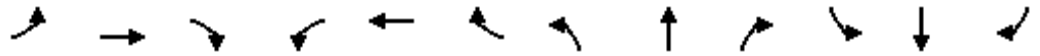


## **APPENDIX M**

### **2017 Build Highland Avenue Intersection Analysis**

Route 128 Add-A-Lane  
1: Highland Ave & 2nd Avenue

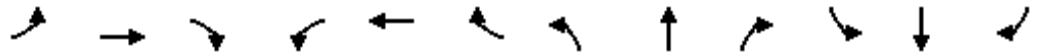
AM 2017 Build  
6/3/2010



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕		↖	↕↕		↖	↕	↖		↕	↖
Volume (vph)	41	905	396	448	575	158	377	10	253	71	39	0
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt		0.956			0.968				0.850			
Flt Protected		0.998		0.950			0.950	0.955			0.969	
Satd. Flow (prot)	0	3377	0	1770	3426	0	1681	1690	1583	0	1805	1863
Flt Permitted		0.891		0.062			0.950	0.955			0.969	
Satd. Flow (perm)	0	3015	0	115	3426	0	1681	1690	1583	0	1805	1863
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		65			60				275			
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		767			913			427			522	
Travel Time (s)		17.4			20.8			9.7			11.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	45	984	430	487	625	172	410	11	275	77	42	0
Shared Lane Traffic (%)							49%					
Lane Group Flow (vph)	0	1459	0	487	797	0	209	212	275	0	119	0
Turn Type	Perm			pm+pt			custom		Perm	custom		Perm
Protected Phases		6		5	2		8	8		4	4	
Permitted Phases	6			2			8		8	4		4
Detector Phase	6	6		5	2		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	61.0	61.0		8.0	21.0		12.0	12.0	12.0	8.0	8.0	8.0
Total Split (s)	64.0	64.0	0.0	28.0	92.0	0.0	26.0	26.0	26.0	12.0	12.0	12.0
Total Split (%)	49.2%	49.2%	0.0%	21.5%	70.8%	0.0%	20.0%	20.0%	20.0%	9.2%	9.2%	9.2%
Maximum Green (s)	59.0	59.0		23.0	87.0		21.0	21.0	21.0	8.0	8.0	8.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	3.0	3.0	3.0
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)	-1.0	-1.0	0.0	-1.0	-1.0	0.0	-1.0	-1.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	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	C-Min	C-Min		None	C-Min		None	None	None	None	None	None
Walk Time (s)	6.0	6.0					6.0	6.0	6.0			
Flash Dont Walk (s)	24.0	24.0					14.0	14.0	14.0			
Pedestrian Calls (#/hr)	4	4					4	4	4			
Act Effct Green (s)		60.0		89.7	89.7		20.3	20.3	19.3		8.0	
Actuated g/C Ratio		0.46		0.69	0.69		0.16	0.16	0.15		0.06	
v/c Ratio		1.02		1.20	0.33		0.80	0.80	0.59		1.07	
Control Delay		63.0		146.9	8.0		74.8	75.2	11.0		162.5	
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0		0.0	
Total Delay		63.0		146.9	8.0		74.8	75.2	11.0		162.5	
LOS		E		F	A		E	E	B		F	
Approach Delay		63.0			60.7			49.7			162.5	
Approach LOS		E			E			D			F	
Queue Length 50th (ft)		~671		~469	124		177	181	0		~111	

Route 128 Add-A-Lane  
1: Highland Ave & 2nd Avenue

AM 2017 Build  
6/3/2010



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		#813		#688	156		#292	#296	81		#239	
Internal Link Dist (ft)		687			833			347			442	
Turn Bay Length (ft)												
Base Capacity (vph)		1427		407	2383		284	286	486		111	
Starvation Cap Reductn		0		0	0		0	0	0		0	
Spillback Cap Reductn		0		0	0		0	0	0		0	
Storage Cap Reductn		0		0	0		0	0	0		0	
Reduced v/c Ratio		1.02		1.20	0.33		0.74	0.74	0.57		1.07	

Intersection Summary

Area Type: Other  
 Cycle Length: 130  
 Actuated Cycle Length: 130  
 Offset: 0 (0%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 130  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.20  
 Intersection Signal Delay: 62.9  
 Intersection LOS: E  
 Intersection Capacity Utilization 91.1%  
 ICU Level of Service F  
 Analysis Period (min) 15  
 ~ 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.

Splits and Phases: 1: Highland Ave & 2nd Avenue



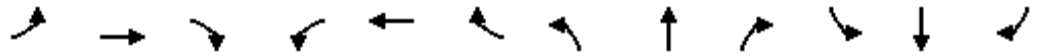
Route 128 Add-A-Lane  
15: Highland Ave & Gould St

AM 2017 Build  
6/3/2010



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	180	1028	67	20	536	157	46	193	307	267	85	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.991			0.966				0.850		0.971	
Flt Protected	0.950			0.950				0.990		0.950		
Satd. Flow (prot)	1770	3507	0	1770	3419	0	0	1844	1583	1770	1809	0
Flt Permitted	0.950			0.950				0.990		0.950		
Satd. Flow (perm)	1770	3507	0	1770	3419	0	0	1844	1583	1770	1809	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		5			26				280		7	
Link Speed (mph)		30			30			30		30		30
Link Distance (ft)		552			1005			281		235		235
Travel Time (s)		12.5			22.8			6.4		5.3		5.3
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	196	1117	73	22	583	171	50	210	334	290	92	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	196	1190	0	22	754	0	0	260	334	290	114	0
Turn Type	Prot			Prot			custom		custom	custom		
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases		6			2		8		8 5	4		
Detector Phase	1	6		5	2		8	8	8 5	4	4	
Switch Phase												
Minimum Initial (s)	4.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	9.0	15.0		11.0	15.0		11.0	11.0		11.0	11.0	
Total Split (s)	24.0	54.0	0.0	11.0	41.0	0.0	26.0	26.0	37.0	29.0	29.0	0.0
Total Split (%)	16.9%	38.0%	0.0%	7.7%	28.9%	0.0%	18.3%	18.3%	26.1%	20.4%	20.4%	0.0%
Maximum Green (s)	19.0	49.0		6.0	36.0		21.0	21.0		24.0	24.0	
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)	-1.0	-1.0	0.0	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Total Lost 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
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	18.3	47.8		7.1	36.6		21.4	31.9	24.4	24.4		
Actuated g/C Ratio	0.15	0.40		0.06	0.30		0.18	0.26	0.20	0.20		
v/c Ratio	0.73	0.85		0.21	0.71		0.79	0.54	0.81	0.31		
Control Delay	66.7	41.0		63.9	41.9		67.1	10.1	65.4	43.4		
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0	0.0	0.0		
Total Delay	66.7	41.0		63.9	41.9		67.1	10.1	65.4	43.4		
LOS	E	D		E	D		E	B	E	D		
Approach Delay		44.7			42.5		35.0			59.2		
Approach LOS		D			D		D			E		
Queue Length 50th (ft)	144	419		17	262		193	31	214	70		

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	19.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	15%
Maximum Green (s)	19.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	



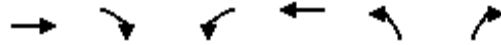
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#300	#715		51	417			#407	106	#445	150	
Internal Link Dist (ft)		472			925			201			155	
Turn Bay Length (ft)												
Base Capacity (vph)	296	1472		104	1080			340	623	371	384	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.66	0.81		0.21	0.70			0.76	0.54	0.78	0.30	

**Intersection Summary**

Area Type: Other  
 Cycle Length: 142  
 Actuated Cycle Length: 120.6  
 Natural Cycle: 120  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.85  
 Intersection Signal Delay: 44.2  
 Intersection LOS: D  
 Intersection Capacity Utilization 76.4%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

**Splits and Phases: 15: Highland Ave & Gould St**

ø1 24 s	ø2 41 s	ø4 29 s	ø8 26 s	ø9 22 s
ø5 11 s	ø6 54 s			



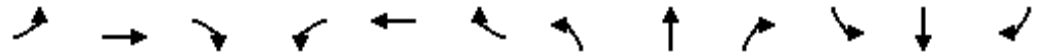
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↗
Volume (veh/h)	1749	588	0	995	0	46
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1901	639	0	1082	0	50
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage (veh)						
Upstream signal (ft)				767		
pX, platoon unblocked				0.96		
vC, conflicting volume	2540			2761 1270		
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2540			2752 1270		
tC, single (s)	4.1			6.8 6.9		
tC, 2 stage (s)						
tF (s)	2.2			3.5 3.3		
p0 queue free %	100			100 69		
cM capacity (veh/h)	173			15 159		

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	1267	1273	541	541	50
Volume Left	0	0	0	0	0
Volume Right	0	639	0	0	50
cSH	1700	1700	1700	1700	159
Volume to Capacity	0.75	0.75	0.32	0.32	0.31
Queue Length 95th (ft)	0	0	0	0	31
Control Delay (s)	0.0	0.0	0.0	0.0	37.7
Lane LOS	E				
Approach Delay (s)	0.0		0.0		37.7
Approach LOS	E				

Intersection Summary					
Average Delay			0.5		
Intersection Capacity Utilization	77.1%		ICU Level of Service		D
Analysis Period (min)	15				

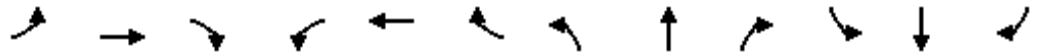
Rooute 128 Add-A-Lane  
1: Highland Ave & 2nd Avenue

PM 2017 Build  
6/3/2010



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕↕		↙	↕↕		↙	↕	↙		↕	↙
Volume (vph)	35	878	206	114	1093	130	714	41	428	119	39	41
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	1.00	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00
Frt		0.972			0.984				0.850			0.850
Flt Protected		0.998		0.950			0.950	0.957			0.964	
Satd. Flow (prot)	0	3433	0	1770	3483	0	1681	1694	1583	0	1796	1583
Flt Permitted		0.838		0.094			0.950	0.957			0.964	
Satd. Flow (perm)	0	2883	0	175	3483	0	1681	1694	1583	0	1796	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		38			21				123			43
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		767			913			427			522	
Travel Time (s)		17.4			20.8			9.7			11.9	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	38	954	224	124	1188	141	776	45	465	129	42	45
Shared Lane Traffic (%)							47%					
Lane Group Flow (vph)	0	1216	0	124	1329	0	411	410	465	0	171	45
Turn Type	Perm			pm+pt			custom		Perm	custom		Perm
Protected Phases		6		5	2		8	8		4	4	
Permitted Phases	6			2			8		8	4		4
Detector Phase	6	6		5	2		8	8	8	4	4	4
Switch Phase												
Minimum Initial (s)	4.0	4.0		3.0	4.0		4.0	4.0	4.0	4.0	4.0	4.0
Minimum Split (s)	20.0	20.0		8.0	21.0		12.0	12.0	12.0	8.0	8.0	8.0
Total Split (s)	42.5	42.5	0.0	8.0	50.5	0.0	30.5	30.5	30.5	9.0	9.0	9.0
Total Split (%)	47.2%	47.2%	0.0%	8.9%	56.1%	0.0%	33.9%	33.9%	33.9%	10.0%	10.0%	10.0%
Maximum Green (s)	37.5	37.5		3.0	45.5		25.5	25.5	25.5	5.0	5.0	5.0
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0	4.0	3.0	3.0	3.0
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)	-1.0	-1.0	0.0	-1.0	-1.0	0.0	-1.0	-1.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	5.0	4.0	4.0	4.0
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	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	C-Min	C-Min		None	C-Min		None	None	None	None	None	None
Walk Time (s)	6.0	6.0					6.0	6.0	6.0			
Flash Dont Walk (s)	24.0	24.0					14.0	14.0	14.0			
Pedestrian Calls (#/hr)	4	4					4	4	4			
Act Effct Green (s)		38.7		47.5	47.5		25.5	25.5	24.5		5.0	5.0
Actuated g/C Ratio		0.43		0.53	0.53		0.28	0.28	0.27		0.06	0.06
v/c Ratio		0.96		0.70	0.72		0.86	0.85	0.89		1.71	0.35
Control Delay		43.5		36.2	19.0		50.0	48.9	44.4		387.7	21.8
Queue Delay		0.0		0.0	0.0		0.0	0.0	0.0		0.0	0.0
Total Delay		43.5		36.2	19.0		50.0	48.9	44.4		387.7	21.8
LOS		D		D	B		D	D	D		F	C
Approach Delay		43.5			20.4			47.6			311.4	
Approach LOS		D			C			D			F	
Queue Length 50th (ft)		337		35	289		228	227	190		~145	1





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)		#494		#98	371		#393	#389	#368		#270	35
Internal Link Dist (ft)		687			833			347			442	
Turn Bay Length (ft)												
Base Capacity (vph)		1261		178	1849		495	499	537		100	129
Starvation Cap Reductn		0		0	0		0	0	0		0	0
Spillback Cap Reductn		0		0	0		0	0	0		0	0
Storage Cap Reductn		0		0	0		0	0	0		0	0
Reduced v/c Ratio		0.96		0.70	0.72		0.83	0.82	0.87		1.71	0.35

**Intersection Summary**

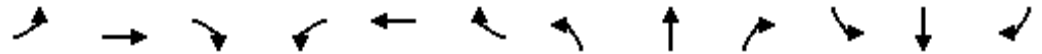
Area Type: Other  
 Cycle Length: 90  
 Actuated Cycle Length: 90  
 Offset: 20 (22%), Referenced to phase 2:WBTL and 6:EBTL, Start of Green  
 Natural Cycle: 90  
 Control Type: Actuated-Coordinated  
 Maximum v/c Ratio: 1.71  
 Intersection Signal Delay: 50.6  
 Intersection LOS: D  
 Intersection Capacity Utilization 103.7%  
 ICU Level of Service G  
 Analysis Period (min) 15  
 ~ 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.

Splits and Phases: 1: Highland Ave & 2nd Avenue



Rooute 128 Add-A-Lane  
15: Highland Ave & Gould St

PM 2017 Build  
6/3/2010



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	91	767	89	257	977	189	35	113	123	289	254	82
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.984			0.976				0.850		0.963	
Flt Protected	0.950			0.950				0.988		0.950		
Satd. Flow (prot)	1770	3483	0	1770	3454	0	0	1840	1583	1770	1794	0
Flt Permitted	0.950			0.950				0.988		0.950		
Satd. Flow (perm)	1770	3483	0	1770	3454	0	0	1840	1583	1770	1794	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		8			18				134		9	
Link Speed (mph)		30			30			30		30		
Link Distance (ft)		552			1005			281		235		
Travel Time (s)		12.5			22.8			6.4		5.3		
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	99	834	97	279	1062	205	38	123	134	314	276	89
Shared Lane Traffic (%)												
Lane Group Flow (vph)	99	931	0	279	1267	0	0	161	134	314	365	0
Turn Type	Prot			Prot			custom		custom	custom		
Protected Phases	1	6		5	2		8	8		4	4	
Permitted Phases		6			2		8		8 5	4		
Detector Phase	1	6		5	2		8	8	8 5	4	4	
Switch Phase												
Minimum Initial (s)	4.0	10.0		6.0	10.0		6.0	6.0		6.0	6.0	
Minimum Split (s)	9.0	15.0		11.0	15.0		11.0	11.0		11.0	11.0	
Total Split (s)	14.0	43.0	0.0	38.0	67.0	0.0	16.0	16.0	54.0	31.0	31.0	0.0
Total Split (%)	9.3%	28.7%	0.0%	25.3%	44.7%	0.0%	10.7%	10.7%	36.0%	20.7%	20.7%	0.0%
Maximum Green (s)	9.0	38.0		33.0	62.0		11.0	11.0		26.0	26.0	
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)	-1.0	-1.0	0.0	-1.0	-1.0	0.0	-1.0	-1.0	-1.0	-1.0	-1.0	0.0
Total Lost 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
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	None	Min		None	Min		None	None		None	None	
Walk Time (s)												
Flash Dont Walk (s)												
Pedestrian Calls (#/hr)												
Act Effct Green (s)	10.1	39.4		25.1	54.4			12.1	40.6	27.3	27.3	
Actuated g/C Ratio	0.08	0.32		0.20	0.44			0.10	0.33	0.22	0.22	
v/c Ratio	0.68	0.83		0.78	0.83			0.89	0.22	0.81	0.91	
Control Delay	81.0	47.6		62.8	36.3			99.9	4.7	63.6	73.6	
Queue Delay	0.0	0.0		0.0	0.0			0.0	0.0	0.0	0.0	
Total Delay	81.0	47.6		62.8	36.3			99.9	4.7	63.6	73.6	
LOS	F	D		E	D			F	A	E	E	
Approach Delay		50.8			41.1			56.7			69.0	
Approach LOS		D			D			E			E	
Queue Length 50th (ft)	76	343		202	425			125	0	230	268	

Lane Group	ø9
Lane Configurations	
Volume (vph)	
Ideal Flow (vphpl)	
Lane Util. Factor	
Frt	
Flt Protected	
Satd. Flow (prot)	
Flt Permitted	
Satd. Flow (perm)	
Right Turn on Red	
Satd. Flow (RTOR)	
Link Speed (mph)	
Link Distance (ft)	
Travel Time (s)	
Peak Hour Factor	
Adj. Flow (vph)	
Shared Lane Traffic (%)	
Lane Group Flow (vph)	
Turn Type	
Protected Phases	9
Permitted Phases	
Detector Phase	
Switch Phase	
Minimum Initial (s)	19.0
Minimum Split (s)	22.0
Total Split (s)	22.0
Total Split (%)	15%
Maximum Green (s)	19.0
Yellow Time (s)	2.0
All-Red Time (s)	1.0
Lost Time Adjust (s)	
Total Lost Time (s)	
Lead/Lag	
Lead-Lag Optimize?	
Vehicle Extension (s)	3.0
Recall Mode	None
Walk Time (s)	6.0
Flash Dont Walk (s)	12.0
Pedestrian Calls (#/hr)	2
Act Effct Green (s)	
Actuated g/C Ratio	
v/c Ratio	
Control Delay	
Queue Delay	
Total Delay	
LOS	
Approach Delay	
Approach LOS	
Queue Length 50th (ft)	



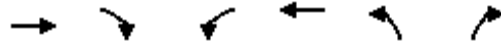
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Queue Length 95th (ft)	#207	#643		361	686			#331	37	#511	#608	
Internal Link Dist (ft)		472			925			201			155	
Turn Bay Length (ft)												
Base Capacity (vph)	145	1115		492	1786			180	718	390	403	
Starvation Cap Reductn	0	0		0	0			0	0	0	0	
Spillback Cap Reductn	0	0		0	0			0	0	0	0	
Storage Cap Reductn	0	0		0	0			0	0	0	0	
Reduced v/c Ratio	0.68	0.83		0.57	0.71			0.89	0.19	0.81	0.91	

**Intersection Summary**

Area Type: Other  
 Cycle Length: 150  
 Actuated Cycle Length: 123.8  
 Natural Cycle: 130  
 Control Type: Actuated-Uncoordinated  
 Maximum v/c Ratio: 0.91  
 Intersection Signal Delay: 50.6  
 Intersection LOS: D  
 Intersection Capacity Utilization 77.8%  
 ICU Level of Service D  
 Analysis Period (min) 15  
 # 95th percentile volume exceeds capacity, queue may be longer.  
 Queue shown is maximum after two cycles.

Splits and Phases: 15: Highland Ave & Gould St

ø1	ø2	ø4	ø8	ø9
14 s	67 s	31 s	16 s	22 s
ø5	ø6			
38 s	43 s			



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑↑			↑↑		↗
Volume (veh/h)	1095	138	0	2359	0	166
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1190	150	0	2564	0	180
Pedestrians						
Lane Width (ft)						
Walking Speed (ft/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None		None			
Median storage (veh)						
Upstream signal (ft)	767					
pX, platoon unblocked					0.72	
vC, conflicting volume			1340	2547	670	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			1340	2373	670	
tC, single (s)			4.1	6.8	6.9	
tC, 2 stage (s)						
tF (s)			2.2	3.5	3.3	
p0 queue free %			100	100	55	
cM capacity (veh/h)			510	21	399	

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1
Volume Total	793	547	1282	1282	180
Volume Left	0	0	0	0	0
Volume Right	0	150	0	0	180
cSH	1700	1700	1700	1700	399
Volume to Capacity	0.47	0.32	0.75	0.75	0.45
Queue Length 95th (ft)	0	0	0	0	57
Control Delay (s)	0.0	0.0	0.0	0.0	21.2
Lane LOS					C
Approach Delay (s)	0.0		0.0		21.2
Approach LOS					C

Intersection Summary					
Average Delay			0.9		
Intersection Capacity Utilization			68.5%	ICU Level of Service	C
Analysis Period (min)			15		