WEBSTER

WEbster Based Signal Timing Evaluation Routine

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

Existing Traffic with Existing Lane Geometrics

MAIN ST AND MAPLE AVE **HALL AND FOREMAN,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: 16 secs	X			X								
Movement 2: 2 secs				X	X	X						
Movement 3: 35 secs		X	X		X	X						
Movement 4: 13 secs							X			X		
Movement 5: 0 secs							X	X	X			
Movement 6: 20 secs								X	X		X	X
# of Lanes (#, S, P)	1	2	S	1	2	S	1	2	S	2	2	1
Unadjusted Volume	255	845	40	50	1085	220	155	530	30	365	370	30
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			Shrd			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

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)	255	845	40	50	1085	220	155	530	30	365	370	30
Saturation Flow (vph)	1700	3600	Shrd	1700	3600	Shrd	1700	3600	Shrd	3200	3600	1800
X or V/C	0.92	0.64	-	0.16	0.89	-	0.71	0.74	-	0.89	0.49	0.08
Effective green (sec)	14	33	-	16	35	-	11	18	-	11	18	18
Split Time (sec)	16	35	-	18	37	-	13	20	-	13	20	20
Min. Time or Ped. Time (sec)	10	20	-	10	20	-	10	20	-	10	20	20
Delay - 15 min pk (sec/veh)	73	24	-	30	32	-	54	38	-	61	32	28
Level of Service (LOS)	E	C+	-	C-	C-	-	D-	D+	-	E	C-	C
Average 'Q' (veh/ln)	6	7	-	1	10	-	3	5	-	4	3	1
Design 'Q'- ft/ln	180	220	-	40	300	-	100	160	-	120	100	40
Do Vehicles Clear?	NO	YES	-	YES	YES	-	YES	YES	-	YES	YES	YES

Summary

Whole Intersection

Weighted Avg Delay (sec) = 37
Level of Service - LOS = D+

Critical Movements

Weighted Avg Delay (sec) = 42
Level of Service - LOS = D
Intersection Capacity Utilization - ICU = 0.86

Required Cycle Length is 86 sec

Min./Ped. Times Satisfied

CITY OF HESPERIA
2008 CMP LEVELS-OF-SERVICE UPDATE

TABLE 1 – CMP INTERSECTION LEVELS-OF-SERVICE

INTERSECTION LOCATION		2005 CMP ANALYSES						2006 CMP ANALYSES						2008 CMP ANALYSES					
		A.M. PEAK			P.M. PEAK			A.M. PEAK			P.M. PEAK			A.M. PEAK			P.M. PEAK		
NORTH-SOUTH	EAST-WEST	LOS	DELAY (SEC.)	V/C RATIO	LOS	DELAY (SEC.)	V/C RATIO	LOS	DELAY (SEC.)	V/C RATIO	LOS	DELAY (SEC.)	V/C RATIO	LOS	DELAY (SEC.)	V/C RATIO	LOS	DELAY (SEC.)	V/C RATIO
MAPLE AVE	MAIN STREET	B	18	0.37	C	25	0.54	WILL ANALYZE IN 2007 CMP UPDATE						D	37	0.86	C	24	0.62

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: MAPLE
EAST-WEST STREET: MAIN
JURISDICTION: HESPERIA

DATE: 05-28-08

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 532

	Rt	Thru	Lt
Total	65	196	271
1st	14	32	56
2nd	5	89	86
3rd	25	45	107
4th	21	30	22

$\vartheta = V_{15} \times 4$

Autos

336 320

176

248 980

752 32

36

152 524 28

Total in PCE's

30 370 365

255 220

1,085

845 50

40

155 530 30

EAST LEG TOTAL: 1,112

	1st	2nd	3rd	4th	Total
Rt	36	51	37	20	144
Thru	208	254	228	238	928
Lt	8	11	12	9	40

	Total	1st	2nd	3rd	4th
Lt	155	40	63	41	11
Thru	753	167	198	219	169
Rt	29	4	9	11	5

WEST LEG TOTAL: 937

Trucks

24 32 42

6 42

90 104

0 18

0 4 0

	Lt	Thru	Rt
1st	46	63	7
2nd	38	132	7
3rd	43	52	11
4th	18	34	10
Total	145	281	35

TOTAL: 461

SOUTH LEG

PEAK HOUR FACTORS

NORTH LEG = 0.74
SOUTH LEG = 0.65
EAST LEG = 0.88
WEST LEG = 0.86

ALL LEGS = 0.81

HOUR TOTAL: 3,042

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : MAPLE
EAST-WEST STREET : MAIN

HESPERIA
05-28-08

BEGINNING TIME : 07:00AM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
17	18	22	2	0	0	0	0	0	0	1	0	60
12	30	56	2	2	0	0	0	0	0	0	0	102
1	84	80	6	4	5	0	1	0	0	0	1	180
21	45	104	3	0	3	0	0	0	1	0	0	177
20	30	19	1	0	3	0	0	0	0	0	0	73
9	23	32	0	0	4	0	0	0	0	0	0	68
12	20	32	0	2	0	0	0	0	1	0	0	67
20	19	34	0	0	0	0	0	0	0	0	0	73
112	269	379	12	8	15	0	1	0	2	1	1	800
						SOUTH LEG						
3	29	26	0	0	0	0	0	0	0	0	0	58
6	58	46	1	5	0	0	0	0	0	0	0	116
7	131	38	0	1	0	0	0	0	0	0	0	177
9	49	40	2	2	2	0	0	0	0	1	1	106
10	33	17	0	1	0	0	0	1	0	0	0	62
10	22	31	0	0	0	0	0	0	0	0	0	63
16	33	18	0	1	0	0	0	0	0	0	0	68
9	20	22	1	0	0	0	0	0	0	0	0	52
70	375	238	4	10	2	0	0	1	0	1	1	702
						EAST LEG						
16	201	10	0	6	3	0	3	0	0	8	0	247
25	193	5	10	6	2	1	1	1	0	8	0	252
44	245	8	10	7	0	7	3	0	0	8	0	316
36	219	9	1	1	1	0	0	0	0	8	2	277
18	232	9	1	1	0	1	0	0	0	5	0	267
21	225	13	0	1	1	0	0	0	0	5	0	266
15	198	15	0	3	1	0	1	0	0	12	0	245
14	198	15	0	1	0	0	0	0	0	10	0	238
189	1711	84	19	19	11	2	6	1	0	64	2	2108
						WEST LEG						
7	144	23	0	6	0	0	2	0	0	7	0	189
3	152	36	1	6	3	0	3	1	0	6	0	211
9	188	62	0	5	1	0	0	0	0	5	0	270
11	211	41	0	1	0	0	0	0	0	7	0	271
5	154	9	0	4	0	0	1	0	0	10	2	185
3	158	15	1	3	0	0	0	0	0	8	1	189
7	212	15	0	7	0	0	0	0	0	7	0	248
3	212	7	0	5	0	0	1	0	0	2	0	230
48	1431	208	2	37	4	0	7	1	0	52	3	1793

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: MAPLE

EAST-WEST STREET: MAIN

TIME: 07:00AM-08:00AM DATE: 05-28-08

NORTH LEG

Rt	Thru	Lt	
63	185	271	Total
19	19	22	1st
14	32	56	2nd
5	89	86	3rd
25	45	107	4th

	1st	2nd	3rd	4th	Total
Rt	16	36	51	37	140
Thru	218	208	254	228	908
Lt	13	8	11	12	44

Total	1st	2nd	3rd	4th	
167	23	40	63	41	Lt
743	159	167	198	219	Thru
31	7	4	9	11	Rt

	Lt	Thru	Rt
1st	26	29	3
2nd	46	63	7
3rd	38	132	7
4th	43	52	11
Total	153	276	28

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: MAPLE

EAST-WEST STREET: MAIN

TIME: 08:00AM-09:00AM DATE: 05-28-08

NORTH LEG

Rt	Thru	Lt	
63	94	124	Total
21	30	22	1st
9	23	36	2nd
13	22	32	3rd
20	19	34	4th

	1st	2nd	3rd	4th	Total
Rt	20	21	15	14	70
Thru	238	231	214	209	892
Lt	9	14	16	15	54

Total	1st	2nd	3rd	4th	
49	11	16	15	7	Lt
784	169	169	226	220	Thru
19	5	4	7	3	Rt

	Lt	Thru	Rt
1st	18	34	10
2nd	31	22	10
3rd	18	34	16
4th	22	20	10
Total	89	110	46

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 Lane Geometrics

MAIN ST AND MAPLE AVE **HALL AND FOREMAN,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								
Movement 2: 2 secs				X	X	X						
Movement 3: 49 secs		X	X		X	X						
Movement 4: 10 secs							X			X		
Movement 5: 0 secs							X	X	X			
Movement 6: 20 secs								X	X		X	X
# of Lanes (#, S, P)	1	2	S	1	2	S	1	2	S	2	2	1
Unadjusted Volume	105	1250	120	75	1330	75	100	140	55	115	200	45
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			Shrd			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

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)	105	1250	120	75	1330	75	100	140	55	115	200	45
Saturation Flow (vph)	1700	3600	Shrd	1700	3600	Shrd	1700	3600	Shrd	3200	3600	1800
X or V/C	0.70	0.74	-	0.40	0.72	-	0.67	0.27	-	0.41	0.28	0.13
Effective green (sec)	8	47	-	10	49	-	8	18	-	8	18	18
Split Time (sec)	10	49	-	12	51	-	10	20	-	10	20	20
Min. Time or Ped. Time (sec)	10	20	-	10	20	-	10	20	-	10	20	20
Delay - 15 min pk (sec/veh)	64	20	-	44	18	-	62	32	-	44	32	31
Level of Service (LOS)	E	B	-	D	B	-	E	C-	-	D	C-	C-
Average 'Q' (veh/ln)	3	8	-	2	8	-	2	2	-	1	2	1
Design 'Q'- ft/ln	100	240	-	60	240	-	60	60	-	40	60	40
Do Vehicles Clear?	YES	YES	-	YES	YES	-	YES	YES	-	YES	YES	YES

Summary

Whole Intersection

Weighted Avg Delay (sec) = 24
Level of Service - LOS = C+

Critical Movements

Weighted Avg Delay (sec) = 25
Level of Service - LOS = C+
Intersection Capacity Utilization - ICU = 0.62

Required Cycle Length is 91 sec

Min./Ped. Times Satisfied

INTERSECTION TURN COUNT

PEAK HOUR

NORTH-SOUTH STREET: MAPLE
EAST-WEST STREET: MAIN
JURISDICTION: HESPERIA

DATE: 05-28-08

PEAK HOUR: 04:45PM

NORTH LEG

TOTAL: 321

	Rt	Thru	Lt	Total
	52	173	96	
1st	11	49	26	887
2nd	17	50	26	851
3rd	14	38	18	837
4th	10	36	26	855

$V = V_{15} \times 4$

Autos

44 192 100 76 1,288 76 104 1,228 120 100 132 52

Total In POE's

45 200 115 105 75 1,250 1,330 120 75 100 140 55

EAST LEG TOTAL: 1,452

	1st	2nd	3rd	4th	Total
Rt	19	20	27	20	86
Thru	326	310	318	305	1259
Lt	19	24	31	33	107

Total	1st	2nd	3rd	4th	
92	26	18	27	21	Lt
1235	309	311	298	317	Thru
96	30	17	21	28	Rt

WEST LEG TOTAL: 1,423

Trucks

0 8 12 0 42 0 0 20 0 0 8 0

	Lt	Thru	Rt
1st	25	34	13
2nd	23	25	10
3rd	23	13	9
4th	26	23	10
Total	97	95	42

SOUTH LEG

TOTAL: 234

PEAK HOUR FACTORS

NORTH LEG = 0.86
SOUTH LEG = 0.81
EAST LEG = 0.97
WEST LEG = 0.97

ALL LEGS = 0.97

HOUR TOTAL: 3,430

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : MAPLE
EAST-WEST STREET : MAIN

HESPERIA
05-28-08

BEGINNING TIME : 04:00PM

AUTOS RT	AUTOS THRU	AUTOS LT	LARGE 2 AXLE RT	LARGE 2 AXLE THRU	LARGE 2 AXLE LT	3 AXLE RT	3 AXLE THRU	3 AXLE LT	4(+) AXLE RT	4(+) AXLE THRU	4(+) AXLE LT	TOTALS
						NORTH LEG						
8	48	36	1	0	0	0	0	0	0	0	0	93
17	45	19	0	0	0	0	0	0	0	0	0	81
17	30	28	0	0	0	0	0	0	0	0	0	75
11	48	25	0	0	0	0	21	0	0	0	31	86
17	50	25	0	0	0	0	0	1	0	0	0	93
13	38	18	1	0	0	0	0	0	0	0	0	70
10	36	26	0	0	0	0	0	0	0	0	0	72
12	34	22	0	0	0	0	0	0	0	0	0	68
105	329	199	2	0	0	0	1	1	0	0	1	638
						SOUTH LEG						
1	19	30	0	0	0	0	0	0	0	0	0	50
7	17	17	0	0	0	0	0	0	0	0	0	41
5	31	17	0	0	0	0	0	0	0	0	0	53
13	33	25	0	0	0	0	21	0	0	0	0	72
10	25	22	0	0	0	0	0	0	0	0	1	58
9	13	23	0	0	0	0	0	0	0	0	0	45
10	23	26	0	0	0	0	0	0	0	0	0	59
7	27	16	0	0	0	0	0	0	0	0	0	50
62	188	176	0	0	0	0	1	0	0	0	1	428
						EAST LEG						
24	336	27	0	1	0	0	1	0	0	2	0	391
20	311	25	0	3	0	0	0	0	0	0	0	359
19	277	30	0	1	0	0	0	0	0	5	0	332
19	322	19	0	151	0	0	0	0	0	93	0	364
20	309	24	0	0	0	0	0	0	0	1	0	354
27	313	31	0	1	0	0	0	0	0	4	0	376
20	303	33	0	0	0	0	0	0	0	2	0	358
21	239	37	0	2	0	0	0	0	0	5	0	304
170	2410	226	0	9	0	0	1	0	0	22	0	2838
						WEST LEG						
9	294	23	0	1	0	0	1	0	0	5	0	333
18	339	23	0	5	0	0	0	0	0	0	0	385
11	279	22	0	0	0	0	1	0	1	9	0	323
30	307	26	0	0	0	0	21	0	0	31	0	365
17	308	18	0	0	0	0	1	0	0	2	0	346
21	296	27	0	0	0	0	0	0	0	2	0	346
28	315	21	0	0	0	0	0	0	0	2	0	366
20	273	45	0	0	0	0	0	0	0	3	0	341
154	2411	205	0	6	0	0	4	0	1	24	0	2805

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: MAPLE

EAST-WEST STREET: MAIN

TIME: 04:00PM-05:00PM DATE: 05-28-08

NORTH LEG

Rt	Thru	Lt	
54	172	109	Total
9	48	36	1st
17	45	19	2nd
17	30	28	3rd
11	49	26	4th

	1st	2nd	3rd	4th	Total
Rt	24	20	19	19	82
Thru	340	314	283	326	1263
Lt	27	25	30	19	101

Total	1st	2nd	3rd	4th	
94	23	23	22	26	Lt
1243	301	344	289	309	Thru
69	9	18	12	30	Rt

	Lt	Thru	Rt
1st	30	19	1
2nd	17	17	7
3rd	17	31	5
4th	25	34	13
Total	89	101	26

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: MAPLE

EAST-WEST STREET: MAIN

TIME: 05:00PM-06:00PM DATE: 05-28-08

NORTH LEG

53	158	92	Total
17	50	26	1st
14	38	18	2nd
10	36	26	3rd
12	34	22	4th
Rt	Thru	Lt	

Rt	20	27	20	21	88
Thru	310	318	305	246	1179
Lt	24	31	33	37	125
	1st	2nd	3rd	4th	Total

Total	1st	2nd	3rd	4th	
111	18	27	21	45	Lt
1202	311	298	317	276	Thru
86	17	21	28	20	Rt

	Lt	Thru	Rt
1st	23	25	10
2nd	23	13	9
3rd	26	23	10
4th	16	27	7
Total	88	88	36

Prepared by NEWPORT TRAFFIC STUDIES