grand Ave SR 24 @ 580	5	5,674	7	5,681	0%	0.57	0.57	B	B	No	no change
Between	SR 24 @ 580 Grand Ave	5	2,653	5	2,658	0%	0.27	0.27	A	A	No	no change
Between	Grand Ave I-880	3	2,557	5	2,562	0%	0.43	0.43	B	B	No	no change
I-580												
Between	I-80 SR 24	5	8,127	6	8,133	0%	0.81	0.81	D	D	No	no change
Between	SR 24 Oakland Ave	4.5	8,599	13	8,612	0%	0.96	0.96	E	E	No	no change
Between	Oakland Ave SR 24	4.5	6,161	19	6,180	0%	0.68	0.69	C	C	No	no change
Between	SR 24 I-80	5	6,366	7	6,373	0%	0.64	0.64	C	C	No	no change
SR 24												
Between	I-580 Ramps Caldecott Tunnel	4	8,254	7	8,261	0%	1.03	1.03	F	F	No	no change
Between	Caldecott Tunnel I-580 Ramps	4	3,124	11	3,135	0%	0.39	0.39	B	B	No	no change
Arterials												
Martin Luther King Jr. Way												
Between	I-580 MacArthur Blvd	2	12	0	12	0%	0.01	0.01	A	A	No	no change
Between	MacArthur Blvd 40th Street	2	1	20	21	2000%	0	0.01	A	A	No	no change
Between	40th Street 45th Street	2	9	22	31	244%	0.01	0.02	A	A	No	no change
Between	45th Street 40th Street	2	13	7	20	54%	0.01	0.01	A	A	No	no change
Between	40th Street MacArthur Blvd	2	-	5	5	0%	0	0	A	A	No	no change
Between	MacArthur Blvd I-580	2	11	7	18	64%	0.01	0.01	A	A	No	no change
Telegraph Ave												
Between	I-580 MacArthur Blvd	2	628	38	666	6%	0.39	0.42	B	B	No	no change
Between	MacArthur Blvd 40th Street	2	1,140	27	1,167	2%	0.71	0.73	C	C	No	no change
Between	40th Street 45th Street	2	1,529	27	1,556	2%	0.96	0.97	E	E	No	no change
Between	45th Street 51st Street	2	1,115	18	1,133	2%	0.7	0.71	C	C	No	no change
Between	51st Street SR 24	2	1,857	9	1,866	0%	1.16	1.17	F	F	No	no change
Between	SR 24 51st Street	2	1,202	18	1,220	1%	0.75	0.76	C	D	No	change
Between	51st Street 45th Street	2	366	26	392	7%	0.23	0.25	A	A	No	no change
Between	45th Street 40th Street	2	507	48	555	9%	0.32	0.35	A	B	No	change
Between	40th Street MacArthur Blvd	2	502	51	553	10%	0.31	0.35	A	B	Yes	change
Between	MacArthur Blvd I-580	2	213	29	242	14%	0.13	0.15	A	A	No	no change
Adeline Street												
Between	San Pablo Avenue Stanford Avenue	2	453	0	453	0%	0.28	0.28	A	A	No	no change
Between	Stanford Avenue San Pablo Avenue	2	99	0	99	0%	0.06	0.06	A	A	No	no change
Shattuck Avenue												
Between	Telegraph Avenue 52nd Street	2	332	7	339	2%	0.21	0.21	A	A	No	no change
Between	52nd Street Alcatraz Avenue	1	878	7	885	1%	1.1	1.11	F	F	No	no change
Between	Alcatraz Avenue 52nd Street	1	887	6	893	1%	1.11	1.12	F	F	No	no change
Between	52nd Street Telegraph Avenue	2	98	20	118	20%	0.06	0.07	A	A	No	no change
West MacArthur Blvd.												
Between	San Pablo Avenue MLK Jr. Way	3	1,065	20	1,085	2%	0.44	0.45	B	B	No	no change
Between	MLK Jr. Way Telegraph Avenue	3	1,041	17	1,058	2%	0.43	0.44	B	B	No	no change
Between	Telegraph Avenue Broadway	3	1,398	7	1,405	1%	0.58	0.59	B	C	No	change
Between	Broadway Telegraph Avenue	3	1,519	7	1,526	0%	0.63	0.64	C	C	No	no change
Between	Telegraph Avenue MLK Jr. Way	3	904	16	920	2%	0.38	0.38	B	B	No	no change
Between	MLK Jr. Way San Pablo Avenue	3	897	12	909	1%	0.37	0.38	B	B	No	no change
51st Street												
Between	Telegraph Avenue Broadway	2	1,126	0	1,126	0%	0.7	0.7	C	C	No	no change
Between	Broadway Telegraph Avenue	2	1,009	0	1,009	0%	0.63	0.63	C	C	No	no change
Claremont Avenue												
Between	Telegraph Avenue College Avenue	2	1,368	5	1,373	0%	0.86	0.86	D	D	No	no change
Between	College Avenue Telegraph Avenue	2	1,168	9	1,177	1%	0.73	0.74	C	C	No	no change

Appendix I - 3
MTS Roadway System Analysis Summary - 2030 AM

Link Location	Segment Limits	# Lanes	No Project Volume	Project Volume	With Project Volume	% Increase	V/C Ratio - No Project	V/C Ratio - With Project	No Project LOS	With Project LOS	Change in V/C >3%	Change in LOS
Freeway Segments												
I-80												
Between	I-580 Powell Street	5	6,523	10	6,533	0%	0.65	0.65	C	C	No	no change
Between	I-580 Powell Street	5	12,514	4	12,518	0%	1.25	1.25	F	F	No	no change
I-880												
Between	Madison St 5th Ave	4	7,221	0	7,221	0%	0.90	0.90	D	D	No	no change
Between	5th Ave Madison St	4	7,903	0	7,903	0%	0.99	0.99	E	E	No	no change
I-980												
Between	I-880 Grand Ave	3	2,864	4	2,868	0%	0.48	0.48	B	B	No	no change
Between	Grand Ave SR 24 @ 580	5	3,037	4	3,041	0%	0.30	0.30	A	A	No	no change
Between	SR 24 @ 580 Grand Ave	5	6,284	7	6,291	0%	0.63	0.63	C	C	No	no change
Between	Grand Ave I-880	3	4,706	7	4,713	0%	0.78	0.79	D	D	No	no change
I-580												
Between	I-80 SR 24	5	6,091	2	6,093	0%	0.61	0.61	C	C	No	no change
Between	SR 24 Oakland Ave	4.5	6,131	20	6,151	0%	0.68	0.68	C	C	No	no change
Between	Oakland Ave SR 24	4.5	8,712	6	8,718	0%	0.97	0.97	E	E	No	no change
Between	SR 24 I-80	5	9,211	12	9,223	0%	0.92	0.92	E	E	No	no change
SR 24												
Between	I-580 Ramps Caldecott Tunnel	4	3,508	11	3,519	0%	0.44	0.44	B	B	No	no change
Between	Caldecott Tunnel I-580 Ramps	4	9,465	5	9,470	0%	1.18	1.18	F	F	No	no change
Arterials												
Martin Luther King Jr. Way												
Between	I-580 MacArthur Blvd	2	14	7	21	50%	0.01	0.01	A	A	No	no change
Between	MacArthur Blvd 40th Street	2	1	12	13	1200%	0	0.01	A	A	No	no change
Between	40th Street 45th Street	2	18	32	50	178%	0.01	0.03	A	A	No	no change
Between	45th Street 40th Street	2	175	5	180	3%	0.11	0.11	A	A	No	no change
Between	40th Street MacArthur Blvd	2	138	9	147	7%	0.09	0.09	A	A	No	no change
Between	MacArthur Blvd I-580	2	14	6	20	43%	0.01	0.01	A	A	No	no change
Telegraph Ave												
Between	I-580 MacArthur Blvd	2	253	25	278	10%	0.16	0.17	A	A	No	no change
Between	MacArthur Blvd 40th Street	2	596	35	631	6%	0.37	0.39	B	B	No	no change
Between	40th Street 45th Street	2	586	35	621	6%	0.37	0.39	B	B	No	no change
Between	45th Street 51st Street	2	441	33	474	7%	0.28	0.3	A	A	No	no change
Between	51st Street SR 24	2	1,764	18	1,782	1%	1.1	1.11	F	F	No	no change
Between	SR 24 51st Street	2	2,044	6	2,050	0%	1.28	1.28	F	F	No	no change
Between	51st Street 45th Street	2	1,669	25	1,694	1%	1.04	1.06	F	F	No	no change
Between	45th Street 40th Street	2	2,011	28	2,039	1%	1.26	1.27	F	F	No	no change
Between	40th Street MacArthur Blvd	2	1,780	32	1,812	2%	1.11	1.13	F	F	No	no change
Between	MacArthur Blvd I-580	2	1,445	36	1,481	2%	0.9	0.93	D	E	No	change
Adeline Street												
Between	San Pablo Avenue Stanford Avenue	2	125	0	125	0%	0.08	0.08	A	A	No	no change
Between	Stanford Avenue San Pablo Avenue	2	1,086	0	1,086	0%	0.68	0.68	C	C	No	no change
Shattuck Avenue												
Between	Telegraph Avenue 52nd Street	2	120	6	126	5%	0.08	0.08	A	A	No	no change
Between	52nd Street Alcatraz Avenue	1	811	6	817	1%	1.01	1.02	F	F	No	no change
Between	Alcatraz Avenue 52nd Street	1	1,172	5	1,177	0%	1.47	1.47	F	F	No	no change
Between	52nd Street Telegraph Avenue	2	304	11	315	4%	0.19	0.2	A	A	No	no change
West MacArthur Blvd.												
Between	San Pablo Avenue MLK Jr. Way	3	930	13	943	1%	0.39	0.39	B	B	No	no change
Between	MLK Jr. Way Telegraph Avenue	3	1,058	8	1,066	1%	0.44	0.44	B	B	No	no change
Between	Telegraph Avenue Broadway	3	1,514	12	1,526	1%	0.63	0.64	C	C	No	no change
Between	Broadway Telegraph Avenue	3	1,741	6	1,747	0%	0.73	0.73	C	C	No	no change
Between	Telegraph Avenue MLK Jr. Way	3	1,401	21	1,422	1%	0.58	0.59	B	C	No	change
Between	MLK Jr. Way San Pablo Avenue	3	1,435	18	1,453	1%	0.6	0.61	C	C	No	no change
51st Street												
Between	Telegraph Avenue Broadway	2	1,269	0	1,269	0%	0.79	0.79	D	D	No	no change
Between	Broadway Telegraph Avenue	2	1,070	0	1,070	0%	0.67	0.67	C	C	No	no change
Claremont Avenue												
Between	Telegraph Avenue College Avenue	2	1,272	6	1,278	0%	0.8	0.8	D	D	No	no change
Between	College Avenue Telegraph Avenue	2	1,735	4	1,739	0%	1.08	1.09	F	F	No	no change

Appendix I - 4
MTS Roadway System Analysis Summary - 2030 PM

Link Location	Segment Limits	# Lanes	No Project Volume	Project Volume	With Project Volume	% Increase	V/C Ratio - No Project	V/C Ratio - With Project	No Project LOS	With Project LOS	Change in V/C >3%	Change in LOS
Freeway Segments												
I-80												
Between	I-580 Powell Street	5	9,870	6	9,876	0%	0.99	0.99	E	E	No	no change
Between	I-580 Powell Street	5	6,668	9	6,677	0%	0.67	0.67	C	C	No	no change
I-880												
Between	Madison St 5th Ave	4	7,953	0	7,953	0%	0.99	0.99	E	E	No	no change
Between	5th Ave Madison St	4	7,281	0	7,281	0%	0.91	0.91	E	E	No	no change
I-980												
Between	I-880 Grand Ave	3	3,744	7	3,751	0%	0.62	0.63	C	C	No	no change
Between	Grand Ave SR 24 @ 580	5	6,341	7	6,348	0%	0.63	0.63	C	C	No	no change
Between	SR 24 @ 580 Grand Ave	5	3,030	5	3,035	0%	0.30	0.30	A	A	No	no change
Between	Grand Ave I-880	3	2,892	5	2,897	0%	0.48	0.48	B	B	No	no change
I-580												
Between	I-80 SR 24	5	9,078	6	9,084	0%	0.91	0.91	E	E	No	no change
Between	SR 24 Oakland Ave	4.5	8,973	13	8,986	0%	1.00	1.00	F	F	No	no change
Between	Oakland Ave SR 24	4.5	6,328	19	6,347	0%	0.70	0.71	C	C	No	no change
Between	SR 24 I-80	5	6,871	7	6,878	0%	0.69	0.69	C	C	No	no change
SR 24												
Between	I-580 Ramps Caldecott Tunnel	4	9,881	7	9,888	0%	1.24	1.24	F	F	No	no change
Between	Caldecott Tunnel I-580 Ramps	4	3,991	11	4,002	0%	0.50	0.50	B	B	No	no change
Arterials												
Martin Luther King Jr. Way												
Between	I-580 MacArthur Blvd	2	16	0	16	0%	0.01	0.01	A	A	No	no change
Between	MacArthur Blvd 40th Street	2	11	20	31	182%	0.01	0.02	A	A	No	no change
Between	40th Street 45th Street	2	74	22	96	30%	0.05	0.06	A	A	No	no change
Between	45th Street 40th Street	2	25	7	32	28%	0.02	0.02	A	A	No	no change
Between	40th Street MacArthur Blvd	2	1	5	6	500%	0	0	A	A	No	no change
Between	MacArthur Blvd I-580	2	14	7	21	50%	0.01	0.01	A	A	No	no change
Telegraph Ave												
Between	I-580 MacArthur Blvd	2	1,446	38	1,484	3%	0.9	0.93	D	E	No	change
Between	MacArthur Blvd 40th Street	2	2,013	27	2,040	1%	1.26	1.28	F	F	No	no change
Between	40th Street 45th Street	2	2,082	27	2,109	1%	1.3	1.32	F	F	No	no change
Between	45th Street 51st Street	2	1,646	18	1,664	1%	1.03	1.04	F	F	No	no change
Between	51st Street SR 24	2	2,202	9	2,211	0%	1.38	1.38	F	F	No	no change
Between	SR 24 51st Street	2	1,376	18	1,394	1%	0.86	0.87	D	D	No	no change
Between	51st Street 45th Street	2	578	26	604	4%	0.36	0.38	B	B	No	no change
Between	45th Street 40th Street	2	742	48	790	6%	0.46	0.49	B	B	No	no change
Between	40th Street MacArthur Blvd	2	815	51	866	6%	0.51	0.54	B	B	No	no change
Between	MacArthur Blvd I-580	2	328	29	357	9%	0.21	0.22	A	A	No	no change
Adeline Street												
Between	San Pablo Avenue Stanford Avenue	2	1,088	0	1,088	0%	0.68	0.68	C	C	No	no change
Between	Stanford Avenue San Pablo Avenue	2	247	0	247	0%	0.15	0.15	A	A	No	no change
Shattuck Avenue												
Between	Telegraph Avenue 52nd Street	2	357	7	364	2%	0.22	0.23	A	A	No	no change
Between	52nd Street Alcatraz Avenue	1	1,018	7	1,025	1%	1.27	1.28	F	F	No	no change
Between	Alcatraz Avenue 52nd Street	1	896	6	902	1%	1.12	1.13	F	F	No	no change
Between	52nd Street Telegraph Avenue	2	107	20	127	19%	0.07	0.08	A	A	No	no change
West MacArthur Blvd.												
Between	San Pablo Avenue MLK Jr. Way	3	1,313	20	1,333	2%	0.55	0.56	B	B	No	no change
Between	MLK Jr. Way Telegraph Avenue	3	1,287	17	1,304	1%	0.54	0.54	B	B	No	no change
Between	Telegraph Avenue Broadway	3	1,656	7	1,663	0%	0.69	0.69	C	C	No	no change
Between	Broadway Telegraph Avenue	3	2,196	7	2,203	0%	0.92	0.92	E	E	No	no change
Between	Telegraph Avenue MLK Jr. Way	3	1,716	16	1,732	1%	0.72	0.72	C	C	No	no change
Between	MLK Jr. Way San Pablo Avenue	3	1,718	12	1,730	1%	0.72	0.72	C	C	No	no change
51st Street												
Between	Telegraph Avenue Broadway	2	1,136	0	1,136	0%	0.71	0.71	C	C	No	no change
Between	Broadway Telegraph Avenue	2	1,171	0	1,171	0%	0.73	0.73	C	C	No	no change
Claremont Avenue												
Between	Telegraph Avenue College Avenue	2	1,849	5	1,854	0%	1.16	1.16	F	F	No	no change
Between	College Avenue Telegraph Avenue	2	1,491	9	1,500	1%	0.93	0.94	E	E	No	no change

**APPENDIX J:
TELEGRAPH AVENUE BUS RAPID TRANSIT ANALYSIS**

APPENDIX J TELEGRAPH AVENUE BUS RAPID TRANSIT

In May of 2007, AC Transit published a Draft Environmental Impact Statement / Environmental Impact Report (EIS/EIR) to implement Bus Rapid Transit (BRT) on Telegraph Avenue and International Boulevard connecting Berkeley, Oakland, and San Leandro. The proposed system would dedicate one travel lane in each direction to bus operations only, allowing buses to provide a quicker and more reliable service than regular bus service today. In the vicinity of the project, the proposed BRT project would generally eliminate one through lane in each direction and narrow Telegraph Avenue to one through lane in each direction.

Currently, there are no finalized design plans, an assurance of full funding for the BRT project, or approvals from AC Transit, the City of Oakland and other public agencies. Although proposed (but not approved) transit improvements are not typically considered as part of the projected baseline conditions, this EIR nevertheless (conservatively) provides a non-CEQA discussion of the potential effects on project impacts caused by proposed modifications to the traffic circulation network by the proposed BRT.

On Telegraph Avenue, within the study area, the BRT project would eliminate one northbound and one southbound travel lanes on Telegraph Avenue. This configuration would result in a single travel lane in northbound and southbound directions on Telegraph Avenue. In addition, the BRT project would eliminate left-turn lanes and prohibit left-turns at most intersections along its route. Left-turns would be allowed at the following locations along Telegraph Avenue within the study area: 51st Street (southbound only), 52st Street (southbound only), 40th Street, MacArthur Boulevard, and 27th Street. The BRT project would include new traffic signals and improvements to existing traffic signals (interconnection) to improve traffic flow.

By eliminating one travel lane in each direction, the BRT project would reduce the vehicular capacity on Telegraph Avenue. As previously shown in the project analysis, many of the study intersections on Telegraph Avenue would operate at poor levels of service under Cumulative Year 2030 Baseline Plus Project conditions. Thus, it is likely that the increased vehicular congestion on Telegraph Avenue would result in some vehicles diverting to other north-south arterials, such as Martin Luther King Jr. Way and Broadway.

Traffic operations Analysis

This section analyzes the effects of implementing the Telegraph Avenue BRT project on both Telegraph Avenue and on parallel roadways. The intersection LOS operations compares intersection LOS under Cumulative Year 2030 Baseline Plus Project (i.e., MacArthur Transit Village) conditions as previously presented in Chapter IV.C with intersection LOS under Cumulative Year 2030 Baseline Plus Project Plus BRT conditions. The Cumulative Year 2030 Baseline Plus Project Plus BRT conditions was developed by adjusting the Cumulative Year 2030 Baseline plus Project Condition of the MacArthur Transit Village EIR to account for geometric and volume changes related to the BRT project. These adjustments were based on the traffic

analysis completed for the BRT EIR.¹ Thus, this analysis is limited to the following intersections only, which are analyzed in both EIRs:

- #2 Telegraph Avenue/52nd Street/Claremont Avenue (a.m. peak hour only)
- #3 Telegraph Avenue/51st Street (a.m. peak hour only)
- #6 Telegraph Avenue/45th Street (p.m. peak hour only)
- #13 Telegraph Avenue/40th Street (a.m. and p.m. peak hours)
- #18 Martin Luther King Jr. Way/MacArthur Boulevard (p.m. peak hour only)
- #20 Telegraph Avenue/West MacArthur Boulevard (p.m. peak hour only)
- #24 Telegraph Avenue/27th Street (p.m. peak hour only)

Based on the traffic volumes developed for the BRT EIR, the BRT project would reduce peak hour traffic volumes on Telegraph Avenue by about 250 vehicles in each direction. However, the BRT EIR does not provide traffic volumes on all parallel roadways that diverted traffic would use.

Table 1 summarizes intersection LOS for seven intersections under both Cumulative Year 2030 Baseline Plus Project No BRT (i.e., the Cumulative Year 2030 Baseline Plus Project conditions analyzed in the MacArthur Transit Village Project EIR) and Cumulative Year 2030 Baseline Plus Project Plus BRT conditions. Table 1 shows intersection LOS for Cumulative Year 2030 Baseline Plus Project No BRT conditions with and without Mitigation Measures TRANS-1 through TRANS-9 as identified in the EIR. In addition, the Cumulative Year 2030 Baseline Plus Project Plus BRT conditions analysis also accounts for implementation of the mitigation measures TRANS 1 through TRANS 9 at the study intersections. Thus, comparison of the Cumulative Year 2030 Baseline Plus Project Plus BRT conditions to Cumulative Year 2030 Baseline Plus Project No BRT (Mitigated) conditions shows the impacts of the BRT project assuming the completion of the MacArthur Transit Village project and implementation of mitigation measures TRANS-1 through TRANS-9.

As shown in Table 1, the implementation of the BRT would increase delay and degrade LOS at the seven studied intersections during both a.m. and p.m. peak hours, The following intersections would operate at unacceptable LOS E or LOS F regardless of the BRT project:

- #2 Telegraph Avenue/52st Street and Claremont Avenue intersection
- #3 Telegraph Avenue/51st Street intersection
- #13 Telegraph Avenue/40th Street intersection

¹ AC Transit East Bay Bus Rapid Transit Traffic Analysis Report (Cambridge Systematics, April 2007)

**Table 1
Cumulative Year 2030 Intersection Level of Service Summary**

No.	Intersection	Traffic Control	Time Period	Cumulative Year 2030 Baseline Plus Project No BRT (Not Mitigated)		Cumulative Year 2030 Baseline Plus Project No BRT (Mitigated)		Cumulative Year 2030 Baseline Plus Project Plus BRT	
				LOS	Delay	LOS	Delay	LOS	Delay
2	Telegraph Avenue/52 nd Street/Claremont Avenue	Signal	AM PM	F E	>120 72.9	F C	>120 31.6	F N/A	>120 N/A
3	Telegraph Avenue/51 st Street	Signal	AM PM	F F	>120 113.7	F F	>120 109.2	F N/A	>120 N/A
6	Telegraph Avenue/45 th Street	Signal	AM PM	B C	17.2 30.7	B C	17.2 30.7	N/A D	N/A 54.8
13	Telegraph Avenue/40 th Street	Signal	AM PM	F F	82.8 0.5	D D	54.5 53.5	F F	>120 >120
18	Martin Luther King Jr. Way/ West MacArthur Boulevard	Signal	AM PM	B C	14.0 25.0	B C	13.5 20.8	N/A D	N/A 38.0
20	Telegraph Avenue/ West MacArthur Boulevard	Signal	AM PM	E F	63.9 102.3	D E	53.8 68.5	N/A F	N/A 113.7
24	Telegraph Avenue/27 th Street	Signal	AM PM	D D	48.4 44.0	D D	48.4 44.0	N/A D	N/A 48.8

Notes: N/A = Intersection was not analyzed in the BRT EIR during the AM peak hour.
Bold indicates significant impacts.
Source: Fehr & Peers, 2007.

The MacArthur Transit Village EIR identifies project impacts at four of the seven study intersections and proposes improvements to mitigate project impacts. Project Impacts at three of the four intersections can be mitigated to a less than significant level. However, the MacArthur Transit Village project impact at the Telegraph Avenue/51st Street intersection would be significant and unavoidable.

The BRT EIR identified the following impacts and mitigation measures in the study area:

- #13 Telegraph Avenue/40th Street – Modify traffic signal to provide protected/permitted left-turns in the east/west approaches and provide either a second northbound and eastbound through lane or provide an exclusive right-turn lane in the southbound direction.
- #20 Telegraph Avenue/MacArthur Boulevard – Either provide a second left-turn lane on northbound Telegraph Avenue or provide a second through lane on northbound Telegraph Avenue, and changes the lane configuration of eastbound

and westbound MacArthur Boulevard to two through lanes, one left-turn lane, and one right-turn lane. This second strategy includes the implementation of protected-permitted phasing for left turn lanes on MacArthur Boulevard

Table 2 summarizes intersection LOS at the four intersections that would operate at LOS E or LOS F under Cumulative Year 2030 Baseline Plus Project Plus BRT conditions with implementation of the mitigation measures identified in the BRT EIR. Although these improvements would improve intersection operations at the Telegraph Avenue/40th Street and Telegraph Avenue/MacArthur Boulevard intersections, both intersections would continue to operate at deficient LOS E or LOS F under Cumulative Year 2030 Baseline Plus Project Plus BRT conditions.

Table 2 Cumulative Year 2030 Mitigated Intersection Level of Service Summary							
No.	Intersection	Traffic Control	Time Period	Cumulative Year 2030 Baseline Plus Project Plus BRT		Cumulative Year 2030 Baseline Plus Project Plus BRT (Mitigated)	
				LOS	Delay	LOS	Delay
2	Telegraph Avenue/52 nd Street/Claremont Avenue	Signal	AM PM	F N/A	>120 N/A	F N/A	>120 N/A
3	Telegraph Avenue/51 st Street	Signal	AM PM	F N/A	>120 N/A	F N/A	>120 N/A
13	Telegraph Avenue/40 th Street	Signal	AM PM	F F	>120 >120	F F	>120 82.1
20	Telegraph Avenue/ West MacArthur Boulevard	Signal	AM PM	N/A F	N/A 113.7	N/A E	N/A 73.7
Notes: N/A = Intersection was not analyzed in the BRT EIR during the AM or PM peak hour. Bold indicates significant impacts.							
Source: Fehr & Peers, 2007.							

These four intersections on Telegraph Avenue would continue to operate at deficient levels after implementation of feasible improvements identified in both BRT EIR and MacArthur Transit Village EIR under the Cumulative Year 2030 Baseline Plus Project Plus BRT conditions. Thus, the additional impacts of the BRT project on these intersections would be significant and unavoidable.

**APPENDIX K:
BART RIDERSHIP ESTIMATES**



APPENDIX K BART RIDERSHIP ESTIMATES

This section presents estimates of BART ridership changes due to the proposed MacArthur BART Transit Village project.

BACKGROUND

In order to develop the proposed Transit Village land uses, the development will replace the existing 618 surface parking spaces, dedicated for BART patron use, with 300 structured parking spaces. A residential parking permit (RPP) program is also planned for the neighborhoods within ¼ mile buffer of the station. The RPP would restrict parking in the neighborhood and would affect an estimated 216 BART patrons currently parked in the surrounding neighborhoods. The estimate of BART patrons parking in the neighborhood is based on license plate survey data collected in May 2006.

While the loss of BART patron parking spaces will result in a decrease in BART ridership and access mode shifts, the new land uses will result in an increase in ridership.

RIDERSHIP ESTIMATION TECHNIQUES

In order to quantify the change in BART ridership, three methodologies were considered:

The **ITE methodology** uses project-specific, land use-based ITE trip generation rates and transit reduction information collected at similar Bay Area transit-oriented developments. Review of the project land use program, Census data, Bay Area Transportation Survey data, field-collected transit-oriented development trip generation surveys and other transit-oriented development trip generation studies were conducted to develop trip generation rates for the transit village. These rates included an estimation of transit trips, which represent 19% of the total trips. See *MacArthur Transit Village Trip Generation* (Fehr & Peers, 2007) for more detail.

The **Willson methodology** uses BART's project-specific replacement parking for joint development methodology developed by Richard Willson, PhD (UCLA) and BART staff. Willson and BART developed this estimation technique to specifically address ridership loss at a station due to the removal of parking by accounting for the project land use program, the number of existing and proposed parking spaces, and information on non-personal vehicle-based station access modes. See *Replacement Parking for Joint Development: An Access Policy Methodology* (BART, 2005) for more detail.

The **Direct Ridership Model methodology** uses BART's station-area direct ridership models (DRM) developed by Fehr & Peers, ARUP, Nelson/Nygaard, Strategic Economics, and BART staff. The DRM are empirical-based, regression models that account for station characteristics including: surrounding population, surrounding employment, feeder transit service, parking levels, and access information by mode (walk, bicycle, transit, drive alone, carpool, and drop-off). See *Access BART* (BART, 2006) for more detail.

After reviewing the data inputs and assumptions of the three methodologies, the Willson methodology was selected for use by the City of Oakland and BART staff because it was developed by BART specifically for replacement parking and joint development applications. The total BART ridership was estimated by separating the ridership increase due to the transit village from the ridership decrease due to the on-site (and off-site) BART patron parking reduction. The following sections present the transit village and parking reduction BART ridership estimates.

TRANSIT VILLAGE BART RIDERSHIP ESTIMATES

As shown in Table 1, the estimated change in BART ridership due to the transit village will result in an increase of 855 daily, 115 AM peak hour, and 137 PM peak hour BART trips.

TABLE 1 BART RIDERSHIP CHANGES DUE TO TRANSIT VILLAGE								
Type of Development	Amount	Total Trips	Trip Split	Disaggregated Trips	Percent BART Capture	Daily Trips	AM Peak Hour Trips ⁶	PM Peak Hour Trips ⁶
Residential (Dwelling Units)	675	3,254 ¹						
Work Trips			25%	814	55.5% ⁴	452	66	80
Non-Work Trips			75%	2,441	11.7% ⁴	286	42	50
Retail (ksf)	44	1,950 ²	100%	1,950	5.00% ⁵	98	6	6
Childcare (ksf)	5	396 ³	100%	396	5.00% ⁵	20	1	1
Total BART Ridership Increase						855	115	137
Notes:								
1 - Residential trip generation from ITE 7th Edition equation for Residential Condominium/Townhouse (Land Use 230). Daily Equation: $\ln(T) = 0.85 \ln(X) + 2.55$								
2 - Retail trip generation from ITE 7th Edition equation for Specialty Retail (Land Use 814). Daily Rate: $(T) = 44.32 (X)$								
3 - Child care trip generation from ITE 7th Edition equation for Child Care (Land Use 565). Daily Rate: $(T) = 79.26 (X)$								
4 - Residential work and non-work BART trip shares based on average of rail shares for developments in Pleasant Hill and S. Alameda County are 40.5% and 8.55 percent respectively (Tables 5-8 on page 46 and Table 5-11 on page 51, CA TOD Report). These developments are suburban with an average of parking supply of 1.3 spaces per dwelling unit and located between 0.1 and 0.5 miles away from a BART Station. The proposed MacArthur Transit Village is in a more urban area, provides only one parking space per dwelling unit, and is immediately adjacent to a BART station. Based on data presented in Table 5-22 of the CA TOD report, the BART trip share capture is increased to account for the amount of parking provided at the site.								
5 - Retail rail share based on rail shares for El Cerrito Plaza, Table 7-7, page 109 CA TOD Report.								
6 - AM and PM peak hour transit trips based on AM/daily (Res = 14.6%, Non-Res = 6%) and PM/daily Res = 17.6%, Non-Res = 6%) ratios from EIR transit trip generation estimates.								
Source: Fehr & Peers, 2007.								

CHANGES IN PARKING SUPPLY BART RIDERSHIP ESTIMATES

As shown in Table 2, the estimated change in BART ridership due to the change in parking supply on-site will result in a decrease of 524 daily, 58 AM peak hour, and 63 PM peak hour BART trips. This analysis is conservative as it assumes that the BART riders who currently park at the BART Station parking lot would not shift to parking in the surrounding neighborhoods and those riders would be lost at the MacArthur Station.

TABLE 2 BART RIDERSHIP CHANGES DUE TO BART ON-SITE PARKING REDUCTION			
Analysis Step	Daily	AM Peak Hour	PM Peak Hour
Number of Spaces Reduced	318		
Space Turnover (cars parked per day)	1		
Number of people per car	1.1		
Number of daily BART trips per person	2		
Number of auto access boardings and alightings reduced	700		
Percent that find another access mode and continue to use BART	25% ¹		
BART ridership retained, change to another access mode	175		
Total BART Ridership Decrease	525	58²	63²
Notes:			
1 - Analysis assumes that 25 percent of riders switch to another BART access mode when their space is removed, and are therefore retained as BART riders. This assumption is based on BART direct ridership model data presented in the <i>Access BART</i> (BART, 2006) report for the MacArthur BART station.			
2 - AM and PM peak hour transit trips based on January 207 boarding and alighting data at the MacArthur BART Station provided by BART (AM = 11% of daily and PM = 12% of daily).			
Source: Fehr & Peers, 2007.			

As shown in Table 3, the estimated change in BART ridership due to the change in parking supply on-site and implementation of the RPP will result in a decrease of 844 daily, 270 AM peak hour, and 84 PM peak hour BART trips.

SUMMARY OF BART RIDERSHIP ESTIMATES

As shown in Table 4, development of the Transit Village and the accompanying change in parking supply on-site will result in an increase of 331 daily, 57 AM peak hour, and 74 PM peak hour BART trips. Development of the Transit Village, the accompanying change in parking supply on-site, and the implementation of the RPP will result in an increase of 11 daily, 22 AM peak hour, and 36 PM peak hour BART trips.

Given the scale of existing BART ridership at the MacArthur BART station, development of the Transit Village will result in a small increase in daily, AM peak hour, and PM peak hour BART ridership levels. BART service from the MacArthur station is currently constrained by the capacity

of arriving trains, which are typically full, during the AM and PM peak hours. The estimated additional amount of peak hour trips would not be noticeable as it would be distributed throughout the peak hour.

TABLE 3 BART RIDERSHIP CHANGES DUE TO BART ON-SITE AND RPP PARKING REDUCTION			
Analysis Step	Daily	AM Peak Hour	PM Peak Hour
Number of Spaces Reduced	512		
Space Turnover (cars parked per day)	1		
Number of people per car	1.1		
Number of daily BART trips per person	2		
Number of auto access boardings and alightings reduced	1126		
Percent that find another access mode and continue to use BART	25% ¹		
BART boardings retained, change to another access mode	282		
Total BART Ridership Decrease	844	93²	101³
Notes:			
1 - Analysis assumes that 25 percent of riders switch to another BART access mode when their space is removed, and are therefore retained as BART riders. This assumption is based on BART direct ridership model data presented in the <i>Access BART</i> (BART, 2006) report for the MacArthur BART station.			
2 - AM and PM peak hour transit trips based on January 207 boarding and alighting data at the MacArthur BART Station provided by BART (AM = 11% of daily and PM = 12% of daily).			
Source: Fehr & Peers, 2007.			

TABLE 4 SUMMARY OF BART RIDERSHIP CHANGES			
Change Due To	Daily	AM Peak Hour	PM Peak Hour
Transit Village	855	115	137
On-Site Parking Reduction	-525	-58	-63
Total	331	57	74
Transit Village	855	115	137
On-Site and RPP Parking Reduction	-844	-93	-101
Total	11	22	36
Source: Fehr & Peers, 2007.			

**APPENDIX L:
EXISTING PLUS COMMERCIAL ALTERNATIVE
INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

Existing+Commercial AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	→	→	→	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	12	12	12	12	12	16	16	16	16	16	16
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	1.00
Fipb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.99	1.00	1.00
Flt Protected	0.95	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.93	1.00	0.95	1.00
Satd. Flow (prot)	1770	4917	1770	4965	1770	4965	2006	2048	1983	1929	1983	1929
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.10	1.00	0.47	1.00	0.47	1.00
Satd. Flow (perm)	1770	4917	1770	4965	1770	4965	219	2048	977	1929	977	1929
Volume (vph)	288	909	182	65	1219	165	206	267	50	146	284	246
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	303	957	192	68	1283	174	217	281	53	154	299	259
RTOR Reduction (vph)	0	21	0	0	14	0	0	6	0	0	0	27
Lane Group Flow (vph)	303	1128	0	68	1443	0	217	328	0	154	531	0
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	→	→	→	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.96	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.97	1.00	0.95	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1696	1681	1607	1681	1607	1681	3406	3406	1770	3207	1770	3207
Flt Permitted	0.80	1.00	0.75	1.00	1.00	1.00	0.94	1.00	0.94	1.00	0.95	1.00
Satd. Flow (perm)	1402	1321	1607	1321	1607	1321	3214	3214	1770	3207	1770	3207
Volume (vph)	8	0	7	118	95	119	10	981	229	72	675	358
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	9	0	8	127	102	128	11	1055	246	77	726	385
RTOR Reduction (vph)	0	8	0	0	61	0	0	15	0	0	0	47
Lane Group Flow (vph)	0	9	0	127	169	0	0	1297	0	77	1064	0
Confl. Peds. (#/hr)	4	4	4	4	4	4	4	4	4	4	4	4

Turn Type	Prot	Perm	pm+pt	Perm
Protected Phases	7	4	3	8
Permitted Phases				2
Actuated Green, G (s)	17.0	55.9	8.6	47.5
Effective Green, g (s)	17.0	55.9	8.6	47.5
Actuated g/C Ratio	0.14	0.47	0.07	0.40
Clearance Time (s)	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	251	2291	127	1965
v/s Ratio Prot	c0.17	0.23	0.04	c0.29
v/c Ratio Perm				0.37
Uniform Delay, d1	51.5	22.2	53.8	30.9
Progression Factor	1.00	1.00	1.00	1.00
Incremental Delay, d2	124.5	0.8	4.3	2.5
Delay (s)	176.0	23.0	58.1	33.4
Level of Service	F	C	E	C
Approach Delay (s)	54.9	D	34.5	C
Approach LOS	D	D	C	C

Turn Type	Prot	Perm	Perm	Prot
Protected Phases	7	7	8	8
Permitted Phases				2
Actuated Green, G (s)	3.3	3.3	13.1	13.1
Effective Green, g (s)	3.8	3.8	13.6	13.6
Actuated g/C Ratio	0.04	0.04	0.15	0.15
Clearance Time (s)	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	59	59	200	243
v/s Ratio Prot	c0.01	0.16	0.10	0.11
v/c Ratio Perm				0.64
Uniform Delay, d1	41.6	35.9	36.2	15.6
Progression Factor	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	4.8	6.8	1.5
Delay (s)	42.0	40.6	43.0	17.7
Level of Service	D	D	D	D
Approach Delay (s)	42.0	D	42.2	D
Approach LOS	D	D	B	B

Intersection Summary	
HCM Average Control Delay	17.8
HCM Volume to Capacity ratio	0.69
Actuated Cycle Length (s)	90.0
Intersection Capacity Utilization	77.9%
Analysis Period (min)	15
c Critical Lane Group	

Intersection Summary	
HCM Average Control Delay	17.8
HCM Volume to Capacity ratio	0.69
Actuated Cycle Length (s)	90.0
Intersection Capacity Utilization	77.9%
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
 4: 47th St. & MLK Jr. Way

Existing+Commercial AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.98	1.00	0.98
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.98	1.00	0.97	1.00	0.97
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3430	1770	3398	1770	3398	1770	3440	1770	3358	1770	3358
Volume (vph)	3433	3430	1770	3398	1770	3398	1770	3440	1770	3358	1770	3358
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	469	555	92	105	705	218	111	612	103	146	548	149
RTOR Reduction (vph)	0	14	0	0	32	0	0	15	0	0	26	0
Lane Group Flow (vph)	469	633	0	105	891	0	111	700	0	146	671	0
Confl. Peds. (#/hr)	6	24	24	6	36	6	36	28	28	28	28	36
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	2	1	6	1	6	1
Actuated Green, G (s)	13.0	30.6	7.9	25.5	8.0	24.4	10.1	26.5	10.1	26.5	10.1	26.5
Effective Green, g (s)	12.5	31.6	7.4	26.5	7.5	25.4	9.6	27.5	9.6	27.5	9.6	27.5
Actuated g/C Ratio	0.14	0.35	0.08	0.29	0.08	0.28	0.11	0.31	0.11	0.31	0.11	0.31
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	477	1204	146	1001	148	971	189	1026	189	1026	189	1026
v/s Ratio Prot	c0.14	0.18	0.06	c0.26	0.06	c0.20	c0.08	0.20	c0.08	0.20	c0.08	0.20
v/s Ratio Perm	0.98	0.53	0.72	0.89	0.75	0.72	0.77	0.65	0.77	0.65	0.77	0.65
Uniform Delay, d1	38.6	23.2	40.3	30.4	40.3	29.1	39.1	27.1	39.1	27.1	39.1	27.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	36.5	0.2	13.2	9.5	17.1	4.6	14.4	2.8	14.4	2.8	14.4	2.8
Delay (s)	75.2	23.4	53.4	39.9	57.4	33.7	58.0	25.2	58.0	25.2	58.0	25.2
Level of Service	E	C	D	D	E	C	E	C	E	C	E	C
Approach Delay (s)	45.2	D	41.3	D	36.9	D	30.9	C	36.9	D	30.9	C
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	39.2											
HCM Volume to Capacity ratio	0.83											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	79.2%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

Existing+Commercial AM
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.96	0.98	0.98	0.99	0.99	1.00	1.00	0.91
Fipb, ped/bikes	0.97	0.97	0.97	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Fipb, ped/bikes	0.97	0.97	0.97	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Frt	0.98	0.98	0.98	0.94	0.98	0.98	0.98	0.99	0.99	1.00	1.00	0.99
Flt Protected	0.98	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1668	1596	1596	3391	3459	3459	3459	3459	3459	3459	3459	4892
Flt Permitted	0.80	0.88	0.88	0.92	0.92	0.88	0.92	0.88	0.88	0.88	0.88	0.81
Satd. Flow (perm)	1363	1418	1418	3141	3053	3053	3141	3053	3053	3053	3053	3994
Volume (vph)	69	50	27	51	44	72	24	463	80	41	428	28
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	77	56	30	57	49	80	27	514	89	46	476	31
RTOR Reduction (vph)	0	18	0	0	53	0	0	29	0	0	10	0
Lane Group Flow (vph)	0	145	0	0	133	0	0	601	0	0	543	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	2	6	6
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (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
Lane Grp Cap (vph)	454	454	454	473	473	1536	1536	1536	1536	1536	1493	1493
v/s Ratio Prot	c0.11	0.09	0.09	0.09	0.09	c0.19	c0.19	c0.19	c0.19	c0.19	0.18	0.18
v/s Ratio Perm	0.32	0.28	0.28	0.28	0.28	0.39	0.39	0.39	0.39	0.39	0.36	0.36
v/c Ratio	11.2	11.0	11.0	11.0	11.0	7.3	7.3	7.3	7.3	7.3	7.1	7.1
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.8	1.5	1.5	1.5	1.5	0.8	0.8	0.8	0.8	0.8	0.7	0.7
Incremental Delay, d2	13.0	12.5	12.5	12.5	12.5	8.0	8.0	8.0	8.0	8.0	7.8	7.8
Delay (s)	B	B	B	B	B	A	A	A	A	A	A	A
Level of Service	B	B	B	B	B	A	A	A	A	A	A	A
Approach Delay (s)	13.0	12.5	12.5	12.5	12.5	8.0	8.0	8.0	8.0	8.0	7.8	7.8
Approach LOS	B	B	B	B	B	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.0											
HCM Volume to Capacity ratio	0.36											
Actuated Cycle Length (s)	45.0											
Intersection Capacity Utilization	60.8%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.96	0.98	0.98	0.99	0.99	1.00	0.91
Fipb, ped/bikes	0.96	0.96	0.96	0.96	0.96	0.98	0.98	0.99	0.99	1.00	1.00	0.98
Fipb, ped/bikes	0.97	0.97	0.97	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	0.99
Frt	0.96	0.96	0.96	0.96	0.98	0.98	0.99	0.99	0.99	1.00	1.00	0.99
Flt Protected	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1642	1657	1657	3456	3456	4892	4892	4892	4892	4892	4892	4892
Flt Permitted	0.82	0.82	0.82	0.80	0.80	0.90	0.90	0.90	0.90	0.90	0.81	0.81
Satd. Flow (perm)	1359	1335	1335	3127	3127	3994	3994	3994	3994	3994	3994	3994
Volume (vph)	51	74	52	34	34	57	36	22	939	47	61	1023
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	57	82	58	38	38	63	40	24	1043	52	68	1137
RTOR Reduction (vph)	0	24	0	0	24	0	0	2	0	0	0	5
Lane Group Flow (vph)	0	173	0	0	117	0	0	1117	0	0	1292	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	2	2	2	2	2	6	6
Permitted Phases	4	4	4	4	4	2	2	2	2	2	6	6
Actuated Green, G (s)	13.1	13.1	13.1	13.1	13.1	62.9	62.9	62.9	62.9	62.9	63.4	63.4
Effective Green, g (s)	13.6	13.6	13.6	13.6	13.6	63.4	63.4	63.4	63.4	63.4	63.4	63.4
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.75	0.75	0.75	0.75	0.75	0.75	0.75
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	217	217	217	214	214	2332	2332	2332	2332	2332	2979	2979
v/s Ratio Prot	c0.13	0.09	0.09	0.09	0.09	c0.36	c0.36	c0.36	c0.36	c0.36	0.32	0.32
v/s Ratio Perm	0.80	0.80	0.80	0.80	0.80	0.48	0.48	0.48	0.48	0.48	0.43	0.43
v/c Ratio	34.4	32.9	32.9	32.9	32.9	4.3	4.3	4.3	4.3	4.3	4.1	4.1
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.52	1.52	1.52	1.52	1.52	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	0.7	0.7	0.7	0.7	0.7	0.5	0.5
Incremental Delay, d2	16.9	16.9	16.9	16.9	16.9	7.2	7.2	7.2	7.2	7.2	4.5	4.5
Delay (s)	D	D	D	D	D	A	A	A	A	A	A	A
Level of Service	D	D	D	D	D	C	C	C	C	C	A	A
Approach Delay (s)	51.3	51.3	51.3	51.3	51.3	7.2	7.2	7.2	7.2	7.2	4.5	4.5
Approach LOS	D	D	D	D	D	C	C	C	C	C	A	A
Intersection Summary												
HCM Average Control Delay	10.5											
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	89.1%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 7: 40th St. & Market St.

HCM Signalized Intersection Capacity Analysis
 8: 40th St. & West St.

Existing+Commercial AM
 1/21/2008

Existing+Commercial AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1731	3478	1757	3471	1766	1805	1734	1841				
Flt Permitted	0.32	1.00	0.45	1.00	0.82	1.00	0.62	1.00				
Satd. Flow (perm)	578	3478	840	3471	1145	1805	1140	1841				
Volume (vph)	19	312	35	28	451	43	82	160	32	91	187	15
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	21	343	38	31	496	47	90	176	35	100	205	16
RTOR Reduction (vph)	0	11	0	0	9	0	0	9	0	0	0	3
Lane Group Flow (vph)	21	370	0	31	534	0	90	202	0	100	218	0
Conf. Peds. (#/hr)	30	12	12	12	30	6	54	54				6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4											
Permitted Phases	4 8 8 2 2 6											
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	166	1000	242	998	701	1106	698	1128				
v/s Ratio Prot	0.11 c0.15											
v/s Ratio Perm	0.04 0.08 0.13 0.18 0.14 0.19											
v/c Ratio	0.13	0.37	0.13	0.54	0.13	0.18	0.18	0.18	0.14	0.19		
Uniform Delay, d1	21.1	22.7	21.1	24.0	6.5	6.8	6.6	6.8				
Progression Factor	1.00	1.00	0.91	0.98	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	1.6	1.1	1.1	2.0	0.4	0.4	0.4	0.4	0.4	0.4		
Delay (s)	22.6	23.8	20.3	25.5	6.9	7.1	7.0	7.2				
Level of Service	C C C C A A A A											
Approach Delay (s)	23.7 25.2 7.1											
Approach LOS	C C C A A A											
Intersection Summary												
HCM Average Control Delay	17.8 HCM Level of Service B											
HCM Volume to Capacity ratio	0.30											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	78.3% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.96	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1759	3464	1738	3517	1766	1805	1734	1841				
Flt Permitted	0.44	1.00	0.45	1.00	0.82	1.00	0.62	1.00				
Satd. Flow (perm)	810	3464	826	3517	1145	1805	1140	1841				
Volume (vph)	15	397	48	29	450	17	61	101	50	26	66	25
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	418	51	31	474	18	64	106	53	27	69	26
RTOR Reduction (vph)	0	12	0	0	4	0	0	4	0	0	0	15
Lane Group Flow (vph)	16	457	0	31	488	0	192	0	0	107	0	0
Conf. Peds. (#/hr)	18	54	54	54	18	4	18	18	4	18	18	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4											
Permitted Phases	4 8 8 2 2 6											
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	38.0	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.41	0.41	0.41	0.41	0.41	0.41
Clearance 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
Lane Grp Cap (vph)	395	1689	403	1715	1185	1231						
v/s Ratio Prot	0.13 c0.14											
v/s Ratio Perm	0.02 0.04 0.04 0.08 0.28 0.16 0.09											
v/c Ratio	0.04	0.27	0.04	0.08	0.28	0.16	0.16	0.16	0.16	0.16	0.16	0.16
Uniform Delay, d1	10.7	12.1	10.9	12.2	14.8	14.3						
Progression Factor	0.92	1.04	1.38	1.44	0.38	0.38						
Incremental Delay, d2	0.2	0.4	0.4	0.4	0.4	0.3						
Delay (s)	10.0	13.0	15.4	17.9	5.9	14.5						
Level of Service	B B B B A A B B											
Approach Delay (s)	12.9 17.8 5.9											
Approach LOS	B B B A A B											
Intersection Summary												
HCM Average Control Delay	13.8 HCM Level of Service B											
HCM Volume to Capacity ratio	0.23											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	59.3% ICU Level of Service B											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

Existing+Commercial AM
 1/21/2008

Existing+Commercial AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	0.99	1.00	1.00	0.98	1.00	1.00	1.00	0.97	1.00	0.99	1.00	0.99	
Frt	1.00	0.99	1.00	1.00	0.97	1.00	1.00	0.97	1.00	0.99	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	
Satd. Flow (prot)	1759	3499	1731	3406	3375	3432	3432	3432	3432	3432	3432	3432	
Flt Permitted	0.42	1.00	1.00	0.46	1.00	1.00	0.91	1.00	1.00	0.79	1.00	0.79	
Satd. Flow (perm)	770	3499	839	3406	3071	2760	3071	2760	2760	2760	2760	2760	
Volume (vph)	31	420	25	89	409	107	30	226	77	79	217	29	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	32	438	26	93	426	111	31	235	80	82	226	30	
RTOR Reduction (vph)	0	5	0	0	29	0	0	36	0	0	9	0	
Lane Group Flow (vph)	32	459	0	93	508	0	0	310	0	0	329	0	
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4			8			2			6			
Permitted Phases	4			8			2			6			
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	32.0	32.0	
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	31.0	31.0	
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39	
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	395	1793	430	1746	1190	1070	1190	1070	1070	1070	1070	1070	
v/s Ratio Prot	0.13			c0.15			0.10	0.10	0.10	c0.12			
v/s Ratio Perm	0.08	0.26	0.22	0.29	0.26	0.26	0.26	0.26	0.26	0.31	0.31	0.31	
v/c Ratio	9.9	10.9	10.7	11.2	10.7	11.2	16.7	16.7	16.7	17.0	17.0	17.0	
Uniform Delay, d1	1.31	1.42	1.00	1.00	1.00	0.70	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	0.4	0.3	1.2	0.4	0.5	0.5	0.5	0.5	0.5	0.7	0.7	0.7	
Incremental Delay, d2	13.4	15.8	11.8	11.6	12.1	12.1	17.8	17.8	17.8	17.8	17.8	17.8	
Delay (s)	B	B	B	B	B	B	B	B	B	B	B	B	
Level of Service	B	B	B	B	B	B	B	B	B	B	B	B	
Approach Delay (s)	15.7			11.6			12.1	12.1	12.1	17.8	17.8	17.8	
Approach LOS	B			B			B	B	B	B	B	B	
Intersection Summary													
HCM Average Control Delay	14.0											HCM Level of Service	B
HCM Volume to Capacity ratio	0.30												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.6%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. Existing+Commercial AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Lane Util. Factor	1.00	0.97	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Fipb, ped/bikes	0.94	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1657	3360	1630	3375	1770	3449	1770	3449	1770	3377	1770	3377	
Flt Permitted	0.27	1.00	0.31	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (pperm)	473	3360	530	3375	1770	3449	1770	3449	1770	3377	1770	3377	
Volume (vph)	68	342	62	61	373	64	95	447	45	78	591	124	
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	
Adj. Flow (vph)	76	380	69	68	414	71	106	497	50	87	657	138	
RTOR Reduction (vph)	0	20	0	0	19	0	0	6	0	0	15	0	
Lane Group Flow (vph)	76	429	0	68	466	0	106	541	0	87	780	0	
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	58	92	
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	4			8			5		2			1	
Permitted Phases	4		8									6	
Actuated Green, G (s)	16.4	16.4	16.4	16.4	16.4	16.4	8.2	47.7	8.2	47.7	7.4	46.9	
Effective Green, g (s)	16.9	16.9	16.9	16.9	16.9	16.9	8.7	48.2	8.7	48.2	7.9	47.4	
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.10	0.57	0.10	0.57	0.09	0.56	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grip Cap (vph)	94	668	105	671	181	1956	165	1883	165	1883	165	1883	
v/s Ratio Prot	0.13	0.13	0.14	0.14	0.14	0.16	0.05	0.23	0.05	0.23	0.05	0.23	
v/s Ratio Perm	0.16	0.13	0.13	0.13	0.13	0.16	0.59	0.28	0.53	0.41	0.53	0.41	
v/c Ratio	0.81	0.64	0.65	0.69	0.69	0.69	0.59	0.28	0.53	0.41	0.53	0.41	
Uniform Delay, d1	32.5	31.3	31.3	31.6	31.6	31.6	36.4	9.4	36.8	10.8	36.8	10.8	
Progression Factor	1.68	1.57	1.00	1.00	1.00	1.00	0.85	1.34	1.35	0.72	1.35	0.72	
Incremental Delay, d2	35.0	1.5	9.8	2.5	3.0	0.3	3.0	0.3	1.3	0.6	1.3	0.6	
Delay (s)	89.4	50.8	41.2	34.2	34.0	13.0	34.0	13.0	51.0	8.4	51.0	8.4	
Level of Service	F	D	D	C	C	B	C	B	D	D	D	A	
Approach Delay (s)	56.4			35.0			16.4				12.6		
Approach LOS	E			D			B				B		
Intersection Summary													
HCM Average Control Delay	27.1											HCM Level of Service	C
HCM Volume to Capacity ratio	0.53												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	60.7%											ICU Level of Service	B
Analysis Period (min)	15												
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. Existing+Commercial AM
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	11	37	635	9	15	681
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	41	706	10	17	757
Pedestrians	34		33			34
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	3		3			3
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.96	0.96				0.96
VC, conflicting volume	1189	426				750
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
vCu, unblocked vol	1038	366				702
tC, single (s)	6.8	6.9				4.1
tC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	94	93				98
cM capacity (veh/h)	201	574				834
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	53	470	245	17	378	378
Volume Left	12	0	0	17	0	0
Volume Right	41	0	10	0	0	0
cSH	402	1700	1700	834	1700	1700
Volume to Capacity	0.13	0.28	0.14	0.02	0.22	0.22
Queue Length 95th (ft)	11	0	0	2	0	0
Control Delay (s)	15.3	0.0	0.0	9.4	0.0	0.0
Lane LOS	C	A	A	A	A	A
Approach Delay (s)	15.3	0.0	0.2			
Approach LOS	C					
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	36.2%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

Existing+Commercial AM
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.99	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00
Flt Protected	1.00	0.95	1.00	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4989	1754	3419	1777	1725	1842	1777	1725	1842	1777	1725	1842
Flt Permitted	0.88	0.52	1.00	0.88	0.88	0.43	0.88	0.43	1.00	0.88	0.43	1.00
Satd. Flow (perm)	4417	964	3419	1584	1584	787	1584	787	1842	1584	787	1842
Volume (vph)	34	283	25	51	274	67	58	180	49	64	188	12
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	308	27	55	298	73	63	196	53	70	204	13
RTOR Reduction (vph)	0	10	0	0	25	0	0	8	0	0	3	0
Lane Group Flow (vph)	0	362	0	55	346	0	0	304	0	70	214	0
Conf. Peds. (#/hr)	24	18	18	24	24	24	24	48	48	48	48	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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
Lane Grp Cap (vph)	2702	590	2092	c0.10			466	466	231	542		
v/s Ratio Prot				c0.10								
v/s Ratio Perm	0.08	0.06	0.06	0.19	0.09	0.09	0.65	0.30	0.40	0.30	0.40	0.40
v/c Ratio	0.13	0.09	0.17	0.17	0.17	0.17	26.2	23.2	24.0	23.2	24.0	24.0
Uniform Delay, d1	7.0	6.8	7.1	6.8	7.1	6.8	6.9	6.9	6.9	6.9	6.9	6.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3	0.2	0.3	0.2	0.3	3.4	3.4	3.4	3.4	3.4	3.4
Delay (s)	7.1	7.1	7.3	7.1	7.3	7.1	33.1	33.1	33.1	33.1	33.1	33.1
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	7.1	7.1	7.3	7.1	7.3	7.1	33.1	33.1	33.1	33.1	33.1	33.1
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	16.9											
HCM Level of Service	B											
HCM Volume to Capacity ratio	0.32											
Actuated Cycle Length (s)	85.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	92.5%											
ICU Level of Service	F											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.99	1.00
Flt Protected	1.00	0.95	1.00	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5051	1747	1837	1747	1780	1747	1780	1747	1837	1747	1780	1837
Flt Permitted	0.90	0.88	0.88	0.88	0.88	0.64	1.00	1.00	0.44	1.00	0.44	1.00
Satd. Flow (perm)	4566	4407	4407	4407	4407	1179	1780	1179	1780	4407	1179	1837
Volume (vph)	25	387	7	34	337	33	30	175	57	23	116	10
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	27	421	8	37	366	36	33	190	62	25	126	11
RTOR Reduction (vph)	0	2	0	0	13	0	0	15	0	0	4	0
Lane Group Flow (vph)	0	454	0	0	426	0	33	237	0	25	133	0
Conf. Peds. (#/hr)	18	18	18	18	18	12	12	18	18	18	18	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2939	2837	2837	2837	2837	302	456	205	471	205	471	471
v/s Ratio Prot						c0.13						
v/s Ratio Perm	0.10	0.10	0.10	0.10	0.10	0.03	0.03	0.03	0.03	0.03	0.03	0.03
v/c Ratio	0.15	0.15	0.15	0.15	0.15	0.11	0.52	0.12	0.28	0.12	0.28	0.28
Uniform Delay, d1	5.6	5.6	5.6	5.6	5.6	22.8	25.5	22.8	23.9	22.8	23.9	23.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.1	0.1	0.1	0.1	4.2	4.2	4.2	4.2	4.2	4.2	4.2
Delay (s)	5.7	5.7	5.7	5.7	5.7	23.5	29.7	23.5	24.5	23.5	24.5	24.5
Level of Service	A	A	A	A	A	C	C	C	C	C	C	C
Approach Delay (s)	5.7	5.7	5.7	5.7	5.7	29.0	24.4	29.0	24.4	29.0	24.4	24.4
Approach LOS	A	A	A	A	A	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	12.6											
HCM Level of Service	B											
HCM Volume to Capacity ratio	0.26											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	51.3%											
ICU Level of Service	A											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

Existing+Commercial AM
 1/21/2008

Existing+Commercial AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	0.97	0.98	1.00	1.00	0.99	1.00	1.00	1.00	0.98	0.98	0.98
Flt Protected	0.99	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.99	0.99	0.99
Satd. Flow (prot)	5001	4862	3426	3426	3426	3422	3422	3422	3422	3422	3422	3422
Flt Permitted	0.84	0.86	0.92	0.86	0.92	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Satd. Flow (perm)	4200	4213	3158	4213	3158	2901	2901	2901	2901	2901	2901	2901
Volume (vph)	52	396	28	45	361	122	15	165	33	61	209	37
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	57	430	30	49	392	133	16	179	36	66	227	40
RTOR Reduction (vph)	0	9	0	0	47	0	0	19	0	0	13	0
Lane Group Flow (vph)	0	508	0	0	527	0	0	212	0	0	320	0
Confl. Peds. (#/hr)	17	19	19	19	17	12	16	16	16	16	16	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	2	2	2	2	6	6
Permitted Phases	4	8	8	2	2	2	2	2	2	2	6	6
Actuated Green, G (s)	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Grp Cap (vph)	2704	2712	2712	809	809	809	743	743	743	743	743	743
v/s Ratio Prot	0.12	0.13	0.13	0.07	0.07	0.07	0.11	0.11	0.11	0.11	0.11	0.11
v/s Ratio Perm	0.19	0.19	0.19	0.26	0.26	0.26	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio	5.8	5.8	5.8	23.7	23.7	23.7	24.9	24.9	24.9	24.9	24.9	24.9
Uniform Delay, d1	0.79	1.00	1.00	0.53	0.53	0.53	0.8	0.8	0.8	0.8	0.8	0.8
Progression Factor	0.2	0.2	0.2	0.8	0.8	0.8	1.8	1.8	1.8	1.8	1.8	1.8
Incremental Delay, d2	4.7	6.0	6.0	24.5	24.5	24.5	14.9	14.9	14.9	14.9	14.9	14.9
Delay (s)	A	A	A	C	C	C	B	B	B	B	B	B
Level of Service	A	A	A	C	C	C	B	B	B	B	B	B
Approach Delay (s)	4.7	6.0	6.0	24.5	24.5	24.5	14.9	14.9	14.9	14.9	14.9	14.9
Approach LOS	A	A	A	C	C	C	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	10.0 HCM Level of Service A											
HCM Volume to Capacity ratio	0.26											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	82.6% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

Existing+Commercial AM
 1/21/2008

Existing+Commercial AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	4867	4813	4813	4813	4813	4813	4813	4813	4813	4813	4813	4813
Flt Permitted	0.68	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Satd. Flow (perm)	3365	3583	3583	3583	3583	3583	3583	3583	3583	3583	3583	3583
Volume (vph)	119	337	94	79	382	140	60	383	39	99	472	132
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	129	366	102	86	415	152	65	416	42	108	513	143
RTOR Reduction (vph)	0	53	0	0	108	0	0	4	0	0	15	0
Lane Group Flow (vph)	0	544	0	0	545	0	65	454	0	108	641	0
Confl. Peds. (#/hr)	40	9	9	9	40	25	31	31	31	31	40	25
Turn Type	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	19.8	19.8	19.8	19.8	19.8	19.8	54.7	54.7	54.7	54.7	54.7	54.7
Effective Green, g (s)	21.3	21.3	21.3	21.3	21.3	21.3	55.7	55.7	55.7	55.7	55.7	55.7
Actuated g/C Ratio	0.25	0.25	0.25	0.25	0.25	0.25	0.66	0.66	0.66	0.66	0.66	0.66
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	843	898	898	898	898	898	461	2278	581	2225	2225	2225
v/s Ratio Prot							0.13	0.13	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.16	0.16	0.16	0.16	0.16	0.16	0.09	0.09	0.09	0.12	0.12	0.12
v/c Ratio	0.65	0.61	0.61	0.61	0.61	0.61	0.14	0.20	0.19	0.19	0.29	0.29
Uniform Delay, d1	28.5	28.2	28.2	28.2	28.2	28.2	5.6	5.8	5.8	6.2	6.2	6.2
Progression Factor	0.84	1.00	1.00	1.00	1.00	1.00	1.20	1.13	1.00	0.61	0.74	0.74
Incremental Delay, d2	1.3	0.8	0.8	0.8	0.8	0.8	0.6	0.2	0.7	0.7	0.3	0.3
Delay (s)	25.3	29.0	29.0	29.0	29.0	29.0	7.3	6.7	6.7	4.2	4.9	4.9
Level of Service	C	C	C	C	C	C	A	A	A	A	A	A
Approach Delay (s)	25.3	29.0	29.0	29.0	29.0	29.0	6.8	6.8	6.8	4.8	4.8	4.8
Approach LOS	C	C	C	C	C	C	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	16.2											
HCM Volume to Capacity ratio	0.39											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	70.4%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

Existing+Commercial AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Ft	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.98	1.00	0.98
Satd. Flow (prot)	1770	4943	1770	4740	1770	4944	1770	4981	1770	4981	1770	4981
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4943	1770	4740	1770	4944	1770	4981	1770	4981	1770	4981
Volume (vph)	70	409	55	112	441	253	89	261	42	226	522	64
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	454	61	124	490	281	99	290	47	251	580	71
RTOR Reduction (vph)	0	18	0	0	108	0	0	25	0	0	17	0
Lane Group Flow (vph)	78	497	0	124	663	0	99	313	0	251	634	0
Confl. Peds. (#/hr)			66			23			38			26

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.93	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.98	1.00	0.98
Ft	1.00	0.95	1.00	0.94	1.00	0.94	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (prot)	1574	1574	1574	1584	1609	3488	1640	3435	1640	3435	1640	3435
Flt Permitted	0.69	1.00	0.69	0.90	1.00	0.90	0.49	1.00	0.42	1.00	0.42	1.00
Satd. Flow (perm)	1106	1106	1106	1442	1442	831	3488	730	3435	730	3435	730
Volume (vph)	29	19	26	25	34	48	54	534	24	24	380	37
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	32	21	28	27	37	52	59	580	26	26	413	40
RTOR Reduction (vph)	0	26	0	0	44	0	0	2	0	0	4	0
Lane Group Flow (vph)	0	55	0	0	72	0	59	604	0	26	449	0
Confl. Peds. (#/hr)			100			100			100			100

Turn Type	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	4	3	4	1
Permitted Phases					1
Actuated Green, G (s)	10.5	26.5	10.5	26.5	9.0
Effective Green, g (s)	10.5	27.5	10.5	27.5	9.0
Actuated g/C Ratio	0.12	0.31	0.12	0.31	0.10
Clearance Time (s)	4.0	5.0	4.0	5.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	207	1510	207	1448	177
v/s Ratio Prot	0.04	0.10	0.07	0.14	0.06
v/s Ratio Perm	0.38	0.33	0.60	0.46	0.56
Uniform Delay, d1	36.7	24.1	37.8	25.2	38.6
Progression Factor	1.00	1.00	0.97	2.00	1.00
Incremental Delay, d2	0.4	0.6	2.4	0.8	2.2
Delay (s)	37.1	24.7	39.2	51.4	40.8
Level of Service	D	C	D	D	D
Approach Delay (s)	26.3	C	49.7	D	27.7
Approach LOS	C	C	D	D	C

Turn Type	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	2
Permitted Phases					2
Actuated Green, G (s)	7.4	7.4	7.4	7.4	70.6
Effective Green, g (s)	6.9	6.9	6.9	6.9	70.1
Actuated g/C Ratio	0.08	0.08	0.08	0.08	0.82
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	90	117	685	2877	602
v/s Ratio Prot	c0.05	0.05	0.07	0.17	0.13
v/s Ratio Perm	0.61	0.61	0.09	0.21	0.04
Uniform Delay, d1	37.8	37.8	1.4	1.6	1.4
Progression Factor	1.00	1.00	1.00	1.00	0.67
Incremental Delay, d2	8.4	6.6	0.2	0.2	0.1
Delay (s)	46.2	44.3	1.7	1.7	1.0
Level of Service	D	D	A	A	A
Approach Delay (s)	46.2	44.3	1.7	1.7	1.0
Approach LOS	D	D	A	A	A

Intersection Summary	54.5	HCM Level of Service	D
HCM Average Control Delay	54.5	HCM Level of Service	D
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Intersection Summary	7.9	HCM Level of Service	A
HCM Average Control Delay	7.9	HCM Level of Service	A
HCM Volume to Capacity ratio	0.25		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave.

Existing+Commercial AM
 1/21/2008

Existing+Commercial AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.97	1.00	0.94	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Frt	1.00	0.97	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3330	1770	3163	1770	3466	1646	3466	1678	3207		
Flt Permitted	0.95	1.00	0.95	1.00	0.41	1.00	0.41	1.00	0.49	1.00		
Satd. Flow (perm)	1770	3330	1770	3163	712	3466	866	3207				
Volume (vph)	255	350	97	50	270	118	58	335	30	46	335	141
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	283	389	108	56	300	131	64	372	33	51	372	157
RTOR Reduction (vph)	0	28	0	0	64	0	0	6	0	0	45	0
Lane Group Flow (vph)	283	469	0	56	367	0	64	399	0	51	484	0
Confl. Peds. (#/hr)	100			100		100	100		100		100	100
Turn Type	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		3	8		2		2		6	
Actuated Green, G (s)	16.5	26.9		4.9	15.3		39.7	39.7	39.7		39.7	39.7
Effective Green, g (s)	17.0	26.4		5.4	14.8		41.2	41.2	41.2		41.2	41.2
Actuated g/C Ratio	0.20	0.31		0.06	0.17		0.48	0.48	0.48		0.48	0.48
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5	5.5		5.5	5.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	354	1034		112	551		345	1680	420		1554	
v/s Ratio Prot	c0.16	0.14		0.03	c0.12		0.09	0.12	0.12		c0.15	
v/s Ratio Perm	0.80	0.45		0.50	0.67		0.19	0.24	0.12		0.31	
Uniform Delay, d1	32.4	23.5		38.5	32.8		12.4	12.8	12.0		13.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	11.2	0.1		1.3	2.4		1.2	0.3	0.6		0.5	
Delay (s)	43.6	23.6		39.8	35.1		13.6	13.1	12.6		13.8	
Level of Service	D	C		D	D		B	B	B		B	B
Approach Delay (s)	30.9			35.7			13.2				13.7	
Approach LOS	C			D			B				B	
Intersection Summary												
HCM Average Control Delay	24.0											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	72.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
1: 52nd St. & Shattuck Ave.

Existing PM + Commercial
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.98	1.00
Frt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.95	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4934	1770	4971	1770	4971	2005	2004	1960	1918	1960	1918
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4934	1770	4971	1770	4971	279	2004	1156	1918	1156	1918
Volume (vph)	322	1228	173	80	958	138	165	237	79	133	264	259
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	339	1293	182	84	1008	145	174	249	83	140	278	273
RTOR Reduction (vph)	0	18	0	0	19	0	0	14	0	0	0	40
Lane Group Flow (vph)	339	1457	0	84	1134	0	174	318	0	140	511	0
Confl. Peds. (#/hr)	32	32	32	32	32	32	4	12	24	24	24	12
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot	Prot	Prot	Prot	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	3	8	5	2	2	2	2	2	2	6
Permitted Phases	18.0	38.3	5.9	26.2	38.8	38.8	27.8	27.8	27.8	27.8	27.8	27.8
Effective Green, G (s)	18.0	38.3	5.9	26.2	39.3	39.3	28.3	28.3	28.3	28.3	28.3	28.3
Actuated g/C Ratio	0.19	0.41	0.06	0.28	0.42	0.42	0.30	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5
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
Lane Grp Cap (vph)	341	2021	112	1393	283	842	350	581	350	581	350	581
v/s Ratio Prot	c0.19	0.30	0.05	c0.23	c0.06	0.16	c0.27	c0.27	c0.27	c0.27	c0.27	c0.27
v/s Ratio Perm	0.99	0.72	0.75	0.81	0.61	0.38	0.40	0.88	0.40	0.88	0.40	0.88
Uniform Delay, d1	37.7	23.1	43.1	31.4	21.8	18.7	25.9	31.0	25.9	31.0	25.9	31.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	46.9	2.3	24.2	5.3	3.9	0.3	0.8	14.2	0.8	14.2	0.8	14.2
Delay (s)	84.6	25.4	67.3	36.7	25.7	19.0	26.6	45.2	26.6	45.2	26.6	45.2
Level of Service	F	C	E	D	C	B	C	D	C	D	C	D
Approach Delay (s)	36.4	36.4	36.4	36.4	36.4	36.4	21.3	41.5	21.3	41.5	21.3	41.5
Approach LOS	D	D	D	D	D	D	C	D	C	D	C	D
Intersection Summary												
HCM Average Control Delay	36.1											
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	93.5											
Intersection Capacity Utilization	92.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
2: 52nd St. & Telegraph Ave.

Existing PM + Commercial
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.92	1.00	0.92	1.00	0.92	1.00	0.97	1.00	0.97	1.00	0.95	1.00
Flt Protected	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1688	1681	1494	1681	1494	1681	3199	3199	1770	3036	1770	3036
Flt Permitted	0.48	0.73	1.00	0.73	1.00	0.73	0.94	0.94	0.94	0.95	1.00	1.00
Satd. Flow (perm)	823	1296	1494	823	1296	1494	3012	3012	1770	3036	1770	3036
Volume (vph)	12	3	21	104	102	118	10	1006	288	98	800	398
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	13	3	22	109	107	124	11	1059	303	103	842	419
RTOR Reduction (vph)	0	21	0	0	45	0	0	20	0	0	47	0
Lane Group Flow (vph)	0	17	0	109	186	0	0	1353	0	103	1214	0
Confl. Peds. (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot
Protected Phases	7	7	8	8	8	8	2	2	2	2	2	6
Permitted Phases	7	7	8	8	8	8	2	2	2	2	2	6
Actuated Green, G (s)	5.1	5.1	15.8	15.8	15.8	15.8	52.4	52.4	8.7	65.6	8.7	65.6
Effective Green, g (s)	5.6	5.6	16.3	16.3	16.3	52.9	52.9	52.9	9.2	66.1	9.2	66.1
Actuated g/C Ratio	0.06	0.06	0.16	0.16	0.16	0.53	0.53	0.53	0.09	0.66	0.09	0.66
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	46	46	211	244	244	1593	163	2007	163	2007	163	2007
v/s Ratio Prot	c0.02	0.02	0.08	0.12	0.12	0.45	0.06	0.40	0.06	0.40	0.06	0.40
v/s Ratio Perm	0.37	0.37	0.52	0.76	0.76	0.85	0.63	0.60	0.63	0.60	0.63	0.60
Uniform Delay, d1	45.5	45.5	38.2	40.0	40.0	20.1	43.8	9.6	43.8	9.6	43.8	9.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.9	1.9	0.9	11.9	11.9	3.2	5.8	1.4	5.8	1.4	5.8	1.4
Delay (s)	47.4	47.4	39.1	51.9	51.9	19.0	49.5	10.9	49.5	10.9	49.5	10.9
Level of Service	D	D	D	D	D	D	D	D	D	D	D	D
Approach Delay (s)	47.4	47.4	47.8	47.8	47.8	19.0	13.8	13.8	13.8	13.8	13.8	13.8
Approach LOS	D	D	D	D	D	D	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	20.2											
HCM Volume to Capacity ratio	0.78											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	102.8%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

Existing PM + Commercial
1/21/2008

Existing PM + Commercial
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frb, ped/bikes	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.98	1.00	0.98
Fllb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3429	1770	3221	1770	3221	1770	3360	1770	3434	1770	3434
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3429	1770	3221	1770	3221	1770	3360	1770	3434	1770	3434
Volume (vph)	508	822	71	93	468	212	69	606	127	203	676	56
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	535	865	75	98	493	223	73	638	134	214	712	59
RTOR Reduction (vph)	0	6	0	0	52	0	0	18	0	0	6	0
Lane Group Flow (vph)	535	934	0	98	664	0	73	754	0	214	765	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	2	1	6	1	6
Permitted Phases												
Actuated Green, G (s)	16.0	30.5	8.0	22.5	5.0	32.5	5.0	32.5	12.0	39.5	12.0	39.5
Effective Green, g (s)	15.5	31.5	7.5	23.5	4.5	33.5	4.5	33.5	11.5	40.5	11.5	40.5
Actuated g/C Ratio	0.16	0.32	0.08	0.24	0.04	0.34	0.04	0.34	0.12	0.40	0.12	0.40
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	532	1080	133	757	80	1126	204	1391	204	1391	204	1391
v/s Ratio Prot	c0.16	c0.27	0.06	0.21	0.04	c0.22	c0.12	c0.22	c0.12	0.22	c0.12	0.22
v/s Ratio Perm	1.01	0.86	0.74	0.88	0.91	0.67	1.05	0.55	1.05	0.55	1.05	0.55
Uniform Delay, d1	42.2	32.2	45.3	36.9	47.6	28.5	44.2	22.8	44.2	22.8	44.2	22.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	40.4	7.1	16.6	10.9	70.5	3.2	70.4	1.3	70.4	1.3	70.4	1.3
Delay (s)	82.7	39.4	61.9	47.7	118.0	31.7	121.9	19.3	121.9	19.3	121.9	19.3
Level of Service	F	D	E	D	F	C	F	C	F	C	F	B
Approach Delay (s)	55.1	E	49.4	D	39.1	D	41.6	D	41.6	D	41.6	D
Approach LOS	E	E	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	47.5 HCM Level of Service D											
HCM Volume to Capacity ratio	0.82											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	82.5% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: 45th St. & MLK Jr. Way

Existing PM + Commercial

1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	0.99	1.00	0.95	0.99	1.00	0.99	0.99
Frbp, ped/bikes	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Ft	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1643	1643	1643	1649	1649	1649	3406	3406	3439	3439	3439	3439
Flt Permitted	0.88	0.88	0.88	0.91	0.91	0.91	0.94	0.94	0.85	0.85	0.85	0.85
Satd. Flow (perm)	1471	1471	1471	1519	1519	1519	3197	3197	2949	2949	2949	2949
Volume (vph)	26	27	21	48	72	50	20	434	66	43	263	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	30	23	53	80	56	22	482	73	48	292	22
RTOR Reduction (vph)	0	15	0	0	30	0	0	23	0	0	10	0
Lane Group Flow (vph)	0	67	0	0	159	0	0	554	0	0	353	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (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
Lane Grp Cap (vph)	500	500	500	516	516	516	1599	1599	1475	1475	1475	1475
v/s Ratio Prot	0.05	0.05	0.05	c0.10	c0.10	c0.10	c0.17	c0.17	0.12	0.12	0.12	0.12
v/s Ratio Perm	0.13	0.13	0.13	0.31	0.31	0.31	0.35	0.35	0.24	0.24	0.24	0.24
v/c Ratio	11.4	11.4	11.4	12.2	12.2	12.2	7.6	7.6	7.1	7.1	7.1	7.1
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.6	0.6	0.6	1.5	1.5	1.5	0.6	0.6	0.4	0.4	0.4	0.4
Incremental Delay, d2	12.0	12.0	12.0	13.7	13.7	13.7	8.2	8.2	7.5	7.5	7.5	7.5
Delay (s)	B	B	B	B	B	B	A	A	A	A	A	A
Level of Service	B	B	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	12.0	12.0	12.0	13.7	13.7	13.7	8.2	8.2	7.5	7.5	7.5	7.5
Approach LOS	B	B	B	B	B	B	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.1 HCM Level of Service A											
HCM Volume to Capacity ratio	0.33											
Actuated Cycle Length (s)	50.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	62.8% ICU Level of Service B											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis

6: 45th St. & Telegraph Ave.

Existing PM + Commercial

1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.97	0.99	1.00	0.95	0.99	1.00	0.99	0.99
Frbp, ped/bikes	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Ft	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1631	1631	1631	1679	1679	1679	3471	3471	4925	4925	4925	4925
Flt Permitted	0.85	0.85	0.85	0.85	0.85	0.85	0.92	0.92	0.81	0.81	0.81	0.81
Satd. Flow (perm)	1417	1417	1417	1446	1446	1446	3180	3180	4483	4483	4483	4483
Volume (vph)	46	49	39	20	41	21	24	1061	42	18	914	67
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	49	52	41	21	44	22	26	1129	45	19	972	71
RTOR Reduction (vph)	0	28	0	0	19	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	114	0	0	68	0	0	1199	0	0	1058	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	6	6	6
Actuated Green, G (s)	8.6	8.6	8.6	8.6	8.6	8.6	62.4	62.4	62.4	62.4	62.4	62.4
Effective Green, g (s)	9.1	9.1	9.1	9.1	9.1	9.1	62.9	62.9	62.9	62.9	62.9	62.9
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.11	0.79	0.79	0.79	0.79	0.79	0.79
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	161	161	161	164	164	164	2500	2500	3525	3525	3525	3525
v/s Ratio Prot	c0.08	c0.08	c0.08	0.05	0.05	0.05	c0.38	c0.38	0.24	0.24	0.24	0.24
v/s Ratio Perm	0.71	0.71	0.71	0.41	0.41	0.41	0.48	0.48	0.30	0.30	0.30	0.30
v/c Ratio	34.2	34.2	34.2	33.0	33.0	33.0	2.9	2.9	2.4	2.4	2.4	2.4
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.6	0.6	0.2	0.2	0.2	0.2
Incremental Delay, d2	10.9	10.9	10.9	13.6	13.6	13.6	3.6	3.6	2.6	2.6	2.6	2.6
Delay (s)	D	D	D	C	C	C	A	A	A	A	A	A
Level of Service	D	D	D	C	C	C	A	A	A	A	A	A
Approach Delay (s)	45.1	45.1	45.1	33.6	33.6	33.6	3.6	3.6	2.6	2.6	2.6	2.6
Approach LOS	D	D	D	C	C	C	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	6.6 HCM Level of Service A											
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	82.2% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	0.96	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.97	1.00	0.97	1.00
Frt	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1694	3486	1731	3401	1697	1822	1720	1830	1697	1822	1720	1830
Flt Permitted	0.29	1.00	0.24	1.00	0.24	1.00	0.56	1.00	0.37	1.00	0.37	1.00
Satd. Flow (perm)	511	3486	445	3401	445	3401	982	1822	667	1830	667	1830
Volume (vph)	26	670	45	47	556	86	109	389	43	93	222	19
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	728	49	51	604	93	118	423	47	101	241	21
RTOR Reduction (vph)	0	6	0	0	15	0	0	5	0	0	4	0
Lane Group Flow (vph)	28	771	0	51	682	0	118	465	0	101	258	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	204	1394	178	1360	496	911	496	911	334	915	334	915
v/s Ratio Prot	c0.22			0.20			c0.26			0.14		0.14
v/s Ratio Perm	0.05	0.11		0.12			0.12			0.15		0.15
v/c Ratio	0.14	0.55		0.29	0.50		0.24	0.51		0.30		0.28
Uniform Delay, d1	15.2	18.5		16.3	18.0		11.4	13.4		11.8		11.6
Progression Factor	1.00	1.00		1.93	2.01		1.80	1.84		1.00		1.00
Incremental Delay, d2	1.4	1.6		3.4	1.1		0.7	1.3		2.3		0.8
Delay (s)	16.6	20.1		34.8	37.3		21.2	26.0		14.1		12.4
Level of Service	B	C		C	D		C	C		B		B
Approach Delay (s)	20.0			37.1			25.0			12.9		12.9
Approach LOS	B			D			C			B		B
Intersection Summary												
HCM Average Control Delay	25.3 HCM Level of Service C											
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	81.0% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

Existing PM + Commercial
 1/21/2008

Existing PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.97	1.00	0.96	1.00	0.96	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1765	3482	1757	3424	1757	3424	3356	3433	3433	3433	3433	3433
Flt Permitted	0.25	1.00	0.24	1.00	0.88	1.00	0.88	1.00	0.79	1.00	0.79	1.00
Satd. Flow (perm)	472	3482	443	3424	2955	3424	2955	3424	2726	3424	2726	3424
Volume (vph)	51	748	70	111	644	144	53	273	115	75	219	38
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	52	756	71	112	651	145	54	276	116	76	221	38
RTOR Reduction (vph)	0	9	0	0	24	0	0	44	0	0	12	0
Lane Group Flow (vph)	52	818	0	112	772	0	0	402	0	0	323	0
Confl. Peds. (#/hr)	8	39	39	8	39	8	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	35.5	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	207	1523	194	1498	1367	1367	1261					
v/s Ratio Prot	0.23			0.23			0.23			0.12		
v/s Ratio Perm	0.11	0.23		0.23			0.14	0.29	0.12	0.26		
v/c Ratio	0.25	0.54		0.58	0.52		0.29	0.29	0.12	0.26		
Uniform Delay, d1	14.2	16.5		16.9	16.3		13.4	13.4	13.1	13.1		
Progression Factor	0.95	1.07		1.29	1.35		0.82	0.82	1.00	1.00		
Incremental Delay, d2	2.0	0.9		11.4	1.2		0.5	0.5	0.5	0.5		
Delay (s)	15.5	18.7		33.3	23.2		11.5	11.5	13.6	13.6		
Level of Service	B	B		C	C		B	B	B	B		
Approach Delay (s)	B	18.5		C	24.5		11.5	11.5	13.6	13.6		
Approach LOS	B	B		C	C		B	B	B	B		
Intersection Summary												
HCM Average Control Delay	18.8											
HCM Volume to Capacity ratio	0.43											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	87.3%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	0.85	
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3268	1770	3539	1770	3539	1770	3539	1770	1583	3539	1583	
Flt Permitted	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3268	1770	3539	1770	3539	1770	3539	1770	1583	3539	1583	
Volume (vph)	840	105	51	737	165	66	66	66	66	66	66	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	866	108	53	760	170	68	68	68	68	68	68	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	974	0	53	760	170	68	68	68	68	68	68	
Confl. Peds. (#/hr)	213	348		348			348			348		
Turn Type	Perm	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4			3			8			2		
Permitted Phases	4			3			8			2		
Actuated Green, G (s)	50.0	5.4	59.4	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	
Effective Green, g (s)	50.0	5.4	59.4	12.6	12.6	12.6	12.6	12.6	12.6	12.6	12.6	
Actuated g/C Ratio	0.62	0.07	0.74	0.16	0.16	0.16	0.16	0.16	0.16	0.16	0.16	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0			3.0			3.0			3.0		
Lane Grp Cap (vph)	2043	119	2628	279	249	249						
v/s Ratio Prot	c0.30			c0.03			0.21			c0.10		
v/s Ratio Perm	0.48	0.45	0.29	0.61	0.27					0.04		
Uniform Delay, d1	8.0	35.9	3.4	31.4	29.7					0.27		
Progression Factor	0.38	0.99	0.89	0.91	0.90					0.90		
Incremental Delay, d2	0.7	2.2	0.2	3.7	0.6					0.6		
Delay (s)	3.7	37.7	3.2	32.3	27.4					27.4		
Level of Service	A	D	A	C	C					C		
Approach Delay (s)	3.7			5.5	30.9					30.9		
Approach LOS	A			A	C					C		
Intersection Summary												
HCM Average Control Delay	7.6											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	49.9%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. Existing PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Lane Util. Factor	1.00	0.99	1.00	0.97	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	
Fpb, ped/bikes	0.93	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fpb, ped/bikes	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1642	3422	1728	3366	1770	3467	1770	3467	1770	3361	1770	3361	
Flt Permitted	0.33	1.00	0.18	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	564	3422	324	3366	1770	3467	1770	3467	1770	3361	1770	3361	
Volume (vph)	128	679	99	37	471	76	186	890	82	103	614	136	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	131	693	101	38	481	78	190	908	84	105	627	139	
RTOR Reduction (vph)	0	14	0	0	16	0	0	7	0	0	22	0	
Lane Group Flow (vph)	131	780	0	38	543	0	190	985	0	105	744	0	
Confl. Peds. (#/hr)	94	86	86	86	94	94	40	40	40	111	111	111	
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	4	4	4	8	8	8	5	2	2	1	6	6	
Permitted Phases	4	8	8	24.9	24.9	24.9	10.8	33.7	7.9	30.8	30.8	30.8	
Actuated Green, G (s)	25.4	25.4	25.4	25.4	25.4	25.4	11.3	34.2	8.4	31.3	31.3	31.3	
Effective Green, g (s)	0.32	0.32	0.32	0.32	0.32	0.32	0.14	0.43	0.11	0.39	0.39	0.39	
Actuated g/C Ratio	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Clearance Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Vehicle Extension (s)	179	1086	103	1069	250	1482	186	1315	186	1315	186	1315	
Lane Grip Cap (vph)	0.23	0.23	0.12	0.16	0.16	0.16	c0.11	c0.28	0.06	0.22	0.22	0.22	
v/s Ratio Prot	0.73	0.72	0.37	0.51	0.51	0.51	0.76	0.66	0.56	0.57	0.57	0.57	
v/s Ratio Perm	24.3	24.1	21.1	22.2	22.2	22.2	33.0	18.3	34.1	19.0	19.0	19.0	
Uniform Delay, d1	0.69	0.64	1.00	1.00	1.00	1.00	0.99	0.53	1.00	1.00	1.00	1.00	
Progression Factor	11.4	1.7	0.8	0.1	10.1	2.0	10.1	2.0	2.3	1.8	1.8	1.8	
Incremental Delay, d2	28.2	17.3	21.9	22.4	22.4	22.4	42.8	11.7	36.4	20.8	20.8	20.8	
Delay (s)	C	B	C	C	C	C	D	B	D	C	D	C	
Level of Service	18.8	B	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	16.7	
Approach Delay (s)	B	B	B	C	C	C	D	B	D	C	D	C	
Approach LOS	B	B	B	C	C	C	D	B	D	C	D	C	
Intersection Summary													
HCM Average Control Delay	19.6											HCM Level of Service	B
HCM Volume to Capacity ratio	0.72												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.3%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. Existing PM + Commercial
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	7	33	1118	31	15	783
Volume (veh/h)	0.90	0.90	0.90	0.90	0.90	0.90
Peak Hour Factor	8	37	1242	34	17	870
Hourly flow rate (vph)	52	52	52	52	45	45
Pedestrians	12.0	12.0	12.0	12.0	12.0	12.0
Lane Width (ft)	4.0	4.0	4.0	4.0	4.0	4.0
Walking Speed (ft/s)	4	4	4	4	4	4
Percent Blockage	None	None	None	None	None	None
Right turn flare (veh)	None	None	None	None	None	None
Median type	230	230	230	230	230	230
Median storage (veh)	0.94	0.88	0.88	0.88	0.88	0.88
Upstream signal (ft)	1832	735	1329	1329	1329	1329
pX, platoon unblocked	1453	564	1238	1238	1238	1238
VC, conflicting volume	6.8	6.9	4.1	4.1	4.1	4.1
VC1, stage 1 conf vol	3.5	3.3	2.2	2.2	2.2	2.2
VC2, stage 2 conf vol	92	90	96	96	96	96
vCu, unblocked vol	100	380	471	471	471	471
tC, single (s)	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
tC, 2 stage (s)	44	828	449	17	435	435
tF (s)	8	0	0	17	0	0
p0 queue free %	37	0	34	0	0	0
cM capacity (veh/h)	255	1700	1700	471	1700	1700
Direction, Lane #	Volume to Capacity	0.17	0.49	0.26	0.04	0.26
Volume Total	Queue Length 95th (ft)	15	0	0	3	0
Volume Left	Control Delay (s)	22.0	0.0	0.0	12.9	0.0
Volume Right	Lane LOS	C	C	B	B	C
CSH	Approach Delay (s)	22.0	0.0	0.2	0.2	0.2
Volume to Capacity	Approach LOS	C	C	C	C	C
Queue Length 95th (ft)	Intersection Summary					
Control Delay (s)	Average Delay	0.5				
Lane LOS	Intersection Capacity Utilization	50.2%				
Approach Delay (s)	ICU Level of Service	A				
Approach LOS	Analysis Period (min)	15				

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00
Fipb, ped/bikes	1.00	0.97	1.00	0.99	1.00	0.99	0.98	1.00	0.97	1.00	0.97	1.00
Frt	0.99	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.99	0.99	0.95	1.00	0.99	0.99	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4984	1719	3291	1766	1714	1832	1766	1714	1832	1766	1714	1832
Flt Permitted	0.79	0.33	1.00	0.81	0.81	0.27	1.00	0.81	0.27	1.00	0.81	0.27
Satd. Flow (perm)	3989	592	3291	1440	482	1832	1440	482	1832	1440	482	1832
Volume (vph)	112	627	27	66	333	168	58	364	84	65	291	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	114	640	28	67	340	171	59	371	86	66	297	20
RTOR Reduction (vph)	0	5	0	0	38	0	0	9	0	0	0	3
Lane Group Flow (vph)	0	777	0	67	473	0	0	507	0	66	314	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31
Clearance 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
Lane Grp Cap (vph)	2344	348	1933	450	151	573						
v/s Ratio Prot		0.11		0.14			0.35			0.14		
v/s Ratio Perm	0.33	0.19	0.24	1.13	0.44	0.55						
v/c Ratio	8.5	7.7	7.9	27.5	21.9	22.8						
Uniform Delay, d1	1.00	1.36	1.38	1.00	0.75	0.75						
Progression Factor	0.4	1.2	0.3	81.8	8.7	3.6						
Incremental Delay, d2	8.8	11.7	11.2	109.3	25.2	20.8						
Delay (s)	A	B	B	F	C	C						
Level of Service	A	B	B	F	C	C						
Approach Delay (s)	8.8	11.3	109.3		21.5							
Approach LOS	A	B	B		F							
Intersection Summary												
HCM Average Control Delay	34.6			HCM Level of Service			C					
HCM Volume to Capacity ratio	0.61			Sum of lost time (s)			8.0					
Actuated Cycle Length (s)	80.0			ICU Level of Service			H					
Intersection Capacity Utilization	138.5%			Analysis Period (min)			15					
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.98
Fipb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.96	1.00	0.94	1.00	0.98
Frt	0.99	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.96	1.00	0.98	1.00
Flt Protected	1.00	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4969	4881	4881	1608	1734	1658	1802	1608	1734	1658	1802	1608
Flt Permitted	0.88	0.80	0.80	0.61	1.00	0.36	1.00	0.61	1.00	0.36	1.00	0.80
Satd. Flow (perm)	4391	3928	3928	1040	1734	631	1802	1040	1734	631	1802	1040
Volume (vph)	39	567	40	70	412	66	41	210	71	56	126	17
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	597	42	74	434	69	43	221	75	59	133	18
RTOR Reduction (vph)	0	9	0	0	22	0	0	16	0	0	0	6
Lane Group Flow (vph)	0	671	0	0	555	0	43	280	0	59	145	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (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
Lane Grp Cap (vph)	2827	2529	2529	267	444	162	462	267	444	162	462	267
v/s Ratio Prot		0.15		0.14	0.04		0.16			0.09		
v/s Ratio Perm	0.24	0.22	0.22	0.16	0.63	0.36	0.31					
v/c Ratio	6.0	5.9	5.9	23.1	26.4	24.4	24.1					
Uniform Delay, d1	1.25	1.20	1.20	1.00	1.00	1.21	1.23					
Progression Factor	0.2	0.2	0.2	1.3	6.7	6.0	1.7					
Incremental Delay, d2	7.7	7.3	7.3	24.4	33.1	35.5	31.3					
Delay (s)	A	A	A	C	C	D	C					
Level of Service	A	A	A	C	C	D	C					
Approach Delay (s)	7.7	7.3	7.3	32.0	32.5	32.5	32.5					
Approach LOS	A	A	A	C	C	D	C					
Intersection Summary												
HCM Average Control Delay	15.0			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.35			Sum of lost time (s)			8.0					
Actuated Cycle Length (s)	80.0			ICU Level of Service			E					
Intersection Capacity Utilization	86.9%			Analysis Period (min)			15					
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	5019	4824	3363	3363	3379	3379	3379	3379	3379	3379	3379	3379	
Flt Permitted	0.83	0.85	0.86	0.86	0.73	0.73	0.73	0.73	0.73	0.73	0.73	0.73	
Satd. Flow (perm)	4205	4098	2899	2899	2510	2510	2510	2510	2510	2510	2510	2510	
Volume (vph)	60	620	34	50	434	195	39	182	72	121	217	66	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Adj. Flow (vph)	61	626	34	51	438	197	39	184	73	122	219	67	
RTOR Reduction (vph)	0	7	0	0	70	0	0	39	0	0	20	0	
Lane Group Flow (vph)	0	714	0	0	616	0	0	257	0	0	388	0	
Confl. Peds. (#/hr)	9	17	17	17	9	12	10	10	10	10	10	12	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4	
Permitted Phases	4	8	8	8	8	8	2	2	2	2	6	6	
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0	
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	
Lane Grp Cap (vph)	2707	2638	743	743	643	643	643	643	643	643	643	643	
v/s Ratio Prot	c0.17	0.15	0.09	0.09	0.15	0.09	0.09	0.09	0.09	0.09	0.15	0.15	
v/s Ratio Perm	0.26	0.23	0.35	0.35	0.23	0.35	0.35	0.35	0.35	0.35	0.60	0.60	
v/c Ratio	6.1	6.0	24.3	24.3	6.0	24.3	24.3	24.3	24.3	24.3	26.2	26.2	
Uniform Delay, d1	1.49	1.16	1.00	1.00	1.16	1.00	1.00	1.00	1.00	1.00	0.77	0.77	
Progression Factor	0.2	0.2	1.3	1.3	0.2	1.3	1.3	1.3	1.3	1.3	4.1	4.1	
Incremental Delay, d2	9.3	7.1	25.5	25.5	7.1	25.5	25.5	25.5	25.5	25.5	24.2	24.2	
Delay (s)	A	A	C	C	A	C	C	C	C	C	C	C	
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A	
Approach Delay (s)	9.3	7.1	25.5	25.5	7.1	25.5	25.5	25.5	25.5	25.5	24.2	24.2	
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A	
Intersection Summary													
HCM Average Control Delay	13.8											HCM Level of Service	B
HCM Volume to Capacity ratio	0.36												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	93.7%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	5052	4964	1695	1695	1601	1601	1601	1601	1601	1601	1601	1601	
Flt Permitted	0.83	0.83	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.86	0.86	
Satd. Flow (perm)	4203	4584	1476	1476	1408	1408	1408	1408	1408	1408	1408	1408	
Volume (vph)	80	761	10	10	489	57	10	10	128	0	193	0	
Peak-hour factor, PHF	0.96	0.96	0.92	0.92	0.96	0.96	0.92	0.92	0.92	0.92	0.96	0.96	
Adj. Flow (vph)	83	793	11	11	509	59	11	11	133	0	201	0	
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	8	0	0	0	
Lane Group Flow (vph)	0	886	0	0	579	0	0	14	0	0	334	0	
Confl. Peds. (#/hr)	0	79	0	0	79	0	0	0	0	0	0	79	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4	
Permitted Phases	4	8	8	8	8	8	2	2	2	2	6	6	
Actuated Green, G (s)	48.2	48.2	48.2	48.2	48.2	48.2	23.8	23.8	23.8	23.8	23.8	23.8	
Effective Green, g (s)	48.2	48.2	48.2	48.2	48.2	48.2	23.8	23.8	23.8	23.8	23.8	23.8	
Actuated g/C Ratio	0.60	0.60	0.60	0.60	0.60	0.60	0.30	0.30	0.30	0.30	0.30	0.30	
Clearance Time (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	
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	
Lane Grp Cap (vph)	2532	2762	439	439	419	419	419	419	419	419	419	419	
v/s Ratio Prot	c0.21	0.13	0.01	0.01	0.13	0.01	0.01	0.01	0.01	0.01	0.24	0.24	
v/s Ratio Perm	0.35	0.21	0.03	0.03	0.21	0.03	0.03	0.03	0.03	0.03	0.80	0.80	
v/c Ratio	6.65	7.2	19.9	19.9	7.2	19.9	19.9	19.9	19.9	19.9	25.9	25.9	
Uniform Delay, d1	0.65	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.81	0.81	
Progression Factor	0.4	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2	10.0	10.0	
Incremental Delay, d2	5.5	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	30.9	30.9	
Delay (s)	A	A	A	A	A	A	A	A	A	A	C	C	
Level of Service	A	A	A	A	A	A	A	A	A	A	B	B	
Approach Delay (s)	5.5	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	7.4	30.9	30.9	
Approach LOS	A	A	A	A	A	A	A	A	A	A	B	B	
Intersection Summary													
HCM Average Control Delay	11.0											HCM Level of Service	B
HCM Volume to Capacity ratio	0.50												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	75.9%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
20: MacArthur Blvd. & Telegraph Ave.

Existing PM + Commercial
1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	4925	4749	4749	1742	3426	1724	3474					
Flt Permitted	0.67	0.69	0.69	0.34	1.00	0.27	1.00					
Satd. Flow (perm)	3327	3271	3271	631	3426	482	3474					
Volume (vph)	222	594	81	61	358	194	100	735	98	145	595	58
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	247	660	90	68	398	216	111	817	109	161	661	64
RTOR Reduction (vph)	0	12	0	0	14	0	0	5	0	0	4	0
Lane Group Flow (vph)	0	985	0	0	668	0	111	921	0	161	721	0
Confl. Peds. (#/hr)	26	19	19	26	39	26	39	92	92	92	92	39

Turn Type	Perm	pm+pt	Perm	Perm
Protected Phases	4	3	8	2
Permitted Phases	4	8	2	6
Actuated Green, G (s)	26.5	26.5	66.0	66.0
Effective Green, g (s)	28.0	28.0	67.0	67.0
Actuated g/C Ratio	0.27	0.27	0.65	0.65
Clearance Time (s)	5.5	5.5	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	904	889	410	2229
v/s Ratio Prot			0.18	0.27
v/s Ratio Perm	0.30	0.20	0.18	0.27
v/c Ratio	1.22dl	0.88dl	0.27	0.41
Uniform Delay, d1	37.5	34.3	7.6	8.6
Progression Factor	1.00	1.00	1.00	1.00
Incremental Delay, d2	57.5	3.2	1.6	0.6
Delay (s)	95.0	37.5	9.3	9.2
Level of Service	F	D	A	A
Approach Delay (s)	95.0	37.5	9.2	9.6
Approach LOS	F	D	A	A

Intersection Summary	
HCM Average Control Delay	38.4
HCM Level of Service	D
HCM Volume to Capacity ratio	0.68
Actuated Cycle Length (s)	103.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.7%
ICU Level of Service	D
Analysis Period (min)	15
dl Defacto Left Lane. Recode with 1 through lane as a left lane.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
21: MacArthur Blvd. & Webster St.

Existing PM + Commercial
1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	1.00	1.00	1.00	0.99	0.99	0.99	1.00	0.99	0.99	1.00	0.99	0.99
Satd. Flow (prot)	5015	4982	4982	1778	1406	1583						
Flt Permitted	0.89	0.77	0.77	0.87	1.00	0.82						
Satd. Flow (perm)	4494	3862	3862	1566	1406	1467						
Volume (vph)	36	776	35	82	530	28	52	92	191	33	33	68
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	36	784	35	83	535	28	53	93	193	33	33	69
RTOR Reduction (vph)	0	6	0	0	6	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	849	0	0	640	0	0	146	102	0	88	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100

Turn Type	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2
Permitted Phases	4	8	2	6
Actuated Green, G (s)	49.5	49.5	24.5	24.5
Effective Green, g (s)	48.5	48.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.29	0.29
Clearance Time (s)	3.0	3.0	3.0	3.0
Vehicle Extension (s)	2724	2341	460	413
Lane Grp Cap (vph)				
v/s Ratio Prot			0.17	0.07
v/s Ratio Perm	0.31	0.27	0.32	0.25
v/c Ratio	7.6	7.4	22.0	21.5
Uniform Delay, d1	1.00	1.00	1.00	1.00
Progression Factor	0.3	0.3	1.8	1.4
Incremental Delay, d2	7.9	7.7	23.8	22.3
Delay (s)	A	A	C	C
Level of Service	A	A	C	C
Approach Delay (s)	7.9	7.7	23.3	22.3
Approach LOS	A	A	C	C

Intersection Summary	
HCM Average Control Delay	11.5
HCM Level of Service	B
HCM Volume to Capacity ratio	0.31
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.6%
ICU Level of Service	F
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
22: MacArthur Blvd. & Broadway

Existing PM + Commercial
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4937	1770	4742	1770	4932	1770	4934	1770	4934	1770	4934
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (pbrm)	1770	4937	1770	4742	1770	4932	1770	4934	1770	4934	1770	4934
Volume (vph)	187	693	86	81	376	210	167	653	106	307	379	63
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	205	762	95	89	413	231	184	718	116	337	416	69
RTOR Reduction (vph)	0	16	0	0	100	0	0	22	0	0	23	0
Lane Group Flow (vph)	205	841	0	89	544	0	184	812	0	337	462	0
Confl. Peds. (#/hr)			81			22			50			43
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	4		3	4		1	2	1	2	1	2
Permitted Phases												
Actuated Green, G (s)	11.0	24.1		11.0	24.1		20.9	26.0		20.9	26.0	
Effective Green, g (s)	11.0	25.1		11.0	25.1		20.9	27.0		20.9	27.0	
Actuated g/C Ratio	0.11	0.25		0.11	0.25		0.21	0.27		0.21	0.27	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	195	1239		195	1190		370	1332		370	1332	
v/s Ratio Prot	c0.12	c0.17		0.05	0.11		0.10	c0.16		c0.19	0.09	
v/s Ratio Perm	1.05	0.68		0.46	0.46		0.50	0.61		0.91	0.35	
Uniform Delay, d1	44.5	33.8		41.7	31.7		34.9	31.9		38.6	29.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	78.6	3.0		0.6	1.3		0.4	2.1		25.5	0.7	
Delay (s)	123.1	36.8		42.3	33.0		35.3	34.0		64.1	30.1	
Level of Service	F	D		D	C		D	C		E	C	
Approach Delay (s)		53.5			34.1			34.2			44.1	
Approach LOS		D			C			C			D	
Intersection Summary												
HCM Average Control Delay	42.0			HCM Level of Service			D					
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	100.0			Sum of lost time (s)			16.0					
Intersection Capacity Utilization	81.5%			ICU Level of Service			D					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
23: 34th St. & Telegraph Ave.

Existing PM + Commercial
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	0.94	0.94	0.94	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	0.96	0.96	0.96	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Frt	0.96	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.98	0.98	0.98	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1564	1655	1564	1655	1691	3468	1645	3451	1645	3451	1645	3451
Flt Permitted	0.70	0.70	0.70	0.84	0.84	0.29	1.00	0.41	1.00	0.41	1.00	0.41
Satd. Flow (pbrm)	1129	1419	1129	1419	523	3468	710	3451	1129	1419	1129	1419
Volume (vph)	98	33	65	42	59	39	40	544	35	36	782	63
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	104	35	69	45	63	41	43	579	37	38	832	67
RTOR Reduction (vph)	0	24	0	0	18	0	0	4	0	0	5	0
Lane Group Flow (vph)	0	184	0	0	131	0	43	612	0	38	894	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			4			2			2		6
Permitted Phases												
Actuated Green, G (s)	16.2			16.2			61.8	61.8		61.8		61.8
Effective Green, g (s)	15.7			15.7			61.3	61.3		61.3		61.3
Actuated g/C Ratio	0.18			0.18			0.72	0.72		0.72		0.72
Clearance Time (s)	3.5			3.5			3.5	3.5		3.5		3.5
Vehicle Extension (s)	2.0			2.0			2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	209			262			377	2501		512		2489
v/s Ratio Prot	c0.16			0.09			0.08	0.18		0.05		c0.26
v/s Ratio Perm	0.88			0.50			0.11	0.24		0.07		0.36
Uniform Delay, d1	33.7			31.1			3.6	4.0		3.5		4.5
Progression Factor	1.00			1.00			1.00	1.00		1.00		1.00
Incremental Delay, d2	31.6			0.5			0.6	0.2		0.3		0.4
Delay (s)	65.4			31.7			4.2	4.2		3.8		4.9
Level of Service	E			C			A	A		A		A
Approach Delay (s)	65.4			31.7			4.2	4.2		4.8		4.8
Approach LOS	E			C			A	A		A		A
Intersection Summary												
HCM Average Control Delay	13.1			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.47											
Actuated Cycle Length (s)	85.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	58.2%			ICU Level of Service			B					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave. Existing PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.93
Frbp, ped/bikes	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.93	1.00	0.93
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.96	1.00	0.96	1.00
Frt	1.00	0.96	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.94	1.00	0.94
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3308	1770	3260	1770	3260	1691	3490	1696	3122	1696	3122
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.29	1.00	0.42	1.00	0.42	1.00
Satd. Flow (perm)	1770	3308	1770	3260	1770	3260	514	3490	745	3122	745	3122
Volume (vph)	127	316	100	56	383	111	113	502	29	113	491	294
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	130	322	102	57	391	113	115	512	30	115	501	300
RTOR Reduction (vph)	0	36	0	0	33	0	0	4	0	0	0	90
Lane Group Flow (vph)	130	388	0	57	471	0	115	538	0	115	711	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		2		2		6	
Permitted Phases							2		44.5		44.5	44.5
Actuated Green, G (s)	9.2	21.9		5.1	17.8		44.5		44.5		44.5	44.5
Effective Green, g (s)	9.7	21.4		5.6	17.3		46.0		46.0		46.0	46.0
Actuated g/C Ratio	0.11	0.25		0.07	0.20		0.54		0.54		0.54	0.54
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5		5.5		5.5	5.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0		2.0		2.0	2.0
Lane Grip Cap (vph)	202	833		117	664		278		1889		403	1690
v/s Ratio Prot	c0.07	0.12		0.03	c0.14		0.22		0.15		0.15	c0.23
v/s Ratio Perm	0.64	0.47		0.49	0.71		0.41		0.28		0.29	0.42
Uniform Delay, d1	36.0	27.0		38.3	31.5		11.5		10.6		10.6	11.6
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00		1.00	1.00
Incremental Delay, d2	5.2	0.2		1.2	2.8		4.5		0.4		1.8	0.8
Delay (s)	41.2	27.1		39.5	34.3		16.0		11.0		12.4	12.4
Level of Service	D	C		D	C		B		B		B	B
Approach Delay (s)	30.4			34.9			11.8				12.4	
Approach LOS	C			C			B		B		B	B
Intersection Summary												
HCM Average Control Delay	20.6		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.52											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0							
Intersection Capacity Utilization	70.1%		ICU Level of Service		C							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave. Existing PM + Commercial
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frbp, ped/bikes	0.92	1.00	1.00	1.00	1.00	0.95
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.91	1.00	1.00	1.00	0.98	1.00
Flt Protected	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1527	1770	3539	3267		
Flt Permitted	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1527	1770	3539	3267		
Volume (vph)	64	144	85	1069	615	115
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	67	150	89	1114	641	120
RTOR Reduction (vph)	103	0	0	0	17	0
Lane Group Flow (vph)	114	0	89	1114	744	0
Confl. Peds. (#/hr)	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	2	3	8	4		
Permitted Phases						
Actuated Green, G (s)	24.2	8.1	47.8	35.7		
Effective Green, g (s)	24.2	8.1	47.8	35.7		
Actuated g/C Ratio	0.30	0.10	0.60	0.45		
Clearance Time (s)	4.0	4.0	4.0	4.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grip Cap (vph)	462	179	2115	1458		
v/s Ratio Prot	c0.07	0.05	c0.31	0.23		
v/s Ratio Perm	0.25	0.50	0.53	0.51		
Uniform Delay, d1	21.0	34.0	9.5	15.9		
Progression Factor	1.00	1.00	1.00	0.66		
Incremental Delay, d2	1.3	2.2	0.2	1.0		
Delay (s)	22.3	36.2	9.7	11.6		
Level of Service	C	D	A	B		
Approach Delay (s)	22.3		11.7	11.6		
Approach LOS	C		B	B		
Intersection Summary						
HCM Average Control Delay	12.7		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.43					
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0	
Intersection Capacity Utilization	54.7%		ICU Level of Service		A	
Analysis Period (min)	15					
c Critical Lane Group						

**APPENDIX M:
YEAR 2015 PLUS COMMERCIAL ALTERNATIVE
INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

2015 AM + Commercial
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Lane Configurations: EBL, EBT, EBR, WBL, WBT, WBR, NBL, NBT, NBR, SBL, SBT, SBR											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.97	1.00	0.98	1.00	0.97	1.00	0.94	1.00	0.95	1.00
Satd. Flow (prot)	1770	4902	1770	4953	1770	4953	2006	2043	1985	1957	1985	1957
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4902	1770	4953	1770	4953	196	2043	945	1957	945	1957
Volume (vph)	300	953	212	90	1330	200	200	288	60	160	422	270
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	1003	223	95	1400	211	211	303	63	168	444	284
RTOR Reduction (vph)	0	27	0	0	17	0	0	6	0	0	19	0
Lane Group Flow (vph)	316	1199	0	95	1594	0	211	360	0	168	709	0
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm				
Protected Phases	7	4		3	8		5	2			6	
Permitted Phases												
Actuated Green, G (s)	17.0	48.4		11.6	43.0		49.5	49.5		40.5	40.5	
Effective Green, g (s)	17.0	48.4		11.6	43.0		50.0	50.0		41.0	41.0	
Actuated g/C Ratio	0.14	0.40		0.10	0.36		0.42	0.42		0.34	0.34	
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	251	1977		171	1775		187	851		323	669	
v/s Ratio Prot	c0.18	0.24		0.05	c0.32		c0.07	0.18		c0.36		
v/s Ratio Perm							0.40			0.18		
Uniform Delay, d1	1.26	0.61		0.56	0.90		1.13	0.42		0.52	1.06	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	144.6	1.4		3.9	7.7		104.5	0.3		1.5	51.7	
Delay (s)	196.1	29.7		55.6	44.1		163.2	25.1		33.1	91.2	
Level of Service	F	C		E	D		F	C		C	F	
Approach Delay (s)	63.8			44.7			75.6			80.3		
Approach LOS	E			D			E			F		
Intersection Summary	HCM Average Control Delay: 61.5 HCM Level of Service: E HCM Volume to Capacity ratio: 1.02 Actuated Cycle Length (s): 120.0 Sum of lost time (s): 12.0 Intersection Capacity Utilization: 110.4% ICU Level of Service: H Analysis Period (min): 15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2015 AM + Commercial
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	Lane Configurations: EBL, EBT, EBR, WBL, WBT, WBR, NBL, NBT, NBR, SBL, SBT, SBR											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.96	0.96
Flpb, ped/bikes	1.00	0.95	1.00	1.00	0.91	1.00	0.99	1.00	0.97	1.00	0.96	0.96
Flt Protected	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1748	1748	1681	1596	1748	1596	3420	3270	1770	3270	1770	3270
Fit Permitted	0.48	0.48	0.74	1.00	0.74	1.00	0.93	0.93	0.95	1.00	0.95	1.00
Satd. Flow (perm)	846	846	1302	1596	846	1596	3196	3196	1770	3270	1770	3270
Volume (vph)	10	10	10	179	110	160	10	1155	235	100	1161	450
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	11	11	188	116	168	11	1216	247	105	1222	474
RTOR Reduction (vph)	0	10	0	0	67	0	0	14	0	0	33	0
Lane Group Flow (vph)	0	23	0	188	217	0	0	1460	0	105	1663	0
Confl. Peds. (#/hr)	4			4	44		12			44		
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Prot					
Protected Phases	7			8			2			1		6
Permitted Phases												
Actuated Green, G (s)	5.1			16.6	16.6		42.6			7.7		54.8
Effective Green, g (s)	5.6			17.1	17.1		43.1			8.2		55.3
Actuated g/C Ratio	0.06			0.19	0.19		0.48			0.09		0.61
Clearance Time (s)	4.5			4.5	4.5		4.5			4.5		4.5
Vehicle Extension (s)	2.0			2.0	2.0		2.0			2.0		2.0
Lane Grp Cap (vph)	53			247	303		1531			161		2009
v/s Ratio Prot	c0.03			c0.14	0.14		c0.46			0.06		c0.51
v/s Ratio Perm	0.43			0.76	0.72		0.95			0.65		0.83
Uniform Delay, d1	40.7			34.5	34.2		22.5			39.5		13.6
Progression Factor	1.00			1.00	1.00		1.01			1.00		1.00
Incremental Delay, d2	2.0			11.7	6.5		6.4			7.0		4.1
Delay (s)	42.7			46.2	40.7		29.1			46.5		17.7
Level of Service	D			D	D		C			D		B
Approach Delay (s)	42.7			42.9			29.1			19.4		
Approach LOS	D			D			C			B		
Intersection Summary	HCM Average Control Delay: 26.3 HCM Level of Service: C HCM Volume to Capacity ratio: 0.87 Actuated Cycle Length (s): 90.0 Sum of lost time (s): 16.0 Intersection Capacity Utilization: 107.9% ICU Level of Service: G Analysis Period (min): 15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

2015 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Frtb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.97	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3435	1770	3356	1770	3356	1770	3417	1770	3397	1770	3397	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (pbrm)	3433	3435	1770	3356	1770	3356	1770	3417	1770	3397	1770	3397	
Volume (vph)	460	590	93	120	700	310	110	661	120	280	900	180	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	479	615	97	125	729	323	115	689	125	292	938	188	
RTOR Reduction (vph)	0	13	0	0	56	0	0	17	0	0	18	0	
Lane Group Flow (vph)	479	699	0	125	996	0	115	797	0	292	1108	0	
Confl. Peds. (#/hr)	6	24	24	6	36	6	36	28	28	28	28	36	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Actuated Green, G (s)	13.0	28.9	9.6	25.5	8.1	23.5	11.0	26.4					
Effective Green, g (s)	12.5	29.9	9.1	26.5	7.6	24.5	10.5	27.4					
Actuated g/C Ratio	0.14	0.33	0.10	0.29	0.08	0.27	0.12	0.30					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grp Cap (vph)	477	1141	179	988	149	930	207	1034					
v/s Ratio Prot	c0.14	c0.20	0.07	c0.30	0.06	0.23	c0.17	c0.33					
v/s Ratio Perm	1.00	0.61	0.70	1.01	0.77	0.86	1.41	1.07					
Uniform Delay, d1	38.8	25.2	39.1	31.8	40.4	31.1	39.8	31.3					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.89					
Incremental Delay, d2	42.2	0.7	9.2	30.7	19.9	10.1	200.6	43.3					
Delay (s)	81.0	25.9	48.3	62.4	60.2	41.1	246.1	71.1					
Level of Service	F	C	D	E	E	D	F	E					
Approach Delay (s)	48.0			60.9			43.5						
Approach LOS	D			E			D						
Intersection Summary													
HCM Average Control Delay	68.1											HCM Level of Service	E
HCM Volume to Capacity ratio	1.14												
Actuated Cycle Length (s)	90.0											Sum of lost time (s)	20.0
Intersection Capacity Utilization	93.9%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 4: 47th St. & MLK Jr. Way

2015 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.86	0.86	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1611	1611	3285	3433	3476	1611	3285	3433	3476	1611	3285	3433	
Flt Permitted	1.00	1.00	0.94	0.95	1.00	1.00	0.94	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (pbrm)	1611	1611	3094	3433	3476	1611	3094	3433	3476	1611	3094	3433	
Volume (vph)	0	0	10	0	0	0	10	345	321	1600	439	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	11	0	0	0	11	363	338	1684	462	63	
RTOR Reduction (vph)	0	11	0	0	0	0	0	26	0	0	0	0	
Lane Group Flow (vph)	0	0	0	0	0	0	0	686	0	1684	525	0	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases								2	1	6			
Permitted Phases													
Actuated Green, G (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	8.0	29.0	45.0	45.0	
Effective Green, g (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	8.0	8.0	29.0	45.0	45.0	
Actuated g/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0.64	1.00	1.00	
Clearance Time (s)								4.0	4.0	4.0	2.0	2.0	
Lane Grp Cap (vph)	0	0	0	0	0	0	0	550	2212	3476	3476	3476	
v/s Ratio Prot								c0.22	c0.49	0.15			
v/s Ratio Perm	0.00	0.00	0.00	0.00	0.00	0.00	0.00	10.56dr	0.76	0.15			
Uniform Delay, d1	22.5	22.5	18.5	18.5	18.5	18.5	18.5	5.6	5.6	0.0			
Progression Factor	1.00	1.00	0.77	0.77	0.77	0.77	0.77	1.00	1.00	1.00			
Incremental Delay, d2	0.0	0.0	124.7	124.7	124.7	124.7	124.7	2.5	2.5	0.1			
Delay (s)	22.5	22.5	138.9	138.9	138.9	138.9	138.9	8.1	8.1	0.1			
Level of Service	C	C	F	F	F	F	F	A	A	A			
Approach Delay (s)	22.5			0.0			138.9						
Approach LOS	C			A			F						
Intersection Summary													
HCM Average Control Delay	38.5											HCM Level of Service	D
HCM Volume to Capacity ratio	0.87												
Actuated Cycle Length (s)	45.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.1%											ICU Level of Service	D
Analysis Period (min)	15												
dr Defacto Right Lane. Recode with 1 through lane as a right lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2015 AM + Commercial
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.97	0.96	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Fipb, ped/bikes	0.98	0.97	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.97	0.94	0.94	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.98	0.98	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1688	1606	1606	3399	3472	3472	3472	3472	3472	3472	3472	3472
Flt Permitted	0.83	0.87	0.87	0.91	0.91	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Satd. Flow (perm)	1436	1418	1418	3085	3085	3085	3085	3085	3085	3085	3085	3085
Volume (vph)	70	80	34	60	60	90	31	496	80	50	589	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	84	36	63	63	95	33	522	84	53	620	32
RTOR Reduction (vph)	0	18	0	0	60	0	0	27	0	0	8	0
Lane Group Flow (vph)	0	176	0	0	161	0	0	612	0	0	697	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	8	8	8	2	2	2	2	6	6	6
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (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
Lane Grp Cap (vph)	479	479	473	473	473	1508	1508	1498	1498	1498	1498	1498
v/s Ratio Prot	c0.12	0.11	0.11	0.11	0.11	0.20	0.20	c0.23	c0.23	c0.23	c0.23	c0.23
v/s Ratio Perm	0.37	0.34	0.34	0.34	0.34	0.41	0.41	0.47	0.47	0.47	0.47	0.47
v/c Ratio	11.4	11.3	11.3	11.3	11.3	7.3	7.3	7.6	7.6	7.6	7.6	7.6
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.2	2.0	2.0	2.0	2.0	0.8	0.8	1.0	1.0	1.0	1.0	1.0
Incremental Delay, d2	13.6	13.2	13.2	13.2	13.2	8.1	8.1	8.6	8.6	8.6	8.6	8.6
Delay (s)	B	B	B	B	B	A	A	A	A	A	A	A
Level of Service	B	B	B	B	B	A	A	A	A	A	A	A
Approach Delay (s)	13.6	13.2	13.2	13.2	13.2	8.1	8.1	8.6	8.6	8.6	8.6	8.6
Approach LOS	B	B	B	B	B	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.6 HCM Level of Service A											
HCM Volume to Capacity ratio	0.43											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	64.1% ICU Level of Service C											
Analysis Period (min)	15											
c Critical Lane Group	15											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.95	0.95	0.95	0.96	0.96	0.96	0.98	0.98	0.98	0.98	0.98	0.98
Fipb, ped/bikes	0.97	0.97	0.97	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.96	0.96	0.98	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1627	1649	1649	3443	3443	3443	3443	3443	3443	3443	3443	3443
Flt Permitted	0.79	0.79	0.79	0.84	0.84	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Satd. Flow (perm)	1298	1328	1328	2882	2882	2882	2882	2882	2882	2882	2882	2882
Volume (vph)	70	80	70	48	70	50	30	1029	62	70	1587	100
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	84	74	51	74	53	32	1083	65	74	1671	105
RTOR Reduction (vph)	0	6	0	0	24	0	0	3	0	0	5	0
Lane Group Flow (vph)	0	226	0	0	154	0	0	1177	0	0	1845	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	2	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	2	2	2	2	6	6	6
Actuated Green, G (s)	16.7	16.7	16.7	16.7	16.7	59.3	59.3	59.3	59.3	59.3	59.3	59.3
Effective Green, g (s)	17.2	17.2	17.2	17.2	17.2	59.8	59.8	59.8	59.8	59.8	59.8	59.8
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	263	263	269	269	269	2028	2028	2851	2851	2851	2851	2851
v/s Ratio Prot	c0.17	0.12	0.12	0.12	0.12	0.41	0.41	c0.46	c0.46	c0.46	c0.46	c0.46
v/s Ratio Perm	0.86	0.86	0.86	0.86	0.86	0.58	0.58	0.65	0.65	0.65	0.65	0.65
v/c Ratio	32.7	30.6	30.6	30.6	30.6	6.3	6.3	6.9	6.9	6.9	6.9	6.9
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	0.75	0.75	1.00	1.00	1.00	1.00	1.00
Progression Factor	23.1	1.8	1.8	1.8	1.8	1.0	1.0	1.2	1.2	1.2	1.2	1.2
Incremental Delay, d2	55.9	32.4	32.4	32.4	32.4	5.8	5.8	8.0	8.0	8.0	8.0	8.0
Delay (s)	E	C	C	C	C	A	A	A	A	A	A	A
Level of Service	E	C	C	C	C	A	A	A	A	A	A	A
Approach Delay (s)	55.9	32.4	32.4	32.4	32.4	5.8	5.8	8.0	8.0	8.0	8.0	8.0
Approach LOS	E	C	C	C	C	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	11.7 HCM Level of Service B											
HCM Volume to Capacity ratio	0.70											
Actuated Cycle Length (s)	85.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	103.9% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 7: 40th St. & Market St. 2015 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	[Diagram symbols]											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.98	1.00	0.98	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1747	3435	1759	3462	1767	1806	1736	1841				
Flt Permitted	0.17	1.00	0.35	1.00	0.44	1.00	0.59	1.00				
Satd. Flow (pbrm)	320	3435	657	3462	810	1806	1077	1841				
Volume (vph)	30	391	80	73	684	74	90	201	39	86	400	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	412	84	77	720	78	95	212	41	91	421	32
RTOR Reduction (vph)	0	21	0	0	10	0	0	9	0	0	3	0
Lane Group Flow (vph)	32	475	0	77	788	0	95	244	0	91	450	0
Conf. Peds. (#/hr)	30		12	12	12	30	6	54	54			6

Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4		8		2	6
Permitted Phases	4		8		2	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.5	3.5
Lane Grp Cap (vph)	92	988	189	995	496	1106
v/s Ratio Prot	0.14		c0.23		0.14	c0.24
v/s Ratio Perm	0.10	0.12	0.12	0.12	0.08	0.08
v/c Ratio	0.35	0.48	0.41	0.79	0.19	0.22
Uniform Delay, d1	22.6	23.6	23.0	26.3	6.8	6.9
Progression Factor	1.00	1.00	0.88	0.91	1.00	1.00
Incremental Delay, d2	10.1	1.7	5.9	5.9	0.9	0.5
Delay (s)	32.7	25.2	26.0	30.0	7.7	7.4
Level of Service	C	C	C	C	A	A
Approach Delay (s)	25.7		29.6		7.5	8.7
Approach LOS	C		C		A	A

Intersection Summary		
HCM Average Control Delay	20.4	HCM Level of Service C
HCM Volume to Capacity ratio	0.52	
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	83.2%	ICU Level of Service E
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 8: 40th St. & West St. 2015 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	[Diagram symbols]											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00	1.00	0.97	1.00	0.97	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1763	3432	1741	3512	1763	3432	3377	3419				
Flt Permitted	0.28	1.00	0.41	1.00	0.41	1.00	0.79	1.00				
Satd. Flow (pbrm)	512	3432	745	3512	2709	3432	2709	2850				
Volume (vph)	30	436	80	61	721	33	70	171	59	70	240	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	459	84	64	759	35	74	180	62	74	253	53
RTOR Reduction (vph)	0	19	0	0	4	0	0	27	0	0	16	0
Lane Group Flow (vph)	32	524	0	64	790	0	0	289	0	0	364	0
Conf. Peds. (#/hr)	18		54	54	18	4	18	18	18	18	18	4

Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4		8		2	6
Permitted Phases	4		8		2	6
Actuated Green, G (s)	38.0	38.0	38.0	38.0	32.0	32.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	33.0	33.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.41	0.41
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0
Lane Grp Cap (vph)	250	1673	363	1712	1117	1176
v/s Ratio Prot	0.06	0.15	0.09	c0.22	0.11	c0.13
v/s Ratio Perm	0.13	0.31	0.18	0.46	0.26	0.31
Uniform Delay, d1	11.2	12.4	11.5	13.6	15.5	15.8
Progression Factor	0.95	1.03	1.25	1.39	0.61	1.00
Incremental Delay, d2	1.0	0.5	1.0	0.8	0.5	0.7
Delay (s)	11.6	13.2	15.3	19.7	9.9	16.5
Level of Service	B	B	B	B	A	B
Approach Delay (s)	13.1		19.4		9.9	16.5
Approach LOS	B		B		A	B

Intersection Summary		
HCM Average Control Delay	15.8	HCM Level of Service B
HCM Volume to Capacity ratio	0.39	
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	73.4%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2015 AM + Commercial
 1/21/2008

2015 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1764	3457	1736	3441	1736	3441	3361	3449	3449	3449	3449	3449
Flt Permitted	0.25	1.00	0.40	1.00	0.40	1.00	0.87	1.00	0.74	1.00	0.74	1.00
Satd. Flow (perm)	460	3457	739	3441	739	3441	2928	3441	2568	3441	2568	3441
Volume (vph)	40	473	61	105	716	129	39	238	92	127	346	30
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	493	64	109	746	134	41	248	96	132	360	31
RTOR Reduction (vph)	0	13	0	0	19	0	0	40	0	0	6	0
Lane Group Flow (vph)	42	544	0	109	861	0	0	345	0	0	517	0
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	236	1772	379	1764	1764	1764	1135	995	995	995	995	995
v/s Ratio Prot	0.16			c0.25								
v/s Ratio Perm	0.09	0.15	0.15	0.15	0.15	0.12	0.12	0.12	0.12	0.20	0.20	0.20
v/c Ratio	0.18	0.31	0.29	0.49	0.30	0.30	0.52	0.52	0.52	0.52	0.52	0.52
Uniform Delay, d1	10.5	11.3	11.1	12.7	17.0	17.0	18.8	18.8	18.8	18.8	18.8	18.8
Progression Factor	1.25	1.30	0.84	0.82	0.59	0.59	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	0.4	1.8	0.9	0.7	0.7	1.9	1.9	1.9	1.9	1.9	1.9
Delay (s)	14.7	15.1	11.1	11.3	10.7	10.7	20.7	20.7	20.7	20.7	20.7	20.7
Level of Service	B	B	B	B	B	B	C	C	C	C	C	C
Approach Delay (s)	15.1			11.2			10.7	10.7	20.7			
Approach LOS	B			B			B	B	C			

Intersection Summary	
HCM Average Control Delay	14.1
HCM Level of Service	B
HCM Volume to Capacity ratio	0.50
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.5%
ICU Level of Service	G
Analysis Period (min)	15
Critical Lane Group	15

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2015 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.96	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Fpb, ped/bikes	0.95	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97
Fpb, ped/bikes	1.00	0.96	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1686	3268	1634	3410	3434	3410	3434	3410	1770	3345	1770	3345
Flt Permitted	0.25	1.00	0.37	1.00	0.58	1.00	0.58	1.00	0.95	1.00	0.95	1.00
Satd. Flow (pperm)	449	3268	640	3410	1993	3410	1993	3410	1770	3345	1770	3345
Volume (vph)	126	350	107	98	542	70	125	495	49	140	984	260
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	133	368	113	103	571	74	132	521	52	147	1036	274
RTOR Reduction (vph)	0	34	0	0	12	0	0	9	0	0	18	0
Lane Group Flow (vph)	133	447	0	103	633	0	0	696	0	147	1292	0
Confl. Peds. (#/hr)	72	137	137	72	72	72	72	58	58	58	58	92
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	4	8	8	8	5	2	2	1	1	6
Permitted Phases	4	8	8	25.3	25.3	25.3	35.7	35.7	10.5	50.7	50.7	50.7
Actuated Green, G (s)	25.3	25.3	25.3	25.3	25.3	25.3	36.2	36.2	11.0	51.2	51.2	51.2
Effective Green, g (s)	25.8	25.8	25.8	25.8	25.8	25.8	0.43	0.43	0.13	0.60	0.60	0.60
Actuated g/C Ratio	0.30	0.30	0.30	0.30	0.30	0.30	0.43	0.43	0.13	0.60	0.60	0.60
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grip Cap (vph)	136	992	194	1035	849	849	229	2015	0.08	0.39	0.39	0.39
v/s Ratio Prot	0.14	0.14	0.14	0.19	0.19	0.19	0.08	0.39	0.08	0.39	0.39	0.39
v/s Ratio Perm	0.30	0.45	0.16	0.53	0.61	0.61	0.64	0.64	0.64	0.64	0.64	0.64
v/c Ratio	0.98	0.45	0.53	0.61	0.61	0.61	0.64	0.64	0.64	0.64	0.64	0.64
Uniform Delay, d1	29.3	23.9	24.6	25.3	21.5	21.5	35.1	35.1	10.9	50.7	50.7	50.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.40	1.40	1.27	0.55	0.55	0.55
Incremental Delay, d2	69.4	0.1	1.4	0.8	5.9	5.9	3.3	3.3	1.1	7.2	7.2	7.2
Delay (s)	98.7	24.0	26.0	26.1	36.0	36.0	47.9	47.9	7.2	51.2	51.2	51.2
Level of Service	F	C	C	C	D	D	D	D	D	A	A	A
Approach Delay (s)	40.2	26.1	26.1	26.1	26.1	26.1	36.0	36.0	11.3	51.2	51.2	51.2
Approach LOS	D	C	C	C	C	C	D	D	B	A	A	A
Intersection Summary												
HCM Average Control Delay	24.4 HCM Level of Service C											
HCM Volume to Capacity ratio	0.86											
Actuated Cycle Length (s)	85.0 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	94.0% ICU Level of Service F											
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. 2015 AM + Commercial
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	0%	0%	0%	0%	0%	0%
Grade	10	33	715	10	20	1143
Volume (veh/h)	0.95	0.95	0.95	0.95	0.95	0.95
Peak Hour Factor	11	35	753	11	21	1203
Hourly flow rate (vph)	34	33	33	33	34	34
Pedestrians	12.0	12.0	12.0	12.0	12.0	12.0
Lane Width (ft)	4.0	4.0	4.0	4.0	4.0	4.0
Walking Speed (ft/s)	3	3	3	3	3	3
Percent Blockage	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	0.77	0.95	230	0.95	0.95	471
Upstream signal (ft)	1469	450	797	1469	450	797
pX, platoon unblocked	1092	360	728	1092	360	728
VC, conflicting volume	6.8	6.9	4.1	6.8	6.9	4.1
VC1, stage 1 conf vol	3.5	3.3	2.2	3.5	3.3	2.2
VC2, stage 2 conf vol	93	94	97	93	94	97
vCu, unblocked vol	147	568	801	147	568	801
tC, single (s)	45	502	261	45	502	261
tC, 2 stage (s)	11	0	21	11	0	21
tF (s)	35	0	11	35	0	11
p0 queue free %	341	1700	801	341	1700	801
cM capacity (veh/h)	0.13	0.30	0.15	0.03	0.35	0.35
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	45	502	261	21	602	602
Volume Left	11	0	0	21	0	0
Volume Right	34	1700	1700	0	1700	1700
cSH	0.13	0.30	0.15	0.03	0.35	0.35
Volume to Capacity	11	0	0	2	0	0
Queue Length 95th (ft)	17.2	0.0	0.0	9.6	0.0	0.0
Control Delay (s)	C	C	C	A	A	A
Lane LOS	C	C	C	A	A	A
Approach Delay (s)	17.2	0.0	0.0	0.2	0.2	0.2
Approach LOS	C	C	C	A	A	A
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	48.9% ICU Level of Service A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2015 AM + Commercial
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00
Fipb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Frt	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.95	1.00	0.95	1.00
Flt Protected	4996	1758	3469	1776	1730	1815						
Satd. Flow (prot)	0.83	0.41	1.00	0.55	0.55	0.40	1.00					
Flt Permitted	4183	758	3469	978	721	1815						
Satd. Flow (perm)	50	480	40	61	622	81	70	209	60	200	313	50
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	53	505	42	64	655	85	74	220	63	211	329	53
Adj. Flow (vph)	0	10	0	0	12	0	0	9	0	0	7	0
RTOR Reduction (vph)	0	590	0	64	728	0	0	348	0	211	375	0
Lane Group Flow (vph)	24	18	18	24	24	24	48	48	48	48	48	24
Conf. Peds. (#/hr)												
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2				6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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
Lane Grp Cap (vph)	2559	464	2122	288	2122	288	212	534				
v/s Ratio Prot	0.14	0.08		c0.21			c0.36	0.29			0.21	
v/s Ratio Perm	0.23	0.14	0.34				1.21	1.00	0.70		1.00	0.70
Uniform Delay, d1	7.5	7.0	8.1				30.0	29.9	26.7		26.7	
Progression Factor	1.00	1.00	1.00				1.00	1.00	1.00		1.00	
Incremental Delay, d2	0.2	0.6	0.4				121.4	60.6	7.5		34.2	
Delay (s)	7.7	7.6	8.5				151.4	90.6	34.2		34.2	
Level of Service	A	A	A				F	F	C		F	
Approach Delay (s)	7.7	8.5					151.4	54.3			54.3	
Approach LOS	A	A	A				F	D			D	
Intersection Summary												
HCM Average Control Delay	41.5											
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	100.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

2015 AM + Commercial
 1/21/2008

2015 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.98	0.97	0.97	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5025	4944	3400	3426	3426	3426	3426	3426	3426	3426	3426	3426
Flt Permitted	0.81	0.83	0.84	0.84	0.77	0.77	0.77	0.77	0.77	0.77	0.77	0.77
Satd. Flow (perm)	4087	4102	2867	2867	2666	2666	2666	2666	2666	2666	2666	2666
Volume (vph)	61	786	40	57	742	136	30	173	46	127	311	44
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	64	827	42	60	781	143	32	182	48	134	327	46
RTOR Reduction (vph)	0	6	0	0	30	0	0	24	0	0	10	0
Lane Group Flow (vph)	0	927	0	0	954	0	0	238	0	0	497	0
Confl. Peds. (#/hr)	17	19	19	19	17	12	16	16	16	16	16	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	2	2	2	6	6	6
Permitted Phases	4	50.0	50.0	50.0	51.5	20.5	0.26	0.26	0.26	5.5	5.5	683
Actuated Green, G (s)	51.5	0.64	0.64	0.64	5.5	5.5	735	0.08	0.32	0.73	0.73	19.0
Effective Green, g (s)	0.64	5.5	5.5	5.5	2641	2641	2641	0.23	0.36	6.6	6.6	27.2
Actuated g/C Ratio	5.5	0.23	0.36	0.36	0.74	1.26	1.00	1.00	1.00	1.2	1.2	6.5
Clearance Time (s)	2631	0.23	0.36	0.36	0.74	1.26	1.00	1.00	1.00	1.2	1.2	6.5
Lane Grp Cap (vph)	2631	0.23	0.36	0.36	0.74	1.26	1.00	1.00	1.00	1.2	1.2	6.5
v/s Ratio Prot	0.23	0.36	0.36	0.36	0.74	1.26	1.00	1.00	1.00	1.2	1.2	6.5
v/s Ratio Perm	0.35	6.6	6.6	6.6	24.1	24.1	24.1	0.74	1.26	1.00	1.00	6.5
v/c Ratio	0.74	1.26	1.00	1.00	1.2	1.2	6.5	5.2	8.7	8.7	25.3	19.4
Uniform Delay, d1	5.2	8.7	25.3	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4
Progression Factor	A	A	C	C	A	A	A	A	A	C	C	B
Incremental Delay, d2	5.2	8.7	25.3	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4
Delay (s)	5.2	8.7	25.3	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4
Level of Service	A	A	C	C	A	A	A	A	A	C	C	B
Approach Delay (s)	5.2	8.7	25.3	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4	19.4
Approach LOS	A	A	C	C	A	A	A	A	A	C	C	B
Intersection Summary												
HCM Average Control Delay	11.1 HCM Level of Service B											
HCM Volume to Capacity ratio	0.47											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	100.5% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

2015 AM + Commercial
 1/21/2008

2015 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.97	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	4953	4860	4860	1760	3424	1743	3409					
Flt Permitted	0.65	0.67	0.24	1.00	0.45	1.00						
Satd. Flow (perm)	3255	3287	445	3424	817	3409						
Volume (vph)	137	758	107	110	717	197	70	390	80	283	706	174
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	144	798	113	116	795	207	74	411	84	298	743	183
RTOR Reduction (vph)	0	21	0	0	74	0	0	13	0	0	17	0
Lane Group Flow (vph)	0	1034	0	0	1004	0	74	482	0	298	909	0
Conf. Peds. (#/hr)	40		9		pm+pt	40	25	31	31			25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	3	8	2	6							
Permitted Phases	4	8	2	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5	45.5
Actuated Green, G (s)	29.0	30.5	30.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5	46.5
Effective Green, g (s)	0.36	0.36	0.36	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55	0.55
Actuated g/C Ratio	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Vehicle Extension (s)	1168	1179	243	1873	447	1865						
Lane Grp Cap (vph)	c0.32	0.31	0.17	0.17	0.17	0.17	0.14	0.14	0.14	0.14	0.14	0.14
v/s Ratio Prot	0.89	0.85	0.30	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
v/s Ratio Perm	25.6	25.2	10.5	10.1	13.7	11.9						
Uniform Delay, d1	1.00	1.00	1.42	1.39	1.30	1.45						
Progression Factor	8.1	5.9	3.1	0.3	5.7	0.7						
Incremental Delay, d2	33.7	31.0	17.9	14.5	23.6	17.9						
Delay (s)	C	C	B	B	C	B						
Level of Service	33.7	31.0	17.9	14.5	23.6	17.9						
Approach Delay (s)	C	C	B	B	C	B						
Approach LOS	C	C	B	B	C	B						
Intersection Summary												
HCM Average Control Delay	25.7		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.75		Sum of lost time (s)		8.0							
Actuated Cycle Length (s)	85.0		ICU Level of Service		E							
Intersection Capacity Utilization	90.9%		Analysis Period (min)		15							
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2015 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.85	1.00	1.00	0.85	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4908	1770	4819	1770	3539	1511	1770	3539	1523	1770	3539	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (pbrm)	1770	4908	1770	4819	1770	3539	1511	1770	3539	1523	1770	3539	
Volume (vph)	160	896	141	150	759	280	110	302	110	310	1151	150	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	168	943	148	158	799	295	116	318	116	326	1212	158	
RTOR Reduction (vph)	0	17	0	0	56	0	0	0	0	51	0	0	
Lane Group Flow (vph)	168	1074	0	158	1038	0	116	318	65	326	1212	125	
Confl. Peds. (#/hr)			66			23			38			26	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	Prot	
Protected Phases	7	4		3	8		5	2	3	1	6	7	
Permitted Phases													
Actuated Green, G (s)	12.0	34.0		13.6	35.6		10.4	31.4	45.0	25.0	46.0	58.0	
Effective Green, g (s)	11.0	35.0		12.6	36.6		9.4	32.4	45.0	24.0	47.0	58.0	
Actuated g/C Ratio	0.09	0.29		0.10	0.31		0.08	0.27	0.38	0.20	0.39	0.48	
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	162	1432		186	1470		139	956	617	354	1386	787	
v/s Ratio Prot	c0.09	c0.22		0.09	0.22		0.07	0.09	0.01	c0.18	c0.34	0.01	
v/s Ratio Perm	1.04	0.75		0.85	0.71		0.83	0.33	0.11	0.92	0.87	0.16	
Uniform Delay, d1	54.5	38.5		52.8	36.9		54.5	35.1	24.4	47.1	33.8	17.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	80.8	3.7		27.6	2.9		31.8	0.9	0.0	28.3	7.9	0.0	
Delay (s)	135.3	42.2		80.4	39.8		86.3	36.1	24.4	75.3	41.7	17.4	
Level of Service	F	D		F	D		F	D	C	E	D	B	
Approach Delay (s)	54.6			44.9			44.2				45.9		
Approach LOS	D			D			D				D		
Intersection Summary													
HCM Average Control Delay	47.8											HCM Level of Service	D
HCM Volume to Capacity ratio	0.84												
Actuated Cycle Length (s)	120.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.5%											ICU Level of Service	E
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2015 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	0.93	0.93	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	
Fipb, ped/bikes	0.97	0.96	1.00	0.96	1.00	0.96	1.00	0.99	1.00	0.93	1.00	0.93	
Frt	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95	
Flt Protected	0.98	0.98	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1582	1582	1600	1600	1600	1663	3460	1645	3467	1645	3467	1645	
Flt Permitted	0.70	0.70	0.86	0.86	0.86	0.86	0.37	1.00	0.41	1.00	0.41	1.00	
Satd. Flow (pbrm)	1133	1133	1398	1398	1398	1398	643	3460	711	3467	711	3467	
Volume (vph)	44	30	40	50	60	70	60	556	40	32	648	42	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	46	32	42	53	63	74	63	585	42	34	682	44	
RTOR Reduction (vph)	0	27	0	0	32	0	0	4	0	0	4	0	
Lane Group Flow (vph)	0	93	0	0	158	0	63	623	0	34	722	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4			4			4			4		6	
Permitted Phases													
Actuated Green, G (s)	12.9			12.9			12.9			12.9		65.1	
Effective Green, g (s)	12.4			12.4			12.4			12.4		64.6	
Actuated g/C Ratio	0.15			0.15			0.15			0.15		0.76	
Clearance Time (s)	3.5			3.5			3.5			3.5		3.5	
Vehicle Extension (s)	2.0			2.0			2.0			2.0		2.0	
Lane Grp Cap (vph)	165			204			489	2630		540		2635	
v/s Ratio Prot	0.08			c0.11			0.10			0.05		c0.21	
v/s Ratio Perm	0.56			0.77			0.13			0.06		0.27	
Uniform Delay, d1	33.8			34.9			2.7			2.6		3.1	
Progression Factor	1.00			1.00			1.00			1.00		0.81	
Incremental Delay, d2	2.6			15.1			0.5			0.2		0.2	
Delay (s)	36.4			50.1			3.3			2.3		2.3	
Level of Service	D			D			A			A		A	
Approach Delay (s)	36.4			50.1			3.2			2.3		2.3	
Approach LOS	D			D			A			A		A	
Intersection Summary													
HCM Average Control Delay	10.1											HCM Level of Service	B
HCM Volume to Capacity ratio	0.35												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.8%											ICU Level of Service	A
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave. 2015 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.97	1.00	0.94	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Fllb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.95	1.00	0.95	1.00
Frt	1.00	0.97	1.00	0.96	1.00	0.96	1.00	0.98	1.00	0.96	1.00	0.96
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3347	1770	3196	1691	3449	1691	3449	1680	3220	1680	3220
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.27	1.00	0.48	1.00	0.48	1.00
Satd. Flow (perm)	1770	3347	1770	3196	484	3449	484	3449	847	3220	847	3220
Volume (vph)	260	400	100	70	370	142	70	354	40	91	527	210
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	421	105	74	389	149	74	373	42	96	555	221
RTOR Reduction (vph)	0	24	0	0	51	0	0	9	0	0	42	0
Lane Group Flow (vph)	274	502	0	74	487	0	74	406	0	96	734	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		3	8		2		2		6	
Actuated Green, G (s)	16.1	26.9		6.8	17.6		37.8		37.8		37.8	
Effective Green, g (s)	16.6	26.4		7.3	17.1		39.3		39.3		39.3	
Actuated g/C Ratio	0.20	0.31		0.09	0.20		0.46		0.46		0.46	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5		5.5		5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	346	1040		152	643		224		1595		392	
v/s Ratio Prot	c0.15	0.15		0.04	c0.15		0.12		0.12		c0.23	
v/s Ratio Perm	0.79	0.48		0.49	0.76		0.33		0.25		0.24	
Uniform Delay, d1	32.6	23.8		37.1	32.0		14.5		13.9		13.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2	11.0	0.1		0.9	4.5		3.9		0.4		1.5	
Delay (s)	43.5	23.9		38.0	36.5		18.4		14.3		15.3	
Level of Service	D	C		D	D		B		B		B	
Approach Delay (s)	30.6		C	36.7		D	14.9			B	16.9	
Approach LOS	C		C	D		D	B		B		B	
Intersection Summary												
HCM Average Control Delay	24.9 HCM Level of Service C											
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	85.0 Sum of lost time (s)											
Intersection Capacity Utilization	73.5% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave. 2015 AM + Commercial
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.91	1.00	1.00	1.00	1.00	0.98
Flt Protected	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1669	1770	3539	3485		
Flt Permitted	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1669	1770	3539	3485		
Volume (vph)	63	119	114	635	1067	122
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	66	125	120	668	1123	128
RTOR Reduction (vph)	81	0	0	0	7	0
Lane Group Flow (vph)	110	0	120	668	1244	0
Turn Type	Prot					
Protected Phases	2	3	8	4		
Permitted Phases						
Actuated Green, G (s)	21.2	9.1	55.8	42.7		
Effective Green, g (s)	21.2	9.1	55.8	42.7		
Actuated g/C Ratio	0.25	0.11	0.66	0.50		
Clearance Time (s)	4.0	4.0	4.0	4.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	416	189	2323	1751		
v/s Ratio Prot	c0.07	c0.07	0.19	c0.36		
v/s Ratio Perm	0.26	0.63	0.29	0.71		
Uniform Delay, d1	25.6	36.4	6.2	16.4		
Progression Factor	1.00	1.01	0.83	0.92		
Incremental Delay, d2	1.5	6.0	0.3	1.9		
Delay (s)	27.2	42.8	5.4	17.0		
Level of Service	C	D	A	B		
Approach Delay (s)	27.2		11.1	17.0		
Approach LOS	C		B	B		
Intersection Summary						
HCM Average Control Delay	15.8 HCM Level of Service B					
HCM Volume to Capacity ratio	0.57					
Actuated Cycle Length (s)	85.0 Sum of lost time (s)					
Intersection Capacity Utilization	60.5% ICU Level of Service B					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2015 PM + Commercial
 1/21/2008

2015 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	16
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.98	1.00
Flt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4929	1770	4969	1770	4969	2005	1998	1962	1919	1919	1919
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	0.54	1.00	1.00	1.00
Satd. Flow (perm)	1770	4929	1770	4969	1770	4969	271	1998	1114	1919	1919	1919
Volume (vph)	340	1232	180	90	1020	150	170	252	90	140	278	270
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	358	1297	189	95	1074	158	179	265	95	147	293	284
RTOR Reduction (vph)	0	20	0	0	20	0	0	14	0	0	39	0
Lane Group Flow (vph)	358	1466	0	95	1212	0	179	346	0	147	538	0
Confl. Peds. (#/hr)	32	32	32	4	12	4	12	24	24	24	24	12
Parking (#/hr)												
Turn Type	Prot	Prot	Prot	pm+pt	pm+pt	Perm						
Protected Phases	7	4	3	8	5	2						6
Permitted Phases							2					6
Actuated Green, G (s)	18.0	35.9	7.5	25.4	39.6	39.6	28.6	28.6	28.6	28.6	28.6	28.6
Effective Green, g (s)	18.0	35.9	7.5	25.4	40.1	40.1	29.1	29.1	29.1	29.1	29.1	29.1
Actuated g/C Ratio	0.19	0.38	0.08	0.27	0.43	0.43	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5
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
Lane Grp Cap (vph)	341	1893	142	1350	283	857	347	597				
v/s Ratio Prot	c0.20	0.30	0.05	c0.24	c0.06	0.17						c0.28
v/s Ratio Perm							0.21					0.13
v/c Ratio	1.05	0.77	0.67	0.90	0.63	0.40	0.42	0.40	0.42	0.40	0.42	0.90
Uniform Delay, d1	37.8	25.3	41.8	32.8	21.8	18.4	25.5	30.8				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	62.4	3.2	11.3	9.7	4.6	0.3	0.8	16.9				
Delay (s)	100.1	28.4	53.1	42.4	26.3	18.8	26.4	47.7				
Level of Service	F	C	D	D	C	B	C	C	D			
Approach Delay (s)	42.3		43.2		21.3		43.4					
Approach LOS	D		D		C		D					
Intersection Summary												
HCM Average Control Delay	40.2 HCM Level of Service D											
HCM Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	93.5 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	96.4% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

2015 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frb, ped/bikes	1.00	0.99	1.00	1.00	0.99	1.00	1.00	0.97	1.00	0.98	1.00	0.98	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.99	1.00	0.99	
Satd. Flow (prot)	3433	3456	1770	3308	1770	3308	1770	3325	1770	3413	1770	3413	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (iperm)	3433	3456	1770	3308	1770	3308	1770	3325	1770	3413	1770	3413	
Volume (vph)	460	880	82	120	510	290	90	911	260	220	682	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	484	926	86	126	537	305	95	959	274	232	718	63	
RTOR Reduction (vph)	0	7	0	0	79	0	0	27	0	0	0	7	
Lane Group Flow (vph)	484	1005	0	126	763	0	95	1206	0	232	774	0	
Confl. Peds. (#/hr)	15	48	48	48	15	123	48	48	48	48	48	123	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Actuated Green, G (s)	15.7	28.3	10.0	22.6	5.0	32.7	12.0	39.7					
Effective Green, g (s)	15.2	29.3	9.5	23.6	4.5	33.7	11.5	40.7					
Actuated g/C Ratio	0.15	0.29	0.10	0.24	0.04	0.34	0.12	0.41					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grip Cap (vph)	522	1013	168	781	80	1121	204	1389					
v/s Ratio Prot	c0.14	c0.29	0.07	0.23	0.05	c0.36	c0.13	0.23					
v/s Ratio Perm	0.93	0.99	0.75	0.98	1.19	1.08	1.14	0.56					
Uniform Delay, d1	41.9	35.2	44.1	37.9	47.8	33.1	44.2	22.7					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.22	0.74					
Incremental Delay, d2	22.3	26.2	15.3	26.1	159.7	49.9	98.6	1.3					
Delay (s)	64.2	61.4	59.4	64.0	207.4	83.0	152.5	18.2					
Level of Service	E	E	E	E	F	F	F	F					
Approach Delay (s)	62.3	E	63.4	E	91.9	F	49.0	D					
Approach LOS	E	E	E	E	F	F	F	D					
Intersection Summary													
HCM Average Control Delay	67.9											HCM Level of Service	E
HCM Volume to Capacity ratio	1.02												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.9%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 4: 47th St. & MLK Jr. Way

2015 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.86	0.86	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1611	1611	3433	3452	1611	1611	3433	3452	1611	1611	3433	3452	
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (iperm)	1611	1611	3433	3452	1611	1611	3433	3452	1611	1611	3433	3452	
Volume (vph)	0	0	10	0	0	0	10	419	306	1500	306	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	11	0	0	0	11	441	322	1579	322	63	
RTOR Reduction (vph)	0	11	0	0	0	0	0	20	0	0	0	0	
Lane Group Flow (vph)	0	0	0	0	0	0	0	754	0	1579	385	0	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases							2	2	1	6			
Actuated Green, G (s)								13.0	29.0	50.0			
Effective Green, g (s)								13.0	29.0	50.0			
Actuated g/C Ratio								0.26	0.58	1.00			
Clearance Time (s)								4.0	4.0	2.0			
Lane Grip Cap (vph)								817	1991	3452			
v/s Ratio Prot								c0.46	0.11				
v/s Ratio Perm								c0.24	0.92	0.79	0.11		
Uniform Delay, d1								18.0	8.2	0.0			
Progression Factor								0.73	1.00	1.00			
Incremental Delay, d2								16.6	3.3	0.1			
Delay (s)								29.8	11.5	0.1			
Level of Service								C	B	A			
Approach Delay (s)								29.8	9.3				
Approach LOS								A	C	A			
Intersection Summary													
HCM Average Control Delay	15.1											HCM Level of Service	B
HCM Volume to Capacity ratio	0.83												
Actuated Cycle Length (s)	50.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.8%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2015 PM + Commercial
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	4.0	1900	1900	4.0	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	0.95	1.00	0.95	0.99	1.00	0.99	0.99	0.99	0.99	0.99
Frbp, ped/bikes	0.97	0.97	0.97	1.00	0.98	0.99	1.00	0.99	0.99	0.99	0.99	0.99
Ft	0.97	0.97	0.96	0.96	0.98	0.99	1.00	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	1.00	0.99	1.00	3412	3442				
Satd. Flow (prot)	1695	1658	1658	3412	3412	3442						
Flt Permitted	0.88	0.88	0.92	0.92	0.93	0.93	3171	2843				
Satd. Flow (perm)	1518	1540	1540	3171	3171	2843						
Volume (vph)	30	50	21	50	100	70	33	575	80	50	276	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	53	22	53	105	74	35	605	84	53	291	21
RTOR Reduction (vph)	0	15	0	0	34	0	0	21	0	0	9	0
Lane Group Flow (vph)	0	92	0	0	198	0	0	704	0	0	356	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (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
Lane Grp Cap (vph)	516	516	524	524	524	524	1586	1422				
v/s Ratio Prot	0.06	0.06	c0.13	c0.13	c0.13	c0.13	c0.22	0.13				
v/s Ratio Perm	0.18	0.18	0.38	0.38	0.38	0.44	0.44	0.25				
v/c Ratio	11.6	11.6	12.5	12.5	12.5	8.0	8.0	7.1				
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Progression Factor	0.8	0.8	2.1	2.1	2.1	0.9	0.9	0.4				
Incremental Delay, d2	12.4	12.4	14.6	14.6	14.6	8.9	8.9	7.6				
Delay (s)	B	B	B	B	B	A	A	A				
Level of Service	B	B	B	B	B	A	A	A				
Approach Delay (s)	12.4	12.4	14.6	14.6	14.6	8.9	8.9	7.6				
Approach LOS	B	B	B	B	B	A	A	A				
Intersection Summary												
HCM Average Control Delay	9.8 HCM Level of Service A											
HCM Volume to Capacity ratio	0.42											
Actuated Cycle Length (s)	50.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	68.6% ICU Level of Service C											
Analysis Period (min)	15											
c Critical Lane Group	15											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	4.0	1900	1900	4.0	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	0.95	1.00	0.95	0.99	1.00	0.99	0.99	0.99	0.99	0.99
Frbp, ped/bikes	0.95	0.95	0.97	1.00	0.98	0.99	1.00	0.99	0.99	0.99	0.99	0.99
Ft	0.95	0.95	0.97	0.97	0.98	0.99	1.00	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.99	1.00	0.99	1.00	3465	4929				
Satd. Flow (prot)	1619	1680	1680	3465	3465	4929						
Flt Permitted	0.80	0.80	0.82	0.82	0.82	0.87	0.87	0.85				
Satd. Flow (perm)	1320	1399	1399	3013	3013	4195						
Volume (vph)	60	60	60	33	60	30	50	1523	65	30	971	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	63	63	35	63	32	53	1603	68	32	1022	74
RTOR Reduction (vph)	0	29	0	0	5	0	0	2	0	0	5	0
Lane Group Flow (vph)	0	160	0	0	125	0	0	1722	0	0	1123	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	6	6	6
Actuated Green, G (s)	12.1	12.1	12.1	12.1	12.1	12.1	58.9	58.9	58.9	58.9	58.9	58.9
Effective Green, g (s)	12.6	12.6	12.6	12.6	12.6	12.6	59.4	59.4	59.4	59.4	59.4	59.4
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.74	0.74	0.74	0.74	0.74	0.74
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	208	208	220	220	220	220	2237	3115				
v/s Ratio Prot	c0.12	c0.12	0.09	0.09	0.09	0.09	c0.57	0.27				
v/s Ratio Perm	0.77	0.77	0.57	0.57	0.57	0.77	0.77	0.36				
v/c Ratio	32.3	32.3	31.2	31.2	31.2	6.2	6.2	3.6				
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	14.8	14.8	2.0	2.0	2.0	2.6	2.6	0.3				
Delay (s)	47.1	47.1	33.2	33.2	33.2	8.8	8.8	3.9				
Level of Service	D	D	C	C	C	A	A	A				
Approach Delay (s)	47.1	47.1	33.2	33.2	33.2	8.8	8.8	3.9				
Approach LOS	D	D	C	C	C	A	A	A				
Intersection Summary												
HCM Average Control Delay	10.4 HCM Level of Service B											
HCM Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	104.7% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

1/21/2008 2015 PM + Commercial

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1761	3486	1766	3439	1738	1818	1764	1817	1764	1817	1764	1817
Flt Permitted	0.27	1.00	0.16	1.00	0.57	1.00	0.36	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	504	3486	297	3439	1050	1818	669	1817	669	1817	669	1817
Volume (vph)	40	835	80	56	582	105	130	391	65	105	200	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	879	84	59	613	111	137	412	68	111	211	32
RTOR Reduction (vph)	0	9	0	0	19	0	0	8	0	0	7	0
Lane Group Flow (vph)	42	954	0	59	705	0	137	473	0	111	236	0
Confl. Peds. (#/hr)	12	12	12	12	12	12	42	12	12	12	42	42
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		8	8	8	2	6	6	6	6	6	6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	202	1394	119	1376	525	909	335	909	335	909	335	909
v/s Ratio Prot	c0.27		c0.21			c0.26						
v/s Ratio Perm	0.08	0.20	0.20	0.51	0.26	0.52	0.33	0.26	0.33	0.26	0.33	0.26
v/c Ratio	0.21	0.68	0.50	0.51	0.26	0.52	0.33	0.26	0.33	0.26	0.33	0.26
Uniform Delay, d1	15.7	19.8	18.0	18.1	11.5	13.5	12.0	11.5	12.0	11.5	12.0	11.5
Progression Factor	1.00	1.00	1.77	1.91	1.72	1.78	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.3	2.7	11.5	1.1	0.4	0.7	2.6	0.7	2.6	0.7	2.6	0.7
Delay (s)	18.0	22.6	43.2	35.7	20.2	24.7	14.6	12.2	14.6	12.2	14.6	12.2
Level of Service	B	C	D	D	C	C	B	B	C	C	B	B
Approach Delay (s)	22.4	22.4	36.3	36.3	23.7	23.7	12.9	12.9	23.7	23.7	12.9	12.9
Approach LOS	C	C	D	D	C	C	B	B	C	C	B	B
Intersection Summary												
HCM Average Control Delay						25.4	HCM Level of Service					C
HCM Volume to Capacity ratio						0.59						
Actuated Cycle Length (s)						80.0	Sum of lost time (s)					8.0
Intersection Capacity Utilization						82.2%	ICU Level of Service					E
Analysis Period (min)						15						
c Critical Lane Group												

1/21/2008 2015 PM + Commercial

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1757	3471	1750	3485	1750	3485	1750	3485	1750	3485	1750	3485
Flt Permitted	0.21	1.00	0.16	1.00	0.16	1.00	0.81	1.00	0.81	1.00	0.87	1.00
Satd. Flow (perm)	386	3471	295	3485	2819	3485	2819	3485	2819	3485	3003	3485
Volume (vph)	50	924	80	64	653	58	100	283	57	33	180	40
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	953	82	66	673	60	103	292	59	34	186	41
RTOR Reduction (vph)	0	8	0	0	8	0	0	3	0	0	17	0
Lane Group Flow (vph)	52	1027	0	66	725	0	0	451	0	0	244	0
Confl. Peds. (#/hr)	24	78	78	78	24	8	24	8	24	8	6	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4		8	8	8	2	6	6	6	6	6	6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.59	0.59	0.59	0.59	0.59	0.59	0.59
Clearance 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
Lane Grp Cap (vph)	121	1085	92	1089	1656	1656	1656	1656	1656	1656	1784	1656
v/s Ratio Prot	c0.30		0.21			c0.16						
v/s Ratio Perm	0.13	0.22	0.22	0.67	0.27	0.27	0.14	0.14	0.27	0.14	0.27	0.14
v/c Ratio	0.43	0.95	0.72	0.67	0.27	0.27	0.14	0.14	0.27	0.14	0.27	0.14
Uniform Delay, d1	21.8	26.8	24.4	23.9	8.1	8.1	7.4	7.4	8.1	7.4	8.1	7.4
Progression Factor	0.49	0.51	0.88	0.86	1.01	1.01	1.00	1.00	1.01	1.00	1.01	1.00
Incremental Delay, d2	8.5	14.4	33.1	2.7	0.3	0.3	0.2	0.2	0.3	0.2	0.3	0.2
Delay (s)	19.2	28.1	54.5	23.3	8.5	8.5	7.6	7.6	8.5	7.6	8.5	7.6
Level of Service	B	C	D	C	A	A	A	A	A	A	A	A
Approach Delay (s)	27.6	27.6	25.9	25.9	8.5	8.5	7.6	7.6	8.5	7.6	8.5	7.6
Approach LOS	C	C	D	C	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay						21.7	HCM Level of Service					C
HCM Volume to Capacity ratio						0.51						
Actuated Cycle Length (s)						80.0	Sum of lost time (s)					8.0
Intersection Capacity Utilization						72.1%	ICU Level of Service					C
Analysis Period (min)						15						
c Critical Lane Group												

MacArthur BART TOD
WC06-2279
Fehr & Peers Associates, Inc.

MacArthur BART TOD
WC06-2279
Fehr & Peers Associates, Inc.

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2015 PM + Commercial
 1/21/2008

2015 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1766	3482	1766	3420	1766	3400	1766	3400	1766	3433	1766	3433
Flt Permitted	0.21	1.00	0.17	1.00	0.17	1.00	0.87	1.00	0.87	1.00	0.75	1.00
Satd. Flow (perm)	398	3482	314	3420	314	3420	2976	3420	2976	3420	2589	3420
Volume (vph)	70	900	84	119	710	165	65	403	111	81	226	40
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	71	909	85	120	717	167	66	407	112	82	228	40
RTOR Reduction (vph)	0	9	0	0	25	0	0	26	0	0	12	0
Lane Group Flow (vph)	71	985	0	120	859	0	0	559	0	0	338	0
Confl. Peds. (#/hr)	8	39	39	8	25	25	25	8	25	25	25	8
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	8	8	8	2	2	2	6	6	6
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	35.5	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	174	1523	137	1496	137	1496	1376	1376	1376	1197	1197	1197
v/s Ratio Prot	0.18	0.28	0.28	0.25	0.25	0.25	0.19	0.19	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.41	0.65	0.88	0.57	0.88	0.57	0.41	0.41	0.28	0.28	0.28	0.28
v/c Ratio	15.4	17.7	20.5	16.9	20.5	16.9	14.2	14.2	13.3	13.3	13.3	13.3
Uniform Delay, d1	0.97	1.03	1.00	1.00	1.00	1.00	1.36	1.36	1.00	1.00	1.00	1.00
Progression Factor	3.3	1.0	49.3	1.6	49.3	1.6	0.8	0.8	0.6	0.6	0.6	0.6
Incremental Delay, d2	18.2	19.2	69.8	18.5	69.8	18.5	20.1	20.1	13.9	13.9	13.9	13.9
Delay (s)	B	B	E	B	E	B	C	C	B	B	B	B
Level of Service	B	B	E	B	E	B	C	C	B	B	B	B
Approach Delay (s)	19.2	19.2	24.6	24.6	24.6	20.1	20.1	20.1	13.9	13.9	13.9	13.9
Approach LOS	B	B	C	C	C	C	C	C	B	B	B	B
Intersection Summary												
HCM Average Control Delay	20.6 HCM Level of Service C											
HCM Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	88.1% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2015 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.97
Lane Util. Factor	1.00	0.99	1.00	0.96	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.94	1.00	0.98	1.00	1.00	0.97	1.00	0.99	1.00	0.97	1.00	0.97
Frt	1.00	0.98	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.97
Satd. Flow (prot)	1657	3420	1734	3316	1770	3475	1770	3475	1770	3475	1770	3343
Flt Permitted	0.29	1.00	0.15	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (pperm)	506	3420	281	3316	1770	3475	1770	3475	1770	3475	1770	3343
Volume (vph)	219	734	109	55	497	110	226	1280	104	110	659	165
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	223	749	111	56	507	112	231	1306	106	112	672	168
RTOR Reduction (vph)	0	15	0	0	24	0	0	7	0	0	0	27
Lane Group Flow (vph)	223	845	0	56	595	0	231	1405	0	112	813	0
Confl. Peds. (#/hr)	94		86	86		94			40			111
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4		8	5	2							6
Permitted Phases	4		8	5	2							6
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	12.6	32.8		8.2	28.4		28.4
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	13.1	33.3		8.7	28.9		28.9
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.16	0.42		0.11	0.36		0.36
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5		4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		2.0
Lane Grip Cap (vph)	164	1112	91	1078	290	1446	192	1208				26.0
v/s Ratio Prot	0.25		0.18		c0.13	c0.40			0.06	0.24		
v/s Ratio Perm	c0.44		0.20		0.62	0.55	0.80	0.97	0.58	0.67		
v/c Ratio	1.36	0.76	0.62	0.55	22.8	22.2	32.2	22.9	33.9	21.6		
Uniform Delay, d1	27.0	24.2	22.8	22.2	1.00	1.00	1.04	1.12	1.00	1.00		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.04	1.12	1.00	1.00		
Incremental Delay, d2	196.1	2.8	8.4	0.3	10.4	15.1	2.9	3.0	2.9	3.0		
Delay (s)	223.1	27.0	31.2	22.6	44.0	40.7	36.8	24.6	36.8	24.6		
Level of Service	F	C	C	C	D	D	D	D	D	C		
Approach Delay (s)	67.4		23.3		41.1							
Approach LOS	E		C		D							
Intersection Summary												
HCM Average Control Delay	41.6	HCM Level of Service										
HCM Volume to Capacity ratio	1.06	D										
Actuated Cycle Length (s)	80.0	Sum of lost time (s)										
Intersection Capacity Utilization	88.8%	ICU Level of Service										
Analysis Period (min)	15	E										
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. 2015 PM + Commercial
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	41	1559	30	20	853
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	43	1641	32	21	898
Pedestrians	52		52		45	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4		4		4	
Right turn flare (veh)						
Median type	None		None		None	
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.81	0.76			0.76	
VC, conflicting volume	2252	933			1725	
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
vCu, unblocked vol	1911	593			1637	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	49	86			93	
cM capacity (veh/h)	41	313			284	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	64	1094	579	21	449	449
Volume Left	21	0	0	21	0	0
Volume Right	43	0	32	0	0	0
cSH	99	1700	1700	284	1700	1700
Volume to Capacity	0.65	0.64	0.34	0.07	0.26	0.26
Queue Length 95th (ft)	80	0	0	6	0	0
Control Delay (s)	92.1	0.0	0.0	18.7	0.0	0.0
Lane LOS	F	C	C	C	C	C
Approach Delay (s)	92.1	0.0	0.0	0.4		
Approach LOS	F					
Intersection Summary						
Average Delay	2.4					
Intersection Capacity Utilization	62.5%					
ICU Level of Service	B					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2015 PM + Commercial
 1/21/2008

2015 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Flt Protected	0.99	0.95	1.00	1.00	0.99	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	5018	1768	3397	1794	1764	1803	1764	1803	1764	1803	1764	1803
Flt Permitted	0.74	0.30	1.00	0.30	0.69	0.26	1.00	0.26	1.00	0.26	1.00	1.00
Satd. Flow (perm)	3716	556	3397	1254	480	1803	480	1803	556	3397	1254	480
Volume (vph)	110	698	30	93	667	201	80	375	90	70	276	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	712	31	95	681	205	82	383	92	71	282	51
RTOR Reduction (vph)	0	5	0	0	35	0	0	9	0	0	8	0
Lane Group Flow (vph)	0	850	0	95	851	0	0	548	0	71	325	0
Conf. Peds. (#/hr)	24	4	4	4	24	48	12	12	12	12	48	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	46.0	46.0	46.0	47.0	47.0	47.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31
Clearance 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
Lane Grp Cap (vph)	2183	327	1996	c0.25	392	150	563	150	563	327	1996	c0.25
v/s Ratio Prot												
v/s Ratio Perm	0.23	0.17	0.17	c0.44	0.15	0.15	0.44	0.15	0.15	0.15	0.15	0.15
v/c Ratio	0.39	0.29	0.43	1.40	0.47	0.58	1.40	0.47	0.58	0.47	0.58	0.47
Uniform Delay, d1	8.8	8.2	9.1	27.5	22.2	23.1	27.5	22.2	23.1	22.2	23.1	22.2
Progression Factor	1.00	1.69	1.77	1.00	0.79	0.79	1.00	0.79	0.79	0.79	0.79	0.79
Incremental Delay, d2	0.5	2.1	0.6	194.0	9.9	4.1	194.0	9.9	4.1	9.9	4.1	9.9
Delay (s)	9.4	16.0	16.7	221.5	27.4	22.2	221.5	27.4	22.2	27.4	22.2	27.4
Level of Service	A	B	B	F	C	C	F	C	C	C	C	C
Approach Delay (s)	9.4	16.6	16.6	221.5	23.1	23.1	221.5	23.1	23.1	23.1	23.1	23.1
Approach LOS	A	B	B	F	C	C	F	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	56.2											
HCM Level of Service	E											
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	139.8%											
ICU Level of Service	H											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.98	1.00
Flt Protected	0.99	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5006	4947	1770	1787	1764	1831	1770	1787	1764	1831	1770	1787
Flt Permitted	0.76	0.81	0.81	0.39	1.00	0.31	1.00	0.31	1.00	0.31	1.00	1.00
Satd. Flow (perm)	3804	4016	4016	729	1787	570	1787	570	1787	4016	4016	1831
Volume (vph)	80	608	40	83	770	153	60	237	76	70	234	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	640	42	87	811	161	63	249	80	74	246	32
RTOR Reduction (vph)	0	8	0	0	32	0	0	14	0	0	6	0
Lane Group Flow (vph)	0	758	0	0	1027	0	63	315	0	74	272	0
Conf. Peds. (#/hr)	12	12	12	12	12	12	6	6	6	6	6	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (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
Lane Grp Cap (vph)	2449	2585	187	458	146	469	2585	187	458	146	469	187
v/s Ratio Prot												
v/s Ratio Perm	0.20	0.31	0.31	0.40	0.34	0.69	0.13	0.13	0.13	0.13	0.13	0.13
v/c Ratio	0.31	0.31	0.31	0.40	0.34	0.69	0.13	0.13	0.13	0.13	0.13	0.13
Uniform Delay, d1	6.3	6.3	6.3	6.8	6.8	24.2	26.9	25.4	26.0	25.4	26.0	25.4
Progression Factor	1.27	2.01	2.01	1.00	1.00	1.00	1.14	1.14	1.14	1.14	1.14	1.14
Incremental Delay, d2	0.3	0.4	0.4	0.4	0.4	4.8	8.2	11.1	4.7	11.1	4.7	11.1
Delay (s)	8.3	14.1	14.1	14.1	14.1	29.0	35.0	40.0	34.5	40.0	34.5	40.0
Level of Service	A	B	B	C	C	D	D	D	D	D	D	D
Approach Delay (s)	8.3	14.1	14.1	14.1	14.1	34.1	35.7	35.7	35.7	35.7	35.7	35.7
Approach LOS	A	B	B	C	C	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	18.4											
HCM Level of Service	B											
HCM Volume to Capacity ratio	0.48											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	81.1%											
ICU Level of Service	D											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

2015 PM + Commercial
 1/21/2008

2015 PM + Commercial
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fp/b, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ft	0.99	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	5017	4906	3405	3405	3405	3405	3405	3405	3405	3405	3405	3405	
Flt Permitted	0.78	0.83	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	
Satd. Flow (perm)	3937	4103	2893	2893	2893	2893	2893	2893	2893	2893	2893	2893	
Volume (vph)	63	671	40	71	855	221	60	296	75	130	217	82	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Adj. Flow (vph)	64	678	40	72	864	223	61	299	76	131	219	83	
RTOR Reduction (vph)	0	7	0	0	50	0	0	22	0	0	26	0	
Lane Group Flow (vph)	0	775	0	0	1109	0	0	414	0	0	407	0	
Confl. Peds. (#/hr)	9	17	17	17	9	12	10	10	10	10	10	12	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4	
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6	
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0	
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	
Lane Grp Cap (vph)	2534	2641	2641	2641	2641	2641	690	690	690	690	690	690	
v/s Ratio Prot	0.20	0.27	0.27	0.27	0.27	0.27	0.15	0.15	0.15	0.18	0.18	0.18	
v/s Ratio Perm	0.31	0.42	0.42	0.42	0.42	0.42	0.60	0.60	0.60	0.72	0.72	0.72	
v/c Ratio	6.3	7.0	7.0	7.0	7.0	7.0	26.1	26.1	26.1	27.1	27.1	27.1	
Uniform Delay, d1	1.49	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.13	1.13	1.13	
Progression Factor	0.3	0.4	0.4	0.4	0.4	0.4	3.8	3.8	3.8	7.7	7.7	7.7	
Incremental Delay, d2	9.7	7.0	7.0	7.0	7.0	7.0	30.0	30.0	30.0	38.2	38.2	38.2	
Delay (s)	A	A	A	A	A	A	C	C	C	D	D	D	
Level of Service	A	A	A	A	A	A	C	C	C	D	D	D	
Approach Delay (s)	9.7	7.0	7.0	7.0	7.0	7.0	30.0	30.0	30.0	38.2	38.2	38.2	
Approach LOS	A	A	A	A	A	A	C	C	C	D	D	D	
Intersection Summary													
HCM Average Control Delay	16.1											HCM Level of Service	B
HCM Volume to Capacity ratio	0.51												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	114.4%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	
Fp/b, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ft	1.00	0.99	0.99	0.99	0.99	0.99	0.93	0.93	0.93	0.92	0.92	0.92	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.98	0.98	0.98	0.98	0.98	
Satd. Flow (prot)	5052	4975	4975	4975	4975	4975	1695	1695	1695	1608	1608	1608	
Flt Permitted	0.75	0.75	0.75	0.93	0.93	0.93	0.86	0.86	0.86	0.85	0.85	0.85	
Satd. Flow (perm)	3825	4623	4623	1493	1493	1493	1401	1401	1401	1401	1401	1401	
Volume (vph)	90	815	10	10	945	60	10	10	138	0	189	0	
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.96	0.96	0.95	0.95	0.95	0.96	0.96	0.96	
Adj. Flow (vph)	94	849	11	11	984	62	11	11	144	0	197	0	
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	8	0	0	0	
Lane Group Flow (vph)	0	953	0	0	1057	0	0	14	0	0	341	0	
Confl. Peds. (#/hr)	0	79	79	79	79	79	79	79	79	79	79	79	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	4	4	4	2	2	2	6	6	6	
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6	
Actuated Green, G (s)	49.3	49.3	49.3	49.3	49.3	49.3	22.7	22.7	22.7	22.7	22.7	22.7	
Effective Green, g (s)	0.62	0.62	0.62	0.62	0.62	0.62	0.28	0.28	0.28	0.28	0.28	0.28	
Actuated g/C Ratio	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Clearance Time (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	
Lane Grp Cap (vph)	2357	2849	2849	2849	2849	2849	424	424	424	398	398	398	
v/s Ratio Prot	0.25	0.25	0.23	0.23	0.23	0.23	0.01	0.01	0.01	0.24	0.24	0.24	
v/s Ratio Perm	0.40	0.40	0.37	0.37	0.37	0.37	0.03	0.03	0.03	0.86	0.86	0.86	
v/c Ratio	7.8	7.6	7.6	7.6	7.6	7.6	20.7	20.7	20.7	27.1	27.1	27.1	
Uniform Delay, d1	0.79	0.79	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	0.5	0.5	0.4	0.4	0.4	0.4	0.0	0.0	0.0	16.4	16.4	16.4	
Incremental Delay, d2	6.7	6.7	8.0	8.0	8.0	8.0	20.7	20.7	20.7	43.5	43.5	43.5	
Delay (s)	A	A	A	A	A	A	C	C	C	D	D	D	
Level of Service	A	A	A	A	A	A	C	C	C	D	D	D	
Approach Delay (s)	6.7	6.7	8.0	8.0	8.0	8.0	20.7	20.7	20.7	43.5	43.5	43.5	
Approach LOS	A	A	A	A	A	A	C	C	C	D	D	D	
Intersection Summary													
HCM Average Control Delay	12.7											HCM Level of Service	B
HCM Volume to Capacity ratio	0.55												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.7%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

MacArthur BART TOD
 WC06-2279
 Fehr & Peers Associates, Inc.

MacArthur BART TOD
 WC06-2279
 Fehr & Peers Associates, Inc.

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave. 2015 PM + Commercial 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Ft	0.99	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.98
Flt Protected	0.99	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99
Satd. Flow (prot)	4925	4756	4756	1748	3451	1745	3455					
Flt Permitted	0.67	0.76	0.76	0.29	1.00	0.14	1.00					
Satd. Flow (perm)	3351	3625	3625	534	3451	262	3455					
Volume (vph)	267	605	91	90	784	426	110	896	100	206	596	81
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	281	637	96	95	825	448	116	943	105	217	627	85
RTOR Reduction (vph)	0	9	0	0	6	0	0	7	0	0	9	0
Lane Group Flow (vph)	0	1005	0	0	1362	0	116	1041	0	217	703	0
Confl. Peds. (#/hr)	26	19	19	pm+pt	26	39	92	92	92	92	92	39

Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	3	8	2	2	6
Permitted Phases	4	8	8	2	2	6
Actuated Green, G (s)	37.8	37.8	37.8	34.4	34.4	34.4
Effective Green, g (s)	39.3	39.3	39.3	35.4	35.4	35.4
Actuated g/C Ratio	0.48	0.48	0.48	0.43	0.43	0.43
Clearance Time (s)	5.5	5.5	5.5	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	1592	1723	1723	229	1477	112
v/s Ratio Prot				0.30		0.20
v/s Ratio Perm	0.30	0.38	0.38	0.22	0.22	0.83
v/c Ratio	1.62dl	0.79	0.79	0.51	0.70	1.94
Uniform Delay, d1	16.3	18.2	18.2	17.3	19.4	23.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	2.4	2.4	7.8	2.8	452.8
Delay (s)	16.9	20.6	20.6	25.1	22.2	476.5
Level of Service	B	C	C	C	C	F
Approach Delay (s)	16.9	20.6	20.6	22.5	22.5	125.2
Approach LOS	B	C	C	C	C	F

Intersection Summary	
HCM Average Control Delay	42.0 HCM Level of Service D
HCM Volume to Capacity ratio	1.33
Actuated Cycle Length (s)	82.7 Sum of lost time (s) 8.0
Intersection Capacity Utilization	99.9% ICU Level of Service F
Analysis Period (min)	15
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St. 2015 PM + Commercial 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.99	0.94	0.98
Ft	0.99	0.99	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.95	0.92	0.92
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99	1.00	0.99	0.99
Satd. Flow (prot)	5020	5019	5019	1748	1406	1566						
Flt Permitted	0.84	0.78	0.78	0.81	1.00	0.92						
Satd. Flow (perm)	4230	3930	3930	1457	1406	1455						
Volume (vph)	40	862	39	100	1167	40	93	94	200	30	30	80
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	40	871	39	101	1179	40	94	95	202	30	30	81
RTOR Reduction (vph)	0	6	0	0	4	0	0	0	0	75	0	37
Lane Group Flow (vph)	0	944	0	0	1316	0	0	189	127	0	104	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100

Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	6
Permitted Phases	4	8	8	2	2	6
Actuated Green, G (s)	49.5	49.5	49.5	24.5	24.5	24.5
Effective Green, g (s)	48.5	48.5	48.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.29	0.29	0.29
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2564	2383	2383	428	413	427
v/s Ratio Prot				0.13	0.09	0.07
v/s Ratio Perm	0.22	0.37	0.37	0.55	0.44	0.31
v/c Ratio	8.0	9.3	9.3	22.9	21.9	21.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.4	0.9	0.9	3.3	1.9	1.4
Incremental Delay, d2	8.4	10.3	10.3	26.2	23.9	22.9
Delay (s)	A	B	B	C	C	C
Level of Service	A	B	B	25.0	22.9	22.9
Approach Delay (s)	8.4	10.3	10.3	25.0	22.9	22.9
Approach LOS	A	B	B	C	C	C

Intersection Summary	
HCM Average Control Delay	12.3 HCM Level of Service B
HCM Volume to Capacity ratio	0.52
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	108.2% ICU Level of Service G
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2015 PM + Commercial
 1/21/2008

2015 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.94	1.00	0.94	1.00	1.00	0.99	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.97	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	4917	1770	4885	1770	3539	1488	1770	3539	1497	1770	4917
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (pbrm)	1770	4917	1770	4885	1770	3539	1488	1770	3539	1497	1770	4917
Volume (vph)	200	759	103	110	937	240	230	851	180	380	423	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	799	108	116	986	253	242	896	189	400	445	116
RTOR Reduction (vph)	0	14	0	0	38	0	0	0	24	0	0	69
Lane Group Flow (vph)	211	893	0	116	1201	0	242	896	165	400	445	47
Confl. Peds. (#/hr)			81			22			50			43
Turn Type	Prot	Prot	Prot	Prot	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases												
Actuated Green, G (s)	12.0	34.0		12.0	34.0		21.0	33.0	45.0	25.0	37.0	49.0
Effective Green, g (s)	11.0	35.0		11.0	35.0		20.0	34.0	45.0	24.0	38.0	49.0
Actuated g/C Ratio	0.09	0.29		0.09	0.29		0.17	0.28	0.38	0.20	0.32	0.41
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	162	1434		162	1425		295	1003	608	354	1121	661
v/s Ratio Prot	c0.12	0.18		0.07	c0.25		0.14	c0.25	0.02	c0.23	c0.13	0.01
v/s Ratio Perm	1.30	0.62		0.72	0.84		0.82	0.89	0.27	1.13	0.40	0.07
Uniform Delay, d1	54.5	36.8		53.0	39.9		48.3	41.3	26.1	48.0	32.0	21.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	173.6	2.0		14.0	6.2		16.5	12.0	0.2	87.9	1.1	0.0
Delay (s)	228.1	38.8		67.0	46.2		64.7	53.3	26.3	135.9	33.1	21.7
Level of Service	F	D		E	D		E	D	C	F	C	C
Approach Delay (s)	74.6			47.9			51.5				74.5	
Approach LOS	E			D			D				E	
Intersection Summary												
HCM Average Control Delay	60.6											
HCM Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	120.0											
Sum of lost time (s)	20.0											
Intersection Capacity Utilization	92.9%											
ICU Level of Service	F											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave. 2015 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.97	1.00	0.94	1.00	0.94	1.00	0.99	1.00	0.94	1.00	0.94
Ftbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.97	1.00	0.97	1.00
Frt	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3340	1770	3162	1698	3476	1716	3134	1716	3134	1716	3134
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3340	1770	3162	1698	3476	1716	3134	1716	3134	1716	3134
Volume (vph)	140	420	110	70	440	193	170	658	50	128	525	300
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	429	112	71	449	197	173	671	51	131	536	306
RTOR Reduction (vph)	0	27	0	0	61	0	0	6	0	0	87	0
Lane Group Flow (vph)	143	514	0	71	585	0	173	716	0	131	755	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		2		2		6	
Actuated Green, G (s)	9.5	22.4		6.7	19.6		42.4		42.4		42.4	
Effective Green, g (s)	10.0	21.9		7.2	19.1		43.9		43.9		43.9	
Actuated g/C Ratio	0.12	0.26		0.08	0.22		0.52		0.52		0.52	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5		5.5		5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	208	861		150	711		243		1795		296	
v/s Ratio Prot	c0.08	c0.15		0.04	c0.18		0.21		0.21		0.24	
v/s Ratio Perm	0.69	0.60		0.47	0.82		0.71		0.40		0.44	
Uniform Delay, d1	36.0	27.7		37.1	31.3		15.7		12.5		12.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2	7.3	0.7		0.9	7.3		16.3		0.7		4.7	
Delay (s)	43.3	28.4		38.0	38.6		32.0		13.2		17.6	
Level of Service	D	C		D	D		C		B		B	
Approach Delay (s)	31.5			38.5			16.8				14.5	
Approach LOS	C			D			B				B	
Intersection Summary												
HCM Average Control Delay	24.0											
HCM Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	77.0%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave. 2015 PM + Commercial
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	1.00	0.95	0.95	0.95
Frt Protected	0.99	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1662	1770	3539	3461	1662	1770
Flt Permitted	0.99	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1662	1770	3539	3461	1662	1770
Volume (vph)	65	150	85	1515	702	121
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	68	158	89	1595	739	127
RTOR Reduction (vph)	127	0	0	0	12	0
Lane Group Flow (vph)	99	0	89	1595	854	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	15.5		7.3	56.5	45.2	
Effective Green, g (s)	15.5		7.3	56.5	45.2	
Actuated g/C Ratio	0.19		0.09	0.71	0.57	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	322		162	2499	1955	
v/s Ratio Prot	c0.06		0.05	c0.45	0.25	
v/s Ratio Perm	0.31		0.55	0.64	0.44	
Uniform Delay, d1	27.6		34.8	6.3	10.0	
Progression Factor	1.00		1.00	1.00	0.65	
Incremental Delay, d2	0.5		3.8	1.3	0.5	
Delay (s)	28.2		38.6	7.5	7.1	
Level of Service	C		D	A	A	
Approach Delay (s)	28.2		9.2	7.1	7.1	
Approach LOS	C		A	A	A	
Intersection Summary						
HCM Average Control Delay	10.1					
HCM Volume to Capacity ratio	0.57					
Actuated Cycle Length (s)	80.0					
Intersection Capacity Utilization	61.4%					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave. 2015 PM Commercial Mit 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3456	1770	3308	1770	3325	1770	3325	1770	3413	1770	3413
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3456	1770	3308	1770	3325	1770	3325	1770	3413	1770	3413
Volume (vph)	480	880	82	120	510	290	90	911	260	220	682	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	926	86	126	537	305	95	959	274	232	718	63
RTOR Reduction (vph)	0	7	0	0	79	0	0	26	0	0	6	0
Lane Group Flow (vph)	484	1005	0	126	763	0	95	1207	0	232	775	0
Confl. Peds. (#/hr)	15	48	48	15	123	48	48	48	48	48	48	123
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		5	2			1	6
Permitted Phases												
Actuated Green, G (s)	15.4	28.0	9.4	22.0	8.9	23.0	4.5	34.6	11.5	41.6	11.5	41.6
Effective Green, g (s)	14.9	29.0	8.9	23.0	8.9	23.0	4.5	34.6	11.5	41.6	11.5	41.6
Actuated g/C Ratio	0.15	0.29	0.09	0.23	0.09	0.23	0.04	0.35	0.12	0.42	0.12	0.42
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	512	1002	158	761	80	1150	80	1150	204	1420	204	1420
v/s Ratio Prot	c0.14	c0.29	0.07	0.23	0.07	0.23	0.05	c0.36	c0.13	0.23	c0.13	0.23
v/s Ratio Perm	0.95	1.00	0.80	1.00	0.80	1.00	1.19	1.05	1.14	0.55	1.14	0.55
Uniform Delay, d1	42.1	35.5	44.7	38.5	47.8	32.7	47.8	32.7	44.2	22.1	44.2	22.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.21	0.74	1.21	0.74
Incremental Delay, d2	26.2	29.1	22.3	33.2	159.7	40.5	159.7	40.5	98.6	1.2	98.6	1.2
Delay (s)	68.4	64.6	67.0	71.7	207.4	73.2	207.4	73.2	152.2	17.6	152.2	17.6
Level of Service	E	E	E	E	E	E	F	E	F	B	F	B
Approach Delay (s)	65.8		71.1		82.8		82.8		48.5		48.5	
Approach LOS	E		E		F		F		D		D	
Intersection Summary												
HCM Average Control Delay	67.9 HCM Level of Service E											
HCM Volume to Capacity ratio	1.01											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	96.9% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St. 2015 PM Commercial Mit 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.99
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fltb, ped/bikes	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.99	0.99	0.95	1.00	0.95	1.00	0.99	1.00	0.99	0.95	1.00	0.95
Satd. Flow (prot)	5018	1768	3396	1793	1793	3396	1793	1793	1763	1802	1763	1802
Flt Permitted	0.71	0.71	0.28	1.00	0.28	1.00	0.80	0.80	0.32	1.00	0.32	1.00
Satd. Flow (perm)	3603	3603	529	3396	529	3396	1449	1449	599	1802	599	1802
Volume (vph)	110	698	30	93	667	201	80	375	90	70	276	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	712	31	95	681	205	82	383	92	71	282	51
RTOR Reduction (vph)	0	4	0	0	32	0	0	8	0	0	7	0
Lane Group Flow (vph)	0	851	0	95	854	0	0	549	0	71	326	0
Confl. Peds. (#/hr)	24	4	4	4	4	4	24	48	12	12	48	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4		8	8		2	2			6	6
Permitted Phases												
Actuated Green, G (s)	46.0	46.0	46.0	46.0	46.0	46.0	34.0	34.0	34.0	34.0	34.0	34.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	35.0	35.0	35.0	35.0	35.0	35.0
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52	0.52	0.39	0.39	0.39	0.39	0.39	0.39
Clearance 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
Lane Grp Cap (vph)	1882	276	1773	c0.25	1773	c0.25	564	564	233	701	233	701
v/s Ratio Prot	0.24	0.18	0.18	0.34	0.48	0.34	c0.38	c0.38	0.12	0.18	0.12	0.18
v/s Ratio Perm	0.45	0.34	0.34	0.48	0.48	0.48	0.97	0.97	0.30	0.46	0.30	0.46
Uniform Delay, d1	13.4	12.5	13.7	12.5	13.7	12.5	27.0	27.0	19.1	20.5	19.1	20.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	3.4	0.9	3.4	0.9	3.4	31.9	31.9	3.3	2.2	3.3	2.2
Delay (s)	14.2	15.9	14.7	15.9	14.7	15.9	58.9	58.9	22.4	22.7	22.4	22.7
Level of Service	B	B	B	B	B	B	E	E	C	C	C	C
Approach Delay (s)	14.2		14.8		14.8		58.9		22.7		22.7	
Approach LOS	B		B		B		E		C		C	
Intersection Summary												
HCM Average Control Delay	24.5 HCM Level of Service C											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	139.8% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group												

**APPENDIX N:
YEAR 2030 PLUS COMMERCIAL ALTERNATIVE
INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2030 AM + Commercial
 1/21/2008

2030 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00
Flt Protected	0.95	1.00	0.97	1.00	0.98	1.00	0.97	1.00	0.94	1.00	0.95	1.00
Satd. Flow (prot)	1770	4896	1770	4953	1770	4953	2006	2035	1986	1953	1986	1953
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.10	1.00	0.42	1.00	0.42	1.00
Satd. Flow (perm)	1770	4896	1770	4953	1770	4953	201	2035	876	1953	876	1953
Volume (vph)	310	1003	232	120	1660	250	200	298	70	180	432	290
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	326	1056	244	126	1747	263	211	314	74	189	455	305
RTOR Reduction (vph)	0	30	0	0	16	0	0	7	0	0	0	20
Lane Group Flow (vph)	326	1270	0	126	1994	0	211	381	0	189	740	0
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm				
Protected Phases	7	4		3	8		5	2				6
Permitted Phases												
Actuated Green, G (s)	17.0	47.9		13.1	44.0		48.5	48.5		39.5		39.5
Effective Green, g (s)	17.0	47.9		13.1	44.0		49.0	49.0		40.0		40.0
Actuated g/C Ratio	0.14	0.40		0.11	0.37		0.41	0.41		0.33		0.33
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5		2.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	251	1954		193	1816		187	831		292		651
v/s Ratio Prot	c0.18	c0.26		0.07	c0.40		c0.07	0.19		c0.38		c0.38
v/c Ratio Perm							0.39			0.22		
Uniform Delay, d1	1.30	0.65		0.65	1.10		1.13	0.46		0.65		1.14
Progression Factor	1.00	1.00		0.89	1.32		0.89	1.00		1.00		1.00
Incremental Delay, d2	160.6	1.7		0.7	45.0		104.5	0.4		4.9		79.3
Delay (s)	212.1	30.9		46.5	95.0		163.2	26.2		38.9		119.3
Level of Service	F	C		D	F		F	C		D		F
Approach Delay (s)	67.3			92.1			74.5			103.3		
Approach LOS	E			F			E			F		F
Intersection Summary												
HCM Average Control Delay	84.5											
HCM Volume to Capacity ratio	1.16											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	120.2%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
 4: 47th St. & MLK Jr. Way

2030 AM + Commercial
 1/21/2008

2030 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	
Fllb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.96	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3417	1770	3370	1770	3391	1770	3391	1770	3393	1770	3393	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3417	1770	3370	1770	3391	1770	3391	1770	3393	1770	3393	
Volume (vph)	460	650	113	140	820	320	120	671	140	320	1190	220	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	479	677	118	146	854	333	125	699	146	333	1229	229	
RTOR Reduction (vph)	0	12	0	0	34	0	0	15	0	0	13	0	
Lane Group Flow (vph)	479	783	0	146	1153	0	125	830	0	333	1445	0	
Confl. Peds. (#/hr)	6	24	24	24	6	36	28	28	28	28	28	36	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Actuated Green, G (s)	15.5	36.8	12.7	34.0	8.5	30.6	22.9	45.0					
Effective Green, g (s)	15.0	37.8	12.2	35.0	8.0	31.6	22.4	46.0					
Actuated g/C Ratio	0.12	0.31	0.10	0.29	0.07	0.26	0.19	0.38					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grp Cap (vph)	429	1076	180	983	118	893	330	1301					
v/s Ratio Prot	c0.14	c0.23	0.08	c0.34	0.07	0.24	c0.19	c0.43					
v/s Ratio Perm	1.12	0.73	0.81	1.17	1.06	0.93	1.01	1.11					
Uniform Delay, d1	52.5	36.5	52.8	42.5	56.0	43.1	48.8	37.0					
Progression Factor	0.82	0.82	1.00	1.00	1.00	1.00	1.25	0.80					
Incremental Delay, d2	74.5	1.7	22.4	88.7	99.7	17.3	17.1	51.0					
Delay (s)	117.5	31.5	75.1	131.2	155.7	60.4	78.1	80.8					
Level of Service	F	C	E	F	F	E	E	F					
Approach Delay (s)	63.9	E	E	125.1	F	72.7	E	80.3					
Approach LOS	E	E	E	F	F	E	E	F					
Intersection Summary													
HCM Average Control Delay	86.1											HCM Level of Service	F
HCM Volume to Capacity ratio	1.17												
Actuated Cycle Length (s)	120.0											Sum of lost time (s)	20.0
Intersection Capacity Utilization	106.3%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2030 AM + Commercial
 1/21/2008

2030 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.97	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.98	0.98	0.94	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Frt	0.98	0.98	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1705	1606	3389	3476								
Satd. Flow (prot)	0.84	0.88	0.87	0.87	0.88	0.88	0.87	0.87	0.88	0.88	0.88	0.88
Satd. Flow (perm)	1453	1426	2945	3058								
Volume (vph)	80	100	34	60	70	110	41	506	90	60	799	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	105	36	63	74	116	43	533	95	63	841	42
RTOR Reduction (vph)	0	15	0	0	68	0	0	30	0	0	7	0
Lane Group Flow (vph)	0	210	0	0	185	0	0	641	0	0	939	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	8	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.33	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (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
Lane Grp Cap (vph)	484	475	475	475	475	475	1440	1440	1440	1440	1495	1495
v/s Ratio Prot	c0.14	0.13	0.13	0.13	0.13	0.13	0.22	0.22	0.22	0.22	c0.31	c0.31
v/c Ratio	0.43	0.39	0.39	0.39	0.39	0.39	0.45	0.45	0.45	0.45	0.63	0.63
Uniform Delay, d1	11.7	11.5	11.5	11.5	11.5	11.5	7.5	7.5	7.5	7.5	8.5	8.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.8	2.4	2.4	2.4	2.4	2.4	1.0	1.0	1.0	1.0	2.0	2.0
Delay (s)	14.5	13.9	13.9	13.9	13.9	13.9	8.5	8.5	8.5	8.5	10.5	10.5
Level of Service	B	B	B	B	B	B	A	A	A	A	B	B
Approach Delay (s)	14.5	13.9	13.9	13.9	13.9	13.9	8.5	8.5	8.5	8.5	10.5	10.5
Approach LOS	B	B	B	B	B	B	A	A	A	A	B	B
Intersection Summary												
HCM Average Control Delay	10.7 HCM Level of Service B											
HCM Volume to Capacity ratio	0.55											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	73.8% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2030 AM + Commercial
1/21/2008

2030 AM + Commercial
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.99	1.00	1.00
Ft	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3375	1764	3454	1768	3454	1768	1830	1745	1815	1745	1815
Flt Permitted	0.17	1.00	0.18	1.00	0.24	1.00	0.24	1.00	0.44	1.00	0.44	1.00
Satd. Flow (perm)	324	3375	328	3454	449	1830	449	1830	815	1815	815	1815
Volume (vph)	180	521	190	93	934	114	160	381	39	206	600	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	548	200	98	983	120	168	401	41	217	632	116
RTOR Reduction (vph)	0	46	0	0	11	0	0	5	0	0	3	0
Lane Group Flow (vph)	189	702	0	98	1092	0	168	437	0	217	745	0
Confl. Peds. (#/hr)	30	12	12	12	30	6	30	6	54	54	30	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	93	970	94	993	275	1121	275	1121	499	1112	499	1112
v/s Ratio Prot	c0.21			0.32			0.24			c0.41		
v/s Ratio Perm	c0.58			0.30			0.37			0.27		
v/c Ratio	2.03	0.72	1.04	1.10	0.61	0.39	0.61	0.39	0.43	0.67	0.43	0.67
Uniform Delay, d1	28.5	25.6	28.5	28.5	28.5	28.5	9.6	7.9	8.2	10.2	8.2	10.2
Progression Factor	1.00	1.00	0.88	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	499.9	4.7	93.8	57.0	9.7	1.0	2.7	3.2	2.7	3.2	2.7	3.2
Delay (s)	528.4	30.3	118.9	82.4	19.3	8.9	10.9	13.4	10.9	13.4	10.9	13.4
Level of Service	F	C	F	F	F	F	B	A	B	B	B	B
Approach Delay (s)	130.8			85.3			11.8			12.9		
Approach LOS	F			F			F			B		B

Intersection Summary	
HCM Average Control Delay	65.9
HCM Level of Service	E
HCM Volume to Capacity ratio	1.10
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	104.5%
ICU Level of Service	G
Analysis Period (min)	15
c Critical Lane Group	

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Synchro 6 Report
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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.99	1.00	1.00
Ft	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1766	3413	1750	3496	1750	3496	1750	3395	3395	3426	3426	3426
Flt Permitted	0.16	1.00	0.29	1.00	0.29	1.00	0.65	1.00	0.65	1.00	0.69	1.00
Satd. Flow (perm)	298	3413	542	3496	542	3496	2228	2228	2228	2397	2397	2397
Volume (vph)	80	586	130	71	961	73	120	281	79	130	380	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	617	137	75	1012	77	126	296	83	137	400	74
RTOR Reduction (vph)	0	24	0	0	7	0	0	21	0	0	14	0
Lane Group Flow (vph)	84	730	0	75	1082	0	0	484	0	0	597	0
Confl. Peds. (#/hr)	18	18	54	54	18	4	18	4	18	18	18	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	38.0	32.0			32.0		32.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	33.0			33.0		33.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.41			0.41		0.41
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0		5.0
Lane Grp Cap (vph)	145	1664	264	1704	264	1704	919			989		989
v/s Ratio Prot	0.21			c0.31			0.22			c0.25		
v/s Ratio Perm	0.58			0.28			0.53			0.60		
v/c Ratio	14.6	13.4	12.2	15.2	12.2	15.2	17.6			18.4		
Uniform Delay, d1	0.97	0.90	1.33	1.42	0.97	0.90	0.56			1.00		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00			1.00		
Incremental Delay, d2	12.7	0.7	2.1	1.5	12.7	0.7	1.4			2.7		
Delay (s)	26.9	12.8	18.4	23.1	26.9	12.8	11.3			21.1		
Level of Service	C	B	B	C	C	B	B			C		
Approach Delay (s)	14.2			22.8			11.3			21.1		
Approach LOS	B			C			B			C		

Intersection Summary	
HCM Average Control Delay	18.3
HCM Level of Service	B
HCM Volume to Capacity ratio	0.62
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.4%
ICU Level of Service	D
Analysis Period (min)	15
c Critical Lane Group	

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HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2030 AM + Commercial
 1/21/2008

2030 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ft	1.00	0.99	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.98	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	
Satd. Flow (prot)	1766	3481	1747	3457	3366	3423	3366	3423	3366	3423	3366	3423	
Flt Permitted	0.16	1.00	0.29	1.00	0.29	1.00	0.79	1.00	0.79	1.00	0.73	1.00	
Satd. Flow (perm)	294	3481	530	3457	2893	2511	2893	2511	2893	2511	2893	2511	
Volume (vph)	50	693	61	125	946	139	49	248	92	157	476	80	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	52	722	64	130	985	145	51	258	96	164	496	83	
RTOR Reduction (vph)	0	8	0	0	15	0	0	37	0	0	12	0	
Lane Group Flow (vph)	52	778	0	130	1115	0	0	368	0	0	731	0	
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4			8			2			6			
Permitted Phases	4			8			2			6			
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	31.0	31.0	31.0	
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	30.9	30.9	30.9	
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39	
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	151	1784	272	1772	1044	973							
v/s Ratio Prot	0.22			c0.32									
v/s Ratio Perm	0.18	0.22	0.25	0.25	0.14	0.14	0.35	0.35	0.29	0.29	0.29	0.29	
v/c Ratio	0.34	0.44	0.48	0.63	0.48	0.63	0.35	0.35	0.75	0.75	0.75	0.75	
Uniform Delay, d1	11.5	12.2	12.6	14.0	17.4	17.4	21.2	21.2	21.2	21.2	21.2	21.2	
Progression Factor	1.21	1.20	1.00	1.00	0.64	0.64	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	5.5	0.7	5.9	1.7	0.9	0.9	5.3	5.3	5.3	5.3	5.3	5.3	
Delay (s)	19.4	15.4	18.5	15.7	11.9	11.9	26.5	26.5	26.5	26.5	26.5	26.5	
Level of Service	B	B	B	B	B	B	C	C	C	C	C	C	
Approach Delay (s)	15.7			16.0			11.9	11.9	26.5	26.5	26.5	26.5	
Approach LOS	B			B			B	B	C	C	C	C	
Intersection Summary													
HCM Average Control Delay	17.8											HCM Level of Service	B
HCM Volume to Capacity ratio	0.68												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	103.6%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ft	0.98	1.00	1.00	0.96	1.00	1.00	0.96	1.00	
Flt Protected	1.00	0.95	1.00	0.96	1.00	0.96	1.00	0.96	
Satd. Flow (prot)	3233	1770	3539	1733	3233	1770	3539	1733	
Flt Permitted	1.00	0.95	1.00	0.96	1.00	0.96	1.00	0.96	
Satd. Flow (perm)	3233	1770	3539	1733	3233	1770	3539	1733	
Volume (vph)	793	151	88	1099	111	40			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	835	159	93	1157	117	42			
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	994	0	93	1157	159	0			
Confl. Peds. (#/hr)	146	266							
Turn Type	Prot			Prot					
Protected Phases	4			3		8		2	
Permitted Phases	4			3		8		2	
Actuated Green, G (s)	52.9	8.6	65.5	11.5					
Effective Green, g (s)	52.9	8.6	65.5	11.5					
Actuated g/C Ratio	0.62	0.10	0.77	0.14					
Clearance Time (s)	4.0	4.0	4.0	4.0					
Vehicle Extension (s)	3.0	3.0	3.0	3.0					
Lane Grp Cap (vph)	2012	179	2727	234					
v/s Ratio Prot	c0.31		c0.05	0.33					
v/s Ratio Perm	0.49	0.52	0.42	0.68					
v/c Ratio	0.85	0.85	1.80	0.88					
Uniform Delay, d1	8.8	36.2	3.3	35.0					
Progression Factor	1.00	0.85	1.80	0.88					
Incremental Delay, d2	0.9	1.0	0.2	7.2					
Delay (s)	9.6	31.9	6.2	37.8					
Level of Service	A	C	A	D					
Approach Delay (s)	9.6		8.1	37.8					
Approach LOS	A		A	D					
Intersection Summary									
HCM Average Control Delay	10.7							HCM Level of Service	B
HCM Volume to Capacity ratio	0.53								
Actuated Cycle Length (s)	85.0							Sum of lost time (s)	12.0
Intersection Capacity Utilization	51.3%							ICU Level of Service	A
Analysis Period (min)	15								
c Critical Lane Group									

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2030 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Lane Util. Factor	1.00	0.93	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Fipb, ped/bikes	0.97	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	0.94	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1721	3096	1690	3416	1770	3437	1770	3437	1770	3361	1770	3361	
Flt Permitted	0.15	1.00	0.21	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (iperm)	279	3096	366	3416	1770	3437	1770	3437	1770	3361	1770	3361	
Volume (vph)	146	420	267	128	732	90	135	505	59	100	1354	320	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	154	442	281	135	771	95	142	532	62	105	1425	337	
RTOR Reduction (vph)	0	119	0	0	11	0	0	9	0	0	23	0	
Lane Group Flow (vph)	154	604	0	135	855	0	142	585	0	105	1739	0	
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	58	92	
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	4	8	8	5	2	2	1	6	1	6	1	6	
Permitted Phases	4	8	8	5	2	2	1	6	1	6	1	6	
Actuated Green, G (s)	25.5	25.5	25.5	25.5	10.7	37.9	8.1	35.3	8.1	35.3	8.1	35.3	
Effective Green, g (s)	26.0	26.0	26.0	26.0	11.2	38.4	8.6	35.8	8.6	35.8	8.6	35.8	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.13	0.45	0.10	0.42	0.10	0.42	0.10	0.42	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grip Cap (vph)	85	947	112	1045	233	1553	179	1416	179	1416	179	1416	
v/s Ratio Prot	0.20	0.25	0.25	c0.08	c0.17	0.06	c0.52	0.06	c0.52	0.06	c0.52	0.06	
v/s Ratio Perm	c0.55	0.37	0.37	0.61	0.38	0.59	1.23	0.59	1.23	0.59	1.23	0.59	
v/c Ratio	1.81	0.64	1.21	0.82	0.61	0.38	0.59	1.23	0.59	1.23	0.59	1.23	
Uniform Delay, d1	29.5	25.4	29.5	27.3	34.8	15.4	36.5	24.6	36.5	24.6	36.5	24.6	
Progression Factor	0.71	0.56	1.00	1.00	0.95	1.32	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	403.1	0.9	150.4	4.8	3.0	0.7	3.1	109.2	3.1	109.2	3.1	109.2	
Delay (s)	424.1	15.2	179.9	32.1	36.1	21.0	39.6	133.8	39.6	133.8	39.6	133.8	
Level of Service	F	B	F	C	D	C	D	F	D	F	D	F	
Approach Delay (s)	87.0	F	52.1	D	24.0	C	128.5	F	24.0	C	128.5	F	
Approach LOS	F	B	F	C	D	C	D	F	D	F	D	F	
Intersection Summary													
HCM Average Control Delay	86.1											HCM Level of Service	F
HCM Volume to Capacity ratio	1.41												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	101.3%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. 2030 AM + Commercial
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	33	746	20	20	1706
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	35	785	21	21	1796
Pedestrians	34	33				34
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	3	3	3	3	3	3
Right turn flare (veh)						
Median type	None	None	None	None	None	None
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.56	0.90				0.90
VC, conflicting volume	1803	471				840
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
vCu, unblocked vol	1130	310				718
tC, single (s)	6.8	6.9				4.1
tC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	79	94				97
cM capacity (veh/h)	101	586				773
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	56	524	283	21	898	898
Volume Left	21	0	0	21	0	0
Volume Right	35	0	21	0	0	0
cSH	208	1700	1700	773	1700	1700
Volume to Capacity	0.27	0.31	0.17	0.03	0.53	0.53
Queue Length 95th (ft)	26	0	0	2	0	0
Control Delay (s)	28.5	0.0	0.0	9.8	0.0	0.0
Lane LOS	D	A	A	A	A	A
Approach Delay (s)	28.5	0.0	0.1			
Approach LOS	D					
Intersection Summary						
Average Delay	0.7					
Intersection Capacity Utilization	64.5%					
ICU Level of Service	C					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2030 AM + Commercial
1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	1.00
Ft	0.99	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.96	1.00	0.96	1.00
Flt Protected	0.99	0.95	1.00	0.95	1.00	0.99	0.99	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4982	1764	3448	1764	3448	1753	1734	1763				
Flt Permitted	0.65	0.24	1.00	0.24	1.00	0.10	0.10	0.39	1.00	0.39	1.00	1.00
Satd. Flow (perm)	3271	447	3448	447	3448	179	708	1763				
Volume (vph)	210	720	50	71	1092	191	100	189	90	200	493	200
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	758	53	75	1149	201	105	199	95	211	519	211
RTOR Reduction (vph)	0	7	0	0	17	0	0	13	0	0	17	0
Lane Group Flow (vph)	0	1025	0	75	1333	0	0	386	0	211	713	0
Confl. Peds. (#/hr)	24	18	18	18	24	24	24	48	48	48	48	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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
Lane Grp Cap (vph)	2001	273	2109	273	2109	53	208	519		208	519	
v/s Ratio Prot				c0.39								0.40
v/s Ratio Perm	0.31	0.17	0.17	0.63	0.17	0.17	c2.15	0.30	0.30	0.30	0.30	0.40
v/c Ratio	1.39d1	0.27	0.63	0.27	0.63	0.27	7.28	1.01	1.37	1.01	1.37	1.37
Uniform Delay, d1	9.3	7.7	10.4	7.7	10.4	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	2.5	1.5	2.5	1.5	2862.7	66.2	180.2	66.2	180.2	66.2	180.2
Delay (s)	10.3	10.2	11.9	10.2	11.9	2892.7	96.2	210.2	96.2	210.2	96.2	210.2
Level of Service	B	B	B	B	B	F	F	F	F	F	F	F
Approach Delay (s)	10.3			11.8			2892.7			184.6		
Approach LOS	B			B			F			F		F

Intersection Summary			
HCM Average Control Delay	356.9	HCM Level of Service	F
HCM Volume to Capacity ratio	2.80		
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	159.0%	ICU Level of Service	H
Analysis Period (min)	15		
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2030 AM + Commercial
1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Flt Protected	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	5034	5008	5008	1762	1801	1762	1801	1770	1801	1770	1801	1801
Flt Permitted	0.74	0.81	0.81	0.20	1.00	0.20	1.00	0.20	1.00	0.20	1.00	1.00
Satd. Flow (perm)	3729	4054	4054	362	1801	362	1801	363	1801	363	1801	1801
Volume (vph)	80	920	30	71	1184	111	70	309	87	150	361	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	968	32	75	1246	117	74	325	92	158	380	84
RTOR Reduction (vph)	0	4	0	0	13	0	0	13	0	0	10	0
Lane Group Flow (vph)	0	1080	0	0	1425	0	74	404	0	158	454	0
Confl. Peds. (#/hr)	18	18	18	18	12	12	12	12	12	12	12	18
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2401	2610	2610	93	462	93	462	93	462	93	462	2401
v/s Ratio Prot							0.20	0.20	0.20	0.20	0.20	0.25
v/s Ratio Perm	0.29	0.45	0.45	0.55	0.55	0.55	0.80	0.88	0.88	0.88	0.88	0.98
Uniform Delay, d1	7.1	7.8	7.8	27.8	28.5	27.8	28.5	29.8	29.6	29.8	29.6	29.6
Progression Factor	1.00	1.00	1.00	0.56	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	0.7	0.7	49.1	20.1	49.1	20.1	350.9	35.0	350.9	35.0	35.0
Delay (s)	7.8	7.8	7.8	5.0	48.6	5.0	48.6	385.8	69.9	385.8	69.9	69.9
Level of Service	A	A	A	A	D	A	D	F	F	F	F	F
Approach Delay (s)	7.8			5.0			52.9			150.1		
Approach LOS	A			A			D			F		F

Intersection Summary			
HCM Average Control Delay	37.1	HCM Level of Service	D
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

2030 AM + Commercial
 1/21/2008

2030 AM + Commercial
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5022	4988	3404	3432	3432	3432	3432	3432	3432	3432	3432	3432
Flt Permitted	0.75	0.80	0.70	0.80	0.80	0.80	0.70	0.80	0.80	0.80	0.80	0.80
Satd. Flow (perm)	3784	4020	2386	2766	2766	2766	2386	2766	2766	2766	2766	2766
Volume (vph)	71	1036	60	67	1262	146	40	183	46	107	461	74
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	75	1091	63	71	1328	154	42	193	48	113	485	78
RTOR Reduction (vph)	0	7	0	0	17	0	0	22	0	0	13	0
Lane Group Flow (vph)	0	1222	0	0	1536	0	0	261	0	0	663	0
Conf. Peds. (#/hr)	17	19	19	19	17	12	16	16	16	16	16	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5	51.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2436	2588	611	611	2588	611	611	2588	611	611	2588	611
v/s Ratio Prot	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
v/s Ratio Perm	0.50	0.59	0.43	0.43	0.59	0.43	0.43	0.59	0.43	0.43	0.59	0.43
v/c Ratio	7.5	8.2	24.9	24.9	8.2	24.9	24.9	8.2	24.9	24.9	8.2	24.9
Uniform Delay, d1	0.65	1.00	1.00	1.00	0.65	1.00	1.00	1.00	0.65	1.00	1.00	1.00
Progression Factor	0.6	1.0	2.2	2.2	0.6	1.0	2.2	2.2	0.6	1.0	2.2	2.2
Incremental Delay, d2	5.5	9.2	27.0	27.0	5.5	9.2	27.0	27.0	5.5	9.2	27.0	27.0
Delay (s)	A	A	C	C	A	A	C	C	A	A	C	C
Level of Service	A	A	C	C	A	A	C	C	A	A	C	C
Approach Delay (s)	5.5	9.2	27.0	27.0	5.5	9.2	27.0	27.0	5.5	9.2	27.0	27.0
Approach LOS	A	A	C	C	A	A	C	C	A	A	C	C
Intersection Summary												
HCM Average Control Delay	13.9 HCM Level of Service B											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	120.6% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group	15											

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5073	4942	1695	1695	4942	1695	1695	4942	1695	1695	4942	1695
Flt Permitted	0.86	0.93	0.88	0.88	0.93	0.88	0.88	0.93	0.88	0.88	0.93	0.88
Satd. Flow (perm)	4359	4583	1530	1530	4583	1530	1530	4583	1530	1530	4583	1530
Volume (vph)	31	1268	10	10	1403	100	10	10	54	10	54	0
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	33	1335	11	11	1477	105	11	11	57	11	57	0
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	9	0	0	0
Lane Group Flow (vph)	0	1378	0	0	1593	0	0	13	0	0	134	0
Conf. Peds. (#/hr)	17	19	19	19	17	12	16	16	16	16	16	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	63.1	63.1	63.1	63.1	63.1	63.1	63.1	63.1	63.1	63.1	63.1	63.1
Effective Green, g (s)	63.1	63.1	63.1	63.1	63.1	63.1	63.1	63.1	63.1	63.1	63.1	63.1
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74	0.74
Clearance Time (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
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
Lane Grp Cap (vph)	3236	3402	250	250	3402	250	250	3402	250	250	3402	250
v/s Ratio Prot	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32	0.32
v/s Ratio Perm	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
v/c Ratio	4.1	4.3	30.0	30.0	4.3	30.0	30.0	4.3	30.0	30.0	4.3	30.0
Uniform Delay, d1	1.00	1.04	1.00	1.00	1.04	1.00	1.00	1.04	1.00	1.00	1.04	1.00
Progression Factor	0.4	0.4	0.1	0.1	0.4	0.1	0.1	0.4	0.1	0.1	0.4	0.1
Incremental Delay, d2	4.5	4.6	30.1	30.1	4.5	4.6	30.1	30.1	4.5	4.6	30.1	30.1
Delay (s)	A	A	C	C	A	A	C	C	A	A	C	C
Level of Service	A	A	C	C	A	A	C	C	A	A	C	C
Approach Delay (s)	4.5	4.6	30.1	30.1	4.5	4.6	30.1	30.1	4.5	4.6	30.1	30.1
Approach LOS	A	A	C	C	A	A	C	C	A	A	C	C
Intersection Summary												
HCM Average Control Delay	6.2 HCM Level of Service A											
HCM Volume to Capacity ratio	0.49											
Actuated Cycle Length (s)	85.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	77.3% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave. 2030 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Satd. Flow (prot)	4932	4920	4920	1770	3417	1746	3426						
Flt Permitted	0.64	0.64	0.64	0.13	1.00	0.37	1.00						
Satd. Flow (perm)	3179	3171	3171	246	3417	674	3426						
Volume (vph)	157	988	187	200	1146	198	120	410	90	363	1136	237	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	165	1040	197	211	1206	208	126	432	95	382	1196	249	
RTOR Reduction (vph)	0	23	0	0	25	0	0	21	0	0	19	0	
Lane Group Flow (vph)	0	1379	0	0	1600	0	126	506	0	382	1426	0	
Confl. Peds. (#/hr)	40		9		pm+pt	40	25	31	31			25	
Turn Type	Perm	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4		3	8				2				6	
Permitted Phases	4		8			2				6		6	
Actuated Green, G (s)	45.2		45.2		45.2		29.3	29.3		29.3		29.3	
Effective Green, g (s)	46.7		46.7		46.7		30.3	30.3		30.3		30.3	
Actuated g/C Ratio	0.55		0.55		0.55		0.36	0.36		0.36		0.36	
Clearance Time (s)	5.5		5.5		5.5		5.0	5.0		5.0		5.0	
Vehicle Extension (s)	2.0		2.0		2.0		2.0	2.0		2.0		2.0	
Lane Grp Cap (vph)	1747		1742		1742		88	1218		240		1221	
v/s Ratio Prot								0.15				0.42	
v/s Ratio Perm	0.43		0.50		0.50		0.51			0.57		0.50	
v/c Ratio	1.06dl		1.55dl		1.55dl		1.43	0.42		1.59		1.17	
Uniform Delay, d1	15.2		17.4		17.4		27.3	20.7		27.3		27.3	
Progression Factor	1.34		1.00		1.00		1.26	1.28		0.51		0.49	
Incremental Delay, d2	2.1		8.0		8.0		245.2	1.0		275.4		80.0	
Delay (s)	22.5		25.4		25.4		279.7	27.4		289.5		93.5	
Level of Service	C		C		C		F	C		F		F	
Approach Delay (s)	22.5		25.4		25.4		76.1			134.5		F	
Approach LOS	C		C		C		E			F		F	
Intersection Summary													
HCM Average Control Delay	66.9											HCM Level of Service	E
HCM Volume to Capacity ratio	1.18												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	117.0%											ICU Level of Service	H
Analysis Period (min)	15												
dl Defacto Left Lane. Recode with 1 though lane as a left lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St. 2030 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	5058	5005	5005	1769	1395	1603							
Flt Permitted	0.83	0.83	0.83	0.82	0.82	0.84	1.00	0.81					
Satd. Flow (perm)	4206	4109	4109	1519	1395	1330							
Volume (vph)	40	1408	23	50	1479	90	35	46	30	100	40	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	42	1482	24	53	1557	95	37	48	32	105	42	63	
RTOR Reduction (vph)	0	2	0	0	8	0	0	0	0	18	0	15	
Lane Group Flow (vph)	0	1546	0	0	1697	0	0	85	14	0	195	0	
Confl. Peds. (#/hr)	100		100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4		4		8		2			2		6	
Permitted Phases	4		4		8		2			2		6	
Actuated Green, G (s)	48.0		48.0		48.0		23.0	23.0		23.0		23.0	
Effective Green, g (s)	48.5		48.5		48.5		23.5	23.5		23.5		23.5	
Actuated g/C Ratio	0.61		0.61		0.61		0.29	0.29		0.29		0.29	
Clearance Time (s)	4.5		4.5		4.5		4.5	4.5		4.5		4.5	
Lane Grp Cap (vph)	2550		2491		2491		446	410		410		391	
v/s Ratio Prot								0.06		0.01		c0.15	
v/s Ratio Perm	0.37		0.61		0.68		0.19	0.03		0.50		0.50	
v/c Ratio	9.8		10.6		10.6		21.1	20.2		23.4		23.4	
Uniform Delay, d1	1.00		1.00		1.00		1.00	1.00		1.00		1.00	
Progression Factor	1.1		1.5		1.5		0.9	0.2		0.2		0.2	
Incremental Delay, d2	10.9		12.1		12.1		22.1	20.3		27.9		27.9	
Delay (s)	B		B		B		C	C		C		C	
Level of Service	B		B		B		C	C		C		C	
Approach Delay (s)	10.9		12.1		12.1		21.6	27.9		27.9		C	
Approach LOS	B		B		B		C	C		C		C	
Intersection Summary													
HCM Average Control Delay	12.8											HCM Level of Service	B
HCM Volume to Capacity ratio	0.62												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.1%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	0.96	1.00	1.00	0.96	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4922	1770	4839	1770	3539	1515	1770	3539	1523	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (pbrm)	1770	4922	1770	4839	1770	3539	1515	1770	3539	1523	1770	3539
Volume (vph)	170	1200	171	210	1141	380	140	422	130	390	1441	250
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1263	180	221	1201	400	147	444	137	411	1517	263
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	33	0	0	13
Lane Group Flow (vph)	179	1428	0	221	1551	0	147	444	104	411	1517	250
Confl. Peds. (#/hr)			66			23				38		
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases												
Actuated Green, G (s)	12.0	32.0		15.0	35.0		11.0	28.0	43.0	29.0	46.0	58.0
Effective Green, g (s)	11.0	33.0		14.0	36.0		10.0	29.0	43.0	28.0	47.0	58.0
Actuated g/C Ratio	0.09	0.28		0.12	0.30		0.08	0.24	0.36	0.23	0.39	0.48
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	1354		207	1452		148	855	593	413	1386	736
v/s Ratio Prot	0.10	0.29		c0.12	c0.32		c0.08	0.13	0.02	0.23	c0.43	0.03
v/s Ratio Perm	1.10	1.05		1.07	1.07		0.99	0.52	0.18	1.00	1.09	0.13
Uniform Delay, d1	54.5	43.5		53.0	42.0		55.0	39.5	26.4	45.9	36.5	19.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	101.6	40.2		81.6	44.2		71.6	2.3	0.1	42.7	54.3	0.1
Delay (s)	156.1	83.7		134.6	86.2		126.5	41.7	26.4	88.6	90.8	19.3
Level of Service	F	F		F	F		F	D	C	F	F	B
Approach Delay (s)	91.7			92.1			56.0				81.8	
Approach LOS	F			F			E				F	
Intersection Summary												
HCM Average Control Delay	84.3	HCM Level of Service										
HCM Volume to Capacity ratio	1.09	F										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	101.4%	ICU Level of Service										
Analysis Period (min)	15	G										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2030 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	0.94	0.94	0.94	0.96	0.96	0.96	1.00	0.98	1.00	0.98	1.00	0.99
Fipb, ped/bikes	0.98	0.98	0.98	0.96	0.96	0.96	1.00	0.98	1.00	0.98	1.00	1.00
Frt	0.96	0.96	0.96	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	1.00
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1610	1610	1610	1626	1626	1626	1733	3434	1663	3472	1663	3472
Flt Permitted	0.69	0.69	0.69	0.80	0.80	0.80	1.00	0.17	1.00	0.17	1.00	1.00
Satd. Flow (pbrm)	1140	1140	1140	1319	1319	1319	305	3434	643	3472	643	3472
Volume (vph)	64	50	50	70	80	70	80	616	60	52	1198	72
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	67	53	53	74	84	74	84	648	63	55	1261	76
RTOR Reduction (vph)	0	21	0	0	23	0	0	6	0	0	4	0
Lane Group Flow (vph)	0	152	0	0	209	0	84	705	0	55	1333	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			4			4			2		6
Permitted Phases												
Actuated Green, G (s)	16.2			16.2			16.2			61.8		61.8
Effective Green, g (s)	15.7			15.7			15.7			61.3		61.3
Actuated g/C Ratio	0.18			0.18			0.18			0.72		0.72
Clearance Time (s)	3.5			3.5			3.5			3.5		3.5
Vehicle Extension (s)	2.0			2.0			2.0			2.0		2.0
Lane Grp Cap (vph)	211			244			220			2477		464
v/s Ratio Prot	0.13			c0.16			0.28			0.09		c0.38
v/s Ratio Perm	0.72			0.86			0.38			0.12		0.53
Uniform Delay, d1	32.6			33.6			4.6			4.2		5.4
Progression Factor	1.00			1.00			1.00			1.00		0.94
Incremental Delay, d2	9.4			23.6			5.0			0.3		0.0
Delay (s)	41.9			57.2			9.5			4.4		3.5
Level of Service	D			E			A			A		A
Approach Delay (s)	41.9			57.2			5.0			4.8		4.8
Approach LOS	D			E			A			A		A
Intersection Summary												
HCM Average Control Delay	12.0	HCM Level of Service										
HCM Volume to Capacity ratio	0.60	B										
Actuated Cycle Length (s)	85.0	Sum of lost time (s)										
Intersection Capacity Utilization	70.1%	ICU Level of Service										
Analysis Period (min)	15	C										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave. 2030 AM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.97
Frbp, ped/bikes	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.97	1.00	0.95
Frt	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.95	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3379	1770	3253	1770	3416	1770	3416	1687	3338	1770	3379
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3379	1770	3253	1770	3416	1770	3416	1687	3338	1770	3379
Volume (vph)	270	500	100	140	710	212	70	374	60	171	1017	220
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	526	105	147	747	223	74	394	63	180	1071	232
RTOR Reduction (vph)	0	18	0	0	33	0	0	14	0	0	20	0
Lane Group Flow (vph)	284	613	0	147	937	0	74	443	0	180	1283	0
Confl. Peds. (#/hr)	100			100	100		100	100		100	100	100
Turn Type	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		3	8		2			6		
Actuated Green, G (s)	16.5	28.0		11.0	22.5		32.5	32.5		32.5	32.5	32.5
Effective Green, g (s)	17.0	27.5		11.5	22.0		34.0	34.0		34.0	34.0	34.0
Actuated g/C Ratio	0.20	0.32		0.14	0.26		0.40	0.40		0.40	0.40	0.40
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	354	1093		239	842		88	1366		308	1335	
v/s Ratio Prot	c0.16	0.18		0.08	c0.29		0.13			c0.38		
v/s Ratio Perm	0.80	0.56		0.62	1.11		0.84	0.32		0.23	0.58	0.96
Uniform Delay, d1	32.4	23.8		34.7	31.5		23.1	17.6		20.0	24.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	11.7	0.4		3.3	67.0		59.2	0.6		7.9	16.9	
Delay (s)	44.1	24.2		37.9	98.5		82.2	18.2		27.9	41.7	
Level of Service	D	C		D	F		F	B		C	D	D
Approach Delay (s)	30.3			90.5			27.1			40.0		
Approach LOS	C			F			C			D		
Intersection Summary												
HCM Average Control Delay	50.1											
HCM Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	96.4%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave. 2030 AM + Commercial
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.91	1.00	1.00	1.00	1.00	0.99
Flt Protected	0.98	0.95	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1669	1770	3539	3501		
Flt Permitted	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1669	1770	3539	3501		
Volume (vph)	63	119	114	665	1627	122
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.95
Adj. Flow (vph)	66	125	120	672	1643	128
RTOR Reduction (vph)	98	0	0	0	6	0
Lane Group Flow (vph)	93	0	120	672	1765	0
Turn Type	Prot					
Protected Phases	2					
Permitted Phases	3					
Actuated Green, G (s)	15.6					
Effective Green, g (s)	15.6					
Actuated g/C Ratio	0.18					
Clearance Time (s)	4.0					
Vehicle Extension (s)	3.0					
Lane Grp Cap (vph)	306					
v/s Ratio Prot	c0.06					
v/s Ratio Perm	0.30					
Uniform Delay, d1	30.0					
Progression Factor	1.00					
Incremental Delay, d2	0.6					
Delay (s)	30.6					
Level of Service	C					
Approach Delay (s)	30.6					
Approach LOS	C					
Intersection Summary						
HCM Average Control Delay	19.8					
HCM Volume to Capacity ratio	0.73					
Actuated Cycle Length (s)	85.0					
Intersection Capacity Utilization	76.0%					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

2030 PM + Commercial
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																				
Lane Configurations	<table border="1"> <tr> <td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td> </tr> </table>												1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900							
1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900																				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900																				
Total Lost time (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																				
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00																				
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	1.00	1.00																				
Flt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.95	1.00	1.00																				
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00																				
Satd. Flow (prot)	1770	4926	1770	4960	1770	4960	2006	1992	1960	1917	1960	1917																				
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.12	1.00	0.53	1.00	0.53	1.00																				
Satd. Flow (perm)	1770	4926	1770	4960	1770	4960	258	1992	1101	1917	1101	1917																				
Volume (vph)	350	1302	190	120	1070	170	200	262	100	160	288	280																				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95																				
Adj. Flow (vph)	368	1371	200	126	1126	179	211	276	105	168	303	295																				
RTOR Reduction (vph)	0	19	0	0	21	0	0	14	0	0	35	0																				
Lane Group Flow (vph)	368	1552	0	126	1284	0	211	367	0	168	563	0																				
Conf. Peds. (#/hr)	32	32	32	32	32	32	4	12	24	24	24	12																				
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0																				
Turn Type	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm																				
Protected Phases	7	4	4	3	8	5	2	2	2	2	2	6																				
Permitted Phases	<table border="1"> <tr> <td>20.0</td><td>36.7</td><td>9.6</td><td>26.3</td><td>43.2</td><td>43.2</td><td>43.2</td><td>30.2</td><td>30.2</td><td>30.2</td><td>30.2</td><td>30.2</td><td>30.2</td> </tr> </table>												20.0	36.7	9.6	26.3	43.2	43.2	43.2	30.2	30.2	30.2	30.2	30.2	30.2							
20.0	36.7	9.6	26.3	43.2	43.2	43.2	30.2	30.2	30.2	30.2	30.2	30.2																				
Actuated Green, G (s)	20.0	36.7	9.6	26.3	43.2	43.2	30.2	30.2	30.2	30.2	30.2	30.2																				
Effective Green, g (s)	20.0	36.7	9.6	26.3	43.7	43.7	30.7	30.7	30.7	30.7	30.7	30.7																				
Actuated g/C Ratio	0.20	0.37	0.10	0.26	0.44	0.44	0.31	0.31	0.31	0.31	0.31	0.31																				
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5																				
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																				
Lane Grp Cap (vph)	354	1808	170	1304	305	871	338	589	338	589	338	589																				
v/s Ratio Prot	c0.21	0.32	0.07	c0.26	c0.08	0.18	c0.29	c0.29	c0.29	c0.29	c0.29	c0.29																				
v/s Ratio Perm	1.04	0.86	0.74	0.98	0.69	0.42	0.50	0.96	0.50	0.96	0.50	0.96																				
Uniform Delay, d1	40.0	29.2	44.0	36.6	44.3	19.4	28.3	34.0	28.3	34.0	28.3	34.0																				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00																				
Incremental Delay, d2	58.5	5.6	15.9	21.5	6.6	0.3	1.2	26.1	1.2	26.1	1.2	26.1																				
Delay (s)	98.5	34.8	59.9	58.1	50.9	19.8	29.5	60.1	29.5	60.1	29.5	60.1																				
Level of Service	F	C	E	E	D	B	C	E	C	E	C	E																				
Approach Delay (s)	46.9	58.3	58.3	58.3	58.3	30.9	53.4	53.4	53.4	53.4	53.4	53.4																				
Approach LOS	D	E	E	E	E	C	D	D	C	D	D	D																				
Intersection Summary	<table border="1"> <tr> <td>HCM Average Control Delay</td> <td>49.4</td> <td>HCM Level of Service</td> <td>D</td> </tr> <tr> <td>HCM Volume to Capacity ratio</td> <td>0.94</td> <td></td> <td></td> </tr> <tr> <td>Actuated Cycle Length (s)</td> <td>100.0</td> <td>Sum of lost time (s)</td> <td>12.0</td> </tr> <tr> <td>Intersection Capacity Utilization</td> <td>101.2%</td> <td>ICU Level of Service</td> <td>G</td> </tr> <tr> <td>Analysis Period (min)</td> <td>15</td> <td></td> <td></td> </tr> </table>												HCM Average Control Delay	49.4	HCM Level of Service	D	HCM Volume to Capacity ratio	0.94			Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0	Intersection Capacity Utilization	101.2%	ICU Level of Service	G	Analysis Period (min)	15		
HCM Average Control Delay	49.4	HCM Level of Service	D																													
HCM Volume to Capacity ratio	0.94																															
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.0																													
Intersection Capacity Utilization	101.2%	ICU Level of Service	G																													
Analysis Period (min)	15																															
c Critical Lane Group																																

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2030 PM + Commercial
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR																				
Lane Configurations	<table border="1"> <tr> <td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td><td>1900</td> </tr> </table>												1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900							
1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900																				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900																				
Total Lost time (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																				
Lane Util. Factor	1.00	0.95	0.95	1.00	0.97	1.00	0.98	1.00	0.95	1.00	0.95	0.95																				
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00																				
Flt	0.93	1.00	0.93	1.00	0.93	1.00	0.95	1.00	0.95	1.00	0.95	1.00																				
Flt Protected	0.99	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	1.00																				
Satd. Flow (prot)	1705	1681	1586	1681	1586	1681	3275	3275	1770	3208	1770	3208																				
Flt Permitted	0.36	0.73	1.00	0.73	1.00	0.73	0.94	0.94	0.95	1.00	0.95	1.00																				
Satd. Flow (perm)	619	1290	1586	619	1290	1586	3087	3087	1770	3208	1770	3208																				
Volume (vph)	10	10	20	126	120	120	10	1122	619	200	896	420																				
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95																				
Adj. Flow (vph)	11	11	21	133	126	126	11	1181	652	211	943	442																				
RTOR Reduction (vph)	0	20	0	0	39	0	0	64	0	0	46	0																				
Lane Group Flow (vph)	0	23	0	133	213	0	0	1780	0	211	1339	0																				
Conf. Peds. (#/hr)	36	36	36	36	36	36	48	48	16	16	48	48																				
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot																				
Protected Phases	7	7	7	8	8	8	2	2	2	2	2	6																				
Permitted Phases	<table border="1"> <tr> <td>6.5</td><td>6.5</td><td>6.5</td><td>16.7</td><td>16.7</td><td>16.7</td><td>45.7</td><td>45.7</td><td>45.7</td><td>13.1</td><td>63.3</td><td>13.1</td><td>63.3</td> </tr> </table>												6.5	6.5	6.5	16.7	16.7	16.7	45.7	45.7	45.7	13.1	63.3	13.1	63.3							
6.5	6.5	6.5	16.7	16.7	16.7	45.7	45.7	45.7	13.1	63.3	13.1	63.3																				
Actuated Green, G (s)	6.5	6.5	6.5	16.7	16.7	16.7	45.7	45.7	45.7	13.1	63.3	13.1																				
Effective Green, g (s)	7.0	7.0	7.0	17.2	17.2	17.2	46.2	46.2	46.2	13.6	63.8	13.6																				
Actuated g/C Ratio	0.07	0.07	0.07	0.17	0.17	0.17	0.46	0.46	0.46	0.14	0.64	0.14																				
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5																				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0																				
Lane Grp Cap (vph)	43	43	222	273	273	1426	241	2047	241	2047	241	2047																				
v/s Ratio Prot	c0.04	0.10	0.10	0.13	0.13	0.13	c0.58	c0.58	c0.12	0.42	c0.12	0.42																				
v/s Ratio Perm	0.55	0.60	0.60	0.78	0.78	0.78	1.25	1.25	0.88	0.65	1.25	0.88																				
Uniform Delay, d1	45.0	38.2	39.6	42.4	42.4	26.9	42.4	42.4	11.2	11.2	42.4	11.2																				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.61	0.61	1.00	1.00	0.61	1.00																				
Incremental Delay, d2	7.4	2.9	12.5	12.5	12.5	112.3	27.1	1.6	27.1	1.6	27.1	1.6																				
Delay (s)	52.3	41.1	52.1	52.1	52.1	128.7	69.5	12.9	69.5	12.9	69.5	12.9																				
Level of Service	D	D	D	D	D	F	E	B	E	B	E	B																				
Approach Delay (s)	52.3	52.3	52.3	48.3	48.3	128.7	20.4	20.4	20.4	20.4	20.4	20.4																				
Approach LOS	D	D	D	D	D	F	C	C	D	C	D	C																				
Intersection Summary	<table border="1"> <tr> <td>HCM Average Control Delay</td> <td>75.2</td> <td>HCM Level of Service</td> <td>E</td> </tr> <tr> <td>HCM Volume to Capacity ratio</td> <td>1.03</td> <td></td> <td></td> </tr> <tr> <td>Actuated Cycle Length (s)</td> <td>100.0</td> <td>Sum of lost time (s)</td> <td>16.0</td> </tr> <tr> <td>Intersection Capacity Utilization</td> <td>118.4%</td> <td>ICU Level of Service</td> <td>H</td> </tr> <tr> <td>Analysis Period (min)</td> <td>15</td> <td></td> <td></td> </tr> </table>												HCM Average Control Delay	75.2	HCM Level of Service	E	HCM Volume to Capacity ratio	1.03			Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0	Intersection Capacity Utilization	118.4%	ICU Level of Service	H	Analysis Period (min)	15		
HCM Average Control Delay	75.2	HCM Level of Service	E																													
HCM Volume to Capacity ratio	1.03																															
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	16.0																													
Intersection Capacity Utilization	118.4%	ICU Level of Service	H																													
Analysis Period (min)	15																															
c Critical Lane Group																																

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 PM + Commercial
1/21/2008

2030 PM + Commercial
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frb, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.98	
Fllb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.94	1.00	0.96	1.00	0.96	1.00	0.99	1.00	0.99	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3418	1770	3299	1770	3283	1770	3415	1770	3415	1770	3415	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3418	1770	3299	1770	3283	1770	3415	1770	3415	1770	3415	
Volume (vph)	460	930	132	160	580	350	100	961	350	300	692	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	484	979	139	168	611	368	105	1012	368	316	728	63	
RTOR Reduction (vph)	0	11	0	0	90	0	0	37	0	0	7	0	
Lane Group Flow (vph)	484	1107	0	168	889	0	105	1343	0	316	784	0	
Confl. Peds. (#/hr)	15	48	48	48	15	123	48	48	48	48	123	123	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Actuated Green, G (s)	15.7	27.5	10.9	22.7	5.0	32.6	12.0	39.6					
Effective Green, g (s)	15.2	28.5	10.4	23.7	4.5	33.6	11.5	40.6					
Actuated g/C Ratio	0.15	0.28	0.10	0.24	0.04	0.34	0.12	0.41					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grp Cap (vph)	522	974	184	782	80	1103	204	1386					
v/s Ratio Prot	c0.14	c0.32	0.09	0.27	0.06	c0.41	c0.18	0.23					
v/s Ratio Perm	0.93	1.14	0.91	1.14	1.31	1.22	1.55	0.57					
Uniform Delay, d1	41.9	35.8	44.4	38.1	47.8	33.2	44.2	22.9					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.20	0.76					
Incremental Delay, d2	22.3	74.0	41.7	76.9	205.3	106.3	264.8	1.3					
Delay (s)	64.2	109.8	86.0	115.0	253.1	139.5	317.8	18.8					
Level of Service	E	F	F	F	F	F	F	B					
Approach Delay (s)	96.0	F	F	110.8	F	147.5	104.1	F					
Approach LOS	F	F	F	F	F	F	F	F					
Intersection Summary													
HCM Average Control Delay	115.2											HCM Level of Service	F
HCM Volume to Capacity ratio	1.17												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.7%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2030 PM + Commercial
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.96	0.96	0.97	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Fipb, ped/bikes	0.99	0.97	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.97	0.96	0.96	0.98	0.98	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1694	1668	1668	3423	3423	3428	3428	3428	3428	3428	3428	3428
Flt Permitted	0.87	0.90	0.90	0.92	0.92	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Satd. Flow (pbrm)	1501	1515	1515	3157	3157	2687	2687	2687	2687	2687	2687	2687
Volume (vph)	40	70	31	70	140	90	43	735	90	60	306	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	74	33	74	147	95	45	774	95	63	322	32
RTOR Reduction (vph)	0	20	0	0	31	0	0	18	0	0	13	0
Lane Group Flow (vph)	0	129	0	0	285	0	0	897	0	0	405	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6	6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (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
Lane Grp Cap (vph)	510	510	510	515	515	1579	1579	1579	1579	1344	1344	1344
v/s Ratio Prot	0.09	0.09	0.09	c0.19	c0.19	c0.28	c0.28	c0.28	c0.28	0.15	0.15	0.15
v/c Ratio	0.25	0.25	0.25	0.55	0.55	0.57	0.57	0.57	0.57	0.30	0.30	0.30
Uniform Delay, d1	11.9	11.9	11.9	13.4	13.4	8.7	8.7	8.7	8.7	7.4	7.4	7.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	1.2	1.2	4.2	4.2	1.5	1.5	1.5	1.5	0.6	0.6	0.6
Delay (s)	13.1	13.1	13.1	17.7	17.7	10.2	10.2	10.2	10.2	7.9	7.9	7.9
Level of Service	B	B	B	B	B	B	B	B	B	A	A	A
Approach Delay (s)	13.1	13.1	13.1	17.7	17.7	10.2	10.2	10.2	10.2	7.9	7.9	7.9
Approach LOS	B	B	B	B	B	B	B	B	B	A	A	A

Intersection Summary	
HCM Average Control Delay	11.2
HCM Level of Service	B
HCM Volume to Capacity ratio	0.56
Actuated Cycle Length (s)	50.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	78.6%
ICU Level of Service	D
Analysis Period (min)	15
Critical Lane Group	c

HCM Signalized Intersection Capacity Analysis
 7: 40th St. & Market St. 2030 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1765	3464	1768	3454	1741	1830	1766	1825				
Flt Permitted	0.12	1.00	0.12	1.00	0.52	1.00	0.22	1.00				
Satd. Flow (perm)	232	3464	233	3454	960	1830	402	1825				
Volume (vph)	90	1115	160	86	902	135	180	561	65	105	250	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	1174	168	91	949	142	189	591	68	111	263	32
RTOR Reduction (vph)	0	14	0	0	15	0	0	5	0	0	6	0
Lane Group Flow (vph)	95	1328	0	91	1076	0	189	654	0	111	290	0
Conf. Peds. (#/hr)	12	12	12	12	42	12	42	12	12	12	12	42
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	93	1386	93	1382	480	915	201	913				
v/s Ratio Prot	c0.41			0.31			c0.36			0.16		
v/s Ratio Perm	0.20			0.39			0.20			0.28		
v/c Ratio	1.02	0.96	0.98	0.78	0.39	0.71	0.55	0.32		0.55	0.32	
Uniform Delay, d1	24.0	23.4	23.7	20.9	12.5	15.6	13.8	11.9		13.8	11.9	
Progression Factor	1.00	1.00	1.72	1.79	1.64	1.63	1.00	1.00		1.00	1.00	
Incremental Delay, d2	99.3	16.1	52.5	1.7	0.2	0.4	10.5	0.9		10.5	0.9	
Delay (s)	123.3	39.4	93.1	39.1	20.6	25.8	24.3	12.8		24.3	12.8	
Level of Service	F	D	F	D	C	C	C	B		C	B	
Approach Delay (s)	45.0			43.3		24.7		15.9				
Approach LOS	D			D		D		B				

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	37.0	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 8: 40th St. & West St. 2030 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1770	3458	1770	3498	1770	3498	3435	3384				
Flt Permitted	0.16	1.00	0.16	1.00	0.16	1.00	0.84					
Satd. Flow (perm)	298	3458	298	3498	298	3498	2914					
Volume (vph)	60	1154	120	74	1033	68	90	333	57	33	160	50
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	61	1166	121	75	1043	69	91	336	58	33	162	51
RTOR Reduction (vph)	0	10	0	0	6	0	0	1	0	0	4	0
Lane Group Flow (vph)	61	1277	0	75	1106	0	0	484	0	0	242	0
Conf. Peds. (#/hr)	24	78	78	24	8	24	8	6	6	6	6	8
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	46.0			46.0		46.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	47.0			47.0		47.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.59			0.59		0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0		5.0
Lane Grp Cap (vph)	93	1081	93	1093			1712			1740		
v/s Ratio Prot	c0.37			0.32								
v/s Ratio Perm	0.20			0.25			c0.17			0.08		
v/c Ratio	0.66	1.18	0.81	1.01	0.28		0.28			0.14		
Uniform Delay, d1	23.8	27.5	25.3	27.5	8.2		8.2			7.4		
Progression Factor	0.64	0.57	0.79	0.82	1.06		1.06			1.00		
Incremental Delay, d2	13.3	85.8	31.3	22.7	0.2		0.2			0.2		
Delay (s)	28.5	101.5	51.3	45.3	8.8		8.8			7.6		
Level of Service	C	F	D	D	D		A			A		
Approach Delay (s)	98.2			45.7			8.8			7.6		
Approach LOS	F			D			A			A		

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	59.0	HCM Level of Service	E
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.7%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & BART Access

2030 PM + Commercial
 1/21/2008

2030 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1768	3492	1764	3447	1764	3419	1764	3419	1764	3419	1764	3419
Flt Permitted	0.11	1.00	0.11	1.00	0.86	1.00	0.86	1.00	0.86	1.00	0.87	1.00
Satd. Flow (perm)	213	3492	212	3447	2949	2949	2949	2949	2949	2949	2307	2307
Volume (vph)	90	1110	84	119	1080	185	75	543	121	91	256	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	1168	88	125	1137	195	79	572	127	96	269	63
RTOR Reduction (vph)	0	7	0	0	17	0	0	12	0	0	17	0
Lane Group Flow (vph)	95	1249	0	125	1315	0	0	766	0	0	411	0
Conf. Peds. (#/hr)	8	39	39	8	8	25	25	25	25	25	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	8	8	2	2	6	6	6	6	6
Permitted Phases	4	8	8	8	8	2	2	6	6	6	6	6
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	93	1528	93	1508	1364	1364	1364	1067	1067	1067	1067	1067
v/s Ratio Prot	0.45	0.36	0.36	0.38	0.38	0.26	0.26	0.18	0.18	0.18	0.18	0.18
v/s Ratio Perm	1.02	0.82	0.82	1.34	0.87	0.56	0.56	0.39	0.39	0.39	0.39	0.39
v/c Ratio	22.5	19.7	22.5	20.5	15.6	15.6	15.6	14.1	14.1	14.1	14.1	14.1
Uniform Delay, d1	1.04	1.04	1.13	1.14	1.32	1.32	1.32	1.00	1.00	1.00	1.00	1.00
Progression Factor	33.5	0.5	203.8	6.2	1.4	1.4	1.4	1.1	1.1	1.1	1.1	1.1
Incremental Delay, d2	56.9	21.0	229.2	29.6	22.0	22.0	22.0	15.1	15.1	15.1	15.1	15.1
Delay (s)	E	C	F	C	C	C	C	B	B	B	B	B
Level of Service	E	C	F	C	C	C	C	B	B	B	B	B
Approach Delay (s)	23.5	46.7	22.0	46.7	22.0	22.0	22.0	15.1	15.1	15.1	15.1	15.1
Approach LOS	C	C	D	D	D	D	D	B	B	B	B	B

Intersection Summary	
HCM Average Control Delay	30.8
HCM Level of Service	C
HCM Volume to Capacity ratio	0.94
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	95.8%
ICU Level of Service	F
Analysis Period (min)	15
Critical Lane Group	c

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2030 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Lane Util. Factor	1.00	0.99	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.96	
Fipb, ped/bikes	0.94	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1671	3443	1770	3336	1770	3473	1770	3473	1770	3276	1770	3276	
Flt Permitted	0.25	1.00	0.15	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (iperm)	441	3443	287	3336	1770	3473	1770	3473	1770	3276	1770	3276	
Volume (vph)	249	934	109	75	557	110	466	1470	124	130	689	255	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	254	953	111	77	568	112	476	1500	127	133	703	260	
RTOR Reduction (vph)	0	11	0	0	20	0	0	7	0	0	0	26	
Lane Group Flow (vph)	254	1053	0	77	660	0	476	1620	0	133	937	0	
Confl. Peds. (#/hr)	94		86	86		94		40				111	
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	4			8		5		2		1		6	
Permitted Phases	4		8										
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	13.5	32.2	13.5	32.2	8.8	27.5	27.5	
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	14.0	32.7	14.0	32.7	9.3	28.0	28.0	
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.18	0.41	0.18	0.41	0.12	0.35	0.35	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grip Cap (vph)	143	1119	93	1084	310	1420	206	1147	206	1147	206	1147	
v/s Ratio Prot	0.31		0.20		c0.27	c0.47		0.08	0.29				
v/s Ratio Perm	c0.58		0.27		0.83	0.61	1.54	1.14	0.65	0.82			
v/c Ratio	1.78	0.94	0.83	0.61	24.9	22.7	33.0	23.6	33.8	23.7			
Uniform Delay, d1	27.0	26.3	24.9	22.7	33.0	23.6	33.8	23.7	33.8	23.7			
Progression Factor	0.85	0.84	1.00	1.00	1.00	0.94	0.97	1.00	1.00	1.00			
Incremental Delay, d2	366.3	10.2	41.1	0.7	248.4	67.8	5.1	6.5	5.1	6.5			
Delay (s)	389.1	32.3	66.1	23.4	279.6	90.8	38.9	30.2	38.9	30.2			
Level of Service	F	C	E	C	F	F	D	C	D	C			
Approach Delay (s)	101.0		F	27.7	C	133.5		F	31.2	C			
Approach LOS	F		F		C			F		C			
Intersection Summary													
HCM Average Control Delay	89.0											HCM Level of Service	F
HCM Volume to Capacity ratio	1.42												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.1%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. 2030 PM + Commercial
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	30	41	1941	40	20	998
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	43	2043	42	21	1051
Pedestrians	52		52		45	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4		4		4	
Right turn flare (veh)						
Median type	None		None		None	
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.73	0.66			0.66	
VC, conflicting volume	2736	1140			2137	
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
vCu, unblocked vol	2424	698			2208	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	0	81			86	
cM capacity (veh/h)	15	233			148	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	75	1362	723	21	525	525
Volume Left	32	0	0	21	0	0
Volume Right	43	0	42	0	0	0
cSH	33	1700	1700	148	1700	1700
Volume to Capacity	2.24	0.80	0.43	0.14	0.31	0.31
Queue Length 95th (ft)	212	0	0	12	0	0
Control Delay (s)	824.5	0.0	0.0	33.3	0.0	0.0
Lane LOS	F	D	D	D	D	D
Approach Delay (s)	824.5	0.0	0.0	0.7		
Approach LOS	F			F		
Intersection Summary						
Average Delay	19.3					
Intersection Capacity Utilization	73.4%					
ICU Level of Service	D					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2030 PM + Commercial
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Flt Protected	0.99	0.95	1.00	1.00	0.99	0.95	1.00	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	5013	1768	3452	1793	1770	1806	1770	1770	1806	1770	1806	1806
Flt Permitted	0.65	0.22	1.00	0.27	0.24	1.00	0.27	0.24	1.00	0.24	1.00	1.00
Satd. Flow (perm)	3269	417	3452	491	442	1806	491	442	1806	442	1806	1806
Volume (vph)	160	858	40	93	1347	221	190	525	120	80	406	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	876	41	95	1374	226	194	536	122	82	414	71
RTOR Reduction (vph)	0	5	0	0	17	0	0	8	0	0	8	0
Lane Group Flow (vph)	0	1075	0	95	1584	0	0	844	0	82	477	0
Confl. Peds. (#/hr)	24	4	4	4	24	48	12	12	12	12	48	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	46.0	46.0	46.0	47.0	47.0	47.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31
Clearance 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
Lane Grp Cap (vph)	1921	245	2028	c0.46			153	138	564			26
v/s Ratio Prot												
v/s Ratio Perm	0.33	0.23	0.23	c1.72			0.19	0.19	0.19	0.19	0.19	0.19
v/c Ratio	1.66dl	0.39	0.78	5.52			0.59	0.59	0.59	0.59	0.59	0.59
Uniform Delay, d1	10.1	8.8	12.6	27.5			23.2	25.7	25.7	25.7	25.7	25.7
Progression Factor	1.00	1.57	1.63	1.00			0.77	0.79	0.79	0.79	0.79	0.79
Incremental Delay, d2	1.2	3.5	2.3	2047.9			14.4	12.1	12.1	12.1	12.1	12.1
Delay (s)	11.3	17.3	22.8	2075.4			32.2	32.6	32.6	32.6	32.6	32.6
Level of Service	B	B	C	F			C	C	C	C	C	C
Approach Delay (s)	11.3		22.5	2075.4			32.5	32.5	32.5	32.5	32.5	32.5
Approach LOS	B		C	F			C	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	438.0
HCM Level of Service	F
HCM Volume to Capacity ratio	2.42
Sum of lost time (s)	8.0
Intersection Capacity Utilization	168.1%
ICU Level of Service	H
Analysis Period (min)	15
Defacto Left Lane. Recode with 1 through lane as a left lane.	
Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & BART Access

2030 PM + Commercial
1/21/2008

2030 PM + Commercial
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ft	0.99	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	5021	4956	4956	3433	3433	3359	3359	3359	3359	3359	3359	3359	
Flt Permitted	0.73	0.82	0.82	0.73	0.73	0.57	0.57	0.57	0.57	0.57	0.57	0.57	
Satd. Flow (perm)	3663	4055	4055	2819	2819	1943	1943	1943	1943	1943	1943	1943	
Volume (vph)	73	891	50	81	1415	241	80	426	75	140	227	92	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Adj. Flow (vph)	74	900	51	82	1429	243	81	430	76	141	229	93	
RTOR Reduction (vph)	0	7	0	0	27	0	0	15	0	0	28	0	
Lane Group Flow (vph)	0	1018	0	0	1727	0	0	572	0	0	435	0	
Conf. Peds. (#/hr)	9	17	17	17	17	9	12	10	10	10	10	12	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4	
Permitted Phases	4	8	8	8	8	8	2	2	2	2	6	6	
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0	
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	
Lane Grp Cap (vph)	2358	2610	2610	2610	2610	645	645	645	645	645	498	498	
v/s Ratio Prot	0.28	0.43	0.43	0.43	0.43	0.23	0.23	0.23	0.23	0.23	0.22	0.22	
v/s Ratio Perm	0.43	0.66	0.66	0.66	0.66	0.89	0.89	0.89	0.89	0.89	0.95dl	0.95dl	
Uniform Delay, d1	7.0	8.8	8.8	8.8	8.8	28.6	28.6	28.6	28.6	28.6	28.5	28.5	
Progression Factor	1.60	2.08	2.08	2.08	2.08	1.00	1.00	1.00	1.00	1.00	1.17	1.17	
Incremental Delay, d2	11.7	19.4	19.4	19.4	19.4	45.2	45.2	45.2	45.2	45.2	52.2	52.2	
Delay (s)	B	B	B	B	B	D	D	D	D	D	D	D	
Level of Service	B	B	B	B	B	D	D	D	D	D	D	D	
Approach Delay (s)	11.7	19.4	19.4	19.4	19.4	45.2	45.2	45.2	45.2	45.2	52.2	52.2	
Approach LOS	B	B	B	B	B	D	D	D	D	D	D	D	
Intersection Summary													
HCM Average Control Delay	25.3											HCM Level of Service	C
HCM Volume to Capacity ratio	0.73												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	126.8%											ICU Level of Service	H
Analysis Period (min)	15												
d1 Defacto Left Lane. Recode with 1 though lane as a left lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave. 2030 PM + Commercial 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.99	0.99	1.00	0.96	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	
Flt Protected	0.98	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	4915	4808	4808	1750	3459	1770	3429						
Flt Permitted	0.68	0.71	0.71	0.20	1.00	0.11	1.00						
Satd. Flow (pbrm)	3379	3422	3422	369	3459	213	3429						
Volume (vph)	387	695	111	110	1174	466	280	1206	110	206	626	111	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	407	732	117	116	1236	491	285	1269	116	217	659	117	
RTOR Reduction (vph)	0	7	0	0	1	0	0	7	0	0	14	0	
Lane Group Flow (vph)	0	1249	0	0	1842	0	295	1378	0	217	762	0	
Confl. Peds. (#/hr)	26	19	19	pm+pt	26	39	92	92	92	92	92	39	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	3	8	8	2	2	2	2	6	6	6	
Permitted Phases	4	4	8	8	8	2	2	2	2	6	6	6	
Actuated Green, G (s)	56.6	56.6	56.6	56.6	56.6	34.0	34.0	34.0	34.0	34.0	34.0	34.0	
Effective Green, g (s)	58.1	58.1	58.1	58.1	58.1	35.0	35.0	35.0	35.0	35.0	35.0	35.0	
Actuated g/C Ratio	0.57	0.57	0.57	0.57	0.57	0.35	0.35	0.35	0.35	0.35	0.35	0.35	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grip Cap (vph)	1942	1967	1967	128	1197	74	1187						
v/s Ratio Prot						0.40	0.40						
v/s Ratio Perm	0.37	0.37	0.37	0.54	0.54	0.80	0.80	0.80	0.80	0.80	0.80	0.80	
v/c Ratio	2.54dl	2.54dl	2.54dl	0.94	0.94	2.30	2.30	2.30	2.30	2.30	2.30	2.30	
Uniform Delay, d1	14.5	14.5	14.5	19.8	19.8	33.0	33.0	33.0	33.0	33.0	33.0	33.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.6	0.6	9.0	9.0	611.0	78.2	905.1	2.7	905.1	2.7	905.1	
Delay (s)	15.1	15.1	15.1	28.8	28.8	644.0	111.2	938.1	30.5	938.1	30.5	938.1	
Level of Service	B	B	B	C	C	F	F	F	F	F	F	F	
Approach Delay (s)	15.1	15.1	15.1	28.8	28.8	204.8	204.8	228.8	228.8	228.8	228.8	228.8	
Approach LOS	B	B	B	C	C	F	F	F	F	F	F	F	
Intersection Summary													
HCM Average Control Delay	111.4											HCM Level of Service	F
HCM Volume to Capacity ratio	1.69												
Actuated Cycle Length (s)	101.1											Sum of lost time (s)	8.0
Intersection Capacity Utilization	122.0%											ICU Level of Service	H
Analysis Period (min)	15												
dl Defacto Left Lane. Recode with 1 though lane as a left lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St. 2030 PM + Commercial 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.89	1.00	1.00	0.94	1.00	0.94	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.98	1.00	0.98	
Frt	0.99	0.99	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.95	1.00	0.95	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99	
Satd. Flow (prot)	5023	5027	5027	1753	1406	1580							
Flt Permitted	0.78	0.78	0.78	0.78	0.78	0.77	1.00	1.00	1.00	0.90	1.00	0.90	
Satd. Flow (pbrm)	3941	3921	3921	1388	1406	1438							
Volume (vph)	50	932	39	110	1597	50	103	104	200	40	40	90	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Adj. Flow (vph)	51	941	39	111	1613	51	104	105	202	40	40	91	
RTOR Reduction (vph)	0	5	0	0	4	0	0	0	64	0	13	0	
Lane Group Flow (vph)	0	1026	0	0	1771	0	0	209	138	0	158	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6	
Permitted Phases	4	4	8	8	8	2	2	2	2	6	6	6	
Actuated Green, G (s)	49.5	49.5	49.5	49.5	49.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29	
Clearance Time (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	
Lane Grip Cap (vph)	2389	2377	2377	408	413	422							
v/s Ratio Prot						0.15	0.15	0.15	0.15	0.15	0.15	0.15	
v/s Ratio Perm	0.26	0.26	0.26	0.45	0.45	0.51	0.51	0.51	0.51	0.51	0.51	0.51	
v/c Ratio	0.43	0.43	0.43	0.75	0.75	0.84	0.84	0.84	0.84	0.84	0.84	0.84	
Uniform Delay, d1	8.4	8.4	8.4	11.3	11.3	23.5	23.5	23.5	23.5	23.5	23.5	23.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.6	0.6	0.6	2.2	2.2	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Delay (s)	9.0	9.0	9.0	13.5	13.5	28.0	24.3	24.9	24.9	24.9	24.9	24.9	
Level of Service	A	A	A	B	B	C	C	C	C	C	C	C	
Approach Delay (s)	9.0	9.0	9.0	13.5	13.5	26.2	24.9	24.9	24.9	24.9	24.9	24.9	
Approach LOS	A	A	A	B	B	C	C	C	C	C	C	C	
Intersection Summary													
HCM Average Control Delay	14.2											HCM Level of Service	B
HCM Volume to Capacity ratio	0.67												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	111.7%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2030 PM + Commercial
 1/21/2008

2030 PM + Commercial
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.94	1.00	1.00	1.00	0.98
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.97	1.00	0.95	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4910	1770	4864	1770	3539	1489	1770	3539	1489	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (pbrm)	1770	4910	1770	4864	1770	3539	1489	1770	3539	1489	1770	3539
Volume (vph)	230	799	113	130	1237	360	310	1181	290	510	513	180
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	841	119	137	1302	379	326	1243	305	537	540	189
RTOR Reduction (vph)	0	15	0	0	44	0	0	0	10	0	0	45
Lane Group Flow (vph)	242	945	0	137	1637	0	326	1243	295	537	540	144
Confl. Peds. (#/hr)			81			22			50			43
Turn Type	Prot	Prot	Prot	Prot	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases												
Actuated Green, G (s)	12.0	33.2		12.8	34.0		25.4	33.0	45.8	25.0	32.6	44.6
Effective Green, g (s)	11.0	34.2		11.8	35.0		24.4	34.0	45.8	24.0	33.6	44.6
Actuated g/C Ratio	0.09	0.29		0.10	0.29		0.20	0.28	0.38	0.20	0.28	0.37
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	162	1399		174	1419		360	1003	618	354	991	607
v/s Ratio Prot	c0.14	0.19		0.08	c0.34		0.18	c0.35	0.05	c0.30	0.15	0.02
v/s Ratio Perm	1.49	0.68		0.79	1.15		0.91	1.24	0.48	1.52	0.54	0.24
Uniform Delay, d1	54.5	38.0		52.9	42.5		46.7	43.0	28.1	48.0	36.7	26.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	251.9	2.6		20.6	77.6		25.3	116.3	0.6	246.7	2.2	0.2
Delay (s)	306.4	40.6		73.4	120.1		71.9	159.3	28.6	294.7	38.9	26.2
Level of Service	F	D		E	F		E	F	C	F	D	C
Approach Delay (s)	94.1			116.6			122.8			145.5		
Approach LOS	F			F			F			F		
Intersection Summary												
HCM Average Control Delay	120.1											
HCM Volume to Capacity ratio	1.21											
Actuated Cycle Length (s)	120.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	119.4%											
ICU Level of Service	H											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
24: 27th St. & Telegraph Ave. 2030 PM + Commercial 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR															
Lane Configurations																											
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900															
Total Lost time (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															
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.94															
Frbp, ped/bikes	1.00	0.98	1.00	0.93	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98															
Frt	1.00	0.97	1.00	1.00	1.00	1.00	0.96	1.00	0.98	1.00	0.98	1.00															
Flt Protected	1.00	0.97	1.00	0.95	1.00	0.99	1.00	0.99	1.00	1.00	0.95	1.00															
Satd. Flow (prot)	1770	3370	1770	3140	1770	3140	1706	3489	1733	3140	1733	3140															
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.23	1.00	0.22	1.00	0.22	1.00															
Satd. Flow (perm)	1770	3370	1770	3140	1770	3140	407	3489	396	3140	396	3140															
Volume (vph)	230	560	120	90	530	253	200	838	50	238	555	310															
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98															
Adj. Flow (vph)	235	571	122	92	541	258	204	855	51	243	566	316															
RTOR Reduction (vph)	0	20	0	0	46	0	0	5	0	0	0	91															
Lane Group Flow (vph)	235	673	0	92	753	0	204	901	0	243	791	0															
Confl. Peds. (#/hr)	100			100	100	100	100	100	100	100	100	100															
Turn Type	<table border="1"> <thead> <tr> <th>Prot</th> <th>Prot</th> <th>Prot</th> <th>Perm</th> <th>Perm</th> </tr> </thead> <tbody> <tr> <td>7</td> <td>4</td> <td></td> <td></td> <td></td> </tr> <tr> <td></td> <td></td> <td>3</td> <td>8</td> <td>2</td> </tr> </tbody> </table>												Prot	Prot	Prot	Perm	Perm	7	4						3	8	2
Prot	Prot	Prot	Perm	Perm																							
7	4																										
		3	8	2																							
Protected Phases																											
Actuated Green, G (s)	10.5	26.0		7.3	22.8		38.2	38.2		38.2	38.2	6															
Effective Green, g (s)	11.0	25.5		7.8	22.3		39.7	39.7		39.7	39.7	6															
Actuated g/C Ratio	0.13	0.30		0.09	0.26		0.47	0.47		0.47	0.47	0.47															
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5	5.5	5.5															
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	2.0															
Lane Grp Cap (vph)	229	1011		162	824		190	1630		185	1467																
v/s Ratio Prot	c0.13	c0.20		0.05	c0.24		0.26	0.26		0.25	0.25	0.25															
v/s Ratio Perm	1.03	0.67		0.57	0.91		0.50	0.50		c0.61	c0.61	0.61															
Uniform Delay, d1	37.0	26.0		37.0	30.4		22.6	16.3		22.6	16.1	1.31															
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00															
Incremental Delay, d2	66.4	1.3		2.7	14.1		86.2	1.4		174.1	1.4	174.1															
Delay (s)	103.4	27.3		39.7	44.6		108.9	17.6		196.8	17.6	196.8															
Level of Service	F	C		D	D		F	B		F	B	F															
Approach Delay (s)	46.6			44.1			34.4			56.3		56.3															
Approach LOS	D			D			C			E		E															
Intersection Summary																											
HCM Average Control Delay	45.4											HCM Level of Service	D														
HCM Volume to Capacity ratio	1.20																										
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	16.0														
Intersection Capacity Utilization	89.2%											ICU Level of Service	E														
Analysis Period (min)	15																										
c Critical Lane Group																											

MacArthur BART TOD
WC06-2279
Fehr & Peers Associates, Inc.

HCM Signalized Intersection Capacity Analysis
25: Transit Village Driveway & Telegraph Ave. 2030 PM + Commercial 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR										
Lane Configurations																
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900										
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0										
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.98										
Frt	1.00	0.85	1.00	1.00	1.00	0.98										
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00										
Satd. Flow (prot)	1770	1583	1770	3539	3466	1770										
Flt Permitted	0.95	1.00	0.95	1.00	1.00	1.00										
Satd. Flow (perm)	1770	1583	1770	3539	3466	1770										
Volume (vph)	65	150	85	1975	752	121										
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95										
Adj. Flow (vph)	68	158	89	2079	792	127										
RTOR Reduction (vph)	0	119	0	0	13	0										
Lane Group Flow (vph)	68	39	89	2079	906	0										
Turn Type	<table border="1"> <thead> <tr> <th>Perm</th> <th>Prot</th> </tr> </thead> <tbody> <tr> <td>2</td> <td></td> </tr> <tr> <td></td> <td>3</td> </tr> <tr> <td></td> <td>8</td> </tr> <tr> <td></td> <td>4</td> </tr> </tbody> </table>						Perm	Prot	2			3		8		4
Perm	Prot															
2																
	3															
	8															
	4															
Protected Phases																
Actuated Green, G (s)	19.0	19.0	7.0	52.5	41.0											
Effective Green, g (s)	19.5	19.5	7.0	52.5	41.5											
Actuated g/C Ratio	0.24	0.24	0.09	0.66	0.52											
Clearance Time (s)	4.5	4.5	4.0	4.0	4.5											
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0											
Lane Grp Cap (vph)	431	386	155	2322	1798											
v/s Ratio Prot	c0.04		0.05	c0.59	0.26											
v/s Ratio Perm	0.16	0.10	0.57	0.90	0.50											
Uniform Delay, d1	23.8	23.4	35.1	11.5	12.5											
Progression Factor	1.00	1.00	1.00	1.00	1.94											
Incremental Delay, d2	0.2	0.1	5.1	5.9	0.6											
Delay (s)	24.0	23.6	40.1	17.4	25.0											
Level of Service	C	C	D	B	C											
Approach Delay (s)	23.7		18.3	25.0												
Approach LOS	C		B	C												
Intersection Summary																
HCM Average Control Delay	20.5					HCM Level of Service	C									
HCM Volume to Capacity ratio	0.70															
Actuated Cycle Length (s)	80.0					Sum of lost time (s)	8.0									
Intersection Capacity Utilization	64.9%					ICU Level of Service	C									
Analysis Period (min)	15															
c Critical Lane Group																

MacArthur BART TOD
WC06-2279
Fehr & Peers Associates, Inc.

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2030 AM Commercial Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	0.95	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.96	1.00
Lane Util. Factor	1.00	0.95	0.95	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.96	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.96	1.00
Flt	0.95	1.00	0.91	1.00	0.97	1.00	0.97	1.00	0.96	1.00	0.96	1.00
Flt Protected	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1750	1681	1596	1770	1596	1770	1596	1770	1596	1770	1596	1770
Flt Permitted	0.55	0.74	1.00	0.55	0.74	1.00	0.55	0.74	1.00	0.55	0.74	1.00
Satd. Flow (perm)	978	1302	1596	978	1302	1596	978	1302	1596	978	1302	1596
Volume (vph)	10	10	10	359	330	470	0	1165	245	110	1341	480
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	11	11	378	347	495	0	1226	258	116	1412	484
RTOR Reduction (vph)	0	6	0	0	43	0	0	15	0	0	28	0
Lane Group Flow (vph)	0	27	0	378	799	0	0	1469	0	116	1868	0
Confl. Peds. (#/hr)	4			4	44			12	12	12	44	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4			8			2			1		6
Permitted Phases	4			8			2			1		6
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	51.5	48.5	48.5	48.5	6.5	59.5	59.5
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	52.0	49.0	49.0	49.0	7.0	60.0	60.0
Actuated g/C Ratio	0.43	0.43	0.43	0.43	0.43	0.43	0.41	0.41	0.41	0.06	0.50	0.50
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	424	564	692	1393	1393	1393	103	1831	103	1831	103	1831
v/s Ratio Prot	0.03	0.29	0.50	0.03	0.29	0.50	0.43	0.43	0.07	0.57	0.03	0.57
v/s Ratio Perm	0.06	0.67	1.15	0.06	0.67	1.15	1.05	1.05	1.13	1.15	0.06	1.15
Uniform Delay, d1	19.8	27.2	34.0	19.8	27.2	34.0	35.5	35.5	35.5	30.0	19.8	35.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.87	0.87	0.87	1.00	1.00	1.00
Incremental Delay, d2	0.0	2.5	85.4	0.0	2.5	85.4	29.3	29.3	29.3	126.7	73.2	73.2
Delay (s)	19.8	29.6	119.4	19.8	29.6	119.4	60.1	60.1	60.1	183.2	103.2	103.2
Level of Service	B	C	F	B	C	F	E	E	E	F	F	F
Approach Delay (s)	19.8			91.6			60.1	60.1	60.1	107.8		107.8
Approach LOS	B			F			E	E	E	F		F

Intersection Summary			
HCM Average Control Delay	88.1	HCM Level of Service	F
HCM Volume to Capacity ratio	1.15		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	99.2%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

2030 AM Commercial Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Total Lost time (s)	0.97	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.98	1.00
Lane Util. Factor	1.00	0.99	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	0.98	1.00	0.96	1.00	0.97	1.00	0.97	1.00	0.98	1.00
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3433	3417	3417	1770	3370	1770	3370	1770	3391	1770	3393	1770
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3433	3417	3417	1770	3370	1770	3370	1770	3391	1770	3393	1770
Volume (vph)	460	650	113	140	820	320	120	671	140	320	1180	220
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	677	118	146	854	333	125	699	146	333	1229	229
RTOR Reduction (vph)	0	11	0	0	34	0	0	15	0	0	13	0
Lane Group Flow (vph)	479	784	0	146	1153	0	125	830	0	333	1445	0
Confl. Peds. (#/hr)	6			24	24		6	36	28	28	36	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		5	2		1		6
Permitted Phases	7	4		3	8		5	2		1		6
Actuated Green, G (s)	15.5	36.9		12.6	34.0		8.5	30.6		22.9		45.0
Effective Green, g (s)	16.0	38.9		13.1	36.0		9.0	32.6		23.4		47.0
Actuated g/C Ratio	0.13	0.32		0.11	0.30		0.08	0.27		0.19		0.39
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5		5.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	458	1108		193	1011		133	921		345		1329
v/s Ratio Prot	0.14	0.23		0.08	0.34		0.07	0.24		0.19		0.43
v/s Ratio Perm	1.05	0.71		0.76	1.14		0.94	0.90		0.97		1.09
Uniform Delay, d1	52.0	35.6		51.9	42.0		55.2	42.2		47.9		36.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.26		0.79
Incremental Delay, d2	54.5	1.7		13.9	75.2		58.5	13.7		8.0		40.8
Delay (s)	106.5	37.3		65.8	117.2		113.7	55.8		68.2		69.5
Level of Service	F	D		E	F		F	E		E		E
Approach Delay (s)	63.3			111.6			63.3			69.2		69.2
Approach LOS	E			F			E			E		E

Intersection Summary			
HCM Average Control Delay	77.3	HCM Level of Service	E
HCM Volume to Capacity ratio	1.07		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	9.0
Intersection Capacity Utilization	106.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 7: 40th St. & Market St. 2030 AM Commercial Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.99	1.00	1.00
Frpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.98	1.00	0.97
Flt	1.00	0.96	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.98	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1758	3377	1764	3457	1768	1831	1768	1831	1768	1831	1750	1815
Flt Permitted	0.16	1.00	0.27	1.00	0.27	1.00	0.14	1.00	0.14	1.00	0.40	1.00
Satd. Flow (perm)	291	3377	494	3457	264	1831	264	1831	264	1831	729	1815
Volume (vph)	180	521	190	93	934	114	160	381	39	206	600	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	548	200	98	983	120	168	401	41	217	632	116
RTOR Reduction (vph)	0	41	0	0	10	0	0	6	0	0	5	0
Lane Group Flow (vph)	189	707	0	98	1093	0	168	436	0	217	743	0
Confl. Peds. (#/hr)	30	12	12	30	6	6	54	54	54	54	54	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	26.4	26.4	26.4	26.4	26.4	26.4	31.9	31.9	31.9	31.9	31.9	31.9
Effective Green, g (s)	25.4	25.4	25.4	25.4	25.4	25.4	31.4	31.4	31.4	31.4	31.4	31.4
Actuated g/C Ratio	0.39	0.39	0.39	0.39	0.39	0.39	0.48	0.48	0.48	0.48	0.48	0.48
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
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
Lane Grp Cap (vph)	114	1324	194	1355	128	887	353	879	353	879	353	879
v/s Ratio Prot	0.21	0.21	0.21	0.32	0.32	0.32	0.24	0.24	0.24	0.24	0.41	0.41
v/s Ratio Perm	0.65	0.53	0.51	0.81	0.81	0.81	0.64	0.64	0.64	0.64	0.30	0.30
v/c Ratio	1.66	0.53	0.51	0.81	0.81	0.81	1.31	0.49	0.49	0.49	0.61	0.85
Uniform Delay, d1	19.7	15.2	14.9	17.5	16.7	11.3	12.3	14.6	12.3	14.6	12.3	14.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	331.6	1.5	9.1	5.2	185.4	0.4	3.2	7.5	3.2	7.5	3.2	7.5
Delay (s)	351.3	16.7	24.0	22.7	202.1	11.7	15.4	22.1	15.4	22.1	15.4	22.1
Level of Service	F	B	C	C	C	F	B	C	B	C	B	C
Approach Delay (s)	84.2	22.8	64.2	22.8	64.2	22.8	64.2	22.8	64.2	22.8	64.2	22.8
Approach LOS	F	F	C	C	C	E	E	E	E	E	C	C

Intersection Summary	
HCM Average Control Delay	44.5
HCM Volume to Capacity ratio	1.47
Actuated Cycle Length (s)	64.8
Intersection Capacity Utilization	101.6%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2030 AM Commercial Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.90	1.00	0.90	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.97
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.97
Flt	1.00	0.94	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3004	1770	3393	1770	3393	1770	3420	1770	3393	1736	3333
Flt Permitted	0.13	1.00	0.13	1.00	0.13	1.00	0.06	1.00	0.06	1.00	0.37	1.00
Satd. Flow (perm)	243	3004	243	3393	243	3393	118	3420	118	3420	681	3333
Volume (vph)	146	420	267	128	732	90	135	505	59	100	1354	320
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	154	442	281	135	771	95	142	532	62	105	1425	337
RTOR Reduction (vph)	0	80	0	0	8	0	0	8	0	0	17	0
Lane Group Flow (vph)	154	643	0	135	858	0	142	586	0	105	1745	0
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	58	92
Turn Type	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt
Protected Phases	7	4	4	3	8	8	5	2	2	1	1	6
Permitted Phases	4	4	4	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	36.0	30.0	30.0	36.0	30.0	30.0	68.5	62.5	62.5	67.5	62.0	62.0
Effective Green, g (s)	37.2	30.6	30.6	37.2	30.6	30.6	69.7	63.1	63.1	68.7	62.6	62.6
Actuated g/C Ratio	0.31	0.26	0.26	0.31	0.26	0.26	0.58	0.53	0.53	0.57	0.52	0.52
Clearance Time (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
Vehicle Extension (s)	3.0	2.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	159	766	159	865	159	865	159	1798	159	444	1739	444
v/s Ratio Prot	0.05	0.21	0.21	0.05	0.25	0.25	0.05	0.17	0.05	0.01	0.52	0.52
v/s Ratio Perm	0.25	0.84	0.84	0.22	0.99	0.99	0.47	0.12	0.47	0.12	0.12	0.12
v/c Ratio	0.97	0.84	0.84	0.85	0.99	0.99	0.89	0.33	0.89	0.33	0.24	0.24
Uniform Delay, d1	37.8	42.4	42.4	33.7	44.6	44.6	31.8	16.3	31.8	12.0	28.7	28.7
Progression Factor	1.16	0.76	0.76	1.00	1.00	1.00	1.50	1.08	1.50	1.00	1.00	1.00
Incremental Delay, d2	56.0	6.6	6.6	32.2	28.4	28.4	40.3	0.5	40.3	0.1	22.4	22.4
Delay (s)	99.9	38.8	38.8	65.8	73.0	73.0	87.9	18.0	87.9	12.1	51.1	51.1
Level of Service	F	D	D	E	E	E	F	B	F	B	B	D
Approach Delay (s)	49.6	D	D	72.0	E	E	31.5	C	31.5	48.9	D	D
Approach LOS	D	D	D	E	E	E	C	C	E	C	D	D

Intersection Summary	
HCM Average Control Delay	51.3
HCM Volume to Capacity ratio	0.99
Actuated Cycle Length (s)	120.0
Intersection Capacity Utilization	101.3%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

2030 AM Commercial Mit
 1/21/2008

2030 AM Commercial Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	0.98	1.00	1.00	1.00	0.99
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	1.00	0.96
Fltb, ped/bikes	0.99	1.00	0.98	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	4981	1762	3446	1770	1729	1704	1759	1704	1759	1704	1759	1704
Flt Permitted	0.66	0.21	1.00	0.10	1.00	0.49	1.00	0.49	1.00	0.49	1.00	0.49
Satd. Flow (perm)	3324	384	3446	189	1729	880	1759	880	1759	880	1759	880
Volume (vph)	210	720	50	71	1092	191	100	189	90	200	493	200
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	758	53	75	1149	201	105	199	95	211	519	211
RTOR Reduction (vph)	0	5	0	0	13	0	0	16	0	0	13	0
Lane Group Flow (vph)	0	1027	0	75	1337	0	105	278	0	211	717	0
Confl. Peds. (#/hr)	24	18	18	24	24	24	48	48	48	48	48	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0	49.0	49.0	49.0	49.0	49.0	49.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.45	0.45	0.45	0.45	0.45	0.45	0.45
Clearance 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
Lane Grp Cap (vph)	1571	182	1629	182	1629	86	786	86	786	400	800	400
v/s Ratio Prot	0.31	0.20	0.20	c0.39	c0.39	0.16	0.16	0.16	0.16	0.24	0.24	0.24
v/s Ratio Perm	3.03dl	0.41	0.82	1.22	1.22	0.35	0.53	0.53	0.53	0.90	0.90	0.90
v/c Ratio	22.1	19.0	25.0	30.0	30.0	19.5	21.5	21.5	21.5	27.6	27.6	27.6
Uniform Delay, d1	2.1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.1	6.8	4.8	167.9	1.2	4.9	14.8	1.2	4.9	14.8	1.2	4.9
Incremental Delay, d2	24.3	25.7	29.8	197.9	20.7	26.4	42.4	20.7	26.4	42.4	20.7	26.4
Delay (s)	C	C	C	C	C	C	C	C	C	C	C	C
Level of Service	C	C	C	C	C	C	C	C	C	C	C	C
Approach Delay (s)	24.3	29.6	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4	67.4
Approach LOS	C	C	C	C	C	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	34.4 HCM Level of Service C											
HCM Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	110.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	142.6% ICU Level of Service H											
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 through lane as a left lane.	c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 AM Commercial Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	0.96	1.00	0.96	1.00	1.00	0.96
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4922	1770	4839	1770	4839	1770	3539	1515	1770	3539	1523
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	4922	1770	4839	1770	4839	1770	3539	1515	1770	3539	1523
Volume (vph)	170	1200	171	210	1141	380	140	422	130	390	1441	250
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1263	180	221	1201	400	147	444	137	411	1517	263
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	33	0	0	13
Lane Group Flow (vph)	179	1428	0	221	1551	0	147	444	104	411	1517	250
Confl. Peds. (#/hr)			66			23			38			26
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm	ov	Prot	pm	ov	pm
Protected Phases	7	4	3	8	5	2	3	1	6	7		
Permitted Phases												6
Actuated Green, G (s)	12.0	32.0	15.0	35.0	11.0	28.0	43.0	29.0	46.0	58.0		
Effective Green, g (s)	11.0	33.0	14.0	36.0	10.0	29.0	43.0	28.0	47.0	58.0		
Actuated g/C Ratio	0.09	0.28	0.12	0.30	0.08	0.24	0.36	0.23	0.39	0.48		
Clearance Time (s)	3.0	5.0	3.0	5.0	3.0	5.0	3.0	3.0	3.0	5.0	3.0	3.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	1354	207	1452	148	855	593	413	1386	736		
v/s Ratio Prot	0.10	0.29	c0.12	c0.32	c0.08	0.13	0.02	0.23	c0.43	0.03		
v/s Ratio Perm	1.10	1.05	1.07	1.07	0.99	0.52	0.18	1.00	1.09	0.34		
Uniform Delay, d1	54.5	43.5	53.0	42.0	55.0	39.5	26.4	45.9	36.5	19.2		
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	101.6	40.2	81.6	44.2	71.6	2.3	0.1	42.7	54.3	0.1		
Delay (s)	156.1	83.7	134.6	86.2	126.5	41.7	26.4	88.6	90.8	19.3		
Level of Service	F	F	F	F	F	D	C	F	F	F		
Approach Delay (s)	91.7		92.1		56.0			81.8				
Approach LOS	F		F		E			F				

Intersection Summary	
HCM Average Control Delay	84.3
HCM Volume to Capacity ratio	1.09
Actuated Cycle Length (s)	120.0
Intersection Capacity Utilization	101.4%
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

2030 PM Commercial Mit
 1/21/2008

2030 PM Commercial Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt, ped/bikes	0.93	1.00	0.93	1.00	0.93	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1704	1681	1586	1770	1586	1770	3275	1770	3208	1770	3208	1770
Flt Permitted	0.56	0.73	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	963	1290	1586	1770	1586	1770	3275	1770	3208	1770	3208	1770
Volume (vph)	10	10	20	126	120	120	0	1122	619	200	896	420
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	11	21	133	126	126	0	1181	652	211	943	442
RTOR Reduction (vph)	0	20	0	0	38	0	0	67	0	0	48	0
Lane Group Flow (vph)	0	23	0	133	214	0	0	1766	0	211	1337	0
Confl. Peds. (#/hr)	36	Permitted	Permitted	36	48	16	16	16	16	16	16	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	4	3	8	8	2	2	2	2	2	6
Permitted Phases	7	4	4	3	8	8	2	2	2	2	2	6
Actuated Green, G (s)	4.0	16.5	16.5	16.5	16.5	16.5	52.0	52.0	9.5	66.0	66.0	66.0
Effective Green, g (s)	4.5	17.0	17.0	17.0	17.0	17.0	52.5	52.5	10.0	66.5	66.5	66.5
Actuated g/C Ratio	0.04	0.17	0.17	0.17	0.17	0.17	0.52	0.52	0.10	0.66	0.66	0.66
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	43	219	270	1719	270	1719	1719	1719	177	2133	177	2133
v/s Ratio Prot	c0.02	0.10	0.13	0.10	0.13	0.10	c0.54	c0.12	0.42	0.12	0.42	0.42
v/s Ratio Perm	0.53	0.61	0.79	0.61	0.79	0.61	1.03	1.03	1.19	0.63	0.63	0.63
Uniform Delay, d1	46.7	38.4	39.8	38.4	39.8	38.4	23.8	23.8	45.0	9.6	9.6	9.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.71	0.71	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.2	3.2	13.7	3.2	13.7	3.2	15.2	15.2	128.8	1.4	1.4	1.4
Delay (s)	53.0	41.7	53.5	41.7	53.5	41.7	32.0	32.0	173.8	11.0	11.0	11.0
Level of Service	D	D	D	D	D	D	C	C	F	B	B	B
Approach Delay (s)	53.0	49.4	49.4	49.4	49.4	49.4	32.0	32.0	32.0	32.5	32.5	32.5
Approach LOS	D	D	D	D	D	D	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	34.2											
HCM Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	100.0											
Intersection Capacity Utilization	89.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 8: 40th St. & West St. 2030 PM Commercial Mit 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97
Flt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fit Protected	1762	3458	1752	3498	1752	3498	1752	3498	1752	3498	1752	3498
Satd. Flow (prot)	0.21	1.00	0.16	1.00	0.21	1.00	0.16	1.00	0.21	1.00	0.16	1.00
Fit Permitted	382	3458	292	3498	382	3458	292	3498	382	3458	292	3498
Satd. Flow (perm)	60	1154	120	1033	68	90	333	57	33	160	50	50
Volume (vph)	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Peak-hour factor, PHF	61	1166	121	1043	69	91	336	58	33	162	51	51
Adj. Flow (vph)	0	10	0	6	0	0	13	0	0	30	0	0
RTOR Reduction (vph)	61	1277	0	75	1106	0	0	472	0	0	217	0
Lane Group Flow (vph)	24	78	78	24	8	8	24	6	6	6	217	8
Confl. Peds. (#/hr)												
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance 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
Lane Grp Cap (vph)	244	2204	186	2230	186	2230	186	2230	186	2230	186	2230
v/s Ratio Prot	0.16	0.37	0.26	0.32	0.16	0.32	0.16	0.32	0.16	0.32	0.16	0.32
v/s Ratio Perm	0.25	0.58	0.40	0.50	0.25	0.50	0.25	0.50	0.25	0.50	0.25	0.50
v/c Ratio	6.3	8.3	7.1	7.7	6.3	8.3	7.1	7.7	6.3	8.3	7.1	7.7
Uniform Delay, d1	0.55	0.44	0.40	0.26	0.40	0.26	0.40	0.26	0.40	0.26	0.40	0.26
Progression Factor	1.0	0.4	3.4	0.4	1.0	0.4	3.4	0.4	1.0	0.4	3.4	0.4
Incremental Delay, d2	4.4	4.1	6.3	2.4	4.4	4.1	6.3	2.4	4.4	4.1	6.3	2.4
Delay (s)	A	A	A	A	A	A	A	A	A	A	A	A
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	4.1	2.7	2.7	2.7	4.1	2.7	2.7	2.7	4.1	2.7	2.7	2.7
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	7.6	HCM Level of Service										
HCM Volume to Capacity ratio	0.59	A										
Actuated Cycle Length (s)	80.0	Sum of lost time (s)										
Intersection Capacity Utilization	80.7%	ICU Level of Service										
Analysis Period (min)	15	D										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2030 PM Commercial Mit 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.96
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3429	1770	3296	1770	3296	1770	3466	1770	3466	1770	3235
Fit Permitted	0.14	1.00	0.16	1.00	0.14	1.00	0.16	1.00	0.14	1.00	0.16	1.00
Satd. Flow (perm)	258	3429	292	3296	258	3429	292	3466	258	3429	292	3235
Volume (vph)	249	934	109	75	557	110	466	1470	124	130	689	255
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	254	953	111	77	568	112	476	1500	127	133	703	260
RTOR Reduction (vph)	0	8	0	0	15	0	0	6	0	0	34	0
Lane Group Flow (vph)	254	1056	0	77	665	0	476	1621	0	133	929	0
Confl. Peds. (#/hr)	94	86	86	94	94	86	86	94	40	40	111	111
Turn Type	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt
Protected Phases	7	4	7	4	7	4	7	4	7	4	7	4
Permitted Phases	4	8	4	8	4	8	4	8	4	8	4	8
Actuated Green, G (s)	40.9	33.7	28.1	24.9	40.9	33.7	28.1	24.9	40.9	33.7	28.1	24.9
Effective Green, g (s)	41.5	34.3	29.3	25.5	41.5	34.3	29.3	25.5	41.5	34.3	29.3	25.5
Actuated g/C Ratio	0.38	0.31	0.27	0.23	0.38	0.31	0.27	0.23	0.38	0.31	0.27	0.23
Clearance Time (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
Vehicle Extension (s)	3.0	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0	2.0	3.0	2.0
Lane Grp Cap (vph)	271	1069	129	764	271	1069	129	764	271	1069	129	764
v/s Ratio Prot	0.11	0.31	0.02	0.20	0.11	0.31	0.02	0.20	0.11	0.31	0.02	0.20
v/s Ratio Perm	0.25	0.58	0.14	0.20	0.25	0.58	0.14	0.20	0.25	0.58	0.14	0.20
v/c Ratio	0.94	0.99	0.60	0.87	0.94	0.99	0.60	0.87	0.94	0.99	0.60	0.87
Uniform Delay, d1	27.6	37.6	33.2	40.7	27.6	37.6	33.2	40.7	27.6	37.6	33.2	40.7
Progression Factor	0.79	0.79	1.00	1.00	0.79	0.79	1.00	1.00	0.79	0.79	1.00	1.00
Incremental Delay, d2	33.3	21.7	7.2	10.3	33.3	21.7	7.2	10.3	33.3	21.7	7.2	10.3
Delay (s)	55.1	51.3	40.5	51.0	55.1	51.3	40.5	51.0	55.1	51.3	40.5	51.0
Level of Service	E	D	D	D	E	D	D	D	E	D	D	D
Approach Delay (s)	52.1	D	49.9	D	52.1	D	49.9	D	52.1	D	49.9	D
Approach LOS	D	D	D	D	D	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	50.2	HCM Level of Service										
HCM Volume to Capacity ratio	0.97	D										
Actuated Cycle Length (s)	110.0	Sum of lost time (s)										
Intersection Capacity Utilization	102.1%	ICU Level of Service										
Analysis Period (min)	15	G										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2030 PM Commercial Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.99	1.00	0.98	1.00	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.98
Fit Protected	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	5013	1768	3452	1737	1802	1770	1805	1770	1805	1770	1805	1770
Fit Permitted	0.66	0.21	1.00	0.26	1.00	0.11	1.00	0.11	1.00	0.11	1.00	0.11
Satd. Flow (perm)	3311	389	3452	476	1802	213	1805	213	1805	213	1805	213
Volume (vph)	160	858	40	93	1347	221	190	525	120	80	406	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	876	41	95	1374	226	194	536	122	82	414	71
RTOR Reduction (vph)	0	5	0	0	15	0	0	9	0	0	7	0
Lane Group Flow (vph)	0	1075	0	95	1585	0	194	649	0	82	478	0
Confl. Peds. (#/hr)	24	4	4	4	4	24	48	12	12	12	48	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52	0.52
Clearance 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
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
Lane Grp Cap (vph)	1729	203	1803	185	701	83	702	83	702	83	702	83
v/s Ratio Prot												
v/s Ratio Perm	0.32	0.24	0.24	0.41	0.41	0.36	0.36	0.36	0.36	0.36	0.36	0.36
v/c Ratio	1.87d	0.47	0.88	1.05	0.93	0.99	0.68	0.99	0.68	0.99	0.68	0.99
Uniform Delay, d1	15.2	13.6	19.0	27.5	26.3	27.3	22.9	27.3	22.9	27.3	22.9	27.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.7	7.6	6.5	79.6	18.1	93.9	2.7	93.9	2.7	93.9	2.7	93.9
Delay (s)	16.9	21.2	25.5	107.1	44.3	121.2	25.6	121.2	25.6	121.2	25.6	121.2
Level of Service	B	C	C	F	D	F	C	F	D	F	C	F
Approach Delay (s)	16.9	C	C	25.2	58.6	39.4	C	58.6	39.4	C	58.6	39.4
Approach LOS	B	C	C	E	E	D	D	E	E	D	D	D
Intersection Summary												
HCM Average Control Delay	31.8 HCM Level of Service C											
HCM Volume to Capacity ratio	0.95											
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	135.8% ICU Level of Service H											
Analysis Period (min)	15											
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

2030 PM Commercial Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Lane Util. Factor	0.91	1.00	0.91	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.99	1.00	0.96	1.00	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Fit Protected	0.98	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	4916	4804	4804	1768	3456	1770	3427	1768	3456	1770	3427	1768
Fit Permitted	0.69	0.69	0.69	0.13	1.00	0.12	1.00	0.13	1.00	0.12	1.00	0.12
Satd. Flow (perm)	3461	3313	3313	249	3456	227	3427	249	3456	227	3427	249
Volume (vph)	387	695	111	110	1174	466	280	1206	110	206	626	111
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	407	732	117	116	1236	491	295	1269	116	217	659	117
RTOR Reduction (vph)	0	10	0	0	59	0	0	6	0	0	13	0
Lane Group Flow (vph)	0	1246	0	0	1784	0	295	1379	0	217	763	0
Confl. Peds. (#/hr)	26	19	19	26	39	26	39	92	26	92	92	39
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	8	8	8	8	8	8
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0
Effective Green, g (s)	51.6	51.6	51.6	51.6	51.6	51.6	51.6	51.6	51.6	51.6	51.6	51.6
Actuated g/C Ratio	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (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
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	1624	1554	1554	329	1276	190	1022	329	1276	190	1022	329
v/s Ratio Prot												
v/s Ratio Perm	0.36	0.36	0.36	0.54	0.54	0.40	0.22	0.54	0.40	0.40	0.22	0.54
v/c Ratio	4.33d	1.15	1.15	29.2	26.3	34.7	31.4	26.3	34.7	31.4	34.8	26.3
Uniform Delay, d1	24.2	24.2	24.2	29.2	26.3	34.7	31.4	26.3	34.7	31.4	34.8	26.3
Progression Factor	1.14	1.00	1.00	1.00	0.85	0.92	1.44	0.85	0.92	1.44	1.17	0.85
Incremental Delay, d2	1.5	74.5	74.5	22.9	48.6	107.2	4.7	22.9	48.6	107.2	4.7	22.9
Delay (s)	29.0	74.5	74.5	103.7	45.2	80.5	152.4	45.2	80.5	152.4	45.6	45.2
Level of Service	C	F	F	F	D	F	D	F	D	F	D	F
Approach Delay (s)	29.0	C	C	103.7	45.2	74.3	68.9	45.2	74.3	68.9	45.6	45.2
Approach LOS	C	C	C	F	F	E	E	F	E	E	D	E
Intersection Summary												
HCM Average Control Delay	72.9 HCM Level of Service E											
HCM Volume to Capacity ratio	1.09											
Actuated Cycle Length (s)	110.0 Sum of lost time (s) 6.8											
Intersection Capacity Utilization	122.0% ICU Level of Service H											
Analysis Period (min)	15											
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.												
c Critical Lane Group												

**APPENDIX O:
EXISTING PLUS TOWER ALTERNATIVE
INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

Existing+Tower AM
 1/21/2008

Existing+Tower AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	1.00
Fipb, ped/bikes	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.99	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4922	1770	4965	1770	4965	2006	2049	1984	1927	1984	1927
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.11	1.00	0.46	1.00	0.46	1.00
Satd. Flow (perm)	1770	4922	1770	4965	1770	4965	222	2049	962	1927	962	1927
Volume (vph)	288	907	176	65	1219	165	206	270	50	146	278	246
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	303	955	185	68	1283	174	217	284	53	154	293	259
RTOR Reduction (vph)	0	20	0	0	14	0	0	6	0	0	28	0
Lane Group Flow (vph)	303	1120	0	68	1443	0	217	331	0	154	524	0
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	3	8	5	2	6	6	6	6	6	6
Permitted Phases												
Actuated Green, G (s)	17.0	56.4	8.6	48.0	44.5	44.5	44.5	44.5	35.5	35.5	35.5	35.5
Effective Green, g (s)	17.0	56.4	8.6	48.0	45.0	45.0	45.0	45.0	36.0	36.0	36.0	36.0
Actuated g/C Ratio	0.14	0.47	0.07	0.40	0.38	0.38	0.38	0.38	0.30	0.30	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5
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
Lane Grp Cap (vph)	251	2313	127	1986	187	768	289	578	289	578	289	578
v/s Ratio Prot	c0.17	0.23	0.04	c0.29	c0.07	0.16	c0.07	0.16	c0.27	c0.27	c0.27	c0.27
v/c Ratio Perm							0.37	0.16	0.16	0.16	0.16	0.16
Uniform Delay, d1	1.21	0.48	0.54	0.73	1.16	0.43	0.53	0.91	0.53	0.91	0.53	0.91
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	124.5	0.7	4.3	2.4	115.7	0.4	1.9	17.8	1.9	17.8	1.9	17.8
Delay (s)	176.0	22.5	58.1	32.8	149.5	28.4	36.9	58.2	36.9	58.2	36.9	58.2
Level of Service	F	C	E	C	F	C	F	C	D	E	D	E
Approach Delay (s)	54.8		33.9		75.8		53.6		53.6		53.6	
Approach LOS	D		C		E		D		D		D	
Intersection Summary												
HCM Average Control Delay	49.8											
HCM Volume to Capacity ratio	0.88											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	98.2%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	1.00	0.94	1.00	0.92	1.00	0.92	1.00	0.97	1.00	0.95	1.00	0.95
Flt Protected	0.97	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1696	1681	1607	1681	1607	1681	3405	3405	1770	3203	1770	3203
Flt Permitted	0.80	0.75	1.00	0.75	1.00	0.75	0.94	0.94	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1402	1321	1607	1321	1607	1321	3215	3215	1770	3203	1770	3203
Volume (vph)	8	0	7	113	95	119	10	987	231	72	664	358
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	9	0	8	122	102	128	11	1061	248	77	714	385
RTOR Reduction (vph)	0	8	0	0	61	0	0	15	0	0	49	0
Lane Group Flow (vph)	0	9	0	122	169	0	0	1305	0	77	1050	0
Confl. Peds. (#/hr)	4			4	44			12	12	12	44	44
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Perm	Prot	Prot	Perm	Prot
Protected Phases	7		8	8	2		2	1		1	6	6
Permitted Phases												
Actuated Green, G (s)	3.3		13.0	13.0	48.7		48.7	7.0		7.0	60.2	60.2
Effective Green, g (s)	3.8		13.5	13.5	49.2		49.2	7.5		7.5	60.7	60.7
Actuated g/C Ratio	0.04		0.15	0.15	0.55		0.55	0.08		0.08	0.67	0.67
Clearance Time (s)	4.5		4.5	4.5	4.5		4.5	4.5		4.5	4.5	4.5
Vehicle Extension (s)	2.0		2.0	2.0	2.0		2.0	2.0		2.0	2.0	2.0
Lane Grp Cap (vph)	59		198	241	1758		1758	148		2160	148	2160
v/s Ratio Prot	c0.01		0.09	0.11	c0.41		c0.41	0.04		c0.33	0.04	c0.33
v/c Ratio Perm	0.16		0.62	0.70	0.74		0.74	0.52		0.49	0.52	0.49
Uniform Delay, d1	41.6		35.8	36.3	15.6		15.6	39.5		7.1	39.5	7.1
Progression Factor	1.00		1.00	1.00	1.03		1.03	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5		4.0	7.3	1.5		1.5	1.5		0.8	1.5	0.8
Delay (s)	42.0		39.8	43.6	17.5		17.5	41.0		7.9	41.0	7.9
Level of Service	D		D	D	B		B	D		D	D	A
Approach Delay (s)	42.0		42.3		17.5		17.5	10.1		10.1	42.3	10.1
Approach LOS	D		D		B		B	D		D	B	B
Intersection Summary												
HCM Average Control Delay	17.7											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	77.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

Existing+Tower AM
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.99	1.00	1.00	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	
Fllb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.98	1.00	0.98	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3432	1770	3398	1770	3441	1770	3441	1770	3354	1770	3354	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3433	3432	1770	3398	1770	3441	1770	3441	1770	3354	1770	3354	
Volume (vph)	450	533	86	101	677	209	107	595	99	140	510	143	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	469	555	90	105	705	218	111	620	103	146	531	149	
RTOR Reduction (vph)	0	14	0	0	32	0	0	14	0	0	27	0	
Lane Group Flow (vph)	469	631	0	105	891	0	111	709	0	146	653	0	
Confl. Peds. (#/hr)	6	24	24	24	24	6	36	28	28	28	28	36	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Actuated Green, G (s)	13.0	30.6	7.9	25.5	8.0	24.4	10.1	26.5					
Effective Green, g (s)	12.5	31.6	7.4	26.5	7.5	25.4	9.6	27.5					
Actuated g/C Ratio	0.14	0.35	0.08	0.29	0.08	0.28	0.11	0.31					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grp Cap (vph)	477	1205	146	1001	148	971	189	1025					
v/s Ratio Prot	c0.14	0.18	0.06	c0.26	0.06	c0.21	c0.08	0.19					
v/s Ratio Perm	0.98	0.52	0.72	0.89	0.75	0.73	0.77	0.64					
Uniform Delay, d1	38.6	23.2	40.3	30.4	40.3	29.2	39.1	26.9					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.12	0.82					
Incremental Delay, d2	36.5	0.2	13.2	9.5	17.1	4.8	14.5	2.7					
Delay (s)	75.2	23.4	53.4	39.9	57.4	34.0	58.2	24.9					
Level of Service	E	C	D	D	E	C	E	C					
Approach Delay (s)	45.2	D	41.3	D	37.1	D	30.8	C					
Approach LOS	D	D	D	D	D	D	D	C					
Intersection Summary													
HCM Average Control Delay	39.2											HCM Level of Service	D
HCM Volume to Capacity ratio	0.83												
Actuated Cycle Length (s)	90.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	79.4%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

Existing+Tower AM
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.86	0.86	1.00	0.95	1.00	0.95	1.00	0.97	0.95	1.00	0.97	0.95	
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1611	1611	3284	3433	3447	1611	1611	3284	3433	3447	1611	1611	
Flt Permitted	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (perm)	1611	1611	3284	3433	3447	1611	1611	3284	3433	3447	1611	1611	
Volume (vph)	0	0	7	0	0	0	7	323	302	1585	289	56	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	0	0	8	0	0	0	8	351	328	1723	292	61	
RTOR Reduction (vph)	0	8	0	0	0	0	0	24	0	0	0	0	
Lane Group Flow (vph)	0	0	0	0	0	0	0	663	0	1723	353	0	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases							2	1	6				
Permitted Phases													
Actuated Green, G (s)	0.0	0.0	0.0	0.0	0.0	0.0	8.0	8.0	29.0	45.0	0.0	0.0	
Effective Green, g (s)	0.0	0.0	0.0	0.0	0.0	0.0	8.0	8.0	29.0	45.0	0.0	0.0	
Actuated g/C Ratio	0.00	0.00	0.00	0.00	0.00	0.00	0.18	0.18	0.64	1.00	0.00	0.00	
Clearance Time (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	
Lane Grp Cap (vph)	0	0	0	0	0	0	554	2212	3447	0	0	0	
v/s Ratio Prot							c0.21	c0.21	c0.50	0.10			
v/s Ratio Perm	0.00	0.00	0.00	0.00	0.00	0.00	11.31dr	11.31dr	0.78	0.10	0.00	0.00	
Uniform Delay, d1	22.5	22.5	22.5	18.5	18.5	18.5	0.75	0.75	5.7	0.0	0.0	0.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0	0.0	104.4	104.4	104.4	2.8	2.8	0.1	0.0	0.0	0.0	
Delay (s)	22.5	22.5	22.5	118.3	118.3	118.3	8.5	8.5	0.1	0.0	0.0	0.0	
Level of Service	C	C	C	F	F	F	A	A	A	A	A	A	
Approach Delay (s)	22.5	22.5	22.5	118.3	118.3	118.3	7.1	7.1	0.1	0.0	0.0	0.0	
Approach LOS	C	C	C	A	A	A	A	A	A	A	A	A	
Intersection Summary													
HCM Average Control Delay	34.7											HCM Level of Service	C
HCM Volume to Capacity ratio	0.87												
Actuated Cycle Length (s)	45.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.4%											ICU Level of Service	D
Analysis Period (min)	15												
dr Defacto Right Lane. Recode with 1 through lane as a right lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

Existing+Tower AM
 1/21/2008

Existing+Tower AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.97	0.97	0.97	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Fipb, ped/bikes	0.97	0.97	0.97	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Frt	0.98	0.98	0.98	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Satd. Flow (prot)	1672	1596	1596	3394	3394	3459	3459	3459	3459	3459	3459	3459
Flt Permitted	0.80	0.80	0.88	0.88	0.88	0.88	0.92	0.92	0.88	0.88	0.88	0.88
Satd. Flow (perm)	1363	1419	1419	3146	3146	3046	3046	3046	3046	3046	3046	3046
Volume (vph)	69	50	25	51	44	72	24	474	80	41	423	28
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	77	56	28	57	49	80	27	527	89	46	470	31
RTOR Reduction (vph)	0	17	0	0	53	0	0	29	0	0	10	0
Lane Group Flow (vph)	0	144	0	0	133	0	0	614	0	0	537	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8		2		2			6	
Permitted Phases	4			8		2		2			6	
Actuated Green, G (s)	15.0			15.0		22.0		22.0			22.0	
Effective Green, g (s)	15.0			15.0		22.0		22.0			22.0	
Actuated g/C Ratio	0.33			0.33		0.49		0.49			0.49	
Clearance Time (s)	4.0			4.0		4.0		4.0			4.0	
Lane Grp Cap (vph)	454			473		1538		1489			1489	
v/s Ratio Prot	c0.11			0.09		c0.20		0.18			0.18	
v/s Ratio Perm	0.32			0.28		0.40		0.36			0.36	
v/c Ratio	11.2			11.0		7.3		7.1			7.1	
Uniform Delay, d1	1.00			1.00		1.00		1.00			1.00	
Progression Factor	1.8			1.5		0.8		0.7			0.7	
Incremental Delay, d2	13.0			12.5		8.1		7.8			7.8	
Delay (s)	B			B		A		A			A	
Level of Service	B			B		A		A			A	
Approach Delay (s)	13.0			12.5		8.1		7.8			7.8	
Approach LOS	B			B		A		A			A	
Intersection Summary												
HCM Average Control Delay	9.0											
HCM Volume to Capacity ratio	0.37											
Actuated Cycle Length (s)	45.0											
Intersection Capacity Utilization	60.6%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

Existing+Tower AM
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	0.98	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1732	3476	1757	3470	1766	3470	1766	3470	1734	3470	1734	3470
Flt Permitted	0.31	1.00	0.47	1.00	0.47	1.00	0.62	1.00	0.63	1.00	0.63	1.00
Satd. Flow (perm)	570	3476	860	3470	1145	3470	1145	3470	1147	3470	1147	3470
Volume (vph)	19	301	35	29	456	44	82	160	27	88	187	15
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	21	331	38	32	501	48	90	176	30	97	205	16
RTOR Reduction (vph)	0	11	0	0	9	0	0	8	0	0	3	0
Lane Group Flow (vph)	21	358	0	32	540	0	90	198	0	97	218	0
Conf. Peds. (#/hr)	30	12	12	12	30	6	30	6	54	54	30	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4											
Permitted Phases	8											
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	164	999	247	998	701	1110	703	1128				
v/s Ratio Prot	0.10											
v/s Ratio Perm	c0.16											
v/c Ratio	0.04	0.04	0.04	0.04	0.04	0.04	0.08	0.08	0.08	0.08	0.08	0.08
Uniform Delay, d1	21.1	22.6	21.1	24.0	6.5	6.7	6.6	6.8				
Progression Factor	1.00	1.00	1.00	0.97	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.6	1.0	1.1	2.1	0.4	0.4	0.4	0.4				
Delay (s)	22.7	23.6	22.2	25.5	6.9	7.1	7.0	7.2				
Level of Service	C	C	C	C	A	A	A	A				
Approach Delay (s)	23.6			25.2			7.1					
Approach LOS	C			C			A					

Intersection Summary	
HCM Average Control Delay	17.8
HCM Volume to Capacity ratio	0.30
Actuated Cycle Length (s)	80.0
Intersection Capacity Utilization	79.0%
Analysis Period (min)	15
Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

Existing+Tower AM
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1759	3460	1736	3517	1736	3517	1736	3517	1736	3517	1736	3517
Flt Permitted	0.43	1.00	0.47	1.00	0.47	1.00	0.85	1.00	0.85	1.00	0.89	1.00
Satd. Flow (perm)	802	3460	851	3517	851	3517	2881	3460	851	3517	851	3517
Volume (vph)	15	377	48	34	457	17	61	101	45	20	66	25
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	16	397	51	36	481	18	64	106	47	21	69	26
RTOR Reduction (vph)	0	12	0	0	3	0	0	28	0	0	15	0
Lane Group Flow (vph)	16	436	0	36	496	0	189	0	0	18	18	0
Conf. Peds. (#/hr)	18	18	54	54	18	4	18	4	18	18	18	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4											
Permitted Phases	8											
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	38.0	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.41	0.41	0.41	0.41	0.41	0.41
Clearance 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
Lane Grp Cap (vph)	391	1687	415	1715	415	1715	1188	1687	415	1715	415	1715
v/s Ratio Prot	0.13											
v/s Ratio Perm	c0.14											
v/c Ratio	0.02	0.02	0.02	0.02	0.02	0.02	0.07	0.07	0.07	0.07	0.07	0.07
Uniform Delay, d1	10.7	12.0	11.0	12.2	11.0	12.2	14.8	14.8	14.8	14.8	14.8	14.8
Progression Factor	0.91	1.04	1.38	1.43	0.91	1.04	0.40	0.40	0.40	0.40	0.40	0.40
Incremental Delay, d2	0.2	0.4	0.4	0.4	0.2	0.4	0.3	0.3	0.3	0.3	0.3	0.3
Delay (s)	10.9	12.4	11.4	12.6	11.2	12.4	15.1	15.1	15.1	15.1	15.1	15.1
Level of Service	A	B	B	B	A	B	A	A	A	A	A	A
Approach Delay (s)	12.8			17.8			6.2			14.4		
Approach LOS	B			B			A			B		

Intersection Summary	
HCM Average Control Delay	13.9
HCM Volume to Capacity ratio	0.23
Actuated Cycle Length (s)	80.0
Intersection Capacity Utilization	54.1%
Analysis Period (min)	15
Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

Existing+Tower AM
 1/21/2008

Existing+Tower AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	0.99	1.00	1.00	0.98	1.00	1.00	1.00	0.97	1.00	0.99	1.00	0.99	
Frt	1.00	0.99	1.00	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99	1.00	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	
Satd. Flow (prot)	1760	3496	1729	3399	3396	3396	3435	3435	3435	3435	3435	3435	
Flt Permitted	0.40	1.00	1.00	0.48	1.00	1.00	0.90	0.90	0.81	0.90	0.81	0.81	
Satd. Flow (perm)	745	3496	875	3399	3087	3087	2819	2819	2819	2819	2819	2819	
Volume (vph)	31	390	25	90	421	117	30	226	62	71	217	29	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	32	406	26	94	439	122	31	235	65	74	226	30	
RTOR Reduction (vph)	0	6	0	0	32	0	0	27	0	0	9	0	
Lane Group Flow (vph)	32	426	0	94	529	0	0	304	0	0	321	0	
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4			8			2			6			
Permitted Phases	4			8			2			6			
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	32.0	32.0	
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	31.0	31.0	
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39	
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	382	1792	448	1742	1196	1196	1092	1092	1092	1092	1092	1092	
v/s Ratio Prot	0.12			c0.16									
v/s Ratio Perm	0.04	0.24	0.11	0.21	0.30	0.25	0.10	0.10	0.11	0.11	0.11	0.11	
v/c Ratio	0.08	0.24	0.21	0.21	0.30	0.25	0.10	0.10	0.11	0.11	0.11	0.11	
Uniform Delay, d1	9.9	10.8	10.7	11.3	11.3	16.6	16.9	16.9	16.9	16.9	16.9	16.9	
Progression Factor	1.33	1.43	1.00	1.00	1.00	0.70	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.4	0.3	1.1	0.5	0.5	0.5	0.5	0.5	0.7	0.7	0.7	0.7	
Delay (s)	13.6	15.7	11.7	11.7	11.7	12.2	12.2	12.2	17.6	17.6	17.6	17.6	
Level of Service	B	B	B	B	B	B	B	B	B	B	B	B	
Approach Delay (s)	15.6			11.7			12.2		17.6			17.6	
Approach LOS	B			B			B		B			B	
Intersection Summary													
HCM Average Control Delay	13.9											HCM Level of Service	B
HCM Volume to Capacity ratio	0.30												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	101.7%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Frbp, ped/bikes	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.97	1.00	1.00	1.00	0.97	1.00	0.97	1.00	
Flt Protected	1.00	0.95	1.00	1.00	0.96	1.00	0.96	1.00	
Satd. Flow (prot)	3117	1770	3539	1734	1770	3539	1734	1734	
Flt Permitted	1.00	0.95	1.00	1.00	0.96	1.00	0.96	1.00	
Satd. Flow (perm)	3117	1770	3539	1734	1770	3539	1734	1734	
Volume (vph)	432	97	73	501	129	44	44	44	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Adj. Flow (vph)	475	107	80	551	142	48	48	48	
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	582	0	80	551	190	0	0	0	
Confl. Peds. (#/hr)	146	266							
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	4			3			8		
Permitted Phases	4			3			8		
Actuated Green, G (s)	50.4	8.1	62.5	14.5	14.5	14.5	14.5	14.5	
Effective Green, g (s)	50.4	8.1	62.5	14.5	14.5	14.5	14.5	14.5	
Actuated g/C Ratio	0.59	0.10	0.74	0.17	0.17	0.17	0.17	0.17	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	1848	169	2602	296	296	296	296	296	
v/s Ratio Prot	c0.19		c0.05	0.16	0.11	0.11	0.11	0.11	
v/s Ratio Perm	0.31	0.47	0.21	0.64	0.64	0.64	0.64	0.64	
v/c Ratio	0.31	0.47	0.21	0.64	0.64	0.64	0.64	0.64	
Uniform Delay, d1	8.7	36.4	3.5	32.8	32.8	32.8	32.8	32.8	
Progression Factor	1.00	1.21	0.71	0.97	0.97	0.97	0.97	0.97	
Incremental Delay, d2	0.4	1.7	0.2	4.7	4.7	4.7	4.7	4.7	
Delay (s)	9.1	45.7	2.7	36.5	36.5	36.5	36.5	36.5	
Level of Service	A	D	A	D	D	D	D	D	
Approach Delay (s)	9.1		8.1	36.5			36.5		
Approach LOS	A		A	D			D		
Intersection Summary									
HCM Average Control Delay	12.4							HCM Level of Service	B
HCM Volume to Capacity ratio	0.40								
Actuated Cycle Length (s)	85.0							Sum of lost time (s)	12.0
Intersection Capacity Utilization	40.2%							ICU Level of Service	A
Analysis Period (min)	15								
c Critical Lane Group									

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave.

Existing+Tower AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Fipb, ped/bikes	0.93	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1651	3362	1630	3370	1770	3451	1770	3451	1770	3369	1770	3369
Flt Permitted	0.31	1.00	0.33	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (pperm)	541	3362	560	3370	1770	3451	1770	3451	1770	3369	1770	3369
Volume (vph)	68	346	62	53	357	64	95	457	45	78	556	124
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	76	384	69	59	397	71	106	508	50	87	618	138
RTOR Reduction (vph)	0	20	0	0	20	0	0	6	0	0	17	0
Lane Group Flow (vph)	76	433	0	59	448	0	106	552	0	87	739	0
Confl. Peds. (#/hr)	72	137	137	72	137	137	72	137	137	72	137	137
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4			8			5		2		1	6
Permitted Phases	4		8				5		2		1	6
Actuated Green, G (s)	17.9	17.9	17.9	17.9	17.9	17.9	8.4	46.2	8.4	46.2	7.4	45.2
Effective Green, g (s)	18.4	18.4	18.4	18.4	18.4	18.4	8.9	46.7	8.9	46.7	7.9	45.7
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22	0.22	0.10	0.55	0.10	0.55	0.09	0.54
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grip Cap (vph)	117	728	121	730	185	1896	165	1811	165	1811	165	1811
v/s Ratio Prot	0.13	0.13	0.13	0.13	0.13	0.13	0.06	0.16	0.06	0.22	0.05	0.22
v/s Ratio Perm	0.14	0.11	0.11	0.11	0.11	0.11	0.57	0.29	0.53	0.41	0.53	0.41
v/c Ratio	0.65	0.60	0.49	0.61	0.49	0.61	36.2	10.3	36.8	11.6	36.8	11.6
Uniform Delay, d1	30.4	30.0	29.2	30.1	29.2	30.1	1.25	1.09	1.00	1.00	1.00	1.00
Progression Factor	0.90	0.88	1.00	1.00	1.00	1.00	2.6	0.4	1.4	0.7	1.4	0.7
Incremental Delay, d2	8.6	0.8	1.1	1.1	1.1	1.1	47.8	11.5	38.2	12.3	38.2	12.3
Delay (s)	36.1	27.3	30.3	31.2	30.3	31.2	D	B	D	B	D	B
Level of Service	D	C	C	C	C	C	D	B	D	B	D	B
Approach Delay (s)	28.6			31.1			17.3		17.3		15.0	
Approach LOS	C			C			B		B		B	
Intersection Summary												
HCM Average Control Delay	21.7											
HCM Volume to Capacity ratio	0.49											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	59.8%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave.

Existing+Tower AM
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	11	35	583	9	15	698
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	12	39	648	10	17	776
Pedestrians	34		33			34
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0		4.0			4.0
Percent Blockage	3		3			3
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)			230			471
pX, platoon unblocked	0.95	0.97				0.97
VC, conflicting volume	1141	397				692
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
vCu, unblocked vol	1011	350				653
tC, single (s)	6.8	6.9				4.1
tC, 2 stage (s)						
tF (s)	3.5	3.3				2.2
p0 queue free %	94	93				98
cM capacity (veh/h)	209	593				877
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	51	432	226	17	388	388
Volume Left	12	0	0	17	0	0
Volume Right	39	0	10	0	0	0
cSH	412	1700	1700	877	1700	1700
Volume to Capacity	0.12	0.25	0.13	0.02	0.23	0.23
Queue Length 95th (ft)	11	0	0	1	0	0
Control Delay (s)	15.0	0.0	0.0	9.2	0.0	0.0
Lane LOS	B	A	A	A	A	A
Approach Delay (s)	15.0	0.0	0.0	0.2		
Approach LOS	B			B		
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	36.6%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

Existing+Tower AM
 1/21/2008

Existing+Tower AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.99	1.00	0.97	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.99
Frt	0.99	1.00	0.97	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.99	0.95	1.00	0.99	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4986	1754	3420	1775	1725	1842	1775	1725	1842	1775	1725	1842
Flt Permitted	0.88	0.53	1.00	0.88	0.88	0.44	1.00	0.88	0.44	1.00	0.88	0.44
Satd. Flow (perm)	4406	975	3420	1577	799	1842	1577	799	1842	1577	799	1842
Volume (vph)	34	273	25	52	279	67	58	175	49	64	189	12
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	37	297	27	57	303	73	63	190	53	70	205	13
RTOR Reduction (vph)	0	10	0	0	25	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	351	0	57	351	0	0	297	0	70	215	0
Conf. Peds. (#/hr)	24	18	18	24	24	48	48	48	48	48	48	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			2		6
Permitted Phases	4			8			2			2		6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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
Lane Grp Cap (vph)	2695	596	2092	464	235	542	464	235	542	464	235	542
v/s Ratio Prot				c0.10								
v/s Ratio Perm	0.08	0.06	0.06	c0.19	0.09	0.09	0.09	0.09	0.09	0.09	0.09	0.12
v/c Ratio	0.13	0.10	0.17	0.64	0.30	0.40	0.30	0.40	0.30	0.40	0.30	0.40
Uniform Delay, d1	7.0	6.8	7.1	23.2	24.0	24.0	23.2	24.0	23.2	24.0	23.2	24.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.3	0.2	6.6	3.2	2.2	3.2	2.2	3.2	2.2	3.2	2.2
Delay (s)	7.1	7.1	7.3	32.7	26.4	26.1	26.4	26.1	26.4	26.1	26.4	26.1
Level of Service	A	A	A	C	C	C	C	C	C	C	C	C
Approach Delay (s)	7.1	7.3	7.3	32.7	26.2	26.2	26.2	26.2	26.2	26.2	26.2	26.2
Approach LOS	A	A	A	C	C	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	16.8											
HCM Level of Service	B											
HCM Volume to Capacity ratio	0.32											
Actuated Cycle Length (s)	85.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	93.2%											
ICU Level of Service	F											
Analysis Period (min)	15											
Critical Lane Group	c											

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

Existing+Tower AM
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5003	4864	3426	3426	3426	3426	3426	3426	3426	3426	3426	3426
Flt Permitted	0.85	0.86	0.92	0.92	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Satd. Flow (perm)	4265	4217	3153	3153	2911	2911	2911	2911	2911	2911	2911	2911
Volume (vph)	45	389	28	46	366	122	15	156	31	61	210	37
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	49	423	30	50	398	133	16	170	34	66	228	40
RTOR Reduction (vph)	0	9	0	0	47	0	0	19	0	0	13	0
Lane Group Flow (vph)	0	493	0	0	534	0	0	201	0	0	321	0
Confl. Peds. (#/hr)	17	19	19	19	12	17	12	16	16	16	16	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	2	2	2	2	2	6
Permitted Phases	4	8	8	2	2	2	2	2	2	2	2	6
Actuated Green, G (s)	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2746	2715	2715	808	808	808	808	808	808	808	808	746
v/s Ratio Prot	0.12	c0.13	c0.13	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	c0.11
v/s Ratio Perm	0.18	0.20	0.20	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.25	0.43
v/c Ratio	5.7	5.8	5.8	23.6	23.6	23.6	23.6	23.6	23.6	23.6	23.6	24.9
Uniform Delay, d1	0.80	1.00	1.00	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53
Progression Factor	0.1	0.2	0.2	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	1.8
Incremental Delay, d2	4.7	6.0	6.0	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	15.0
Delay (s)	A	A	A	C	C	C	C	C	C	C	C	B
Level of Service	A	A	A	A	A	A	A	A	A	A	A	B
Approach Delay (s)	4.7	6.0	6.0	24.4	24.4	24.4	24.4	24.4	24.4	24.4	24.4	15.0
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	B
Intersection Summary												
HCM Average Control Delay	9.9											
HCM Volume to Capacity ratio	0.26											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	81.1%											
Analysis Period (min)	15											
c Critical Lane Group	A											

HCM Signalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

Existing+Tower AM
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5062	4717	1695	1695	1695	1695	1695	1695	1695	1695	1695	1695
Flt Permitted	0.91	0.93	0.89	0.89	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Satd. Flow (perm)	4637	4393	1548	1548	1372	1372	1372	1372	1372	1372	1372	1372
Volume (vph)	16	478	10	10	473	100	10	10	10	58	0	55
Peak-hour factor, PHF	0.90	0.90	0.92	0.92	0.90	0.90	0.92	0.92	0.92	0.90	0.92	0.90
Adj. Flow (vph)	18	531	11	11	526	111	11	11	11	64	0	61
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	559	0	0	648	0	0	12	0	0	125	0
Confl. Peds. (#/hr)	0	0	0	0	98	0	0	0	0	0	0	98
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	2	2	2	2	2	6
Permitted Phases	4	8	8	2	2	2	2	2	2	2	2	6
Actuated Green, G (s)	65.9	65.9	65.9	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1
Effective Green, g (s)	65.9	65.9	65.9	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1	11.1
Actuated g/C Ratio	0.78	0.78	0.78	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13	0.13
Clearance Time (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
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
Lane Grp Cap (vph)	3595	3406	3406	202	202	202	202	202	202	179	179	179
v/s Ratio Prot	0.12	c0.15	c0.15	0.01	0.01	0.01	0.01	0.01	0.01	0.01	0.01	c0.09
v/s Ratio Perm	0.16	0.19	0.19	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.06	0.70
v/c Ratio	2.4	2.5	2.5	32.4	32.4	32.4	32.4	32.4	32.4	32.4	32.4	35.3
Uniform Delay, d1	1.00	1.09	1.09	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.71
Progression Factor	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	0.1	10.8
Incremental Delay, d2	2.5	2.9	2.9	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	35.9
Delay (s)	A	A	A	A	A	A	A	A	A	A	A	D
Level of Service	A	A	A	A	A	A	A	A	A	A	A	D
Approach Delay (s)	2.5	2.9	2.9	32.5	32.5	32.5	32.5	32.5	32.5	32.5	32.5	35.9
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	D
Intersection Summary												
HCM Average Control Delay	6.2											
HCM Volume to Capacity ratio	0.26											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	51.5%											
Analysis Period (min)	15											
c Critical Lane Group	A											

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

Existing+Tower AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	
Frt	0.97	0.97	0.97	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	1.00	
Flt Protected	0.99	0.99	0.99	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	4869	4821	4821	1753	3471	1738	3393						
Flt Permitted	0.69	0.74	0.74	0.38	1.00	0.38	1.00	0.51	1.00				
Satd. Flow (perm)	3381	3580	3580	693	3471	925	3393						
Volume (vph)	110	337	94	79	382	133	60	349	39	101	480	137	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	
Adj. Flow (vph)	120	366	102	86	415	145	65	379	42	110	522	149	
RTOR Reduction (vph)	0	55	0	0	110	0	0	5	0	0	15	0	
Lane Group Flow (vph)	0	533	0	0	536	0	65	416	0	110	656	0	
Confl. Peds. (#/hr)	40		9		40	25	31		31		31	25	
Turn Type	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4		3	8			2				6		
Permitted Phases	4		8			2				6			
Actuated Green, G (s)	19.2		19.2		19.2		55.3		55.3		55.3		
Effective Green, g (s)	20.7		20.7		20.7		56.3		56.3		56.3		
Actuated g/C Ratio	0.24		0.24		0.24		0.66		0.66		0.66		
Clearance Time (s)	5.5		5.5		5.5		5.0		5.0		5.0		
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0		
Lane Grp Cap (vph)	823		872		459		2299		613		2247		
v/s Ratio Prot							0.12				c0.19		
v/s Ratio Perm	c0.16		0.15		0.09		0.12		0.12		0.12		
v/c Ratio	0.65		0.62		0.14		0.18		0.18		0.29		
Uniform Delay, d1	28.9		28.6		5.3		5.5		5.5		6.0		
Progression Factor	0.91		1.00		1.22		1.12		1.23		1.32		
Incremental Delay, d2	1.3		0.9		0.6		0.2		0.6		0.3		
Delay (s)	27.5		29.5		7.1		6.4		7.4		8.2		
Level of Service	C		C		A		A		A		A		
Approach Delay (s)	27.5		29.5		7.1		6.5		7.4		8.1		
Approach LOS	C		C		C		A		A		A		
Intersection Summary													
HCM Average Control Delay	17.9											HCM Level of Service	B
HCM Volume to Capacity ratio	0.39												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	70.3%											ICU Level of Service	C
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

Existing+Tower AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	0.98	1.00	0.88	1.00	0.95	0.95	
Fipb, ped/bikes	1.00	1.00	1.00	0.99	1.00	1.00	0.93	1.00	0.93	1.00	0.94	0.94	
Frt	1.00	1.00	1.00	0.98	1.00	1.00	0.85	1.00	0.85	1.00	0.84	0.84	
Flt Protected	1.00	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.96	1.00	0.97	0.97	
Satd. Flow (prot)	5043	4928	4928	1664	1395	1523							
Flt Permitted	0.89	0.91	0.91	0.84	1.00	0.84	1.00	0.86	1.00	0.86	1.00	0.86	
Satd. Flow (perm)	4495	4493	4493	1458	1395	1346							
Volume (vph)	25	470	9	24	569	75	14	4	13	47	1	41	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Adj. Flow (vph)	27	516	10	26	625	82	15	4	14	52	1	45	
RTOR Reduction (vph)	0	2	0	0	20	0	0	0	10	0	0	32	
Lane Group Flow (vph)	0	551	0	0	713	0	0	19	4	0	66	0	
Confl. Peds. (#/hr)	100		100		100		100		100		100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4		4		8		2				6		
Permitted Phases	4		8		8		2		2		6		
Actuated Green, G (s)	48.0		48.0		48.0		23.0		23.0		23.0		
Effective Green, g (s)	48.5		48.5		48.5		23.5		23.5		23.5		
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29		
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5		
Lane Grp Cap (vph)	2725		2724		2724		428		410		395		
v/s Ratio Prot							0.01		0.00		c0.05		
v/s Ratio Perm	0.12		0.26		0.26		0.04		0.01		0.17		
v/c Ratio	0.20		7.1		7.4		20.2		20.0		21.0		
Uniform Delay, d1	1.00		1.00		1.00		1.00		1.00		1.00		
Progression Factor	0.2		0.2		0.2		0.2		0.2		0.2		
Incremental Delay, d2	7.2		7.6		7.6		20.4		20.1		21.9		
Delay (s)	A		A		A		C		C		C		
Level of Service	A		A		A		C		C		C		
Approach Delay (s)	7.2		7.6		7.6		20.3		21.9		21.9		
Approach LOS	A		A		A		C		C		C		
Intersection Summary													
HCM Average Control Delay	8.7											HCM Level of Service	A
HCM Volume to Capacity ratio	0.23												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.7%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

Existing+Tower AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.94	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4942	1770	4737	1770	4943	1770	4981	1770	4981	1770	4981
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (pbrm)	1770	4942	1770	4737	1770	4943	1770	4981	1770	4981	1770	4981
Volume (vph)	70	412	56	112	436	253	89	260	42	226	523	64
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	78	458	62	124	484	281	99	289	47	251	581	71
RTOR Reduction (vph)	0	18	0	0	111	0	0	25	0	0	17	0
Lane Group Flow (vph)	78	502	0	124	654	0	99	312	0	251	635	0
Confl. Peds. (#/hr)			66			23			38			26
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	3	4		3	4		1	2		1	2	
Permitted Phases												
Actuated Green, G (s)	10.5	26.5		10.5	26.5		9.0	26.0		9.0	26.0	
Effective Green, g (s)	10.5	27.5		10.5	27.5		9.0	27.0		9.0	27.0	
Actuated g/C Ratio	0.12	0.31		0.12	0.31		0.10	0.30		0.10	0.30	
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	207	1510		207	1447		177	1483		177	1494	
v/s Ratio Prot	0.04	0.10		0.07	0.14		0.06	0.06		0.04	0.13	
v/s Ratio Perm												
v/c Ratio	0.38	0.33		0.60	0.45		0.56	0.21		1.42	0.43	
Uniform Delay, d1	36.7	24.2		37.8	25.2		38.6	23.5		40.5	25.3	
Progression Factor	1.00	1.00		0.97	2.02		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.6		2.4	0.8		2.2	0.3		217.9	0.9	
Delay (s)	37.1	24.7		39.2	51.6		40.8	23.9		258.4	26.2	
Level of Service	D	C		D	D		D	C		F	C	
Approach Delay (s)	26.4		C	49.8		D	27.7		C	90.7		F
Approach LOS	C		C	D		D	C		C	F		F
Intersection Summary												
HCM Average Control Delay	54.5											
HCM Volume to Capacity ratio	0.58											
Actuated Cycle Length (s)	90.0											
Sum of lost time (s)	16.0											
Intersection Capacity Utilization	72.9%											
ICU Level of Service	C											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

Existing+Tower AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	0.93	0.93	0.93	0.95	0.95	0.95	1.00	0.99	1.00	0.99	1.00	0.98
Fipb, ped/bikes	0.97	0.96	0.96	0.96	0.96	0.96	0.91	1.00	1.00	0.92	1.00	0.99
Frt	0.95	0.95	0.95	0.94	0.94	0.94	1.00	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1570	4942	1570	4737	1570	4943	1570	4981	1570	4981	1570	4981
Flt Permitted	0.73	1.00	0.73	0.90	0.90	0.90	0.49	1.00	1.00	0.43	1.00	1.00
Satd. Flow (pbrm)	1163		1163	1449		1449	824	3486		747	3437	
Volume (vph)	27	19	26	25	34	42	54	509	24	24	389	37
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	29	21	28	27	37	46	59	553	26	26	423	40
RTOR Reduction (vph)	0	26	0	0	39	0	0	2	0	0	4	0
Lane Group Flow (vph)	0	52	0	0	71	0	59	577	0	26	459	0
Confl. Peds. (#/hr)	100		100		100		100		100		100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4		4		4		2		2		6	
Permitted Phases												
Actuated Green, G (s)	7.3		7.3		7.3		70.7	70.7		70.7	70.7	
Effective Green, g (s)	6.8		6.8		6.8		70.2	70.2		70.2	70.2	
Actuated g/C Ratio	0.08		0.08		0.08		0.83	0.83		0.83	0.83	
Clearance Time (s)	3.5		3.5		3.5		3.5	3.5		3.5	3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	93		93		116		681	2879		617	2839	
v/s Ratio Prot	0.04		0.04		0.05		0.07	0.17		0.03	0.13	
v/s Ratio Perm												
v/c Ratio	0.56		0.56		0.62		0.09	0.20		0.04	0.16	
Uniform Delay, d1	37.7		37.7		37.8		1.4	1.5		1.3	1.5	
Progression Factor	1.00		1.00		1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.6		4.6		6.6		0.3	0.2		0.1	0.1	
Delay (s)	42.2		42.2		44.5		1.6	1.7		0.7	0.7	
Level of Service	D		D		D		A	A		A	A	
Approach Delay (s)	42.2		42.2		44.5		1.7		A	0.7		A
Approach LOS	D		D		D		A		A	0.7		A
Intersection Summary												
HCM Average Control Delay	7.3											
HCM Volume to Capacity ratio	0.24											
Actuated Cycle Length (s)	85.0											
Sum of lost time (s)	15											
Intersection Capacity Utilization	54.6%											
ICU Level of Service	A											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

Existing+Tower AM
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.97	1.00	0.94	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Fllb, ped/bikes	1.00	1.00	1.00	1.00	1.00	0.93	1.00	0.99	1.00	0.95	1.00	0.96
Frt	1.00	0.97	1.00	0.96	1.00	0.96	1.00	0.99	1.00	0.95	1.00	0.96
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3330	1770	3191	1647	3464	1675	3211				
Flt Permitted	0.95	1.00	0.95	1.00	0.41	1.00	0.50	1.00				
Satd. Flow (perm)	1770	3330	1770	3191	707	3464	883	3211				
Volume (vph)	255	350	97	50	270	105	58	322	30	49	341	141
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	283	389	108	56	300	117	64	358	33	54	379	157
RTOR Reduction (vph)	0	28	0	0	55	0	0	7	0	0	43	0
Lane Group Flow (vph)	283	469	0	56	362	0	64	384	0	54	493	0
Confl. Peds. (#/hr)	100			100			100		100		100	
Turn Type	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		3	8		2		2		6	
Actuated Green, G (s)	16.5	26.7		4.9	15.1		39.9	39.9	39.9		39.9	39.9
Effective Green, g (s)	17.0	26.2		5.4	14.6		41.4	41.4	41.4		41.4	41.4
Actuated g/C Ratio	0.20	0.31		0.06	0.17		0.49	0.49	0.49		0.49	0.49
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5	5.5		5.5	5.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0		2.0	2.0
Lane Grp Cap (vph)	354	1026		112	548		344	1687	430		1564	
v/s Ratio Prot	c0.16	0.14		0.03	c0.11		0.09	0.11	0.06		c0.15	
v/s Ratio Perm	0.80	0.46		0.50	0.66		0.19	0.23	0.13		0.32	
Uniform Delay, d1	32.4	23.7		38.5	32.9		12.3	12.6	11.9		13.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00		1.00	
Incremental Delay, d2	11.2	0.1		1.3	2.3		1.2	0.3	0.6		0.5	
Delay (s)	43.6	23.8		39.8	35.2		13.5	12.9	12.5		13.7	
Level of Service	D	C		D	D		B	B	B		B	B
Approach Delay (s)	31.0			35.8			13.0				13.6	
Approach LOS	C			D			B				B	
Intersection Summary												
HCM Average Control Delay	23.9											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	72.3%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave.

Existing+Tower AM
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.91	1.00	0.95	1.00	0.98
Flt Protected	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1670	1770	3539	3481		
Flt Permitted	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1670	1770	3539	3481		
Volume (vph)	73	136	61	558	597	74
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	79	148	66	607	649	80
RTOR Reduction (vph)	108	0	0	0	6	0
Lane Group Flow (vph)	119	0	66	607	723	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	10.7		7.4	66.3	54.9	
Effective Green, g (s)	10.7		7.4	66.3	54.9	
Actuated g/C Ratio	0.13		0.09	0.78	0.65	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	210		154	2760	2248	
v/s Ratio Prot	c0.07		c0.04	0.17	c0.21	
v/s Ratio Perm	0.57		0.43	0.22	0.32	
Uniform Delay, d1	35.0		36.8	2.5	6.7	
Progression Factor	1.00		1.00	1.77	0.33	
Incremental Delay, d2	3.5		1.8	0.2	0.3	
Delay (s)	38.5		38.6	4.6	2.6	
Level of Service	D		D	A	A	
Approach Delay (s)	38.5		7.9	2.6		
Approach LOS	D		A	A	A	
Intersection Summary						
HCM Average Control Delay	9.8					
HCM Volume to Capacity ratio	0.37					
Actuated Cycle Length (s)	85.0					
Intersection Capacity Utilization	44.6%					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

Existing PM + Tower
 1/21/2008

Existing PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	16
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.98	1.00
Flt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4932	1770	4971	1770	4971	2005	2002	1960	1919	1960	1919
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.13	1.00	0.56	1.00	0.56	1.00
Satd. Flow (perm)	1770	4932	1770	4971	1770	4971	278	2002	1160	1919	1160	1919
Volume (vph)	322	1229	176	80	958	138	165	233	79	133	267	259
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	339	1294	185	84	1008	145	174	245	83	140	281	273
RTOR Reduction (vph)	0	18	0	0	19	0	0	14	0	0	39	0
Lane Group Flow (vph)	339	1461	0	84	1134	0	174	314	0	140	515	0
Confl. Peds. (#/hr)	0	0	32	32	0	4	12	24	24	24	0	12
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot	Prot	Prot	Prot	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	3	3	8	5	2	2	2	2	6	6
Permitted Phases												
Actuated Green, G (s)	18.0	38.2	5.9	26.1	38.9	38.9	38.9	27.9	27.9	27.9	27.9	27.9
Effective Green, g (s)	18.0	38.2	5.9	26.1	39.4	39.4	39.4	28.4	28.4	28.4	28.4	28.4
Actuated g/C Ratio	0.19	0.41	0.06	0.28	0.42	0.42	0.42	0.30	0.30	0.30	0.30	0.30
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5
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
Lane Grp Cap (vph)	341	2015	112	1388	283	844	352	583	352	583	352	583
v/s Ratio Prot	c0.19	0.30	0.05	c0.23	c0.06	0.16	c0.27	c0.20	0.12	0.12	c0.27	c0.20
v/s Ratio Perm	0.99	0.72	0.75	0.82	0.61	0.37	0.40	0.88	0.40	0.88	0.40	0.88
Uniform Delay, d1	37.7	23.2	43.1	31.5	21.8	18.6	25.8	31.0	25.8	31.0	25.8	31.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	46.9	2.3	24.2	5.4	3.9	0.3	0.7	14.8	0.7	14.8	0.7	14.8
Delay (s)	84.6	25.5	67.3	36.9	25.7	18.8	26.5	45.7	26.5	45.7	26.5	45.7
Level of Service	F	C	E	D	C	B	C	D	C	D	C	D
Approach Delay (s)	36.6	36.6	36.6	39.0	39.0	21.2	41.9	41.9	21.2	41.9	41.9	41.9
Approach LOS	D	D	D	D	D	C	D	D	C	D	D	D
Intersection Summary												
HCM Average Control Delay	36.3											
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	93.5											
Intersection Capacity Utilization	92.4%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

Existing PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frb, ped/bikes	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.98	1.00	0.98
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3428	1770	3221	1770	3221	1770	3357	1770	3434	1770	3434
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (iperm)	3433	3428	1770	3221	1770	3221	1770	3357	1770	3434	1770	3434
Volume (vph)	508	822	72	93	468	212	69	594	127	203	682	56
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	535	865	76	98	493	223	73	625	134	214	718	59
RTOR Reduction (vph)	0	6	0	0	52	0	0	18	0	0	6	0
Lane Group Flow (vph)	535	935	0	98	664	0	73	741	0	214	771	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Permitted Phases												
Actuated Green, G (s)	16.0	30.5	8.0	22.5	5.0	32.5	12.0	39.5				
Effective Green, g (s)	15.5	31.5	7.5	23.5	4.5	33.5	11.5	40.5				
Actuated g/C Ratio	0.16	0.32	0.08	0.24	0.04	0.34	0.12	0.40				
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0				
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Lane Grp Cap (vph)	532	1080	133	757	80	1125	204	1391				
v/s Ratio Prot	c0.16	c0.27	0.06	0.21	0.04	c0.22	c0.12	0.22				
v/s Ratio Perm	1.01	0.87	0.74	0.88	0.91	0.66	1.05	0.55				
Uniform Delay, d1	42.2	32.3	45.3	36.9	47.6	28.4	44.2	22.8				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.16	0.79				
Incremental Delay, d2	40.4	7.2	16.6	10.9	70.5	3.0	70.3	1.3				
Delay (s)	82.7	39.4	61.9	47.7	118.0	31.4	121.8	19.4				
Level of Service	F	D	E	D	F	C	F	B				
Approach Delay (s)	55.1	E	49.4	D	39.0	D	41.5	D				
Approach LOS	E	E	D	D	D	D	D	D				
Intersection Summary												
HCM Average Control Delay	47.4											
HCM Volume to Capacity ratio	0.82											
Actuated Cycle Length (s)	100.0											
Sum of lost time (s)	12.0											
Intersection Capacity Utilization	82.2%											
ICU Level of Service	E											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 4: 47th St. & MLK Jr. Way

Existing PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.86	0.86	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.97	1.00	0.97
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1611	1611	3287	3433	3442	1611	3287	3433	3442	1611	3287	3433
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (iperm)	1611	1611	3287	3433	3442	1611	3287	3433	3442	1611	3287	3433
Volume (vph)	0	0	6	0	0	0	10	285	280	1430	288	64
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	0	0	7	0	0	0	11	310	283	1554	313	70
RTOR Reduction (vph)	0	7	0	0	0	0	0	21	0	0	0	0
Lane Group Flow (vph)	0	0	0	0	0	0	0	583	0	1554	383	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases							2	1	6			
Permitted Phases												
Actuated Green, G (s)	0.0	0.0	13.0	13.0	29.0	50.0						
Effective Green, g (s)	0.0	0.0	13.0	13.0	29.0	50.0						
Actuated g/C Ratio	0.00	0.00	0.26	0.26	0.58	1.00						
Clearance Time (s)			4.0	4.0	4.0	2.0						
Lane Grp Cap (vph)	0	0	809	1991	3442	c0.45	0.11					
v/s Ratio Prot			c0.19	0.72	0.78	0.11						
v/s Ratio Perm	0.00	0.00	1.00	1.00	1.00	1.00						
Uniform Delay, d1	25.0	25.0	16.8	16.8	8.1	0.0						
Progression Factor	1.00	1.00	0.75	0.75	3.1	0.1						
Incremental Delay, d2	0.0	0.0	5.3	5.3	3.1	0.1						
Delay (s)	25.0	25.0	11.2	11.2	11.2	0.1						
Level of Service	C	C	B	B	B	A						
Approach Delay (s)	25.0	0.0	18.0	18.0	9.0	A						
Approach LOS	C	A	B	B	B	A						
Intersection Summary												
HCM Average Control Delay	11.2											
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	50.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	70.6%											
ICU Level of Service	C											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis

5: 45th St. & MLK Jr. Way

Existing PM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.98	0.98	0.99	0.99	0.99	0.99
Frbp, ped/bikes	0.96	0.96	0.96	0.98	0.98	0.98	1.00	1.00	0.99	0.99	0.99	0.99
Ft	0.96	0.96	0.96	0.98	0.98	0.98	1.00	1.00	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1643	1643	1643	1649	1649	1649	3404	3404	3439	3439	3439	3439
Flt Permitted	0.88	0.88	0.88	0.91	0.91	0.91	0.94	0.94	0.85	0.85	0.85	0.85
Satd. Flow (perm)	1471	1471	1471	1519	1519	1519	3201	3201	2956	2956	2956	2956
Volume (vph)	26	27	21	48	72	50	18	423	66	43	264	20
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	29	30	23	53	80	56	20	470	73	48	293	22
RTOR Reduction (vph)	0	15	0	0	30	0	0	24	0	0	10	0
Lane Group Flow (vph)	0	67	0	0	159	0	0	540	0	0	354	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (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
Lane Grp Cap (vph)	500	500	500	516	516	516	1601	1601	1478	1478	1478	1478
v/s Ratio Prot	0.05	0.05	0.05	c0.10	c0.10	c0.10	c0.17	c0.17	0.12	0.12	0.12	0.12
v/s Ratio Perm	0.13	0.13	0.13	0.31	0.31	0.31	0.34	0.34	0.24	0.24	0.24	0.24
v/c Ratio	11.4	11.4	11.4	12.2	12.2	12.2	7.5	7.5	7.1	7.1	7.1	7.1
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.6	0.6	0.6	1.5	1.5	1.5	0.6	0.6	0.4	0.4	0.4	0.4
Incremental Delay, d2	12.0	12.0	12.0	13.7	13.7	13.7	8.1	8.1	7.5	7.5	7.5	7.5
Delay (s)	B	B	B	B	B	B	A	A	A	A	A	A
Level of Service	B	B	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	12.0	12.0	12.0	13.7	13.7	13.7	8.1	8.1	7.5	7.5	7.5	7.5
Approach LOS	B	B	B	B	B	B	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.1 HCM Level of Service A											
HCM Volume to Capacity ratio	0.32											
Actuated Cycle Length (s)	50.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	62.8% ICU Level of Service B											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis

6: 45th St. & Telegraph Ave.

Existing PM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.98	0.98	0.99	0.99	0.99	0.99
Frbp, ped/bikes	0.96	0.96	0.96	0.98	0.98	0.98	1.00	1.00	0.99	0.99	0.99	0.99
Ft	0.96	0.96	0.96	0.98	0.98	0.98	1.00	1.00	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1631	1631	1631	1680	1680	1680	3475	3475	4927	4927	4927	4927
Flt Permitted	0.86	0.86	0.86	0.86	0.86	0.86	0.91	0.91	0.81	0.81	0.81	0.81
Satd. Flow (perm)	1420	1420	1420	1459	1459	1459	3180	3180	4490	4490	4490	4490
Volume (vph)	46	49	39	19	41	21	24	1045	39	18	927	67
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	49	52	41	20	44	22	26	1112	41	19	986	71
RTOR Reduction (vph)	0	28	0	0	19	0	0	1	0	0	4	0
Lane Group Flow (vph)	0	114	0	0	67	0	0	1178	0	0	1072	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	2	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	2	6	6
Actuated Green, G (s)	8.6	8.6	8.6	8.6	8.6	8.6	62.4	62.4	62.4	62.4	62.4	62.4
Effective Green, g (s)	9.1	9.1	9.1	9.1	9.1	9.1	62.9	62.9	62.9	62.9	62.9	62.9
Actuated g/C Ratio	0.11	0.11	0.11	0.11	0.11	0.11	0.79	0.79	0.79	0.79	0.79	0.79
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	162	162	166	166	166	2500	2500	3530	3530	3530	3530
v/s Ratio Prot	c0.08	c0.08	c0.08	0.05	0.05	0.05	c0.37	c0.37	0.24	0.24	0.24	0.24
v/s Ratio Perm	0.70	0.70	0.70	0.40	0.40	0.40	0.47	0.47	0.30	0.30	0.30	0.30
v/c Ratio	34.1	34.1	34.1	32.9	32.9	32.9	2.9	2.9	2.4	2.4	2.4	2.4
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	2.25	2.25	1.00	1.00	1.00	1.00
Progression Factor	10.6	10.6	10.6	0.6	0.6	0.6	0.5	0.5	0.2	0.2	0.2	0.2
Incremental Delay, d2	44.8	44.8	44.8	33.5	33.5	33.5	7.0	7.0	2.6	2.6	2.6	2.6
Delay (s)	D	D	D	C	C	C	A	A	A	A	A	A
Level of Service	D	D	D	C	C	C	A	A	A	A	A	A
Approach Delay (s)	44.8	44.8	44.8	33.5	33.5	33.5	7.0	7.0	2.6	2.6	2.6	2.6
Approach LOS	D	D	D	C	C	C	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	8.2 HCM Level of Service A											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	81.6% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

Existing PM + Tower
1/21/2008

Existing PM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	0.96	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.97	1.00	0.97	1.00
Frt	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1693	3487	1731	3402	1697	1822	1720	1830	1693	3487	1731	3402
Flt Permitted	0.29	1.00	0.24	1.00	0.24	1.00	0.56	1.00	0.37	1.00	0.37	1.00
Satd. Flow (perm)	520	3487	441	3402	492	1822	667	1830	520	3487	441	3402
Volume (vph)	26	674	45	548	84	109	389	43	94	222	19	222
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	28	733	49	48	596	91	118	423	47	102	241	21
RTOR Reduction (vph)	0	6	0	0	15	0	0	5	0	0	4	0
Lane Group Flow (vph)	28	776	0	48	672	0	118	465	0	102	258	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	208	1395	176	1361	496	911	334	915				
v/s Ratio Prot	c0.22			0.20			c0.26			0.14		
v/s Ratio Perm	0.05	0.11		0.12			0.12			0.15		
v/c Ratio	0.13	0.56	0.27	0.49	0.24	0.51	0.31	0.28				
Uniform Delay, d1	15.2	18.5	16.2	17.9	11.4	13.4	11.8	11.6				
Progression Factor	1.00	1.00	1.94	2.02	1.80	1.84	1.00	1.00				
Incremental Delay, d2	1.3	1.6	3.2	1.1	0.7	1.3	2.4	0.8				
Delay (s)	16.6	20.1	34.6	37.3	21.2	26.0	14.2	12.4				
Level of Service	B	C	C	D	C	C	B	B				
Approach Delay (s)	20.0			37.1			25.0					
Approach LOS	C			D			C					
Intersection Summary												
HCM Average Control Delay	25.2											
HCM Volume to Capacity ratio	0.53											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	81.0%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

Existing PM + Tower
 1/21/2008

Existing PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	0.99	1.00	0.97	1.00	0.96	1.00	0.96	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1765	3482	1757	3430	1757	3430	1757	3430	1757	3430	1757	3430
Flt Permitted	0.27	1.00	0.24	1.00	0.24	1.00	0.88	1.00	0.88	1.00	0.78	1.00
Satd. Flow (perm)	504	3482	436	3430	436	3430	2953	3430	2953	3430	2716	3430
Volume (vph)	51	756	70	107	622	131	53	273	120	76	219	38
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	52	764	71	108	628	132	54	276	121	77	221	38
RTOR Reduction (vph)	0	8	0	0	22	0	0	46	0	0	12	0
Lane Group Flow (vph)	52	827	0	108	738	0	0	405	0	0	324	0
Confl. Peds. (#/hr)	8	39	39	8	25	25	8	25	25	8	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	8	8	8	2	2	2	6	6	6
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	35.5	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	221	1523	191	1501	191	1501	1366	1366	1366	1256	1256	1256
v/s Ratio Prot	0.10	0.24	0.24	0.22	0.22	0.22	0.14	0.14	0.14	0.12	0.12	0.12
v/s Ratio Perm	0.24	0.54	0.57	0.49	0.57	0.49	0.30	0.30	0.30	0.26	0.26	0.26
v/c Ratio	14.1	16.6	16.8	16.1	16.8	16.1	13.4	13.4	13.4	13.1	13.1	13.1
Uniform Delay, d1	0.93	1.07	1.31	1.41	1.31	1.41	0.83	0.83	0.83	1.00	1.00	1.00
Progression Factor	1.7	0.9	11.2	1.1	11.2	1.1	0.5	0.5	0.5	0.5	0.5	0.5
Incremental Delay, d2	14.8	18.7	33.3	23.8	33.3	23.8	11.6	11.6	11.6	13.6	13.6	13.6
Delay (s)	B	B	C	C	C	C	B	B	B	B	B	B
Level of Service	B	B	C	C	C	C	B	B	B	B	B	B
Approach Delay (s)	18.5	25.0	25.0	25.0	25.0	25.0	11.6	11.6	11.6	13.6	13.6	13.6
Approach LOS	B	B	C	C	C	C	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	18.8											
HCM Volume to Capacity ratio	0.43											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	87.1%											
Analysis Period (min)	15											
c Critical Lane Group	15											

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Ft	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3235	1770	3539	1770	3539	1770	3539	1770	3539	1770	3539	
Flt Permitted	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	3235	1770	3539	1770	3539	1770	3539	1770	3539	1770	3539	
Volume (vph)	840	119	55	737	126	47	840	119	55	737	126	47
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Adj. Flow (vph)	866	123	57	760	130	48	866	123	57	760	130	48
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	989	0	57	760	130	48	989	0	57	760	130	48
Confl. Peds. (#/hr)	213	348	348	213	348	348	213	348	348	213	348	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	4	3	3	8	2	2	4	3	3	8	2	
Permitted Phases	4	3	3	8	2	2	4	3	3	8	2	
Actuated Green, G (s)	54.0	5.5	63.5	8.5	8.5	8.5	54.0	5.5	63.5	8.5	8.5	
Effective Green, g (s)	54.0	5.5	63.5	8.5	8.5	8.5	54.0	5.5	63.5	8.5	8.5	
Actuated g/C Ratio	0.68	0.07	0.79	0.11	0.11	0.11	0.68	0.07	0.79	0.11	0.11	
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
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	
Lane Grp Cap (vph)	2184	122	2809	188	168	168	2184	122	2809	188	168	
v/s Ratio Prot	0.31	0.03	0.21	0.07	0.07	0.07	0.31	0.03	0.21	0.07	0.07	
v/s Ratio Perm	0.45	0.47	0.27	0.69	0.29	0.29	0.45	0.47	0.27	0.69	0.29	
v/c Ratio	6.1	35.8	2.2	34.5	33.0	33.0	6.1	35.8	2.2	34.5	33.0	
Uniform Delay, d1	0.53	0.87	1.56	0.95	0.92	0.92	0.53	0.87	1.56	0.95	0.92	
Progression Factor	0.6	2.3	0.2	10.3	0.9	0.9	0.6	2.3	0.2	10.3	0.9	
Incremental Delay, d2	3.8	33.5	3.6	43.1	31.4	31.4	3.8	33.5	3.6	43.1	31.4	
Delay (s)	A	C	A	D	C	C	A	C	A	D	C	
Level of Service	A	C	A	D	C	C	A	C	A	D	C	
Approach Delay (s)	3.8	5.7	40.0	40.0	40.0	40.0	3.8	5.7	40.0	40.0	40.0	
Approach LOS	A	A	D	D	D	D	A	A	D	D	D	
Intersection Summary												
HCM Average Control Delay	7.8											
HCM Volume to Capacity ratio	0.48											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	48.3%											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. Existing PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↕	↔	↔	↕	↔	↔	↕	↔	↔	↕	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.98	
Fpb, ped/bikes	1.00	0.99	1.00	0.97	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	
Fpb, ped/bikes	0.93	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	
Frt	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.97	
Frt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1643	3419	1726	3368	1770	3466	1770	3466	1770	3364	1770	3364	
Frt Permitted	0.33	1.00	0.20	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	567	3419	356	3368	1770	3466	1770	3466	1770	3364	1770	3364	
Volume (vph)	128	660	99	37	475	76	186	870	82	103	626	136	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	131	673	101	38	485	78	190	888	84	105	639	139	
RTOR Reduction (vph)	0	15	0	0	16	0	0	8	0	0	22	0	
Lane Group Flow (vph)	131	759	0	38	547	0	190	964	0	105	756	0	
Conf. Peds. (#/hr)	94		86	86	94		40		40		111		
Turn Type	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	4		8	5	2	1						6	
Permitted Phases	4		8	5	2	1						6	
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	25.5	10.8	33.1	7.9	30.2			
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	26.0	11.3	33.6	8.4	30.7			
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.32	0.14	0.42	0.11	0.38			
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grip Cap (vph)	184	1111	116	1095	250	1456	186	1291					
v/s Ratio Prot			0.22	0.16		c0.11	c0.28		0.06	0.22			
v/s Ratio Perm	c0.23		0.11		0.11								
v/c Ratio	0.71	0.68	0.33	0.50	0.76	0.66	0.56	0.59					
Uniform Delay, d1	23.7	23.4	20.4	21.8	33.0	18.6	34.1	19.6					
Progression Factor	0.58	0.54	1.00	1.00	0.90	0.52	0.98	0.87					
Incremental Delay, d2	9.6	1.3	0.6	0.1	10.1	2.1	2.3	1.9					
Delay (s)	23.3	13.9	21.0	21.9	39.7	11.7	35.5	18.9					
Level of Service	C	B	C	C	D	B	D	B					
Approach Delay (s)	15.3		21.8		16.3		20.9						
Approach LOS	B		C		B		C						
Intersection Summary													
HCM Average Control Delay	18.1											HCM Level of Service	B
HCM Volume to Capacity ratio	0.71												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.7%											ICU Level of Service	C
Analysis Period (min)	15												
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. Existing PM + Tower
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	↔	↔	↕	↕	↔	↔
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	7	33	1133	31	15	735
Peak Hour Factor	0.90	0.90	0.90	0.90	0.90	0.90
Hourly flow rate (vph)	8	37	1259	34	17	817
Pedestrians	52		52		45	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4		4		4	
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	230					
pX, platoon unblocked	0.94					
VC, conflicting volume	1822					
VC1, stage 1 conf vol	744					
VC2, stage 2 conf vol						
vCu, unblocked vol	1438					
tC, single (s)	6.8					
tC, 2 stage (s)						
tF (s)	3.5					
p0 queue free %	92					
cM capacity (veh/h)	103					
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	44	839	454	17	408	408
Volume Left	8	0	0	17	0	0
Volume Right	37	0	34	0	0	0
cSH	256	1700	1700	462	1700	1700
Volume to Capacity	0.17	0.49	0.27	0.04	0.24	0.24
Queue Length 95th (ft)	15	0	0	3	0	0
Control Delay (s)	22.0	0.0	0.0	13.1	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	22.0	0.0	0.0	0.3		
Approach LOS	C					
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	50.7%					
ICU Level of Service	A					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

Existing PM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Fipb, ped/bikes	1.00	0.97	1.00	0.99	1.00	0.99	0.98	1.00	0.97	1.00	0.97	1.00
Frt	0.99	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.99	0.99	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4985	1719	3288	1766	1714	1832	1766	1714	1832	1766	1714	1832
Flt Permitted	0.80	0.32	1.00	0.82	0.82	0.27	1.00	0.82	0.27	1.00	0.82	0.27
Satd. Flow (perm)	3998	588	3288	1449	482	1832	1449	482	1832	1449	482	1832
Volume (vph)	112	633	27	64	327	168	58	364	84	65	288	20
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	114	646	28	65	334	171	59	371	86	66	294	20
RTOR Reduction (vph)	0	5	0	0	38	0	0	9	0	0	3	0
Lane Group Flow (vph)	0	783	0	65	467	0	0	507	0	66	311	0
Conf. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31
Clearance 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
Lane Grp Cap (vph)	2349	345	1932	453	151	573						
v/s Ratio Prot		0.20	0.11		0.14		0.35	0.14		0.14		
v/s Ratio Perm		0.33	0.19	0.24		1.12	0.44	0.44	0.54			
v/c Ratio		8.5	7.7	7.9		27.5	21.9	22.8				
Uniform Delay, d1		1.00	1.34	1.35		1.00	0.75	0.75				
Progression Factor		0.4	1.2	0.3		0.79	0.87	0.87				
Incremental Delay, d2		8.8	11.4	11.0		106.5	25.1	20.6				
Delay (s)		A	B	B		F	C	C				
Level of Service		A	B	B		F	C	C				
Approach Delay (s)		8.8	11.1	11.1		106.5	21.4	21.4				
Approach LOS		A	B	B		F	C	C				

Intersection Summary		
HCM Average Control Delay	33.9	HCM Level of Service C
HCM Volume to Capacity ratio	0.61	
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	138.5%	ICU Level of Service H
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

Existing PM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.98
Fipb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.94	1.00	0.98
Frt	0.99	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.96	1.00	0.98	1.00
Flt Protected	1.00	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4970	1606	4883	1606	1733	1659	1800	1659	1800	1659	1800	1800
Flt Permitted	0.88	0.80	0.80	0.80	0.80	0.62	1.00	0.35	1.00	0.35	1.00	1.00
Satd. Flow (perm)	4398	3935	3935	1054	1733	619	1800	619	1800	619	1800	1800
Volume (vph)	39	573	40	68	405	64	41	212	73	56	122	17
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	41	603	42	72	426	67	43	223	77	59	128	18
RTOR Reduction (vph)	0	9	0	0	21	0	0	16	0	0	7	0
Lane Group Flow (vph)	0	677	0	0	544	0	43	284	0	59	139	0
Conf. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (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
Lane Grp Cap (vph)	2831	2533	2533	270	444	159	461	159	461	159	461	461
v/s Ratio Prot		c0.15	0.14		0.04		0.16	0.64		0.10		
v/s Ratio Perm		0.24	0.21		0.21		0.16	0.64		0.37		0.30
v/c Ratio		6.0	5.9		23.1		26.5	24.5		24.0		24.0
Uniform Delay, d1		1.25	1.16		1.00		1.00	1.00		1.21		1.23
Progression Factor		0.2	0.2		0.2		1.3	6.9		6.3		1.6
Incremental Delay, d2		7.7	7.0		24.3		33.4	36.0		31.1		31.1
Delay (s)		A	A		C		C	D		C		C
Level of Service		A	A		C		C	D		C		C
Approach Delay (s)		7.7	7.0		32.3		32.3	32.5		32.5		32.5
Approach LOS		A	A		C		C	C		C		C

Intersection Summary		
HCM Average Control Delay	15.0	HCM Level of Service B
HCM Volume to Capacity ratio	0.35	
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	87.1%	ICU Level of Service E
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

Existing PM + Tower
 1/21/2008

Existing PM + Tower
 1/21/2008

Movement	EBL	Ebt	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5019	4820	3363	3363	3378	3378	3378	3378	3378	3378	3378	3378
Flt Permitted	0.83	0.85	0.86	0.86	0.86	0.73	0.86	0.86	0.86	0.86	0.73	0.86
Satd. Flow (perm)	4181	4114	2901	2901	2505	2505	2901	2901	2505	2505	2505	2505
Volume (vph)	64	624	34	48	423	195	39	182	72	121	213	66
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	65	630	34	48	427	197	39	184	73	122	215	67
RTOR Reduction (vph)	0	6	0	0	70	0	0	39	0	0	21	0
Lane Group Flow (vph)	0	723	0	0	602	0	0	257	0	0	383	0
Confl. Peds. (#/hr)	9	17	17	17	9	12	10	10	10	10	10	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2692	2648	2648	2648	2648	2648	743	743	743	743	642	642
v/s Ratio Prot	c0.17	0.15	0.15	0.15	0.15	0.15	0.09	0.09	0.09	0.09	c0.15	c0.15
v/s Ratio Perm	0.27	0.23	0.23	0.23	0.23	0.23	0.35	0.35	0.35	0.35	0.60	0.60
v/c Ratio	6.1	5.9	5.9	5.9	5.9	5.9	24.3	24.3	24.3	24.3	26.1	26.1
Uniform Delay, d1	1.49	1.25	1.25	1.25	1.25	1.25	1.00	1.00	1.00	1.00	0.76	0.76
Progression Factor	0.2	0.2	0.2	0.2	0.2	0.2	1.3	1.3	1.3	1.3	4.0	4.0
Incremental Delay, d2	9.4	7.6	7.6	7.6	7.6	7.6	25.5	25.5	25.5	25.5	23.8	23.8
Delay (s)	A	A	A	A	A	A	C	C	C	C	C	C
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	9.4	7.6	7.6	7.6	7.6	7.6	25.5	25.5	25.5	25.5	23.8	23.8
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	13.9											
HCM Volume to Capacity ratio	0.36											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	94.8%											
Analysis Period (min)	15											
c Critical Lane Group	F											

Movement	EBL	Ebt	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5052	4934	1695	1695	1695	1601	1695	1695	1695	1695	1601	1695
Flt Permitted	0.83	0.92	0.85	0.85	0.85	0.86	0.85	0.85	0.85	0.85	0.86	0.86
Satd. Flow (perm)	4214	4555	1473	1473	1407	1407	1473	1473	1473	1473	1407	1407
Volume (vph)	80	766	10	10	477	57	10	10	10	128	0	193
Peak-hour factor, PHF	0.96	0.96	0.92	0.92	0.96	0.96	0.92	0.92	0.92	0.92	0.96	0.96
Adj. Flow (vph)	83	798	11	11	497	59	11	11	11	133	0	201
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	8	0	0
Lane Group Flow (vph)	0	891	0	0	567	0	0	14	0	0	0	334
Confl. Peds. (#/hr)	0	79	0	0	79	0	0	14	0	0	0	79
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	49.0	49.0	49.0	49.0	49.0	49.0	23.0	23.0	23.0	23.0	23.0	23.0
Effective Green, g (s)	49.0	49.0	49.0	49.0	49.0	49.0	23.0	23.0	23.0	23.0	23.0	23.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (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
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
Lane Grp Cap (vph)	2581	2790	2790	2790	2790	2790	423	423	423	405	405	405
v/s Ratio Prot	c0.21	0.12	0.12	0.12	0.12	0.12	0.01	0.01	0.01	0.01	c0.24	c0.24
v/s Ratio Perm	0.35	0.20	0.20	0.20	0.20	0.20	0.03	0.03	0.03	0.03	0.82	0.82
v/c Ratio	7.6	6.9	6.9	6.9	6.9	6.9	20.5	20.5	20.5	20.5	26.6	26.6
Uniform Delay, d1	0.67	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95
Progression Factor	0.4	0.2	0.2	0.2	0.2	0.2	0.0	0.0	0.0	0.0	12.7	12.7
Incremental Delay, d2	5.5	7.0	7.0	7.0	7.0	7.0	20.5	20.5	20.5	20.5	38.1	38.1
Delay (s)	A	A	A	A	A	A	C	C	C	C	C	C
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C
Approach Delay (s)	5.5	7.0	7.0	7.0	7.0	7.0	20.5	20.5	20.5	20.5	38.1	38.1
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	12.1											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	65.2%											
Analysis Period (min)	15											
c Critical Lane Group	B											

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

Existing PM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.98
Frt	0.99	0.99	0.99	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.99	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	4924	4746	4746	1740	3427	1725	3484	1725	3484	1725	3484	1725
Flt Permitted	0.67	0.68	0.68	0.36	1.00	0.26	1.00	0.26	1.00	0.26	1.00	0.26
Satd. Flow (perm)	3326	3266	3266	664	3427	477	3484	477	3484	477	3484	477
Volume (vph)	227	594	81	61	358	197	100	742	98	135	570	46
Peak-hour factor, PHF	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90	0.90
Adj. Flow (vph)	252	660	90	68	398	219	111	824	109	150	633	51
RTOR Reduction (vph)	0	12	0	0	14	0	0	5	0	0	3	0
Lane Group Flow (vph)	0	990	0	0	671	0	111	928	0	150	681	0
Confl. Peds. (#/hr)	26	19	19	26	39	26	39	92	26	39	92	26
Turn Type	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	3	8	2	2	2	2	2	2	2	2	6
Permitted Phases	4	8	26.5	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0	66.0
Actuated Green, G (s)	28.0	28.0	28.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0	67.0
Effective Green, g (s)	0.27	0.27	0.27	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65	0.65
Actuated g/C Ratio	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Clearance Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Vehicle Extension (s)	904	888	888	432	2229	310	2266	310	2266	310	2266	310
Lane Grp Cap (vph)	c0.30	0.21	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17
v/s Ratio Prot	1.25dl	0.88dl	0.26	0.42	0.48	0.30	0.30	0.30	0.30	0.30	0.30	0.30
v/s Ratio Perm	37.5	34.4	7.6	8.6	9.2	7.8	7.8	7.8	7.8	7.8	7.8	7.8
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	59.5	3.3	1.4	0.6	5.3	0.3	0.3	0.3	0.3	0.3	0.3	0.3
Incremental Delay, d2	97.0	37.7	9.0	9.2	14.5	8.2	8.2	8.2	8.2	8.2	8.2	8.2
Delay (s)	F	D	A	A	B	A	A	B	A	B	A	A
Level of Service	97.0	37.7	9.0	9.2	14.5	8.2	8.2	8.2	8.2	8.2	8.2	8.2
Approach Delay (s)	F	D	A	A	B	A	A	B	A	B	A	A
Approach LOS	F	D	A	A	B	A	A	B	A	B	A	A
Intersection Summary												
HCM Average Control Delay	39.4											
HCM Level of Service	D											
HCM Volume to Capacity ratio	0.66											
Actuated Cycle Length (s)	103.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	80.4%											
ICU Level of Service	D											
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

Existing PM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.94
Fipb, ped/bikes	1.00	1.00	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.98
Frt	0.99	0.99	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	0.93
Flt Protected	0.99	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Satd. Flow (prot)	5022	4982	4982	1777	1406	1583	1777	1406	1583	1777	1406	1583
Flt Permitted	0.89	0.89	0.89	0.77	0.86	1.00	0.86	1.00	0.86	1.00	0.86	0.82
Satd. Flow (perm)	4498	3869	3869	1561	1406	1466	1561	1406	1466	1561	1406	1466
Volume (vph)	36	771	30	82	531	28	53	92	191	33	33	68
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	36	779	30	83	536	28	54	93	193	33	33	69
RTOR Reduction (vph)	0	5	0	0	6	0	0	0	0	0	0	47
Lane Group Flow (vph)	0	840	0	0	641	0	0	147	100	0	88	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	2	2	2	2	2	6
Permitted Phases	4	49.5	49.5	48.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Actuated Green, G (s)	48.5	48.5	48.5	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Effective Green, g (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
Actuated g/C Ratio	2727	2346	2346	459	413	413	413	413	413	413	413	431
Clearance Time (s)	c0.19	0.17	0.17	0.32	0.24	0.24	0.24	0.24	0.24	0.24	0.24	0.24
Vehicle Extension (s)	7.6	7.4	7.4	22.0	21.5	21.5	21.5	21.5	21.5	21.5	21.5	21.2
Lane Grp Cap (vph)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
v/s Ratio Prot	0.3	0.3	0.3	1.8	1.4	1.4	1.4	1.4	1.4	1.4	1.4	1.1
v/s Ratio Perm	7.9	7.7	7.7	23.9	22.9	22.9	22.9	22.9	22.9	22.9	22.9	22.3
Uniform Delay, d1	A	A	A	C	C	C	C	C	C	C	C	C
Progression Factor	7.9	7.7	7.7	23.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Incremental Delay, d2	A	A	A	A	A	A	A	A	A	A	A	A
Delay (s)	7.9	7.7	7.7	23.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	7.9	7.7	7.7	23.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3	22.3
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	11.5											
HCM Level of Service	B											
HCM Volume to Capacity ratio	0.31											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	96.6%											
ICU Level of Service	F											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

Existing PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.91	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.95	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4940	1770	4743	1770	4932	1770	4933	1770	4933	1770	4933	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1770	4940	1770	4743	1770	4932	1770	4933	1770	4933	1770	4933	
Volume (vph)	187	690	84	81	377	210	167	653	106	307	377	63	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Adj. Flow (vph)	205	758	92	89	414	231	184	718	116	337	414	69	
RTOR Reduction (vph)	0	15	0	0	100	0	0	22	0	0	23	0	
Lane Group Flow (vph)	205	835	0	89	545	0	184	812	0	337	460	0	
Confl. Peds. (#/hr)			81			22			50			43	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	3	4		3	4		1	2		1	2		
Permitted Phases													
Actuated Green, G (s)	11.0	24.1		11.0	24.1		20.9	26.0		20.9	26.0		
Effective Green, g (s)	11.0	25.1		11.0	25.1		20.9	27.0		20.9	27.0		
Actuated g/C Ratio	0.11	0.25		0.11	0.25		0.21	0.27		0.21	0.27		
Clearance Time (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0		
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0	2.0		
Lane Grip Cap (vph)	195	1240		195	1190		370	1332		370	1332		
v/s Ratio Prot	c0.12	c0.17		0.05	0.11		0.10	c0.16		c0.19	0.09		
v/s Ratio Perm	1.05	0.67		0.46	0.46		0.50	0.61		0.91	0.35		
Uniform Delay, d1	44.5	33.8		41.7	31.7		34.9	31.9		38.6	29.4		
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00		
Incremental Delay, d2	78.6	2.9		0.6	1.3		0.4	2.1		25.5	0.7		
Delay (s)	123.1	36.7		42.3	33.0		35.3	34.0		64.1	30.1		
Level of Service	F	D		D	C		D	C		E	C		
Approach Delay (s)		53.5			34.1			34.2			44.1		
Approach LOS		D			C			C			D		
Intersection Summary													
HCM Average Control Delay	42.0											HCM Level of Service	D
HCM Volume to Capacity ratio	0.76												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	81.5%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

Existing PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	0.94	0.94	0.94	0.97	0.97	0.97	1.00	0.99	1.00	0.99	1.00	0.99	
Fipb, ped/bikes	0.96	0.96	0.96	0.97	0.97	0.97	1.00	0.99	1.00	0.99	1.00	0.93	
Frt	0.95	0.95	0.95	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	0.95	
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1563	1657	1563	1657	1657	1657	1688	3469	1646	3454	1563	1657	
Flt Permitted	0.71	0.71	0.71	0.84	0.84	0.84	0.30	1.00	0.41	1.00	0.71	0.71	
Satd. Flow (perm)	1132	1418	1132	1418	1418	1418	537	3469	705	3454	1132	1418	
Volume (vph)	97	33	65	42	59	38	40	552	35	32	765	59	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	
Adj. Flow (vph)	103	35	69	45	63	40	43	587	37	34	814	63	
RTOR Reduction (vph)	0	24	0	0	18	0	0	4	0	0	5	0	
Lane Group Flow (vph)	0	183	0	0	130	0	43	620	0	34	872	0	
Confl. Peds. (#/hr)			100			100			100			100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4		4		4		2		2		6		
Permitted Phases													
Actuated Green, G (s)	16.1		16.1		16.1		61.9	61.9	61.9		61.9	61.9	
Effective Green, g (s)	15.6		15.6		15.6		61.4	61.4	61.4		61.4	61.4	
Actuated g/C Ratio	0.18		0.18		0.18		0.72	0.72	0.72		0.72	0.72	
Clearance Time (s)	3.5		3.5		3.5		3.5	3.5	3.5		3.5	3.5	
Vehicle Extension (s)	2.0		2.0		2.0		2.0	2.0	2.0		2.0	2.0	
Lane Grip Cap (vph)	208		260		260		388	2506	509		2495		
v/s Ratio Prot	c0.16		0.09		0.09		0.08	0.18			c0.25		
v/s Ratio Perm	0.88		0.50		0.50		0.11	0.25			0.07	0.35	
Uniform Delay, d1	33.8		31.2		31.2		3.6	4.0			3.4	4.4	
Progression Factor	1.00		1.00		1.00		1.00	1.00			1.00	1.00	
Incremental Delay, d2	30.5		0.6		0.6		0.6	0.2			0.3	0.4	
Delay (s)	64.3		31.7		31.7		4.1	4.2			3.7	4.8	
Level of Service	E		C		C		A	A			A	A	
Approach Delay (s)	64.3		31.7		31.7		4.2	4.2			4.7	4.7	
Approach LOS	E		C		C		A	A			A	A	
Intersection Summary													
HCM Average Control Delay	13.0											HCM Level of Service	B
HCM Volume to Capacity ratio	0.46												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	57.6%											ICU Level of Service	B
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave. Existing PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.93	1.00	0.93
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.96	1.00	0.96	1.00
Frt	1.00	0.96	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.94	1.00	0.94
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3308	1770	3254	1690	3490	1696	3118	1696	3118	1696	3118
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3308	1770	3254	1690	3490	1696	3118	1696	3118	1696	3118
Volume (vph)	127	316	100	56	383	114	113	507	29	105	482	294
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	130	322	102	57	391	116	115	517	30	107	492	300
RTOR Reduction (vph)	0	36	0	0	35	0	0	4	0	0	94	0
Lane Group Flow (vph)	130	388	0	57	472	0	115	543	0	107	698	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		2	2		6		6
Permitted Phases							2			6		6
Actuated Green, G (s)	9.2	22.0		5.1	17.9		44.4	44.4		44.4		44.4
Effective Green, g (s)	9.7	21.5		5.6	17.4		45.9	45.9		45.9		45.9
Actuated g/C Ratio	0.11	0.25		0.07	0.20		0.54	0.54		0.54		0.54
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5		5.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	202	837		117	666		281	1885		399		1684
v/s Ratio Prot	c0.07	0.12		0.03	c0.15		0.22	0.16		0.14		c0.22
v/s Ratio Perm	0.64	0.46		0.49	0.71		0.41	0.29		0.27		0.41
v/c Ratio	36.0	26.9		38.3	31.4		11.5	10.6		10.5		11.6
Uniform Delay, d1	1.00	1.00		1.00	1.00		1.00	1.00		1.00		1.00
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	5.2	0.1		1.2	2.8		4.4	0.4		1.6		0.8
Delay (s)	41.2	27.0		39.5	34.3		15.9	11.0		12.2		12.3
Level of Service	D	C		D	C		B	B		B		B
Approach Delay (s)	30.3			34.8			11.9			12.3		
Approach LOS	C			C			B			B		B
Intersection Summary												
HCM Average Control Delay	20.7		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.51											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0							
Intersection Capacity Utilization	69.9%		ICU Level of Service		C							
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave. Existing PM + Tower
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frbp, ped/bikes	0.92	1.00	1.00	1.00	0.94	0.94
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.91	1.00	1.00	1.00	0.97	0.97
Flt Protected	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1529	1770	3539	3244		
Flt Permitted	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1529	1770	3539	3244		
Volume (vph)	44	96	100	1069	615	127
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	46	100	104	1114	641	132
RTOR Reduction (vph)	70	0	0	0	20	0
Lane Group Flow (vph)	76	0	104	1114	753	0
Confl. Peds. (#/hr)	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	24.2		8.5	47.8	35.3	
Effective Green, g (s)	24.2		8.5	47.8	35.3	
Actuated g/C Ratio	0.30		0.11	0.60	0.44	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	463		188	2115	1431	
v/s Ratio Prot	c0.05		0.06	c0.31	0.23	
v/s Ratio Perm	0.16		0.55	0.53	0.53	
v/c Ratio	20.5		33.9	9.5	16.3	
Uniform Delay, d1	1.00		1.00	1.00	0.81	
Progression Factor	1.00		1.00	1.00	1.00	
Incremental Delay, d2	0.8		3.5	0.2	1.1	
Delay (s)	21.2		37.4	9.7	14.3	
Level of Service	C		D	A	B	
Approach Delay (s)	21.2		12.1	14.3		
Approach LOS	C		B	B		
Intersection Summary						
HCM Average Control Delay	13.5		HCM Level of Service		B	
HCM Volume to Capacity ratio	0.41					
Actuated Cycle Length (s)	80.0		Sum of lost time (s)		8.0	
Intersection Capacity Utilization	55.9%		ICU Level of Service		B	
Analysis Period (min)	15					
c Critical Lane Group						

**APPENDIX P:
YEAR 2015 PLUS TOWER ALTERNATIVE
INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

2015 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	16
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	1.00
Flt	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.94	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4906	1770	4953	1770	4953	2006	2043	1985	1956	1985	1956
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.10	1.00	0.44	1.00	0.44	1.00
Satd. Flow (perm)	1770	4906	1770	4953	1770	4953	201	2043	925	1956	925	1956
Volume (vph)	300	951	206	90	1330	200	200	291	60	160	416	270
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	316	1001	217	95	1400	211	211	306	63	168	438	284
RTOR Reduction (vph)	0	26	0	0	16	0	0	6	0	0	19	0
Lane Group Flow (vph)	316	1192	0	95	1595	0	211	363	0	168	703	0
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10
Turn Type	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		3	8		5	2		6		6
Permitted Phases												
Actuated Green, G (s)	17.0	49.4		11.6	44.0		48.5	48.5		39.5		39.5
Effective Green, g (s)	17.0	49.4		11.6	44.0		49.0	49.0		40.0		40.0
Actuated g/C Ratio	0.14	0.41		0.10	0.37		0.41	0.41		0.33		0.33
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5		2.5
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0		3.0
Lane Grp Cap (vph)	251	2020		171	1816		187	834		308		652
v/s Ratio Prot	c0.18	0.24		0.05	c0.32		c0.07	0.18		c0.36		c0.36
v/s Ratio Perm							0.39			0.18		
v/c Ratio	1.26	0.59		0.56	0.88		1.13	0.44		0.55		1.08
Uniform Delay, d1	51.5	27.4		51.7	35.5		58.7	25.5		32.6		40.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	144.6	1.3		3.9	6.4		104.5	0.4		2.0		58.0
Delay (s)	196.1	28.7		55.6	41.9		163.2	25.9		34.6		98.0
Level of Service	F	C		E	D		F	C		C		F
Approach Delay (s)	63.2			42.7			75.9			86.1		
Approach LOS	E			D			E			F		
Intersection Summary												
HCM Average Control Delay	61.6											
HCM Volume to Capacity ratio	1.02											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	110.1%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2015 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.96	1.00
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.96
Flt	0.95	1.00	0.95	1.00	0.91	1.00	0.97	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.98	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1748	1748	1681	1596	3420	1770	3268	1770	3268	1770	3268	1770
Flt Permitted	0.48	0.48	0.74	1.00	0.93	0.93	0.93	0.93	0.95	1.00	0.95	1.00
Satd. Flow (perm)	846	846	1302	1596	3197	1770	3268	1770	3268	1770	3268	1770
Volume (vph)	10	10	10	174	110	160	10	1161	237	100	1150	450
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	11	11	183	116	168	11	1222	249	105	1211	474
RTOR Reduction (vph)	0	10	0	0	68	0	0	14	0	0	33	0
Lane Group Flow (vph)	0	23	0	183	216	0	0	1468	0	105	1652	0
Confl. Peds. (#/hr)	4			4	44		12			12		44
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot
Protected Phases	7			8			2			1		6
Permitted Phases												
Actuated Green, G (s)	5.1			16.2	16.2		43.0			7.7		55.2
Effective Green, g (s)	5.6			16.7	16.7		43.5			8.2		55.7
Actuated g/C Ratio	0.06			0.19	0.19		0.48			0.09		0.62
Clearance Time (s)	4.5			4.5	4.5		4.5			4.5		4.5
Vehicle Extension (s)	2.0			2.0	2.0		2.0			2.0		2.0
Lane Grp Cap (vph)	53			242	296		1545			161		2023
v/s Ratio Prot	c0.03			c0.14	0.14		c0.46			0.06		c0.51
v/s Ratio Perm	0.43			0.76	0.73		0.95			0.65		0.82
v/c Ratio	40.7			34.7	34.5		22.2			39.5		13.2
Uniform Delay, d1	1.00			1.00	1.00		1.00			1.00		1.00
Progression Factor	2.0			11.3	7.8		6.0			7.0		3.8
Incremental Delay, d2	42.7			46.0	42.3		28.2			46.5		17.0
Delay (s)	D			D	D		C			D		B
Level of Service	D			D	D		C			D		B
Approach Delay (s)	42.7			43.8			28.2			18.7		
Approach LOS	D			D			C			B		
Intersection Summary												
HCM Average Control Delay	25.8											
HCM Volume to Capacity ratio	0.87											
Actuated Cycle Length (s)	90.0											
Intersection Capacity Utilization	107.6%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2015 AM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.97	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3437	1770	3356	1770	3418	1770	3395	1770	3395	1770	3395	
Satd. Flow (perm)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Volume (vph)	460	590	91	120	700	310	110	668	120	280	884	180	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	479	615	95	125	729	323	115	696	125	292	921	188	
RTOR Reduction (vph)	0	13	0	0	56	0	0	16	0	0	18	0	
Lane Group Flow (vph)	479	697	0	125	996	0	115	805	0	292	1091	0	
Confl. Peds. (#/hr)	6	24	24	6	36	6	36	28	28	28	28	36	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Actuated Green, G (s)	13.0	28.9	9.6	25.5	8.1	23.5	11.0	26.4					
Effective Green, g (s)	12.5	29.9	9.1	26.5	7.6	24.5	10.5	27.4					
Actuated g/C Ratio	0.14	0.33	0.10	0.29	0.08	0.27	0.12	0.30					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grp Cap (vph)	477	1142	179	988	149	930	207	1034					
v/s Ratio Prot	c0.14	c0.20	0.07	c0.30	0.06	0.24	c0.17	c0.32					
v/s Ratio Perm	1.00	0.61	0.70	1.01	0.77	0.87	1.41	1.06					
Uniform Delay, d1	38.8	25.2	39.1	31.8	40.4	31.2	39.8	31.3					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.88					
Incremental Delay, d2	42.2	0.7	9.2	30.7	19.9	10.6	201.0	37.7					
Delay (s)	81.0	25.8	48.3	62.4	60.2	41.8	246.5	65.3					
Level of Service	F	C	D	E	E	D	F	E					
Approach Delay (s)	48.1		60.9		44.0		103.0						
Approach LOS	D		E		D		F						
Intersection Summary													
HCM Average Control Delay	66.9											HCM Level of Service	E
HCM Volume to Capacity ratio	1.14												
Actuated Cycle Length (s)	90.0											Sum of lost time (s)	20.0
Intersection Capacity Utilization	94.1%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2015 AM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.86	0.86	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.98	1.00	0.97	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3437	1770	3356	1770	3418	1770	3395	1770	3395	1770	3395	
Satd. Flow (perm)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Volume (vph)	0	0	10	0	0	0	0	347	330	1600	434	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	11	0	0	0	0	365	347	1684	457	63	
RTOR Reduction (vph)	0	11	0	0	0	0	0	26	0	0	0	0	
Lane Group Flow (vph)	0	0	0	0	0	0	0	697	0	1684	520	0	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Actuated Green, G (s)	13.0	28.9	9.6	25.5	8.1	23.5	11.0	26.4					
Effective Green, g (s)	12.5	29.9	9.1	26.5	7.6	24.5	10.5	27.4					
Actuated g/C Ratio	0.14	0.33	0.10	0.29	0.08	0.27	0.12	0.30					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grp Cap (vph)	477	1142	179	988	149	930	207	1034					
v/s Ratio Prot	c0.14	c0.20	0.07	c0.30	0.06	0.24	c0.17	c0.32					
v/s Ratio Perm	1.00	0.61	0.70	1.01	0.77	0.87	1.41	1.06					
Uniform Delay, d1	38.8	25.2	39.1	31.8	40.4	31.2	39.8	31.3					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.14	0.88					
Incremental Delay, d2	42.2	0.7	9.2	30.7	19.9	10.6	201.0	37.7					
Delay (s)	81.0	25.8	48.3	62.4	60.2	41.8	246.5	65.3					
Level of Service	F	C	D	E	E	D	F	E					
Approach Delay (s)	48.1		60.9		44.0		103.0						
Approach LOS	D		E		D		F						
Intersection Summary													
HCM Average Control Delay	41.0											HCM Level of Service	D
HCM Volume to Capacity ratio	0.87												
Actuated Cycle Length (s)	45.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	79.5%											ICU Level of Service	D
Analysis Period (min)	15												
dr Defacto Right Lane. Recode with 1 through lane as a right lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2015 AM + Tower
 1/21/2008

2015 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.97	0.96	0.97	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Fipb, ped/bikes	0.98	0.97	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	0.94	0.98	0.94	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Flt Protected	0.98	0.98	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1691	1605	1605	3402	3472	3472	3472	3472	3472	3472	3472	3472
Flt Permitted	0.83	0.87	0.87	0.91	0.91	0.88	0.91	0.91	0.88	0.88	0.88	0.88
Satd. Flow (perm)	1437	1418	1418	3091	3091	3058	3091	3091	3058	3058	3058	3058
Volume (vph)	70	80	32	60	60	90	31	507	80	50	584	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	74	84	34	63	63	95	33	534	84	53	615	32
RTOR Reduction (vph)	0	17	0	0	60	0	0	26	0	0	8	0
Lane Group Flow (vph)	0	175	0	0	161	0	0	625	0	0	692	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	8	8	8	2	2	2	2	6	6	6
Actuated Green, G (s)	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Effective Green, g (s)	15.0	15.0	15.0	15.0	15.0	22.0	22.0	22.0	22.0	22.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.33	0.33	0.33	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Clearance Time (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
Lane Grp Cap (vph)	479	479	473	473	473	1511	1511	1511	1511	1495	1495	1495
v/s Ratio Prot	c0.12	0.11	0.11	0.11	0.11	0.20	0.20	0.20	0.20	c0.23	c0.23	c0.23
v/s Ratio Perm	0.36	0.34	0.34	0.34	0.34	0.41	0.41	0.41	0.41	0.46	0.46	0.46
v/c Ratio	11.4	11.3	11.3	11.3	11.3	7.4	7.4	7.4	7.4	7.6	7.6	7.6
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.1	2.0	2.0	2.0	2.0	0.8	0.8	0.8	0.8	1.0	1.0	1.0
Incremental Delay, d2	13.5	13.2	13.2	13.2	13.2	8.2	8.2	8.2	8.2	8.6	8.6	8.6
Delay (s)	B	B	B	B	B	A	A	A	A	A	A	A
Level of Service	B	B	B	B	B	A	A	A	A	A	A	A
Approach Delay (s)	13.5	13.2	13.2	13.2	13.2	8.2	8.2	8.2	8.2	8.6	8.6	8.6
Approach LOS	B	B	B	B	B	A	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.6 HCM Level of Service A											
HCM Volume to Capacity ratio	0.42											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	63.9% ICU Level of Service B											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 AM + Tower
1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	1.00	1.00	0.99	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00
Frt	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1748	3432	1759	3462	1767	3482	1767	3482	1736	3481	1736	3481
Flt Permitted	0.17	1.00	1.00	0.36	1.00	1.00	0.44	1.00	1.00	0.59	1.00	1.00
Satd. Flow (perm)	320	3432	675	3462	810	3462	810	1812	1084	1841	1084	1841
Volume (vph)	30	380	80	74	689	75	90	201	34	83	400	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	400	84	78	725	79	95	212	36	87	421	32
RTOR Reduction (vph)	0	22	0	0	11	0	0	8	0	0	3	0
Lane Group Flow (vph)	32	462	0	78	793	0	95	240	0	87	450	0
Conf. Peds. (#/hr)	30	12	12	12	30	6	30	6	54	54	30	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4				8				2			6
Permitted Phases	4			8			2				6	
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	49.5	49.5	49.5	49.5	49.5	49.5
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	23.0	49.0	49.0	49.0	49.0	49.0	49.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.61	0.61	0.61	0.61	0.61	0.61
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	92	987	194	194	995	496	1110	664	1128	664	1128	92
v/s Ratio Prot	0.13				c0.23				0.13		c0.24	
v/s Ratio Perm	0.10	0.12	0.12	0.12	0.12	0.12	0.12	0.22	0.08	0.13	0.40	0.10
v/c Ratio	0.35	0.47	0.40	0.40	0.80	0.19	0.22	0.22	0.13	0.13	0.40	0.35
Uniform Delay, d1	22.6	23.5	23.0	26.3	6.8	6.9	6.8	6.9	6.5	7.9	6.5	22.6
Progression Factor	1.00	1.00	0.87	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	10.1	1.6	5.6	6.1	0.9	0.4	0.9	0.4	0.4	1.1	0.4	10.1
Delay (s)	32.7	25.1	25.6	30.1	7.7	7.4	7.7	7.4	6.9	9.0	6.9	32.7
Level of Service	C	C	C	C	C	C	A	A	A	A	A	C
Approach Delay (s)		25.5			29.7			7.5		8.7		
Approach LOS		C			C			A		A		A

Intersection Summary		
HCM Average Control Delay	20.4	HCM Level of Service C
HCM Volume to Capacity ratio	0.53	
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	83.4%	ICU Level of Service E
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 AM + Tower
1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.98
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1763	3428	1740	3512	1740	3512	3385	3428	3385	3428	3385	3428
Flt Permitted	0.27	1.00	1.00	0.42	1.00	1.00	0.42	1.00	0.79	1.00	0.84	1.00
Satd. Flow (perm)	506	3428	767	3512	767	3512	2716	3428	2716	3428	2716	3428
Volume (vph)	30	416	80	66	728	33	70	171	54	64	240	50
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	438	84	69	766	35	74	180	57	67	253	53
RTOR Reduction (vph)	0	20	0	0	4	0	0	24	0	0	16	0
Lane Group Flow (vph)	32	502	0	69	797	0	0	287	0	0	357	0
Conf. Peds. (#/hr)	18	54	54	18	4	18	4	18	18	18	54	18
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4				8				2			6
Permitted Phases	4			8			2				6	
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	38.0	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	33.0	33.0	33.0	33.0	33.0	33.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.41	0.41	0.41	0.41	0.41	0.41
Clearance 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
Lane Grp Cap (vph)	247	1671	374	1712	374	1712	1120	1120	1120	1120	1193	247
v/s Ratio Prot	0.15				c0.23				0.11		c0.12	
v/s Ratio Perm	0.06	0.13	0.30	0.18	0.47	0.26	0.26	0.26	0.26	0.26	0.30	0.06
Uniform Delay, d1	11.2	12.3	11.5	13.6	15.4	15.7	15.4	15.7	15.7	15.7	15.7	11.2
Progression Factor	0.96	1.03	1.38	1.48	1.04	1.04	1.04	1.04	1.04	1.04	1.04	0.96
Incremental Delay, d2	1.0	0.4	1.0	0.8	0.5	0.5	0.5	0.5	0.5	0.5	0.5	1.0
Delay (s)	11.7	13.1	16.9	21.0	10.4	16.4	10.4	16.4	16.4	16.4	16.4	11.7
Level of Service	B	B	B	C	C	C	B	B	B	B	B	B
Approach Delay (s)		13.1			20.7			10.4		16.4		
Approach LOS		B			C			B		B		B

Intersection Summary		
HCM Average Control Delay	16.4	HCM Level of Service B
HCM Volume to Capacity ratio	0.39	
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	73.7%	ICU Level of Service D
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2015 AM + Tower
 1/21/2008

2015 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1764	3452	1735	3436	3381	3381	3451	3451	3451	3451	3451	3451
Flt Permitted	0.24	1.00	0.42	1.00	0.86	0.86	0.86	0.86	0.86	0.76	0.76	0.76
Satd. Flow (pbrm)	443	3452	773	3436	2939	2939	2642	2642	2642	2642	2642	2642
Volume (vph)	40	443	61	106	728	139	39	238	77	119	346	30
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	42	461	64	110	758	145	41	248	80	124	360	31
RTOR Reduction (vph)	0	14	0	0	20	0	0	32	0	0	6	0
Lane Group Flow (vph)	42	511	0	110	883	0	0	337	0	0	509	0
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	227	1769	396	1761	1139	1139	1024	1024	1024	1024	1024	1024
v/s Ratio Prot	0.15			c0.26								
v/s Ratio Perm	0.09	0.15	0.14	0.14	0.14	0.11	0.11	0.11	0.11	0.19	0.19	0.19
v/c Ratio	0.19	0.29	0.28	0.50	0.50	0.30	0.30	0.30	0.30	0.50	0.50	0.50
Uniform Delay, d1	10.5	11.2	11.1	12.8	12.8	17.0	17.0	17.0	17.0	18.6	18.6	18.6
Progression Factor	1.28	1.31	1.00	1.00	1.00	0.65	0.65	0.65	0.65	1.00	1.00	1.00
Incremental Delay, d2	1.7	0.4	1.7	1.0	1.0	0.6	0.6	0.6	0.6	1.7	1.7	1.7
Delay (s)	15.2	15.0	12.8	13.8	13.8	11.6	11.6	11.6	11.6	20.3	20.3	20.3
Level of Service	B	B	B	B	B	B	B	B	B	C	C	C
Approach Delay (s)	15.0	15.0	13.7	13.7	13.7	11.6	11.6	11.6	11.6	20.3	20.3	20.3
Approach LOS	B	B	B	B	B	B	B	B	B	C	C	C
Intersection Summary												
HCM Average Control Delay	15.1											
HCM Volume to Capacity ratio	0.50											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	102.5%											
Analysis Period (min)	15											
c Critical Lane Group	15											

Movement	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	0.94	1.00	0.94	1.00	0.94	1.00	0.94	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.98	1.00	0.98	1.00	0.97	1.00	0.97	1.00
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.96	1.00	0.96
Satd. Flow (prot)	3247	1770	3539	1735	3247	1770	3539	1735
Flt Permitted	1.00	0.95	1.00	0.96	1.00	0.96	1.00	0.96
Satd. Flow (pbrm)	3247	1770	3539	1735	3247	1770	3539	1735
Volume (vph)	543	98	72	839	134	44	44	44
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	572	103	76	883	141	46	46	46
RTOR Reduction (vph)	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	675	0	76	883	187	0	0	0
Confl. Peds. (#/hr)	146	266						
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4			3			8	
Permitted Phases	4			3			8	
Actuated Green, G (s)	52.0	7.8	63.8	13.2	63.8	13.2	63.8	13.2
Effective Green, g (s)	52.0	7.8	63.8	13.2	63.8	13.2	63.8	13.2
Actuated g/C Ratio	0.61	0.09	0.75	0.16	0.75	0.16	0.75	0.16
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1986	162	2656	269	1986	162	2656	269
v/s Ratio Prot	0.21		c0.04	c0.25			c0.11	
v/s Ratio Perm	0.34	0.47	0.33	0.70	0.33	0.70	0.33	0.70
v/c Ratio	0.34	0.47	0.33	0.70	0.33	0.70	0.33	0.70
Uniform Delay, d1	8.1	36.6	3.5	34.0	3.5	34.0	3.5	34.0
Progression Factor	1.00	1.03	0.72	0.72	0.72	0.72	0.72	0.72
Incremental Delay, d2	0.5	1.6	0.2	7.5	0.2	7.5	0.2	7.5
Delay (s)	8.6	39.3	2.8	32.0	2.8	32.0	2.8	32.0
Level of Service	A	D	A	C	A	C	A	C
Approach Delay (s)	8.6	5.7	32.0	32.0	5.7	32.0	32.0	32.0
Approach LOS	A	A	A	C	A	C	A	C
Intersection Summary								
HCM Average Control Delay	9.4							
HCM Volume to Capacity ratio	0.40							
Actuated Cycle Length (s)	85.0							
Intersection Capacity Utilization	43.3%							
Analysis Period (min)	15							
c Critical Lane Group	15							

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2015 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.97
Fipb, ped/bikes	0.95	1.00	0.92	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.97	1.00	0.98	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.99	0.99	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1683	3270	1636	3407	1683	3436	1770	3339	1683	3407	1683	3270
Flt Permitted	0.26	1.00	0.36	1.00	0.59	0.59	0.95	1.00	0.26	1.00	0.36	1.00
Satd. Flow (pperm)	453	3270	622	3407	2037	2037	1770	3339	453	3270	622	3407
Volume (vph)	126	354	107	90	526	70	125	505	49	140	949	260
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	133	373	113	95	554	74	132	532	52	147	999	274
RTOR Reduction (vph)	0	34	0	0	13	0	0	8	0	0	18	0
Lane Group Flow (vph)	133	452	0	95	615	0	0	708	0	147	1255	0
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	58	92
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	4	4	8	8	8	5	2	2	1	1	6
Permitted Phases	4	4	4	8	8	8	5	2	2	1	1	6
Actuated Green, G (s)	24.4	24.4	24.4	24.4	24.4	24.4	36.6	36.6	36.6	10.5	51.6	10.5
Effective Green, g (s)	24.9	24.9	24.9	24.9	24.9	24.9	37.1	37.1	37.1	11.0	52.1	11.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.44	0.44	0.44	0.13	0.61	0.13
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grip Cap (vph)	133	958	182	998	889	889	229	2047	229	2047	229	2047
v/s Ratio Prot	0.14	0.14	0.14	0.18	0.18	0.18	0.08	0.38	0.08	0.38	0.08	0.38
v/s Ratio Perm	0.29	0.47	0.15	0.52	0.62	0.62	0.35	0.61	0.35	0.61	0.35	0.61
v/c Ratio	1.00	0.47	0.52	0.62	0.62	0.62	0.35	0.61	0.35	0.61	0.35	0.61
Uniform Delay, d1	30.1	24.7	25.1	25.9	20.7	20.7	35.1	10.2	35.1	10.2	35.1	10.2
Progression Factor	0.73	0.67	1.00	1.00	1.00	1.38	1.28	0.53	1.38	1.28	0.53	1.28
Incremental Delay, d2	76.0	0.1	1.2	0.8	0.8	4.5	3.3	1.0	4.5	3.3	1.0	3.3
Delay (s)	98.1	16.7	26.3	26.7	33.2	33.2	48.4	6.4	33.2	48.4	6.4	48.4
Level of Service	F	B	C	C	C	C	D	A	C	D	A	D
Approach Delay (s)	34.2	C	26.7	C	33.2	C	10.8	B	33.2	C	10.8	B
Approach LOS	C	C	C	C	C	C	B	B	C	C	B	B
Intersection Summary												
HCM Average Control Delay	22.8		HCM Level of Service		C							
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	85.0		Sum of lost time (s)		12.0							
Intersection Capacity Utilization	92.9%		ICU Level of Service		F							
Analysis Period (min)	15											
dl Defacto Left Lane. Recode with 1 though lane as a left lane.												
dr Defacto Right Lane. Recode with 1 though lane as a right lane.												
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. 2015 AM + Tower
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT	
Lane Configurations	Free	Free	Free	Free	Free	Free	
Sign Control	Free	Free	Free	Free	Free	Free	
Grade	0%	0%	0%	0%	0%	0%	
Volume (veh/h)	10	31	663	10	20	1160	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	11	33	698	11	21	1221	
Pedestrians	34	33	33	33	34	34	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0	
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0	
Percent Blockage	3	3	3	3	3	3	
Right turn flare (veh)	None	None	None	None	None	None	
Median type	None	None	None	None	None	None	
Median storage (veh)	None	None	None	None	None	None	
Upstream signal (ft)	None	None	230	None	None	471	
pX, platoon unblocked	0.80	0.95	0.95	0.95	0.95	0.95	
VC, conflicting volume	1423	422	742	422	742	742	
VC1, stage 1 conf vol	None	None	None	None	None	None	
VC2, stage 2 conf vol	None	None	None	None	None	None	
vCu, unblocked vol	1097	342	678	342	678	678	
tC, single (s)	6.8	6.9	4.1	6.9	4.1	4.1	
tC, 2 stage (s)	None	None	None	None	None	None	
tF (s)	3.5	3.3	2.2	3.3	2.2	2.2	
p0 queue free %	93	94	97	94	97	97	
cM capacity (veh/h)	153	588	841	588	841	841	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3	
Volume Total	43	465	243	21	611	611	
Volume Left	11	0	0	21	0	0	
Volume Right	33	0	11	0	0	0	
cSH	347	1700	1700	841	1700	1700	
Volume to Capacity	0.12	0.27	0.14	0.03	0.36	0.36	
Queue Length 95th (ft)	11	0	0	2	0	0	
Control Delay (s)	16.8	0.0	0.0	9.4	0.0	0.0	
Lane LOS	C	A	A	A	A	A	
Approach Delay (s)	16.8	0.0	0.2	0.2	0.0	0.0	
Approach LOS	C	A	A	A	A	A	
Intersection Summary							
Average Delay	0.5						
Intersection Capacity Utilization	49.3%		ICU Level of Service				A
Analysis Period (min)	15						

HCM Signalized Intersection Capacity Analysis
16: MacArthur Blvd. & Market St.

2015 AM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Fipb, ped/bikes	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Frt	0.99	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.95	1.00	0.95	1.00
Flt Protected	4994	1758	3469	1775	1729	1815						
Satd. Flow (prot)	0.83	0.41	1.00	0.54	0.40	1.00						
Flt Permitted	4174	767	3469	969	730	1815						
Satd. Flow (perm)	50	470	40	62	627	81	70	204	60	200	314	50
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	53	495	42	65	660	85	74	215	63	211	331	53
Adj. Flow (vph)	0	10	0	0	12	0	0	9	0	0	7	0
RTOR Reduction (vph)	0	10	0	0	12	0	0	9	0	0	7	0
Lane Group Flow (vph)	0	580	0	65	733	0	0	343	0	211	377	0
Conf. Peds. (#/hr)	24	18	18	24	24	24	24	48	48	48	48	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2				6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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
Lane Grp Cap (vph)	2554	469	2122	c0.21			285	215	534			
v/s Ratio Prot	0.14	0.08		c0.21			c0.35	0.29	0.21			
v/s Ratio Perm	0.23	0.14	0.35	1.20	0.98	0.71	1.20	0.98	0.71			
Uniform Delay, d1	7.4	7.0	8.1	30.0	29.8	26.7	30.0	29.8	26.7			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	0.2	0.6	0.4	119.8	56.8	7.6	119.8	56.8	7.6			
Delay (s)	7.6	7.6	8.6	149.8	86.5	34.4	149.8	86.5	34.4			
Level of Service	A	A	A	F	F	C	F	F	C			
Approach Delay (s)	7.6	8.5		149.8	52.9		149.8	52.9				
Approach LOS	A	A	A	F	F	D	F	F	D			

Intersection Summary	
HCM Average Control Delay	40.7 HCM Level of Service D
HCM Volume to Capacity ratio	0.62
Actuated Cycle Length (s)	85.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	101.5% ICU Level of Service G
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
17: MacArthur Blvd. & West St.

2015 AM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Frt	1.00	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.99	1.00
Flt Protected	5046	1758	4979	1757	1770	1830						
Satd. Flow (prot)	0.88	0.41	1.00	0.54	0.40	1.00						
Flt Permitted	4463	767	3469	969	730	1815						
Satd. Flow (perm)	30	700	20	51	669	91	50	194	73	90	276	30
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	32	737	21	54	704	96	53	204	77	95	291	32
Adj. Flow (vph)	0	4	0	0	20	0	0	17	0	0	5	0
RTOR Reduction (vph)	0	4	0	0	20	0	0	17	0	0	5	0
Lane Group Flow (vph)	0	786	0	0	834	0	53	264	0	95	318	0
Conf. Peds. (#/hr)	18	18	18	18	18	18	18	18	18	18	18	18
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2				6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2873	2719	150	454	182	469						
v/s Ratio Prot	0.18	0.20		c0.20	0.09	0.13						
v/s Ratio Perm	0.27	0.31	0.35	0.58	0.52	0.68						
Uniform Delay, d1	6.2	6.3	24.3	26.0	25.5	26.8						
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00						
Incremental Delay, d2	0.2	0.3	6.4	5.4	10.1	7.5						
Delay (s)	6.4	6.4	30.7	31.4	40.4	39.7						
Level of Service	A	A	C	C	D	D						
Approach Delay (s)	6.4	4.5	31.3	31.3	39.9							
Approach LOS	A	A	C	C	D	D						

Intersection Summary	
HCM Average Control Delay	15.0 HCM Level of Service B
HCM Volume to Capacity ratio	0.41
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	64.1% ICU Level of Service C
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 19: MacArthur Blvd. & Frontage Road

2015 AM + Tower
 1/21/2008

2015 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	0.98	0.97	0.97	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5026	4944	3399	3399	3426	3426	3426	3426	3426	3426	3426	3426
Flt Permitted	0.82	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83
Satd. Flow (perm)	4150	4102	2855	2855	2692	2692	2692	2692	2692	2692	2692	2692
Volume (vph)	54	779	40	58	747	136	30	164	44	127	312	44
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	57	820	42	61	786	143	32	173	46	134	328	46
RTOR Reduction (vph)	0	6	0	0	29	0	0	24	0	0	10	0
Lane Group Flow (vph)	0	913	0	0	961	0	0	227	0	0	498	0
Confl. Peds. (#/hr)	17	19	19	19	12	12	16	16	16	16	16	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	8	8	8	2	2	2	2	6	6
Permitted Phases	4	8	8	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2672	2641	2641	2641	2641	2641	732	732	732	732	690	690
v/s Ratio Prot	0.22	0.23	0.23	0.23	0.23	0.23	0.08	0.08	0.08	0.08	c0.19	c0.19
v/s Ratio Perm	0.34	0.36	0.36	0.36	0.36	0.36	0.31	0.31	0.31	0.31	0.72	0.72
v/c Ratio	6.5	6.6	6.6	6.6	6.6	6.6	24.0	24.0	24.0	24.0	27.2	27.2
Uniform Delay, d1	0.75	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.49	0.49
Progression Factor	0.3	0.4	0.4	0.4	0.4	0.4	1.1	1.1	1.1	1.1	6.2	6.2
Incremental Delay, d2	5.2	7.0	7.0	7.0	7.0	7.0	25.1	25.1	25.1	25.1	19.5	19.5
Delay (s)	A	A	A	A	A	A	C	C	C	C	B	B
Level of Service	A	A	A	A	A	A	C	C	C	C	B	B
Approach Delay (s)	5.2	7.0	7.0	7.0	7.0	7.0	25.1	25.1	25.1	25.1	19.5	19.5
Approach LOS	A	A	A	A	A	A	C	C	C	C	B	B
Intersection Summary												
HCM Average Control Delay	10.5 HCM Level of Service B											
HCM Volume to Capacity ratio	0.47											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	100.4% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

2015 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	0.98	0.97	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97	
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Satd. Flow (prot)	4954	4865	4865	1760	3415	1741	3408						
Flt Permitted	0.66	0.68	0.68	0.23	1.00	0.46	1.00						
Satd. Flow (pbrm)	3267	3322	3322	425	3415	851	3408						
Volume (vph)	128	758	107	110	717	190	70	356	80	285	714	179	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	135	798	113	116	795	200	74	375	84	300	752	188	
RTOR Reduction (vph)	0	21	0	0	68	0	0	15	0	0	18	0	
Lane Group Flow (vph)	0	1025	0	0	1003	0	74	444	0	300	922	0	
Confl. Peds. (#/hr)	40		9		pm+pt	40	25	31	31			25	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	3	8	2	2	2	2	2	2	2	2	6	
Permitted Phases	4	8	8	2	2	2	2	2	2	2	2	6	
Actuated Green, G (s)	30.4	30.4	30.4	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	44.1	
Effective Green, g (s)	31.9	31.9	31.9	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	45.1	
Actuated g/C Ratio	0.38	0.38	0.38	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	0.53	
Clearance Time (s)	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	1226	1247	1247	226	1812	452	1808						
v/s Ratio Prot								0.13				0.27	
v/s Ratio Perm	0.31	0.30	0.30	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	0.17	
v/c Ratio	0.84	0.80	0.80	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	0.33	
Uniform Delay, d1	24.2	23.8	23.8	11.3	10.8	11.3	10.8	11.3	10.8	11.3	10.8	12.8	
Progression Factor	1.49	1.00	1.00	1.41	1.38	1.41	1.38	1.41	1.38	1.41	1.38	1.24	
Incremental Delay, d2	4.7	3.6	3.6	3.7	3.3	3.7	3.3	3.7	3.3	3.7	3.3	3.8	
Delay (s)	40.8	27.4	27.4	19.7	15.2	19.7	15.2	19.7	15.2	19.7	15.2	16.8	
Level of Service	D	C	C	B	B	B	B	B	B	B	B	B	
Approach Delay (s)	40.8	27.4	27.4	19.7	15.2	19.7	15.2	19.7	15.2	19.7	15.2	18.2	
Approach LOS	D	C	C	B	B	B	B	B	B	B	B	B	
Intersection Summary													
HCM Average Control Delay	26.5											HCM Level of Service	C
HCM Volume to Capacity ratio	0.74												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	90.6%											ICU Level of Service	E
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

2015 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.96	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.97	1.00	0.97	0.97	
Satd. Flow (prot)	5040	4983	4983	1770	1395	1770	1395	1606					
Flt Permitted	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.82	
Satd. Flow (pbrm)	4451	4372	4372	1585	1395	1585	1395	1357					
Volume (vph)	30	1090	33	30	984	80	22	33	20	80	30	40	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	32	1147	35	32	1036	84	23	35	21	84	32	42	
RTOR Reduction (vph)	0	4	0	0	11	0	0	0	0	15	0	16	
Lane Group Flow (vph)	0	1210	0	0	1141	0	0	58	6	0	142	0	
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	8	8	8	2	2	2	2	2	6	
Permitted Phases	4	4	4	8	8	8	2	2	2	2	2	6	
Actuated Green, G (s)	48.0	48.0	48.0	48.0	48.0	48.0	23.0	23.0	23.0	23.0	23.0	23.0	
Effective Green, g (s)	48.5	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5	
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Lane Grp Cap (vph)	2698	2651	2651	466	410	466	410	399					
v/s Ratio Prot								0.04	0.00	0.00	0.10	0.10	
v/s Ratio Perm	0.45	0.43	0.43	0.26	0.26	0.26	0.12	0.02	0.02	0.02	0.36	0.36	
v/c Ratio	8.5	8.4	8.4	20.7	20.0	20.7	20.0	22.3				22.3	
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Progression Factor	0.5	0.5	0.5	0.5	0.5	0.5	0.5	0.1	0.1	0.1	0.5	0.5	
Incremental Delay, d2	9.1	8.9	8.9	8.9	8.9	8.9	21.3	20.1	24.7	24.7	24.7	24.7	
Delay (s)	A	A	A	A	A	A	C	C	C	C	C	C	
Level of Service	A	A	A	A	A	A	C	C	C	C	C	C	
Approach Delay (s)	9.1	8.9	8.9	8.9	8.9	8.9	21.0	24.7	24.7	24.7	24.7	24.7	
Approach LOS	A	A	A	A	A	A	C	C	C	C	C	C	
Intersection Summary													
HCM Average Control Delay	10.3											HCM Level of Service	B
HCM Volume to Capacity ratio	0.42												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.7%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2015 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	0.95	1.00	1.00	0.96	1.00	0.96	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.85	1.00	1.00	0.85	1.00	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1770	4908	1770	4818	1770	3539	1511	1770	3539	1523	1770	3539	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (pbrm)	1770	4908	1770	4818	1770	3539	1511	1770	3539	1523	1770	3539	
Volume (vph)	160	899	142	150	754	280	110	301	110	310	1152	150	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	168	946	149	158	794	295	116	317	116	326	1213	158	
RTOR Reduction (vph)	0	17	0	0	56	0	0	0	51	0	0	33	
Lane Group Flow (vph)	168	1078	0	158	1033	0	116	317	65	326	1213	125	
Confl. Peds. (#/hr)			66			23			38			26	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	Prot	
Protected Phases	7	4		3	8		5	2	3	1	6	7	
Permitted Phases													
Actuated Green, G (s)	12.0	34.0		13.6	35.6		10.4	31.4	45.0	25.0	46.0	58.0	
Effective Green, g (s)	11.0	35.0		12.6	36.6		9.4	32.4	45.0	24.0	47.0	58.0	
Actuated g/C Ratio	0.09	0.29		0.10	0.31		0.08	0.27	0.38	0.20	0.39	0.48	
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	162	1432		186	1469		139	956	617	354	1386	787	
v/s Ratio Prot	c0.09	c0.22		0.09	0.21		0.07	0.09	0.01	c0.18	c0.34	0.01	
v/s Ratio Perm	1.04	0.75		0.85	0.70		0.83	0.33	0.11	0.92	0.88	0.07	
Uniform Delay, d1	54.5	38.6		52.8	36.9		54.5	35.1	24.4	47.1	33.8	17.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	80.8	3.7		27.6	2.8		31.8	0.9	0.0	28.3	8.0	0.0	
Delay (s)	135.3	42.3		80.4	39.7		86.3	36.0	24.4	75.3	41.8	17.4	
Level of Service	F	D		F	D		F	D	C	E	D	B	
Approach Delay (s)	54.7			44.9			44.2				45.9		
Approach LOS	D			D			D				D		
Intersection Summary													
HCM Average Control Delay	47.8											HCM Level of Service	D
HCM Volume to Capacity ratio	0.84												
Actuated Cycle Length (s)	120.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	82.5%											ICU Level of Service	E
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2015 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Frbp, ped/bikes	0.93	0.93	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	0.99	1.00	
Fipb, ped/bikes	0.97	0.96	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	0.93	1.00	
Frt	0.95	0.95	0.95	0.95	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00	
Flt Protected	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1580	1580	1606	1606	1606	1665	3456	1640	3468	1640	3468	1640	
Flt Permitted	0.72	0.72	0.86	0.86	0.86	1.00	0.36	1.00	0.42	1.00	0.42	1.00	
Satd. Flow (pbrm)	1164			1395			637	3456	730	3468			
Volume (vph)	42	30	40	50	60	64	60	531	40	32	657	42	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	44	32	42	53	63	67	63	559	42	34	692	44	
RTOR Reduction (vph)	0	28	0	0	29	0	0	4	0	0	3	0	
Lane Group Flow (vph)	0	90	0	0	154	0	63	597	0	34	733	0	
Confl. Peds. (#/hr)	100			100			100		100		100		
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4			4			4		2		6		
Permitted Phases													
Actuated Green, G (s)	12.7			12.7			12.7		65.3		65.3		
Effective Green, g (s)	12.2			12.2			12.2		64.8		64.8		
Actuated g/C Ratio	0.14			0.14			0.14		0.76		0.76		
Clearance Time (s)	3.5			3.5			3.5		3.5		3.5		
Vehicle Extension (s)	2.0			2.0			2.0		2.0		2.0		
Lane Grp Cap (vph)	167			200			486		2635		557		
v/s Ratio Prot	0.08			c0.11			0.10		0.05		c0.21		
v/s Ratio Perm	0.54			0.77			0.13		0.23		0.06		
Uniform Delay, d1	33.8			35.0			2.7		2.9		2.5		
Progression Factor	1.00			1.00			1.00		1.00		0.73		
Incremental Delay, d2	1.7			14.7			0.6		0.2		0.2		
Delay (s)	35.4			49.8			3.2		3.1		2.0		
Level of Service	D			D			A		A		A		
Approach Delay (s)	35.4			49.8			3.1		3.1		2.2		
Approach LOS	D			D			A		A		A		
Intersection Summary													
HCM Average Control Delay	9.8											HCM Level of Service	A
HCM Volume to Capacity ratio	0.35												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	54.8%											ICU Level of Service	A
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

2015 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.97	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.95	1.00	0.95
Flt	1.00	0.97	1.00	0.96	1.00	0.96	1.00	0.98	1.00	0.95	1.00	0.96
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3347	1770	3217	1692	3445	1677	3222				
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3347	1770	3217	1692	3445	1677	3222				
Volume (vph)	260	400	100	70	370	129	70	341	40	94	533	210
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	274	421	105	74	389	136	74	359	42	99	561	221
RTOR Reduction (vph)	0	24	0	0	45	0	0	9	0	0	41	0
Lane Group Flow (vph)	274	502	0	74	480	0	74	392	0	99	741	0
Confl. Peds. (#/hr)	100			100	100		100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		3	8		2			6		6
Actuated Green, G (s)	16.1	26.6		6.8	17.3		38.1	38.1	38.1	38.1	38.1	38.1
Effective Green, g (s)	16.6	26.1		7.3	16.8		39.6	39.6	39.6	39.6	39.6	39.6
Actuated g/C Ratio	0.20	0.31		0.09	0.20		0.47	0.47	0.47	0.47	0.47	0.47
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5	5.5	5.5	5.5	5.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	346	1028		152	636		225	1605	403	1501		
v/s Ratio Prot	c0.15	0.15		0.04	c0.15		0.15	0.11		0.11		c0.23
v/s Ratio Perm	0.79	0.49		0.49	0.75		0.33	0.24		0.25		0.49
Uniform Delay, d1	32.6	24.0		37.1	32.2		14.3	13.7		13.7		15.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	11.0	0.1		0.9	4.5		3.9	0.4		1.4		1.2
Delay (s)	43.5	24.1		38.0	36.7		18.2	14.0		15.1		16.9
Level of Service	D	C		D	D		B	B		B		B
Approach Delay (s)	30.8		C	36.8		D	14.7		B	16.7		B
Approach LOS	C		C	D		D	B		B	B		B
Intersection Summary												
HCM Average Control Delay	24.8											
HCM Volume to Capacity ratio	0.62											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	73.7%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave.

2015 AM + Tower
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.98	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1670	1770	3539	3503		
Flt Permitted	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1670	1770	3539	3503		
Volume (vph)	73	136	61	635	1067	79
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	77	143	64	668	1123	83
RTOR Reduction (vph)	81	0	0	0	4	0
Lane Group Flow (vph)	139	0	64	668	1202	0
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	2		3	8	4	
Permitted Phases						
Actuated Green, G (s)	20.4		5.5	56.6	47.1	
Effective Green, g (s)	20.4		5.5	56.6	47.1	
Actuated g/C Ratio	0.24		0.06	0.67	0.55	
Clearance Time (s)	4.0		4.0	4.0	4.0	
Vehicle Extension (s)	3.0		3.0	3.0	3.0	
Lane Grp Cap (vph)	401		115	2357	1941	
v/s Ratio Prot	c0.08		c0.04	0.19	c0.34	
v/s Ratio Perm	0.35		0.56	0.28	0.62	
Uniform Delay, d1	26.8		38.6	5.8	12.9	
Progression Factor	1.00		0.97	0.85	0.97	
Incremental Delay, d2	2.4		5.1	0.3	1.2	
Delay (s)	29.2		42.6	5.3	13.6	
Level of Service	C		D	A	B	
Approach Delay (s)	29.2		8.5	13.6		
Approach LOS	C		A	B		
Intersection Summary						
HCM Average Control Delay	13.5					
HCM Volume to Capacity ratio	0.54					
Actuated Cycle Length (s)	85.0					
Intersection Capacity Utilization	57.8%					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

2015 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	16
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.98	1.00
Flt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4926	1770	4969	1770	4969	2005	1997	1961	1920	1920	1920
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.13	1.00	0.55	1.00	0.55	1.00
Satd. Flow (perm)	1770	4926	1770	4969	1770	4969	271	1997	1126	1920	1126	1920
Volume (vph)	340	1233	183	90	1020	150	170	248	90	140	281	270
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	358	1298	193	95	1074	158	179	261	95	147	296	284
RTOR Reduction (vph)	0	20	0	0	20	0	0	15	0	0	39	0
Lane Group Flow (vph)	358	1471	0	95	1212	0	179	341	0	147	541	0
Confl. Peds. (#/hr)	32	32	32	32	32	32	4	12	24	24	24	12
Parking (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot	Prot	Prot	Prot	pm+pt	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4	4	3	8	5	2	2	2	2	2	6
Permitted Phases												
Actuated Green, G (s)	18.0	35.8	7.5	25.3	39.7	39.7	28.7	29.2	28.7	29.2	28.7	28.7
Effective Green, g (s)	18.0	35.8	7.5	25.3	40.2	40.2	29.2	29.2	29.2	29.2	29.2	29.2
Actuated g/C Ratio	0.19	0.38	0.08	0.27	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5
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
Lane Grp Cap (vph)	341	1886	142	1345	283	859	352	600	352	600	352	600
v/s Ratio Prot	c0.20	0.30	0.05	c0.24	c0.06	0.17	c0.28	c0.28	c0.28	c0.28	c0.28	c0.28
v/s Ratio Perm	1.05	0.78	0.67	0.90	0.63	0.40	0.42	0.40	0.42	0.40	0.42	0.40
Uniform Delay, d1	37.8	25.4	41.8	32.9	21.7	18.3	25.4	30.8	25.4	30.8	25.4	30.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	62.4	3.3	11.3	9.9	4.6	0.3	0.8	16.9	0.8	16.9	0.8	16.9
Delay (s)	100.1	28.7	53.1	42.8	26.3	18.6	26.2	47.6	26.2	47.6	26.2	47.6
Level of Service	F	C	D	D	C	B	C	D	C	D	C	D
Approach Delay (s)	42.5	42.5	43.6	43.6	21.2	21.2	43.3	43.3	21.2	21.2	43.3	43.3
Approach LOS	D	D	D	D	C	C	D	D	C	D	D	D
Intersection Summary												
HCM Average Control Delay	40.4 HCM Level of Service D											
HCM Volume to Capacity ratio	0.90											
Actuated Cycle Length (s)	93.5 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	96.6% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2015 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.93	1.00	0.92	1.00	0.92	1.00	0.96	1.00	0.96	1.00	0.95	1.00
Satd. Flow (prot)	1705	1705	1681	1578	1681	1578	3316	3316	1770	3193	1770	3193
Flt Permitted	0.36	0.36	0.73	1.00	0.94	0.94	0.94	0.94	0.95	1.00	0.95	1.00
Satd. Flow (perm)	619	619	1290	1578	1290	1578	3128	3128	1770	3193	1770	3193
Volume (vph)	10	10	20	117	110	120	10	1134	485	120	821	410
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	11	21	123	116	126	11	1194	511	126	864	432
RTOR Reduction (vph)	0	20	0	0	43	0	0	39	0	0	50	0
Lane Group Flow (vph)	0	23	0	123	199	0	0	1677	0	126	1246	0
Confl. Peds. (#/hr)	36	36	36	36	48	48	36	48	16	16	16	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Perm
Protected Phases	7	7	8	8	8	8	2	2	2	1	1	6
Permitted Phases												
Actuated Green, G (s)	6.5	6.5	16.0	16.0	16.0	16.0	48.7	48.7	10.8	64.0	10.8	64.0
Effective Green, g (s)	7.0	7.0	16.5	16.5	16.5	16.5	49.2	49.2	11.3	64.5	11.3	64.5
Actuated g/C Ratio	0.07	0.07	0.16	0.16	0.16	0.16	0.49	0.49	0.11	0.64	0.11	0.64
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	43	43	213	260	260	260	1539	1539	200	2059	200	2059
v/s Ratio Prot	c0.04	c0.04	0.10	0.13	0.13	0.13	c0.54	c0.54	0.07	c0.39	0.07	c0.39
v/s Ratio Perm	0.55	0.55	0.58	0.77	0.77	0.77	1.09	1.09	0.63	0.61	0.63	0.61
Uniform Delay, d1	45.0	45.0	38.5	39.9	39.9	39.9	25.4	25.4	42.4	10.3	42.4	10.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.60	0.60	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.4	7.4	2.4	11.5	11.5	11.5	41.7	41.7	4.7	1.3	4.7	1.3
Delay (s)	52.3	52.3	40.9	51.4	51.4	51.4	56.9	56.9	47.0	11.7	47.0	11.7
Level of Service	D	D	D	D	D	D	E	E	D	D	D	B
Approach Delay (s)	52.3	52.3	47.9	47.9	47.9	47.9	56.9	56.9	44.8	14.8	44.8	14.8
Approach LOS	D	D	D	D	D	D	E	E	D	B	D	B
Intersection Summary												
HCM Average Control Delay	39.0 HCM Level of Service D											
HCM Volume to Capacity ratio	0.93											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	111.7% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

2015 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.98	1.00	0.98	
Fllb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.99	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.99	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	3433	3456	1770	3308	1770	3323	1770	3414	1770	3414	1770	3414	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (perm)	3433	3456	1770	3308	1770	3323	1770	3414	1770	3414	1770	3414	
Volume (vph)	460	880	83	120	510	290	90	899	260	220	688	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	484	926	87	126	537	305	95	946	274	232	724	63	
RTOR Reduction (vph)	0	7	0	0	79	0	0	27	0	0	7	0	
Lane Group Flow (vph)	484	1006	0	126	763	0	95	1193	0	232	780	0	
Confl. Peds. (#/hr)	15	48	48	48	15	123	48	48	48	48	48	123	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4		3	8		5	2		1		6	
Actuated Green, G (s)	15.7	28.3		10.0	22.6		5.0	32.7		12.0		39.7	
Effective Green, g (s)	15.2	29.3		9.5	23.6		4.5	33.7		11.5		40.7	
Actuated g/C Ratio	0.15	0.29		0.10	0.24		0.04	0.34		0.12		0.41	
Clearance Time (s)	3.5	5.0		3.5	5.0		3.5	5.0		3.5		5.0	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0	
Lane Grp Cap (vph)	522	1013		168	781		80	1120		204		1389	
v/s Ratio Prot	c0.14	c0.29		0.07	0.23		0.05	c0.36		c0.13		0.23	
v/s Ratio Perm	0.93	0.99		0.75	0.98		1.19	1.07		1.14		0.56	
Uniform Delay, d1	41.9	35.2		44.1	37.9		47.8	33.1		44.2		22.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.22		0.74	
Incremental Delay, d2	22.3	26.4		15.3	26.1		159.7	46.2		98.6		1.3	
Delay (s)	64.2	61.6		59.4	64.0		207.4	79.4		152.5		18.3	
Level of Service	E	E		E	E		F	E		F		B	
Approach Delay (s)	62.5			63.4			88.6			48.8			
Approach LOS	E			E			F			D			
Intersection Summary													
HCM Average Control Delay	66.9											HCM Level of Service	E
HCM Volume to Capacity ratio	1.01												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	96.6%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 4: 47th St. & MLK Jr. Way

2015 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.86	0.86	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1611	1611	1611	3318	3433	3453	1611	1611	1611	3433	3453	1611	
Flt Permitted	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (perm)	1611	1611	1611	3318	3433	3453	1611	1611	1611	3433	3453	1611	
Volume (vph)	0	0	10	0	0	0	10	415	289	1500	307	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	11	0	0	0	11	437	315	1579	323	63	
RTOR Reduction (vph)	0	11	0	0	0	0	0	20	0	0	0	0	
Lane Group Flow (vph)	0	0	0	0	0	0	0	743	0	1579	386	0	
Turn Type							Perm			Prot			
Protected Phases							2			1		6	
Permitted Phases													
Actuated Green, G (s)								13.0		29.0		50.0	
Effective Green, g (s)								13.0		29.0		50.0	
Actuated g/C Ratio								0.26		0.58		1.00	
Clearance Time (s)								4.0		4.0		2.0	
Lane Grp Cap (vph)								818		1991		3453	
v/s Ratio Prot								c0.24		c0.46		0.11	
v/s Ratio Perm								0.00		0.91		0.11	
Uniform Delay, d1								25.0		17.9		8.2	
Progression Factor								1.00		0.74		1.00	
Incremental Delay, d2								0.0		15.0		3.3	
Delay (s)								25.0		28.2		11.5	
Level of Service								C		C		B	
Approach Delay (s)								25.0		28.2		9.3	
Approach LOS								A		C		A	
Intersection Summary													
HCM Average Control Delay	14.6											HCM Level of Service	B
HCM Volume to Capacity ratio	0.83												
Actuated Cycle Length (s)	50.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	77.5%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

2015 PM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Fipb, ped/bikes	0.98	0.97	0.97	1.00	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Frt	0.97	0.96	0.96	0.96	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	1695	1658	1658	3411	3411	3411	3442	3442	3442	3442	3442	3442
Flt Permitted	0.88	0.92	0.92	0.93	0.93	0.93	0.82	0.82	0.82	0.82	0.82	0.82
Satd. Flow (perm)	1518	1540	1540	3175	3175	3175	2850	2850	2850	2850	2850	2850
Volume (vph)	30	50	21	50	100	70	31	564	80	50	277	20
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	53	22	53	105	74	33	594	84	53	292	21
RTOR Reduction (vph)	0	15	0	0	34	0	0	21	0	0	9	0
Lane Group Flow (vph)	0	92	0	0	198	0	0	690	0	0	357	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	8	2	2	2	2	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	2	6	6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (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
Lane Grp Cap (vph)	516	516	516	524	524	524	1588	1588	1425	1425	1425	1425
v/s Ratio Prot	0.06	0.06	0.06	c0.13	c0.13	c0.13	c0.22	c0.22	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.18	0.18	0.18	0.38	0.38	0.38	0.43	0.43	0.25	0.25	0.25	0.25
v/c Ratio	11.6	11.6	11.6	12.5	12.5	12.5	8.0	8.0	7.1	7.1	7.1	7.1
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.8	0.8	0.8	2.1	2.1	2.1	0.9	0.9	0.4	0.4	0.4	0.4
Incremental Delay, d2	12.4	12.4	12.4	14.6	14.6	14.6	8.9	8.9	7.6	7.6	7.6	7.6
Delay (s)	B	B	B	B	B	B	A	A	A	A	A	A
Level of Service	B	B	B	B	B	B	A	A	A	A	A	A
Approach Delay (s)	12.4	12.4	12.4	14.6	14.6	14.6	8.9	8.9	7.6	7.6	7.6	7.6
Approach LOS	B	B	B	B	B	B	A	A	A	A	A	A
Intersection Summary												
HCM Average Control Delay	9.7											
HCM Level of Service	A											
HCM Volume to Capacity ratio	0.41											
Actuated Cycle Length (s)	50.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	68.6%											
ICU Level of Service	C											
Analysis Period (min)	15											
Critical Lane Group	c											

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2015 PM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.95	0.95	0.95	0.97	0.97	0.97	0.99	0.99	0.99	0.99	0.99	0.99
Fipb, ped/bikes	0.97	0.97	0.97	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.95	0.95	0.95	0.97	0.97	0.97	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1619	1680	1680	3467	3467	3467	4931	4931	4931	4931	4931	4931
Flt Permitted	0.81	0.81	0.81	0.83	0.83	0.83	0.87	0.87	0.87	0.87	0.87	0.87
Satd. Flow (perm)	1325	1325	1325	1412	1412	1412	3007	3007	3007	3007	3007	3007
Volume (vph)	60	60	60	32	32	32	50	1507	62	30	984	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	63	63	63	34	34	34	53	1586	65	32	1036	74
RTOR Reduction (vph)	0	27	0	0	0	0	5	0	2	0	5	0
Lane Group Flow (vph)	0	162	0	0	124	0	0	1702	0	0	1137	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	2	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	2	6	6
Actuated Green, G (s)	12.2	12.2	12.2	12.2	12.2	12.2	58.8	58.8	58.8	58.8	58.8	58.8
Effective Green, g (s)	12.7	12.7	12.7	12.7	12.7	12.7	59.3	59.3	59.3	59.3	59.3	59.3
Actuated g/C Ratio	0.16	0.16	0.16	0.16	0.16	0.16	0.74	0.74	0.74	0.74	0.74	0.74
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	210	210	210	224	224	224	2229	2229	3117	3117	3117	3117
v/s Ratio Prot	c0.12	c0.12	c0.12	0.09	0.09	0.09	c0.57	c0.57	0.27	0.27	0.27	0.27
v/s Ratio Perm	0.77	0.77	0.77	0.55	0.55	0.55	0.76	0.76	0.36	0.36	0.36	0.36
v/c Ratio	32.3	32.3	32.3	31.0	31.0	31.0	6.2	6.2	3.7	3.7	3.7	3.7
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.81	1.81	1.00	1.00	1.00	1.00
Progression Factor	1.00	1.00	1.00	1.7	1.7	1.7	1.0	1.0	0.3	0.3	0.3	0.3
Incremental Delay, d2	14.7	14.7	14.7	32.7	32.7	32.7	12.2	12.2	4.0	4.0	4.0	4.0
Delay (s)	D	D	D	C	C	C	B	B	A	A	A	A
Level of Service	D	D	D	C	C	C	B	B	A	A	A	A
Approach Delay (s)	47.0	47.0	47.0	32.7	32.7	32.7	12.2	12.2	4.0	4.0	4.0	4.0
Approach LOS	D	D	D	C	C	C	B	B	A	A	A	A
Intersection Summary												
HCM Average Control Delay	12.1											
HCM Level of Service	B											
HCM Volume to Capacity ratio	0.76											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	104.4%											
ICU Level of Service	G											
Analysis Period (min)	15											
Critical Lane Group	c											

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St.

2015 PM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1761	3487	1766	3440	1766	3440	1738	1818	1764	1817	1764	1817
Flt Permitted	0.28	1.00	0.16	1.00	0.57	1.00	0.57	1.00	0.36	1.00	0.36	1.00
Satd. Flow (perm)	516	3487	294	3440	1050	1818	1050	1818	669	1817	669	1817
Volume (vph)	40	839	80	53	574	103	130	391	65	106	200	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	883	84	56	604	108	137	412	68	112	211	32
RTOR Reduction (vph)	0	9	0	0	18	0	0	8	0	0	0	7
Lane Group Flow (vph)	42	958	0	56	694	0	137	473	0	112	236	0
Confl. Peds. (#/hr)	12	12	12	12	42	12	42	12	12	12	12	42
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	206	1395	118	1376	525	909	525	909	335	909	335	909
v/s Ratio Prot	c0.27			0.20			c0.26			0.13		0.13
v/s Ratio Perm	0.08	0.19	0.19	0.50	0.26	0.52	0.13	0.13	0.17	0.33	0.26	0.26
v/c Ratio	0.20	0.69	0.47	0.50	0.26	0.52	0.13	0.13	0.17	0.33	0.26	0.26
Uniform Delay, d1	15.7	19.9	17.8	18.0	11.5	13.5	11.5	13.5	12.0	11.5	12.0	11.5
Progression Factor	1.00	1.00	1.77	1.92	1.72	1.78	1.72	1.78	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.2	2.8	10.8	1.1	0.4	0.7	0.4	0.7	2.7	0.7	2.7	0.7
Delay (s)	17.9	22.6	42.3	35.6	20.2	24.8	20.2	24.8	14.7	12.2	14.7	12.2
Level of Service	B	C	D	D	C	C	C	C	B	B	B	B
Approach Delay (s)	22.4			36.1			23.8			13.0		13.0
Approach LOS	C			D			C			B		B

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	25.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St.

2015 PM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1757	3471	1750	3488	1750	3488	1750	3488	3420	3424	3424	3424
Flt Permitted	0.22	1.00	0.16	1.00	0.16	1.00	0.81			0.87		0.87
Satd. Flow (perm)	406	3471	295	3488	2817		2817			3003		3003
Volume (vph)	50	931	80	60	640	53	100	281	59	33	180	40
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	52	960	82	62	660	55	103	290	61	34	186	41
RTOR Reduction (vph)	0	8	0	0	8	0	0	3	0	0	17	0
Lane Group Flow (vph)	52	1034	0	62	707	0	0	451	0	0	244	0
Confl. Peds. (#/hr)	24	78	78	24	8	24	8	6	6	6	6	8
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	46.0			46.0		46.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	47.0			47.0		47.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.59			0.59		0.59
Clearance Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0			5.0		5.0
Lane Grp Cap (vph)	127	1085	92	1090	1655		1655			1784		1784
v/s Ratio Prot	c0.30			0.20			c0.16			0.08		0.08
v/s Ratio Perm	0.13	0.21	0.21	0.67	0.65	0.27	0.27	0.14	0.14	0.14	0.14	0.14
Uniform Delay, d1	21.7	26.9	24.0	23.7	8.1	7.4	8.1	7.4	7.4	7.4	7.4	7.4
Progression Factor	0.49	0.51	0.92	0.93	1.01	1.01	1.01	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	7.5	15.2	28.9	2.6	0.3	0.2	0.3	0.2	0.2	0.2	0.2	0.2
Delay (s)	18.2	29.0	51.1	24.5	8.5	7.6	8.5	7.6	7.6	7.6	7.6	7.6
Level of Service	B	C	D	C	A	A	A	A	A	A	A	A
Approach Delay (s)	28.5			26.7			8.5			7.6		7.6
Approach LOS	C			C			A			A		A

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	22.3	HCM Level of Service	C
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2015 PM + Tower
 1/21/2008

2015 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1765	3483	1760	3425	1766	3396	1760	3396	1766	3396	1760	3396
Flt Permitted	0.23	1.00	0.17	1.00	0.17	1.00	0.17	1.00	0.17	1.00	0.17	1.00
Satd. Flow (perm)	427	3483	308	3425	308	3425	2973	3483	308	3425	2973	3483
Volume (vph)	70	908	84	115	688	152	65	403	116	82	226	40
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	71	917	85	116	695	154	66	407	117	83	228	40
RTOR Reduction (vph)	0	8	0	0	24	0	0	27	0	0	12	0
Lane Group Flow (vph)	71	994	0	116	825	0	0	563	0	0	339	0
Confl. Peds. (#/hr)	8	39	39	8	25	25	8	39	39	8	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	6	6	6	6	6	6
Permitted Phases	4	8	8	2	2	2	6	6	6	6	6	6
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	35.5	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	187	1524	135	1498	1375	1375	1193	1193	1193	1193	1193	1193
v/s Ratio Prot	0.17	0.29	0.29	0.24	0.24	0.24	0.13	0.13	0.13	0.13	0.13	0.13
v/s Ratio Perm	0.38	0.65	0.65	0.86	0.55	0.41	0.28	0.28	0.28	0.28	0.28	0.28
v/c Ratio	15.2	17.7	20.3	16.7	14.3	13.3	13.3	13.3	13.3	13.3	13.3	13.3
Uniform Delay, d1	0.95	1.03	1.53	1.64	1.36	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.7	1.0	44.9	1.4	0.8	0.8	0.8	0.8	0.8	0.8	0.8	0.8
Incremental Delay, d2	17.1	19.3	75.9	28.7	20.2	13.9	13.9	13.9	13.9	13.9	13.9	13.9
Delay (s)	B	B	E	C	C	B	B	B	B	B	B	B
Level of Service	B	B	E	C	C	B	B	B	B	B	B	B
Approach Delay (s)	19.1	19.1	34.4	20.2	20.2	13.9	13.9	13.9	13.9	13.9	13.9	13.9
Approach LOS	B	B	C	C	C	B	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	23.7 HCM Level of Service C											
HCM Volume to Capacity ratio	0.63											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	87.9% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group	15											

Movement	EBT	EBR	WBL	WBT	NBL	NBT	NBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	0.98	1.00	1.00	1.00	0.96	1.00	0.96
Flt Protected	1.00	0.95	1.00	0.95	1.00	0.96	1.00
Satd. Flow (prot)	3272	1770	3539	1733	3272	1770	3539
Flt Permitted	1.00	0.95	1.00	0.96	1.00	0.96	1.00
Satd. Flow (perm)	3272	1770	3539	1733	3272	1770	3539
Volume (vph)	996	122	59	833	132	47	47
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	1027	126	61	859	136	48	48
RTOR Reduction (vph)	0	0	0	0	0	0	0
Lane Group Flow (vph)	1153	0	61	859	184	0	0
Confl. Peds. (#/hr)	213	348	348	213	348	348	213
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4	3	8	2	2	2	2
Permitted Phases	4	3	8	2	2	2	2
Actuated Green, G (s)	50.2	5.8	60.0	12.0	12.0	12.0	12.0
Effective Green, g (s)	50.2	5.8	60.0	12.0	12.0	12.0	12.0
Actuated g/C Ratio	0.63	0.07	0.75	0.15	0.15	0.15	0.15
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2053	128	2654	260	260	260	260
v/s Ratio Prot	c0.35	c0.03	0.24	c0.11	c0.11	c0.11	c0.11
v/s Ratio Perm	0.56	0.48	0.32	0.71	0.71	0.71	0.71
v/c Ratio	8.6	35.6	3.3	32.3	32.3	32.3	32.3
Uniform Delay, d1	0.77	0.83	0.79	0.84	0.84	0.84	0.84
Progression Factor	0.77	0.83	0.79	0.84	0.84	0.84	0.84
Incremental Delay, d2	0.9	2.1	0.2	8.2	8.2	8.2	8.2
Delay (s)	7.5	31.8	2.9	35.3	35.3	35.3	35.3
Level of Service	A	C	A	D	D	D	D
Approach Delay (s)	7.5	4.8	35.3	35.3	35.3	35.3	35.3
Approach LOS	A	A	D	D	D	D	D
Intersection Summary							
HCM Average Control Delay	8.6 HCM Level of Service A						
HCM Volume to Capacity ratio	0.58						
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 12.0						
Intersection Capacity Utilization	55.8% ICU Level of Service B						
Analysis Period (min)	15						
c Critical Lane Group	15						

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2015 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.96	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Fipb, ped/bikes	0.94	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.98	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1658	3417	1732	3317	1770	3474	1770	3474	1770	3346	1770	3346
Flt Permitted	0.29	1.00	0.16	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (iperm)	501	3417	292	3317	1770	3474	1770	3474	1770	3346	1770	3346
Volume (vph)	219	715	109	55	501	110	226	1260	104	110	671	165
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	223	730	111	56	511	112	231	1286	106	112	685	168
RTOR Reduction (vph)	0	15	0	0	24	0	0	7	0	0	26	0
Lane Group Flow (vph)	223	826	0	56	599	0	231	1385	0	112	827	0
Confl. Peds. (#/hr)	94		86	86		94			40			111
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4		8	5	2	1	6					
Permitted Phases	4		8	5	2	1	6					
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	12.6	32.8		8.2	28.4		
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	13.1	33.3		8.7	28.9		
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.16	0.42		0.11	0.36		
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5		
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0		
Lane Grp Cap (vph)	163	1111	95	1078	290	1446	192	1209				
v/s Ratio Prot	0.24		0.18		c0.13	c0.40		0.06	0.25			
v/s Ratio Perm	c0.44		0.19		0.56	0.80	0.96		0.58	0.68		
v/c Ratio	1.37	0.74	0.59	0.56	22.2	32.2	22.7		33.9	21.7		
Uniform Delay, d1	27.0	24.0	22.5	22.2	1.00	1.00	1.04	1.12	0.91	1.20		
Progression Factor	1.03	1.04	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		
Incremental Delay, d2	195.0	2.0	5.9	0.4	10.5	13.0	10.5	13.0	2.7	2.9		
Delay (s)	222.9	27.1	28.4	22.6	44.1	38.5	44.1	38.5	33.6	28.9		
Level of Service	F	C	C	C	D	D	D	D	C	C		
Approach Delay (s)	68.1		23.1		39.3				29.5			
Approach LOS	E		C		D				C			
Intersection Summary												
HCM Average Control Delay	41.6			HCM Level of Service			D					
HCM Volume to Capacity ratio	1.06											
Actuated Cycle Length (s)	80.0			Sum of lost time (s)			8.0					
Intersection Capacity Utilization	88.4%			ICU Level of Service			E					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. 2015 PM + Tower
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	41	1574	30	20	805
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	43	1657	32	21	847
Pedestrians	52		52		45	
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4	4	4	4	4	4
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	230					
pX, platoon unblocked	0.81	0.75			0.75	
VC, conflicting volume	2242	941			1740	
VC1, stage 1 conf vol						
VC2, stage 2 conf vol						
vCu, unblocked vol	1892	598			1656	
tC, single (s)	6.8	6.9			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	50	86			92	
cM capacity (veh/h)	42	310			278	
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	64	1105	584	21	424	424
Volume Left	21	0	0	21	0	0
Volume Right	43	0	32	0	0	0
cSH	101	1700	1700	278	1700	1700
Volume to Capacity	0.64	0.65	0.34	0.08	0.25	0.25
Queue Length 95th (ft)	78	0	0	6	0	0
Control Delay (s)	89.1	0.0	0.0	19.0	0.0	0.0
Lane LOS	F	C	C	C	C	C
Approach Delay (s)	89.1	0.0	0.0	0.5		
Approach LOS	F					
Intersection Summary						
Average Delay	2.3					
Intersection Capacity Utilization	62.9%			ICU Level of Service		
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2015 PM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Frt	0.99	0.99	0.95	1.00	0.99	0.99	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5019	1768	3396	1794	1764	1803	1764	1803	1764	1803	1764	1803
Flt Permitted	0.74	0.30	1.00	0.30	1.00	0.70	0.26	1.00	0.26	1.00	0.26	1.00
Satd. Flow (perm)	3725	552	3396	1263	480	1803	480	1803	480	1803	480	1803
Volume (vph)	110	704	30	91	661	201	80	375	90	70	273	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	718	31	93	674	205	82	383	92	71	279	51
RTOR Reduction (vph)	0	5	0	0	36	0	0	9	0	0	0	8
Lane Group Flow (vph)	0	856	0	93	843	0	0	548	0	71	322	0
Conf. Peds. (#/hr)	24	4	4	4	24	48	12	12	12	12	12	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31
Clearance 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
Lane Grp Cap (vph)	2188	324	1995	c0.25			395	150	563			0.18
v/s Ratio Prot												
v/s Ratio Perm	0.23	0.17	0.17	c0.43			0.43	0.15	0.15	0.15	0.15	0.15
v/c Ratio	0.39	0.29	0.42	1.39	0.98	0.98	0.31	0.47	0.47	0.47	0.47	0.47
Uniform Delay, d1	8.8	8.2	9.1	27.5	22.2	23.0	27.5	22.2	22.2	22.2	22.2	22.2
Progression Factor	1.00	1.69	1.77	1.00	1.00	1.00	1.00	0.79	0.79	0.79	0.79	0.79
Incremental Delay, d2	0.5	2.1	0.6	189.4	9.9	4.0	189.4	9.9	9.9	9.9	9.9	9.9
Delay (s)	9.4	15.9	16.6	216.9	27.3	22.0	216.9	27.3	27.3	27.3	27.3	27.3
Level of Service	A	B	B	F	C	C	F	C	C	C	C	C
Approach Delay (s)	9.4	16.6	16.6	216.9	27.3	22.0	216.9	27.3	27.3	27.3	27.3	27.3
Approach LOS	A	B	B	F	C	C	F	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	55.2
HCM Level of Service	E
HCM Volume to Capacity ratio	0.76
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	139.8%
ICU Level of Service	H
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2015 PM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.98	1.00
Frt	0.99	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5007	4947	4947	1770	1786	1830	1770	1786	1786	1830	1770	1830
Flt Permitted	0.76	0.81	0.81	0.40	1.00	0.30	1.00	0.30	1.00	0.30	1.00	1.00
Satd. Flow (perm)	3814	4023	4023	742	1786	554	1830	742	1786	554	1830	1830
Volume (vph)	80	614	40	81	763	151	60	239	78	70	230	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	646	42	85	803	159	63	252	82	74	242	32
RTOR Reduction (vph)	0	8	0	0	32	0	0	15	0	0	0	6
Lane Group Flow (vph)	0	764	0	0	1015	0	63	319	0	74	268	0
Conf. Peds. (#/hr)	12	12	12	12	12	12	6	6	6	6	6	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (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
Lane Grp Cap (vph)	2455	2590	2590	190	458	142	469	190	458	142	469	469
v/s Ratio Prot												
v/s Ratio Perm	0.20	0.20	0.20	c0.25			0.08	0.18	0.18	0.18	0.18	0.18
v/c Ratio	0.31	0.31	0.31	0.39	0.39	0.33	0.70	0.52	0.52	0.52	0.52	0.52
Uniform Delay, d1	6.3	6.3	6.3	6.8	6.8	24.2	26.9	25.5	25.5	25.5	25.5	25.9
Progression Factor	1.27	1.27	1.27	1.99	1.99	1.00	1.00	1.13	1.13	1.13	1.13	1.14
Incremental Delay, d2	0.3	0.3	0.3	0.4	0.4	4.6	8.5	12.1	12.1	12.1	12.1	12.1
Delay (s)	8.3	8.3	8.3	13.9	13.9	28.8	35.4	40.9	40.9	40.9	40.9	41.1
Level of Service	A	A	A	B	B	C	D	D	D	D	D	C
Approach Delay (s)	8.3	13.9	13.9	13.9	13.9	34.4	35.6	35.6	35.6	35.6	35.6	35.6
Approach LOS	A	B	B	B	B	C	D	D	D	D	D	D

Intersection Summary	
HCM Average Control Delay	18.4
HCM Level of Service	B
HCM Volume to Capacity ratio	0.48
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	81.1%
ICU Level of Service	D
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

2015 PM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	
Frt	1.00	1.00	1.00	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Satd. Flow (prot)	5016	4905	3405	3405	3405	3405	3405	3405	3405	3405	3405	3405	
Flt Permitted	0.78	0.84	0.84	0.84	0.84	0.84	0.79	0.79	0.79	0.84	0.84	0.84	
Satd. Flow (perm)	3906	4109	2701	2701	2701	2701	2701	2701	2701	2201	2201	2201	
Volume (vph)	67	675	40	69	844	221	60	296	75	130	213	82	
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	
Adj. Flow (vph)	68	682	40	70	853	223	61	299	76	131	215	83	
RTOR Reduction (vph)	0	7	0	0	51	0	0	22	0	0	26	0	
Lane Group Flow (vph)	0	783	0	0	1095	0	0	414	0	0	403	0	
Confl. Peds. (#/hr)	9	17	17	17	17	9	12	10	10	10	10	12	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4	
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6	
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0	
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	
Lane Grp Cap (vph)	2514	2645	2645	2645	2645	2645	692	692	692	564	564	564	
v/s Ratio Prot	0.20	0.27	0.27	0.27	0.27	0.27	0.15	0.15	0.15	0.18	0.18	0.18	
v/s Ratio Perm	0.31	0.41	0.41	0.41	0.41	0.41	0.60	0.60	0.60	0.71	0.71	0.71	
v/c Ratio	6.3	6.9	6.9	6.9	6.9	6.9	26.1	26.1	26.1	27.1	27.1	27.1	
Uniform Delay, d1	1.50	0.93	0.93	0.93	0.93	0.93	1.00	1.00	1.00	1.13	1.13	1.13	
Progression Factor	0.3	0.4	0.4	0.4	0.4	0.4	3.8	3.8	3.8	7.5	7.5	7.5	
Incremental Delay, d2	9.8	6.8	6.8	6.8	6.8	6.8	29.9	29.9	29.9	38.1	38.1	38.1	
Delay (s)	A	A	A	A	A	A	C	C	C	D	D	D	
Level of Service	A	A	A	A	A	A	C	C	C	D	D	D	
Approach Delay (s)	9.8	6.8	6.8	6.8	6.8	6.8	29.9	29.9	29.9	38.1	38.1	38.1	
Approach LOS	A	A	A	A	A	A	C	C	C	D	D	D	
Intersection Summary													
HCM Average Control Delay	16.1											HCM Level of Service	B
HCM Volume to Capacity ratio	0.50												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	112.6%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2015 PM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	0.99	0.99	0.99	0.99	0.99	0.93	0.93	0.93	0.92	0.92	0.92	
Frt	1.00	1.00	1.00	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Satd. Flow (prot)	5052	4974	1695	1695	1695	1695	1695	1695	1695	1608	1608	1608	
Flt Permitted	0.76	0.93	0.93	0.93	0.93	0.93	0.85	0.85	0.85	0.85	0.85	0.85	
Satd. Flow (perm)	3833	4621	1471	1471	1471	1471	1471	1471	1471	1401	1401	1401	
Volume (vph)	90	820	10	10	933	60	10	10	10	138	0	189	
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.96	0.96	0.95	0.95	0.95	0.95	0.96	0.96	
Adj. Flow (vph)	94	854	11	11	972	62	11	11	11	144	0	197	
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	8	0	0	
Lane Group Flow (vph)	0	958	0	0	1045	0	0	14	0	0	0	341	
Confl. Peds. (#/hr)	0	79	79	79	79	79	79	79	79	79	79	79	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4	
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6	
Actuated Green, G (s)	48.9	48.9	48.9	48.9	48.9	48.9	23.1	23.1	23.1	23.1	23.1	23.1	
Effective Green, g (s)	48.9	48.9	48.9	48.9	48.9	48.9	23.1	23.1	23.1	23.1	23.1	23.1	
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	
Clearance Time (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	
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	
Lane Grp Cap (vph)	2343	2825	2825	2825	2825	2825	425	425	425	405	405	405	
v/s Ratio Prot	0.25	0.23	0.23	0.23	0.23	0.23	0.01	0.01	0.01	0.24	0.24	0.24	
v/s Ratio Perm	0.41	0.37	0.37	0.37	0.37	0.37	0.03	0.03	0.03	0.84	0.84	0.84	
v/c Ratio	8.1	7.8	7.8	7.8	7.8	7.8	20.4	20.4	20.4	26.7	26.7	26.7	
Uniform Delay, d1	0.81	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	0.96	0.96	
Progression Factor	0.5	0.4	0.4	0.4	0.4	0.4	0.0	0.0	0.0	14.3	14.3	14.3	
Incremental Delay, d2	7.0	8.2	8.2	8.2	8.2	8.2	20.5	20.5	20.5	40.0	40.0	40.0	
Delay (s)	A	A	A	A	A	A	C	C	C	D	D	D	
Level of Service	A	A	A	A	A	A	C	C	C	D	D	D	
Approach Delay (s)	7.0	8.2	8.2	8.2	8.2	8.2	20.5	20.5	20.5	40.0	40.0	40.0	
Approach LOS	A	A	A	A	A	A	C	C	C	D	D	D	
Intersection Summary													
HCM Average Control Delay	12.4											HCM Level of Service	B
HCM Volume to Capacity ratio	0.55												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	73.6%											ICU Level of Service	D
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

2015 PM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Ft	0.99	0.99	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Flt Protected	0.99	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4925	4755	4755	1747	3451	1745	3463					
Flt Permitted	0.67	0.76	0.76	0.31	1.00	0.14	1.00					
Satd. Flow (pbrm)	3353	3620	3620	570	3451	256	3463					
Volume (vph)	272	605	91	90	784	429	110	903	100	196	571	69
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	286	637	96	95	825	452	116	951	105	206	601	73
RTOR Reduction (vph)	0	9	0	0	6	0	0	7	0	0	8	0
Lane Group Flow (vph)	0	1010	0	0	1366	0	116	1049	0	206	666	0
Confl. Peds. (#/hr)	26	19	19	pm+pt	26	39	92	92	92	92	92	39

Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	3	8			6
Permitted Phases	4	8	2	2	2	6
Actuated Green, G (s)	38.0	38.0	34.4	34.4	34.4	34.4
Effective Green, g (s)	39.5	39.5	35.4	35.4	35.4	35.4
Actuated g/C Ratio	0.48	0.48	0.43	0.43	0.43	0.43
Clearance Time (s)	5.5	5.5	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	1598	1725	243	1474	109	1479
v/s Ratio Prot			0.30			0.19
v/s Ratio Perm	0.30	0.38	0.20	0.20	0.30	0.81
v/c Ratio	1.65dl	0.79	0.48	0.71	1.89	0.45
Uniform Delay, d1	16.3	18.2	17.1	19.6	23.8	16.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	2.4	6.6	2.9	432.9	1.0
Delay (s)	16.9	20.6	23.7	22.5	456.7	17.8
Level of Service	B	C	C	C	F	B
Approach Delay (s)	16.9	20.6	22.6	22.6	120.6	F
Approach LOS	B	C	C	C	F	F

Intersection Summary	
HCM Average Control Delay	40.1 HCM Level of Service D
HCM Volume to Capacity ratio	1.31
Actuated Cycle Length (s)	82.9 Sum of lost time (s) 8.0
Intersection Capacity Utilization	99.7% ICU Level of Service F
Analysis Period (min)	15
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St.

2015 PM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98
Ft	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.92
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	0.99
Satd. Flow (prot)	5026	5019	5019	1748	1406	1566						
Flt Permitted	0.84	0.78	0.78	0.81	1.00	0.92						
Satd. Flow (pbrm)	4232	3937	3937	1453	1406	1455						
Volume (vph)	40	857	34	100	1168	40	94	200	30	30	80	80
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	40	866	34	101	1180	40	95	95	202	30	81	81
RTOR Reduction (vph)	0	5	0	0	4	0	0	0	76	0	37	0
Lane Group Flow (vph)	0	935	0	0	1317	0	0	190	126	0	104	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100

Turn Type	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	6
Permitted Phases	4	8	8	2	2	6
Actuated Green, G (s)	49.5	49.5	49.5	24.5	24.5	24.5
Effective Green, g (s)	48.5	48.5	48.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.29	0.29	0.29
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	2566	2387	2387	427	413	427
v/s Ratio Prot				0.13	0.09	0.07
v/s Ratio Perm	0.22	0.36	0.55	0.44	0.31	0.24
v/c Ratio	8.0	9.3	9.3	23.0	21.9	21.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.4	0.9	0.9	3.3	1.9	1.4
Incremental Delay, d2	8.4	10.2	10.2	26.3	23.8	22.9
Delay (s)	A	B	B	C	C	C
Level of Service	A	B	B	C	C	C
Approach Delay (s)	8.4	10.2	10.2	25.0	22.9	22.9
Approach LOS	A	B	B	C	C	C

Intersection Summary	
HCM Average Control Delay	12.3 HCM Level of Service B
HCM Volume to Capacity ratio	0.52
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0
Intersection Capacity Utilization	108.2% ICU Level of Service G
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2015 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.94	1.00	0.94	1.00	1.00	0.99	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.97	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (prot)	1770	4919	1770	4885	1770	3539	1488	1770	3539	1497	1770	4919
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00
Satd. Flow (pbrm)	1770	4919	1770	4885	1770	3539	1488	1770	3539	1497	1770	4919
Volume (vph)	200	756	101	110	938	240	230	851	180	380	421	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	211	796	106	116	987	253	242	896	189	400	443	116
RTOR Reduction (vph)	0	14	0	0	38	0	0	0	24	0	0	69
Lane Group Flow (vph)	211	888	0	116	1202	0	242	896	165	400	443	47
Confl. Peds. (#/hr)			81			22			50			43
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	Prot
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases												
Actuated Green, G (s)	12.0	34.0		12.0	34.0		21.0	33.0	45.0	25.0	37.0	49.0
Effective Green, g (s)	11.0	35.0		11.0	35.0		20.0	34.0	45.0	24.0	38.0	49.0
Actuated g/C Ratio	0.09	0.29		0.09	0.29		0.17	0.28	0.38	0.20	0.32	0.41
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	162	1435		162	1425		295	1003	608	354	1121	661
v/s Ratio Prot	c0.12	0.18		0.07	c0.25		0.14	c0.25	0.02	c0.23	c0.13	0.01
v/s Ratio Perm	1.30	0.62		0.72	0.84		0.82	0.89	0.27	1.13	0.40	0.07
Uniform Delay, d1	54.5	36.7		53.0	39.9		48.3	41.3	26.1	48.0	32.0	21.6
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	173.6	2.0		14.0	6.3		16.5	12.0	0.2	87.9	1.0	0.0
Delay (s)	228.1	38.7		67.0	46.2		64.7	53.3	26.3	135.9	33.1	21.7
Level of Service	F	D		E	D		E	D	C	F	C	C
Approach Delay (s)	74.6			48.0			51.5			74.6		E
Approach LOS	E			D			D			E		E
Intersection Summary												
HCM Average Control Delay	60.6			HCM Level of Service			E					
HCM Volume to Capacity ratio	0.99											
Actuated Cycle Length (s)	120.0											
Sum of lost time (s)	20.0											
Intersection Capacity Utilization	92.9%											
ICU Level of Service	F											
Analysis Period (min)	15											
Critical Lane Group	c											

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2015 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	←	←	←	←	←	←	←	←	←	←	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	0.94	0.96	1.00	0.96	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	0.97	0.97	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Frt	0.96	0.96	1.00	0.96	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Flt Protected	0.98	0.98	1.00	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1598	1598	1642	1642	1696	3461	1696	3461	1679	3455	1679	3455
Flt Permitted	0.66	0.66	0.81	0.81	0.29	1.00	0.29	1.00	0.34	1.00	0.34	1.00
Satd. Flow (pbrm)	1075	1075	1345	1345	517	3461	517	3461	597	3455	597	3455
Volume (vph)	111	50	70	60	70	63	140	689	50	42	796	63
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	117	53	74	63	74	66	147	725	53	44	838	66
RTOR Reduction (vph)	0	28	0	0	31	0	0	4	0	0	4	0
Lane Group Flow (vph)	0	216	0	0	172	0	147	774	0	44	900	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			4			4			2		6
Permitted Phases												
Actuated Green, G (s)	16.3			16.3			16.3			56.7		56.7
Effective Green, g (s)	15.8			15.8			15.8			56.2		56.2
Actuated g/C Ratio	0.20			0.20			0.20			0.70		0.70
Clearance Time (s)	3.5			3.5			3.5			3.5		3.5
Vehicle Extension (s)	2.0			2.0			2.0			2.0		2.0
Lane Grp Cap (vph)	212			266			363	2431		419		2427
v/s Ratio Prot	c0.20			0.13			c0.28			0.07		0.26
v/s Ratio Perm	1.02			0.65			0.40	0.32		0.11		0.37
Uniform Delay, d1	32.1			29.5			4.9	4.6		3.8		4.8
Progression Factor	1.00			1.00			1.00	1.00		1.00		1.00
Incremental Delay, d2	66.7			4.0			3.3	0.3		0.5		0.4
Delay (s)	98.8			33.5			8.3	4.9		4.3		5.2
Level of Service	F			C			A	A		A		A
Approach Delay (s)	98.8			33.5			5.4			5.2		5.2
Approach LOS	F			C			A			A		A
Intersection Summary												
HCM Average Control Delay	17.6			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.54											
Actuated Cycle Length (s)	80.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	65.0%											
ICU Level of Service	C											
Analysis Period (min)	15											
Critical Lane Group	c											

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave. 2015 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.94
Frbp, ped/bikes	1.00	0.97	1.00	0.94	1.00	0.94	1.00	0.99	1.00	0.94	1.00	0.97
Frt	1.00	0.97	1.00	1.00	1.00	1.00	0.96	1.00	1.00	0.97	1.00	1.00
Satd. Flow (prot)	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3340	1770	3158	1697	3476	1717	3130	1717	3130	1717	3130
Volume (vph)	140	420	110	70	440	196	170	663	50	120	516	300
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	143	429	112	71	449	200	173	677	51	122	527	306
RTOR Reduction (vph)	0	27	0	0	62	0	0	6	0	0	90	0
Lane Group Flow (vph)	143	514	0	71	587	0	173	722	0	122	743	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		2	2		6		6
Actuated Green, G (s)	9.5	22.5		6.7	19.7		42.3	42.3		42.3		42.3
Effective Green, g (s)	10.0	22.0		7.2	19.2		43.8	43.8		43.8		43.8
Actuated g/C Ratio	0.12	0.26		0.08	0.23		0.52	0.52		0.52		0.52
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5		5.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	208	864		150	713		245	1791		292		1613
v/s Ratio Prot	c0.08	c0.15		0.04	c0.19		c0.36	0.21		0.22		0.24
v/s Ratio Perm	0.69	0.59		0.47	0.82		0.71	0.40		0.42		0.46
Uniform Delay, d1	36.0	27.6		37.1	31.3		15.7	12.6		12.7		13.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	7.3	0.7		0.9	7.3		15.8	0.7		4.4		1.0
Delay (s)	43.3	28.3		38.0	38.6		31.5	13.3		17.1		14.0
Level of Service	D	C		D	D		C	B		B		B
Approach Delay (s)	31.5			38.5			16.8			14.4		
Approach LOS	C			D			B			B		B
Intersection Summary												
HCM Average Control Delay	24.0 HCM Level of Service C											
HCM Volume to Capacity ratio	0.77											
Actuated Cycle Length (s)	85.0 Sum of lost time (s)											
Intersection Capacity Utilization	76.9% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave. 2015 PM + Tower
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	0.95	0.95
Frt	0.91	1.00	1.00	1.00	0.98	1.00
Frt Protected	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1663	1770	3539	3485		
Satd. Flow (perm)	1663	1770	3539	3455		
Volume (vph)	45	102	100	1515	702	133
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	107	105	1595	739	140
RTOR Reduction (vph)	86	0	0	0	14	0
Lane Group Flow (vph)	68	0	105	1595	865	0
Turn Type	Prot					
Protected Phases	2	3	8	4		
Permitted Phases						
Actuated Green, G (s)	15.4	7.8	56.6	44.8		
Effective Green, g (s)	15.4	7.8	56.6	44.8		
Actuated g/C Ratio	0.19	0.10	0.71	0.56		
Clearance Time (s)	4.0	4.0	4.0	4.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	320	173	2504	1935		
v/s Ratio Prot	c0.04	0.06	c0.45	0.25		
v/s Ratio Perm	0.21	0.61	0.64	0.45		
Uniform Delay, d1	27.2	34.6	6.2	10.3		
Progression Factor	1.00	1.00	1.00	0.66		
Incremental Delay, d2	0.3	5.9	1.3	0.6		
Delay (s)	27.5	40.5	7.5	7.4		
Level of Service	C	D	A	A		
Approach Delay (s)	27.5		9.5	7.4		
Approach LOS	C		A	A		
Intersection Summary						
HCM Average Control Delay	9.9 HCM Level of Service A					
HCM Volume to Capacity ratio	0.55					
Actuated Cycle Length (s)	80.0 Sum of lost time (s)					
Intersection Capacity Utilization	57.3% ICU Level of Service B					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave. 2015 PM Tower Mit 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.97	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.99	1.00	0.95	1.00	0.97	1.00	0.97	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3433	3456	1770	3308	1770	3323	1770	3323	1770	3414	1770	3414
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3433	3456	1770	3308	1770	3323	1770	3323	1770	3414	1770	3414
Volume (vph)	480	880	83	120	510	290	90	899	260	220	688	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	926	87	126	537	305	95	946	274	232	724	63
RTOR Reduction (vph)	0	7	0	0	79	0	0	27	0	0	6	0
Lane Group Flow (vph)	484	1006	0	126	763	0	95	1193	0	232	781	0
Confl. Peds. (#/hr)	15	48	48	15	123	48	48	48	48	48	123	123
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4	3	8	5	2	1	6				
Permitted Phases	15.6	28.5	9.1	22.0	8.3	33.2	12.2	37.1				
Actuated Green, G (s)	15.1	29.5	8.6	23.0	7.8	34.2	11.7	38.1				
Effective Green, g (s)	0.15	0.29	0.09	0.23	0.08	0.34	0.12	0.38				
Actuated g/C Ratio	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0				
Clearance Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0				
Vehicle Extension (s)	518	1020	152	761	138	1136	207	1301				
Lane Grp Cap (vph)	c0.14	c0.29	0.07	0.23	0.05	c0.36	c0.13	c0.23				
v/s Ratio Prot	0.93	0.99	0.83	1.00	0.69	1.05	1.12	0.60				
v/s Ratio Perm	42.0	35.0	45.0	38.5	44.9	32.9	44.1	24.8				
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.21	0.74				
Progression Factor	23.9	24.6	28.4	33.2	10.8	40.9	92.5	1.7				
Incremental Delay, d2	65.9	59.6	73.3	71.7	55.7	73.8	146.1	20.1				
Delay (s)	E	E	E	E	E	E	F	C				
Level of Service	E	E	E	E	E	E	F	C				
Approach Delay (s)	61.6	71.9	72.5	48.8								
Approach LOS	E	E	E	E								
Intersection Summary												
HCM Average Control Delay	63.9	HCM Level of Service										
HCM Volume to Capacity ratio	1.03	E										
Actuated Cycle Length (s)	100.0	Sum of lost time (s)										
Intersection Capacity Utilization	96.6%	ICU Level of Service										
Analysis Period (min)	15	F										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St. 2015 PM Tower Mit 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.99	1.00	1.00	1.00	1.00
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.99	0.99	1.00	0.97	1.00	0.98	1.00	0.98	1.00	1.00	1.00	0.98
Flt Protected	0.99	0.99	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95
Satd. Flow (prot)	5018	1768	3395	1793	1763	1801	1763	1801	1763	1801	1763	1801
Flt Permitted	0.71	0.28	1.00	0.81	0.32	1.00	0.32	1.00	0.81	0.32	1.00	0.32
Satd. Flow (perm)	3611	525	3395	1456	599	1801	599	1801	1456	599	1801	599
Volume (vph)	110	704	30	91	661	201	80	375	90	70	273	50
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	112	718	31	93	674	205	82	383	92	71	279	51
RTOR Reduction (vph)	0	4	0	0	32	0	0	8	0	0	7	0
Lane Group Flow (vph)	0	857	0	93	847	0	0	549	0	71	323	0
Confl. Peds. (#/hr)	24	4	4	24	48	12	12	12	12	12	48	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	6					
Permitted Phases	46.0	46.0	46.0	46.0	34.0	34.0	34.0	34.0				
Actuated Green, G (s)	47.0	47.0	47.0	47.0	35.0	35.0	35.0	35.0				
Effective Green, g (s)	0.52	0.52	0.52	0.52	0.39	0.39	0.39	0.39				
Actuated g/C Ratio	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0				
Clearance Time (s)	1886	274	1773	566	233	700	233	700				
Lane Grp Cap (vph)	0.24	0.18	0.18	c0.25	0.12	0.18	0.12	0.18				
v/s Ratio Prot	0.45	0.34	0.48	0.97	0.30	0.46	0.30	0.46				
v/s Ratio Perm	13.5	12.5	13.7	27.0	19.1	20.5	19.1	20.5				
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Progression Factor	0.8	3.3	0.9	31.1	3.3	2.2	3.3	2.2				
Incremental Delay, d2	14.3	15.8	14.6	58.1	22.4	22.7	22.4	22.7				
Delay (s)	B	B	B	E	C	C	C	C				
Level of Service	B	B	B	E	C	C	C	C				
Approach Delay (s)	14.3	14.7	14.7	58.1	22.6	22.6	22.6	22.6				
Approach LOS	B	B	B	E	C	C	C	C				
Intersection Summary												
HCM Average Control Delay	24.4	HCM Level of Service										
HCM Volume to Capacity ratio	0.69	C										
Actuated Cycle Length (s)	90.0	Sum of lost time (s)										
Intersection Capacity Utilization	139.8%	ICU Level of Service										
Analysis Period (min)	15	H										
c Critical Lane Group												

**APPENDIX Q:
YEAR 2030 PLUS TOWER ALTERNATIVE
INTERSECTION LEVEL OF SERVICE CALCULATION WORKSHEETS**

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave.

2030 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	16	
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	
Flpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	
Flt	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.94	1.00	1.00	
Satd. Flow (prot)	1770	4900	1770	4953	1770	4953	2006	2036	1986	1982	1986	1982	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.10	1.00	0.42	1.00	0.42	1.00	
Satd. Flow (perm)	1770	4900	1770	4953	1770	4953	201	2036	868	1952	868	1952	
Volume (vph)	310	1001	226	120	1660	250	200	301	70	180	426	290	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	326	1054	238	126	1747	263	211	317	74	189	448	305	
RTOR Reduction (vph)	0	29	0	0	16	0	0	7	0	0	0	21	
Lane Group Flow (vph)	326	1263	0	126	1994	0	211	384	0	189	732	0	
Confl. Peds. (#/hr)	10	10	10	10	10	10	10	10	10	10	10	10	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+pt	Perm					
Protected Phases	7	4		3	8		5	2			6		
Permitted Phases													
Actuated Green, G (s)	17.0	47.9		13.1	44.0		48.5	48.5		39.5	39.5		
Effective Green, g (s)	17.0	47.9		13.1	44.0		49.0	49.0		40.0	40.0		
Actuated g/C Ratio	0.14	0.40		0.11	0.37		0.41	0.41		0.33	0.33		
Clearance Time (s)	4.0	4.0		4.0	4.0		4.0	2.5		2.5	2.5		
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0		
Lane Grp Cap (vph)	251	1956		193	1816		187	831		289	651		
v/s Ratio Prot	c0.18	c0.26		0.07	c0.40		c0.07	0.19		c0.38	c0.38		
v/s Ratio Perm							0.39			0.22			
Uniform Delay, d1	1.30	0.65		0.65	1.10		1.13	0.46		0.65	1.12		
Progression Factor	1.00	1.00		1.00	1.00		0.97	0.97		1.00	1.00		
Incremental Delay, d2	160.6	1.7		7.7	53.2		104.5	0.4		5.2	74.9		
Delay (s)	212.1	30.8		59.0	91.2		163.2	26.3		39.3	114.9		
Level of Service	F	C		E	F		F	C		D	F		
Approach Delay (s)	67.4			89.3			74.3			99.7			
Approach LOS	E			F			E			F			
Intersection Summary													
HCM Average Control Delay	82.7											HCM Level of Service	F
HCM Volume to Capacity ratio	1.15												
Actuated Cycle Length (s)	120.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	119.9%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2030 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.97	
Flt	0.95	1.00	1.00	0.91	1.00	0.91	1.00	0.97	1.00	0.96	1.00	1.00	
Satd. Flow (prot)	1749	1749	1681	1597	1749	1597	3417	3417	1770	3291	1770	3291	
Flt Permitted	0.48	0.74	0.74	1.00	0.74	1.00	0.74	0.74	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	847	1302	1597	1302	1597	1302	2535	2535	1770	3291	1770	3291	
Volume (vph)	10	10	10	354	330	470	10	1171	247	110	1330	460	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	11	11	11	373	347	495	11	1233	260	116	1400	484	
RTOR Reduction (vph)	0	10	0	0	57	0	0	18	0	0	35	0	
Lane Group Flow (vph)	0	23	0	373	785	0	0	1486	0	116	1849	0	
Confl. Peds. (#/hr)	4			4	44		4	44	12	12	12	44	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm							
Protected Phases	7			8			2				1	6	
Permitted Phases													
Actuated Green, G (s)	5.1			26.5	26.5		32.5			7.9	44.9		
Effective Green, g (s)	5.6			27.0	27.0		33.0			8.4	45.4		
Actuated g/C Ratio	0.06			0.30	0.30		0.37			0.09	0.50		
Clearance Time (s)	4.5			4.5	4.5		4.5			4.5	4.5		
Vehicle Extension (s)	2.0			2.0	2.0		2.0			2.0	2.0		
Lane Grp Cap (vph)	53			391	479		930			165	1660		
v/s Ratio Prot	c0.03			0.29	0.49		c0.59			0.07	c0.56		
v/s Ratio Perm	0.43			0.95	1.64		1.60			0.70	1.11		
Uniform Delay, d1	40.7			30.9	31.5		28.5			39.6	22.3		
Progression Factor	1.00			1.00	1.00		0.97			1.00	1.00		
Incremental Delay, d2	2.0			33.3	296.4		270.5			10.5	60.2		
Delay (s)	42.7			64.2	327.9		298.1			50.1	82.5		
Level of Service	D			E	F		F			D	F		
Approach Delay (s)	42.7			247.0			298.1			80.6			
Approach LOS	D			F			F			F			
Intersection Summary													
HCM Average Control Delay	191.7											HCM Level of Service	F
HCM Volume to Capacity ratio	1.49												
Actuated Cycle Length (s)	90.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	137.8%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 AM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	
Fllb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.97	1.00	0.98	1.00	0.98	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	3433	3427	1770	3372	1770	3372	1770	3403	1770	3404	1770	3404	
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (pbrm)	3433	3427	1770	3372	1770	3372	1770	3403	1770	3404	1770	3404	
Volume (vph)	460	650	111	140	820	320	120	678	140	320	1164	220	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	
Adj. Flow (vph)	479	677	116	146	854	333	125	706	146	333	1212	229	
RTOR Reduction (vph)	0	15	0	0	46	0	0	20	0	0	17	0	
Lane Group Flow (vph)	479	778	0	146	1141	0	125	832	0	333	1424	0	
Confl. Peds. (#/hr)	6	24	24	24	24	6	36	28	28	28	28	36	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	3	8	5	2	2	1	1	6	6	
Actuated Green, G (s)	13.0	28.4	10.1	25.5	9.6	23.5	9.6	23.5	11.0	24.9	11.0	24.9	
Effective Green, g (s)	12.5	29.4	9.6	26.5	9.1	24.5	9.1	24.5	10.5	25.9	10.5	25.9	
Actuated g/C Ratio	0.14	0.33	0.11	0.29	0.10	0.27	0.10	0.27	0.12	0.29	0.12	0.29	
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	477	1119	189	993	179	926	179	926	207	980	179	926	
v/s Ratio Prot	c0.14	c0.23	0.08	c0.34	0.07	0.24	0.07	0.24	c0.19	c0.42	0.08	c0.19	
v/s Ratio Perm	1.00	0.69	0.77	1.15	0.70	0.90	0.70	0.90	1.61	1.45	0.70	0.90	
Uniform Delay, d1	38.8	26.4	39.1	31.8	39.1	31.6	39.1	31.6	39.8	32.0	39.8	32.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.19	0.86	1.00	1.00	
Incremental Delay, d2	42.2	1.5	16.2	79.0	9.2	13.4	9.2	13.4	276.0	204.4	9.2	13.4	
Delay (s)	81.0	27.9	55.3	110.7	48.3	44.9	48.3	44.9	323.2	232.0	48.3	44.9	
Level of Service	F	C	E	F	D	D	D	D	F	F	F	F	
Approach Delay (s)	47.9	47.9	104.7	104.7	45.3	45.3	45.3	45.3	249.1	249.1	45.3	45.3	
Approach LOS	D	D	F	F	D	D	D	D	F	F	D	D	
Intersection Summary													
HCM Average Control Delay	128.2											HCM Level of Service	F
HCM Volume to Capacity ratio	1.30												
Actuated Cycle Length (s)	90.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	105.9%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 AM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.86	0.86	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (prot)	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	
Flt Permitted	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Satd. Flow (pbrm)	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	1611	
Volume (vph)	0	0	10	0	0	0	0	10	367	350	1600	664	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	11	0	0	0	0	11	386	368	1684	693	
RTOR Reduction (vph)	0	11	0	0	0	0	0	0	26	0	0	0	
Lane Group Flow (vph)	0	0	0	0	0	0	0	0	739	0	1684	762	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	2												
Permitted Phases	2												
Actuated Green, G (s)	0.0												
Effective Green, g (s)	0.0												
Actuated g/C Ratio	0.00												
Clearance Time (s)	4.0												
Lane Grp Cap (vph)	0												
v/s Ratio Prot	0												
v/s Ratio Perm	0.00												
v/c Ratio	0.00												
Uniform Delay, d1	22.5												
Progression Factor	1.00												
Incremental Delay, d2	0.0												
Delay (s)	22.5												
Level of Service	C												
Approach Delay (s)	22.5												
Approach LOS	C												
Intersection Summary													
HCM Average Control Delay	48.0											HCM Level of Service	D
HCM Volume to Capacity ratio	0.89												
Actuated Cycle Length (s)	45.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	80.7%											ICU Level of Service	D
Analysis Period (min)	15												
dr Defacto Right Lane. Recode with 1 through lane as a right lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

2030 AM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0			4.0			4.0		4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.97	0.98	0.98	0.98	0.98	0.98	1.00	1.00	1.00	1.00	0.99	0.99
Ft	0.98	0.94	0.94	0.94	0.98	0.98	0.98	0.98	0.98	0.98	0.99	0.99
Flt Protected	0.98	0.98	0.99	0.99	1.00	1.00	3391	3476				
Satd. Flow (prot)	1709	1606	1606	1606	3391	3476						
Flt Permitted	0.84	0.84	0.88	0.88	0.87	0.87	2952	3053				
Satd. Flow (perm)	1455	1427	1427	1427	2952	3053						
Volume (vph)	80	100	32	60	70	110	41	517	90	60	794	40
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	105	34	63	74	116	43	544	95	63	836	42
RTOR Reduction (vph)	0	15	0	0	68	0	0	29	0	0	8	0
Lane Group Flow (vph)	0	208	0	0	185	0	0	653	0	0	933	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2		2		6	
Permitted Phases	4			8			2		2		6	
Actuated Green, G (s)	15.0			15.0			22.0		22.0		22.0	
Effective Green, g (s)	15.0			15.0			22.0		22.0		22.0	
Actuated g/C Ratio	0.33			0.33			0.49		0.49		0.49	
Clearance Time (s)	4.0			4.0			4.0		4.0		4.0	
Lane Grp Cap (vph)	485			476			1443		1493		1493	
v/s Ratio Prot	c0.14			0.13			0.22		c0.31		c0.31	
v/s Ratio Perm	0.43			0.39			0.45		0.63		0.63	
v/c Ratio	11.7			11.5			7.5		8.5		8.5	
Uniform Delay, d1	1.00			1.00			1.00		1.00		1.00	
Progression Factor	2.8			2.4			1.0		2.0		2.0	
Incremental Delay, d2	14.4			13.9			8.6		10.4		10.4	
Delay (s)	B			B			A		B		B	
Level of Service	B			B			A		B		B	
Approach Delay (s)	14.4			13.9			8.6		10.4		10.4	
Approach LOS	B			B			A		B		B	
Intersection Summary												
HCM Average Control Delay	10.7 HCM Level of Service B											
HCM Volume to Capacity ratio	0.55											
Actuated Cycle Length (s)	45.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	73.8% ICU Level of Service D											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2030 AM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0			4.0			4.0			4.0		4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	0.96	0.96	0.96	0.95	0.95	0.95	1.00	1.00	1.00	1.00	0.98	0.98
Ft	0.96	0.96	0.96	0.96	0.98	0.98	1.00	1.00	1.00	1.00	0.99	0.99
Flt Protected	0.98	0.98	0.99	0.99	1.00	1.00	3433	4958				
Satd. Flow (prot)	1639	1645	1645	1645	3433	4958						
Flt Permitted	0.76	0.76	0.81	0.81	0.76	0.76	2614	3970				
Satd. Flow (perm)	1260	1260	1345	1345	2614	3970						
Volume (vph)	80	100	80	53	90	70	40	1069	72	80	1926	100
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	105	84	56	95	74	42	1125	76	84	2027	105
RTOR Reduction (vph)	0	2	0	0	24	0	0	4	0	0	4	0
Lane Group Flow (vph)	0	271	0	0	201	0	0	1239	0	0	2212	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			4			2		2		6	
Permitted Phases	4			4			2		2		6	
Actuated Green, G (s)	19.4			19.4			56.6		56.6		56.6	
Effective Green, g (s)	19.9			19.9			57.1		57.1		57.1	
Actuated g/C Ratio	0.23			0.23			0.67		0.67		0.67	
Clearance Time (s)	4.5			4.5			4.5		4.5		4.5	
Vehicle Extension (s)	2.0			2.0			2.0		2.0		2.0	
Lane Grp Cap (vph)	295			315			1756		2667		2667	
v/s Ratio Prot	c0.22			0.15			0.47		c0.56		c0.56	
v/s Ratio Perm	0.92			0.64			0.71		0.83		0.83	
v/c Ratio	31.8			29.3			8.7		10.3		10.3	
Uniform Delay, d1	1.00			1.00			1.00		1.00		1.00	
Progression Factor	31.9			3.1			2.4		3.1		3.1	
Incremental Delay, d2	63.7			32.4			11.1		13.5		13.5	
Delay (s)	E			C			B		B		B	
Level of Service	E			C			B		B		B	
Approach Delay (s)	63.7			32.4			11.1		13.5		13.5	
Approach LOS	E			C			B		B		B	
Intersection Summary												
HCM Average Control Delay	17.3 HCM Level of Service B											
HCM Volume to Capacity ratio	0.85											
Actuated Cycle Length (s)	85.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	112.5% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 7: 40th St. & Market St.

HCM Signalized Intersection Capacity Analysis
 8: 40th St. & West St.

2030 AM + Tower
 1/21/2008

2030 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	↑	←	↑	←	←	↑	←	↑	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00
Ft	1.00	0.96	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3372	1763	3453	1768	3453	1745	1815	1745	1815	1745	1815
Flt Permitted	0.17	1.00	0.18	1.00	0.24	1.00	0.45	1.00	0.45	1.00	0.45	1.00
Satd. Flow (perm)	324	3372	340	3453	449	1834	822	1815	822	1815	822	1815
Volume (vph)	180	510	190	94	939	115	160	381	34	203	600	110
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	189	537	200	99	988	121	168	401	36	214	632	116
RTOR Reduction (vph)	0	48	0	0	12	0	0	4	0	0	3	0
Lane Group Flow (vph)	189	689	0	99	1097	0	168	433	0	214	745	0
Conf. Peds. (#/hr)	30	12	12	12	30	6	54	54	54	54	54	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	2	8	2	8	2	8	2	8	2	8
Permitted Phases	4	8	2	8	2	8	2	8	2	8	2	8
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0	23.0
Actuated g/C Ratio	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	93	969	98	993	275	1123	503	1112	503	1112	503	1112
v/s Ratio Prot	c0.20	0.20	0.32	0.32	0.24	0.24	c0.41	0.24	0.24	0.24	c0.41	0.24
v/s Ratio Perm	c0.58	0.71	1.01	1.10	0.61	0.39	0.43	0.67	0.43	0.67	0.43	0.67
v/c Ratio	28.5	25.5	28.5	28.5	9.6	7.9	8.1	10.2	8.1	10.2	8.1	10.2
Uniform Delay, d1	1.00	1.00	0.87	0.89	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	4.4	4.4	82.9	59.0	9.7	1.0	2.6	3.2	2.6	3.2	2.6	3.2
Incremental Delay, d2	528.4	30.0	107.8	84.3	19.3	8.9	10.7	13.4	10.7	13.4	10.7	13.4
Delay (s)	F	C	F	F	F	A	B	B	A	B	B	B
Level of Service	F	C	F	F	F	A	B	B	A	B	B	B
Approach Delay (s)	131.7	86.2	86.2	86.2	11.8	11.8	12.8	12.8	11.8	11.8	12.8	12.8
Approach LOS	F	F	F	F	F	F	B	B	F	B	B	B
Intersection Summary												
HCM Average Control Delay	66.3						HCM Level of Service			E		
HCM Volume to Capacity ratio	1.10						Sum of lost time (s)			8.0		
Actuated Cycle Length (s)	80.0						ICU Level of Service			G		
Intersection Capacity Utilization	104.5%						Analysis Period (min)			15		
Analysis Period (min)	15						Critical Lane Group			c		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←	↑	←	↑	←	←	↑	←	↑	←	←
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.99	1.00	1.00	1.00
Ft	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1766	3410	1749	3496	1749	3496	3399	3426	3399	3426	3399	3426
Flt Permitted	0.16	1.00	0.30	1.00	0.30	1.00	0.65	1.00	0.65	1.00	0.65	1.00
Satd. Flow (perm)	294	3410	560	3496	560	3496	2235	2436	2235	2436	2235	2436
Volume (vph)	80	566	130	76	968	73	120	281	74	124	380	70
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	596	137	80	1019	77	126	296	78	131	400	74
RTOR Reduction (vph)	0	25	0	0	7	0	0	19	0	0	14	0
Lane Group Flow (vph)	84	708	0	80	1089	0	0	481	0	0	591	0
Conf. Peds. (#/hr)	18	54	54	18	4	18	4	18	18	18	4	4
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	2	8	2	8	2	8	2	8	2	8
Permitted Phases	4	8	2	8	2	8	2	8	2	8	2	8
Actuated Green, G (s)	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0	39.0
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49	0.49
Clearance 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
Lane Grp Cap (vph)	143	1662	273	1704	1704	922	1005	1005	922	1005	922	1005
v/s Ratio Prot	0.21	0.21	0.14	c0.31	0.14	0.22	c0.24	0.22	0.22	c0.24	0.22	c0.24
v/s Ratio Perm	0.29	0.43	0.29	0.64	0.29	0.52	0.59	0.52	0.52	0.59	0.52	0.59
v/c Ratio	14.7	13.3	12.3	15.3	12.3	17.6	18.2	17.6	17.6	18.2	17.6	18.2
Uniform Delay, d1	0.97	0.90	1.33	1.41	0.97	0.57	0.57	0.57	0.57	0.57	0.57	0.57
Progression Factor	2.1	1.5	2.1	1.5	2.1	1.4	1.4	1.4	1.4	1.4	1.4	1.4
Incremental Delay, d2	27.7	12.6	18.4	23.0	18.4	23.0	11.4	20.8	11.4	20.8	11.4	20.8
Delay (s)	C	B	C	B	C	B	C	B	C	B	C	B
Level of Service	C	B	C	B	C	B	C	B	C	B	C	B
Approach Delay (s)	14.2	22.7	22.7	11.4	22.7	11.4	20.8	20.8	11.4	20.8	11.4	20.8
Approach LOS	B	B	B	C	B	C	B	B	B	B	C	C
Intersection Summary												
HCM Average Control Delay	18.3						HCM Level of Service			B		
HCM Volume to Capacity ratio	0.62						Sum of lost time (s)			8.0		
Actuated Cycle Length (s)	80.0						ICU Level of Service			D		
Intersection Capacity Utilization	78.0%						Analysis Period (min)			15		
Analysis Period (min)	15						Critical Lane Group			c		

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

2030 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.98
Frt	1.00	0.99	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1766	3478	1746	3453	1746	3453	3371	3420	3371	3420	3371	3420
Flt Permitted	0.15	1.00	0.30	1.00	0.30	1.00	0.80	0.80	0.80	0.74	0.74	0.74
Satd. Flow (perm)	281	3478	556	3453	556	3453	2698	2551	2698	2551	2698	2551
Volume (vph)	50	663	61	126	958	149	49	248	77	149	476	80
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	52	691	64	131	998	155	51	258	80	155	496	83
RTOR Reduction (vph)	0	9	0	0	16	0	0	29	0	0	12	0
Lane Group Flow (vph)	52	746	0	131	1137	0	0	360	0	0	722	0
Confl. Peds. (#/hr)	13	71	71	13	22	22	22	22	22	22	22	22
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	41.5	41.5	41.5	41.5	41.5	41.5	32.0	32.0	32.0	32.0	32.0	32.0
Effective Green, g (s)	41.0	41.0	41.0	41.0	41.0	41.0	31.0	31.0	31.0	31.0	31.0	31.0
Actuated g/C Ratio	0.51	0.51	0.51	0.51	0.51	0.51	0.39	0.39	0.39	0.39	0.39	0.39
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	144	1782	285	1770	285	1770	1045	989	1045	989	989	989
v/s Ratio Prot	0.21			c0.33								
v/s Ratio Perm	0.19	0.21	0.24	0.24	0.24	0.13	0.13	0.13	0.13	0.28	0.28	0.28
v/c Ratio	0.36	0.42	0.46	0.64	0.64	0.34	0.34	0.34	0.34	0.73	0.73	0.73
Uniform Delay, d1	11.7	12.1	12.4	14.2	14.2	17.3	17.3	17.3	17.3	20.9	20.9	20.9
Progression Factor	1.20	1.20	1.00	1.00	1.00	0.64	0.64	0.64	0.64	1.00	1.00	1.00
Incremental Delay, d2	6.2	0.7	5.3	1.8	1.8	0.9	0.9	0.9	0.9	4.7	4.7	4.7
Delay (s)	20.3	15.2	17.7	16.0	16.0	12.0	12.0	12.0	12.0	25.7	25.7	25.7
Level of Service	C	B	B	B	B	B	B	B	B	C	C	C
Approach Delay (s)	15.6			16.2			12.0			25.7		
Approach LOS	B			B			B			C		

Intersection Summary		
HCM Average Control Delay	17.7	HCM Level of Service B
HCM Volume to Capacity ratio	0.68	
Actuated Cycle Length (s)	80.0	Sum of lost time (s) 8.0
Intersection Capacity Utilization	103.6%	ICU Level of Service G
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & Frontage Road

2030 AM + Tower
 1/21/2008

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	1.00	1.00	1.00	0.97	0.97
Flt Protected	1.00	0.95	1.00	0.96	1.00	0.96
Satd. Flow (prot)	1755	1770	3539	1735	1735	1735
Flt Permitted	1.00	0.95	1.00	0.96	1.00	0.96
Satd. Flow (perm)	1755	1770	3539	1735	1735	1735
Volume (vph)	793	98	72	1099	134	44
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	835	103	76	1157	141	46
RTOR Reduction (vph)	0	0	0	0	0	0
Lane Group Flow (vph)	938	0	76	1157	187	0
Confl. Peds. (#/hr)	146	266				
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	4		3		8	2
Permitted Phases	4		3		8	2
Actuated Green, G (s)	50.2		9.2		63.4	13.6
Effective Green, g (s)	50.2		9.2		63.4	13.6
Actuated g/C Ratio	0.59		0.11		0.75	0.16
Clearance Time (s)	4.0		4.0		4.0	4.0
Vehicle Extension (s)	3.0		3.0		3.0	3.0
Lane Grp Cap (vph)	1036		192		2640	278
v/s Ratio Prot	c0.53		0.04		c0.33	c0.11
v/s Ratio Perm	0.91		0.40		0.44	0.67
v/c Ratio	15.3		35.3		4.1	33.6
Uniform Delay, d1	1.00		1.16		0.36	0.91
Progression Factor	1.00		0.6		0.2	6.0
Incremental Delay, d2	12.8		41.4		1.7	36.7
Delay (s)	28.1		41.4		1.7	36.7
Level of Service	C		D		A	D
Approach Delay (s)	28.1		41.4		1.7	36.7
Approach LOS	C		A		A	D

Intersection Summary		
HCM Average Control Delay	16.3	HCM Level of Service B
HCM Volume to Capacity ratio	0.81	
Actuated Cycle Length (s)	85.0	Sum of lost time (s) 12.0
Intersection Capacity Utilization	72.6%	ICU Level of Service C
Analysis Period (min)	15	
c Critical Lane Group		

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2030 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Lane Util. Factor	1.00	0.93	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98	
Fipb, ped/bikes	0.97	1.00	0.96	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	0.94	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1719	3098	1691	3414	1770	3438	1770	3438	1770	3357	1770	3357	
Flt Permitted	0.15	1.00	0.20	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (pperm)	278	3098	362	3414	1770	3438	1770	3438	1770	3357	1770	3357	
Volume (vph)	146	424	267	120	716	90	135	515	59	100	1319	320	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	154	446	281	126	754	95	142	542	62	105	1388	337	
RTOR Reduction (vph)	0	117	0	0	11	0	0	9	0	0	23	0	
Lane Group Flow (vph)	154	610	0	126	838	0	142	595	0	105	1702	0	
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	58	92	
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	4	8	8	5	2	1	6	1	6	1	6	1	
Permitted Phases	4	8	8	5	2	1	6	1	6	1	6	1	
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	10.7	37.9	8.1	35.3	8.1	35.3	8.1	
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	11.2	38.4	8.6	35.8	8.6	35.8	8.6	
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.13	0.45	0.10	0.42	0.10	0.42	0.10	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grip Cap (vph)	85	948	111	1044	233	1553	179	1414	179	1414	179	1414	
v/s Ratio Prot	0.20	0.25	0.25	c0.08	c0.17	0.06	c0.51	0.06	c0.51	0.06	c0.51	0.06	
v/s Ratio Perm	c0.55	0.35	0.35	0.61	0.38	0.59	1.20	0.59	1.20	0.59	1.20	0.59	
v/c Ratio	1.81	0.64	1.14	0.80	0.61	0.38	0.59	1.20	0.59	1.20	0.59	1.20	
Uniform Delay, d1	29.5	25.5	29.5	27.1	34.8	15.4	36.5	24.6	36.5	24.6	36.5	24.6	
Progression Factor	1.09	1.18	1.00	1.00	1.04	1.51	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	384.5	0.5	126.4	4.3	3.0	0.7	3.1	98.6	3.1	98.6	3.1	98.6	
Delay (s)	416.7	30.5	155.9	31.4	39.1	24.1	39.6	123.2	39.6	123.2	39.6	123.2	
Level of Service	F	C	F	C	D	C	D	F	D	F	D	F	
Approach Delay (s)	98.0	F	47.5	D	26.9	C	118.4	F	118.4	F	118.4	F	
Approach LOS	F	F	D	D	C	C	F	F	F	F	F	F	
Intersection Summary													
HCM Average Control Delay	83.4											HCM Level of Service	F
HCM Volume to Capacity ratio	1.40												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	16.0
Intersection Capacity Utilization	99.9%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. 2030 AM + Tower
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	20	31	694	20	20	1723
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	21	33	731	21	21	1814
Pedestrians	34	33	33	34	34	34
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	3	3	3	3	3	3
Right turn flare (veh)	None	None	None	None	None	None
Median type	None	None	None	None	None	None
Median storage (veh)	None	None	None	None	None	None
Upstream signal (ft)	None	None	230	None	None	471
pX, platoon unblocked	0.61	0.92	0.92	0.92	0.92	0.92
VC, conflicting volume	1757	444	786	444	786	786
VC1, stage 1 conf vol	None	None	None	None	None	None
VC2, stage 2 conf vol	None	None	None	None	None	None
vCu, unblocked vol	1192	302	675	302	675	675
tC, single (s)	6.8	6.9	4.1	6.9	4.1	4.1
tC, 2 stage (s)	None	None	None	None	None	None
tF (s)	3.5	3.3	2.2	3.3	2.2	2.2
p0 queue free %	79	95	97	95	97	97
cM capacity (veh/h)	101	601	812	601	812	812
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	54	487	265	21	907	907
Volume Left	21	0	0	21	0	0
Volume Right	33	0	21	0	0	0
cSH	205	1700	1700	812	1700	1700
Volume to Capacity	0.26	0.29	0.16	0.03	0.53	0.53
Queue Length 95th (ft)	25	0	0	2	0	0
Control Delay (s)	28.7	0.0	0.0	9.5	0.0	0.0
Lane LOS	D	A	A	A	A	A
Approach Delay (s)	28.7	0.0	0.1	0.1	0.1	0.1
Approach LOS	D	D	D	D	D	D
Intersection Summary						
Average Delay	0.7					
Intersection Capacity Utilization	64.9%					
ICU Level of Service	C					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2030 AM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.99	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.96	1.00	0.96	1.00
Flt Protected	0.99	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4981	1763	3448	1763	3448	1763	1752	1733	1763	1763	1763	1763
Flt Permitted	0.65	0.24	1.00	0.24	1.00	0.10	0.10	0.39	1.00	0.39	1.00	1.00
Satd. Flow (perm)	3273	454	3448	454	3448	180	180	717	1763	717	1763	1763
Volume (vph)	210	710	50	72	1097	191	100	184	90	200	494	200
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	747	53	76	1155	201	105	194	95	211	520	211
RTOR Reduction (vph)	0	7	0	0	17	0	0	13	0	0	17	0
Lane Group Flow (vph)	0	1014	0	76	1339	0	0	381	0	211	714	0
Confl. Peds. (#/hr)	24	18	18	24	24	24	24	48	48	48	48	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	51.0	51.0	51.0	51.0	51.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	52.0	52.0	52.0	52.0	52.0	25.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Clearance 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
Lane Grp Cap (vph)	2002	278	2109	278	2109	53	53	211	519	211	519	211
v/s Ratio Prot				c0.39						0.41		
v/s Ratio Perm	0.31	0.17	0.17	0.64	0.27	0.64	c2.12	0.29	0.29	0.29	0.138	0.138
v/c Ratio	1.41dl	9.3	7.7	10.5	30.0	30.0	30.0	30.0	30.0	30.0	30.0	30.0
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.9	2.4	1.5	2820.3	62.0	181.0	62.0	181.0	62.0	181.0	62.0	181.0
Incremental Delay, d2	10.2	10.1	11.9	2850.3	92.0	211.0	92.0	211.0	92.0	211.0	92.0	211.0
Delay (s)	B	B	B	B	B	F	F	F	F	F	F	F
Level of Service	B	B	B	B	B	F	F	F	F	F	F	F
Approach Delay (s)	10.2	11.9	11.9	2850.3	184.3	184.3	184.3	184.3	184.3	184.3	184.3	184.3
Approach LOS	B	B	B	B	B	F	F	F	F	F	F	F

Intersection Summary	
HCM Average Control Delay	349.4
HCM Level of Service	F
HCM Volume to Capacity ratio	2.76
Actuated Cycle Length (s)	85.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	158.8%
ICU Level of Service	H
Analysis Period (min)	15
Defacto Left Lane. Recode with 1 through lane as a left lane.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2030 AM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.97	1.00
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	5033	1762	3448	1762	3448	1762	1803	1770	1802	1770	1802	1802
Flt Permitted	0.74	0.24	1.00	0.24	1.00	0.10	0.10	0.39	1.00	0.39	1.00	1.00
Satd. Flow (perm)	3724	461	3448	461	3448	180	180	717	1763	717	1763	1763
Volume (vph)	80	910	30	71	1189	111	70	304	83	150	366	80
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	958	32	75	1252	117	74	320	87	158	385	84
RTOR Reduction (vph)	0	4	0	0	13	0	0	12	0	0	10	0
Lane Group Flow (vph)	0	1070	0	0	1431	0	74	395	0	158	459	0
Confl. Peds. (#/hr)	18	18	18	24	24	24	24	48	48	48	48	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	50.0	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2397	2614	2614	2614	2614	93	462	93	462	93	462	2614
v/s Ratio Prot												
v/s Ratio Perm	0.29	0.45	0.45	0.55	0.55	0.80	0.86	0.86	0.86	0.86	0.86	0.86
v/c Ratio	7.1	7.8	7.8	27.8	28.3	29.8	29.7	29.7	29.7	29.7	29.7	29.7
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.6	0.7	0.7	49.1	18.0	351.2	37.7	37.7	37.7	37.7	37.7	37.7
Incremental Delay, d2	7.7	7.7	7.7	5.0	46.4	385.9	72.4	72.4	72.4	72.4	72.4	72.4
Delay (s)	A	A	A	A	A	D	D	D	D	D	D	D
Level of Service	A	A	A	A	A	D	D	D	D	D	D	D
Approach Delay (s)	7.7	7.7	7.7	5.0	51.1	151.4	151.4	151.4	151.4	151.4	151.4	151.4
Approach LOS	A	A	A	A	A	D	D	D	D	D	D	D

Intersection Summary	
HCM Average Control Delay	37.2
HCM Level of Service	D
HCM Volume to Capacity ratio	0.88
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	89.5%
ICU Level of Service	E
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
18: MacArthur Blvd. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
19: MacArthur Blvd. & Frontage Road

2030 AM + Tower
1/21/2008

2030 AM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.97	0.97	0.98	0.98	0.98
Frt	0.99	1.00	1.00	0.99	1.00	0.99	0.99	1.00	0.99	0.99	0.98	0.98
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5022	4988	4988	3403	3403	3432	3432	3403	3432	3432	3432	3432
Flt Permitted	0.77	0.80	0.80	0.69	0.69	0.81	0.81	0.69	0.81	0.81	0.81	0.81
Satd. Flow (perm)	3856	4021	4021	2375	2375	2794	2794	2375	2794	2794	2794	2794
Volume (vph)	64	1029	60	68	1267	146	40	174	44	107	462	74
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	67	1083	63	72	1334	154	42	183	46	113	486	78
RTOR Reduction (vph)	0	7	0	0	17	0	0	22	0	0	13	0
Lane Group Flow (vph)	0	1206	0	0	1543	0	0	249	0	0	664	0
Confl. Peds. (#/hr)	17	19	19	17	12	16	16	16	16	16	16	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2482	2589	2589	2589	2589	609	609	609	609	716	716	716
v/s Ratio Prot	0.31	0.31	0.31	0.38	0.38	0.11	0.11	0.11	0.11	0.24	0.24	0.24
v/s Ratio Perm	0.49	0.49	0.49	0.60	0.60	0.41	0.41	0.41	0.41	0.93	0.93	0.93
v/c Ratio	7.4	7.4	7.4	8.2	8.2	24.7	24.7	24.7	24.7	29.0	29.0	29.0
Uniform Delay, d1	0.66	0.66	0.66	1.00	1.00	1.00	1.00	1.00	1.00	0.47	0.47	0.47
Progression Factor	0.5	0.5	0.5	1.0	1.0	2.0	2.0	2.0	2.0	19.2	19.2	19.2
Incremental Delay, d2	5.4	5.4	5.4	9.3	9.3	26.8	26.8	26.8	26.8	32.9	32.9	32.9
Delay (s)	A	A	A	A	A	C	C	C	C	C	C	C
Level of Service	A	A	A	A	A	C	C	C	C	C	C	C
Approach Delay (s)	5.4	5.4	5.4	9.3	9.3	26.8	26.8	26.8	26.8	32.9	32.9	32.9
Approach LOS	A	A	A	A	A	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	13.6											
HCM Volume to Capacity ratio	0.69											
Actuated Cycle Length (s)	80.0											
Intersection Capacity Utilization	121.5%											
Analysis Period (min)	15											
c Critical Lane Group												

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	0.99	0.99	1.00	0.99	0.99	1.00	0.93	0.93	0.92	0.92	0.92
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5073	4942	4942	1695	1695	1589	1589	1695	1589	1589	1589	1589
Flt Permitted	0.86	0.93	0.93	0.93	0.93	0.90	0.90	0.90	0.90	0.86	0.86	0.86
Satd. Flow (perm)	4356	4585	4585	1560	1560	1395	1395	1560	1395	1395	1395	1395
Volume (vph)	31	1259	10	10	1408	100	10	10	10	54	0	73
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	33	1325	11	11	1482	105	11	11	11	57	0	77
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1369	0	0	1598	0	0	13	0	0	134	0
Confl. Peds. (#/hr)	0	0	0	0	98	0	0	0	0	0	0	98
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	8	8	2	2	2	2	6	6	6
Permitted Phases	4	4	4	8	8	2	2	2	2	6	6	6
Actuated Green, G (s)	63.9	63.9	63.9	63.9	63.9	13.1	13.1	13.1	13.1	13.1	13.1	13.1
Effective Green, g (s)	63.9	63.9	63.9	63.9	63.9	13.1	13.1	13.1	13.1	13.1	13.1	13.1
Actuated g/C Ratio	0.75	0.75	0.75	0.75	0.75	0.15	0.15	0.15	0.15	0.15	0.15	0.15
Clearance Time (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
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
Lane Grp Cap (vph)	3275	3447	3447	3447	3447	240	240	240	240	215	215	215
v/s Ratio Prot	0.31	0.31	0.31	0.35	0.35	0.01	0.01	0.01	0.01	0.10	0.10	0.10
v/s Ratio Perm	0.42	0.42	0.42	0.46	0.46	0.05	0.05	0.05	0.05	0.62	0.62	0.62
v/c Ratio	3.8	3.8	3.8	4.0	4.0	30.7	30.7	30.7	30.7	33.6	33.6	33.6
Uniform Delay, d1	1.00	1.00	1.00	1.40	1.40	1.00	1.00	1.00	1.00	0.87	0.87	0.87
Progression Factor	0.4	0.4	0.4	0.1	0.1	0.1	0.1	0.1	0.1	4.0	4.0	4.0
Incremental Delay, d2	4.2	4.2	4.2	5.7	5.7	30.8	30.8	30.8	30.8	33.1	33.1	33.1
Delay (s)	A	A	A	A	A	C	C	C	C	C	C	C
Level of Service	A	A	A	A	A	C	C	C	C	C	C	C
Approach Delay (s)	4.2	4.2	4.2	5.7	5.7	30.8	30.8	30.8	30.8	33.1	33.1	33.1
Approach LOS	A	A	A	A	A	C	C	C	C	C	C	C
Intersection Summary												
HCM Average Control Delay	6.4											
HCM Volume to Capacity ratio	0.49											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	77.2%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave. 2030 AM + Tower 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	0.97	1.00	
Frt	0.98	0.98	0.98	1.00	0.97	1.00	0.97	1.00	0.97	1.00	0.97	1.00	
Flt Protected	0.99	0.99	0.99	0.99	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	4933	4933	4924	4924	1770	3408	1744	3424					
Flt Permitted	0.64	0.64	0.64	0.13	1.00	0.13	1.00	0.39	1.00				
Satd. Flow (perm)	3170	3174	3174	244	3408	244	3408	722	3424				
Volume (vph)	148	988	187	200	1146	191	120	376	90	365	1144	242	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	156	1040	197	211	1206	201	126	396	95	384	1204	255	
RTOR Reduction (vph)	0	23	0	0	24	0	0	23	0	20	0	20	
Lane Group Flow (vph)	0	1370	0	0	1594	0	126	468	0	384	1439	0	
Confl. Peds. (#/hr)	40		9		pm+pt	40	25	31	31			25	
Turn Type	Perm	Perm	pm+pt	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4		3	8			2				6		
Permitted Phases	4		8			2					6		
Actuated Green, G (s)	45.0		45.0		45.0		29.5		29.5		29.5		
Effective Green, g (s)	46.5		46.5		46.5		30.5		30.5		30.5		
Actuated g/C Ratio	0.55		0.55		0.55		0.36		0.36		0.36		
Clearance Time (s)	5.5		5.5		5.5		5.0		5.0		5.0		
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0		
Lane Grp Cap (vph)	1734		1736		1736		88		1223		259		
v/s Ratio Prot							0.14					0.42	
v/s Ratio Perm	0.43		0.50		0.52		0.52		0.53		0.53		
v/c Ratio	0.99dl		1.54dl		1.43		0.38		1.48		1.17		
Uniform Delay, d1	15.4		17.5		27.2		20.3		27.2		27.2		
Progression Factor	1.17		1.00		1.27		1.29		0.71		0.70		
Incremental Delay, d2	2.2		8.0		245.4		0.9		229.6		82.7		
Delay (s)	20.1		25.5		280.0		27.0		248.8		101.7		
Level of Service	C		C		F		C		F		F		
Approach Delay (s)	20.1		25.5		25.5		78.6		132.4		132.4		
Approach LOS	C		C		C		E		F		F		
Intersection Summary													
HCM Average Control Delay	66.1											HCM Level of Service	E
HCM Volume to Capacity ratio	1.14												
Actuated Cycle Length (s)	85.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	117.0%											ICU Level of Service	H
Analysis Period (min)	15												
dl Defacto Left Lane. Recode with 1 though lane as a left lane.													
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St. 2030 AM + Tower 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.91	0.91	0.91	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.97	1.00	
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.95	1.00	0.95	
Fipb, ped/bikes	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00	
Frt	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	
Satd. Flow (prot)	5058	5058	5005	5005	1770	1395	1770	1395	1603				
Flt Permitted	0.83	0.83	0.82	0.82	0.84	1.00	0.84	1.00	0.81				
Satd. Flow (perm)	4208	4208	4107	4107	1512	1395	1512	1395	1334				
Volume (vph)	40	1410	23	50	1474	90	32	43	30	100	40	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	42	1484	24	53	1552	95	34	45	32	105	42	63	
RTOR Reduction (vph)	0	2	0	0	8	0	0	0	0	18	0	15	
Lane Group Flow (vph)	0	1548	0	0	1692	0	0	79	14	0	195	0	
Confl. Peds. (#/hr)	100		100	100	100	100	100	100	100	100	100	100	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	
Protected Phases	4		4		8		2		2		6		
Permitted Phases	4		8		8		2		2		6		
Actuated Green, G (s)	48.0		48.0		48.0		23.0		23.0		23.0		
Effective Green, g (s)	48.5		48.5		48.5		23.5		23.5		23.5		
Actuated g/C Ratio	0.61		0.61		0.61		0.29		0.29		0.29		
Clearance Time (s)	4.5		4.5		4.5		4.5		4.5		4.5		
Lane Grp Cap (vph)	2551		2490		2490		444		410		392		
v/s Ratio Prot							0.05		0.01		0.15		
v/s Ratio Perm	0.37		0.41		0.68		0.18		0.03		0.50		
v/c Ratio	0.61		0.68		10.5		21.1		20.2		23.4		
Uniform Delay, d1	9.8		10.5		1.00		1.00		1.00		1.00		
Progression Factor	1.00		1.00		1.5		0.9		0.2		4.5		
Incremental Delay, d2	1.1		12.1		12.1		21.9		20.3		27.8		
Delay (s)	10.9		23.6		23.6		43.8		40.6		49.3		
Level of Service	B		B		B		C		C		C		
Approach Delay (s)	10.9		12.1		12.1		21.5		27.8		27.8		
Approach LOS	B		B		B		C		C		C		
Intersection Summary													
HCM Average Control Delay	12.8											HCM Level of Service	B
HCM Volume to Capacity ratio	0.62												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	94.0%											ICU Level of Service	F
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	1.00	0.96	1.00	1.00	0.96	1.00	0.96
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.96	1.00	0.96	1.00	0.85	1.00	1.00	0.85	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1770	4923	1770	4839	1770	4839	1770	3539	1515	1770	3539	1523
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (pbrm)	1770	4923	1770	4839	1770	4839	1770	3539	1515	1770	3539	1523
Volume (vph)	170	1209	172	210	1144	380	140	421	130	390	1442	250
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1273	181	221	1204	400	147	443	137	411	1518	263
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	33	0	0	13
Lane Group Flow (vph)	179	1439	0	221	1554	0	147	443	104	411	1518	250
Confl. Peds. (#/hr)			66			23			38			26
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	pm+ov
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases												6
Actuated Green, G (s)	12.0	32.0		15.0	35.0		11.0	28.0	43.0	29.0	46.0	58.0
Effective Green, g (s)	11.0	33.0		14.0	36.0		10.0	29.0	43.0	28.0	47.0	58.0
Actuated g/C Ratio	0.09	0.28		0.12	0.30		0.08	0.24	0.36	0.23	0.39	0.48
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	1354		207	1452		148	855	593	413	1386	736
v/s Ratio Prot	0.10	0.29		c0.12	c0.32		c0.08	0.13	0.02	0.23	c0.43	0.03
v/s Ratio Perm	1.10	1.06		1.07	1.07		0.99	0.52	0.18	1.00	1.10	0.13
Uniform Delay, d1	54.5	43.5		53.0	42.0		55.0	39.4	26.4	45.9	36.5	19.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	101.6	43.0		81.6	45.0		71.6	2.2	0.1	42.7	54.6	0.1
Delay (s)	156.1	86.5		134.6	87.0		126.5	41.7	26.4	88.6	91.1	19.3
Level of Service	F	F		F	F		F	D	C	F	F	B
Approach Delay (s)	94.1			92.7			56.0			82.0		F
Approach LOS	F			F			E			F		F
Intersection Summary												
HCM Average Control Delay	85.2			HCM Level of Service			F					
HCM Volume to Capacity ratio	1.09											
Actuated Cycle Length (s)	120.0											
Sum of lost time (s)	16.0											
Intersection Capacity Utilization	101.5%			ICU Level of Service			G					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2030 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Frbp, ped/bikes	0.94	0.94	0.94	0.97	0.96	0.96	1.00	0.98	1.00	0.98	1.00	0.99
Fipb, ped/bikes	0.98	0.98	0.98	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	1.00
Frt	0.96	0.96	0.96	0.96	0.96	0.96	1.00	0.99	1.00	0.99	1.00	1.00
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1608	1608	1608	1632	1632	1632	1734	3430	1658	3472	1658	3472
Flt Permitted	0.71	0.71	0.71	0.79	0.79	0.79	1.00	0.95	1.00	0.95	1.00	1.00
Satd. Flow (pbrm)	1159	1159	1159	1311	1311	1311	302	3430	662	3472	662	3472
Volume (vph)	62	50	50	70	80	64	80	591	60	52	1207	72
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	65	53	53	74	84	67	84	622	63	55	1271	76
RTOR Reduction (vph)	0	22	0	0	20	0	0	7	0	0	4	0
Lane Group Flow (vph)	0	149	0	0	205	0	84	678	0	55	1343	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			4			4			2		6
Permitted Phases												6
Actuated Green, G (s)	15.9			15.9			62.1			62.1		62.1
Effective Green, g (s)	15.4			15.4			61.6			61.6		61.6
Actuated g/C Ratio	0.18			0.18			0.72			0.72		0.72
Clearance Time (s)	3.5			3.5			3.5			3.5		3.5
Vehicle Extension (s)	2.0			2.0			2.0			2.0		2.0
Lane Grp Cap (vph)	210			238			219			2486		480
v/s Ratio Prot	0.13			c0.16			0.28			0.08		c0.39
v/s Ratio Perm	0.71			0.86			0.38			0.27		0.11
Uniform Delay, d1	32.7			33.7			4.5			4.0		5.3
Progression Factor	1.00			1.00			1.00			1.00		0.96
Incremental Delay, d2	8.6			24.4			5.0			0.3		0.0
Delay (s)	41.3			58.1			9.5			4.3		3.4
Level of Service	D			E			A			A		A
Approach Delay (s)	41.3			58.1			4.9			4.7		4.7
Approach LOS	D			E			A			A		A
Intersection Summary												
HCM Average Control Delay	11.9			HCM Level of Service			B					
HCM Volume to Capacity ratio	0.60											
Actuated Cycle Length (s)	85.0											
Sum of lost time (s)	8.0											
Intersection Capacity Utilization	70.3%			ICU Level of Service			C					
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

2030 AM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.97
Frbp, ped/bikes	1.00	0.98	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97
Frt	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.95	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3379	1770	3267	1770	3412	1770	3412	1685	3339	1770	3379
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	1770	3379	1770	3267	1770	3412	1770	3412	1685	3339	1770	3379
Volume (vph)	270	500	100	140	710	199	70	361	60	174	1023	220
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	284	526	105	147	747	209	74	380	63	183	1077	232
RTOR Reduction (vph)	0	18	0	0	30	0	0	15	0	0	20	0
Lane Group Flow (vph)	284	613	0	147	926	0	74	428	0	183	1289	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Prot	Prot	Prot	Prot	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	7	4		3	8		2	2		6		6
Actuated Green, G (s)	16.5	28.0		11.0	22.5		32.5	32.5		32.5		32.5
Effective Green, g (s)	17.0	27.5		11.5	22.0		34.0	34.0		34.0		34.0
Actuated g/C Ratio	0.20	0.32		0.14	0.26		0.40	0.40		0.40		0.40
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5	5.5		5.5		5.5
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	354	1093		239	846		88	1365		314		1336
v/s Ratio Prot	c0.16	0.18		0.08	c0.28		0.13			c0.39		
v/s Ratio Perm	0.80	0.56		0.62	1.09		0.34			0.23		
Uniform Delay, d1	32.4	23.8		34.7	31.5		23.1	17.5		20.0		24.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00		1.00
Incremental Delay, d2	11.7	0.4		3.3	59.8		59.2	0.6		7.7		17.5
Delay (s)	44.1	24.2		37.9	91.3		82.2	18.1		27.6		42.4
Level of Service	D	C		D	F		F	B		C		D
Approach Delay (s)	30.3			84.2			27.3			40.6		
Approach LOS	C			F			C			D		
Intersection Summary												
HCM Average Control Delay	48.5											
HCM Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	85.0											
Intersection Capacity Utilization	96.1%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 25: Village Drive & Telegraph Ave.

2030 AM + Tower
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	0.91	1.00	1.00	0.95	0.95	0.95
Flt Protected	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1670	1770	3539	3514	1670	1770
Flt Permitted	0.98	0.95	1.00	1.00	1.00	1.00
Satd. Flow (perm)	1670	1770	3539	3514	1670	1770
Volume (vph)	73	136	61	665	1627	79
Peak-hour factor, PHF	0.95	0.95	0.95	0.99	0.99	0.95
Adj. Flow (vph)	77	143	64	672	1643	83
RTOR Reduction (vph)	95	0	0	0	3	0
Lane Group Flow (vph)	125	0	64	672	1723	0
Turn Type	Prot					
Protected Phases	2 3 8 4					
Permitted Phases						
Actuated Green, G (s)	15.9	7.6	61.1	49.5		
Effective Green, g (s)	15.9	7.6	61.1	49.5		
Actuated g/C Ratio	0.19	0.09	0.72	0.58		
Clearance Time (s)	4.0	4.0	4.0	4.0		
Vehicle Extension (s)	3.0	3.0	3.0	3.0		
Lane Grp Cap (vph)	312	158	2544	2046		
v/s Ratio Prot	c0.07	c0.04	0.19	c0.49		
v/s Ratio Perm						
v/c Ratio	0.40	0.41	0.26	0.84		
Uniform Delay, d1	30.4	36.6	4.1	14.5		
Progression Factor	1.00	1.03	1.14	1.63		
Incremental Delay, d2	0.8	1.4	0.2	0.4		
Delay (s)	31.2	39.0	5.0	24.1		
Level of Service	C	D	A	C		
Approach Delay (s)	31.2		7.9	24.1		
Approach LOS	C		A	C		
Intersection Summary						
HCM Average Control Delay	20.2					
HCM Volume to Capacity ratio	0.70					
Actuated Cycle Length (s)	85.0					
Intersection Capacity Utilization	69.8%					
Analysis Period (min)	15					
c Critical Lane Group						

HCM Signalized Intersection Capacity Analysis
 1: 52nd St. & Shattuck Ave. 2030 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.0	2.0	2.0	2.0	2.0	16
Lane Util. Factor	1.00	0.91	1.00	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Flt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.96	1.00	0.95	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4924	1770	4960	1770	4960	2006	1990	1960	1918	1918	1918
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.12	1.00	0.54	1.00	1.00	1.00
Satd. Flow (perm)	1770	4924	1770	4960	1770	4960	257	1990	1109	1918	1918	1918
Volume (vph)	350	1303	193	120	1070	170	200	258	100	160	291	280
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	368	1372	203	126	1126	179	211	272	105	168	306	295
RTOR Reduction (vph)	0	19	0	0	21	0	0	14	0	0	35	0
Lane Group Flow (vph)	368	1556	0	126	1284	0	211	363	0	168	566	0
Confl. Peds. (#/hr)			32	32		4	12		24		24	
Parking (#/hr)												0
Turn Type	Prot	4	4	Prot	3	8	pm+pt	5	2	2	6	6
Protected Phases	7											
Permitted Phases												
Actuated Green, G (s)	20.0	36.6	9.6	26.2	43.3	43.3	30.3	30.3	30.3	30.3	30.3	30.3
Effective Green, g (s)	20.0	36.6	9.6	26.2	43.8	43.8	30.8	30.8	30.8	30.8	30.8	30.8
Actuated g/C Ratio	0.20	0.37	0.10	0.26	0.44	0.44	0.31	0.31	0.31	0.31	0.31	0.31
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	2.5	2.5	2.5	2.5	2.5	2.5
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
Lane Grp Cap (vph)	354	1802	170	1300	305	872	342	591				
v/s Ratio Prot	c0.21	0.32	0.07	c0.26	c0.08	0.18		c0.29				
v/s Ratio Perm			0.23				0.15					
v/c Ratio	1.04	0.86	0.74	0.99	0.69	0.42	0.49	0.96				
Uniform Delay, d1	40.0	29.4	44.0	36.7	44.3	19.3	28.2	34.0				
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00				
Incremental Delay, d2	58.5	5.8	15.9	22.1	6.6	0.3	1.1	26.4				
Delay (s)	98.5	35.2	59.9	58.9	50.9	19.6	29.3	60.4				
Level of Service	F	D	E	E	D	B	C	E				
Approach Delay (s)	47.2		59.0		30.9		53.6					
Approach LOS	D		E		C		D					
Intersection Summary												
HCM Average Control Delay	49.7 HCM Level of Service D											
HCM Volume to Capacity ratio	0.94											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 12.0											
Intersection Capacity Utilization	101.4% ICU Level of Service G											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave. 2030 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Flpb, ped/bikes	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	0.93	1.00	0.93	1.00	0.93	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	0.99	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1705	1705	1681	1586	1705	1681	3275	3275	1770	3209	3209	3209
Flt Permitted	0.36	0.36	0.73	1.00	0.73	1.00	0.94	0.94	0.95	1.00	0.95	1.00
Satd. Flow (perm)	619	619	1290	1586	619	1290	3087	3087	1770	3209	3209	3209
Volume (vph)	10	10	20	127	120	120	10	1114	615	200	901	420
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	11	21	134	126	126	11	1173	647	211	948	442
RTOR Reduction (vph)	0	20	0	0	39	0	0	64	0	0	45	0
Lane Group Flow (vph)	0	23	0	134	213	0	0	1767	0	211	1345	0
Confl. Peds. (#/hr)			36				36	48		16	16	48
Turn Type	Perm	7	7	Perm	8	8	Perm	2	2	1	1	6
Protected Phases	7											
Permitted Phases												
Actuated Green, G (s)	6.5	6.5	16.7	16.7	16.7	16.7	45.7	45.7	13.1	63.3	63.3	63.3
Effective Green, g (s)	7.0	7.0	17.2	17.2	17.2	17.2	46.2	46.2	13.6	63.8	63.8	63.8
Actuated g/C Ratio	0.07	0.07	0.17	0.17	0.17	0.17	0.46	0.46	0.14	0.64	0.64	0.64
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	43	43	222	273	273	273	1426	1426	241	2047	2047	2047
v/s Ratio Prot	c0.04	c0.04	0.10	0.13	0.13	0.13	c0.57	c0.57	c0.12	0.42	0.42	0.42
v/s Ratio Perm	0.55	0.55	0.60	0.78	0.78	0.78	1.24	1.24	0.88	0.66	0.66	0.66
v/c Ratio	45.0	45.0	38.3	39.6	39.6	39.6	26.9	26.9	42.4	11.3	11.3	11.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	0.62	0.62	1.00	1.00	1.00	1.00
Progression Factor	7.4	7.4	3.2	12.5	12.5	12.5	108.2	108.2	27.1	1.7	1.7	1.7
Incremental Delay, d2	52.3	52.3	41.4	52.1	52.1	52.1	124.8	124.8	69.5	12.9	12.9	12.9
Delay (s)	D	D	D	D	D	D	F	F	E	B	B	B
Level of Service	D	D	D	D	D	D	F	F	E	B	B	B
Approach Delay (s)	52.3	52.3	48.4	48.4	48.4	48.4	124.8	124.8	20.4	20.4	20.4	20.4
Approach LOS	D	D	D	D	D	D	F	F	C	C	C	C
Intersection Summary												
HCM Average Control Delay	73.0 HCM Level of Service E											
HCM Volume to Capacity ratio	1.03											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	118.2% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
3: 51st St. & Telegraph Ave.

2030 PM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.97	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Frbp, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.98	
Fllb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.98	1.00	0.94	1.00	0.96	1.00	0.96	1.00	0.99	1.00	0.99	
Flt Protected	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	3433	3418	1770	3299	1770	3280	1770	3416	1770	3416	1770	3416	
Flt Permitted	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Satd. Flow (perm)	3433	3418	1770	3299	1770	3280	1770	3416	1770	3416	1770	3416	
Volume (vph)	460	930	133	160	580	350	100	949	350	300	698	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	484	979	140	168	611	368	105	999	368	316	735	63	
RTOR Reduction (vph)	0	11	0	0	90	0	0	38	0	0	7	0	
Lane Group Flow (vph)	484	1108	0	168	889	0	105	1329	0	316	791	0	
Confl. Peds. (#/hr)	15	48	48	48	15	123	48	48	48	48	123	123	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	7	4	3	8	5	2	1	6					
Actuated Green, G (s)	15.7	27.5	10.9	22.7	5.0	32.6	12.0	39.6					
Effective Green, g (s)	15.2	28.5	10.4	23.7	4.5	33.6	11.5	40.6					
Actuated g/C Ratio	0.15	0.28	0.10	0.24	0.04	0.34	0.12	0.41					
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0					
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0					
Lane Grp Cap (vph)	522	974	184	782	80	1102	204	1387					
v/s Ratio Prot	c0.14	c0.32	0.09	0.27	0.06	c0.41	c0.18	0.23					
v/s Ratio Perm	0.93	1.14	0.91	1.14	1.31	1.21	1.55	0.57					
Uniform Delay, d1	41.9	35.8	44.4	38.1	47.8	33.2	44.2	23.0					
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.19	0.77					
Incremental Delay, d2	22.3	74.4	41.7	76.9	205.3	101.5	264.7	1.3					
Delay (s)	64.2	110.2	86.0	115.0	253.1	134.7	317.6	18.9					
Level of Service	E	F	F	F	F	F	F	B					
Approach Delay (s)	96.3	F	F	110.8	F	143.1	103.6	F					
Approach LOS	F	F	F	F	F	F	F	F					
Intersection Summary													
HCM Average Control Delay	113.9											HCM Level of Service	F
HCM Volume to Capacity ratio	1.16												
Actuated Cycle Length (s)	100.0											Sum of lost time (s)	12.0
Intersection Capacity Utilization	109.3%											ICU Level of Service	H
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
4: 47th St. & MLK Jr. Way

2030 PM + Tower
1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (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	
Lane Util. Factor	0.86	0.86	1.00	0.97	0.95	0.95	0.94	0.94	1.00	0.98	1.00	0.98	
Frt Protected	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	
Satd. Flow (prot)	1611	1611	3335	3433	3463	3433	3433	3463	3433	3463	3433	3463	
Flt Permitted	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (perm)	1611	1611	3335	3433	3463	3433	3433	3463	3433	3463	3433	3463	
Volume (vph)	0	0	10	0	0	0	10	555	349	1550	357	60	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	0	0	11	0	0	0	11	584	367	1632	376	63	
RTOR Reduction (vph)	0	11	0	0	0	0	0	18	0	0	0	0	
Lane Group Flow (vph)	0	0	0	0	0	0	0	944	0	1632	439	0	
Turn Type							Perm	Prot					
Protected Phases							2	1					
Permitted Phases													
Actuated Green, G (s)	0.0	0.0	13.0	0.0	0.0	0.0	13.0	29.0	50.0	50.0	50.0	50.0	
Effective Green, g (s)	0.0	0.0	13.0	0.0	0.0	0.0	13.0	29.0	50.0	50.0	50.0	50.0	
Actuated g/C Ratio	0.00	0.00	0.26	0.00	0.00	0.00	0.26	0.58	1.00	1.00	1.00	1.00	
Clearance Time (s)			4.0				4.0	4.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	0	0	823	0	0	0	823	1991	3463	3463	3463	3463	
v/s Ratio Prot			c0.30				c0.30	c0.48	0.13	0.13	0.13	0.13	
v/s Ratio Perm	0.00	0.00	1.15	0.00	0.00	0.00	1.15	0.82	0.13	0.13	0.13	0.13	
Uniform Delay, d1	25.0	25.0	18.5	8.4	0.0	0.0	18.5	8.4	0.0	0.0	0.0	0.0	
Progression Factor	1.00	1.00	0.71	1.00	1.00	1.00	0.71	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.0	0.0	78.7	0.0	0.0	0.0	78.7	3.9	0.1	0.1	0.1	0.1	
Delay (s)	25.0	25.0	91.8	8.4	0.0	0.0	91.8	12.3	0.1	0.1	0.1	0.1	
Level of Service	C	C	F	B	A	A	F	B	A	A	A	A	
Approach Delay (s)	25.0	25.0	91.8	8.4	0.0	0.0	91.8	12.3	0.1	0.1	0.1	0.1	
Approach LOS	C	C	F	B	A	A	F	B	A	A	A	A	
Intersection Summary													
HCM Average Control Delay	35.7											HCM Level of Service	D
HCM Volume to Capacity ratio	0.92												
Actuated Cycle Length (s)	50.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	84.4%											ICU Level of Service	E
Analysis Period (min)	15												
c Critical Lane Group													

HCM Signalized Intersection Capacity Analysis
 5: 45th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 6: 45th St. & Telegraph Ave.

2030 PM + Tower
 1/21/2008

2030 PM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Fipb, ped/bikes	0.99	0.97	0.97	0.97	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.97	0.96	0.96	0.96	0.96	0.96	0.98	0.98	0.99	0.99	0.99	0.99
Flt Protected	0.99	0.99	0.99	0.99	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1694	1668	1668	1668	1668	1668	3422	3422	3428	3428	3428	3428
Flt Permitted	0.87	0.90	0.90	0.90	0.92	0.92	0.92	0.92	0.78	0.78	0.78	0.78
Satd. Flow (perm)	1501	1515	1515	1515	1515	1515	3161	3161	2694	2694	2694	2694
Volume (vph)	40	70	31	70	140	90	41	724	90	60	307	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	42	74	33	74	147	95	43	762	95	63	323	32
RTOR Reduction (vph)	0	20	0	0	31	0	0	18	0	0	13	0
Lane Group Flow (vph)	0	129	0	0	285	0	0	882	0	0	406	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	8	8	2	2	2	6	6	6
Permitted Phases	4	4	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Effective Green, g (s)	17.0	17.0	17.0	17.0	17.0	17.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.34	0.34	0.34	0.34	0.34	0.34	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (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
Lane Grp Cap (vph)	510	510	510	510	510	510	1581	1581	1347	1347	1347	1347
v/s Ratio Prot	0.09	0.09	0.09	0.09	0.09	0.09	0.28	0.28	0.15	0.15	0.15	0.15
v/s Ratio Perm	0.25	0.25	0.25	0.25	0.25	0.25	0.56	0.56	0.30	0.30	0.30	0.30
v/c Ratio	11.9	11.9	11.9	11.9	11.9	11.9	8.7	8.7	7.4	7.4	7.4	7.4
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	1.2	1.2	1.2	1.2	1.2	1.2	1.4	1.4	1.4	1.4	1.4	1.4
Incremental Delay, d2	13.1	13.1	13.1	13.1	13.1	13.1	10.1	10.1	7.9	7.9	7.9	7.9
Delay (s)	B	B	B	B	B	B	B	B	A	A	A	A
Level of Service	B	B	B	B	B	B	B	B	B	B	B	B
Approach Delay (s)	13.1	13.1	13.1	13.1	13.1	13.1	10.1	10.1	7.9	7.9	7.9	7.9
Approach LOS	B	B	B	B	B	B	B	B	B	B	B	B

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.96	0.96	0.96	0.96	0.96	0.96	0.99	0.99	0.98	0.98	0.98	0.98
Fipb, ped/bikes	0.97	0.97	0.97	0.97	0.99	0.99	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.96	0.96	0.96	0.96	0.96	0.96	0.99	0.99	0.99	0.99	0.99	0.99
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.98	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	1623	1623	1623	1667	1667	1667	3454	3454	4911	4911	4911	4911
Flt Permitted	0.74	0.74	0.74	0.88	0.88	0.88	0.76	0.76	0.79	0.79	0.79	0.79
Satd. Flow (perm)	1227	1227	1227	1483	1483	1483	2640	2640	3909	3909	3909	3909
Volume (vph)	80	70	70	32	80	50	90	1667	82	40	1104	90
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	84	74	74	34	84	53	95	1755	86	42	1162	95
RTOR Reduction (vph)	0	18	0	0	2	0	2	0	2	0	0	6
Lane Group Flow (vph)	0	214	0	0	169	0	0	1934	0	0	1293	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	2	2	2	6	6	6
Permitted Phases	4	4	4	4	4	4	2	2	2	6	6	6
Actuated Green, G (s)	15.4	15.4	15.4	15.4	15.4	15.4	55.6	55.6	55.6	55.6	55.6	55.6
Effective Green, g (s)	15.9	15.9	15.9	15.9	15.9	15.9	56.1	56.1	56.1	56.1	56.1	56.1
Actuated g/C Ratio	0.20	0.20	0.20	0.20	0.20	0.20	0.70	0.70	0.70	0.70	0.70	0.70
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	244	244	244	295	295	295	1851	1851	2741	2741	2741	2741
v/s Ratio Prot	0.17	0.17	0.17	0.11	0.11	0.11	0.73	0.73	0.33	0.33	0.33	0.33
v/s Ratio Perm	0.88	0.88	0.88	0.57	0.57	0.57	1.04	1.04	0.47	0.47	0.47	0.47
v/c Ratio	31.1	31.1	31.1	29.0	29.0	29.0	11.9	11.9	5.3	5.3	5.3	5.3
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	27.3	27.3	27.3	1.7	1.7	1.7	33.7	33.7	0.6	0.6	0.6	0.6
Incremental Delay, d2	58.4	58.4	58.4	30.6	30.6	30.6	45.6	45.6	5.9	5.9	5.9	5.9
Delay (s)	E	E	E	C	C	C	D	D	A	A	A	A
Level of Service	E	E	E	C	C	C	D	D	D	D	D	D
Approach Delay (s)	58.4	58.4	58.4	30.6	30.6	30.6	45.6	45.6	5.9	5.9	5.9	5.9
Approach LOS	E	E	E	C	C	C	D	D	D	D	D	D

Intersection Summary	
HCM Average Control Delay	11.2
HCM Volume to Capacity ratio	0.56
Actuated Cycle Length (s)	50.0
Intersection Capacity Utilization	78.2%
Analysis Period (min)	15
c Critical Lane Group	

Intersection Summary	
HCM Average Control Delay	31.6
HCM Volume to Capacity ratio	1.01
Actuated Cycle Length (s)	80.0
Intersection Capacity Utilization	113.9%
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
7: 40th St. & Market St. 2030 PM + Tower 1/21/2008

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Frt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1765	3464	1768	3455	1741	1830	1766	1825				
Flt Permitted	0.12	1.00	0.12	1.00	0.52	1.00	0.22	1.00				
Satd. Flow (perm)	232	3464	233	3455	960	1830	402	1825				
Volume (vph)	90	1119	160	83	894	133	180	561	65	106	250	30
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	1178	168	87	941	140	189	591	68	112	263	32
RTOR Reduction (vph)	0	14	0	0	14	0	0	5	0	0	6	0
Lane Group Flow (vph)	95	1332	0	87	1067	0	189	654	0	112	290	0
Confl. Peds. (#/hr)	12	12	12	12	42	12	42	12	12	12	42	42
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8				2			6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)	33.0	33.0	33.0	33.0	33.0	33.0	40.5	40.5	40.5	40.5	40.5	40.5
Effective Green, g (s)	32.0	32.0	32.0	32.0	32.0	32.0	40.0	40.0	40.0	40.0	40.0	40.0
Actuated g/C Ratio	0.40	0.40	0.40	0.40	0.40	0.40	0.50	0.50	0.50	0.50	0.50	0.50
Clearance Time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.5	3.5	3.5	3.5	3.5	3.5
Lane Grp Cap (vph)	93	1386	93	1382	480	915			201	913		
v/s Ratio Prot	c0.41			0.37			0.20		c0.36			0.16
v/s Ratio Perm	1.02	0.96	0.94	0.77	0.39	0.71	0.56	0.32	0.28	0.28	0.56	0.32
Uniform Delay, d1	24.0	23.4	23.0	20.8	12.5	15.6	13.9	11.9			13.9	11.9
Progression Factor	1.00	1.00	1.71	1.79	1.64	1.63	1.00	1.00			1.00	1.00
Incremental Delay, d2	99.3	16.5	45.0	1.8	0.2	0.4	10.7	0.9			10.7	0.9
Delay (s)	123.3	39.9	84.4	39.1	20.6	25.8	24.6	12.8			24.6	12.8
Level of Service	F	D	F	D	C	C	C	B			C	B
Approach Delay (s)	F	D	F	D	42.5	D	24.7	D			16.0	B
Approach LOS	D	D	D	D	D	D	D	D			D	B
Intersection Summary												
HCM Average Control Delay			36.9		HCM Level of Service		D					
HCM Volume to Capacity ratio			0.85		Sum of last time (s)		8.0					
Actuated Cycle Length (s)			80.0		ICU Level of Service		F					
Intersection Capacity Utilization			96.6%		Analysis Period (min)		15					
Critical Lane Group					c		Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
8: 40th St. & West St. 2030 PM + Tower 1/21/2008

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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Frt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1765	3458	1770	3500	1765	3458	1770	3500	1765	3458	1770	3500
Flt Permitted	0.16	1.00	0.16	1.00	0.16	1.00	0.16	1.00	0.16	1.00	0.16	1.00
Satd. Flow (perm)	297	3458	297	3458	990	1825	402	1825				
Volume (vph)	60	1161	120	70	1020	63	90	331	59	33	160	50
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	61	1173	121	71	1030	64	91	334	60	33	162	51
RTOR Reduction (vph)	0	10	0	0	10	0	0	1	0	0	4	0
Lane Group Flow (vph)	61	1284	0	71	1089	0	0	484	0	0	242	0
Confl. Peds. (#/hr)	24	24	24	24	78	78	24	78	24	24	78	78
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8				2			6	
Permitted Phases	4			8			2				6	
Actuated Green, G (s)	24.0	24.0	24.0	24.0	24.0	24.0	46.0	46.0	46.0	46.0	46.0	46.0
Effective Green, g (s)	25.0	25.0	25.0	25.0	25.0	25.0	47.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.31	0.31	0.31	0.31	0.31	0.31	0.59	0.59	0.59	0.59	0.59	0.59
Clearance 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
Lane Grp Cap (vph)	93	1081	93	1081	480	915			201	913		
v/s Ratio Prot	c0.37			0.31			0.20		c0.36			0.16
v/s Ratio Perm	1.02	0.96	0.94	0.77	0.39	0.71	0.56	0.32	0.28	0.28	0.56	0.32
Uniform Delay, d1	24.0	23.4	23.0	20.8	12.5	15.6	13.9	11.9			13.9	11.9
Progression Factor	1.00	1.00	1.71	1.79	1.64	1.63	1.00	1.00			1.00	1.00
Incremental Delay, d2	99.3	16.5	45.0	1.8	0.2	0.4	10.7	0.9			10.7	0.9
Delay (s)	123.3	39.9	84.4	39.1	20.6	25.8	24.6	12.8			24.6	12.8
Level of Service	F	D	F	D	C	C	C	B			C	B
Approach Delay (s)	F	D	F	D	42.5	D	24.7	D			16.0	B
Approach LOS	D	D	D	D	D	D	D	D			D	B
Intersection Summary												
HCM Average Control Delay			36.9		HCM Level of Service		D					
HCM Volume to Capacity ratio			0.85		Sum of last time (s)		8.0					
Actuated Cycle Length (s)			80.0		ICU Level of Service		F					
Intersection Capacity Utilization			96.6%		Analysis Period (min)		15					
Critical Lane Group					c		Critical Lane Group					

HCM Signalized Intersection Capacity Analysis
 9: 40th St. & MLK Jr. Way

HCM Signalized Intersection Capacity Analysis
 10: 40th St. & BART Access

2030 PM + Tower
 1/21/2008

2030 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ft	1.00	0.99	1.00	0.98	1.00	0.97	1.00	0.97	1.00	0.98	1.00	0.98
Flt Protected	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	1768	3493	1764	3451	1764	3415	1764	3415	1764	3419	1764	3419
Flt Permitted	0.11	1.00	0.11	1.00	0.11	1.00	0.11	1.00	0.11	1.00	0.11	1.00
Satd. Flow (perm)	213	3493	212	3451	212	3451	212	3451	212	3451	212	3451
Volume (vph)	90	1118	84	115	1058	172	75	543	126	92	256	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	95	1177	88	121	1114	181	79	572	133	97	269	63
RTOR Reduction (vph)	0	7	0	0	16	0	0	12	0	0	17	0
Lane Group Flow (vph)	95	1258	0	121	1279	0	0	772	0	0	412	0
Confl. Peds. (#/hr)	8	39	39	8	39	39	8	772	0	0	25	25
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	8	8	8	2	2	2	6	6	6
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	35.5	35.5	35.5	35.5	35.5	35.5	38.0	38.0	38.0	38.0	38.0	38.0
Effective Green, g (s)	35.0	35.0	35.0	35.0	35.0	35.0	37.0	37.0	37.0	37.0	37.0	37.0
Actuated g/C Ratio	0.44	0.44	0.44	0.44	0.44	0.44	0.46	0.46	0.46	0.46	0.46	0.46
Clearance Time (s)	3.5	3.5	3.5	3.5	3.5	3.5	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	93	1528	93	1510	1363	1363	1061	1061	1061	1061	1061	1061
v/s Ratio Prot	0.45	0.36	0.36	0.37	0.37	0.37	0.26	0.26	0.26	0.18	0.18	0.18
v/s Ratio Perm	1.02	0.82	0.82	0.85	0.85	0.85	0.57	0.57	0.57	0.39	0.39	0.39
v/c Ratio	22.5	19.8	19.8	22.5	20.1	15.7	15.7	15.7	15.7	14.1	14.1	14.1
Uniform Delay, d1	1.03	1.04	1.29	1.32	1.43	1.43	1.5	1.5	1.5	1.1	1.1	1.1
Progression Factor	33.5	0.5	189.7	5.5	23.8	23.8	15.2	15.2	15.2	15.2	15.2	15.2
Incremental Delay, d2	56.8	21.1	218.7	32.1	23.8	23.8	15.2	15.2	15.2	15.2	15.2	15.2
Delay (s)	E	C	F	C	C	C	B	B	B	B	B	B
Level of Service	E	C	F	C	C	C	B	B	B	B	B	B
Approach Delay (s)	23.6	48.0	48.0	48.0	48.0	48.0	15.2	15.2	15.2	15.2	15.2	15.2
Approach LOS	C	C	D	D	D	D	B	B	B	B	B	B
Intersection Summary												
HCM Average Control Delay	31.4 HCM Level of Service C											
HCM Volume to Capacity ratio	0.93											
Actuated Cycle Length (s)	80.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	95.2% ICU Level of Service F											
Analysis Period (min)	15											
c Critical Lane Group	15											

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2030 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	
Lane Util. Factor	1.00	0.99	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.97	1.00	0.97	
Fipb, ped/bikes	0.94	1.00	0.98	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Fipb, ped/bikes	1.00	0.98	1.00	0.98	1.00	0.99	1.00	0.99	1.00	0.96	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (prot)	1672	3441	1748	3337	1770	3472	1770	3472	1770	3279	1770	3279	
Flt Permitted	0.25	1.00	0.15	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	
Satd. Flow (iperm)	437	3441	283	3337	1770	3472	1770	3472	1770	3279	1770	3279	
Volume (vph)	249	915	109	75	561	110	466	1450	124	130	701	255	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	
Adj. Flow (vph)	254	934	111	77	572	112	476	1480	127	133	715	260	
RTOR Reduction (vph)	0	11	0	0	20	0	0	7	0	0	0	26	
Lane Group Flow (vph)	254	1034	0	77	664	0	476	1600	0	133	949	0	
Confl. Peds. (#/hr)	94		86	86		94			40			111	
Turn Type	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	
Protected Phases	4			8		5		2		1		6	
Permitted Phases	4		8										
Actuated Green, G (s)	25.5	25.5	25.5	25.5	25.5	13.5	32.2		8.8	27.5			
Effective Green, g (s)	26.0	26.0	26.0	26.0	26.0	14.0	32.7		9.3	28.0			
Actuated g/C Ratio	0.32	0.32	0.32	0.32	0.32	0.18	0.41		0.12	0.35			
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5		4.5	4.5			
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0		2.0	2.0			
Lane Grip Cap (vph)	142	1118	92	1085	310	1419	206	1148					
v/s Ratio Prot	0.30		0.20		c0.27	c0.46		0.08	0.29				
v/s Ratio Perm	c0.58		0.27		0.84	0.61	1.54	1.13	0.65	0.83			
v/c Ratio	1.79	0.92	0.84	0.61	25.0	22.7	33.0	23.6	33.8	23.8			
Uniform Delay, d1	27.0	26.1	25.0	22.7	33.0	23.6	33.8	23.8	33.8	23.8			
Progression Factor	1.55	1.59	1.00	1.00	1.00	0.94	0.96	1.00	1.00	1.00			
Incremental Delay, d2	376.4	10.3	43.7	0.7	249.4	62.8	5.1	6.9	5.1	6.9			
Delay (s)	418.2	51.6	68.7	23.5	280.5	85.4	38.9	30.7	38.9	30.7			
Level of Service	F	D	E	C	F	F	D	C	D	C			
Approach Delay (s)	123.3		F		28.1		130.0		F		31.6		
Approach LOS	F		C		C		F		C		C		
Intersection Summary													
HCM Average Control Delay	92.8											HCM Level of Service	F
HCM Volume to Capacity ratio	1.42												
Actuated Cycle Length (s)	80.0											Sum of lost time (s)	8.0
Intersection Capacity Utilization	102.1%											ICU Level of Service	G
Analysis Period (min)	15												
c Critical Lane Group													

HCM Unsignalized Intersection Capacity Analysis
 15: 38th St. & Telegraph Ave. 2030 PM + Tower
 1/21/2008

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations	Free	Free	Free	Free	Free	Free
Sign Control	Free	Free	Free	Free	Free	Free
Grade	0%	0%	0%	0%	0%	0%
Volume (veh/h)	30	41	1956	40	20	950
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	32	43	2059	42	21	1000
Pedestrians	52		52			45
Lane Width (ft)	12.0	12.0	12.0	12.0	12.0	12.0
Walking Speed (ft/s)	4.0	4.0	4.0	4.0	4.0	4.0
Percent Blockage	4		4			4
Right turn flare (veh)						
Median type	None					
Median storage (veh)						
Upstream signal (ft)	230					
pX, platoon unblocked	0.73					
VC, conflicting volume	2726					
VC1, stage 1 conf vol	1148					
VC2, stage 2 conf vol						
vCu, unblocked vol	2417					
tC, single (s)	6.8					
tC, 2 stage (s)						
tF (s)	3.5					
p0 queue free %	0					
cM capacity (veh/h)	15					
Direction, Lane #	WB 1	NB 2	SB 1	SB 2	SB 3	SB 3
Volume Total	75	1373	728	21	500	500
Volume Left	32	0	0	21	0	0
Volume Right	43	0	42	0	0	0
cSH	33	1700	1700	145	1700	1700
Volume to Capacity	2.23	0.81	0.43	0.15	0.29	0.29
Queue Length 95th (ft)	212	0	0	12	0	0
Control Delay (s)	819.7	0.0	0.0	34.0	0.0	0.0
Lane LOS	F	D	D	D	D	D
Approach Delay (s)	819.7	0.0	0.7			
Approach LOS	F		F			
Intersection Summary						
Average Delay	19.4					
Intersection Capacity Utilization	73.9%					
ICU Level of Service	D					
Analysis Period (min)	15					

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2030 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00
Frt	0.99	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.95	1.00	0.95	1.00
Flt Protected	5014	1768	3452	1793	1770	1806						
Satd. Flow (prot)	0.65	0.22	1.00	0.28	0.28	0.24	1.00					
Flt Permitted	3268	414	3452	501	442	1806						
Satd. Flow (perm)	160	864	40	91	1341	221	190	525	120	80	403	70
Volume (vph)	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Peak-hour factor, PHF	163	882	41	93	1368	226	194	536	122	82	411	71
Adj. Flow (vph)	0	5	0	0	17	0	0	8	0	0	8	0
RTOR Reduction (vph)	0	5	0	0	17	0	0	8	0	0	8	0
Lane Group Flow (vph)	0	1081	0	93	1578	0	0	844	0	82	474	0
Conf. Peds. (#/hr)	24	4	4	4	24	48	12	12	12	12	12	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	46.0	46.0	46.0	46.0	46.0	46.0	24.0	24.0	24.0	24.0	24.0	24.0
Effective Green, g (s)	47.0	47.0	47.0	47.0	47.0	47.0	25.0	25.0	25.0	25.0	25.0	25.0
Actuated g/C Ratio	0.59	0.59	0.59	0.59	0.59	0.59	0.31	0.31	0.31	0.31	0.31	0.31
Clearance 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
Lane Grp Cap (vph)	1920	243	2028	c0.46			157	138	564			26
v/s Ratio Prot	0.33	0.22	0.22	c1.69			0.19	0.19	0.19			0.26
v/s Ratio Perm	1.66dl	0.38	0.78	5.38			0.59	0.59	0.84			0.84
Uniform Delay, d1	10.2	8.8	12.5	27.5			23.2	25.6	25.6			25.6
Progression Factor	1.00	1.58	1.63	1.00			0.77	0.79	0.79			0.79
Incremental Delay, d2	1.2	3.4	2.3	1984.3			14.5	11.9	11.9			11.9
Delay (s)	11.4	17.3	22.8	2011.8			32.3	32.2	32.2			32.2
Level of Service	B	B	C	F			C	C	C			C
Approach Delay (s)	11.4			22.5			2011.8					32.2
Approach LOS	B			C			F					C

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	425.5	HCM Level of Service	F
HCM Volume to Capacity ratio	2.38		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	167.7%	ICU Level of Service	H
Analysis Period (min)	15		
dl Defacto Left Lane. Recode with 1 through lane as a left lane.			
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 17: MacArthur Blvd. & West St.

2030 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	0.99	1.00	0.99	1.00	1.00	0.96	1.00	1.00	0.98	1.00
Frt	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Flt Protected	4999	5015	1770	1787	1766	1821						
Satd. Flow (prot)	0.76	0.79	0.79	0.38	1.00	0.20	1.00					
Flt Permitted	3800	3951	710	1787	363	1821						
Satd. Flow (perm)	60	804	70	101	1373	111	140	339	108	90	230	40
Volume (vph)	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Peak-hour factor, PHF	63	846	74	106	1445	117	147	357	114	95	242	42
Adj. Flow (vph)	0	12	0	0	11	0	0	14	0	0	8	0
RTOR Reduction (vph)	0	12	0	0	11	0	0	14	0	0	8	0
Lane Group Flow (vph)	0	971	0	0	1657	0	147	457	0	95	276	0
Conf. Peds. (#/hr)	12	12	12	12	12	12	6	6	6	6	6	6
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8			2			6		6
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (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
Lane Grp Cap (vph)	2446	2543	182	458	93	467						15
v/s Ratio Prot	0.26	0.42	0.21	0.21			0.26	0.15				0.15
v/s Ratio Perm	0.40	0.65	0.81	1.00			1.02	0.59				0.59
Uniform Delay, d1	6.8	8.7	27.9	29.7			29.8	26.1				26.1
Progression Factor	1.17	1.57	1.00	1.00			1.20	1.20				1.20
Incremental Delay, d2	0.0	1.0	30.7	41.5			90.3	4.4				4.4
Delay (s)	8.0	14.7	58.6	71.2			125.8	35.8				35.8
Level of Service	A	B	E	E			F	F				D
Approach Delay (s)	8.0			14.7			68.2					58.4
Approach LOS	A			B			E					E

Intersection Summary		HCM Level of Service	
HCM Average Control Delay	26.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	80.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	100.6%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
 18: MacArthur Blvd. & MLK Jr. Way

2030 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	0.99	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5020	4955	3433	3433	3358	3358	3358	3358	3358	3358	3358	3358
Flt Permitted	0.72	0.82	0.82	0.73	0.73	0.57	0.73	0.73	0.57	0.73	0.57	0.57
Satd. Flow (perm)	3630	4062	2828	2828	1941	1941	1941	1941	1941	1941	1941	1941
Volume (vph)	77	895	50	79	1404	241	80	426	75	140	223	92
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	78	904	51	80	1418	243	81	430	76	141	225	93
RTOR Reduction (vph)	0	7	0	0	28	0	0	15	0	0	0	28
Lane Group Flow (vph)	0	1026	0	0	1713	0	0	572	0	0	431	0
Confl. Peds. (#/hr)	9	17	17	17	9	12	10	10	10	10	10	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	19.0	19.0	19.0	19.0	19.0	19.0
Effective Green, g (s)	51.5	51.5	51.5	51.5	51.5	20.5	20.5	20.5	20.5	20.5	20.5	20.5
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Lane Grp Cap (vph)	2337	2615	2615	2615	2615	648	648	648	648	497	497	497
v/s Ratio Prot	0.28	0.42	0.42	0.42	0.42	0.23	0.23	0.23	0.23	0.22	0.22	0.22
v/s Ratio Perm	0.44	0.66	0.66	0.66	0.66	0.88	0.88	0.88	0.88	0.94	0.94	0.94
v/c Ratio	7.1	8.8	8.8	8.8	8.8	28.6	28.6	28.6	28.6	28.4	28.4	28.4
Uniform Delay, d1	1.61	1.20	1.20	1.20	1.20	1.00	1.00	1.00	1.00	1.18	1.18	1.18
Progression Factor	0.5	1.0	1.0	1.0	1.0	16.1	16.1	16.1	16.1	18.0	18.0	18.0
Incremental Delay, d2	11.9	11.5	11.5	11.5	11.5	44.7	44.7	44.7	44.7	51.6	51.6	51.6
Delay (s)	B	B	B	B	B	D	D	D	D	D	D	D
Level of Service	B	B	B	B	B	D	D	D	D	D	D	D
Approach Delay (s)	11.9	11.5	11.5	11.5	11.5	44.7	44.7	44.7	44.7	51.6	51.6	51.6
Approach LOS	B	B	B	B	B	D	D	D	D	D	D	D
Intersection Summary												
HCM Average Control Delay	21.5		21.5		21.5		21.5		21.5		21.5	
HCM Volume to Capacity ratio	0.72		0.72		0.72		0.72		0.72		0.72	
Actuated Cycle Length (s)	80.0		80.0		80.0		80.0		80.0		80.0	
Intersection Capacity Utilization	126.7%		126.7%		126.7%		126.7%		126.7%		126.7%	
Analysis Period (min)	15		15		15		15		15		15	
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.	15		15		15		15		15		15	
c Critical Lane Group	C		C		C		C		C		C	

HCM Signalized Intersection Capacity Analysis
 19: MacArthur Blvd. & BART Access

2030 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Satd. Flow (prot)	5058	5031	3433	3433	3358	3358	3358	3358	3358	3358	3358	3358
Flt Permitted	0.70	0.93	0.93	0.89	0.89	0.85	0.89	0.89	0.85	0.89	0.85	0.85
Satd. Flow (perm)	3573	4679	2828	2828	1941	1941	1941	1941	1941	1941	1941	1941
Volume (vph)	90	1050	10	10	1523	60	10	10	10	138	0	189
Peak-hour factor, PHF	0.96	0.96	0.95	0.95	0.96	0.96	0.95	0.95	0.95	0.95	0.96	0.96
Adj. Flow (vph)	94	1094	11	11	1586	62	11	11	11	144	0	197
RTOR Reduction (vph)	0	1	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	0	1198	0	0	1659	0	0	25	0	0	341	0
Confl. Peds. (#/hr)	0	17	17	17	9	12	10	10	10	10	10	12
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	4	4	4	4	4	4	4	4	4
Permitted Phases	4	8	8	8	8	8	2	2	2	6	6	6
Actuated Green, G (s)	48.5	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
Effective Green, g (s)	49.5	49.5	49.5	49.5	49.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (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
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
Lane Grp Cap (vph)	2166	2837	2837	2837	2837	463	463	463	463	409	409	409
v/s Ratio Prot	0.34	0.34	0.34	0.34	0.34	0.02	0.02	0.02	0.02	0.02	0.02	0.02
v/s Ratio Perm	0.55	0.55	0.55	0.55	0.55	0.58	0.58	0.58	0.58	0.58	0.58	0.58
v/c Ratio	9.3	9.3	9.3	9.3	9.3	20.3	20.3	20.3	20.3	26.4	26.4	26.4
Uniform Delay, d1	0.86	0.86	0.86	0.86	0.86	1.00	1.00	1.00	1.00	1.10	1.10	1.10
Progression Factor	0.9	0.9	0.9	0.9	0.9	0.0	0.0	0.0	0.0	13.3	13.3	13.3
Incremental Delay, d2	9.0	9.0	9.0	9.0	9.0	20.3	20.3	20.3	20.3	42.3	42.3	42.3
Delay (s)	A	A	A	A	A	B	B	B	B	D	D	D
Level of Service	A	A	A	A	A	B	B	B	B	D	D	D
Approach Delay (s)	9.0	9.0	9.0	9.0	9.0	20.3	20.3	20.3	20.3	42.3	42.3	42.3
Approach LOS	A	A	A	A	A	B	B	B	B	D	D	D
Intersection Summary												
HCM Average Control Delay	13.4		13.4		13.4		13.4		13.4		13.4	
HCM Volume to Capacity ratio	0.67		0.67		0.67		0.67		0.67		0.67	
Actuated Cycle Length (s)	80.0		80.0		80.0		80.0		80.0		80.0	
Intersection Capacity Utilization	92.5%		92.5%		92.5%		92.5%		92.5%		92.5%	
Analysis Period (min)	15		15		15		15		15		15	
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.	15		15		15		15		15		15	
c Critical Lane Group	C		C		C		C		C		C	

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave. 2030 PM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	0.95
Frbp, ped/bikes	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	1.00	0.98
Ft	0.99	0.99	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98	0.93
Flt Protected	0.98	1.00	1.00	0.95	1.00	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4915	4806	4806	1748	3460	1770	3436					
Flt Permitted	0.68	0.71	0.71	0.22	1.00	0.11	1.00					
Satd. Flow (pbrm)	3382	3417	3417	407	3460	213	3436					
Volume (vph)	392	695	111	110	1174	469	280	1213	110	196	601	99
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	413	732	117	116	1236	494	285	1277	116	206	633	104
RTOR Reduction (vph)	0	7	0	0	1	0	0	7	0	0	12	0
Lane Group Flow (vph)	0	1255	0	0	1845	0	295	1386	0	206	725	0
Confl. Peds. (#/hr)	26	19	19	pm+pt	26	39	92	92	92	92	92	39
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	3	8	2	2	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	2	2	6	6	6
Actuated Green, G (s)	56.7	56.7	56.7	56.7	34.0	34.0	34.0	34.0	34.0	34.0	34.0	34.0
Effective Green, g (s)	58.2	58.2	58.2	58.2	35.0	35.0	35.0	35.0	35.0	35.0	35.0	35.0
Actuated g/C Ratio	0.58	0.58	0.58	0.58	0.35	0.35	0.35	0.35	0.35	0.35	0.35	0.35
Clearance Time (s)	5.5	5.5	5.5	5.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	1945	1965	1965	141	1197	74	1188					
v/s Ratio Prot					0.40	0.40	0.40	0.40	0.40	0.21	0.21	0.21
v/s Ratio Perm	0.37	0.37	0.37	0.54	0.73	0.73	0.73	0.73	0.73	0.97	0.97	0.97
v/c Ratio	2.58dl	2.58dl	2.58dl	0.94	2.09	1.16	2.78	2.78	2.78	0.61	0.61	0.61
Uniform Delay, d1	14.5	19.9	19.9	33.1	33.1	33.1	33.1	33.1	33.1	27.4	27.4	27.4
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.6	9.2	9.2	514.8	80.9	839.0	2.3	2.3	2.3	2.3	2.3	2.3
Delay (s)	15.1	29.1	29.1	547.9	114.0	872.1	29.8	29.8	29.8	29.8	29.8	29.8
Level of Service	B	C	C	F	F	F	F	F	F	F	F	C
Approach Delay (s)	15.1	29.1	29.1	29.1	189.8	213.8	213.8	213.8	213.8	213.8	213.8	213.8
Approach LOS	B	C	C	C	F	F	F	F	F	F	F	F

Intersection Summary	
HCM Average Control Delay	103.6
HCM Level of Service	F
HCM Volume to Capacity ratio	1.64
Actuated Cycle Length (s)	101.2
Sum of lost time (s)	8.0
Intersection Capacity Utilization	121.8%
ICU Level of Service	H
Analysis Period (min)	15
dl Defacto Left Lane. Recode with 1 though lane as a left lane.	
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 21: MacArthur Blvd. & Webster St. 2030 PM + Tower
 1/21/2008



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	0.91	0.91	1.00	0.91	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.96	1.00	0.98	0.98	0.98
Ft	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.95	0.93	0.93
Flt Protected	1.00	1.00	1.00	1.00	1.00	1.00	0.98	1.00	0.99	1.00	0.99	1.00
Satd. Flow (prot)	5029	5027	5027	1753	1406	1580						
Flt Permitted	0.78	0.78	0.78	0.78	0.78	1.00	0.77	1.00	0.90	0.90	0.90	0.90
Satd. Flow (pbrm)	3943	3928	3928	1384	1406	1438						
Volume (vph)	50	927	34	110	1598	50	104	200	40	40	40	90
Peak-hour factor, PHF	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Adj. Flow (vph)	51	936	34	111	1614	51	105	105	202	40	40	91
RTOR Reduction (vph)	0	4	0	0	4	0	0	4	0	64	0	13
Lane Group Flow (vph)	0	1017	0	0	1772	0	0	210	138	0	158	0
Confl. Peds. (#/hr)	100	100	100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	8	8	2	2	2	2	2	6	6	6
Permitted Phases	4	4	8	8	2	2	2	2	2	6	6	6
Actuated Green, G (s)	49.5	49.5	49.5	49.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5	24.5
Effective Green, g (s)	48.5	48.5	48.5	48.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5	23.5
Actuated g/C Ratio	0.61	0.61	0.61	0.61	0.29	0.29	0.29	0.29	0.29	0.29	0.29	0.29
Clearance Time (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
Lane Grp Cap (vph)	2390	2381	2381	407	413	422						
v/s Ratio Prot					0.15	0.10	0.10	0.10	0.10	0.11	0.11	0.11
v/s Ratio Perm	0.26	0.43	0.43	0.74	0.74	0.74	0.52	0.33	0.33	0.37	0.37	0.37
v/c Ratio	8.4	11.3	11.3	23.5	22.1	22.1	22.1	22.1	22.1	22.4	22.4	22.4
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	0.6	0.6	0.6	2.2	2.2	2.2	4.6	2.2	2.2	2.5	2.5	2.5
Incremental Delay, d2	8.9	13.5	13.5	13.5	28.1	24.3	24.3	24.3	24.3	24.9	24.9	24.9
Delay (s)	A	B	B	B	C	C	C	C	C	C	C	C
Level of Service	A	B	B	B	C	C	C	C	C	C	C	C
Approach Delay (s)	8.9	13.5	13.5	13.5	26.2	24.9	24.9	24.9	24.9	24.9	24.9	24.9
Approach LOS	A	B	B	B	C	C	C	C	C	C	C	C

Intersection Summary	
HCM Average Control Delay	14.2
HCM Level of Service	B
HCM Volume to Capacity ratio	0.67
Actuated Cycle Length (s)	80.0
Sum of lost time (s)	8.0
Intersection Capacity Utilization	111.8%
ICU Level of Service	H
Analysis Period (min)	15
c Critical Lane Group	

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	1.00	0.98	1.00	0.99	1.00	0.94	1.00	0.94	1.00	0.94	1.00	0.99
Fipb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.98	1.00	0.97	1.00	0.85	1.00	0.85	1.00	0.85	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	4912	1770	4864	1770	3539	1489	1770	3539	1489	1770	3539
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (pbrm)	1770	4912	1770	4864	1770	3539	1489	1770	3539	1489	1770	3539
Volume (vph)	230	796	111	130	1238	360	310	1181	290	510	511	180
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	242	838	117	137	1303	379	326	1243	305	537	538	189
RTOR Reduction (vph)	0	15	0	0	44	0	0	0	11	0	0	45
Lane Group Flow (vph)	242	940	0	137	1638	0	326	1243	294	537	538	144
Confl. Peds. (#/hr)			81			22			50			43
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	pm+ov	Prot	pm+ov	Prot	pm+ov	Prot
Protected Phases	7	4		3	8		5	2	3	1	6	7
Permitted Phases												
Actuated Green, G (s)	12.0	33.2		12.8	34.0		25.4	33.0	45.8	25.0	32.6	44.6
Effective Green, g (s)	11.0	34.2		11.8	35.0		24.4	34.0	45.8	24.0	33.6	44.6
Actuated g/C Ratio	0.09	0.29		0.10	0.29		0.20	0.28	0.38	0.20	0.28	0.37
Clearance Time (s)	3.0	5.0		3.0	5.0		3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0	3.0	3.0	3.0	3.0
Lane Grip Cap (vph)	162	1400		174	1419		360	1003	618	354	991	607
v/s Ratio Prot	c0.14	0.19		0.08	c0.34		0.18	c0.35	0.05	c0.30	0.15	0.02
v/s Ratio Perm	1.49	0.67		0.79	1.15		0.91	1.24	0.48	1.52	0.54	0.24
Uniform Delay, d1	54.5	37.9		52.9	42.5		46.7	43.0	28.0	48.0	36.7	26.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	251.9	2.6		20.6	77.9		25.3	116.3	0.6	246.7	2.1	0.2
Delay (s)	306.4	40.5		73.4	120.4		71.9	159.3	28.6	294.7	38.8	26.2
Level of Service	F	D		E	F		E	F	C	F	D	C
Approach Delay (s)	94.3			116.9			122.8			145.6		
Approach LOS	F			F			F			F		
Intersection Summary												
HCM Average Control Delay	120.2	HCM Level of Service										
HCM Volume to Capacity ratio	1.21	F										
Actuated Cycle Length (s)	120.0	Sum of lost time (s)										
Intersection Capacity Utilization	119.4%	ICU Level of Service										
Analysis Period (min)	15	H										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 23: 34th St. & Telegraph Ave.

2030 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	1.00	0.95	1.00	0.95
Frbp, ped/bikes	0.93	0.96	1.00	0.96	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fipb, ped/bikes	0.98	0.97	1.00	0.97	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98
Frt	0.95	0.95	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.98
Flt Protected	0.98	0.98	0.98	0.98	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1585	1816	1705	3488	1729	3446						
Flt Permitted	0.66	0.72	0.25	1.00	0.17	1.00						
Satd. Flow (pbrm)	1063	1181	443	3488	315	3446						
Volume (vph)	131	60	100	120	80	103	50	1109	50	42	856	73
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	138	63	105	126	84	108	53	1167	53	44	901	77
RTOR Reduction (vph)	0	23	0	0	22	0	0	4	0	0	7	0
Lane Group Flow (vph)	0	283	0	0	296	0	53	1216	0	44	971	0
Confl. Peds. (#/hr)	100		100	100	100	100	100	100	100	100	100	100
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4		4		4		2		2		6	6
Permitted Phases												
Actuated Green, G (s)	23.7		23.7		23.7		54.3		54.3		54.3	54.3
Effective Green, g (s)	23.2		23.2		23.2		53.8		53.8		53.8	53.8
Actuated g/C Ratio	0.27		0.27		0.27		0.63		0.63		0.63	0.63
Clearance Time (s)	3.5		3.5		3.5		3.5		3.5		3.5	3.5
Vehicle Extension (s)	2.0		2.0		2.0		2.0		2.0		2.0	2.0
Lane Grip Cap (vph)	290		322		322		280		2208		199	2181
v/s Ratio Prot	c0.27		0.25		0.12		0.35		0.14		0.28	0.28
v/s Ratio Perm	0.98		0.92		0.19		0.55		0.22		0.45	0.45
Uniform Delay, d1	30.6		30.0		30.0		6.5		8.8		6.7	8.0
Progression Factor	1.00		1.00		1.00		1.00		1.00		1.00	1.00
Incremental Delay, d2	46.0		29.5		29.5		1.5		1.0		2.5	0.7
Delay (s)	76.6		59.5		59.5		8.0		9.8		9.2	8.6
Level of Service	E		E		E		A		A		A	A
Approach Delay (s)	76.6		59.5		59.5		9.7		9.7		8.7	8.7
Approach LOS	E		E		E		A		A		A	A
Intersection Summary												
HCM Average Control Delay	21.8	HCM Level of Service										
HCM Volume to Capacity ratio	0.68	C										
Actuated Cycle Length (s)	85.0	Sum of lost time (s)										
Intersection Capacity Utilization	71.2%	ICU Level of Service										
Analysis Period (min)	15	C										
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 24: 27th St. & Telegraph Ave.

2030 PM + Tower
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.94
Frbp, ped/bikes	1.00	0.98	1.00	0.93	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.98
Frt	1.00	0.97	1.00	0.95	1.00	0.99	1.00	0.99	1.00	0.98	1.00	0.95
Satd. Flow (prot)	1770	3370	1770	3137	1770	3137	1704	3489	1733	3136	1770	3370
Satd. Flow (perm)	1770	3370	1770	3137	1770	3137	1704	3489	1733	3136	1770	3370
Volume (vph)	230	560	120	90	530	256	200	843	50	230	546	310
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	235	571	122	92	541	261	204	860	51	235	557	316
RTOR Reduction (vph)	0	20	0	0	46	0	0	5	0	0	95	0
Lane Group Flow (vph)	235	673	0	92	756	0	204	906	0	235	778	0
Confl. Peds. (#/hr)	100			100			100			100		100
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8		2		2		6	
Actuated Green, G (s)	10.5	26.1		7.3	22.9		38.1		38.1		38.1	
Effective Green, g (s)	11.0	25.6		7.8	22.4		39.6		39.6		39.6	
Actuated g/C Ratio	0.13	0.30		0.09	0.26		0.47		0.47		0.47	
Clearance Time (s)	4.5	3.5		4.5	3.5		5.5		5.5		5.5	
Vehicle Extension (s)	2.0	2.0		2.0	2.0		2.0		2.0		2.0	
Lane Grp Cap (vph)	229	1015		162	827		192		1625		182	
v/s Ratio Prot	c0.13	c0.20		0.05	c0.24		0.26		0.26		0.25	
v/s Ratio Perm	1.03	0.66		0.57	0.91		0.49		0.60		0.60	
Uniform Delay, d1	37.0	25.9		37.0	30.4		22.7		16.4		22.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00		1.00		1.00	
Incremental Delay, d2	66.4	1.3		2.7	14.2		82.5		1.4		165.7	
Delay (s)	103.4	27.2		39.7	44.6		105.2		17.8		188.4	
Level of Service	F	C		D	D		F		B		F	
Approach Delay (s)	46.5			44.1			33.8				53.8	
Approach LOS	D			D			C				D	
Intersection Summary												
HCM Average Control Delay												44.5
HCM Volume to Capacity ratio												1.18
Actuated Cycle Length (s)												85.0
Intersection Capacity Utilization												89.1%
Analysis Period (min)												15
c Critical Lane Group												D

HCM Signalized Intersection Capacity Analysis
 25: Transit Village Driveway & Telegraph Ave.

2030 PM + Tower
 1/21/2008

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0
Lane Util. Factor	1.00	1.00	1.00	0.95	1.00	0.98
Frt	1.00	0.85	1.00	1.00	1.00	0.98
Satd. Flow (prot)	1770	1583	1770	3539	3459	1770
Satd. Flow (perm)	1770	1583	1770	3539	3459	1770
Volume (vph)	45	102	100	1975	752	133
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	47	107	105	2079	792	140
RTOR Reduction (vph)	0	83	0	0	14	0
Lane Group Flow (vph)	47	24	105	2079	918	0
Turn Type	Perm	Prot	Prot	Prot	Prot	Prot
Protected Phases	2		3	8	4	
Permitted Phases		2				
Actuated Green, G (s)	17.8	17.8	7.7	53.7	41.5	
Effective Green, g (s)	18.3	18.3	7.7	53.7	42.0	
Actuated g/C Ratio	0.23	0.23	0.10	0.67	0.52	
Clearance Time (s)	4.5	4.5	4.0	4.0	4.5	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	405	362	170	2376	1816	
v/s Ratio Prot	c0.03	0.02	0.06	c0.59	0.27	
v/s Ratio Perm	0.12	0.07	0.62	0.88	0.51	
Uniform Delay, d1	24.4	24.2	34.7	10.5	12.3	
Progression Factor	1.00	1.00	1.00	1.00	1.93	
Incremental Delay, d2	0.1	0.1	6.5	4.9	0.6	
Delay (s)	24.6	24.2	41.3	15.4	24.3	
Level of Service	C	C	D	B	C	
Approach Delay (s)	24.3		16.6	24.3		
Approach LOS	C		B	C		
Intersection Summary						
HCM Average Control Delay						19.2
HCM Volume to Capacity ratio						0.68
Actuated Cycle Length (s)						80.0
Intersection Capacity Utilization						64.6%
Analysis Period (min)						15
c Critical Lane Group						B

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2030 AM Tower Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97	1.00	1.00	0.97
Flt	0.95	1.00	0.91	1.00	0.91	1.00	0.97	1.00	0.96	1.00	1.00	0.96
Flt Protected	0.98	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1747	1681	1599	1681	1599	1681	1599	1681	1599	1681	1599	1681
Flt Permitted	0.70	0.74	1.00	0.70	0.74	1.00	0.70	0.74	1.00	0.70	0.74	1.00
Satd. Flow (perm)	1247	1302	1599	1247	1302	1599	1247	1302	1599	1247	1302	1599
Volume (vph)	10	10	10	354	330	470	0	1171	247	110	1330	480
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	11	11	373	347	495	0	1233	260	116	1400	484
RTOR Reduction (vph)	0	11	0	0	57	0	0	19	0	0	37	0
Lane Group Flow (vph)	0	22	0	373	785	0	0	1474	0	116	1848	0
Confl. Peds. (#/hr)	4			4	44			12	12	12	44	
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	7	7	8	8	8	2	2	2	1	6	
Permitted Phases	7			8	8	8	35.7	35.7	35.7	5.5	45.7	
Actuated Green, G (s)	3.3	27.5	27.5	27.5	27.5	27.5	36.2	36.2	36.2	6.0	46.2	
Effective Green, g (s)	3.8	28.0	28.0	28.0	28.0	28.0	0.40	0.40	0.40	0.07	0.51	
Actuated g/C Ratio	0.04	0.31	0.31	0.31	0.31	0.31	4.5	4.5	4.5	4.5	4.5	
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	2.0	2.0	2.0	2.0	2.0	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	1374	1374	1374	118	1889	
Lane Grp Cap (vph)	60.02	0.29	0.49	0.29	0.49	0.49	0.43	0.43	0.43	0.07	0.56	
v/s Ratio Prot	0.42	0.92	1.58	0.92	1.58	1.07	0.98	0.98	0.98	1.09	1.09	
v/c Ratio	42.0	29.9	31.0	29.9	31.0	26.9	41.9	41.9	41.9	21.9	21.9	
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.07	1.07	1.07	1.00	1.00	
Incremental Delay, d2	2.0	25.7	270.1	25.7	270.1	36.6	76.9	76.9	76.9	52.3	52.3	
Delay (s)	44.0	55.7	301.1	55.7	301.1	65.4	118.9	118.9	118.9	74.2	74.2	
Level of Service	D	E	F	E	F	E	F	F	F	E	E	
Approach Delay (s)	44.0			225.8		65.4				76.8		
Approach LOS	D			F		E				F		

Intersection Summary	
HCM Average Control Delay	111.1 HCM Level of Service F
HCM Volume to Capacity ratio	1.23
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 12.0
Intersection Capacity Utilization	98.8% ICU Level of Service F
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

2030 AM Tower Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.97	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Frbp, ped/bikes	1.00	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.99
Flt	1.00	1.00	0.98	1.00	0.96	1.00	0.97	1.00	0.97	1.00	1.00	0.98
Flt Protected	0.95	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	3433	3427	3427	1770	3372	1770	3372	1770	3403	1770	3404	3404
Flt Permitted	0.95	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (perm)	3433	3427	3427	1770	3372	1770	3372	1770	3403	1770	3404	3404
Volume (vph)	480	650	111	140	820	320	120	678	140	320	1164	220
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	479	677	116	146	854	333	125	706	146	333	1212	229
RTOR Reduction (vph)	0	15	0	0	46	0	0	19	0	0	18	0
Lane Group Flow (vph)	479	778	0	146	1141	0	125	833	0	333	1423	0
Confl. Peds. (#/hr)	6			24	24		6	36	28	28	36	
Turn Type	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot	Prot
Protected Phases	7	4		3	8	8	5	2	2	1	6	
Permitted Phases	14.0	27.4		11.1	24.5	6.5	22.0		12.5	28.0		
Actuated Green, G (s)	13.5	28.4		10.6	25.5	6.0	23.0		12.0	29.0		
Effective Green, g (s)	0.15	0.32		0.12	0.28	0.07	0.26		0.13	0.32		
Actuated g/C Ratio	3.5	5.0		3.5	5.0	3.5	5.0		3.5	5.0		
Clearance Time (s)	2.0	2.0		2.0	2.0	2.0	2.0		2.0	2.0		
Vehicle Extension (s)	515	1081		208	955	118	870		236	1097		
Lane Grp Cap (vph)	c0.14	c0.23		c0.08	c0.34	0.07	0.24		c0.19	c0.42		
v/s Ratio Prot	0.93	0.72		0.70	1.19	1.06	0.96		1.41	1.30		
v/c Ratio	37.8	27.3		38.2	32.2	42.0	33.0		39.0	30.5		
Uniform Delay, d1	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00		
Incremental Delay, d2	23.3	1.9		8.4	98.0	99.7	21.7		187.3	134.5		
Delay (s)	61.1	29.2		46.6	130.3	141.7	54.7		228.9	156.5		
Level of Service	E	C		D	F	D	F		F	F		
Approach Delay (s)	41.2			121.1		65.8			170.1			
Approach LOS	D			F		E			F			

Intersection Summary	
HCM Average Control Delay	108.3 HCM Level of Service F
HCM Volume to Capacity ratio	1.24
Actuated Cycle Length (s)	90.0 Sum of lost time (s) 16.0
Intersection Capacity Utilization	105.9% ICU Level of Service G
Analysis Period (min)	15

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave. 2030 AM Tower Mit 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	0.90	1.00	0.97	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97
Flpb, ped/bikes	1.00	0.94	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.97
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3007	1762	3390	1770	3422	1770	3422	1736	3328	1736	3328
Flt Permitted	0.13	1.00	0.14	1.00	0.06	1.00	0.06	1.00	0.37	1.00	0.37	1.00
Satd. Flow (perm)	246	3007	253	3390	120	3422	120	3422	678	3328	678	3328
Volume (vph)	146	424	267	120	716	90	135	515	59	100	1319	320
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	154	446	281	126	754	95	142	542	62	105	1388	337
RTOR Reduction (vph)	0	78	0	0	8	0	0	7	0	0	18	0
Lane Group Flow (vph)	154	649	0	126	841	0	142	597	0	105	1707	0
Confl. Peds. (#/hr)	72	137	137	72	72	72	58	58	58	58	92	92
Turn Type	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt
Protected Phases	7	4		8	3	8	5	2		1		6
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	36.8	29.8		34.8	28.8		67.6	61.5		65.8		60.6
Effective Green, g (s)	37.3	30.3		35.3	29.3		68.6	62.0		66.8		61.1
Actuated g/C Ratio	0.31	0.25		0.29	0.24		0.57	0.52		0.56		0.51
Clearance Time (s)	4.0	4.5		4.0	4.5		4.5	4.5		4.5		4.5
Vehicle Extension (s)	3.0	2.0		3.0	2.0		2.0	2.0		2.0		2.0
Lane Grp Cap (vph)	165	759		150	828		159	1768		428		1695
v/s Ratio Prot	c0.05	0.22		0.04	c0.25		c0.05	0.17		0.12		c0.51
v/s Ratio Perm	0.24			0.21			0.46			0.12		
v/c Ratio	0.93	0.85		0.84	1.02		0.89	0.34		0.25		1.01
Uniform Delay, d1	36.7	42.7		35.4	45.4		31.3	17.0		12.8		29.4
Progression Factor	1.14	0.75		1.00	1.00		0.92	0.84		1.00		1.00
Incremental Delay, d2	46.6	8.0		31.8	35.2		40.2	0.5		0.1		23.6
Delay (s)	88.6	40.1		67.2	80.5		68.8	14.7		12.9		53.1
Level of Service	F	D		E	F		E	B		B		D
Approach Delay (s)	48.6			78.8			25.0			50.8		
Approach LOS	D			E			C			D		D

Intersection Summary	Value	Level of Service
HCM Average Control Delay	52.2	D
HCM Volume to Capacity ratio	1.00	
Actuated Cycle Length (s)	120.0	Sum of lost time (s)
Intersection Capacity Utilization	99.9%	ICU Level of Service
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St. 2030 AM Tower Mit 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.91	1.00	0.95	1.00	0.95	1.00	1.00	0.97	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00	1.00	1.00	0.98	1.00	1.00	0.95	1.00	1.00	1.00	0.96
Flt Protected	0.99	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	4980	1762	3447	1770	3447	1770	1726	1726	1704	1759	1704	1759
Flt Permitted	0.66	1.00	0.21	1.00	0.10	1.00	0.10	1.00	0.50	1.00	0.50	1.00
Satd. Flow (perm)	3328	391	3447	391	3447	391	1726	1726	889	1759	889	1759
Volume (vph)	210	710	50	72	1097	191	100	184	90	200	494	200
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	221	747	53	76	1155	201	105	194	95	211	520	211
RTOR Reduction (vph)	0	5	0	0	13	0	0	16	0	0	13	0
Lane Group Flow (vph)	0	1016	0	76	1343	0	105	273	0	211	718	0
Confl. Peds. (#/hr)	24	18	18	24	24	24	48	48	48	48	24	24
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4			8		8	2			6		6
Permitted Phases	4			8		8	2			6		6
Actuated Green, G (s)	51.0			51.0	51.0		49.0	49.0		49.0		49.0
Effective Green, g (s)	52.0			52.0	52.0		50.0	50.0		50.0		50.0
Actuated g/C Ratio	0.47			0.47	0.47		0.45	0.45		0.45		0.45
Clearance Time (s)	5.0			5.0	5.0		5.0	5.0		5.0		5.0
Lane Grp Cap (vph)	1573			185	1629		85	785		404		800
v/s Ratio Prot	0.31			0.19	c0.39		c0.56	0.16		0.24		0.41
v/s Ratio Perm	3.036l			0.41	0.82		1.24	0.35		0.52		0.90
v/c Ratio	22.0			19.0	25.1		30.0	19.4		21.5		27.6
Uniform Delay, d1	1.00			1.00	1.00		1.00	1.00		1.00		1.00
Progression Factor	2.1			6.6	4.9		173.7	1.2		4.8		14.9
Incremental Delay, d2	24.1			25.6	30.0		203.7	20.7		26.2		42.5
Delay (s)	24.1			25.6	30.0		203.7	20.7		26.2		42.5
Level of Service	C			C	C		F	C		C		D
Approach Delay (s)	24.1			29.7			69.4			38.9		
Approach LOS	C			E			D			D		D

Intersection Summary	Value	Level of Service
HCM Average Control Delay	34.6	HCM Level of Service
HCM Volume to Capacity ratio	1.03	C
Actuated Cycle Length (s)	110.0	Sum of lost time (s)
Intersection Capacity Utilization	142.7%	ICU Level of Service
Analysis Period (min)	15	

d1 Defacto Left Lane. Recode with 1 through lane as a left lane.
 c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

2030 AM Tower Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Lane Util. Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ftp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Fit Protected	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Satd. Flow (prot)	4932	4913	4913	4913	4913	4913	4913	4913	4913	4913	4913	4913
Fit Permitted	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Satd. Flow (perm)	3161	3148	3148	3148	3148	3148	3148	3148	3148	3148	3148	3148
Volume (vph)	148	988	187	200	1146	191	120	376	90	365	1144	242
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	156	1040	197	211	1206	201	126	396	95	384	1204	255
RTOR Reduction (vph)	0	16	0	0	15	0	0	17	0	0	15	0
Lane Group Flow (vph)	0	1377	0	0	1603	0	126	474	0	384	1444	0
Confl. Peds. (#/hr)	40	9	40	25	40	25	40	25	31	31	25	25
Turn Type	Perm	Perm	Perm	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt
Protected Phases	4	4	4	3	8	8	5	2	2	1	6	6
Permitted Phases	4	4	4	8	8	8	2	2	2	1	6	6
Actuated Green, G (s)	57.7	57.7	57.7	57.7	57.7	57.7	34.4	29.9	54.3	46.3	46.3	46.3
Effective Green, g (s)	58.3	58.3	58.3	58.3	58.3	58.3	35.1	30.5	54.9	46.9	46.9	46.9
Actuated g/C Ratio	0.49	0.49	0.49	0.49	0.49	0.49	0.29	0.25	0.46	0.39	0.39	0.39
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	4.0	3.5	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	3.0	2.0	2.0	2.0
Lane Grp Cap (vph)	1536	1529	1529	1529	1529	1529	130	864	447	1336	447	1336
v/s Ratio Prot	0.10	0.29	0.10	0.29	0.10	0.29	0.04	0.14	0.15	0.42	0.15	0.42
v/s Ratio Perm	1.06	1.06	1.06	1.06	1.06	1.06	0.97	0.55	0.86	1.08	0.86	1.08
Uniform Delay, d1	28.1	28.1	28.1	28.1	28.1	28.1	30.9	42.3	38.8	24.2	36.5	36.5
Progression Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.92	0.83	0.79	0.59	0.59	0.59
Incremental Delay, d2	6.5	6.5	6.5	6.5	6.5	6.5	66.7	2.4	11.4	46.6	46.6	46.6
Delay (s)	32.1	32.1	32.1	32.1	32.1	32.1	105.8	34.6	30.7	68.4	68.4	68.4
Level of Service	C	C	C	E	E	E	F	C	C	C	E	E
Approach Delay (s)	32.1	32.1	32.1	67.6	67.6	67.6	49.2	49.2	60.5	60.5	60.5	60.5
Approach LOS	C	C	C	E	E	E	D	D	E	E	E	E
Intersection Summary												
HCM Average Control Delay	54.1											
HCM Volume to Capacity ratio	1.06											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	117.0%											
Analysis Period (min)	15											
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.												
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 22: MacArthur Blvd. & Broadway

2030 AM Tower Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	4	4	4	4	4	4	4	4	4	4	4	4
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.91	1.00	0.91	1.00	0.91	1.00	0.95	1.00	1.00	0.95	1.00
Frbp, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	1.00	0.96	1.00	1.00	0.96
Ftp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.85	1.00	1.00	0.85
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (prot)	1770	4923	1770	4839	1770	4839	1770	3539	1515	1770	3539	1523
Fit Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00
Satd. Flow (perm)	1770	4923	1770	4839	1770	4839	1770	3539	1515	1770	3539	1523
Volume (vph)	170	1209	172	210	1144	380	140	421	130	390	1442	280
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	179	1273	181	221	1204	400	147	443	137	411	1518	283
RTOR Reduction (vph)	0	15	0	0	50	0	0	0	33	0	0	13
Lane Group Flow (vph)	179	1439	0	221	1554	0	147	443	104	411	1518	250
Confl. Peds. (#/hr)	66	66	66	23	23	23	38	38	38	26	26	26
Turn Type	Prot	Prot	Prot	pm ov	pm ov	pm ov	pm ov	pm ov	pm ov	pm ov	pm ov	pm ov
Protected Phases	7	4	7	3	8	8	5	2	3	1	6	7
Permitted Phases	7	4	7	3	8	8	5	2	3	1	6	7
Actuated Green, G (s)	12.0	32.0	12.0	15.0	35.0	35.0	11.0	28.0	43.0	29.0	46.0	58.0
Effective Green, g (s)	11.0	33.0	11.0	14.0	36.0	36.0	10.0	29.0	43.0	28.0	47.0	58.0
Actuated g/C Ratio	0.09	0.28	0.09	0.12	0.30	0.30	0.08	0.24	0.36	0.23	0.39	0.48
Clearance Time (s)	3.0	5.0	3.0	3.0	5.0	5.0	3.0	5.0	3.0	3.0	5.0	3.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	162	1354	162	207	1452	148	855	593	413	1386	736	413
v/s Ratio Prot	0.10	0.29	0.10	0.12	0.32	0.32	0.08	0.13	0.23	0.23	0.43	0.13
v/s Ratio Perm	1.10	1.06	1.10	1.07	1.07	1.07	0.99	0.52	0.18	1.00	1.10	0.34
Uniform Delay, d1	54.5	43.5	54.5	53.0	42.0	42.0	55.0	39.4	26.4	45.9	36.5	19.2
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	101.6	43.0	101.6	81.6	45.0	45.0	71.6	2.2	0.1	42.7	54.6	0.1
Delay (s)	156.1	86.5	156.1	134.6	87.0	87.0	126.5	41.7	26.4	88.6	91.1	19.3
Level of Service	F	F	F	F	F	F	F	D	C	F	F	B
Approach Delay (s)	94.1	94.1	94.1	92.7	92.7	92.7	56.0	56.0	82.0	82.0	82.0	82.0
Approach LOS	F	F	F	F	F	F	E	E	F	F	F	F
Intersection Summary												
HCM Average Control Delay	85.2											
HCM Volume to Capacity ratio	1.09											
Actuated Cycle Length (s)	120.0											
Intersection Capacity Utilization	101.5%											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 2: 52nd St. & Telegraph Ave.

2030 PM Tower Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	0.93	1.00	0.93	1.00	0.93	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Flt Protected	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	1704	1681	1586	1770	1586	1770	3275	3275	1770	3209	3209	1770
Flt Permitted	0.56	0.73	1.00	0.95	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95
Satd. Flow (perm)	963	1290	1586	1770	1586	1770	3275	3275	1770	3209	3209	1770
Volume (vph)	10	20	127	120	120	0	1114	615	200	901	420	420
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	11	21	134	126	126	0	1173	647	211	948	442	442
RTOR Reduction (vph)	0	20	0	0	38	0	0	67	0	0	47	0
Lane Group Flow (vph)	0	23	0	134	214	0	0	1753	0	211	1343	0
Confl. Peds. (#/hr)	36	Perm	Perm	36	48	16	16	16	16	16	48	48
Turn Type	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted
Protected Phases	7	4	8	3	8	2	5	2	1	6	6	6
Permitted Phases	7	4	8	3	8	2	5	2	1	6	6	6
Actuated Green, G (s)	4.0	16.5	16.5	8.5	24.0	8.7	34.0	13.5	38.8	13.5	38.8	13.5
Effective Green, g (s)	4.5	17.0	17.0	8.0	25.0	8.2	35.0	13.0	39.8	13.0	39.8	13.0
Actuated g/C Ratio	0.04	0.17	0.17	0.08	0.25	0.08	0.35	0.13	0.40	0.13	0.40	0.13
Clearance Time (s)	4.5	4.5	4.5	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	43	219	270	142	825	145	1148	230	1360	230	1360	230
v/s Ratio Prot	c0.02	0.10	0.13	0.09	0.27	0.06	c0.41	c0.18	0.23	c0.18	0.23	c0.18
v/s Ratio Perm	0.53	0.61	0.79	1.02	1.19	0.63	1.37	0.58	0.58	1.37	0.58	0.58
Uniform Delay, d1	46.7	38.4	39.8	46.0	37.5	44.8	32.5	43.5	23.6	43.5	23.6	43.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.2	3.5	13.7	133.1	54.4	14.1	81.1	188.4	1.4	188.4	1.4	188.4
Delay (s)	53.0	42.0	53.5	179.1	91.9	58.8	113.6	241.1	18.3	241.1	18.3	241.1
Level of Service	D	D	D	F	F	E	F	F	B	F	B	B
Approach Delay (s)	53.0	49.5	29.4	104.6	104.6	109.7	109.7	81.5	81.5	109.7	81.5	81.5
Approach LOS	D	D	D	F	F	F	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	33.0 HCM Level of Service C											
HCM Volume to Capacity ratio	0.97											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	89.4% ICU Level of Service E											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 3: 51st St. & Telegraph Ave.

2030 PM Tower Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (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
Lane Util. Factor	0.97	0.95	1.00	0.95	0.95	0.95	1.00	0.97	1.00	0.95	1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3433	3418	1770	3299	1770	3299	1770	3280	1770	3416	1770	3416
Flt Permitted	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (perm)	3433	3418	1770	3299	1770	3299	1770	3280	1770	3416	1770	3416
Volume (vph)	460	930	133	160	580	350	100	949	350	300	698	60
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	484	979	140	168	611	368	105	999	368	316	735	63
RTOR Reduction (vph)	0	12	0	0	90	0	0	38	0	0	6	0
Lane Group Flow (vph)	484	1107	0	168	889	0	105	1329	0	316	792	0
Confl. Peds. (#/hr)	15	48	48	15	123	48	48	48	48	48	123	123
Turn Type	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted	Permitted
Protected Phases	7	4	8	3	8	2	5	2	1	6	6	6
Permitted Phases	7	4	8	3	8	2	5	2	1	6	6	6
Actuated Green, G (s)	11.5	27.0	8.5	24.0	8.7	34.0	13.5	38.8	13.5	38.8	13.5	38.8
Effective Green, g (s)	11.0	28.0	8.0	25.0	8.2	35.0	13.0	39.8	13.0	39.8	13.0	39.8
Actuated g/C Ratio	0.11	0.28	0.08	0.25	0.08	0.35	0.13	0.40	0.13	0.40	0.13	0.40
Clearance Time (s)	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0	3.5	5.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	378	957	142	825	145	1148	230	1360	230	1360	230	1360
v/s Ratio Prot	c0.14	c0.32	0.09	0.27	0.06	c0.41	c0.18	0.23	c0.18	0.23	c0.18	0.23
v/s Ratio Perm	1.28	1.16	1.18	1.08	0.72	1.16	1.37	0.58	1.37	0.58	1.37	0.58
Uniform Delay, d1	44.5	36.0	46.0	37.5	44.8	32.5	43.5	23.6	43.5	23.6	43.5	23.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	145.1	82.6	133.1	54.4	14.1	81.1	188.4	1.4	188.4	1.4	188.4	1.4
Delay (s)	189.6	118.6	179.1	91.9	58.8	113.6	241.1	18.3	241.1	18.3	241.1	18.3
Level of Service	F	F	F	F	F	E	F	F	F	F	F	B
Approach Delay (s)	140.0	104.6	104.6	104.6	104.6	109.7	109.7	81.5	81.5	109.7	81.5	81.5
Approach LOS	F	F	F	F	F	F	F	F	F	F	F	F
Intersection Summary												
HCM Average Control Delay	111.8 HCM Level of Service F											
HCM Volume to Capacity ratio	1.23											
Actuated Cycle Length (s)	100.0 Sum of lost time (s) 16.0											
Intersection Capacity Utilization	109.3% ICU Level of Service H											
Analysis Period (min)	15											
c Critical Lane Group												

HCM Signalized Intersection Capacity Analysis
 8: 40th St. & West St.

2030 PM Tower Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Frpb, ped/bikes	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.97
Flt	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99	1.00	0.99
Fit Protected	1762	3458	1752	3500	1752	3500	1752	3500	1752	3500	1752	3500
Satd. Flow (prot)	0.21	1.00	0.16	1.00	0.21	1.00	0.16	1.00	0.21	1.00	0.16	1.00
Fit Permitted	392	3458	288	3500	392	3458	288	3500	392	3458	288	3500
Satd. Flow (perm)	60	1161	120	1020	63	90	331	59	33	160	50	50
Volume (vph)	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99	0.99
Peak-hour factor, PHF	61	1173	121	1030	64	91	334	60	33	162	51	51
Adj. Flow (vph)	0	10	0	6	0	0	14	0	0	30	0	0
RTOR Reduction (vph)	61	1284	0	1088	0	0	471	0	0	217	0	0
Lane Group Flow (vph)	24	78	78	24	8	8	24	8	6	6	8	8
Conf. Peds. (#/hr)	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Turn Type	4	4	4	4	4	4	4	4	4	4	4	4
Protected Phases	8	8	8	8	8	8	8	8	8	8	8	8
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0	50.0
Effective Green, g (s)	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0	51.0
Actuated g/C Ratio	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64	0.64
Clearance 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
Lane Grp Cap (vph)	250	2204	184	2231	184	2231	184	2231	184	2231	184	2231
v/s Ratio Prot	0.16	0.37	0.25	0.31	0.16	0.37	0.25	0.31	0.16	0.37	0.25	0.31
v/s Ratio Perm	0.24	0.58	0.39	0.49	0.24	0.58	0.39	0.49	0.24	0.58	0.39	0.49
v/c Ratio	6.2	8.4	7.0	7.6	6.2	8.4	7.0	7.6	6.2	8.4	7.0	7.6
Uniform Delay, d1	0.55	0.44	0.38	0.27	0.55	0.44	0.38	0.27	0.55	0.44	0.38	0.27
Progression Factor	0.9	0.4	3.4	0.4	0.9	0.4	3.4	0.4	0.9	0.4	3.4	0.4
Incremental Delay, d2	4.3	4.1	6.1	2.5	4.3	4.1	6.1	2.5	4.3	4.1	6.1	2.5
Delay (s)	A	A	A	A	A	A	A	A	A	A	A	A
Level of Service	A	A	A	A	A	A	A	A	A	A	A	A
Approach Delay (s)	4.1	2.7	2.7	4.1	4.1	2.7	2.7	4.1	4.1	2.7	2.7	4.1
Approach LOS	A	A	A	A	A	A	A	A	A	A	A	A

Intersection Summary	Value	Unit
HCM Average Control Delay	7.7	HCM Level of Service
HCM Volume to Capacity ratio	0.59	
Actuated Cycle Length (s)	80.0	Sum of lost time (s)
Intersection Capacity Utilization	80.7%	ICU Level of Service
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 13: 40th St. & Telegraph Ave.

2030 PM Tower Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	GBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Total Lost time (s)	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Lane Util. Factor	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.95
Frpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Flt	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.98	1.00	0.96
Fit Protected	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	1770	3427	1770	3298	1770	3298	1770	3465	1770	3465	1770	3239
Fit Permitted	0.14	1.00	0.16	1.00	0.14	1.00	0.16	1.00	0.14	1.00	0.16	1.00
Satd. Flow (perm)	266	3427	303	3298	266	3427	303	3465	266	3427	303	3239
Volume (vph)	249	915	109	75	561	110	466	1450	124	130	701	255
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	254	934	111	77	572	112	476	1480	127	133	715	260
RTOR Reduction (vph)	0	8	0	0	15	0	0	6	0	0	33	0
Lane Group Flow (vph)	254	1037	0	77	669	0	476	1601	0	133	942	0
Conf. Peds. (#/hr)	94	86	86	94	94	86	86	94	40	40	111	111
Turn Type	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt	pm pt
Protected Phases	7	4	3	8	8	8	5	2	2	1	6	6
Permitted Phases	4	4	4	4	4	4	4	4	4	4	4	4
Actuated Green, G (s)	39.8	32.6	27.2	24.0	61.7	52.2	61.7	52.2	38.2	32.7	38.2	32.7
Effective Green, g (s)	40.9	33.7	28.4	24.6	62.3	52.8	62.3	52.8	39.4	33.3	39.4	33.3
Actuated g/C Ratio	0.37	0.31	0.26	0.22	0.57	0.48	0.57	0.48	0.36	0.30	0.36	0.30
Clearance Time (s)	3.5	4.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Vehicle Extension (s)	3.0	2.0	3.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lane Grp Cap (vph)	275	1050	129	738	480	1663	480	1663	166	981	166	981
v/s Ratio Prot	0.11	0.30	0.02	0.20	0.23	0.46	0.23	0.46	0.04	0.29	0.04	0.29
v/s Ratio Perm	0.23	0.59	0.13	0.13	0.33	0.46	0.33	0.46	0.24	0.29	0.24	0.29
v/c Ratio	0.92	0.99	0.60	0.91	0.99	0.96	0.99	0.96	0.80	0.96	0.80	0.96
Uniform Delay, d1	28.0	37.9	33.7	41.6	33.1	27.7	33.1	27.7	28.4	37.7	28.4	37.7
Progression Factor	0.95	0.76	1.00	1.00	1.00	0.56	1.00	0.56	1.00	1.00	1.00	1.00
Incremental Delay, d2	30.0	21.8	7.2	14.5	30.0	10.6	30.0	10.6	22.4	20.5	22.4	20.5
Delay (s)	56.8	50.6	41.0	56.1	71.7	26.1	71.7	26.1	50.8	58.2	50.8	58.2
Level of Service	E	D	D	E	E	C	E	C	D	E	D	E
Approach Delay (s)	51.8	D	D	54.5	D	D	54.5	D	36.5	57.3	36.5	57.3
Approach LOS	D	D	D	D	D	D	D	D	E	E	E	E

Intersection Summary	Value	Unit
HCM Average Control Delay	47.3	HCM Level of Service
HCM Volume to Capacity ratio	0.97	
Actuated Cycle Length (s)	110.0	Sum of lost time (s)
Intersection Capacity Utilization	102.1%	ICU Level of Service
Analysis Period (min)	15	

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
 16: MacArthur Blvd. & Market St.

2030 PM Tower Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Total Lost time (s)	0.91	1.00	0.95	1.00	1.00	1.00	1.00	0.99	1.00	0.99	1.00	0.99
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.97	1.00	0.98	1.00	0.98
Frbp, ped/bikes	0.99	1.00	0.98	1.00	0.98	1.00	0.97	1.00	0.98	1.00	0.98	1.00
Flt Protected	0.99	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	5013	1768	3450	1734	1801	1770	1801	1770	1801	1770	1801	1770
Flt Permitted	0.66	0.20	1.00	0.29	1.00	0.13	1.00	0.13	1.00	0.13	1.00	0.13
Satd. Flow (perm)	3309	368	3450	530	1801	242	1801	242	1801	242	1801	242
Volume (vph)	160	864	40	91	1341	221	190	525	120	80	403	70
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	163	882	41	93	1368	226	194	536	122	82	411	71
RTOR Reduction (vph)	0	4	0	0	12	0	0	7	0	0	6	0
Lane Group Flow (vph)	0	1082	0	93	1582	0	194	651	0	82	476	0
Confl. Peds. (#/hr)	24	4	4	4	24	48	12	12	12	12	48	48
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	8	8	2	2	2	2	2	2	2	2	2
Permitted Phases	4	8	8	2	2	2	2	2	2	2	2	2
Actuated Green, G (s)	54.0	54.0	54.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0	46.0
Effective Green, g (s)	55.0	55.0	55.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0	47.0
Actuated g/C Ratio	0.50	0.50	0.50	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43	0.43
Clearance 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
Lane Grp Cap (vph)	1655	184	1725	226	770	103	770	103	770	103	770	103
v/s Ratio Prot	0.33	0.25	0.25	c0.37	c0.36	0.34	0.34	0.34	0.34	0.34	0.34	0.34
v/s Ratio Perm	2.26d1	0.51	0.92	0.86	0.84	0.80	0.62	0.62	0.62	0.62	0.62	0.62
v/c Ratio	20.4	18.4	25.4	28.5	28.2	27.3	24.5	24.5	24.5	24.5	24.5	24.5
Uniform Delay, d1	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Progression Factor	2.0	9.6	9.3	32.1	11.0	45.6	3.7	3.7	3.7	3.7	3.7	3.7
Incremental Delay, d2	22.5	28.0	34.6	60.6	39.2	72.9	28.2	28.2	28.2	28.2	28.2	28.2
Delay (s)	C	C	C	E	D	E	C	C	C	E	C	C
Level of Service	C	C	C	E	D	E	C	C	C	E	C	C
Approach Delay (s)	22.5	34.3	34.3	44.1	44.1	34.7	34.7	34.7	34.7	34.7	34.7	34.7
Approach LOS	C	C	C	D	D	C	C	C	C	D	C	C
Intersection Summary												
HCM Average Control Delay	33.3 HCM Level of Service C											
HCM Volume to Capacity ratio	0.89											
Actuated Cycle Length (s)	110.0 Sum of lost time (s) 8.0											
Intersection Capacity Utilization	135.7% ICU Level of Service H											
Analysis Period (min)	15											
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.	c Critical Lane Group											

HCM Signalized Intersection Capacity Analysis
 20: MacArthur Blvd. & Telegraph Ave.

2030 PM Tower Mit
 1/21/2008

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Ideal Flow (vphpl)	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Total Lost time (s)	0.91	1.00	0.91	1.00	0.99	1.00	0.95	1.00	0.99	1.00	0.95	0.95
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	0.99
Frbp, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.99	1.00	1.00	1.00	0.99
Flt Protected	0.98	0.98	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95	1.00	0.95
Satd. Flow (prot)	4916	4803	4803	1768	3457	1770	3434	1770	3434	1770	3434	1770
Flt Permitted	0.70	0.68	0.68	0.15	1.00	0.12	1.00	0.12	1.00	0.12	1.00	0.12
Satd. Flow (perm)	3477	3299	3299	278	3457	231	3434	231	3434	231	3434	231
Volume (vph)	392	695	111	110	1174	469	280	1213	110	196	601	99
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Adj. Flow (vph)	413	732	117	116	1236	494	295	1277	116	206	633	104
RTOR Reduction (vph)	0	10	0	0	60	0	0	6	0	0	12	0
Lane Group Flow (vph)	0	1252	0	0	1786	0	295	1387	0	206	725	0
Confl. Peds. (#/hr)	26	19	19	26	39	26	39	92	92	92	39	39
Turn Type	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm	Perm
Protected Phases	4	4	4	3	8	8	2	2	2	2	2	2
Permitted Phases	4	4	4	3	8	8	2	2	2	2	2	2
Actuated Green, G (s)	50.0	50.0	50.0	50.0	50.0	50.0	52.0	41.0	39.2	31.7	31.7	31.7
Effective Green, g (s)	50.6	50.6	50.6	50.6	50.6	50.6	52.6	41.6	39.9	32.3	32.3	32.3
Actuated g/C Ratio	0.46	0.46	0.46	0.46	0.46	0.46	0.48	0.38	0.36	0.29	0.29	0.29
Clearance Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	3.5	4.0	3.5	4.0	4.0	4.0
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	3.0	2.0	3.0	2.0	2.0	2.0
Lane Grp Cap (vph)	1599	1518	1518	1518	1518	1518	362	1307	190	1008	1008	1008
v/s Ratio Prot	0.36	0.36	0.36	c0.54	c0.54	0.26	0.13	c0.40	c0.07	0.21	0.21	0.21
v/s Ratio Perm	4.39d1	1.18	1.18	1.18	1.18	1.06	0.81	1.06	1.08	0.72	0.72	0.72
Uniform Delay, d1	25.1	29.7	29.7	29.7	29.7	34.2	22.9	34.2	31.8	34.8	34.8	34.8
Progression Factor	1.19	1.00	1.00	1.00	1.00	1.23	0.90	1.23	1.35	1.28	1.28	1.28
Incremental Delay, d2	1.8	86.7	86.7	86.7	86.7	11.4	41.1	11.4	87.9	4.2	4.2	4.2
Delay (s)	31.6	116.4	116.4	116.4	116.4	39.5	71.7	39.5	130.7	48.7	48.7	48.7
Level of Service	C	F	F	F	F	D	E	D	F	D	D	D
Approach Delay (s)	31.6	116.4	116.4	116.4	116.4	66.1	66.1	66.1	66.6	66.6	66.6	66.6
Approach LOS	C	F	F	F	F	E	E	E	E	E	E	E
Intersection Summary												
HCM Average Control Delay	74.8 HCM Level of Service E											
HCM Volume to Capacity ratio	1.12											
Actuated Cycle Length (s)	110.0 Sum of lost time (s) 10.2											
Intersection Capacity Utilization	121.8% ICU Level of Service H											
Analysis Period (min)	15											
d1 Defacto Left Lane. Recode with 1 through lane as a left lane.	c Critical Lane Group											