# Appendix K Diversion Analysis





#### **Project Description**

The Project includes the potential closure of the eastbound direction ramp for vehicular traffic at Washington Street and University Avenue. In addition, the concept proposes to restrict vehicular traffic on the westbound direction at University Avenue and Front Street. The purpose of these changes to vehicular circulation (diversion) is to achieve the traffic volumes necessary to create a low stress street to accommodate a Bicycle Boulevard bikeway design along the section of University Avenue between lbis Street and Front Street.

This preliminary capacity analysis has been prepared to evaluate the potential effect in vehicular capacity along Washington Street as a result of traffic diversion from this section of University Avenue. This analysis used available turn movement data from multiple sources and newly commissioned intersection counts.

The study area is shown in Figure 1. The locations analyzed are listed below.

#### Intersections

- I. Washington Ave and Goldfinch St
- 2. Washington Ave and Front St
- 3. Washington Ave and First Ave
- 4. Washington Ave and Fourth Ave
- 5. Washington Ave and Fifth Ave
- 6. Washington Ave and Eight Ave/SR 163 Off-Ramp
- Washington Ave and Richmond St/ SR 163 On-Ramp
- 8. Washington Ave and Lincoln Ave
- 9. University Ave and Hawk St
- 10. University Ave and Goldfinch St
- 11. University Ave and Front Ave
- 12. University Ave and First Ave

14. University Ave and Fifth Ave

13. University Ave and Fourth Ave

- 15. University Ave and Sixth Ave
- 16. University Ave and Seventh Ave
- 17. University Ave and Eighth Ave
- 18. University Ave and Ninth Ave
- 19. University Ave and Tenth Ave
- 20. University Ave and Vermont St
- 21. University Ave and Richmond St
- 22. University Ave and Normal St
- 23. University Ave and Park Blvd
- 24. Normal St and Park Blvd
- 25. Robinson Ave and Park Blvd

#### **Study Scenarios**

The following scenarios were analyzed:

- Year 2035 without Project
- Year 2035 with Project

The purpose of this preliminary capacity analysis is to identify any potential issues that may be associated with the Project once implemented. A complete traffic impact study including existing and future conditions will be conducted during the preliminary engineering phase of the Project.





#### **Year 2035 Traffic Volumes**

The implemented traffic growth to the roadway network within the study area is a function of expected land development, economic activity, and changes in demographics. Several methods can be used to estimate this growth. For the purposes of this analysis, Year 2008 and Year 2035 based on the San Diego Association of Governments computerized travel forecast model (Series 12 Select Zone Analysis) were used. Using the existing counts volumes and the growth factor calculated by the interpolation of the two models, future base volumes were developed. Appendix K-A contains the growth calculation worksheets.

#### **Intersection Analysis Results**

Year 2035 peak hour period turning movement traffic volumes for both AM and PM peak hour were analyzed. Figures 2 and 3 show Year 2035 AM and PM peak hour without project traffic conditions for intersections respectively. Appendix K-B contains the traffic analysis methodologies and concepts used in this analysis.

The 2035 baseline analysis assumes no roadway network changes. Table I summarizes the results of the intersection analysis. As shown on Table I, all intersections in the study area operate at a level of service (LOS) D or above except for the following intersections:

- University Ave and 6th Ave LOS E (AM peak hour)
- Washington St and 8th Ave/SR 163 Off-Ramp LOS F (PM peak hour)
- University Ave and Front St LOS F (PM peak hour)
- University Ave and Sixth Ave LOS E (PM peak hour)

Appendix K-C contains the intersection analysis worksheets for the 2035 peak hour without project.





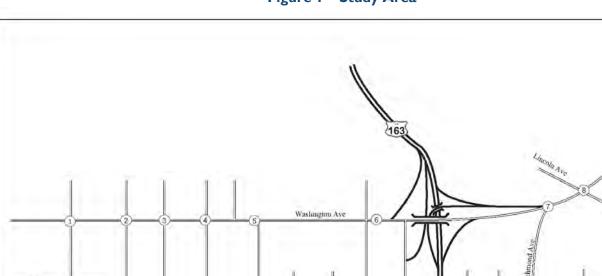


Figure I – Study Area







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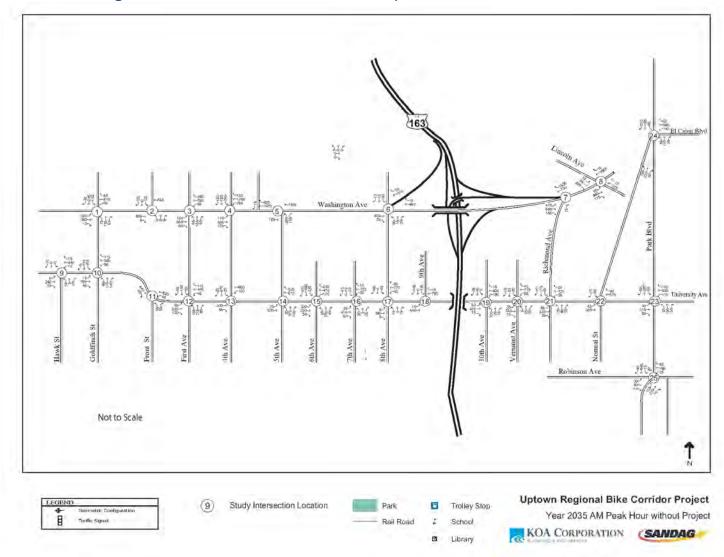


Figure 2 – Year 2035 AM Peak without Project Traffic Conditions





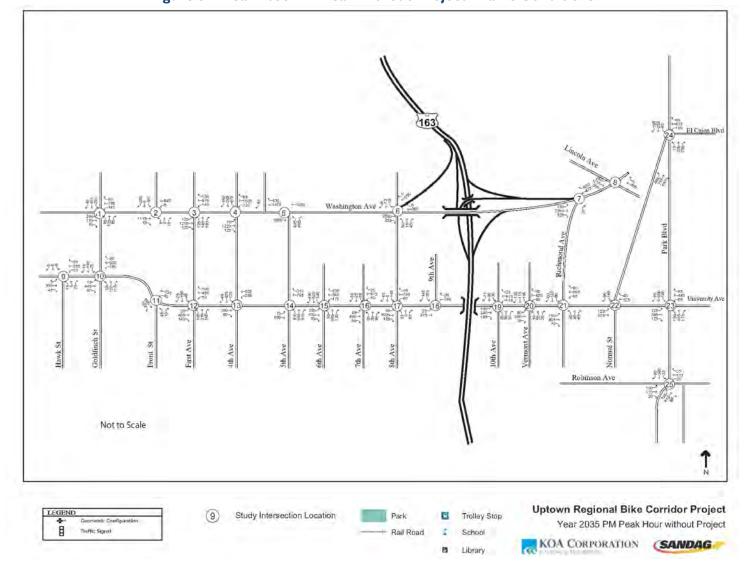


Figure 3 – Year 2035 PM Peak without Project Traffic Conditions





Table I – Year 2035 Peak Hour without Project

Year 2035 without Project Conditions	AM Pea	ak Hour	PM Peak Hour		
	Delay	LOS	Delay	LOS	
I. Washington Ave & Goldfinch St	35.8	D	35.9	D	
2. Washington Ave & Front St	11.5	В	15.9	В	
3. Washington Ave & First Ave	26.3	С	33.8	С	
4. Washington Ave & Fourth Ave	25.0	С	37.0	D	
5. Washington Ave & Fifth Ave	13.7	В	20.1	С	
6. Washington Ave & Eight Ave/SR-163 Off Ramp	<b>42</b> . I	D	317.2	F	
7. Washington Ave & Richmond St/SR-163 On Ramp	19.8	В	15.2	В	
8. Washington Ave & Lincoln Ave	51.3	D	48.2	D	
9. University Ave & Hawk St	18.6	С	22.9	С	
I0. University Ave & Goldfinch St	10.9	В	18.0	В	
II. University Ave & Front Ave	27.9	D	53.1	F	
I2. University Ave & First Ave	19.8	С	28.2	С	
13. University Ave & Fourth Ave	21.3	С	24.3	С	
I4. University Ave & Fifth Ave	20.9	С	28.3	С	
15. University Ave & Sixth Ave	56.4	E	69.1	E	
16. University Ave & Seventh Ave	4.1	Α	8.6	Α	
17. University Ave & Eighth Ave	12.2	С	24.7	С	
18. University Ave & Ninth Ave	8.0	В	11.9	В	
19. University Ave & Tenth Ave	19.3	С	20.2	С	
20. University Ave & Vermont St	12.0	В	17.8	В	
21. University Ave & Richmond St	19.5	С	23.3	С	
22. University Ave & Normal St	7.2	Α	9.7	Α	
23. University Ave & Park Blvd	23.5	D	41.6	D	
24. Normal St & Park Blvd	23.2	С	32.0	С	
25. Robinson Ave & Park Blvd	7.1	Α	8.6	Α	





#### **Year 2035 with Project Conditions**

Year 2035 with project traffic volumes were developed by reassigning the Year 2035 base volumes discussed previously for both eastbound and westbound traffic from University Avenue onto Washington Street and adjacent streets. Changes were assessed by comparing the Year 2035 without Project conditions against the Year 2035 with the addition of the project traffic. Below is the list of assumptions made for the Diversion Analysis under Year 2035 with Project conditions (diversion from University Avenue to Washington Street).

- A 5 percent reduction was applied to diverted trips due to mode conversion from vehicle to bicycle as a result of the Project
- 50 bicycles on both eastbound and westbound direction on University Avenue

During the AM Peak hour

- 225 trips were diverted in the eastbound direction
- 390 trips were diverted in the westbound direction

During the PM Peak hour

- 500 trips were diverted in the eastbound direction
- 550 trips were diverted in the westbound direction

A summary of the results is presented below.

#### **Intersection Analysis Results**

The Year 2035 with project peak hour period turning movement traffic volumes for both AM and PM peak hour are summarized in Figures 4 and 5 respectively. Table 2 summarizes the results of the intersection analysis. All intersections in the study area are calculated to operate at LOS D or above except for the following:

- University Ave and 6th Ave (LOS E) during both AM peak and PM peak hour
- Washington St and 8th Ave/SR 163 Off-Ramp (LOS E) during the AM peak hour and (LOS F) PM peak hour
- Washington St and Lincoln Ave (LOS E) during the AM peak hour and (LOS E) during the PM peak hour
- Normal St and Park Blvd (LOS F) during the PM peak hour

Appendix K-D includes Year 2035 with project peak hour intersection analysis worksheets.





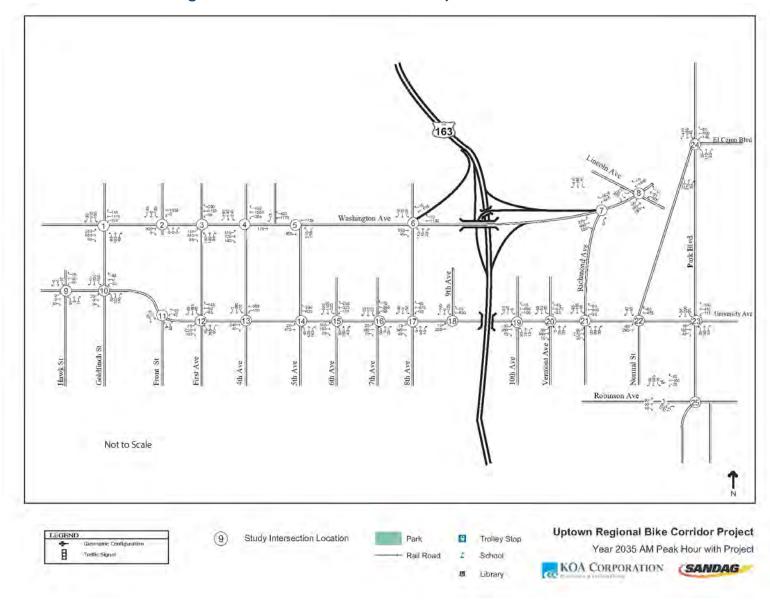


Figure 3 - Year 2035 AM Peak with Project Traffic Conditions





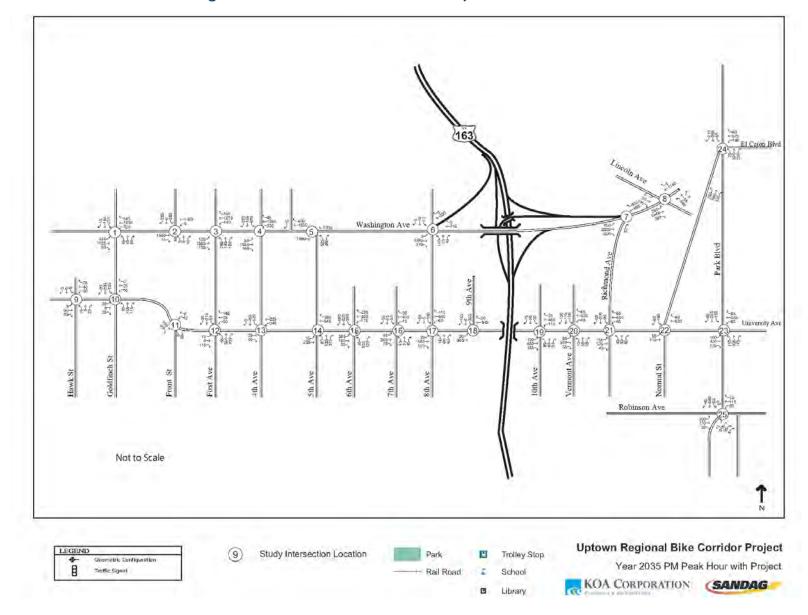


Figure 3 - Year 2035 PM Peak with Project Traffic Conditions





Table 2 – Year 2035 Peak Hour with Project

Table 2 – Tea				. 0,000		
Intersections	Year 2035 wi	ear 2035 without Project		vith Project	<b>∆</b> Delay	Significant
	Delay	LOS	Delay	LOS		
AM Peak Hour		_		_		
I. Washington Ave & Goldfinch St	35.8	D	30.8	C	-5.0	No
2. Washington Ave & Front St	11.5	В	8.1	A	-3.4	No
3. Washington Ave & First Ave	26.3	С	24.1	С	-2.2	No
4. Washington Ave & Fourth Ave	25.0	С	23.7	С	-1.3	No
5. Washington Ave & Fifth Ave	13.7	В	24.8	C	11.1	No
6. Washington Ave & Eight Ave/SR-163 Off Ramp	42.1	D	66.1	E	24.0	Yes
7. Washington Ave & Richmond St/SR-163 On Ramp	19.8	В	16.8	В	-3.0	No
8. Washington Ave & Lincoln	51.3	D	78.6	E	27.3	Yes
9. University Ave & Hawk St	18.6	С	9.3	Α	-9.3	No
10. University Ave & Goldfinch St	10.9	В	9.3	Α	-1.6	No
II. University Ave & Front Ave	27.9	D	11.0	В	-16.9	No
I2. University Ave & First Ave	19.8	С	15.8	В	-4.0	No
13. University Ave & Fourth Ave	21.3	С	25.3	С	4.0	No
I4. University Ave & Fifth Ave *	20.9	С	23.4	С	2.5	No
I5. University Ave & Sixth Ave *	56.4	Е	68.2	Е	11.8	Yes
16. University Ave & Seventh Ave	4.1	Α	4.8	Α	0.7	No
17. University Ave & Eighth Ave	12.2	С	12.2	В	0.0	No
18. University Ave & Ninth Ave	8.0	В	10.1	В	2.1	No
19. University Ave & Tenth Ave	19.3	С	16.9	В	-2.4	No
20. University Ave & Vermont St	12.0	В	13.8	В	1.8	No
21. University Ave & Richmond St	19.5	С	16.5	В	-3.0	No
22. University Ave & Normal St	7.2	Α	8.9	Α	1.7	No
23. University Ave & Park Blvd	23.5	D	23.9	С	0.4	No
24. Normal St & Park Blvd	23.2	С	24.6	С	1.4	No
25. Robinson Ave & Park Blvd	7.1	Α	7.1	Α	0.0	No
PM Peak Hour						
I. Washington Ave & Goldfinch St	35.9	D	35.8	D	-0. I	No
2. Washington Ave & Front St	15.9	В	13.2	В	-2.7	No
3. Washington Ave & First Ave	33.8	С	51.8	D	18.0	No
4. Washington Ave & Fourth Ave	37.0	D	44.3	D	7.3	No
5. Washington Ave & Fifth Ave	20.1	С	26.0	С	5.9	No
6. Washington Ave & Eight Ave/SR-163 Off Ramp	317.2	F	342.8	F	25.6	Yes
7. Washington Ave & Richmond St/SR-163 On Ramp	15.2	В	4.9	Α	-10.3	No
8. Washington Ave & Lincoln Ave	48.2	D	68.3	E	20.1	Yes
9. University Ave & Hawk St	22.9	С	9.9	Α	-13.0	No
10. University Ave & Goldfinch St	18.0	В	9.5	Α	-8.5	No
11. University Ave & Front Ave	53.1	F	9.9	Α	-43.2	No
12. University Ave & First Ave	28.2	С	17.6	В	-10.6	No
13. University Ave & Fourth Ave	24.3	С	27.7	С	3.4	No
14. University Ave & Fifth Ave	28.3	С	32.6	С	4.3	No
15. University Ave & Sixth Ave	69.1	E	70.3	Е	1.2	No
16. University Ave & Seventh Ave	8.6	Α	12.3	В	3.7	No
17. University Ave & Eighth Ave	24.7	С	23.3	С	-1.4	No
18. University Ave & Ninth Ave	11.9	В	16.9	В	5.0	No
19. University Ave & Tenth Ave	20.2	С	21.8	С	1.6	No
20. University Ave & Vermont St	17.8	В	18.0	В	0.2	No
21. University Ave & Richmond St	23.3	С	20.1	С	-3.2	No
22. University Ave & Normal St	9.7	Α	7.7	Α	-2.0	No
23. University Ave & Park Blvd	41.6	D	36.2	D	-5.4	No
24. Normal St & Park Blvd	32.0	С	86.9	F	54.9	Yes
25. Robinson Ave & Park Blvd	8.6	Α	8.6	Α	0.0	No





### **Appendix K-A:** Growth Calculation Sheet

**Table I - Growth Calculation Sheet** 

Table I - Gro	Year	Year	cet	Adj.
Roadway Segment	2008	2035	Growth	Growth
University Avenue				
west of Goldfinch	9600	11400	1.2	
east of Goldfinch	14900	17100	1.1	
lst - 3rd	12000	15000	1.3	
3rd - 4th	13100	16200	1.2	
4th - 5th	18700	24000	1.3	
5th - 6th	23400	31400	1.3	
Subtotal	91700	115100	1.26	1.26
6th - 7th	28000	29400	1.1	
7th - 8th	28000	29400	1.1	
8th - 9th	25400	28700	1.1	
9th - 10th	25800	29000	1.1	
Subtotal	107200	116500	1.09	1.09
I0th - Vermont	30700	33100	1.1	
Vermont - Richmond	25600	24700	1.0	
Richmond - Normal	21600	17000	8.0	
Normal - Centre	19900	14900	0.7	
Centre - Park	21600	16200	8.0	
Subtotal	119400	105900	0.89	1.05
Park Boulevard				
University - Essex	16000	18400	1.2	
Essex - Robinson	14700	16700	1.1	
Robinson - Pennsylvania	17000	18800	1.1	
Brookes - Myrtle	12800	15000	1.2	
Upas - Morley Field	13200	16200	1.2	
Morley Field - Zoo	15100	18100	1.2	
Subtotal	88800	103200	1.16	1.16
Washington Street				
University - Hawk	22500	25700	1.1	
Hawk-Goldfinch	26900	30600	1.1	
Goldfinch-Dove	25700	29300	1.1	
Dove-Albatross	26200	29800	1.1	
Albatross-Front	26000	28700	1.1	
Front-1st	26500	29200	1.1	-
lst - 3rd	31300	31600	1.0	
3rd - 4th	32300	32800	1.0	
4th - 5th	37700	37800	1.0	
5th - 6th	33500	42500	1.3	
6th - 7th	39400	42500	1.1	
7th - 8th	39400	42500	1.1	
8th - 9th	40900	43800	1.1	-





Decidence Comment	Year	Year	Constitution	Adj.
Roadway Segment University Avenue	2008	2035	Growth	Growth
9th-Vermont	34200	37900	1.1	
Vermont - Richmond	41500	44400	1.1	
Subtotal	484000	529100	1.09	1.09
Goldfinch St	404000	327100	1.07	1.07
North of Washington	12200	12900	1.1	
Washington-University	5600	6800	1.1	
South of University	8700	9500	1.1	
Subtotal	26500	29200	1.10	1.10
Albatross	26300	27200	1.10	1.10
North of Washington	4300	5700	1.3	
Washington-University	2800	3800	1.4	
Subtotal	7100	9500	1.34	1.34
Front	7100	7300	1.54	1.34
North of Washington	6200	7700	1.2	
South of Washington	2900	3700	1.3	
Subtotal	9100	11400	1.25	1.25
	Year	Year		Adj.
Roadway Segment	2008	2035	Growth	Growth
Ist				
North of Washington	5400	7700	1.4	
Washington-University	6000	7400	1.2	
South of University	10400	13500	1.3	
Subtotal	21800	28600	1.31	1.31
4th				
North of Washington	12400	12400	1.0	
Washington-University	10400	12100	1.2	
South of University	12000	13100	1.1	
Subtotal	34800	37600	1.08	1.08
5th				
Washington-University	11600	12600	1.1	
South of University	10100	13700	1.4	
Subtotal	21700	26300	1.21	1.21
6th				
North of Washington	36000	43400	1.2	
Washington-University	36000	43400	1.2	
South of University	27600	31200	1.1	
Subtotal	99600	118000	1.18	1.18
9th	12-25			
Washington-University	10500	11400	1.1	
Subtotal	10500	11400	1.09	1.09
SR 163 Ramp/8th	12000	1 4000		
Off-Ramp	13000	14900	1.1	
Subtotal	13000	14900	1.15	1.15
Vermont				





Roadway Segment		Year 2008	Year 2035	Growth	Adj. Growth
University Avenue					
North of Unive	rsity	6600	8200	1.2	
Subt	otal	6600	8200	1.24	1.24
Richmond					
South of Washin	gton	11500	10100	0.9	
North of Unive	rsity	11600	6900	0.6	
South of Unive	rsity	8100	9500	1.2	
Subt	otal	31200	26500	0.85	0.85
Lincoln					
North of Washin	gton	4100	4300	1.0	
South of Washin	gton	8400	11100	1.3	
Subt	otal	12500	15400	1.23	1.23
Normal					
North of Unive	rsity	3800	3900	1.0	
South of	Park	23600	28100	1.2	
Subt	otal	27400	32000	1.17	1.17
El Cajon					
East of	Park	21300	23600	1.1	
Subt	otal	21300	23600	1.11	1.11
Robinson					
West of	Park	9300	10900	1.2	
East of	Park	4600	4900	1.1	
Subt	otal	13900	15800	1.14	1.14





#### Appendix K-B: Traffic Analysis Methodology

A brief overview of traffic analysis methodologies and concepts used in this analysis is presented in this section. Street system operating conditions are typically described in terms of "level of service." LOS is a report-card scale used to indicate the traffic flow on roadway segments and at intersections. LOS ranges from LOS A (free flow, little congestion) to LOS F (forced flow, extreme congestion).

#### **Intersection Capacity**

The analysis of peak hour intersection performance was conducted using the Synchro analysis software program, which uses methodologies defined in the 2000 Highway Capacity Manual (HCM) to calculate results. LOS for intersections is determined by control delay. Control delay is defined as the total elapsed time from when a vehicle stops at the end of a queue to the time the vehicle departs from the stop line. The total elapsed time includes the time required for the vehicle to travel from the last-in-queue position to the first-in-queue position; including deceleration of vehicles from free-flow speed to the speed of vehicles in the queue The HCM LOS for the range of delay by seconds for unsignalized and signalized intersections is described in Table I.

Table I
Unsignalized and Signalized Intersection Level of Service (HCM 2000)

I aval at Samiaa	Unsignalized	Signalized
Level of Service	Average Control Delay (seconds/vehicle)	Average Control Delay (seconds/vehicle)
Α	0-10	0-10
В	> 10-15	> 10-20
С	> 15-25	> 20-35
D	> 25-35	> 35-55
E	> 35-50	> 55-80
F	>50	> 80

Source: Highway Capacity Manual 2000.

#### **Signalized Intersections**

The HCM analysis methodology for evaluating signalized intersections is based on the "operational analysis" procedure. This technique uses 1,900 passenger cars per hour of green per lane as the maximum saturation flow of a single lane at an intersection. This saturation flow rate is adjusted to account for lane width, on-street parking, conflicting pedestrian flow, traffic composition, (e.g., the percentage of vehicles that are trucks), and shared lane movements (e.g., through and right-turn movements from the same lane). Average control delay is calculated by taking a volume-weighted average of all the delays for all vehicles entering the intersection.

#### **Level of Service Definitions**

The concept of LOS is defined as a qualitative measure describing operational conditions within a traffic stream, and the motorists' and/or passengers' perception of operations. A LOS definition generally describes these conditions in terms of such factors as speed, travel time, freedom to maneuver, comfort, convenience, and safety. Levels of service for freeway segments can generally be categorized as shown in the table above.





# Appendix K-C: Peak Hour Intersection Analysis Worksheets – 2035 Conditions





#### HCM Signalized Intersection Capacity Analysis

TOTT OIGHTONE	a micorocción oupa	only i miony or o	
: Washington	St & First Ave		

	*	4	1	1	+	*	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>1</b>		7	<b>†</b>			43			A	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0	200000		4.0			4000000	30000
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00				
Frpb, ped/bikes	1.00	0.98		1.00	0.98			0.99				
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00				
Frt	1.00	0.99		1.00	0.96			0.96				
Flt Protected	0.95	1.00		0.95	1.00			0.99				
Satd. Flow (prot)	1770	3423		1770	3322			1758				
Flt Permitted	0.12	1.00		0.28	1.00			0.99				
Satd. Flow (perm)	215	3423		521	3322			1758				
Volume (vph)	130	650	65	95	780	290	65	185	90	0	0	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)	137	684	68	100	821	305	68	195	95	0.50	0.55	0.00
RTOR Reduction (vph)	0.	7	0	0	34	0	0	11	0	ő	Ö	Ö
Lane Group Flow (vph)	137	745	Ö	100	1092	Ö	0	347	0	Ö	Ö	0
Confl. Peds. (#/hr)	101	143	58	100	1002	32		241	26	- 0		49
Confl. Bikes (#/hr)			19			7			4			6
	was tak			in the Track			Danie					
Turn Type	pm+pt	2		pm+pt	-		Perm	4				
Protected Phases	5 2			6	6			4				
Permitted Phases		40.0			100		4	20.5				
Actuated Green, G (s)	57,8	49.3		55.2	48.0			36.5				
Effective Green, g (s)	59.1	50.2		56.5	48.9			37.4				
Actuated g/C Ratio	0.54	0.46		0.51	0.44			0.34				
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9				
Vehicle Extension (s)	2.0	1.0		2,0	1.0			1.0				
Lane Grp Cap (vph)	241	1562		354	1477			598				
v/s Ratio Prot	c0.05	0.22		0.02	d0.33			0.00				
v/s Ratio Perm	0.26			0.13	6 30			0.20				
v/c Ratio	0.57	0.48		0.28	0.74			0.58				
Uniform Delay, d1	17.5	20.8		14.5	25.3			29.8				
Progression Factor	1.00	1.00		1.00	1.00			1.00				
Incremental Delay, d2	1.8	1.0		0.2	3.4			4.1				
Delay (s)	19.4	21.8		14.7	28.6			33.9				
Level of Service	В	C		В	С			С				
Approach Delay (s)		21.4			27.5			33.9			0.0	
Approach LOS		С			C			С			Α	
Intersection Summary	_		- 6.00						-			
HCM Average Control [			26.3	F	ICM Le	vel of Se	ervice		С			
HCM Volume to Capaci	ty ratio		0.64									
Actuated Cycle Length	(s)		110.0		Sum of I	ost time	(s)		12.0			
Intersection Capacity U			74.9%	J.	CU Lev	el of Ser	vice		D			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates

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# HCM Signalized Intersection Capacity Analysis 3: Washington St & Fifth Ave

10/17/2013

	-	1	1	+	1	1	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	44	and the same		11	44	7	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0			4.0	4.0	4.0	
Lane Util. Factor	0.95			0.95	0.97	0.91	
Frpb, ped/bikes	1.00			1.00	1.00	0.95	
Flpb, ped/bikes	1.00			1.00	1.00	1.00	
Frt	1.00			1.00	1.00	0.85	
Flt Protected	1.00			1.00	0.95	1.00	
Satd. Flow (prot)	3539			3539	3433	1369	
Flt Permitted	1.00			1.00	0.95	1.00	
Satd. Flow (perm)	3539			3539	3433	1369	
Volume (vph)	785	0	0	1505	450	105	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	826	0	0	1584	474	111	
RTOR Reduction (vph)	0	ō	ő	0	0	91	
ane Group Flow (vph)	826	0	0	1584	474	20	
Confl. Peds. (#/hr)		52	-	,,,,,,	***	31	
Confl. Bikes (#/hr)		14					
Furn Type		1.7				Perm	
Protected Phases	2			6	8	I CIIII	
Permitted Phases	- 4					8	
Actuated Green, G (s)	76.0			76.0	18.7	18.7	
Effective Green, g (s)	76.9			76.9	19.1	19.1	
Actuated g/C Ratio	0.74			0.74	0.18	0.18	
Clearance Time (s)	4.9			4.9	4.4	4.4	
Vehicle Extension (s)	1.0			1.0	1.0	1.0	
					630		
Lane Grp Cap (vph)	2617 0.23			2617 c0.45		251	
//s Ratio Prot	0.23			CU.45	c0.14	0.04	
//s Ratio Perm	0.00			0.04	0.75	0.01	
r/c Ratio	0.32			0.61	0.75	0.08	
Jniform Delay, d1	4.6			6.4	40.2	35.2	
Progression Factor	1.00			1.00	1.00	1.00	
ncremental Delay, d2	0.3			1.0	4.5	0.1	
Delay (s)	4.9			7.4	44.7	35.2	
Level of Service	A			A	D	D	
Approach Delay (s)	4.9			7.4	42.9		
Approach LOS	Α			Α	D		
ntersection Summary							
HCM Average Control D			13.7	H	ICM Le	vel of Service	В
HCM Volume to Capaci			0.63				-64
Actuated Cycle Length (			104.0			ost time (s)	8.0
ntersection Capacity Ut	ilization		66.7%	Į.	OU Levi	el of Service	C
Analysis Period (min)			15				
Critical Lane Group							

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 4: Washington St & Goldfinch St

10/17/2013

	1	-	1	1	4	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	<b>1</b>		*	<b>†</b>		7	1		7	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	0000000	4.0	4.0	200000	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	
Frpb, ped/bikes	1.00	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	
Frt	1.00	1.00		1.00	0.99		1.00	0.96		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3528		1770	3478		1770	1785		1770	1812	
Flt Permitted	0.95	1.00		0.95	1.00		0.35	1.00		0.39	1.00	
Satd. Flow (perm)	1770	3528		1770	3478		643	1785		728	1812	
Volume (vph)	280	465	10	50	815	60	75	155	60	155	205	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)	295	489	11	53	858	63	79	163	63	163	216	32
RTOR Reduction (vph)	0	1	0	0	4	0	0	17	0	. 0	6	Ö
Lane Group Flow (vph)	295	499	0	53	917	0	79	209	0	163	242	0
Confl. Peds. (#/hr)					- 11	27	- 15		7	155		27
Confl. Bikes (#/hr)						3						18
Turn Type	Prot			Prot			Perm		_	Perm		
Protected Phases	5	2		1	6		1 Olim	8		1 01111	4	
Permitted Phases		-					8	~		4		
Actuated Green, G (s)	22.0	62.4		7.3	47.3		21.4	21.4		20.5	20.5	
Effective Green, g (s)	22.4	63.3		7.3	48.2		21.4	21.4		21.4	21.4	
Actuated g/C Ratio	0.22	0.61		0.07	0.46		0.21	0.21		0.21	0.21	
Clearance Time (s)	4.4	4.9		4.0	4.9		4.0	4.0		4.9	4.9	
Vehicle Extension (s)	2.0	3.3		3.0	3.3		3.0	3.0		2.0	2.0	
Lane Grp Cap (vph)	381	2147		124	1612		132	367		150	373	
v/s Ratio Prot	c0.17	0.14		0.03	d0.26		102	0.12		,,,,,	0.13	
v/s Ratio Perm	00.11	0.14		0,00	w.20		0.12	0.12		d0.22	0.10	
v/c Ratio	0.77	0.23		0.43	0.57		0.60	0.57		1.09	0.65	
Uniform Delay, d1	38.4	9.3		46.3	20.3		37.4	37.2		41.3	37.8	
Progression Factor	1.00	1.00		0.93	1.13		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.7	0.3		2.2	1.4		7.1	2.1		98.5	2.9	
Delay (s)	47.1	9.5		45.4	24.4		44.5	39.3		139.8	40.7	
Level of Service	D	A		D	C		D	D		F	D	
Approach Delay (s)		23.5			25.6			40.7		J-	80.0	
Approach LOS		0			C			D			F	
Intersection Summary			7.5									
HCM Average Control D	elay		35.8	F	ICM Le	vel of Se	ervice		D			
HCM Volume to Capaci			0.74									
Actuated Cycle Length (			104.0		Sum of I	ost time	(s)		12.0			
Intersection Capacity Ut			75.2%			el of Ser			D			
	Carles Strate				All actions of the		10 J S 10 J		-			
Analysis Period (min)			15									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





# HCM Signalized Intersection Capacity Analysis 5: Washington St & Front St

10/17/2013

1	-	7	1	X 91-3	1	1	1	-	1	1	1
EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
	<b>1</b>	AL WI		414			44		7	सी	
1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	190
	4.0			4.0			4.0		4.0	4.0	4.
	0.95			0.95			1.00		0.95	0.95	1.0
	1.00			1.00			1.00		1.00	1.00	0.9
	1.00			1.00			1.00		1.00	1.00	1.0
											0.8
										and the same of the same of	1.0
											1493
											1.0
											1493
n.		5	0		ñ	Ü		5.			18:
											0.9
											100%
											19:
											7!
											11
U	720	Ü	U.	900		U	- 1	Ų.	100	99	15
			-		В	B			-		11
			Perm			Perm	<u> </u>		Perm	-	Perr
	2		Α.	ь			8			4	
			ь	20.2		8	- 12.2			7.75	
											14.
											15.
											0.1
											4.
											3,6
	2734			2736			242		200	200	224
	0.21			c0.25			0.00				
									0.07	0.07	c0.08
	0.27			0.33			0.00		0.50	0.49	0.53
	3.4			3.6			37.6		40.6	40.6	40.3
	1.04			1.00					1.00	1.00	1.00
											2.1
											42.
									D		[
									77		
	A			А			D			D	
elay		11.5	+	ICM Le	vel of S	ervice		В			
						7 - 45 11		4.5			
5)				Sum of I	ost time	(s)		8.0			
lization		54.2%		CU Lev	el of Sei	vice		Α			
	0 0.95 100% 0 0	BBL BBT  1900 1900 0.95 1.00 1.00 1.00 3536 1.00 3536 0 685 0.95 0.95 100% 100% 0 721 0 0 726  2 79.5 80.4 0.77 4.9 3.0 2734 0.21 0.27 3.4 1.04 0.2 3.7 A. 3.7 A.	BBL BBT BBR  1900 1900 1900  4.0 0.95 1.00 1.00 1.00 3536 1.00 3536 1.00 3536 0 685 5 0.95 0.95 0.95 100% 100% 100% 0 721 5 0 0 0 0 0 726 0  2 79.5 80.4 0.77 4.9 3.0 2734 0.21 0.27 3.4 1.04 0.2 3.7 A 3.7 A elay 7 ratio 0.36	BBL BBT BBR WBL  1900 1900 1900 1900  4.0 0.95 1.00 1.00 1.00 3536 1.00 3536 1.00 3536 0 685 5 0 0.95 0.95 0.95 0.95 100% 100% 100% 100% 0 721 5 0 0 0 0 0 0 0 726 0 0  Perm 2 6 79.5 80.4 0.77 4.9 3.0 2734 0.21 0.27 3.4 1.04 0.2 3.7 A 3.7 A  elay 11.5 b	## Perm  2	BBL   BBT   BBR   WBL   WBT   WBR	EBL EBT EBR WBL WBT WBR NBL  1900 1900 1900 1900 1900 1900 1900 190	BBL   BBT   BBR   WBL   WBT   WBR   NBL   NBT	EBL EBT EBR WBL WBT WBR NBL NBT NBR  1900 1900 1900 1900 1900 1900 1900 190	FBL   FBR   FBR	EBL EBT EBR WBL WBT WBR NBL NBT NBR SBL SBT 1900 1900 1900 1900 1900 1900 1900 1900

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# HCM Signalized Intersection Capacity Analysis 7: Washington St & Fourth Ave

10/17/2013

	1	-	1	1	-	1	1	1	1	1	Į.	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	<b>1</b>		ሻሻ	<b>†</b>		-			7	4	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	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	1.00	0.95		0.97	0.95					0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99					1.00	1.00	0.97
Flpb, ped/bikes	1.00	1.00		1.00	1.00					1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.99					1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1,00					0.95	0.99	1.00
Satd. Flow (prot)	1770	3390		3433	3454					1681	1754	1529
Flt Permitted	0.95	1.00		0.95	1.00					0.95	0.99	1.00
Satd. Flow (perm)	1770	3390		3433	3454					1681	1754	1529
Volume (vph)	110	555	125	295	1250	130	0	0	0	245	180	130
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	584	132	311	1316	137	0	0	0	258	189	137
RTOR Reduction (vph)	0	14	0	0	5	0	0	0	0	0	0	112
Lane Group Flow (vph)	116	702	0	311	1448	0	0	0	0	218	229	25
Confl. Peds. (#/hr)		7.70	43			35				-		10
Confl. Bikes (#/hr)			10			10			1			10
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	5	2		1	6					1.9.111	4	
Permitted Phases										4	-	1
Actuated Green, G (s)	9.5	59.5		12.5	62.5					17.8	17.8	17.8
Effective Green, g (s)	9.9	60.4		12.9	63.4					18.7	18.7	18.7
Actuated g/C Ratio	0.10	0.58		0.12	0.61					0.18	0.18	0.18
Clearance Time (s)	4.4	4.9		4.4	4.9					4.9	4.9	4.9
Vehicle Extension (s)	2.0	0.2		1.0	0.2					1.0	1.0	1.0
Lane Grp Cap (vph)	168	1969		426	2106					302	315	275
v/s Ratio Prot	c0.07	0.21		0.09	c0.42							
v/s Ratio Perm	22.21									0.13	0.13	0.02
v/c Ratio	0.69	0.36		0.73	0.69					0.72	0.73	0.09
Uniform Delay, d1	45.6	11.5		43.9	13.6					40.2	40.2	35.8
Progression Factor	1.00	1.00		1.05	1.04					1,00	1.00	1.00
Incremental Delay, d2	9.4	0.5		4.6	1.5					7.0	6.9	0.1
Delay (s)	55.0	12.0		50.7	15.7					47.2	47.2	35.8
Level of Service	Е	В		D	В					D	D	0
Approach Delay (s)		18.0			21.9			0.0			44.5	
Approach LOS		В			С			Α			D	
Intersection Summary												
HCM Average Control [	Delay		25.0	H	ICM Le	vel of S	ervice		С			
HCM Volume to Capaci			0.70									
Actuated Cycle Length			104.0		Sum of I	ost time	(s)		12.0			
Intersection Capacity U			70.7%			el of Sei			C			
				-		STATE OF THE PARTY.	-					
Analysis Period (min)			15									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis
11: Washington St & SR-163 Off-Ramp

10/17/2013

	-	1	+	1	1	1	-	1	1	1	1	t
Movement	EBT	EBR	WBT	WBR	NBL	NBT	NBR2	SBL	SBT	SBR	SWR	SWR2
Lane Configurations	<b>†</b> 1>	-	<b>1</b>			4		- 0	4		Ž.	
Ideal Flow (vphpl)	1900	1900	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	0.95		0.95			1.00			1.00		1.00	
Frpb, ped/bikes	0.99		1.00			1.00			1.00		1.00	
Flpb, ped/bikes	1.00		1.00			1.00			1.00		1.00	
Frt	0.99		1.00			0.97			0.97		0.86	
Flt Protected	1.00		1.00			0.97			0.98		1,00	
Satd. Flow (prot)	3472		3533			1749			1758		1611	
Flt Permitted	1.00		1.00			0.83			0.86		1.00	
Satd. Flow (perm)	3472		3533			1496			1543		1611	
Volume (vph)	800	75	960	10	60	10	20	20	15	10	615	15
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)	842	79	1011	11	63	11	21	21	16	11	647	16
RTOR Reduction (vph)	7	0	0	0	0	13	0	0	10	0	1	Ó
Lane Group Flow (vph)	914	0	1022	0	0	82	0	0	38	0	662	0
Confl. Peds. (#/hr)		18		1		0.10				7		
Turn Type					Perm			Perm		ic	ustom	-
Protected Phases	2		6		1.140000	8			4		5	
Permitted Phases					8			4				
Actuated Green, G (s)	37.6		37.6		771	10.1			9.6		38.8	
Effective Green, g (s)	38.6		38.6			10.1			10.1		39.3	
Actuated g/C Ratio	0.39		0.39			0.10			0.10		0.39	
Clearance Time (s)	5.0		5.0			4.0			4.5		4.5	
Vehicle Extension (s)	2.0		2.0			0.9			2.0		2.0	
Lane Grp Cap (vph)	1340		1364			151			156		633	
v/s Ratio Prot	0.26		c0.29			1982			1.55		c0.41	
v/s Ratio Perm			10.00			c0.06			0.02			
v/c Ratio	0.68		0.75			0.55			0.24		1.05	
Uniform Delay, d1	25.6		26.5			42.8			41.4		30.4	
Progression Factor	1.00		1.00			1.00			1.00		1.00	
Incremental Delay, d2	2.8		3.8			2.2			0.3		48.5	
Delay (s)	28.4		30.3			44.9			41.7		78.9	
Level of Service	С		С			D			D		E	
Approach Delay (s)	28.4		30.3			44.9			41.7			
Approach LOS	C		С			D			D			
Intersection Summary												
HCM Average Control D			42.1	H	ICM Lev	vel of S	ervice		D			
HCM Volume to Capaci			0.86									
Actuated Cycle Length (			100.0		Sum of I	ost time	(s)		12.0			
Intersection Capacity Ut		1 5	84.1%		CU Leve				E.			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 14: Normal St & Park Blvd

10/17/2013

	1	-	1	1	+	1	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBI
Lane Configurations	44	**	7	7	**	7	7	<b>^</b>	7	7	<b>1</b>	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	190
Total Lost time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.
Lane Util. Factor	0.97	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.9
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	1.0
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	1.0
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.93	0.8
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.0
Satd. Flow (prot)	3433	3539	1529	1770	3539	1534	1770	3539	1528	1770	3144	144
Flt Permitted	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.0
Satd. Flow (perm)	3433	3539	1529	1770	3539	1534	1770	3539	1528	1770	3144	144
Volume (vph)	190	230	50	145	565	80	55	110	85	45	195	37
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	0.9
Adj. Flow (vph)	200	242	53	153	595	84	58	116	89	47	205	39
RTOR Reduction (vph)	0	0	37	0	0	57	0	0	0	0	137	14
Lane Group Flow (vph)	200	242	16	153	595	27	58	116	89	47	261	5
Confl. Peds. (#/hr)	200		5			16			38			
Confl. Bikes (#/hr)			25			16			1			
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Pro
Protected Phases	5	2		- 1	6		3	8		7	4	
Permitted Phases			2			6			8			
Actuated Green, G (s)	7.3	21.3	21.3	9.0	22.5	22.5	4.0	19.7	19.7	2.3	18.0	18.
Effective Green, g (s)	9.2	23.2	23.2	10.4	24.4	24.4	5.4	21.6	21.6	3.7	19.9	19.
Actuated g/C Ratio	0.12	0.31	0.31	0.14	0.33	0.33	0.07	0.29	0.29	0.05	0.27	0.2
Clearance Time (s)	5.9	5.9	5.9	5.4	5.9	5.9	5.4	5.9	5.9	5.4	5.9	5.
Vehicle Extension (s)	2.0	4.8	4.8	2.0	3.8	3.8	2.0	3.5	3.5	2.0	3.9	3.
Lane Grp Cap (vph)	422	1096	474	246	1153	500	128	1021	441	87	835	38
v/s Ratio Prot	0.06	0.07		c0.09	d0.17		c0.03	0.03		0.03	c0.08	0.0
v/s Ratio Perm		W-27-26	0.01			0.02			0.06			
v/c Ratio	0.47	0.22	0.03	0.62	0.52	0.05	0.45	0.11	0.20	0.54	0.31	0.1
Uniform Delay, d1	30.6	19.2	18.0	30.4	20.5	17.3	33.3	19.6	20.1	34.8	22.0	21.
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.0
Incremental Delay, d2	0.3	0.2	0.1	3.5	0.5	0.1	0.9	0.1	0.3	3.6	0.3	0.
Delay (s)	30.9	19.4	18.1	33.9	21.0	17.4	34.3	19.7	20.4	38.4	22.3	21.
Level of Service	С	В	В	C	C	В	С	В	С	D	С	1
Approach Delay (s)		23.9			23.0			23.1			23.1	
Approach LOS		С			C			Ç			С	
Intersection Summary	77.		3.2.									
HCM Average Control D	) ela y		23.2	-	ICM Le	vel of S	ervice		С			
HCM Volume to Capaci	ty ratio		0.44									
Actuated Cycle Length i	(s)		74.9		Sum of I	ost time	(s)		12.0			
Intersection Capacity Ut			70.1%			el of Se			C			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis

15: University Ave & First Ave

10/17/2013

Movement Lane Configurations	EBL						1	1	1			
Lane Configurations	LUL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
		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	
Lane Util. Factor		1.00			1,00			1.00			1.00	
Frpb, ped/bikes		0.98			0.98			0.99			0.98	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.96			0.97			0.98			0.97	
Flt Protected		1.00			1.00			0.98			0.99	
Satd. Flow (prot)		1749			1764			1776			1765	
Flt Permitted		0.95			0.94			0.76			0.91	
Satd. Flow (perm)		1659			1663			1383			1613	
Volume (vph)	35	335	135	45	400	115	195	215	60	35	150	45
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)	37	353	142	47	421	121	205	226	63	37	158	47
RTOR Reduction (vph)	0	24	0	0	17	0	0	11	0	0	17	0
Lane Group Flow (vph)	0	508	0	0	572	0	0	483	0	0	225	E
Confl. Peds. (#/hr)			37			52			34			51
Confl. Bikes (#/hr)			7			6			5			4
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2		1,310,11	2			4		7.4	4	
Permitted Phases	2	-		2			4			4		
Actuated Green, G (s)		22.3			22.3			19.9			19.9	
Effective Green, g (s)		23.2			23.2			20.8			20.8	
Actuated g/C Ratio		0.45			0.45			0.40			0.40	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		740			742			553			645	
v/s Ratio Prot												
v/s Ratio Perm		0.31			c0.34			c0.35			0.14	
v/c Ratio		0.69			0.77			0.87			0.35	
Uniform Delay, d1		11.5			12.2			14.4			10.9	
Progression Factor		1.00			1.03			1.00			1.00	
Incremental Delay, d2		5.1			6.7			13.9			0.1	
Delay (s)		16.6			19.2			28.3			11.0	
Level of Service		В			В			С			В	
Approach Delay (s)		16.6			19.2			28.3			11.0	
Approach LOS		В			В			С			В	
Intersection Summary												
HCM Average Control [	Delay		19.8	-	ICM Let	vel of Se	ervice		В			
HCM Volume to Capac			0.82									
Actuated Cycle Length			52.0	S	Sum of I	ost time	(s)		8.0			
Intersection Capacity U			92.3%	10	OU Levi	el of Ser	vice		F			
Analysis Period (min)			15		-	and the second						
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis
16: University Ave & Fourth Ave

1	$\Omega/4$	70	01	13
-10	ши	151	ш	L.T.

	1	-	7	1	+	1	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		1>		*	1				A. Maria		473	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0		100		117.7		4.0	
Lane Util. Factor		1.00		1.00	1.00						0.95	
Frpb, ped/bikes		0.99		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.98		1.00	1.00						0.99	
Flt Protected		1.00		0.95	1.00						1.00	
Satd. Flow (prot)		1804		1770	1863						3488	
Flt Permitted		1.00		0.35	1.00						1.00	
Satd. Flow (perm)		1804		649	1863						3488	
Volume (vph)	0	400	65	100	600	0	0.	Ö	0	20	470	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)	0	421	68	105	632	Ü.	0	0	0	21	495	21
RTOR Reduction (vph)	0	4	0	0	.0	0	0	0	0	0	3	0
Lane Group Flow (vph)	0	485	0	105	632	0.	0	0	0	0	534	0
Confl. Peds. (#/hr)			47			49			21			55
Confl. Bikes (#/hr)			3			1						3
Turn Type				pm+pt						Perm		
Protected Phases		2		1	6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		56.6		69.2	69.2						21.2	
Effective Green, g (s)		57.5		70.1	70.1						22.1	
Actuated g/C Ratio		0.55		0.67	0.67						0.21	
Clearance Time (s)		4.9		4.4	4.9						4.9	
Vehicle Extension (s)		2.0		3.0	2.0						2.0	
Lane Grp Cap (vph)		997		530	1256						741	
v/s Ratio Prot		0.27		0.02	c0.34							
v/s Ratio Perm				0.12							0.15	
v/c Ratio		0.49		0.20	0.50						0.72	
Uniform Delay, d1		14.2		7.5	8.4						38.1	
Progression Factor		0.87		1.21	1.47						1.00	
Incremental Delay, d2		1.3		0.2	0.1						2.9	
Delay (s)		13.7		9.2	12.4						41.0	
Level of Service		В		Α	В						D	
Approach Delay (s)		13.7			11.9			0.0			41.0	
Approach LOS		В			В			Α			D	
Intersection Summary												
HCM Average Control De	elay		21.3	ł	ICM Le	vel of Se	ervice		C			
HCM Volume to Capacity			0.53									
Actuated Cycle Length (s			104.0			ost time			8.0			
Intersection Capacity Util		1	61.6%			el of Ser			В			
Analysis Period (min)			15									
c Critical Lane Group												

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# HCM Signalized Intersection Capacity Analysis 17: University Ave & Fifth Ave

10/17/2013

	1	-	*	1	•	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		ર્ન		-	ተተ	7		41474				-
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0			4.0	4.0		4.0				
Lane Util. Factor		1.00			0.95	1.00		0.91				
Frpb, ped/bikes		1.00			1.00	0.74		0.96				
Flpb, ped/bikes		1.00			1.00	1.00		1.00				
Frt		1.00			1.00	0.85		0.96				
Flt Protected		1.00			1.00	1.00		0.99				
Satd. Flow (prot)		1859			3539	1170		4659				
Flt Permitted		0.94			1.00	1.00		0.99				
Satd. Flow (perm)		1758			3539	1170		4659				
Volume (vph)	25	530	0	0	810	325	85	375	165	0	0	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)	26	558	0	0	853	342	89	395	174	0	0	0
RTOR Reduction (vph)	0	.0	0	0	.0	75	0	63	0	0	0	0
Lane Group Flow (vph)	0	584	0	0	853	267	0	595	0	0	0	0
Confl. Peds. (#/hr)			134			136			97			91
Confl. Bikes (#/hr)			8			20			4			24
Turn Type	Perm					Perm	Perm					
Protected Phases		2			2			4				
Permitted Phases	2					2	4					
Actuated Green, G (s)		59.5			59.5	59.5		27.0				
Effective Green, g (s)		60.4			60.4	60.4		27.9				
Actuated g/C Ratio		0.58			0.58	0.58		0.27				
Clearance Time (s)		4.9			4.9	4.9		4.9				
Vehicle Extension (s)		1.0			1.0	1.0		1.0				_
Lane Grp Cap (vph)		1021			2055	680		1250				
v/s Ratio Prot					0.24							
v/s Ratio Perm		c0.33				0.23		0.13				
v/c Ratio		0.57			0.42	0.39		0.48				
Uniform Delay, d1		13.7			12.0	11.8		31.9				
Progression Factor		1.23			1.19	1.37		1.00				
Incremental Delay, d2		2.2			0.5	1.5		0.1				
Delay (s)		19.0			14.9	17.8		32.0				
Level of Service		В			В	В		С			- one -	
Approach Delay (s)		19.0			15.7			32.0			0.0	
Approach LOS		В			В			С			Α	
Intersection Summary			-				-		-			
HCM Average Control D			20.9	+	ICM Le	vel of S	ervice		С			
HCM Volume to Capaci			0.50			*******	7.5		88			
Actuated Cycle Length (			104.0			ost time			8.0			
Intersection Capacity Ut	ilization		88.7%		JU Lev	el of Sei	rvice		E			
Analysis Period (min)			15									
c Critical Lane Group												

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## HCM Signalized Intersection Capacity Analysis

18: University Ave & Sixth Ave 10/17/2013

	1	-	+	1	+	1	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	N. N.	<b>^</b> 1>		7	44	7	7	<b>^</b> 1>		7	<b>^</b>	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.97		1.00	1.00	0.90	1.00	1.00		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
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3380		1770	3539	1422	1770	3506		1770	3539	1523
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3380		1770	3539	1422	1770	3506		1770	3539	1523
Volume (vph)	500	200	30	170	470	255	50	730	40	220	1050	530
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)	526	211	32	179	495	268	53	768	42	232	1105	558
RTOR Reduction (vph)	0	11	0	0	.0	12	0	4	0	.0	0.	74
Lane Group Flow (vph)	526	232	0	179	495	258	53	806	0	232	1105	484
Confl. Peds. (#/hr)			115		400	121			16			34
Confl. Bikes (#/hr)			29			26			4			6
Turn Type	Prot			Prot		pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2		1	6	7	3	8		7	4	5
Permitted Phases	-	-				6		-				4
Actuated Green, G (s)	11.2	27.7		12.7	29.2	44.2	6.1	29.5		15.0	38.4	49.6
Effective Green, g (s)	11.6	28.6		13.1	30.1	45.5	6.5	30.9		15.4	39.8	51.4
Actuated g/C Ratio	0.11	0.28		0.13	0.29	0.44	0.06	0.30		0.15	0.38	0.49
Clearance Time (s)	4.4	4.9		4.4	4.9	4.4	4.4	5.4		4.4	5.4	4.4
Vehicle Extension (s)	3,0	2.2		2.0	2.2	2.0	2.0	3.8		2.0	3,8	3.0
Lane Grp Cap (vph)	383	930		223	1024	677	111	1042		262	1354	811
v/s Ratio Prot	c0.15	0.07		0.10	c0.14	0.06	0.03	0.23		c0.13	c0.31	0.07
v/s Ratio Perm	00,,0	0.01		0,,0		0.12	0.00	0.20			00.0,	0.25
v/c Ratio	1.37	0.25		0.80	0.48	0.38	0.48	0.77		0.89	0.82	0.60
Uniform Delay, d1	46.2	29.3		44.2	30.5	19.7	47.1	33.4		43.4	28.8	18.9
Progression Factor	0.76	1.07		1.20	1.14	0.57	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	181.9	0.6		17.1	1.6	0.1	1.2	3.8		27.2	4.1	1.2
Delay (s)	216.8	32.0		70.2	36.3	11.5	48.3	37.2		70.7	32.9	20.1
Level of Service	F	0		E	D	В.	D.5	D		E	C	20.1
Approach Delay (s)		158.4			35.7		-	37.9			33.7	ĭ
Approach LOS		F			D			D			C	
Intersection Summary			-52				-		_			
HCM Average Control [			56.4	ł	ICM Let	vel of Se	ervice		E			
HCM Volume to Capaci			0.74									
Actuated Cycle Length			104.0			ost time	4.7		8.0			
Intersection Capacity U	tilization		84.7%	- 10	CU Levi	el of Ser	vice		E			
Analysis Period (min)			15									
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis
19: University Ave & Seventh Ave

10/17/2013

	1	-	7	1	+	*	1	1	1	1	+	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		473			414			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	2 200	20-22-20	4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.94			0.99			0.97			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.94			0.94	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		3235			3497			1670			1704	
Flt Permitted		0.89			0.88			0.87			0.90	
Satd. Flow (perm)		2896			3090			1482			1564	
Volume (vph)	25	410	80	50	725	15	30	5	25	20	10	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)	26	432	84	53	763	16	32	5	26	21	11	26
RTOR Reduction (vph)	0	7	0	0	1	0	0	23	0	0	23	0
Lane Group Flow (vph)	0	535	0	0	831	0	0	40	0	n n	35	Ō
Confl. Peds. (#/hr)	m.,	999	116		35,	87			35	-	99.	4
Confl. Bikes (#/hr)			35			22			3			1
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	1 0,111	2		, 0,,,,,	2		, 0,,,,,	4		7 01111	4	
Permitted Phases	2	-		2	-		4	-		4		
Actuated Green, G (s)		82.6			82.6			11.6			11.6	
Effective Green, g (s)		83.5			83.5			12.5			12.5	
Actuated g/C Ratio		0.80			0.80			0.12			0.12	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		2325			2481			178			188	
v/s Ratio Prot		2020			2,01			110			100	
v/s Ratio Perm		0.18			c0.27			c0.03			0.02	
v/c Ratio		0.23			0.34			0.23			0.19	
Uniform Delay, d1		2.5			2.8			41.4			41.2	
Progression Factor		0.30			0.13			1.00			1.00	
Incremental Delay, d2		0.30			0.3			0.2			0.2	
Delay (s)		0.9			0.7			41.6			41.4	
Level of Service		A			A			D D			D	
Approach Delay (s)		0.9			0.7			41.6			41.4	
Approach LOS		A			A			D			D	
Intersection Summary					-							
HCM Average Control D	elay		4.1	H	ICM Le	vel of Se	ervice		Α			
HCM Volume to Capacit			0.32									
Actuated Cycle Length (			104.0		Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut			62.9%			el of Ser			В			
			15	-	-	20 20 20 20 20	97.77					
Analysis Period (min)			1.0									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 20: University Ave & Eighth St

10/17/2013

	1	-	7	1	4	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	-	की के			4ी के	-		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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.93			0.93	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.92			0.92	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		3437			3497			1555			1565	
Flt Permitted		0.91			0.88			0.76			0.85	
Satd. Flow (perm)		3143			3081			1206			1366	
Volume (vph)	15	390	45	60	770	50	10	0	15	45	0	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)	16	411	47	63	811	53	11	0	16	47	0	63
RTOR Reduction (vph)	0	6	0	0	3	0	0	14	0	0	50	C
Lane Group Flow (vph)	0	468	0	Ō	924	0	Ō	13	Ō	n n	60	Ū
Confl. Peds. (#/hr)		100	38	~	- V2-1	-	- 3	, , ,	70	_	- 00	65
Turn Type	Perm			Perm			Perm		3.9	Perm		
Protected Phases	1. CHIII	2		Lenn	2		Lettin	3		Lemm	4	
Permitted Phases	2			2			3			4	- 4	
Actuated Green, G (s)	- 4	62.0		- 4	62.0		3	11.4		**	12.9	
Effective Green, g (s)		63.9			63.9			13.3			14.8	
Actuated g/C Ratio		0.61			0.61			0.13			0.14	
Clearance Time (s)		5.9			5.9			5.9			5.9	
Vehicle Extension (s)		1.0			1.0			2.0			2.0	
		1931			1893			154				
Lane Grp Cap (vph)		1931			1993			154			194	
v/s Ratio Prot		0.45			-0.20			-0.04			-6.64	
v/s Ratio Perm		0.15			0.30			c0.01			c0.04	
v/c Ratio		0.24			0.49			0.08			0.31	
Uniform Delay, d1		9.1			11.0			40.0			40.0	
Progression Factor		1.27			0.66			1.00			1.00	
Incremental Delay, d2		0.3			0.9			0.1			0.3	
Delay (s)		11.8			8.2			40.1			40.4	
Level of Service		В			A			D			D	
Approach Delay (s)		11.8			8.2			40.1			40.4	
Approach LOS		В			Α			D			D	
Intersection Summary												
HCM Average Control D			12.2	+	ICM Le	vel of S	ervice		В			
HCM Volume to Capaci			0.40			I m Zuzima	10/140		-			
Actuated Cycle Length			104.0			ost time	PS 1100 -		12.0			
Intersection Capacity Ut	tilization		65.2%	J)	OU Lev	el of Sei	rvice		С			
Analysis Period (min)			15									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





Diversion Analysis

# HCM Signalized Intersection Capacity Analysis 21: University Ave & Ninth St

10/17/2013

Appendix K-C

	1	-	-	1	1	1	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		414	<b>1</b>		7	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95	0.95		1.00	1.00	
Frpb, ped/bikes		1.00	0.99		1.00	0.97	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	
Frt		1.00	1.00		1.00	0.85	
Flt Protected		1.00	1.00		0.95	1.00	
Satd. Flow (prot)		3535	3511		1770	1532	
Flt Permitted		0.93	1.00		0.95	1.00	
Satd. Flow (perm)		3300	3511		1770	1532	
Volume (vph)	10	400	790	15	125	105	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	11	421	832	16	132	111	
RTOR Reduction (vph)	0	0	1	0	0	63	
Lane Group Flow (vph)	0	432	847	0	132	48	
Confl. Peds. (#/hr)	φ.	702	041	94	102	10	
Confl. Bikes (#/hr)				23		3	
	Perm			20		Perm	
Turn Type	Perm	2			4	Perm	
Protected Phases	2	2	6		4	4	
Permitted Phases	2	00.0	02.0		407		
Actuated Green, G (s)		82.0	82.0		12.7	12.7	
Effective Green, g (s)		82.9	82.9		13.1	13.1	
Actuated g/C Ratio		0,80	0.80		0.13	0.13	
Clearance Time (s)		4.9	4.9		4.4	4.4	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)		2630	2799		223	193	
v/s Ratio Prot		200	c0.24		യ.07	-2122	
v/s Ratio Perm		0.13				0.03	
v/c Ratio		0.16	0.30		0.59	0.25	
Uniform Delay, d1		2.5	2.8		42.9	41.0	
Progression Factor		0.35	0.39		1.00	1.00	
Incremental Delay, d2		0.1	0.1		4.2	0.7	
Delay (s)		1.0	1.2		47.1	41.7	
Level of Service		Α	Α		D	D	
Approach Delay (s)		1.0	1.2		44.6		
Approach LOS		Α	Α		D		
Intersection Summary	T						
HCM Average Control D			8.0	1	ICM Let	vel of Servic	ce A
HCM Volume to Capacit			0.34				
Actuated Cycle Length (			104.0	S	Sum of I	ost time (s)	8.0
Intersection Capacity Ut	ilization		39.2%	10	CU Levi	el of Service	Α
Analysis Period (min)			15				
c Critical Lane Group							

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 22: University Ave & Tenth St

10/17/2013

	1	-	1	1	+	1	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>^</b> 1>		7	个个	7"	T	<b>f</b> >		7	f)	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	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	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	0.66	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		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3350		1770	3539	1053	1770	1703		1770	1704	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.71	1.00		0.73	1.00	
Satd. Flow (perm)	1787	3350		1770	3539	1053	1314	1703		1365	1704	
Volume (vph)	50	405	75	190	635	15	100	20	15	.5	40	35
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	426	79	200	668	16	105	21	16	5	42	37
RTOR Reduction (vph)	0	11	0	0	.0	4	0	13	0	0	31	0
Lane Group Flow (vph)	53	494	0	200	668	12	105	24	0	5	48	0
Confl. Peds. (#/hr)			69	222	32/2	102	100		35		14.5	19
Confl. Bikes (#/hr)			30			24			2			1
Heavy Vehicles (%)	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6	1 91111	L STOR	8		1 01111	4	
Permitted Phases						6	8	-		4		
Actuated Green, G (s)	6.3	59.6		14.3	67.6	67.6	15.9	15.9		15.9	15.9	
Effective Green, g (s)	6.7	60.5		14.7	68.5	68.5	16.8	16.8		16.8	16.8	
Actuated g/C Ratio	0.06	0.58		0.14	0.66	0.66	0.16	0.16		0.16	0.16	
Clearance Time (s)	4.4	4.9		4.4	4.9	4.9	4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	5.3		2.0	3.4	3.4	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	115	1949		250	2331	694	212	275		221	275	
v/s Ratio Prot	0.03	0.15		c0.11	d0.19	004	212	0.01		221	0.03	
v/s Ratio Perm	0.03	0.15		00.11	ω.10	0.01	c0.08	0.01		0.00	0.00	
v/c Ratio	0.46	0.25		0.80	0.29	0.02	0.50	0.09		0.02	0.17	
Uniform Delay, d1	46.9	10.7		43.2	7.5	6.1	39.7	37.1		36.7	37.6	
Progression Factor	0.96	0.77		1.45	0.17	0.01	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.77		14.9	0.17	0.0	0.7	0.0		0.0	0.1	
Delay (s)	45.9	8.6		77.8	1.5	0.1	40.4	37.1		36.7	37.7	
Level of Service	#3.5 D	A		F E	Α.	A	40.4 D	D		.30,7 D	D D	
Approach Delay (s)	v	12.1		-	18.8	0	<u>U</u>	39.5		D	37.7	
Approach LOS		B			В			D D			D.	
Intersection Summary												
HCM Average Control D	elay		19.3	1	ICM Le	vel of S	ervice		В			
HCM Volume to Capaci			0.40		- FULL TO	- CONT. C. S. C.						
Actuated Cycle Length (			104.0	9	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut		13	59.3%		CU Lev			The second secon				
Analysis Period (min)			15			10.793						
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 23: University Ave & Vermont St

10/17/2013

	1	-	1	1	+	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>1</b>		7	44	7	7	1		7	<b>^</b>	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.76	1.00	0.98		1.00	1.00	0.93
Flpb, ped/bikes	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	1.00	0.85	1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1,00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1593	3147		1593	3185	1090	1593	1526		1593	1676	1325
Flt Permitted	0.95	1.00		0.95	1,00	1.00	0.73	1.00		0.73	1.00	1.00
Satd. Flow (perm)	1593	3147		1593	3185	1090	1229	1526		1218	1676	1325
Volume (vph)	35	380	15	35	775	45	5	25	20	20	35	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)	37	400	16	37	816	47	5	26	21	21	37	74
RTOR Reduction (vph)	0	2	0	0	0	18	0	17	0	0	0	59
Lane Group Flow (vph)	37	414	0	37	816	29	5	30	0	21	37	15
Confl. Peds. (#/hr)	16.0		46		100.1 401	86		3.40	34		16.0	56
Confl. Bikes (#/hr)			27			14			11			3
Turn Type	Prot		100	Prot	-	Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6	4 501111	1 01111	8		7 01111	4	7 0111
Permitted Phases	-	-				6	8			4	(4)	4
Actuated Green, G (s)	4.9	64.0		5.0	64.1	64.1	20.8	20.8		20.8	20.8	20.8
Effective Green, g (s)	5.3	64.9		5.4	65.0	65.0	21.7	21.7		21.7	21.7	21.7
Actuated g/C Ratio	0.05	0.62		0.05	0.62	0.62	0.21	0.21		0.21	0.21	0.21
Clearance Time (s)	4.4	4.9		4.4	4.9	4.9	4.9	4.9		4.9	4.9	4.9
Vehicle Extension (s)	2.0	3.2		2.0	3.4	3.4	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	81	1964		83	1991	681	256	318		254	350	276
v/s Ratio Prot	c0.02	0.13		0.02	c0.26	001	200	0.02		201	c0.02	210
v/s Ratio Perm	00.02	0.10		0.02	00.20	0.03	0.00	0.02		0.02	00.02	0.01
v/c Ratio	0.46	0.21		0.45	0.41	0.04	0.02	0.10		0.08	0.11	0.08
Uniform Delay, d1	48.0	8.5		47.8	9.8	7.5	32.7	33.2		33.1	33.3	32.9
Progression Factor	0.97	1.28		1.28	0.39	0.08	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.5	0.2		1.3	0.6	0.1	0.0	0.1		0.1	0.1	0.1
Delay (s)	48.1	11.0		62.4	4.4	0.7	32.7	33.4		33.3	33.4	33.0
Level of Service	D	В		E	A	A	C	C		C	C	0
Approach Delay (s)		14.1			6.6	10.70	·	33.3			33.2	- ~
Approach LOS		В			A			C			C	
Intersection Summary												
HCM Average Control E	)elay		12.0	H	ICM Le	vel of Se	ervice		В			
HCM Volume to Capaci			0.33									
Actuated Cycle Length			104.0	5	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut		1	62.9%			el of Ser			В			
Analysis Period (min)			15				0000		9.			
c Critical Lane Group			3.5									

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HCM Signalized Intersection Capacity Analysis 24: University Ave & Richmond St

10/17/2013

	1	-	1	1	+	1	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>1</b>		7	44	7	7	1	-	7	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	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.96		1.00	1.00	0.80	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		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.95		1.00	0.94	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3364		1770	3539	1269	1770	1739		1770	1720	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.52	1.00		0.69	1.00	
Satd. Flow (perm)	1770	3364		1770	3539	1269	961	1739		1284	1720	
Volume (vph)	65	320	35	30	720	80	25	60	30	45	115	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)	68	337	37	32	758	84	26	63	32	47	121	74
RTOR Reduction (vph)	0	6	0	0	0	34	0	21	0	0	26	0
Lane Group Flow (vph)	68	368	0	32	758	50	26	74	0	47	169	0
Confl. Peds. (#/hr)			127		alena.	69			43		100	52
Confl. Bikes (#/hr)			26			20			6			3
Turn Type	Prot		10.001	Prot		Perm	Perm			Perm	_	
Protected Phases	5	2		1	6		7 01111	8		1.01111	4	
Permitted Phases		-		- '		6	8			4	-	
Actuated Green, G (s)	7.4	58.4		4.4	55.4	55.4	27.0	27.0		27.0	27.0	
Effective Green, g (s)	7.8	59.3		4.8	56.3	56.3	27.9	27.9		27.9	27.9	
Actuated g/C Ratio	0.07	0.57		0.05	0.54	0.54	0.27	0.27		0.27	0.27	
Clearance Time (s)	4.4	4.9		4.4	4.9	4.9	4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.2		2.0	3.1	3.1	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	133	1918		82	1916	687	258	467		344	461	
v/s Ratio Prot	c0.04	c0.11		0.02	00.21	001	200	0.04		244	c0.10	
v/s Ratio Perm	60.04	00.11		0.02	W.Z 1	0.04	0.03	0.04		0.04	00.10	
v/c Ratio	0.51	0.19		0.39	0.40	0.07	0.10	0.16		0.14	0.37	
Uniform Delay, d1	46.3	10.8		48.2	13.9	11.4	28.6	29.1		28.9	30.9	
Progression Factor	1.19	1.08		1.00	1,00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	0.2		1.1	0.6	0.2	0.1	0.1		0.1	0.2	
Delay (s)	56.3	11.9		49.3	14.5	11.6	28.7	29.1		29.0	31.1	
Level of Service	50.5 E	В		D	В	В	C	C		C	C	
Approach Delay (s)		18.7		U	15.5	- 0		29.0			30,7	
Approach LOS		В			13.3 B			23.0 C			C	
Intersection Summary												
HCM Average Control D	HCM Average Control Delay		19.5	H	ICM Le	vel of S	ervice		В			
The Chinese of the Control of the Co	HCM Volume to Capacity ratio		0.41									
Actuated Cycle Length (s)			104.0		Sum of I	ost time	(s)		16.0			
Intersection Capacity Utilization			63.2%			el of Ser			В			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





# HCM Signalized Intersection Capacity Analysis 25: University Ave & Normal St

10/17/2013

	1	-	c <del>ilo</del>	1	1	4	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	7	<b>十</b> 个	<b>1</b>		7	7"	
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
otal Lost time (s)	4.0	4.0	4.0		4.0	4.0	
ane Util. Factor	1.00	0.95	0.95		1.00	1.00	
rpb, ped/bikes	1.00	1.00	1.00		1.00	0.94	
lpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	
rt	1.00	1.00	0.99		1.00	0.85	
It Protected	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	3472		1770	1493	
It Permitted	0.38	1.00	1.00		0.95	1.00	
Satd. Flow (perm)	711	3539	3472		1770	1493	
/olume (vph)	45	305	570	60	55	70	
eak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	47	321	600	63	58	74	
RTOR Reduction (vph)	0	0	6	0	.0	56	
ane Group Flow (vph)	47	321	657	Ö	58	18	
Confl. Peds. (#/hr)	381		001	58	-00	75	
Confl. Bikes (#/hr)				20		1	
urn Type	Perm			20		Perm	
Protected Phases	Leilli	2	6		4	reiiii	
Permitted Phases	2	- 4	D		4	4	
CONTRACTOR OF THE PARTY OF THE	46.1	46.1	46.1		17.0	17.0	
Actuated Green, G (s)	47.0	47.0	47.0		17.4	17.4	
Effective Green, g (s)	0.65	0.65	0.65		0.24	0.24	
Actuated g/C Ratio							
Clearance Time (s)	4.9	4.9	4.9		4.4	4.4	
/ehicle Extension (s)	4.8	4.8	3.9		2.0	2.0	
ane Grp Cap (vph)	462	2297	2254		425	359	
/s Ratio Prot		0.09	c0.19		Ø.03		
/s Ratio Perm	0.07					0.01	
/c Ratio	0.10	0.14	0.29		0.14	0.05	
Jniform Delay, d1	4.8	4.9	5.5		21.6	21.1	
Progression Factor	1.00	1.00	1.00		1.00	1.00	
ncremental Delay, d2	0.2	0.1	0.1		0.1	0.0	
Pelay (s)	5.0	5.0	5.6		21.7	21.2	
evel of Service	Α	A	Α		С	С	
Approach Delay (s)		5.0	5.6		21.4		
Approach LOS		A	Α		C		
ntersection Summary			_				
ICM Average Control D			7.2	1	ICM Let	el of Service	A
ICM Volume to Capaci			0.25				
Actuated Cycle Length i			72.4	5	Sum of l	ost time (s)	8.0
ntersection Capacity Ut			71.9%	10	CU Leve	el of Service	¢
Analysis Period (min)			15				
Critical Lane Group							

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 26: University Ave & Park Blvd

10/17/2013

Movement	EBL	EBT										
4	7		EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>↑</b> ₽		7	<b>*</b> 1>		7	<b>1</b>		7	*	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	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
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	0.99		1.00	1.00	0.93
Flpb, ped/bikes	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	0.96		1.00	1.00	0.86
Flt Protected	0.95	1.00		0.95	1,00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770.	3340		1770	3428		1770	3357		1770	3539	1478
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3340		1770	3428		1770	3357		1770	3539	1478
Volume (vph)	40	215	80	115	505	100	85	150	55	50	290	55
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	226	84	121	532	105	89	158	58	53	305	- 58
RTOR Reduction (vph)	0	37	0	0	14	0	0	40	0	0	0	43
Lane Group Flow (vph)	42	273	0	121	623	0	89	176	0	53	305	15
Confl. Peds. (#/hr)			68			42			43	- 4.44		60
Confl. Bikes (#/hr)			8			8			8			8
Turn Type	Prot			Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	-											1
Actuated Green, G (s)	2.0	25.6		7.8	31.4		5.4	21.2		2.9	18.7	18.7
Effective Green, g (s)	2.4	26.5		8.2	32.3		5.8	22.1		3.3	19.6	19.6
Actuated g/C Ratio	0.03	0.35		0.11	0.42		0.08	0.29		0.04	0.26	0.28
Clearance Time (s)	4.4	4.9		4.4	4.9		4.4	4.9		4.4	4.9	4.9
Vehicle Extension (s)	3.0	2.0		3.0	2.0		3.0	3.3		2.0	2.9	2.9
Lane Grp Cap (vph)	56	1163		191	1455		135	975		77	911	380
v/s Ratio Prot	0.02	0.08		c0.07	<b>ക</b> .18		c0.05	0.05		0.03	c0.09	
v/s Ratio Perm	200000				22-2107					X-00000		0.01
v/c Ratio	0.75	0.23		0.63	0.43		0.66	0.18		0.69	0.33	0.04
Uniform Delay, d1	36.6	17.6		32.5	15.4		34.2	20.2		35.9	23.0	21.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	42.7	0.0		6.7	0.1		11.1	0.1		18.4	0.2	0.0
Delay (s)	79.2	17.6		39.2	15.5		45,3	20.3		54.3	23.2	21.2
Level of Service	É	В		D	В		D	С		D	С	C
Approach Delay (s)		25.0			19.3			27.6			26.9	
Approach LOS		С			В			С			С	
Intersection Summary												
HCM Average Control D	elay		23.5	H	ICM Le	vel of Se	ervice		C			
HCM Volume to Capacit			0.43									
Actuated Cycle Length (s)			76.1	5	Sum of I	ost time	(s)		12.0			
Intersection Capacity Utilization			75.3%			el of Ser			D			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 27: Washington St & SR-163 On-Ramp

10/17/2013

	*	-	7	1	-	1	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	ተተተ	7	1.34	<b>†</b> 1>	7		Lucia de la	7		110	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			1%			0%	
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0			4.0		-0.00	
Lane Util. Factor	1.00	0.91	1.00		0.91	0.91			1.00			
Frpb, ped/bikes	1.00	1.00	0.98		0.99	0.99			1.00			
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00			1.00			
Frt	1.00	1.00	0.85		0.92	0.85			0.86			
Flt Protected	0.95	1.00	1.00		1.00	1.00			1.00			
Satd. Flow (prot)	1770	5085	1544		3113	1423			1603			
Flt Permitted	0.95	1.00	1.00		1.00	1.00			1.00			
Satd. Flow (perm)	1770	5085	1544		3113	1423			1603			
Volume (vph)	470	860	165	0	730	1535	0	0	15	0	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	0.98
Adj. Flow (vph)	495	905	174	0.00	768	1616	0.55	0.55	16	0.55	0,33	
				0							0	(
RTOR Reduction (vph)	405	000	174		1405	127	0	0	0	0		
Lane Group Flow (vph)	495	905	174	0	1465	703	0	0	16	0	0	0
Confl. Peds. (#/hr)			1			8						
Confl. Bikes (#/hr)			11			2						
Turn Type	Prot		Perm			Perm		C	ustom			
Protected Phases	5	2			6							
Permitted Phases			2			6			2			
Actuated Green, G (s)	33.1	116.0	116.0		73.6	73.6			116.0			
Effective Green, g (s)	33.5	116.0	116.0		74.5	74.5			116.0			
Actuated g/C Ratio	0.29	1.00	1.00		0.64	0.64			1.00			
Clearance Time (s)	4.4	2.0	2.0		4.9	4.9			2.0			
Vehicle Extension (s)	2.0	3.0	3.0		2.8	2.8			3.0			
Lane Grp Cap (vph)	511	5085	1544		1999	914			1603			
v/s Ratio Prot	c0.28	0.18	14.00		0.47				1000			
v/s Ratio Perm			0.11			c0.49			0.01			
v/c Ratio	0.97	0.18	0.11		0.73	0.77			0.01			
Uniform Delay, d1	40.7	0.0	0.0		14.0	14.7			0.0			
Progression Factor	1.00	1.00	1.00		1.00	1.00			1.00			
Incremental Delay, d2	31.4	0.1	0.1		2.4	6.2			0.0			
Delay (s)	72.1	0.1	0.1		16.4	20.9			0.0			
Level of Service	E	Α.	A		B	20.5 C			A			
Approach Delay (s)		22.7	- 0		18.0	· ·		0.0	_		0.0	
Approach LOS		22.7 C			10.0 B			Α.			Α.	
•		- 14			_			1919			**	
Intersection Summary	lolou		10.0	- 1	IOM La	vel of Sc	nuico		В			
HCM Average Control D			19.8		ICIAI F6.	A610126	sty ice		В			
HCM Volume to Capaci			0.83	-	V 25 I	a a de la Recordo	7.3		0.0			
Actuated Cycle Length (s) 116.0						ost time			8.0			
Intersection Capacity Utilization 96.1%					U Levi	el of Ser	Aice		F			
Analysis Period (min)			15									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 28: Washington St & Lincoln Ave

10/17/2013

Zo. vvasnington St d		III AVE				-00					10,1	72013
	1	-	*	1	+	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	ተተጉ			<b>ተ</b> ቀሱ		7	f)			स	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	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	1.00	0.91			0.91		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
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.97			1.00		1.00	1.00			1.00	0.85
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1770	4877			5077		1770	1863			1842	1583
Flt Permitted	0.95	1.00			1.00		0.95	1.00			0.99	1.00
Satd. Flow (perm)	1770	4877		_	5077		1770	1863			1842	1583
Volume (vph)	60	640	175	0	1665	15	375	10	0	10	35	295
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	674	184	0	1753	16	395	11	0	11	37	311
RTOR Reduction (vph)	0	23	0	0	1	0	0	0	0	0	0	296
Lane Group Flow (vph)	63	835	0	0	1768	0	395	11	0	0	48	15
Confl. Peds. (#/hr)			6			4			19			
Confl. Bikes (#/hr)			7			3						1
Turn Type	Prot						Split			Split		Prot
Protected Phases	5	2			6		3	- 3		4	4	4
Permitted Phases												
Actuated Green, G (s)	8.7	88.7			75.5		29.6	29,6			7.0	7.0
Effective Green, g (s)	9.1	89.6			76.5		30.5	30.5			7.9	7.9
Actuated g/C Ratio	0.06	0.56			0.48		0.19	0.19			0.05	0.05
Clearance Time (s)	4.4	4.9			5.0		4.9	4.9			4.9	4.9
Vehicle Extension (s)	2.0	5.7			6.0		3.0	3,0			2.0	2.0
Lane Grp Cap (vph)	101	2731			2427		337	355			91	78
v/s Ratio Prot	c0.04	0.17			d0.35		c0.22	0.01			c0.03	0.01
v/s Ratio Perm												
v/c Ratio	0.62	0.31			0.73		1.17	0.03			0.53	0.20
Uniform Delay, d1	73.8	18.7			33.4		64.8	52.7			74.2	73.0
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	8.3	0.3			1.6		104.4	0.0			2.5	0.5
Delay (s)	82.1	19.0			35.0		169.2	52.8			76.8	73.5
Level of Service	F	В			D		F	D			E	E
Approach Delay (s)		23.3			35.0			166.0			73.9	
Approach LOS		С			D			F			E	
Intersection Summary			44									
HCM Average Control D	Name and Address of the Owner, where the Parket of the Owner, where the Owner, which is the Owne		51.3	F	ICM Le	vel of Se	ervice		D			
HCM Volume to Capaci			0.82									
Actuated Cycle Length			160.0			ost time	~ ~		36.0			
Intersection Capacity Ut	tilization	1 3	81.5%	J.	CU Lev	el of Ser	vice		D			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 32: Robinson Ave & Park Blvd

10/17/2013

	1	-	-	1	+	1	1	1	1	1	L.	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBL	SBT
Lane Configurations	7	1,			4			की कि			ā	<b>^</b>
Ideal Flow (vphpl)	1900	1900	1900	1900	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			1.00	0.95
Frpb, ped/bikes	1.00	0.99			0.99			1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	1.00
Frt	1.00	0.97			0.96			1.00			1.00	0.99
Flt Protected	0.95	1.00			1.00			0.99			0.95	1.00
Satd. Flow (prot)	1770	1785			1762			3472			1770	3493
Flt Permitted	0.55	1.00			0.97			0.73			0.51	1.00
Satd. Flow (perm)	1022	1785			1716			2560			956	3493
Volume (vph)	30	40	10	25	160	85	105	270	10	55	15	565
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	42	11	26	168	89	111	284	11	58	16	595
RTOR Reduction (vph)	0	0	0	0	33	0	0	0	0	0	0	7
Lane Group Flow (vph)	32	53	Ö	Ō	250	0.	Ō	406	0	0	74	630
Confl. Peds. (#/hr)			24		222	23	====		18	-	4.4	223
Confl. Bikes (#/hr)			9			2			22			
Turn Type	Perm			Perm			Perm			Perm	Perm	
Protected Phases	1.0111)	4		LOIM	8		Citi	2		Lomi	1 Cilli	6
Permitted Phases	4			8			2	-		6	6	-
Actuated Green, G (s)	9.4	9.4			9.4		-	19.3			19.3	19.3
Effective Green, g (s)	10.3	10.3			10.3			20.2			20.2	20.2
Actuated g/C Ratio	0.27	0.27			0.27			0.52			0.52	0.52
Clearance Time (s)	4.9	4.9			4.9			4.9			4.9	4.9
Vehicle Extension (s)	2.0	2.0			2.0			3.5			3.5	3.5
Lane Grp Cap (vph)	273	478			459			1343			502	1833
v/s Ratio Prot	213	0.03			433			1343			302	c0.18
v/s Ratio Piot	0.03	0.03			c0.15			0.16			0.08	00.70
v/c Ratio	0.03	0.11			0.54			0.30			0.15	0.34
Uniform Delay, d1	10.7	10.6			12.1			5.2			4.7	5.3
Progression Factor	1.00	1.00			1.00			1.00			1.00	1.00
Incremental Delay, d2	0.1	0.0			0.7			0.2			0.2	0.1
Delay (s)	10.7	10.7			12.8			5.3			4.9	5.4
Level of Service	B-	В			12.0 B			3.3 A			Α.5	Δ.4
		10.7			12.8			5.3			^	5.4
Approach Delay (s) Approach LOS		В.			12.0 B			Α.				Δ,
Intersection Summary												
HCM Average Control [			7.1	1	ICM Le	vel of Si	ervice		Α			
HCM Volume to Capaci			0.41									
Actuated Cycle Length			38.5		Sum of I	ost time	(s)		8.0			
Intersection Capacity U	tilization		65.5%	þ	CU Levi	el of Sei	vice		C			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





# HCM Signalized Intersection Capacity Analysis 32: Robinson Ave & Park Blvd

10/17/2013



Movement	SBR	
Lance Configurations		
Ideal Flow (vphpl)	1900	
Total Lost time (s)		
Lane Util. Factor		
Frpb, ped/bikes		
Flpb, ped/bikes		
Frt		
Fit Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Volume (vph)	40	
Peak-hour factor, PHF	0.95	
Adj. Flow (vph)	42	
RTOR Reduction (vph)	0	
Lane Group Flow (vph)	0	
Confl. Peds. (#/hr)	35	
Confl. Bikes (#/hr)	8	
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Vehicle Extension (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s)		
Level of Service		
Approach Delay (s)		
Approach LOS		
11.		
Intersection Summary		

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





#### HCM Unsignalized Intersection Capacity Analysis 35: University Ave & Hawk St

10/17/2013

35: University Ave 8	ersity Ave & Hawk St										10/1	10/17/2013		
	1	-	7	1	+	1	1	†	1	1	1	1		
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR		
Lane Configurations		4			4			4	1		4			
Sign Control		Free			Free			Stop			Stop			
Grade		0%			0%			0%			0%			
Volume (veh/h)	0	245	30	10	440	15	35	- 5	10	0	0	10		
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95		
Hourly flow rate (vph)	0	258	32	11	463	16	37	5	11	0	0	11		
Pedestrians														
Lane Width (ft)														
Walking Speed (ft/s)														
Percent Blockage														
Right turn flare (veh)														
Median type								None			None			
Median storage veh)														
Upstream signal (ft)					324									
pX , platoon unblocked	0.84			500			0.84	0.84	- 50-21	0.84	0.84	0.84		
vC, conflicting volume	479			289			776	774	274	779	782	471		
vC1, stage 1 conf vol														
vC2, stage 2 conf vol							222							
vCu, unblocked vol	377			289			733	730	274	736	739	368		
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2		
tC, 2 stage (s)	0.0			0.0			0.5	4.6	~~	0.6	4.6	0.0		
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3		
pO queue free %	100			99			87	98	99	100	100	98		
cM capacity (veh/h)	988			1272			275	290	765	271	286	567		
Direction, Lane #	EB1	WB 1	NB1	SB1										
Volume Total	289	489	53	11										
Volume Left	0	11	37	0										
Volume Right	32	16	11	11										
cSH	988	1272	317	567										
Volume to Capacity	0.00	0.01	0.17	0.02										
Queue Length 95th (ft)	0	_ 1	15	1										
Control Delay (s)	0.0	0.3	18.6	11.5										
Lane LOS		A	C	В										
Approach Delay (s)	0.0	0.3	18.6	11.5										
Approach LOS			С	В										
Intersection Summary														
Average Delay			1.5											
Intersection Capacity Ut	tilization	b 3	48.3%	- 10	CU Lev	el of Ser	vice		A					
Analysis Period (min)			15											

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis
40: University Ave & Goldfinch St

10/17/2013

	1	-	1	1	+	*	1	1	-	1	+	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	B		*	1>		7	1		7	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	20 20 20 20	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	
Frt	1.00	0.97		1.00	0.96		1.00	0.92		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1810		1770	1796		1770	1709		1770	1853	
Flt Permitted	0.32	1.00		0.61	1.00		0.66	1.00		0.59	1.00	
Satd. Flow (perm)	592	1810		1128	1796		1236	1709		1093	1853	
Volume (vph)	15	190	45	95	365	115	65	115	140	105	135	E
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	200	47	100	384	121	68	121	147	111	142	5
RTOR Reduction (vph)	0	21	0	0	28	0	0	88	0	0	3	Û
Lane Group Flow (vph)	16	226	0	100	477	0	68	180	0	111	144	C
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	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		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	237	724		451	718		494	684		437	741	
v/s Ratio Prot		0.12			c0.27			c0.11			0.08	
v/s Ratio Perm	0.03			0.09			0.06			0.10		
v/c Ratio	0.07	0.31		0.22	0.66		0.14	0.26		0.25	0.19	
Uniform Delay, d1	7.4	8.2		7.9	9.8		7.6	8.0		8.0	7.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	1.1		1,1	4.8		0.6	0.9		1.4	0.6	
Delay (s)	7.9	9.4		9.0	14.6		8.2	9.0		9.4	8.4	
Level of Service	A	A		Α	В		A.	A		A	A	
Approach Delay (s)		9.3			13.7			8.8			8.8	
Approach LOS		Α.			В			Α			A	
Intersection Summary												
HCM Average Control D	)elay		10.9	H	ICM Lev	el of S	ervice		В			
HCM Volume to Capaci			0.46									
Actuated Cycle Length (			40.0	S	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut		3	63,3%			el of Sei	20,74		В			
Analysis Period (min)			15				77.9					
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





#### HCM Unsignalized Intersection Capacity Analysis 169: University Ave & Front St

10/17/2013

	-	7	1	*	1	-	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	<b>1</b> >			र्स	A		
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Volume (veh/h)	440	85	45	500	55	35	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	463	89	47	526	58	37	
Pedestrians					1.25.00		
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type					None		
Median storage veh)					A 100 (100)		
Upstream signal (ft)				332			
pX, platoon unblocked				375	0.88		
vC, conflicting volume			553		1129	508	
vC1, stage 1 conf vol							
vC2, stage 2 conf vol							
vCu, unblocked vol			553		1147	508	
tC, single (s)			4.1		6.4	6.2	
tC, 2 stage (s)							
tF (s)			2.2		3.5	3.3	
pO queue free %			95		69	93	
cM capacity (veh/h)			1017		184	565	
Direction, Lane #	EB 1	WB 1	NB1		-	1.001	
Volume Total	553	574	95				
Volume Left	000	47	58				
Volume Right	89	- 0	37				
cSH	1700	1017	250				
Volume to Capacity	0.33	0.05	0.38				
Queue Length 95th (ft)	0.55	4	42				
Control Delay (s)	0.0	1.3	27.9				
Lane LOS	0.0	A	D D				
Approach Delay (s)	0.0	1.3	27.9				
Approach LOS	5.5	179	D				
Intersection Summary							
Average Delay			2.8				
Intersection Capacity Ut	ilization		72.3%	10	CULeve	el of Service	C
Analysis Period (min)			15	10		21 9311100	

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





Diversion Analysis

# HCM Unsignalized Intersection Capacity Analysis 194: Washington St & Fifth Ave

10/17/2013

	1	-	-	1	1	1	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		<b>^</b>	<b>^</b>			7	
Sign Control		Free	Free		Stop	-	
Grade		0%	0%		0%		
Volume (veh/h)	0	0	1475	430	0	15	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	0	0	1553	453	0	16	
Pedestrians							
ane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type					None		
Median storage veh)					110110		
Jpstream signal (ft)		248	112				
X, platoon unblocked	0.78	240	112		0.78	0.78	
C, conflicting volume	2005				1779	1003	
C1, stage 1 conf vol	2003				1110	1005	
C2, stage 2 conf vol							
Cu, unblocked vol	2007				1718	726	
C, single (s)	4.1				6.8	6.9	
C, Sirgle (s) C, 2 stage (s)	4:1				0.0	0.5	
F(s)	2.2				3.5	3.3	
oO queue free %	100				100	95	
	220				63	287	
cM capacity (veh/h)	220				63	207	
Direction , Lane #	EB 1	EB 2	WB1	WB2	SB 1		
/olume Total	0	0	1035	970	16		
/olume Left	0	0	0	0	0		
/olume Right	0	0	0	453	16		
SH	1700	1700	1700	1700	287		
/olume to Capacity	0.00	0.00	0.61	0.57	0.05		
Queue Length 95th (ft)	0	0	0	0	4		
Control Delay (s)	0.0	0.0	0.0	0.0	18,3		
lane LOS					C		
Approach Delay (s)	0.0		0.0		18.3		
Approach LOS					С		
ntersection Summary			170				
werage Delay			0.1				
ntersection Capacity Ut	tilization		64.5%	1	CU Levi	el of Service	C
Analysis Period (min)			15				

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Diversion Analysis

HCM Unsignalized Intersection Capacity Analysis 194: Washington St & Fifth Ave

10/17/2013

	1	-	+	*	1	1	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		<b>十</b> 个	朴			7"	
Sign Control		Free	Free		Stop		
Grade		0%	0%		0%		
Volume (veh/h)	0	0	1475	430	0	15	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	0	0	1553	453	0	16	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type					None		
Median storage veh)							
Upstream signal (ft)		248	112				
pX, platoon unblocked	0.78				0.78	0.78	
vC, conflicting volume	2005				1779	1003	
vC1, stage 1 conf vol	OT THE REAL PROPERTY.						
vC2, stage 2 conf vol							
vCu, unblocked vol	2007				1718	726	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)					FAT	7.77	
tF (s)	2.2				3.5	3.3	
pO queue free %	100				100	95	
cM capacity (veh/h)	220				63	287	
Direction, Lane #	EB1	EB 2	WB1	WB2	SB 1		
Volume Total	0	0	1035	970	16		_
Volume Left	0	0	0	0,0	0		
Volume Right	0	0	Ö	453	16		
cSH	1700	1700	1700	1700	287		
Volume to Capacity	0.00	0.00	0.61	0.57	0.05		
Queue Length 95th (ft)	0.00	0.00	0.01	0.57	4		
Control Delay (s)	0.0	0.0	0.0	0.0	18.3		
Lane LOS	0.0	0.0	0.0	0.0	C		
Approach Delay (s)	0.0		0.0		18.3		
Approach LOS	0.0		0.0		C		
Intersection Summary							
Average Delay			0.1				
Intersection Capacity Ut	ilization		64.5%	þ	CU Levi	el of Service	C
Analysis Period (min)			15				

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#### HCM Signalized Intersection Capacity Analysis 1: Washington St & First Ave

10/17/2013

	1	-	1	1	-	*	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>1</b>		1	<b>†</b>			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				
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00				
Frpb, ped/bikes	1.00	0.98		1.00	0.99			0.98				
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00				
Frt	1.00	0.99		1.00	0.98			0.95				
Flt Protected	0.95	1.00		0.95	1,00			0.99				
Satd. Flow (prot)	1770	3423		1770	3420			1707				
Flt Permitted	0.14	1.00		0.08	1,00			0.99				
Satd. Flow (perm)	253	3423		152	3420			1707				
Volume (vph)	125	1205	120	140	870	150	125	145	180	0	0	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)	132	1268	126	147	916	158	132	153	189	0	0	- 0
RTOR Reduction (vph)	0	7	0	0	12	0	0	21	0	0	0	Ċ
Lane Group Flow (vph)		1387	0	147	1062	0	0	453	0	0	0	- 0
Confl. Peds. (#/hr)	COM-HV	1000	58			32			26			49
Confl. Bikes (#/hr)			19			7			4			6
Turn Type	pm+pt			pm+pt			Perm					
Protected Phases	5	2		1	6			4				
Permitted Phases	2			6			4					
Actuated Green, G (s)	56.7	48.3		56.3	48.1			36.5				
Effective Green, g (s)	58.0	49.2		57.6	49.0			37.4				
Actuated g/C Ratio	0.53	0.45		0.52	0.45			0.34				
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9				
Vehicle Extension (s)	2.0	1.0		2.0	1.0			1.0				
Lane Grp Cap (vph)	255	1531		206	1523			580				
v/s Ratio Prot	0.04	c0.41		c0.06	0.31							
v/s Ratio Perm	0.23			0.32	.=			0.27				
v/c Ratio	0.52	0.91		0.71	0.70			0.78				
Uniform Delay, d1	16.9	28.3		21.9	24.5			32.6				
Progression Factor	1.00	1.00		1.00	1.00			1.00				
Incremental Delay, d2	0.7	9.3		9.3	2.7			10.0				
Delay (s)	17.6	37.6		31.2	27.2			42.7				
Level of Service	В	D		C	C			D				
Approach Delay (s)		35.8			27.7			42.7			0.0	
Approach LOS		D			C			D			A	
Intersection Summary												
HCM Average Control [	Delay		33.8	H	ICM Le	vel of Se	ervice		C			
HCM Volume to Capac			0.78									
Actuated Cycle Length			110.0	5	Sum of I	ost time	(s)		8.0			
Intersection Capacity U	tilization		88.5%		Contract Con	el of Ser			E			
Analysis Period (min)			15		-		4000		-			
c Critical Lane Group												

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#### HCM Signalized Intersection Capacity Analysis

3: Washington St & Fifth Ave	10/17/2013

	-	1	1	+	1	-	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	*			- 11	de	7	
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0			4.0	4.0	4.0	
ane Util. Factor	0.95			0.95	0.97	0.91	
rpb, ped/bikes	1.00			1.00	0.97	0.95	
lpb, ped/bikes	1.00			1.00	1.00	1.00	
rt	1.00			1.00	0.95	0.85	
It Protected	1.00			1.00	0.97	1.00	
Satd. Flow (prot)	3539			3539	3243	1369	
It Permitted	1.00			1.00	0.97	1.00	
Satd. Flow (perm)	3539			3539	3243	1369	
/olume (vph)	1660	0	0	1065	445	465	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	1747	0	0	1121	468	489	
RTOR Reduction (vph)	0	0	0	0	14	14	
ane Group Flow (vph)	1747	0	0	1121	667	262	
onfl. Peds. (#/hr)		52				31	
onfl. Bikes (#/hr)		14					
urn Type						Perm	
rotected Phases	2			6	8		
ermitted Phases						8	
Actuated Green, G (s)	70.5			70.5	24.2	24.2	
ffective Green, g (s)	71.4			71.4	24.6	24.6	
Actuated g/C Ratio	0.69			0.69	0.24	0.24	
learance Time (s)	4.9			4.9	4.4	4.4	
/ehicle Extension (s)	1.0			1.0	1.0	1.0	
ane Grp Cap (vph)	2430			2430	767	324	
/s Ratio Prot	c0.49			0.32	c0.21		
/s Ratio Perm	- Carrier			***		0.19	
/c Ratio	0.72			0.46	0.87	0.81	
Jniform Delay, d1	10.1			7.5	38.2	37.5	
Progression Factor	1.00			1.00	1.00	1.00	
ncremental Delay, d2	1.9			0.6	10.0	13.1	
elay (s)	12.0			8.1	48.2	50.6	
evel of Service	В			Α	D	D	
Approach Delay (s)	12.0			8.1	48.9		
Approach LOS	В			Α	D		
ntersection Summary							
ICM Average Control [	) ela y		20.1	+	ICM Lev	el of Service	C
CM Volume to Capaci			0.76				
Actuated Cycle Length			104.0	5	Sum of l	ost time (s)	8.0
ntersection Capacity U			74.5%		Commence of the Commence of th	el of Service	D
Analysis Period (min)			15			W 2015/2005512	-
Critical Lane Group							

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## HCM Signalized Intersection Capacity Analysis 4: Washington St & Goldfinch St

10/17/2013

	1	-	1	1	-	1	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	<b>1</b>		7	<b>†</b>		7	1		7	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	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		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	1.00	
Frt	1.00	1.00		1.00	0.99		1.00	0.94		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3532		1770	3474		1770	1759		1770	1830	
Flt Permitted	0.95	1.00		0.95	1.00		0.54	1.00		0.49	1.00	
Satd. Flow (perm)	1770	3532		1770	3474		1011	1759		910	1830	
Volume (vph)	245	710	10	145	765	60	65	135	80	250	165	15
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)	258	747	11	153	805	63	68	142	84	263	174	16
RTOR Reduction (vph)	0	1	0	0	5	Ō	0	22	0	0	4	Ĉ
Lane Group Flow (vph)	258	757	0	153	863	0	68	204	0	263	186	- 0
Confl. Peds. (#/hr)	55.5		-		777	27						27
Confl. Bikes (#/hr)						3						18
Turn Type	Prot			Prot	_		Perm			Perm	_	
Protected Phases	5	2		1	6		Citi	8		Cilli	4	
Permitted Phases	10	-		- '	- 90		8			4	- 1	
Actuated Green, G (s)	17.9	46.8		13.3	41.8		31.0	31.0		30.1	30.1	
Effective Green, g (s)	18.3	47.7		13.3	42.7		31.0	31.0		31.0	31.0	
Actuated g/C Ratio	0.18	0.46		0.13	0.41		0.30	0.30		0.30	0.30	
Clearance Time (s)	4.4	4.9		4.0	4.9		4.0	4.0		4.9	4.9	
Vehicle Extension (s)	2.0	3.3		3.0	3.3		3.0	3.0		2.0	2.0	
Lane Grp Cap (vph)	311	1620		226	1426		301	524		271	545	
v/s Ratio Prot	c0.15	0.21		0.09	d0.25		301	0.12		27.1	0.10	
v/s Ratio Perm	60.13	0.21		0.05	W.23		0.07	0.12		о <del>0.29</del>	0.10	
v/c Ratio	0.83	0.47		0.68	0.61		0.23	0.39		0.97	0.34	
Uniform Delay, d1	41.3	19.4		43.3	24.0		27.5	29.0		36.0	28.5	
Progression Factor	1.00	1.00		0.92	1.22		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.8	1.0		6.9	1.7		0.4	0.5		46.2	0.1	
Delay (s)	57.1	20.4		46.7	31.1		27.9	29.5		82.2	28.7	
Level of Service	E	20.4 C		D	C		27.5	23.3 C		02.2 F	20.7 C	
Approach Delay (s)		29.7		U	33.4		0	29.1		,	59.8	
Approach LOS		20.r			0.4 C			23,1 C			55.0 E	
Intersection Summary			-									
HCM Average Control D	) ela v		35.9	1	ICM Le	vel of S	ervice		D			
HCM Volume to Capaci			0.77			_						
Actuated Cycle Length			104.0	9	Sum of I	ost time	(s)		12.0			
Intersection Capacity Ut			76.0%			el of Sei			D			
Analysis Period (min)			15	-			-00-00-		-			
c Critical Lane Group			,0									

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#### HCM Signalized Intersection Capacity Analysis

5:	Washington	St &	Front St

10/17/2013

	1	-	1	1	*	1	1	1	*	1	+	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>1</b>			44	-	- this	4	-	7	4	7
Ideal Flow (vphpl)	1900	1900	1900	1900	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		0.95			0.95			1.00		0.95	0.95	1.00
Frpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	0.95
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	1.00
Frt		1.00			1.00			0.91		1.00	1.00	0.85
Flt Protected		1.00			1.00			0.98		0.95	0.95	1.00
Satd. Flow (prot)		3532			3538			1664		1681	1681	1506
Flt Permitted		1.00			0.95			0.93		0.75	0.75	1.00
Satd. Flow (perm)		3532			3362			1568		1322	1322	1506
Volume (vph)	0	1115	15	5	940	0	5	0	10	380	0	295
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
Growth Factor (vph)	100%	100%	100%	100%	100%	100%	100%	100%	100%	102%	100%	100%
Adj. Flow (vph)	0	1174	16	5	989	0	5	0	11	408	0	311
RTOR Reduction (vph)	0	1	0	0	0	Ō	Ō	- 8	0	0	Ō	56
Lane Group Flow (vph)	Ö	1189	ŏ	Ö	994	Ō	ō	8	Ō	204	204	255
Confl. Peds. (#/hr)		1.00				36	-i					19
Confl. Bikes (#/hr)						6						16
Turn Type				Perm			Perm			Perm		Perm
Protected Phases		2		Femi	6		L CITI	8		Femili	4	Leim
Permitted Phases		- 4		6	· ·		8			4		4
Actuated Green, G (s)		70.9			70.9			24.2		23.3	23.3	23.3
Effective Green, g (s)		71.8			71.8			24.2		24.2	24.2	24.2
Actuated g/C Ratio		0.69			0.69			0.23		0.23	0.23	0.23
Clearance Time (s)		4.9			4.9			4.0		4.9	4.9	4.9
		3.0			3.0			3.0		3.0	3.0	3.0
Vehicle Extension (s)		2438			2321			365		308	308	350
Lane Grp Cap (vph)					2021			200		200	200	220
v/s Ratio Prot		c0.34			0.30			0.00		0.45	0.45	c0.17
v/s Ratio Perm		0.40								0.15	0.15	
v/c Ratio		0.49			0.43			0.02		0.66	0.66	0.73
Uniform Delay, d1		7.5			7.1			30.8		36.2	36.2	36.9
Progression Factor		0.76			1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2		0.6			0.6			0.0		5.3	5.3	7.4
Delay (s)		6.3			7.7			30.8		41.5	41.5	44.3
Level of Service		A			A			C		D	D	D
Approach Delay (s)		6.3			7.7			30.8			42.7	
Approach LOS		A			А			C			D	
Intersection Summary												
HCM Average Control [			15.9	- F	ICM Le	velofS	ervice		В			
HCM Volume to Capaci			0.55									
Actuated Cycle Length			104.0			ost time			8.0			
Intersection Capacity Ut	tilization		60.3%	þ	CU Lev	el of Se	rvice		В			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





WBT

1900

0.95

0.99

1.00

0.99

1.00

3486

1.00

3486

1035

0.95

1089

1153

4.0

1900

65

68

0

0

35

10

0.95

NBL

1900

0,95

0

0

0

NBT

1900

0.95

0

0

0

NBR

1900

0.95

0

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0

12.0

WBL

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1900

0.97

1.00

1.00

1.00

0.95

3433

0.95

3433

330

0.95

347

347

0

4.0

#### HCM Signalized Intersection Capacity Analysis

1900

4.0

1.00

1.00

1.00

1.00

0.95

1770

0.95

1770

0.95

70

74

O.

74

EBT

900

4.0

0.95

0.99

1.00

0.99

1.00

3463

1.00

3463

1220

0.95

1284

1409

1900

125

0.95

132

0

0

43

10

0.89

104.0

82.0%

15

7: Washington	St & Fourth	AVA
7. Washington	OL & FOULTH	AVE

Movement

Lane Configurations

Ideal Flow (vphpl)

Total Lost time (s)

Lane Util. Factor

Frpb, ped/bikes

Flpb, ped/bikes

Satd. Flow (prot)

Satd. Flow (perm)

Peak-hour factor, PHF

RTOR Reduction (vph)

Lane Group Flow (vph)

Confl. Peds. (#/hr)

Confl. Bikes (#/hr)

Flt Protected

Flt Permitted

Volume (vph)

Adj. Flow (vph)

Frt

1	1	1
SBL	SBT	SBR
7	सी	7
1900	1900	1900
4.0	4.0	4.0
0.95	0.95	1.00
1.00	1.00	0.97
1.00	1.00	1.00
1.00	1.00	0.85
0.95	0.97	1.00
1681	1723	1537
0.95	0.97	1.00
1681	1723	1537
675	205	160
0.95	0.95	0.95
711	216	168
.0	0	58
451	476	110
		10
		10
Perm		Perm
	4	10

10/17/2013

Comit. Dikes (milit)			10		10				1.0
Turn Type	Prot		Prot				Perm		Perm
Protected Phases	5	2	1	6				4	
Permitted Phases							4		4
Actuated Green, G (s)	7.6	48.2	11.7	52.3			29.9	29.9	29.9
Effective Green, g (s)	8.0	49.1	12.1	53.2			30.8	30.8	30.8
Actuated g/C Ratio	0.08	0.47	0.12	0.51			0.30	0.30	0.30
Clearance Time (s)	4.4	4.9	4.4	4.9			4.9	4.9	4.9
Vehicle Extension (s)	2.0	0.2	1.0	0.2			1.0	1.0	1.0
Lane Grp Cap (vph)	136	1635	399	1783			498	510	455
v/s Ratio Prot	0.04	c0.41	c0.10	0.33					
v/s Ratio Perm							0.27	0.28	0.07
v/c Ratio	0.54	0.86	0.87	0.65			0.91	0.93	0.24
Uniform Delay, d1	46.2	24.4	45.2	18.5			35.2	35.6	27.8
Progression Factor	1.00	1.00	1.13	1.00			1.00	1.00	1.00
Incremental Delay, d2	2.4	6.2	16.0	1.7			19.5	24.0	0.1
Delay (s)	48.6	30.7	67.1	20.1			54.7	59.6	27.9
Level of Service	D	C	E	C			D	E	C
Approach Delay (s)		31.5		31.0		0.0		52.7	
Approach LOS		С		С		Α		D	
Intersection Summary			Tar -						
HCM Average Control D	elay (		37.0 H	ICM Levi	el of Service		D		

Sum of lost time (s)

ICU Level of Service

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates

Synchro 6 Report Page 5



HCM Volume to Capacity ratio

Intersection Capacity Utilization

Actuated Cycle Length (s)

Analysis Period (min)

c Critical Lane Group



HCM Signalized Intersection Capacity Analysis
11: Washington St & SR-163 Off-Ramp

10/17/2013

	-	1	-	1	1	1	1	1	1	1	1	t
Movement	EBT	EBR	WBT	WBR	NBL	NBT	NBR2	SBL	SBT	SBR	SWR	SWR2
Lane Configurations	<b>1</b>		<b>^</b>			4		47.	4		Z.	
Ideal Flow (vphpl)	1900	1900	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	0.95		0.95			1.00			1.00		1.00	
Frpb, ped/bikes	0.99		1.00			1.00			1.00		1.00	
Flpb, ped/bikes	1.00		1.00			1.00			1.00		1.00	
Frt	0.99		1.00			0.95			0.98		0.86	
Flt Protected	1.00		1.00			0.98			0.98		1.00	
Satd. Flow (prot)	3467		3534			1726			1773		1611	
Flt Permitted	1,00		1.00			0.83			0.83		1.00	
Satd. Flow (perm)	3467		3534			1460			1502		1611	
Volume (vph)	2290	235	560	5	60	15	45	15	10	5	590	5
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)	2411	247	589	5	63	16	47	16	11	5	621	5
RTOR Reduction (vph)	8	0	0	0	0	25	0	0	4	0	0	0
Lane Group Flow (vph)	2650	0	594	0	0	101	0	0	28	0	626	0
Confl. Peds. (#/hr)		18		1						7		
Turn Type	-				Perm			Perm		0	custom	
Protected Phases	2		6			8			4		5	
Permitted Phases					8	100		4				
Actuated Green, G (s)	38.5		38.5			11.7			11.2		36.3	
Effective Green, g (s)	39.5		39.5			11.7			11.7		36.8	
Actuated g/C Ratio	0.40		0.40			0.12			0.12		0.37	
Clearance Time (s)	5.0		5.0			4.0			4.5		4.5	
Vehicle Extension (s)	2.0		2.0			0.9			2.0		2.0	
Lane Grp Cap (vph)	1369		1396			171			176		593	
v/s Ratio Prot	c0.76		0.17						23.4		c0.39	
v/s Ratio Perm						c0.07			0.02			
v/c Ratio	1.94		0.43			0.59			0.16		1.06	
Uniform Delay, d1	30.2		22.0			41.9			39.7		31.6	
Progression Factor	1.00		1.00			1.00			1.00		1.00	
Incremental Delay, d2	423.8		1.0			3.6			0.2		52.5	
Delay (s)	454.1		23.0			45.5			39.9		84.1	
Level of Service	F		С			D			D		F	
Approach Delay (s)	454.1		23.0			45.5			39.9			
Approach LOS	F		C			D			D			
Intersection Summary												
HCM Average Control D	) ela y		317.2	ŧ	ICM Lev	el of S	ervice		F			
HCM Volume to Capaci			1.39									
Actuated Cycle Length (			100.0	S	Sum of l	st time	(s)		12.0			
Intersection Capacity Ut			86.6%		CU Leve				E			
Analysis Period (min)			15									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis
14: Normal St & Park Blvd

10/17/2013

	1	-	7	1	-	1	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	75	<b>^</b>	7	7	1	7	7	<b>^</b>	7	7	<b>†</b> 1>	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.96	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	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	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)	3433	3539	1532	1770	3539	1529	1770	3539	1518	1770	3329	1441
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)	3433	3539	1532	1770	3539	1529	1770	3539	1518	1770	3329	1441
Volume (vph)	485	715	130	160	435	60	75	320	230	80	255	195
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)	511	753	137	168	458	63	79	337	242	84	268	205
RTOR Reduction (vph)	0	0	90	0	0	44	0	0	0	.0	8	125
Lane Group Flow (vph)	511	753	47	168	458	19	79	337	242	84	297	43
Confl. Peds. (#/hr)			5			16			38			
Confl. Bikes (#/hr)			25			16			1			
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Prot
Protected Phases	5	2		1	6		3	8		7	4	4
Permitted Phases			2	77776	and the same of the	6	.=	221212	8	-		THE ST AND
Actuated Green, G (s)	17.2	31.7	31.7	12.9	26.9	26.9	6.7	24.6	24.6	5.2	23.1	23.1
Effective Green, g (s)	19.1	33.6	33.6	14.3	28.8	28.8	8.1	26.5	26.5	6.6	25.0	25.0
Actuated g/C Ratio	0.20	0.35	0.35	0.15	0.30	0.30	0.08	0.27	0.27	0.07	0.26	0.26
Clearance Time (s)	5.9	5.9	5.9	5.4	5.9	5.9	5.4	5.9	5.9	5.4	5.9	5.9
Vehicle Extension (s)	2.0	4.8	4.8	2.0	3.8	3,8	2.0	3.5	3.5	2.0	3.9	3,9
Lane Grp Cap (vph)	676	1226	531	261	1051	454	148	967	415	120	858	371
v/s Ratio Prot	c0.15	c0.21		0.09	0.13		0.04	0.10		d0.05	0.09	0.03
v/s Ratio Perm			0.03			0.01			c0.16			
v/c Ratio	0.76	0.61	0.09	0.64	0.44	0.04	0.53	0.35	0.58	0.70	0.35	0.12
Uniform Delay, d1	36.8	26.3	21.4	39.0	27.5	24.3	42.6	28.3	30.5	44.2	29.3	27.6
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	4.3	1.3	0.1	4.0	0.4	0.0	1.8	0.3	2.2	13.4	0.3	0.2
Delay (s)	41.0	27.6	21.5	43.0	27.9	24.3	44.5	28.6	32.7	57.7	29.7	27.7
Level of Service	D	0	С	D	0	С	D	0	С	Е	C	С
Approach Delay (s)		31.9			31.3			32.0			33.3	
Approach LOS		С			С			C			С	
Intersection Summary					at II							
HCM Average Control D			32.0	- 1	ICM Le	vel of Se	ervice		С			
HCM Volume to Capaci			0.60	- 12			73		6.6			
Actuated Cycle Length			97.0			ost time	4.7		8.0			
Intersection Capacity Ut	tilization		78.4%	10	JU Lev	el of Ser	vice		D			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis
15: University Ave & First Ave

10/17/2013

	1	-	*	1	-	*	1	†	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4		100	4			4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	DOCUME		4.0	and the same		4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.98			0.98			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.98			0.98			0.99	
Flt Protected		1.00			1.00			0.99			0.99	
Satd. Flow (prot)		1760			1782			1767			1806	
Flt Permitted		0.96			0.93			0.82			0.87	
Satd. Flow (perm)		1691			1656			1473			1589	
Volume (vph)	30	405	140	50	460	100	165	310	105	45	190	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)	32	426	147	53	484	105	174	326	111	47	200	26
RTOR Reduction (vph)	0	23	0	0	13	0	0	16	0	0	8	0
Lane Group Flow (vph)	0	583	0	0	629	0	0	595	0	0	266	0
Confl. Peds. (#/hr)		222	37	- 7	255	52		777	34			51
Confl. Bikes (#/hr)			7			6			5			4
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	1.01111	2		1 01111	2		01111	4		,	4	
Permitted Phases	2	7		2	100		4			4	- 41	
Actuated Green, G (s)		21.1			21.1			21.1			21.1	
Effective Green, g (s)		22.0			22.0			22.0			22.0	
Actuated g/C Ratio		0.42			0.42			0.42			0.42	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		715			701			623			672	
v/s Ratio Prot		110			101			020			012	
v/s Ratio Perm		0.34			d0.38			c0.40			0.17	
v/c Ratio		0.81			0.90			0.96			0.40	
Uniform Delay, d1		13.2			13.9			14.5			10.4	
Progression Factor		1.00			1.02			1.00			1.00	
Incremental Delay, d2		9.9			15.4			25.1			0.1	
Delay (s)		23.1			29.6			39.6			10.5	
Level of Service		C			C			D			В	
Approach Delay (s)		23.1			29.6			39.6			10.5	
Approach LOS		С			C			D			В	
Intersection Summary												
HCM Average Control D	) ela y		28.2	F	ICM Le	vel of Se	ervice		С			
HCM Volume to Capaci			0.93									
Actuated Cycle Length (			52.0		Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut		1	05.1%	þ	CU Lev	el of Ser	vice		G			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





## HCM Signalized Intersection Capacity Analysis 16: University Ave & Fourth Ave

10/17/2013

	*	-	1	-	+	4	4	4		-	1	1
		1		*			7	1	-			
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		<b>1</b> >		7	1		1250			1000	474	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0		4.0	4.0						4.0	
Lane Util. Factor		1.00		1.00	1.00						0.95	
Frpb, ped/bikes		0.98		1.00	1.00						0.99	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.97		1.00	1.00						0.99	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		1784		1770	1863						3426	
Flt Permitted		1.00		0.30	1.00						0.99	
Satd. Flow (perm)		1784		553	1863						3426	
Volume (vph)	0	390	90	245	525	0	0	0	0	120	420	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)	0	411	95	258	553	0	0	0	0	126	442	42
RTOR Reduction (vph)	0	7	0	0	0	0	0	0	0	0	5	0
Lane Group Flow (vph)	0	499	0	258	553	0	0	0	0	0	605	. 0
Confl. Peds. (#/hr)			47			49			21			55
Confl. Bikes (#/hr)			3			1						3
Turn Type				pm+pt						Perm		
Protected Phases		2		1	6						4	
Permitted Phases				6						4	-	
Actuated Green, G (s)		50.0		67.9	67.9						22.5	
Effective Green, g (s)		50.9		68.8	68.8						23.4	
Actuated g/C Ratio		0.49		0.66	0.66						0.22	
Clearance Time (s)		4.9		4.4	4.9						4.9	
Vehicle Extension (s)		2.0		3.0	2.0						2.0	
Lane Grp Cap (vph)		873		528	1232	_					771	
v/s Ratio Prot		c0.28		c0.07	0.30							
v/s Ratio Perm		*****		0.26	.=175						0.18	
v/c Ratio		0.57		0.49	0.45						0.78	
Uniform Delay, d1		18.8		9.9	8.5						37.9	
Progression Factor		0.89		2.45	1.06						1.00	
Incremental Delay, d2		1.5		0.6	0.1						4.8	
Delay (s)		18.3		24.9	9.1						42.8	
Level of Service		В		C	A						D	
Approach Delay (s)		18.3		- Č	14.1			0.0			42.8	
Approach LOS		В			В			A			D	
Intersection Summary										_		
HCM Average Control D	elay		24.3	H	ICM Lev	el of Se	ervice		С			
HCM Volume to Capacit			0.59									
Actuated Cycle Length (			104.0	S	Sum of I	ost time	(s)		12.0			
Intersection Capacity Uti			70.2%			el of Ser			C			
Analysis Period (min)			15				0055		2.			
c Critical Lane Group			- 1-									

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HCM Signalized Intersection Capacity Analysis 17: University Ave & Fifth Ave

10/17/2013

	1	-	1	1	+	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			<b>^</b>	7		414				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	Document		4.0	4.0		4.0				
Lane Util. Factor		1.00			0.95	1.00		0.91				
Frpb, ped/bikes		1.00			1.00	0.74		0.95				
Flpb, ped/bikes		1.00			1.00	1.00		1.00				
Frt		1.00			1.00	0.85		0.95				
Flt Protected		0.99			1.00	1.00		0.99				
Satd. Flow (prot)		1853			3539	1170		4555				
Flt Permitted		0.84			1.00	1.00		0.99				
Satd. Flow (perm)		1565			3539	1170		4555				
Volume (vph)	70	605	0	0	795	310	130	590	370	0	0	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)	7.4	637	0	0	837	326	137	621	389	0	0	0
RTOR Reduction (vph)	0	0	0	0	.0	73	0	89	0	0	0	Ċ
Lane Group Flow (vph)	0	711	Ō	0	837	253	o o	1058	0	0	0	0
Confl. Peds. (#/hr)			134	7	201	136		1555	97	-		91
Confl. Bikes (#/hr)			8			20			4			24
Turn Type	Perm					Perm	Perm		-			
Protected Phases	T. CIIII)	2			2	r. Citi	Citi	4				
Permitted Phases	2	-			-	2	4	-				
Actuated Green, G (s)		59.5			59.5	59.5		27.1				
Effective Green, g (s)		60.4			60.4	60.4		28.0				
Actuated g/C Ratio		0.58			0.58	0.58		0.27				
Clearance Time (s)		4.9			4.9	4.9		4.9				
Vehicle Extension (s)		1.0			1.0	1.0		1.0				
Lane Grp Cap (vph)		909			2055	680		1226				_
v/s Ratio Prot		200			0.24	000		1220				
v/s Ratio Perm		c0.45			0.24	0.22		0.23				
v/c Ratio		0.78			0.41	0.22		0.86				
Uniform Delay, d1		16.7			12.0	11.7		36.2				
Progression Factor		0.87			1.42	1.84		1.00				
Incremental Delay, d2		6.0			0.5	1.3		6.3				
Delay (s)		20.6			17.5	22.7		42.4				
Level of Service		20.0 C			В	C		D				
Approach Delay (s)		20.6			19.0			42.4			0.0	
Approach LOS		20.0 C			В			D			A	
Intersection Summary			-				_					
HCM Average Control D	) ela v		28.3	F	ICM Le	vel of S	ervice		Ċ			
HCM Volume to Capaci			0.74									
Actuated Cycle Length			104.0	5	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut			96.1%			el of Sei			F			
Analysis Period (min)			15		Lar	2. 0. 00	1,00					
c Critical Lane Group			,,,									
c Chilical Lane Group												

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HCM Signalized Intersection Capacity Analysis
18: University Ave & Sixth Ave

10/17/2013

	1	-	1	1	+	1	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	77	<b>1</b>		7	44	7	7	<b>^</b>	-	7	44	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.97	0.95		1.00	0.95	1.00	1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.98		1.00	1.00	0.90	1.00	1.00		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	1.00	1.00
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	3406		1770	3539	1424	1770	3469		1770	3539	1521
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	3406		1770	3539	1424	1770	3469		1770	3539	1521
Volume (vph)	385	450	55	175	540	235	50	985	120	340	820	490
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)	405	474	58	184	568	247	53	1037	126	358	863	516
RTOR Reduction (vph)	0	9	0	0	0	4	0	9	0	0	0	70
Lane Group Flow (vph)	405	523	0	184	568	243	53	1154	0	358	863	448
Confl. Peds. (#/hr)			115			121			16			34
Confl. Bikes (#/hr)			29			26			4			E
Turn Type	Prot			Prot	1	pm+ov	Prot			Prot		pm+ov
Protected Phases	5	2		1	6	7	3	8		7	4	5
Permitted Phases						6						
Actuated Green, G (s)	9.6	25.9		12.9	29.2	44.8	6.1	30.5		15.6	40.0	49.6
Effective Green, g (s)	10.0	26.8		13.3	30.1	46.1	6.5	31.9		16.0	41.4	51.4
Actuated g/C Ratio	0.10	0.26		0.13	0.29	0.44	0.06	0.31		0.15	0.40	0.49
Clearance Time (s)	4.4	4.9		4.4	4.9	4.4	4.4	5.4		4.4	5.4	4.4
Vehicle Extension (s)	3.0	2.2		2.0	2.2	2.0	2.0	3.8		2.0	3.8	3.0
Lane Grp Cap (vph)	330	878		226	1024	686	111	1064		272	1409	810
v/s Ratio Prot	c0.12	0.15		0.10	Ø.16	0.05	0.03	c0.33		ø0.20	0.24	0.05
v/s Ratio Perm				214.3	12277.2	0.12	415.5	20.20		100,000	= 1= 11,	0.24
v/c Ratio	1.23	0.60		0.81	0.55	0.35	0.48	1.08		1.32	0.61	0.55
Uniform Delay, d1	47.0	33.8		44.1	31.3	19.1	47.1	36.0		44.0	24.9	18.3
Progression Factor	0.95	1.12		1.11	1.12	0.90	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	116.7	1.7		17.9	2.1	0.1	1.2	53.5		165.9	0.9	0.8
Delay (s)	161.5	39.5		66.8	37.1	17.2	48.3	89.5		209.9	25.8	19.1
Level of Service	F	D		E	D	В	D	F		F	C	E
Approach Delay (s)		92.2			37.7			87.7			61.8	
Approach LOS		F			D			F			Е	
Intersection Summary			-						-			
HCM Average Control D	elay 💮		69.1	1	ICM Le	vel of Se	ervice		E			
HCM Volume to Capaci	Company of the last		0.96									
Actuated Cycle Length			104.0		Sum of I	ost time	(s)		16.0			
Intersection Capacity Ut			97.7%			el of Ser			F			
Analysis Period (min)	and the second		15			and the second						
c Critical Lane Group			- 17									

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HCM Signalized Intersection Capacity Analysis
19: University Ave & Seventh Ave

10/17/2013

	1	-	1	1	4-		1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations		473			र्क			4	-		4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	0,0,0,0		4.0			4.0			4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.97			0.99			0.97			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.99			0.99			0.93			0.95	
Flt Protected		1.00			1,00			0.98			0.98	
Satd. Flow (prot)		3365			3462			1655			1714	
Flt Permitted		0.88			0.78			0.79			0.68	
Satd. Flow (perm)		2952			2721			1329			1195	
Volume (vph)	45	850	85	60	675	30	65	30	95	50	25	- 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)	47	895	89	63	711	32	68	32	100	53	26	53
RTOR Reduction (vph)	0	4	0	0	2	0	0	45	0	0	30	Ó
Lane Group Flow (vph)	0	1027	0	0	804	0	ō	155	0	ā	102	- 0
Confl. Peds. (#/hr)	Ti.	1921	116		77.	87	7	,	35	₹ .	,0.5	1
Confl. Bikes (#/hr)			35			22			3			- 1
Turn Type	Perm			Perm	_		Perm			Perm	_	
Protected Phases	1.01111	2		1 Citi	2		i cimi	4		7 01111	4	
Permitted Phases	2	_		2			4			4	-	
Actuated Green, G (s)	شد	78.6			78.6		- "	15.6			15.6	
Effective Green, g (s)		79.5			79.5			16.5			16.5	
Actuated g/C Ratio		0.76			0.76			0.16			0.16	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		2257			2080			211	_		190	
v/s Ratio Prot		2201			2000			211			100	
v/s Ratio Perm		c0.35			0.30			c0.12			0.09	
v/c Ratio		0.46			0.39			0.73			0.54	
Uniform Delay, d1		4.4			4.1			41.6			40.2	
Progression Factor		0.35			0.14			1.00			1.00	
Incremental Delay, d2		0.33			0.3			10.7			1.5	
Delay (s)		1.9			0.9			52.4			41.7	
Level of Service		A			A			D D			D	
Approach Delay (s)		1.9			0.9			52.4			41.7	
Approach LOS		A			A			D			D	
Intersection Summary			-						-			
HCM Average Control D	elay		8.6		ICM Le	vel of Se	ervice		Α			
HCM Volume to Capaci			0.50									
Actuated Cycle Length (			104.0	.5	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut			77.5%			el of Ser			D			
Analysis Period (min)			15				100		-			
c Critical Lane Group												

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## HCM Signalized Intersection Capacity Analysis 20: University Ave & Eighth St

10/17/2013

	1	-	1	1	-	*	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		414			414			4			4	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	0.0010101	3.000	4.0		000000	4.0		1000	4.0	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.99			1.00			0.93			0.96	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.93			0.96	
Flt Protected		1.00			1.00			0.98			0.97	
Satd. Flow (prot)		3429			3475			1575			1661	
Flt Permitted		0.90			0.70			0.83			0.72	
Satd. Flow (perm)		3088			2446			1341			1231	
Volume (vph)	30	1005	125	60	795	95	55	0	65	145	0	65
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
		1058	132		837		58			153		68
Adj. Flow (vph)	32			63		100		0	68		0	
RTOR Reduction (vph)	0	8	0	0	7	0	0	43	0	0	15	0
Lane Group Flow (vph)	0	1214	0	0	993	0	0	83	0	0	206	0
Confl. Peds. (#/hr)			38						-70			65
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			3			4	
Permitted Phases	2			2			3			4		
Actuated Green, G (s)		54.3			54.3			13.8			18.2	
Effective Green, g (s)		56.2			56.2			15.7			20.1	
Actuated g/C Ratio		0.54			0.54			0.15			0.19	
Clearance Time (s)		5.9			5.9			5.9			5.9	
Vehicle Extension (s)		1.0			1.0			2.0			2.0	
Lane Grp Cap (vph)		1669			1322			202			238	
v/s Ratio Prot												
v/s Ratio Perm		0.39			c0.41			c0.06			c0.17	
v/c Ratio		0.73			0.75			0.41			0.86	
Uniform Delay, d1		18.1			18.5			40.0			40.6	
Progression Factor		0.98			0.82			1.00			1.00	
Incremental Delay, d2		2.6			3.8			0.5			25.4	
Delay (s)		20.3			19.0			40.4			66.0	
Level of Service		20.5 C			В.			D			E	
Approach Delay (s)		20.3			19.0			40.4			66.0	
Approach LOS		20.5 C			15,0 B			D			E	
Intersection Summary												
HCM Average Control D	)elav		24.7	F	ICM Le	vel of Se	ervice		С			
HCM Volume to Capaci			0.72						~			
Actuated Cycle Length			104.0		Sum of I	ost time	(e)		12.0			
Intersection Capacity Ut			89.6%			el of Ser	2 / -		12.0 E			
Analysis Period (min)	mzanon		15	- 15	OO Lev	ei 01 961	AICE		12			
c Critical Lane Group			10									

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# HCM Signalized Intersection Capacity Analysis 21: University Ave & Ninth St

10/17/2013

	1	-	-	1	1	1	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		414	<b>^</b>		7	7	
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		4.0	4.0		4.0	4.0	
Lane Util. Factor		0.95	0.95		1.00	1.00	
Frpb, ped/bikes		1.00	0.99		1.00	0.97	
Flpb, ped/bikes		1.00	1.00		1.00	1.00	
-rt		1.00	1.00		1.00	0.85	
Flt Protected		1.00	1.00		0.95	1.00	
Satd. Flow (prot)		3536	3501		1770	1536	
Flt Permitted		0.93	1.00		0.95	1.00	
Satd. Flow (perm)		3284	3501		1770	1536	
Volume (vph)	20	975	780	20	355	145	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	21	1026	821	21	374	153	
RTOR Reduction (vph)	0	0	1	0	0	56	
ane Group Flow (vph)	Ō	1047	841	Ö	374	97	
Confl. Peds. (#/hr)	T.		700	94	77.00	10	
Confl. Bikes (#/hr)				23		3	
Turn Type	Perm					Perm	
Protected Phases	1 61111	2	6		4	1 citt	
Permitted Phases	2		- 0		**	4	
Actuated Green, G (s)		69.2	69.2		25.5	25.5	
Effective Green, g (s)		70.1	70.1		25.9	25.9	
Actuated g/C Ratio		0.67	0.67		0.25	0.25	
Clearance Time (s)		4.9	4.9		4.4	4.4	
Vehicle Extension (s)		3.0	3.0		3.0	3.0	
		2214	2360		441	383	
Lane Grp Cap (vph)		2214				303	
//s Ratio Prot		-0.22	0.24		d0.21	0.00	
//s Ratio Perm		c0.32	0.00		0.05	0.06	
//c Ratio		0.47	0.36		0.85	0.25	
Uniform Delay, d1		8.1	7.3		37.2	31.3	
Progression Factor		0.23	0.38		1.00	1.00	
ncremental Delay, d2		0.5	0.1		14.1	0.3	
Delay (s)		2.3	2.8		51.2	31.6	
Level of Service		A	A		D	С	
Approach Delay (s)		2.3	2.8		45.5		
Approach LOS		Α	Α		D		
ntersection Summary			44.6		10111	1.60	
HCM Average Control E			11.9	- 1	ICM Let	vel of Service	В
HCM Volume to Capaci			0.57				100
Actuated Cycle Length (			104.0			ost time (s)	8.0
Intersection Capacity Ut Analysis Period (min)	tilization		67.5%	10	OU Leve	el of Service	C
			15				

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# HCM Signalized Intersection Capacity Analysis 22: University Ave & Tenth St

10/17/2013

	1	-	7	1	+	1	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	<b>^</b> 1>		7	个个	74	ሻ	<b>f</b>		ሻ	f)	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	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	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	0.66	1.00	0.98		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	
Frt	1.00	0.98		1.00	1.00	0.85	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	
Satd. Flow (prot)	1787	3341		1770	3539	1051	1770	1694		1770	1713	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.46	1.00		0.61	1.00	
Satd. Flow (perm)	1787	3341		1770	3539	1051	855	1694		1145	1713	
Volume (vph)	150	940	185	115	615	25	95	60	50	30	95	75
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)	158	989	195	121	647	26	100	63	53	32	100	79
RTOR Reduction (vph)	0	12	0	0	.0	9	0	34	0	0	31	
Lane Group Flow (vph)	158	1172	0	121	647	17	100	82	0	32	148	0
Confl. Peds. (#/hr)	1000	3333	69	1000	9.00	102			35		100	19
Confl. Bikes (#/hr)			30			24			2			1
Heavy Vehicles (%)	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5.	2		1	6	1 51111	1 2100	8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	13.0	61.1		10.8	58.9	58.9	17.9	17.9		17.9	17.9	
Effective Green, g (s)	13.4	62.0		11.2	59.8	59.8	18.8	18.8		18.8	18.8	
Actuated g/C Ratio	0.13	0.60		0.11	0.57	0.57	0.18	0.18		0.18	0.18	
Clearance Time (s)	4.4	4.9		4.4	4.9	4.9	4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	5.3		2.0	3.4	3.4	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	230	1992		191	2035	604	155	306		207	310	
v/s Ratio Prot	c0.09	c0.35		0.07	0.18	004	,00,	0.05		201	0.09	
v/s Ratio Perm	00.00	00.00		0.01	0.10	0.02	c0.12	0.00		0.03	0.00	
v/c Ratio	0.69	0.59		0.63	0.32	0.03	0.65	0.27		0.15	0.48	
Uniform Delay, d1	43.3	13.1		44.4	11.5	9.5	39.5	36.7		35.9	38.2	
Progression Factor	1.03	0.98		1.39	0.30	0.06	1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.5	1.1		4.7	0.30	0.00	6.7	0.2		0.1	0.4	
Delay (s)	50.2	13.8		66.6	3.8	0.7	46.2	36.9		36.0	38.6	
Level of Service	J0.2	13.8 B		E	Α.	Α.	40.2 D	D		D D	D	
Approach Delay (s)	U	18.1		- 1	13.3		U.	41.2		D	38.2	
Approach LOS		В.			В			D D			D D	
Intersection Summary												
HCM Average Control D			20.2	}	ICM Le	vel of S	ervice		C			
HCM Volume to Capaci			0.60									
Actuated Cycle Length			104.0	5	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut	tilization	i	77.2%	10	CU Lev	el of Se	rvice		D			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





#### HCM Signalized Intersection Capacity Analysis

20. OHIVOIDE TWO G VOILHOIL OF	23: U	Iniversity	Ave &	Vermont	St
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10/17/2013

	1	-	+	1	•	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>1</b>		7	个个	7	T	4		7	<b>†</b>	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00	0.76	1.00	0.98		1.00	1.00	0.93
Flpb, ped/bikes	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	1.00	0.85	1.00	0.94		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1593	3147		1593	3185	1089	1593	1546		1593	1676	1325
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.63	1.00		0.68	1.00	1.00
Satd. Flow (perm)	1593	3147		1593	3185	1089	1055	1546		1144	1676	1325
Volume (vph)	80	880	35	45	620	85	10	55	35	100	115	130
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	926	37	47	653	89	11	58	37	105	121	137
RTOR Reduction (vph)	0	2	0	0	.0	39	0	26	0	.0	0	105
Lane Group Flow (vph)	84	961	0	47	653	50	11	69	0	105	121	32
Confl. Peds. (#/hr)			46			86			34			56
Confl. Bikes (#/hr)			27			14			11			3
Turn Type	Prot			Prot		Perm	Perm			Perm		Perm
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		4
Actuated Green, G (s)	8.8	60.0		6.7	57.9	57.9	23.1	23.1		23.1	23.1	23.1
Effective Green, g (s)	9.2	60.9		7.1	58.8	58.8	24.0	24.0		24.0	24.0	24.0
Actuated g/C Ratio	0.09	0.59		0.07	0.57	0.57	0.23	0.23		0.23	0.23	0.23
Clearance Time (s)	4.4	4.9		4.4	4.9	4.9	4.9	4.9		4.9	4.9	4.9
Vehicle Extension (s)	2.0	3.2		2.0	3.4	3.4	3.0	3.0		3.0	3,0	3.0
Lane Grp Cap (vph)	141	1843		109	1801	616	243	357		264	387	306
v/s Ratio Prot	c0.05	c0.31		0.03	0.21			0.04			0.07	
v/s Ratio Perm						0.05	0.01			c0.09		0.02
v/c Ratio	0.60	0.52		0.43	0.36	0.08	0.05	0.19		0.40	0.31	0.10
Uniform Delay, d1	45.6	12.9		46.5	12.4	10.3	31.1	32.2		33.9	33.2	31.5
Progression Factor	0.99	1.08		1.17	0.52	0.14	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	3.7	0.9		1.0	0.5	0.2	0.1	0.3		1.0	0.5	0.1
Delay (s)	48.9	14.8		55.2	7.0	1.7	31.2	32.5		34.9	33.6	31.7
Level of Service	D	В		E	Α	A	C	C		С	C	C
Approach Delay (s)		17.5			9.3			32.3			33.2	
Approach LOS		В			Α			C			С	
Intersection Summary												
HCM Average Control D	Name and Address of the Owner, where the Parket of the Owner, where the Parket of the Owner, where the Owner,		17.8	+	ICM Le	vel of S	ervice		В			
HCM Volume to Capaci			0.48									
Actuated Cycle Length (			104.0			ost time	2		8.0			
Intersection Capacity Ut	tilization	0	65.6%	JO	CU Lev	el of Sei	rvice		C			
Analysis Period (min)			15									
c Critical Lane Group												

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# HCM Signalized Intersection Capacity Analysis 24: University Ave & Richmond St

10/17/2013

	1	-	1	1	+		1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>^</b>		7	<b>ተ</b> ተ	7	7	1		7	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	
Lane Util. Factor	1.00	0.95		1.00	0.95	1.00	1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.97		1.00	1.00	0.80	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		1.00	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.94		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3397		1770	3539	1266	1770	1704		1770	1749	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.40	1.00		0.59	1.00	
Satd. Flow (perm)	1770	3397		1770	3539	1266	737	1704		1095	1749	
Volume (vph)	150	805	70	65	565	80	45	85	65	90	185	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)	158	847	74	68	595	84	47	89	68	95	195	84
RTOR Reduction (vph)	0	5	0	0	.0	45	0	32	0	.0	18	0
Lane Group Flow (vph)	158	916	0	68	595	39	47	125	0	95	261	0
Confl. Peds. (#/hr)			127			69			43			52
Confl. Bikes (#/hr)			26			20			6			3
Turn Type	Prot			Prot		Perm	Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases						6	8			4		
Actuated Green, G (s)	13.5	54.0		7.2	47.7	47.7	28.6	28.6		28.6	28.6	
Effective Green, g (s)	13.9	54.9		7.6	48.6	48.6	29.5	29.5		29.5	29.5	
Actuated g/C Ratio	0.13	0.53		0.07	0.47	0.47	0.28	0.28		0.28	0.28	
Clearance Time (s)	4.4	4.9		4.4	4.9	4.9	4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.2		2.0	3.1	3.1	2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	237	1793		129	1654	592	209	483		311	496	
v/s Ratio Prot	c0.09	c0.27		0.04	0.17			0.07			c0.15	
v/s Ratio Perm						0.03	0.06			0.09		
v/c Ratio	0.67	0.51		0.53	0.36	0.07	0.22	0.26		0.31	0.53	
Uniform Delay, d1	42.8	15.9		46.5	17.7	15.2	28.5	28.8		29.2	31.4	
Progression Factor	1.17	0.91		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	0.9		1.8	0.6	0.2	0.2	0.1		0.2	0.5	
Delay (s)	55.1	15.4		48.3	18.3	15.4	28.7	28.9		29.4	31.8	
Level of Service	Е	В		D	В	В	C	С		С	C	
Approach Delay (s)		21.2			20.7			28.9			31.2	
Approach LOS		С			C			С			С	
Intersection Summary									-			
HCM Average Control D	And in case of the last of the		23.3	F	ICM Le	vel of S	ervice		С			
HCM Volume to Capaci			0.53									
Actuated Cycle Length			104.0			ost time			8.0			
Intersection Capacity Ut	tilization		77.3%	Ji	CU Lev	el of Sei	rvice		D			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





## HCM Signalized Intersection Capacity Analysis 25: University Ave & Normal St

10/17/2013

	*	-	+	1	1	1	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	7	**	<b>*</b>		7	7	
Ideal Flow (vphpl)	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	0.95	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	1.00		1.00	0.94	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.99		1.00	0.85	
Flt Protected	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	3496		1770	1492	
Flt Permitted	0.35	1.00	1.00		0.95	1.00	
Satd. Flow (perm)	658	3539	3496		1770	1492	
Volume (vph)	125	915	625	40	165	90	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	132	963	658	42	174	95	
RTOR Reduction (vph)	0	0	4	Ō		67	
Lane Group Flow (vph)	132	963	696	Ö	174	28	
Confl. Peds. (#/hr)		000	000	58	10.00	75	
Confl. Bikes (#/hr)				20		1	
Furn Type	Perm			20		Perm	
Protected Phases	reiiii	2	6		4	reiiii	
Permitted Phases	2		0		4	4	
	42.4	42.4	42.4		212	21.3	
Actuated Green, G (s)	43.3		43.3		21.3	21.7	
Effective Green, g (s)		43.3					
Actuated g/C Ratio	0.59	0.59	0.59		0.30	0.30	
Clearance Time (s)	4.9	4.9	4.9		4.4	4.4	
Vehicle Extension (s)	4.8	4.8	3.9		2.0	2.0	
Lane Grp Cap (vph)	390	2099	2074		526	444	
//s Ratio Prot		c0.27	0.20		d0.10	2.54	
r/s Ratio Perm	0.20	nd wa	790 J. V		and the same	0.02	
//c Ratio	0.34	0.46	0.34		0.33	0.06	
Jniform Delay, d1	7.6	8.3	7.5		20.0	18.4	
Progression Factor	1.00	1.00	1.00		1.00	1.00	
ncremental Delay, d2	1.0	0.3	0.1		0.1	0.0	
Delay (s)	8.6	8.6	7.7		20.1	18.4	
Level of Service	Α	A	Α		C	В	
Approach Delay (s)		8.6	7.7		19.5		
Approach LOS		А	Α		В		
ntersection Summary							
HCM Average Control D			9.7	F	ICM Lev	el of Service	Α.
HCM Volume to Capaci	ty ratio		0.42				
Actuated Cycle Length (	(s)		73.0	S	Sum of l	ost time (s)	8.0
ntersection Capacity Ut			75.7%	10	CU Leve	of Service	D
Analysis Period (min)	The second second		15				

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HCM Signalized Intersection Capacity Analysis 26: University Ave & Park Blvd

10/17/2013

	1	-	1	1	-	1	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	<b>1</b>		Y	<b>†</b> \$	-	7	<b>1</b>	-	N.	44	ī
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	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
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1,00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.98		1.00	0.95		1.00	1.00	0.88
Flt Protected	0.95	1.00		0.95	1.00		0.95	1,00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3408		1770	3428		1770	3332		1770	3539	1 469
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3408		1770	3428		1770	3332		1770	3539	1469
Volume (vph)	125	595	125	85	440	85	130	405	175	180	350	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)	132	626	132	89	463	89	137	426	184	189	368	84
RTOR Reduction (vph)	0	18	0	0	16	0	0	49	0	0	0	59
Lane Group Flow (vph)	132	740	0	89	536	0	137	561	0	189	368	25
Confl. Peds. (#/hr)			68			42		250517	43	5,010		60
Confl. Bikes (#/hr)			8			8			8			- {
Turn Type	Prot			Prot			Prot			Prot	_	Perm
Protected Phases	5	2		1	6		3	8		7	4	,
Permitted Phases							-					-
Actuated Green, G (s)	5.0	25.5		6.4	26.9		9.5	26.3		7.2	24.0	24.0
Effective Green, g (s)	5.4	26.4		6.8	27.8		9.9	27.2		7.6	24.9	24.9
Actuated g/C Ratio	0.06	0.31		0.08	0.33		0.12	0.32		0.09	0.30	0.30
Clearance Time (s)	4.4	4.9		4.4	4.9		4.4	4.9		4.4	4.9	4.9
Vehicle Extension (s)	3.0	2.0		3.0	2.0		3.0	3.3		2.0	2.9	2.9
Lane Grp Cap (vph)	114	1071		143	1135		209	1079		160	1049	435
v/s Ratio Prot	c0.07	c0.22		0.05	0.16		0.08	c0.17		c0.11	0.10	
v/s Ratio Perm	102121			2172			4.55				F-45.	0.02
v/c Ratio	1.16	0.69		0.62	0.47		0.66	0.52		1.18	0.35	0.08
Uniform Delay, d1	39.3	25.2		37.4	22.3		35.4	23.1		38.2	23.2	21.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	132.9	1.6		8.2	0.1		7.2	0.5		128.2	0.2	0.1
Delay (s)	172.2	26.8		45.5	22.4		42.6	23.6		166.4	23.4	21.2
Level of Service	F	C		D	С		D	C		F	С	0
Approach Delay (s)		48.4			25.6			27.1			65.3	
Approach LOS		D			C			C			E	
Intersection Summary												
HCM Average Control D			41.6	1	ICM Le	vel of Se	ervice		D			
HCM Volume to Capaci			0.66									
Actuated Cycle Length i			84.0	S	Sum of I	ost time	(s)		12.0			
Intersection Capacity Ut		b - 3	85.0%	10	CU Levi	el of Ser	vice		E			
Analysis Period (min)			15									
c Critical Lane Group			,0									

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HCM Signalized Intersection Capacity Analysis 27: Washington St & SR-163 On-Ramp

10/17/2013

	1	-	*	1	+	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	ተተተ	7		<b>†</b> 1>	7			7		-	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			1%			0%	
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		0.91	0.91			1.00			
Frpb, ped/bikes	1.00	1.00	0.98		0.99	0.99			1.00			
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00			1.00			
Frt	1.00	1.00	0.85		0.93	0.85			0.86			
Flt Protected	0.95	1.00	1.00		1.00	1.00			1.00			
Satd. Flow (prot)	1770	5085	1544		3133	1422			1603			
Flt Permitted	0.95	1.00	1.00		1.00	1.00			1.00			
Satd. Flow (perm)	1770	5085	1544		3133	1422			1603			
Volume (vph)	780.	2260	525	0	470	830	0	.0	25	0	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)	821	2379	553	0	495	874	0	0	26	0	0	(
RTOR Reduction (vph)	0	0	0	0	91	91	0	0	0	0	0	
Lane Group Flow (vph)	821	2379	553	0	841	346	Ô	0	26	0	0	C
Confl. Peds. (#/hr)	-220		1			29/05/			77.5		- 44	1
Confl. Bikes (#/hr)			- 11			2						
Turn Type	Prot		Perm			Perm		ŕ	ustom			
Protected Phases	5	2	1 01111		6	1 99111			40.0111			
Permitted Phases			2			6			2			
Actuated Green, G (s)	55.7	116.0	116.0		51.0	51.0			116.0			
Effective Green, g (s)	56.1	116.0	116.0		51.9	51.9			116.0			
Actuated g/C Ratio	0.48	1.00	1.00		0.45	0.45			1.00			
Clearance Time (s)	4.4	2.0	2.0		4.9	4.9			2.0			
Vehicle Extension (s)	2.0	3.0	3.0		2.8	2.8			3.0			
Lane Grp Cap (vph)	856	5085	1544		1402	636			1603			
v/s Ratio Prot	c0.46	0.47	1344		d0.27	000			1000			
v/s Ratio Perm	00.40	0.47	0.36		W.Zr	0.24			0.02			
v/c Ratio	0.96	0.47	0.36		0.60	0.54			0.02			
Uniform Delay, d1	28.8	0.0	0.0		24.2	23.4			0.02			
Progression Factor	1.00	1.00	1.00		1.00	1.00			1.00			
Incremental Delay, d2	21.0	0.3	0.6		1.9	3.3			0.0			
Delay (s)	49.8	0.3	0.6		26.1	26.7			0.0			
Level of Service	45.0 D	Α.	Α.		20.1	0			Α.			
Approach Delay (s)	U	11.2	- 0		26.3	· ·		0.0	_		0.0	
Approach LOS		B			20.5 C			Α.			Α.	
Intersection Summary		_									***	
HCM Average Control D	Velat		15.2	-	ICM Le	vel of Se	envice		В	_		
HCM Volume to Capaci			0.79	L	OW LE	, 5, 0, 0,	214100		U			
Actuated Cycle Length i			116.0	Ç	um of l	ost time	(e)		8.0			
Intersection Capacity Ut			84.1%			el of Ser			0.0 E			
Analysis Period (min)	zarion		15	10	O Levi	si oi dei	AICC					
c Critical Lane Group			10									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 28: Washington St & Lincoln Ave

10/17/2013

	1	-	1	1	-	1	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	ተተጉ			<b>ተ</b> ተጉ		ሻ	13	-		र्स	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	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	1.00	0.91			0.91		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
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.97			1.00		1.00	0.99			1.00	0.85
Flt Protected	0.95	1.00			1,00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1770	4918			5081		1770	1829			1850	1583
Flt Permitted	0.95	1.00			1.00		0.95	1.00			0.99	1.00
Satd. Flow (perm)	1770	4918			5081		1770	1829			1850	1583
Volume (vph)	250	1715	355	0	955	5	345	45	5	5	30	145
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	0.96
Adj. Flow (vph)	263	1805	374	0	1005	5	363	47	5	5	32	153
RTOR Reduction (vph)	0	15	0	0	0	0	0	2	0	0	0	145
Lane Group Flow (vph)	263	2164	0	.0	1010	0	363	50	0	0	37	8
Confl. Peds. (#/hr)			6			4		34.5	19			
Confl. Bikes (#/hr)			7			3						
Turn Type	Prot						Split			Split		Pro
Protected Phases	5	2			6		3	3		4	4	1
Permitted Phases												
Actuated Green, G (s)	27.1	88.7			57.1		29.6	29.6			7.0	7.0
Effective Green, g (s)	27.5	89.6			58.1		30.5	30.5			7.9	7.9
Actuated g/C Ratio	0.17	0.56			0.36		0.19	0.19			0.05	0.05
Clearance Time (s)	4.4	4.9			5.0		4.9	4.9			4.9	4.9
Vehicle Extension (s)	2.0	5.7			6.0		3.0	3.0			2.0	2.0
Lane Grp Cap (vph)	304	2754			1845		337	349			91	78
v/s Ratio Prot	c0.15	c0.44			0.20		c0.21	0.03			c0.02	0.00
v/s Ratio Perm	0000000	20000										
v/c Ratio	0.87	0.79			0.55		1.08	0.14			0.41	0.10
Uniform Delay, d1	64.4	27.7			40.5		64.8	53.9			73.8	72.8
Progression Factor	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	21.1	2.3			0.8		71.1	0.2			1.1	0.2
Delay (s)	85.5	30.0			41.3		135.9	54.1			74.9	72.8
Level of Service	F	С			D		F	D			E	E
Approach Delay (s)		36.0			41.3			125.6			73.2	
Approach LOS		D			D			F			E	
Intersection Summary												_
HCM Average Control D			48.2	- 1	ICM Le	vel of Si	ervice		D			
HCM Volume to Capaci			0.84									
Actuated Cycle Length			160.0		Sum of I	ost time	(s)		32.0			
Intersection Capacity Ut			73.6%	10	CU Lev	el of Sei	vice		D			
Analysis Period (min)			15									
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis HCM Signalized Intersection Capacity Analysis 32: Robinson Ave & Park Blvd

10/17/2013

	1	L	1	1	
Movement	SBL2	SBL	SBT	SBR	
Lane Configurations		ă	<b>^</b>		
Ideal Flow (vphpl)	1900	1900	1900	1900	
Total Lost time (s)		4.0	4.0	2000	
Lane Util. Factor		1.00	0.95		
Frpb, ped/bikes		1.00	0.99		
Flpb, ped/bikes		1.00	1.00		
Frt		1.00	0.98		
Flt Protected		0.95	1.00		
Satd. Flow (prot)		1770	3431		
Flt Permitted		0.30	1.00		
Satd. Flow (perm)		554	3431		
Volume (vph)	30	35	360	65	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	32	37	379	68	
RTOR Reduction (vph)	0	0	20	0	
Lane Group Flow (vph)	0	69	427	Ō	
Confl. Peds. (#/hr)		100	121	35	
Confl. Bikes (#/hr)				8	
Turn Type	Perm	Perm			
Protected Phases	2.5	-	6		
Permitted Phases	6	6			
Actuated Green, G (s)	-	20.8	20.8		
Effective Green, g (s)		21.7	21.7		
Actuated g/C Ratio		0.51	0.51		
Clearance Time (s)		4.9	4.9		
Vehicle Extension (s)		3.5	3.5		
Lane Grp Cap (vph)		284	1756		
v/s Ratio Prot			0.12		
v/s Ratio Perm		0.12	43000		
v/c Ratio		0.24	0.24		
Uniform Delay, d1		5.8	5.8		
Progression Factor		1.00	1.00		
Incremental Delay, d2		0.5	0.1		
Delay (s)		6.3	5.9		
Level of Service		A	А		
Approach Delay (s)			5.9		
Approach LOS			Α		
Intersection Summary					
intersection Summary					

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





## HCM Signalized Intersection Capacity Analysis 40: University Ave & Goldfinch St

10/17/2013

	1		7	1	+	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	1		7	1>		ሻ	1		7	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	
Lane Util. Factor	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	0.93		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1820		1770	1803		1770	1729		1770	1843	
Flt Permitted	0.39	1.00		0.27	1.00		0.66	1.00		0.60	1.00	
Satd. Flow (perm)	719	1820		500	1803		1223	1729		1122	1843	
Volume (vph)	15	445	80	180	330	90	55	125	115	75	140	10
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	468	84	189	347	95	58	132	121	79	147	11
RTOR Reduction (vph)	0	16	0	0	25	0	0	73	0	.0	7	Ű
Lane Group Flow (vph)	16	536	0	189	417	0	58	180	0	79	151	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	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		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	288	728		200	721		489	692		449	737	
v/s Ratio Prot		0.29			0.23			c0.10			0.08	
v/s Ratio Perm	0.02			c0.38			0.05			0.07		
v/c Ratio	0.06	0.74		0.94	0.58		0.12	0.26		0.18	0.21	
Uniform Delay, d1	7.4	10.2		11.6	9.4		7.6	8.0		7.7	7.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	6.5		50.7	3.4		0.5	0.9		0.9	0.6	
Delay (s)	7.7	16.7		62.3	12.7		8.1	9.0		8,6	8.5	
Level of Service	A	В		E	В		A	A		A	A	
Approach Delay (s)		16.5			27.6			8.8			8.5	
Approach LOS		В			C			Α			A	
Intersection Summary			-		-							-0
HCM Average Control D	) ela y		18.0	H	ICM Le	vel of Se	ervice		В			
HCM Volume to Capaci			0.60									
Actuated Cycle Length (			40.0	S	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut			69.3%			el of Ser			С			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 without P Katz, Okitsu & Associates





Appendix K-D: Peak Hour Intersection Analysis Worksheets – 2035 with Project Conditions





#### HCM Signalized Intersection Capacity Analysis 1. Washington St & First Ave

10/17/2013

1: Washington St & First Ave											10/17/2013		
	1	-	+	1	4	1	1	†	-	1	ļ	1	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations	7	<b>1</b>		7	<b>†</b> 1>			4					
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	42.22	4.0	4.0	20 20 20 20	20042-01	4.0			- W 50-0-		
Lane Util. Factor	1.00	0.95		1.00	0.95			1.00					
Frpb, ped/bikes	1.00	0.98		1.00	0.99			0.99					
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00					
Frt	1.00	0.99		1.00	0.97			0.97					
Flt Protected	0.95	1.00		0.95	1.00			0.98					
Satd. Flow (prot)	1770.	3428		1770	3380			1763					
Flt Permitted	0.08	1.00		0.19	1.00			0.98					
Satd. Flow (perm)	149	3428		362	3380			1763					
Volume (vph)	130	845	85	95	1135	290	190	185	90	0	0	.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)	137	889	89	100	1195	305	200	195	95	0	0	0.00	
RTOR Reduction (vph)	0	7	0	0	23	0	0	9	0	Ö	ő	Č	
Lane Group Flow (vph)	137	971	0	100	1477	0	0	481	0	0	0	C	
Confl. Peds. (#/hr)	107	201	58	100	1466	32	0	401	26	U	Α.	49	
Confl. Bikes (#/hr)			19			7			4			#3 E	
The state of the s	Assi Law		15	name (n. r.)	_	- 1	Perm		-			U	
Turn Type	pm+pt 5	2		pm+pt	6		Perm	4					
Protected Phases		2		1	6		- 7	4					
Permitted Phases	2	10.4			40.7		4	24.4					
Actuated Green, G (s)	54.7	49.1		49.9	46.7			31.1					
Effective Green, g (s)	56.0	50.0		51.2	47.6			32.0					
Actuated g/C Ratio	0.56	0.50		0.51	0.48			0.32					
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9					
Vehicle Extension (s)	2.0	1.0		2.0	1.0			1.0					
Lane Grp Cap (vph)	181	1714		236	1609			564					
v/s Ratio Prot	c0.05	0.28		0.02	c0.44								
v/s Ratio Perm	0.38	No. To be		0.20				0.27					
v/c Ratio	0.76	0.57		0.42	0.92			0.85					
Uniform Delay, d1	38.8	17.4		25.7	24.4			31.8					
Progression Factor	1.07	1.02		0.29	0.47			1.00					
Incremental Delay, d2	14.0	1.3		0.3	6.6			15.1					
Delay (s)	55.5	19.1		7.7	18.1			46.9					
Level of Service	Е	В		Α	В			D					
Approach Delay (s)		23.5			17.4			46.9			0.0		
Approach LOS		С			В			D			А		
Intersection Summary													
HCM Average Control [	Delay		24.1	- +	ICM Let	vel of Se	ervice		С				
HCM Volume to Capac			0.86										
Actuated Cycle Length			100.0		Sum of I	ost time	(s)	12.0					
Intersection Capacity U			91,3%			el of Ser			F				
Analysis Period (min)			15										
c Critical Lane Group													

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HCM Signalized Intersection Capacity Analysis
4: Washington St & Goldfinch St

10/17/2013

	1	-	1	1	+	1	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>^</b> 1>		7	<b>1</b>		7	1		7	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	29.9.R.	4.0	4.0		4.0	4.0	2000	4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	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	
Frt	1.00	0.99		1.00	0.98		1.00	0.95		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3496		1770	3448		1770	1762		1770	1813	
Flt Permitted	0.95	1.00		0.95	1.00		0.36	1.00		0.52	1.00	
Satd. Flow (perm)	1770	3496		1770	3448		664	1762		962	1813	
Volume (vph)	280	680	60	100	1170	140	90	105	60	155	205	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)	295	716	63	105	1232	147	95	111	63	163	216	32
RTOR Reduction (vph)	0	5	0	0	10	0	0	26	0	0	6	0
Lane Group Flow (vph)	295	774	0	105	1369	0	95	148	0	163	242	0
Confl. Peds. (#/hr)	200	114		103	1300	27	- 55	140	0	103	242	27
Confl. Bikes (#/hr)						3						16
	Prot			Prot	_	- 0	Perm		_	Perm		10
Turn Type	Prot 5	2			6		Perm	0		Perm	- 3	
Protected Phases	5	2		1	ь			8			4	
Permitted Phases	20.4	10.0		CUA	20.4		40.0	40.0		17.3	470	
Actuated Green, G (s)	20.1	49.8		9.1	38.4		18.2	18.2			17.3	
Effective Green, g (s)	20.5	50.7		9.1	39.3		18.2	18.2		18.2	18.2	
Actuated g/C Ratio	0.23	0.56		0.10	0.44		0.20	0.20		0.20	0.20	
Clearance Time (s)	4.4	4.9		4.0	4.9		4.0	4.0		4.9	4.9	
Vehicle Extension (s)	2.0	3,3		3.0	3.3		3.0	3.0		2.0	2.0	
Lane Grp Cap (vph)	403	1969		179	1506		134	356		195	367	
v/s Ratio Prot	c0.17	0.22		0.06	d0.40			0.08			0.13	
v/s Ratio Perm					- CONTRACTOR		0.14			c0.17		
v/c Ratio	0.73	0.39		0.59	0.91		0.71	0.42		0.84	0.66	
Uniform Delay, d1	32.2	11.0		38.7	23.7		33.4	31.3		34.5	33.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.8	0.6		4.8	9.7		15.8	0.8		24.5	3.2	
Delay (s)	38.0	11.6		43.5	33.3		49.2	32.1		59.0	36.3	
Level of Service	D	В		D	С		D	С		E	D	
Approach Delay (s)		18.9			34.1			38.1			45.3	
Approach LOS		В			C			D			D	
Intersection Summary												
HCM Average Control D			30.8	1	ICM Le	vel of Si	ervice		С			
HCM Volume to Capaci			0.85									
Actuated Cycle Length			90.0		Sum of I	ost time	(s)		12.0			
Intersection Capacity Ut			88.5%	1	CU Levi	el of Sei	vice		E			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





## HCM Signalized Intersection Capacity Analysis 5: Washington St & Front St

10/17/2013

	1	-	*	1	4	*	1	1	-	1	1	1	
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF	
Lane Configurations		<b>1</b>			414			4		7	सी	- 1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	190	
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	4.	
Lane Util. Factor		0.95			0.95			1.00		0.95	0.95	1.0	
Frpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	0.9	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	1.0	
Frt		1.00			1.00			0.86		1.00	1.00	0.8	
Fit Protected		1.00			1.00			1.00		0.95	0.95	1.0	
Satd. Flow (prot)		3536			3539			1611		1681	1681	1499	
Flt Permitted		1.00			1.00			1.00		0.75	0.75	1.0	
Satd. Flow (perm)		3536			3539			1611		1335	1335	1499	
Volume (vph)	0	900	5	0	1335	0	0	0	5	185	0	18	
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	0.98	
Growth Factor (vph)	100%	100%	100%	100%	100%	100%	100%	100%	100%	102%	100%	100%	
Adj. Flow (vph)	0	947	5	0	1405	0	0	0	5	199	0	19	
RTOR Reduction (vph)	0	0	0	0	0	0	0	4	0	0	0	3	
	0	952	0	0	1405	0	0	1	0	100	99	16	
Lane Group Flow (vph)	U.	952	U	U	1405		U	, in	U	100	99		
Confl. Peds. (#/hr)						36						1.	
Confl. Bikes (#/hr)				-		6	-			_		1	
Turn Type		- 1		Perm	- 120		Perm			Perm	- 2	Perr	
Protected Phases		2		14.	6			8			4		
Permitted Phases				6			8			4			
Actuated Green, G (s)		73.9			73.9			17.2		16.3	16.3	16.	
Effective Green, g (s)		74.8			74.8			17.2		17.2	17.2	17.	
Actuated g/C Ratio		0.75			0.75			0.17		0.17	0.17	0.1	
Clearance Time (s)		4.9			4.9			4.0		4.9	4.9	4.	
Vehicle Extension (s)		3,0			3.0			3.0		3.0	3.0	3,1	
Lane Grp Cap (vph)		2645			2647			277		230	230	258	
v/s Ratio Prot		0.27			c0.40			0.00					
v/s Ratio Perm										0.07	0.07	c0.1	
v/c Ratio		0.36			0.53			0.00		0.43	0.43	0.63	
Uniform Delay, d1		4.3			5.3			34.3		37.0	37.0	38.	
Progression Factor		1.00			0.14			1.00		1.00	1.00	1.0	
Incremental Delay, d2		0.4			0.4			0.0		1.3	1.3	4	
Delay (s)		4.7			1.1			34.3		38.4	38.3	43.	
Level of Service		A			A			C		D	D	]	
Approach Delay (s)		4.7			1.1			34.3			40.7	- 5	
Approach LOS		A			A			C			D		
Intersection Summary			- 20										
HCM Average Control D	) ela y		8.1	1	ICM Le	vel of S	ervice	-	A				
HCM Volume to Capaci			0.55		- A MILL THE		- A						
Actuated Cycle Length			100.0	5	Sum of I	ost time	(s)		8.0				
Intersection Capacity Ut			67.5%			el of Se	12 (4)	- C					
Analysis Period (min)			15	,					- V				
c Critical Lane Group													

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis
7: Washington St & Fourth Ave

10/17/2013

	1	-	1	-	-		1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	ሻ	<b>1</b>		ሻሻ	<b>*</b> 1>					7	स	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	190
Total Lost time (s)	4.0	4.0		4.0	4.0					4.0	4.0	4.
Lane Util. Factor	1.00	0.95		0.97	0.95					0.95	0.95	1.0
Frpb, ped/bikes	1.00	0.99		1.00	0.99					1.00	1.00	0.9
Flpb, ped/bikes	1.00	1.00		1.00	1.00					1.00	1.00	1.0
Frt	1.00	0.97		1.00	0.99					1.00	1.00	0.8
Flt Protected	0.95	1.00		0.95	1.00					0.95	0.99	1.0
Satd. Flow (prot)	1770	3405		3433	3442					1681	1744	1530
Flt Permitted	0.95	1.00		0.95	1.00					0.95	0.99	1.0
Satd. Flow (perm)	1770	3405		3433	3442					1681	1744	1530
Volume (vph)	115	725	145	295	1550	130	0	0	0	245	140	190
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	0.9
Adj. Flow (vph)	121	763	153	311	1632	137	0	0	0	258	147	200
RTOR Reduction (vph)	0	12	0	0	5	0	0	0	0	.0	0	103
Lane Group Flow (vph)	121	904	0	311	1764	0	Ö	0	0	197	208	9
Confl. Peds. (#/hr)			43			35				-200	2240	1)
Confl. Bikes (#/hr)			10			10			1			11
Bus Blockages (#/hr)	0	0	0	0	4	0	0	0	0	0	0	
Turn Type	Prot			Prot						Perm		Perr
Protected Phases	5.	2		1	6						4	
Permitted Phases										4	-	- 1
Actuated Green, G (s)	5.3	59.0		10.0	63.7					16.8	16.8	16.
Effective Green, g (s)	5.7	59.9		10.4	64.6					17.7	17.7	17.
Actuated g/C Ratio	0.06	0.60		0.10	0.65					0.18	0.18	0.1
Clearance Time (s)	4.4	4.9		4.4	4.9					4.9	4.9	4.
Vehicle Extension (s)	2.0	0.2		1.0	0.2					1.0	1.0	1.1
Lane Grp Cap (vph)	101	2040		357	2224					298	309	27
v/s Ratio Prot	0.07	0.27		c0.09	d0.51					200	303	21
v/s Ratio Perm	0.07	0,21		00.00	0.51					0.12	0.12	0.0
v/c Ratio	1.20	0.44		0.87	0.79					0.66	0.67	0.3
Uniform Delay, d1	47.1	10.9		44.1	12.9					38.4	38.4	36.
Progression Factor	0.68	0.77		0.90	0.63					1.00	1.00	1.0
Incremental Delay, d2	145.3	0.6		12.6	1.8					4.2	4.5	0.3
Delay (s)	177.5	9.0		52.5	9.9					42.6	42.9	36.
Level of Service	177.5	Α.		52.5 D	3.3 A					42.0 D	42.9 D	100.
Approach Delay (s)		28.7		U	16.3			0.0		D	40.7	1
Approach LOS		20.7 C			10.3 B			Α.			40.7 D	
Approach LOS		Ų			Ь			^			U	
Intersection Summary												
HCM Average Control D			23.7	+	ICM Le	el of Se	ervice		C			
HCM Volume to Capaci			0.76									
Actuated Cycle Length (			100.0		Sum of I				8.0			
Intersection Capacity Ut	tilization		78.4%	1	CU Lev	el of Ser	vice		D			
Analysis Period (min)			15									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis
11: Washington St & SR-163 Off-Ramp

10/17/2013

	-	*	-	1	1	1	1	1	1	1	1	t
Movement	EBT	EBR	WBT	WBR	NBL	NBT	NBR2	SBL	SBT	SBR	SWR	SWR2
Lane Configurations	<b>1</b>		<b>1</b>			4			4		Z.	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0		4.0			4.0		2000000	4.0	25000	4.0	
Lane Util. Factor	0.95		0.95			1.00			1.00		1.00	
Frpb, ped/bikes	0.99		1.00			1.00			0.99		1.00	
Flpb, ped/bikes	1.00		1.00			1.00			1.00		1.00	
Frt	0.99		1.00			0.98			0.97		0.86	
Flt Protected	1.00		1.00			0.96			0.98		1.00	
Satd. Flow (prot)	3465		3534			1758			1757		1611	
Flt Permitted	1.00		1.00			0.77			0.88		1.00	
Satd. Flow (perm)	3465		3534			1410			1588		1611	
Volume (vph)	950	95	1135	10	110	10	20	20	15	10	615	15
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)	1000	100	1195	11	116	11	21	21	16	11	647	16
RTOR Reduction (vph)	6	0	0	0	0	5	0	Ö	10	0	1	Ö
Lane Group Flow (vph)	1094	0	1206	O.	Ö	143	0	0	38	0	662	o o
Confl. Peds. (#/hr)	1004	18	1200	1	- 0	140			30	7	002	
Turn Type					Perm			Perm			custom	
Protected Phases	2		6		Femi	8		Ferm	4	,	5	
Permitted Phases	- 4		0		8	U		4	4		Ü	
A CONTRACTOR OF THE PROPERTY O	54.5		54.5		.0	15.5		4	15.0		36.5	
Actuated Green, G (s)	55.5		55.5			15.5			15.5		37.0	
Effective Green, g (s)	0.46		0.46						0.13		0.31	
Actuated g/C Ratio	5.0		5,0			0.13 4.0			4.5		4.5	
Clearance Time (s)												
Vehicle Extension (s)	2.0		2.0			0.9			2.0		2.0	
Lane Grp Cap (vph)	1603		1634			182			205		497	
v/s Ratio Prot	0.32		c0.34			-8.48			0.00		c0.41	
v/s Ratio Perm			847			c0.10			0.02		. 55	
v/c Ratio	0.68		0.74			0.78			0.19		1.33	
Uniform Delay, d1	25.3		26.3			50.6			46.6		41.5	
Progression Factor	1.00		0.88			1.00			1.00		1.00	
Incremental Delay, d2	2.4		2.2			18.2			0.2		163.0	
Delay (s)	27.7		25.4			68,8			46.8		204.5	
Level of Service	С		C			E			D		F	
Approach Delay (s)	27.7		25.4			68,8			46.8			
Approach LOS	C		C			E			D			
Intersection Summary	-		-			-			-			
HCM Average Control D			66.1	H	ICM Le	vel of S	ervice		E			
HCM Volume to Capaci			0.95									
Actuated Cycle Length (			120.0	5	Sum of l	ost time	(s)		12.0			
Intersection Capacity Ut		0 8	94.0%	- [0	CU Leve	el of Se	rvice		F			
Analysis Period (min)	-		15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis
14: Normal St & Park Blvd

10/17/2013

14. Normai St & Par	•		-	100	4				- 4	1	- 1	,
		-		1	100	-	1	T	-	*		*
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	44	**	1	7	<b>^</b>	7	7	44	7	7	<b>†</b>	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.91
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.96	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	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.92	0.85
Fit 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)	3433	3539	1534	1770	3539	1535	1770	3539	1526	1770	3129	1441
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)	3433	3539	1534	1770	3539	1535	1770	3539	1526	1770	3129	1441
Volume (vph)	225	315	50	145	705	80	55	110	85	45	195	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)	237	332	53	153	742	84	58	116	89	47	205	432
RTOR Reduction (vph)	0.	.0	34	0	0	54	0	0	0	.0	164	164
Lane Group Flow (vph)	237	332	19	153	742	30	58	116	89	47	257	52
Confl. Peds. (#/hr)			5			16	1791		38			
Confl. Bikes (#/hr)			25			16			1			
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Prot
Protected Phases	5	2		1	6		3	8		7	4	4
Permitted Phases			2			6			8			
Actuated Green, G (s)	7.9	26.6	26.6	8.3	26.5	26.5	4.2	19.4	19.4	2.0	17.2	17.2
Effective Green, g (s)	9.8	28.5	28.5	9.7	28.4	28.4	5.6	21.3	21.3	3.4	19.1	19.1
Actuated g/C Ratio	0.12	0.36	0.36	0.12	0.36	0.36	0.07	0,27	0.27	0.04	0.24	0.24
Clearance Time (s)	5.9	5.9	5.9	5.4	5.9	5.9	5.4	5.9	5.9	5.4	5.9	5.9
Vehicle Extension (s)	2.0	4.8	4.8	2.0	3.8	3.8	2.0	3.5	3.5	2.0	3.9	3.9
Lane Grp Cap (vph)	426	1278	554	218	1274	553	126	955	412	76	757	349
v/s Ratio Prot	0.07	0.09		c0.09	c0.21		c0.03	0.03		0.03	c0.08	0.04
v/s Ratio Perm	0.00		0.01			0.02			0.06	-FUR.S		
v/c Ratio	0.56	0.26	0.03	0.70	0.58	0.05	0.46	0.12	0.22	0.62	0.34	0.15
Uniform Delay, d1	32.5	17.8	16.3	33.2	20.4	16.5	35.2	21.7	22.3	37.1	24.7	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	0.9	0.2	0.0	8.1	0.8	0.1	1.0	0.1	0.3	10.1	0.4	0.3
Delay (s)	33.4	18.0	16.4	41.3	21.2	16.5	36.2	21.8	22.6	47.2	25.1	23.8
Level of Service	С	В	В	D	С	В	D	С	C	D	C	0
Approach Delay (s)		23.7			24.0			25.3			26.2	
Approach LOS		С			С			С			С	
Intersection Summary												
HCM Average Control D	) elay		24.6	- t	ICM Le	vel of S	ervice		С			
HCM Volume to Capaci			0.51									
Actuated Cycle Length (			78.9	8	Sum of I	ost time	(s)		16.0			
Intersection Capacity Ut			73.4%			el of Se			D			
Analysis Period (min)	and the second		15		and the second second		200					
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis
15: University Ave & First Ave

10/17/2013

	1	-	1	1	4-		1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		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	Docume		4.0	and the same		4.0			4.0	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.97			0.91			0.99			0.98	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.97			0.92			0.98			0.98	
Fit Protected		0.99			0.99			0.99			0.99	
Satd. Flow (prot)		1738			1549			1788			1771	
Flt Permitted		0.90			0.88			0.91			0.91	
Satd. Flow (perm)		1585			1375			1637			1623	
Volume (vph)	75	250	100	45	50	145	70	265	60	40	165	45
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)	79	263	105	47	53	153	74	279	63	42	174	47
RTOR Reduction (vph)	0	16	0	0	79	0	0	15	0	0	18	0
Lane Group Flow (vph)	0	431	0	0	174	0	0	401	0	0	245	0
Confl. Peds. (#/hr)			37			52			34			51
Confl. Bikes (#/hr)			50			50						
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			4			4	
Permitted Phases	2			2			4			4		
Actuated Green, G (s)		25.7			25.7			19.5			19.5	
Effective Green, g (s)		26.6			26.6			20.4			20.4	
Actuated g/C Ratio		0.48			0.48			0.37			0.37	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		767			665			607			602	
v/s Ratio Prot												
v/s Ratio Perm		c0.27			0.13			c0.24			0.15	
v/c Ratio		0.56			0.26			0.66			0.41	
Uniform Delay, d1		10.1			8.4			14.4			12.8	
Progression Factor		1.00			2.54			1.00			1.00	
Incremental Delay, d2		3.0			0.9			2.1			0.2	
Delay (s)		13.0			22.2			16.5			13.0	
Level of Service		В			C			В			В	
Approach Delay (s)		13.0			22.2			16.5			13.0	
Approach LOS		В			C			В			В	
Intersection Summary			- 1.0									
HCM Average Control D			15.8	F	ICM Le	vel of Se	ervice		В			
HCM Volume to Capaci	ty ratio		0.60									
Actuated Cycle Length (			55.0		Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut			68.4%			el of Ser			C			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





## HCM Signalized Intersection Capacity Analysis 16: University Ave & Fourth Ave

10/17/2013

	1	-	7	1	+	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations		ĵ»		*	<b>1</b>						4ि	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	190
Total Lost time (s)		4.0		4.0	4.0	20 20 20	2004	A.C. Care			4.0	200.42
Lane Util. Factor		1.00		1.00	1.00						0.95	
Frpb, ped/bikes		0.99		1.00	1.00						1.00	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.99		1.00	1.00						1.00	
Flt Protected		1.00		0.95	1.00						1.00	
Satd. Flow (prot)		1815		1770	1833						3532	
Flt Permitted		1.00		0.45	1.00						1.00	
Satd. Flow (perm)		1815		844	1833						3532	
Volume (vph)	0	340	40	100	365	0	0	0	0	20	490	
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	0.9
Adj. Flow (vph)	0.55	358	42	105	384	0.55	0.55	0.55	0.55	21	516	0,5
RTOR Reduction (vph)	0	2	0	0	0	0	0	0	0	0	0	
Lane Group Flow (vph)	0	398	0	105	384	0	0	0	0	0	537	
Confl. Peds. (#/hr)	· ·	330	47	103	304	49	U	U	21	U	337	5
Confl. Bikes (#/hr)			50			50			50			2
	0	Ö	20	0	4	0	Ö	0	50	0	0	
Bus Blockages (#/hr)	Ų	U	U		4	Ų	U	U	U		Ų	
Turn Type				pm+pt						Perm		
Protected Phases		2		1	6						4	
Permitted Phases				6	212					4	200	
Actuated Green, G (s)		62.3		75.2	74.7						21.4	
Effective Green, g (s)		63.2		75.6	75.6						22.3	
Actuated g/C Ratio		0.57		0.69	0.69						0.20	
Clearance Time (s)		4.9		4.4	4.9						4.9	
Vehicle Extension (s)		2.0		3.0	2.0						2.0	
Lane Grp Cap (vph)		1043		651	1260						716	
v/s Ratio Prot		c0.22		0.01	c0.21							
v/s Ratio Perm				0.10							0.15	
v/c Ratio		0.38		0.16	0.30						0.75	
Uniform Delay, d1		12.8		9.8	6.8						41.2	
Progression Factor		0.98		1.88	1.71						1.00	
ncremental Delay, d2		0.9		0.1	0.0						3.9	
Delay (s)		13.4		18.4	11.7						45.2	
Level of Service		В		В	В						D	
Approach Delay (s)		13.4			13.1			0.0			45.2	
Approach LOS		В			В			А			D	
ntersection Summary									-			
HCM Average Control D			25,3		ICM Le	vel of Se	ervice		C			
HCM Volume to Capaci			0.45									
Actuated Cycle Length (			110,0	9	Sum of I	ost time	(s)		12.1			
Intersection Capacity Ut			56.5%			el of Ser			В			
Analysis Period (min)	VILLEY LINE N		15		51 BY ASSES							

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## HCM Signalized Intersection Capacity Analysis 17: University Ave & Fifth Ave

10/17/2013

	1	-	1	1	1	*	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			<b>1</b>			नीक				
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	Decome		4.0			4.0				
Lane Util. Factor		1.00			0.95			0.95				
Frpb, ped/bikes		1.00			0.90			0.93				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.95			0.96				
Flt Protected		1.00			1.00			1.00				
Satd. Flow (prot)		1859			3008			3157				
Flt Permitted		0.94			1.00			1.00				
Satd. Flow (perm)		1752			3008			3157				
Volume (vph)	20	475	0	0	620	350	40	420	165	0	0	Ö
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)	21	500	0.50	0.00	653	368	42	442	174	0.00	0	0,00
RTOR Reduction (vph)	0	0	ő	ō	52	0	0	42	0	Ö	Ö	ő
Lane Group Flow (vph)	0	521	o o	Ö	969	0	n	616	0	0	Ö	0
Confl. Peds. (#/hr)		321	134		200	136		0.10	97		- 0	91
Confl. Bikes (#/hr)			50			50			57			50
Turn Type	Perm		UU			00	Perm					باد
Protected Phases	Perm	2			2		Perm	4				
Permitted Phases	2	4			4		4	4				
	- 4	61.9			04.0		4	27.7				
Actuated Green, G (s)					61.9							
Effective Green, g (s)		62.8			62.8			28.6				
Actuated g/C Ratio		0.57			0.57			0.26				
Clearance Time (s)		4.9			4.9			4.9				
Vehicle Extension (s)		1.0			1.0			1.0				
Lane Grp Cap (vph)		1000			1717			821				
v/s Ratio Prot					d0.32							
v/s Ratio Perm		0.30						0.20				
v/c Ratio		0.52			0.56			0.75				
Uniform Delay, d1		14.4			14.9			37.4				
Progression Factor		1.04			0.97			1.00				
Incremental Delay, d2		1.9			1.1			3.4				
Delay (s)		16.8			15.6			40.9				
Level of Service		В			В			D				
Approach Delay (s)		16.8			15.6			40.9			0.0	
Approach LOS		В			В			D			Α	
Intersection Summary												
HCM Average Control D			23.4	F	ICM Le	vel of Se	ervice	_	С			
HCM Volume to Capaci	ty ratio		0.62									
Actuated Cycle Length			110.0	5	Sum of I	ost time	(s)		18.6			
Intersection Capacity Ut			70.8%			el of Ser			C			
Analysis Period (min)			15									
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis

18: University Ave & Sixth Ave

10/17/2013

	1	-	*	1	+	*	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻሻ	1		7	<b>†</b> 1>		٦	<b>^</b>		7	1	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.97		1.00	0.92		1.00	1.00		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
Frt	1.00	0.98		1.00	0.93		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1682		1770	3041		1770	3506		1770	3539	1522
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1682		1770	3041		1770	3506		1770	3539	1522
Volume (vph)	500	150	25	170	320	255	50	730	40	220	1050	520
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)	526	158	26	179	337	268	53	768	42	232	1105	547
RTOR Reduction (vph)	0	5	0	0	127	0	0	4	0	0	0	67
Lane Group Flow (vph)	526	179	0	179	478	0	53	806	0	232	1105	480
Confl. Peds. (#/hr)	7	11.5	115		70.0	121		7.7-	16			34
Confl. Bikes (#/hr)			50			50			- 4			
Bus Blockages (#/hr)	0	12	0	0	.0	0	0	0	0	.0	Ô	0
Turn Type	Prot			Prot			Prot			Prot		pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	- 3				- 0							4
Actuated Green, G (s)	10.6	29.5		13.6	32.5		5.3	30.1		17.7	42.5	53.1
Effective Green, g (s)	11.0	30.4		14.0	33.4		5.7	31.5		18.1	43.9	54.9
Actuated g/C Ratio	0.10	0.28		0.13	0.30		0.05	0.29		0.16	0.40	0.50
Clearance Time (s)	4.4	4.9		4.4	4.9		4.4	5.4		4.4	5.4	4.4
Vehicle Extension (s)	3.0	2.2		2.0	2.2		2.0	3.8		2.0	3.8	3.0
Lane Grp Cap (vph)	343	485		225	923		92	1004		291	1412	760
v/s Ratio Prot	c0.15	0.11		c0.10	d0.16		0.03	c0.23		0.13	c0.31	0.06
v/s Ratio Perm	00.10	0.11		CO. 10	w.10		0,05	00.23		u. 13	10.01	0.25
v/c Ratio	1.53	0.38		0.80	0.52		0.58	0.80		0.80	0.78	0.63
Uniform Delay, d1	49.5	32.2		46.6	31.7		51.0	36.4		44.2	28.9	20.2
Progression Factor	0.93	0.87		1.00	0.90		1.00	1.00		1.00	1.00	1.00
	251.9	2.0		16.2	2.0		5.3	4.9		13.2	3.0	1.7
Incremental Delay, d2		30.0		63.0	30.6							21.9
Delay (s)	298.1 F	Georgia (1997)					56.3 E	41.3		57.4	31.9	
Level of Service	F	220.0		E	38.0		=	42.2		E	0	С
Approach Delay (s)		228.6									32.1	
Approach LOS		F			D			D			0	
Intersection Summary			4.74				- 10					
HCM Average Control D			68.2	t	HCM Le	vel of Se	ervice		Е			
HCM Volume to Capaci			0.80				nits.					
Actuated Cycle Length i			110,0			ost time	102 100 -		12.0			
Intersection Capacity Ut	tilization		84.7%	J	CU Lev	el of Ser	vice		Е			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis
19: University Ave & Seventh Ave

10/17/2013

	1	-	1	-	r <del>d i</del>	*	1	1	-	1	ļ	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	_	414			413			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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.93			0.99			0.97			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			1.00			0.94			0.94	
Flt Protected		1.00			1.00			0.98			0.98	
Satd. Flow (prot)		3131			3421			1672			1705	
Flt Permitted		0.90			0.86			0.86			0.90	
Satd. Flow (perm)		2824			2964			1472			1570	
Volume (vph)	25	365	75	55.	565	15	30	5	25	20	10	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)	26	384	79	58	595	16	32	5	26	21	11	26
RTOR Reduction (vph)	0	6	0	0	1	0	0	23	0	0	23	0
Lane Group Flow (vph)	Ō	483	0	Ō	668	0	Ō	40	ō	ā	35	Ō
Confl. Peds. (#/hr)	-		116	7		87			35			4
Confl. Bikes (#/hr)			50			50						
Bus Blockages (#/hr)	Ó	12	0	0	9	0	0	0	0	0	0	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases	1.61111	2		Lenn	2		I citi	4		Lenn	4	
Permitted Phases	2			2			4	7		4	7	
Actuated Green, G (s)	- 4	88.6		2	88.6		7	11.6		-	11.6	
Effective Green, g (s)		89.5			89.5			12.5			12.5	
Actuated g/C Ratio		0.81			0.81			0.11			0.11	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		2298			2412			167			178	
v/s Ratio Prot		2230			2412			1-07			17.0	
		0.17			d0.23			-0.00			0.00	
v/s Ratio Perm v/c Ratio		0.17			0.28			c0.03 0.24			0.02	
Uniform Delay, d1		2.3			2.5			44.4			44.2	
Progression Factor		0.29									1.00	
					0.07			1.00				
Incremental Delay, d2		0.2			0.3			0.3			0.2	
Delay (s)		U.8			0.4 A			44.7			44.4 D	
Level of Service		0.8						D			1000	
Approach Delay (s)					0.4			44.7			44.4	
Approach LOS		А			Α			D			D	
Intersection Summary												
HCM Average Control D			4.8	· · · · · · · · · · · · · · · ·	ICM Let	vel of S	ervice		A			
HCM Volume to Capaci	ty ratio		0.27									
Actuated Cycle Length			110.0	5	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut	tilization		57.3%	J	CU Levi	el of Sei	rvice		В			
Analysis Period (min)			15									
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis 20: University Ave & Eighth St

10/17/2013

	1	-	1	1	-	1	1	†	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		473			414		- this	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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.98			1.00			0.97			0.93	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.99			0.97			0.92	
Flt Protected		1.00			1,00			1.00			0.98	
Satd. Flow (prot)		3331			3464			1732			1563	
Flt Permitted		0.92			0.87			0.95			0.83	
Satd. Flow (perm)		3058			3034			1654			1325	
Volume (vph)	15	345	45	60	615	65	5	40	15	50	0	65
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	363	47	63	647	68	5	42	16	53	0.00	68
RTOR Reduction (vph)	0	6	Ö	0	4	0	Ö	12	0	0	50	0
Lane Group Flow (vph)	0	420	0	Ö	774	0	ő	51	Ö	0	7.1	Ö
Confl. Peds. (#/hr)	Ψ.	720	38	_	21.2	Ψ.	, , , , , , , , , , , , , , , , , , ,	٠.	70		2.1	65
Confl. Bikes (#/hr)			50			50						- 00
Bus Blockages (#/hr)	Ō	12	0	0	Ó	0	0	0	0	0	Ō	0
Turn Type	Perm	11.2	.0.	Perm	- 0		Perm	.0	- 0	Perm	Ü	0
Protected Phases	remi	2		rem	2		Lettin	3		Femi	4	
Permitted Phases	2	- 2		2			3	3		4	4	
Actuated Green, G (s)	- 4	CC 7			CC 7		٥	10.0		4	13.0	
		66.7 68.6			66.7 68.6			12.6 14.5			14.9	
Effective Green, g (s)								0.13			0.14	
Actuated g/C Ratio		0.62 5.9			0.62 5.9			5.9				
Clearance Time (s)											5.9	
Vehicle Extension (s)		1.0			1.0			2.0			2.0	
Lane Grp Cap (vph)		1907			1892			218			179	
v/s Ratio Prot					0.00			0.00			886	
v/s Ratio Perm		0.14			d0.26			c0.03			c0.05	
v/c Ratio		0.22			0.41			0.23			0.40	
Uniform Delay, d1		9.0			10.5			42.8			43.4	
Progression Factor		0.63			0.73			1.00			1.00	
Incremental Delay, d2		0.3			0.6			0.2			0.5	
Delay (s)		5.9			8.3			43.0			44.0	
Level of Service		A			A			D			D	
Approach Delay (s)		5.9			8.3			43.0			44.0	
Approach LOS		A			Α			D			D	
Intersection Summary			-									- 3
HCM Average Control D			12.2	1	ICM Le	vel of Se	ervice		В			
HCM Volume to Capaci	ty ratio		0.38									
Actuated Cycle Length	(s)		110.0	5	Sum of I	ost time	(s)		12.0			
Intersection Capacity Ut			62.7%			el of Ser			В			
Analysis Period (min)			15									
c Critical Lane Group												

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## HCM Signalized Intersection Capacity Analysis 21: University Ave & Ninth St

10/17/2013

	1	-	-	1	1	1			
Movement	EBL	EBT	WBT	WBR	SBL	SBR			
Lane Configurations		414	<b>^</b>		7	7			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Total Lost time (s)		4.0	4.0		4.0	4.0			
Lane Util. Factor		0.95	0.95		1.00	1.00			
Frpb, ped/bikes		1.00	0.99		1.00	0.97			
Flpb, ped/bikes		1.00	1.00		1.00	1.00			
Frt		1.00	1.00		1.00	0.85			
Fit Protected		1.00	1.00		0.95	1.00			
Satd. Flow (prot)		3534	3419		1770	1539			
Flt Permitted		0.93	1.00		0.95	1.00			
Satd. Flow (perm)		3306	3419		1770	1539			
Volume (vph)	10	355	650	15	125	105			
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95			
Adj. Flow (vph)	11	374	684	16	132	111			
RTOR Reduction (vph)	0	0	1	0	.0	74			
Lane Group Flow (vph)	Ö	385	699	Ö	132	37			
Confl. Peds. (#/hr)	0	505	000	94	102	10			
Confl. Bikes (#/hr)				50		10			
Bus Blockages (#/hr)	Ó	0	12	0	.0	Ó			
		- 0	12.						
Turn Type	Perm	2	6		4	Perm			
Protected Phases	2		ь		4	200			
Permitted Phases	- 2	07.0	07.0		42.0	4 4 2 9			
Actuated Green, G (s)		87.9	87.9		12.8	12.8			
Effective Green, g (s)		88.8	88,8		13.2	13.2			
Actuated g/C Ratio		0.81	0.81		0.12	0.12			
Clearance Time (s)		4.9	4.9		4.4	4.4			
Vehicle Extension (s)		3.0	3.0		3.0	3.0			
Lane Grp Cap (vph)		2669	2760		212	185			
v/s Ratio Prot		70.71 W	c0.20		d0.07	- Company			
v/s Ratio Perm		0.12	-2.29		0.00	0.02			
v/c Ratio		0.14	0.25		0.62	0.20			
Uniform Delay, d1		2.3	2.6		46.0	43.6			
Progression Factor		0.27	0.77		1.00	1.00			
ncremental Delay, d2		0.1	0.0		5.6	0.5			
Delay (s)		0.7	2.0		51.6	44.2			
Level of Service		A	A		D	D			
Approach Delay (s)		0.7	2.0		48.2				
Approach LOS		Α	Α		D				
ntersection Summary			200						
HCM Average Control D			10.1	ŧ	ICM Le	vel of Ser	vice	В	
HCM Volume to Capaci			0.30						
Actuated Cycle Length i			110.0	5	Sum of I	ost time (:	s)	8.0	
Intersection Capacity Ut	tilization		35.4%	J	CU Lev	el of Servi	ice	A	
Analysis Period (min)			15						
c Critical Lane Group									

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HCM Signalized Intersection Capacity Analysis 22: University Ave & Tenth St

10/17/2013

	*	-	7	1	+	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>↑</b> ₽		ሻ	<b>†</b>		7	1		7	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	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.96		1.00	0.99		1.00	0.98		100	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00		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	
Satd. Flow (prot)	1787	3206		1770	3485		1770	1703		1770	1716	
Flt Permitted	0.95	1.00		0.95	1.00		0.71	1.00		0.73	1.00	
Satd. Flow (perm)	1787	3206		1770	3485		1320	1703		1365	1716	
Volume (vph)	50	360	75	190	495	15	95	20	15	5	40	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)	53	379	79	200	521	16	100	21	16	5	42	32
RTOR Reduction (vph)	0	12	0	0	1	0	0	14	0	0	27	0
Lane Group Flow (vph)	53	446	0	200	536	0	100	23	0	5	47	0
Confl. Peds. (#/hr)			69			102			35			19
Confl. Bikes (#/hr)			50			50						
Heavy Vehicles (%)	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#/hr)	0	17	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases	-				77.		8			4		
Actuated Green, G (s)	5.0	58.6		21.3	74.9		15.9	15.9		15.9	15.9	
Effective Green, g (s)	5.4	59.5		21.7	75.8		16.8	16.8		16.8	16.8	
Actuated g/C Ratio	0.05	0.54		0.20	0.69		0.15	0.15		0.15	0.15	
Clearance Time (s)	4.4	4.9		4.4	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	5.3		2.0	3.4		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	88	1734		349	2401		202	260		208	262	
v/s Ratio Prot	c0.03	c0.14		c0.11	0.15			0.01			0.03	
v/s Ratio Perm	2001000			E 15 16 A . 1	Xeros		c0.08	- C15%		0.00	909080	
v/c Ratio	0.60	0.26		0.57	0.22		0.50	0.09		0.02	0.18	
Uniform Delay, d1	51.2	13.5		40.0	6.3		42.7	40.0		39.6	40.6	
Progression Factor	1.15	0.82		0.74	0.20		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.6	0.4		1.4	0.2		0.7	0.1		0.0	0.1	
Delay (s)	66.5	11.4		30.8	1.4		43.4	40.1		39.6	40.7	
Level of Service	Е	В		С	Α		D	D		D	D	
Approach Delay (s)		17.1			9.4			42.5			40.6	
Approach LOS		В			Α			D			D	
Intersection Summary												
HCM Average Control D	) ela y		16.9	H	ICM Le	vel of Se	ervice		В			
HCM Volume to Capaci	ty ratio		0.38									
Actuated Cycle Length			110.0	S	Sum of I	ost time	(s)		12.0			
Intersection Capacity Ut	tilization		59.2%			el of Ser			В			
Analysis Period (min)			15									
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis 23: University Ave & Vermont St

10/17/2013

	1	-	7	1	+	1	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	<b>1</b>		*	<b>†</b>	-	7	fà.		J.	<b>^</b>	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	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	1.00	0.95		1.00	0.95			1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.98			0.98		1.00	1.00	0.93
Flpb, ped/bikes	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			0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00			1.00		0.95	1.00	1.00
Satd. Flow (prot)	1593	3140		1593	3016			1532		1593	1676	1325
Flt Permitted	0.95	1.00		0.95	1.00			1.00		0.73	1.00	1.00
Satd. Flow (perm)	1593	3140		1593	3016			1532		1218	1676	1325
Volume (vph)	35	335	15	35	570	45	0	25	20	20	35	65
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)	37	353	16	37	600	47	0	26	21	21	37	68
RTOR Reduction (vph)	0	2	0	0	3	0	0	17	0	0	0	55
Lane Group Flow (vph)	37	367	- 0	37	644	0	0	30	0	21	37	13
Confl. Peds. (#/hr)		8-71	46		13.000	86			34			56
Confl. Bikes (#/hr)			50			50						
Bus Blockages (#/hr)	0	0	0	0	12	0	0	0	0	0	0	(
Turn Type	Prot			Prot			Perm			Perm		Perm
Protected Phases	5	2		1	6		1 51111	8		1 91111	4	+ 9,11
Permitted Phases				_			8			4		4
Actuated Green, G (s)	8.1	70.0		5.0	66.9			20.8		20.8	20.8	20.8
Effective Green, g (s)	8.5	70.9		5.4	67.8			21.7		21.7	21.7	21.7
Actuated g/C Ratio	0.08	0.64		0.05	0.62			0.20		0.20	0.20	0.20
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9		4.9	4.9	4.9
Vehicle Extension (s)	2.0	3.2		2.0	3.4			3.0		3.0	3.0	3,0
Lane Grp Cap (vph)	123	2024		78	1859			302		240	331	261
v/s Ratio Prot	c0.02	0.12		c0.02	c0.21			0.02			c0.02	101
v/s Ratio Perm	00.02	0.72		00.02				0.02		0.02	00.02	0.01
v/c Ratio	0.30	0.18		0.47	0.35			0.10		0.09	0.11	0.05
Uniform Delay, d1	47.9	7.9		50.9	10.3			36.2		36.1	36.2	35.8
Progression Factor	0.93	0.17		1.00	1.00			1.00		1.00	1.00	1.00
Incremental Delay, d2	0.5	0.2		1.7	0.5			0.1		0.2	0.2	0.1
Delay (s)	45.0	1.6		52.6	10.8			36.3		36.2	36.4	35.9
Level of Service	D D	A		D D	В.			.D		D	D	D
Approach Delay (s)	90	5.5			13.1			36.3			36.1	
Approach LOS		Α.			В			.D			D.	
Intersection Summary												
HCM Average Control D	lelav		13.8	-	ICM Le	vel of S	envice		В			
HCM Volume to Capacit			0.30	1		2. 2. 2.			_			
Actuated Cycle Length (			110.0		Sum of I	ost time	(s)		16.0			
Intersection Capacity Ut	ilization		55.9%			el of Sei	2.7		В			
Analysis Period (min)			15	-	0.0 F06	J. O. OCI	1100		- 0			
c Critical Lane Group			10									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 24: University Ave & Richmond St

10/17/2013

	1	-	1	1	4	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	٦	<b>^</b> 1>		7	<b>†</b> 1>		7	13		7	1	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	190
Total Lost time (s)	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	
Frpb, ped/bikes	1.00	0.97		1.00	0.98		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	
Frt	1.00	0.98		1.00	0.98		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	
Satd. Flow (prot)	1770	3275		1770	3323		1770	1746		1770	1745	
Flt Permitted	0.95	1.00		0.95	1.00		0.53	1.00		0.70	1.00	
Satd. Flow (perm)	1770	3275		1770	3323		984	1746		1295	1745	
Volume (vph)	65	275	35	30	605	80	20	60	30	45	130	6
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	0.9
Adj. Flow (vph)	68	289	37	32	637	84	21	63	32	47	137	6
RTOR Reduction (vph)	0	8	0	0	9	0	Ö	23	0	.0	33	_
Lane Group Flow (vph)	68	318	Ö	32	712	0	21	72	Ö	47	172	
Confl. Peds. (#/hr)	00	510	127	02	112	69	4.0	12	43		114	5
Confl. Bikes (#/hr)			50			50			40			
Bus Blockages (#/hr)	Ó	13	0	0	12	0	0	0	0	0	0	
		9,3	. 0		12	- 0		.0	- 0	Perm	- 0	
Turn Type	Prot	2		Prot			Perm			Leun	- 1	
Protected Phases	5			1	6			8		-	4	
Permitted Phases	5.0	40.0		2.2	40.0		8	20.0		4	20.0	
Actuated Green, G (s)	5.0	42.8		2.2	40.0		20.8	20.8		20.8	20.8	
Effective Green, g (s)	5.4	43.7		2.6	40.9		21.7	21.7		21.7	21.7	
Actuated g/C Ratio	0.07	0.55		0.03	0.51		0.27	0.27		0.27	0.27	
Clearance Time (s)	4.4	4.9		4.4	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.2		2.0	3.1		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	119	1789		58	1699		267	474		351	473	
v/s Ratio Prot	c0.04	c0.10		0.02	d0.21		na réisi	0.04		venen.	c0.10	
//s Ratio Perm							0.02			0.04		
v/c Ratio	0.57	0.18		0.55	0.42		0.08	0.15		0.13	0.36	
Uniform Delay, d1	36.2	9.1		38.1	12.2		21.7	22.2		22.0	23.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
ncremental Delay, d2	4.1	0.2		6.3	0.8		0.0	0.1		0.1	0.2	
Delay (s)	40.2	9.3		44.4	12.9		21.8	22.2		22.1	23.7	
Level of Service	D	A		D	В		C	C		C	C	
Approach Delay (s)		14.7			14.3			22.1			23.4	
Approach LOS		В			В			C			C	
ntersection Summary			10									
HCM Average Control D			16.5	ŧ	ICM Le	vel of S	ervice		В			
HCM Volume to Capaci			0.43									
Actuated Cycle Length (	(s)		80.0	5	Sum of I	ost time	(s)		16.0			
Intersection Capacity Ut	ilization	1.	62.4%			el of Sei			В			
Analysis Period (min)			15									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





# HCM Signalized Intersection Capacity Analysis 25: University Ave & Normal St

10/17/2013

	1	-	-	1	1	1	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	7	**	<b>^</b>		7	7	
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	
ane Util. Factor	1.00	0.95	0.95		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99		1.00	0.94	
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.98		1.00	0.85	
Flt Protected	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	3398		1770	1481	
Flt Permitted	0.42	1.00	1.00		0.95	1.00	
Satd. Flow (perm)	781	3539	3398		1770	1481	
Volume (vph)	40	265	475	60	55	40	
Peak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Adj. Flow (vph)	42	279	500	63	58	42	
RTOR Reduction (vph)	0	0	8	0	.0	30	
Lane Group Flow (vph)	42	279	555	Ö	58	12	
Confl. Peds. (#/hr)		210	9.90	58	99	75	
Confl. Bikes (#/hr)				50		13	
Bus Blockages (#/hr)	0	0	8	0	0	O	
Furn Type		- 0	.0	- 0	- 0	Perm	
Protected Phases	Perm	2	6		4	Femi	
Permitted Phases	2		0		4	4	
	51.5	E1 E	E1 E		247	24.7	
Actuated Green, G (s)		51.5	51.5		24.7		
Effective Green, g (s)	52.4	52.4	52.4		25.1	25.1 0.29	
Actuated g/C Ratio	0.61	0.61	0.61		0.29		
Clearance Time (s)	4.9	4.9	4.9		4.4	4.4	
√ehicle Extension (s)	4.8	4.8	3.9		2.0	2.0	
Lane Grp Cap (vph)	479	2169	2083		520	435	
//s Ratio Prot		0.08	c0.16		യ.03		
//s Ratio Perm	0.05		- 2-00			0.01	
r/c Ratio	0.09	0.13	0.27		0.11	0.03	
Jniform Delay, d1	6.8	7.0	7.7		22.1	21.5	
Progression Factor	1.00	1.00	1.00		1.00	1.00	
ncremental Delay, d2	0.2	0.1	0.1		0.0	0.0	
Delay (s)	6.9	7.0	7.7		22.1	21.5	
Level of Service	A	A.	A		C	C	
Approach Delay (s)		7.0	7.7		21.9		
Approach LOS		Α	Α		C		
ntersection Summary					-		
HCM Average Control D			8.9	1	ICM Le	vel of Servic	ce A
HCM Volume to Capaci			0.22				
Actuated Cycle Length (	(s)		85.5	S	Sum of I	ost time (s)	8.0
ntersection Capacity Ut			67.7%			el of Service	
Analysis Period (min) C. Critical Lane Group			15				

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 26: University Ave & Park Blvd

10/17/2013

	1	-	+	1	-	1	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	<b>^</b> 1>		7	<b>*</b> 1>		ሻ	<b>^</b>		7	ተተ	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	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
Frpb, ped/bikes	1.00	0.98		1.00	0.99		1.00	0.99		1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	0.96		1.00	1.00	0.89
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3234		1770	3408		1770	3357		1770	3539	1478
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3234		1770	3408		1770	3357		1770	3539	1478
Volume (vph)	40	180	80	115	410	100	85	150	55	50	290	55
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	0.98
Adj. Flow (vph)	42	189	84	121	432	105	89	158	58	53	305	58
RTOR Reduction (vph)	0	49	0	0	18	0	0	40	0	0	0.	43
Lane Group Flow (vph)	42	224	0	121	519	0	89	176	0	53	305	15
Confl. Peds. (#/hr)	-		68	10.000	2000	42	25.00	2.5.0	43		202	60
Confl. Bikes (#/hr)			8			8			8			
Bus Blockages (#/hr)	0	12	0	0	0	0	0	0	0	0	0	į
Turn Type	Prot			Prot			Prot			Prot		Pern
Protected Phases	5.	2		1	6		3	8		7	4	
Permitted Phases											-	- 4
Actuated Green, G (s)	2.0	25.6		7.8	31.4		5.4	21.2		2.9	18.7	18.3
Effective Green, g (s)	2.4	26.5		8.2	32.3		5.8	22.1		3.3	19.6	19.6
Actuated g/C Ratio	0.03	0.35		0.11	0.42		0.08	0.29		0.04	0.26	0.28
Clearance Time (s)	4.4	4.9		4.4	4.9		4.4	4.9		4.4	4.9	4.9
Vehicle Extension (s)	3.0	2.0		3.0	2.0		3.0	3.3		2.0	2.9	2.9
Lane Grp Cap (vph)	56	1126		191	1446		135	975		77	911	380
v/s Ratio Prot	0.02	0.07		c0.07	c0.15		c0.05	0.05		0.03	c0.09	200
v/s Ratio Piot v/s Ratio Perm	0.02	0.01		00.07	00.15		00.00	0.03		0.03	00.00	0.01
v/c Ratio	0.75	0.20		0.63	0.36		0.66	0.18		0.69	0.33	0.04
Uniform Delay, d1	36.6	17.4		32.5	14.9		34.2	20.2		35.9	23.0	21.3
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	42.7	0.0		6.7	0.1		11.1	0.1		18.4	0.2	0.0
Delay (s)	79.2	17.4		39.2	14.9		45.3	20.3		54.3	23.2	21.3
Level of Service	7 5.Z	В		D.	14.3 B		#3.3 D	20.5 C		D D	23.2 C	21.2
Approach Delay (s)	-	25.6		U	19.4		υ,	27.6		U	26.9	4
Approach LOS		25.6			19.4 B			27.0			26.5 C	
Intersection Summary					_			7				
HCM Average Control D	elav		23.9	1	ICM Le	rel of S	envice		C			
HCM Volume to Capacit			0.40		IOW LE	ve10130	214106		Ų			
Actuated Cycle Length (			76.1		Sum of I	net time	(0)		12.0			
Intersection Capacity Ut			75.2%		CU Levi		5 7		12.0 D			
Analysis Period (min)	mzatiofi		15	-	OO LEVI	er or Ser	vice		U			
Milarysis Feriou (IIIIII)			13									

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HCM Signalized Intersection Capacity Analysis 27: Washington St & SR-163 On-Ramp

10/17/2013

	*	-	*	1	4	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	<b>ተ</b> ተተ	7		<b>†</b> 1>	7			7		- A	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			1%			0%	
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		0.91	0.91			1.00			
Frpb, ped/bikes	1.00	1.00	0.98		0.99	0.99			1.00			
Flpb. ped/bikes	1.00	1.00	1.00		1.00	1.00			1.00			
Frt	1.00	1.00	0.85		0.94	0.85			0.86			
Flt Protected	0.95	1.00	1.00		1.00	1.00			1.00			
Satd. Flow (prot)	1770	5085	1544		3154	1422			1603			
Flt Permitted	0.95	1.00	1.00		1.00	1.00			1.00			
Satd. Flow (perm)	1770	5085	1544		3154	1422			1603			
Volume (vph)	470	995	180	0	905	1535	- 0	.0	15	0	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	0.98
Adj. Flow (vph)	495	1047	189	0.00	953	1616	0.00	0.53	16	0.55	0.55	0.00
RTOR Reduction (vph)	433	0	0	0	70	135	0	0	0	0	0	(
	495	1047	189	0	1602	762	0	0	16	0	0	Ċ
Lane Group Flow (vph)	490	1047		U	1002	702	U.	Ų	10	U	U	
Confl. Peds. (#/hr)			11			2						
Confl. Bikes (#/hr)	-							-	J. 1821-1			
Turn Type	Prot	- 4	Perm		- 20	Perm		.0	ustom			
Protected Phases	5	2	-		6				400			
Permitted Phases			2			6			2			
Actuated Green, G (s)	39.4	120.0	120.0		71.3	71.3			120.0			
Effective Green, g (s)	39.8	120.0	120.0		72.2	72.2			120.0			
Actuated g/C Ratio	0.33	1.00	1.00		0.60	0.60			1.00			
Clearance Time (s)	4.4	2.0	2.0		4.9	4.9			2.0			
Vehicle Extension (s)	2.0	3.0	3.0		2.8	2.8			3.0			
Lane Grp Cap (vph)	587	5085	1544		1898	856			1603	_		
v/s Ratio Prot	c0.28	0.21			0.51							
v/s Ratio Perm			0.12			c0.54			0.01			
v/c Ratio	0.84	0.21	0.12		0.84	0.89			0.01			
Uniform Delay, d1	37.2	0.0	0.0		19.3	20.5			0.0			
Progression Factor	0.67	1.00	1.00		0.77	1.17			1.00			
Incremental Delay, d2	9.6	0.1	0.2		2.1	6.3			0.0			
Delay (s)	34.5	0.1	0.2		16.9	30.2			0.0			
Level of Service	С	A	А		В	C			А			
Approach Delay (s)		9.9			21.6	-		0.0			0.0	
Approach LOS		A			C			A			A	
Intersection Summary			2.00									
HCM Average Control D	elay		16.8	+	ICM Le	vel of Se	ervice		В			
HCM Volume to Capaci	tv ratio		0.87		CONTRACTOR OF THE PARTY OF THE	-0.00						
Actuated Cycle Length (			120,0	5	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut		l.	96.1%			el of Ser			F			
Analysis Period (min)			15				***					

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





### HCM Signalized Intersection Capacity Analysis

28: Washington St & Lincoln Ave 10/17/2013

	1	-	1	1	+	1	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	ተተጉ			<b>**</b>		7	1	-		र्स	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	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	1.00	0.91			0.91		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
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.00
Frt	1.00	0.97			1.00		1.00	1.00			1.00	0.86
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.99	1.00
Satd. Flow (prot)	1770	4896			5078		1770	1863			1842	1583
Flt Permitted	0.95	1.00			1.00		0.95	1.00			0.99	1.00
Satd. Flow (perm)	1770	4896			5078		1770	1863			1842	1583
Volume (vph)	65	760	190	0	1840	15	375	10	0	10	35	295
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	0.96
Adj. Flow (vph)	68	800	200	0	1937	16	395	11	0.00	11	37	311
RTOR Reduction (vph)	0	21	0	ō	0	0	0	Ô	0	Ö	0	291
Lane Group Flow (vph)	68	979	0	Ö	1953	0	395	11	Ö	Ö	48	20
Confl. Peds. (#/hr)	00	3/3	6	.0.	1000	4	300	P.L	19	9	40	20
Confl. Bikes (#/hr)			7			3			13			
	Prot		- 0			9	- Charles			- Calla	_	
Turn Type		-					Split			Split	-	Pro
Protected Phases	5	2			6		3	3		4	4	1
Permitted Phases		~			00.7		48.2	40.4				
Actuated Green, G (s)	7.0	74.2			62.7		12.1	12.1			7.0	7.0
Effective Green, g (s)	7.4	75.1			63.7		13.0	13.0			7.9	7.9
Actuated g/C Ratio	0.06	0,63			0.53		0.11	0.11			0.07	0.07
Clearance Time (s)	4.4	4.9			5.0		4.9	4.9			4.9	4.9
Vehicle Extension (s)	2.0	5.7			6.0		3,0	3.0			2.0	2.0
Lane Grp Cap (vph)	109	3064			2696		192	202			121	104
v/s Ratio Prot	c0.04	0.20			ம.38		c0.22	0.01			c0.03	0.01
v/s Ratio Perm												
v/c Ratio	0.62	0.32			0.72		2.06	0.05			0.40	0.20
Uniform Delay, d1	54.9	10.5			21.5		53.5	48.0			53.8	53.0
Progression Factor	0.84	1.27			1.00		1.00	1.00			1.00	1.00
Incremental Delay, d2	7.7	0.3			1.4		493.4	0.1			0.8	0.3
Delay (s)	53.8	13.6			22.8		546,9	48.1			54.5	53.4
Level of Service	D	В			C		F	D			D	D
Approach Delay (s)		16.2			22.8			533.4			53.5	
Approach LOS		В			C			F			D	
Intersection Summary			-						- 4-			- 1
HCM Average Control D			78.6	+	ICM Let	vel of S	ervice		Е			
HCM Volume to Capaci			0.88									
Actuated Cycle Length			120.0	S	Sum of I	ost time	(s)		28.0			
Intersection Capacity Ut			84.9%	- 10	OU Levi	el of Sei	vice		E			
			15			-						
Analysis Period (min)			10									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 32: Robinson Ave & Park Blvd

		4-3-4		بندن
4	0.74	170	0.4	12
- 1	LLC I	15/	111	-31

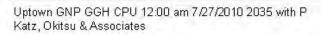
	1	-	-	1	+	1	1	1	1	1	4	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL2	SBL	SBT
Lane Configurations	7	1			4	- 48	40.7	की कि			ă	1
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0			4.0			4.0			4.0	4.0
Lane Util. Factor	1.00	1.00			1,00			0.95			1.00	0.95
Frpb, ped/bikes	1.00	0.99			0.99			1.00			1.00	1.00
Flpb, ped/bikes	1.00	1.00			1.00			1.00			1.00	1.00
Frt	1.00	0.97			0.96			1.00			1.00	0.99
Flt Protected	0.95	1.00			1.00			0.99			0.95	1.00
Satd. Flow (prot)	1770	1785			1762			3472			1770	3493
Flt Permitted	0.55	1.00			0.97			0.73			0.51	1.00
Satd. Flow (perm)	1022	1785			1716			2560			956	3493
Volume (vph)	30	40	10	25	160	85	105	270	10	55	15	565
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	42	11	26	168	89	111	284	11	58	16	595
RTOR Reduction (vph)	ő	0	0	0	33	0	0	0	0	0	Ō	7
Lane Group Flow (vph)	32	53	0	Ō	250	0	Õ	406	0	Ö	74	630
Confl. Peds. (#/hr)	4.5		24	_	200	23		,,,,,	18		1.7	000
Confl. Bikes (#/hr)			9			2			22			
Turn Type	Perm			Perm	_	-	Perm		- Late	Perm	Perm	_
Protected Phases	reim	4		Fellill	8		Ferm	2		Feiiii	rem	E
Permitted Phases	4	#		8	Ů.		2	- 4		6	6	
Actuated Green, G (s)	9.4	9.4			9.4			19.3		0	19.3	19.3
Effective Green, g (s)	10.3	10.3			10.3			20.2			20.2	20.2
Actuated g/C Ratio	0.27	0.27			0.27			0.52			0.52	0.52
Clearance Time (s)	4.9	4.9			4.9			4.9			4.9	4.9
Vehicle Extension (s)	2.0	2.0			2.0			3.5			3.5	3.5
	273	478			459			1343			502	1833
Lane Grp Cap (vph)	2/3				459			1343			502	
v/s Ratio Prot	0.03	0.03			σ0.15			0.40			0.08	c0.18
v/s Ratio Perm	The second second	0.44						0.16				0.20
v/c Ratio	0.12	0.11			0.54			0.30			0.15	0.34
Uniform Delay, d1	10.7	10.6			12.1			5.2			4.7	5.3
Progression Factor	1.00	1.00			1,00			1.00			1.00	1.00
Incremental Delay, d2	0.1	0.0			0.7			0.2			0.2	0.1
Delay (s)	10.7	10.7			12.8			5.3			4.9	5,4
Level of Service	В	В			В			A			Α	A
Approach Delay (s)		10.7			12.8			5.3				5,4
Approach LOS		В			В			Α				A
Intersection Summary	-											
HCM Average Control D			7.1	1	ICM Le	rel of Se	ervice		А			
HCM Volume to Capaci			0.41				1.5		-5-4			
Actuated Cycle Length (			38.5			ost time			8.0			
Intersection Capacity Ut	tilization		65.5%	10	OU Levi	el of Ser	vice		C			
Analysis Period (min)			15									

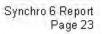
Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





	1	
Movement	SBR	
Lance Configurations	and the second s	
Ideal Flow (vphpl)	1900	
Total Lost time (s)		
Lane Util. Factor		
Frpb, ped/bikes		
Flpb, ped/bikes		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Volume (vph)	40	
Peak-hour factor, PHF	0.95	
Adj. Flow (vph)	42	
RTOR Reduction (vph)	0	
Lane Group Flow (vph)	0	
Confl. Peds. (#/hr)	35	
Confl. Bikes (#/hr)	8	
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Vehicle Extension (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s)		
Level of Service		
Approach Delay (s)		
Approach LOS		









### HCM Unsignalized Intersection Capacity Analysis

- 4	$\Omega/1$	7	$\sigma$	04	2
	11/1		0.71		- 5

	1	-	1	1	-	1	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			4			4			44	
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Volume (veh/h)	0	0	30	10	50	15	30	5	15	10	0	0
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.98
Hourly flow rate (vph)	0	0	32	11	53	16	32	5	16	11	0	- 0
Pedestrians					3.5							-
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)								140110			440110	
Upstream signal (ft)					324							
pX, platoon unblocked					524							
vC, conflicting volume	68			32			97	105	16	116	113	61
vC1, stage 1 conf vol	.00			02			- 01	100	10	110	110	-01
vC2, stage 2 conf vol												
vCu, unblocked vol	68			32			97	105	16	116	113	61
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)	4.1			4.1			F F	0.0	0.2	7.1	0.0	0.2
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
pO queue free %	100			99			96	99	99	99	100	100
cM capacity (veh/h)	1533			1581			880	780	1063	839	772	1005
	1000						000	700	1003	039	112	1000
Direction, Lane #	EB1	WB1	NB1	SB1							_	
Volume Total	32	79	53	11								
Volume Left	0	11	32	11								
Volume Right	32	16	16	0								
cSH	1533	1581	916	839								
Volume to Capacity	0.00	0.01	0.06	0.01								
Queue Length 95th (ft)	0	1	5	1								
Control Delay (s)	0.0	1.0	9.2	9.3								
Lane LOS		Α	Α	Α								
Approach Delay (s)	0.0	1.0	9.2	9.3								
Approach LOS			Α	Α								
Intersection Summary												
Average Delay			3.8									
Intersection Capacity Ut	tilization	b i	20.8%	10	CU Levi	el of Ser	vice		A			
Analysis Period (min)			15									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis
40: University Ave & Goldfinch St

10/17/2013

	1	-	7	1	+	*	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	B		*	1>		7	1		7	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	
Lane Util. Factor	1.00			1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00			1.00	0.85		1.00	0.92		1.00	0.99	
Flt Protected	0.95			0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770			1770	1583		1770	1716		1770	1845	
Flt Permitted	0.71			0.76	1.00		0.60	1.00		0.57	1.00	
Satd. Flow (perm)	1328			1410	1583		1116	1716		1068	1845	
Volume (vph)	20	0	0	30	0	65	50	125	140	150	230	15
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)	21	0	0	32	0	68	53	132	147	158	242	16
RTOR Reduction (vph)	0	0	0	0	41	0	0	88	0	0	6	0
Lane Group Flow (vph)	21	0	0	32	27	0	53	191	0	158	252	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16,0			16.0	16.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0			16.0	16.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	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	4.0		4.0	4.0	
Lane Grp Cap (vph)	531			564	633		446	686		427	738	
v/s Ratio Prot					0.02			0.11			0.14	
v/s Ratio Perm	0.02			c0.02			0.05			d0.15		
v/c Ratio	0.04			0.06	0.04		0.12	0.28		0.37	0.34	
Uniform Delay, d1	7.3			7.4	7.3		7.6	8.1		8.5	8.3	
Progression Factor	1.00			1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1			0.2	0.1		0.5	1.0		2.5	1.3	
Delay (s)	7.5			7.6	7.5		8.1	9.1		10.9	9.6	
Level of Service	A			A	Α		A	A		В	A	
Approach Delay (s)		7.5			7.5			8.9			10.1	
Approach LOS		A			Α			Α			В	
Intersection Summary	-											
HCM Average Control D			9.3	H	ICM Le	el of Se	ervice		Α			
HCM Volume to Capaci			0.21									
Actuated Cycle Length (			40.0			ost time	100		8.0			
Intersection Capacity Ut	ilization	-	41.8%	10	CU Leve	el of Ser	rvice		Α			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





#### HCM Unsignalized Intersection Capacity Analysis 169: University Ave & Front St

10/17/2013

	-	1	1	+	1	-	
Movement	EBT	EBR	WBL	WBT	NBL	NBR	
Lane Configurations	1			4	Y		
Sign Control	Free			Free	Stop		
Grade	0%			0%	0%		
Volume (veh/h)	300	30	45	25	5	85	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	316	32	47	26	5	89	
Pedestrians							
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type					None		
Median storage veh)					140116		
Upstream signal (ft)				332			
pX, platoon unblocked				JJZ			
			347		453	332	
vC, conflicting volume			347		493	332	
/C1, stage 1 conf vol							
C2, stage 2 conf vol			247		150	222	
Cu, unblocked vol			347		453	332	
C, single (s)			4.1		6.4	6.2	
C, 2 stage (s)					-	- 22	
tF (s)			2.2		3.5	3.3	
pO queue free %			96		99	87	
cM capacity (veh/h)			1212		543	710	
Direction , Lane #	EB1	WB1	NB1				
√olume Total	347	74	95				
Volume Left	0	47	5				
Volume Right	32	0	89				
SH	1700	1212	698				
Volume to Capacity	0.20	0.04	0.14				
Queue Length 95th (ft)	0	3	12				
Control Delay (s)	0.0	5.3	11.0				
ane LOS	=10%	Α	В				
Approach Delay (s)	0.0	5.3	11.0				
Approach LOS	710		В				
Intersection Summary			4.00				
Average Delay			2.8				
Intersection Capacity Ut	ilization		36.9%	10	CU Leve	el of Service	A
Analysis Period (min)	The state of the s		15		The second second	or who common hope of	

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





Diversion Analysis

# HCM Unsignalized Intersection Capacity Analysis 194: Washington St & Fifth Ave

10/17/2013

Appendix K-D

	1	-	-	*	1	1	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations		11	<b>^</b> }			7	
Sign Control		Free	Free		Stop	-	
Grade		0%	0%		0%		
Volume (veh/h)	0	170	1775	430	0	15	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly flow rate (vph)	0	179	1868	453	0	16	
Pedestrians	-				-		
Lane Width (ft)							
Walking Speed (ft/s)							
Percent Blockage							
Right turn flare (veh)							
Median type					None		
Median type Median storage veh)					140116		
Upstream signal (ft)		248	112				
	0.57	240	112		0.57	0.57	
pX, platoon unblocked							
C, conflicting volume	2321				2184	1161	
C1, stage 1 conf vol							
vC2, stage 2 conf vol	0.500				0005	F18	
Cu, unblocked vol	2566				2325	519	
tC, single (s)	4.1				6.8	6.9	
tC, 2 stage (s)	ask CV or				NAME OF THE PARTY	an Chi	
tF (s)	2.2				3.5	3,3	
pO queue free %	100				100	94	
cM capacity (veh/h)	96				18	284	
Direction, Lane #	EB1	EB 2	WB1	WB2	SB 1		
√olume Total	89	89	1246	1075	16		
√olume Left	0	0	0	0	0		
Volume Right	0	0	0	453	16		
cSH	1700	1700	17.00	1700	284		
Volume to Capacity	0.05	0.05	0.73	0.63	0.06		
Queue Length 95th (ft)	0	0	0	0	4		
Control Delay (s)	0.0	0.0	0.0	0.0	18.4		
Lane LOS					C		
Approach Delay (s)	0.0		0.0		18.4		
Approach LOS					C		
Intersection Summary			- 100				
Average Delay			0.1				A
Intersection Capacity Ut	tilization		72.8%	- 1	CU Leve	el of Service	C
Analysis Period (min)	-		15				

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





#### HCM Signalized Intersection Capacity Analysis

1: Washington St & First Ave					10/1	7/2013
J → >	1 +	1	-	1	1	1

	1	-	1	1	+	*	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>1</b>		7	<b>†</b> 1>			4		- 2.5	- 44	
Ideal Flow (vphpl)	1900	1900	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	0.95		1.00	0.95			1.00				
Frpb, ped/bikes	1.00	0.98		1.00	0.99			0.99				
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00				
Frt	1.00	0.99		1.00	0.98			0.96				
Flt Protected	0.95	1.00		0.95	1.00			0.98				
Satd. Flow (prot)	1770	3430		1770	3456			1725				
Flt Permitted	0.08	1.00		0.08	1.00			0.98				
Satd. Flow (perm)	151	3430		154	3456			1725				
Volume (vph)	125	1585	155	140	1275	150	265	145	180	0	0	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)	132	1668	163	147	1342	158	279	153	189	0	0	0
RTOR Reduction (vph)	0	7	0	0	9	0	0	16	0	0	0	Ō
Lane Group Flow (vph)	132	1824	0	147	1491	0	0	605	0	0	0	0
Confl. Peds. (#/hr)	2.000		58		2000	32	-		26			49
Confl. Bikes (#/hr)			19			7			4			6
Turn Type	pm+pt			pm+pt			Perm					
Protected Phases	5	2		1	6		1	4				
Permitted Phases	2	7		6	-		4	-,				
Actuated Green, G (s)	53.0	48.3		51.6	47.6			31.1				
Effective Green, g (s)	54.3	49.2		52.9	48.5			32.0				
Actuated g/C Ratio	0.54	0.49		0.53	0.48			0.32				
Clearance Time (s)	4.4	4.9		4.4	4.9			4.9				
Vehicle Extension (s)	2.0	1.0		2.0	1.0			1.0				
Lane Grp Cap (vph)	165	1688		153	1676			552				
v/s Ratio Prot	0.04	c0.53		c0.04	0.43			002				
v/s Ratio Perm	0.39	90.00		0.47	2.10			0.35				
v/c Ratio	0.80	1.08		0.96	0.89			1.10				
Uniform Delay, d1	39.5	25.4		46.6	23.3			34.0				
Progression Factor	0.88	0.85		0.54	0.30			1.00				
Incremental Delay, d2	17.2	44.7		45.7	4.8			67.4				
Delay (s)	51.8	66.2		70.6	11.9			101.4				
Level of Service	D	E		E	В			F				
Approach Delay (s)	-	65.3			17.2			101.4			0.0	
Approach LOS		E			В			F			A	
Intersection Summary									-			
HCM Average Control [	Delay		51.8	+	ICM Le	el of Se	ervice	_	D			
HCM Volume to Capac	ity ratio		1.05									
Actuated Cycle Length			100.0	S	Sum of I	ost time	(s)		12.0			
Intersection Capacity U		1	07.6%			el of Ser			G			
Analysis Period (min)			15	-								
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





# HCM Signalized Intersection Capacity Analysis 3: Washington St & Fifth Ave

10/17/2013

	-	1	1	+	1	1			
Movement	EBT	EBR	WBL	WBT	NBL	NBR			
ane Configurations	个个			<b>†</b> †	7	7			
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
otal Lost time (s)	4.0			4.0	4.0	4.0			
ane Util. Factor	0.95			0.95	1.00	1.00			
rpb, ped/bikes	1.00			1.00	1.00	0.95			
lpb, ped/bikes	1.00			1.00	1.00	1.00			
rt	1.00			1.00	1.00	0.85			
It Protected	1.00			1.00	0.95	1.00			
atd. Flow (prot)	3539			3539	1770	1507			
t Permitted	1.00			1.00	0.95	1.00			
atd. Flow (perm)	3539			3539	1770	1507			
olume (vph)	1990	0	0	1330	525	465			
eak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95			
dj. Flow (vph)	2095	0.95	0.90	1400	553	489			
TOR Reduction (vph)	2095	0	0	1400	223	409 5			
			0						
ane Group Flow (vph)	2095	0 52	U	1400	553	484 31			
onfl. Peds. (#/hr)						2)			
onfl. Bikes (#/hr)	ō.	14	47	0	-6	ō			
us Blockages (#/hr)	0	0	17	0	0	0			
ım Type						Perm			
rotected Phases	2			6	8	10			
ermitted Phases						8			
ctuated Green, G (s)	59.1			59.1	31.6	31.6			
fective Green, g (s)	60.0			60.0	32.0	32.0			
ctuated g/C Ratio	0.60			0.60	0.32	0.32			
learance Time (s)	4.9			4.9	4.4	4.4			
ehicle Extension (s)	1.0			1.0	1.0	1.0			
ane Grp Cap (vph)	2123			2123	566	482			
/s Ratio Prot	c0.59			0.40	0.31				
s Ratio Perm						c0.32			
c Ratio	0.99			0.66	0.98	1.00			
niform Delay, d1	19.6			13.2	33.6	34.0			
rogression Factor	0.40			1.00	1.00	1.00			
cremental Delay, d2	3.6			1.6	31.6	42.1			
elay (s)	11.4			14.9	65.2	76.1			
evel of Service	В			В	E	E			
pproach Delay (s)	11.4			14.9	70.3	-			
oproach LOS	В			В	E				
tersection Summary									
CM Average Control D	)elav		26.0	1	ICM Le	vel of Serv	ice	C	
CM Volume to Capaci			0.99	- 1	OW LO	101010618	,		
ctuated Cycle Length (			100,0	ic	um of t	ost time (s)		8.0	
ntersection Capacity Ut			93.2%			el of Servic		6.0 F	
Analysis Period (min)	mzation		15	10	O Levi	ei oi Seivic	.6		
Critical Lane Group			15						
Childal Lane Group									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





#### HCM Signalized Intersection Capacity Analysis

4: Washington St & Goldfinch St
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10/17/2013

	1	-	1	1	+	*	1	1	-	1	Ţ	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	ሻ	<b>1</b>		7	<b>†</b> 1>		7	1		7	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	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		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	1.00	
Frt	1.00	0.99		1.00	0.98		1.00	0.90		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3512		1770	3436		1770	1684		1770	1831	
Flt Permitted	0.95	1.00		0.95	1.00		0.53	1.00		0.64	1.00	
Satd. Flow (perm)	1770	3512		1770	3436		984	1684		1184	1831	_
Volume (vph)	245	1125	60	320	1050	145	80	45	80	250	165	15
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)	258	1184	63	337	1105	153	84	47	84	263	174	16
RTOR Reduction (vph)	0	4	0	0	12	0	0	63	0	0	4	Ō
Lane Group Flow (vph)	258	1243	0	337	1246	0	84	68	0	263	186	0
Confl. Peds. (#/hr)						27				12.52		27
Confl. Bikes (#/hr)						3						16
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8			4	
Permitted Phases							8			4		
Actuated Green, G (s)	14.8	35.1		19.2	39.1		22.8	22.8		21.9	21.9	
Effective Green, g (s)	15.2	36.0		19.2	40.0		22.8	22.8		22.8	22.8	
Actuated g/C Ratio	0.17	0.40		0.21	0.44		0.25	0.25		0.25	0.25	
Clearance Time (s)	4.4	4.9		4.0	4.9		4.0	4.0		4.9	4.9	
Vehicle Extension (s)	2.0	3.3		3.0	3.3		3.0	3.0		2.0	2.0	
Lane Grp Cap (vph)	299	1405		378	1527		249	427		300	464	
v/s Ratio Prot	0.15	c0.35		c0.19	d0.36			0.04			0.10	
v/s Ratio Perm				3-22-141-150-	and the same of		0.09			d0.22		
v/c Ratio	0.86	0.88		0.89	0.82		0.34	0.16		0.88	0.40	
Uniform Delay, d1	36.4	25.1		34.4	21.8		27.4	26.1		32.3	27.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	21.1	8.4		22.2	4.9		0.8	0.2		23.1	0.2	
Delay (s)	57.5	33.5		56.6	26.7		28.2	26.3		55.3	28.1	
Level of Service	Е	С		Е	С		С	С		Е	С	
Approach Delay (s)		37.6			33.0			27.1			43.9	
Approach LOS		D			C			С			D	
Intersection Summary			- 4									
HCM Average Control D			35.8	F	ICM Le	vel of Se	ervice		D			
HCM Volume to Capaci			0.92									
Actuated Cycle Length			90.0		Sum of I	ost time	(s)		16.0			
Intersection Capacity Ut			85.2%	þ	CU Levi	el of Ser	vice		E			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 5: Washington St & Front St

10/17/2013

	1	-	*	-	+	1	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7.6	<b>^</b>		100	414			4		T.	4	
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	190
Total Lost time (s)		4.0			4.0			4.0		4.0	4.0	4.
Lane Util. Factor		0.95			0.95			1.00		0.95	0.95	1.0
Frpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	0.9
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	1.0
Frt		1.00			1.00			0.91		1.00	1.00	0.8
Flt Protected		1.00			1.00			0.98		0.95	0.95	1.0
Satd. Flow (prot)		3534			3539			1664		1681	1681	150
Flt Permitted		1.00			0.95			0.93		0.75	0.75	1.0
Satd. Flow (perm)		3534			3360			1572		1322	1322	150
Volume (vph)	0	1530	15	5	1485	Ü	5	0	10	380	0	29
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	0.9
Growth Factor (vph)	100%	100%	100%	100%	100%	100%	100%	100%	100%	102%	100%	100
Adj. Flow (vph)	0	1611	16	5	1563	0	5	0	11	408	0	31
	0	1	0	0	1303	0	0	8	0	0	0	2
RTOR Reduction (vph)	0	1626	0	0	1568		0		0			
Lane Group Flow (vph)	U	1020	U	U	1000	0	U	8	U	204	204	29
Confl. Peds. (#/hr)						36						1
Confl. Bikes (#/hr)						6						1
Turn Type				Perm			Perm			Perm		Per
Protected Phases		2			6			- 8			4	
Permitted Phases				6			8			4		
Actuated Green, G (s)		65.9			65.9			25.2		24.3	24.3	24
Effective Green, g (s)		66.8			66.8			25.2		25.2	25.2	25
Actuated g/C Ratio		0.67			0.67			0.25		0.25	0.25	0.2
Clearance Time (s)		4.9			4.9			4.0		4.9	4.9	4
Vehicle Extension (s)		3,0			3.0			3.0		3.0	3.0	3
Lane Grp Cap (vph)		2361			2244			396		333	333	38
//s Ratio Prot		0.46										
//s Ratio Perm					c0.47			0.00		0.15	0.15	c0.1
v/c Ratio		0.69			0.70			0.02		0.61	0.61	0.7
Jniform Delay, d1		10.2			10.3			28.1		33.1	33.1	34
Progression Factor		1.00			0.17			1.00		1.00	1.00	1.0
ncremental Delay, d2		1.7			0.8			0.0		3.3	3.3	8
Delay (s)		11.9			2.5			28.1		36.4	36.4	43
Level of Service		В			A			C		D	D	-,0
Approach Delay (s)		11.9			2.5			28.1			39.4	
Approach LOS		В			Α.			20.1			D.4	
ntersection Summary												
HCM Average Control D	)elav		13.2	1	ICM Le	vel of S	ewice		В			
HCM Volume to Capaci			0.72	,		. 5. 6. 6.	-11100		-			
Actuated Cycle Length i			100.0		Sum of I	ost time	(0)		8.0			
Intersection Capacity Ut			75.4%			el of Se			D.0			
	mzation			- 1	OO LEV	et or 26	Aice		U			
Analysis Period (min) c Critical Lane Group			15									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





### HCM Signalized Intersection Capacity Analysis

7: Washington	St & Fourth Ave	

	*	-	1	1	1	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	<b>^</b>		ሻሻ	<b>†</b> 1>					7	सी	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	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	1.00	0.95		0.97	0.95					0.95	0.95	1.00
Frpb, ped/bikes	1.00	0.99		1.00	1.00					1.00	1.00	0.97
Flpb, ped/bikes	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	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00					0.95	0.97	1.00
Satd. Flow (prot)	1770	3464		3433	347.1					1681	1715	1537
Flt Permitted	0.95	1.00		0.95	1.00					0.95	0.97	1:00
Satd. Flow (perm)	1770	3464		3433	347.1					1681	1715	1537
Volume (vph)	80	1550	160	330	1390	65	0	Ü	.0	675	155	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)	84	1632	168	347	1463	68	0	0	0	711	163	221
RTOR Reduction (vph)	0	7	0	0	3	0	0	0	0	0	0	85
Lane Group Flow (vph)	84	1793	0	347	1528	0	0	0	0	425	449	138
Confl. Peds. (#/hr)		11.55	43	1241		35					14.5	10
Confl. Bikes (#/hr)			10			10			1			10
Bus Blockages (#/hr)	Ó	0	0	0	4	0	0	0	0	0	0	0
Turn Type	Prot			Prot						Perm		Perm
Protected Phases	5	2		1	6					1 5.1111	4	1 5111
Permitted Phases										4		4
Actuated Green, G (s)	5.3	47.8		10.0	52.5					28.0	28.0	28.0
Effective Green, g (s)	5.7	48.7		10.4	53.4					28.9	28.9	28.9
Actuated g/C Ratio	0.06	0.49		0.10	0.53					0.29	0.29	0.29
Clearance Time (s)	4.4	4.9		4.4	4.9					4.9	4.9	4.9
Vehicle Extension (s)	2.0	0.2		1.0	0.2					1.0	1.0	1.0
Lane Grp Cap (vph)	101	1687		357	1854					486	496	444
v/s Ratio Prot	0.05	c0.52		c0.10	d0.44					400	400	
v/s Ratio Perm	0.03	00.02		00.10						0.25	0.26	0.09
v/c Ratio	0.83	1.06		0.97	0.82					0.87	0.91	0.31
Uniform Delay, d1	46.7	25.6		44.7	19.4					33.8	34.2	27.7
Progression Factor	0.78	1.06		1.00	0.85					1.00	1.00	1.00
Incremental Delay, d2	5.2	29.8		34.9	3.5					15.5	19.5	0.1
Delay (s)	41.7	56.9		79.7	20.0					49.3	53.7	27.9
Level of Service	D D	.50,5		75.7 E	20,0 B					45.5 D	D D	27.5
Approach Delay (s)	U	56.2			31.0			0.0		U	46.8	-
Approach LOS		50.2			C C			A			40.0 D	
Intersection Summary												
HCM Average Control E	) ela y		44.3	t	ICM Le	vel of Se	ervice		D			
HCM Volume to Capaci			0.96		-		-					
Actuated Cycle Length			100.0	5	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut			91.3%			el of Ser			F			
Analysis Period (min)			15									
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis
11: Washington St & SR-163 Off-Ramp

10/17/2013

	_#	-	7	+	1	1	1	-	1	1	1	1
Movement	EBL	EBT	EBR	WBT	WBR	NBL	NBT	NBR2	SBL	SBT	SBR	SWE
Lane Configurations		<b>^</b>		<b>1</b>			4			4	- A	ř
Ideal Flow (vphpl)	1900	1900	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		0.95		0.95			1.00			1.00		1.00
Frpb, ped/bikes		0.99		1.00			1.00			1.00		1.00
Flpb, ped/bikes		1.00		1.00			1.00			1.00		1.00
Frt		0.99		1.00			0.97			0.98		0.88
Fit Protected		1.00		1.00			0.97			0.98		1.00
Satd. Flow (prot)		3462		3535			1743			1773		1611
Flt Permitted		0.95		1.00			0.79			0.87		1.00
Satd. Flow (perm)		3302		3535			1431			1573		1611
Volume (vph)	5	2580	270	745	5	140	10	45	15	10	5	590
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	0.96
Adj. Flow (vph)	5	2716	284	784	5	147	11	47	16	11	5	621
RTOR Reduction (vph)	0	6	0	0	0	0	9	0	0	4	0	(
Lane Group Flow (vph)	0	2999	0	789	0	0	196	0	0	28	0	628
Confl. Peds. (#/hr)		- C- SOL - SOL	18		1		- 100				7	200
Turn Type	Perm					Perm			Perm		- 0	uston
Protected Phases	21,02000	2		6		31,000,000	8			4		Ę
Permitted Phases	2					8.			4			
Actuated Green, G (s)		54.5		54.5			19.1		-	18.6		32.9
Effective Green, g (s)		55.5		55.5			19.1			19.1		33.4
Actuated g/C Ratio		0.46		0.46			0.16			0.16		0.28
Clearance Time (s)		5.0		5.0			4.0			4.5		4.5
Vehicle Extension (s)		2.0		2.0			0.9			2.0		2.0
Lane Grp Cap (vph)		1527		1635			228			250		448
v/s Ratio Prot		1		0.22								c0.39
v/s Ratio Perm		c0.91					c0.14			0.02		
v/c Ratio		1.96		0.48			0.86			0.11		1.40
Uniform Delay, d1		32.2		22.3			49.1			43.2		43.3
Progression Factor		1.00		1.40			1.00			1.00		1.00
Incremental Delay, d2		436.0		0.8			25.1			0.1		192.0
Delay (s)		468.3		31.9			74.2			43.3		235.3
Level of Service		F		C			E			D		F
Approach Delay (s)		468.3		31.9			74.2			43.3		
Approach LOS		F		0			E			D		
Intersection Summary												
HCM Average Control D	) ela y		342.8	+	ICM Le	vel of S	ervice		F			
HCM Volume to Capaci			1.59									
Actuated Cycle Length i			120.0	5	Sum of I	ost time	(s)		12.0			
Intersection Capacity Ut		1	06.5%			el of Sei			G			
Analysis Period (min)			15									

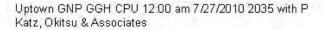
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c Critical Lane Group



	t	
	V	
Movement	SWR2	
Lan <b>g</b> Configurations		
Ideal Flow (vphpl)	1900	
Total Lost time (s)		
Lane Util. Factor		
Frpb, ped/bikes		
Flpb, ped/bikes		
Frt		
Flt Protected		
Satd. Flow (prot)		
Flt Permitted		
Satd. Flow (perm)		
Volume (vph)	5	
Peak-hour factor, PHF	0.95	
Adj. Flow (vph)	5	
RTOR Reduction (vph)	0	
Lane Group Flow (vph)	0	
Confl. Peds. (#/hr)		
Turn Type		
Protected Phases		
Permitted Phases		
Actuated Green, G (s)		
Effective Green, g (s)		
Actuated g/C Ratio		
Clearance Time (s)		
Vehicle Extension (s)		
Lane Grp Cap (vph)		
v/s Ratio Prot		
v/s Ratio Perm		
v/c Ratio		
Uniform Delay, d1		
Progression Factor		
Incremental Delay, d2		
Delay (s) Level of Service		
Approach Delay (s) Approach LOS		
Whinacii roo		







HCM Signalized Intersection Capacity Analysis
14: Normal St & Park Blvd

10/17/2013

	*	-	7	1	+	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	44	<b>^</b>	7	7	44	7	Ĭ	44	7	N.	<b>†</b> 13	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0	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	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.91	0.9
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00	0.97	1.00	1.00	0.96	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	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.98	0.86
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)	3433	3539	1534	1770	3539	1533	1770	3539	1518	1770	3306	1 4 4 1
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)	3433	3539	1534	1770	3539	1533	1770	3539	1518	1770	3306	1441
Volume (vph)	550	880	130	160	575	60	75	320	230	80	255	215
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)	579	926	137	168	605	63	79	337	242	84	268	228
RTOR Reduction (vph)	0	0	87	0	.0	38	0	.0	0	.0	14	129
Lane Group Flow (vph)	579	926	50	168	605	25	79	337	242	84	307	44
Confl. Peds. (#/hr)			5	7-5		16			38			
Confl. Bikes (#/hr)			25			16			1			
Turn Type	Prot		Perm	Prot		Perm	Prot		Perm	Prot		Pro
Protected Phases	5	2		1	6		3	8		7	4	1
Permitted Phases			2			6			8			
Actuated Green, G (s)	7.4	33.2	33.2	11.4	36.7	36.7	6.7	25.4	25.4	4.2	22.9	22.9
Effective Green, g (s)	9.3	35.1	35.1	12.8	38.6	38.6	8.1	27.3	27.3	5.6	24.8	24.8
Actuated g/C Ratio	0.10	0.36	0.36	0.13	0.40	0.40	0.08	0.28	0.28	0.06	0.26	0.28
Clearance Time (s)	5.9	5.9	5.9	5.4	5.9	5.9	5.4	5.9	5.9	5.4	5.9	5.9
Vehicle Extension (s)	2.0	4.8	4.8	2.0	3.8	3,8	2.0	3.5	3.5	2.0	3.9	3,9
Lane Grp Cap (vph)	330	1283	556	234	1411	611	148	998	428	102	847	369
v/s Ratio Prot	c0.17	c0.26		0.09	c0.17		0.04	0.10		c0.05	0.09	0.03
v/s Ratio Perm			0.03			0.02			c0.16			
v/c Ratio	1.75	0.72	0.09	0.72	0.43	0.04	0.53	0.34	0.57	0.82	0.36	0.12
Uniform Delay, d1	43.8	26.6	20.3	40.3	21.1	17.8	42.5	27.6	29.7	45.1	29.5	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	351.8	2.4	0.1	8.4	0.3	0.0	1.8	0.2	1.9	37.7	0.4	0.2
Delay (s)	395.5	29.1	20.5	48.7	21.4	17.8	44.4	27.8	31.5	82.8	29.9	27.8
Level of Service	F	C	C	D	C	В	D	C	C	F	C	C
Approach Delay (s)		157.6			26.6			31.2			37.0	
Approach LOS		F			C			C			D	
Intersection Summary												
HCM Average Control D	) ela y		86.9	1	ICM Le	vel of Se	ervice		F			
HCM Volume to Capaci			0.77									
Actuated Cycle Length (			96.8			ost time	4.7		16.0			
Intersection Capacity Ut	ilization	1	82.5%	- 19	CU Levi	el of Ser	vice		E			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis
15: University Ave & First Ave

10/17/2013

	1	-	1	-	T-	*	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		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	
Lane Util. Factor		1.00			1.00			1.00			1.00	
Frpb, ped/bikes		0.92			0.90			0.99			0.99	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.92			0.91			0.97			0.99	
Flt Protected		0.98			0.99			0.99			0.99	
Satd. Flow (prot)		1548			1504			1774			1802	
Flt Permitted		0.82			0.91			0.92			0.86	
Satd. Flow (perm)		1291			1383			1646			1561	
Volume (vph)	70	0	115	50	25	165	65	350	105	55	215	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	0	121	53	26	17.4	68	368	111	58	226	32
RTOR Reduction (vph)	0	68	0	0	98	0	0	20	0	0	9	0
Lane Group Flow (vph)	0	127	0	Ū	155	0	n	527	Ō	0	307	0
Confl. Peds. (#/hr)	-	151	37	7		52	- 7		34			51
Confl. Bikes (#/hr)			50			50						
Turn Type	Perm			Perm			Perm			Perm	_	_
Protected Phases	1.01111	2		1 Ollin	2.		1 01111	4		1.01111	4	
Permitted Phases	2	-		2			4	7		4	741	
Actuated Green, G (s)		23.2			23.2		_	22.0			22.0	
Effective Green, g (s)		24.1			24.1			22.9			22.9	
Actuated g/C Ratio		0.44			0.44			0.42			0.42	
Clearance Time (s)		4.9			4.9			4.9			4.9	
Vehicle Extension (s)		2.0			2.0			2.0			2.0	
Lane Grp Cap (vph)		566			606			685			650	-
v/s Ratio Prot		500			000			003			030	
v/s Ratio Perm		0.10			d0.11			c0.32			0.20	
v/c Ratio		0.22			0.26			0.77			0.47	
Uniform Delay, d1		9.6			9.8			13.8			11.7	
Progression Factor		1.00			2.79			1.00			1.00	
Incremental Delay, d2		0.9			1.0			4.7			0.2	
Delay (s)		10.5			28.3			18.5			11.9	
Level of Service		В			20.5 C			В			В	
Approach Delay (s)		10.5			28.3			18.5			11.9	
Approach LOS		В			20.5 C			10.5 B			B	
Intersection Summary												
HCM Average Control D	elay		17.6	F	ICM Le	vel of Se	ervice		В			
HCM Volume to Capaci			0.51									
Actuated Cycle Length (			55.0	9	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut			62.9%			el of Ser			В			
Analysis Period (min)			15	- 1			33.0.0		-			
c Critical Lane Group			7.5									

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## HCM Signalized Intersection Capacity Analysis 16: University Ave & Fourth Ave

10/17/2013

	*	-	1	1	+	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations		1>		7	1						414	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	0000	4.0	4.0			WU-101			4.0	
Lane Util. Factor		1.00		1.00	1.00						0.95	
Frpb, ped/bikes		0.92		1.00	1.00						1.00	
Flpb, ped/bikes		1.00		1.00	1.00						1.00	
Frt		0.91		1.00	1.00						1.00	
Flt Protected		1.00		0.95	1.00						0.99	
Satd. Flow (prot)		1556		1770	1833						3503	
Flt Permitted		1.00		0.70	1.00						0.99	
		1556		1308	1833						3503	
Satd. Flow (perm)	0		rr			- 0	0	- 0	- 0	400		- 1
Volume (vph)	0	25	55	245	225	0	0	0	0	120	455	0.01
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	0.96
Adj. Flow (vph)	0	26	58	258	237	0	0	0.	0	126	479	(
RTOR Reduction (vph)	0	27	0	0	0	0	0	0	0	0	0	(
Lane Group Flow (vph)	0	57	0	258	237	0	0	0	0	0	605	(
Confl. Peds. (#/hr)			47			49			21			55
Confl. Bikes (#/hr)			50			50			50			
Bus Blockages (#/hr)	0	.0	0	0	4	0	0	0	0	Ö	0	. (
Turn Type				pm+pt						Perm		
Protected Phases		2		1	6						4	
Permitted Phases				6						4		
Actuated Green, G (s)		58.4		73.3	72.8						23.3	
Effective Green, g (s)		59.3		73.7	73.7						24.2	
Actuated g/C Ratio		0.54		0.67	0.67						0.22	
Clearance Time (s)		4.9		4.4	4.9						4.9	
Vehicle Extension (s)		2.0		3.0	2.0						2.0	
Lane Grp Cap (vph)		839		920	1228						771	
v/s Ratio Prot		0.04		c0.03	0.13						11.1	
v/s Ratio Perm		0.04		c0.16	0.13						0.17	
v/c Ratio		0.07		0.28	0.19						0.78	
Uniform Delay, d1		12.1		7.5	6.9						40.4	
					0.97							
Progression Factor		1.55		1.11							1.00	
Incremental Delay, d2		0.1		0.1	0.0						4.9	
Delay (s)		19.0		8.4	6.7						45.3	
Level of Service		В		A	A						D	
Approach Delay (s)		19.0			7.6			0.0			45.3	
Approach LOS		В			Α			Α			D	
Intersection Summary			-									
HCM Average Control D	elay		27.7	F	ICM Le	vel of Se	ervice		0			
HCM Volume to Capaci			0.40									
Actuated Cycle Length (			110,0	5	Sum of I	ost time	(s)		12.1			
Intersection Capacity Ut			46.3%			el of Ser			А			
Analysis Period (min)	2.3.024500		15	-			ALC: COLOR					

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## HCM Signalized Intersection Capacity Analysis 17: University Ave & Fifth Ave

10/17/2013

17: University Ave &	•	-	1	-	4		4	1	-	1	1	12013
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		4			<b>†</b> 1>			414	100000		30000	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.0	1000	,,,,,,	4.0		1000	4.0				1000
Lane Util. Factor		1.00			0.95			0.95				
Frpb, ped/bikes		1.00			0.89			0.91				
Flpb, ped/bikes		1.00			1.00			1.00				
Frt		1.00			0.94			0.95				
Flt Protected		0.99			1.00			1.00				
Satd. Flow (prot)		1846			2952			3052				
Flt Permitted		0.65			1.00			1.00				
Satd. Flow (perm)		1203			2952			3052				
Volume (vph)	55	255	0	0	545	360	80	635	370	0	0	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)	58	268	0.55	0.55	574	379	84	668	389	0.00	0.55	0.00
RTOR Reduction (vph)	0	0	ŏ	ō	91	0	0	64	0	ō	Ö	ő
Lane Group Flow (vph)	0	326	Ö	0	862	0	0	1077	0	0	ő	0
Confl. Peds. (#/hr)	0	320	134	0	002	136		1011	97	Ų	0	91
Confl. Bikes (#/hr)			50			50			51			50
Turn Type	Perm		JU			00	Perm					30
Protected Phases	Penn	2			2		Perm	4				
Permitted Phases	2				4		4	4				
Actuated Green, G (s)		51.3			51.3		4	40.8				
		52.2			52.2			41.7				
Effective Green, g (s) Actuated g/C Ratio		0.47			0.47			0.38				
Clearance Time (s)		4.9			4.9			4.9				
		1.0			1.0			1.0				_
Vehicle Extension (s)												_
Lane Grp Cap (vph)		571			1401			1157				
v/s Ratio Prot		0.07			d0.29			0.05				
v/s Ratio Perm		0.27			0.00			0.35				
v/c Ratio		0.57			0.62			0.93				
Uniform Delay, d1		20.8			21.4			32.8				
Progression Factor		0.70			0.93			1.00				
Incremental Delay, d2		4.0			1.7			12.9				
Delay (s)		18.6			21.7			45.7				
Level of Service		В			C			D				
Approach Delay (s)		18.6			21.7			45.7			0.0	
Approach LOS		В			C			D			Α	
Intersection Summary	_		00.0		10121	1 12						
HCM Average Control D			32.6	+	ICM Le	vel of Se	ervice		С			
HCM Volume to Capacit			0.73				1.4					
Actuated Cycle Length (			110.0			ost time			12.3			
Intersection Capacity Ut	ilization		94.7%	þ	CU Lev	el of Ser	vice		F			
Analysis Period (min)			15									
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis
18: University Ave & Sixth Ave

10/17/2013

	1	-	+	1	+	*	1	1	-	-	+	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	44	fà		7	<b>†</b> 1>		7	44		ሻ	<b>^</b>	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.0
Lane Util. Factor	0.97	1.00		1.00	0.95		1.00	0.95		1.00	0.95	1.00
Frpb, ped/bikes	1.00	0.92		1.00	0.92		1.00	1.00		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
Frt	1.00	0.95		1.00	0.94		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	3433	1547		1770	3071		1770	3470		1770	3539	1521
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	3433	1547		1770	3071		1770	3470		1770	3539	1521
Volume (vph)	385	100	55	175	335	235	45	985	120	340	820	490
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)	405	105	58	184	353	247	47	1037	126	358	863	516
RTOR Reduction (vph)	0	18	0	0	117	0	0	8	0	0	0	66
Lane Group Flow (vph)	405	145	0	184	483	0	47	1155	Ö	358	863	450
Confl. Peds. (#/hr)	400	140	115	104	400	121	40	1199	16	220	000	34
Confl. Bikes (#/hr)			50			50			10			- 34
Bus Blockages (#/hr)	Ö	12	0	0	0	0	0	0	Ö	0	0	0
		1.2	- 0		- 0	- 0		- 0		Prot		
Turn Type	Prot	2		Prot	· ·		Prot					pm+ov
Protected Phases	5	2		1	6		3	8		7	4	5
Permitted Phases	40.0	20.4		10.7	20.2		5.0	24.0		10.5	45.0	4
Actuated Green, G (s)	10.6	26.1		13.7	29.2		5.3	31.6		19.5	45.8	56.4
Effective Green, g (s)	11.0	27.0		14.1	30.1		5.7	33.0		19.9	47.2	58.2
Actuated g/C Ratio	0.10	0.25		0.13	0.27		0.05	0.30		0.18	0.43	0.53
Clearance Time (s)	4.4	4.9		4.4	4.9		4.4	5.4		4.4	5.4	4.4
Vehicle Extension (s)	3.0	2.2		2.0	2.2		2.0	3.8		2.0	3.8	3.0
Lane Grp Cap (vph)	343	380		227	840		92	1041		320	1519	805
v/s Ratio Prot	c0.12	0.09		c0.10	c0.16		0.03	c0.33		d0.20	0.24	0.06
v/s Ratio Perm		-										0.24
v/c Ratio	1.18	0.38		0.81	0.58		0.51	1.11		1.12	0.57	0.56
Uniform Delay, d1	49.5	34.5		46.7	34.4		50.8	38.5		45.0	23.7	17.3
Progression Factor	1.13	1.19		1.19	0.99		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	97.3	1.6		17.9	2.8		2.0	62.8		86.3	0.6	0.8
Delay (s)	153.1	42.7		73.3	36.8		52.8	101.3		131.3	24.3	18.2
Level of Service	F	D		E	D		D	F		F	C	B
Approach Delay (s)		121.4			45.4			99.5			44.5	
Approach LOS		F			D			F			D	
Intersection Summary												
HCM Average Control D			70.3	- I	ICM Le	vel of S	ervice		E			
HCM Volume to Capaci			0.97									
Actuated Cycle Length			110.0	5	Sum of I	ost time	(s)		16.0			
Intersection Capacity Ut	tilization		97.7%	- 10	CU Levi	el of Sei	vice		F			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 19: University Ave & Seventh Ave

10/17/2013

45 0.95 47	## 1900 4.0 0.95 0.95 1.00 0.98 1.00 3207 0.87 2796 505	1900	WBL 1900	WBT 1900 4.0 0.95 0.98 1.00 0.99 0.99	1900	NBL 1900	NBT 1900 4.0 1.00 0.97 1.00	NBR 1900	SBL 1900	\$BT 1900 4.0 1.00 0.99	SBR 1900
45 0.95 47	1900 4.0 0.95 0.95 1.00 0.98 1.00 3207 0.87 2796 505	1900	1900	1900 4.0 0.95 0.98 1.00 0.99 0.99	1900	1900	1900 4.0 1.00 0.97 1.00	1900	1900	1900 4.0 1.00	1900
45 0.95 47	4.0 0.95 0.95 1.00 0.98 1.00 3207 0.87 2796	1900	1900	4.0 0.95 0.98 1.00 0.99 0.99	1900	1900	4.0 1.00 0.97 1.00	1900	1900	4.0 1.00	1900
0.95 47	0.95 0.95 1.00 0.98 1.00 3207 0.87 2796 505			0.95 0.98 1.00 0.99 0.99			1.00 0.97 1.00			1.00	
0.95 47	0.95 1.00 0.98 1.00 3207 0.87 2796 505			0.98 1.00 0.99 0.99			0.97 1.00				
0.95 47	1.00 0.98 1.00 3207 0.87 2796 505			1.00 0.99 0.99			1.00			0.99	
0.95 47	0.98 1.00 3207 0.87 2796 505			0.99							
0.95 47	1.00 3207 0.87 2796 505			0.99						1.00	
0.95 47	3207 0.87 2796 505						0.93			0.95	
0.95 47	0.87 2796 505			2000			0.98			0.98	
0.95 47	2796 505			3366			1656			1715	
0.95 47	505			0.79			0.78			0.66	
0.95 47				2673			1309			1163	
0.95 47		75	70	470	30	65	30	95	50	25	50
47	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
	532	79	74	495	32	68	32	100	53	26	53
0	4	0	0	2	0	0	48	0	0	32	0
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-	84.5		-	845		- 4	15.7			15.7	
										77.7	_
	2171			2075			130			170	
	°0.33			0.22			c0 12			nna	
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dou		10.2		ICM La	ol of Sa	evico.		P	_		
			L.	OW FE	ve10196	STATES		D			
			c	um of l	not time	(3)		00			
Zativí			I/	O LEVI	si oi Sel	Aice		D			
		15									
1	O Perm 2 2 ay ratio zation	Perm 2 84.5 85.4 0.78 4.9 2.0 2171 c0.23 0.30 3.6 0.52 0.1 2.0 A 2.0 A	0 12 0 Perm 2 2 84.5 85.4 0.78 4.9 2.0 2171  c0.23 0.30 3.6 0.52 0.1 2.0 A 2.0	50 0 12 0 0 0 Perm Perm 2 2 2 2 84.5 85.4 0.78 4.9 2.0 2171  c0.23 0.30 3.6 0.52 0.1 2.0 A	50	50	Solution   Solution	Solution   Solution	50         50           0         12         0         0         9         0         0         0         0           Perm         Perm	Solution   Solution	SO

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





### HCM Signalized Intersection Capacity Analysis 20: University Ave & Fighth St

10/17/2013

	1	-	1	1	-	1	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations		473			414			4		- Constitution	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	
Lane Util. Factor		0.95			0.95			1.00			1.00	
Frpb, ped/bikes		0.98			0.99			0.94			0.96	
Flpb, ped/bikes		1.00			1.00			1.00			1.00	
Frt		0.98			0.98			0.94			0.96	
Flt Protected		1.00			1,00			1.00			0.97	
Satd. Flow (prot)		3293			3424			1627			1652	
Flt Permitted		0.91			0.78			0.97			0.72	
Satd. Flow (perm)		2992			2664			1590			1226	
Volume (vph)	25	680	120	60	640	115	10	60	65	160	5	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	0.9
Adj. Flow (vph)	26	716	126	63	674	121	11	63	68	168	5	84
RTOR Reduction (vph)	0	11	0	03	10	0	0	32	00	0	17	ا
Lane Group Flow (vph)	0	857	0	0	848	0	0	110	0	0	240	
	Ų.	007	38	,U	040	Ų.	U	110	70	U	240	6
Confl. Peds. (#/hr)			50			50			70			0:
Confl. Bikes (#/hr)	ō	40		ō	- 6			ò		- 6	ò	
Bus Blockages (#/hr)	0	12	0	0	0	0	0	0	0	0	0	(
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		2			2			3			4	
Permitted Phases	2			2	977		3			4		
Actuated Green, G (s)		54.4			54.4			14.3			23.6	
Effective Green, g (s)		56.3			56.3			16.2			25.5	
Actuated g/C Ratio		0.51			0.51			0.15			0.23	
Clearance Time (s)		5.9			5.9			5.9			5.9	
Vehicle Extension (s)		1.0			1.0			2.0			2.0	
Lane Grp Cap (vph)		1531			1363			234			284	
v/s Ratio Prot												
v/s Ratio Perm		0.29			d0.32			c0.07			c0.20	
v/c Ratio		0.56			0.62			0.47			0.85	
Uniform Delay, d1		18.4			19.2			43.0			40.4	
Progression Factor		0.87			0.67			1.00			1.00	
Incremental Delay, d2		1.4			2.1			0.5			19.3	
Delay (s)		17.4			15.0			43.5			59.7	
Level of Service		В			В			D			E	
Approach Delay (s)		17.4			15.0			43.5			59.7	
Approach LOS		В			В			D			E	
Intersection Summary			- 5 4									
HCM Average Control D	elay		23.3	+	ICM Le	vel of Se	ervice		С			
HCM Volume to Capaci			0.65				- WHITE					
Actuated Cycle Length (			110.0	9	Sum of I	ost time	(s)		12.0			
Intersection Capacity Ut			91.1%			el of Ser			F			
Analysis Period (min)			15				1100		- 4			

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





### HCM Signalized Intersection Capacity Analysis

21: University Ave & Ninth St

10/17/2013

Movement		1	-	+	1	1	4		
Lane Configurations   1900	Movement	EBL	EBT	WBT	WBR	SBL	SBR	_	
Ideal Flow (rphpl)	Lane Configurations		414	<b>1</b>		- 1	7		
Total Lost time (s)		1900			1900				
Frpb, ped/bikes	The second of th		4.0						
Frpb, ped/bikes						1.00			
Fipb, ped/bikes									
Fit Protected 1.00 1.00 0.85 Fit Protected 1.00 1.00 0.95 1.00 Satd. Flow (prort) 3634 3407 1770 1539 Fit Permitted 0.92 1.00 0.95 1.00 Satd. Flow (perm) 3269 3407 1770 1539 Volume (vph) 20 665 645 20 355 145 Peak-hour factor, PHF 0.95 0.95 0.95 0.95 0.95 0.95 Adj. Flow (vph) 21 700 679 21 374 153 RTOR Reduction (vph) 0 0 1 0 665 Lane Group Flow (vph) 0 721 699 0 374 88 Confl. Peds. (#hr) 94 10 Confl. Bikes (#hr) 94 10 Confl. Bikes (#hr) 50 Bus Blockages (#hr) 0 0 12 0 0 0 Turn Type Perm Perm Protected Phases 2 4 4 Actuated Green, G (s) 74.6 74.6 26.1 26.1 Effective Green, G (s) 75.5 75.5 26.5 26.5 Actuated Green, G (s) 74.6 74.6 26.1 26.1 Effective Green, G (s) 75.5 75.5 26.5 26.5 Actuated Green, G (s) 74.6 74.6 26.1 26.1 Effective Green, G (s) 75.5 75.5 26.5 26.5 Actuated G									
Fit Protected			The second second						
Satd. Flow (proft)         3534         3407         1770         1539           Fif Permitted         0.92         1.00         0.95         1.00           Satd. Flow (perm)         3269         3407         1770         1539           Volume (vph)         20         665         645         20         355         145           Peak-hour factor, PHF         0.95         0.95         0.95         0.95         0.95         0.95           Adj. Flow (vph)         21         700         679         21         374         153           RTOR Reduction (vph)         0         0         1         0         0         65           Lane Group Flow (vph)         0         721         699         0         374         88           Confl. Belse (#hr)         0         0         12         0         0         0           Confl. Belse (#hr)         0         0         12         0         0         0           Turn Type         Perm         Perm         Perm         Perm         Perm           Profested Phases         2         6         4         4           Actuated Green, G (s)         75.5         75.5         26									
Fif Permitted									
Satd. Flow (perm)   3269   3407   1770   1539									
Volume (vph)         20         665         645         20         355         145           Peak hour factor, PHF         0.95         0.95         0.95         0.95         0.95         0.95           Adj. Flow (vph)         21         700         679         21         374         153           RTOR Reduction (vph)         0         0         1         0         0         65           Lane Group Flow (vph)         0         721         699         0         374         88           Confl. Bikes (#hr)         0         0         12         0         0         0           Sus Blockages (#hr)         0         0         12         0         0         0           Turn Type         Perm         Perm         Perm         Perm           Protected Phases         2         6         4           Permitted Phases         2         6         4           Permitted Phases         2         4         4           Actuated Green, G (s)         74.6         74.6         26.1         26.1           Effective Green, g (s)         75.5         75.5         26.5         26.5         A           Actuated Gylc Ra	ALCORATE ADDITIONS								
Peak-hour factor, PHF		20			20				
Adj. Flow (vph)       21       700       679       21       374       153         RTOR Reduction (vph)       0       0       1       0       0       65         Lane Group Flow (vph)       0       721       699       0       374       88         Confl. Peds. (#hr)       94       10         Confl. Bikes (#hr)       50       88       0         Bus Blockages (#hr)       0       0       12       0       0       0         Turn Type       Perm       Perm       Perm       Perm         Protected Phases       2       6       4       4         Permitted Phases       2       4       4       4       4         Permitted Phases       2       4<									
RTOR Reduction (vph)									
Lane Group Flow (vph)									
Confl. Peds. (#/hr)					177				
Confl. Bikes (#/hr)         50           Bus Blockages (#hr)         0         0         12         0         0           Turn Type         Perm         Perm           Protected Phases         2         6         4           Permitted Phases         2         4           Actuated Green, G (s)         74.6         74.6         26.1         26.1           Effective Green, g (s)         75.5         75.5         26.5         26.5           Actuated g/C Ratio         0.69         0.69         0.24         0.24           Clearance Time (s)         4.9         4.9         4.4         4.4           Vehicle Extension (s)         3.0         3.0         3.0         3.0           Lane Grp Cap (vph)         2244         238         426         371           v/s Ratio Prot         0.21         0.21         0.21           v/s Ratio Prot         0.32         0.30         0.88         0.24           Uniform Delay, d1         6.9         6.8         40.2         33.6           Progression Factor         0.32         0.84         1.00         1.00           Incremental Delay, d2         0.3         0.1         18.1         0.3 </td <td></td> <td>U</td> <td>141</td> <td>659</td> <td></td> <td>37.4</td> <td></td> <td></td> <td></td>		U	141	659		37.4			
Bus Blockage's (#hr)							10		
Turn Type	The second secon	- 6	- 6	42			- 2		
Protected Phases         2         6         4           Permitted Phases         2         4           Actuated Green, G (s)         74.6         74.6         26.1           Effective Green, g (s)         75.5         75.5         26.5           Actuated g/C Ratio         0.69         0.69         0.24           Clearance Time (s)         4.9         4.9         4.4           Vehicle Extension (s)         3.0         3.0         3.0           Lane Grp Cap (vph)         2244         2338         426         371           v/s Ratio Prot         0.21         c0.21         c0.21           v/s Ratio Perm         c0.22         0.06         c0.21           v/c Ratio         0.32         0.30         0.88         0.24           Uniform Delay, d1         6.9         6.8         40.2         33.6           Progression Factor         0.32         0.84         1.00         1.00           Incremental Delay, d2         0.3         0.1         18.1         0.3           Delay (s)         2.5         5.8         58.3         34.0           Level of Service         A         A         E         C           Approach LOS<			U	12	U	- 0			
Permitted Phases   2		Perm					Perm		
Actuated Green, G (s) 74.6 74.6 26.1 26.1  Effective Green, g (s) 75.5 75.5 26.5 26.5  Actuated g/C Ratio 0.69 0.69 0.24 0.24  Clearance Time (s) 4.9 4.9 4.4 4.4  Vehicle Extension (s) 3.0 3.0 3.0 3.0  Lane Grp Cap (vph) 2244 2338 426 371  v/s Ratio Prot 0.21 c0.21  v/s Ratio Perm c0.22  v/c Ratio 0.32 0.30 0.88 0.24  Uniform Delay, d1 6.9 6.8 40.2 33.6  Progression Factor 0.32 0.84 1.00 1.00  Incremental Delay, d2 0.3 0.1 18.1 0.3  Delay (s) 2.5 5.8 58.3 34.0  Level of Service A A E C  Approach Delay (s) 2.5 5.8 51.2  Approach LOS A A D  Intersection Summary  HCM Average Control Delay 16.9 HCM Level of Service B  HCM Volume to Capacity ratio 0.47  Actuated Cycle Length (s) 110.0 Sum of lost time (s) 8.0  Intersection Capacity Utilization 59.2% ICU Level of Service B	Company of the Compan	-	2	6		4			
Effective Green, g (s)       75.5       75.5       26.5       26.5         Actuated g/C Ratio       0.69       0.69       0.24       0.24         Clearance Time (s)       4.9       4.9       4.4       4.4         Vehicle Extension (s)       3.0       3.0       3.0       3.0         Lane Grp Cap (vph)       2244       2338       426       371         v/s Ratio Prot       0.21       c0.21         v/s Ratio Perm       c0.22       0.06         v/c Ratio       0.32       0.30       0.88       0.24         Uniform Delay, d1       6.9       6.8       40.2       33.6         Progression Factor       0.32       0.84       1.00       1.00         Incremental Delay, d2       0.3       0.1       18.1       0.3         Delay (s)       2.5       5.8       58.3       34.0         Level of Service       A       A       E       C         Approach LOS       A       A       D         Intersection Summary       HCM Level of Service       B         HCM Volume to Capacity ratio       0.47         Actuated Cycle Length (s)       110.0       Sum of lost time (s)       8.0 <t< td=""><td></td><td>2</td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>		2							
Actuated g/C Ratio 0.69 0.69 0.24 0.24 Clearance Time (s) 4.9 4.9 4.4 4.4 Vehicle Extension (s) 3.0 3.0 3.0 3.0 Lane Grp Cap (vph) 2244 2338 426 371 v/s Ratio Prot 0.21 c0.21 v/s Ratio Perm c0.22 v/c Ratio 0.32 0.30 0.88 0.24 Uniform Delay, d1 6.9 6.8 40.2 33.6 Progression Factor 0.32 0.84 1.00 1.00 Incremental Delay, d2 0.3 0.1 18.1 0.3 Delay (s) 2.5 5.8 58.3 34.0 Level of Service A A E C Approach Delay (s) A A D Intersection Summary HCM Average Control Delay 16.9 HCM Level of Service B HCM Volume to Capacity ratio 0.47 Actuated Cycle Length (s) 110.0 Sum of lost time (s) 8.0 Intersection Capacity Utilization 59.2% ICU Level of Service B	Actuated Green, G (s)					Annual State of State			
Clearance Time (s)       4.9       4.9       4.4       4.4         Vehicle Extension (s)       3.0       3.0       3.0       3.0         Lane Grp Cap (vph)       2244       2338       426       371         v/s Ratio Prot       0.21       60.21         v/s Ratio Perm       c0.22       0.06         v/c Ratio       0.32       0.30       0.88       0.24         Uniform Delay, d1       6.9       6.8       40.2       33.6         Progression Factor       0.32       0.84       1.00       1.00         Incremental Delay, d2       0.3       0.1       18.1       0.3         Delay (s)       2.5       5.8       58.3       34.0         Level of Service       A       A       E       C         Approach LOS       A       A       D         Intersection Summary       A       D       HCM Level of Service       B         HCM Volume to Capacity ratio       0.47         Actuated Cycle Length (s)       110.0       Sum of lost time (s)       8.0         Intersection Capacity Utilization       59.2%       ICU Level of Service       B									
Vehicle Extension (s)         3.0         3.0         3.0         3.0           Lane Grp Cap (vph)         2244         2338         426         371           v/s Ratio Prot         0.21         60.21           v/s Ratio Perm         c0.22         0.06           v/c Ratio         0.32         0.30         0.88         0.24           Uniform Delay, d1         6.9         6.8         40.2         33.6           Progression Factor         0.32         0.84         1.00         1.00           Incremental Delay, d2         0.3         0.1         18.1         0.3           Delay (s)         2.5         5.8         58.3         34.0           Level of Service         A         A         E         C           Approach Delay (s)         2.5         5.8         51.2           Approach LOS         A         A         D           Intersection Summary         HCM Level of Service         B           HCM Volume to Capacity ratio         0.47           Actuated Cycle Length (s)         110.0         Sum of lost time (s)         8.0           Intersection Capacity Utilization         59.2%         ICU Level of Service         B						0.24			
Lane Grp Cap (vph)       2244       2338       426       371         v/s Ratio Prot       0.21       d0.21         v/s Ratio Perm       c0.22       0.06         v/c Ratio       0.32       0.30       0.88       0.24         Uniform Delay, d1       6.9       6.8       40.2       33.6         Progression Factor       0.32       0.84       1.00       1.00         Incremental Delay, d2       0.3       0.1       18.1       0.3         Delay (s)       2.5       5.8       58.3       34.0         Level of Service       A       A       E       C         Approach Delay (s)       2.5       5.8       51.2         Approach LOS       A       A       D         Intersection Summary       HCM Average Control Delay       16.9       HCM Level of Service       B         HCM Volume to Capacity ratio       0.47         Actuated Cycle Length (s)       110.0       Sum of lost time (s)       8.0         Intersection Capacity Utilization       59.2%       ICU Level of Service       B	Clearance Time (s)		4.9			4.4	4.4		
v/s Ratio Prot       0.21       c0.21         v/s Ratio Perm       c0.22       0.06         v/c Ratio       0.32       0.30       0.88       0.24         Uniform Delay, d1       6.9       6.8       40.2       33.6         Progression Factor       0.32       0.84       1.00       1.00         Incremental Delay, d2       0.3       0.1       18.1       0.3         Delay (s)       2.5       5.8       58.3       34.0         Level of Service       A       A       E       C         Approach Delay (s)       2.5       5.8       51.2         Approach LOS       A       A       D         Intersection Summary         HCM Average Control Delay       16.9       HCM Level of Service       B         HCM Volume to Capacity ratio       0.47         Actuated Cycle Length (s)       110.0       Sum of lost time (s)       8.0         Intersection Capacity Utilization       59.2%       ICU Level of Service       B	Vehicle Extension (s)		3.0	3.0					
v/s Ratio Perm       cD.22       0.06         v/c Ratio       0.32       0.30       0.88       0.24         Uniform Delay, d1       6.9       6.8       40.2       33.6         Progression Factor       0.32       0.84       1.00       1.00         Incremental Delay, d2       0.3       0.1       18.1       0.3         Delay (s)       2.5       5.8       58.3       34.0         Level of Service       A       A       E       C         Approach Delay (s)       2.5       5.8       51.2         Approach LOS       A       A       D         Intersection Summary       Intersection Summary       Intersection Capacity ratio       0.47         Actuated Cycle Length (s)       110.0       Sum of lost time (s)       8.0         Intersection Capacity Utilization       59.2%       ICU Level of Service       B	Lane Grp Cap (vph)		2244	2338		426	371		
v/s Ratio Perm       c0.22       0.06         v/c Ratio       0.32       0.30       0.88       0.24         Uniform Delay, d1       6.9       6.8       40.2       33.6         Progression Factor       0.32       0.84       1.00       1.00         Incremental Delay, d2       0.3       0.1       18.1       0.3         Delay (s)       2.5       5.8       58.3       34.0         Level of Service       A       A       E       C         Approach Delay (s)       2.5       5.8       51.2         Approach LOS       A       A       D         Intersection Summary       Intersection Summary       Intersection Capacity ratio       0.47         Actuated Cycle Length (s)       110.0       Sum of lost time (s)       8.0         Intersection Capacity Utilization       59.2%       ICU Level of Service       B				0.21		c0.21			
Uniform Delay, d1         6.9         6.8         40.2         33.6           Progression Factor         0.32         0.84         1.00         1.00           Incremental Delay, d2         0.3         0.1         18.1         0.3           Delay (s)         2.5         5.8         58.3         34.0           Level of Service         A         A         E         C           Approach Delay (s)         2.5         5.8         51.2           Approach LOS         A         A         D           Intersection Summary         Intersection Summary         Intersection Capacity ratio         B           HCM Volume to Capacity ratio         0.47         Actuated Cycle Length (s)         110.0         Sum of lost time (s)         8.0           Intersection Capacity Utilization         59.2%         ICU Level of Service         B			c0.22				0.06		
Uniform Delay, d1         6.9         6.8         40.2         33.6           Progression Factor         0.32         0.84         1.00         1.00           Incremental Delay, d2         0.3         0.1         18.1         0.3           Delay (s)         2.5         5.8         58.3         34.0           Level of Service         A         A         E         C           Approach Delay (s)         2.5         5.8         51.2           Approach LOS         A         A         D           Intersection Summary         Intersection Summary         Intersection Capacity ratio         B           HCM Volume to Capacity ratio         0.47         Actuated Cycle Length (s)         110.0         Sum of lost time (s)         8.0           Intersection Capacity Utilization         59.2%         ICU Level of Service         B	v/c Ratio		0.32	0.30		0.88	0.24		
Progression Factor         0.32         0.84         1.00         1.00           Incremental Delay, d2         0.3         0.1         18.1         0.3           Delay (s)         2.5         5.8         58.3         34.0           Level of Service         A         A         E         C           Approach Delay (s)         2.5         5.8         51.2           Approach LOS         A         A         D           Intersection Summary         Intersection Summary         HCM Level of Service         B           HCM Volume to Capacity ratio         0.47           Actuated Cycle Length (s)         110.0         Sum of lost time (s)         8.0           Intersection Capacity Utilization         59.2%         ICU Level of Service         B									
Incremental Delay, d2			2007/02/			100000	T. T. T. T.		
Delay (s)         2.5         5.8         58.3         34.0           Level of Service         A         A         E         C           Approach Delay (s)         2.5         5.8         51.2           Approach LOS         A         A         D           Intersection Summary           HCM Average Control Delay         16.9         HCM Level of Service         B           HCM Volume to Capacity ratio         0.47           Actuated Cycle Length (s)         110.0         Sum of lost time (s)         8.0           Intersection Capacity Utilization         59.2%         ICU Level of Service         B									
Level of Service         A         A         E         C           Approach Delay (s)         2.5         5.8         51.2           Approach LOS         A         A         D           Intersection Summary           HCM Average Control Delay         16.9         HCM Level of Service         B           HCM Volume to Capacity ratio         0.47           Actuated Cycle Length (s)         110.0         Sum of lost time (s)         8.0           Intersection Capacity Utilization         59.2%         ICU Level of Service         B									
Approach Delay (s)         2.5         5.8         51.2           Approach LOS         A         A         D           Intersection Summary           HCM Average Control Delay         16.9         HCM Level of Service         B           HCM Volume to Capacity ratio         0.47           Actuated Cycle Length (s)         110.0         Sum of lost time (s)         8.0           Intersection Capacity Utilization         59.2%         ICU Level of Service         B									
Approach LOS A A D  Intersection Summary  HCM Average Control Delay 16.9 HCM Level of Service B  HCM Volume to Capacity ratio 0.47  Actuated Cycle Length (s) 110.0 Sum of lost time (s) 8.0  Intersection Capacity Utilization 59.2% ICU Level of Service B									
Intersection Summary HCM Average Control Delay 16.9 HCM Level of Service B HCM Volume to Capacity ratio 0.47 Actuated Cycle Length (s) 110.0 Sum of lost time (s) 8.0 Intersection Capacity Utilization 59.2% ICU Level of Service B	Approach LOS								
HCM Average Control Delay 16.9 HCM Level of Service B HCM Volume to Capacity ratio 0.47 Actuated Cycle Length (s) 110.0 Sum of lost time (s) 8.0 Intersection Capacity Utilization 59.2% ICU Level of Service B	Intersection Summary								
HCM Volume to Capacity ratio 0.47  Actuated Cycle Length (s) 110.0 Sum of lost time (s) 8.0  Intersection Capacity Utilization 59.2% ICU Level of Service B		)elav		16.9	-	ICM Le	vel of Service	se B	
Actuated Cycle Length (s) 110.0 Sum of lost time (s) 8.0 Intersection Capacity Utilization 59.2% ICU Level of Service B						. S III LG	. DI OF COTAIN		
Intersection Capacity Utilization 59.2% ICU Level of Service B						Sum of I	net time (e)	8.0	
Migrator Chou IIIIII		mzanon			15	OO LEVI	er or geralce		
c Critical Lane Group				10					

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 22: University Ave & Tenth St

1	$\Omega/1$	7/	วก	13

	1	-	7	1	-	1	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>↑</b> \$		*	<b>*</b> 1>	-	7	fà.		7	- ↑	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	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	1.00	0.95		1.00	0.95		1,00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.95		1.00	0.98		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.99		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	
Satd. Flow (prot)	1787	3139		1770	3451		1770	1695		1770	1713	
Flt Permitted	0.95	1.00		0.95	1,00		0.44	1.00		0.60	1.00	
Satd. Flow (perm)	1787	3139		1770	3451		813	1695		1117	1713	
Volume (vph)	150	630	185	115	480	25	95	60	50	30	95	75
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)	158	663	195	121	505	26	100	63	53	32	100	79
RTOR Reduction (vph)	0	19	0	0	2	0	0	33	0	0	32	Ö
Lane Group Flow (vph)	158	839	0	121	529	0	100	83	0	32	147	0
Confl. Peds. (#/hr)			69			102			35			19
Confl. Bikes (#/hr)			50			50						
Heavy Vehicles (%)	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%
Bus Blockages (#hr)	0	17	0	0	0	0	0	0	0	0	0	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	5	2		1	6			8		7 0	4	
Permitted Phases		-			~		8			4	- 14	
Actuated Green, G (s)	13.5	58.3		19.6	64.4		17.9	17.9		17.9	17.9	
Effective Green, g (s)	13.9	59.2		20.0	65.3		18.8	18.8		18.8	18.8	
Actuated g/C Ratio	0.13	0.54		0.18	0.59		0.17	0.17		0.17	0.17	
Clearance Time (s)	4.4	4.9		4.4	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	5.3		2.0	3.4		2.0	2.0		2.0	2.0	
Lane Grp Cap (vph)	226	1689		322	2049		139	290		191	293	
v/s Ratio Prot	c0.09	c0.27		c0.07	0.15		,00	0.05		10.1	0.09	
v/s Ratio Perm	00.00	00.21		00.01	0.,0		c0.12	0.00		0.03	0.00	
v/c Ratio	0.70	0.50		0.38	0.26		0.72	0.29		0.17	0.50	
Uniform Delay, d1	46.0	16.0		39.5	10.7		43.1	39.7		38.9	41.4	
Progression Factor	1.01	0.81		0.78	0.43		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.5	0.9		0.3	0.3		13.8	0.2		0.2	0.5	
Delay (s)	53.0	13.9		31.0	4.9		56.9	39.9		39.1	41.9	
Level of Service	D	В		C	A		E	D		D	D	
Approach Delay (s)		20.0			9.7			47.8			41.4	
Approach LOS		C			Α			D			D	
Intersection Summary												
HCM Average Control D	)elay		21.8	F.	ICM Le	vel of S	ervice		C			
HCM Volume to Capaci			0.54									
Actuated Cycle Length			110.0	S	Sum of I	ost time	(s)		12.0			
Intersection Capacity Ut			69.0%			el of Ser			C			
Analysis Period (min)			15									
c Critical Lane Group												

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HCM Signalized Intersection Capacity Analysis 23: University Ave & Vermont St

10/17/2013

			*			1	4	1		*	
EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
7	<b>^</b> 1>		*	<b>1</b>		Ĭ	1		7	<b>^</b>	
1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	190
4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	4.
1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.0
1.00	0.99		1.00	0.96		1.00	0.98		1.00	1.00	0.9
1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.0
1.00	0.99		1.00	0.98		1.00	0.94		1.00	1.00	0.8
0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.0
1593	3124		1593	2898		1593	1551		1593	1676	132
0.95	1.00		0.95	1.00		0.62	1.00		0.67	1.00	1.0
1593	3124		1593	2898		1035	1551		1128	1676	132
	570	35	45	425	85	10	55	35	100	115	13
	0.95										0.9
											13
											10
											3
	655			555		2.0	9.5		1,2.2	1-1	5
0	0	0	0	12	0	0	0	Ö	0	Ö	
											Peri
	2			6		1 21111	8			4	211
						8			4		
11.1	67.1		55	61.5			23.2			23.2	23.
	The second second										24.
											0.2
											4.
											3.
											290
						221			4		20
CO.03	00.20		0.00	0.10		0.01	0.04		കവര	0.01	0.0
0.50	0.33		0.55	0.32			0.20			0.33	0.1
											34.
											1.0
											0.
											34.
											J4.
U			-			6			D		- 5
	Α.			10.5 B			D D			D D	
elav		18.0	F	CMTe	elof Se	ervice		В			
				O IN LO	010100			U			
			Q	um of b	net time	(a)		12.0			
meation			18	O LEVE	, or oel	AICG		U			
t	1900 4.0 1.00 1.00 1.00 1.00 0.95 1593 0.95 1593 80 0.95 84 0 Prot 5 11.1 11.5 0.10 4.4 2.0 167 c0.05 0.95 0.95 0.95 10.95	1900 1900 4.0 4.0 1.00 0.95 1.00 0.99 1.00 1.00 1.00 0.99 0.95 1.00 1593 3124 0.95 1.00 1593 3124 80 570 0.95 0.95 84 600 0 2 84 635  0 0 0  Prot 5 2  11.1 67.1 11.5 68.0 0.10 0.62 4.4 4.9 2.0 3.2 167 1931 c0.05 c0.20 0.50 0.33 46.5 10.1 0.93 0.21 0.8 0.4 44.0 2.6 D A 7.4 A  (elay ty ratio (s)	1900 1900 1900 4.0 4.0 1.00 0.95 1.00 0.99 1.00 1.00 1.00 0.99 0.95 1.00 1593 3124 0.95 1.00 1593 3124 80 570 35 0.95 0.95 0.95 84 600 37 0 2 0 84 635 0 84 635 0 96 50 0 97 60 0 97 7	1900 1900 1900 1900 4.0 4.0 4.0 4.0 1.00 0.95 1.00 1.00 1.00 1.00 1.00 0.99 1.00 0.95 1.00 0.95 1593 3124 1593 0.95 1.00 0.95 1593 3124 1593 80 570 35 45 0.95 0.95 0.95 0.95 84 600 37 47 0 2 0 0 84 635 0 47 46 50 0 0 0 0 0  Prot	1900 1900 1900 1900 1900 1900 4.0 4.0 4.0 4.0 4.0 1.00 0.95 1.00 0.96 1.00 1.00 1.00 1.00 1.00 1.00 0.99 1.00 0.98 0.95 1.00 0.95 1.00 1593 3124 1593 2898 0.95 1.00 0.95 1.00 1593 3124 1593 2898 0.95 0.96 0.97 0.97 0.97 0.98 0.98 0.99 0.99 0.99 0.99 0.99 0.99 0.99 0.99	1900 1900 1900 1900 1900 1900 1900  4.0 4.0 4.0 4.0 4.0  1.00 0.95 1.00 0.96  1.00 1.00 1.00 1.00 1.00  1.00 0.99 1.00 0.98  0.95 1.00 0.95 1.00  1593 3124 1593 2898  0.95 1.00 0.95 1.00  1593 3124 1593 2898  80 570 35 45 425 85  0.95 0.95 0.95 0.95 0.95 0.95  84 600 37 47 447 89  0 2 0 0 10 0  84 635 0 47 526 0  46 86  50 50  0 0 0 0 0 12 0  Prot Prot 5 2 1 6  11.1 67.1 5.5 61.5  11.5 68.0 5.9 62.4  0.10 0.62 0.05 0.57  4.4 4.9 4.4 4.9  2.0 3.2 2.0 3.4  167 1931 85 1644  0.005 c0.20 0.03 0.18  0.50 0.33 0.55 0.32  46.5 10.1 50.8 12.6  0.93 0.21 1.00 1.00  0.8 0.4 4.4 0.5  44.0 2.6 55.1 13.1  D A E B  7.4 16.5  A B  Pelay 18.0 HCM Level of Set sime ilization 57.2% ICU Level of Set sime ilization ICU Level of Set simple ICU Level o	1900   1900	1900   1900	1900   1900   1900   1900   1900   1900   1900   1900   4.	1900	1900

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 24: University Ave & Richmond St

10/17/2013

	1	-	7	1	-	1	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	<b>1</b>		7	<b>*</b> 1>		7	λ		7	ĵ.	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	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	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.98		1.00	0.97		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	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	0.94		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3327		1770	3274		1770	1713		1770	1764	
Flt Permitted	0.95	1.00		0.95	1.00		0.39	1.00		0.62	1.00	
Satd. Flow (perm)	1770	3327		1770	3274		734	1713		1154	1764	
Volume (vph)	150	525	45	65	430	80	45	85	65	90	210	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)	158	553	47	68	453	84	47	89	68	95	221	84
RTOR Reduction (vph)	0	6	0	0	16	0	0	48	0	.0	24	(
Lane Group Flow (vph)	158	594	0	68	521	0	47	109	0	95	281	0
Confl. Peds. (#/hr)	100	204	127	00	521	69	7.0	1,00	43		201	52
Confl. Bikes (#/hr)			50			50			43			0.2
Bus Blockages (#/hr)	0	13	0	Ö	12	0	0	0	0	0	0	0
Turn Type	Prot	- 13	- u	Prot	-14	.0	Perm	- U	- 0	Perm	.0	-
Protected Phases	5	2			6		Perm	8		Penn	4	
1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	5			1	ь			0		4	4	
Permitted Phases	11.0	27.0		<i>E</i> 0	24.2		8 22.9	22.0		4	22.9	
Actuated Green, G (s)	11.6	37.9		5.0	31.3			22.9		22.9		
Effective Green, g (s)	12.0	38.8		5.4	32.2		23.8	23,8		23.8	23.8	
Actuated g/C Ratio	0.15	0.48		0.07	0.40		0.30	0.30		0.30	0.30	
Clearance Time (s)	4.4	4.9		4.4	4.9		4.9	4.9		4.9	4.9	
Vehicle Extension (s)	2.0	3.2		2.0	3.1		2.0	2.0		2.0	2.0	_
Lane Grp Cap (vph)	266	1614		119	1318		218	510		343	525	
v/s Ratio Prot	c0.09	c0.18		0.04	0.16			0.06			c0.16	
v/s Ratio Perm							0.06			0.08		
v/c Ratio	0.59	0.37		0.57	0.40		0.22	0.21		0.28	0.54	
Uniform Delay, d1	31.7	12.9		36.2	17.0		21,1	21.1		21.5	23.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.6		4.1	0.9		0.2	0.1		0.2	0.5	
Delay (s)	34.1	13.6		40.2	17.9		21.3	21.2		21.7	24.0	
Level of Service	C	В		D	В		C	C		C	C	
Approach Delay (s)		17.8			20.4			21.2			23.5	
Approach LOS		В			C			C			C	
Intersection Summary												
HCM Average Control D			20.1	}	ICM Le	vel of Si	ervice		C			
HCM Volume to Capaci			0.45									
Actuated Cycle Length			0.08		Sum of I				8.0			
Intersection Capacity Ut	tilizatior	iv	74.7%	ŢĢ	CU Levi	el of Sei	rvice		D			
Analysis Period (min)			15									
c Critical Lane Group												

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# HCM Signalized Intersection Capacity Analysis 25: University Ave & Normal St

10/17/2013

	1	-	-	1	1	4	
Movement	EBL	EBT	WBT	WBR	SBL	SBR	
Lane Configurations	7	<b>^</b>	<b>^</b> 1>		1	7"	
deal Flow (vphpl)	1900	1900	1900	1900	1900	1900	
Total Lost time (s)	4.0	4.0	4.0		4.0	4.0	
ane Util. Factor	1.00	0.95	0.95		1.00	1.00	
rpb, ped/bikes	1.00	1.00	1.00		1.00	0.95	
lpb, ped/bikes	1.00	1.00	1.00		1.00	1.00	
rt	1.00	1.00	0.99		1.00	0.85	
It Protected	0.95	1.00	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3539	3432		1770	1506	
It Permitted	0.41	1.00	1.00		0.95	1.00	
Satd. Flow (perm)	767	3539	3432		1770	1506	
olume (vph)	55	715	530	40	165	50	
eak-hour factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
dj. Flow (vph)	58	753	558	42	174	53	
TOR Reduction (vph)	0	753	4	0	0	39	
ane Group Flow (vph)	58	753	596	0	174	14	
Confl. Peds. (#/hr)	30	100	550	58	10.4	75	
onfl. Bikes (#/hr)				50		70	
	0	0			n	0	
us Blockages (#/hr)		U	8	0	0		
urn Type	Perm					Perm	
Protected Phases	/6	2	6		4	-	
ermitted Phases	2					4	
ctuated Green, G (s)	35.6	35.6	35.6		15.7	15.7	
ffective Green, g (s)	36.5	36.5	36.5		16.1	16.1	
Actuated g/C Ratio	0.60	0.60	0.60		0.27	0.27	
learance Time (s)	4.9	4.9	4.9		4.4	4.4	
/ehicle Extension (s)	4.8	4.8	3.9		2.0	2.0	
ane Grp Cap (vph)	462	2132	2067		470	400	
/s Ratio Prot		c0.21	0.17		c0.10		
/s Ratio Perm	0.08					0.01	
/c Ratio	0.13	0.35	0.29		0.37	0.04	
Iniform Delay, d1	5.2	6.1	5.8		18.1	16.5	
rogression Factor	1.00	1.00	1.00		1.00	1.00	
ncremental Delay, d2	0.2	0.2	0.1		0.2	0.0	
elay (s)	5.4	6.3	5.9		18.3	16.5	
evel of Service	A	Α.	A		В	В	
Approach Delay (s)	17.4	6.2	5.9		17.9		
Approach LOS		A	Α		В		
ntersection Summary							
CM Average Control D	elay		7.7	H	ICM Le	el of Service	ce A
ICM Volume to Capaci			0.36				
ctuated Cycle Length (			60.6	5	Sum of li	ost time (s)	8.0
ntersection Capacity Ut			75.3%			el of Service	
			15	47			

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HCM Signalized Intersection Capacity Analysis 26: University Ave & Park Blvd

10/17/2013

	1	-	1	1	+	*	1	1	1	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>^</b>		7	<b>†</b>		٦	<b>^</b> 1>		7	*	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	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
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	0.93
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.97		1.00	0.97		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1770	3286		1770	3404		1770	3333		1770	3539	1471
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1770	3286		1770	3404		1770	3333		1770	3539	1471
Volume (vph)	100	420	125	85	345	85	130	405	175	180	350	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)	105	442	132	89	363	89	137	426	184	189	368	84
RTOR Reduction (vph)	0.	30	0	0	23	0	0	48	0	.0	0	58
Lane Group Flow (vph)	105	544	Ö	89	429	o o	137	562	ō	189	368	26
Confl. Peds. (#/hr)		711	68		,,,,,,	42	101		43	100		60
Confl. Bikes (#/hr)			8			8			8			8
Bus Blockages (#/hr)	0	12	ŏ	0	Û	Ö	0	0	Ō	0	0	Ö
Turn Type	Prot	1.2		Prot			Prot			Prot		Perm
Protected Phases	5	2		1	6		3	8		7	4	+ Stu
Permitted Phases					- 4							4
Actuated Green, G (s)	5.1	23.4		6.6	24.9		9.4	26.1		7.3	24.0	24.0
Effective Green, g (s)	5.5	24.3		7.0	25.8		9.8	27.0		7.7	24.9	24.9
Actuated g/C Ratio	0.07	0.30		0.09	0.31		0.12	0.33		0.09	0.30	0.30
Clearance Time (s)	4.4	4.9		4.4	4.9		4.4	4.9		4.4	4.9	4.9
Vehicle Extension (s)	3.0	2.0		3.0	2.0		3.0	3.3		2.0	2.9	2.9
Lane Grp Cap (vph)	119	97.4		151	1071		212	1097		166	1075	447
v/s Ratio Prot	c0.06	c0.17		0.05	0.13		0.08	c0.17		d0.11	0.10	440
v/s Ratio Perm	00.00	CO.17		0.00	0.15		0,00	CO. 17			0.10	0.02
v/c Ratio	0.88	0.56		0.59	0.40		0.65	0.51		1.14	0.34	0.02
Uniform Delay, d1	37.9	24.3		36.1	22.0		34.4	22.2		37.1	22.2	20.2
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
	48.1	0.4		5.8	0.1		6.6	0.4		112.0	0.2	0.1
Incremental Delay, d2					22.1						22.4	20.3
Delay (s)	86.0 F	24.7		41.9			41.1 D	22.6		149.1 F		
Level of Service	Œ	24.2		D	25.4		U	26.0		Г	59.5	С
Approach Delay (s)		34.2										
Approach LOS		С			С			С			E	
Intersection Summary	-		-				- 14					
HCM Average Control D			36.2	t	ICM Le	vel of Se	ervice		D			
HCM Volume to Capaci			0.59									
Actuated Cycle Length i			82.0			ost time	AND LONG		12.0			
Intersection Capacity Ut	ilization		83.6%	Jo	CU Lev	el of Ser	vice		É			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 27: Washington St & SR-163 On-Ramp

10/17/2013

	1	-	1	1	+	1	4	†	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	<b>ተ</b> ተተ	7		<b>†</b> 1>	7	100	-,-	7			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		0%			0%			1%			0%	
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		0.91	0.91			1.00			
Frpb, ped/bikes	1.00	1.00	0.98		1.00	0.99			1.00			
Flpb, ped/bikes	1.00	1.00	1.00		1.00	1.00			1.00			
Frt	1.00	1.00	0.85		0.95	0.85			0.86			
Flt Protected	0.95	1.00	1.00		1.00	1.00			1.00			
Satd. Flow (prot)	1770	5085	1544		3197	1422			1603			
Flt Permitted	0.95	1.00	1.00		1.00	1.00			1.00			
Satd. Flow (perm)	1770	5085	1544		3197	1422			1603			
Volume (vph)	780	2525	550	0	655	830	0	0	25	0	0	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)	821	2658	579	0	689	874	0	0	26	0	0	0
RTOR Reduction (vph)	0	0	0	o o	48	86	Ō	0	0	0	0	Ö
Lane Group Flow (vph)	821	2658	579	ō	1014	415	Ö	ŏ	26	Ö	Ŏ	ő
Confl. Peds. (#/hr)	021	2000	1		1014	410		- Č				1
Confl. Bikes (#/hr)			11			2						- 1
Turn Type	Prot		Perm	-		Perm			ustom			
Protected Phases	5	2	Letini		6	Lenn			ustom			
Permitted Phases	رر	- 4	2			6			2			
Actuated Green, G (s)	58.7	120.0	120.0		52.0	52.0			120.0			
Effective Green, g (s)	59.1	120.0	120.0		52.9	52.9			120.0			
Actuated g/C Ratio	0.49	1.00	1.00		0.44	0.44			1.00			
Clearance Time (s)	4.4	2.0	2.0		4.9	4.9			2.0			
	2.0	3.0	3.0		2.8	2.8			3.0			-
Vehicle Extension (s)												_
Lane Grp Cap (vph)	872	5085	1544		1409	627			1603			
v/s Ratio Prot	c0.46	0.52	0.07		d0.32	0.00			0.00			
v/s Ratio Perm	0.04	0.50	0.37		0.70	0.29			0.02			
v/c Ratio	0.94	0.52	0.38		0.72	0.66			0.02			
Uniform Delay, d1	28.8	0.0	0.0		27.5	26.5			0.0			
Progression Factor	0.70	1.00	1.00		0.17	0.25			1.00			
Incremental Delay, d2	2.4	0.0	0.1		0.3	0.5			0.0			
Delay (s)	22.5	0.0	0.1		4.9	7.3			0.0			
Level of Service	C	A	А		A	A		0.0	Α		0.0	
Approach Delay (s)		4.6			5.7			0.0			0.0	
Approach LOS		A.			Α			A			A	
Intersection Summary			-									
HCM Average Control D	) elay		4.9	- 1	ICM Le	el of Se	ervice		A			
HCM Volume to Capaci			0.84									
Actuated Cycle Length	(s)		120.0	S	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut			84.1%			el of Ser	200		E			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





HCM Signalized Intersection Capacity Analysis 28: Washington St & Lincoln Ave

10/17/2013

	1	-	*	1	+	*	1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBF
Lane Configurations	7	<b>**</b>			<b>^^</b>		7	1			લી	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	190
Total Lost time (s)	4.0	4.0			4.0		4.0	4.0			4.0	4.
Lane Util. Factor	1.00	0.91			0.91		1.00	1.00			1.00	1.0
Frpb, ped/bikes	1.00	0.99			1.00		1.00	0.99			1.00	1.0
Flpb, ped/bikes	1.00	1.00			1.00		1.00	1.00			1.00	1.0
Frt	1.00	0.98			1.00		1.00	0.99			1.00	0.8
Flt Protected	0.95	1.00			1.00		0.95	1.00			0.99	1.0
Satd. Flow (prot)	1770	4930			5081		1770	1825			1850	1583
Flt Permitted	0.95	1.00			1.00		0.95	1.00			0.99	1.0
Satd. Flow (perm)	1770	4930			5081		1770	1825			1850	1583
Volume (vph)	260	1945	380	0	1140	5	345	45	5	5	30	149
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	0.9
Adj. Flow (vph)	27.4	2047	400	0	1200	5	363	47	5	5	32	153
RTOR Reduction (vph)	0	14	0	0	.0	0	0	4	0	0	0	143
Lane Group Flow (vph)	274	2433	0	0	1205	0	363	48	0	0	37	10
Confl. Peds. (#/hr)			6		0.000	4		- 10	19			
Confl. Bikes (#/hr)			7			3						
Turn Type	Prot						Split			Split		Pro
Protected Phases	5	2			6		3	3		4	4	1
Permitted Phases		-						-			- 41	
Actuated Green, G (s)	38.4	74.2			31.3		12.1	12.1			7.0	7.1
Effective Green, g (s)	38.8	75.1			32.3		13.0	13.0			7.9	7.5
Actuated g/C Ratio	0.32	0.63			0.27		0.11	0.11			0.07	0.0
Clearance Time (s)	4.4	4.9			5.0		4.9	4.9			4.9	4.5
Vehicle Extension (s)	2.0	5.7			6.0		3.0	3.0			2.0	2.
Lane Grp Cap (vph)	572	3085			1368		192	198			122	104
v/s Ratio Prot	0.15	c0.49			d0.24		c0.21	0.03			c0.02	0.0
v/s Ratio Perm	0.15	00.43			W.24		00.21	0.03			00.02	0.0
v/s Ratio Felli v/c Ratio	0.48	0.79			0.88		1.89	0.24			0.30	0.11
Uniform Delay, d1	32.5	16.6			42.0		53.5	49.0			53.4	52.
Progression Factor	0.50	1.37			1.00		1.00	1.00			1.00	1.0
Incremental Delay, d2	0.50	1.9			7.8		419.8	0.6			0.5	0.
The state of the s	16.6	24.7			49.8		473.3	49.6			53.9	52.
Delay (s) Level of Service	10.0 B	24.7			45.0 D		473.3 F	43.0 D			53.5 D	92.
		23.8			49.8		E	420.2			53.1	-
Approach Delay (s)		23.0 C			49.0 D			420.2 F				
Approach LOS		U			D			Г			D	
Intersection Summary			00.0		10141	1.40			_			
HCM Average Control D			68.3	- +	ICIVI Le	vel of S	ervice		Е			
HCM Volume to Capaci			0.95				2.5		200.0			
Actuated Cycle Length (			120.0			ost time			28.0			
Intersection Capacity Ut	ilization		78.6%	- 1	CU Lev	el of Sei	rvice		D			
Analysis Period (min)			15									

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





## HCM Signalized Intersection Capacity Analysis 32: Robinson Ave & Park Blvd

10/17/2013

	1	-	-	1	5	1	4	1	1	1	1	1
Movement	EBL	EBT	EBR	EBR2	WBL2	WBL	WBT	WBR	NBL	NBT	NBR	NBR2
Lane Configurations	7	1>					4	ALL WIL		सी के		
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0					4.0			4.0	-	
Lane Util. Factor	1.00	1.00					1.00			0.95		
Frpb, ped/bikes	1.00	0.98					0.99			1.00		
Flpb, ped/bikes	1.00	1.00					1.00			1.00		
Frt	1.00	0.94					0.97			0.99		
Flt Protected	0.95	1.00					0.99			0.99		
Satd. Flow (prot)	1770	1712					1790			3472		
Flt Permitted	0.69	1.00					0.92			0.80		
Satd. Flow (perm)	1291	1712					1664			2798		
Volume (vph)	100	170	30	85	5	20	115	35	135	615	35	5
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)	105	179	32	89	5	21	121	37	142	647	37	5
RTOR Reduction (vph)	0	29	0	0	0	0	17	0	0	0	0	Ċ
Lane Group Flow (vph)	105	271	0	0	.0	0	167	0	0	831	0	
Confl. Peds. (#/hr)	400		24				727	23		224	18	
Confl. Bikes (#/hr)			9					2			22	
Turn Type	Perm				Perm	Perm			Perm			
Protected Phases		4			2000		8		1.01.00	2		
Permitted Phases	4				8	8			2	7		
Actuated Green, G (s)	11.8	11.8					11.8			20.8		
Effective Green, g (s)	12.7	12.7					12.7			21.7		
Actuated g/C Ratio	0.30	0.30					0.30			0.51		
Clearance Time (s)	4.9	4.9					4.9			4.9		
Vehicle Extension (s)	2.0	2.0					2.0			3.5		
Lane Grp Cap (vph)	387	513					498			1432		
v/s Ratio Prot		c0.16										
v/s Ratio Perm	0.08	12.73 5.71					0.10			d0.30		
v/c Ratio	0.27	0.53					0.34			0.58		
Uniform Delay, d1	11.3	12.4					11.6			7.2		
Progression Factor	1.00	1.00					1.00			1.00		
Incremental Delay, d2	0.1	0.5					0.1			0.6		
Delay (s)	11.5	12.8					11.7			7.8		
Level of Service	В	В					В			Α		
Approach Delay (s)		12.5					11.7			7.8		
Approach LOS		В					В			Α		
Intersection Summary												
HCM Average Control D			8.6	}	HCM Le	vel of S	ervice		Α			
HCM Volume to Capaci			0.56									
Actuated Cycle Length (			42.4	- 3	Sum of I	ost time	(s)		8.0			
Intersection Capacity Ut			82.1%			el of Se			E			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





# HCM Signalized Intersection Capacity Analysis 32: Robinson Ave & Park Blvd

10/17/2013

	1	L	1	1
Movement	SBL2	SBL	SBT	SBR
Lane Configurations		Ä	<b>^</b>	
Ideal Flow (vphpl)	1900	1900	1900	1900
Total Lost time (s)		4.0	4.0	
Lane Util. Factor		1.00	0.95	
Frpb, ped/bikes		1.00	0.99	
Flpb, ped/bikes		1.00	1.00	
Frt		1.00	0.98	
Flt Protected		0.95	1.00	
Satd. Flow (prot)		177.0	3431	
Flt Permitted		0.30	1.00	
Satd. Flow (perm)		554	3431	
Volume (vph)	30	35	360	65
Peak-hour factor, PHF	0.95	0.95	0.95	0.95
Adj. Flow (vph)	32	37	379	68
RTOR Reduction (vph)	0	.0	20	0
Lane Group Flow (vph)	0	69	427	0
Confl. Peds. (#/hr)	-	77		35
Confl. Bikes (#/hr)				.8
Turn Type	Perm	Perm		
Protected Phases			6	
Permitted Phases	6	6		
Actuated Green, G (s)		20.8	20.8	
Effective Green, g (s)		21.7	21.7	
Actuated g/C Ratio		0.51	0.51	
Clearance Time (s)		4.9	4.9	
Vehicle Extension (s)		3.5	3.5	
Lane Grp Cap (vph)		284	1756	
v/s Ratio Prot		207	0.12	
v/s Ratio Perm		0.12	0.12	
v/c Ratio		0.24	0.24	
Uniform Delay, d1		5.8	5.8	
Progression Factor		1.00	1.00	
		0.5	0.1	
Incremental Lielay d2				
Incremental Delay, d2		6.3	5 4	
Delay (s)		6.3 A	5.9 Δ	
Delay (s) Level of Service		6.3 A	Α	
Delay (s) Level of Service Approach Delay (s)			A 5.9	
Delay (s) Level of Service			Α	

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## HCM Signalized Intersection Capacity Analysis 40: University Ave & Goldfinch St

10/17/2013

	1	-	1	1	+		1	1	-	1	1	1
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	7	1>		7	f)		7	1>		7	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	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.87		1.00	1.00		1.00	0.93		1.00	0.99	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1617		1770	1863		1770	1734		1770	1845	
Flt Permitted	0.74	1.00		0.73	1.00		0.51	1.00		0.59	1.00	
Satd. Flow (perm)	1379	1617		1359	1863		951	1734		1104	1845	
Volume (vph)	20	5	35	65	25	0	40	135	115	135	295	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)	21	5	37	68	26	0	42	142	121	142	311	21
RTOR Reduction (vph)	0	22	0	0	.0	0	0	73	0	.0	6	-0
Lane Group Flow (vph)	21	20	0	68	26	0	42	190	0	142	326	0
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Effective Green, g (s)	16.0	16.0		16.0	16.0		16.0	16.0		16.0	16.0	
Actuated g/C Ratio	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		4.0	4.0		4.0	4.0	
Lane Grp Cap (vph)	552	647		544	745		380	694	_	442	738	
v/s Ratio Prot		0.01			0.01			0.11			c0.18	
v/s Ratio Perm	0.02			c0.05			0.04			0.13		
v/c Ratio	0.04	0.03		0.12	0.03		0.11	0.27		0.32	0.44	
Uniform Delay, d1	7.3	7.3		7.6	7.3		7.5	8.1		8.3	8.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.1		0.5	0.1		0.6	1.0		1.9	1.9	
Delay (s)	7.4	7.4		8.1	7.4		8.1	9.1		10.2	10,7	
Level of Service	A	A		Α	A		A	A		В	В	
Approach Delay (s)		7.4			7.9			8.9			10.5	
Approach LOS		A			Α			A			В	
Intersection Summary												
HCM Average Control D	elay 💮		9.5	H	ICM Lev	rel of Si	ervice		Α			
HCM Volume to Capaci			0.28									
Actuated Cycle Length (	(s)		40.0	5	ium of li	ost time	(s)		8.0			
Intersection Capacity Ut			41.9%	10	U Leve	el of Sei	vice		Α			
Analysis Period (min)			15									
c Critical Lane Group												

Uptown GNP GGH CPU 12:00 am 7/27/2010 2035 with P Katz, Okitsu & Associates





