

Harbour Pointe Boulevard SW Supplemental Transportation Analysis



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CITY OF MUKILTEO

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Harbour Pointe Blvd SW Widening project

Supplemental Analysis of Alternative Intersection Operations

City of Mukilteo, WA

Introduction

The Harbour Pointe Blvd SW widening project begins at the intersection of SR 525 and terminates 1,584 feet west on Harbour Pointe Blvd SW. Safety improvements to mitigate collisions along this section of Harbour Pointe Blvd SW are the main purpose for this project. Proposed changes will also increase operational efficiency, improve the Level of Service (LOS) and create a continuous pedestrian and bike facility on the south side of Harbour Pointe Blvd SW connecting to existing pedestrian, bike and transit facilities on SR 525.

Another goal of this project is reducing the eastbound vehicle queuing approaching SR 525. Currently, eastbound vehicles can queue towards the west up to and through the intersection at Cyrus Way, both in the PM peak hour and midday.

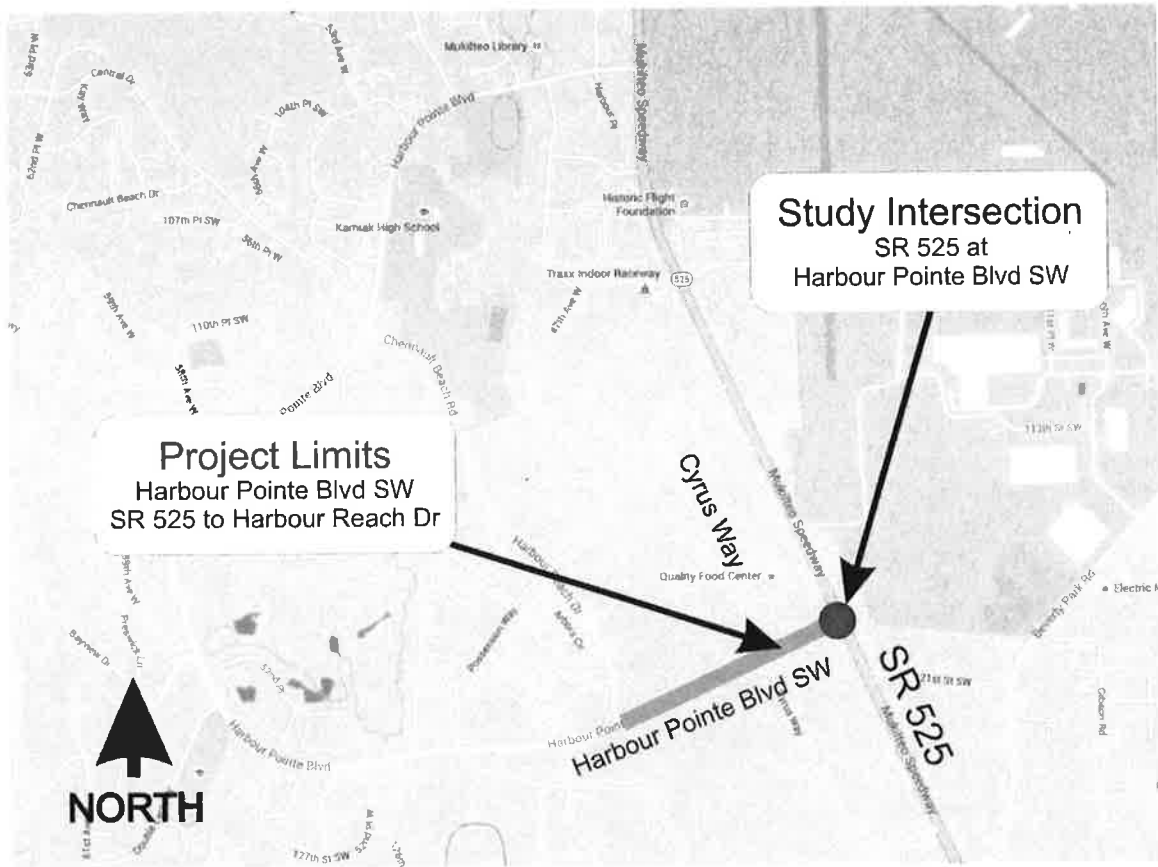
This traffic analysis looks at four alternative configurations for improving intersection operations at Harbour Point Blvd SW and SR 525. All these option require elimination of the southerly crosswalk.

- Option A modifies the signal operation to provide a protected dual right turn phase for eastbound vehicles.
- Option B is a split phase operation where all the eastbound vehicles movements are occurring in the same phase, and westbound movements all occur in another separate phase. This includes a dual right turn movement for eastbound vehicles.
- Option C is similar to Option B, and adds a dual left turn movement along with the dual right turn movement for eastbound vehicles.
- Option D restricts the northbound to southbound U-turns at the intersection and adds a dual left turn movement along with the dual right turn movement for eastbound vehicles.

Figure 1 shows a vicinity map for the study area.

This traffic analysis developed information to examine the performance measurements for level of service, vehicle delays and queue length for each of these options. Traffic operations for the data collection year (2015) was analyzed.

Figure 1 - Vicinity Map



Existing Roadway Conditions

Harbour Pointe Blvd SW is a four-lane urban collector in the City of Mukilteo with five lanes at the intersection approach to SR 525 and a two-way left-turn lane part of the way between Cyrus Way and Harbour Reach Dr. SR 525, also known as the Mukilteo Speedway, is a state route with two through lanes in the northbound and southbound directions. There is also a northbound dual left turn, and southbound single left turn lane, and bike lanes on both sides. Harbour Pointe Blvd SW carries 16,900 vehicles east/westbound daily and the posted speed limit is 35 mph. SR 525 carries 58,000 vehicles north/southbound daily and the posted speed is 40 mph.

Traffic Signal Operations and Maintenance

Per RCW 47.24.020(13), the state is responsible for operating and maintaining all traffic control devices on state routes in cities and towns with population less than 25,000. The City of Mukilteo has a population of nearly 21,000. Therefore, all the traffic signals on SR 525 are owned and operated by the Washington State Department of Transportation (WSDOT).

The traffic signal at Harbour Pointe Blvd SW and SR 525 is part of a coordinated system along SR 525 from Lincoln Way to Paine Field Blvd. This signal is not currently coordinated with the traffic signal at Cyrus Way, nor are there any communications links between these two signals at this time. Any proposed changes to the operation of this signal or changes to the hardware and communications require WSDOT approval in order to be implemented.

Data Collection

Traffic counts used for the traffic analysis were collected in 2014 and 2015. The AM, midday, and PM peak hour turning movements at the intersection of Harbour Pointe Blvd SW and SR 525 are summarized in Table.1. This analysis used the PM peak hour data to compare the performance of each option.

Table 1: Peak Hour Intersection Turning Movements at Harbour Pointe Blvd SW and SR 525

Peak Hour	PHF	% HV	Approach													
			Eastbound			Northbound			Westbound			Southbound				
			Lt turn	Thru	Rt turn	U-turn	Lt turn	Thru	Rt turn	Lt turn	Thru	Rt turn	U-turn	Lt turn	Thru	Rt turn
2015																
AM	0.96	5.5	95	17	380	25	508	960	62	51	29	6	3	32	906	64
MD	0.93	6.2	83	40	320	49	361	837	57	68	39	27	5	41	1053	53
PM	0.96	5.4	180	65	479	62	545	1270	42	86	37	28	2	19	1306	25

Description of Alternative Intersection Operations

For a traffic signal controlled intersection, there are numerous configurations and operations that can be modeled. Keeping in consideration that one of the project objectives is to reduce the length of the eastbound vehicle queuing, four different intersection configurations were developed that utilize an eastbound dual right turn. Another objective considered is trying to maintain traffic signal coordination on the SR 525 corridor. To meet this, the alternatives continued to operate within the existing 160 second cycle length for the traffic signal.

Other considerations include crosswalk removal. The protected eastbound right turns and westbound left-turns conflict with pedestrians crossing on the southerly crosswalk in all options analyzed. Pedestrian access across SR 525 would be handled in the northerly crosswalk.

This report compared these four alternative configurations to base conditions. Other variations of these alternative configurations can be run as needed. Performance measurement considered include Level of Service (LOS), delay, and vehicle queuing. The following is a list highlighting some of the configuration details related to each of the alternatives modeled.

Base Model.

This model uses the current lane configuration and signal timing setting from the Synchro model obtained from WSDOT. The model was updated with the 2015 traffic count data. The base lane configuration includes:

- A single eastbound right turn lane
- Crosswalks on all intersection approaches
- East and west left turns are permissive, not protected, and can run simultaneously.
- North and south left-turns are protected, not permissive, and include U-Turns.
- Northbound is a dual left turn onto Harbour Pointe Blvd SW.
- Right turns on red (ROTR) are allowed on all approaches.

Base Model Coordinated.

This model uses the base model in coordination with the traffic signal at Cyrus Way. The Cyrus Way traffic signal is modeled using an 80 second cycle.

Option A.

This alternative incorporates an eastbound dual right turn by modifying the through lane to a thru/right turn operation. The configuration includes:

- A dual eastbound right turn lane configuration.
- Crosswalk removed on southerly intersection approach.
- Eastbound right turns on red (RTOR) are restricted. RTOR on other approaches are permitted.
- East and west left turns are protected, not permissive, and can run simultaneously.
- North and south left-turns are protected, not permissive, and include U-Turns.
- Northbound is a dual left turn onto Harbour Pointe Blvd SW.

Option B.

This alternative incorporates an eastbound dual right turn operation by splitting the eastbound and westbound phases. The configuration includes:

- A dual eastbound right turn lane configuration.
- Crosswalk removed on southerly intersection approach.
- Eastbound right turns on red (RTOR) are restricted. RTOR on other approaches are permitted.
- East and west left turns are protected, not permissive, and can run simultaneously.
- North and south left-turns are protected, not permissive, and include U-Turns.
- Northbound is a dual left turn onto Harbour Pointe Blvd SW.

Option C.

This alternative incorporates an eastbound dual right turn operation by splitting the eastbound and westbound phases. The configuration includes:

- A dual eastbound right turn lane configuration.
- A dual eastbound left turn lane configuration. The through lane was modified to allow left/thru/right movements
- Crosswalk removed on southerly intersection approach.
- Eastbound right turns on red (RTOR) are restricted. RTOR on other approaches are permitted.
- East and west left turns are protected, not permissive, and can run simultaneously.
- North and south left-turns are protected, not permissive, and include U-Turns.
- Northbound is a dual left turn onto Harbour Pointe Blvd SW.

Option D.

This alternative incorporates an eastbound dual right turn by modifying the through lane to a thru/right turn operation and restricting north to south U-Turns. The configuration includes:

- A dual eastbound right turn lane configuration.
- A right turn overlap is added during the northbound left-turn phase.
- Crosswalk removed on southerly intersection approach.
- Right turns on red (ROTR) are allowed on all approaches.
- East and west left turns are protected, not permissive, and can run simultaneously.
- North and south left-turns are protected, not permissive.
- Northbound is a dual left turn onto Harbour Pointe Blvd SW.
- North to south U-Turns are restricted.

Assumptions

The following is a list of some of the parameters and assumptions used for the analysis that are common in the base and alternative models:

- Cycle Length – Used the existing 160 second cycle for all options.
- Ped Flashing Don't Walk – Computed using 3.5 ft/sec walking speed
- Peak Hour Factor – 0.96
- Percentage of Heavy Vehicles – 5%
- Analysis year – 2015
- Yellow and All-Red – used existing values.
- Ped Initial Walk – 6 seconds

Analysis

Synchro software version 9.1 was used to perform the analysis of the traffic signal operations for each option. This software was used to develop a model of Harbour Pointe Blvd SW from Cyrus Way to SR 525, and includes existing lane configurations and traffic signal timings. The Synchro model calculated the delay and LOS for each approach. Detailed outputs from the model runs for the SR 525 intersection are located in Appendix A. The delay and LOS values are summarized in Table 2.

Level of Service – This analysis used Highway Capacity Manual (HCM) 2000 edition because the 2010 edition methodology does not have the ability to evaluate U-Turn movements. Both the 2000 edition and the 2010 edition use the same intersection LOS and Delay measures.

Intersection LOS and Delay		
LOS	Signalized Delay per Vehicle (sec/veh)	Unsignalized Delay per Vehicle (sec/veh)
A	0-10	0-10
B	>10-20	>10-15
C	>20-35	>15-25
D	>35-55	>25-35
E	>55-80	>35-50
F	>80	>50

Source: 2010 Highway Capacity Manual

Table 2: Synchro Values for Vehicle Delay (seconds) and Level of Service, by Approach

Option	Approach				Overall Intersection
	EB	NB	WB	SB	
Base	55.8 - E	38.8 - D	41.6 - D	45.5 - D	44.0 - D
Base-Coord	55.8 - E	38.8 - D	41.6 - D	45.5 - D	44.0 - D
Opt A	77.1 - E	45.2 - D	97.2 - F	66.8 - E	59.7 - E
Opt B	107.3 - F	49.3 - D	71.0 - E	102.2 - F	77.5 - E
Opt C	106.8 - F	53.0 - D	71.4 - E	102.2 - F	79.1 - E
Opt D	48.7 - D	42.3 - D	70.7 - E	60.3 - E	50.2 - D

Synchro software uses HCM formulas to calculate vehicle queuing. This software can be limited when calculating the queuing distance of the approaches which have movements that exceed storage capacity or may be impacted by vehicle queues from an adjacent intersection. In order to better understand the length of queuing on Harbour Pointe Blvd SW, SimTraffic microsimulation software was used. SimTraffic simulates the operation of the roadway network in the model.

For this report, each alternative model was run five times, and the results for the intersection movement were averaged over the five runs. The queuing results are shown in Table 3. Detailed model outputs are located in Appendix B.

Table 3: SimTraffic Values for Vehicle 95th Percentile Queuing (feet), by Movement

	Movement Direction												
Option	EBL	EBT	EBR	WBL	WBT	WBR	NBUL	NBL	NBT	NBTR	SBL	SBT	SBTR
Base	270	306	790	117	120	39	395	421	348	366	150	763	756
Base-Coord	221	153	389	123	111	51	407	451	355	380	115	707	643
Opt A	269	330	310	142	182	57	426	480	415	438	80	809	743
Opt B	335	496	458	132	126	56	431	489	408	443	88	951	934
Opt C	381	557	516	119	126	42	542	602	481	436	124	905	908
Opt D	239	236	230	135	136	64	445	494	410	441	111	887	859

Comparison of Modeling Results

Option A Review

Table 2 shows the overall intersection LOS 59.7 seconds, which is LOS E. Even with the dual right turn, Syncho analysis shows the delay for eastbound vehicles is 77.1 (LOS E), which is approximately 22 seconds longer than the base condition. This is, in part, because eastbound right turns on red need to be prohibited to avoid conflicts with northbound to southbound U-turns and westbound left turns.

Simtraffic is a microsimulation tool models the effects of nearby intersections on the vehicle queues better than Synchro, which uses HCM formulas. Table 3 shows the SimTraffic analysis for eastbound right turn queues is 310 feet as opposed to 790 feet in the base condition, and 389 feet with coordination. This indicates that the dual right turn can reduce the overall eastbound queuing.

The northbound 95 percentile queues increase an average of 69 feet in the PM peak hour and the southbound queues about 17 feet. While slightly higher than existing, these queues indicate SR 525 can still operate at an acceptable LOS.

Option B Review

Table 2 shows the overall intersection LOS 77.5 seconds, which is LOS E. The Syncho analysis shows the delay for eastbound vehicles is 107.3 (LOS F), which is approximately 52 seconds longer than the base condition. This is, in part, because eastbound right turns on red need to be prohibited to avoid conflicts with northbound to southbound U-turns.

Table 3 shows the SimTraffic analysis for eastbound right turn queues is 458 feet as opposed to 790 feet in the base condition, and 389 feet with coordination. This indicates that the dual right turn for a split-phase operation may reduce the overall eastbound queuing, depending on signal coordination and optimization.

The northbound 95 percentile queues increase an average of 68 feet in the PM peak hour and the southbound queues increase about 183 feet. The southbound queues fall into LOS F category.

Option C Review

Table 2 shows the overall intersection LOS 79.1 seconds, which is LOS E. The Syncho analysis shows the delay for eastbound vehicles is 106.8 (LOS F), which is approximately 51 seconds longer than the base condition. This is, in part, because eastbound right turns on red need to be prohibited to avoid conflicts with northbound to southbound U-turns.

Table 3 shows the SimTraffic analysis for eastbound right turn queues is 516 feet as opposed to 790 feet in the base condition, and 389 feet with coordination. This indicates that the dual right turn for a split-phase operation may reduce the overall eastbound queuing, depending on signal coordination and optimization.

The northbound 95 percentile queues increase an average of 101 feet in the PM peak hour and the southbound queues increase about 147 feet. The southbound queues fall into LOS F category.

Option D Review

Table 2 shows the overall intersection LOS 50.2 seconds, which is LOS D. The Syncho analysis shows the delay for eastbound vehicles is 48.7 (LOS D), which is approximately 7 seconds shorter than the base condition. This is, in part, because eastbound right turns on red can be allowed, and can also overlap with northbound to westbound left-turns.

Table 3 shows the SimTraffic analysis for eastbound right turn queues is 230 feet as opposed to 790 feet in the base condition, and 389 feet with coordination. This indicates that the dual right turn can reduce the overall eastbound queuing.

The northbound 95 percentile queues increase an average of 68 feet in the PM peak hour and the southbound queues increase about 198 feet. While slightly higher than existing, these queues indicate SR 525 can still operate at an acceptable LOS.

Summary of Analysis Findings

Option D showed the best intersection performance while reducing the eastbound 95th percentile vehicle queues for eastbound vehicles. Southbound vehicle queues increased about 15%. Restricting the north to south U-turns will require northbound drivers to find a more indirect route to access westside businesses. Drivers exiting driveways and roadways on the east side will need to take a longer route to head southbound.

Option A showed the best overall performance when allowing northbound to southbound U-turns. While the dual right turn has shorter queues, the overall intersection delay increases about 16 seconds to LOS E. There are minor increases to the 95th percentile queues for northbound and southbound

Appendix A

Synchro Reports

Lanes, Volumes, Timings

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Sup-2015 PM-base.syn
02/08/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations	↔	↑	↔	↔	↑	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	180	65	479	86	37	28	62	545	1270	42	2	19	1306	25
Future Volume (vph)	180	65	479	86	37	28	62	545	1270	42	2	19	1306	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	100		100		756		0		150		0
Storage Lanes	1		1	1		1		2		0		1		0
Taper Length (ft)	25			25				25				25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.97	0.95	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850			0.995				0.997	
Flt Protected	0.950			0.950				0.950				0.950		
Satd. Flow (prot)	1719	1810	1538	1719	1810	1538	0	3351	3421	0	0	1727	3428	0
Flt Permitted	0.732			0.707				0.950				0.950		
Satd. Flow (perm)	1325	1810	1538	1279	1810	1538	0	3351	3421	0	0	1727	3428	0
Right Turn on Red			Yes			Yes				Yes				Yes
Satd. Flow (RTOR)			487			82			3				1	
Link Speed (mph)	35				35				40				40	
Link Distance (ft)	888				554				955				825	
Travel Time (s)	17.3				10.8				16.3				14.1	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	5%	5%	0%	5%	5%	5%
Adj. Flow (vph)	188	68	499	90	39	29	65	568	1323	44	2	20	1360	26
Shared Lane Traffic (%)														
Lane Group Flow (vph)	188	68	499	90	39	29	0	633	1367	0	0	22	1386	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)	12	12		12	12			24	24			24	24	
Link Offset(ft)	0	0		0	0			0	0			0	0	
Crosswalk Width(ft)	16	16		16	16			16	16			16	16	
Two way Left Turn Lane														
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15	9	15	15	9	9	15	15	9	9	15	15	9
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	Prot	NA	Prot	Prot	Prot	NA	NA
Protected Phases		4			8		5	5	2		1	1	6	
Permitted Phases	4		4	8		8								

Lanes, Volumes, Timings

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Sup-2015 PM-base.syn
02/08/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	5	5	2		1	1	6	
Switch Phase														
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	9.0	9.0	29.0	9.0	9.0	9.0	29.0	29.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	70.0	70.0	90.0	70.0	35.0	35.0	55.0	55.0
Total Split (%)	21.9%	21.9%	21.9%	21.9%	21.9%	21.9%	43.8%	43.8%	56.3%	43.8%	21.9%	21.9%	34.4%	34.4%
Maximum Green (s)	30.0	30.0	30.0	30.0	30.0	30.0	65.0	65.0	85.0	65.0	30.0	30.0	50.0	50.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0			5.0				5.0	5.0
Lead/Lag							Lead	Lead	Lag	Lead	Lead	Lead	Lag	Lag
Lead-Lag Optimize?							Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	C-Min	None	None	None	C-Min	C-Min
Walk Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Flash Dont Walk (s)	24.0	24.0	24.0	24.0	24.0	24.0	24.0	24.0	18.0	24.0	18.0	18.0	18.0	18.0
Pedestrian Calls (#/hr)	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Act Effct Green (s)	26.8	26.8	26.8	26.8	26.8	26.8	36.9	36.9	114.9	36.9	7.6	7.6	81.3	81.3
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17	0.17	0.23	0.23	0.72	0.23	0.05	0.05	0.51	0.51
v/c Ratio	0.85	0.22	0.75	0.42	0.13	0.09	0.82	0.82	0.56	0.82	0.27	0.27	0.80	0.80
Control Delay	95.1	58.2	13.2	65.0	55.9	0.5	67.5	67.5	13.0	67.5	80.9	80.9	38.2	38.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.1	58.2	13.2	65.0	55.9	0.5	67.5	67.5	13.0	67.5	80.9	80.9	38.2	38.2
LOS	F	E	B	E	E	A	E	E	B	E	F	F	D	D
Approach Delay														
Approach LOS														

Intersection Summary

Area Type: Other

Cycle Length: 160

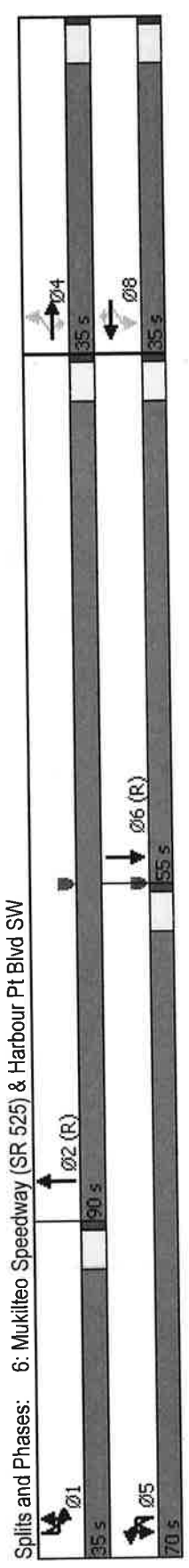
Actuated Cycle Length: 160

Offset: 0 (0%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 100

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Control Type: Actuated-Coordinated	
Maximum v/c Ratio: 0.85	Intersection LOS: D
Intersection Signal Delay: 35.1	ICU Level of Service G
Intersection Capacity Utilization 105.3%	
Analysis Period (min) 15	



Queues

Sup-2015 PM-base.syn
02/08/2017

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	188	68	499	90	39	29	633	1367	22	1386
v/c Ratio	0.85	0.22	0.75	0.42	0.13	0.09	0.82	0.56	0.27	0.80
Control Delay	95.1	58.2	13.2	65.0	55.9	0.5	67.5	13.0	80.9	38.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	95.1	58.2	13.2	65.0	55.9	0.5	67.5	13.0	80.9	38.2
Queue Length 50th (ft)	189	61	10	83	34	0	327	385	23	643
Queue Length 95th (ft)	#307	110	135	144	71	0	374	473	55	#837
Internal Link Dist (ft)		808			474			875		745
Turn Bay Length (ft)	300			100		100	756		150	
Base Capacity (vph)	248	339	684	239	339	355	1361	2458	323	1743
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.76	0.20	0.73	0.38	0.12	0.08	0.47	0.56	0.07	0.80

Intersection Summary

- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Sup-2015 PM-base-coord.syn
02/09/2017

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations	↩	↑	↗	↗	↑	↗	↗	↗	↑	↗	↗	↗	↑	↗
Traffic Volume (vph)	180	65	479	86	37	28	62	545	1270	42	2	19	1306	25
Future Volume (vph)	180	65	479	86	37	28	62	545	1270	42	2	19	1306	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	100		100		756		0		150		0
Storage Lanes	1		1	1		1		2		0		1		0
Taper Length (ft)	25			25				25				25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.97	0.95	0.95	0.95	1.00	0.95	0.95
Frt			0.850			0.850			0.995				0.997	
Flt Protected	0.950			0.950				0.950				0.950		
Satd. Flow (prot)	1719	1810	1538	1719	1810	1538	0	3351	3421	0	0	1727	3428	0
Flt Permitted	0.732			0.713				0.950				0.950		
Satd. Flow (perm)	1325	1810	1538	1290	1810	1538	0	3351	3421	0	0	1727	3428	0
Right Turn on Red			Yes			Yes				Yes				Yes
Satd. Flow (RTOR)		35	227		35	82			4				1	
Link Speed (mph)		888			554				40				825	
Link Distance (ft)					10.8				16.3				14.1	
Travel Time (s)		17.3							0.96				0.96	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	5%	5%	0%	5%	5%	5%
Adj. Flow (vph)	188	68	499	90	39	29	65	568	1323	44	2	20	1360	26
Shared Lane Traffic (%)														
Lane Group Flow (vph)	188	68	499	90	39	29	0	633	1367	0	0	22	1386	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)		12		12	12				24			24	24	
Link Offset(ft)		0		0	0				0			0	0	
Crosswalk Width(ft)		16		16	16				16			16	16	
Two way Left Turn Lane														
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15		9
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Prot	Prot	NA	Prot	Prot	Prot	NA	NA
Protected Phases		4			8		5	5	2		1	1	6	
Permitted Phases	4		4	8		8								

Lanes, Volumes, Timings

Sup-2015 PM-base-coord.syn
02/09/2017

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Detector Phase	4	4	4	8	8	8	5	5	2		1	1	6	
Switch Phase														
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	
Minimum Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	9.0	9.0	29.0		9.0	9.0	29.0	
Total Split (s)	46.0	46.0	46.0	46.0	46.0	46.0	39.0	39.0	99.0		15.0	15.0	75.0	
Total Split (%)	28.8%	28.8%	28.8%	28.8%	28.8%	28.8%	24.4%	24.4%	61.9%		9.4%	9.4%	46.9%	
Maximum Green (s)	41.0	41.0	41.0	41.0	41.0	41.0	34.0	34.0	94.0		10.0	10.0	70.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0			5.0		5.0	5.0	5.0	
Lead/Lag							Lead	Lead	Lag		Lead	Lead	Lag	
Lead-Lag Optimize?							Yes	Yes	Yes		Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	None	C-Min		None	None	C-Min	
Walk Time (s)	6.0	6.0	6.0	6.0	6.0	6.0			6.0				6.0	
Flash Dont Walk (s)	24.0	24.0	24.0	24.0	24.0	24.0			18.0				18.0	
Pedestrian Calls (#/hr)	0	0	0	0	0	0			0				0	
Act Effct Green (s)	36.6	36.6	36.6	36.6	36.6	36.6			105.2		7.6	7.6	75.6	
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23	0.23			0.66		0.05	0.05	0.47	
v/c Ratio	0.62	0.16	0.95	0.31	0.09	0.07			0.61		0.27	0.27	0.86	
Control Delay	59.0	43.8	56.2	52.6	46.7	0.3			19.0		81.0	81.0	44.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0			0.0		0.0	0.0	0.0	
Total Delay	59.0	43.8	56.2	52.6	46.7	0.3			19.0		81.0	81.0	44.9	
LOS	E	D	E	D	D	A			B		F	F	D	
Approach Delay		55.8			41.6				38.8				45.5	
Approach LOS		E			D				D				D	

Intersection Summary

Area Type: Other

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 52 (33%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 100

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.95

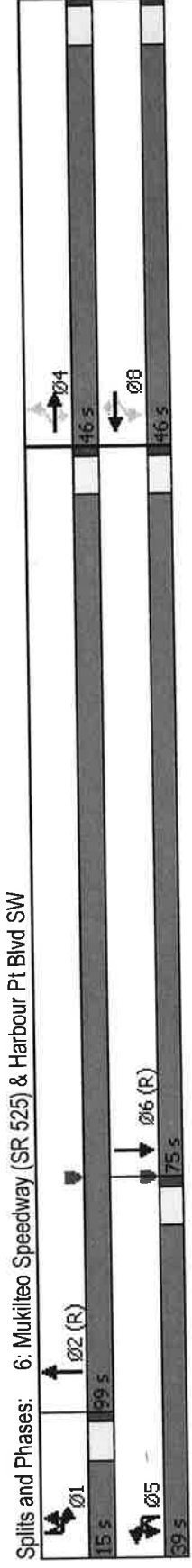
Intersection Signal Delay: 44.0

Intersection Capacity Utilization 105.3%

Analysis Period (min) 15

Intersection LOS: D

ICU Level of Service G



Queues

Sup-2015 PM-base-coord.syn
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6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	188	68	499	90	39	29	633	1367	22	1386
v/c Ratio	0.62	0.16	0.95	0.31	0.09	0.07	0.92	0.61	0.27	0.86
Control Delay	59.0	43.8	56.2	52.6	46.7	0.3	81.7	19.0	81.0	44.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	59.0	43.8	56.2	52.6	46.7	0.3	81.7	19.0	81.0	44.9
Queue Length 50th (ft)	145	46	194	76	31	0	335	476	23	714
Queue Length 95th (ft)	266	81	#322	131	65	0	#435	577	55	#834
Internal Link Dist (ft)		808			474			875		745
Turn Bay Length (ft)	300			100		100	756		150	
Base Capacity (vph)	339	463	562	330	463	455	712	2251	107	1620
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.55	0.15	0.89	0.27	0.08	0.06	0.89	0.61	0.21	0.86

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

Sup-2015 PM-opt A.syn
02/09/2017

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	180	65	479	86	37	28	62	545	1270	42	2	19	1306	25
Future Volume (vph)	180	65	479	86	37	28	62	545	1270	42	2	19	1306	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300	0	0	100	100	100	100	756	0	0	0	150	0	0
Storage Lanes	1	1	1	1	1	1	1	2	2	0	0	1	1	0
Taper Length (ft)	25			25				25				25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.97	0.95	0.95	0.95	1.00	0.95	0.95
Frt	0.950	0.885	0.850	0.950		0.850		0.950	0.995			0.950	0.997	
Frt Protected														
Satd. Flow (prot)	1719	1521	1461	1719	1810	1538	0	3351	3421	0	0	1727	3428	0
Frt Permitted	0.950			0.950				0.950				0.950		
Satd. Flow (perm)	1719	1521	1461	1719	1810	1538	0	3351	3421	0	0	1727	3428	0
Right Turn on Red			No			Yes				Yes				Yes
Satd. Flow (RTOR)						116			3				1	
Link Speed (mph)	35	35			35				40				40	
Link Distance (ft)	888	888			554				955				825	
Travel Time (s)	17.3	17.3			10.8				16.3				14.1	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	5%	5%	0%	5%	5%	5%
Adj. Flow (vph)	188	68	499	90	39	29	65	568	1323	44	2	20	1360	26
Shared Lane Traffic (%)			44%											
Lane Group Flow (vph)	188	288	279	90	39	29	0	633	1367	0	0	22	1386	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)	12	12		12	12			24	24			24	24	
Link Offset(ft)	0	0		0	0			0	0			0	0	
Crosswalk Width(ft)	16	16		16	16			16	16			16	16	
Two way Left Turn Lane														
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15	9	15	15	9	9	15	15	9	9	15	15	9
Turn Type	Prot	NA	Prot	Prot	NA	Perm	Prot	Prot	NA	Prot	Prot	Prot	NA	Prot
Protected Phases	7	4	4	3	8	8	5	5	2	1	1	1	6	6
Permitted Phases						8								

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Detector Phase	7	4	4	3	8	8	5	5	2		1	1	6	
Switch Phase														
Minimum Initial (s)	5.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.5	9.0	9.0	9.5	35.0	35.0	9.0	9.0	29.0	9.0	9.0	9.0	29.0	29.0
Total Split (s)	20.0	41.0	41.0	14.0	35.0	35.0	35.0	35.0	91.0	14.0	14.0	14.0	70.0	70.0
Total Split (%)	12.5%	25.6%	25.6%	8.8%	21.9%	21.9%	21.9%	21.9%	56.9%	8.8%	8.8%	8.8%	43.8%	43.8%
Maximum Green (s)	15.5	36.0	36.0	9.5	30.0	30.0	30.0	30.0	86.0	9.0	9.0	9.0	65.0	65.0
Yellow Time (s)	3.5	4.0	4.0	3.5	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	5.0	5.0	4.5	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lag	Lag	Lag	Lead	Lead	Lead	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	C-Min	C-Min	None	None	C-Min	C-Min
Walk Time (s)					6.0	6.0			6.0	6.0			6.0	6.0
Flash Dont Walk (s)					24.0	24.0			18.0	18.0			18.0	18.0
Pedestrian Calls (#/hr)					0	0			0	0			0	0
Act Effct Green (s)	36.2	33.4	33.4	9.5	8.8	8.8			94.6	7.4	7.4	7.4	65.7	65.7
Actuated g/C Ratio	0.23	0.21	0.21	0.06	0.06	0.06			0.59	0.05	0.05	0.05	0.41	0.41
v/c Ratio	0.48	0.91	0.92	0.88	0.39	0.15			0.68	0.28	0.28	0.28	0.98	0.98
Control Delay	52.1	84.3	86.6	134.0	83.4	1.6			25.9	81.9	81.9	81.9	66.6	66.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.1	84.3	86.6	134.0	83.4	1.6			25.9	81.9	81.9	81.9	66.6	66.6
LOS	D	F	F	F	F	A			C	C	F	F	E	E
Approach Delay		77.1			97.2				45.2				66.8	
Approach LOS		E			F				D				E	

Intersection Summary

Area Type: Other
 Cycle Length: 160
 Actuated Cycle Length: 160
 Offset: 52 (33%), Referenced to phase 2:NBT and 6:SBT, Start of Green
 Natural Cycle: 145

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.98

Intersection Signal Delay: 59.7

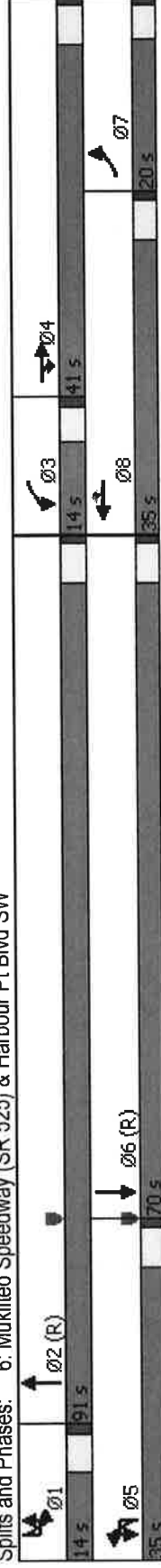
Intersection Capacity Utilization 95.0%

Analysis Period (min) 15

Intersection LOS: E

ICU Level of Service F

Splits and Phases: 6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW



Queues

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

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	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group										
Lane Group Flow (vph)	188	288	279	90	39	29	633	1367	22	1386
v/c Ratio	0.48	0.91	0.92	0.88	0.39	0.15	0.95	0.68	0.28	0.98
Control Delay	52.1	84.3	86.6	134.0	83.4	1.6	86.8	25.9	81.9	66.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.1	84.3	86.6	134.0	83.4	1.6	86.8	25.9	81.9	66.6
Queue Length 50th (ft)	152	309	300	95	40	0	~349	552	23	756
Queue Length 95th (ft)	268	#475	#467	#210	81	0	#482	654	55	#926
Internal Link Dist (ft)		808			474			875		745
Turn Bay Length (ft)	300			100		100	756		150	
Base Capacity (vph)	388	342	328	102	339	382	667	2023	97	1409
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.48	0.84	0.85	0.88	0.12	0.08	0.95	0.68	0.23	0.98

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
- Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
- Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

Sup-2015 PM-opt B.syn
02/09/2017

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	180	65	479	86	37	28	62	545	1270	42	2	19	1306	25
Future Volume (vph)	180	65	479	86	37	28	62	545	1270	42	2	19	1306	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	100		100		756		0		150		0
Storage Lanes	1		1	1		1		2		0		1		0
Taper Length (ft)	25			25				25				25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.95	0.97	0.95	0.95	0.95	1.00	0.95	0.95
Frt		0.885	0.850			0.850			0.995				0.997	
Frt Protected	0.950			0.950				0.950				0.950		
Satd. Flow (prot)	1719	1521	1461	1719	1810	1538	0	3351	3421	0	0	1727	3428	0
Frt Permitted	0.950			0.575				0.950				0.950		
Satd. Flow (perm)	1719	1521	1461	1040	1810	1538	0	3351	3421	0	0	1727	3428	0
Right Turn on Red			No			Yes			Yes					Yes
Satd. Flow (RTOR)						116			3				1	
Link Speed (mph)		35			35				40				40	
Link Distance (ft)		888			554				955				825	
Travel Time (s)		17.3			10.8				16.3				14.1	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	5%	5%	0%	5%	5%	5%
Adj. Flow (vph)	188	68	499	90	39	29	65	568	1323	44	2	20	1360	26
Shared Lane Traffic (%)			44%											
Lane Group Flow (vph)	188	288	279	90	39	29	0	633	1367	0	0	22	1386	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)		12			12				24				24	
Link Offset(ft)		0			0				0				0	
Crosswalk Width(ft)		16			16				16				16	
Two way Left Turn Lane														
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15		9
Turn Type	Split	NA	Prot	Perm	NA	Perm	Prot	Prot	NA	Prot	Prot	Prot	NA	NA
Protected Phases	4	4	4		3		5	5	2	1	1	1	6	
Permitted Phases				3		3								

Lanes, Volumes, Timings

Sup-2015 PM-opt B.syn
02/09/2017

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Detector Phase	4	4	4	3	3	3	5	5	2		1	1	6	
Switch Phase														
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	9.0	9.0	9.0	35.0	35.0	35.0	9.0	9.0	29.0	9.0	9.0	9.0	29.0	29.0
Total Split (s)	35.0	35.0	35.0	35.0	35.0	35.0	26.0	26.0	76.0	14.0	14.0	14.0	64.0	64.0
Total Split (%)	21.9%	21.9%	21.9%	21.9%	21.9%	21.9%	16.3%	16.3%	47.5%	8.8%	8.8%	8.8%	40.0%	40.0%
Maximum Green (s)	30.0	30.0	30.0	30.0	30.0	30.0	21.0	21.0	71.0	9.0	9.0	9.0	59.0	59.0
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lag	Lag	Lead	Lead	Lag	Lag
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Recall Mode	None	None	None	None	None	None	None	None	C-Min	C-Min	None	None	C-Min	C-Min
Walk Time (s)				6.0	6.0	6.0			6.0	6.0			6.0	6.0
Flash Dont Walk (s)				24.0	24.0	24.0			18.0	18.0			18.0	18.0
Pedestrian Calls (#/hr)				0	0	0			0	0			0	0
Act Effct Green (s)	30.0	30.0	30.0	19.1	19.1	19.1			87.7	87.7			59.0	59.0
Actuated g/C Ratio	0.19	0.19	0.19	0.12	0.12	0.12			0.55	0.55			0.37	0.37
v/c Ratio	0.58	1.01	1.02	0.73	0.18	0.10			0.73	0.73			1.10	1.10
Control Delay	67.6	118.8	122.3	97.5	62.2	0.7			32.4	32.4			102.5	102.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0			0.0	0.0
Total Delay	67.6	118.8	122.3	97.5	62.2	0.7			32.4	32.4			102.5	102.5
LOS	E	F	F	F	E	A			C	C			F	F
Approach Delay		107.3			71.0				49.3	49.3			102.2	102.2
Approach LOS		F			E				D	D			F	F

Intersection Summary

Area Type: Other

Cycle Length: 160

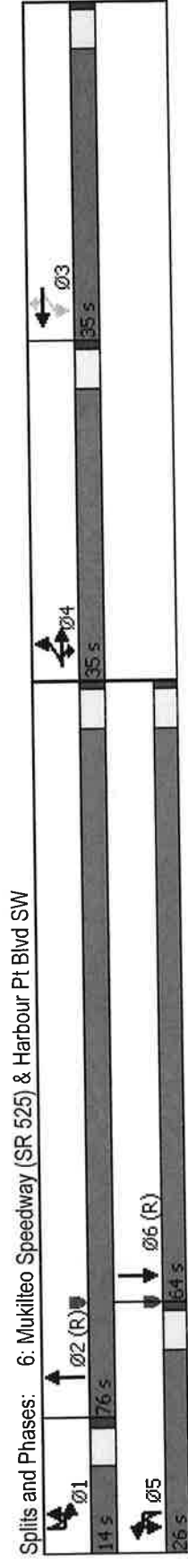
Actuated Cycle Length: 160

Offset: 31 (19%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 145

Lanes, Volumes, Timings
6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Control Type: Actuated-Coordinated
Maximum v/c Ratio: 1.10
Intersection LOS: E
Intersection Signal Delay: 77.5
ICU Level of Service F
Intersection Capacity Utilization 95.4%
Analysis Period (min) 15



Queues

Sup-2015 PM-opt B.syn
02/09/2017

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group										
Lane Group Flow (vph)	188	288	279	90	39	29	633	1367	22	1386
v/c Ratio	0.58	1.01	1.02	0.73	0.18	0.10	0.95	0.73	0.27	1.10
Control Delay	67.6	118.8	122.3	97.5	62.2	0.7	85.8	32.4	80.9	102.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	67.6	118.8	122.3	97.5	62.2	0.7	85.8	32.4	80.9	102.5
Queue Length 50th (ft)	182	~326	~324	92	37	0	341	585	23	~861
Queue Length 95th (ft)	271	#536	#527	151	72	0	#563	789	55	#1002
Internal Link Dist (ft)		808			474			875		745
Turn Bay Length (ft)	300			100		100	756		150	
Base Capacity (vph)	322	285	273	195	339	382	667	1875	99	1264
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.58	1.01	1.02	0.46	0.12	0.08	0.95	0.73	0.22	1.10

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.

Queue shown is maximum after two cycles.

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

Sup-2015 PM-opt C.syn
02/09/2017

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	180	65	479	86	37	28	62	545	1270	42	2	19	1306	25
Future Volume (vph)	180	65	479	86	37	28	62	545	1270	42	2	19	1306	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	100		100		756		0		150		0
Storage Lanes	1		1	1		1		2		0		1		0
Taper Length (ft)	25			25				25				25		
Lane Util. Factor	0.95	0.91	0.95	1.00	1.00	1.00	0.95	0.97	0.95	0.95	0.95	1.00	0.95	0.95
Frt		0.893	0.850			0.850			0.995				0.997	
Flt Protected	0.950	0.997		0.950				0.950				0.950		
Satd. Flow (prot)	1633	1466	1461	1719	1810	1538	0	3351	3421	0	0	1727	3428	0
Flt Permitted	0.950	0.997		0.560				0.950				0.950		
Satd. Flow (perm)	1633	1466	1461	1013	1810	1538	0	3351	3421	0	0	1727	3428	0
Right Turn on Red			No			Yes				Yes				Yes
Satd. Flow (RTOR)						116			3				1	
Link Speed (mph)		35			35				40				40	
Link Distance (ft)		888			554				955				825	
Travel Time (s)		17.3			10.8				16.3				14.1	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	0%	5%	5%	5%	0%	5%	5%	5%
Adj. Flow (vph)	188	68	499	90	39	29	65	568	1323	44	2	20	1360	26
Shared Lane Traffic (%)	10%		43%											
Lane Group Flow (vph)	169	302	284	90	39	29	0	633	1367	0	0	22	1386	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	RNA	Left	Left	Right	RNA	Left	Left	Right
Median Width (ft)		12		12	12				24				24	
Link Offset (ft)		0		0	0				0				0	
Crosswalk Width (ft)		16		16	16				16				16	
Two way Left Turn Lane														
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	9	15		9	9	15		9
Turn Type	Split	NA	Prot	Perm	NA	Perm	Prot	Prot	NA	NA	Prot	Prot	NA	
Protected Phases	4	4	4		3		5	5	2		1	1	6	
Permitted Phases				3		3								

Mukilteo HPB/SR 525 5:00 pm 10/19/2015 2015 PM - Opt C split phase

Lochner

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBU	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Detector Phase	4	4	4	3	3	3	5	5	2		1	1	6	
Switch Phase														
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	
Minimum Split (s)	9.0	9.0	9.0	35.0	35.0	35.0	9.0	9.0	29.0		9.0	9.0	29.0	
Total Split (s)	36.0	36.0	36.0	35.0	35.0	35.0	25.0	25.0	77.0		12.0	12.0	64.0	
Total Split (%)	22.5%	22.5%	22.5%	21.9%	21.9%	21.9%	15.6%	15.6%	48.1%		7.5%	7.5%	40.0%	
Maximum Green (s)	31.0	31.0	31.0	30.0	30.0	30.0	20.0	20.0	72.0		7.0	7.0	59.0	
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0			0.0				0.0	
Total Lost Time (s)	5.0	5.0	5.0	5.0	5.0	5.0			5.0				5.0	
Lead/Lag	Lead	Lead	Lead	Lag	Lag	Lag	Lead	Lead	Lag		Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None	None	None	None	None	None	None	C-Min		None	None	C-Min	
Walk Time (s)				6.0	6.0	6.0			6.0				6.0	
Flash Dont Walk (s)				24.0	24.0	24.0			18.0				18.0	
Pedestrian Calls (#/hr)				0	0	0			0				0	
Act Effct Green (s)	31.0	31.0	31.0	19.5	19.5	19.5			86.6			7.3	59.0	
Actuated g/C Ratio	0.19	0.19	0.19	0.12	0.12	0.12			0.54			0.05	0.37	
v/c Ratio	0.53	1.06	1.00	0.73	0.18	0.10			0.74			0.28	1.10	
Control Delay	63.5	125.8	112.5	98.4	61.8	0.7			33.3			82.4	102.5	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0			0.0			0.0	0.0	
Total Delay	63.5	125.8	112.5	98.4	61.8	0.7			33.3			82.4	102.5	
LOS	E	F	F	F	E	A			C			F	F	
Approach Delay		106.8			71.4				53.0				102.2	
Approach LOS		F			E				D				F	
Intersection Summary														
Area Type:	Other													
Cycle Length:	160													
Actuated Cycle Length:	160													
Offset:	52 (33%), Referenced to phase 2:NBT and 6:SBT, Start of Green													
Natural Cycle:	145													

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 1.10

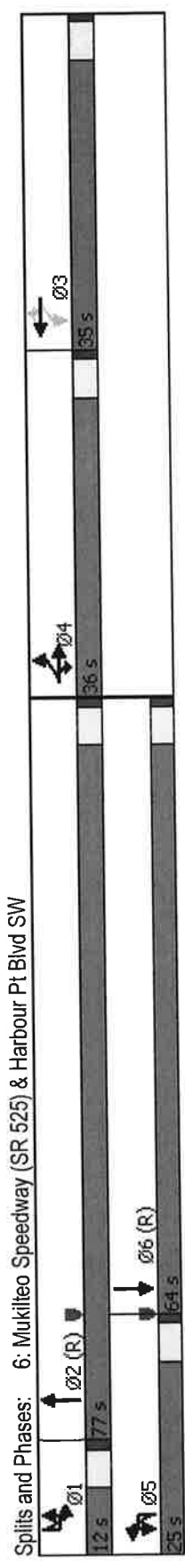
Intersection LOS: E

Intersection Signal Delay: 79.1

ICU Level of Service F

Intersection Capacity Utilization 95.4%

Analysis Period (min) 15



Queues

6: Mukiteo Speedway (SR 525) & Harbour Pt Blvd SW

Sup-2015 PM-opt C.syn
02/09/2017



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	169	302	284	90	39	29	633	1367	22	1386
v/c Ratio	0.53	1.06	1.00	0.73	0.18	0.10	0.99	0.74	0.28	1.10
Control Delay	63.5	125.8	112.5	98.4	61.8	0.7	95.5	33.3	82.4	102.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	63.5	125.8	112.5	98.4	61.8	0.7	95.5	33.3	82.4	102.5
Queue Length 50th (ft)	153	~359	~264	92	37	0	344	597	23	~861
Queue Length 95th (ft)	236	#583	#517	151	72	0	#580	789	55	#1002
Internal Link Dist (ft)		808			474			875		745
Turn Bay Length (ft)	300			100		100	756		150	
Base Capacity (vph)	316	284	283	189	339	382	639	1853	83	1264
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.53	1.06	1.00	0.48	0.12	0.08	0.99	0.74	0.27	1.10

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lanes, Volumes, Timings

Sup-2015 PM-opt D.syn
02/09/2017

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
Lane Configurations	↔	↑	↔	↔	↑	↔	↔	↔	↔	↔	↔	↔	↔
Traffic Volume (vph)	180	65	479	86	37	28	607	1270	42	2	19	1306	25
Future Volume (vph)	180	65	479	86	37	28	607	1270	42	2	19	1306	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	300		0	100		100	756		0		150		0
Storage Lanes	1		1	1		1	2		0		1		0
Taper Length (ft)	25			25			25				25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	0.97	0.95	0.95	0.95	1.00	0.95	0.95
Frt		0.885	0.850			0.850		0.995				0.997	
Flt Protected	0.950			0.950			0.950				0.950		
Satd. Flow (prot)	1719	1521	1461	1719	1810	1538	3335	3421	0	0	1727	3428	0
Flt Permitted	0.950			0.950			0.950				0.950		
Satd. Flow (perm)	1719	1521	1461	1719	1810	1538	3335	3421	0	0	1727	3428	0
Right Turn on Red			Yes			Yes			Yes				Yes
Satd. Flow (RTOR)		87	106			116		3				1	
Link Speed (mph)		35			35			40				40	
Link Distance (ft)		888			554			955				825	
Travel Time (s)		17.3			10.8			16.3				14.1	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	5%	5%	5%	5%	5%	5%	5%	5%	5%	0%	5%	5%	5%
Adj. Flow (vph)	188	68	499	90	39	29	632	1323	44	2	20	1360	26
Shared Lane Traffic (%)			44%										
Lane Group Flow (vph)	188	288	279	90	39	29	632	1367	0	0	22	1386	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	R NA	Left	Left	Right
Median Width(ft)	12	12		12	12		24	24			24	24	
Link Offset(ft)	0	0		0	0		0	0			0	0	
Crosswalk Width(ft)	16	16		16	16		16	16			16	16	
Two way Left Turn Lane													
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15	15	9	15	15	9	15	15	9	9	15	15	9
Turn Type	Prot	NA	pt+ov	Prot	NA	Perm	Prot	NA	Prot	Prot	Prot	NA	NA
Protected Phases	7	4	4 5	3	8		5	2		1	1	6	
Permitted Phases					8								

Lanes, Volumes, Timings
6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBU	SBL	SBT	SBR
	7	4	4.5	3	8	8	5	2		1	1	6	
Detector Phase													
Switch Phase													
Minimum Initial (s)	5.0	4.0		4.0	4.0	4.0	4.0	4.0		4.0	4.0	4.0	
Minimum Split (s)	9.5	9.0		9.5	35.0	35.0	9.0	29.0		9.0	9.0	29.0	
Total Split (s)	20.0	31.0		24.0	35.0	35.0	37.0	94.0		11.0	11.0	68.0	
Total Split (%)	12.5%	19.4%		15.0%	21.9%	21.9%	23.1%	58.8%		6.9%	6.9%	42.5%	
Maximum Green (s)	15.5	26.0		19.5	30.0	30.0	32.0	89.0		6.0	6.0	63.0	
Yellow Time (s)	3.5	4.0		3.5	4.0	4.0	4.0	4.0		4.0	4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0		1.0	1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	
Total Lost Time (s)	4.5	5.0		4.5	5.0	5.0	5.0	5.0		5.0	5.0	5.0	
Lead/Lag	Lag	Lag		Lead	Lead	Lead	Lead	Lag		Lead	Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes	Yes	Yes	Yes		Yes	Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	3.0	
Recall Mode	None	None		None	None	None	None	C-Min		None	None	C-Min	
Walk Time (s)					6.0	6.0		6.0				6.0	
Flash Dont Walk (s)					24.0	24.0		18.0				18.0	
Pedestrian Calls (#/hr)					0	0		0				0	
Act Effct Green (s)	33.5	26.5	64.1	13.7	8.8	8.8	32.6	98.6			6.1	67.7	
Actuated g/C Ratio	0.21	0.17	0.40	0.09	0.06	0.06	0.20	0.62			0.04	0.42	
v/c Ratio	0.52	0.89	0.43	0.61	0.39	0.15	0.93	0.65			0.34	0.96	
Control Delay	54.3	63.9	26.8	87.4	83.4	1.6	83.3	23.3			88.9	59.9	
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0			0.0	0.0	
Total Delay	54.3	63.9	26.8	87.4	83.4	1.6	83.3	23.3			88.9	59.9	
LOS	D	E	C	F	F	A	F	C			F	E	
Approach Delay		47.8			70.7			42.3				60.3	
Approach LOS		D			E			D				E	

Intersection Summary

Area Type: Other

Cycle Length: 160

Actuated Cycle Length: 160

Offset: 52 (33%), Referenced to phase 2:NBT and 6:SBT, Start of Green

Natural Cycle: 145

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Control Type: Actuated-Coordinated

Maximum v/c Ratio: 0.96

Intersection Signal Delay: 50.2

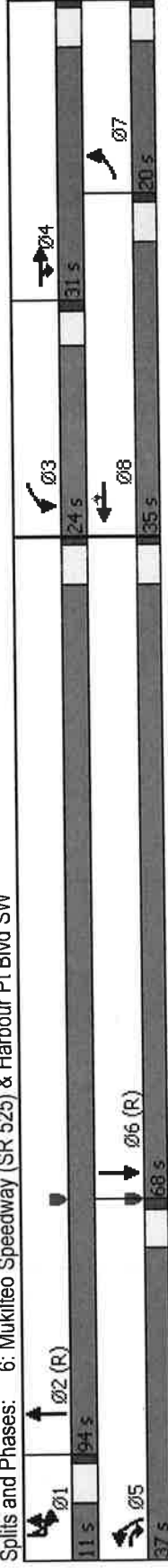
Intersection Capacity Utilization 88.5%

Analysis Period (min) 15

Intersection LOS: D

ICU Level of Service E

Splits and Phases: 6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW



Queues

Sup-2015 PM-opt D.syn
02/09/2017

6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	188	288	279	90	39	29	632	1367	22	1386
v/c Ratio	0.52	0.89	0.43	0.61	0.39	0.15	0.93	0.65	0.34	0.96
Control Delay	54.3	63.9	26.8	87.4	83.4	1.6	83.3	23.3	88.9	59.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	54.3	63.9	26.8	87.4	83.4	1.6	83.3	23.3	88.9	59.9
Queue Length 50th (ft)	137	149	109	93	40	0	338	539	23	~811
Queue Length 95th (ft)	239	#411	284	152	81	0	#459	625	56	#952
Internal Link Dist (ft)		808			474			875		745
Turn Bay Length (ft)	300			100		100	756		150	
Base Capacity (vph)	359	336	642	209	339	382	684	2109	66	1451
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.52	0.86	0.43	0.43	0.12	0.08	0.92	0.65	0.33	0.96

Intersection Summary

- ~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
- # 95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Appendix B
SimTraffic Reports
Five-Run Averages

Queuing and Blocking Report 2015 PM Base

02/09/2017

Intersection: 6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	R	L	T	R	UL	L	T	TR	UL	T	TR	
Maximum Queue (ft)	256	433	760	117	120	39	395	421	348	366	150	763	756	
Average Queue (ft)	161	86	486	70	40	16	229	273	163	187	34	551	503	
95th Queue (ft)	270	306	790	119	95	43	354	400	304	323	103	841	801	
Link Distance (ft)		802	802		502				909	909		779	779	
Upstream Blk Time (%)			1									6	3	
Queuing Penalty (veh)			2									0	0	
Storage Bay Dist (ft)	300			100		100	756	756			150			
Storage Blk Time (%)	0			10	1							46		
Queuing Penalty (veh)	0			6	1							10		

Queuing and Blocking Report 2015 PM Base

02/09/2017

Intersection: 6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
	L	T	R	L	T	R	UL	UL	L	T	TR	UL	T	TR
Directions Served														
Maximum Queue (ft)	244	186	381	118	114	54	424	451	366	388	388	130	694	643
Average Queue (ft)	135	57	260	68	40	21	282	322	216	247	247	43	504	450
95th Queue (ft)	221	153	389	123	111	51	407	451	355	380	380	115	707	643
Link Distance (ft)		802	802		502				909	909	909		779	779
Upstream Blk Time (%)													1	0
Queuing Penalty (veh)													0	0
Storage Bay Dist (ft)	300			100		100	756	756				150		
Storage Blk Time (%)	0			10	1							0	45	
Queuing Penalty (veh)	0			6	1							0	10	

Queuing and Blocking Report

2015 PM - Opt A

02/09/2017

Intersection: 6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Movement	EB	EB	EB	WB	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	R	L	T	R	UL	L	T	TR	UL	T	TR	UL	T	TR
Maximum Queue (ft)	303	356	314	124	212	74	449	498	407	422	82	770	701	82	770	701
Average Queue (ft)	145	222	215	90	75	20	297	341	262	293	27	591	523	27	591	523
95th Queue (ft)	269	330	310	142	182	57	426	480	415	438	80	809	743	80	809	743
Link Distance (ft)		802	802		502				909	909		779	779		779	779
Upstream Blk Time (%)												3	1		0	0
Queuing Penalty (veh)																
Storage Bay Dist (ft)	300			100		100	756	756			150					
Storage Blk Time (%)	0	3		27	3	0						53				
Queuing Penalty (veh)	0	5		17	4	0						11				

Queuing and Blocking Report 2015 PM - Opt B split phase

02/09/2017

Intersection: 6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB
	L	TR	R	L	T	R	UL	L	T	TR	UL	T	TR
Directions Served													
Maximum Queue (ft)	324	509	476	122	161	68	432	496	385	433	129	835	820
Average Queue (ft)	187	317	302	76	50	20	284	337	260	282	27	747	713
95th Queue (ft)	335	496	458	132	126	56	431	489	408	443	88	951	934
Link Distance (ft)		802	802		502				909	909		779	779
Upstream Blk Time (%)												28	20
Queuing Penalty (veh)												0	0
Storage Bay Dist (ft)	300			100		100	756	756			150	60	
Storage Blk Time (%)	1	14		14	2	0						13	
Queuing Penalty (veh)	3	25		9	2	0							

Queuing and Blocking Report 2015 PM - Opt C split phase

02/09/2017

Intersection: 6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Movement	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	LTR	R	L	T	R	UL	L	T	TR	UL	T	TR		
Maximum Queue (ft)	306	505	496	116	137	40	463	495	492	439	174	822	823		
Average Queue (ft)	236	371	353	69	56	16	317	365	286	304	38	727	704		
95th Queue (ft)	381	557	516	119	126	42	542	602	481	436	124	905	908		
Link Distance (ft)		802	802		502				909	909		779	779		
Upstream Blk Time (%)												32	28		0
Queuing Penalty (veh)															
Storage Bay Dist (ft)	300			100		100	756	756			150				
Storage Blk Time (%)	0	27		9	1			0				61			
Queuing Penalty (veh)	1	24		6	1			1				13			

Queuing and Blocking Report 2015 PM - Opt D

02/09/2017

Intersection: 6: Mukilteo Speedway (SR 525) & Harbour Pt Blvd SW

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	R	L	T	R	L	L	T	TR	UL	T	TR	
Maximum Queue (ft)	264	247	252	123	167	74	450	498	452	490	129	814	796	
Average Queue (ft)	139	159	150	78	61	24	304	351	249	271	34	653	594	
95th Queue (ft)	239	236	230	135	136	64	445	494	410	441	111	887	859	
Link Distance (ft)		802	802		502				909	909		779	779	
Upstream Blk Time (%)												10	6	
Queuing Penalty (veh)												0	0	
Storage Bay Dist (ft)	300			100		100	756	756			150			
Storage Blk Time (%)	1	0		16	4	0						55		
Queuing Penalty (veh)	2	0		11	4	0						12		