Version 2.0.9 RECEIVED

JUN 15 2010

SAN BERNARDINO ASSOCIATED GOVTS

06-14-2010

WEBSTER

WEbster Based Signal Timing Evaluation Routine

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

CMP 2010 Update

Grand Avenue at Chino Hills Parkway | **City of Chino Hills** | **AM Peak Hour**

Input

	Eastbound			Westbound			Northbound			Southbound		
Movement Times	L	T	R	*L*	*T*	R	L	T	R	*L*	*T*	R
Movement 1: 11 secs	X			X								
Movement 2: 16 secs		X	X		X	X						
Movement 3: 10 secs							X			X		
Movement 4: 16 secs								X	X		X	X
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	S	2	2	S	1	2	1	1	2	S
Unadjusted Volume	84	148	49	319	455	115	93	253	54	165	345	132
Peak Hour Factor (PHF)	0.88	0.88	0.88	0.91	0.91	0.91	0.87	0.87	0.87	0.96	0.96	0.96
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)			Shrd			Shrd						Shrd
Min. Time or Ped. Time	10	16	16	10	16	16	10	16	16	10	16	16
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

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)	16	20
Sat Flow (1 Left lane, vphg)		1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)	1700	1800
Vehicle Length (feet)		20

Output

				***	***					***	***	
Pk. Hr. Vol. (vph)	95	168	56	351	500	126	107	291	62	172	359	138
Saturation Flow (vph)	1800	3600	Shrd	3200	3600	Shrd	1800	3600	1700	1800	3600	Shrd
X or V/C	0.31	0.24	-	0.65	0.66	-	0.39	0.31	0.14	0.63	0.52	-
Effective green (sec)	9	14	-	9	14	-	8	14	14	8	14	-
Split Time (sec)	11	16	-	11	16	-	10	16	16	10	16	-
Min. Time or Ped. Time (sec)	10	16	-	10	16	-	10	16	16	10	16	-
Delay - 15 min pk (sec/veh)	22	16	-	26	21	-	25	16	16	32	19	-
Level of Service (LOS)	C+	B	-	C	C+	-	C+	B	B	C-	B	-
Average 'Q' (veh/ln)	1	1	-	2	3	-	1	2	1	2	3	-
Design 'Q'- ft/ln	40	40	-	60	100	-	40	60	40	60	100	-
Do Vehicles Clear?	YES	YES	-	YES	YES	-	YES	YES	YES	YES	YES	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 21
Level of Service - LOS = C+

Critical Movements

Weighted Avg Delay (sec) = 23
Level of Service - LOS = C+
Intersection Capacity Utilization - ICU = 0.61

Required Cycle Length is 53 sec

Min./Ped. Times Satisfied

WEBSTER

WEbster Based Signal Timing Evaluation Routine

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

CMP 2010 Update

Grand Avenue at Chino Hills Parkway **City of Chino Hills** **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: 16 secs		X	X		X	X						
Movement 3: 10 secs							X			X		
Movement 4: 18 secs								X	X		X	X
Movement 5: 0 secs												
Movement 6: 0 secs												
# of Lanes (#, S, P)	1	2	S	2	2	S	1	2	1	1	2	S
Unadjusted Volume	125	508	60	169	263	66	111	725	251	151	371	86
Peak Hour Factor (PHF)	0.96	0.96	0.96	0.95	0.95	0.95	0.96	0.96	0.96	0.96	0.96	0.96
Growth Factor (%)												
Project Trip Volume (vph)												
Sat. Flow Override (vph)			Shrd			Shrd						Shrd
Min. Time or Ped. Time	10	16	16	10	16	16	10	16	16	10	16	16
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

	Other	Default
Duration of Peak Period (min)		15
Lost Time (sec)		2
Min. Time (Left Turns, sec)		10
Min/Ped Time (Thru Lanes, sec)	16	20
Sat Flow (1 Left lane, vphg)		1800
Sat Flow (2 Left lanes, vphg)	3200	3500
Sat Flow (1 Thru lane, vphg)	1800	1900
Sat Flow (1 Right lane, vphg)	1700	1800
Vehicle Length (feet)		20

Output

	***	***						***		***		
Pk. Hr. Vol. (vph)	130	529	62	178	277	69	116	755	261	157	386	90
Saturation Flow (vph)	1800	3600	Shrd	3200	3600	Shrd	1800	3600	1700	1800	3600	Shrd
X or V/C	0.49	0.63	-	0.38	0.37	-	0.44	0.71	0.52	0.59	0.45	-
Effective green (sec)	8	14	-	8	14	-	8	16	16	8	16	-
Split Time (sec)	10	16	-	10	16	-	10	18	18	10	18	-
Min. Time or Ped. Time (sec)	10	16	-	10	16	-	10	16	16	10	16	-
Delay - 15 min pk (sec/veh)	27	21	-	23	18	-	26	21	20	31	17	-
Level of Service (LOS)	C	C+	-	C+	B	-	C	C+	B	C-	B	-
Average 'Q' (veh/ln)	2	3	-	1	2	-	2	4	3	2	3	-
Design 'Q'- ft/ln	60	100	-	40	60	-	60	120	100	60	100	-
Do Vehicles Clear?	YES	YES	-	YES	YES	-	YES	YES	YES	YES	YES	-

Summary

Whole Intersection

Weighted Avg Delay (sec) = 21
Level of Service - LOS = C+

Critical Movements

Weighted Avg Delay (sec) = 22
Level of Service - LOS = C+
Intersection Capacity Utilization - ICU = 0.63

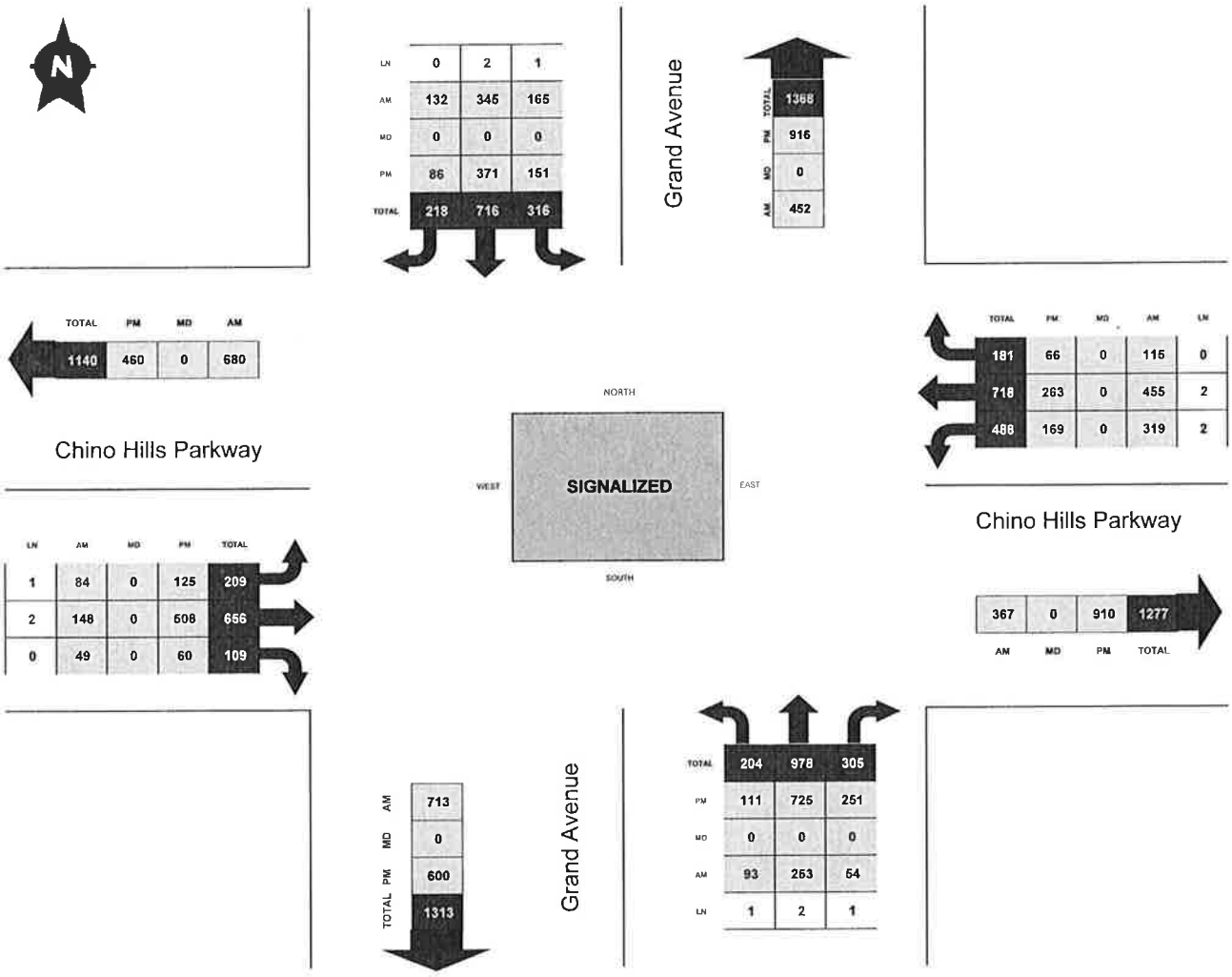
Required Cycle Length is 54 sec

Min./Ped. Times Satisfied

PEAK HOUR ITM SUMMARY

#001 Grand Avenue & Chino Hills Parkway

LOCATION:	001	QTD PROJ#:	100148	AM PEAK:	715 AM
NORTH / SOUTH:	Grand Avenue	DATE:	Wednesday, June 09, 2010	MD PEAK:	
EAST / WEST:	Chino Hills Parkway	VICINITY:	Chino Hills, CA	PM PEAK:	500 PM



AM COUNT	7:00 AM	TO	9:00 AM	MD COUNT	-	TO	-	PM COUNT	4:00 PM TO 6:00 PM

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VEHICLE TURNING MOVEMENT COUNT

#001 Grand Avenue & Chino Hills Parkway - AM PEAK

LOCATION#:	001	QTD PROJ#:	100148
NORTH / SOUTH:	Grand Avenue	DATE:	Wednesday, June 09, 2010
EAST / WEST:	Chino Hills Parkway	VICINITY:	Chino Hills, CA

DIRECTION	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	1	2	1	1	2	0	1	2	0	2	2	0	
6:00 AM													
6:15 AM													
6:30 AM													
6:45 AM													
7:00 AM	15	44	12	29	87	22	22	27	16	84	106	20	484
7:15 AM	16	54	14	38	92	30	16	31	14	77	112	26	520
7:30 AM	23	61	13	43	96	24	19	39	12	86	121	36	573
7:45 AM	29	68	17	45	85	37	26	32	13	72	115	28	567
8:00 AM	25	70	10	39	72	41	23	46	10	84	107	25	552
8:15 AM	24	58	14	31	87	33	18	36	11	78	103	23	516
8:30 AM	31	61	10	29	83	26	16	40	15	73	107	19	510
8:45 AM	26	57	11	28	85	24	18	47	18	69	112	15	510
9:00 AM													
9:15 AM													
9:30 AM													
9:45 AM													
10:00 AM													
10:15 AM													
10:30 AM													
VOLUME STATS	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	189	473	101	282	687	237	158	298	109	623	883	192	4232
P.H.V: (1)	93	253	54	165	345	132	84	148	49	319	455	115	2212
P.H.F: (2)		0.877			0.961			0.889			0.915		0.965

(1) Peak Hour Volume (Peak Hour Begins At 715 AM)
(2) Peak Hour Factor (directional aggregate)

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VEHICLE TURNING MOVEMENT COUNT

#001 Grand Avenue & Chino Hills Parkway - PM PEAK

LOCATION#:	001	QTD PROJ#:	100148
NORTH / SOUTH:	Grand Avenue	DATE:	Wednesday, June 09, 2010
EAST / WEST:	Chino Hills Parkway	VICINITY:	Chino Hills, CA

DIRECTION	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	TOTALS
LANES:	1	2	1	1	2	0	1	2	0	2	2	0	
3:00 PM													
3:15 PM													
3:30 PM													
3:45 PM													
4:00 PM	32	167	49	33	71	17	30	99	13	36	63	13	623
4:15 PM	31	171	56	30	79	15	33	105	11	41	67	16	655
4:30 PM	28	156	52	36	80	19	40	109	12	37	76	18	663
4:45 PM	26	165	51	29	75	25	35	118	16	47	70	12	669
5:00 PM	33	174	59	35	88	21	31	123	14	39	61	15	693
5:15 PM	25	183	66	42	91	25	34	125	16	36	68	20	731
5:30 PM	26	189	67	35	98	23	27	132	12	46	71	14	740
5:45 PM	27	179	59	39	94	17	33	128	18	48	63	17	722
6:00 PM													
6:15 PM													
6:30 PM													
6:45 PM													
VOLUME SOUTH	NL	NT	NR	SL	ST	SR	EL	ET	ER	WL	WT	WR	
TOTAL:	228	1384	459	279	676	162	263	939	112	330	539	125	5496
P.H.V: 1	111	725	251	151	371	86	125	508	60	169	263	66	2886
P.H.F: 2		0.964			0.962			0.968			0.950		0.975

(1) Peak Hour Volume (Peak Hour Begins At 500 PM)
(2) Peak Hour Factor (directional aggregate)

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VEHICLE CLASSIFICATIONS

LOCATION:	Chino Hills Parkway and Grand Avenue	PROJECT #	100145
DIRECTION:	EASTBOUND	LOCATION #	001
VICINITY:	Chino Hills, CA	START DATE:	Wednesday, May 26, 2010

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
0:00	0	42	4	0	1	0	0	0	0	0	0	0	0	47
1:00	0	22	7	0	0	0	0	0	0	0	0	0	0	29
2:00	1	22	3	0	1	0	0	0	0	0	0	0	0	27
3:00	0	14	1	0	1	0	0	0	1	0	0	0	0	17
4:00	0	24	4	0	3	1	0	0	0	0	0	0	0	32
5:00	0	92	14	0	7	0	0	1	0	0	0	0	0	114
6:00	0	238	53	0	21	1	0	2	1	0	0	0	0	316
7:00	1	286	76	0	17	1	1	4	0	0	1	0	0	387
8:00	1	178	52	0	10	1	0	4	1	0	0	0	0	247
9:00	2	170	50	0	11	0	0	5	0	0	0	0	0	238
10:00	1	170	67	0	13	0	0	1	0	0	0	0	0	252
11:00	2	208	75	0	19	1	0	4	0	0	0	0	0	309
12:00	1	205	76	0	10	1	0	4	0	0	0	0	0	297
13:00	0	242	71	0	10	1	0	4	1	0	0	0	0	329
14:00	2	345	98	1	25	3	0	4	0	0	0	0	0	478
15:00	2	365	112	3	32	2	0	6	1	0	0	0	0	523
16:00	7	428	97	2	20	9	0	11	1	0	0	0	0	575
17:00	5	491	101	7	25	8	2	11	0	0	1	0	0	651
18:00	3	397	70	1	26	8	0	4	0	0	0	0	0	509
19:00	0	308	70	0	13	0	0	1	1	0	0	0	0	393
20:00	0	261	48	1	8	4	0	0	0	0	0	0	0	322
21:00	2	188	41	0	10	4	0	2	0	0	0	0	0	247
22:00	0	114	24	0	8	0	0	0	0	0	0	0	0	148
23:00	1	67	9	0	7	1	0	0	0	0	0	0	0	85
TOTAL	31	4877	1223	15	298	46	3	68	7	0	2	0	0	6570
% of Total:	0%	74%	19%	0%	5%	1%	0%	1%	0%	0%	0%	0%	0%	

7 - 9 AM Peak Total	12 - 2 PM Peak Total	4 - 6 PM Peak Total
634	626	1226

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VEHICLE CLASSIFICATIONS

LOCATION:	Chino Hills Parkway and Grand Avenue	PROJECT #	100145
DIRECTION:	WESTBOUND	LOCATION #	001
VICINITY:	Chino Hills, CA	START DATE:	Wednesday, May 26, 2010

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
0:00	0	37	3	0	3	0	0	0	0	0	0	0	0	43
1:00	0	24	8	0	2	0	0	0	0	0	0	0	0	34
2:00	0	17	1	0	0	0	0	0	0	0	0	0	0	18
3:00	0	19	6	0	1	0	0	0	0	0	0	0	0	26
4:00	0	52	19	0	11	0	0	0	0	0	0	0	0	82
5:00	0	208	68	0	30	2	0	3	0	0	0	0	0	311
6:00	4	510	115	4	25	6	0	14	1	0	0	0	0	679
7:00	12	760	153	11	32	22	1	22	0	0	0	0	0	1013
8:00	10	545	128	6	34	8	0	19	4	0	2	0	0	756
9:00	7	351	86	1	14	2	0	7	0	0	0	0	0	468
10:00	4	297	83	1	19	0	0	9	0	0	0	0	0	413
11:00	1	270	99	0	24	2	0	0	0	0	0	0	0	396
12:00	2	267	64	0	23	4	0	6	0	0	0	0	0	366
13:00	2	297	80	3	26	2	0	2	0	0	0	0	0	412
14:00	1	324	73	3	23	2	0	10	0	0	0	0	0	436
15:00	2	314	99	2	34	4	0	9	1	0	0	0	0	465
16:00	4	318	98	0	21	4	0	4	1	0	0	0	0	450
17:00	8	347	77	1	23	3	0	4	1	0	0	0	0	464
18:00	9	337	83	1	22	7	0	6	0	0	0	0	0	465
19:00	0	244	64	0	22	2	0	5	0	0	0	0	0	337
20:00	1	195	49	0	15	0	0	3	0	0	0	0	0	263
21:00	2	163	27	1	11	1	0	0	0	0	0	0	0	205
22:00	0	106	18	0	7	0	0	0	0	0	0	0	0	131
23:00	1	48	8	0	4	0	0	0	0	0	0	0	0	61
TOTAL	70	6050	1509	34	426	71	1	123	8	0	2	0	0	8294
% of Total:	1%	73%	18%	0%	5%	1%	0%	1%	0%	0%	0%	0%	0%	

7 - 9 AM Peak Total	12 - 2 PM Peak Total	4 - 6 PM Peak Total
1769	778	914

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VEHICLE CLASSIFICATIONS

LOCATION:	Chino Hills Parkway and Grand Avenue	PROJECT #	100145
DIRECTION:	NORTHBOUND	LOCATION #	001
VICINITY:	Chino Hills, CA	START DATE:	Wednesday, May 26, 2010

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
0:00	1	40	2	0	0	0	0	0	0	0	0	0	0	43
1:00	2	26	0	0	1	0	0	0	0	0	0	0	0	29
2:00	0	15	1	0	0	0	0	0	0	0	0	0	0	16
3:00	0	16	0	0	0	0	0	0	0	0	0	0	0	16
4:00	0	19	1	0	0	0	0	0	0	0	0	0	0	20
5:00	0	34	10	0	3	0	0	0	0	0	0	0	0	47
6:00	1	119	15	0	2	0	0	0	1	0	0	0	0	138
7:00	1	281	31	1	4	1	0	6	2	0	0	0	0	327
8:00	1	296	23	0	3	2	0	1	5	0	0	0	0	331
9:00	1	260	24	2	8	4	0	3	3	0	1	0	0	306
10:00	4	273	33	2	10	3	0	3	1	0	0	0	0	329
11:00	1	348	36	1	9	3	0	1	2	0	0	0	0	401
12:00	5	310	36	3	6	3	0	7	1	0	2	0	0	373
13:00	3	342	25	1	7	4	0	5	0	0	0	0	0	387
14:00	2	474	48	4	12	5	0	10	0	0	0	0	0	555
15:00	10	551	51	6	15	9	0	15	0	0	0	0	0	657
16:00	10	641	63	19	10	17	2	24	6	0	0	0	0	792
17:00	21	712	67	17	16	25	0	25	3	0	3	0	1	890
18:00	12	683	52	15	13	19	1	23	4	0	0	0	0	822
19:00	5	462	23	8	4	9	0	10	2	0	0	0	0	523
20:00	8	349	30	3	0	3	0	3	0	0	0	0	0	396
21:00	4	235	23	0	4	3	0	0	0	0	0	0	0	269
22:00	1	170	21	0	0	0	0	0	0	0	0	0	0	192
23:00	0	84	6	0	2	0	0	0	0	0	0	0	0	92
TOTAL	93	6740	621	82	129	110	3	136	30	0	6	0	1	7951
% of Total:	1%	85%	8%	1%	2%	1%	0%	2%	0%	0%	0%	0%	0%	

7 - 9 AM Peak Total	12 - 2 PM Peak Total	4 - 6 PM Peak Total
658	760	1682

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VEHICLE CLASSIFICATIONS

LOCATION:	Chino Hills Parkway and Grand Avenue	PROJECT #	100145
DIRECTION:	SOUTHBOUND	LOCATION #	001
VICINITY:	Chino Hills, CA	START DATE:	Wednesday, May 26, 2010

Time	#1	#2	#3	#4	#5	#6	#7	#8	#9	#10	#11	#12	#13	Total
0:00	1	26	2	0	3	0	0	0	0	0	0	0	0	32
1:00	0	12	2	0	0	0	0	0	0	0	0	0	0	14
2:00	0	24	1	0	0	0	0	0	0	0	0	0	0	25
3:00	0	7	3	1	1	0	0	0	0	0	0	0	0	12
4:00	0	37	7	0	3	0	0	0	0	0	0	0	0	47
5:00	3	144	36	1	12	0	0	0	0	0	0	0	0	196
6:00	3	429	76	3	16	5	0	12	1	0	0	0	0	545
7:00	7	642	88	6	32	18	0	16	4	0	0	0	0	813
8:00	1	458	72	3	15	5	0	11	1	0	0	0	0	566
9:00	0	294	55	1	19	1	0	4	0	0	0	0	0	374
10:00	6	240	56	0	11	2	0	1	2	0	0	0	0	318
11:00	4	300	77	1	12	1	0	2	1	0	1	0	0	399
12:00	2	338	76	0	18	1	0	3	0	0	0	0	0	438
13:00	4	352	67	2	9	4	0	4	0	0	0	0	0	442
14:00	1	546	92	2	14	8	0	7	0	0	0	0	0	670
15:00	1	478	77	2	21	9	0	10	1	0	0	0	0	599
16:00	3	427	66	2	18	7	0	9	0	0	0	0	0	532
17:00	5	478	72	2	10	6	0	4	0	0	0	0	0	577
18:00	3	455	69	1	5	3	0	1	0	0	0	0	0	537
19:00	3	362	50	1	6	5	0	0	0	0	0	0	0	427
20:00	0	317	49	0	8	3	0	2	0	0	0	0	0	379
21:00	1	197	37	0	5	3	0	2	0	0	0	0	0	245
22:00	0	121	20	0	2	0	0	0	0	0	0	0	0	143
23:00	0	57	10	0	1	0	0	0	0	0	0	0	0	68
TOTAL	48	6741	1160	28	241	81	0	88	10	0	1	0	0	8398
% of Total:	1%	80%	14%	0%	3%	1%	0%	1%	0%	0%	0%	0%	0%	

7 - 9 AM Peak Total	12 - 2 PM Peak Total	4 - 6 PM Peak Total
1379	880	1109

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