WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Existing Traffic with Existing Geometrics

MAIN STREET AND I AVENUE | **HFI, INC** | **AM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	T	R	L	*T*	R	L	*T*	R	*L*	T	R
Movement 1: 10 secs	X			X								X
Movement 2: 7 secs	X	X	X									X
Movement 3: 58 secs		X	X		X	X						
Movement 4: 18 secs							X			X		
Movement 5: 2 secs							X	X	X			
Movement 6: 15 secs								X	X		X	X
# of Lanes (#, S, P)	2	2	1	2	2	S	2	2	1	1	2	1
Unadjusted Volume	155	395	80	25	615	55	200	175	45	90	120	235
Peak Hour Factor (PHF)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)						Shrd						
Min. Time or Ped. Time	10	20	20	10	20	20	10	20	20	10	20	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	1.00	1.00	1.00	1.00	1.00	-	1.00	1.00	1.00	1.00	1.00	1.00

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***				***			***		***		
Pk. Hr. Vol. (vph)	155	395	80	25	615	55	200	175	45	90	120	235
Saturation Flow (vph)	3200	3600	1800	3200	3600	Shrd	3200	3600	1800	1700	3600	1800
X or V/C	0.36	0.19	0.08	0.11	0.37	-	0.38	0.36	0.18	0.36	0.28	0.48
Effective green (sec)	15	63	63	8	56	-	18	15	15	16	13	30
Split Time (sec)	17	65	65	10	58	-	20	17	17	18	15	32
Min. Time or Ped. Time (sec)	10	20	20	10	20	-	10	20	20	10	20	20
Delay - 15 min pk (sec/veh)	45	11	11	49	17	-	43	45	44	47	46	37
Level of Service (LOS)	D	B	B	D	B	-	D	D	D	D	D	D+
Average 'Q' (veh/ln)	2	3	1	1	5	-	3	2	1	2	2	5
Design 'Q'- ft/ln	60	100	40	40	160	-	100	60	40	60	60	160
Do Vehicles Clear?	YES	YES	YES	YES	YES	-	YES	YES	YES	YES	YES	YES

Summary

Whole Intersection

Weighted Avg Delay (sec) = 28
Level of Service - LOS = C

Critical Movements

Weighted Avg Delay (sec) = 28
Level of Service - LOS = C
Intersection Capacity Utilization - ICU = 0.36

Predetermined Cycle Length is 110 sec

Min./Ped. Times May Not Be Satisfied

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: "I"
EAST-WEST STREET: MAIN
JURISDICTION: HESPERIA

DATE: 06-02-09

PEAK HOUR: 08:00AM

NORTH LEG

TOTAL: 294

157	92	45	Total	
30	24	14	1st	123
35	23	6	2nd	129
37	19	5	3rd	117
55	26	20	4th	522
Rt	Thru	Lt		

$V = V_{15} \times 4$

Autos

208 84 68

152 364 76 52 564 24

192 172 44

Total In PCE's

235 120 90

155 395 80 55 615 25

200 175 45

EAST LEG TOTAL: 584

Rt	12	15	7	13	47
Thru	127	113	130	147	517
Lt	3	9	2	6	20
	1st	2nd	3rd	4th	Total

Geometrics

Total	1st	2nd	3rd	4th	
149	28	38	45	38	Lt
310	64	83	69	94	Thru
75	18	19	19	19	Rt

TS

WEST LEG TOTAL: 534

Trucks in PCE's

24 32 20

28 48

4

	Lt	Thru	Rt
1st	59	38	6
2nd	53	30	5
3rd	41	37	6
4th	50	43	11
Total	203	148	28

TOTAL: 379

SOUTH LEG

PEAK HOUR FACTORS

NORTH LEG = 0.73
SOUTH LEG = 0.91
EAST LEG = 0.88
WEST LEG = 0.88

ALL LEGS = 0.86

HOUR TOTAL: 1,791

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : "I" HESPERIA

EAST-WEST STREET : MAIN 06-02-09

BEGINNING TIME : 07:00AM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
22	27	4	0	1	0	0	1	0	1	0	0	56
30	9	7	2	0	2	1	1	0	0	0	0	52
18	23	10	2	1	1	0	0	0	1	0	0	56
41	24	11	2	1	0	0	1	1	0	0	0	81
29	24	14	0	0	0	1	0	0	0	0	0	68
34	23	6	0	0	0	1	0	0	0	0	0	64
34	19	5	1	0	0	0	0	0	2	0	0	61
52	21	17	2(3)	5(8)	2(3)	0	0	1(2)	1(3)	0	0	101
260	170	74	9	8	5	3	3	2	5	0	0	539
						SOUTH LEG						
2	22	35	1	1	0	0	1	0	0	0	0	62
3	36	43	0	0	0	0	0	0	0	0	0	82
4	29	58	0	0	0	0	0	0	0	0	0	91
8	38	45	0	0	0	1	0	0	0	0	0	92
6	37	58	0	0	0	0	1	0	0	0	1	103
5	28	52	0	1	0	0	1	0	0	0	1	88
6	33	39	0	0	1	0	3	1	0	1	0	84
11	43	48	0	0	0	0	0	2(4)	0	0	0	104
45	266	378	1	2	1	1	6	3	0	1	2	706
						EAST LEG						
8	119	3	0	1	0	0	0	0	0	1	0	132
6	133	4	0	3	0	0	0	0	0	2	0	148
9	159	4	0	3	1	0	1	0	0	3	0	180
10	158	10	0	0	0	0	1	0	0	3	0	182
12	121	3	0	2	0	0	2	0	0	2	0	142
15	109	9	0	1	0	0	2	0	0	1	0	137
7	126	2	0	0	0	0	1	0	0	3	0	139
13	141	6	0	(5)3	0	0	(4)2	0	0	1(3)	0	166
80	1066	41	0	13	1	0	9	0	0	16	0	1226
						WEST LEG						
6	44	17	0	1	1	0	0	0	1	2	1	73
8	53	30	1	0	1	0	0	0	0	4	0	97
16	57	18	0	1	1	0	1	2	0	1	5	102
15	60	32	3	0	0	0	0	3	0	1	1	115
18	58	23	0	3	4	0	2	0	0	1	1	110
19	80	34	0	0	3	0	2	0	0	1	1	140
18	67	44	0	0	0	0	1	1	1	1	0	133
19	91	38	0	(2)1	0	0	(2)1	0	0	(3)1	0	151
119	510	236	4	6	10	0	7	6	2	12	9	921

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: "I"

EAST-WEST STREET: MAIN

TIME: 07:00AM-08:00AM DATE: 06-02-09

NORTH LEG

Rt	Thru	Lt	
120	89	36	Total
23	29	4	1st
33	10	9	2nd
21	24	11	3rd
43	26	12	4th

	1st	2nd	3rd	4th	Total
Rt	8	6	9	10	33
Thru	121	138	166	162	587
Lt	3	4	5	10	22

Total	1st	2nd	3rd	4th	
112	19	31	26	36	Lt
225	47	57	60	61	Thru
50	7	9	16	18	Rt

	Lt	Thru	Rt
1st	35	24	3
2nd	43	36	3
3rd	58	29	4
4th	45	38	9
Total	181	127	19

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: "I"

EAST-WEST STREET: MAIN

TIME: 08:00AM-09:00AM DATE: 06-02-09

NORTH LEG

Rt	Thru	Lt	
157	92	45	Total
30	24	14	1st
35	23	6	2nd
37	19	5	3rd
55	26	20	4th

	1st	2nd	3rd	4th	Total
Rt	12	15	7	13	47
Thru	127	113	130	147	517
Lt	3	9	2	6	20

Total	1st	2nd	3rd	4th	
149	28	38	45	38	Lt
310	64	83	69	94	Thru
75	18	19	19	19	Rt

	Lt	Thru	Rt
1st	59	38	6
2nd	53	30	5
3rd	41	37	6
4th	50	43	11
Total	203	148	28

Prepared by NEWPORT TRAFFIC STUDIES

WEBSTER

WEbster Based Signal Timing Evaluation Routine

For Capacity and Level of Service Analysis Using HCM 2000 Control Delay

Existing Traffic with Existing Geometrics

MAIN STREET AND I AVENUE **HFI, INC** **PM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	*L*	T	R	L	*T*	R	*L*	T	R	L	*T*	R
Movement 1: 10 secs	X			X								X
Movement 2: 17 secs	X	X	X									X
Movement 3: 41 secs		X	X		X	X						
Movement 4: 20 secs							X			X		
Movement 5: 2 secs										X	X	X
Movement 6: 20 secs								X	X		X	X
# of Lanes (#, S, P)	2	2	1	2	2	S	2	2	1	1	2	1
Unadjusted Volume	355	835	200	60	600	35	260	150	55	135	320	140
Peak Hour Factor (PHF)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)						Shrd						
Min. Time or Ped. Time	10	20	20	10	20	20	10	20	20	10	20	20
Permissive Veh/Cycle												
Progression Adj. Factor (PAF)	1.00	1.00	1.00	1.00	1.00	-	1.00	1.00	1.00	1.00	1.00	1.00

Parameter Values (using default set 'SANBAG (Existing)')

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)		20
Sat Flow (1 Left lane, vphg)	1700	1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

	***				***		***				***	
Pk. Hr. Vol. (vph)	355	835	200	60	600	35	260	150	55	135	320	140
Saturation Flow (vph)	3200	3600	1800	3200	3600	Shrd	3200	3600	1800	1700	3600	1800
X or V/C	0.49	0.46	0.22	0.26	0.50	-	0.50	0.25	0.19	0.44	0.49	0.18
Effective green (sec)	25	56	56	8	39	-	18	18	18	20	20	47
Split Time (sec)	27	58	58	10	41	-	20	20	20	22	22	49
Min. Time or Ped. Time (sec)	10	20	20	10	20	-	10	20	20	10	20	20
Delay - 15 min pk (sec/veh)	39	18	15	51	29	-	45	41	41	44	43	20
Level of Service (LOS)	D+	B	B	D-	C	-	D	D	D	D	D	C+
Average 'Q' (veh/ln)	4	6	3	1	6	-	3	2	1	3	4	2
Design 'Q'- ft/ln	120	180	100	40	180	-	100	60	40	100	120	60
Do Vehicles Clear?	YES	YES	YES	YES	YES	-	YES	YES	YES	YES	YES	YES

Summary

Whole Intersection

Weighted Avg Delay (sec) = 31
Level of Service - LOS = C-

Critical Movements

Weighted Avg Delay (sec) = 37
Level of Service - LOS = D+
Intersection Capacity Utilization - ICU = 0.49

Predetermined Cycle Length is 110 sec

Min./Ped. Times Satisfied

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: "I"
EAST-WEST STREET: MAIN
JURISDICTION: HESPERIA

DATE: 06-02-09

PEAK HOUR: 04:30PM

NORTH LEG

TOTAL: 576

	Rt	Thru	Lt
Total	190	271	115
1st	59	68	29
2nd	48	72	18
3rd	49	52	35
4th	34	79	33

EAST LEG TOTAL: 622

	1st	2nd	3rd	4th	Total
Rt	10	5	9	8	32
Thru	111	144	136	147	538
Lt	18	7	13	14	52

WEST LEG TOTAL: 1,364

	Total	1st	2nd	3rd	4th
Lt	347	77	88	94	88
Thru	842	218	187	231	206
Rt	175	46	46	34	49

SOUTH LEG

TOTAL: 465

	Lt	Thru	Rt
1st	44	64	14
2nd	74	34	10
3rd	54	43	13
4th	65	37	13
Total	237	178	50

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.95
EAST LEG = 0.92
WEST LEG = 0.95

ALL LEGS = 0.98

HOUR TOTAL: 3,027

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : "I" HESPERIA

EAST-WEST STREET : MAIN 06-02-09

BEGINNING TIME : 04:00PM

AUTOS			LARGE 2 AXLE			3 AXLE			4(+) AXLE			TOTALS
RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	RT	THRU	LT	
						NORTH LEG						
36	80	16	0	2	0	0	0	0	0	1	0	135
42	52	21	0	0	1	0	0	0	0	0	0	116
58	66	29	1	1	0	0	0	0	0	1	0	156
45	71	18	1	0	0	0	1	0	2	0	0	138
42	50	34	1	1	0	4	1	0	2	0	1	136
33	77	33	0	(3)2	0	1(2)	0	0	0	0	0	146
43	60	35	0	0	0	0	0	0	0	0	0	138
38	60	11	0	0	0	0	0	0	0	0	0	109
337	516	197	3	6	1	5	2	0	4	2	1	1074
						SOUTH LEG						
14	37	45	0	0	0	0	0	0	0	0	0	96
6	32	54	0	0	0	0	0	0	0	0	1	93
14	64	44	0	0	0	0	0	0	0	0	0	122
10	34	74	0	0	0	0	0	0	0	0	0	118
13	42	54	0	1	0	0	0	0	0	0	0	110
13	37	65	0	0	0	0	0	0	0	0	0	115
8	42	52	0	0	0	0	0	0	0	0	0	102
10	50	68	0	0	0	0	0	0	0	0	0	128
88	338	456	0	1	0	0	0	0	0	0	1	884
						EAST LEG						
3	93	10	0	0	0	0	1	0	0	0	0	107
13	154	6	0	1	0	0	0	0	0	0	0	174
10	109	18	0	0	0	0	1	0	0	1	0	139
4	138	7	1	3	0	0	1	0	0	2	0	156
8	132	13	1	2	0	0	1	0	0	1	0	158
8	144	14	0	(3)2	0	0	0	0	0	(3)1	0	169
8	96	5	0	0	0	0	0	0	0	0	0	109
3	128	3	0	0	0	0	0	0	0	0	0	134
57	994	76	2	8	0	0	4	0	0	5	0	1146
						WEST LEG						
43	169	77	0	0	0	0	0	1	0	3	0	293
49	181	72	0	1	0	0	0	0	0	2	0	305
46	217	77	0	0	0	0	0	0	0	1	0	341
46	184	88	0	1	0	0	0	0	0	2	0	321
33	228	94	1	0	0	0	2	0	0	1	0	359
49	205	88	0	0	0	0	0	0	0	(3)1	0	343
31	159	48	0	0	0	0	0	0	0	1	0	239
38	189	72	0	0	0	0	0	0	0	0	0	299
335	1532	616	1	2	0	0	2	1	0	11	0	2500

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: "I"

EAST-WEST STREET: MAIN

TIME: 04:00PM-05:00PM DATE: 06-02-09

NORTH LEG

Rt	Thru	Lt	
185	275	85	Total
36	83	16	1st
42	52	22	2nd
59	68	29	3rd
48	72	18	4th

	1st	2nd	3rd	4th	Total
Rt	3	13	10	5	31
Thru	94	155	111	144	504
Lt	10	6	18	7	41

Total	1st	2nd	3rd	4th	
315	78	72	77	88	Lt
761	172	184	218	187	Thru
184	43	49	46	46	Rt

	Lt	Thru	Rt
1st	45	37	14
2nd	55	32	6
3rd	44	64	14
4th	74	34	10
Total	218	167	44

Prepared by NEWPORT TRAFFIC STUDIES