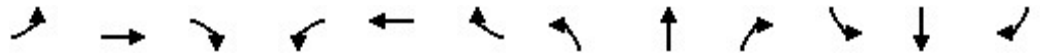


**APPENDIX J**  
**Intersection Capacity Analyses**  
**Weekday PM Peak Hour**  
**2021 Estimated Traffic Conditions**

# Intersection Capacity Analysis

## 1: Washington St & Sherman St

08/22/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕	↕		↕	
Traffic Volume (vph)	34	133	68	68	111	81	52	326	52	31	494	37
Future Volume (vph)	34	133	68	68	111	81	52	326	52	31	494	37
Confl. Peds. (#/hr)	5		3	3		5	5		6	6		5
Peak Hour Factor	0.79	0.79	0.79	0.89	0.89	0.89	0.89	0.89	0.89	0.92	0.92	0.92
Growth Factor	108%	108%	108%	108%	108%	108%	108%	108%	108%	108%	108%	108%
Heavy Vehicles (%)	3%	3%	3%	4%	4%	4%	2%	2%	2%	2%	2%	2%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	321	0	0	316	0	0	459	63	0	659	0
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	Perm	NA	
Protected Phases		4			8			2				6
Permitted Phases	4			8			2		2	6		
Detector Phase	4	4		8	8		2	2	2	6		6
Switch Phase												
Minimum Initial (s)	7.0	7.0		7.0	7.0		10.0	10.0	10.0	10.0		10.0
Minimum Split (s)	12.5	12.5		12.5	12.5		15.5	15.5	15.5	15.5		15.5
Total Split (s)	20.0	20.0		20.0	20.0		40.0	40.0	40.0	40.0		40.0
Total Split (%)	24.4%	24.4%		24.4%	24.4%		48.8%	48.8%	48.8%	48.8%		48.8%
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	4.0		4.0
All-Red Time (s)	1.5	1.5		1.5	1.5		1.5	1.5	1.5	1.5		1.5
Lost Time Adjust (s)		0.0			0.0			0.0	0.0			0.0
Total Lost Time (s)		5.5			5.5			5.5	5.5			5.5
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		Min	Min	Min	Min		Min
v/c Ratio		0.71			0.84			0.63	0.08			0.81
Control Delay		32.1			45.1			17.1	3.3			23.9
Queue Delay		0.0			0.0			0.0	0.0			0.0
Total Delay		32.1			45.1			17.1	3.3			23.9
Queue Length 50th (ft)		79			81			88	0			141
Queue Length 95th (ft)		#274			#352			290	18			#513
Internal Link Dist (ft)		308			288			525				178
Turn Bay Length (ft)									200			
Base Capacity (vph)		452			374			1048	1039			1164
Starvation Cap Reductn		0			0			0	0			0
Spillback Cap Reductn		0			0			0	0			0
Storage Cap Reductn		0			0			0	0			0
Reduced v/c Ratio		0.71			0.84			0.44	0.06			0.57

### Intersection Summary

Cycle Length: 82

Actuated Cycle Length: 55.2

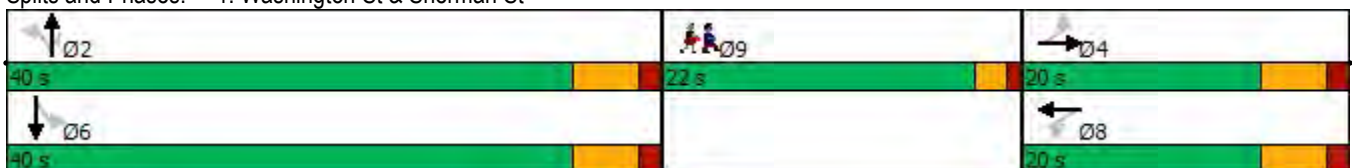
Natural Cycle: 100

Control Type: Actuated-Uncoordinated

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

Queue shown is maximum after two cycles.

Splits and Phases: 1: Washington St & Sherman St



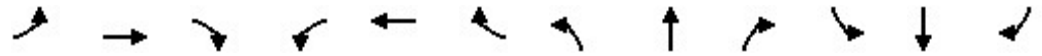
Intersection Capacity Analysis  
1: Washington St & Sherman St

08/22/2022

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	27%
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Intersection Capacity Analysis  
2: Washington St & Revere St/Driveway

08/22/2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (vph)	55	0	102	3	0	2	69	447	2	0	562	48
Future Volume (vph)	55	0	102	3	0	2	69	447	2	0	562	48
Confl. Peds. (#/hr)	11		3	3		11	19		31	31		19
Peak Hour Factor	0.72	0.72	0.72	0.42	0.42	0.42	0.92	0.92	0.92	0.80	0.80	0.80
Growth Factor	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%
Heavy Vehicles (%)	5%	5%	5%	0%	0%	0%	4%	4%	4%	3%	3%	3%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	226	0	0	12	0	0	585	0	0	793	0
Turn Type	Perm	NA		Perm	NA		Perm	NA			NA	
Protected Phases		4			8			2				6
Permitted Phases	4			8			2			6		
Detector Phase	4	4		8	8		2	2		6		6
Switch Phase												
Minimum Initial (s)	4.0	4.0		4.0	4.0		10.0	10.0		10.0		10.0
Minimum Split (s)	9.0	9.0		9.0	9.0		15.0	15.0		15.0		15.0
Total Split (s)	22.0	22.0		22.0	22.0		59.0	59.0		59.0		59.0
Total Split (%)	21.4%	21.4%		21.4%	21.4%		57.3%	57.3%		57.3%		57.3%
Yellow Time (s)	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
Lost Time Adjust (s)		0.0			0.0			0.0				0.0
Total Lost Time (s)		5.0			5.0			5.0				5.0
Lead/Lag												
Lead-Lag Optimize?												
Recall Mode	None	None		None	None		C-Min	C-Min		C-Min		C-Min
v/c Ratio		0.89			0.06			0.67				0.64
Control Delay		61.9			0.4			19.2				16.2
Queue Delay		0.0			0.0			0.0				0.0
Total Delay		61.9			0.4			19.2				16.2
Queue Length 50th (ft)		96			0			148				191
Queue Length 95th (ft)		126			0			#554				477
Internal Link Dist (ft)		383			46			533				146
Turn Bay Length (ft)												
Base Capacity (vph)		297			257			875				1246
Starvation Cap Reductn		0			0			0				0
Spillback Cap Reductn		0			0			0				0
Storage Cap Reductn		0			0			0				0
Reduced v/c Ratio		0.76			0.05			0.67				0.64

Intersection Summary

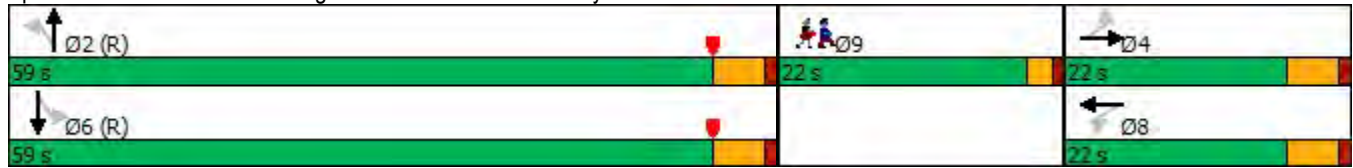
Cycle Length: 103  
 Actuated Cycle Length: 103  
 Offset: 23 (22%), Referenced to phase 2:NBTL and 6:SBTL, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

# Intersection Capacity Analysis

## 2: Washington St & Revere St/Driveway

08/22/2022

Splits and Phases: 2: Washington St & Revere St/Driveway



Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	21%
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
<b>Intersection Summary</b>	

Intersection Capacity Analysis  
3: Washington St & Bolivar St

08/22/2022



Lane Group	NWL	NWR	NET	NER	SWL	SWT	Ø7
Lane Configurations							
Traffic Volume (vph)	225	94	354	210	112	589	
Future Volume (vph)	225	94	354	210	112	589	
Confl. Peds. (#/hr)	7	11		27	27		
Peak Hour Factor	0.86	0.86	0.89	0.89	0.86	0.86	
Growth Factor	104%	104%	104%	104%	104%	104%	
Heavy Vehicles (%)	1%	1%	2%	2%	1%	1%	
Shared Lane Traffic (%)							
Lane Group Flow (vph)	272	114	659	0	135	712	
Turn Type	Prot	pt+ov	NA		pm+pt	NA	
Protected Phases	8	8 1	2		1	6	7
Permitted Phases					6		
Detector Phase	8	8 1	2		1	6	
Switch Phase							
Minimum Initial (s)	5.0		10.0		2.0	10.0	7.0
Minimum Split (s)	10.5		15.5		7.5	15.5	20.0
Total Split (s)	21.0		50.0		9.0	59.0	20.0
Total Split (%)	21.0%		50.0%		9.0%	59.0%	20%
Yellow Time (s)	4.0		4.0		4.0	4.0	2.0
All-Red Time (s)	1.5		1.5		1.5	1.5	1.0
Lost Time Adjust (s)	0.0		0.0		0.0	0.0	
Total Lost Time (s)	5.5		5.5		5.5	5.5	
Lead/Lag	Lag		Lead		Lag		Lead
Lead-Lag Optimize?	Yes		Yes		Yes		Yes
Recall Mode	None		C-Min		None	C-Min	None
v/c Ratio	0.84	0.24	0.69		0.39	0.60	
Control Delay	64.5	5.1	22.9		17.1	15.7	
Queue Delay	0.0	0.0	5.8		0.0	1.2	
Total Delay	64.5	5.1	28.7		17.1	16.9	
Queue Length 50th (ft)	161	0	245		27	211	
Queue Length 95th (ft)	#314	27	#539		69	426	
Internal Link Dist (ft)	291		172			533	
Turn Bay Length (ft)		150			200		
Base Capacity (vph)	322	483	954		345	1183	
Starvation Cap Reductn	0	0	236		0	255	
Spillback Cap Reductn	0	0	0		0	0	
Storage Cap Reductn	0	0	0		0	0	
Reduced v/c Ratio	0.84	0.24	0.92		0.39	0.77	

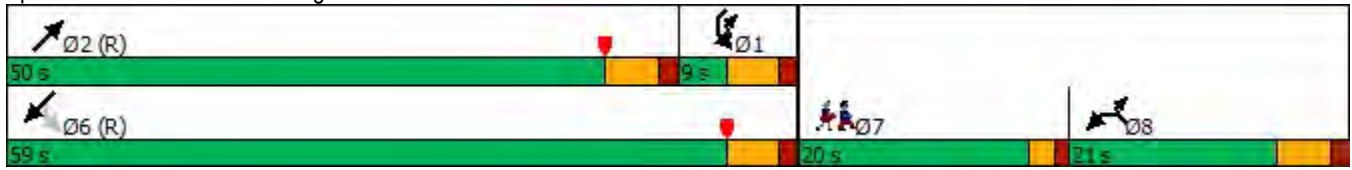
Intersection Summary

Cycle Length: 100  
 Actuated Cycle Length: 100  
 Offset: 2 (2%), Referenced to phase 2:NET and 6:SWTL, Start of Yellow  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

# Intersection Capacity Analysis 3: Washington St & Bolivar St

08/22/2022

















Splits and Phases: 3: Washington St & Bolivar St



Intersection Capacity Analysis (HCM 2000 Unsignalized)

4: Washington St & Mechanic St/Wall St

08/22/2022

												
Movement	SEL	SET	SER	NWL	NWT	NWR	NEL	NET	NER	SWL	SWT	SWR
Lane Configurations												
Traffic Volume (veh/h)	7	7	4	52	1	35	2	505	67	35	774	13
Future Volume (Veh/h)	7	7	4	52	1	35	2	505	67	35	774	13
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.64	0.64	0.64	0.71	0.71	0.71	0.86	0.86	0.86	0.91	0.91	0.91
Hourly flow rate (vph)	11	11	6	76	1	51	2	611	81	40	885	15
Pedestrians		22			8			4			1	
Lane Width (ft)		12.0			12.0			12.0			12.0	
Walking Speed (ft/s)		3.5			3.5			3.5			3.5	
Percent Blockage		2			1			0			0	
Right turn flare (veh)												
Median type								None			None	
Median storage (veh)												
Upstream signal (ft)								205			252	
pX, platoon unblocked	0.84	0.84	0.75	0.84	0.84	0.83	0.75			0.83		
vC, conflicting volume	1702	1698	918	1652	1666	660	922			700		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1284	1279	729	1223	1240	488	733			535		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	89	92	98	32	99	89	100			95		
cM capacity (veh/h)	98	130	313	112	136	479	643			854		
Direction, Lane #	SE 1	NW 1	NE 1	SW 1								
Volume Total	28	128	694	940								
Volume Left	11	76	2	40								
Volume Right	6	51	81	15								
cSH	130	162	643	854								
Volume to Capacity	0.22	0.79	0.00	0.05								
Queue Length 95th (ft)	19	128	0	4								
Control Delay (s)	40.2	80.5	0.1	1.3								
Lane LOS	E	F	A	A								
Approach Delay (s)	40.2	80.5	0.1	1.3								
Approach LOS	E	F										
<b>Intersection Summary</b>												
Average Delay			7.1									
Intersection Capacity Utilization			85.3%		ICU Level of Service				E			
Analysis Period (min)			15									



Intersection Capacity Analysis  
5: Church St & Washington St

08/22/2022



Lane Group	EBL	EBR	NEL	NET	SWT	SWR	Ø2	Ø3	Ø4	Ø5
Lane Configurations				↕	↕					
Traffic Volume (vph)	0	0	258	577	595	236				
Future Volume (vph)	0	0	258	577	595	236				
Confl. Peds. (#/hr)	3	4	9			9				
Peak Hour Factor	0.25	0.25	0.90	0.90	0.90	0.90				
Growth Factor	104%	104%	104%	104%	104%	104%				
Heavy Vehicles (%)	0%	0%	2%	2%	1%	1%				
Shared Lane Traffic (%)										
Lane Group Flow (vph)	0	0	0	965	961	0				
Turn Type			pm+pt	NA	NA					
Protected Phases			4 5	2 4 5	6		2	3	4	5
Permitted Phases			2 4 5							
Detector Phase			4 5	2 4 5	6					
Switch Phase										
Minimum Initial (s)					10.0		10.0	7.0	5.0	1.5
Minimum Split (s)					15.5		50.0	21.0	10.5	7.0
Total Split (s)					43.0		50.0	21.0	30.0	7.0
Total Split (%)					42.6%		50%	21%	30%	7%
Yellow Time (s)					4.0		4.0	2.0	4.0	4.0
All-Red Time (s)					1.5		1.5	1.0	1.5	1.0
Lost Time Adjust (s)					0.0					
Total Lost Time (s)					5.5					
Lead/Lag					Lead		Lead	Lag	Lag	
Lead-Lag Optimize?					Yes		Yes	Yes	Yes	
Recall Mode					C-Min		C-Min	None	None	None
v/c Ratio				1.05	1.42					
Control Delay				69.5	223.3					
Queue Delay				19.1	0.6					
Total Delay				88.6	223.9					
Queue Length 50th (ft)				513	~835					
Queue Length 95th (ft)				#1157	#1080					
Internal Link Dist (ft)	599			58	125					
Turn Bay Length (ft)										
Base Capacity (vph)				917	679					
Starvation Cap Reductn				90	55					
Spillback Cap Reductn				0	0					
Storage Cap Reductn				0	0					
Reduced v/c Ratio				1.17	1.54					

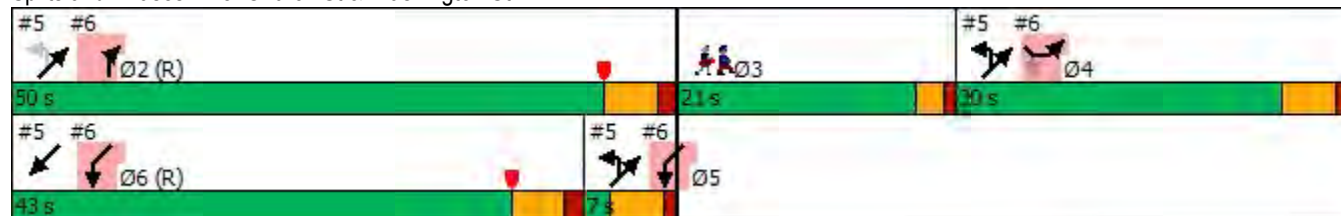
Intersection Summary

Cycle Length: 101  
 Actuated Cycle Length: 101  
 Offset: 0 (0%), Referenced to phase 2:NETL and 6:SWT, Start of Yellow  
 Natural Cycle: 145  
 Control Type: Actuated-Coordinated  
 ~ 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.

Intersection Capacity Analysis  
5: Church St & Washington St

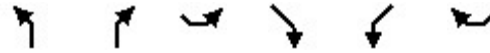
08/22/2022

Splits and Phases: 5: Church St & Washington St



Intersection Capacity Analysis  
6: Washington St & Neponset St

08/22/2022



Lane Group	NBL	NBR	SEL	SER	SWL	SWR	Ø3	Ø5	Ø6
Lane Configurations		↗	↘	↘	↗				
Traffic Volume (vph)	0	619	239	488	583	0			
Future Volume (vph)	0	619	239	488	583	0			
Confl. Peds. (#/hr)	8		4	1		8			
Peak Hour Factor	0.90	0.90	0.98	0.98	0.93	0.93			
Growth Factor	104%	104%	104%	104%	104%	104%			
Heavy Vehicles (%)	1%	1%	1%	1%	1%	1%			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	0	715	254	518	652	0			
Turn Type		Prot	Prot	Perm	Prot				
Protected Phases		2	4		5 6		3	5	6
Permitted Phases				4					
Detector Phase		2	4	4	5 6				
Switch Phase									
Minimum Initial (s)		10.0	5.0	5.0			7.0	1.5	10.0
Minimum Split (s)		50.0	10.5	10.5			21.0	7.0	15.5
Total Split (s)		50.0	30.0	30.0			21.0	7.0	43.0
Total Split (%)		49.5%	29.7%	29.7%			21%	7%	43%
Yellow Time (s)		4.0	4.0	4.0			2.0	4.0	4.0
All-Red Time (s)		1.5	1.5	1.5			1.0	1.0	1.5
Lost Time Adjust (s)		0.0	0.0	0.0					
Total Lost Time (s)		5.5	5.5	5.5					
Lead/Lag			Lag	Lag			Lead	Lag	Lead
Lead-Lag Optimize?			Yes	Yes			Yes	Yes	Yes
Recall Mode		C-Min	None	None			None	None	C-Min
v/c Ratio		0.67	0.35	0.57	0.82				
Control Delay		6.7	24.6	7.5	34.7				
Queue Delay		0.0	0.0	0.0	51.0				
Total Delay		6.7	24.6	7.5	85.6				
Queue Length 50th (ft)		35	102	25	357				
Queue Length 95th (ft)		142	229	156	#539				
Internal Link Dist (ft)	658		508		153				
Turn Bay Length (ft)									
Base Capacity (vph)		1064	731	904	796				
Starvation Cap Reductn		0	0	0	241				
Spillback Cap Reductn		0	0	0	0				
Storage Cap Reductn		0	0	0	0				
Reduced v/c Ratio		0.67	0.35	0.57	1.17				

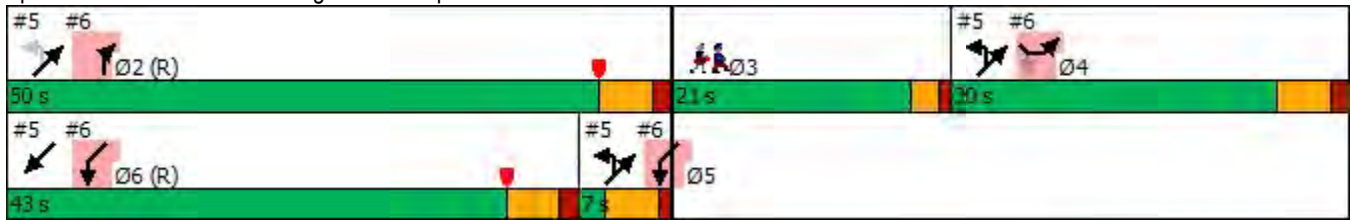
Intersection Summary

Cycle Length: 101  
 Actuated Cycle Length: 101  
 Offset: 0 (0%), Referenced to phase 2:NETL and 6:SWT, Start of Yellow  
 Natural Cycle: 145  
 Control Type: Actuated-Coordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Intersection Capacity Analysis  
6: Washington St & Neponset St

08/22/2022

Splits and Phases: 6: Washington St & Neponset St



Intersection Capacity Analysis (HCM 2000 Unsignalized)

7: Washington St & High St

08/22/2022






















Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	36	120	119	544	994	74
Future Volume (Veh/h)	36	120	119	544	994	74
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.87	0.87	0.94	0.94	0.96	0.96
Hourly flow rate (vph)	43	143	132	602	1077	80
Pedestrians	1			1		
Lane Width (ft)	12.0			12.0		
Walking Speed (ft/s)	3.5			3.5		
Percent Blockage	0			0		
Right turn flare (veh)						
Median type				None	None	
Median storage (veh)						
Upstream signal (ft)						
pX, platoon unblocked						
vC, conflicting volume	1984	1119	1158			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1984	1119	1158			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	18	43	78			
cM capacity (veh/h)	53	251	606			
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>		
Volume Total	186	132	602	1157		
Volume Left	43	132	0	0		
Volume Right	143	0	0	80		
cSH	134	606	1700	1700		
Volume to Capacity	1.39	0.22	0.35	0.68		
Queue Length 95th (ft)	305	21	0	0		
Control Delay (s)	274.6	12.6	0.0	0.0		
Lane LOS	F	B				
Approach Delay (s)	274.6	2.3		0.0		
Approach LOS	F					
<b>Intersection Summary</b>						
Average Delay			25.4			
Intersection Capacity Utilization			85.9%		ICU Level of Service	E
Analysis Period (min)			15			

Intersection Capacity Analysis (HCM 2000 Unsignalized)

8: Washington St & Shoppes Village Driveway

















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Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	4	13	45	0	204	5	469	48	237	790	23
Future Volume (Veh/h)	13	4	13	45	0	204	5	469	48	237	790	23
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.73	0.73	0.73	0.95	0.95	0.95	0.90	0.90	0.90	0.98	0.98	0.98
Hourly flow rate (vph)	19	6	19	49	0	223	6	542	55	252	838	24
Pedestrians					1							
Lane Width (ft)					12.0							
Walking Speed (ft/s)					3.5							
Percent Blockage					0							
Right turn flare (veh)												
Median type								TWLTL				None
Median storage veh								2				
Upstream signal (ft)								872				
pX, platoon unblocked	0.93	0.93		0.93	0.93	0.93				0.93		
vC, conflicting volume	2158	1964	850	1946	1948	570	862			598		
vC1, stage 1 conf vol	1354	1354		582	582							
vC2, stage 2 conf vol	804	610		1364	1366							
vCu, unblocked vol	2207	1998	850	1980	1982	501	862			531		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	0	95	95	56	100	58	99			74		
cM capacity (veh/h)	13	133	359	112	144	530	780			969		
Direction, Lane #	EB 1	WB 1	WB 2	NB 1	SB 1	SB 2						
Volume Total	44	49	223	603	252	862						
Volume Left	19	49	0	6	252	0						
Volume Right	19	0	223	55	0	24						
cSH	29	112	530	780	969	1700						
Volume to Capacity	1.51	0.44	0.42	0.01	0.26	0.51						
Queue Length 95th (ft)	127	47	52	1	26	0						
Control Delay (s)	553.4	60.2	16.6	0.2	10.0	0.0						
Lane LOS	F	F	C	A	B							
Approach Delay (s)	553.4	24.5		0.2	2.3							
Approach LOS	F	C										
Intersection Summary												
Average Delay			16.6									
Intersection Capacity Utilization			92.1%	ICU Level of Service		F						
Analysis Period (min)			15									

Intersection Capacity Analysis (HCM 2000 Unsignalized)

9: Washington St & Plaza Driveway

















08/22/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	13	0	38	61	0	52	20	457	93	24	815	2
Future Volume (Veh/h)	13	0	38	61	0	52	20	457	93	24	815	2
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.67	0.67	0.67	0.91	0.91	0.91	0.93	0.93	0.93	0.98	0.98	0.98
Hourly flow rate (vph)	20	0	59	70	0	59	22	511	104	25	865	2
Pedestrians		1			1							
Lane Width (ft)		12.0			12.0							
Walking Speed (ft/s)		3.5			3.5							
Percent Blockage		0			0							
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)								624				
pX, platoon unblocked	0.89	0.89		0.89	0.89	0.89				0.89		
vC, conflicting volume	1583	1577	867	1583	1526	564	868			616		
vC1, stage 1 conf vol	917	917		608	608							
vC2, stage 2 conf vol	666	660		975	918							
vCu, unblocked vol	1593	1587	867	1593	1529	448	868			507		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	92	100	83	66	100	89	97			97		
cM capacity (veh/h)	241	271	350	203	273	545	780			941		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	79	129	637	892								
Volume Left	20	70	22	25								
Volume Right	59	59	104	2								
cSH	315	285	780	941								
Volume to Capacity	0.25	0.45	0.03	0.03								
Queue Length 95th (ft)	24	56	2	2								
Control Delay (s)	20.2	27.7	0.8	0.7								
Lane LOS	C	D	A	A								
Approach Delay (s)	20.2	27.7	0.8	0.7								
Approach LOS	C	D										
<b>Intersection Summary</b>												
Average Delay			3.6									
Intersection Capacity Utilization			74.7%		ICU Level of Service					D		
Analysis Period (min)			15									

Intersection Capacity Analysis (HCM 2000 Unsignalized)

10: Washington St & Cobb Corner

08/22/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	19	2	11	34	6	60	24	476	39	66	826	32
Future Volume (Veh/h)	19	2	11	34	6	60	24	476	39	66	826	32
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.73	0.73	0.73	0.78	0.78	0.78	0.97	0.97	0.97	0.96	0.96	0.96
Hourly flow rate (vph)	27	3	16	45	8	80	26	510	42	72	895	35
Pedestrians		1										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		3.5										
Percent Blockage		0										
Right turn flare (veh)												
Median type								TWLTL			TWLTL	
Median storage (veh)								2			2	
Upstream signal (ft)								423				
pX, platoon unblocked	0.88	0.88		0.88	0.88	0.88				0.88		
vC, conflicting volume	1724	1662	914	1657	1658	531	931			552		
vC1, stage 1 conf vol	1058	1058		583	583							
vC2, stage 2 conf vol	667	604		1074	1075							
vCu, unblocked vol	1755	1684	914	1679	1680	398	931			422		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)	6.1	5.5		6.1	5.5							
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	86	99	95	76	96	86	96			93		
cM capacity (veh/h)	191	232	329	191	224	575	738			1000		
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total	46	133	578	1002								
Volume Left	27	45	26	72								
Volume Right	16	80	42	35								
cSH	227	324	738	1000								
Volume to Capacity	0.20	0.41	0.04	0.07								
Queue Length 95th (ft)	18	48	3	6								
Control Delay (s)	24.8	23.6	1.0	1.9								
Lane LOS	C	C	A	A								
Approach Delay (s)	24.8	23.6	1.0	1.9								
Approach LOS	C	C										
<b>Intersection Summary</b>												
Average Delay			3.9									
Intersection Capacity Utilization			85.7%		ICU Level of Service				E			
Analysis Period (min)			15									



# Intersection Capacity Analysis

## 11: Bay Rd/Washington St & N Main St/Sharon St

08/22/2022

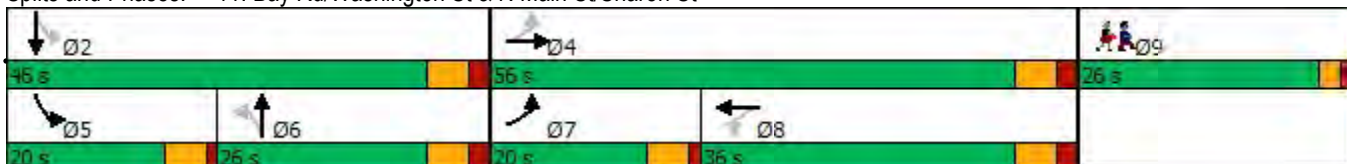


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		←↑			←↑			←↑		←	↑	
Traffic Volume (vph)	150	397	70	98	445	133	42	286	31	267	470	166
Future Volume (vph)	150	397	70	98	445	133	42	286	31	267	470	166
Confl. Peds. (#/hr)	1		2	2		1	1		2	2		1
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94	0.89	0.89	0.89	0.91	0.91	0.91
Growth Factor	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%	104%
Heavy Vehicles (%)	2%	2%	2%	2%	2%	2%	1%	1%	1%	1%	1%	1%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	682	0	0	747	0	0	419	0	305	727	0
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		pm+pt	NA	
Protected Phases	7	4			8			6		5	2	
Permitted Phases	4			8			6			2		
Detector Phase	7	4		8	8		6	6		5	2	
Switch Phase												
Minimum Initial (s)	6.0	15.0		15.0	15.0		15.0	15.0		6.0	15.0	
Minimum Split (s)	11.0	21.0		21.0	21.0		21.0	21.0		11.0	21.0	
Total Split (s)	20.0	56.0		36.0	36.0		26.0	26.0		20.0	46.0	
Total Split (%)	15.6%	43.8%		28.1%	28.1%		20.3%	20.3%		15.6%	35.9%	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	2.0		2.0	2.0		2.0	2.0		1.0	2.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		6.0			6.0			6.0		5.0	6.0	
Lead/Lag	Lead			Lag	Lag		Lag	Lag		Lead		
Lead-Lag Optimize?	Yes			Yes	Yes		Yes	Yes		Yes		
Recall Mode	None	None		None	None		None	None		None	None	
v/c Ratio		0.85			0.83			0.91		0.67	0.93	
Control Delay		37.3			34.9			63.0		30.9	47.0	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		37.3			34.9			63.0		30.9	47.0	
Queue Length 50th (ft)		170			183			118		107	355	
Queue Length 95th (ft)		#380			#381			#330		#318	#998	
Internal Link Dist (ft)		217			198			180			132	
Turn Bay Length (ft)												
Base Capacity (vph)		1087			900			461		454	784	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.63			0.83			0.91		0.67	0.93	

### Intersection Summary

Cycle Length: 128  
 Actuated Cycle Length: 95.3  
 Natural Cycle: 150  
 Control Type: Actuated-Uncoordinated  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

### Splits and Phases: 11: Bay Rd/Washington St & N Main St/Sharon St



Intersection Capacity Analysis  
11: Bay Rd/Washington St & N Main St/Sharon St

08/22/2022

Lane Group	Ø9
Lane Configurations	
Traffic Volume (vph)	
Future Volume (vph)	
Confl. Peds. (#/hr)	
Peak Hour Factor	
Growth Factor	
Heavy Vehicles (%)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	7.0
Minimum Split (s)	26.0
Total Split (s)	26.0
Total Split (%)	20%
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Recall Mode	None
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
Queue Length 50th (ft)	
Queue Length 95th (ft)	
Internal Link Dist (ft)	
Turn Bay Length (ft)	
Base Capacity (vph)	
Starvation Cap Reductn	
Spillback Cap Reductn	
Storage Cap Reductn	
Reduced v/c Ratio	
Intersection Summary	

Intersection Capacity Analysis (HCM 2000 Unsignalized)

12: Washington St & Starbucks Driveway

08/22/2022



















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Traffic Volume (veh/h)	2	0	38	12	0	15	17	557	21	8	801	4
Future Volume (Veh/h)	2	0	38	12	0	15	17	557	21	8	801	4
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.92	0.92	0.92	0.94	0.94	0.94
Hourly flow rate (vph)	3	0	56	18	0	22	19	630	24	9	886	4
Pedestrians		1										
Lane Width (ft)		12.0										
Walking Speed (ft/s)		3.5										
Percent Blockage		0										
Right turn flare (veh)												
Median type								None			TWLTL	
Median storage veh											2	
Upstream signal (ft)								212				
pX, platoon unblocked	0.91	0.91		0.91	0.91	0.91				0.91		
vC, conflicting volume	1282	1599	446	1197	1589	327	891			654		
vC1, stage 1 conf vol	907	907		680	680							
vC2, stage 2 conf vol	375	692		517	909							
vCu, unblocked vol	1108	1457	446	1015	1446	57	891			417		
tC, single (s)	7.7	6.7	7.1	7.6	6.6	7.0	4.1			4.1		
tC, 2 stage (s)	6.7	5.7		6.6	5.6							
tF (s)	3.6	4.1	3.4	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	99	100	90	95	100	98	97			99		
cM capacity (veh/h)	266	282	538	346	284	900	756			1034		
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>NB 1</b>	<b>NB 2</b>	<b>SB 1</b>	<b>SB 2</b>						
Volume Total	59	40	334	339	452	447						
Volume Left	3	18	19	0	9	0						
Volume Right	56	22	0	24	0	4						
cSH	511	523	756	1700	1034	1700						
Volume to Capacity	0.12	0.08	0.03	0.20	0.01	0.26						
Queue Length 95th (ft)	10	6	2	0	1	0						
Control Delay (s)	13.0	12.5	0.9	0.0	0.3	0.0						
Lane LOS	B	B	A		A							
Approach Delay (s)	13.0	12.5	0.4		0.1							
Approach LOS	B	B										
<b>Intersection Summary</b>												
Average Delay			1.0									
Intersection Capacity Utilization			43.1%		ICU Level of Service				A			
Analysis Period (min)			15									

Intersection Capacity Analysis (HCM 2000 Unsignalized)

13: Sharon St & Cobb Corner Dr

08/22/2022

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	8	627	4	38	594	20	26	4	37	29	3	27
Future Volume (Veh/h)	8	627	4	38	594	20	26	4	37	29	3	27
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.89	0.89	0.89	0.88	0.88	0.88	0.70	0.70	0.70
Hourly flow rate (vph)	9	717	5	44	694	23	31	5	44	43	4	40
Pedestrians												1
Lane Width (ft)												12.0
Walking Speed (ft/s)												3.5
Percent Blockage												0
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		278										
pX, platoon unblocked				0.92			0.92	0.92	0.92	0.92	0.92	
vC, conflicting volume	718			722			1573	1544	361	1218	1534	706
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	718			526			1450	1418	134	1064	1408	706
tC, single (s)	4.2			4.2			7.6	6.6	7.0	7.5	6.5	6.9
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.6	4.1	3.4	3.5	4.0	3.3
p0 queue free %	99			95			54	96	95	70	97	89
cM capacity (veh/h)	871			948			68	114	808	142	119	378
Direction, Lane #	EB 1	EB 2	WB 1	NB 1	SB 1							
Volume Total	368	364	761	80	87							
Volume Left	9	0	44	31	43							
Volume Right	0	5	23	44	40							
cSH	871	1700	948	144	197							
Volume to Capacity	0.01	0.21	0.05	0.56	0.44							
Queue Length 95th (ft)	1	0	4	70	52							
Control Delay (s)	0.3	0.0	1.2	57.4	36.9							
Lane LOS	A		A	F	E							
Approach Delay (s)	0.2		1.2	57.4	36.9							
Approach LOS				F	E							
<b>Intersection Summary</b>												
Average Delay			5.3									
Intersection Capacity Utilization			69.4%		ICU Level of Service				C			
Analysis Period (min)			15									

Intersection Capacity Analysis (HCM 2000 Unsignalized)

14: Sharon St & Village Shoppes Dr

08/22/2022



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↔			↔						↔	↔
Traffic Volume (veh/h)	18	647	32	11	557	121	0	0	0	125	1	102
Future Volume (Veh/h)	18	647	32	11	557	121	0	0	0	125	1	102
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.91	0.91	0.91	0.92	0.92	0.92	0.92	0.92	0.92	0.78	0.78	0.78
Hourly flow rate (vph)	21	739	37	12	630	137	0	0	0	167	1	136
Pedestrians								1			2	
Lane Width (ft)								0.0			12.0	
Walking Speed (ft/s)								3.5			3.5	
Percent Blockage								0			0	
Right turn flare (veh)												
Median type		None			None							
Median storage (veh)												
Upstream signal (ft)		591										
pX, platoon unblocked				0.74			0.74	0.74	0.74	0.74	0.74	
vC, conflicting volume	769			777			1660	1594	758	1524	1544	700
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	769			518			1717	1627	493	1533	1559	700
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	97			98			100	100	100	0	99	69
cM capacity (veh/h)	839			772			35	72	424	68	80	440
<b>Direction, Lane #</b>	<b>EB 1</b>	<b>WB 1</b>	<b>SB 1</b>	<b>SB 2</b>								
Volume Total	797	779	168	136								
Volume Left	21	12	167	0								
Volume Right	37	137	0	136								
cSH	839	772	68	440								
Volume to Capacity	0.03	0.02	2.46	0.31								
Queue Length 95th (ft)	2	1	408	32								
Control Delay (s)	0.7	0.4	796.0	16.8								
Lane LOS	A	A	F	C								
Approach Delay (s)	0.7	0.4	447.4									
Approach LOS			F									
<b>Intersection Summary</b>												
Average Delay			72.8									
Intersection Capacity Utilization			61.7%		ICU Level of Service				B			
Analysis Period (min)			15									