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 C 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: 22 secs	X	X	X									X
Movement 2: 48 secs		X	X		X	X						
Movement 3: 12 secs				X	X	X						
Movement 4: 33 secs							X	X	X			
Movement 5: 5 secs										X	X	X
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	1	1	2	S	1	1	S	1	1	1
Unadjusted Volume	150	915	360	60	920	15	230	230	20	10	25	240
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			
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

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)	150	915	360	60	920	15	230	230	20	10	25	240
Saturation Flow (vph)	1700	3600	1800	1700	3600	Shrd	1700	1800	Shrd	1700	1800	1800
X or V/C	0.53	0.45	0.35	0.42	0.54	-	0.52	0.54	-	0.24	0.56	0.64
Effective green (sec)	20	68	68	10	58	-	31	31	-	3	3	25
Split Time (sec)	22	70	70	12	60	-	33	33	-	5	5	27
Min. Time or Ped. Time (sec)	10	20	20	10	20	-	10	20	-	10	20	20
Delay - 15 min pk (sec/veh)	53	16	15	61	23	-	43	43	-	70	99	52
Level of Service (LOS)	D-	B	B	E	C+	-	D	D	-	E	F	D-
Average 'Q' (veh/ln)	4	7	5	2	8	-	6	6	-	1	1	6
Design 'Q'- ft/ln	120	220	160	60	240	-	180	180	-	40	40	180
Do Vehicles Clear?	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) = 31
Level of Service - LOS = C-
Intersection Capacity Utilization - ICU = 0.54

Predetermined Cycle Length is 120 sec

Min./Ped. Times May Not Be Satisfied

INTERSECTION TURN COUNT

PEAK HOUR

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

DATE: 06-04-09

PEAK HOUR: 07:15AM

NORTH LEG

TOTAL: 209

Rt	Thru	Lt		
171	25	13	Total	
39	12	1	1st	634
46	2	1	2nd	631
51	4	2	3rd	743
35	7	9	4th	637

$U = V_{15} \times 4$

Autos

184 8 8

128 12

840 828

348 36

384 28 20

Total in PCE's

240 25 10

150 15

915 920

360 60

420 40 20

EAST LEG TOTAL: 955

	1st	2nd	3rd	4th	Total
Rt	5	0	3	1	9
Thru	230	228	217	215	890
Lt	12	18	11	15	56

Total	1st	2nd	3rd	4th	
118	30	21	35	32	Lt
711	165	165	219	162	Thru
236	38	56	88	54	Rt

WEST LEG TOTAL: 1,065

Geometrics

TS

Trucks in PCE's

56 16 0

20 0

72 92

8 20

36 8

	Lt	Thru	Rt
1st	87	6	9
2nd	80	4	10
3rd	100	8	5
4th	98	4	5
Total	365	22	29

TOTAL: 416

SOUTH LEG

PEAK HOUR FACTORS

NORTH LEG = 0.92
SOUTH LEG = 0.92
EAST LEG = 0.97
WEST LEG = 0.78

ALL LEGS = 0.89

HOUR TOTAL: 2,645

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : "C" HESPERIA

EAST-WEST STREET : MAIN 06-04-09

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						
24	2	5	1	0	0	2	0	0	2	0	0	36
34	12	1	3	0	0	0	0	0	2	0	0	52
41	2	1	2	0	0	0	0	0	3	0	0	49
46	2	2	1(2)	1(2)	0	0	(2)1	0	4(12)	0	0	57
33	7	7	1	0	2	0	0	0	1	0	0	51
39	5	6	3	0	0	2	0	1	0	0	0	56
50	2	4	1	0	0	1	1	1	3	0	1	64
46	7	3	2	0	0	1	0	0	3	0	2	64
313	39	29	14	1	2	6	2	2	18	0	3	429
						SOUTH LEG						
4	4	49	0	0	0	1	0	0	0	0	0	58
9	6	87	0	0	0	0	0	0	0	0	0	102
9	4	79	0	0	1	1	0	0	0	0	0	94
5	7	96	0	(2)1	(2)1	0	0	(4)2	0	0	(3)1	113
4	4	97	1	0	1	0	0	0	0	0	0	107
4	2	52	1	0	0	1	0	1	0	0	1	62
8	5	88	0	0	0	1	0	0	0	0	0	102
8	6	59	1	0	1	1	0	2	0	0	0	78
51	38	607	3	1	4	5	0	5	0	0	2	716
						EAST LEG						
1	167	2	2	4	1	0	2	0	0	6	0	185
3	220	11	1	2	0	1	4	0	0	4	1	247
0	216	17	0	4	0	0	3	0	0	5	1	246
3	207	9	0	(6)4	(2)1	0	(2)1	0	0	(15)5	(3)1	231
1	204	13	0	4	0	0	4	2	0	3	0	231
2	205	9	0	10	0	0	3	2	1	5	0	237
3	189	11	0	2	0	0	2	0	0	5	0	212
2	261	11	1	3	1	0	3	0	0	4	1	287
15	1669	83	4	33	3	1	22	4	1	37	4	1876
						WEST LEG						
29	105	12	0	1	1	0	3	0	0	4	1	156
38	153	29	0	3	1	0	6	0	0	3	0	233
55	157	17	1	2	1	0	3	1	0	3	2	242
87	210	32	(2)1	(8)5	(3)2	0	(4)2	(2)1	0	(6)2	0	342
54	149	28	0	4	0	0	5	3	0	4	1	248
31	167	24	0	3	0	0	3	2	0	3	2	235
33	155	18	1	2	0	0	0	0	1	0	2	212
45	241	34	1	2	0	1	1	0	2	5	0	332
372	1337	194	4	22	5	1	23	7	3	24	8	2000

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: "C"

EAST-WEST STREET: MAIN

TIME: 07:00AM-08:00AM DATE: 06-04-09

NORTH LEG

Rt	Thru	Lt	
165	20	9	Total
29	2	5	1st
39	12	1	2nd
46	2	1	3rd
51	4	2	4th

	1st	2nd	3rd	4th	Total
Rt	3	5	0	3	11
Thru	179	230	228	217	854
Lt	3	12	18	11	44

Total	1st	2nd	3rd	4th	
100	14	30	21	35	Lt
662	113	165	165	219	Thru
211	29	38	56	88	Rt

	Lt	Thru	Rt
1st	49	4	5
2nd	87	6	9
3rd	80	4	10
4th	100	8	5
Total	316	22	29

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: "C"

EAST-WEST STREET: MAIN

TIME: 08:00AM-09:00AM DATE: 06-04-09

NORTH LEG

	Rt	Thru	Lt
Total	186	22	27
1st	35	7	9
2nd	44	5	7
3rd	55	3	6
4th	52	7	5

	1st	2nd	3rd	4th	Total
Rt	1	3	3	3	10
Thru	215	223	198	271	907
Lt	15	11	11	13	50

	Total	1st	2nd	3rd	4th
Lt	114	32	28	20	34
Thru	744	162	176	157	249
Rt	169	54	31	35	49

	Lt	Thru	Rt
1st	98	4	5
2nd	54	2	6
3rd	88	5	9
4th	62	6	10
Total	302	17	30

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 C 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: 17 secs	X	X	X									X
Movement 2: 51 secs		X	X		X	X						
Movement 3: 15 secs				X	X	X						
Movement 4: 27 secs							X	X	X			
Movement 5: 10 secs										X	X	X
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	1	1	2	S	1	1	S	1	1	1
Unadjusted Volume	140	1435	310	130	1265	50	215	215	60	90	40	355
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)		3600			3600	Shrd		1800	Shrd		1800	
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

Parameter Values (using default set 'Webster')

	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)		1800
Sat Flow (2 Left lanes, vphg)		3500
Sat Flow (1 Thru lane, vphg)		1900
Sat Flow (1 Right lane, vphg)		1800
Vehicle Length (feet)		20

Output

		***		***				***		***		
Pk. Hr. Vol. (vph)	140	1435	310	130	1265	50	215	215	60	90	40	355
Saturation Flow (vph)	1800	3600	1800	1800	3600	Shrd	1800	1800	Shrd	1800	1800	1800
X or V/C	0.62	0.72	0.31	0.67	0.68	-	0.57	0.73	-	0.75	0.33	0.95
Effective green (sec)	15	66	66	13	64	-	25	25	-	8	8	25
Split Time (sec)	17	68	68	15	66	-	27	27	-	10	10	27
Min. Time or Ped. Time (sec)	10	20	20	10	20	-	10	20	-	10	20	20
Delay - 15 min pk (sec/veh)	62	23	16	68	23	-	49	56	-	89	61	82
Level of Service (LOS)	E	C+	B	E	C+	-	D	E+	-	F	E	F
Average 'Q' (veh/ln)	4	11	5	4	10	-	6	7	-	3	1	10
Design 'Q'- ft/ln	120	340	160	120	300	-	180	220	-	100	40	300
Do Vehicles Clear?	YES	YES	YES	YES	YES	-	YES	YES	-	YES	YES	NO

Summary

Whole Intersection

Weighted Avg Delay (sec) = 35
Level of Service - LOS = C-

Critical Movements

Weighted Avg Delay (sec) = 34
Level of Service - LOS = C-
Intersection Capacity Utilization - ICU = 0.72

Predetermined Cycle Length is 120 sec

Min./Ped. Times May Not Be Satisfied

INTERSECTION TURN COUNT

PEAK HOUR

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

DATE: 06-04-09

PEAK HOUR: 04:45PM

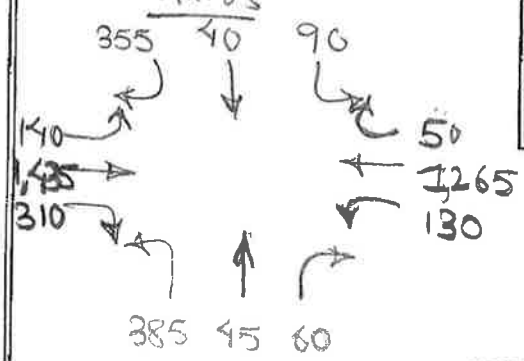
NORTH LEG

TOTAL: 421

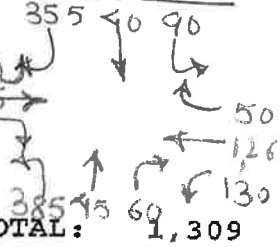
Rt	Thru	Lt		
311	47	63	Total	
84	13	11	1st	1,047
75	13	11	2nd	1,069
64	11	19	3rd	1,047
88	10	22	4th	1,070

$Q = V_{15} \times 4$

Autos



Total in PCEs



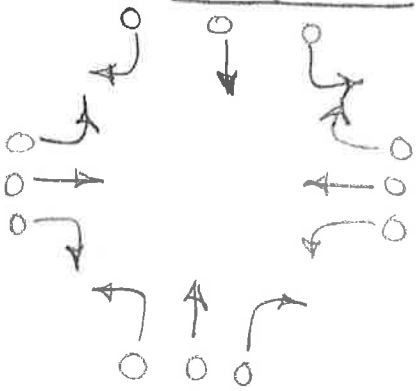
EAST LEG TOTAL: 1,309

	1st	2nd	3rd	4th	Total
Rt	9	4	12	12	37
Thru	289	304	284	316	1193
Lt	14	15	18	32	79

WEST LEG TOTAL: 2,022

Total	1st	2nd	3rd	4th	
156	54	38	30	34	Lt
1479	356	379	386	358	Thru
387	88	110	112	77	Rt

Trucks in PCEs



SOUTH LEG

	Lt	Thru	Rt
1st	108	11	10
2nd	89	10	21
3rd	90	8	13
4th	96	11	14
Total	383	40	58

TOTAL: 481

PEAK HOUR FACTORS

NORTH LEG = 0.88
SOUTH LEG = 0.93
EAST LEG = 0.91
WEST LEG = 0.96

ALL LEGS = 0.99

HOUR TOTAL: 4,233

Prepared by NEWPORT TRAFFIC STUDIES

SANBAG CLASSIFICATION SUMMARY

NORTH-SOUTH STREET : "C" HESPERIA

EAST-WEST STREET : MAIN 06-04-09

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						
79	16	22	0	0	0	0	0	0	0	0	0	117
86	14	20	0	0	1	0	0	0	0	0	0	121
89	8	20	0	0	0	0	0	0	0	0	0	117
84	13	11	0	0	0	0	0	0	0	0	0	108
75	13	11	0	0	0	0	0	0	0	0	0	99
64	11	19	0	0	0	0	0	0	0	0	0	94
88	10	22	0	0	0	0	0	0	0	0	0	120
55	11	9	0	0	0	0	0	0	0	0	0	75
620	96	134	0	0	1	0	0	0	0	0	0	851
						SOUTH LEG						
10	11	121	0	0	0	0	0	0	0	0	0	142
10	8	112	0	0	0	0	0	1	0	0	1	132
9	14	112	0	0	0	0	0	0	0	0	0	135
10	11	108	0	0	0	0	0	0	0	0	0	129
21	10	89	0	0	0	0	0	0	0	0	0	120
13	8	90	0	0	0	0	0	0	0	0	0	111
14	11	96	0	0	0	0	0	0	0	0	0	121
13	6	75	0	0	0	0	0	0	0	0	0	94
100	79	803	0	0	0	0	0	1	0	0	1	984
						EAST LEG						
6	289	12	0	0	0	0	0	0	0	0	0	307
4	299	13	0	5	0	0	1	0	0	6	0	328
8	305	16	0	0	0	0	0	0	0	1	0	330
9	289	14	0	0	0	0	0	0	0	0	0	312
4	304	15	0	0	0	0	0	0	0	0	0	323
12	284	17	0	0	0	0	0	1	0	0	0	314
12	316	32	0	0	0	0	0	0	0	0	0	360
2	264	21	0	0	0	0	0	0	0	0	0	287
57	2350	140	0	5	0	0	1	1	0	7	0	2561
						WEST LEG						
84	331	54	0	0	0	0	0	0	0	0	1	470
79	321	51	1	1	0	0	0	0	0	5	2	460
94	322	52	0	0	0	0	0	0	0	0	1	469
88	356	54	0	0	0	0	0	0	0	0	0	498
110	379	38	0	0	0	0	0	0	0	0	0	527
112	386	30	0	0	0	0	0	0	0	0	0	528
77	358	34	0	0	0	0	0	0	0	0	0	469
115	327	48	0	0	0	0	0	0	0	0	0	490
759	2780	361	1	1	0	0	0	0	0	5	4	3911

Prepared by Newport Traffic Studies

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: "C"

EAST-WEST STREET: MAIN

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

NORTH LEG

Rt	Thru	Lt	
338	51	74	Total
79	16	22	1st
86	14	21	2nd
89	8	20	3rd
84	13	11	4th

	1st	2nd	3rd	4th	Total
Rt	6	4	8	9	27
Thru	289	311	306	289	1195
Lt	12	13	16	14	55

Total	1st	2nd	3rd	4th	
215	55	53	53	54	Lt
1336	331	327	322	356	Thru
346	84	80	94	88	Rt

	Lt	Thru	Rt
1st	121	11	10
2nd	114	8	10
3rd	112	14	9
4th	108	11	10
Total	455	44	39

Prepared by NEWPORT TRAFFIC STUDIES

INTERSECTION TURNING COUNT

NORTH-SOUTH STREET: "C"

EAST-WEST STREET: MAIN

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

NORTH LEG

Rt	Thru	Lt	
282	45	61	Total
75	13	11	1st
64	11	19	2nd
88	10	22	3rd
55	11	9	4th

	1st	2nd	3rd	4th	Total
Rt	4	12	12	2	30
Thru	304	284	316	264	1168
Lt	15	18	32	21	86

Total	1st	2nd	3rd	4th	
150	38	30	34	48	Lt
1450	379	386	358	327	Thru
414	110	112	77	115	Rt

	Lt	Thru	Rt
1st	89	10	21
2nd	90	8	13
3rd	96	11	14
4th	75	6	13
Total	350	35	61

Prepared by NEWPORT TRAFFIC STUDIES