

HCM Unsignalized Intersection Capacity Analysis
 51: Old Olympic Highway & N 5th Ave

8/8/2012

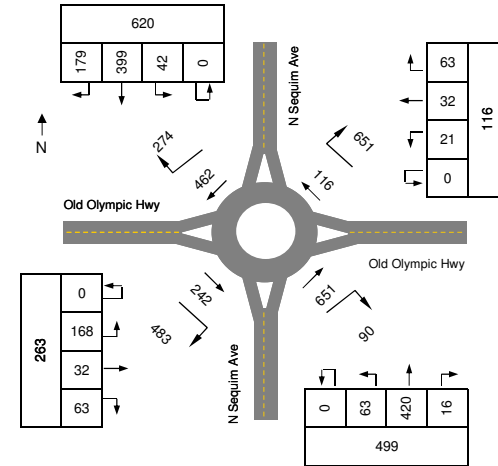


Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control	Stop			Stop			Stop				Stop	
Volume (vph)	15	140	180	80	140	30	140	140	70	30	100	15
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	152	196	87	152	33	152	152	76	33	109	16
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	NB 2	SB 1					
Volume Total (vph)	16	348	87	185	152	228	158					
Volume Left (vph)	16	0	87	0	152	0	33					
Volume Right (vph)	0	196	0	33	0	76	16					
Hadj (s)	0.58	-0.31	0.58	-0.04	0.58	-0.15	0.06					
Departure Headway (s)	7.4	6.5	7.5	6.9	7.4	6.7	7.2					
Degree Utilization, x	0.03	0.62	0.18	0.35	0.31	0.42	0.32					
Capacity (veh/h)	461	530	449	492	453	513	458					
Control Delay (s)	9.4	18.3	11.0	12.4	12.5	13.2	13.5					
Approach Delay (s)	17.9		12.0		12.9		13.5					
Approach LOS	C		B		B		B					
Intersection Summary												
Delay			14.3									
HCM Level of Service			B									
Intersection Capacity Utilization			55.6%		ICU Level of Service		B					
Analysis Period (min)			15									

ROUNDBOUT CAPACITY ANALYSIS - HCM 2010

Period (hr)	1	Project	Sequim TMP				E-W Street		Old Olympic Hwy					
PHF	0.9	Scenario	2032 PM				N-S Street		N Sequim Ave					
Approach		Lane	Lane Config.	Percentage			Flow (pcph)	Conflicting		Capacity (pcph)	v/c	Control Delay (sec)	LOS*	95th Queue** (ft)
Direction	Lanes			L	T	R		Flow	Lanes					
North	1	1	LTR	100%	100%	100%	499	242	1	887	0.62	11.4	B	121
	Bypass?													
	No													
	Total			100%	100%	100%	499					11.4	B	
South	1	1	LT	100%	100%	100%	620	116	1	1,006	0.68	11.9	B	157
	Bypass?													
	No													
	Total			100%	100%	100%	620					11.9	B	
East	1	1	L	100%	100%	100%	263	462	1	712	0.41	9.0	A	52
	Bypass?													
	No													
	Total			100%	100%	100%	263					9.0	A	
West	1	1	LTR	100%	100%	100%	116	651	1	589	0.22	8.0	A	21
	Bypass?													
	No													
	Total			100%	100%	100%	116					8.0	A	
All						1,498					10.9	B		

Diagram



Volumes

	Northbound				Southbound				Eastbound				Westbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Total (vph)	0	60	400	15	0	40	380	170	0	160	30	60	0	20	30	60
Trucks	0	3	20	1	0	2	19	9	0	8	2	3	0	1	2	3
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars	0	57	380	14	0	38	361	161	0	152	28	57	0	19	28	57
f _{HV}	1.00	0.95	0.95	0.94	1.00	0.95	0.95	0.95	1.00	0.95	0.94	0.95	1.00	0.95	0.94	0.95
Total (pcph)	0	63	420	16	0	42	399	179	0	168	32	63	0	21	32	63

	Northbound				Southbound				Eastbound				Westbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Truck %	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
Trucks (vph)																

Source: NCHRP Report 672 - Roundabouts: An Informational Guide, Second Edition (TRB, 2010)

* Does not include the effect of conflicting pedestrians

** Assumes a queued vehicle length of 25 feet

HCM Unsignalized Intersection Capacity Analysis
 53: W Hendrickson Road & N Priest Rd

















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Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	➔			➔	➔	
Sign Control	Stop			Stop	Stop	
Volume (vph)	10	5	120	15	10	110
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	5	130	16	11	120
Direction, Lane #	EB 1	WB 1	NB 1			
Volume Total (vph)	16	147	130			
Volume Left (vph)	0	130	11			
Volume Right (vph)	5	0	120			
Hadj (s)	-0.12	0.26	-0.45			
Departure Headway (s)	4.2	4.5	3.8			
Degree Utilization, x	0.02	0.18	0.14			
Capacity (veh/h)	818	786	897			
Control Delay (s)	7.3	8.4	7.5			
Approach Delay (s)	7.3	8.4	7.5			
Approach LOS	A	A	A			
Intersection Summary						
Delay			7.9			
HCM Level of Service			A			
Intersection Capacity Utilization			28.7%	ICU Level of Service	A	
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
 54: W Hendrickson Road & N Kendall Road

8/8/2012

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	120	50	10	15	70	120	10	90	10	60	70	100
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	130	54	11	16	76	130	11	98	11	65	76	109
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	196	223	120	250								
Volume Left (vph)	130	16	11	65								
Volume Right (vph)	11	130	11	109								
Hadj (s)	0.18	-0.25	0.05	-0.12								
Departure Headway (s)	5.4	5.0	5.5	5.1								
Degree Utilization, x	0.29	0.31	0.18	0.35								
Capacity (veh/h)	613	669	585	655								
Control Delay (s)	10.7	10.2	9.7	10.8								
Approach Delay (s)	10.7	10.2	9.7	10.8								
Approach LOS	B	B	A	B								
Intersection Summary												
Delay				10.4								
HCM Level of Service				B								
Intersection Capacity Utilization				51.6%	ICU Level of Service							A
Analysis Period (min)				15								

HCM Signalized Intersection Capacity Analysis

55: W Hendrickson Road & N 5th Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	50	50	100	50	30	30	320	110	30	340	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	12	13	12	12	10	12	10	13	12	10	14	12
Total Lost time (s)	4.5	4.5		4.5	4.0		4.5	4.5		4.5	4.5	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		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	0.93		1.00	0.94		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)	1719	1711		1719	1573		1604	1783		1604	1884	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1719	1711		1719	1573		1604	1783		1604	1884	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	1.00
Adj. Flow (vph)	65	54	54	109	54	33	33	348	120	33	370	60
RTOR Reduction (vph)	0	42	0	0	25	0	0	17	0	0	8	0
Lane Group Flow (vph)	65	66	0	109	62	0	33	451	0	33	422	0
Confl. Peds. (#/hr)	8		1	1		8	2		6	6		2
Confl. Bikes (#/hr)									4			
Turn Type	Prot			Prot			Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases												
Actuated Green, G (s)	3.5	11.8		4.8	13.6		1.9	17.5		1.9	17.5	
Effective Green, g (s)	3.5	11.8		4.8	13.6		1.9	17.5		1.9	17.5	
Actuated g/C Ratio	0.06	0.22		0.09	0.25		0.04	0.32		0.04	0.32	
Clearance Time (s)	4.5	4.5		4.5	4.0		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	111	374		153	396		56	578		56	611	
v/s Ratio Prot	0.04	0.04		c0.06	c0.04		c0.02	c0.25		0.02	0.22	
v/s Ratio Perm												
v/c Ratio	0.59	0.18		0.71	0.16		0.59	0.78		0.59	0.69	
Uniform Delay, d1	24.5	17.1		23.9	15.7		25.7	16.5		25.7	15.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.7	0.2		14.5	0.2		14.9	6.8		14.9	3.4	
Delay (s)	32.2	17.4		38.4	15.9		40.5	23.3		40.5	19.3	
Level of Service	C	B		D	B		D	C		D	B	
Approach Delay (s)		22.9			28.4			24.4			20.8	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	23.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	54.0	Sum of lost time (s)	13.5
Intersection Capacity Utilization	44.5%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

56: W Hendrickson Road & N Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Volume (veh/h)	130	0	110	5	5	5	70	410	5	0	400	120	
Sign Control		Stop			Stop			Free			Free		
Grade		0%			0%			0%			0%		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.96	0.92	
Hourly flow rate (vph)	141	0	120	5	5	5	76	427	5	0	417	130	
Pedestrians		5											
Lane Width (ft)		10.0											
Walking Speed (ft/s)		4.0											
Percent Blockage		0											
Right turn flare (veh)			4										
Median type							None			TWLTL			
Median storage veh											2		
Upstream signal (ft)													
pX, platoon unblocked													
vC, conflicting volume	1074	1072	487	1058	1134	430	552			433			
vC1, stage 1 conf vol	487	487		582	582								
vC2, stage 2 conf vol	587	585		476	552								
vCu, unblocked vol	1074	1072	487	1058	1134	430	552			433			
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1			
tC, 2 stage (s)	6.1	5.5		6.1	5.5								
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2			
p0 queue free %	62	100	79	98	98	99	92			100			
cM capacity (veh/h)	375	385	573	311	349	619	1000			1111			

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	261	16	76	433	0	547
Volume Left	141	5	76	0	0	0
Volume Right	120	5	0	5	0	130
cSH	692	390	1000	1700	1700	1700
Volume to Capacity	0.38	0.04	0.08	0.25	0.00	0.32
Queue Length 95th (ft)	44	3	6	0	0	0
Control Delay (s)	16.9	14.6	8.9	0.0	0.0	0.0
Lane LOS	C	B	A			
Approach Delay (s)	16.9	14.6	1.3		0.0	
Approach LOS	C	B				

Intersection Summary

Average Delay	4.0
Intersection Capacity Utilization	56.2%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

57: W Fir Street & N 5th Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Volume (veh/h)	50	100	90	50	80	15	90	460	50	25	410	60
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.94	0.96	0.94	0.97	0.97	0.97
Hourly flow rate (vph)	54	109	98	54	87	16	96	479	53	26	423	62
Pedestrians		3			7			3			4	
Lane Width (ft)		15.0			16.0			12.0			11.5	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		0			1			0			0	
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh												2
Upstream signal (ft)								1302				
pX, platoon unblocked												
vC, conflicting volume	1243	1239	460	1334	1243	517	488			539		
vC1, stage 1 conf vol	508	508		704	704							
vC2, stage 2 conf vol	734	731		629	539							
vCu, unblocked vol	1243	1239	460	1334	1243	517	488			539		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	77	65	83	70	72	97	91			97		
cM capacity (veh/h)	234	314	592	183	309	547	1057			1006		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	261	158	96	532	26	485
Volume Left	54	54	96	0	26	0
Volume Right	98	16	0	53	0	62
cSH	351	259	1057	1700	1006	1700
Volume to Capacity	0.74	0.61	0.09	0.31	0.03	0.29
Queue Length 95th (ft)	144	91	7	0	2	0
Control Delay (s)	39.7	38.3	8.7	0.0	8.7	0.0
Lane LOS	E	E	A		A	
Approach Delay (s)	39.7	38.3	1.3		0.4	
Approach LOS	E	E				

Intersection Summary

Average Delay	11.2
Intersection Capacity Utilization	56.3%
ICU Level of Service	B
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

58: W Fir Street & N Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕		↗	↘		↗	↘	
Volume (veh/h)	70	40	50	10	40	40	50	330	15	30	420	60
Sign Control		Stop			Stop			Free			Free	
Grade		-1%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92
Hourly flow rate (vph)	76	43	54	11	43	43	54	359	16	33	438	65
Pedestrians		2			3			1			3	
Lane Width (ft)		14.0			14.0			10.5			11.0	
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			TWLTL	
Median storage veh											2	
Upstream signal (ft)								1317				
pX, platoon unblocked												
vC, conflicting volume	1073	1024	473	1058	1048	373	505			378		
vC1, stage 1 conf vol	537	537		479	479							
vC2, stage 2 conf vol	536	487		580	570							
vCu, unblocked vol	1073	1024	473	1058	1048	373	505			378		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	78	89	91	97	88	93	95			97		
cM capacity (veh/h)	340	397	594	313	373	667	1048			1177		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	174	98	54	375	33	503
Volume Left	76	11	54	0	33	0
Volume Right	54	43	0	16	0	65
cSH	409	452	1048	1700	1177	1700
Volume to Capacity	0.43	0.22	0.05	0.22	0.03	0.30
Queue Length 95th (ft)	52	20	4	0	2	0
Control Delay (s)	20.2	15.2	8.6	0.0	8.1	0.0
Lane LOS	C	C	A		A	
Approach Delay (s)	20.2	15.2	1.1		0.5	
Approach LOS	C	C				

Intersection Summary

Average Delay	4.6
Intersection Capacity Utilization	54.8%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

59: E Fir Street & N Brown Rd

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔			↔			↔	
Volume (veh/h)	20	30	60	5	10	10	50	70	5	10	60	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	33	65	5	11	11	54	76	5	11	65	11
Pedestrians		7			2			3			1	
Lane Width (ft)		15.0			15.0			12.0			16.0	
Walking Speed (ft/s)		4.0			4.0			4.0			4.0	
Percent Blockage		1			0			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	304	292	81	366	294	82	83			84		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	304	292	81	366	294	82	83			84		
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 %	96	94	93	99	98	99	96			99		
cM capacity (veh/h)	596	582	962	498	580	967	1484			1492		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	120	27	136	87
Volume Left	22	5	54	11
Volume Right	65	11	5	11
cSH	746	664	1484	1492
Volume to Capacity	0.16	0.04	0.04	0.01
Queue Length 95th (ft)	14	3	3	1
Control Delay (s)	10.7	10.6	3.2	1.0
Lane LOS	B	B	A	A
Approach Delay (s)	10.7	10.6	3.2	1.0
Approach LOS	B	B		

Intersection Summary			
Average Delay		5.7	
Intersection Capacity Utilization	29.0%		ICU Level of Service A
Analysis Period (min)		15	

HCM Unsignalized Intersection Capacity Analysis
60: W Spruce St & N Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕		↕	↕			↕	
Volume (veh/h)	15	40	25	10	25	25	30	390	10	20	470	30
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96
Hourly flow rate (vph)	16	43	27	11	27	27	33	424	11	21	490	31
Pedestrians		3			3			3			2	
Lane Width (ft)		12.0			12.0			12.0			12.0	
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)								702				
pX, platoon unblocked	0.87	0.87		0.87	0.87	0.87				0.87		
vC, conflicting volume	1082	1053	511	1096	1063	434	524			438		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1019	986	511	1036	998	275	524			279		
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 %	89	79	95	92	86	96	97			98		
cM capacity (veh/h)	153	203	558	137	199	657	1040			1114		

Direction, Lane #	EB 1	WB 1	WB 2	NB 1	NB 2	SB 1
Volume Total	87	11	54	33	435	542
Volume Left	16	11	0	33	0	21
Volume Right	27	0	27	0	11	31
cSH	235	137	306	1040	1700	1114
Volume to Capacity	0.37	0.08	0.18	0.03	0.26	0.02
Queue Length 95th (ft)	40	6	16	2	0	1
Control Delay (s)	29.0	33.5	19.3	8.6	0.0	0.5
Lane LOS	D	D	C	A		A
Approach Delay (s)	29.0	21.7		0.6		0.5
Approach LOS	D	C				

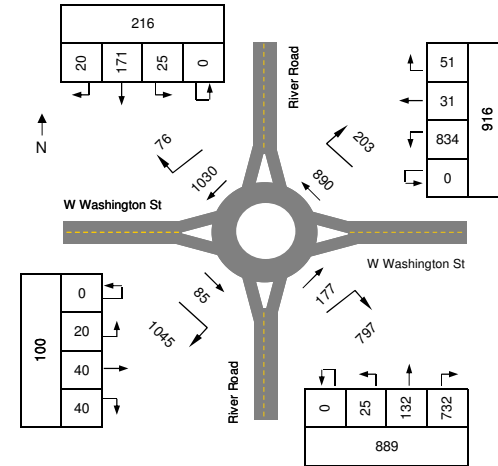
Intersection Summary

Average Delay	3.9
Intersection Capacity Utilization	61.0%
ICU Level of Service	B
Analysis Period (min)	15

ROUNDBABOUT CAPACITY ANALYSIS - HCM 2010

Period (hr)	1	Project	Sequim TMP				E-W Street		W Washington St					
PHF	0.96	Scenario	2032 PM				N-S Street		River Road					
Approach		Lane	Lane Config.	Percentage			Flow (pcph)	Conflicting		Capacity (pcph)	v/c	Control Delay (sec)	LOS*	95th Queue** (ft)
Direction	Lanes			L	T	R		Flow	Lanes					
North	1	1	LTR	100%	100%	40%	450	85	1	1,038	0.45	6.8	A	61
	Bypass?													
	Free	Bypass	R	0%	0%	60%	439					0.0	A	
	Total			100%	100%	100%	889						3.4	A
South	1	1	LT	100%	100%	100%	216	890	1	464	0.48	15.5	C	69
	Bypass?													
	No													
	Total			100%	100%	100%	216						15.5	C
East	1	1	L	100%	100%	100%	100	1,030	1	403	0.26	12.3	B	26
	Bypass?													
	No													
	Total			100%	100%	100%	100						12.3	B
West	1	1	LTR	100%	100%	40%	885	177	1	947	0.97	66.5	F	790
	Bypass?													
	Free	Bypass	R	0%	0%	60%	31					0.0	A	
	Total			100%	100%	100%	916						64.3	F
All						2,121						31.3	D	

Diagram



Volumes

	Northbound				Southbound				Eastbound				Westbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Total (vph)	0	25	130	720	0	25	170	20	0	20	40	40	0	820	30	50
Trucks	0	0	2	12	0	0	1	0	0	0	0	0	0	14	1	1
Bicycles	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Cars	0	25	128	708	0	25	169	20	0	20	40	40	0	806	29	49
f _{HV}	1.00	1.00	0.98	0.98	1.00	1.00	0.99	1.00	1.00	1.00	1.00	1.00	1.00	0.98	0.97	0.98
Total (pcph)	0	25	132	732	0	25	171	20	0	20	40	40	0	834	31	51

	Northbound				Southbound				Eastbound				Westbound			
	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Truck %	1.6	1.6	1.6	1.6	0.7	0.7	0.7	0.7	0	0	0	0	1.7	1.7	1.7	1.7
Trucks (vph)																

Source: NCHRP Report 672 - Roundabouts: An Informational Guide, Second Edition (TRB, 2010)

* Does not include the effect of conflicting pedestrians

** Assumes a queued vehicle length of 25 feet

HCM Signalized Intersection Capacity Analysis

62: W Washington St & N Priest Rd

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗	↗	↖	↗		↖	↗	
Volume (vph)	70	690	25	60	720	90	140	60	110	120	90	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	11	16	11	12	12	13	12	11	12	13	11	12
Grade (%)		0%			0%			3%			0%	
Total Lost time (s)	4.5	5.0		4.5	5.0	5.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	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	1.00	
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.90		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)	1711	3973		1787	1866	1610	1778	1606		1829	1670	
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1711	3973		1787	1866	1610	1778	1606		1829	1670	
Peak-hour factor, PHF	0.93	0.97	0.93	0.92	0.97	0.92	0.93	0.93	0.93	0.92	0.92	0.92
Adj. Flow (vph)	75	711	27	65	742	98	151	65	118	130	98	76
RTOR Reduction (vph)	0	1	0	0	0	22	0	47	0	0	20	0
Lane Group Flow (vph)	75	737	0	65	742	76	151	136	0	130	154	0
Confl. Peds. (#/hr)						2			3			3
Heavy Vehicles (%)	2%	2%	2%	1%	1%	1%	0%	0%	0%	2%	2%	2%
Bus Blockages (#/hr)	0	2	0	0	2	0	0	0	0	0	0	0
Turn Type	Prot			Prot		Perm	Prot			Prot		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases						6						
Actuated Green, G (s)	7.6	44.7		7.4	44.5	44.5	12.0	17.3		8.7	14.0	
Effective Green, g (s)	7.6	44.7		7.4	44.5	44.5	12.0	17.3		8.7	14.0	
Actuated g/C Ratio	0.08	0.47		0.08	0.47	0.47	0.13	0.18		0.09	0.15	
Clearance Time (s)	4.5	5.0		4.5	5.0	5.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	136	1858		138	869	749	223	291		166	245	
v/s Ratio Prot	c0.04	0.19		0.04	c0.40		c0.08	c0.08		0.07	c0.09	
v/s Ratio Perm						0.05						
v/c Ratio	0.55	0.40		0.47	0.85	0.10	0.68	0.47		0.78	0.63	
Uniform Delay, d1	42.4	16.6		42.2	22.7	14.3	39.9	35.0		42.5	38.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.8	0.1		2.5	8.2	0.1	7.9	1.2		21.0	4.9	
Delay (s)	47.1	16.8		44.8	30.8	14.4	47.8	36.2		63.5	43.3	
Level of Service	D	B		D	C	B	D	D		E	D	
Approach Delay (s)		19.6			30.1			41.5			51.9	
Approach LOS		B			C			D			D	

Intersection Summary

HCM Average Control Delay	30.9	HCM Level of Service	C
HCM Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	95.6	Sum of lost time (s)	21.5
Intersection Capacity Utilization	74.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

63: W Washington St & N 7th Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	110	580	180	80	700	60	210	60	30	60	60	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	13	15	10	16	12	13	12	12	11	13	12
Grade (%)		-1%			0%			-2%				0%
Total Lost time (s)	5.0	5.0	5.0	5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	0.99		1.00	0.98	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.99		1.00	0.95		1.00	0.90	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1612	1879	1655	1604	2021		1792	1709		1640	1661	
Flt Permitted	0.14	1.00	1.00	0.24	1.00		0.62	1.00		0.69	1.00	
Satd. Flow (perm)	231	1879	1655	409	2021		1171	1709		1198	1661	
Peak-hour factor, PHF	0.92	0.96	0.92	0.93	0.96	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	120	604	196	86	729	65	228	65	33	65	65	120
RTOR Reduction (vph)	0	0	80	0	4	0	0	24	0	0	89	0
Lane Group Flow (vph)	120	604	116	86	790	0	228	74	0	65	96	0
Confl. Peds. (#/hr)	5		4	4		5	1		9	9		1
Confl. Bikes (#/hr)						2			7			2
Turn Type	pm+pt		Perm	pm+pt		Perm		Perm		Perm		
Protected Phases	1	6		5	2		4		8			
Permitted Phases	6		6	2		4		8				
Actuated Green, G (s)	34.3	29.9	29.9	34.3	29.9	17.4	17.4	17.4	17.4	17.4	17.4	17.4
Effective Green, g (s)	33.3	29.4	29.4	33.3	29.4	16.9	16.9	16.9	16.9	16.9	16.9	16.9
Actuated g/C Ratio	0.51	0.45	0.45	0.51	0.45	0.26	0.26	0.26	0.26	0.26	0.26	0.26
Clearance Time (s)	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	201	847	746	280	911	304	443	311	431			
v/s Ratio Prot	c0.04	0.32		0.02	c0.39		0.04		0.06			
v/s Ratio Perm	0.27		0.07	0.14		c0.19		0.05				
v/c Ratio	0.60	0.71	0.16	0.31	0.87	0.75	0.17	0.21	0.22			
Uniform Delay, d1	13.1	14.5	10.6	9.7	16.1	22.2	18.7	18.9	19.0			
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00			
Incremental Delay, d2	4.7	2.9	0.1	0.6	8.7	10.0	0.2	0.3	0.3			
Delay (s)	17.8	17.3	10.7	10.4	24.8	32.2	18.9	19.3	19.3			
Level of Service	B	B	B	B	C	C	B	B	B			
Approach Delay (s)		16.0			23.4		28.2		19.3			
Approach LOS		B			C		C		B			

Intersection Summary

HCM Average Control Delay	20.8	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	65.2	Sum of lost time (s)	15.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

64: W Washington St & N 5th Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	540	20	25	610	60	60	120	20	100	110	380
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	16	12	10	16	12	10	13	12	10	12	12
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	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		0.99	1.00	
Frt	1.00	0.99		1.00	0.99		1.00	0.98		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1668	2102		1668	2081		1668	1895		1642	1605	
Flt Permitted	0.95	1.00		0.95	1.00		0.23	1.00		0.66	1.00	
Satd. Flow (perm)	1668	2102		1668	2081		408	1895		1135	1605	
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)	284	568	21	26	642	63	63	126	21	105	116	400
RTOR Reduction (vph)	0	1	0	0	4	0	0	8	0	0	168	0
Lane Group Flow (vph)	284	588	0	26	701	0	63	139	0	105	348	0
Confl. Peds. (#/hr)			1			6	5		3	3		5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	2%	2%
Bus Blockages (#/hr)	0	2	0	0	2	0	0	0	0	0	0	0
Turn Type	Prot		Prot		Perm			Perm				
Protected Phases	1	6		5	2			4				8
Permitted Phases							4					8
Actuated Green, G (s)	14.4	41.8		2.4	29.8		17.7	17.7		17.7	17.7	
Effective Green, g (s)	13.9	41.3		1.9	29.3		17.2	17.2		17.2	17.2	
Actuated g/C Ratio	0.18	0.55		0.03	0.39		0.23	0.23		0.23	0.23	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	307	1151		42	809		93	432		259	366	
v/s Ratio Prot	c0.17	0.28		0.02	c0.34			0.07				c0.22
v/s Ratio Perm							0.15			0.09		
v/c Ratio	0.93	0.51		0.62	0.87		0.68	0.32		0.41	0.95	
Uniform Delay, d1	30.2	10.7		36.4	21.2		26.6	24.2		24.8	28.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	32.3	0.4		24.2	9.6		17.8	0.4		1.0	34.2	
Delay (s)	62.5	11.1		60.6	30.9		44.4	24.7		25.8	62.8	
Level of Service	E	B		E	C		D	C		C	E	
Approach Delay (s)		27.8			31.9			30.6			56.6	
Approach LOS		C			C			C			E	

Intersection Summary

HCM Average Control Delay	36.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.90		
Actuated Cycle Length (s)	75.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	102.0%	ICU Level of Service	G
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis

65: W Washington St & N 3rd Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	15	570	40	40	550	10	80	40	40	10	50	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	14	12	10	13	12	12	13	12	12	13	12
Total Lost time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Frbp, ped/bikes	1.00	1.00		1.00	1.00			0.98			0.98	
Flpb, ped/bikes	1.00	1.00		1.00	1.00			1.00			1.00	
Frt	1.00	0.99		1.00	1.00			0.97			0.95	
Flt Protected	0.95	1.00		0.95	1.00			0.98			0.99	
Satd. Flow (prot)	1604	1907		1604	1677			1560			1555	
Flt Permitted	0.95	1.00		0.95	1.00			0.84			0.96	
Satd. Flow (perm)	1604	1907		1604	1677			1336			1508	
Peak-hour factor, PHF	0.92	0.96	0.92	0.93	0.96	0.93	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	16	594	43	43	573	11	87	43	43	11	54	43
RTOR Reduction (vph)	0	3	0	0	1	0	0	22	0	0	36	0
Lane Group Flow (vph)	16	634	0	43	583	0	0	151	0	0	72	0
Confl. Peds. (#/hr)			8			17			28			12
Confl. Bikes (#/hr)			1						1			3
Parking (#/hr)					0	0		0	0		0	0
Turn Type	Prot			Prot			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases							4			8		
Actuated Green, G (s)	0.9	25.8		1.9	26.8			9.0			9.0	
Effective Green, g (s)	0.4	25.3		1.4	26.3			8.5			8.5	
Actuated g/C Ratio	0.01	0.50		0.03	0.52			0.17			0.17	
Clearance Time (s)	4.5	4.5		4.5	4.5			4.5			4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0			3.0			3.0	
Lane Grp Cap (vph)	13	961		45	879			226			255	
v/s Ratio Prot	0.01	0.33		c0.03	c0.35							
v/s Ratio Perm								c0.11			0.05	
v/c Ratio	1.23	0.66		0.96	0.66			0.67			0.28	
Uniform Delay, d1	24.9	9.2		24.4	8.7			19.5			18.2	
Progression Factor	1.00	1.00		1.00	1.00			1.00			1.00	
Incremental Delay, d2	333.7	1.6		116.2	1.9			7.3			0.6	
Delay (s)	358.6	10.9		140.6	10.6			26.9			18.8	
Level of Service	F	B		F	B			C			B	
Approach Delay (s)		19.4			19.5			26.9			18.8	
Approach LOS		B			B			C			B	

Intersection Summary

HCM Average Control Delay	20.2	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	50.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	57.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
66: W Washington St & N Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	60	430	90	100	400	90	160	280	100	180	240	70
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	10	12	12	10	12	12	10	15	12	14	14	12
Total Lost time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frbp, ped/bikes	1.00	1.00		1.00	0.99		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	0.97		1.00	0.96		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1685	1664		1636	1599		1652	1937		1888	1910	
Flt Permitted	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (perm)	1685	1664		1636	1599		1652	1937		1888	1910	
Peak-hour factor, PHF	0.92	0.96	0.92	0.92	0.96	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	65	448	98	109	417	98	174	304	109	196	261	76
RTOR Reduction (vph)	0	8	0	0	8	0	0	13	0	0	11	0
Lane Group Flow (vph)	65	538	0	109	507	0	174	400	0	196	326	0
Confl. Peds. (#/hr)						9			12			1
Heavy Vehicles (%)	0%	0%	0%	3%	3%	3%	2%	2%	2%	2%	2%	2%
Parking (#/hr)		0	0		0	0						
Turn Type	Prot			Prot			Split			Split		
Protected Phases	1	6		5	2		4	4		3	3	
Permitted Phases												
Actuated Green, G (s)	4.5	34.8		8.3	38.6		21.0	21.0		17.8	17.8	
Effective Green, g (s)	4.0	34.3		7.8	38.1		20.5	20.5		17.3	17.3	
Actuated g/C Ratio	0.04	0.34		0.08	0.38		0.21	0.21		0.17	0.17	
Clearance Time (s)	4.5	4.5		4.5	4.5		4.5	4.5		4.5	4.5	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	67	571		128	610		339	397		327	331	
v/s Ratio Prot	0.04	c0.32		c0.07	c0.32		0.11	c0.21		0.10	c0.17	
v/s Ratio Perm												
v/c Ratio	0.97	0.94		0.85	0.83		0.51	1.01		0.60	0.99	
Uniform Delay, d1	47.9	31.8		45.5	28.0		35.3	39.7		38.1	41.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	99.2	24.1		38.8	9.4		1.3	47.3		2.9	45.2	
Delay (s)	147.1	56.0		84.3	37.4		36.6	87.0		41.1	86.4	
Level of Service	F	E		F	D		D	F		D	F	
Approach Delay (s)		65.7			45.6			72.0			69.7	
Approach LOS		E			D			E			E	

Intersection Summary

HCM Average Control Delay	62.8	HCM Level of Service	E
HCM Volume to Capacity ratio	1.02		
Actuated Cycle Length (s)	99.9	Sum of lost time (s)	25.0
Intersection Capacity Utilization	81.4%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis

67: E Washington St & N Brown Rd

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	30	540	50	40	510	70	30	50	50	50	70	40
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			-1%	
Peak Hour Factor	0.93	0.97	0.93	0.97	0.97	0.97	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	32	557	54	41	526	72	33	54	54	54	76	43
Pedestrians												5
Lane Width (ft)												13.0
Walking Speed (ft/s)												4.0
Percent Blockage												0
Right turn flare (veh)												2
Median type		TWLTL			None							
Median storage (veh)		2										
Upstream signal (ft)					901							
pX, platoon unblocked												
vC, conflicting volume	603			610			1316	1334	584	1316	1288	531
vC1, stage 1 conf vol							648	648		613	613	
vC2, stage 2 conf vol							668	685		703	675	
vCu, unblocked vol	603			610			1316	1334	584	1316	1288	531
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			96			87	83	89	78	77	92
cM capacity (veh/h)	975			968			258	321	516	252	326	548

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1	SB 1
Volume Total	32	610	41	526	72	141	174
Volume Left	32	0	41	0	0	33	54
Volume Right	0	54	0	0	72	54	43
cSH	975	1700	968	1700	1700	352	394
Volume to Capacity	0.03	0.36	0.04	0.31	0.04	0.40	0.44
Queue Length 95th (ft)	3	0	3	0	0	47	55
Control Delay (s)	8.8	0.0	8.9	0.0	0.0	21.9	22.9
Lane LOS	A		A			C	C
Approach Delay (s)	0.4		0.6			21.9	22.9
Approach LOS						C	C

Intersection Summary

Average Delay	4.8
Intersection Capacity Utilization	53.9%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis
 68: E Washington St & W Sequim Bay Rd

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	270	230	15	5	250	5	10	5	5	5	5	240
Sign Control		Free			Free			Stop			Stop	
Grade		0%			-1%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	293	250	16	5	272	5	11	5	5	5	5	261
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type	None				TWLTL							
Median storage (veh)	2											
Upstream signal (ft)	1271											
pX, platoon unblocked												
vC, conflicting volume	277			266			1391	1133	258	1130	1139	274
vC1, stage 1 conf vol							845	845		285	285	
vC2, stage 2 conf vol							546	288		845	853	
vCu, unblocked vol	277			266			1391	1133	258	1130	1139	274
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)							6.1	5.5		6.1	5.5	
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	77			100			83	98	99	98	98	66
cM capacity (veh/h)	1269			1280			62	256	773	249	267	757

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	SB 1
Volume Total	293	266	5	277	22	272
Volume Left	293	0	5	0	11	5
Volume Right	0	16	0	5	5	261
cSH	1269	1700	1280	1700	107	703
Volume to Capacity	0.23	0.16	0.00	0.16	0.20	0.39
Queue Length 95th (ft)	22	0	0	0	18	46
Control Delay (s)	8.7	0.0	7.8	0.0	47.0	13.3
Lane LOS	A		A		E	B
Approach Delay (s)	4.6		0.2		47.0	13.3
Approach LOS					E	B

Intersection Summary

Average Delay	6.4
Intersection Capacity Utilization	53.8%
ICU Level of Service	A
Analysis Period (min)	15

HCM Unsignalized Intersection Capacity Analysis

69: W Prairie St & S Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔		↗	↘		↗	↘	
Volume (veh/h)	10	210	20	230	190	40	10	430	240	30	410	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.96	0.92
Hourly flow rate (vph)	11	228	22	250	207	43	11	448	261	33	427	5
Pedestrians		1						1				
Lane Width (ft)		12.0						12.0				
Walking Speed (ft/s)		4.0						4.0				
Percent Blockage		0						0				
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage veh								2			2	
Upstream signal (ft)											1025	
pX, platoon unblocked	0.92	0.92	0.92	0.92	0.92		0.92					
vC, conflicting volume	1112	1227	432	1229	1099	578	434			709		
vC1, stage 1 conf vol	496	496		600	600							
vC2, stage 2 conf vol	616	731		629	499							
vCu, unblocked vol	1078	1202	337	1205	1063	578	339			709		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	95	32	97	0	47	92	99			96		
cM capacity (veh/h)	203	336	642	215	390	517	1120			881		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	261	500	11	709	33	433
Volume Left	11	250	11	0	33	0
Volume Right	22	43	0	261	0	5
cSH	340	281	1120	1700	881	1700
Volume to Capacity	0.77	1.78	0.01	0.42	0.04	0.25
Queue Length 95th (ft)	153	825	1	0	3	0
Control Delay (s)	43.3	394.2	8.2	0.0	9.2	0.0
Lane LOS	E	F	A		A	
Approach Delay (s)	43.3	394.2	0.1		0.6	
Approach LOS	E	F				

Intersection Summary

Average Delay	107.3
Intersection Capacity Utilization	85.3%
ICU Level of Service	E
Analysis Period (min)	15

HCM Signalized Intersection Capacity Analysis
70: SR 101 WB Ramps & River Road

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↕	↗	↖	↑			↑	↗
Volume (vph)	0	0	0	25	0	190	60	820	0	0	310	750
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)					4.6	4.6	4.6	4.6			4.6	4.6
Lane Util. Factor					1.00	1.00	1.00	1.00			1.00	1.00
Frt					1.00	0.85	1.00	1.00			1.00	0.85
Flt Protected					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (prot)					1787	1599	1787	1881			1881	1599
Flt Permitted					0.95	1.00	0.95	1.00			1.00	1.00
Satd. Flow (perm)					1787	1599	1787	1881			1881	1599
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.98	0.92	0.96	0.96	0.98
Adj. Flow (vph)	0	0	0	27	0	207	65	837	0	0	323	765
RTOR Reduction (vph)	0	0	0	0	0	189	0	0	0	0	0	249
Lane Group Flow (vph)	0	0	0	0	27	18	65	837	0	0	323	516
Heavy Vehicles (%)	0%	0%	0%	1%	1%	1%	1%	1%	1%	1%	1%	1%
Turn Type				Perm		Perm	Prot					Perm
Protected Phases					8		5	2			6	
Permitted Phases				8		8						6
Actuated Green, G (s)					8.0	8.0	7.5	72.8			60.7	60.7
Effective Green, g (s)					8.0	8.0	7.5	72.8			60.7	60.7
Actuated g/C Ratio					0.09	0.09	0.08	0.81			0.67	0.67
Clearance Time (s)					4.6	4.6	4.6	4.6			4.6	4.6
Vehicle Extension (s)					3.0	3.0	3.0	3.0			3.0	3.0
Lane Grp Cap (vph)					159	142	149	1522			1269	1078
v/s Ratio Prot							0.04	c0.44			0.17	
v/s Ratio Perm					0.02	0.01						0.32
v/c Ratio					0.17	0.13	0.44	0.55			0.25	0.48
Uniform Delay, d1					37.9	37.8	39.2	3.0			5.8	7.0
Progression Factor					1.00	1.00	0.98	1.72			1.00	1.00
Incremental Delay, d2					0.5	0.4	1.3	0.9			0.5	1.5
Delay (s)					38.4	38.2	39.7	6.0			6.2	8.6
Level of Service					D	D	D	A			A	A
Approach Delay (s)		0.0			38.2			8.4			7.9	
Approach LOS		A			D			A			A	

Intersection Summary

HCM Average Control Delay	11.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	9.2
Intersection Capacity Utilization	108.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis

71: SR 101 EB Ramps & River Road

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕	↗					↖		↘	↕	
Volume (vph)	730	0	80	0	0	0	0	150	30	210	120	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		4.6	4.6					4.6		4.6	4.6	
Lane Util. Factor		1.00	1.00					1.00		1.00	1.00	
Frt		1.00	0.85					0.98		1.00	1.00	
Flt Protected		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (prot)		1787	1599					1820		1805	1900	
Flt Permitted		0.95	1.00					1.00		0.95	1.00	
Satd. Flow (perm)		1787	1599					1820		1805	1900	
Peak-hour factor, PHF	0.98	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.96	0.96
Adj. Flow (vph)	745	0	87	0	0	0	0	163	33	219	125	0
RTOR Reduction (vph)	0	0	46	0	0	0	0	8	0	0	0	0
Lane Group Flow (vph)	0	745	41	0	0	0	0	188	0	219	125	0
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	Perm		Perm							Prot		
Protected Phases		4						2		1	6	
Permitted Phases	4		4									
Actuated Green, G (s)		42.0	42.0					19.8		14.4	38.8	
Effective Green, g (s)		42.0	42.0					19.8		14.4	38.8	
Actuated g/C Ratio		0.47	0.47					0.22		0.16	0.43	
Clearance Time (s)		4.6	4.6					4.6		4.6	4.6	
Vehicle Extension (s)		3.0	3.0					3.0		3.0	3.0	
Lane Grp Cap (vph)		834	746					400		289	819	
v/s Ratio Prot								c0.10		c0.12	0.07	
v/s Ratio Perm		0.42	0.03									
v/c Ratio		0.89	0.05					0.47		0.76	0.15	
Uniform Delay, d1		22.0	13.1					30.5		36.1	15.6	
Progression Factor		1.00	1.00					1.00		0.96	0.74	
Incremental Delay, d2		11.9	0.0					3.9		10.6	0.4	
Delay (s)		33.9	13.2					34.5		45.3	12.0	
Level of Service		C	B					C		D	B	
Approach Delay (s)		31.7			0.0			34.5			33.2	
Approach LOS		C			A			C			C	

Intersection Summary

HCM Average Control Delay	32.5	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	90.0	Sum of lost time (s)	13.8
Intersection Capacity Utilization	108.1%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

72: SR 101 WB Ramps & S Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations					↔		↗	↑			↑	↗
Volume (veh/h)	0	0	0	10	0	190	70	460	0	0	320	320
Sign Control		Stop			Stop			Free			Free	
Grade		0%			2%			0%			1%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.96	0.92	0.92	0.96	0.96
Hourly flow rate (vph)	0	0	0	11	0	207	76	479	0	0	333	333
Pedestrians												
Lane Width (ft)												
Walking Speed (ft/s)												
Percent Blockage												
Right turn flare (veh)												
Median type							None			TWLTL		
Median storage (veh)										2		
Upstream signal (ft)												
pX, platoon unblocked												
vC, conflicting volume	1171	965	333	965	1298	479	667			479		
vC1, stage 1 conf vol	333	333		631	631							
vC2, stage 2 conf vol	838	631		333	667							
vCu, unblocked vol	1171	965	333	965	1298	479	667			479		
tC, single (s)	7.1	6.5	6.2	7.2	6.6	6.3	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.2	5.6							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	100	97	100	64	92			100		
cM capacity (veh/h)	207	400	713	382	308	580	928			1078		

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	217	76	479	333	333
Volume Left	11	76	0	0	0
Volume Right	207	0	0	0	333
cSH	566	928	1700	1700	1700
Volume to Capacity	0.38	0.08	0.28	0.20	0.20
Queue Length 95th (ft)	45	7	0	0	0
Control Delay (s)	15.3	9.2	0.0	0.0	0.0
Lane LOS	C	A			
Approach Delay (s)	15.3	1.3		0.0	
Approach LOS	C				

Intersection Summary		
Average Delay		2.8
Intersection Capacity Utilization	59.3%	ICU Level of Service
Analysis Period (min)	15	B

HCM Unsignalized Intersection Capacity Analysis

73: SR 101 EB Ramps & S Sequim Ave

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↖	↗					↕		↖	↗	
Volume (veh/h)	350	0	90	0	0	0	0	180	10	230	120	0
Sign Control		Stop			Stop			Free			Free	
Grade		-3%			2%			3%			-2%	
Peak Hour Factor	0.96	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	365	0	98	0	0	0	0	196	11	250	130	0
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	832	837	130	929	832	201	130			207		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	832	837	130	929	832	201	130			207		
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 %	0	100	89	100	100	100	100			82		
cM capacity (veh/h)	249	248	919	192	251	845	1443			1371		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1	SB 2
Volume Total	365	98	207	250	130
Volume Left	365	0	0	250	0
Volume Right	0	98	11	0	0
cSH	249	919	1700	1371	1700
Volume to Capacity	1.47	0.11	0.12	0.18	0.08
Queue Length 95th (ft)	525	9	0	17	0
Control Delay (s)	268.1	9.4	0.0	8.2	0.0
Lane LOS	F	A		A	
Approach Delay (s)	213.4		0.0	5.4	
Approach LOS	F				

Intersection Summary		
Average Delay		96.0
Intersection Capacity Utilization	59.3%	ICU Level of Service
Analysis Period (min)		15
		B

HCM Unsignalized Intersection Capacity Analysis

75: SR 101 WB Ramp & Simdars Rd

8/8/2012



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations				↕	↕	
Volume (veh/h)	0	0	100	50	180	30
Sign Control	Yield			Free	Free	
Grade	0%			1%	-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	109	54	196	33
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	484	212	228			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	484	212	228			
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	92			
cM capacity (veh/h)	492	821	1322			
Direction, Lane #	NB 1	SB 1				
Volume Total	163	228				
Volume Left	109	0				
Volume Right	0	33				
cSH	1322	1700				
Volume to Capacity	0.08	0.13				
Queue Length 95th (ft)	7	0				
Control Delay (s)	5.5	0.0				
Lane LOS	A					
Approach Delay (s)	5.5	0.0				
Approach LOS						
Intersection Summary						
Average Delay			2.3			
Intersection Capacity Utilization			26.1%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis
76: SR 101 EB Ramp & Simdars Rd

8/8/2012



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	40	5	140	0	0	0	0	110	5	170	15	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			-2%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	5	152	0	0	0	0	120	5	185	16	0
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	508	511	16	663	508	122	16			125		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	508	511	16	663	508	122	16			125		
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 %	90	99	86	100	100	100	100			87		
cM capacity (veh/h)	424	403	1054	283	404	921	1582			1443		

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	43	158	125	201
Volume Left	43	0	0	185
Volume Right	0	152	5	0
cSH	424	998	1700	1443
Volume to Capacity	0.10	0.16	0.07	0.13
Queue Length 95th (ft)	9	14	0	11
Control Delay (s)	14.5	9.3	0.0	7.3
Lane LOS	B	A		A
Approach Delay (s)	10.4		0.0	7.3
Approach LOS	B			

Intersection Summary			
Average Delay		6.8	
Intersection Capacity Utilization	32.5%		ICU Level of Service A
Analysis Period (min)	15		