Appendix B: Intersection Turning Movement Counts

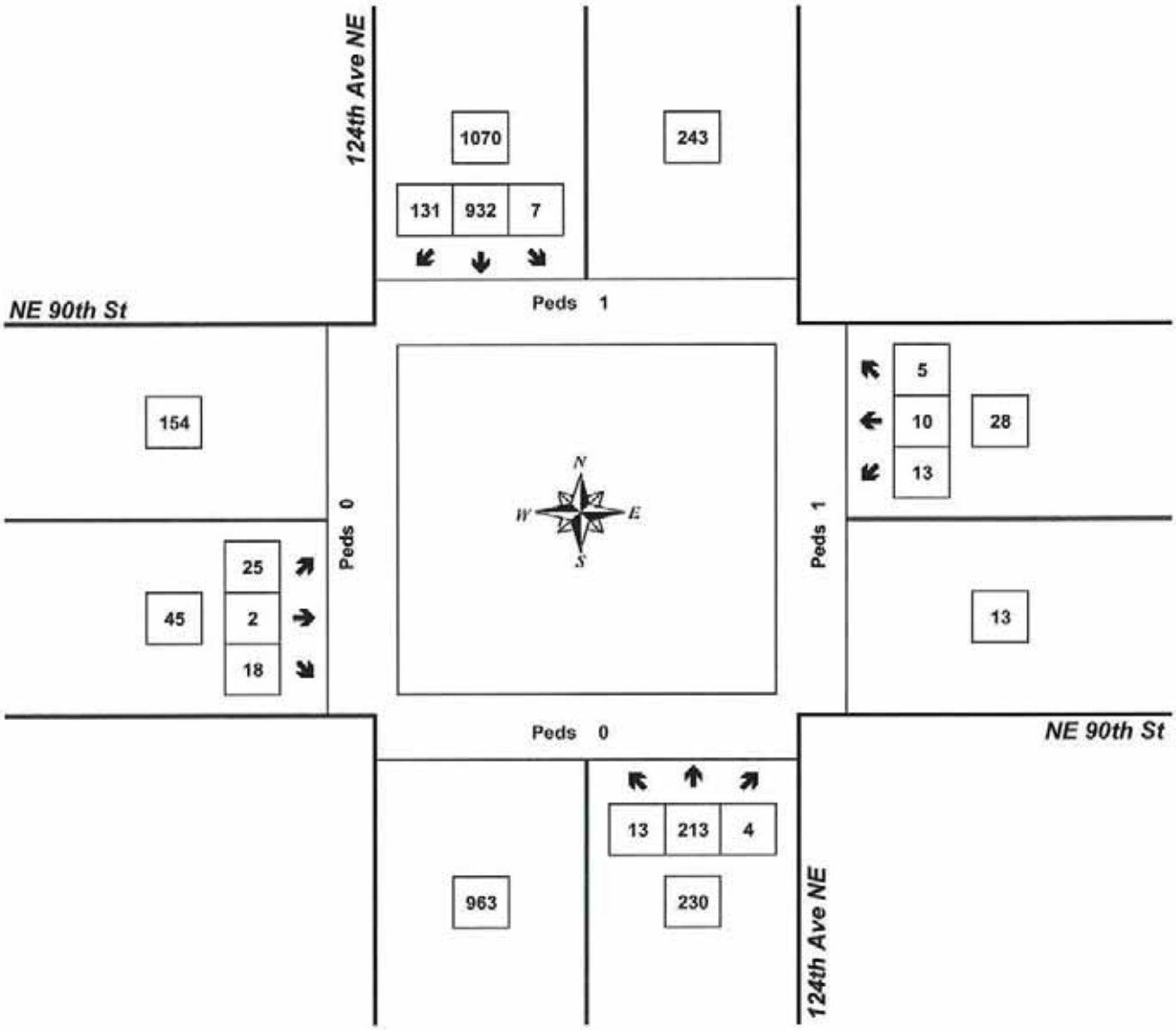
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

124th Ave NE & NE 90th St

8:00 AM to 9:00 AM
Wednesday, August 03, 2011



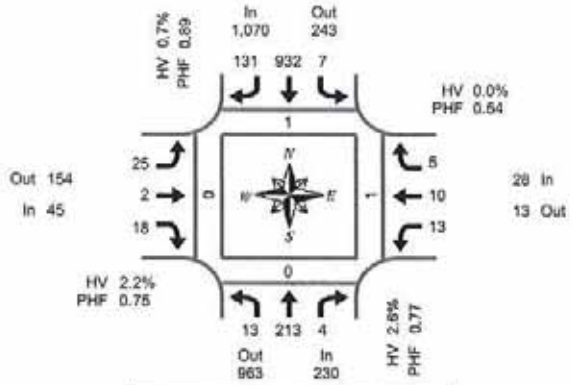
Approach	PHF	HV%	Volume
EB	0.75	2.2%	45
WB	0.54	0.0%	28
NB	0.77	2.6%	230
SB	0.89	0.7%	1,070
Intersection	0.85	1.1%	1,373

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc

Mark Skaggs
(206) 251-0300



Peak Hour Summary
8:00 AM to 9:00 AM

124th Ave NE & NE 90th St

Wednesday, August 03, 2011
7:00 AM to 9:00 AM

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
7:00 AM	2	15	0	1	0	131	10	3	1	1	5	0	3	1	2	0	171	1	0	0	2
7:15 AM	0	28	0	1	2	148	19	1	7	0	2	0	3	4	1	0	214	0	0	0	0
7:30 AM	0	31	1	0	1	213	26	2	7	1	2	0	2	2	0	0	286	0	0	1	1
7:45 AM	4	49	1	2	3	235	43	0	5	0	3	0	6	2	3	0	354	0	0	0	0
8:00 AM	4	41	0	1	0	203	35	1	8	0	6	1	2	2	1	0	302	0	0	0	0
8:15 AM	4	58	1	2	1	237	29	2	5	1	4	0	4	2	1	0	347	1	0	1	0
8:30 AM	0	47	0	2	3	239	21	4	3	0	3	0	1	0	2	0	319	0	0	0	0
8:45 AM	5	67	3	1	3	253	48	1	9	1	5	0	6	6	1	0	405	0	0	0	0
Total Survey	19	336	6	10	13	1,659	229	14	45	4	30	1	27	19	11	0	2,398	2	0	2	3

Peak Hour Summary
8:00 AM to 9:00 AM

By Approach	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	230	963	1,193	6	1,070	243	1,313	8	45	154	199	1	28	13	41	0	1,373
%HV	2.6%				0.7%				2.2%				0.0%				1.1%
PHF	0.77				0.89				0.75				0.54				0.85

Pedestrians Crosswalk			
North	South	East	West
1	0	1	0

By Movement	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	13	213	4	230	7	932	131	1,070	25	2	18	45	13	10	5	28	1,373
PHF	0.65	0.79	0.33	0.77	0.58	0.92	0.71	0.89	0.69	0.50	0.75	0.75	0.54	0.42	0.63	0.54	0.85

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
7:00 AM	6	123	2	4	6	727	98	6	20	2	12	0	14	9	6	0	1,025	1	0	1	3
7:15 AM	8	149	2	4	6	799	123	4	27	1	13	1	13	10	5	0	1,156	0	0	1	1
7:30 AM	12	179	3	5	5	888	133	5	25	2	15	1	14	8	5	0	1,289	1	0	2	1
7:45 AM	12	195	2	7	7	914	128	7	21	1	16	1	13	6	7	0	1,322	1	0	1	0
8:00 AM	13	213	4	6	7	932	131	8	25	2	18	1	13	10	5	0	1,373	1	0	1	0

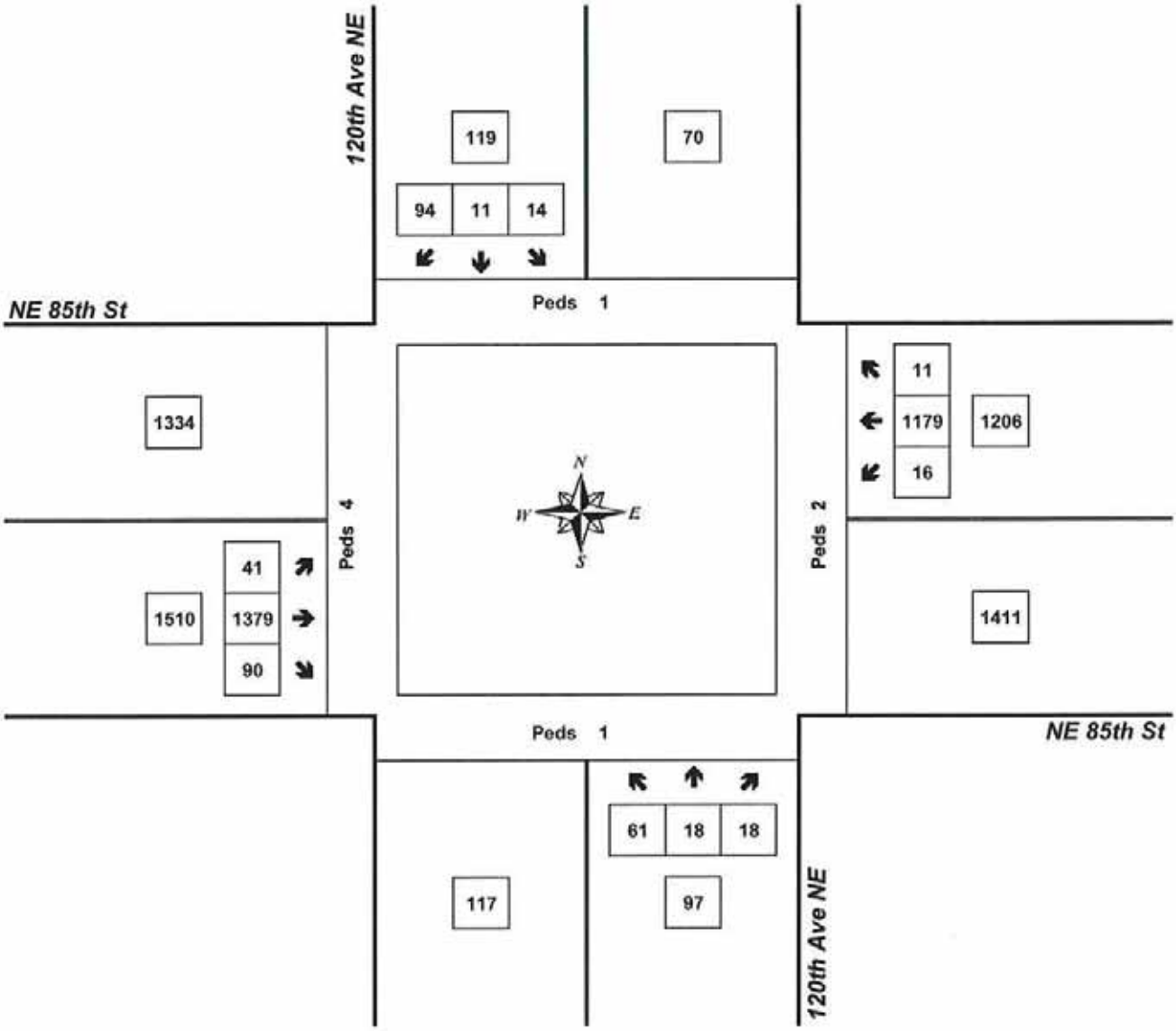
Peak Hour Summary

All Traffic Data Services Inc

Mark Skaggs
(206) 251-0300

120th Ave NE & NE 85th St

8:00 AM to 9:00 AM
Wednesday, August 03, 2011



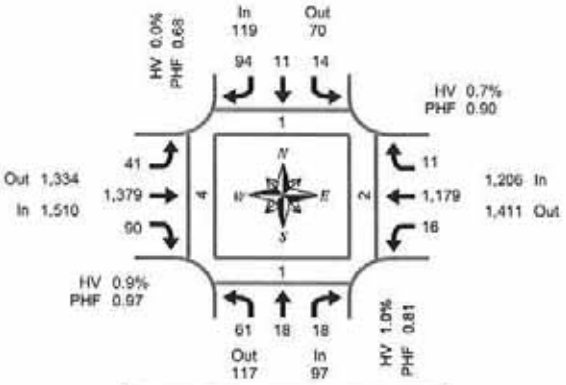
Approach	PHF	HV%	Volume
EB	0.97	0.9%	1,510
WB	0.90	0.7%	1,206
NB	0.81	1.0%	97
SB	0.68	0.0%	119
Intersection	0.92	0.8%	2,932

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc

Mark Skaggs
(206) 251-0300



Peak Hour Summary
8:00 AM to 9:00 AM

120th Ave NE & NE 85th St

Wednesday, August 03, 2011
7:00 AM to 9:00 AM

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
7:00 AM	3	0	2	0	3	1	4	0	4	243	14	10	4	232	3	4	513	0	0	0	0
7:15 AM	11	0	2	0	1	3	10	2	7	297	11	5	2	288	1	6	633	0	0	0	0
7:30 AM	9	1	4	0	3	1	23	1	6	254	18	1	8	302	2	3	631	0	1	1	1
7:45 AM	15	1	1	3	2	3	26	4	4	302	12	2	8	288	2	2	664	0	1	1	2
8:00 AM	10	3	5	0	1	3	14	0	4	338	9	4	8	296	5	1	696	0	1	0	2
8:15 AM	15	2	2	0	6	5	25	0	13	354	22	2	2	287	4	2	737	0	0	0	1
8:30 AM	18	7	5	1	0	2	19	0	11	340	28	3	1	266	2	3	699	0	0	2	0
8:45 AM	18	6	6	0	7	1	38	0	13	347	31	4	5	330	0	3	800	1	0	0	1
Total Survey	99	20	27	4	23	19	157	7	62	2,475	145	31	38	2,289	19	24	5,373	1	3	4	7

Peak Hour Summary
8:00 AM to 9:00 AM

By Approach	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	97	117	214	1	119	70	189	0	1,510	1,334	2,844	13	1,206	1,411	2,617	9	2,932
%HV	1.0%				0.0%				0.9%				0.7%				0.8%
PHF	0.81				0.68				0.97				0.90				0.92

Pedestrians Crosswalk			
North	South	East	West
1	1	2	4

By Movement	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	61	18	18	97	14	11	94	119	41	1,379	90	1,510	16	1,179	11	1,206	2,932
PHF	0.85	0.64	0.75	0.81	0.50	0.55	0.65	0.68	0.79	0.97	0.73	0.97	0.50	0.89	0.55	0.90	0.92

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
7:00 AM	38	2	9	3	9	8	63	7	21	1,096	55	18	22	1,110	8	15	2,441	0	2	2	3
7:15 AM	45	5	12	3	7	10	73	7	21	1,191	50	12	26	1,174	10	12	2,624	0	3	2	5
7:30 AM	49	7	12	3	12	12	88	5	27	1,246	61	9	26	1,173	13	8	2,728	0	3	2	6
7:45 AM	58	13	13	4	9	13	84	4	32	1,334	71	11	19	1,137	13	8	2,796	0	2	3	5
8:00 AM	61	18	18	1	14	11	94	0	41	1,379	90	13	16	1,179	11	9	2,932	1	1	2	4

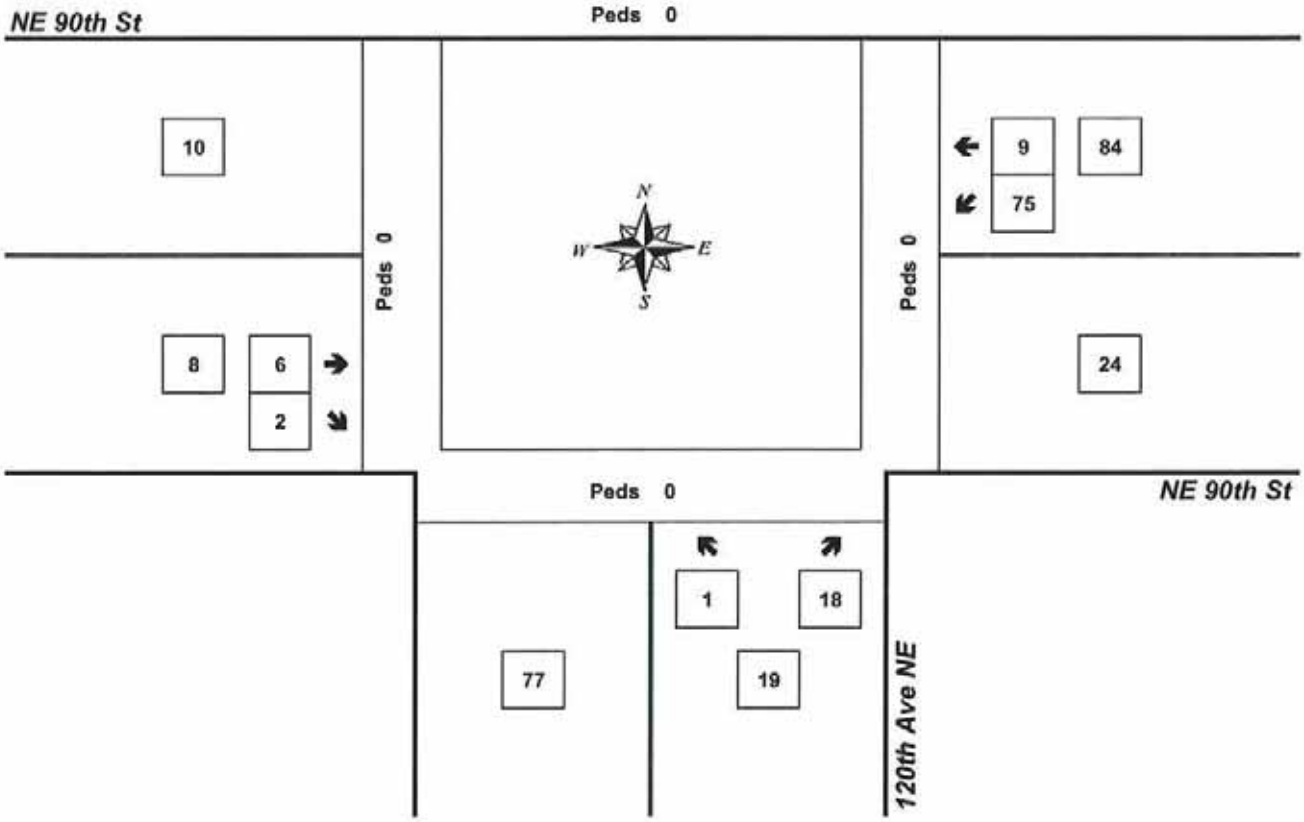
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

120th Ave NE & NE 90th St

8:00 AM to 9:00 AM
Wednesday, August 03, 2011

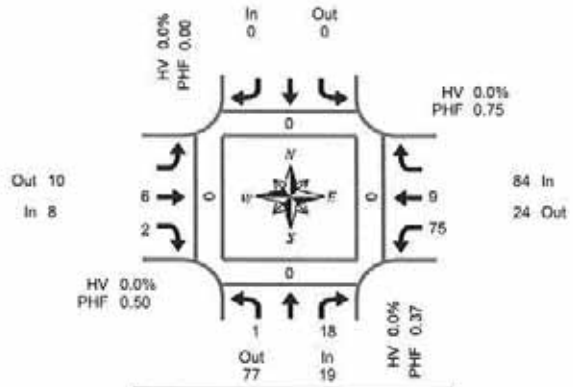


Approach	PHF	HV%	Volume
EB	0.50	0.0%	8
WB	0.75	0.0%	84
NB	0.37	0.0%	19
SB	0.00	0.0%	0
Intersection	0.66	0.0%	111

Count Period: 7:00 AM to 9:00 AM

Total Vehicle Summary

All Traffic Data Services Inc.
Mark Skaggs
(206) 251-0300



Peak Hour Summary
8:00 AM to 9:00 AM

120th Ave NE & NE 90th St

Wednesday, August 03, 2011
7:00 AM to 9:00 AM

15-Minute Interval Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Interval Total	Pedestrians Crosswalk			
	L		R	HV					T	R	HV		T		HV			North	South	East	West
7:00 AM	1		1	1					1	0	0	5	3		0		11	0	0	0	0
7:15 AM	1		0	1					0	0	0	14	2		2		17	0	0	0	0
7:30 AM	0		2	0					0	3	2	13	1		0		19	0	0	0	0
7:45 AM	1		0	0					1	2	2	26	2		0		32	0	0	0	0
8:00 AM	0		1	0					2	0	0	15	2		0		20	0	0	0	0
8:15 AM	0		3	0					3	1	0	22	3		0		32	0	0	0	0
8:30 AM	0		2	0					1	0	0	11	3		0		17	0	0	0	0
8:45 AM	1		12	0					0	1	0	27	1		0		42	0	0	0	0
Total Survey	4		21	2					8	7	4	133	17		2		190	0	0	0	0

Peak Hour Summary
8:00 AM to 9:00 AM

By Approach	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total		In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	19	77	96	0	0	0	0		8	10	18	0	84	24	108	0	111	0	0	0	0
%HV	0.0%				0.0%				0.0%				0.0%				0.0%				
PHF	0.37				0.00				0.50				0.75				0.66				

By Movement	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 90th St			Westbound NE 90th St				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	1		18	19				0		6	2	8	75	9		84	111
PHF	0.25		0.38	0.37				0.00		0.50	0.50	0.50	0.69	0.75		0.75	0.66

Rolling Hour Summary
7:00 AM to 9:00 AM

Interval Start Time	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Interval Total	Pedestrians Crosswalk			
	L		R	HV					T	R	HV		T		HV			North	South	East	West
7:00 AM	3		3	2					2	5	4	58	8		2		79	0	0	0	0
7:15 AM	2		3	1					3	5	4	68	7		2		88	0	0	0	0
7:30 AM	1		6	0					6	6	4	76	8		0		103	0	0	0	0
7:45 AM	1		6	0					7	3	2	74	10		0		101	0	0	0	0
8:00 AM	1		18	0					6	2	0	75	9		0		111	0	0	0	0

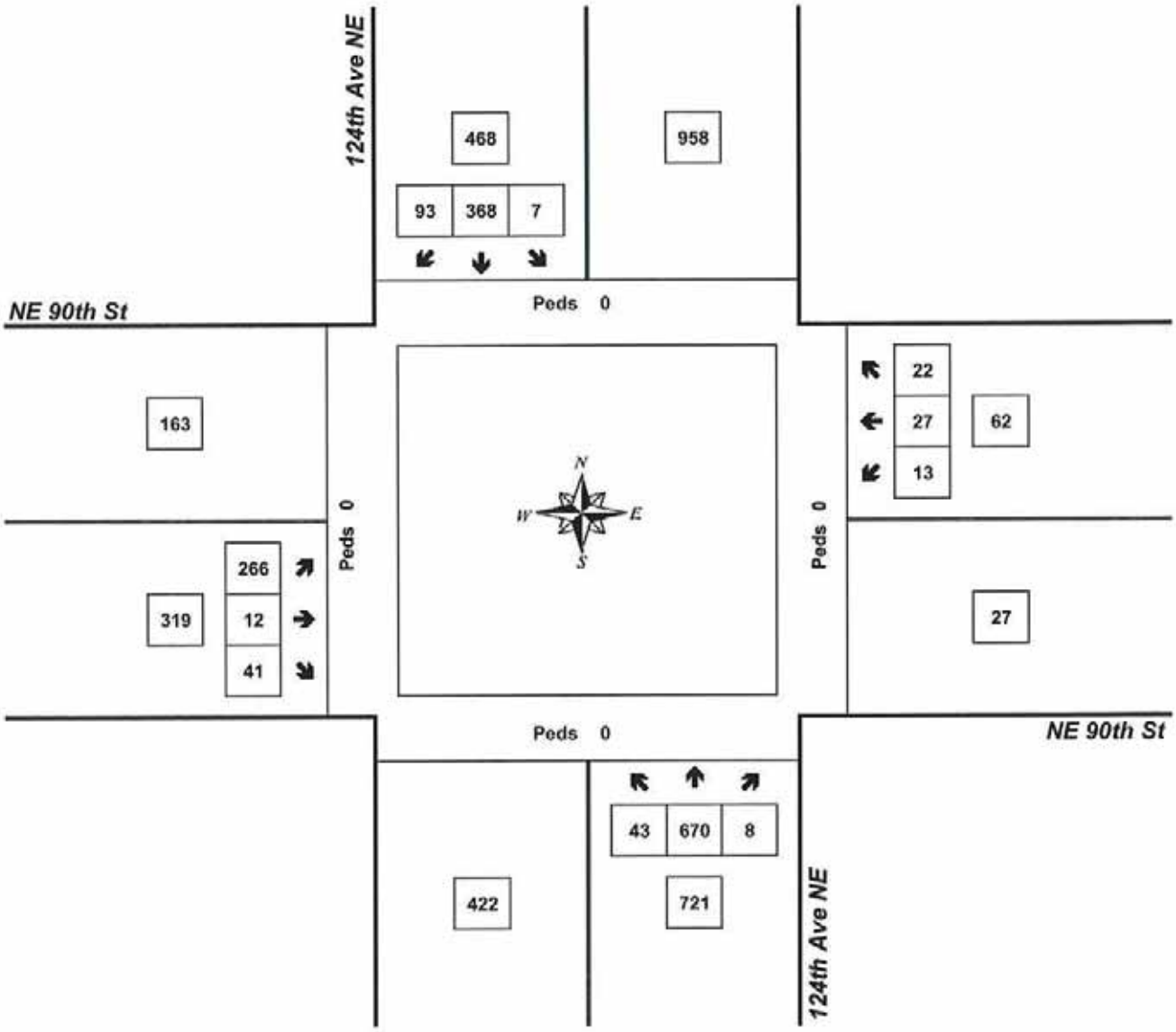
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

124th Ave NE & NE 90th St

4:45 PM to 5:45 PM
Tuesday, August 02, 2011



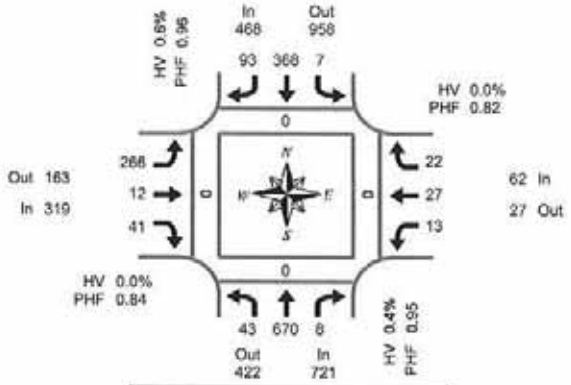
Approach	PHF	HV%	Volume
EB	0.84	0.0%	319
WB	0.82	0.0%	62
NB	0.95	0.4%	721
SB	0.96	0.6%	468
Intersection	0.98	0.4%	1,570

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc

Mark Skaggs
(206) 251-0300



Peak Hour Summary
4:45 PM to 5:45 PM

124th Ave NE & NE 90th St

Tuesday, August 02, 2011
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	7	119	4	1	1	83	26	2	41	1	10	0	3	5	4	0	304	0	0	0	0
4:15 PM	11	154	4	1	2	85	29	0	43	1	12	0	0	3	2	0	346	0	0	0	0
4:30 PM	11	137	1	0	2	81	23	1	60	1	7	0	3	4	1	0	331	0	0	0	0
4:45 PM	11	166	3	1	1	94	22	0	62	1	8	0	4	3	5	0	380	0	0	0	0
5:00 PM	10	157	1	0	2	94	26	2	75	6	14	0	3	5	7	0	400	0	0	0	0
5:15 PM	12	176	2	1	1	96	21	0	61	3	7	0	4	10	5	0	398	0	0	0	0
5:30 PM	10	171	2	1	3	84	24	1	68	2	12	0	2	9	5	0	392	0	0	0	0
5:45 PM	15	184	3	0	0	79	26	0	41	5	4	0	3	4	4	0	368	0	0	0	0
Total Survey	87	1,264	20	5	12	696	197	6	451	20	74	0	22	43	33	0	2,919	0	0	0	0

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	721	422	1,143	3	468	958	1,426	3	319	163	482	0	62	27	89	0	1,570	0	0	0	0
%HV	0.4%				0.6%				0.0%				0.0%				0.4%				
PHF	0.95				0.96				0.84				0.82				0.98				

By Movement	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	43	670	8	721	7	368	93	468	266	12	41	319	13	27	22	62	1,570
PHF	0.90	0.95	0.67	0.95	0.58	0.96	0.89	0.96	0.80	0.50	0.73	0.84	0.81	0.68	0.79	0.82	0.98

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	40	576	12	3	6	343	100	3	206	4	37	0	10	15	12	0	1,361	0	0	0	0
4:15 PM	43	614	9	2	7	354	100	3	240	9	41	0	10	15	15	0	1,457	0	0	0	0
4:30 PM	44	636	7	2	6	365	92	3	258	11	36	0	14	22	18	0	1,509	0	0	0	0
4:45 PM	43	670	8	3	7	368	93	3	266	12	41	0	13	27	22	0	1,570	0	0	0	0
5:00 PM	47	688	8	2	6	353	97	3	245	16	37	0	12	28	21	0	1,558	0	0	0	0

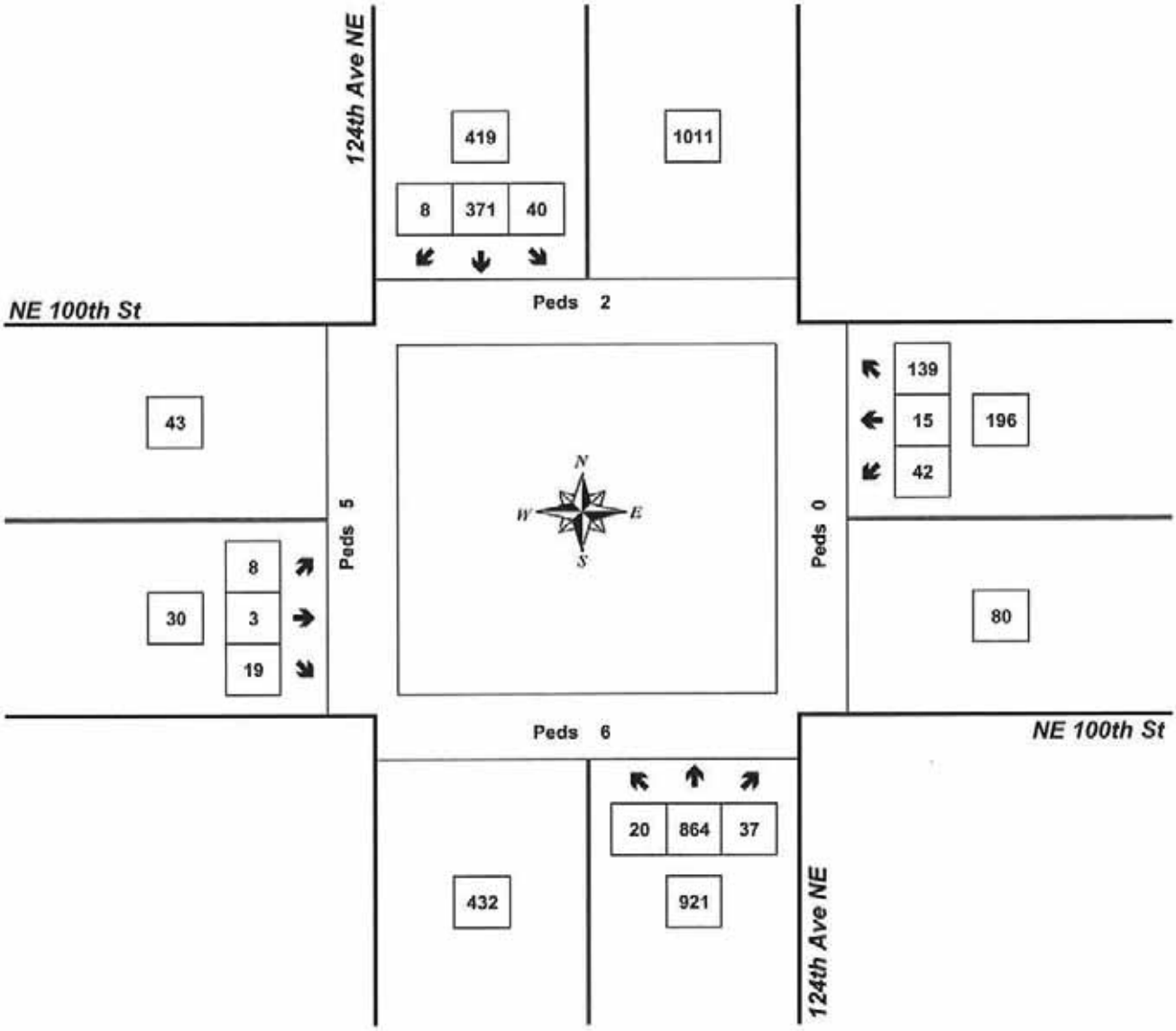
Peak Hour Summary

All Traffic Data Services Inc

Mark Skaggs
(206) 251-0300

124th Ave NE & NE 100th St

4:45 PM to 5:45 PM
Tuesday, August 02, 2011

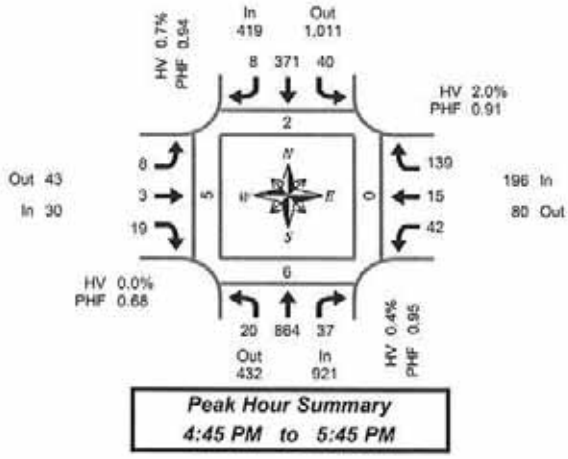


Approach	PHF	HV%	Volume
EB	0.68	0.0%	30
WB	0.91	2.0%	196
NB	0.95	0.4%	921
SB	0.94	0.7%	419
Intersection	0.96	0.7%	1,566

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc
Mark Skaggs
(206) 251-0300



124th Ave NE & NE 100th St

Tuesday, August 02, 2011
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 100th St				Westbound NE 100th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	5	134	14	4	13	90	1	1	0	2	8	0	6	1	23	0	297	4	1	0	1
4:15 PM	4	168	15	3	5	92	1	1	0	0	4	0	14	1	28	2	332	5	0	0	0
4:30 PM	1	169	6	1	7	91	0	1	0	1	2	0	9	2	25	0	313	1	1	0	0
4:45 PM	10	208	4	0	8	90	0	0	1	2	3	0	8	5	39	0	378	0	0	0	0
5:00 PM	1	213	13	2	14	95	2	2	2	0	5	0	14	1	33	4	393	1	3	0	1
5:15 PM	5	224	14	1	10	95	5	0	3	1	7	0	8	4	30	0	406	1	2	0	1
5:30 PM	4	219	6	1	8	91	1	1	2	0	4	0	12	5	37	0	389	0	1	0	3
5:45 PM	6	211	15	0	4	89	1	0	1	1	3	0	11	0	34	1	376	1	2	1	0
Total Survey	36	1,546	87	12	69	733	11	6	9	7	36	0	82	19	249	7	2,884	13	10	1	6

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 100th St				Westbound NE 100th St				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	921	432	1,353	4	419	1,011	1,430	3	30	43	73	0	196	80	276	4	1,566	2	6	0	5
%HV	0.4%				0.7%				0.0%				2.0%				0.7%				
PHF	0.95				0.94				0.68				0.91				0.96				

By Movement	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 100th St				Westbound NE 100th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	20	864	37	921	40	371	8	419	8	3	19	30	42	15	139	196	1,566
PHF	0.50	0.96	0.66	0.95	0.71	0.98	0.40	0.94	0.67	0.38	0.68	0.68	0.75	0.75	0.89	0.91	0.96

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 100th St				Westbound NE 100th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	20	679	39	8	33	363	2	3	1	5	17	0	37	9	115	2	1,320	10	2	0	1
4:15 PM	16	758	38	6	34	368	3	4	3	3	14	0	45	9	125	6	1,416	7	4	0	1
4:30 PM	17	814	37	4	39	371	7	3	6	4	17	0	39	12	127	4	1,490	3	6	0	2
4:45 PM	20	864	37	4	40	371	8	3	8	3	19	0	42	15	139	4	1,566	2	6	0	5
5:00 PM	16	867	48	4	36	370	9	3	8	2	19	0	45	10	134	5	1,564	3	8	1	5

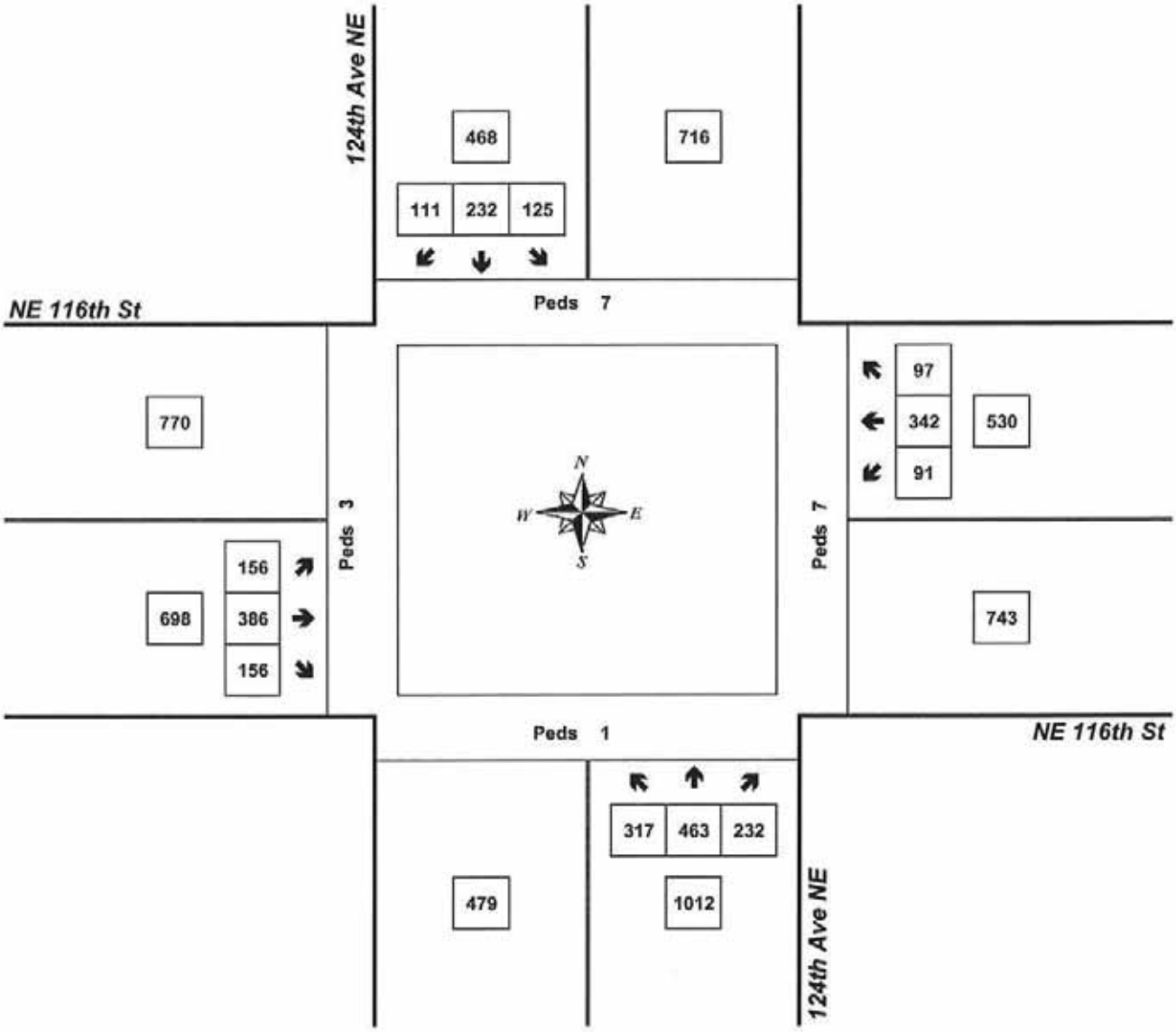
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

124th Ave NE & NE 116th St

5:00 PM to 6:00 PM
Tuesday, August 02, 2011

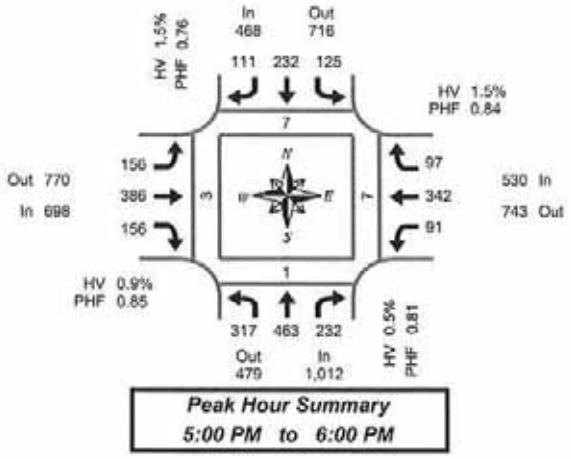


Approach	PHF	HV%	Volume
EB	0.85	0.9%	698
WB	0.84	1.5%	530
NB	0.81	0.5%	1,012
SB	0.76	1.5%	468
Intersection	0.82	1.0%	2,708

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc
Mark Skaggs
(206) 251-0300



124th Ave NE & NE 116th St

Tuesday, August 02, 2011
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 116th St				Westbound NE 116th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	35	106	26	1	16	72	12	1	32	72	36	2	19	64	15	1	505	0	0	3	1
4:15 PM	49	99	32	1	9	68	18	1	42	80	41	3	21	78	16	1	553	1	0	1	0
4:30 PM	49	132	24	3	19	80	22	3	35	78	31	1	24	66	14	1	574	1	0	0	0
4:45 PM	66	101	49	1	14	59	34	0	36	86	24	2	20	94	28	1	611	3	1	0	1
5:00 PM	75	96	36	0	24	44	17	1	28	84	15	1	18	64	17	1	514	0	0	0	0
5:15 PM	91	142	79	3	36	74	43	2	45	117	43	4	24	98	35	4	827	5	0	5	2
5:30 PM	70	109	63	1	31	53	28	3	42	96	52	0	27	91	24	1	686	2	1	1	1
5:45 PM	81	116	54	1	34	61	23	1	43	89	46	1	24	89	21	2	681	0	0	1	0
Total Survey	516	901	363	11	183	511	197	12	301	702	288	14	175	644	170	12	4,951	12	2	11	5

Peak Hour Summary
5:00 PM to 6:00 PM

By Approach	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 116th St				Westbound NE 116th St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	1,012	479	1,491	5	468	716	1,184	7	698	770	1,468	6	530	743	1,273	8	2,708
%HV	0.5%				1.5%				0.9%				1.5%				1.0%
PHF	0.81				0.76				0.85				0.84				0.82

Pedestrians Crosswalk			
North	South	East	West
7	1	7	3

By Movement	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 116th St				Westbound NE 116th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	317	463	232	1,012	125	232	111	468	156	386	156	698	91	342	97	530	2,708
PHF	0.87	0.82	0.73	0.81	0.87	0.78	0.65	0.76	0.87	0.82	0.75	0.85	0.84	0.87	0.69	0.84	0.82

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 116th St				Westbound NE 116th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	199	438	131	6	58	279	86	5	145	316	132	8	84	302	73	4	2,243	5	1	4	2
4:15 PM	239	428	141	5	66	251	91	5	139	328	111	7	81	302	75	4	2,252	5	1	1	1
4:30 PM	281	471	188	7	93	257	116	6	142	365	113	8	84	322	94	7	2,526	9	1	5	3
4:45 PM	302	448	227	5	105	230	122	6	149	383	134	7	87	347	104	7	2,638	10	2	6	4
5:00 PM	317	463	232	5	125	232	111	7	156	386	156	6	91	342	97	8	2,708	7	1	7	3

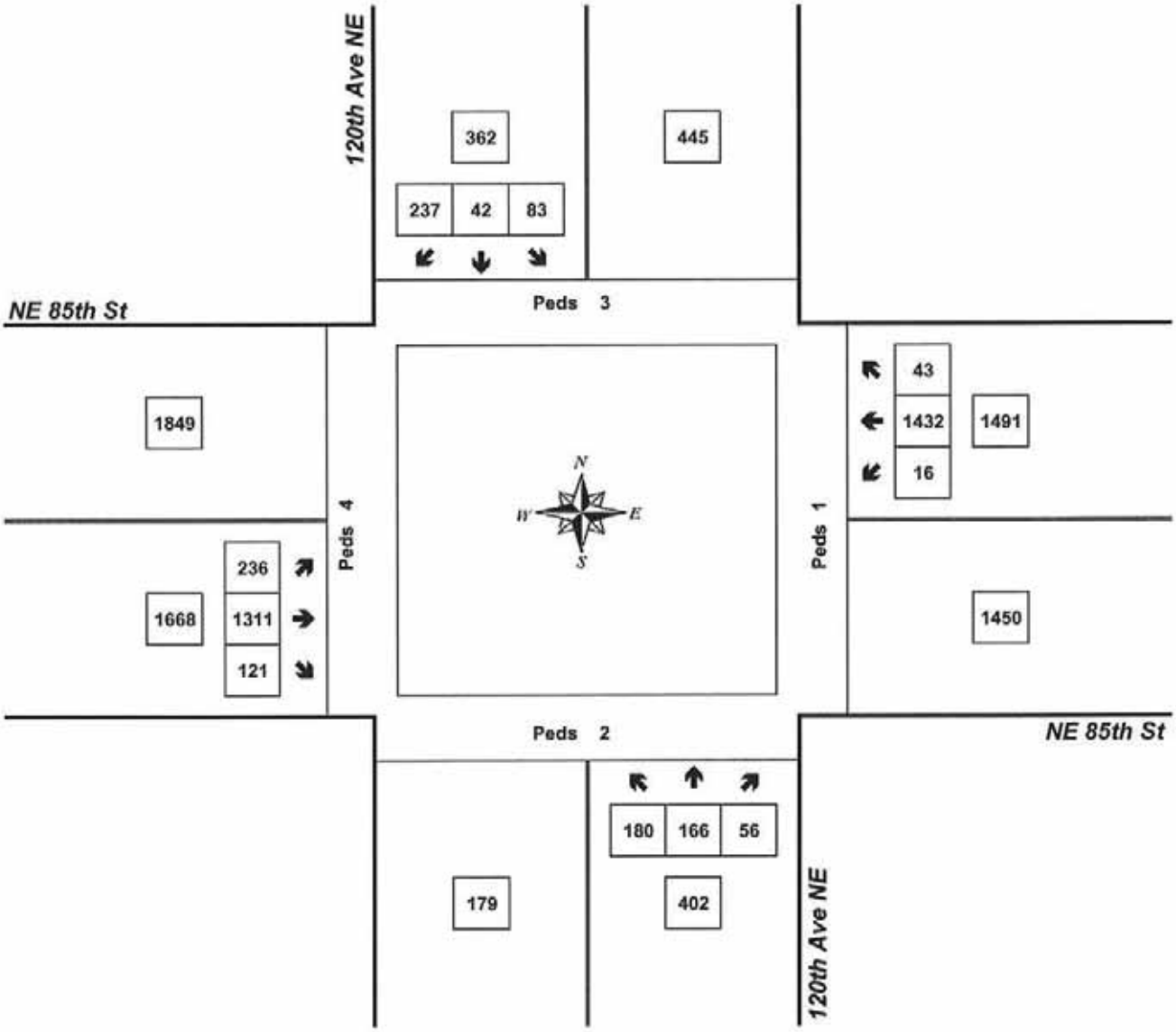
Peak Hour Summary

All Traffic Data Services Inc

Mark Skaggs
(206) 251-0300

120th Ave NE & NE 85th St

5:00 PM to 6:00 PM
Tuesday, August 02, 2011



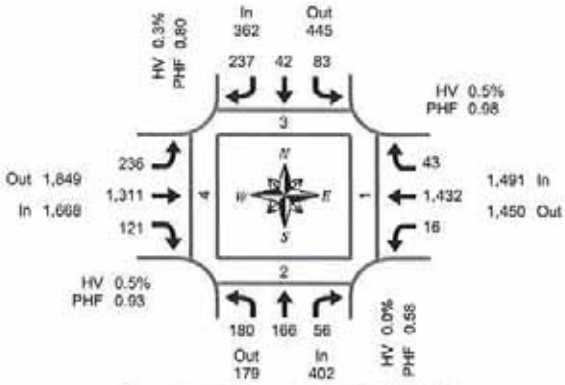
Approach	PHF	HV%	Volume
EB	0.93	0.5%	1,668
WB	0.98	0.5%	1,491
NB	0.58	0.0%	402
SB	0.80	0.3%	362
Intersection	0.97	0.5%	3,923

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc

Mark Skaggs
(206) 251-0300



Peak Hour Summary
5:00 PM to 6:00 PM

120th Ave NE & NE 85th St

Tuesday, August 02, 2011
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	41	24	12	0	24	14	67	0	40	319	17	4	3	340	18	1	919	1	0	2	0
4:15 PM	36	17	7	0	33	13	67	0	50	314	25	3	4	378	15	5	959	0	0	0	0
4:30 PM	22	35	9	1	34	9	69	0	41	334	21	5	4	362	15	1	955	0	0	0	0
4:45 PM	40	30	17	0	28	11	59	0	46	326	12	4	0	363	10	2	942	1	0	2	0
5:00 PM	31	28	10	0	28	6	79	1	43	386	20	0	3	361	15	4	1,010	0	0	0	0
5:15 PM	38	29	9	0	19	15	45	0	48	361	16	4	2	353	8	0	943	0	1	1	1
5:30 PM	50	25	8	0	13	11	59	0	52	336	27	5	3	369	10	2	963	2	0	0	2
5:45 PM	61	84	29	0	23	10	54	0	93	228	58	0	8	349	10	2	1,007	1	1	0	1
Total Survey	319	272	101	1	202	89	499	1	413	2,604	196	25	27	2,875	101	17	7,698	5	2	5	4

Peak Hour Summary
5:00 PM to 6:00 PM

By Approach	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	402	179	581	0	362	445	807	1	1,668	1,849	3,517	9	1,491	1,450	2,941	8	3,923	3	2	1	4
%HV	0.0%				0.3%				0.5%				0.5%				0.5%				
PHF	0.58				0.80				0.93				0.98				0.97				

By Movement	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	180	166	56	402	83	42	237	362	236	1,311	121	1,668	16	1,432	43	1,491	3,923
PHF	0.74	0.49	0.48	0.58	0.74	0.70	0.75	0.80	0.63	0.85	0.52	0.93	0.50	0.97	0.72	0.98	0.97

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	139	106	45	1	119	47	262	0	177	1,293	75	16	11	1,443	58	9	3,775	2	0	4	0
4:15 PM	129	110	43	1	123	39	274	1	180	1,360	78	12	11	1,464	55	12	3,866	1	0	2	0
4:30 PM	131	122	45	1	109	41	252	1	178	1,407	69	13	9	1,439	48	7	3,850	1	1	3	1
4:45 PM	159	112	44	0	88	43	242	1	189	1,409	75	13	8	1,446	43	8	3,858	3	1	3	3
5:00 PM	180	166	56	0	83	42	237	1	236	1,311	121	9	16	1,432	43	8	3,923	3	2	1	4

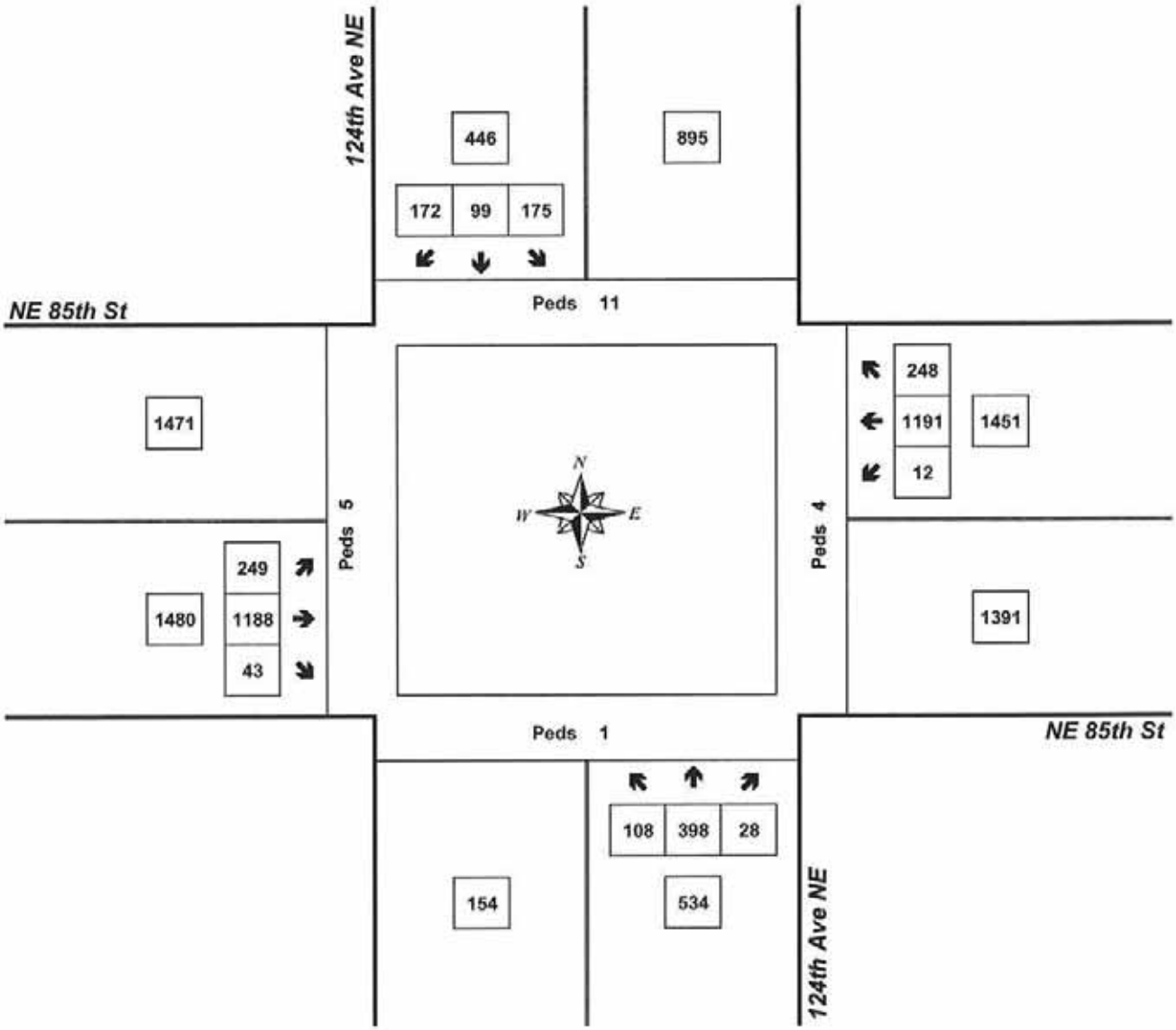
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

124th Ave NE & NE 85th St

4:45 PM to 5:45 PM
Tuesday, August 02, 2011



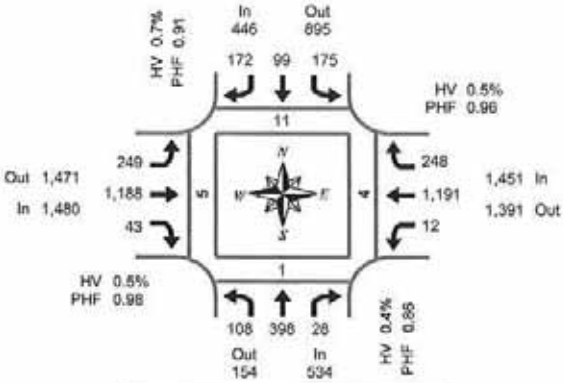
Approach	PHF	HV%	Volume
EB	0.98	0.5%	1,480
WB	0.96	0.5%	1,451
NB	0.86	0.4%	534
SB	0.91	0.7%	446
Intersection	0.98	0.5%	3,911

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc

Mark Skaggs
(206) 251-0300



Peak Hour Summary
4:45 PM to 5:45 PM

124th Ave NE & NE 85th St

Tuesday, August 02, 2011
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	34	57	1	2	47	25	30	1	58	288	6	3	5	300	54	8	905	2	0	4	0
4:15 PM	24	56	5	0	42	23	40	2	43	274	3	1	2	301	56	3	869	1	3	1	3
4:30 PM	27	76	2	0	46	18	36	1	46	306	3	0	4	314	61	3	939	1	0	1	1
4:45 PM	23	84	3	0	36	18	44	0	71	292	6	3	2	284	64	2	927	1	0	0	1
5:00 PM	20	91	10	1	44	29	50	2	54	308	14	2	5	294	63	4	982	3	0	1	1
5:15 PM	34	108	6	1	49	23	41	0	57	299	6	2	0	316	62	0	1,001	2	1	2	1
5:30 PM	31	115	9	0	46	29	37	1	67	289	17	0	5	297	59	1	1,001	5	0	1	2
5:45 PM	35	87	5	1	33	19	30	0	70	264	4	2	2	286	72	3	907	2	1	2	2
Total Survey	228	674	41	5	343	184	308	7	466	2,320	59	13	25	2,392	491	24	7,531	17	5	12	11

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	534	154	688	2	446	895	1,341	3	1,480	1,471	2,951	7	1,451	1,391	2,842	7	3,911
%HV	0.4%				0.7%				0.5%				0.5%				0.5%
PHF	0.96				0.91				0.98				0.96				0.96

Pedestrians Crosswalk			
North	South	East	West
11	1	4	5

By Movement	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	108	398	28	534	175	99	172	446	249	1,188	43	1,480	12	1,191	248	1,451	3,911
PHF	0.79	0.87	0.70	0.86	0.89	0.85	0.86	0.91	0.88	0.96	0.63	0.98	0.60	0.94	0.97	0.96	0.98

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 124th Ave NE				Southbound 124th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	106	273	11	2	171	84	150	4	218	1,160	18	7	13	1,199	235	16	3,640	5	3	6	5
4:15 PM	94	307	20	1	168	88	170	5	214	1,180	26	6	13	1,193	244	12	3,717	6	3	3	6
4:30 PM	104	359	21	2	175	88	171	3	228	1,205	29	7	11	1,208	250	9	3,849	7	1	4	4
4:45 PM	108	398	28	2	175	99	172	3	249	1,188	43	7	12	1,191	248	7	3,911	11	1	4	5
5:00 PM	120	401	30	3	172	100	158	3	248	1,160	41	6	12	1,193	256	8	3,891	12	2	6	6

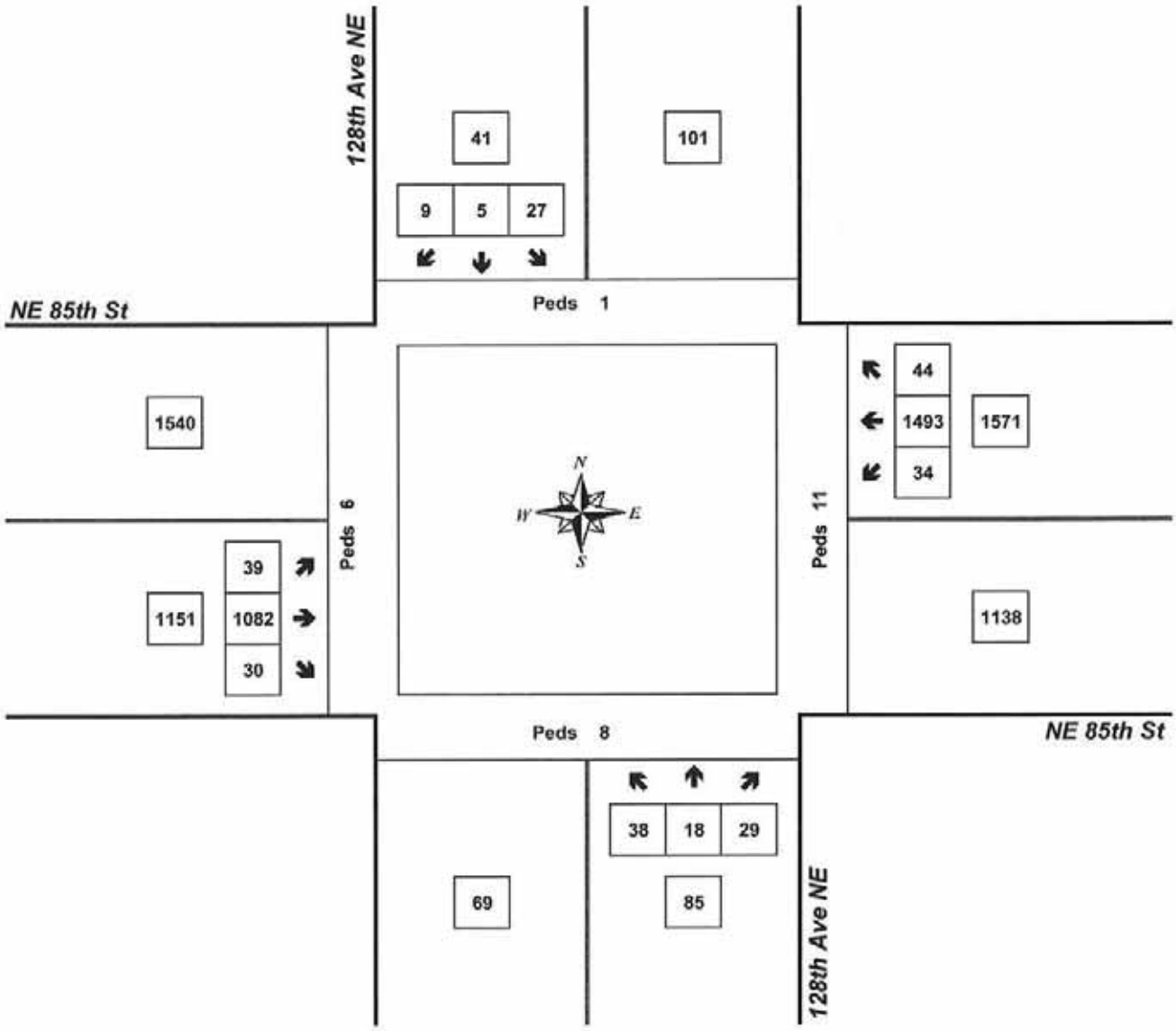
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

128th Ave NE & NE 85th St

4:30 PM to 5:30 PM
Tuesday, August 02, 2011

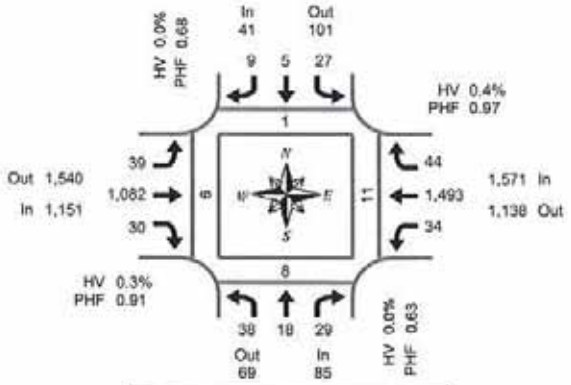


Approach	PHF	HV%	Volume
EB	0.91	0.3%	1,151
WB	0.97	0.4%	1,571
NB	0.63	0.0%	85
SB	0.68	0.0%	41
Intersection	0.96	0.4%	2,848

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc
Mark Skaggs
(206) 251-0300



Peak Hour Summary
4:30 PM to 5:30 PM

128th Ave NE & NE 85th St

Tuesday, August 02, 2011
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 128th Ave NE				Southbound 128th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	6	3	4	0	6	2	7	0	12	273	9	4	8	326	9	8	665	0	0	0	0
4:15 PM	7	5	6	0	5	5	2	0	12	277	5	1	11	372	9	5	716	0	2	1	2
4:30 PM	5	3	7	0	12	1	2	0	12	238	8	1	9	386	9	2	692	1	0	2	0
4:45 PM	5	0	5	0	4	2	3	0	7	273	7	0	15	357	5	4	683	0	4	4	0
5:00 PM	15	9	10	0	6	0	4	0	10	275	6	2	7	377	12	0	731	0	4	5	3
5:15 PM	13	6	7	0	5	2	0	0	10	296	9	0	3	373	18	1	742	0	0	0	3
5:30 PM	4	6	10	0	8	4	7	0	17	230	7	0	3	358	23	1	683	0	0	1	3
5:45 PM	12	7	5	0	7	2	6	0	13	247	10	1	13	352	7	1	681	1	0	0	0
Total Survey	67	39	54	0	53	18	31	0	93	2,115	61	9	69	2,901	92	22	5,593	2	10	13	11

Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound 128th Ave NE				Southbound 128th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	85	69	154	0	41	101	142	0	1,151	1,540	2,691	3	1,571	1,138	2,709	7	2,848	1	8	11	6
%HV	0.0%				0.0%				0.3%				0.4%				0.4%				
PHF	0.63				0.68				0.91				0.97				0.96				

By Movement	Northbound 128th Ave NE				Southbound 128th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	38	18	29	85	27	5	9	41	39	1,082	30	1,151	34	1,493	44	1,571	2,848
PHF	0.63	0.50	0.73	0.63	0.56	0.63	0.56	0.68	0.81	0.91	0.83	0.91	0.57	0.97	0.61	0.97	0.96

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 128th Ave NE				Southbound 128th Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	23	11	22	0	27	10	14	0	43	1,061	29	6	43	1,441	32	19	2,756	1	6	7	2
4:15 PM	32	17	28	0	27	8	11	0	41	1,063	26	4	42	1,492	35	11	2,822	1	10	12	5
4:30 PM	38	18	29	0	27	5	9	0	39	1,082	30	3	34	1,493	44	7	2,849	1	8	11	6
4:45 PM	37	21	32	0	23	8	14	0	44	1,080	29	2	28	1,465	58	6	2,839	0	8	10	9
5:00 PM	44	28	32	0	26	8	17	0	50	1,054	32	3	28	1,460	60	3	2,837	1	4	6	9

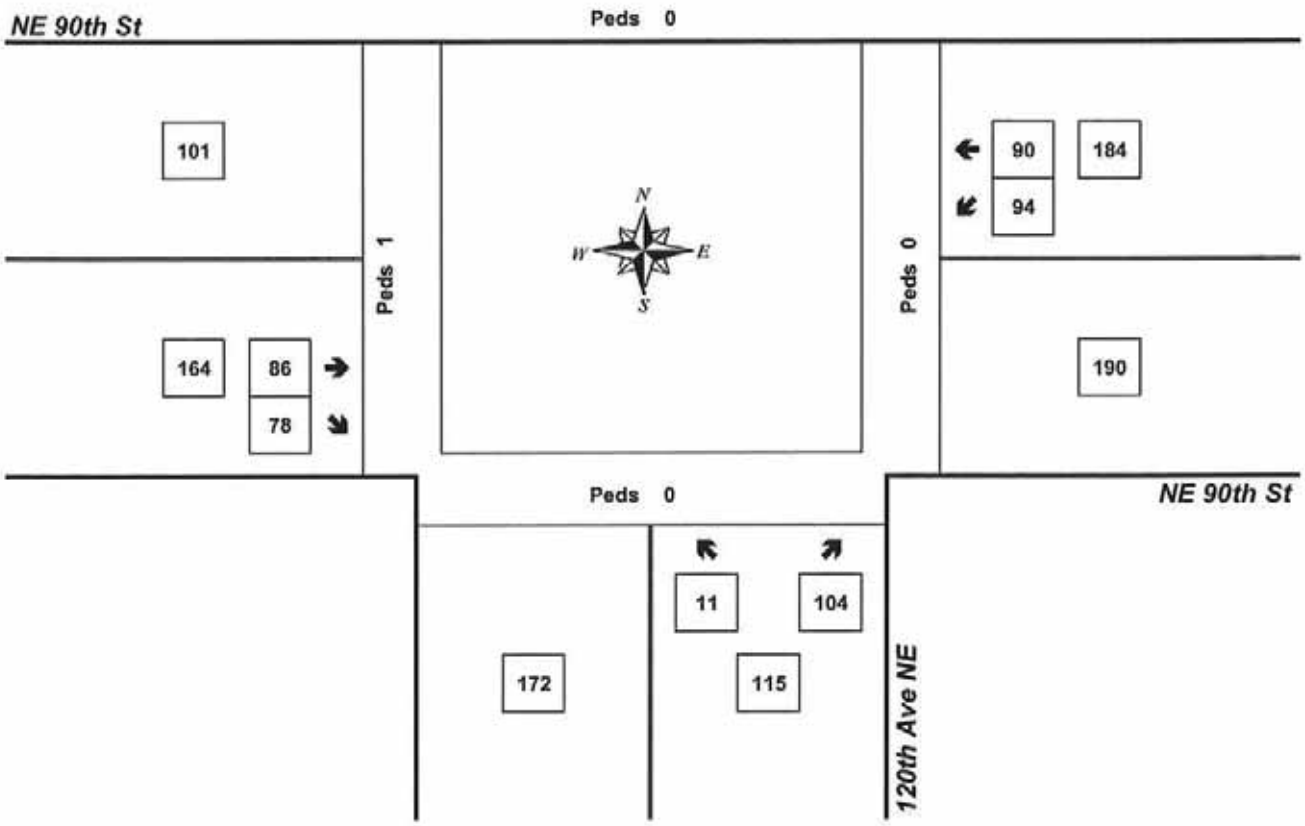
Peak Hour Summary

All Traffic Data Services Inc

Mark Skaggs
(206) 251-0300

120th Ave NE & NE 90th St

4:30 PM to 5:30 PM
Tuesday, August 02, 2011

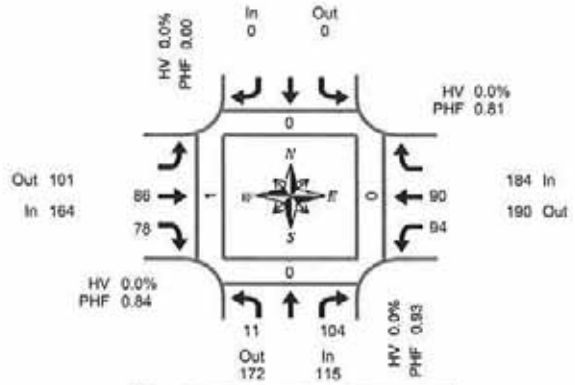


Approach	PHF	HV%	Volume
EB	0.84	0.0%	164
WB	0.81	0.0%	184
NB	0.93	0.0%	115
SB	0.00	0.0%	0
Intersection	0.98	0.0%	463

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc
Mark Skaggs
(206) 251-0300



Peak Hour Summary
4:30 PM to 5:30 PM

120th Ave NE & NE 90th St

Tuesday, August 02, 2011
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Interval Total	Pedestrians Crosswalk			
	L		R	HV					T	R	HV		L	T		HV		North	South	East	West
4:00 PM	2		18	0					17	21	0		15	25		0	98	0	0	0	0
4:15 PM	5		21	1					16	24	0		27	17		0	110	0	0	0	0
4:30 PM	4		27	0					18	23	0		26	20		0	118	0	0	0	0
4:45 PM	0		28	0					22	21	0		20	22		0	113	0	0	0	1
5:00 PM	1		27	0					28	21	0		25	14		0	116	0	0	0	0
5:15 PM	6		22	0					18	13	0		23	34		0	116	0	0	0	0
5:30 PM	1		29	0					24	15	0		31	18		0	118	0	0	0	0
5:45 PM	2		13	0					16	16	1		22	26		0	97	0	0	0	0
Total Survey	21		185	1					159	154	1		189	178		0	886	0	0	0	1

Peak Hour Summary
4:30 PM to 5:30 PM

By Approach	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Total
	In	Out	Total	HV	In	Out	Total		In	Out	Total	HV	In	Out	Total	HV	
Volume	115	172	287	0	0	0	0		164	101	265	0	184	190	374	0	463
%HV	0.0%				0.0%				0.0%				0.0%				0.0%
PHF	0.93				0.00				0.84				0.81				0.98

Pedestrians Crosswalk			
North	South	East	West
0	0	0	1

By Movement	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Total
	L		R	Total				Total		T	R	Total	L	T		Total	
Volume	11		104	115				0		86	78	164	94	90		184	463
PHF	0.46		0.93	0.93				0.00		0.77	0.85	0.84	0.90	0.66		0.81	0.98

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Interval Total	Pedestrians Crosswalk			
	L		R	HV					T	R	HV		L	T		HV		North	South	East	West
4:00 PM	11		94	1					73	89	0		88	84		0	439	0	0	0	1
4:15 PM	10		103	1					84	89	0		98	73		0	457	0	0	0	1
4:30 PM	11		104	0					86	78	0		94	90		0	463	0	0	0	1
4:45 PM	8		106	0					92	70	0		99	88		0	463	0	0	0	1
5:00 PM	10		91	0					86	65	1		101	94		0	447	0	0	0	0

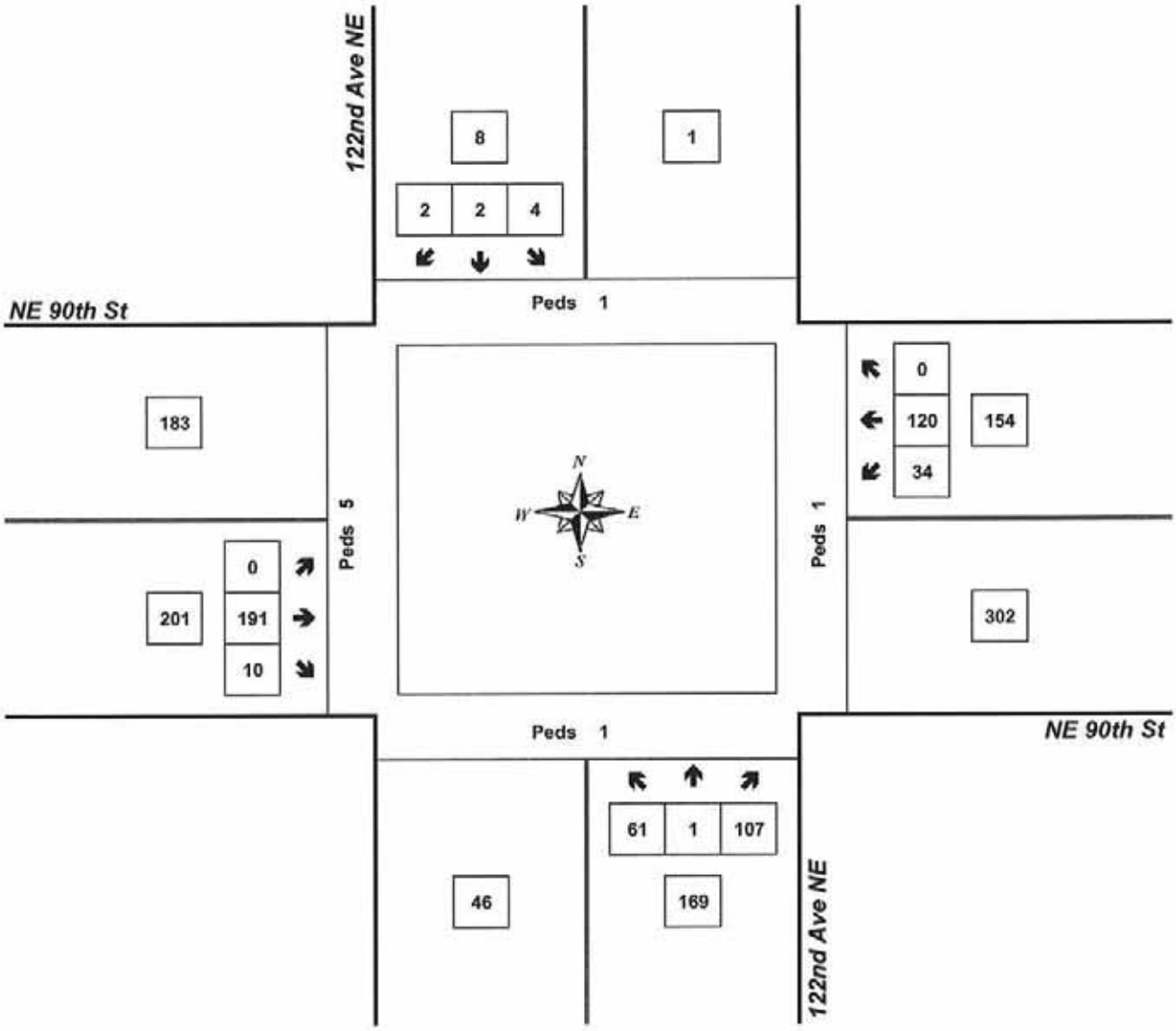
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

122nd Ave NE & NE 90th St

4:45 PM to 5:45 PM
Tuesday, August 02, 2011

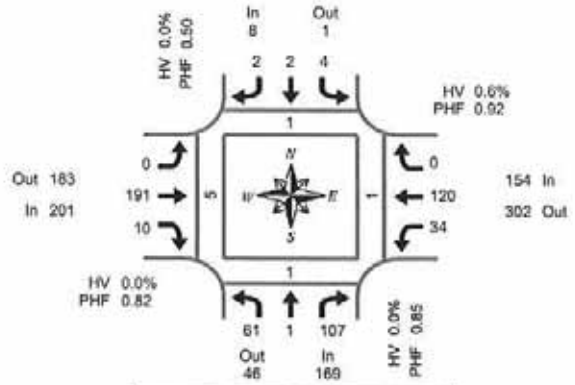


Approach	PHF	HV%	Volume
EB	0.82	0.0%	201
WB	0.92	0.6%	154
NB	0.85	0.0%	169
SB	0.50	0.0%	8
Intersection	0.95	0.2%	532

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc
Mark Skaggs
(206) 251-0300



Peak Hour Summary
4:45 PM to 5:45 PM

122nd Ave NE & NE 90th St

Tuesday, August 02, 2011
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 122nd Ave NE				Southbound 122nd Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	11	0	18	0	0	0	0	0	0	29	1	0	11	30	0	0	100	0	0	0	0
4:15 PM	17	0	21	0	0	2	1	0	0	43	1	0	13	29	0	0	127	0	2	0	0
4:30 PM	15	0	27	1	0	1	0	0	0	37	3	0	7	32	0	0	122	1	0	0	0
4:45 PM	15	0	18	0	0	0	0	0	0	52	9	0	10	25	0	0	129	0	0	0	1
5:00 PM	13	0	37	0	1	1	0	0	0	43	0	0	10	28	0	1	133	1	0	1	2
5:15 PM	21	1	28	0	1	1	0	0	0	46	0	0	9	33	0	0	140	0	1	0	1
5:30 PM	12	0	24	0	2	0	2	0	0	50	1	0	5	34	0	0	130	0	0	0	1
5:45 PM	13	0	29	0	2	1	0	0	0	30	3	0	4	37	1	0	120	0	0	0	1
Total Survey	117	1	202	1	6	6	3	0	0	330	18	0	69	248	1	1	1,001	2	3	1	6

Peak Hour Summary
4:45 PM to 5:45 PM

By Approach	Northbound 122nd Ave NE				Southbound 122nd Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV		North	South	East	West
Volume	169	46	215	0	8	1	9	0	201	183	384	0	154	302	456	1	532	1	1	1	5
%HV	0.0%				0.0%				0.0%				0.6%				0.2%				
PHF	0.85				0.50				0.82				0.92				0.95				

By Movement	Northbound 122nd Ave NE				Southbound 122nd Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	61	1	107	169	4	2	2	8	0	191	10	201	34	120	0	154	532
PHF	0.73	0.25	0.72	0.85	0.50	0.50	0.25	0.50	0.00	0.92	0.28	0.82	0.85	0.88	0.00	0.92	0.95

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 122nd Ave NE				Southbound 122nd Ave NE				Eastbound NE 90th St				Westbound NE 90th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	58	0	84	1	0	3	1	0	0	161	14	0	41	116	0	0	478	1	2	0	1
4:15 PM	60	0	103	1	1	4	1	0	0	175	13	0	40	114	0	1	511	2	2	1	3
4:30 PM	64	1	110	1	2	3	0	0	0	178	12	0	36	118	0	1	524	2	1	1	4
4:45 PM	61	1	107	0	4	2	2	0	0	191	10	0	34	120	0	1	532	1	1	1	5
5:00 PM	59	1	118	0	6	3	2	0	0	169	4	0	28	132	1	1	523	1	1	1	5

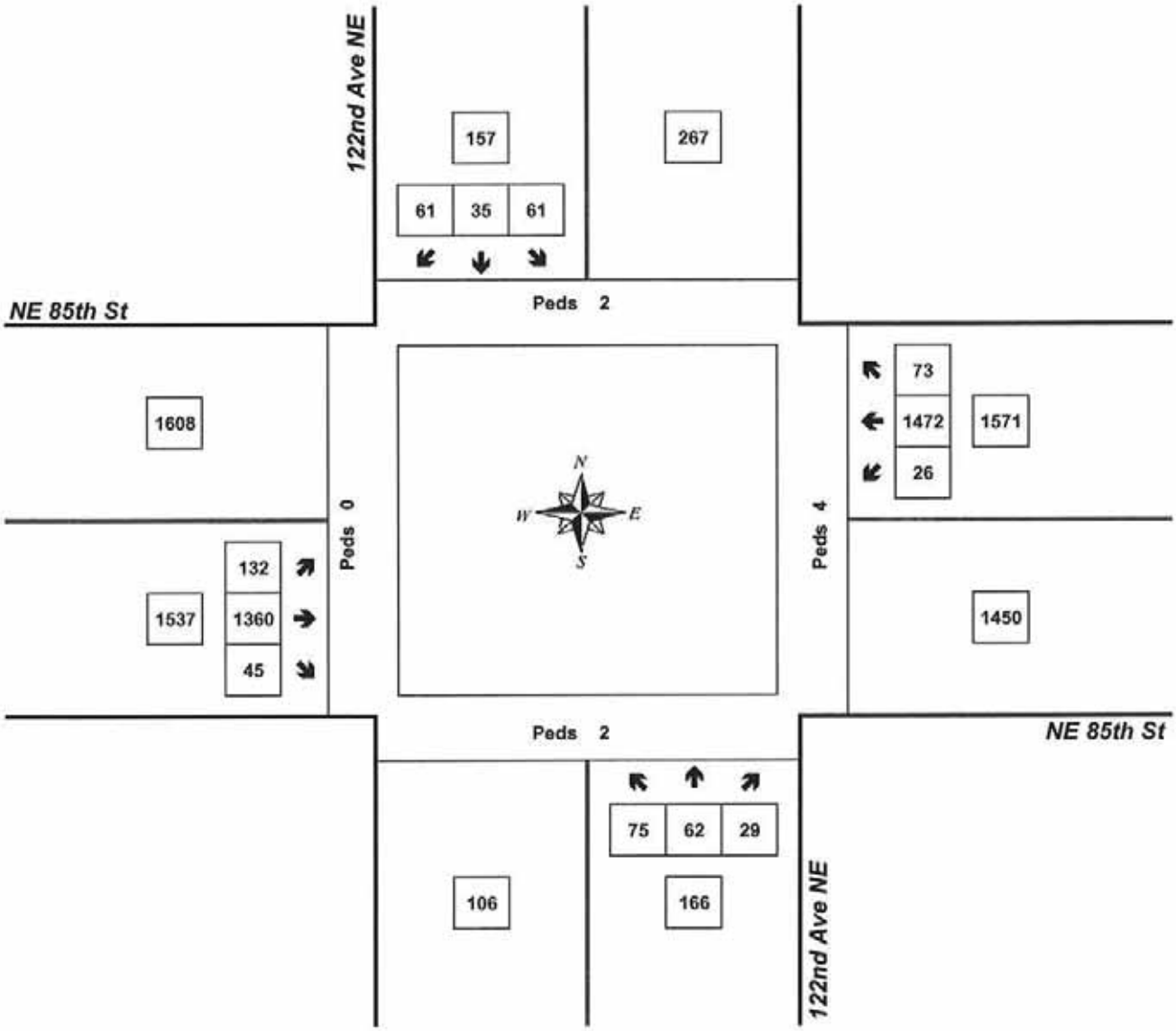
Peak Hour Summary

All Traffic Data Services Inc

Mark Skaggs
(206) 251-0300

122nd Ave NE & NE 85th St

5:00 PM to 6:00 PM
Tuesday, August 02, 2011



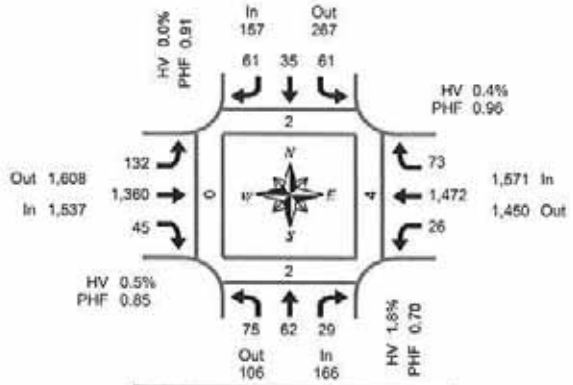
Approach	PHF	HV%	Volume
EB	0.85	0.5%	1,537
WB	0.96	0.4%	1,571
NB	0.70	1.8%	166
SB	0.91	0.0%	157
Intersection	0.96	0.5%	3,431

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc

Mark Skaggs
(206) 251-0300



Peak Hour Summary
5:00 PM to 6:00 PM

122nd Ave NE & NE 85th St

Tuesday, August 02, 2011
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 122nd Ave NE				Southbound 122nd Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	12	11	7	0	7	6	18	0	34	330	22	5	9	346	17	8	819	1	2	0	0
4:15 PM	13	5	10	0	12	6	15	0	38	287	12	3	11	347	20	6	776	0	0	1	0
4:30 PM	14	8	7	0	12	7	14	0	41	310	11	3	5	341	20	3	790	0	0	0	1
4:45 PM	13	11	10	0	13	6	14	0	24	342	13	5	8	307	18	2	779	0	0	0	5
5:00 PM	16	9	0	0	23	6	14	0	35	405	10	0	3	356	13	4	890	0	0	1	0
5:15 PM	28	19	12	2	11	7	13	0	31	269	16	3	4	376	27	0	813	1	0	0	0
5:30 PM	17	20	9	0	14	8	18	0	29	323	14	0	12	365	18	0	847	1	0	2	0
5:45 PM	14	14	8	1	13	14	16	0	37	363	5	4	7	375	15	3	881	0	2	1	0
Total Survey	127	97	63	3	105	60	122	0	269	2,629	103	23	59	2,813	148	26	6,595	3	4	5	6

Peak Hour Summary
5:00 PM to 6:00 PM

By Approach	Northbound 122nd Ave NE				Southbound 122nd Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	166	106	272	3	157	267	424	0	1,537	1,608	3,145	7	1,571	1,450	3,021	7	3,431
%HV	1.8%				0.0%				0.5%				0.4%				0.5%
PHF	0.70				0.91				0.85				0.96				0.96

Pedestrians Crosswalk			
North	South	East	West
2	2	4	0

By Movement	Northbound 122nd Ave NE				Southbound 122nd Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	75	62	29	166	61	35	61	157	132	1,360	45	1,537	26	1,472	73	1,571	3,431
PHF	0.67	0.78	0.60	0.70	0.66	0.63	0.85	0.91	0.89	0.84	0.70	0.85	0.54	0.98	0.68	0.96	0.96

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 122nd Ave NE				Southbound 122nd Ave NE				Eastbound NE 85th St				Westbound NE 85th St				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	52	35	34	0	44	25	61	0	137	1,269	58	16	33	1,341	75	19	3,164	1	2	1	6
4:15 PM	56	33	27	0	60	25	57	0	138	1,344	46	11	27	1,351	71	15	3,235	0	0	2	6
4:30 PM	71	47	29	2	59	26	55	0	131	1,326	50	11	20	1,380	78	9	3,272	1	0	1	6
4:45 PM	74	59	31	2	61	27	59	0	119	1,339	53	8	27	1,404	76	6	3,329	2	0	3	5
5:00 PM	75	62	29	3	61	35	61	0	132	1,360	45	7	26	1,472	73	7	3,431	2	2	4	0

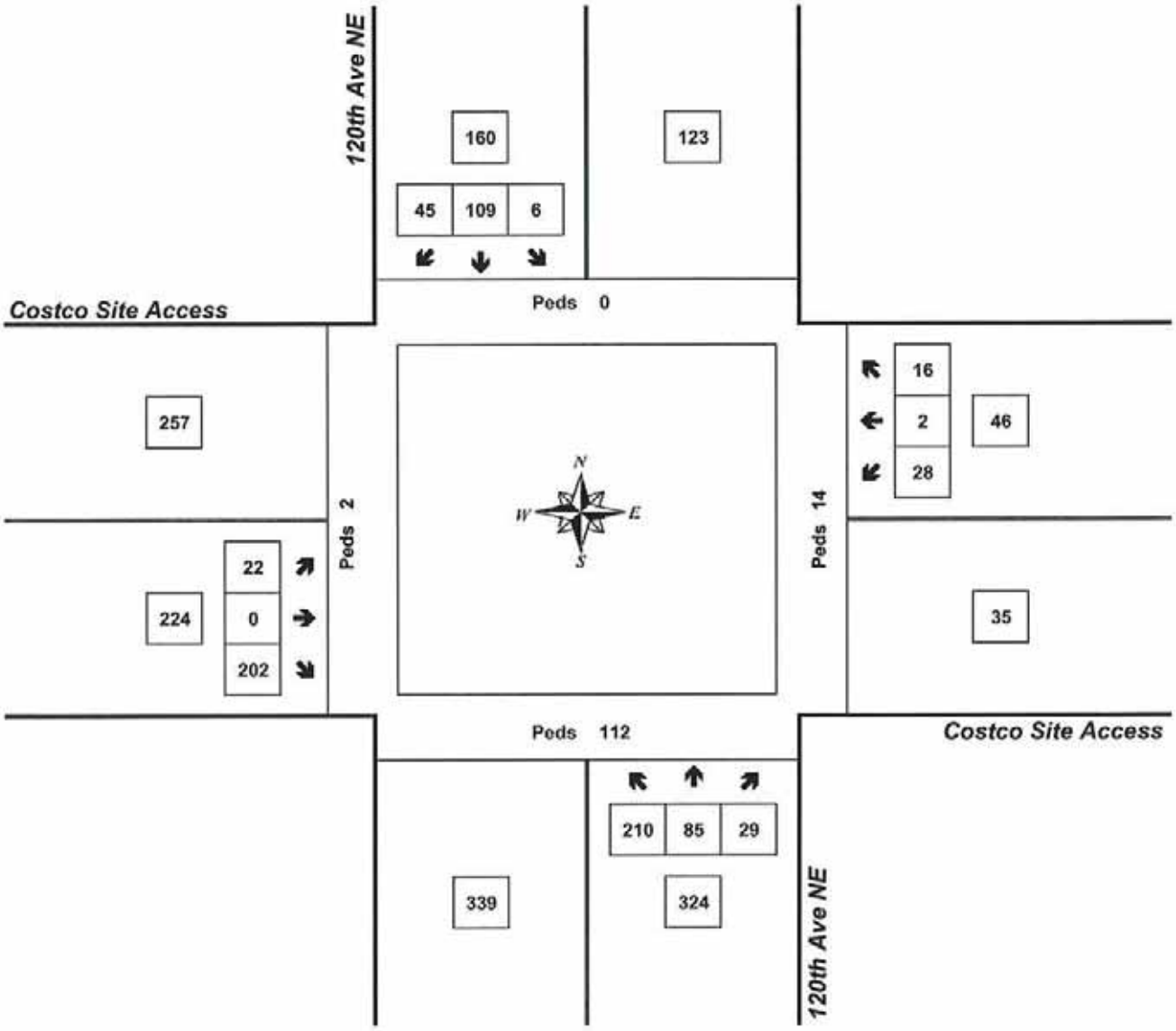
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

120th Ave NE & Costco Site Access

4:00 PM to 5:00 PM
Thursday, August 04, 2011

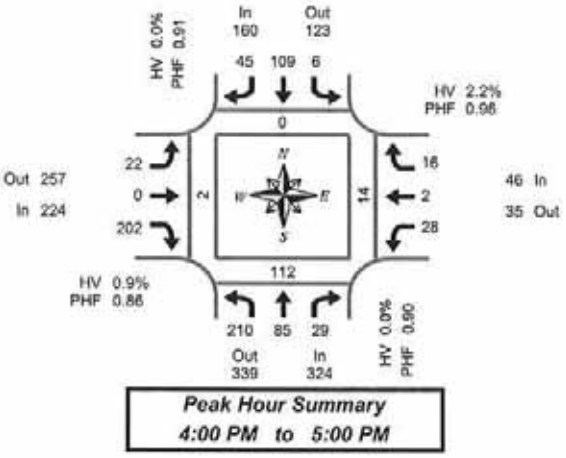


Approach	PHF	HV%	Volume
EB	0.86	0.9%	224
WB	0.96	2.2%	46
NB	0.90	0.0%	324
SB	0.91	0.0%	160
Intersection	0.94	0.4%	754

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc
Mark Skaggs
(206) 251-0300



120th Ave NE & Costco Site Access

Thursday, August 04, 2011
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound Costco Site Access				Westbound Costco Site Access				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	65	20	5	0	1	29	14	0	5	0	51	0	5	1	4	0	200	0	32	7	0
4:15 PM	41	19	10	0	2	30	8	0	6	0	49	2	8	0	4	0	177	0	23	6	0
4:30 PM	52	22	5	0	2	31	9	0	8	0	57	0	9	0	3	0	198	0	33	0	2
4:45 PM	52	24	9	0	1	19	14	0	3	0	45	0	6	1	5	1	179	0	24	1	0
5:00 PM	53	29	6	0	1	21	9	0	1	0	51	0	8	0	3	0	182	0	33	3	0
5:15 PM	50	28	6	0	3	26	8	0	12	0	49	0	7	0	3	0	192	0	36	5	0
5:30 PM	46	19	4	0	1	34	10	0	6	0	48	0	6	0	2	0	176	0	24	0	0
5:45 PM	53	22	5	0	2	28	9	0	4	0	32	0	8	1	3	0	167	0	31	0	0
Total Survey	412	183	50	0	13	218	81	0	45	0	382	2	57	3	27	1	1,471	0	236	22	2

Peak Hour Summary
4:00 PM to 5:00 PM

By Approach	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound Costco Site Access				Westbound Costco Site Access				Total
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total	HV	
Volume	324	339	663	0	160	123	283	0	224	257	481	2	46	35	81	1	754
%HV	0.0%				0.0%				0.9%				2.2%				0.4%
PHF	0.90				0.91				0.86				0.96				0.94

Pedestrians Crosswalk			
North	South	East	West
0	112	14	2

By Movement	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound Costco Site Access				Westbound Costco Site Access				Total
	L	T	R	Total	L	T	R	Total	L	T	R	Total	L	T	R	Total	
Volume	210	85	29	324	6	109	45	160	22	0	202	224	28	2	16	46	754
PHF	0.81	0.89	0.73	0.90	0.75	0.88	0.80	0.91	0.69	0.00	0.89	0.86	0.78	0.50	0.80	0.96	0.94

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound Costco Site Access				Westbound Costco Site Access				Interval Total	Pedestrians Crosswalk			
	L	T	R	HV	L	T	R	HV	L	T	R	HV	L	T	R	HV		North	South	East	West
4:00 PM	210	85	29	0	6	109	45	0	22	0	202	2	28	2	16	1	754	0	112	14	2
4:15 PM	198	94	30	0	6	101	40	0	18	0	202	2	31	1	15	1	736	0	113	10	2
4:30 PM	207	103	26	0	7	97	40	0	24	0	202	0	30	1	14	1	751	0	126	9	2
4:45 PM	201	100	25	0	6	100	41	0	22	0	193	0	27	1	13	1	729	0	117	9	0
5:00 PM	202	98	21	0	7	109	36	0	23	0	180	0	29	1	11	0	717	0	124	8	0

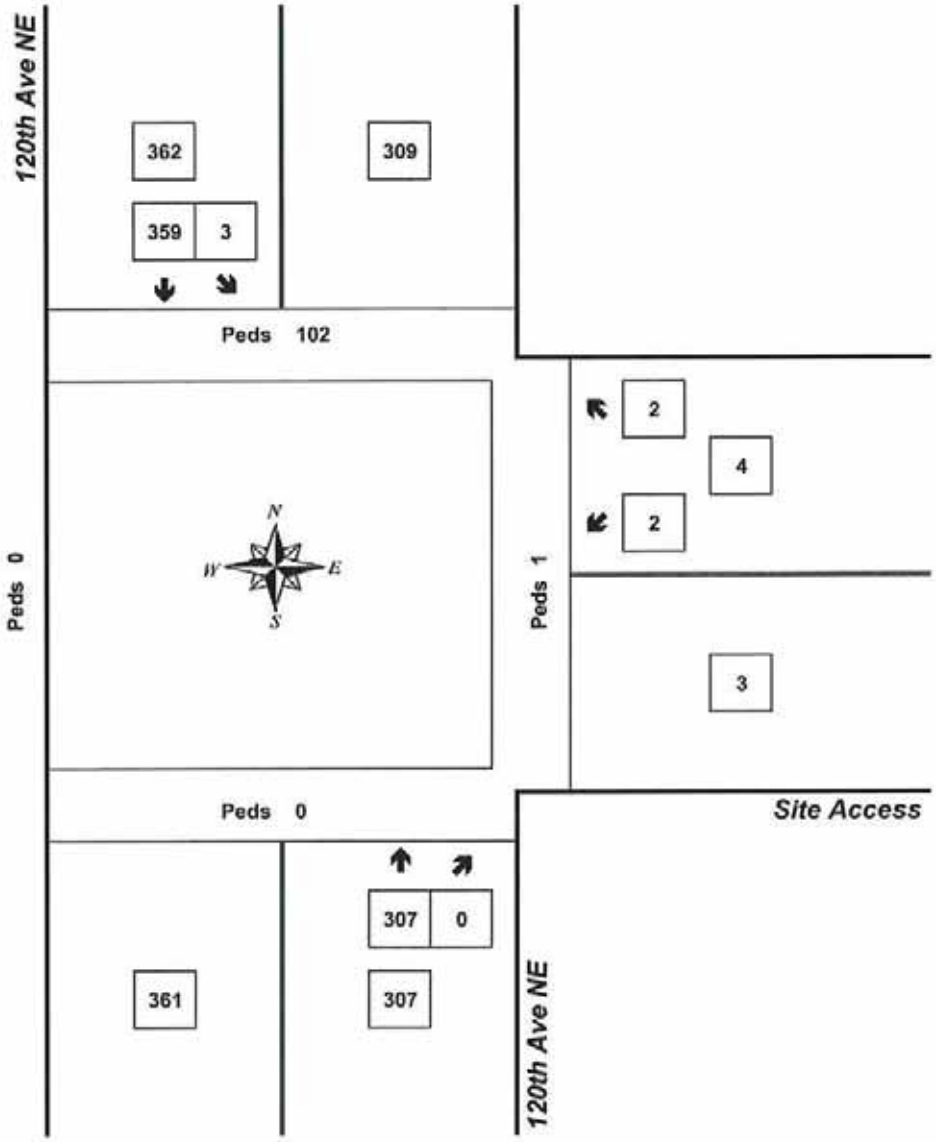
Peak Hour Summary

All Traffic Data Services Inc.

Mark Skaggs
(206) 251-0300

120th Ave NE & Site Access

4:15 PM to 5:15 PM
Tuesday, August 02, 2011



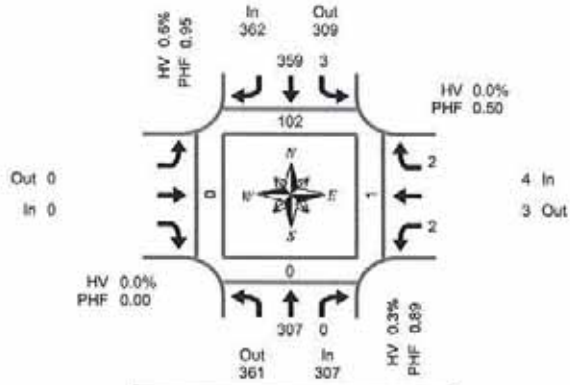
Approach	PHF	HV%	Volume
EB	0.00	0.0%	0
WB	0.50	0.0%	4
NB	0.89	0.3%	307
SB	0.95	0.6%	362
Intersection	0.95	0.4%	673

Count Period: 4:00 PM to 6:00 PM

Total Vehicle Summary

All Traffic Data Services Inc

Mark Skaggs
(206) 251-0300



Peak Hour Summary
4:15 PM to 5:15 PM

120th Ave NE & Site Access

Tuesday, August 02, 2011
4:00 PM to 6:00 PM

15-Minute Interval Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound Site Access				Westbound Site Access				Interval Total	Pedestrians Crosswalk			
		T	R	HV	L	T		HV					L		R	HV		North	South	East	West
4:00 PM		79	0	0	0	72		0					3		0	0	154	20	0	0	0
4:15 PM		69	0	1	0	95		0					0		0	0	164	24	0	0	0
4:30 PM		86	0	0	0	92		0					0		0	0	178	27	0	1	0
4:45 PM		76	0	0	1	80		0					1		1	0	159	23	0	0	0
5:00 PM		76	0	0	2	92		2					1		1	0	172	28	0	0	0
5:15 PM		86	0	0	0	72		0					0		2	0	160	22	0	1	0
5:30 PM		70	0	0	1	72		0					2		0	0	145	21	0	0	0
5:45 PM		77	0	0	0	73		0					0		0	0	150	33	0	0	0
Total Survey		619	0	1	4	648		2					7		4	0	1,282	198	0	2	0

Peak Hour Summary
4:15 PM to 5:15 PM

By Approach	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound Site Access				Westbound Site Access				Total	Pedestrians Crosswalk			
	In	Out	Total	HV	In	Out	Total	HV	In	Out	Total		In	Out	Total	HV		North	South	East	West
Volume	307	361	668	1	362	309	671	2	0	0	0		4	3	7	0	673	102	0	1	0
%HV	0.3%				0.6%				0.0%				0.0%				0.4%				
PHF	0.89				0.95				0.00				0.50				0.95				

By Movement	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound Site Access				Westbound Site Access				Total
		T	R	Total	L	T		Total				Total	L		R	Total	
Volume		307	0	307	3	359		362				0	2		2	4	673
PHF		0.89	0.00	0.89	0.38	0.94		0.95				0.00	0.50		0.50	0.50	0.95

Rolling Hour Summary
4:00 PM to 6:00 PM

Interval Start Time	Northbound 120th Ave NE				Southbound 120th Ave NE				Eastbound Site Access				Westbound Site Access				Interval Total	Pedestrians Crosswalk			
		T	R	HV	L	T		HV					L		R	HV		North	South	East	West
4:00 PM		310	0	1	1	339		0					4		1	0	655	94	0	1	0
4:15 PM		307	0	1	3	359		2					2		2	0	673	102	0	1	0
4:30 PM		324	0	0	3	336		2					2		4	0	669	100	0	2	0
4:45 PM		308	0	0	4	316		2					4		4	0	636	94	0	1	0
5:00 PM		309	0	0	3	309		2					3		3	0	627	104	0	1	0

Appendix C: Level of Service Definition

Highway Capacity Manual, 2000

Signalized intersection level of service (LOS) is defined in terms of the average total vehicle delay of all movements through an intersection. Vehicle delay is a method of quantifying several intangible factors, including driver discomfort, frustration, and lost travel time. Specifically, LOS criteria are stated in terms of average delay per vehicle during a specified time period (for example, the PM peak hour). Vehicle delay is a complex measure based on many variables, including signal phasing (i.e., progression of movements through the intersection), signal cycle length, and traffic volumes with respect to intersection capacity. Table 1 shows LOS criteria for signalized intersections, as described in the *Highway Capacity Manual* (Transportation Research Board, Special Report 209, 2000).

Table 1. Level of Service Criteria for Signalized Intersections

Level of Service	Average Control Delay (sec/veh)	General Description (Signalized Intersections)
A	≤10	Free Flow
B	>10 - 20	Stable Flow (slight delays)
C	>20 - 35	Stable flow (acceptable delays)
D	>35 - 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 - 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

Unsignalized intersection LOS criteria can be further reduced into two intersection types: all-way stop-controlled and two-way stop-controlled. All-way, stop-controlled intersection LOS is expressed in terms of the average vehicle delay of all of the movements, much like that of a signalized intersection. Two-way, stop-controlled intersection LOS is defined in terms of the average vehicle delay of an individual movement(s). This is because the performance of a two-way, stop-controlled intersection is more closely reflected in terms of its individual movements, rather than its performance overall. For this reason, LOS for a two-way, stop-controlled intersection is defined in terms of its individual movements. With this in mind, total average vehicle delay (i.e., average delay of all movements) for a two-way, stop-controlled intersection should be viewed with discretion. Table 2 shows LOS criteria for unsignalized intersections (both all-way and two-way, stop-controlled).

Table 2. Level of Service Criteria for Unsignalized Intersections

Level of Service	Average Control Delay (sec/veh)
A	0 - 10
B	>10 - 15
C	>15 - 25
D	>25 - 35
E	>35 - 50
F	>50

Source: *Highway Capacity Manual*, Transportation Research Board, Special Report 209, 2000.

HCM Signalized Intersection Capacity Analysis
3: NE 90th Street & 124th Avenue NE

Kirkland Costco Gasoline
Existing 2011 Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	20	15	10	5	15	215	5	5	930	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.95		1.00	1.00		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)	1764	1639		1805	1791		1752	1837		1785	1847	
Flt Permitted	0.75	1.00		0.74	1.00		0.09	1.00		0.60	1.00	
Satd. Flow (perm)	1385	1639		1401	1791		167	1837		1126	1847	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	29	6	24	18	12	6	18	253	6	6	1094	153
RTOR Reduction (vph)	0	23	0	0	6	0	0	0	0	0	3	0
Lane Group Flow (vph)	29	7	0	18	12	0	18	259	0	6	1244	0
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	3%	3%	3%	1%	1%	1%
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	6.0	6.0		6.0	6.0		76.5	75.0		74.9	74.2	
Effective Green, g (s)	6.0	6.0		6.0	6.0		76.5	75.0		74.9	74.2	
Actuated g/C Ratio	0.06	0.06		0.06	0.06		0.79	0.78		0.77	0.77	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	86	102		87	111		157	1425		877	1417	
v/s Ratio Prot		0.00			0.01		c0.00	0.14		0.00	c0.67	
v/s Ratio Perm	c0.02			0.01			0.09			0.01		
v/c Ratio	0.34	0.07		0.21	0.11		0.11	0.18		0.01	0.88	
Uniform Delay, d1	43.4	42.7		43.1	42.8		13.8	2.8		2.5	8.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.3	0.3		1.2	0.4		0.3	0.1		0.0	6.5	
Delay (s)	45.8	43.0		44.3	43.3		14.1	2.9		2.5	14.5	
Level of Service	D	D		D	D		B	A		A	B	
Approach Delay (s)		44.4			43.8			3.6			14.4	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	14.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	96.7	Sum of lost time (s)	15.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
5: NE 90th Street & 120th Avenue NE

Kirkland Costco Gasoline
Existing 2011 Weekday PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	5	5	75	10	5	20
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66
Hourly flow rate (vph)	8	8	114	15	8	30

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total (vph)	15	129	8	30
Volume Left (vph)	0	114	8	0
Volume Right (vph)	8	0	0	30
Hadj (s)	-0.30	0.18	0.50	-0.70
Departure Headway (s)	3.8	4.2	5.3	4.1
Degree Utilization, x	0.02	0.15	0.01	0.03
Capacity (veh/h)	923	851	652	837
Control Delay (s)	6.9	7.9	7.2	6.1
Approach Delay (s)	6.9	7.9	6.3	
Approach LOS	A	A	A	

Intersection Summary			
Delay	7.5		
HCM Level of Service	A		
Intersection Capacity Utilization	21.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: NE 85th Street & 120th Avenue NE

Kirkland Costco Gasoline
Existing 2011 Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1380	90	15	1180	10	60	20	20	15	10	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	3.9
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3536		1787	3569		1783	1727		1802	1900	1602
Flt Permitted	0.95	1.00		0.95	1.00		0.54	1.00		0.73	1.00	1.00
Satd. Flow (perm)	1787	3536		1787	3569		1015	1727		1381	1900	1602
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	0.92
Adj. Flow (vph)	43	1500	98	16	1283	11	65	22	22	16	11	103
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	43	1598	0	16	1294	0	65	44	0	16	11	103
Confl. Peds. (#/hr)	1		1	1		1	4		2	2		4
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			pm+pt			pm+pt		pm+ov
Protected Phases	1	6		5	2		7	4		3	8	1
Permitted Phases							4			8		8
Actuated Green, G (s)	9.5	86.3		2.0	78.8		17.8	12.6		10.4	8.4	17.9
Effective Green, g (s)	11.4	87.7		3.9	80.2		21.3	14.5		12.2	10.4	21.9
Actuated g/C Ratio	0.09	0.70		0.03	0.64		0.17	0.12		0.10	0.08	0.18
Clearance Time (s)	5.9	5.4		5.9	5.4		5.8	5.9		4.9	6.0	5.9
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)	163	2481		56	2290		216	200		145	158	281
v/s Ratio Prot	0.02	c0.45		0.01	c0.36		c0.02	0.03		0.00	0.01	0.03
v/s Ratio Perm							c0.03			0.01		0.03
v/c Ratio	0.26	0.64		0.29	0.57		0.30	0.22		0.11	0.07	0.37
Uniform Delay, d1	52.9	10.2		59.2	12.6		44.7	50.1		51.4	52.8	45.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	1.3		2.8	1.0		0.8	0.6		0.3	0.2	0.8
Delay (s)	53.8	11.5		62.0	13.6		45.5	50.7		51.7	53.0	46.2
Level of Service	D	B		E	B		D	D		D	D	D
Approach Delay (s)		12.6			14.2			47.6			47.5	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	15.9	HCM Level of Service	B
HCM Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	58.6%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: NE 116th Street & 124th Avenue NE

Kirkland Costco Gasoline
Existing 2011 Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	385	155	90	340	95	315	465	230	125	230	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.96	1.00	1.00	0.96	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	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1787	1881	1563	1769	1863	1523	1785	1881	1541	1769	3335	
Flt Permitted	0.16	1.00	1.00	0.18	1.00	1.00	0.34	1.00	1.00	0.15	1.00	
Satd. Flow (perm)	295	1881	1563	330	1863	1523	642	1881	1541	285	3335	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	189	470	189	110	415	116	384	567	280	152	280	134
RTOR Reduction (vph)	0	0	129	0	0	83	0	0	132	0	47	0
Lane Group Flow (vph)	189	470	60	110	415	33	384	567	148	152	367	0
Confl. Peds. (#/hr)	7		1	1		7	3		7	7		3
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	40.2	28.8	28.8	33.8	25.6	25.6	46.1	32.5	32.5	34.7	25.1	
Effective Green, g (s)	42.0	30.3	30.3	35.8	27.1	27.1	47.1	34.0	34.0	36.7	26.6	
Actuated g/C Ratio	0.44	0.32	0.32	0.37	0.28	0.28	0.49	0.35	0.35	0.38	0.28	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	321	593	493	261	525	429	529	665	545	273	923	
v/s Ratio Prot	c0.08	c0.25		0.04	0.22		c0.14	c0.30		0.06	0.11	
v/s Ratio Perm	0.18		0.04	0.12		0.02	0.22		0.10	0.15		
v/c Ratio	0.59	0.79	0.12	0.42	0.79	0.08	0.73	0.85	0.27	0.56	0.40	
Uniform Delay, d1	19.8	30.0	23.4	21.9	31.9	25.3	16.7	28.7	22.2	22.1	28.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.8	6.7	0.0	0.4	7.4	0.0	4.2	9.9	0.1	1.4	0.1	
Delay (s)	21.6	36.7	23.5	22.3	39.3	25.3	20.9	38.7	22.3	23.5	28.3	
Level of Service	C	D	C	C	D	C	C	D	C	C	C	
Approach Delay (s)		30.4			33.9			29.4			27.0	
Approach LOS		C			C			C			C	

Intersection Summary			
HCM Average Control Delay	30.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	96.1	Sum of lost time (s)	6.0
Intersection Capacity Utilization	71.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: NE 100th Street & 124th Avenue NE

Kirkland Costco Gasoline
Existing 2011 Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	5	20	40	15	140	20	865	35	40	370	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.92		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1697		1756	1578		1798	1889		1787	1873	
Flt Permitted		0.90		0.73	1.00		0.51	1.00		0.20	1.00	
Satd. Flow (perm)		1542		1356	1578		974	1889		380	1873	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	10	5	21	42	16	146	21	901	36	42	385	10
RTOR Reduction (vph)	0	17	0	0	112	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	19	0	42	50	0	21	936	0	42	394	0
Confl. Peds. (#/hr)	2		6	6		2	5					5
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		6.8		6.8	6.8		31.6	31.6		31.6	31.6	
Effective Green, g (s)		7.8		7.8	7.8		32.6	32.6		32.6	32.6	
Actuated g/C Ratio		0.17		0.17	0.17		0.70	0.70		0.70	0.70	
Clearance Time (s)		4.0		4.0	4.0		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	
Lane Grp Cap (vph)		259		228	265		684	1327		267	1316	
v/s Ratio Prot					c0.03			c0.50			0.21	
v/s Ratio Perm		0.01		0.03			0.02			0.11		
v/c Ratio		0.07		0.18	0.19		0.03	0.70		0.16	0.30	
Uniform Delay, d1		16.3		16.6	16.6		2.1	4.1		2.3	2.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		0.4	0.3		0.0	1.7		0.3	0.1	
Delay (s)		16.4		17.0	16.9		2.1	5.8		2.6	2.7	
Level of Service		B		B	B		A	A		A	A	
Approach Delay (s)		16.4			16.9			5.7			2.7	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.5	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	46.4	Sum of lost time (s)	6.0
Intersection Capacity Utilization	66.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
3: NE 90th Street & 124th Avenue NE

Kirkland Costco Gasoline
Existing 2011 Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	265	10	40	15	25	20	45	670	10	5	370	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frt	1.00	0.88		1.00	0.93		1.00	1.00		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)	1805	1671		1805	1776		1805	1896		1787	1824	
Flt Permitted	0.73	1.00		0.72	1.00		0.37	1.00		0.20	1.00	
Satd. Flow (perm)	1381	1671		1375	1776		698	1896		371	1824	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	270	10	41	15	26	20	46	684	10	5	378	97
RTOR Reduction (vph)	0	31	0	0	15	0	0	1	0	0	14	0
Lane Group Flow (vph)	270	20	0	15	31	0	46	693	0	5	461	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.1	14.1		14.1	14.1		27.7	26.3		26.3	25.6	
Effective Green, g (s)	14.1	14.1		14.1	14.1		27.7	26.3		26.3	25.6	
Actuated g/C Ratio	0.25	0.25		0.25	0.25		0.49	0.47		0.47	0.46	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	347	420		346	446		372	889		192	832	
v/s Ratio Prot		0.01			0.02		c0.00	c0.37		0.00	0.25	
v/s Ratio Perm	c0.20			0.01			0.06			0.01		
v/c Ratio	0.78	0.05		0.04	0.07		0.12	0.78		0.03	0.55	
Uniform Delay, d1	19.5	15.9		15.9	16.0		7.8	12.5		9.5	11.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.5	0.0		0.1	0.1		0.2	4.4		0.1	0.8	
Delay (s)	30.0	16.0		15.9	16.1		7.9	16.8		9.5	11.9	
Level of Service	C	B		B	B		A	B		A	B	
Approach Delay (s)		27.8			16.0			16.3			11.9	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	17.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	56.1	Sum of lost time (s)	10.0
Intersection Capacity Utilization	67.1%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: NE 90th Street & 122nd Avenue NE

Kirkland Costco Gasoline
Existing 2011 Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	190	10	35	120	0	60	5	105	5	5	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	200	11	37	126	0	63	5	111	5	5	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	211	163	179	16
Volume Left (vph)	0	37	63	5
Volume Right (vph)	11	0	111	5
Hadj (s)	-0.03	0.06	-0.30	-0.13
Departure Headway (s)	4.5	4.7	4.5	4.9
Degree Utilization, x	0.27	0.21	0.22	0.02
Capacity (veh/h)	759	727	745	658
Control Delay (s)	9.2	8.9	8.8	8.0
Approach Delay (s)	9.2	8.9	8.8	8.0
Approach LOS	A	A	A	A

Intersection Summary			
Delay	8.9		
HCM Level of Service	A		
Intersection Capacity Utilization	42.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: NE 90th Street & 120th Avenue NE

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	85	80	95	90	10	105
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	87	82	97	92	10	107

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total (vph)	168	189	10	107
Volume Left (vph)	0	97	10	0
Volume Right (vph)	82	0	0	107
Hadj (s)	-0.29	0.10	0.50	-0.70
Departure Headway (s)	4.1	4.5	5.8	4.6
Degree Utilization, x	0.19	0.23	0.02	0.14
Capacity (veh/h)	846	775	584	729
Control Delay (s)	8.1	8.8	7.7	7.1
Approach Delay (s)	8.1	8.8	7.2	
Approach LOS	A	A	A	

Intersection Summary			
Delay	8.1		
HCM Level of Service	A		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: NE 85th Street & 120th Avenue NE

Kirkland Costco Gasoline
Existing 2011 Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	235	1310	120	15	1430	45	180	165	55	85	40	235
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	3.9
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3522		1787	3555		1800	1822		1804	1900	1602
Flt Permitted	0.95	1.00		0.95	1.00		0.64	1.00		0.38	1.00	1.00
Satd. Flow (perm)	1787	3522		1787	3555		1205	1822		715	1900	1602
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	242	1351	124	15	1474	46	186	170	57	88	41	242
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	242	1475	0	15	1520	0	186	227	0	88	41	242
Confl. Peds. (#/hr)	3		2	2		3	4		1	1		4
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			pm+pt			pm+pt		pm+ov
Protected Phases	1	6		5	2		7	4		3	8	1
Permitted Phases							4			8		8
Actuated Green, G (s)	21.4	71.1		3.6	53.3		35.5	22.9		29.9	19.6	41.0
Effective Green, g (s)	23.3	72.5		5.5	54.7		39.1	24.8		31.7	21.6	45.0
Actuated g/C Ratio	0.18	0.56		0.04	0.42		0.30	0.19		0.24	0.17	0.35
Clearance Time (s)	5.9	5.4		5.9	5.4		5.8	5.9		4.9	6.0	5.9
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)	320	1964		76	1496		428	348		268	316	555
v/s Ratio Prot	0.14	c0.42		0.01	c0.43		c0.05	c0.12		0.03	0.02	0.08
v/s Ratio Perm							0.08			0.05		0.07
v/c Ratio	0.76	0.75		0.20	1.02		0.43	0.65		0.33	0.13	0.44
Uniform Delay, d1	50.7	21.9		60.1	37.6		35.5	48.6		39.3	46.2	32.7
Progression Factor	1.29	0.73		0.80	0.61		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.7	1.8		1.0	24.2		0.7	4.3		0.7	0.2	0.6
Delay (s)	71.8	17.8		48.8	47.3		36.2	53.0		40.1	46.4	33.3
Level of Service	E	B		D	D		D	D		D	D	C
Approach Delay (s)		25.4			47.4			45.4			36.3	
Approach LOS		C			D			D			D	

Intersection Summary			
HCM Average Control Delay	36.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	85.1%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: NE 85th Street & 122nd Avenue NE

Kirkland Costco Gasoline
Existing 2011 Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	1360	45	25	1470	75	75	60	30	60	35	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		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	1.00		1.00	0.99		1.00	0.95		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3554		1805	3579		1770	1760		1796	1720	
Flt Permitted	0.08	1.00		0.14	1.00		0.58	1.00		0.60	1.00	
Satd. Flow (perm)	157	3554		266	3579		1073	1760		1127	1720	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	140	1462	48	27	1581	81	81	65	32	65	38	65
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	140	1510	0	27	1662	0	81	97	0	65	103	0
Confl. Peds. (#/hr)	2		2	2		2			4	4		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	103.3	93.7		90.4	86.6		15.3	15.3		15.3	15.3	
Effective Green, g (s)	105.0	95.2		94.0	87.9		17.2	17.2		17.2	17.2	
Actuated g/C Ratio	0.81	0.73		0.72	0.68		0.13	0.13		0.13	0.13	
Clearance Time (s)	5.7	5.5		5.8	5.3		5.9	5.9		5.9	5.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	289	2603		259	2420		142	233		149	228	
v/s Ratio Prot	c0.05	0.42		0.00	c0.46			0.06			0.06	
v/s Ratio Perm	0.34			0.07			c0.08			0.06		
v/c Ratio	0.48	0.58		0.10	0.69		0.57	0.42		0.44	0.45	
Uniform Delay, d1	14.9	8.1		6.2	12.7		52.9	51.8		51.9	52.0	
Progression Factor	2.91	0.25		0.26	0.31		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	0.8		0.1	1.0		5.4	1.2		2.0	1.4	
Delay (s)	44.6	2.8		1.7	4.9		58.4	53.0		54.0	53.5	
Level of Service	D	A		A	A		E	D		D	D	
Approach Delay (s)		6.3			4.9			55.4			53.7	
Approach LOS		A			A			E			D	

Intersection Summary			
HCM Average Control Delay	10.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.65		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	72.4%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: NE 85th Street & 124th Avenue NE

Kirkland Costco Gasoline
Existing 2011 Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	250	1190	45	10	1190	250	110	400	30	175	100	170
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		4.0	4.0	5.7	4.0	5.7		5.0	5.6	5.0
Lane Util. Factor	1.00	*0.85		1.00	*0.90	1.00	1.00	0.95		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.95	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3178		1787	3386	1526	1805	3567		1787	1881	1582
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1787	3178		1787	3386	1526	1805	3567		1787	1881	1582
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	255	1214	46	10	1214	255	112	408	31	179	102	173
RTOR Reduction (vph)	0	0	0	0	0	72	0	0	0	0	0	63
Lane Group Flow (vph)	255	1260	0	10	1214	183	112	439	0	179	102	110
Confl. Peds. (#/hr)	11		1	1		11	5		4	4		5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	Prot			Prot		Perm	Prot			Prot		pm+ov
Protected Phases	1	6		5	2		7	4		3	8	1
Permitted Phases						2						8
Actuated Green, G (s)	21.0	64.0		1.5	45.3	45.3	15.2	27.6		14.7	26.4	47.4
Effective Green, g (s)	21.0	65.6		3.4	47.0	45.3	17.0	27.6		14.7	26.4	47.4
Actuated g/C Ratio	0.16	0.50		0.03	0.36	0.35	0.13	0.21		0.11	0.20	0.36
Clearance Time (s)	5.0	5.6		5.9	5.7	5.7	5.8	5.7		5.0	5.6	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	289	1604		47	1224	532	236	757		202	382	577
v/s Ratio Prot	c0.14	0.40		0.01	c0.36		0.06	c0.12		c0.10	0.05	0.03
v/s Ratio Perm						0.12						0.04
v/c Ratio	0.88	0.79		0.21	0.99	0.34	0.47	0.58		0.89	0.27	0.19
Uniform Delay, d1	53.3	26.4		62.0	41.3	31.3	52.4	46.0		56.8	43.6	28.2
Progression Factor	1.30	0.76		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	22.4	3.4		2.3	23.8	1.8	1.5	3.2		33.8	1.7	0.2
Delay (s)	91.9	23.3		64.3	65.2	33.1	53.9	49.2		90.6	45.4	28.4
Level of Service	F	C		E	E	C	D	D		F	D	C
Approach Delay (s)		34.9			59.6			50.2			56.7	
Approach LOS		C			E			D			E	

Intersection Summary			
HCM Average Control Delay	48.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	19.7
Intersection Capacity Utilization	95.4%	ICU Level of Service	F
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
9: NE 85th Street & 128th Avenue NE

Kirkland Costco Gasoline
Existing 2011 Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1080	30	35	1495	45	40	20	30	25	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.8	4.7		4.8	4.6		4.7	4.7		4.7	4.7	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3556		1769	3521		1788	1697		1775	1679	
Flt Permitted	0.11	1.00		0.20	1.00		0.75	1.00		0.72	1.00	
Satd. Flow (perm)	200	3556		372	3521		1406	1697		1350	1679	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	1149	32	37	1590	48	43	21	32	27	5	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	43	1181	0	37	1638	0	43	53	0	27	16	0
Confl. Peds. (#/hr)	1		8	8		1	6		11	11		6
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	0%	0%
Turn Type	D.P+P			D.P+P			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	98.7	91.2		98.6	93.6		14.2	14.2		14.2	14.2	
Effective Green, g (s)	100.7	92.2		100.6	94.6		15.2	15.2		15.2	15.2	
Actuated g/C Ratio	0.77	0.71		0.77	0.73		0.12	0.12		0.12	0.12	
Clearance Time (s)	5.8	5.7		5.8	5.6		5.7	5.7		5.7	5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	229	2522		378	2562		164	198		158	196	
v/s Ratio Prot	0.01	c0.33		0.01	c0.47			c0.03			0.01	
v/s Ratio Perm	0.14			0.07			0.03			0.02		
v/c Ratio	0.19	0.47		0.10	0.64		0.26	0.27		0.17	0.08	
Uniform Delay, d1	6.9	8.2		8.4	9.0		52.3	52.3		51.7	51.2	
Progression Factor	1.00	1.00		0.31	0.78		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.6		0.1	0.9		0.9	0.7		0.5	0.2	
Delay (s)	7.3	8.9		2.6	7.9		53.1	53.1		52.2	51.4	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		8.8			7.8			53.1			51.9	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	10.3	HCM Level of Service	B
HCM Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	62.8%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Unsignalized Intersection Capacity Analysis
100: Main Parking Lot Driveway & 120th Avenue NE

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	20	215	200	95	125	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	21	229	213	101	133	48
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)				924		
pX, platoon unblocked						
vC, conflicting volume	686	159	183			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	686	159	183			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	74	85			
cM capacity (veh/h)	351	887	1390			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	250	213	101	181
Volume Left	21	213	0	0
Volume Right	229	0	0	48
cSH	785	1390	1700	1700
Volume to Capacity	0.32	0.15	0.06	0.11
Queue Length 95th (ft)	34	14	0	0
Control Delay (s)	11.7	8.1	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.7	5.5		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	6.2		
Intersection Capacity Utilization	45.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
101: East Parking Lot Driveway & 120th Avenue NE

Kirkland Costco Gasoline
Existing 2011 Weekday PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	30	20	280	30	5	335
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	32	21	298	32	5	356
Pedestrians	14		112			
Lane Width (ft)	12.0		12.0			
Walking Speed (ft/s)	4.0		4.0			
Percent Blockage	1		9			
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)			832			
pX, platoon unblocked						
vC, conflicting volume	807	328			344	
vC1, stage 1 conf vol	328					
vC2, stage 2 conf vol	479					
vCu, unblocked vol	807	328			344	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	97			100	
cM capacity (veh/h)	505	707			1212	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	53	330	5	356
Volume Left	32	0	5	0
Volume Right	21	32	0	0
cSH	570	1700	1212	1700
Volume to Capacity	0.09	0.19	0.00	0.21
Queue Length 95th (ft)	8	0	0	0
Control Delay (s)	12.0	0.0	8.0	0.0
Lane LOS	B		A	
Approach Delay (s)	12.0	0.0	0.1	
Approach LOS	B			

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	27.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: NE 90th Street & 124th Avenue NE

Kirkland Costco Gasoline
Future 2012 Without-Project Weekday AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	20	15	10	5	15	220	5	5	945	130
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	0.99		1.00	1.00		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.88		1.00	0.95		1.00	1.00		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)	1764	1639		1805	1791		1752	1837		1785	1847	
Flt Permitted	0.75	1.00		0.74	1.00		0.08	1.00		0.60	1.00	
Satd. Flow (perm)	1385	1639		1401	1791		152	1837		1119	1847	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	29	6	24	18	12	6	18	259	6	6	1112	153
RTOR Reduction (vph)	0	23	0	0	6	0	0	0	0	0	3	0
Lane Group Flow (vph)	29	7	0	18	12	0	18	265	0	6	1262	0
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	3%	3%	3%	1%	1%	1%
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	6.0	6.0		6.0	6.0		77.2	75.7		75.6	74.9	
Effective Green, g (s)	6.0	6.0		6.0	6.0		77.2	75.7		75.6	74.9	
Actuated g/C Ratio	0.06	0.06		0.06	0.06		0.79	0.78		0.78	0.77	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	85	101		86	110		145	1428		873	1420	
v/s Ratio Prot		0.00			0.01		c0.00	0.14		0.00	c0.68	
v/s Ratio Perm	c0.02			0.01			0.10			0.01		
v/c Ratio	0.34	0.07		0.21	0.11		0.12	0.19		0.01	0.89	
Uniform Delay, d1	43.8	43.1		43.4	43.2		15.0	2.8		2.4	8.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.3		1.2	0.5		0.4	0.1		0.0	7.1	
Delay (s)	46.2	43.4		44.7	43.6		15.4	2.9		2.5	15.4	
Level of Service	D	D		D	D		B	A		A	B	
Approach Delay (s)		44.8			44.1			3.7			15.3	
Approach LOS		D			D			A			B	

Intersection Summary			
HCM Average Control Delay	15.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	97.4	Sum of lost time (s)	15.0
Intersection Capacity Utilization	74.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
5: NE 90th Street & 120th Avenue NE

Kirkland Costco Gasoline
Future 2012 Without-Project Weekday AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	5	5	75	10	5	20
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66
Hourly flow rate (vph)	8	8	114	15	8	30

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total (vph)	15	129	8	30
Volume Left (vph)	0	114	8	0
Volume Right (vph)	8	0	0	30
Hadj (s)	-0.30	0.18	0.50	-0.70
Departure Headway (s)	3.8	4.2	5.3	4.1
Degree Utilization, x	0.02	0.15	0.01	0.03
Capacity (veh/h)	923	851	652	837
Control Delay (s)	6.9	7.9	7.2	6.1
Approach Delay (s)	6.9	7.9	6.3	
Approach LOS	A	A	A	

Intersection Summary			
Delay	7.5		
HCM Level of Service	A		
Intersection Capacity Utilization	21.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: NE 85th Street & 120th Avenue NE

Kirkland Costco Gasoline
Future 2012 Without-Project Weekday AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1410	90	15	1200	10	60	20	20	15	10	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	3.9
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3537		1787	3569		1783	1727		1802	1900	1602
Flt Permitted	0.95	1.00		0.95	1.00		0.54	1.00		0.73	1.00	1.00
Satd. Flow (perm)	1787	3537		1787	3569		1015	1727		1381	1900	1602
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	0.92
Adj. Flow (vph)	43	1533	98	16	1304	11	65	22	22	16	11	103
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	43	1631	0	16	1315	0	65	44	0	16	11	103
Confl. Peds. (#/hr)	1		1	1		1	4		2	2		4
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			pm+pt			pm+pt		pm+ov
Protected Phases	1	6		5	2		7	4		3	8	1
Permitted Phases							4			8		8
Actuated Green, G (s)	9.5	86.3		2.0	78.8		17.8	12.6		10.4	8.4	17.9
Effective Green, g (s)	11.4	87.7		3.9	80.2		21.3	14.5		12.2	10.4	21.9
Actuated g/C Ratio	0.09	0.70		0.03	0.64		0.17	0.12		0.10	0.08	0.18
Clearance Time (s)	5.9	5.4		5.9	5.4		5.8	5.9		4.9	6.0	5.9
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)	163	2482		56	2290		216	200		145	158	281
v/s Ratio Prot	0.02	c0.46		0.01	c0.37		c0.02	0.03		0.00	0.01	0.03
v/s Ratio Perm							c0.03			0.01		0.03
v/c Ratio	0.26	0.66		0.29	0.57		0.30	0.22		0.11	0.07	0.37
Uniform Delay, d1	52.9	10.3		59.2	12.7		44.7	50.1		51.4	52.8	45.4
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.9	1.4		2.8	1.1		0.8	0.6		0.3	0.2	0.8
Delay (s)	53.8	11.7		62.0	13.8		45.5	50.7		51.7	53.0	46.2
Level of Service	D	B		E	B		D	D		D	D	D
Approach Delay (s)		12.8			14.3			47.6			47.5	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	16.0	HCM Level of Service	B
HCM Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	59.4%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: NE 116th Street & 124th Avenue NE

Kirkland Costco Gasoline
Future 2012 Without-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	390	155	90	345	95	320	475	235	125	235	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97	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	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1786	1881	1564	1769	1863	1528	1786	1881	1546	1768	3341	
Flt Permitted	0.18	1.00	1.00	0.22	1.00	1.00	0.29	1.00	1.00	0.25	1.00	
Satd. Flow (perm)	342	1881	1564	418	1863	1528	536	1881	1546	457	3341	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	189	476	189	110	421	116	390	579	287	152	287	134
RTOR Reduction (vph)	0	0	125	0	0	81	0	0	181	0	64	0
Lane Group Flow (vph)	189	476	64	110	421	35	390	579	106	152	357	0
Confl. Peds. (#/hr)	7		1	1		7	3		7	7		3
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	33.6	24.5	24.5	27.4	21.4	21.4	33.3	20.8	20.8	23.8	15.3	
Effective Green, g (s)	35.5	26.0	26.0	29.4	22.9	22.9	34.3	22.3	22.3	25.8	16.8	
Actuated g/C Ratio	0.46	0.34	0.34	0.38	0.30	0.30	0.45	0.29	0.29	0.34	0.22	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	348	637	529	283	556	456	484	546	449	316	731	
v/s Ratio Prot	c0.07	c0.25		0.04	0.23		c0.16	c0.31		0.06	0.11	
v/s Ratio Perm	0.18		0.04	0.11		0.02	0.20		0.07	0.10		
v/c Ratio	0.54	0.75	0.12	0.39	0.76	0.08	0.81	1.06	0.24	0.48	0.49	
Uniform Delay, d1	14.6	22.5	17.5	16.7	24.4	19.4	15.8	27.2	20.8	19.6	26.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	4.2	0.0	0.3	5.2	0.0	9.0	55.5	0.1	0.4	0.2	
Delay (s)	15.5	26.7	17.6	17.0	29.6	19.4	24.8	82.8	20.9	20.0	26.4	
Level of Service	B	C	B	B	C	B	C	F	C	C	C	
Approach Delay (s)		22.2			25.6			50.6			24.7	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM Average Control Delay	34.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.81		
Actuated Cycle Length (s)	76.8	Sum of lost time (s)	6.0
Intersection Capacity Utilization	72.0%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: NE 100th Street & 124th Avenue NE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	5	20	40	15	140	20	880	35	40	375	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.92		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1697		1756	1578		1798	1889		1787	1873	
Flt Permitted		0.90		0.73	1.00		0.51	1.00		0.19	1.00	
Satd. Flow (perm)		1543		1356	1578		965	1889		362	1873	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	10	5	21	42	16	146	21	917	36	42	391	10
RTOR Reduction (vph)	0	17	0	0	107	0	0	1	0	0	1	0
Lane Group Flow (vph)	0	19	0	42	55	0	21	952	0	42	400	0
Confl. Peds. (#/hr)	2		6	6		2	5					5
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		6.9		6.9	6.9		31.5	31.5		31.5	31.5	
Effective Green, g (s)		7.9		7.9	7.9		32.5	32.5		32.5	32.5	
Actuated g/C Ratio		0.17		0.17	0.17		0.70	0.70		0.70	0.70	
Clearance Time (s)		4.0		4.0	4.0		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	
Lane Grp Cap (vph)		263		231	269		676	1323		254	1312	
v/s Ratio Prot					c0.03			c0.50			0.21	
v/s Ratio Perm		0.01		0.03			0.02			0.12		
v/c Ratio		0.07		0.18	0.20		0.03	0.72		0.17	0.30	
Uniform Delay, d1		16.2		16.5	16.5		2.1	4.2		2.4	2.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		0.4	0.4		0.0	1.9		0.3	0.1	
Delay (s)		16.3		16.9	16.9		2.1	6.1		2.7	2.8	
Level of Service		B		B	B		A	A		A	A	
Approach Delay (s)		16.3			16.9			6.0			2.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.7	HCM Level of Service	A
HCM Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	46.4	Sum of lost time (s)	6.0
Intersection Capacity Utilization	67.0%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: NE 90th Street & 124th Avenue NE

Kirkland Costco Gasoline
Future 2012 Without-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	270	10	40	15	25	20	45	680	10	5	375	95
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frt	1.00	0.88		1.00	0.93		1.00	1.00		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)	1805	1671		1805	1776		1805	1896		1787	1824	
Flt Permitted	0.73	1.00		0.72	1.00		0.27	1.00		0.27	1.00	
Satd. Flow (perm)	1381	1671		1375	1776		510	1896		510	1824	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	276	10	41	15	26	20	46	694	10	5	383	97
RTOR Reduction (vph)	0	29	0	0	14	0	0	1	0	0	7	0
Lane Group Flow (vph)	276	22	0	15	32	0	46	703	0	5	473	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	22.8	22.8		22.8	22.8		37.7	37.7		34.4	34.4	
Effective Green, g (s)	22.8	22.8		22.8	22.8		37.7	37.7		34.4	34.4	
Actuated g/C Ratio	0.30	0.30		0.30	0.30		0.49	0.49		0.45	0.45	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	413	500		411	531		320	938		242	823	
v/s Ratio Prot		0.01			0.02		0.01	c0.37		0.00	c0.26	
v/s Ratio Perm	c0.20			0.01			0.06			0.01		
v/c Ratio	0.67	0.04		0.04	0.06		0.14	0.75		0.02	0.57	
Uniform Delay, d1	23.4	19.0		18.9	19.1		11.6	15.5		18.2	15.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.1	0.0		0.0	0.0		0.2	3.3		0.0	1.0	
Delay (s)	27.5	19.0		19.0	19.1		11.8	18.8		18.3	16.5	
Level of Service	C	B		B	B		B	B		B	B	
Approach Delay (s)		26.1			19.1			18.4			16.5	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	19.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.68		
Actuated Cycle Length (s)	76.2	Sum of lost time (s)	10.0
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: NE 90th Street &

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	195	10	35	120	0	60	5	105	5	5	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	205	11	37	126	0	63	5	111	5	5	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	216	163	179	16
Volume Left (vph)	0	37	63	5
Volume Right (vph)	11	0	111	5
Hadj (s)	-0.03	0.06	-0.30	-0.13
Departure Headway (s)	4.5	4.7	4.5	4.9
Degree Utilization, x	0.27	0.21	0.22	0.02
Capacity (veh/h)	759	725	742	655
Control Delay (s)	9.2	8.9	8.8	8.0
Approach Delay (s)	9.2	8.9	8.8	8.0
Approach LOS	A	A	A	A

Intersection Summary			
Delay	9.0		
HCM Level of Service	A		
Intersection Capacity Utilization	42.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: NE 90th Street & 120th Avenue NE

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	85	80	95	90	10	105
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	87	82	97	92	10	107

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total (vph)	168	189	10	107
Volume Left (vph)	0	97	10	0
Volume Right (vph)	82	0	0	107
Hadj (s)	-0.29	0.10	0.50	-0.70
Departure Headway (s)	4.1	4.5	5.8	4.6
Degree Utilization, x	0.19	0.23	0.02	0.14
Capacity (veh/h)	846	775	584	729
Control Delay (s)	8.1	8.8	7.7	7.1
Approach Delay (s)	8.1	8.8	7.2	
Approach LOS	A	A	A	

Intersection Summary			
Delay	8.1		
HCM Level of Service	A		
Intersection Capacity Utilization	32.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: NE 85th Street & 120th Avenue NE

Kirkland Costco Gasoline
Future 2012 Without-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	1330	120	15	1455	45	185	165	55	85	40	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	3.9
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3522		1787	3555		1800	1822		1804	1900	1603
Flt Permitted	0.95	1.00		0.95	1.00		0.61	1.00		0.40	1.00	1.00
Satd. Flow (perm)	1787	3522		1787	3555		1165	1822		769	1900	1603
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	247	1371	124	15	1500	46	191	170	57	88	41	247
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	247	1495	0	15	1546	0	191	227	0	88	41	247
Confl. Peds. (#/hr)	3		2	2		3	4		1	1		4
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			pm+pt			pm+pt		pm+ov
Protected Phases	1	6		5	2		7	4		3	8	1
Permitted Phases							4			8		8
Actuated Green, G (s)	22.9	71.2		3.6	51.9		36.3	23.6		28.9	19.4	42.3
Effective Green, g (s)	24.8	72.6		5.5	53.3		39.8	25.5		30.7	21.4	46.3
Actuated g/C Ratio	0.19	0.56		0.04	0.41		0.31	0.20		0.24	0.16	0.36
Clearance Time (s)	5.9	5.4		5.9	5.4		5.8	5.9		4.9	6.0	5.9
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)	341	1967		76	1458		427	357		264	313	571
v/s Ratio Prot	c0.14	c0.42		0.01	c0.43		c0.05	c0.12		0.03	0.02	0.08
v/s Ratio Perm							0.09			0.05		0.07
v/c Ratio	0.72	0.76		0.20	1.06		0.45	0.64		0.33	0.13	0.43
Uniform Delay, d1	49.4	22.0		60.1	38.4		35.1	48.0		40.1	46.4	31.9
Progression Factor	0.86	0.73		0.75	0.46		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	5.0	1.9		0.9	38.5		0.7	3.7		0.7	0.2	0.5
Delay (s)	47.5	18.0		46.3	56.1		35.8	51.7		40.8	46.6	32.4
Level of Service	D	B		D	E		D	D		D	D	C
Approach Delay (s)		22.2			56.0			44.4			35.9	
Approach LOS		C			E			D			D	

Intersection Summary			
HCM Average Control Delay	38.6	HCM Level of Service	D
HCM Volume to Capacity ratio	0.80		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	8.0
Intersection Capacity Utilization	86.3%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: NE 85th Street & 122nd Avenue NE

Kirkland Costco Gasoline
Future 2012 Without-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	130	1380	45	25	1500	75	75	60	30	60	35	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		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	1.00		1.00	0.99		1.00	0.95		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3555		1805	3580		1770	1760		1796	1720	
Flt Permitted	0.08	1.00		0.13	1.00		0.58	1.00		0.60	1.00	
Satd. Flow (perm)	150	3555		256	3580		1073	1760		1127	1720	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	140	1484	48	27	1613	81	81	65	32	65	38	65
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	140	1532	0	27	1694	0	81	97	0	65	103	0
Confl. Peds. (#/hr)	2		2	2		2			4	4		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	103.3	93.7		91.0	87.2		15.3	15.3		15.3	15.3	
Effective Green, g (s)	105.0	95.2		94.6	88.5		17.2	17.2		17.2	17.2	
Actuated g/C Ratio	0.81	0.73		0.73	0.68		0.13	0.13		0.13	0.13	
Clearance Time (s)	5.7	5.5		5.8	5.3		5.9	5.9		5.9	5.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	276	2603		253	2437		142	233		149	228	
v/s Ratio Prot	c0.05	0.43		0.00	c0.47			0.06			0.06	
v/s Ratio Perm	0.36			0.07			c0.08			0.06		
v/c Ratio	0.51	0.59		0.11	0.70		0.57	0.42		0.44	0.45	
Uniform Delay, d1	16.0	8.2		6.2	12.6		52.9	51.8		51.9	52.0	
Progression Factor	2.04	0.86		0.26	0.20		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.2	0.8		0.1	1.1		5.4	1.2		2.0	1.4	
Delay (s)	33.7	7.8		1.8	3.6		58.4	53.0		54.0	53.5	
Level of Service	C	A		A	A		E	D		D	D	
Approach Delay (s)		10.0			3.6			55.4			53.7	
Approach LOS		A			A			E			D	

Intersection Summary			
HCM Average Control Delay	11.2	HCM Level of Service	B
HCM Volume to Capacity ratio	0.66		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	73.2%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: NE 85th Street & 124th Avenue NE

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	255	1210	45	10	1215	255	110	405	30	180	100	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		4.0	4.0	5.7	4.0	5.7		5.0	5.6	5.0
Lane Util. Factor	1.00	*0.85		1.00	*0.90	1.00	1.00	0.95		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.95	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3178		1787	3386	1526	1805	3568		1787	1881	1582
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1787	3178		1787	3386	1526	1805	3568		1787	1881	1582
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	260	1235	46	10	1240	260	112	413	31	184	102	179
RTOR Reduction (vph)	0	0	0	0	0	77	0	0	0	0	0	50
Lane Group Flow (vph)	260	1281	0	10	1240	183	112	444	0	184	102	129
Confl. Peds. (#/hr)	11		1	1		11	5		4	4		5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	Prot			Prot		Perm	Prot			Prot		pm+ov
Protected Phases	1	6		5	2		7	4		3	8	1
Permitted Phases						2						8
Actuated Green, G (s)	23.7	64.4		1.5	43.0	43.0	13.1	27.0		14.9	28.1	51.8
Effective Green, g (s)	23.7	66.0		3.4	44.7	43.0	14.9	27.0		14.9	28.1	51.8
Actuated g/C Ratio	0.18	0.51		0.03	0.34	0.33	0.11	0.21		0.11	0.22	0.40
Clearance Time (s)	5.0	5.6		5.9	5.7	5.7	5.8	5.7		5.0	5.6	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	326	1613		47	1164	505	207	741		205	407	691
v/s Ratio Prot	0.15	c0.40		0.01	c0.37		0.06	c0.12		c0.10	0.05	0.03
v/s Ratio Perm						0.12						0.05
v/c Ratio	0.80	0.79		0.21	1.07	0.36	0.54	0.60		0.90	0.25	0.19
Uniform Delay, d1	50.9	26.4		62.0	42.6	33.1	54.3	46.6		56.8	42.2	25.4
Progression Factor	0.77	0.62		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.9	3.5		2.3	45.6	2.0	2.9	3.6		35.7	1.5	0.1
Delay (s)	50.3	19.8		64.3	88.3	35.1	57.2	50.2		92.5	43.7	25.5
Level of Service	D	B		E	F	D	E	D		F	D	C
Approach Delay (s)		25.0			79.0			51.6			56.0	
Approach LOS		C			E			D			E	

Intersection Summary			
HCM Average Control Delay	52.2	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.7
Intersection Capacity Utilization	96.6%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: NE 85th Street & 128th Avenue NE

Kirkland Costco Gasoline
Future 2012 Without-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1095	30	35	1525	45	40	20	30	25	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.8	4.7		4.8	4.6		4.7	4.7		4.7	4.7	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3556		1769	3522		1788	1697		1775	1679	
Flt Permitted	0.10	1.00		0.19	1.00		0.75	1.00		0.72	1.00	
Satd. Flow (perm)	190	3556		358	3522		1406	1697		1350	1679	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	1165	32	37	1622	48	43	21	32	27	5	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	43	1197	0	37	1670	0	43	53	0	27	16	0
Confl. Peds. (#/hr)	1		8	8		1	6		11	11		6
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	0%	0%
Turn Type	D.P+P			D.P+P			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	98.7	89.6		98.6	93.6		14.2	14.2		14.2	14.2	
Effective Green, g (s)	100.7	90.6		100.6	94.6		15.2	15.2		15.2	15.2	
Actuated g/C Ratio	0.77	0.70		0.77	0.73		0.12	0.12		0.12	0.12	
Clearance Time (s)	5.8	5.7		5.8	5.6		5.7	5.7		5.7	5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	222	2478		386	2563		164	198		158	196	
v/s Ratio Prot	0.01	c0.34		0.01	c0.47			c0.03			0.01	
v/s Ratio Perm	0.14			0.07			0.03			0.02		
v/c Ratio	0.19	0.48		0.10	0.65		0.26	0.27		0.17	0.08	
Uniform Delay, d1	7.3	9.0		8.9	9.2		52.3	52.3		51.7	51.2	
Progression Factor	1.00	1.00		0.25	0.28		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.7		0.1	1.0		0.9	0.7		0.5	0.2	
Delay (s)	7.7	9.7		2.3	3.6		53.1	53.1		52.2	51.4	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		9.6			3.5			53.1			51.9	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	8.2	HCM Level of Service	A
HCM Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	63.6%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
100: Main Parking Lot Driveway & 120th Avenue NE

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	20	220	205	95	125	45
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	21	234	218	101	133	48
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)				924		
pX, platoon unblocked						
vC, conflicting volume	696	159	183			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	696	159	183			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	94	74	84			
cM capacity (veh/h)	344	887	1390			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	255	218	101	181
Volume Left	21	218	0	0
Volume Right	234	0	0	48
cSH	784	1390	1700	1700
Volume to Capacity	0.33	0.16	0.06	0.11
Queue Length 95th (ft)	35	14	0	0
Control Delay (s)	11.8	8.1	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	11.8	5.5		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	6.3		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
101: East Parking Lot Driveway & 120th Avenue NE

Kirkland Costco Gasoline
Future 2012 Without-Project Weekday PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	30	20	285	30	5	340
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	32	21	303	32	5	362
Pedestrians	14		112			
Lane Width (ft)	12.0		12.0			
Walking Speed (ft/s)	4.0		4.0			
Percent Blockage	1		9			
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)			832			
pX, platoon unblocked						
vC, conflicting volume	817	333			349	
vC1, stage 1 conf vol	333					
vC2, stage 2 conf vol	484					
vCu, unblocked vol	817	333			349	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	94	97			100	
cM capacity (veh/h)	501	703			1207	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	53	335	5	362
Volume Left	32	0	5	0
Volume Right	21	32	0	0
cSH	566	1700	1207	1700
Volume to Capacity	0.09	0.20	0.00	0.21
Queue Length 95th (ft)	8	0	0	0
Control Delay (s)	12.0	0.0	8.0	0.0
Lane LOS	B		A	
Approach Delay (s)	12.0	0.0	0.1	
Approach LOS	B			

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	27.9%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
3: NE 90th Street & 124th Avenue NE

Kirkland Costco Gasoline
Future 2012 With-Project Weekday AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	44	6	39	15	19	5	26	218	5	5	936	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.87		1.00	0.97		1.00	1.00		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)	1764	1620		1805	1830		1752	1837		1785	1841	
Flt Permitted	0.74	1.00		0.72	1.00		0.05	1.00		0.60	1.00	
Satd. Flow (perm)	1372	1620		1373	1830		98	1837		1122	1841	
Peak-hour factor, PHF	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85	0.85
Adj. Flow (vph)	52	7	46	18	22	6	31	256	6	6	1101	184
RTOR Reduction (vph)	0	42	0	0	5	0	0	0	0	0	4	0
Lane Group Flow (vph)	52	11	0	18	23	0	31	262	0	6	1281	0
Confl. Peds. (#/hr)	1					1			1	1		
Heavy Vehicles (%)	2%	2%	2%	0%	0%	0%	3%	3%	3%	1%	1%	1%
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	8.3	8.3		8.3	8.3		77.4	75.0		74.2	73.4	
Effective Green, g (s)	8.3	8.3		8.3	8.3		77.4	75.0		74.2	73.4	
Actuated g/C Ratio	0.08	0.08		0.08	0.08		0.78	0.76		0.75	0.74	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	115	136		115	153		117	1390		845	1364	
v/s Ratio Prot		0.01			0.01		c0.01	0.14		0.00	c0.70	
v/s Ratio Perm	c0.04			0.01			0.20			0.01		
v/c Ratio	0.45	0.08		0.16	0.15		0.26	0.19		0.01	0.94	
Uniform Delay, d1	43.2	41.9		42.2	42.1		22.2	3.4		3.1	10.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.8	0.3		0.6	0.4		1.2	0.1		0.0	12.4	
Delay (s)	46.0	42.1		42.8	42.6		23.4	3.5		3.1	23.3	
Level of Service	D	D		D	D		C	A		A	C	
Approach Delay (s)		44.1			42.7			5.6			23.2	
Approach LOS		D			D			A			C	

Intersection Summary			
HCM Average Control Delay	22.0	HCM Level of Service	C
HCM Volume to Capacity ratio	0.87		
Actuated Cycle Length (s)	99.1	Sum of lost time (s)	15.0
Intersection Capacity Utilization	76.2%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
5: NE 90th Street & 120th Avenue NE

Kirkland Costco Gasoline
Future 2012 With-Project Weekday AM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	44	76	75	71	54	20
Peak Hour Factor	0.66	0.66	0.66	0.66	0.66	0.66
Hourly flow rate (vph)	67	115	114	108	82	30

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total (vph)	182	221	82	30
Volume Left (vph)	0	114	82	0
Volume Right (vph)	115	0	0	30
Hadj (s)	-0.38	0.10	0.50	-0.70
Departure Headway (s)	4.1	4.5	5.9	4.7
Degree Utilization, x	0.21	0.28	0.13	0.04
Capacity (veh/h)	849	768	573	709
Control Delay (s)	8.1	9.2	8.6	6.7
Approach Delay (s)	8.1	9.2	8.1	
Approach LOS	A	A	A	

Intersection Summary			
Delay	8.6		
HCM Level of Service	A		
Intersection Capacity Utilization	24.6%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: NE 85th Street & 120th Avenue NE

Kirkland Costco Gasoline
Future 2012 With-Project Weekday AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	73	1411	90	15	1190	24	60	22	20	39	11	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	3.9
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00		1.00	0.93		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3537		1787	3562		1783	1734		1802	1900	1604
Flt Permitted	0.95	1.00		0.95	1.00		0.54	1.00		0.73	1.00	1.00
Satd. Flow (perm)	1787	3537		1787	3562		1014	1734		1379	1900	1604
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	0.92
Adj. Flow (vph)	79	1534	98	16	1293	26	65	24	22	42	12	153
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	79	1632	0	16	1319	0	65	46	0	42	12	153
Confl. Peds. (#/hr)	1		1	1		1	4		2	2		4
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	1%	1%	1%	0%	0%	0%
Turn Type	Prot			Prot			pm+pt			pm+pt		pm+ov
Protected Phases	1	6		5	2		7	4		3	8	1
Permitted Phases							4			8		8
Actuated Green, G (s)	12.3	82.3		2.0	72.0		23.5	14.6		12.4	8.4	20.7
Effective Green, g (s)	14.2	83.7		3.9	73.4		25.3	16.5		14.2	10.4	24.7
Actuated g/C Ratio	0.11	0.67		0.03	0.59		0.20	0.13		0.11	0.08	0.20
Clearance Time (s)	5.9	5.4		5.9	5.4		5.8	5.9		4.9	6.0	5.9
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)	203	2368		56	2092		273	229		173	158	317
v/s Ratio Prot	0.04	c0.46		0.01	c0.37		c0.02	0.03		0.01	0.01	c0.06
v/s Ratio Perm							0.03			0.02		0.04
v/c Ratio	0.39	0.69		0.29	0.63		0.24	0.20		0.24	0.08	0.48
Uniform Delay, d1	51.4	12.7		59.2	16.9		41.3	48.4		50.3	52.9	44.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	1.2	1.7		2.8	1.5		0.5	0.4		0.7	0.2	1.2
Delay (s)	52.6	14.3		62.0	18.4		41.8	48.8		51.0	53.1	45.6
Level of Service	D	B		E	B		D	D		D	D	D
Approach Delay (s)		16.1			18.9			44.7			47.2	
Approach LOS		B			B			D			D	

Intersection Summary			
HCM Average Control Delay	20.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	125.0	Sum of lost time (s)	11.9
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
1: NE 116th Street & 124th Avenue NE

Kirkland Costco Gasoline
Future 2012 With-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	155	390	159	92	345	95	320	486	236	125	245	110
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00	0.97	1.00	1.00	0.97	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	1.00	1.00	
Frt	1.00	1.00	0.85	1.00	1.00	0.85	1.00	1.00	0.85	1.00	0.95	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00	
Satd. Flow (prot)	1786	1881	1564	1769	1863	1528	1786	1881	1546	1768	3346	
Flt Permitted	0.18	1.00	1.00	0.22	1.00	1.00	0.27	1.00	1.00	0.25	1.00	
Satd. Flow (perm)	342	1881	1564	418	1863	1528	516	1881	1546	457	3346	
Peak-hour factor, PHF	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82	0.82
Adj. Flow (vph)	189	476	194	112	421	116	390	593	288	152	299	134
RTOR Reduction (vph)	0	0	128	0	0	81	0	0	177	0	60	0
Lane Group Flow (vph)	189	476	66	112	421	35	390	593	111	152	373	0
Confl. Peds. (#/hr)	7		1	1		7	3		7	7		3
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	1%	1%	1%	2%	2%	2%
Turn Type	pm+pt		Perm	pm+pt		Perm	pm+pt		Perm	pm+pt		
Protected Phases	5	2		1	6		3	8		7	4	
Permitted Phases	2		2	6		6	8		8	4		
Actuated Green, G (s)	33.6	24.5	24.5	27.4	21.4	21.4	33.3	20.8	20.8	23.8	15.3	
Effective Green, g (s)	35.5	26.0	26.0	29.4	22.9	22.9	34.3	22.3	22.3	25.8	16.8	
Actuated g/C Ratio	0.46	0.34	0.34	0.38	0.30	0.30	0.45	0.29	0.29	0.34	0.22	
Clearance Time (s)	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5	4.5	4.0	4.5	
Vehicle Extension (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Lane Grp Cap (vph)	348	637	529	283	556	456	479	546	449	316	732	
v/s Ratio Prot	c0.07	c0.25		0.04	0.23		c0.16	c0.32		0.06	0.11	
v/s Ratio Perm	0.18		0.04	0.12		0.02	0.20		0.07	0.10		
v/c Ratio	0.54	0.75	0.12	0.40	0.76	0.08	0.81	1.09	0.25	0.48	0.51	
Uniform Delay, d1	14.6	22.5	17.5	16.7	24.4	19.4	15.9	27.2	20.8	19.6	26.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.9	4.2	0.0	0.3	5.2	0.0	9.7	63.9	0.1	0.4	0.2	
Delay (s)	15.5	26.7	17.6	17.0	29.6	19.4	25.6	91.2	20.9	20.0	26.6	
Level of Service	B	C	B	B	C	B	C	F	C	C	C	
Approach Delay (s)		22.2			25.6			55.1			24.9	
Approach LOS		C			C			E			C	

Intersection Summary			
HCM Average Control Delay	35.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.82		
Actuated Cycle Length (s)	76.8	Sum of lost time (s)	6.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
2: NE 100th Street & 124th Avenue NE

Kirkland Costco Gasoline
Future 2012 With-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	5	22	41	15	140	26	893	36	40	391	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Util. Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes		0.98		1.00	0.98		1.00	1.00		1.00	1.00	
Flpb, ped/bikes		1.00		0.99	1.00		1.00	1.00		1.00	1.00	
Frt		0.92		1.00	0.86		1.00	0.99		1.00	1.00	
Flt Protected		0.99		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)		1692		1756	1578		1798	1889		1787	1873	
Flt Permitted		0.90		0.73	1.00		0.50	1.00		0.19	1.00	
Satd. Flow (perm)		1545		1353	1578		946	1889		352	1873	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	10	5	23	43	16	146	27	930	38	42	407	10
RTOR Reduction (vph)	0	19	0	0	104	0	0	2	0	0	1	0
Lane Group Flow (vph)	0	19	0	43	58	0	27	966	0	42	416	0
Confl. Peds. (#/hr)	2		6	6		2	5					5
Heavy Vehicles (%)	0%	0%	0%	2%	2%	2%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			Perm			Perm		
Protected Phases		6			2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)		6.9		6.9	6.9		32.2	32.2		32.2	32.2	
Effective Green, g (s)		7.9		7.9	7.9		33.2	33.2		33.2	33.2	
Actuated g/C Ratio		0.17		0.17	0.17		0.70	0.70		0.70	0.70	
Clearance Time (s)		4.0		4.0	4.0		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	
Lane Grp Cap (vph)		259		227	265		667	1332		248	1320	
v/s Ratio Prot					c0.04			c0.51			0.22	
v/s Ratio Perm		0.01		0.03			0.03			0.12		
v/c Ratio		0.07		0.19	0.22		0.04	0.73		0.17	0.32	
Uniform Delay, d1		16.5		16.8	16.9		2.1	4.2		2.3	2.6	
Progression Factor		1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2		0.1		0.4	0.4		0.0	2.0		0.3	0.1	
Delay (s)		16.6		17.3	17.4		2.1	6.2		2.7	2.8	
Level of Service		B		B	B		A	A		A	A	
Approach Delay (s)		16.6			17.3			6.1			2.8	
Approach LOS		B			B			A			A	

Intersection Summary			
HCM Average Control Delay	6.8	HCM Level of Service	A
HCM Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	47.1	Sum of lost time (s)	6.0
Intersection Capacity Utilization	67.9%	ICU Level of Service	C
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
3: NE 90th Street & 124th Avenue NE

Kirkland Costco Gasoline
Future 2012 With-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	300	11	56	15	36	20	64	670	10	5	370	119
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
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	
Frt	1.00	0.87		1.00	0.95		1.00	1.00		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	1661		1805	1800		1805	1896		1787	1813	
Flt Permitted	0.72	1.00		0.71	1.00		0.23	1.00		0.29	1.00	
Satd. Flow (perm)	1368	1661		1354	1800		445	1896		551	1813	
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	306	11	57	15	37	20	65	684	10	5	378	121
RTOR Reduction (vph)	0	40	0	0	14	0	0	1	0	0	10	0
Lane Group Flow (vph)	306	28	0	15	43	0	65	694	0	5	489	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	0%	0%	1%	1%	1%
Turn Type	Perm			Perm			pm+pt			pm+pt		
Protected Phases		4			8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.7	24.7		24.7	24.7		40.4	40.4		35.0	35.0	
Effective Green, g (s)	24.7	24.7		24.7	24.7		40.4	40.4		35.0	35.0	
Actuated g/C Ratio	0.31	0.31		0.31	0.31		0.50	0.50		0.43	0.43	
Clearance Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	418	508		414	550		325	948		249	785	
v/s Ratio Prot		0.02			0.02		0.02	c0.37		0.00	c0.27	
v/s Ratio Perm	c0.22			0.01			0.08			0.01		
v/c Ratio	0.73	0.06		0.04	0.08		0.20	0.73		0.02	0.62	
Uniform Delay, d1	25.1	19.8		19.7	20.0		12.5	15.9		18.9	17.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	6.5	0.0		0.0	0.1		0.3	2.9		0.0	1.5	
Delay (s)	31.6	19.9		19.7	20.0		12.8	18.9		18.9	19.3	
Level of Service	C	B		B	C		B	B		B	B	
Approach Delay (s)		29.5			20.0			18.3			19.3	
Approach LOS		C			B			B			B	

Intersection Summary			
HCM Average Control Delay	21.1	HCM Level of Service	C
HCM Volume to Capacity ratio	0.70		
Actuated Cycle Length (s)	80.8	Sum of lost time (s)	10.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
4: NE 90th Street &

Kirkland Costco Gasoline
Future 2012 With-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Volume (vph)	0	242	10	35	175	0	77	5	105	5	5	5
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Hourly flow rate (vph)	0	255	11	37	184	0	81	5	111	5	5	5

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	265	221	197	16
Volume Left (vph)	0	37	81	5
Volume Right (vph)	11	0	111	5
Hadj (s)	-0.02	0.05	-0.25	-0.13
Departure Headway (s)	4.7	4.8	4.8	5.2
Degree Utilization, x	0.35	0.30	0.26	0.02
Capacity (veh/h)	722	705	685	596
Control Delay (s)	10.2	9.8	9.6	8.4
Approach Delay (s)	10.2	9.8	9.6	8.4
Approach LOS	B	A	A	A

Intersection Summary			
Delay	9.9		
HCM Level of Service	A		
Intersection Capacity Utilization	50.3%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
5: NE 90th Street & 120th Avenue NE

Kirkland Costco Gasoline
Future 2012 With-Project Weekday PM Peak Hour

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Volume (vph)	112	153	115	142	73	125
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	114	156	117	145	74	128

Direction, Lane #	EB 1	WB 1	NB 1	NB 2
Volume Total (vph)	270	262	74	128
Volume Left (vph)	0	117	74	0
Volume Right (vph)	156	0	0	128
Hadj (s)	-0.35	0.09	0.50	-0.70
Departure Headway (s)	4.4	4.8	6.2	5.0
Degree Utilization, x	0.33	0.35	0.13	0.18
Capacity (veh/h)	771	710	539	659
Control Delay (s)	9.6	10.5	9.0	7.9
Approach Delay (s)	9.6	10.5	8.3	
Approach LOS	A	B	A	

Intersection Summary			
Delay	9.6		
HCM Level of Service	A		
Intersection Capacity Utilization	43.1%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Signalized Intersection Capacity Analysis
6: NE 85th Street & 120th Avenue NE

Kirkland Costco Gasoline
Future 2012 With-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	280	1327	120	15	1440	65	185	168	55	116	41	296
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	3.9
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	0.99		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3522		1787	3547		1801	1823		1804	1900	1603
Flt Permitted	0.95	1.00		0.95	1.00		0.62	1.00		0.40	1.00	1.00
Satd. Flow (perm)	1787	3522		1787	3547		1166	1823		759	1900	1603
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	289	1368	124	15	1485	67	191	173	57	120	42	305
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	289	1492	0	15	1552	0	191	230	0	120	42	305
Confl. Peds. (#/hr)	3		2	2		3	4		1	1		4
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	0%	0%	0%
Turn Type	Prot			Prot			pm+pt			pm+pt		pm+ov
Protected Phases	1	6		5	2		7	4		3	8	1
Permitted Phases							4			8		8
Actuated Green, G (s)	23.6	70.7		3.6	50.7		36.8	23.8		29.4	19.6	43.2
Effective Green, g (s)	25.5	72.1		5.5	52.1		40.3	25.7		31.2	21.6	47.2
Actuated g/C Ratio	0.20	0.55		0.04	0.40		0.31	0.20		0.24	0.17	0.36
Clearance Time (s)	5.9	5.4		5.9	5.4		5.8	5.9		4.9	6.0	5.9
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)	351	1953		76	1422		434	360		268	316	582
v/s Ratio Prot	c0.16	0.42		0.01	c0.44		c0.05	c0.13		0.04	0.02	0.10
v/s Ratio Perm							0.09			0.07		0.09
v/c Ratio	0.82	0.76		0.20	1.09		0.44	0.64		0.45	0.13	0.52
Uniform Delay, d1	50.1	22.4		60.1	39.0		34.7	47.9		40.4	46.2	32.6
Progression Factor	0.87	0.74		0.75	0.46		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.2	2.0		0.9	50.2		0.7	3.7		1.2	0.2	0.9
Delay (s)	53.9	18.5		46.2	68.1		35.4	51.6		41.6	46.4	33.4
Level of Service	D	B		D	E		D	D		D	D	C
Approach Delay (s)		24.3			67.9			44.2			36.7	
Approach LOS		C			E			D			D	

Intersection Summary			
HCM Average Control Delay	43.8	HCM Level of Service	D
HCM Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	89.8%	ICU Level of Service	E
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
7: NE 85th Street & 122nd Avenue NE

Kirkland Costco Gasoline
Future 2012 With-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	147	1390	46	25	1505	75	75	61	30	60	35	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		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	1.00		1.00	0.99		1.00	0.95		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3554		1805	3580		1770	1761		1796	1720	
Flt Permitted	0.08	1.00		0.13	1.00		0.58	1.00		0.59	1.00	
Satd. Flow (perm)	145	3554		254	3580		1073	1761		1121	1720	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	158	1495	49	27	1618	81	81	66	32	65	38	65
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	158	1544	0	27	1699	0	81	98	0	65	103	0
Confl. Peds. (#/hr)	2		2	2		2			4	4		
Heavy Vehicles (%)	1%	1%	1%	0%	0%	0%	2%	2%	2%	0%	0%	0%
Turn Type	pm+pt			pm+pt			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases	6			2			4			8		
Actuated Green, G (s)	103.3	93.7		90.2	86.4		15.3	15.3		15.3	15.3	
Effective Green, g (s)	105.0	95.2		93.8	87.7		17.2	17.2		17.2	17.2	
Actuated g/C Ratio	0.81	0.73		0.72	0.67		0.13	0.13		0.13	0.13	
Clearance Time (s)	5.7	5.5		5.8	5.3		5.9	5.9		5.9	5.9	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	283	2603		250	2415		142	233		148	228	
v/s Ratio Prot	c0.06	0.43		0.00	c0.47			0.06			0.06	
v/s Ratio Perm	0.39			0.07			c0.08			0.06		
v/c Ratio	0.56	0.59		0.11	0.70		0.57	0.42		0.44	0.45	
Uniform Delay, d1	20.4	8.2		6.4	13.1		52.9	51.8		52.0	52.0	
Progression Factor	1.64	0.85		0.27	0.20		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.9	0.8		0.1	1.1		5.4	1.2		2.1	1.4	
Delay (s)	35.3	7.8		1.8	3.8		58.4	53.0		54.0	53.5	
Level of Service	D	A		A	A		E	D		D	D	
Approach Delay (s)		10.4			3.7			55.5			53.7	
Approach LOS		B			A			E			D	

Intersection Summary			
HCM Average Control Delay	11.4	HCM Level of Service	B
HCM Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	12.0
Intersection Capacity Utilization	74.3%	ICU Level of Service	D
Analysis Period (min)	15		
c Critical Lane Group			

HCM Signalized Intersection Capacity Analysis
8: NE 85th Street & 124th Avenue NE

Kirkland Costco Gasoline
Future 2012 With-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	255	1216	49	10	1218	263	112	406	30	191	100	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	5.0	4.0		4.0	4.0	5.7	4.0	5.7		5.0	5.6	5.0
Lane Util. Factor	1.00	*0.85		1.00	*0.90	1.00	1.00	0.95		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	1.00	0.95	1.00	1.00		1.00	1.00	0.99
Flpb, ped/bikes	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.99		1.00	1.00	0.85	1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1787	3177		1787	3386	1526	1805	3568		1787	1881	1582
Flt Permitted	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	1.00
Satd. Flow (perm)	1787	3177		1787	3386	1526	1805	3568		1787	1881	1582
Peak-hour factor, PHF	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Adj. Flow (vph)	260	1241	50	10	1243	268	114	414	31	195	102	179
RTOR Reduction (vph)	0	0	0	0	0	80	0	0	0	0	0	49
Lane Group Flow (vph)	260	1291	0	10	1243	188	114	445	0	195	102	130
Confl. Peds. (#/hr)	11		1	1		11	5		4	4		5
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%	0%	0%	0%	1%	1%	1%
Turn Type	Prot			Prot		Perm	Prot			Prot		pm+ov
Protected Phases	1	6		5	2		7	4		3	8	1
Permitted Phases						2						8
Actuated Green, G (s)	23.7	64.3		1.5	42.9	42.9	13.2	27.0		15.0	28.1	51.8
Effective Green, g (s)	23.7	65.9		3.4	44.6	42.9	15.0	27.0		15.0	28.1	51.8
Actuated g/C Ratio	0.18	0.51		0.03	0.34	0.33	0.12	0.21		0.12	0.22	0.40
Clearance Time (s)	5.0	5.6		5.9	5.7	5.7	5.8	5.7		5.0	5.6	5.0
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	326	1610		47	1162	504	208	741		206	407	691
v/s Ratio Prot	0.15	c0.41		0.01	c0.37		0.06	c0.12		c0.11	0.05	0.03
v/s Ratio Perm						0.12						0.05
v/c Ratio	0.80	0.80		0.21	1.07	0.37	0.55	0.60		0.95	0.25	0.19
Uniform Delay, d1	50.9	26.6		62.0	42.7	33.3	54.3	46.6		57.1	42.2	25.4
Progression Factor	0.78	0.63		1.00	1.00	1.00	1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	10.8	3.6		2.3	47.2	2.1	2.9	3.6		47.2	1.5	0.1
Delay (s)	50.5	20.3		64.3	89.9	35.4	57.2	50.2		104.3	43.7	25.6
Level of Service	D	C		E	F	D	E	D		F	D	C
Approach Delay (s)		25.4			80.1			51.6			61.7	
Approach LOS		C			F			D			E	

Intersection Summary			
HCM Average Control Delay	53.4	HCM Level of Service	D
HCM Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	9.7
Intersection Capacity Utilization	97.3%	ICU Level of Service	F
Analysis Period (min)	15		

c Critical Lane Group

HCM Signalized Intersection Capacity Analysis
9: NE 85th Street & 128th Avenue NE

Kirkland Costco Gasoline
Future 2012 With-Project Weekday PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	40	1111	31	35	1536	53	40	22	30	25	5	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.8	4.7		4.8	4.6		4.7	4.7		4.7	4.7	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		0.99	1.00		0.98	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.91		1.00	0.90	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3556		1769	3519		1788	1704		1775	1679	
Flt Permitted	0.10	1.00		0.19	1.00		0.75	1.00		0.72	1.00	
Satd. Flow (perm)	183	3556		355	3519		1406	1704		1347	1679	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	43	1182	33	37	1634	56	43	23	32	27	5	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	0	0	0	0	0
Lane Group Flow (vph)	43	1215	0	37	1690	0	43	55	0	27	16	0
Confl. Peds. (#/hr)	1		8	8		1	6		11	11		6
Heavy Vehicles (%)	1%	1%	1%	2%	2%	2%	0%	0%	0%	0%	0%	0%
Turn Type	D.P+P			D.P+P			Perm			Perm		
Protected Phases	1	6		5	2			4			8	
Permitted Phases	2			6			4			8		
Actuated Green, G (s)	98.6	91.1		98.5	93.5		14.3	14.3		14.3	14.3	
Effective Green, g (s)	100.6	92.1		100.5	94.5		15.3	15.3		15.3	15.3	
Actuated g/C Ratio	0.77	0.71		0.77	0.73		0.12	0.12		0.12	0.12	
Clearance Time (s)	5.8	5.7		5.8	5.6		5.7	5.7		5.7	5.7	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	217	2519		366	2558		165	201		159	198	
v/s Ratio Prot	0.01	c0.34		0.01	c0.48			c0.03			0.01	
v/s Ratio Perm	0.14			0.07			0.03			0.02		
v/c Ratio	0.20	0.48		0.10	0.66		0.26	0.27		0.17	0.08	
Uniform Delay, d1	7.5	8.4		8.8	9.3		52.2	52.3		51.6	51.1	
Progression Factor	1.00	1.00		0.24	0.29		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.7		0.1	1.0		0.8	0.7		0.5	0.2	
Delay (s)	8.0	9.1		2.2	3.7		53.0	53.0		52.1	51.3	
Level of Service	A	A		A	A		D	D		D	D	
Approach Delay (s)		9.0			3.7			53.0			51.8	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM Average Control Delay	8.0	HCM Level of Service	A
HCM Volume to Capacity ratio	0.61		
Actuated Cycle Length (s)	130.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis
100: Main Parking Lot Driveway & 120th Avenue NE

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Volume (veh/h)	30	210	180	168	203	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	32	223	191	179	216	64
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)				905		
pX, platoon unblocked						
vC, conflicting volume	812	250	282			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	812	250	282			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	72	85			
cM capacity (veh/h)	297	790	1279			

Direction, Lane #	EB 1	NB 1	NB 2	SB 1
Volume Total	255	191	179	280
Volume Left	32	191	0	0
Volume Right	223	0	0	64
cSH	654	1279	1700	1700
Volume to Capacity	0.39	0.15	0.11	0.16
Queue Length 95th (ft)	46	13	0	0
Control Delay (s)	14.0	8.3	0.0	0.0
Lane LOS	B	A		
Approach Delay (s)	14.0	4.3		0.0
Approach LOS	B			

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	49.0%	ICU Level of Service	A
Analysis Period (min)	15		

HCM Unsignalized Intersection Capacity Analysis
101: East Parking Lot Driveway & 120th Avenue NE

Kirkland Costco Gasoline
Future 2012 With-Project Weekday PM Peak Hour

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	55	30	323	55	10	403
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	59	32	344	59	11	429
Pedestrians	14		112			
Lane Width (ft)	12.0		12.0			
Walking Speed (ft/s)	4.0		4.0			
Percent Blockage	1		9			
Right turn flare (veh)						
Median type			TWLTL			None
Median storage veh)			2			
Upstream signal (ft)			795			
pX, platoon unblocked						
vC, conflicting volume	949	387			416	
vC1, stage 1 conf vol	387					
vC2, stage 2 conf vol	562					
vCu, unblocked vol	949	387			416	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)	5.4					
tF (s)	3.5	3.3			2.2	
p0 queue free %	87	95			99	
cM capacity (veh/h)	455	656			1140	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	90	402	11	429
Volume Left	59	0	11	0
Volume Right	32	59	0	0
cSH	510	1700	1140	1700
Volume to Capacity	0.18	0.24	0.01	0.25
Queue Length 95th (ft)	16	0	1	0
Control Delay (s)	13.6	0.0	8.2	0.0
Lane LOS	B		A	
Approach Delay (s)	13.6	0.0	0.2	
Approach LOS	B			

Intersection Summary			
Average Delay	1.4		
Intersection Capacity Utilization	32.8%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix E: Trip Generation Study

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
101 S Capitol Boulevard, Suite 301, Boise, ID 83702 P 208.338.2683 F 208.338.2685

MEMORANDUM

Date: June 29, 2011 Project #: C10

To: Kim Katz, Costco Wholesale

From: Sonia Hennum, PE PTOE

Project: Kirkland Costco Gasoline Addition

Subject: Trip Generation Estimate

cc: Dan McKinney, Jr., Transpo Group
John Ellingsen, Barghausen Consulting Engineers

As requested, Kittelson & Associates, Inc. has prepared a trip generation estimate for the proposed Costco Gasoline fuel station addition to the existing Costco development located on 120th Avenue NE in Kirkland, Washington. Although a previous trip generation estimate for the project was prepared back in 2008, an update to the estimate has been developed for two key reasons:

- The project site plan has changed since that time, and
- Additional Costco Gasoline trip generation data has been collected since 2008 to expand the data sample size and information that is available on the specific nature and characteristics of Costco Gasoline travel.

As such, it was determined that the most up to date, comprehensive, and representative trip generation data should be used for the project transportation impact analysis.

COSTCO TRANSPORTATION DATABASE

For the past fifteen years, KAI has maintained a database of traffic data and travel characteristics for Costco Wholesale. The database contains transportation information such as trip generation, trip type percentages, and parking demand for Costco locations in the United States, Canada, and Mexico. The database is updated and refined each time new Costco traffic counts or information become available to KAI. The Costco database was determined as the best source from which to develop the

trip generation estimate for the Kirkland Costco Gasoline project since it provides use-specific data that most accurately represents the anticipated traffic characteristics of the proposed fuel station. Costco has invested significant effort into developing this use-specific trip generation database for both their warehouses and their fuel stations because of the unique characteristics of Costco customer travel that exist due to membership requirements and the nature of Costco sales (typically larger volume purchases and lower frequency visits than traditional retailers). These unique elements apply to the trip generation for Costco warehouses, Costco Gasoline fuel stations, and the interaction of trips between the two. The database currently has traffic information from the two existing Costco Gasoline facilities that are in closest proximity to the Kirkland site (Aurora Village and Woodinville), as well as numerous locations in large metropolitan areas of California (Bay Area, LA Area, and San Diego). In addition, given that the proposed site plan for the Kirkland location is a 5 island (20 fueling position) facility, data from the two existing 5 island Costco Gasoline facilities (Scottsdale and Tucson, Arizona) was also collected and evaluated to prepare the trip generation estimate for the Kirkland project.

COSTCO GASOLINE TRIP CHARACTERISTICS

An important trend seen from trip generation studies at over 20 Costco Gasoline facilities is that trip generation is not directly related to the number of islands (or fueling positions) at a facility. Although the standard reference manual ITE Trip Generation (8th Edition) currently reports trip generation for gasoline stations based on the independent variable of fueling positions, more recent transportation studies indicate that other variables besides the specific number of fueling pumps have a much larger influence on trip generation. As such, the profession is moving towards modifying this for the gasoline station land use codes and working on studies that include different independent variables. In particular for the case of Costco Gasoline facilities, membership base (since they are member-only facilities), market area, and adjacent warehouse activity appear to have a much greater influence on the activity levels of the associated fuel stations than whether the facility is 12, 16, or 20 fueling positions (the three typical Costco models).

As such, to develop a trip generation estimate for the proposed Kirkland project, Costco provided the projected sales volume for the proposed fuel station that has been developed as part of the financial analysis and business fiscal decision process. This projection is created by Costco using detailed analysis of the membership base, market area, demographics, and existing warehouse activity of the Kirkland site. The same known, real world data was pulled for all of the existing Costco Gasoline facilities in the transportation database. The Costco trip generation database was then quarried and screened for all available data from sites with activity characteristics (membership base, market area,

warehouse and fuel station activity volume) similar to or greater than that projected for Kirkland. This resulted in trip generation data sample set for 18 existing Costco Gasoline facilities all of which are either 16 or 20 fueling positions and similar or greater in activity to that projected for the Kirkland site. The details and specifics of the representative sites used to develop the trip generation are provided in Attachment "A." The specific membership information and actual sales and activity volumes are not listed due to the privacy and proprietary nature of the data, but the activity and volume level of each sample site in comparison to that projected for the Kirkland project is provided.

TRIP GENERATION ESTIMATE

Using the detailed data provided in Attachment "A" a trip generation estimate for the Kirkland site was prepared and is summarized in Table 1 for total gas station trip generation rates, internal trip capture between the fuel station and the warehouse, as well as pass-by trip capture from the surrounding street system.

Table 1 Kirkland Costco Gasoline Trip Generation Estimate

	Weekday Daily Trip Ends	Weekday AM Peak Hour Trip Ends			Weekday PM Peak Hour Trip Ends			Weekend Midday Peak Hour Trip Ends		
Costco Gasoline	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**	**In**	**Out**	**Total**
Total Trip Ends	4,530	110	110	220	210	210	420	225	225	450
Internal Trips (0% AM, 35% PM, 34% MD)	*(1,540)*	*(0)*	*(0)*	*(0)*	*(75)*	*(75)*	*(150)*	*(75)*	*(75)*	*(150)*
External Trips	2,990	110	110	220	135	135	270	150	150	300
Pass-by Trips (32% AM, 39% PM, 33% MD)	*(990)*	*(35)*	*(35)*	*(70)*	*(50)*	*(50)*	*100*	*(50)*	*(50)*	*(100)*
Net New Trips	**2,000**	**75**	**75**	**150**	**85**	**85**	**170**	**100**	**100**	**200**

Notes: no internal trips during the AM peak period as warehouse is not open; pass-by trip percentage is percentage of remaining external trips

As shown in Table 1, the proposed Kirkland Costco Gasoline fuel station is estimated to generate approximately 75 new vehicles (or 150 trip ends) during the weekday a.m. peak hour, approximately 85 new vehicles (or 170 trip ends) during the weekday p.m. peak hour, and approximately 100 new vehicles (or 200 trip ends) during the weekend midday peak hour. The proposed fuel station is estimated to process approximately 1,000 new vehicles (or 2,000 daily new trip ends) on a weekday. While trip type survey information has not been collected for the entire weekday daily time period,

on a daily basis the trip type percentages are expected to be similar to those observed during the weekend midday peak hour.

It is important to note that, based on the database information, there is not a noticeable difference in the overall trip generation for a 20 fueling position fuel station compared to a 16 fueling position fuel station (as was previously proposed for this site). Part of this is due to the fact that there are only two existing Costco Gasoline locations with 5 islands within the mainland United States and thus a limited sample size. However, there are sample sites in the database with 16 fueling positions that generate more trips than one of the 20 fueling position location and both size facilities generate essentially the same overall range in number of trips. As outlined previously, trip generation for Costco Gasoline facilities, is more influenced by membership base and adjacent warehouse activity. Given that the expected volume for the Kirkland location is lower than the majority of example sites in the database used to generate the trip generation estimate (both 16 and 20 fueling position locations), it was determined that the average trip generation from all of the sites would be an appropriate, if not conservative, estimation for the project. Again, the detailed comparison of the Kirkland location to the activity of the sample sites is provided in Attachment "A."

Also indicated in the table, the unique nature of Costco operations and its membership requirements result in different trip characteristics than those observed at the standard fuel stations summarized in the ITE Trip Generation Manual. The percentage of pass-by trips at Costco fuel stations is considerably lower than that quoted in the ITE manual for typical fuel stations. Correspondingly, membership requirements also have a significant effect on trip internalization (or sharing of trips) between the warehouse and the fuel station. Fewer people exclusively visit a Costco fuel station (in comparison to a typical standalone station) because they have another primary purpose for visiting the site (that being a trip to the warehouse).

Internal Trips

A key finding from the studies conducted at Costco facilities is that approximately 35% of the weekday p.m. and Saturday midday peak hour trips to and from Costco fueling stations are internal capture trips. Internal capture trips account for those members who patronize both the warehouse and the gasoline pumps during a single visit to the Costco site. As such, although they account for a trip to both the warehouse and the fuel station, they only account for one overall vehicle trip to the site and on the surrounding transportation system. Table 1 shows that, based on studies including surveys at Costco fuel stations and membership card transaction data, on average 35% of the members buying gas during the weekday p.m. peak hour and 34% during the Saturday midday peak

hour are members whose main purpose to the site is to visit the Costco warehouse. The database shows that this number ranges from about 22% to as high as 65% at various sites, but for the purposes of conservative analysis an average estimate has been used. There are no internal shared trips between the warehouse and fuel station during the weekday a.m. peak hour as the Costco warehouse does not open until after this time in the morning.

Pass-by Trips

Another key trip characteristic that must be considered is that of pass-by trip capture. Pass-by trips represent members (and trips) that are currently traveling on the surrounding street network (for example, on NE 85th Street) for some other primary purpose (such as a trip from work to home) and stop into the site en route during their normal travel. As such, pass-by trips do not result in a net increase in traffic on the surrounding transportation system and, typically, their only effect occurs at the site access driveways where they become turning movements. Table 1 shows that, based on studies using customer surveys at Costco Gasoline fuel stations, on average 32% of the trips during the weekday a.m. peak hour, 39% of the trips during the weekday p.m. peak hour, and 33% of the trips during the weekend midday peak hour can be classified as pass-by trip capture from the surrounding street system. This is lower than the average capture rate quoted in the ITE Trip Generation Manual for typical service stations (58% in the a.m. and 42% in the p.m.) and, again, is attributable to the unique travel characteristics that result from Costco's membership requirements.

COMPARISON TO PREVIOUS TRIP GENERATION ESTIMATE

Finally, the updated trip generation estimate summarized in Table 1 was compared to the trip generation used for the previous project analysis in 2008. Again, the trip generation estimate has been updated to include expanded data sample sizes in the Costco transportation database, to account for the updated proposed site plan, and to reflect a refined estimate for the activity level of this site compared to other existing locations where trip generation data has been collected. The comparison of the updated 2011 estimate to that previous used in 2008 is outlined in Table 2.

Table 2 Trip Generation Estimate Comparison

	Weekday Daily Trip Ends	Weekday AM Peak Hour	Weekday PM Peak Hour	Weekend Midday Peak Hour
Total Trips				
2011 Update	4,530	220	420	450
2008 Previous Analysis	*2,775*	*365*	*390*	*410*
Net New Trips				
2011 Update	2,000	150	170	200
2008 Previous Analysis	*970*	*150*	*150*	*115*

As can be seen from Table 2, with the exception of the total trips estimated for the weekday a.m. peak hour period which did not change, this updated date reflects an increased and more conservative estimate for the expected trip generation for the proposed Kirkland Costco Gasoline addition than was previously assumed in the 2008 analysis. All time period estimates for the number of net new trips generated by the project have either remained constant or increased (some significantly so). The two time periods that show the most significant differences are the weekday daily and weekday a.m. peak hour estimates. This is due to the fact that the estimates prepared in 2008 for those two time periods were based on very limited sample sizes (only 1 or 2 data points) and the updated estimates now include data from several additional sites.

We trust this memorandum provides the required information for the trip generation estimate for the Kirkland Costco Gasoline addition project. If you have any question or require additional information please contact us at (208) 338-2683 or shennum@kittelson.com.

ATTACHMENT A – SAMPLE SITE INFORMATION

KITTELSON & ASSOCIATES, INC.
TRANSPORTATION ENGINEERING / PLANNING
101 S Capitol Boulevard, Suite 301, Boise, ID 83702 | 208.336.2643 | 208.336.2645

COSTCO GASOLINE TRIP CHARACTERISTICS DATA (updated June 28, 2011)

Location	Size (fueling positions)	Fuel Station Volume*	Weekday PM Peak Hour Trip Generation	Saturday Midday Peak Hour Trip Generation
ANTIOCH, CA	16	84%	N/A	380
BURBANK, CA	16	122%	416	468
CARLSBAD, CA	16	123%	440	N/A
CITY OF INDUSTRY, CA	16	128%	466	476
FOUNTAIN VALLEY, CA	16	131%	467	464
GARDEN GROVE, CA	16	119%	N/A	442
LAGUNA NIGUEL HR, CA	16	126%	N/A	502
LAGUNA NIGUEL, CA	16	111%	N/A	440
MORENA BLVD, CA	16	119%	372	N/A
OXNARD, CA	16	120%	392	410
RANCHO DEL REY, CA	16	144%	414	N/A
S. SAN DIEGO, CA	16	115%	362	N/A
SIMI VALLEY, CA	16	119%	414	392
VALLEJO, CA	16	112%	N/A	440
WOODINVILLE, WA	16	129%	416	N/A
AURORA VILLAGE, WA	16	113%	414	N/A
SCOTTSDALE, AZ	20	122%	498	570
TUCSON, AZ	20	96%	344	440
AVERAGE			417	452

*** known annual volume at this station reported as a % of the projected annual volume at Kirkland location**

COSTCO GASOLINE TRIP TYPE INFORMATION

Location	Fueling Positions	Internal Trip Capture			Pass-by Trip Capture		
		AM Peak Hour	PM Peak Hour	Saturday Peak	AM Peak Hour	PM Peak Hour	Saturday Peak
Waterbury, CT	12	0%	46%	29%		76%	70%
Missoula, MT	12	0%	29%	26%			
Milford, CT	12	0%	13%	44%		59%	54%
Helena, MT	12	0%	21%				
Oxnard, CA	16	0%	28%			29%	
Fountain Valley, CA	16	0%	32%	29%		62%	26%
Corona, CA	12	0%	27%	35%		34%	33%
City of Industry, CA	16	0%	29%	24%		53%	10%
Chino Hills, CA	12	0%	25%	25%		36%	11%
SE San Diego, CA	16	0%	42%			31%	
Rancho Del Ray, CA	16	0%	41%			32%	
Morena, CA	16	0%	42%			15%	
Carlsbad, CA	16	0%	31%			34%	
Laguna Niguel, CA	16	0%	41%	47%	34%	27%	36%
Scottsdale, AZ	20	0%	39%	47%	30%	18%	25%
Tucson, AZ	20	0%	66%			34%	
Average		0%	35%	34%	32%	39%	33%

ENCLOSURE 4

Appendix F: Transportation Concurrency Test

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

DEPARTMENT OF PUBLIC WORKS
MEMORANDUM

To: Planning Department

From: Thang Nguyen, Transportation Engineer

Date: July 25, 2011

Subject: Costco Gas Station Development, CON11-00006

The purpose of this memo is to inform you that the proposed Costco Gas Station development has passed traffic concurrency. This memo will serve as the concurrency test notice.

Project Description
The applicant is proposing to construct a 20 fueling position members only gas station at the current Kirkland Costco site.

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 (July 25, 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.

cc: Advantage
File

1) Project ID:	Costco Gas Station	4) Transportation Concurrency Status: PASS	6) Transportation Concurrency Certificate Date:
2) Project Description:	construct a member only gas station with 20 fueling positions	5) Transportation Concurrency Test Date: 25-Jul-11	7) Certificate of Occupancy Date
3) Build-out Year:	2012		

1.133333

0 0 0 0 0 OF TRAFFI 0 0 0 0 0 0 0 0

8) Daily Trips 0 | PM Peak Trips: 170 external trips (50/50) | Impacted Subarea(s): E | TAZ: 266

Signalized Intersection PM Peak Traffic Impact

Code	Intersection	Project PM Peak Turning Volumes: Eastbound LT	Eastbound TH	Eastbound RT	Northbound LT	Northbound TH	Northbound RT	Southbound LT	Southbound TH	Southbound RT	Westbound LT	Westbound TH	Westbound RT	PM Peak	Daily Trips	Sum of	Vol.
	North Driveway/NE 90th Street		85		45							40		170			
	Main Driveway/120th Ave NE					45			53					99			
	Delivery Driveway/120th Ave NE					45			53					99			
	NE 90th St/120th Ave NE		32	53	45							40		170			
408	NE 90th St/ 124th Ave NE	20	1	11	9					19		11		73			
404	124th Ave NE/NE 100th St				6	14	1		19					40			
311	NE 116th ST/124th Ave NE			6		11	1		10		2			31			
403	NE 85th St/ 120th Ave NE	37				3		10	1	41			5	97			
409	NE 85th St/122nd Ave NE		10									5		15			
402	NE 85th St/124th Ave NE		6		3	1		11				3	8	33			
412	NE 85th St/128th Ave NE		16	1		2						8	8	35			
401	NE 85th St/ 132nd Ave NE	1	14	1	1							15		32			
109	NE 85th St/114th Ave NE		6				1	1			1	6	1	16			
	#N/A													0			
	#N/A													0			
	#N/A													0			
	#N/A													0			
	#N/A													0			
	#N/A													0			

Transportation Concurrency Test

Subarea No	*LOS Standards* A= Max. Intersection LOS	B=Average 2013 V/C	*LOS with Project Impacts* a=No. exceeding 1.4	b=Average V/C	a <= A?	b<= B?
Southwest (1xx)	1.4	0.90	0	0.88	yes	yes
Northwest (2xx)	1.4	0.93	0	0.90	yes	yes
Northeast (3xx)	1.4	0.91	0	0.82	yes	yes
East(4xx)	1.4	1.06	0	0.88	yes	yes

TEST RESULTS

Result: **PASS**

* Based on Critical Movement, Planning Method TRC #212.
1. Number of intersection exceeding Average V/C LOS Standard (2012)
1. Sixth Year Target Average V/C ratio, see step 6, part 1 of the guidelines

ENCLOSURE 4

Appendix G: Parking Utilization Study

Hourly Parking Data
August 2011

Average Weekday Peak Hours

Parking Lot	Supply	10:00 AM	11:00 AM	12:00 PM	1:00 PM	2:00 PM
North Lot	239	22	20	24	29	34
Main Lot	395	192	275	341	315	315
East Lot	69	64	72	71	66	67
Costco Total	*703*	*278*	*367*	*436*	*410*	*416*
On-Street	-	8	7	5	8	7

*on-street parking counts provided for reference

Saturday Peak Hours

Parking Lot	Supply	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM
North Lot	239	79	66	67	60	80	51
Main Lot	395	371	361	371	370	380	355
East Lot	69	71	71	70	69	70	66
Costco Total	*703*	*521*	*498*	*508*	*499*	*530*	*472*
On-Street	-	10	8	7	7	8	6

*on-street parking counts provided for reference

ENCLOSURE 4