

## APPENDIX A

# TRIP GENERATION MEMORANDUM

## TECHNICAL MEMORANDUM

Project: Lake Washington School District  
International Community School

Subject: Trip Generation Summary

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### 1. Introduction

This memorandum describes the Lake Washington School District's (District) proposed expansion of the International Community School (ICS) project as well as the trip generation estimates prepared for State Environmental Policy Act (SEPA) and permitting review of the project. The method applied to estimate trip generation rates and the net changes in site traffic are summarized.

### 2. Project Description

The ICS is located at 11133 NE 65<sup>th</sup> Street in Kirkland, WA and serves grades 7 through 12. It shares its campus with the Community School (CS) which serves grades 1 through 6. The ICS has a current enrollment of 380 students with 21 full time staff; with a start time of 7:30 A.M. and dismissal at 2:05 P.M. (except on Wednesday when dismissal occurs at 11:50 A.M.). The CS has a current enrollment of 69 students with four full-time and one part-time staff; with a start time of 8:45 A.M. and dismissal at 3:20 P.M. (except on Wednesday when dismissal occurs at 12:10 P.M.).<sup>1</sup>

With the proposed project, new facilities would be built on the existing campus that would allow the ICS to add 6<sup>th</sup> graders. This would increase enrollment by 65 students to 445 total ICS students (CS enrollment would remain at 70 students and five staff members). Two teachers would be added at ICS for a total staff count of 23. Construction for the project is anticipated to begin in September 2011 with an early site preparation package. Construction of the building would start in early 2012. Occupancy of the new school building is expected in early 2013 and demolition and other site work associated with the project would be completed in summer 2013.

### 3. Existing Vehicle Traffic

Access to the school is provided by an internal loop road with two driveways located on NE 65<sup>th</sup> Street. The West Driveway is located approximately 80 feet to the east of 111<sup>th</sup> Avenue NE. Although they are offset, this intersection effectively operates as a four-legged intersection, with 111<sup>th</sup> Avenue

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<sup>1</sup> Enrollment and staffing information provided in an email from Mike Finnegan, Lake Washington School District (LWSD), on February 22, 2011; other information obtained from the LWSD website, <http://www.lwsd.org/Schools/Pages/default.aspx>, accessed November 4, 2010.

NE serving as the north leg, and the West Driveway serving as the south leg. The intersection of the East Driveway with NE 65<sup>th</sup> Street also operates as a four-legged intersection, with 112<sup>th</sup> Avenue NE serving as the north leg and the East Driveway serving as the south leg. Both driveway intersections are two-way stop controlled on the north and south legs. Traffic on the internal loop road circulates one-way in a counterclockwise direction, with all vehicles entering the campus via the West Driveway and exiting via the East Driveway. The ICS has two school buses that drop students off in the morning and three buses that pick students up in the afternoon. CS does not utilize any school buses.

Five-day machine counts were taken at both driveways from Tuesday, September 28, 2010 through Saturday, October 2, 2010, tabulating the total vehicles that entered and exited the campus per day, by 15-minute increments. In addition, manual turning movement counts were conducted at both driveway intersections during the peak school traffic periods on Tuesday, September 28, 2010, which reflects a typical weekday. Collectively these counts indicated the time intervals in which the peak hours occur, and also provided the total number of vehicles generated by the schools during peak and off-peak periods.

Existing traffic counts were compiled for the following analysis periods:

- **AM Peak Hour** – Refers to the morning hour in which the highest number of vehicle trips is generated by the schools, which counts indicate occurs between 6:45 and 7:45 A.M. on a typical weekday. This hour also coincides with the typical AM peak hour citywide.
- **School PM Peak Hour** – Refers to the afternoon hour in which the highest number of vehicle trips is generated by the schools, which the counts indicate occurs between 2:00 and 3:00 P.M. on a typical weekday.
- **Commuter PM Peak Hour** – Refers to the afternoon hour in which the highest number of vehicle trips occurs overall on the citywide street system. It was assumed that this peak period occurs during the typical afternoon commute period of 5:00 to 6:00 P.M.
- **Daily** – Refers to the total number of trips that occur from midnight to midnight on a typical weekday. Usually for a school a typical weekday is defined as a Tuesday, Wednesday, or Thursday of a week that school is in session. Since ICS and CS both have early dismissal on Wednesdays (and counts indicated that overall traffic volumes are lower on this day), only Tuesday and Thursday have been defined as ‘typical’ for this project.

Table 1 summarizes the existing vehicle trips generated by the schools during each of these analysis periods, based on the traffic counts.

**Table 1. International Community School/Community School – Existing Trips**

Analysis Period	Time Interval	Vehicle Trips <sup>1</sup>			Directional Split	
		In	Out	Total	In	Out
AM Peak Hour	6:45–7:45 A.M.	190	133	323	59%	41%
School PM Peak Hour	2:00–3:00 P.M.	65	120	185	35%	65%
Commuter PM Peak Hour	5:00–6:00 P.M.	16	8	24	67%	33%
Daily	---	561	561	1,122	50%	50%

Source: Heffron Transportation, Inc., February 2011, based on counts conducted in September 2010.

1. Trip totals for AM and school PM peak hours are based upon manual turning movement counts. Daily trip total and commuter PM peak period trip totals are based upon driveway tube counts.

## 4. Trip Generation Rates

Trip generation rates were estimated by dividing the number of observed trips in each analysis period by student enrollment, resulting in an estimated number of trips per student. This is consistent with the approach presented by the Institute of Transportation Engineers (ITE) in *Trip Generation*,<sup>2</sup> which provides estimates of projected trips per student. Because both the ICS and CS are located on the same site, but start and dismiss at distinctly different times, the time interval for each analysis period was closely assessed to determine whether the ICS student enrollment, the CS student enrollment, or the total enrollment of both schools combined were the most appropriate base unit. The primary generator for each analysis period was identified as follows:

- **AM Peak Hour** – Since the period between 6:45 and 7:45 A.M. ends an hour before the CS begins, it is concluded that this traffic is generated almost entirely by the ICS, and that any contribution by CS-generated traffic can be considered negligible. Thus, the trip estimates were applied to the ICS current enrollment of 380 students.
- **School PM Peak Hour** – Since the period between 2:00 and 3:00 P.M. ends 20 minutes before the CS dismissal occurs, it is concluded that this traffic is generated almost entirely by the ICS, and that any contribution by CS-generated traffic can be considered negligible. Thus, the trip estimates were applied to the ICS current enrollment of 380 students. It should be noted that observed traffic volumes in the following hour, 3:00 to 4:00 P.M., are almost but not quite as high as they are in the preceding hour. It is assumed that traffic occurring during this second hour reflects a mix of CS- and ICS-generated vehicles.
- **Commuter PM Peak Hour** – Since the period between 5:00 and 6:00 P.M. occurs well after dismissal of both ICS and CS, traffic occurring during this period could potentially be attributed to either school. Thus, the trip estimates were applied to the total ICS and CS current enrollment of 449 students.
- **Daily** – Since daily traffic consists of all peak and non-peak hours from midnight to midnight, traffic that occurs over the course of an entire day is attributed to both schools. Thus, the trip estimates were applied to the total ICS and CS current enrollment of 449 students.

Table 2 summarizes the vehicle trip rates that were estimated based upon the observed trip counts and the primary generator assumptions described above. Note, the AM and school PM peak hour trip generation rates derived from observed counts are considerably higher than rates provided by ITE. However, the commuter PM peak hour rate is lower than published ITE rates. The primary reason for this is that ICS and CS are choice schools with students from the entire school district. Students coming from farther distances that are more scattered are also more likely to drive or be driven to and from school. This is reflected in the low number of school buses that serve the schools, and the low number of pedestrians who were observed entering and exiting the school grounds during the school start and dismissal periods (fewer than 10 during each peak hour). In addition, these schools do not have the same level of afternoon extra-curricular activities that might contribute to the level of commuter PM peak hour traffic of more traditional schools. Therefore, it was concluded that ITE rates would likely underestimate the number of vehicle trips generated by the two schools during peak hours and overestimate the commuter PM peak hour traffic. The derived rates summarized in Table 2 reasonably reflect the actual trip generation characteristics of the subject school.

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<sup>2</sup> Institute of Transportation Engineers [ITE], 8<sup>th</sup> Edition, 2008.

Table 2. International Community School/Community School – Trip Generation Rates

Analysis Period	Time Interval	Total Trip Rate	Directional Split	
			In	Out
AM Peak Hour	6:45–7:45 A.M.	0.85 trip / ICS Student <sup>1</sup>	59%	41%
School PM Peak Hour	2:00–3:00 P.M.	0.49 trip / ICS Student <sup>1</sup>	35%	65%
Commuter PM Peak Hour	5:00–6:00 P.M.	0.05 trip / Total Student <sup>2</sup>	67%	33%
Daily	---	2.50 trip / Total Student <sup>2</sup>	50%	50%

Source: Heffron Transportation, Inc., November 2010, based on counts conducted in September 2010.

1. ICS Student = The student enrollment at ICS.
2. Total Student = The combined enrollment at CS and ICS.

## 5. Project Trip Generation

Table 3 summarizes the forecasted trip generation for the proposed expanded ICS during each analysis period; existing trip generation is shown for comparison. The estimates reflect the trip generation rates summarized in Table 2 and the planned increase in school capacity 445 students (from existing enrollment of 380 students)—a net increase in of 65 students. This also results in an increase of total campus enrollment capacity (ICS and CS combined) from 450 to about 515 students.

Table 3. International Community School/Community School – New Trip Estimates

Analysis Period	Expanded Enrollment	Expanded ICS			Existing ICS			Net New Trips		
		In	Out	Total	In	Out	Total	In	Out	Total
AM Peak Hour (6:45–7:45 A.M.)	445 ICS Students	223	155	378	190	133	323	33	22	55
School PM Peak Hour (2:00–3:00 P.M.)	445 ICS Students	76	142	218	65	120	185	11	22	33
Commuter PM Peak Hour (5:00–6:00 P.M.)	515 Total Students	17	9	26	16	8	24	1	1	2
Daily	515 Total Students	645	645	1,290	560	560	1,120	85	85	170

Source: Heffron Transportation, Inc., February 2011, based on counts conducted in September 2010 and future ICS capacity of 445 students.

## APPENDIX B

# LEVEL OF SERVICE DEFINITIONS & LOS CALCULATION SHEETS

Levels of service (LOS) are qualitative descriptions of traffic operating conditions. These levels of service are designated with letters ranging from LOS A, which is indicative of good operating conditions with little or no delay, to LOS F, which is indicative of stop-and-go conditions with frequent and lengthy delays. Levels of service for this analysis were developed using procedures presented in the *Highway Capacity Manual* (Transportation Research Board, 2000).

Level of service for signalized intersections is defined in terms of delay. Delay can be a cause of driver discomfort, frustration, inefficient fuel consumption, and lost travel time. Specifically, level of service criteria are stated in terms of the average delay per vehicle in seconds. Delay is a complex measure and is dependent on a number of variables including: the quality of progression, cycle length, green ratio, and a volume-to-capacity ratio for the lane group or approach in question. Table A-1 shows the level of service criteria for signalized intersections from the *Highway Capacity Manual*.

Table B-1. Level of Service Criteria

Level of Service	Average Delay Per Vehicle	General Description
A	Less than 10.0 Seconds	Free flow
B	10.1 to 20.0 seconds	Stable flow (slight delays)
C	20.1 to 35.0 seconds	Stable flow (acceptable delays)
D	35.1 to 55.0 seconds	Approaching unstable flow (tolerable delay—occasionally wait through more than one signal cycle before proceeding.
E	55.1 to 80.0 seconds	Unstable flow (approaching intolerable delay)
F	Greater than 80.0 seconds	Forced flow (jammed)

Source: Transportation Research Board, *Highway Capacity Manual*, 2000.

For unsignalized intersections, level of service is based on the average delay per vehicle for each turning movement. The level of service for a two-way, stop-controlled intersection is determined by the computed or measured control delay and is defined for each minor movement. Delay is related to the availability of gaps in the main street's traffic flow, and the ability of a driver to enter or pass through those gaps. The delay at an all-way, stop-sign (AWSC) controlled intersection is based on saturation headways, departure headways, and service time using procedures in *Chapter 17 – Unsignalized Intersections, Applications – AWSC Intersections* of the *Highway Capacity Manual 2000* (Transportation Research Board (TRB), 2000). Table A-2 shows the level of service criteria for unsignalized intersections from the *Highway Capacity Manual*.

Table B-2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Delay (seconds per vehicle)
A	Less than 10.0
B	10.1 to 15.0
C	15.1 to 25.0
D	25.1 to 35.0
E	35.1 to 50.0
F	Greater than 50.0

Source: Transportation Research Board, *Highway Capacity Manual*, 2000.

LWSD - ICS Expansion  
1: NE 65th St & 112th Ave NE

Existing AM Peak Hour  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SGR
Lane Configurations		+			+			+			+	
Volume (veh/h)	16	5	0	0	9	16	24	109	0	6	0	70
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.58	0.58	0.57	0.57	0.57	0.38	0.38	0.38	0.46	0.46	0.46
Hourly flow rate (vph)	28	9	0	0	16	28	63	267	0	13	0	152
Pedestrians		3									2	
Lane Width (ft)		11.0									11.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	46			9			249	110	9	239	96	35
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	46			9			249	110	9	239	96	35
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			89	63	100	97	100	85
cM capacity (veh/h)	1573			1625			591	766	1073	498	777	1031
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	36	44	350	165								
Volume Left	28	0	63	13								
Volume Right	0	28	0	152								
cSH	1573	1700	727	951								
Volume to Capacity	0.02	0.03	0.48	0.17								
Queue Length 95th (ft)	1	0	66	16								
Control Delay (s)	5.6	0.0	14.5	9.6								
Lane LOS	A		B	A								
Approach Delay (s)	5.6	0.0	14.5	9.6								
Approach LOS			B	A								
Intersection Summary												
Average Delay			11.5									
Intersection Capacity Utilization			27.1%		ICU Level of Service				A			
Analysis Period (min)			15									

LWSD - ICS Expansion  
2: NE 65th St & 111th Ave NE

Existing AM Peak Hour  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SGR
Lane Configurations		+			+			+			+	
Volume (veh/h)	9	19	69	59	40	4	0	0	0	2	62	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.56	0.56	0.56	0.46	0.46	0.46	0.38	0.38	0.38	0.28	0.28	0.28
Hourly flow rate (vph)	16	34	123	128	87	9	0	0	0	7	221	14
Pedestrians											7	1
Lane Width (ft)											0.0	11.0
Walking Speed (ft/s)											4.0	4.0
Percent Blockage											0	0
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	97			164			608	488	103	477	545	92
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	97			164			608	488	103	477	545	92
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			91			100	100	100	98	45	99
cM capacity (veh/h)	1502			1414			213	434	958	463	403	970
Direction, Lane #	EB 1	WB 1	SB 1									
Volume Total	173	224	243									
Volume Left	16	128	7									
Volume Right	123	9	14									
cSH	1502	1414	419									
Volume to Capacity	0.01	0.09	0.58									
Queue Length 95th (ft)	1	7	89									
Control Delay (s)	0.8	4.8	24.8									
Lane LOS	A	A	C									
Approach Delay (s)	0.8	4.8	24.8									
Approach LOS			C									
Intersection Summary												
Average Delay			11.3									
Intersection Capacity Utilization			22.6%		ICU Level of Service				A			
Analysis Period (min)			15									

LWSD - ICS Expansion  
3: NE 64th St & 111th Ave NE

Existing AM Peak Hour  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			Y	Y	
Volume (veh/h)	1	2	1	28	25	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.81	0.81	0.52	0.52
Hourly flow rate (vph)	1	3	1	35	48	2
Pedestrians	3					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type			None	None		
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	89	52	53			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	89	52	53			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	914	1019	1562			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	4	36	50			
Volume Left	1	1	0			
Volume Right	3	0	2			
cSH	981	1562	1700			
Volume to Capacity	0.00	0.00	0.03			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	8.7	0.3	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.7	0.3	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.5			
Intersection Capacity Utilization			14.3%	ICU Level of Service		A
Analysis Period (min)			15			

LWSD - ICS Expansion  
1: NE 65th St & 112th Ave NE

Existing Afternoon Peak Hour  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		Y			Y			Y			Y	
Volume (veh/h)	11	8	0	0	8	4	22	98	0	7	0	32
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.71	0.71	0.71	0.43	0.43	0.43	0.67	0.67	0.67	0.89	0.89	0.89
Hourly flow rate (vph)	15	11	0	0	19	9	33	146	0	8	0	36
Pedestrians					34			1				
Lane Width (ft)					11.0			11.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					3			0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	28			12			102	71	46	173	67	23
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	28			12			102	71	46	173	67	23
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			96	82	100	99	100	97
cM capacity (veh/h)	1589			1618			841	811	996	652	810	1045
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	27	28	179	44								
Volume Left	15	0	33	8								
Volume Right	0	9	0	36								
cSH	1599	1700	816	943								
Volume to Capacity	0.01	0.02	0.22	0.05								
Queue Length 95th (ft)	1	0	21	4								
Control Delay (s)	4.2	0.0	10.6	9.0								
Lane LOS	A		B	A								
Approach Delay (s)	4.2	0.0	10.6	9.0								
Approach LOS			B	A								
<b>Intersection Summary</b>												
Average Delay				8.7								
Intersection Capacity Utilization				26.4%	ICU Level of Service							A
Analysis Period (min)				15								

LWSD - ICS Expansion  
2: NE 65th St & 111th Ave NE

Existing Afternoon Peak Hour  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+						+	
Volume (veh/h)	13	13	21	21	36	5	0	0	0	6	23	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.59	0.59	0.59	0.61	0.61	0.61	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	22	22	36	34	59	8	0	0	0	9	34	16
Pedestrians		2			2			0				
Lane Width (ft)		11.0			11.0			0.0				
Walking Speed (ft/s)		4.0			4.0			4.0				
Percent Blockage		0			0			0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	67			67			260	229	51	218	243	65
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	67			67			260	229	51	218	243	65
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			98			100	100	100	99	95	98
cM capacity (veh/h)	1547			1529			638	650	1021	721	638	1003
Direction, Lane #	EB 1	WB 1	SB 1									
Volume Total	80	102	60									
Volume Left	22	34	9									
Volume Right	36	8	16									
cSH	1547	1529	723									
Volume to Capacity	0.01	0.02	0.08									
Queue Length 95th (ft)	1	2	7									
Control Delay (s)	2.1	2.6	10.4									
Lane LOS	A	A	B									
Approach Delay (s)	2.1	2.6	10.4									
Approach LOS			B									
Intersection Summary												
Average Delay			4.4									
Intersection Capacity Utilization			20.5%		ICU Level of Service				A			
Analysis Period (min)			15									

LWSD - ICS Expansion  
3: NE 64th St & 111th Ave NE

Existing Afternoon Peak Hour  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				+	+	
Volume (veh/h)	1	4	2	26	43	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.81	0.81	0.52	0.52
Hourly flow rate (vph)	1	5	2	32	83	10
Pedestrians				2		
Lane Width (ft)				11.0		
Walking Speed (ft/s)				4.0		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	127	90	94			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	127	90	94			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	870	872	1510			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	7	35	92			
Volume Left	1	2	0			
Volume Right	5	0	10			
cSH	950	1510	1700			
Volume to Capacity	0.01	0.00	0.05			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	8.8	0.5	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.8	0.5	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			14.0%		ICU Level of Service	A
Analysis Period (min)			15			

LWSD - ICS Expansion  
1: NE 65th St & 112th Ave NE

Forecast 2013 Without Project - AM Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Volume (veh/h)	17	5	0	0	9	17	24	109	0	6	0	71
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.58	0.58	0.57	0.57	0.57	0.38	0.38	0.38	0.46	0.46	0.46
Hourly flow rate (vph)	29	9	0	0	16	30	63	267	0	13	0	154
Pedestrians		3									2	
Lane Width (ft)		11.0									11.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	48			9			255	115	9	243	100	36
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	48			9			255	115	9	243	100	36
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			89	62	100	97	100	85
cM capacity (veh/h)	1570			1625			583	760	1073	492	772	1030
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	38	46	350	167								
Volume Left	29	0	63	13								
Volume Right	0	30	0	154								
cSH	1570	1700	720	949								
Volume to Capacity	0.02	0.03	0.49	0.18								
Queue Length 95th (ft)	1	0	67	16								
Control Delay (s)	5.7	0.0	14.6	9.6								
Lane LOS	A		B	A								
Approach Delay (s)	5.7	0.0	14.6	9.6								
Approach LOS			B	A								
Intersection Summary												
Average Delay			11.6									
Intersection Capacity Utilization			27.2%		ICU Level of Service				A			
Analysis Period (min)			15									

LWSD - ICS Expansion  
2: NE 65th St & 111th Ave NE

Forecast 2013 Without Project - AM Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Volume (veh/h)	9	20	69	59	41	4	0	0	0	2	62	4
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.56	0.56	0.56	0.46	0.46	0.48	0.38	0.38	0.38	0.28	0.28	0.28
Hourly flow rate (vph)	16	36	123	128	89	9	0	0	0	7	221	14
Pedestrians											7	1
Lane Width (ft)											0.0	11.0
Walking Speed (ft/s)											4.0	4.0
Percent Blockage											0	0
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	99			166			611	492	104	480	549	94
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	99			166			611	492	104	480	549	94
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			91			100	100	100	98	45	99
cM capacity (veh/h)	1489			1412			211	432	956	460	401	967
Direction, Lane #	EB 1	WB 1	SB 1									
Volume Total	175	226	243									
Volume Left	16	128	7									
Volume Right	123	9	14									
cSH	1499	1412	417									
Volume to Capacity	0.01	0.09	0.58									
Queue Length 95th (ft)	1	7	90									
Control Delay (s)	0.8	4.8	25.0									
Lane LOS	A	A	C									
Approach Delay (s)	0.8	4.8	25.0									
Approach LOS			C									
Intersection Summary												
Average Delay			11.3									
Intersection Capacity Utilization			22.7%		ICU Level of Service				A			
Analysis Period (min)			15									

LWSD - ICS Expansion  
3: NE 64th St & 111th Ave NE

Forecast 2013 Without Project - AM Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y			Y	Y	
Volume (veh/h)	1	2	1	28	25	1
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.81	0.81	0.52	0.52
Hourly flow rate (vph)	1	3	1	35	48	2
Pedestrians	3					
Lane Width (ft)	11.0					
Walking Speed (ft/s)	4.0					
Percent Blockage	0					
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	89	52	53			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	89	52	53			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	100	100			
cM capacity (veh/h)	914	1019	1562			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	4	36	50			
Volume Left	1	1	0			
Volume Right	3	0	2			
cSH	981	1562	1700			
Volume to Capacity	0.00	0.00	0.03			
Queue Length 95th (ft)	0	0	0			
Control Delay (s)	8.7	0.3	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.7	0.3	0.0			
Approach LOS	A					
<b>Intersection Summary</b>						
Average Delay			0.5			
Intersection Capacity Utilization			14.3%	ICU Level of Service		A
Analysis Period (min)			15			

LWSD - ICS Expansion  
1: NE 65th St & 112th Ave NE

Forecast 2013 Without Project - Afternoon Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		Y			Y			Y	Y		Y	
Volume (veh/h)	12	8	0	0	8	4	22	98	0	7	0	33
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.71	0.71	0.71	0.43	0.43	0.43	0.67	0.67	0.67	0.89	0.89	0.89
Hourly flow rate (vph)	17	11	0	0	19	9	33	146	0	8	0	37
Pedestrians					34			1				
Lane Width (ft)					11.0			11.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					3			0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	28			12			106	74	46	175	69	23
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	28			12			106	74	46	175	69	23
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			96	82	100	99	100	96
cM capacity (veh/h)	1589			1618			834	807	996	649	806	1045
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	28	28	179	45								
Volume Left	17	0	33	8								
Volume Right	0	9	0	37								
cSH	1599	1700	812	944								
Volume to Capacity	0.01	0.02	0.22	0.05								
Queue Length 95th (ft)	1	0	21	4								
Control Delay (s)	4.4	0.0	10.7	9.0								
Lane LOS	A		B	A								
Approach Delay (s)	4.4	0.0	10.7	9.0								
Approach LOS			B	A								
<b>Intersection Summary</b>												
Average Delay				8.7								
Intersection Capacity Utilization				26.4%	ICU Level of Service							A
Analysis Period (min)				15								

WLSD - ICS Expansion  
2: NE 65th St & 111th Ave NE

Forecast 2013 Without Project - Afternoon Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+						+	
Volume (veh/h)	14	14	21	21	37	5	0	0	0	6	23	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.59	0.59	0.59	0.61	0.61	0.61	0.67	0.67	0.67	0.67	0.67	0.67
Hourly flow rate (vph)	24	24	36	34	61	8	0	0	0	9	34	16
Pedestrians		2			2			0			0	
Lane Width (ft)		11.0			11.0			0.0			0.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			0			0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	69			68			267	236	53	225	249	67
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	69			68			267	236	53	225	249	67
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			98			100	100	100	99	95	98
cM capacity (veh/h)	1545			1526			631	643	1019	713	632	1001
Direction, Lane #	EB 1	WB 1	SB 1									
Volume Total	83	103	60									
Volume Left	24	34	9									
Volume Right	36	8	16									
cSH	1545	1526	717									
Volume to Capacity	0.02	0.02	0.08									
Queue Length 95th (ft)	1	2	7									
Control Delay (s)	2.2	2.6	10.5									
Lane LOS	A	A	B									
Approach Delay (s)	2.2	2.6	10.5									
Approach LOS			B									
Intersection Summary												
Average Delay			4.4									
Intersection Capacity Utilization			20.6%		ICU Level of Service				A			
Analysis Period (min)			15									

WLSD - ICS Expansion  
3: NE 64th St & 111th Ave NE

Forecast 2013 Without Project - Afternoon Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				+	+	
Volume (veh/h)	1	4	2	27	44	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.75	0.75	0.81	0.81	0.52	0.52
Hourly flow rate (vph)	1	5	2	33	85	10
Pedestrians				2		
Lane Width (ft)				11.0		
Walking Speed (ft/s)				4.0		
Percent Blockage				0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	130	91	96			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	130	91	96			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	99	100			
cM capacity (veh/h)	667	870	1508			
Direction, Lane #	EB 1	NB 1	SB 1			
Volume Total	7	36	94			
Volume Left	1	2	0			
Volume Right	5	0	10			
cSH	947	1508	1700			
Volume to Capacity	0.01	0.00	0.06			
Queue Length 95th (ft)	1	0	0			
Control Delay (s)	8.8	0.5	0.0			
Lane LOS	A	A				
Approach Delay (s)	8.8	0.5	0.0			
Approach LOS	A					
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			14.0%		ICU Level of Service	A
Analysis Period (min)			15			

LWSD - ICS Expansion  
1: NE 65th St & 112th Ave NE

Forecast 2013 With Project AM Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Volume (veh/h)	19	5	139	0	9	17	25	114	0	6	62	19
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.58	0.58	0.58	0.57	0.57	0.57	0.38	0.38	0.38	0.46	0.46	0.46
Hourly flow rate (vph)	33	9	240	0	16	30	66	300	0	13	135	41
Pedestrians		3									2	
Lane Width (ft)		11.0									11.0	
Walking Speed (ft/s)		4.0									4.0	
Percent Blockage		0									0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	48			248			336	242	128	377	346	36
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	48			248			336	242	128	377	346	36
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98			100			86	54	100	96	76	96
cM capacity (veh/h)	1570			1329			474	645	922	362	562	1030
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	281	46	366	189								
Volume Left	33	0	66	13								
Volume Right	240	30	0	41								
cSH	1570	1329	606	599								
Volume to Capacity	0.02	0.00	0.60	0.32								
Queue Length 95th (ft)	2	0	101	34								
Control Delay (s)	1.0	0.0	19.6	13.8								
Lane LOS	A		C	B								
Approach Delay (s)	1.0	0.0	19.6	13.8								
Approach LOS			C	B								
Intersection Summary												
Average Delay			11.4									
Intersection Capacity Utilization			37.1%		ICU Level of Service				A			
Analysis Period (min)			15									

LWSD - ICS Expansion  
2: NE 65th St & 111th Ave NE

Forecast 2013 With Project AM Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Volume (veh/h)	20	95	0	0	49	4	0	0	0	68	0	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.56	0.56	0.56	0.46	0.46	0.46	0.38	0.38	0.38	0.28	0.28	0.28
Hourly flow rate (vph)	36	170	0	0	107	9	0	0	0	243	0	39
Pedestrians											7	1
Lane Width (ft)											0.0	11.0
Walking Speed (ft/s)											4.0	4.0
Percent Blockage											0	0
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	116				177		398	364	177	353	360	112
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	116				177		398	364	177	353	360	112
tC, single (s)	4.1				4.1		7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2				2.2		3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	98				100		100	100	100	59	100	96
cM capacity (veh/h)	1478				1399		532	553	872	594	556	946
Direction, Lane #	EB 1	WB 1		SB 1								
Volume Total	205	115		282								
Volume Left	36	0		243								
Volume Right	0	9		39								
cSH	1478	1399		626								
Volume to Capacity	0.02	0.00		0.45								
Queue Length 95th (ft)	2	0		58								
Control Delay (s)	1.5	0.0		15.4								
Lane LOS	A			C								
Approach Delay (s)	1.5	0.0		15.4								
Approach LOS				C								
Intersection Summary												
Average Delay				7.7								
Intersection Capacity Utilization				24.0%		ICU Level of Service				A		
Analysis Period (min)				15								

WUSD - ICS Expansion  
3: NE 64th St & 111th Ave NE

Forecast 2013 With Project AM Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Volume (veh/h)	1	0	2	1	0	15	1	29	0	0	39	1
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.92	0.75	0.92	0.92	0.92	0.81	0.81	0.92	0.92	0.52	0.52
Hourly flow rate (vph)	1	0	3	1	0	16	1	38	0	0	75	2
Pedestrians		3										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		0										
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	134	117	79	117	118	36	80			36		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	134	117	79	117	118	36	80			36		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	100	100	98	100			100		
cM capacity (veh/h)	825	770	865	855	770	1037	1527			1575		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	4	17	37	77								
Volume Left	1	1	1	0								
Volume Right	3	16	0	2								
cSH	925	1023	1527	1575								
Volume to Capacity	0.00	0.02	0.00	0.00								
Queue Length 95th (ft)	0	1	0	0								
Control Delay (s)	8.9	8.6	0.3	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	8.9	8.6	0.3	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			1.4									
Intersection Capacity Utilization			14.3%		ICU Level of Service				A			
Analysis Period (min)			15									

WUSD - ICS Expansion  
4: South Dwy & 111th Ave NE

Forecast 2013 With Project AM Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			+			+
Volume (veh/h)	0	0	30	3	19	23
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.38	0.38	0.81	0.81	0.52	0.52
Hourly flow rate (vph)	0	0	37	4	37	44
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	156	39			41	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	156	39			41	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			98	
cM capacity (veh/h)	816	1033			1569	
Direction, Lane #	NB 1	SB 1				
Volume Total	41	81				
Volume Left	0	37				
Volume Right	4	0				
cSH	1700	1569				
Volume to Capacity	0.02	0.02				
Queue Length 95th (ft)	0	2				
Control Delay (s)	0.0	3.4				
Lane LOS		A				
Approach Delay (s)	0.0	3.4				
Approach LOS						
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			12.3%		ICU Level of Service	A
Analysis Period (min)			15			

LWSD - ICS Expansion  
1: NE 65th St & 112th Ave NE

Forecast 2013 With Project PM Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	14	8	46	0	8	4	23	105	0	7	22	15
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.71	0.71	0.71	0.43	0.43	0.43	0.67	0.67	0.67	0.89	0.89	0.89
Hourly flow rate (vph)	20	11	65	0	19	9	34	157	0	8	25	17
Pedestrians					34			1				
Lane Width (ft)					11.0			11.0				
Walking Speed (ft/s)					4.0			4.0				
Percent Blockage					3			0				
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	28			77			137	112	79	219	140	23
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	28			77			137	112	79	219	140	23
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			100			96	80	100	99	97	98
cM capacity (veh/h)	1589			1533			791	768	956	594	736	1045
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	96	28	191	49								
Volume Left	20	0	34	8								
Volume Right	65	9	0	17								
cSH	1599	1533	772	785								
Volume to Capacity	0.01	0.00	0.25	0.06								
Queue Length 95th (ft)	1	0	24	5								
Control Delay (s)	1.6	0.0	11.2	9.9								
Lane LOS	A		B	A								
Approach Delay (s)	1.6	0.0	11.2	9.9								
Approach LOS			B	A								
Intersection Summary												
Average Delay			7.6									
Intersection Capacity Utilization			29.6%		ICU Level of Service				A			
Analysis Period (min)			15									

LWSD - ICS Expansion  
2: NE 65th St & 111th Ave NE

Forecast 2013 With Project PM Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations		↔	↔		↔	↔
Volume (veh/h)	14	38	40	6	30	14
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.59	0.59	0.61	0.61	0.67	0.67
Hourly flow rate (vph)	24	64	66	10	45	21
Pedestrians		2	2			
Lane Width (ft)		11.0	11.0			
Walking Speed (ft/s)		4.0	4.0			
Percent Blockage		0	0			
Right turn flare (veh)						
Median type		None	None			
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	75				184	72
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	75				184	72
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				94	98
cM capacity (veh/h)	1537				796	994
Direction, Lane #	EB 1	WB 1	SB 1			
Volume Total	88	75	66			
Volume Left	24	0	45			
Volume Right	0	10	21			
cSH	1537	1700	850			
Volume to Capacity	0.02	0.04	0.08			
Queue Length 95th (ft)	1	0	6			
Control Delay (s)	2.1	0.0	9.6			
Lane LOS	A		A			
Approach Delay (s)	2.1	0.0	9.6			
Approach LOS			A			
Intersection Summary						
Average Delay			3.5			
Intersection Capacity Utilization			20.1%		ICU Level of Service	A
Analysis Period (min)			15			

WLSD - ICS Expansion  
3: NE 64th St & 111th Ave NE

Forecast 2013 With Project PM Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		+			+			+			+	
Volume (veh/h)	1	0	4	1	0	13	2	27	0	0	51	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.75	0.75	0.75	0.67	0.67	0.67	0.81	0.81	0.67	0.67	0.52	0.52
Hourly flow rate (vph)	1	0	5	1	0	19	2	33	0	0	99	10
Pedestrians		2										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		4.0										
Percent Blockage		0										
Right turn flare (veh)												
Median type							None			None		
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	163	143	105	146	148	33	110			33		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	163	143	105	146	148	33	110			33		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	100	100	98	100			100		
cM capacity (veh/h)	789	749	854	815	741	1040	1491			1578		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	7	21	36	108								
Volume Left	1	1	2	0								
Volume Right	5	19	0	10								
cSH	915	1020	1491	1700								
Volume to Capacity	0.01	0.02	0.00	0.06								
Queue Length 95th (ft)	1	2	0	0								
Control Delay (s)	9.0	8.6	0.5	0.0								
Lane LOS	A	A	A									
Approach Delay (s)	9.0	8.6	0.5	0.0								
Approach LOS	A	A										
Intersection Summary												
Average Delay			1.5									
Intersection Capacity Utilization			14.0%		ICU Level of Service				A			
Analysis Period (min)			15									

WLSD - ICS Expansion  
4: South Dwy & 111th Ave NE

Forecast 2013 With Project PM Peak  
HCM Unsignalized Intersection Capacity Analysis

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			+			+
Volume (veh/h)	0	0	29	1	7	49
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.67	0.67	0.81	0.67	0.67	0.52
Hourly flow rate (vph)	0	0	36	1	10	94
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	152	37			37	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	152	37			37	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	100	100			99	
cM capacity (veh/h)	839	1042			1573	
Direction, Lane #	NB 1	SB 1				
Volume Total	37	105				
Volume Left	0	10				
Volume Right	1	0				
cSH	1700	1573				
Volume to Capacity	0.02	0.01				
Queue Length 95th (ft)	0	1				
Control Delay (s)	0.0	0.8				
Lane LOS		A				
Approach Delay (s)	0.0	0.8				
Approach LOS						
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			11.8%		ICU Level of Service	A
Analysis Period (min)			15			

## APPENDIX C

# CONCURRENCY TEST RESULTS NOTICE

**CITY OF KIRKLAND**

123 FIFTH AVENUE ● KIRKLAND, WASHINGTON 98033-6189 ● (425) 587-3000

**DEPARTMENT OF PUBLIC WORKS  
MEMORANDUM**

**To:** Tony Leavitt, Planner

**From:** Thang Nguyen, Transportation Engineer

**Date:** March 29, 2011

**Subject:** International Community School Expansion (ICS)

The purpose of this memo is to inform you that the proposed International Community School expansion has passed traffic concurrency. This memo will serve as the concurrency test notice.

**Project Description**

The applicant (Lake Washington School District) renovate and expand the existing school and increase enrollment capacity of the ICS from 380 to 445 students (65 additional students) and two additional faculties. It is anticipated that the expansion will be completed in the summer of 2013. Two additional driveways are proposed to provide access onto the school parking lot from 111<sup>th</sup> Avenue NE. One existing driveway off NE 65<sup>th</sup> Street will be eliminated and one driveway will provide two direction traffic flow of the school main parking lot. The trip generation estimate for the proposed school is based on traffic counts at the school and is summarized in Table 1 below.

Table 1. Trip Generation

Time Period	Enrollment	Expanded ICS			Existing ICS			Net New Trips		
		<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>	<i>In</i>	<i>Out</i>	<i>Total</i>
Am Peak	455	223	155	378	190	133	323	<b>33</b>	<b>22</b>	<b>55</b>
Afternoon Peak	445	76	142	218	65	120	185	<b>11</b>	<b>22</b>	<b>33</b>
PM Evening Peak	515	17	9	26	16	8	24	<b>1</b>	<b>1</b>	<b>2</b>
Daily	515	645	645	1,290	560	560	1,120	<b>85</b>	<b>85</b>	<b>170</b>

The proposed project passed traffic concurrency. This memo will serve as the concurrency test notice for the proposed project. Per *Section 25.10.020 Procedures* of the KMC, this Concurrency Test Notice will expire in one year (March 29, 2012) unless a development permit and certificate of concurrency are issued or an extension is granted.

## **EXPIRATION**

The concurrency test notice shall expire and a new concurrency test application is required unless:

1. A complete SEPA checklist, traffic impact analysis and all required documentation are submitted to the City within 90 calendar days of the concurrency test notice.
2. A Certificate of Concurrency is issued or an extension is requested and granted by the Public Works Department within one year of issuance of the concurrency test notice. (A Certificate of Concurrency is issued at the same time a development permit or building permit is issued if the applicant holds a valid concurrency test notice.)
3. A Certificate of Concurrency shall expire six years from the date of issuance of the concurrency test notice unless all building permits are issued for buildings approved under the concurrency test notice.

## **APPEALS**

The concurrency test notice may be appealed by the public or agency with jurisdiction. The concurrency test notice is subject to an appeal until the SEPA review process is complete and the appeal deadline has passed. Concurrency appeals are heard before the Hearing Examiner along with any applicable SEPA appeal. For more information, refer to the Kirkland Municipal Code, Title 25. If you have any questions, please call me at x3869.

## **Traffic Analysis**

Since the impact of the expansion is low in the PM peak and is higher during the AM and during the school afternoon peaks, the traffic analysis shall focus on the impact during those times (6:45 to 7:45 AM and 2:00 to 3:00 PM). The traffic analysis will be limited to level of service analyses the school driveways include queuing and sight distance analyses.

cc: Advantage  
File