

























HCM 6th Signalized Intersection Summary
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Steady State)
 AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	221	129	206	352	90	75	764	120	72	1071	114
Future Volume (veh/h)	148	221	129	206	352	90	75	764	120	72	1071	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	1953	1953	1953	1953	1953	1953	1953	1953	1969	1969	1969
Adj Flow Rate, veh/h	166	248	145	219	374	96	94	955	150	76	1127	120
Peak Hour Factor	0.89	0.89	0.89	0.94	0.94	0.94	0.80	0.80	0.80	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	2	2	2
Cap, veh/h	192	384	171	243	486	217	112	1950	870	97	1935	863
Arrive On Green	0.10	0.10	0.10	0.13	0.13	0.13	0.06	0.53	0.53	0.05	0.52	0.52
Sat Flow, veh/h	1860	3711	1655	1860	3711	1655	1860	3711	1655	1875	3741	1668
Grp Volume(v), veh/h	166	248	145	219	374	96	94	955	150	76	1127	120
Grp Sat Flow(s),veh/h/ln	1860	1856	1655	1860	1856	1655	1860	1856	1655	1875	1870	1668
Q Serve(g_s), s	12.3	9.0	12.1	16.2	13.6	7.5	7.0	23.0	6.6	5.6	29.1	5.2
Cycle Q Clear(g_c), s	12.3	9.0	12.1	16.2	13.6	7.5	7.0	23.0	6.6	5.6	29.1	5.2
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	192	384	171	243	486	217	112	1950	870	97	1935	863
V/C Ratio(X)	0.86	0.65	0.85	0.90	0.77	0.44	0.84	0.49	0.17	0.79	0.58	0.14
Avail Cap(c_a), veh/h	258	435	194	258	486	217	112	1950	870	113	1935	863
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.8	60.3	61.7	59.9	58.8	56.1	65.1	21.2	17.3	65.6	23.4	17.6
Incr Delay (d2), s/veh	19.9	2.7	25.6	30.4	7.3	1.4	41.1	0.9	0.4	26.3	1.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.7	4.3	6.2	9.6	6.8	3.2	4.5	9.7	2.6	3.3	12.4	2.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	81.7	63.0	87.2	90.4	66.1	57.5	106.2	22.1	17.8	92.0	24.6	17.9
LnGrp LOS	F	E	F	F	E	E	F	C	B	F	C	B
Approach Vol, veh/h		559			689			1199			1323	
Approach Delay, s/veh		74.9			72.6			28.1			27.9	
Approach LOS		E			E			C			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.8	80.2	24.9	21.1	15.0	79.0	21.0	24.9				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 8.4	* 69	* 19	* 16	* 8.4	* 69	* 19	* 16				
Max Q Clear Time (g_c+I1), s	7.6	25.0	18.2	14.1	9.0	31.1	14.3	15.6				
Green Ext Time (p_c), s	0.0	7.8	0.1	0.4	0.0	9.5	0.2	0.2				
Intersection Summary												
HCM 6th Ctrl Delay				43.1								
HCM 6th LOS				D								
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary
 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Future Conditions (Steady State)
 AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (veh/h)	27	4	31	57	3	12	32	983	33	23	1395	29
Future Volume (veh/h)	27	4	31	57	3	12	32	983	33	23	1395	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	1891	1891	1891	1938	1938	1938	1969	1969	1969
Adj Flow Rate, veh/h	43	6	47	80	4	0	37	1130	33	25	1533	32
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.87	0.87	0.87	0.91	0.91	0.91
Percent Heavy Veh, %	0	0	0	7	7	7	4	4	4	2	2	2
Cap, veh/h	198	20	159	150	197	0	313	2975	1327	442	3028	63
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1435	195	1529	1298	1891	0	323	3681	1642	483	3747	78
Grp Volume(v), veh/h	43	0	53	80	4	0	37	1130	33	25	764	801
Grp Sat Flow(s),veh/h/ln	1435	0	1725	1298	1891	0	323	1841	1642	483	1870	1955
Q Serve(g_s), s	3.9	0.0	4.0	8.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	4.1	0.0	4.0	12.5	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.89	1.00		0.00	1.00		1.00	1.00		0.04
Lane Grp Cap(c), veh/h	198	0	180	150	197	0	313	2975	1327	442	1511	1580
V/C Ratio(X)	0.22	0.00	0.30	0.53	0.02	0.00	0.12	0.38	0.02	0.06	0.51	0.51
Avail Cap(c_a), veh/h	274	0	271	218	297	0	313	2975	1327	442	1511	1580
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.2	0.0	58.0	63.7	56.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.9	2.9	0.0	0.0	0.8	0.4	0.0	0.2	1.2	1.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.8	3.0	0.1	0.0	0.1	0.2	0.0	0.0	0.5	0.5
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	0.0	58.9	66.7	56.3	0.0	0.8	0.4	0.0	0.2	1.2	1.2
LnGrp LOS	E	A	E	E	E	A	A	A	A	A	A	A
Approach Vol, veh/h		96			84			1200			1590	
Approach Delay, s/veh		58.8			66.2			0.4			1.2	
Approach LOS		E			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		119.4		20.6		119.4		20.6				
Change Period (Y+Rc), s		* 6.3		6.0		* 6.3		6.0				
Max Green Setting (Gmax), s*		1.1E2		22.0		* 1.1E2		22.0				
Max Q Clear Time (g_c+11), s		2.0		6.1		2.0		14.5				
Green Ext Time (p_c), s		11.2		0.3		16.2		0.1				

Intersection Summary

HCM 6th Ctrl Delay	4.6
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
 3: Rochester Road (M-150) & Hickory Lawn Road

Future Conditions (Steady State)
 AM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Vol, veh/h	0	5	3	1048	1483	0
Future Vol, veh/h	0	5	3	1048	1483	0
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	63	63	87	87	91	91
Heavy Vehicles, %	0	0	4	4	2	2
Mvmt Flow	0	8	3	1205	1630	0

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	2239	815	1630	0	0
Stage 1	1630	-	-	-	-
Stage 2	609	-	-	-	-
Critical Hdwy	6.8	6.9	4.18	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.24	-	-
Pot Cap-1 Maneuver	*236	*497	*732	-	-
Stage 1	*468	-	-	-	-
Stage 2	*627	-	-	-	-
Platoon blocked, %	1	1	1	-	-
Mov Cap-1 Maneuver	*235	*497	*732	-	-
Mov Cap-2 Maneuver	*347	-	-	-	-
Stage 1	*466	-	-	-	-
Stage 2	*627	-	-	-	-


















Approach	EB	NB	SB
HCM Control Delay, s	12.4	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 732	-	497	-	-
HCM Lane V/C Ratio	0.005	-	0.016	-	-
HCM Control Delay (s)	9.9	-	12.4	-	-
HCM Lane LOS	A	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Future Conditions (Steady State)
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	629	0	439	0	683	0	0	1159	337
Future Volume (veh/h)	0	0	0	629	0	439	0	683	0	0	1159	337
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No		No		No
Adj Sat Flow, veh/h/ln				1969	0	1969	0	1938	0	0	1969	1969
Adj Flow Rate, veh/h				676	0	472	0	804	0	0	1274	0
Peak Hour Factor				0.93	0.93	0.93	0.85	0.85	0.85	0.91	0.91	0.91
Percent Heavy Veh, %				2	0	2	0	4	0	0	2	2
Cap, veh/h				790	0	637	0	2562	0	0	2603	
Arrive On Green				0.22	0.00	0.22	0.00	1.00	0.00	0.00	0.47	0.00
Sat Flow, veh/h				3638	0	2937	0	3875	0	0	3839	1668
Grp Volume(v), veh/h				676	0	472	0	804	0	0	1274	0
Grp Sat Flow(s),veh/h/ln				1819	0	1468	0	1841	0	0	1870	1668
Q Serve(g_s), s				25.0	0.0	21.0	0.0	0.0	0.0	0.0	33.0	0.0
Cycle Q Clear(g_c), s				25.0	0.0	21.0	0.0	0.0	0.0	0.0	33.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				790	0	637	0	2562	0	0	2603	
V/C Ratio(X)				0.86	0.00	0.74	0.00	0.31	0.00	0.00	0.49	
Avail Cap(c_a), veh/h				935	0	755	0	2562	0	0	2603	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	2.00	1.00	1.00	0.67	0.67
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				52.7	0.0	51.1	0.0	0.0	0.0	0.0	20.2	0.0
Incr Delay (d2), s/veh				6.9	0.0	3.2	0.0	0.3	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				12.3	0.0	8.1	0.0	0.1	0.0	0.0	15.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				59.6	0.0	54.4	0.0	0.3	0.0	0.0	20.8	0.0
LnGrp LOS				E	A	D	A	A	A	A	C	
Approach Vol, veh/h					1148			804			1274	
Approach Delay, s/veh					57.5			0.3			20.8	
Approach LOS					E			A			C	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		103.6				103.6		36.4				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 92				* 92		36.0				
Max Q Clear Time (g_c+I1), s		2.0				35.0		27.0				
Green Ext Time (p_c), s		5.8				11.4		3.4				

Intersection Summary

HCM 6th Ctrl Delay	28.8
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary

5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Future Conditions (Steady State)
AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	258	0	223	0	0	0	0	620	296	0	1471	0
Future Volume (veh/h)	258	0	223	0	0	0	0	620	296	0	1471	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	1906	1906	1906				0	1953	1953	0	1969	0
Adj Flow Rate, veh/h	311	0	73				0	747	0	0	1634	0
Peak Hour Factor	0.93	0.93	0.93				0.83	0.83	0.83	0.90	0.90	0.90
Percent Heavy Veh, %	6	6	6				0	3	3	0	2	0
Cap, veh/h	387	0	172				0	2993		0	3016	0
Arrive On Green	0.11	0.00	0.11				0.00	0.81	0.00	0.00	1.00	0.00
Sat Flow, veh/h	3631	0	1616				0	3809	1655	0	3938	0
Grp Volume(v), veh/h	311	0	73				0	747	0	0	1634	0
Grp Sat Flow(s),veh/h/ln	1816	0	1616				0	1856	1655	0	1870	0
Q Serve(g_s), s	11.7	0.0	5.9				0.0	6.8	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	11.7	0.0	5.9				0.0	6.8	0.0	0.0	0.0	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	387	0	172				0	2993		0	3016	0
V/C Ratio(X)	0.80	0.00	0.42				0.00	0.25		0.00	0.54	0.00
Avail Cap(c_a), veh/h	726	0	323				0	2993		0	3016	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	2.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	61.1	0.0	58.5				0.0	3.3	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	4.0	0.0	1.7				0.0	0.2	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.7	0.0	2.5				0.0	1.8	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	65.1	0.0	60.2				0.0	3.5	0.0	0.0	0.7	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h	384						747			1634		
Approach Delay, s/veh	64.2						3.5			0.7		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	119.1		20.9		119.1							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 1E2		28.0		* 1E2							
Max Q Clear Time (g_c+I1), s	8.8		13.7		2.0							
Green Ext Time (p_c), s	5.2		1.2		19.2							

Intersection Summary

























HCM 6th Ctrl Delay	10.3
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Steady State)
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	407	151	223	298	131	154	1349	187	187	1293	160
Future Volume (veh/h)	210	407	151	223	298	131	154	1349	187	187	1293	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	231	447	166	275	368	162	164	1435	199	201	1390	172
Peak Hour Factor	0.91	0.91	0.91	0.81	0.81	0.81	0.94	0.94	0.94	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	256	529	236	275	568	254	167	1647	734	167	1647	734
Arrive On Green	0.14	0.14	0.14	0.15	0.15	0.15	0.18	0.87	0.87	0.09	0.44	0.44
Sat Flow, veh/h	1890	3770	1682	1890	3770	1682	1890	3770	1682	1890	3770	1682
Grp Volume(v), veh/h	231	447	166	275	368	162	164	1435	199	201	1390	172
Grp Sat Flow(s),veh/h/ln	1890	1885	1682	1890	1885	1682	1890	1885	1682	1890	1885	1682
Q Serve(g_s), s	16.9	16.2	13.2	20.4	12.9	12.7	12.1	28.2	2.7	12.4	46.0	9.0
Cycle Q Clear(g_c), s	16.9	16.2	13.2	20.4	12.9	12.7	12.1	28.2	2.7	12.4	46.0	9.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	256	529	236	275	568	254	167	1647	734	167	1647	734
V/C Ratio(X)	0.90	0.84	0.70	1.00	0.65	0.64	0.98	0.87	0.27	1.20	0.84	0.23
Avail Cap(c_a), veh/h	275	630	281	275	630	281	167	1647	734	167	1647	734
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.6	58.7	57.4	59.8	55.9	55.9	57.5	6.8	5.2	63.8	35.2	24.7
Incr Delay (d2), s/veh	29.3	8.9	6.2	53.8	2.0	4.1	63.3	6.6	0.9	133.8	5.5	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.9	8.2	5.9	13.7	6.2	5.6	8.0	4.7	1.0	12.0	21.2	3.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	88.9	67.6	63.6	113.6	57.9	60.0	120.8	13.4	6.1	197.6	40.7	25.5
LnGrp LOS	F	E	E	F	E	E	F	B	A	F	D	C
Approach Vol, veh/h		844			805			1798			1763	
Approach Delay, s/veh		72.6			77.4			22.4			57.1	
Approach LOS		E			E			C			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	67.7	27.0	26.3	19.0	67.7	25.6	27.7				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 12	* 57	* 20	* 23	* 12	* 57	* 20	* 23				
Max Q Clear Time (g_c+I1), s	14.4	30.2	22.4	18.2	14.1	48.0	18.9	14.9				
Green Ext Time (p_c), s	0.0	12.3	0.0	1.5	0.0	6.0	0.1	1.8				

Intersection Summary

HCM 6th Ctrl Delay	50.8
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Future Conditions (Steady State)
 PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (veh/h)	88	7	96	147	7	62	99	1624	90	65	1555	87
Future Volume (veh/h)	88	7	96	147	7	62	99	1624	90	65	1555	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	1984	1984	1984	1984	1984	1984	1969	1969	1969
Adj Flow Rate, veh/h	147	12	150	162	8	44	104	1709	76	69	1654	93
Peak Hour Factor	0.60	0.60	0.60	0.91	0.91	0.91	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	1	1	1	1	1	1	2	2	2
Cap, veh/h	329	29	358	230	60	329	242	2588	1154	234	2472	138
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1374	127	1587	1234	265	1457	278	3770	1682	266	3602	201
Grp Volume(v), veh/h	147	0	162	162	0	52	104	1709	76	69	854	893
Grp Sat Flow(s),veh/h/ln	1374	0	1714	1234	0	1722	278	1885	1682	266	1870	1933
Q Serve(g_s), s	13.4	0.0	11.3	18.1	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.8	0.0	11.3	29.4	0.0	3.4	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.93	1.00		0.85	1.00		1.00	1.00		0.10
Lane Grp Cap(c), veh/h	329	0	387	230	0	389	242	2588	1154	234	1284	1326
V/C Ratio(X)	0.45	0.00	0.42	0.70	0.00	0.13	0.43	0.66	0.07	0.30	0.67	0.67
Avail Cap(c_a), veh/h	352	0	416	251	0	418	242	2588	1154	234	1284	1326
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.0	0.0	46.3	58.9	0.0	43.3	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.0	0.7	7.8	0.0	0.2	5.5	1.3	0.1	3.2	2.7	2.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	5.0	6.2	0.0	1.5	0.4	0.5	0.0	0.2	1.0	1.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.9	0.0	47.1	66.7	0.0	43.4	5.5	1.3	0.1	3.2	2.7	2.7
LnGrp LOS	D	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		309			214			1889			1816	
Approach Delay, s/veh		48.9			61.0			1.5			2.8	
Approach LOS		D			E			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		102.4		37.6		102.4		37.6				
Change Period (Y+Rc), s		* 6.3		6.0		* 6.3		6.0				
Max Green Setting (Gmax), s		* 94		34.0		* 94		34.0				
Max Q Clear Time (g_c+1), s		2.0		18.8		2.0		31.4				
Green Ext Time (p_c), s		30.7		1.3		25.9		0.2				

Intersection Summary

HCM 6th Ctrl Delay	8.5
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
 3: Rochester Road (M-150) & Hickory Lawn Road

Future Conditions (Steady State)
 PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑↑	↑↑	
Traffic Vol, veh/h	0	9	8	1813	1796	2
Future Vol, veh/h	0	9	8	1813	1796	2
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	95	95	94	94
Heavy Vehicles, %	0	0	1	1	1	1
Mvmt Flow	0	15	8	1908	1911	2

Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	2882	957	1913	0	-	0
Stage 1	1912	-	-	-	-	-
Stage 2	970	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.12	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.21	-	-	-
Pot Cap-1 Maneuver	-	*371	*554	-	-	-
Stage 1	*349	-	-	-	-	-
Stage 2	*313	-	-	-	-	-
Platoon blocked, %	2	1	1	-	-	-
Mov Cap-1 Maneuver	-	*371	*554	-	-	-
Mov Cap-2 Maneuver	*149	-	-	-	-	-
Stage 1	*345	-	-	-	-	-
Stage 2	*313	-	-	-	-	-


















Approach	EB	NB	SB
HCM Control Delay, s		0.1	0
HCM LOS	-		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 554	-	-	-	-
HCM Lane V/C Ratio	0.015	-	-	-	-
HCM Control Delay (s)	11.6	-	-	-	-
HCM Lane LOS	B	-	-	-	-
HCM 95th %tile Q(veh)	0	-	-	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Future Conditions (Steady State)
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	393	0	488	0	1372	0	0	1395	426
Future Volume (veh/h)	0	0	0	393	0	488	0	1372	0	0	1395	426
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				1984	0	1984	0	1984	0	0	1984	1984
Adj Flow Rate, veh/h				452	0	556	0	1460	0	0	1468	0
Peak Hour Factor				0.87	0.87	0.87	0.94	0.94	0.94	0.95	0.95	0.95
Percent Heavy Veh, %				1	0	1	0	1	0	0	1	1
Cap, veh/h				811	0	655	0	2607	0	0	2607	
Arrive On Green				0.22	0.00	0.22	0.00	0.69	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3666	0	2960	0	3969	0	0	3870	1682
Grp Volume(v), veh/h				452	0	556	0	1460	0	0	1468	0
Grp Sat Flow(s),veh/h/ln				1833	0	1480	0	1885	0	0	1885	1682
Q Serve(g_s), s				15.3	0.0	25.2	0.0	27.3	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				15.3	0.0	25.2	0.0	27.3	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				811	0	655	0	2607	0	0	2607	
V/C Ratio(X)				0.56	0.00	0.85	0.00	0.56	0.00	0.00	0.56	
Avail Cap(c_a), veh/h				1100	0	888	0	2607	0	0	2607	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				48.4	0.0	52.3	0.0	10.9	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.6	0.0	5.9	0.0	0.9	0.0	0.0	0.9	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				7.2	0.0	10.0	0.0	10.1	0.0	0.0	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				49.0	0.0	58.1	0.0	11.7	0.0	0.0	0.9	0.0
LnGrp LOS				D	A	E	A	B	A	A	A	
Approach Vol, veh/h					1008			1460			1468	
Approach Delay, s/veh					54.1			11.7			0.9	
Approach LOS					D			B			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		103.0				103.0		37.0				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 86				* 86		42.0				
Max Q Clear Time (g_c+I1), s		29.3				2.0		27.2				
Green Ext Time (p_c), s		14.4				15.1		3.8				

Intersection Summary

HCM 6th Ctrl Delay	18.5
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Future Conditions (Steady State)
PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	332	0	246	0	0	0	0	1394	604	0	1288	0
Future Volume (veh/h)	332	0	246	0	0	0	0	1394	604	0	1288	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	1953	1953	1953				0	1984	1984	0	1984	0
Adj Flow Rate, veh/h	437	0	90				0	1515	0	0	1370	0
Peak Hour Factor	0.84	0.84	0.84				0.92	0.92	0.92	0.94	0.94	0.94
Percent Heavy Veh, %	3	3	3				0	1	1	0	1	0
Cap, veh/h	524	0	233				0	2911		0	2911	0
Arrive On Green	0.14	0.00	0.14				0.00	0.77	0.00	0.00	0.77	0.00
Sat Flow, veh/h	3720	0	1655				0	3870	1682	0	3969	0
Grp Volume(v), veh/h	437	0	90				0	1515	0	0	1370	0
Grp Sat Flow(s),veh/h/ln	1860	0	1655				0	1885	1682	0	1885	0
Q Serve(g_s), s	16.0	0.0	6.9				0.0	21.4	0.0	0.0	18.2	0.0
Cycle Q Clear(g_c), s	16.0	0.0	6.9				0.0	21.4	0.0	0.0	18.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	524	0	233				0	2911		0	2911	0
V/C Ratio(X)	0.83	0.00	0.39				0.00	0.52		0.00	0.47	0.00
Avail Cap(c_a), veh/h	850	0	378				0	2911		0	2911	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	58.6	0.0	54.7				0.0	6.1	0.0	0.0	5.7	0.0
Incr Delay (d2), s/veh	3.9	0.0	1.0				0.0	0.7	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	7.9	0.0	3.0				0.0	6.7	0.0	0.0	5.7	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	62.5	0.0	55.7				0.0	6.7	0.0	0.0	6.3	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h	527						1515			1370		
Approach Delay, s/veh	61.3						6.7			6.3		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	114.3		25.7		114.3							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 96		32.0		* 96							
Max Q Clear Time (g_c+I1), s	23.4		18.0		20.2							
Green Ext Time (p_c), s	16.0		1.7		13.2							

Intersection Summary

























HCM 6th Ctrl Delay	15.0
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Steady State)
 SAT MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	213	265	121	255	297	149	166	1341	182	185	1385	209
Future Volume (veh/h)	213	265	121	255	297	149	166	1341	182	185	1385	209
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	296	368	168	268	313	157	175	1412	192	197	1473	222
Peak Hour Factor	0.72	0.72	0.72	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	275	465	207	275	465	207	169	1725	769	167	1711	763
Arrive On Green	0.15	0.12	0.12	0.15	0.12	0.12	0.09	0.45	0.45	0.09	0.45	0.45
Sat Flow, veh/h	1890	3770	1682	1890	3770	1682	1905	3800	1695	1890	3770	1682
Grp Volume(v), veh/h	296	368	168	268	313	157	175	1412	192	197	1473	222
Grp Sat Flow(s),veh/h/ln	1890	1885	1682	1890	1885	1682	1905	1900	1695	1890	1885	1682
Q Serve(g_s), s	20.4	13.3	13.6	19.8	11.1	12.6	12.4	45.2	9.8	12.4	49.0	11.6
Cycle Q Clear(g_c), s	20.4	13.3	13.6	19.8	11.1	12.6	12.4	45.2	9.8	12.4	49.0	11.6
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	275	465	207	275	465	207	169	1725	769	167	1711	763
V/C Ratio(X)	1.07	0.79	0.81	0.97	0.67	0.76	1.04	0.82	0.25	1.18	0.86	0.29
Avail Cap(c_a), veh/h	275	630	281	275	630	281	169	1725	769	167	1711	763
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.8	59.6	59.8	59.5	58.7	59.3	63.8	33.2	23.5	63.8	34.3	24.1
Incr Delay (d2), s/veh	75.5	4.9	12.0	46.7	1.7	7.8	79.5	4.5	0.8	125.1	5.9	1.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	15.3	6.5	6.4	12.8	5.3	5.7	9.6	20.7	4.0	11.6	22.5	4.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	135.3	64.5	71.8	106.2	60.4	67.1	143.3	37.7	24.3	188.9	40.2	25.0
LnGrp LOS	F	E	E	F	E	E	F	D	C	F	D	C
Approach Vol, veh/h		832			738			1779			1892	
Approach Delay, s/veh		91.2			78.5			46.6			53.9	
Approach LOS		F			E			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	70.1	27.0	23.9	19.0	70.1	27.0	23.9				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 12	* 57	* 20	* 23	* 12	* 57	* 20	* 23				
Max Q Clear Time (g_c+I1), s	14.4	47.2	21.8	15.6	14.4	51.0	22.4	14.6				
Green Ext Time (p_c), s	0.0	6.6	0.0	1.6	0.0	4.7	0.0	1.5				

Intersection Summary

HCM 6th Ctrl Delay	60.8
HCM 6th LOS	E

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Future Conditions (Steady State)
 SAT MD Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (veh/h)	105	8	104	201	7	72	100	1488	114	113	1609	107
Future Volume (veh/h)	105	8	104	201	7	72	100	1488	114	113	1609	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	140	11	134	221	8	36	105	1566	99	119	1694	113
Peak Hour Factor	0.75	0.75	0.75	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	239	20	249	152	50	224	249	2847	1270	279	2710	179
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1384	130	1585	1263	317	1426	262	3770	1682	301	3589	237
Grp Volume(v), veh/h	140	0	145	221	0	44	105	1566	99	119	883	924
Grp Sat Flow(s),veh/h/ln	1384	0	1715	1263	0	1743	262	1885	1682	301	1885	1942
Q Serve(g_s), s	13.6	0.0	10.9	11.1	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	16.7	0.0	10.9	22.0	0.0	3.1	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.92	1.00		0.82	1.00		1.00	1.00		0.12
Lane Grp Cap(c), veh/h	239	0	269	152	0	274	249	2847	1270	279	1423	1466
V/C Ratio(X)	0.59	0.00	0.54	1.46	0.00	0.16	0.42	0.55	0.08	0.43	0.62	0.63
Avail Cap(c_a), veh/h	239	0	269	152	0	274	249	2847	1270	279	1423	1466
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.2	0.0	54.3	66.3	0.0	51.0	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	3.7	0.0	2.1	238.8	0.0	0.3	5.2	0.8	0.1	4.7	2.0	2.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	5.1	0.0	4.9	15.5	0.0	1.4	0.4	0.3	0.0	0.4	0.8	0.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.9	0.0	56.4	305.2	0.0	51.3	5.2	0.8	0.1	4.7	2.0	2.1
LnGrp LOS	E	A	E	F	A	D	A	A	A	A	A	A
Approach Vol, veh/h		285			265			1770			1926	
Approach Delay, s/veh		59.1			263.0			1.0			2.2	
Approach LOS		E			F			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		112.0		28.0		112.0		28.0				
Change Period (Y+Rc), s		* 6.3		6.0		* 6.3		6.0				
Max Green Setting (Gmax), s*		1.1E2		22.0		* 1.1E2		22.0				
Max Q Clear Time (g_c+1), s		2.0		18.7		2.0		24.0				
Green Ext Time (p_c), s		27.5		0.4		32.2		0.0				

Intersection Summary

HCM 6th Ctrl Delay	21.8
HCM 6th LOS	C

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
 3: Rochester Road (M-150) & Hickory Lawn Road

Future Conditions (Steady State)
 SAT MD Peak Hour

Intersection						
Int Delay, s/veh	0.2					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	↔		↔	↑↑	↑↑	
Traffic Vol, veh/h	0	13	11	1702	1910	4
Future Vol, veh/h	0	13	11	1702	1910	4
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	65	65	95	95	91	91
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	20	12	1792	2099	4


















Major/Minor	Minor2	Major1	Major2			
Conflicting Flow All	3021	1052	2103	0	-	0
Stage 1	2101	-	-	-	-	-
Stage 2	920	-	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-	-
Pot Cap-1 Maneuver	11	226	265	-	-	-
Stage 1	82	-	-	-	-	-
Stage 2	353	-	-	-	-	-
Platoon blocked, %				-	-	-
Mov Cap-1 Maneuver	11	226	265	-	-	-
Mov Cap-2 Maneuver	61	-	-	-	-	-
Stage 1	78	-	-	-	-	-
Stage 2	353	-	-	-	-	-

Approach	EB	NB	SB
HCM Control Delay, s	22.5	0.1	0
HCM LOS	C		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	265	-	226	-	-
HCM Lane V/C Ratio	0.044	-	0.088	-	-
HCM Control Delay (s)	19.2	-	22.5	-	-
HCM Lane LOS	C	-	C	-	-
HCM 95th %tile Q(veh)	0.1	-	0.3	-	-

HCM 6th Signalized Intersection Summary
 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Future Conditions (Steady State)
 SAT MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	322	0	445	0	1315	0	0	1569	399
Future Volume (veh/h)	0	0	0	322	0	445	0	1315	0	0	1569	399
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No		No		No			No	
Adj Sat Flow, veh/h/ln				1984	0	1984	0	1984	0	0	1984	1984
Adj Flow Rate, veh/h				350	0	477	0	1414	0	0	1652	0
Peak Hour Factor				0.92	0.92	0.92	0.93	0.93	0.93	0.95	0.95	0.95
Percent Heavy Veh, %				1	0	1	0	1	0	0	1	1
Cap, veh/h				708	0	571	0	2714	0	0	2714	
Arrive On Green				0.19	0.00	0.19	0.00	0.72	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3666	0	2960	0	3969	0	0	3870	1682
Grp Volume(v), veh/h				350	0	477	0	1414	0	0	1652	0
Grp Sat Flow(s),veh/h/ln				1833	0	1480	0	1885	0	0	1885	1682
Q Serve(g_s), s				11.9	0.0	21.7	0.0	23.5	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				11.9	0.0	21.7	0.0	23.5	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				708	0	571	0	2714	0	0	2714	
V/C Ratio(X)				0.49	0.00	0.84	0.00	0.52	0.00	0.00	0.61	
Avail Cap(c_a), veh/h				1152	0	930	0	2714	0	0	2714	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				50.4	0.0	54.3	0.0	8.8	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.5	0.0	3.6	0.0	0.7	0.0	0.0	1.0	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				5.6	0.0	8.4	0.0	8.3	0.0	0.0	0.4	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				50.9	0.0	57.9	0.0	9.5	0.0	0.0	1.0	0.0
LnGrp LOS				D	A	E	A	A	A	A	A	
Approach Vol, veh/h					827			1414			1652	
Approach Delay, s/veh					55.0			9.5			1.0	
Approach LOS					D			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		107.0				107.0		33.0				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 84				* 84		44.0				
Max Q Clear Time (g_c+I1), s		25.5				2.0		23.7				
Green Ext Time (p_c), s		13.7				19.4		3.3				

Intersection Summary

HCM 6th Ctrl Delay	15.6
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Future Conditions (Steady State)
 SAT MD Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	358	0	194	0	0	0	0	1225	420	0	1466	0
Future Volume (veh/h)	358	0	194	0	0	0	0	1225	420	0	1466	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	1984	1984	1984				0	1984	1984	0	1984	0
Adj Flow Rate, veh/h	447	0	85				0	1346	0	0	1576	0
Peak Hour Factor	0.88	0.88	0.88				0.91	0.91	0.91	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1				0	1	1	0	1	0
Cap, veh/h	542	0	241				0	2902		0	2902	0
Arrive On Green	0.14	0.00	0.14				0.00	0.77	0.00	0.00	0.77	0.00
Sat Flow, veh/h	3780	0	1682				0	3870	1682	0	3969	0
Grp Volume(v), veh/h	447	0	85				0	1346	0	0	1576	0
Grp Sat Flow(s),veh/h/ln	1984	0	1682				0	1885	1682	0	1885	0
Q Serve(g_s), s	16.1	0.0	6.4				0.0	17.9	0.0	0.0	23.2	0.0
Cycle Q Clear(g_c), s	16.1	0.0	6.4				0.0	17.9	0.0	0.0	23.2	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	542	0	241				0	2902		0	2902	0
V/C Ratio(X)	0.83	0.00	0.35				0.00	0.46		0.00	0.54	0.00
Avail Cap(c_a), veh/h	1188	0	529				0	2902		0	2902	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	58.3	0.0	54.1				0.0	5.8	0.0	0.0	6.4	0.0
Incr Delay (d2), s/veh	3.3	0.0	0.9				0.0	0.5	0.0	0.0	0.7	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	8.0	0.0	2.8				0.0	5.6	0.0	0.0	7.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	61.5	0.0	55.0				0.0	6.3	0.0	0.0	7.1	0.0
LnGrp LOS	E	A	D				A	A		A	A	A
Approach Vol, veh/h	532						1346			1576		
Approach Delay, s/veh	60.5						6.3			7.1		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	113.9		26.1		113.9							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 84		44.0		* 84							
Max Q Clear Time (g_c+I1), s	19.9		18.1		25.2							
Green Ext Time (p_c), s	12.6		2.0		16.8							

Intersection Summary

























HCM 6th Ctrl Delay	15.0
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Steady State)
 SAT PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	209	235	114	237	221	128	175	1189	153	146	1129	165
Future Volume (veh/h)	209	235	114	237	221	128	175	1189	153	146	1129	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	222	250	121	272	254	147	184	1252	161	155	1201	176
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	248	355	158	278	415	185	169	1838	820	169	1838	820
Arrive On Green	0.13	0.09	0.09	0.15	0.11	0.11	0.09	0.48	0.48	0.09	0.48	0.48
Sat Flow, veh/h	1905	3800	1695	1905	3800	1695	1905	3800	1695	1905	3800	1695
Grp Volume(v), veh/h	222	250	121	272	254	147	184	1252	161	155	1201	176
Grp Sat Flow(s),veh/h/ln	1905	1900	1695	1905	1900	1695	1905	1900	1695	1905	1900	1695
Q Serve(g_s), s	16.1	8.9	9.8	19.9	8.9	11.8	12.4	35.5	7.6	11.3	33.4	8.4
Cycle Q Clear(g_c), s	16.1	8.9	9.8	19.9	8.9	11.8	12.4	35.5	7.6	11.3	33.4	8.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	248	355	158	278	415	185	169	1838	820	169	1838	820
V/C Ratio(X)	0.90	0.70	0.76	0.98	0.61	0.79	1.09	0.68	0.20	0.92	0.65	0.21
Avail Cap(c_a), veh/h	278	635	283	278	635	283	169	1838	820	169	1838	820
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	60.0	61.6	61.9	59.6	59.5	60.8	63.8	27.8	20.6	63.3	27.3	20.8
Incr Delay (d2), s/veh	27.3	2.6	7.4	48.3	1.5	8.5	95.6	2.1	0.5	46.4	1.8	0.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.4	4.3	4.5	13.1	4.3	5.4	10.3	15.7	3.1	7.5	14.8	3.4
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	87.2	64.1	69.4	107.9	61.0	69.3	159.4	29.9	21.2	109.7	29.1	21.4
LnGrp LOS	F	E	E	F	E	E	F	C	C	F	C	C
Approach Vol, veh/h		593			673			1597			1532	
Approach Delay, s/veh		73.8			81.8			43.9			36.4	
Approach LOS		E			F			D			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.0	74.3	27.0	19.7	19.0	74.3	24.8	21.9				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 12	* 57	* 20	* 23	* 12	* 57	* 20	* 23				
Max Q Clear Time (g_c+I1), s	13.3	37.5	21.9	11.8	14.4	35.4	18.1	13.8				
Green Ext Time (p_c), s	0.0	8.8	0.0	1.3	0.0	8.9	0.1	1.3				

Intersection Summary

HCM 6th Ctrl Delay	51.1
HCM 6th LOS	D

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Future Conditions (Steady State)
 SAT PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (veh/h)	78	9	91	148	5	54	89	1369	75	70	1403	84
Future Volume (veh/h)	78	9	91	148	5	54	89	1369	75	70	1403	84
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	130	15	147	172	6	26	95	1456	62	78	1559	93
Peak Hour Factor	0.60	0.60	0.60	0.86	0.86	0.86	0.94	0.94	0.94	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	249	25	245	138	51	223	283	2869	1280	315	2752	163
Arrive On Green	0.16	0.16	0.16	0.16	0.16	0.16	1.00	1.00	1.00	1.00	1.00	1.00
Sat Flow, veh/h	1399	159	1560	1243	327	1418	307	3800	1695	349	3645	216
Grp Volume(v), veh/h	130	0	162	172	0	32	95	1456	62	78	809	843
Grp Sat Flow(s),veh/h/ln	1399	0	1719	1243	0	1745	307	1900	1695	349	1900	1961
Q Serve(g_s), s	12.3	0.0	12.3	9.7	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s	14.5	0.0	12.3	22.0	0.0	2.2	0.0	0.0	0.0	0.0	0.0	0.0
Prop In Lane	1.00		0.91	1.00		0.81	1.00		1.00	1.00		0.11
Lane Grp Cap(c), veh/h	249	0	270	138	0	274	283	2869	1280	315	1435	1481
V/C Ratio(X)	0.52	0.00	0.60	1.25	0.00	0.12	0.34	0.51	0.05	0.25	0.56	0.57
Avail Cap(c_a), veh/h	249	0	270	138	0	274	283	2869	1280	315	1435	1481
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	56.9	0.0	54.9	67.0	0.0	50.7	0.0	0.0	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh	2.0	0.0	3.6	158.1	0.0	0.2	3.2	0.6	0.1	1.9	1.6	1.6
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.5	0.0	5.7	11.0	0.0	1.0	0.2	0.3	0.0	0.2	0.6	0.7
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.8	0.0	58.5	225.1	0.0	50.8	3.2	0.6	0.1	1.9	1.6	1.6
LnGrp LOS	E	A	E	F	A	D	A	A	A	A	A	A
Approach Vol, veh/h		292			204			1613			1730	
Approach Delay, s/veh		58.7			197.7			0.8			1.6	
Approach LOS		E			F			A			A	
Timer - Assigned Phs		2		4		6		8				
Phs Duration (G+Y+Rc), s		112.0		28.0		112.0		28.0				
Change Period (Y+Rc), s		* 6.3		6.0		* 6.3		6.0				
Max Green Setting (Gmax), s*		1.1E2		22.0		* 1.1E2		22.0				
Max Q Clear Time (g_c+1), s		2.0		16.5		2.0		24.0				
Green Ext Time (p_c), s		21.5		0.6		22.0		0.0				

Intersection Summary

HCM 6th Ctrl Delay	16.0
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th TWSC
 3: Rochester Road (M-150) & Hickory Lawn Road

Future Conditions (Steady State)
 SAT PM Peak Hour

Intersection						
Int Delay, s/veh	0					
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations	Y		Y	↑↑	↑↑	
Traffic Vol, veh/h	0	6	4	1533	1641	1
Future Vol, veh/h	0	6	4	1533	1641	1
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Stop	Stop	Free	Free	Free	Free
RT Channelized	-	None	-	None	-	None
Storage Length	0	-	500	-	-	-
Veh in Median Storage, #	0	-	-	0	0	-
Grade, %	0	-	-	0	0	-
Peak Hour Factor	60	60	95	95	92	92
Heavy Vehicles, %	0	0	0	0	1	1
Mvmt Flow	0	10	4	1614	1784	1

Major/Minor	Minor2	Major1		Major2	
Conflicting Flow All	2600	893	1785	0	0
Stage 1	1785	-	-	-	-
Stage 2	815	-	-	-	-
Critical Hdwy	6.8	6.9	4.1	-	-
Critical Hdwy Stg 1	5.8	-	-	-	-
Critical Hdwy Stg 2	5.8	-	-	-	-
Follow-up Hdwy	3.5	3.3	2.2	-	-
Pot Cap-1 Maneuver	*26	*434	*651	-	-
Stage 1	*409	-	-	-	-
Stage 2	*418	-	-	-	-
Platoon blocked, %	1	1	1	-	-
Mov Cap-1 Maneuver	*26	*434	*651	-	-
Mov Cap-2 Maneuver	*200	-	-	-	-
Stage 1	*406	-	-	-	-
Stage 2	*418	-	-	-	-


















Approach	EB	NB	SB
HCM Control Delay, s	13.5	0	0
HCM LOS	B		

Minor Lane/Major Mvmt	NBL	NBT	EBLn1	SBT	SBR
Capacity (veh/h)	* 651	-	434	-	-
HCM Lane V/C Ratio	0.006	-	0.023	-	-
HCM Control Delay (s)	10.6	-	13.5	-	-
HCM Lane LOS	B	-	B	-	-
HCM 95th %tile Q(veh)	0	-	0.1	-	-

Notes
 ~: Volume exceeds capacity \$: Delay exceeds 300s +: Computation Not Defined *: All major volume in platoon

HCM 6th Signalized Intersection Summary
 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Future Conditions (Steady State)
 SAT PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	0	0	0	342	0	415	0	1177	0	0	1158	368
Future Volume (veh/h)	0	0	0	342	0	415	0	1177	0	0	1158	368
Initial Q (Qb), veh				0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)				1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj				1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach				No			No			No		
Adj Sat Flow, veh/h/ln				2000	0	2000	0	2000	0	0	2000	2000
Adj Flow Rate, veh/h				376	0	453	0	1239	0	0	1245	0
Peak Hour Factor				0.91	0.91	0.91	0.95	0.95	0.95	0.93	0.93	0.93
Percent Heavy Veh, %				0	0	0	0	0	0	0	0	0
Cap, veh/h				681	0	550	0	2769	0	0	2769	
Arrive On Green				0.18	0.00	0.18	0.00	0.73	0.00	0.00	1.00	0.00
Sat Flow, veh/h				3695	0	2983	0	4000	0	0	3900	1695
Grp Volume(v), veh/h				376	0	453	0	1239	0	0	1245	0
Grp Sat Flow(s),veh/h/ln				1848	0	1492	0	1900	0	0	1900	1695
Q Serve(g_s), s				12.9	0.0	20.4	0.0	18.4	0.0	0.0	0.0	0.0
Cycle Q Clear(g_c), s				12.9	0.0	20.4	0.0	18.4	0.0	0.0	0.0	0.0
Prop In Lane				1.00		1.00	0.00		0.00	0.00		1.00
Lane Grp Cap(c), veh/h				681	0	550	0	2769	0	0	2769	
V/C Ratio(X)				0.55	0.00	0.82	0.00	0.45	0.00	0.00	0.45	
Avail Cap(c_a), veh/h				1161	0	938	0	2769	0	0	2769	
HCM Platoon Ratio				1.00	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00
Upstream Filter(I)				1.00	0.00	1.00	0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh				51.9	0.0	54.9	0.0	7.6	0.0	0.0	0.0	0.0
Incr Delay (d2), s/veh				0.7	0.0	3.2	0.0	0.5	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh				0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln				6.2	0.0	8.0	0.0	6.4	0.0	0.0	0.2	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh				52.6	0.0	58.1	0.0	8.2	0.0	0.0	0.5	0.0
LnGrp LOS				D	A	E	A	A	A	A	A	
Approach Vol, veh/h					829			1239			1245	
Approach Delay, s/veh					55.6			8.2			0.5	
Approach LOS					E			A			A	
Timer - Assigned Phs		2				6		8				
Phs Duration (G+Y+Rc), s		108.2				108.2		31.8				
Change Period (Y+Rc), s		* 6.2				* 6.2		6.0				
Max Green Setting (Gmax), s		* 84				* 84		44.0				
Max Q Clear Time (g_c+I1), s		20.4				2.0		22.4				
Green Ext Time (p_c), s		10.9				11.1		3.3				

Intersection Summary

HCM 6th Ctrl Delay	17.2
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [SBR] is excluded from calculations of the approach delay and intersection delay.

HCM 6th Signalized Intersection Summary
 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Future Conditions (Steady State)
 SAT PM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	280	0	199	0	0	0	0	1096	412	0	1237	0
Future Volume (veh/h)	280	0	199	0	0	0	0	1096	412	0	1237	0
Initial Q (Qb), veh	0	0	0				0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00				1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach	No						No			No		
Adj Sat Flow, veh/h/ln	2000	2000	2000				0	1984	1984	0	1984	0
Adj Flow Rate, veh/h	337	0	84				0	1154	0	0	1345	0
Peak Hour Factor	0.94	0.94	0.94				0.95	0.95	0.95	0.92	0.92	0.92
Percent Heavy Veh, %	0	0	0				0	1	1	0	1	0
Cap, veh/h	425	0	189				0	3021		0	3021	0
Arrive On Green	0.11	0.00	0.11				0.00	0.80	0.00	0.00	0.80	0.00
Sat Flow, veh/h	3810	0	1695				0	3870	1682	0	3969	0
Grp Volume(v), veh/h	337	0	84				0	1154	0	0	1345	0
Grp Sat Flow(s),veh/h/ln	1905	0	1695				0	1885	1682	0	1885	0
Q Serve(g_s), s	12.1	0.0	6.5				0.0	12.3	0.0	0.0	15.4	0.0
Cycle Q Clear(g_c), s	12.1	0.0	6.5				0.0	12.3	0.0	0.0	15.4	0.0
Prop In Lane	1.00		1.00				0.00		1.00	0.00		0.00
Lane Grp Cap(c), veh/h	425	0	189				0	3021		0	3021	0
V/C Ratio(X)	0.79	0.00	0.44				0.00	0.38		0.00	0.45	0.00
Avail Cap(c_a), veh/h	1197	0	533				0	3021		0	3021	0
HCM Platoon Ratio	1.00	1.00	1.00				1.00	1.00	1.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	0.00	1.00				0.00	1.00	0.00	0.00	1.00	0.00
Uniform Delay (d), s/veh	60.6	0.0	58.1				0.0	4.0	0.0	0.0	4.3	0.0
Incr Delay (d2), s/veh	3.4	0.0	1.6				0.0	0.4	0.0	0.0	0.5	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0				0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.1	0.0	2.9				0.0	3.4	0.0	0.0	4.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	64.0	0.0	59.8				0.0	4.3	0.0	0.0	4.8	0.0
LnGrp LOS	E	A	E				A	A		A	A	A
Approach Vol, veh/h	421						1154			1345		
Approach Delay, s/veh	63.2						4.3			4.8		
Approach LOS	E						A			A		
Timer - Assigned Phs	2		4		6							
Phs Duration (G+Y+Rc), s	118.4		21.6		118.4							
Change Period (Y+Rc), s	* 6.2		6.0		* 6.2							
Max Green Setting (Gmax), s	* 84		44.0		* 84							
Max Q Clear Time (g_c+I1), s	14.3		14.1		17.4							
Green Ext Time (p_c), s	9.8		1.5		12.6							

Intersection Summary

HCM 6th Ctrl Delay	13.0
HCM 6th LOS	B

Notes

User approved volume balancing among the lanes for turning movement.
 * HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.
 Unsignalized Delay for [NBR] is excluded from calculations of the approach delay and intersection delay.

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	284	228	274	174	308	257	261	190	168	294	305	198
Average Queue (ft)	134	106	107	105	181	154	140	70	76	127	132	44
95th Queue (ft)	235	187	241	173	282	226	225	142	148	229	241	133
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)										0	0	
Queuing Penalty (veh)										1	0	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			6	15			5	0		0	4	0
Queuing Penalty (veh)			7	17			5	1		0	5	0

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	183	335	354	196
Average Queue (ft)	81	206	214	44
95th Queue (ft)	185	309	321	130
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			2	
Queuing Penalty (veh)			2	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	86	62	141	39	77	86	104	30	52	132	144
Average Queue (ft)	25	22	55	7	26	19	21	2	16	38	71
95th Queue (ft)	65	52	114	27	62	61	68	15	44	94	139
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)											
Queuing Penalty (veh)											
Storage Bay Dist (ft)					500				500		
Storage Blk Time (%)											
Queuing Penalty (veh)											

Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	29	32
Average Queue (ft)	4	2
95th Queue (ft)	22	15
Link Distance (ft)	531	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	364	458	378	263	134	140	209	221
Average Queue (ft)	240	286	189	164	59	61	124	122
95th Queue (ft)	350	406	297	238	114	114	191	189
Link Distance (ft)	1030				150	150	311	311
Upstream Blk Time (%)					0	0		
Queuing Penalty (veh)					0	1		
Storage Bay Dist (ft)	250	250	250					
Storage Blk Time (%)	1	15	1	0				
Queuing Penalty (veh)	7	67	11	2				

Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	268	327	311	132	139	38	162	195
Average Queue (ft)	146	220	158	54	50	1	78	106
95th Queue (ft)	250	305	268	113	111	27	149	185
Link Distance (ft)	936			1203	1203		229	229
Upstream Blk Time (%)								0
Queuing Penalty (veh)								0
Storage Bay Dist (ft)	250	250		175				
Storage Blk Time (%)	0	4	0		0	0		
Queuing Penalty (veh)	0	9	0		0	0		

Zone Summary

Zone wide Queuing Penalty: 137

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	321	280	330	175	516	191	215	182	381	440	438	200
Average Queue (ft)	186	158	160	115	290	110	95	84	212	351	356	127
95th Queue (ft)	292	239	281	191	535	170	173	161	419	499	497	254
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									4	22	17	
Queuing Penalty (veh)									0	187	144	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			13	14			1	1	4	22	40	1
Queuing Penalty (veh)			20	28			1	2	26	34	75	5

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	740	925	944	325
Average Queue (ft)	484	494	519	193
95th Queue (ft)	893	948	929	408
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)		0	0	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)	4	2	29	
Queuing Penalty (veh)	27	3	46	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	212	175	244	126	231	296	296	60	244	308	303
Average Queue (ft)	77	57	120	46	181	238	211	15	120	135	157
95th Queue (ft)	160	117	210	105	283	356	338	42	253	287	280
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)	0	0	0		17	45	12		6	6	1
Queuing Penalty (veh)	0	0	0		0	272	73		0	53	5
Storage Bay Dist (ft)					500				500		
Storage Blk Time (%)					17	45			6	6	
Queuing Penalty (veh)					135	44			43	4	

Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road

Movement	EB	NB	NB	NB	SB	SB
Directions Served	LR	L	T	T	T	TR
Maximum Queue (ft)	43	227	541	548	9	11
Average Queue (ft)	10	30	267	234	0	0
95th Queue (ft)	35	214	685	636	6	8
Link Distance (ft)	531		532	532	231	231
Upstream Blk Time (%)		0	25	14		
Queuing Penalty (veh)		0	229	125		
Storage Bay Dist (ft)		500				
Storage Blk Time (%)			26			
Queuing Penalty (veh)			2			

Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	294	359	502	364	202	212	304	331
Average Queue (ft)	146	205	241	206	140	151	178	203
95th Queue (ft)	257	334	442	342	221	230	289	311
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					18	17	0	0
Queuing Penalty (veh)					124	119	1	3
Storage Bay Dist (ft)	250	250		250				
Storage Blk Time (%)	0	2	11	7				
Queuing Penalty (veh)	0	9	75	44				

Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	314	365	296	441	495	200	226	249
Average Queue (ft)	163	229	171	160	174	58	127	147
95th Queue (ft)	267	314	269	332	383	207	207	230
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)							0	0
Queuing Penalty (veh)							1	2
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	0	5	0		4	0		
Queuing Penalty (veh)	0	16	1		24	1		

Zone Summary

Zone wide Queuing Penalty: 2005

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	437	193	241	174	886	821	777	214	379	432	420	200
Average Queue (ft)	208	99	81	85	492	252	223	102	187	280	286	109
95th Queue (ft)	386	167	183	158	905	738	666	172	388	480	483	238
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									3	11	7	
Queuing Penalty (veh)									0	92	59	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			4	5	2	0	1	1	3	11	24	0
Queuing Penalty (veh)			6	8	3	0	1	1	17	18	44	0

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	1025	1323	1326	325
Average Queue (ft)	663	989	1017	269
95th Queue (ft)	1267	1640	1640	448
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)		21	36	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)	0	29	59	
Queuing Penalty (veh)	3	54	123	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	198	166	300	114	226	283	274	58	321	380	377
Average Queue (ft)	96	62	239	44	188	240	146	12	244	300	265
95th Queue (ft)	187	128	357	98	283	356	282	40	411	471	398
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)	5	0	40		28	60	2		33	51	4
Queuing Penalty (veh)	0	0	0		0	341	11		0	465	38
Storage Bay Dist (ft)					500				500		
Storage Blk Time (%)					28	60			33	51	
Queuing Penalty (veh)					210	60			267	57	

Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road

Movement	EB	NB	NB	NB
Directions Served	LR	L	T	T
Maximum Queue (ft)	30	327	487	485
Average Queue (ft)	11	46	339	140
95th Queue (ft)	33	273	767	497
Link Distance (ft)	531		532	532
Upstream Blk Time (%)		0	42	2
Queuing Penalty (veh)		0	363	19
Storage Bay Dist (ft)		500		
Storage Blk Time (%)			43	
Queuing Penalty (veh)			5	

Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Movement	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	R	R	T	T	T	T	R
Maximum Queue (ft)	288	410	750	395	199	198	306	321	76
Average Queue (ft)	132	237	368	217	137	143	184	203	3
95th Queue (ft)	289	467	927	437	230	229	300	338	48
Link Distance (ft)			1030		150	150	311	311	311
Upstream Blk Time (%)			12		31	24	1	1	0
Queuing Penalty (veh)			0		206	156	4	9	0
Storage Bay Dist (ft)	250	250		250					
Storage Blk Time (%)	0	12	25	16					
Queuing Penalty (veh)	1	52	135	88					

Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	326	534	303	884	866	200	244	247
Average Queue (ft)	182	262	154	375	378	67	114	128
95th Queue (ft)	321	496	307	1080	1097	222	210	219
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)		1		7	18		1	1
Queuing Penalty (veh)		0		0	0		5	6
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	5	13	0		22	0		
Queuing Penalty (veh)	16	37	1		92	1		

Zone Summary

Zone wide Queuing Penalty: 3076

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	282	182	190	156	427	215	160	172	326	384	367	200
Average Queue (ft)	168	100	75	79	218	91	67	90	202	201	194	77
95th Queue (ft)	261	158	154	138	370	167	127	154	315	348	326	199
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									1	2	0	
Queuing Penalty (veh)									0	15	2	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			2	3				0	1	2	7	0
Queuing Penalty (veh)			2	3				0	4	4	11	0

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	266	411	445	325
Average Queue (ft)	147	266	293	126
95th Queue (ft)	251	390	422	310
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			10	0
Queuing Penalty (veh)			17	1

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	TR
Maximum Queue (ft)	152	191	284	85	206	246	226	30	122	182	227
Average Queue (ft)	65	52	145	28	71	92	110	9	51	89	138
95th Queue (ft)	130	115	262	64	149	184	194	30	98	159	211
Link Distance (ft)	217	217	284	284		231	231	231		321	321
Upstream Blk Time (%)		0	5		0	1	0				
Queuing Penalty (veh)		0	0		0	4	1				
Storage Bay Dist (ft)					500				500		
Storage Blk Time (%)					0	1					
Queuing Penalty (veh)					0	1					

Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road

Movement	EB	NB	NB
Directions Served	LR	L	T
Maximum Queue (ft)	38	32	27
Average Queue (ft)	7	3	1
95th Queue (ft)	29	18	16
Link Distance (ft)	531		532
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)		500	
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	230	276	306	275	188	190	268	268
Average Queue (ft)	120	163	179	151	92	100	152	154
95th Queue (ft)	205	240	263	238	162	179	242	252
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					1	2		
Queuing Penalty (veh)					7	9		
Storage Bay Dist (ft)	250	250		250				
Storage Blk Time (%)	0	0	1	0				
Queuing Penalty (veh)	0	2	7	2				

Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

























Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	223	283	236	251	261	200	201	201
Average Queue (ft)	124	189	125	109	99	16	106	124
95th Queue (ft)	220	260	228	203	198	105	184	201
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)							0	0
Queuing Penalty (veh)							0	0
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	0	1	0		1	0		
Queuing Penalty (veh)	0	3	0		3	0		

Zone Summary

Zone wide Queuing Penalty: 98

HCM 6th Signalized Intersection Summary
1: Rochester Road (M-150) & Auburn Road

Future Conditions (Opening Day) w/ IMP
AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	221	130	208	352	90	76	767	122	72	1074	114
Future Volume (veh/h)	148	221	130	208	352	90	76	767	122	72	1074	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	1953	1953	1953	1953	1953	1953	1953	1953	1969	1969	1969
Adj Flow Rate, veh/h	166	248	146	221	374	96	95	959	152	76	1131	120
Peak Hour Factor	0.89	0.89	0.89	0.94	0.94	0.94	0.80	0.80	0.80	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	2	2	2
Cap, veh/h	193	386	172	248	495	221	117	1937	864	97	1912	853
Arrive On Green	0.10	0.10	0.10	0.13	0.13	0.13	0.13	1.00	1.00	0.05	0.51	0.51
Sat Flow, veh/h	1860	3711	1655	1860	3711	1655	1860	3711	1655	1875	3741	1668
Grp Volume(v), veh/h	166	248	146	221	374	96	95	959	152	76	1131	120
Grp Sat Flow(s),veh/h/ln	1860	1856	1655	1860	1856	1655	1860	1856	1655	1875	1870	1668
Q Serve(g_s), s	12.3	9.0	12.1	16.4	13.6	7.5	7.0	0.0	0.0	5.6	29.7	5.3
Cycle Q Clear(g_c), s	12.3	9.0	12.1	16.4	13.6	7.5	7.0	0.0	0.0	5.6	29.7	5.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	193	386	172	248	495	221	117	1937	864	97	1912	853
V/C Ratio(X)	0.86	0.64	0.85	0.89	0.76	0.43	0.81	0.49	0.18	0.78	0.59	0.14
Avail Cap(c_a), veh/h	337	435	194	337	495	221	178	1937	864	179	1912	853
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.7	60.2	61.6	59.7	58.5	55.8	60.4	0.0	0.0	65.6	24.0	18.0
Incr Delay (d2), s/veh	10.4	2.7	25.9	19.4	6.5	1.3	15.2	0.9	0.4	12.6	1.4	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	4.3	6.2	8.9	6.7	3.2	3.5	0.2	0.1	3.0	12.7	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.1	62.9	87.6	79.0	65.0	57.1	75.6	0.9	0.4	78.2	25.3	18.4
LnGrp LOS	E	E	F	E	E	E	E	A	A	E	C	B
Approach Vol, veh/h		560			691			1206			1327	
Approach Delay, s/veh		72.1			68.4			6.7			27.7	
Approach LOS		E			E			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.9	79.7	25.3	21.2	15.4	78.2	21.2	25.3				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 13	* 58	* 25	* 16	* 13	* 58	* 25	* 16				
Max Q Clear Time (g_c+I1), s	7.6	2.0	18.4	14.1	9.0	31.7	14.3	15.6				
Green Ext Time (p_c), s	0.1	8.0	0.3	0.4	0.1	8.7	0.3	0.2				
Intersection Summary												
HCM 6th Ctrl Delay			35.0									
HCM 6th LOS			D									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

Future Conditions (Opening Day) w/ IMP

2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

AM Peak Hour



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations	↖	↗		↖	↗		↖	↑↑	↗	↖	↑↑	↗
Traffic Volume (veh/h)	28	5	30	57	3	12	32	988	33	23	1401	29
Future Volume (veh/h)	28	5	30	57	3	12	32	988	33	23	1401	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	1891	1891	1891	1938	1938	1938	1969	1969	1969
Adj Flow Rate, veh/h	44	8	46	80	4	0	37	1136	33	25	1540	32
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.87	0.87	0.87	0.91	0.91	0.91
Percent Heavy Veh, %	0	0	0	7	7	7	4	4	4	2	2	2
Cap, veh/h	198	27	154	149	197	0	338	2726	1216	446	2751	1227
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.00	0.05	1.00	1.00	0.04	1.00	1.00
Sat Flow, veh/h	1435	257	1477	1297	1891	0	1845	3681	1642	1875	3741	1668
Grp Volume(v), veh/h	44	0	54	80	4	0	37	1136	33	25	1540	32
Grp Sat Flow(s),veh/h/ln	1435	0	1734	1297	1891	0	1845	1841	1642	1875	1870	1668
Q Serve(g_s), s	4.0	0.0	4.0	8.5	0.3	0.0	0.7	0.0	0.0	0.5	0.0	0.0
Cycle Q Clear(g_c), s	4.2	0.0	4.0	12.5	0.3	0.0	0.7	0.0	0.0	0.5	0.0	0.0
Prop In Lane	1.00		0.85	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	198	0	181	149	197	0	338	2726	1216	446	2751	1227
V/C Ratio(X)	0.22	0.00	0.30	0.54	0.02	0.00	0.11	0.42	0.03	0.06	0.56	0.03
Avail Cap(c_a), veh/h	254	0	248	199	270	0	389	2726	1216	494	2751	1227
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.2	0.0	58.0	63.8	56.3	0.0	3.9	0.0	0.0	4.1	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.9	3.0	0.0	0.0	0.1	0.5	0.0	0.1	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.8	3.0	0.1	0.0	0.2	0.2	0.0	0.1	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	0.0	58.9	66.7	56.3	0.0	4.0	0.5	0.0	4.1	0.8	0.0
LnGrp LOS	E	A	E	E	E	A	A	A	A	A	A	A
Approach Vol, veh/h		98			84			1206			1597	
Approach Delay, s/veh		58.8			66.2			0.6			0.9	
Approach LOS		E			E			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.4	110.0		20.6	10.1	109.3		20.6				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.0	* 6.3	* 6.3		6.0				
Max Green Setting (Gmax), s	* 6.7	* 95		20.0	* 7.7	* 94		20.0				
Max Q Clear Time (g_c+I1), s	2.5	2.0		6.2	2.7	2.0		14.5				
Green Ext Time (p_c), s	0.0	9.8		0.3	0.0	17.1		0.1				

Intersection Summary

























HCM 6th Ctrl Delay	4.5
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Opening Day) w/ IMP
 PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	407	155	226	298	131	157	1357	191	187	1301	160
Future Volume (veh/h)	210	407	155	226	298	131	157	1357	191	187	1301	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	231	447	170	279	368	162	167	1444	203	201	1399	172
Peak Hour Factor	0.91	0.91	0.91	0.81	0.81	0.81	0.94	0.94	0.94	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	257	530	236	302	619	276	189	1566	699	181	1550	691
Arrive On Green	0.14	0.14	0.14	0.16	0.16	0.16	0.20	0.83	0.83	0.10	0.41	0.41
Sat Flow, veh/h	1890	3770	1682	1890	3770	1682	1890	3770	1682	1890	3770	1682
Grp Volume(v), veh/h	231	447	170	279	368	162	167	1444	203	201	1399	172
Grp Sat Flow(s),veh/h/ln	1890	1885	1682	1890	1885	1682	1890	1885	1682	1890	1885	1682
Q Serve(g_s), s	16.8	16.2	13.5	20.4	12.7	12.5	12.0	38.7	3.8	13.4	48.6	9.4
Cycle Q Clear(g_c), s	16.8	16.2	13.5	20.4	12.7	12.5	12.0	38.7	3.8	13.4	48.6	9.4
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	257	530	236	302	619	276	189	1566	699	181	1550	691
V/C Ratio(X)	0.90	0.84	0.72	0.92	0.59	0.59	0.88	0.92	0.29	1.11	0.90	0.25
Avail Cap(c_a), veh/h	302	630	281	302	630	281	194	1566	699	181	1550	691
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.5	58.7	57.5	58.0	54.2	54.1	55.2	10.2	7.2	63.3	38.6	27.0
Incr Delay (d2), s/veh	25.2	8.9	7.0	32.6	1.5	3.1	34.0	10.5	1.1	99.9	8.9	0.9
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.6	8.2	6.1	12.3	6.0	5.4	6.8	6.7	1.4	11.3	23.2	3.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	84.7	67.6	64.6	90.5	55.7	57.2	89.2	20.7	8.3	163.2	47.5	27.9
LnGrp LOS	F	E	E	F	E	E	F	C	A	F	D	C
Approach Vol, veh/h		848			809			1814			1772	
Approach Delay, s/veh		71.6			68.0			25.6			58.8	
Approach LOS		E			E			C			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	64.8	29.0	26.3	20.6	64.1	25.6	29.6				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 13	* 54	* 22	* 23	* 14	* 53	* 22	* 23				
Max Q Clear Time (g_c+I1), s	15.4	40.7	22.4	18.2	14.0	50.6	18.8	14.7				
Green Ext Time (p_c), s	0.0	8.3	0.0	1.5	0.0	2.1	0.2	1.8				

Intersection Summary

HCM 6th Ctrl Delay	50.8
HCM 6th LOS	D

Notes























* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

Future Conditions (Opening Day) w/ IMP

2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	86	9	98	147	9	62	99	1641	90	65	1570	87
Future Volume (veh/h)	86	9	98	147	9	62	99	1641	90	65	1570	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	1984	1984	1984	1984	1984	1984	1969	1969	1969
Adj Flow Rate, veh/h	143	15	153	162	10	44	104	1727	76	69	1670	93
Peak Hour Factor	0.60	0.60	0.60	0.91	0.91	0.91	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	1	1	1	1	1	1	2	2	2
Cap, veh/h	330	35	357	229	73	322	284	2284	1019	271	2257	1006
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.07	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	1371	153	1565	1227	320	1410	1890	3770	1682	1875	3741	1668
Grp Volume(v), veh/h	143	0	168	162	0	54	104	1727	76	69	1670	93
Grp Sat Flow(s),veh/h/ln	1371	0	1718	1227	0	1731	1890	1885	1682	1875	1870	1668
Q Serve(g_s), s	13.0	0.0	11.7	18.2	0.0	3.5	3.0	0.0	0.0	2.0	0.0	0.0
Cycle Q Clear(g_c), s	16.5	0.0	11.7	29.9	0.0	3.5	3.0	0.0	0.0	2.0	0.0	0.0
Prop In Lane	1.00		0.91	1.00		0.81	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	330	0	392	229	0	395	284	2284	1019	271	2257	1006
V/C Ratio(X)	0.43	0.00	0.43	0.71	0.00	0.14	0.37	0.76	0.07	0.25	0.74	0.09
Avail Cap(c_a), veh/h	331	0	393	229	0	396	361	2284	1019	312	2257	1006
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	49.6	0.0	46.2	59.0	0.0	43.1	9.3	0.0	0.0	9.3	0.0	0.0
Incr Delay (d2), s/veh	0.9	0.0	0.7	9.6	0.0	0.2	0.8	2.4	0.1	0.5	2.2	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.6	0.0	5.2	6.3	0.0	1.5	1.1	0.8	0.0	0.7	0.7	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	50.5	0.0	47.0	68.6	0.0	43.2	10.1	2.4	0.1	9.8	2.2	0.2
LnGrp LOS	D	A	D	E	A	D	B	A	A	A	A	A
Approach Vol, veh/h		311			216			1907			1832	
Approach Delay, s/veh		48.6			62.3			2.7			2.4	
Approach LOS		D			E			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	91.1		37.9	11.3	90.8		37.9				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.0	* 6.3	* 6.3		6.0				
Max Green Setting (Gmax), s	* 7.7	* 82		32.0	* 11	* 79		32.0				
Max Q Clear Time (g_c+I1), s	4.0	2.0		18.5	5.0	2.0		31.9				
Green Ext Time (p_c), s	0.0	22.0		1.2	0.1	20.6		0.0				

Intersection Summary

























HCM 6th Ctrl Delay	8.9
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Opening Day) w/ IMP
 SAT MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	213	265	125	260	297	149	169	1353	186	185	1396	209
Future Volume (veh/h)	213	265	125	260	297	149	169	1353	186	185	1396	209
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	296	368	174	274	313	157	178	1424	196	197	1485	222
Peak Hour Factor	0.72	0.72	0.72	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	302	477	213	297	467	208	182	1641	732	181	1628	726
Arrive On Green	0.16	0.13	0.13	0.16	0.12	0.12	0.19	0.86	0.86	0.10	0.43	0.43
Sat Flow, veh/h	1890	3770	1682	1890	3770	1682	1905	3800	1695	1890	3770	1682
Grp Volume(v), veh/h	296	368	174	274	313	157	178	1424	196	197	1485	222
Grp Sat Flow(s),veh/h/ln	1890	1885	1682	1890	1885	1682	1905	1900	1695	1890	1885	1682
Q Serve(g_s), s	21.8	13.2	14.1	20.0	11.1	12.6	13.0	28.5	2.9	13.4	51.7	12.1
Cycle Q Clear(g_c), s	21.8	13.2	14.1	20.0	11.1	12.6	13.0	28.5	2.9	13.4	51.7	12.1
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	302	477	213	297	467	208	182	1641	732	181	1628	726
V/C Ratio(X)	0.98	0.77	0.82	0.92	0.67	0.75	0.98	0.87	0.27	1.09	0.91	0.31
Avail Cap(c_a), veh/h	302	630	281	302	630	281	182	1641	732	181	1628	726
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.6	59.2	59.6	58.1	58.6	59.3	56.4	7.4	5.6	63.3	37.3	26.0
Incr Delay (d2), s/veh	45.8	4.3	13.2	31.8	1.7	7.6	59.5	6.5	0.9	92.7	9.3	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.0	6.4	6.7	12.0	5.3	5.7	8.5	4.9	1.1	10.9	24.5	5.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	104.4	63.5	72.8	89.9	60.3	66.9	116.0	13.8	6.5	156.0	46.5	27.1
LnGrp LOS	F	E	E	F	E	E	F	B	A	F	D	C
Approach Vol, veh/h		838			744			1798			1904	
Approach Delay, s/veh		79.9			72.6			23.2			55.6	
Approach LOS		E			E			C			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	67.1	28.6	24.3	20.0	67.1	29.0	23.9				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 13	* 54	* 22	* 23	* 13	* 54	* 22	* 23				
Max Q Clear Time (g_c+I1), s	15.4	30.5	22.0	16.1	15.0	53.7	23.8	14.6				
Green Ext Time (p_c), s	0.0	11.4	0.0	1.6	0.0	0.6	0.0	1.5				

Intersection Summary

HCM 6th Ctrl Delay	50.8
HCM 6th LOS	D

Notes























* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

Future Conditions (Opening Day) w/ IMP

2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

SAT MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	10	104	201	9	72	100	1507	114	113	1629	107
Future Volume (veh/h)	105	10	104	201	9	72	100	1507	114	113	1629	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	140	13	134	221	10	36	105	1586	99	119	1715	113
Peak Hour Factor	0.75	0.75	0.75	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	369	38	392	278	95	343	203	2174	970	298	2186	975
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.07	1.00	1.00	0.05	0.77	0.77
Sat Flow, veh/h	1381	152	1566	1260	381	1372	1890	3770	1682	1890	3770	1682
Grp Volume(v), veh/h	140	0	147	221	0	46	105	1586	99	119	1715	113
Grp Sat Flow(s),veh/h/ln	1381	0	1718	1260	0	1753	1890	1885	1682	1890	1885	1682
Q Serve(g_s), s	12.2	0.0	9.8	24.4	0.0	2.8	3.2	0.0	0.0	3.6	36.9	2.4
Cycle Q Clear(g_c), s	15.0	0.0	9.8	34.2	0.0	2.8	3.2	0.0	0.0	3.6	36.9	2.4
Prop In Lane	1.00		0.91	1.00		0.78	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	369	0	430	278	0	438	203	2174	970	298	2186	975
V/C Ratio(X)	0.38	0.00	0.34	0.79	0.00	0.10	0.52	0.73	0.10	0.40	0.78	0.12
Avail Cap(c_a), veh/h	369	0	430	278	0	438	264	2174	970	352	2186	975
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.2	0.0	43.1	57.1	0.0	40.4	18.1	0.0	0.0	10.8	11.0	7.0
Incr Delay (d2), s/veh	0.6	0.0	0.5	14.7	0.0	0.1	2.0	2.2	0.2	0.9	2.9	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	4.3	9.0	0.0	1.3	1.3	0.7	0.1	1.5	9.3	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.9	0.0	43.5	71.8	0.0	40.5	20.2	2.2	0.2	11.7	13.9	7.2
LnGrp LOS	D	A	D	E	A	D	C	A	A	B	B	A
Approach Vol, veh/h		287			267			1790			1947	
Approach Delay, s/veh		45.2			66.4			3.1			13.3	
Approach LOS		D			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	87.0		41.0	11.5	87.5		41.0				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.0	* 6.3	* 6.3		6.0				
Max Green Setting (Gmax), s	* 9.7	* 77		35.0	* 9.7	* 77		35.0				
Max Q Clear Time (g_c+I1), s	5.6	2.0		17.0	5.2	38.9		36.2				
Green Ext Time (p_c), s	0.1	18.4		1.2	0.1	17.8		0.0				

Intersection Summary

























HCM 6th Ctrl Delay	14.5
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Opening Day) w/ IMP
 SAT PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	209	235	118	240	221	128	179	1197	157	146	1137	165
Future Volume (veh/h)	209	235	118	240	221	128	179	1197	157	146	1137	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	222	250	126	276	254	147	188	1260	165	155	1210	176
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	249	366	163	300	468	209	196	1760	785	180	1729	771
Arrive On Green	0.13	0.10	0.10	0.16	0.12	0.12	0.21	0.93	0.93	0.09	0.45	0.45
Sat Flow, veh/h	1905	3800	1695	1905	3800	1695	1905	3800	1695	1905	3800	1695
Grp Volume(v), veh/h	222	250	126	276	254	147	188	1260	165	155	1210	176
Grp Sat Flow(s),veh/h/ln	1905	1900	1695	1905	1900	1695	1905	1900	1695	1905	1900	1695
Q Serve(g_s), s	16.1	8.9	10.2	20.0	8.8	11.7	13.7	10.1	1.2	11.2	35.6	8.8
Cycle Q Clear(g_c), s	16.1	8.9	10.2	20.0	8.8	11.7	13.7	10.1	1.2	11.2	35.6	8.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	249	366	163	300	468	209	196	1760	785	180	1729	771
V/C Ratio(X)	0.89	0.68	0.77	0.92	0.54	0.70	0.96	0.72	0.21	0.86	0.70	0.23
Avail Cap(c_a), veh/h	305	635	283	305	635	283	196	1760	785	196	1729	771
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.9	61.2	61.8	58.1	57.7	58.9	55.3	3.1	2.8	62.5	30.5	23.2
Incr Delay (d2), s/veh	23.3	2.3	7.5	31.6	1.0	4.9	52.5	2.5	0.6	28.5	2.4	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.2	4.3	4.6	12.1	4.2	5.2	8.5	2.2	0.5	6.7	16.1	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	83.2	63.5	69.3	89.7	58.7	63.8	107.9	5.7	3.4	91.0	32.9	23.9
LnGrp LOS	F	E	E	F	E	E	F	A	A	F	C	C
Approach Vol, veh/h		598			677			1613			1541	
Approach Delay, s/veh		72.0			72.4			17.3			37.7	
Approach LOS		E			E			B			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.8	71.5	28.6	20.1	21.0	70.3	24.9	23.8				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 14	* 53	* 22	* 23	* 14	* 53	* 22	* 23				
Max Q Clear Time (g_c+I1), s	13.2	12.1	22.0	12.2	15.7	37.6	18.1	13.7				
Green Ext Time (p_c), s	0.0	11.5	0.0	1.3	0.0	7.6	0.2	1.3				

Intersection Summary

HCM 6th Ctrl Delay	40.2
HCM 6th LOS	D

Notes























* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

Future Conditions (Opening Day) w/ IMP

2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

SAT PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	10	91	148	7	54	90	1385	75	70	1419	83
Future Volume (veh/h)	78	10	91	148	7	54	90	1385	75	70	1419	83
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	130	17	147	172	8	26	96	1473	62	78	1577	92
Peak Hour Factor	0.60	0.60	0.60	0.86	0.86	0.86	0.94	0.94	0.94	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	355	42	359	240	96	313	299	2281	1018	322	2278	1016
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.07	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	1396	179	1544	1241	414	1344	1905	3800	1695	1905	3800	1695
Grp Volume(v), veh/h	130	0	164	172	0	34	96	1473	62	78	1577	92
Grp Sat Flow(s),veh/h/ln	1396	0	1722	1241	0	1758	1905	1900	1695	1905	1900	1695
Q Serve(g_s), s	11.2	0.0	11.3	19.1	0.0	2.1	2.8	0.0	0.0	2.2	0.0	0.0
Cycle Q Clear(g_c), s	13.4	0.0	11.3	30.4	0.0	2.1	2.8	0.0	0.0	2.2	0.0	0.0
Prop In Lane	1.00		0.90	1.00		0.76	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	355	0	401	240	0	409	299	2281	1018	322	2278	1016
V/C Ratio(X)	0.37	0.00	0.41	0.72	0.00	0.08	0.32	0.65	0.06	0.24	0.69	0.09
Avail Cap(c_a), veh/h	379	0	431	261	0	440	364	2281	1018	362	2278	1016
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.2	0.0	45.5	58.4	0.0	42.0	9.5	0.0	0.0	9.5	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.7	8.2	0.0	0.1	0.6	1.4	0.1	0.4	1.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	5.0	6.6	0.0	1.0	1.1	0.5	0.0	0.9	0.6	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.9	0.0	46.2	66.7	0.0	42.1	10.1	1.4	0.1	9.8	1.8	0.2
LnGrp LOS	D	A	D	E	A	D	B	A	A	A	A	A
Approach Vol, veh/h		294			206			1631			1747	
Approach Delay, s/veh		46.9			62.6			1.9			2.0	
Approach LOS		D			E			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.1	90.4		38.6	11.2	90.2		38.6				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.0	* 6.3	* 6.3		6.0				
Max Green Setting (Gmax), s	* 7.7	* 79		35.0	* 9.7	* 77		35.0				
Max Q Clear Time (g_c+I1), s	4.2	2.0		15.4	4.8	2.0		32.4				
Green Ext Time (p_c), s	0.0	15.6		1.3	0.1	18.1		0.2				

Intersection Summary

HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	255	241	325	174	276	306	278	217	126	282	291	172
Average Queue (ft)	124	105	109	101	149	149	133	79	55	158	161	63
95th Queue (ft)	219	187	254	179	245	246	237	164	106	252	257	166
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			3	16			6	0			9	0
Queuing Penalty (veh)			5	18			5	1			11	0

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	145	390	405	324
Average Queue (ft)	62	222	233	51
95th Queue (ft)	122	328	352	165
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			3	
Queuing Penalty (veh)			4	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	76	72	132	48	74	82	104	30	55	125	171	70
Average Queue (ft)	23	21	52	8	23	16	25	2	15	34	60	4
95th Queue (ft)	57	52	105	30	59	57	74	15	44	94	135	33
Link Distance (ft)	203	203	284	284		231	231	231		321	321	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					500				500			75
Storage Blk Time (%)											4	0
Queuing Penalty (veh)											1	0

Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	42	25
Average Queue (ft)	7	1
95th Queue (ft)	28	9
Link Distance (ft)	531	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	373	404	298	281	126	136	168	161
Average Queue (ft)	226	271	185	160	60	72	89	83
95th Queue (ft)	327	363	274	252	115	128	153	145
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					0	0		
Queuing Penalty (veh)					0	0		
Storage Bay Dist (ft)	250	250	250					
Storage Blk Time (%)	1	13	2	1				
Queuing Penalty (veh)	6	57	13	5				

Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	262	328	278	130	154	77	186	196
Average Queue (ft)	134	211	147	57	54	3	94	119
95th Queue (ft)	242	291	255	118	123	40	168	192
Link Distance (ft)	936		1203		1203	229		229
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (ft)	250	250				175		
Storage Blk Time (%)	0	2	0	0		0		
Queuing Penalty (veh)	0	6	0	0		0		

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	364	298	319	175	506	285	260	191	381	441	444	200
Average Queue (ft)	185	169	171	122	260	124	105	85	233	379	386	152
95th Queue (ft)	305	255	284	199	494	244	210	159	443	519	517	261
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									0	30	34	
Queuing Penalty (veh)									0	257	289	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			18	13			1	1	0	30	49	1
Queuing Penalty (veh)			28	27			1	2	2	47	93	4

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	732	905	942	325
Average Queue (ft)	344	512	558	193
95th Queue (ft)	672	892	953	403
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)			0	
Queuing Penalty (veh)			0	
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)	0	1	38	
Queuing Penalty (veh)	0	1	61	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	163	120	219	111	231	291	291	48	121	327	365	100
Average Queue (ft)	62	46	118	41	100	187	206	17	48	180	247	30
95th Queue (ft)	128	98	195	86	216	326	343	43	96	301	365	98
Link Distance (ft)	203	203	284	284		231	231	231		321	321	
Upstream Blk Time (%)	0		0		0	10	14			0	2	
Queuing Penalty (veh)	0		0		0	60	85			1	17	
Storage Bay Dist (ft)					500				500			75
Storage Blk Time (%)					0	10				0	27	0
Queuing Penalty (veh)					1	10				0	23	1

Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road

Movement	EB	NB	NB	NB
Directions Served	LR	L	T	T
Maximum Queue (ft)	38	141	259	284
Average Queue (ft)	8	14	67	76
95th Queue (ft)	30	116	325	338
Link Distance (ft)	531		532	532
Upstream Blk Time (%)			3	3
Queuing Penalty (veh)			26	29
Storage Bay Dist (ft)		500		
Storage Blk Time (%)			3	
Queuing Penalty (veh)			0	

Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	264	313	334	308	192	204	281	301
Average Queue (ft)	151	200	206	174	129	141	177	203
95th Queue (ft)	239	284	304	264	200	212	266	286
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					4	6	0	0
Queuing Penalty (veh)					27	40	0	1
Storage Bay Dist (ft)	250	250		250				
Storage Blk Time (%)	0	3	3	0				
Queuing Penalty (veh)	0	12	23	3				

Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	288	363	326	332	427	200	210	235
Average Queue (ft)	163	238	177	159	173	57	131	150
95th Queue (ft)	253	328	286	266	320	205	207	226
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)							0	0
Queuing Penalty (veh)							0	2
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	0	6	0		4	0		
Queuing Penalty (veh)	0	20	1		27	1		

Intersection: 9001: Rochester Road (M-150) & Dummy Node

Movement	EB	NB	NB	SB	SB
Directions Served	R	T	TR	T	TR
Maximum Queue (ft)	83	481	476	6	36
Average Queue (ft)	33	237	250	0	2
95th Queue (ft)	69	561	580	4	19
Link Distance (ft)	230	321	321	381	381
Upstream Blk Time (%)		12	14		
Queuing Penalty (veh)		104	120		
Storage Bay Dist (ft)					
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 9002: Rochester Road (M-150) & Dummy Node

Movement	EB	NB	NB	SB
Directions Served	R	T	TR	TR
Maximum Queue (ft)	41	73	97	9
Average Queue (ft)	15	15	17	0
95th Queue (ft)	41	124	143	7
Link Distance (ft)	328	311	311	532
Upstream Blk Time (%)		0	1	
Queuing Penalty (veh)		4	7	
Storage Bay Dist (ft)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 9003: Rochester Road (M-150) & WB M-59 On-Ramp

Movement	NB	NB	NB
Directions Served	T	T	R
Maximum Queue (ft)	47	76	30
Average Queue (ft)	5	10	1
95th Queue (ft)	32	49	21
Link Distance (ft)	719	719	
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (ft)			25
Storage Blk Time (%)		1	
Queuing Penalty (veh)		4	

Intersection: 9004: Rochester Road (M-150) & EB M-59 On-Ramp

Movement

Directions Served

Maximum Queue (ft)

Average Queue (ft)

95th Queue (ft)

Link Distance (ft)

Upstream Blk Time (%)

Queuing Penalty (veh)

Storage Bay Dist (ft)

Storage Blk Time (%)

Queuing Penalty (veh)

Network Summary

Network wide Queuing Penalty: 1461

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	374	213	251	174	518	328	201	192	381	432	433	200
Average Queue (ft)	188	104	97	91	299	121	101	98	249	343	354	128
95th Queue (ft)	329	173	207	165	516	226	174	171	424	517	527	256
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									1	19	24	
Queuing Penalty (veh)									0	163	203	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			4	8			0	1	1	19	42	1
Queuing Penalty (veh)			6	13			1	2	3	32	79	4

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	1023	1289	1336	325
Average Queue (ft)	623	917	955	259
95th Queue (ft)	1207	1544	1554	437
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)		12	22	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)	0	18	50	
Queuing Penalty (veh)	2	33	106	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	157	115	286	124	207	280	283	61	262	352	364	100
Average Queue (ft)	75	48	167	39	80	189	208	24	85	233	288	36
95th Queue (ft)	137	100	258	90	162	308	328	52	177	349	386	106
Link Distance (ft)	203	203	284	284		231	231	231		321	321	
Upstream Blk Time (%)	0		0		0	6	9		0	1	5	
Queuing Penalty (veh)	0		0		0	35	52		0	8	46	
Storage Bay Dist (ft)					500				500			75
Storage Blk Time (%)					0	6			0	1	32	0
Queuing Penalty (veh)					0	6			0	1	34	0

Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road

Movement	EB	NB	NB	NB
Directions Served	LR	L	T	T
Maximum Queue (ft)	46	42	150	174
Average Queue (ft)	10	9	21	31
95th Queue (ft)	34	32	108	135
Link Distance (ft)	531		532	532
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		500		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Movement	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	R	R	T	T	T	T	R
Maximum Queue (ft)	224	262	296	271	195	191	301	315	48
Average Queue (ft)	120	167	183	153	108	115	204	224	2
95th Queue (ft)	214	238	260	235	185	197	281	305	34
Link Distance (ft)			1030		150	150	311	311	311
Upstream Blk Time (%)					2	3	0	1	
Queuing Penalty (veh)					15	21	1	3	
Storage Bay Dist (ft)	250	250		250					
Storage Blk Time (%)	0	1	1	0					
Queuing Penalty (veh)	0	3	8	2					

Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	296	332	303	339	345	200	253	249
Average Queue (ft)	160	224	150	155	150	40	144	160
95th Queue (ft)	263	307	267	281	288	170	234	243
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)							1	1
Queuing Penalty (veh)							7	9
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	0	4	0		4	0		
Queuing Penalty (veh)	0	13	0		16	0		

Intersection: 9001: Rochester Road (M-150) & Dummy Node

Movement	EB	WB	NB	NB	SB	SB
Directions Served	R	R	T	TR	T	TR
Maximum Queue (ft)	108	165	421	468	8	37
Average Queue (ft)	48	68	125	142	0	2
95th Queue (ft)	98	197	406	442	4	17
Link Distance (ft)	230	365	321	321	381	381
Upstream Blk Time (%)			4	6		
Queuing Penalty (veh)			33	47		
Storage Bay Dist (ft)						
Storage Blk Time (%)						
Queuing Penalty (veh)						

Intersection: 9002: Rochester Road (M-150) & Dummy Node

Movement	EB	NB	SB
Directions Served	R	TR	TR
Maximum Queue (ft)	270	11	11
Average Queue (ft)	126	0	1
95th Queue (ft)	229	8	6
Link Distance (ft)	328	311	532
Upstream Blk Time (%)	0		
Queuing Penalty (veh)	0		
Storage Bay Dist (ft)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Intersection: 9003: Rochester Road (M-150) & WB M-59 On-Ramp

Movement	NB	NB
Directions Served	T	T
Maximum Queue (ft)	63	64
Average Queue (ft)	4	5
95th Queue (ft)	29	32
Link Distance (ft)	719	719
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)		
Storage Blk Time (%)		1
Queuing Penalty (veh)		2

Intersection: 9004: Rochester Road (M-150) & EB M-59 On-Ramp

Movement	SB
Directions Served	T
Maximum Queue (ft)	7
Average Queue (ft)	0
95th Queue (ft)	5
Link Distance (ft)	719
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (ft)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Network Summary

Network wide Queuing Penalty: 1010

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	301	169	202	153	346	149	151	172	375	432	427	200
Average Queue (ft)	169	96	83	81	195	85	67	81	198	229	233	88
95th Queue (ft)	264	158	168	147	306	133	124	149	331	401	413	210
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									0	2	3	
Queuing Penalty (veh)									0	17	21	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			2	4			0	1	0	2	19	0
Queuing Penalty (veh)			2	5			0	1	1	4	30	0

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	240	525	583	325
Average Queue (ft)	128	298	327	137
95th Queue (ft)	218	465	523	329
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			15	
Queuing Penalty (veh)			24	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	170	149	261	68	164	269	280	47	134	255	274	100
Average Queue (ft)	58	46	128	22	61	138	155	14	53	120	167	27
95th Queue (ft)	122	109	212	51	132	253	271	40	104	217	257	93
Link Distance (ft)	203	203	284	284		231	231	231		321	321	
Upstream Blk Time (%)	0	0	0		0	1	2					
Queuing Penalty (veh)	0	0	0		0	4	9					
Storage Bay Dist (ft)					500				500			75
Storage Blk Time (%)					0	1					20	0
Queuing Penalty (veh)					0	1					17	0

Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road

Movement	EB	NB	NB	NB	SB
Directions Served	LR	L	T	T	T
Maximum Queue (ft)	34	27	6	29	9
Average Queue (ft)	6	3	0	1	0
95th Queue (ft)	25	16	4	12	7
Link Distance (ft)	531		532	532	231
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		500			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	237	304	321	270	184	191	245	257
Average Queue (ft)	131	174	188	156	95	106	157	160
95th Queue (ft)	215	248	277	242	167	184	252	262
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					1	2		0
Queuing Penalty (veh)					8	13		0
Storage Bay Dist (ft)	250	250		250				
Storage Blk Time (%)	0	1	2	0				
Queuing Penalty (veh)	0	4	12	2				

Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

























Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	247	274	237	246	269	159	232	251
Average Queue (ft)	119	185	126	120	104	12	123	140
95th Queue (ft)	215	259	236	216	211	91	217	226
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)							0	1
Queuing Penalty (veh)							2	5
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	0	1	0		1	0		
Queuing Penalty (veh)	0	2	0		4	0		

Zone Summary

Zone wide Queuing Penalty: 189

HCM 6th Signalized Intersection Summary
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Steady State) w/ IMP
 AM Peak Hour























												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	148	221	129	206	352	90	75	764	120	72	1071	114
Future Volume (veh/h)	148	221	129	206	352	90	75	764	120	72	1071	114
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1953	1953	1953	1953	1953	1953	1953	1953	1953	1969	1969	1969
Adj Flow Rate, veh/h	166	248	145	219	374	96	94	955	150	76	1127	120
Peak Hour Factor	0.89	0.89	0.89	0.94	0.94	0.94	0.80	0.80	0.80	0.95	0.95	0.95
Percent Heavy Veh, %	3	3	3	3	3	3	3	3	3	2	2	2
Cap, veh/h	193	384	171	246	489	218	116	1943	867	97	1920	856
Arrive On Green	0.10	0.10	0.10	0.13	0.13	0.13	0.12	1.00	1.00	0.05	0.51	0.51
Sat Flow, veh/h	1860	3711	1655	1860	3711	1655	1860	3711	1655	1875	3741	1668
Grp Volume(v), veh/h	166	248	145	219	374	96	94	955	150	76	1127	120
Grp Sat Flow(s),veh/h/ln	1860	1856	1655	1860	1856	1655	1860	1856	1655	1875	1870	1668
Q Serve(g_s), s	12.3	9.0	12.1	16.2	13.6	7.5	6.9	0.0	0.0	5.6	29.4	5.3
Cycle Q Clear(g_c), s	12.3	9.0	12.1	16.2	13.6	7.5	6.9	0.0	0.0	5.6	29.4	5.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	193	384	171	246	489	218	116	1943	867	97	1920	856
V/C Ratio(X)	0.86	0.65	0.85	0.89	0.76	0.44	0.81	0.49	0.17	0.78	0.59	0.14
Avail Cap(c_a), veh/h	337	435	194	337	489	218	178	1943	867	179	1920	856
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	61.7	60.3	61.7	59.7	58.7	56.0	60.5	0.0	0.0	65.6	23.7	17.9
Incr Delay (d2), s/veh	10.4	2.7	25.6	19.1	7.0	1.4	14.8	0.9	0.4	12.6	1.3	0.3
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	6.2	4.3	6.2	8.8	6.8	3.2	3.5	0.2	0.1	3.0	12.6	2.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	72.1	63.0	87.2	78.8	65.7	57.4	75.2	0.9	0.4	78.2	25.1	18.2
LnGrp LOS	E	E	F	E	E	E	E	A	A	E	C	B
Approach Vol, veh/h		559			689			1199			1323	
Approach Delay, s/veh		72.0			68.7			6.7			27.5	
Approach LOS		E			E			A			C	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	13.9	79.9	25.1	21.1	15.3	78.5	21.2	25.1				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 13	* 58	* 25	* 16	* 13	* 58	* 25	* 16				
Max Q Clear Time (g_c+I1), s	7.6	2.0	18.2	14.1	8.9	31.4	14.3	15.6				
Green Ext Time (p_c), s	0.1	8.0	0.3	0.4	0.1	8.7	0.3	0.2				
Intersection Summary												
HCM 6th Ctrl Delay			35.0									
HCM 6th LOS			D									
Notes												
* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.												

HCM 6th Signalized Intersection Summary

Future Conditions (Steady State) w/ IMP

2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	27	4	31	57	3	12	32	983	33	23	1395	29
Future Volume (veh/h)	27	4	31	57	3	12	32	983	33	23	1395	29
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	1891	1891	1891	1938	1938	1938	1969	1969	1969
Adj Flow Rate, veh/h	43	6	47	80	4	0	37	1130	33	25	1533	32
Peak Hour Factor	0.63	0.63	0.63	0.71	0.71	0.71	0.87	0.87	0.87	0.91	0.91	0.91
Percent Heavy Veh, %	0	0	0	7	7	7	4	4	4	2	2	2
Cap, veh/h	198	20	159	150	197	0	340	2728	1217	448	2753	1228
Arrive On Green	0.10	0.10	0.10	0.10	0.10	0.00	0.05	1.00	1.00	0.04	1.00	1.00
Sat Flow, veh/h	1435	195	1529	1298	1891	0	1845	3681	1642	1875	3741	1668
Grp Volume(v), veh/h	43	0	53	80	4	0	37	1130	33	25	1533	32
Grp Sat Flow(s),veh/h/ln	1435	0	1725	1298	1891	0	1845	1841	1642	1875	1870	1668
Q Serve(g_s), s	3.9	0.0	4.0	8.5	0.3	0.0	0.7	0.0	0.0	0.5	0.0	0.0
Cycle Q Clear(g_c), s	4.1	0.0	4.0	12.5	0.3	0.0	0.7	0.0	0.0	0.5	0.0	0.0
Prop In Lane	1.00		0.89	1.00		0.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	198	0	179	150	197	0	340	2728	1217	448	2753	1228
V/C Ratio(X)	0.22	0.00	0.30	0.54	0.02	0.00	0.11	0.41	0.03	0.06	0.56	0.03
Avail Cap(c_a), veh/h	264	0	259	209	284	0	391	2728	1217	496	2753	1228
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.2	0.0	58.0	63.7	56.3	0.0	3.9	0.0	0.0	4.1	0.0	0.0
Incr Delay (d2), s/veh	0.5	0.0	0.9	3.0	0.0	0.0	0.1	0.5	0.0	0.1	0.8	0.0
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	1.5	0.0	1.8	3.0	0.1	0.0	0.2	0.2	0.0	0.1	0.3	0.0
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	58.7	0.0	58.9	66.7	56.4	0.0	4.0	0.5	0.0	4.1	0.8	0.0
LnGrp LOS	E	A	E	E	E	A	A	A	A	A	A	A
Approach Vol, veh/h		96			84			1200			1590	
Approach Delay, s/veh		58.8			66.2			0.6			0.9	
Approach LOS		E			E			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	9.4	110.0		20.6	10.1	109.3		20.6				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.0	* 6.3	* 6.3		6.0				
Max Green Setting (Gmax), s	* 6.7	* 94		21.0	* 7.7	* 93		21.0				
Max Q Clear Time (g_c+I1), s	2.5	2.0		6.1	2.7	2.0		14.5				
Green Ext Time (p_c), s	0.0	9.7		0.3	0.0	16.9		0.1				

Intersection Summary

























HCM 6th Ctrl Delay	4.5
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
1: Rochester Road (M-150) & Auburn Road

Future Conditions (Steady State) w/ IMP
PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	407	151	223	298	131	154	1349	187	187	1293	160
Future Volume (veh/h)	210	407	151	223	298	131	154	1349	187	187	1293	160
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	231	447	166	275	368	162	164	1435	199	201	1390	172
Peak Hour Factor	0.91	0.91	0.91	0.81	0.81	0.81	0.94	0.94	0.94	0.93	0.93	0.93
Percent Heavy Veh, %	1	1	1	1	1	1	1	1	1	1	1	1
Cap, veh/h	257	529	236	289	594	265	186	1593	710	181	1582	706
Arrive On Green	0.14	0.14	0.14	0.15	0.16	0.16	0.20	0.84	0.84	0.10	0.42	0.42
Sat Flow, veh/h	1890	3770	1682	1890	3770	1682	1890	3770	1682	1890	3770	1682
Grp Volume(v), veh/h	231	447	166	275	368	162	164	1435	199	201	1390	172
Grp Sat Flow(s),veh/h/ln	1890	1885	1682	1890	1885	1682	1890	1885	1682	1890	1885	1682
Q Serve(g_s), s	16.8	16.2	13.2	20.2	12.8	12.6	11.8	34.6	3.4	13.4	47.5	9.3
Cycle Q Clear(g_c), s	16.8	16.2	13.2	20.2	12.8	12.6	11.8	34.6	3.4	13.4	47.5	9.3
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	257	529	236	289	594	265	186	1593	710	181	1582	706
V/C Ratio(X)	0.90	0.84	0.70	0.95	0.62	0.61	0.88	0.90	0.28	1.11	0.88	0.24
Avail Cap(c_a), veh/h	289	630	281	289	630	281	194	1593	710	181	1582	706
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.6	58.7	57.4	58.8	55.1	55.0	55.4	9.0	6.5	63.3	37.4	26.3
Incr Delay (d2), s/veh	27.1	8.9	6.2	40.0	1.7	3.5	33.2	8.6	1.0	99.9	7.3	0.8
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.8	8.2	5.9	12.7	6.1	5.5	6.7	5.9	1.2	11.3	22.3	3.8
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	86.7	67.6	63.6	98.8	56.8	58.5	88.6	17.6	7.5	163.2	44.6	27.1
LnGrp LOS	F	E	E	F	E	E	F	B	A	F	D	C
Approach Vol, veh/h		844			805			1798			1763	
Approach Delay, s/veh		72.0			71.5			22.9			56.4	
Approach LOS		E			E			C			E	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	65.7	28.0	26.3	20.4	65.3	25.6	28.7				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 13	* 55	* 21	* 23	* 14	* 54	* 21	* 23				
Max Q Clear Time (g_c+I1), s	15.4	36.6	22.2	18.2	13.8	49.5	18.8	14.8				
Green Ext Time (p_c), s	0.0	10.1	0.0	1.5	0.0	3.6	0.2	1.8				

Intersection Summary

HCM 6th Ctrl Delay	49.7
HCM 6th LOS	D

Notes























* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

Future Conditions (Steady State) w/ IMP

2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	88	7	96	147	7	62	99	1624	90	65	1555	87
Future Volume (veh/h)	88	7	96	147	7	62	99	1624	90	65	1555	87
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	1984	1984	1984	1984	1984	1984	1969	1969	1969
Adj Flow Rate, veh/h	147	12	150	162	8	44	104	1709	76	69	1654	93
Peak Hour Factor	0.60	0.60	0.60	0.91	0.91	0.91	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	1	1	1	1	1	1	2	2	2
Cap, veh/h	327	29	357	229	60	328	287	2296	1024	275	2269	1012
Arrive On Green	0.22	0.22	0.22	0.22	0.22	0.22	0.07	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	1374	127	1587	1234	265	1457	1890	3770	1682	1875	3741	1668
Grp Volume(v), veh/h	147	0	162	162	0	52	104	1709	76	69	1654	93
Grp Sat Flow(s),veh/h/ln	1374	0	1714	1234	0	1722	1890	1885	1682	1875	1870	1668
Q Serve(g_s), s	13.4	0.0	11.3	18.1	0.0	3.4	3.0	0.0	0.0	1.9	0.0	0.0
Cycle Q Clear(g_c), s	16.8	0.0	11.3	29.4	0.0	3.4	3.0	0.0	0.0	1.9	0.0	0.0
Prop In Lane	1.00		0.93	1.00		0.85	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	327	0	386	229	0	387	287	2296	1024	275	2269	1012
V/C Ratio(X)	0.45	0.00	0.42	0.71	0.00	0.13	0.36	0.74	0.07	0.25	0.73	0.09
Avail Cap(c_a), veh/h	332	0	392	234	0	394	364	2296	1024	316	2269	1012
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	50.1	0.0	46.4	59.0	0.0	43.4	9.1	0.0	0.0	9.1	0.0	0.0
Incr Delay (d2), s/veh	1.0	0.0	0.7	9.2	0.0	0.2	0.8	2.2	0.1	0.5	2.1	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.8	0.0	5.0	6.3	0.0	1.5	1.1	0.7	0.0	0.7	0.7	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	51.0	0.0	47.2	68.2	0.0	43.5	9.9	2.2	0.1	9.6	2.1	0.2
LnGrp LOS	D	A	D	E	A	D	A	A	A	A	A	A
Approach Vol, veh/h		309			214			1889			1816	
Approach Delay, s/veh		49.0			62.2			2.6			2.3	
Approach LOS		D			E			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.0	91.6		37.5	11.3	91.2		37.5				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.0	* 6.3	* 6.3		6.0				
Max Green Setting (Gmax), s	* 7.7	* 82		32.0	* 11	* 79		32.0				
Max Q Clear Time (g_c+I1), s	3.9	2.0		18.8	5.0	2.0		31.4				
Green Ext Time (p_c), s	0.0	21.5		1.2	0.1	20.1		0.0				

Intersection Summary

HCM 6th Ctrl Delay	8.9
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Steady State) w/ IMP
 SAT MD Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	213	265	121	255	297	149	166	1341	182	185	1385	209
Future Volume (veh/h)	213	265	121	255	297	149	166	1341	182	185	1385	209
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	1984	1984	1984	1984	1984	1984	2000	2000	2000	1984	1984	1984
Adj Flow Rate, veh/h	296	368	168	268	313	157	175	1412	192	197	1473	222
Peak Hour Factor	0.72	0.72	0.72	0.95	0.95	0.95	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	1	1	1	1	1	1	0	0	0	1	1	1
Cap, veh/h	302	465	207	292	444	198	182	1664	742	181	1651	737
Arrive On Green	0.16	0.12	0.12	0.15	0.12	0.12	0.19	0.88	0.88	0.10	0.44	0.44
Sat Flow, veh/h	1890	3770	1682	1890	3770	1682	1905	3800	1695	1890	3770	1682
Grp Volume(v), veh/h	296	368	168	268	313	157	175	1412	192	197	1473	222
Grp Sat Flow(s),veh/h/ln	1890	1885	1682	1890	1885	1682	1905	1900	1695	1890	1885	1682
Q Serve(g_s), s	21.8	13.3	13.6	19.6	11.2	12.7	12.7	25.1	2.5	13.4	50.5	12.0
Cycle Q Clear(g_c), s	21.8	13.3	13.6	19.6	11.2	12.7	12.7	25.1	2.5	13.4	50.5	12.0
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	302	465	207	292	444	198	182	1664	742	181	1651	737
V/C Ratio(X)	0.98	0.79	0.81	0.92	0.70	0.79	0.96	0.85	0.26	1.09	0.89	0.30
Avail Cap(c_a), veh/h	302	630	281	302	630	281	182	1664	742	181	1651	737
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	58.6	59.6	59.8	58.3	59.4	60.1	56.3	6.4	5.0	63.3	36.3	25.5
Incr Delay (d2), s/veh	45.8	4.9	12.0	30.9	2.1	9.7	54.8	5.6	0.8	92.7	7.8	1.1
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	14.0	6.5	6.4	11.7	5.4	5.9	8.1	4.4	1.0	10.9	23.6	4.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	104.4	64.5	71.8	89.2	61.5	69.8	111.2	12.0	5.9	156.0	44.1	26.5
LnGrp LOS	F	E	E	F	E	E	F	B	A	F	D	C
Approach Vol, veh/h		832			738			1779			1892	
Approach Delay, s/veh		80.2			73.3			21.1			53.7	
Approach LOS		F			E			C			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	20.0	67.9	28.2	23.9	20.0	67.9	29.0	23.1				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 13	* 54	* 22	* 23	* 13	* 54	* 22	* 23				
Max Q Clear Time (g_c+I1), s	15.4	27.1	21.6	15.6	14.7	52.5	23.8	14.7				
Green Ext Time (p_c), s	0.0	12.0	0.1	1.6	0.0	1.6	0.0	1.5				

Intersection Summary

HCM 6th Ctrl Delay	49.6
HCM 6th LOS	D

Notes























* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

Future Conditions (Steady State) w/ IMP

2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

SAT MD Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	105	8	104	201	7	72	100	1488	114	113	1609	107
Future Volume (veh/h)	105	8	104	201	7	72	100	1488	114	113	1609	107
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	1984	1984	1984	1984	1984	1984
Adj Flow Rate, veh/h	140	11	134	221	8	36	105	1566	99	119	1694	113
Peak Hour Factor	0.75	0.75	0.75	0.91	0.91	0.91	0.95	0.95	0.95	0.95	0.95	0.95
Percent Heavy Veh, %	0	0	0	0	0	0	1	1	1	1	1	1
Cap, veh/h	371	33	396	280	79	357	207	2174	970	301	2186	975
Arrive On Green	0.25	0.25	0.25	0.25	0.25	0.25	0.07	1.00	1.00	0.05	0.77	0.77
Sat Flow, veh/h	1384	130	1585	1263	317	1426	1890	3770	1682	1890	3770	1682
Grp Volume(v), veh/h	140	0	145	221	0	44	105	1566	99	119	1694	113
Grp Sat Flow(s),veh/h/ln	1384	0	1715	1263	0	1743	1890	1885	1682	1890	1885	1682
Q Serve(g_s), s	12.1	0.0	9.7	24.3	0.0	2.7	3.2	0.0	0.0	3.6	35.8	2.4
Cycle Q Clear(g_c), s	14.8	0.0	9.7	34.0	0.0	2.7	3.2	0.0	0.0	3.6	35.8	2.4
Prop In Lane	1.00		0.92	1.00		0.82	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	371	0	429	280	0	436	207	2174	970	301	2186	975
V/C Ratio(X)	0.38	0.00	0.34	0.79	0.00	0.10	0.51	0.72	0.10	0.39	0.77	0.12
Avail Cap(c_a), veh/h	371	0	429	280	0	436	267	2174	970	356	2186	975
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.33	1.33	1.33
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	46.1	0.0	43.0	57.0	0.0	40.4	17.6	0.0	0.0	10.8	10.8	7.0
Incr Delay (d2), s/veh	0.6	0.0	0.5	14.2	0.0	0.1	1.9	2.1	0.2	0.8	2.8	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.3	0.0	4.3	8.9	0.0	1.2	1.3	0.6	0.1	1.5	9.0	0.9
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	46.7	0.0	43.5	71.1	0.0	40.5	19.5	2.1	0.2	11.6	13.6	7.2
LnGrp LOS	D	A	D	E	A	D	B	A	A	B	B	A
Approach Vol, veh/h		285			265			1770			1926	
Approach Delay, s/veh		45.1			66.0			3.0			13.1	
Approach LOS		D			E			A			B	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	12.0	87.0		41.0	11.5	87.5		41.0				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.0	* 6.3	* 6.3		6.0				
Max Green Setting (Gmax), s	* 9.7	* 77		35.0	* 9.7	* 77		35.0				
Max Q Clear Time (g_c+I1), s	5.6	2.0		16.8	5.2	37.8		36.0				
Green Ext Time (p_c), s	0.1	17.9		1.2	0.1	17.6		0.0				

Intersection Summary

























HCM 6th Ctrl Delay	14.3
HCM 6th LOS	B

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary
 1: Rochester Road (M-150) & Auburn Road

Future Conditions (Steady State) w/ IMP
 SAT PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	209	235	114	237	221	128	175	1189	153	146	1129	165
Future Volume (veh/h)	209	235	114	237	221	128	175	1189	153	146	1129	165
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	222	250	121	272	254	147	184	1252	161	155	1201	176
Peak Hour Factor	0.94	0.94	0.94	0.87	0.87	0.87	0.95	0.95	0.95	0.94	0.94	0.94
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	249	355	158	296	449	200	196	1778	793	180	1747	779
Arrive On Green	0.13	0.09	0.09	0.16	0.12	0.12	0.21	0.94	0.94	0.09	0.46	0.46
Sat Flow, veh/h	1905	3800	1695	1905	3800	1695	1905	3800	1695	1905	3800	1695
Grp Volume(v), veh/h	222	250	121	272	254	147	184	1252	161	155	1201	176
Grp Sat Flow(s),veh/h/ln	1905	1900	1695	1905	1900	1695	1905	1900	1695	1905	1900	1695
Q Serve(g_s), s	16.1	8.9	9.8	19.7	8.8	11.7	13.3	8.7	1.1	11.2	35.0	8.8
Cycle Q Clear(g_c), s	16.1	8.9	9.8	19.7	8.8	11.7	13.3	8.7	1.1	11.2	35.0	8.8
Prop In Lane	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	249	355	158	296	449	200	196	1778	793	180	1747	779
V/C Ratio(X)	0.89	0.70	0.76	0.92	0.57	0.73	0.94	0.70	0.20	0.86	0.69	0.23
Avail Cap(c_a), veh/h	305	635	283	305	635	283	196	1778	793	196	1747	779
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	1.00	1.00	1.00
Upstream Filter(I)	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	59.9	61.6	61.9	58.3	58.3	59.6	55.2	2.7	2.4	62.5	29.9	22.8
Incr Delay (d2), s/veh	23.3	2.6	7.4	31.0	1.1	5.8	47.1	2.4	0.6	28.5	2.2	0.7
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	9.2	4.3	4.5	11.8	4.3	5.3	8.1	1.9	0.5	6.7	15.7	3.6
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	83.2	64.1	69.4	89.2	59.4	65.4	102.3	5.0	3.0	91.0	32.1	23.5
LnGrp LOS	F	E	E	F	E	E	F	A	A	F	C	C
Approach Vol, veh/h		593			673			1597			1532	
Approach Delay, s/veh		72.3			72.8			16.0			37.1	
Approach LOS		E			E			B			D	
Timer - Assigned Phs	1	2	3	4	5	6	7	8				
Phs Duration (G+Y+Rc), s	19.8	72.1	28.4	19.7	21.0	71.0	24.9	23.2				
Change Period (Y+Rc), s	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6	* 6.6				
Max Green Setting (Gmax), s	* 14	* 53	* 22	* 23	* 14	* 53	* 22	* 23				
Max Q Clear Time (g_c+I1), s	13.2	10.7	21.7	11.8	15.3	37.0	18.1	13.7				
Green Ext Time (p_c), s	0.0	11.5	0.1	1.3	0.0	7.7	0.2	1.3				

Intersection Summary

HCM 6th Ctrl Delay	39.7
HCM 6th LOS	D

Notes























* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

HCM 6th Signalized Intersection Summary

Future Conditions (Steady State) w/ IMP

2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

SAT PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	78	9	91	148	5	54	89	1369	75	70	1403	84
Future Volume (veh/h)	78	9	91	148	5	54	89	1369	75	70	1403	84
Initial Q (Qb), veh	0	0	0	0	0	0	0	0	0	0	0	0
Ped-Bike Adj(A_pbT)	1.00		1.00	1.00		1.00	1.00		1.00	1.00		1.00
Parking Bus, Adj	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Work Zone On Approach		No			No			No			No	
Adj Sat Flow, veh/h/ln	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000	2000
Adj Flow Rate, veh/h	130	15	147	172	6	26	95	1456	62	78	1559	93
Peak Hour Factor	0.60	0.60	0.60	0.86	0.86	0.86	0.94	0.94	0.94	0.90	0.90	0.90
Percent Heavy Veh, %	0	0	0	0	0	0	0	0	0	0	0	0
Cap, veh/h	356	37	361	240	76	329	302	2285	1019	326	2282	1018
Arrive On Green	0.23	0.23	0.23	0.23	0.23	0.23	0.07	1.00	1.00	0.07	1.00	1.00
Sat Flow, veh/h	1399	159	1560	1243	327	1418	1905	3800	1695	1905	3800	1695
Grp Volume(v), veh/h	130	0	162	172	0	32	95	1456	62	78	1559	93
Grp Sat Flow(s),veh/h/ln	1399	0	1719	1243	0	1745	1905	1900	1695	1905	1900	1695
Q Serve(g_s), s	11.2	0.0	11.2	19.1	0.0	2.0	2.7	0.0	0.0	2.2	0.0	0.0
Cycle Q Clear(g_c), s	13.2	0.0	11.2	30.3	0.0	2.0	2.7	0.0	0.0	2.2	0.0	0.0
Prop In Lane	1.00		0.91	1.00		0.81	1.00		1.00	1.00		1.00
Lane Grp Cap(c), veh/h	356	0	398	240	0	404	302	2285	1019	326	2282	1018
V/C Ratio(X)	0.37	0.00	0.41	0.72	0.00	0.08	0.31	0.64	0.06	0.24	0.68	0.09
Avail Cap(c_a), veh/h	381	0	430	263	0	436	368	2285	1019	366	2282	1018
HCM Platoon Ratio	1.00	1.00	1.00	1.00	1.00	1.00	2.00	2.00	2.00	2.00	2.00	2.00
Upstream Filter(I)	1.00	0.00	1.00	1.00	0.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Uniform Delay (d), s/veh	47.3	0.0	45.6	58.4	0.0	42.1	9.4	0.0	0.0	9.4	0.0	0.0
Incr Delay (d2), s/veh	0.6	0.0	0.7	8.1	0.0	0.1	0.6	1.4	0.1	0.4	1.7	0.2
Initial Q Delay(d3),s/veh	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
%ile BackOfQ(50%),veh/ln	4.0	0.0	4.9	6.6	0.0	0.9	1.0	0.4	0.0	0.8	0.5	0.1
Unsig. Movement Delay, s/veh												
LnGrp Delay(d),s/veh	47.9	0.0	46.3	66.6	0.0	42.2	10.0	1.4	0.1	9.8	1.7	0.2
LnGrp LOS	D	A	D	E	A	D	B	A	A	A	A	A
Approach Vol, veh/h		292			204			1613			1730	
Approach Delay, s/veh		47.0			62.8			1.8			2.0	
Approach LOS		D			E			A			A	
Timer - Assigned Phs	1	2		4	5	6		8				
Phs Duration (G+Y+Rc), s	11.1	90.5		38.4	11.2	90.4		38.4				
Change Period (Y+Rc), s	* 6.3	* 6.3		6.0	* 6.3	* 6.3		6.0				
Max Green Setting (Gmax), s	* 7.7	* 79		35.0	* 9.7	* 77		35.0				
Max Q Clear Time (g_c+I1), s	4.2	2.0		15.2	4.7	2.0		32.3				
Green Ext Time (p_c), s	0.0	15.3		1.3	0.1	17.7		0.2				

Intersection Summary

HCM 6th Ctrl Delay	8.6
HCM 6th LOS	A

Notes

* HCM 6th computational engine requires equal clearance times for the phases crossing the barrier.

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	240	187	230	174	302	232	220	153	138	279	290	200
Average Queue (ft)	119	105	97	104	164	142	129	73	67	150	154	69
95th Queue (ft)	202	170	204	175	269	210	205	139	125	248	258	168
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			4	14			3	0			8	0
Queuing Penalty (veh)			6	15			2	1			10	0

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	141	369	402	277
Average Queue (ft)	62	226	229	46
95th Queue (ft)	125	335	340	136
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			3	
Queuing Penalty (veh)			4	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	85	60	127	56	77	90	113	32	63	130	165	65
Average Queue (ft)	25	16	50	10	26	21	27	2	18	35	61	6
95th Queue (ft)	65	44	101	36	62	61	78	16	49	94	134	31
Link Distance (ft)	203	203	284	284		231	231	231		321	321	
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (ft)					500				500			75
Storage Blk Time (%)											4	0
Queuing Penalty (veh)											1	0

Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road

Movement	EB	NB
Directions Served	LR	L
Maximum Queue (ft)	38	21
Average Queue (ft)	5	2
95th Queue (ft)	23	11
Link Distance (ft)	531	
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (ft)	500	
Storage Blk Time (%)		
Queuing Penalty (veh)		

Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	373	417	295	274	116	144	192	191
Average Queue (ft)	237	279	185	163	58	68	94	90
95th Queue (ft)	351	393	268	245	108	121	164	162
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					0	0		
Queuing Penalty (veh)					0	0		
Storage Bay Dist (ft)	250	250	250					
Storage Blk Time (%)	2	13	1	0				
Queuing Penalty (veh)	8	58	11	1				

Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Movement	EB	EB	EB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	T	T
Maximum Queue (ft)	270	328	272	124	128	203	201
Average Queue (ft)	136	208	147	54	47	97	119
95th Queue (ft)	234	283	246	106	103	176	194
Link Distance (ft)	936		1203		1203	229	229
Upstream Blk Time (%)					0		0
Queuing Penalty (veh)					0		0
Storage Bay Dist (ft)	250	250					
Storage Blk Time (%)	0	2	0	0			
Queuing Penalty (veh)	1	6	0	0			

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	298	297	308	175	456	192	214	208	381	456	448	200
Average Queue (ft)	171	174	163	113	233	112	100	89	236	386	393	143
95th Queue (ft)	270	259	267	192	430	174	185	166	438	522	519	266
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									0	30	34	
Queuing Penalty (veh)									0	253	286	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			16	9			1	1	0	30	48	0
Queuing Penalty (veh)			25	19			2	2	1	46	91	3

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	429	758	828	325
Average Queue (ft)	235	429	481	208
95th Queue (ft)	450	682	754	422
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			33	
Queuing Penalty (veh)			53	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	175	123	253	109	213	282	287	58	104	259	314	100
Average Queue (ft)	63	44	122	41	89	178	192	18	47	139	193	30
95th Queue (ft)	130	91	208	87	197	334	340	48	91	230	285	96
Link Distance (ft)	203	203	284	284		231	231	231		321	321	
Upstream Blk Time (%)	0		0		0	15	18			0	0	
Queuing Penalty (veh)	0		0		0	91	107			1	1	
Storage Bay Dist (ft)					500				500			75
Storage Blk Time (%)					0	15				0	24	0
Queuing Penalty (veh)					1	15				0	21	0

Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road

Movement	EB	NB	NB	NB
Directions Served	LR	L	T	T
Maximum Queue (ft)	34	132	300	324
Average Queue (ft)	9	9	122	130
95th Queue (ft)	31	82	466	484
Link Distance (ft)	531		532	532
Upstream Blk Time (%)		0	5	6
Queuing Penalty (veh)		0	46	51
Storage Bay Dist (ft)		500		
Storage Blk Time (%)			5	
Queuing Penalty (veh)			0	

Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	249	311	345	300	192	195	259	295
Average Queue (ft)	140	190	199	173	126	140	156	187
95th Queue (ft)	240	280	291	264	201	210	242	271
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					3	5		0
Queuing Penalty (veh)					23	36		1
Storage Bay Dist (ft)	250	250		250				
Storage Blk Time (%)	0	2	2	1				
Queuing Penalty (veh)	0	9	16	6				

Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	275	334	314	318	406	200	243	246
Average Queue (ft)	163	233	175	153	164	60	138	156
95th Queue (ft)	263	317	271	258	300	209	213	230
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)							0	0
Queuing Penalty (veh)							1	3
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	0	5	0		4	0		
Queuing Penalty (veh)	0	16	1		22	1		

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	426	202	242	169	386	198	224	212	381	432	433	200
Average Queue (ft)	203	110	89	79	234	113	103	107	251	330	337	127
95th Queue (ft)	411	178	193	152	383	179	192	191	422	517	525	254
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									2	18	19	
Queuing Penalty (veh)									0	153	160	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			4	6			1	3	2	18	38	0
Queuing Penalty (veh)			5	10			1	4	17	30	69	3

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	856	1095	1150	325
Average Queue (ft)	508	817	860	265
95th Queue (ft)	1123	1458	1469	437
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)		8	17	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)	0	14	49	
Queuing Penalty (veh)	1	26	102	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	184	99	291	104	230	283	283	57	203	326	360	100
Average Queue (ft)	84	43	165	36	88	195	207	21	82	223	277	38
95th Queue (ft)	156	86	260	81	195	309	322	50	157	327	360	107
Link Distance (ft)	203	203	284	284		231	231	231		321	321	
Upstream Blk Time (%)	1		1		0	7	9		0	0	3	
Queuing Penalty (veh)	0		0		0	39	53		0	2	25	
Storage Bay Dist (ft)					500				500			75
Storage Blk Time (%)					0	7			0	0	31	0
Queuing Penalty (veh)					0	7			0	0	33	1

Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road

Movement	EB	NB	NB	NB
Directions Served	LR	L	T	T
Maximum Queue (ft)	38	42	182	231
Average Queue (ft)	10	8	23	30
95th Queue (ft)	34	30	132	148
Link Distance (ft)	531		532	532
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)		500		
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Movement	WB	WB	WB	WB	NB	NB	SB	SB	SB
Directions Served	L	L	R	R	T	T	T	T	R
Maximum Queue (ft)	224	255	303	274	193	192	295	317	47
Average Queue (ft)	118	161	192	164	108	117	199	216	0
95th Queue (ft)	215	237	278	247	188	204	274	297	0
Link Distance (ft)			1030		150	150	311	311	311
Upstream Blk Time (%)					2	4	0	0	
Queuing Penalty (veh)					15	24	0	2	
Storage Bay Dist (ft)	250	250		250					
Storage Blk Time (%)	0	0	2	0					
Queuing Penalty (veh)	0	2	12	2					

Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	268	315	250	292	316	200	255	253
Average Queue (ft)	148	209	133	139	138	32	135	150
95th Queue (ft)	246	291	254	243	255	153	226	235
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)							1	1
Queuing Penalty (veh)							4	6
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	0	3	0		3	0		
Queuing Penalty (veh)	0	7	0		11	0		

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	EB	EB	EB	EB	WB	WB	WB	WB	NB	NB	NB	NB
Directions Served	L	T	T	R	L	T	T	R	L	T	T	R
Maximum Queue (ft)	279	195	207	170	333	145	185	200	326	386	416	200
Average Queue (ft)	166	101	80	79	202	78	65	86	204	240	235	83
95th Queue (ft)	260	163	165	146	308	133	132	163	362	412	399	204
Link Distance (ft)		1050	1050			1708	1708			381	381	
Upstream Blk Time (%)									4	8	2	
Queuing Penalty (veh)									0	58	13	
Storage Bay Dist (ft)	1000			125	1000			175	1000			175
Storage Blk Time (%)			3	4			0	1	4	8	17	0
Queuing Penalty (veh)			3	4			0	1	22	13	27	0

Intersection: 1: Rochester Road (M-150) & Auburn Road

Movement	SB	SB	SB	SB
Directions Served	L	T	T	R
Maximum Queue (ft)	237	448	478	325
Average Queue (ft)	123	267	305	125
95th Queue (ft)	208	394	445	303
Link Distance (ft)		1299	1299	
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (ft)	1000			275
Storage Blk Time (%)			11	
Queuing Penalty (veh)			19	

Intersection: 2: Rochester Road (M-150) & Site Drive/Meijer-Lowe's Drive

Movement	EB	EB	WB	WB	NB	NB	NB	NB	SB	SB	SB	SB
Directions Served	L	TR	L	TR	L	T	T	R	L	T	T	R
Maximum Queue (ft)	158	129	224	73	181	281	283	48	106	234	282	100
Average Queue (ft)	62	41	114	26	60	115	140	12	41	107	161	25
95th Queue (ft)	122	93	196	59	131	235	266	36	87	198	252	87
Link Distance (ft)	203	203	284	284		231	231	231		321	321	
Upstream Blk Time (%)	0	0	0		0	1	2					0
Queuing Penalty (veh)	0	0	0		0	5	9					1
Storage Bay Dist (ft)					500				500			75
Storage Blk Time (%)					0	1					19	0
Queuing Penalty (veh)					0	1					16	0

Intersection: 3: Rochester Road (M-150) & Hickory Lawn Road

Movement	EB	NB	NB	NB	SB
Directions Served	LR	L	T	T	T
Maximum Queue (ft)	30	22	61	80	5
Average Queue (ft)	5	2	2	4	0
95th Queue (ft)	23	15	28	33	4
Link Distance (ft)	531		532	532	231
Upstream Blk Time (%)					
Queuing Penalty (veh)					
Storage Bay Dist (ft)		500			
Storage Blk Time (%)					
Queuing Penalty (veh)					

Intersection: 4: Rochester Road (M-150) & WB M-59 Exit-Ramp

Movement	WB	WB	WB	WB	NB	NB	SB	SB
Directions Served	L	L	R	R	T	T	T	T
Maximum Queue (ft)	235	264	278	246	180	188	247	266
Average Queue (ft)	129	174	171	142	100	108	154	160
95th Queue (ft)	214	241	252	228	173	180	235	251
Link Distance (ft)			1030		150	150	311	311
Upstream Blk Time (%)					2	2		0
Queuing Penalty (veh)					9	13		0
Storage Bay Dist (ft)	250	250		250				
Storage Blk Time (%)	0	1	1	0				
Queuing Penalty (veh)	0	2	6	2				

Intersection: 5: Rochester Road (M-150) & EB M-59 Exit-Ramp

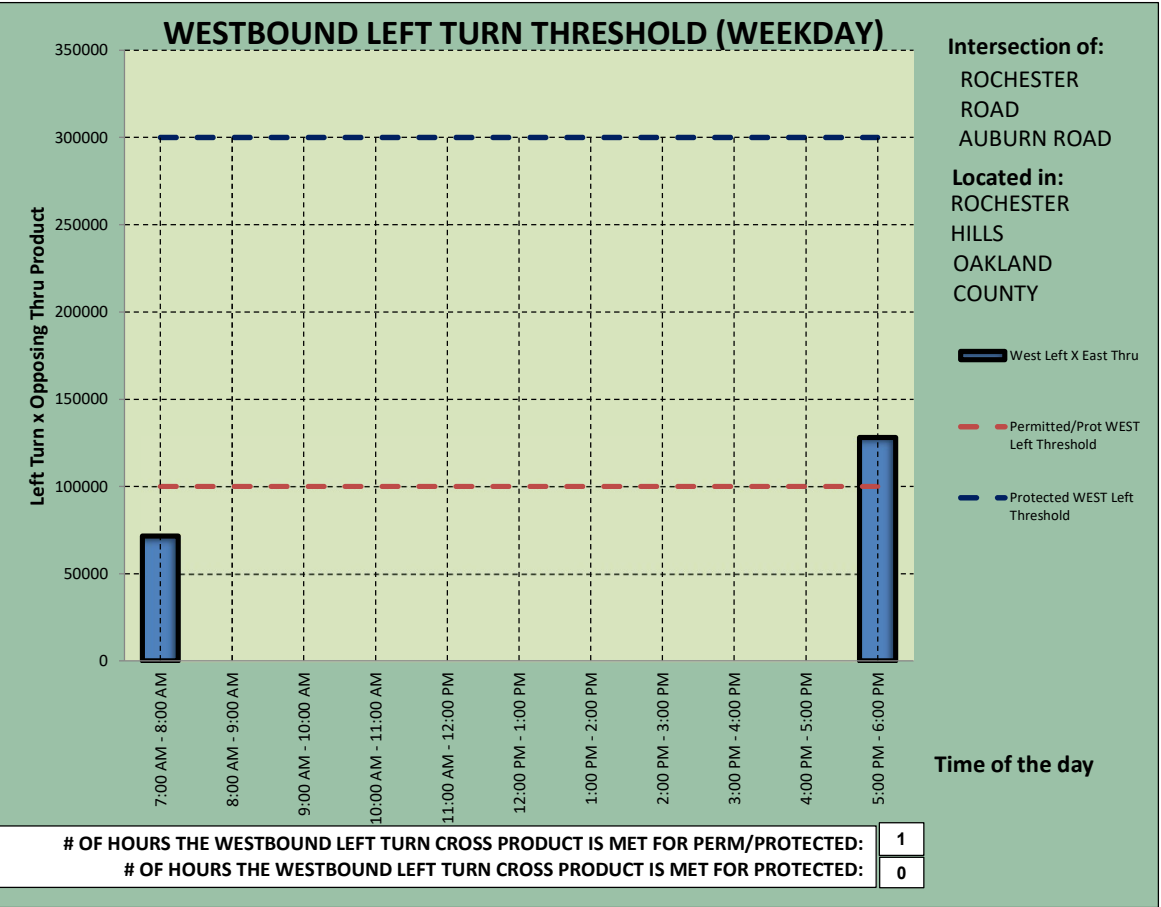
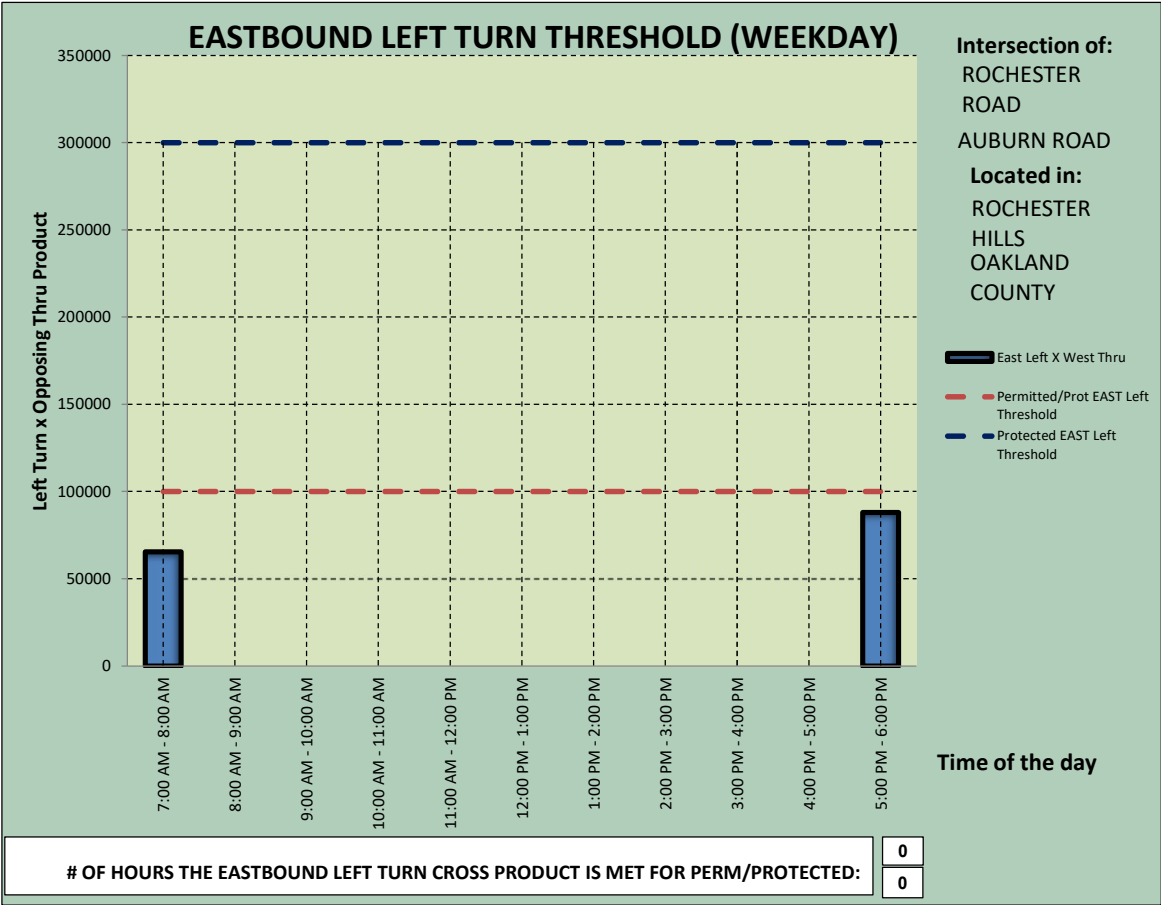
Movement	EB	EB	EB	NB	NB	NB	SB	SB
Directions Served	L	LTR	R	T	T	R	T	T
Maximum Queue (ft)	230	279	226	269	265	158	247	241
Average Queue (ft)	122	185	121	117	99	12	118	136
95th Queue (ft)	218	258	227	216	208	91	217	224
Link Distance (ft)		936		1203	1203		229	229
Upstream Blk Time (%)							0	1
Queuing Penalty (veh)							2	3
Storage Bay Dist (ft)	250		250			175		
Storage Blk Time (%)	0	1	0		1	0		
Queuing Penalty (veh)	0	2	0		3	0		

Zone Summary

Zone wide Queuing Penalty: 236

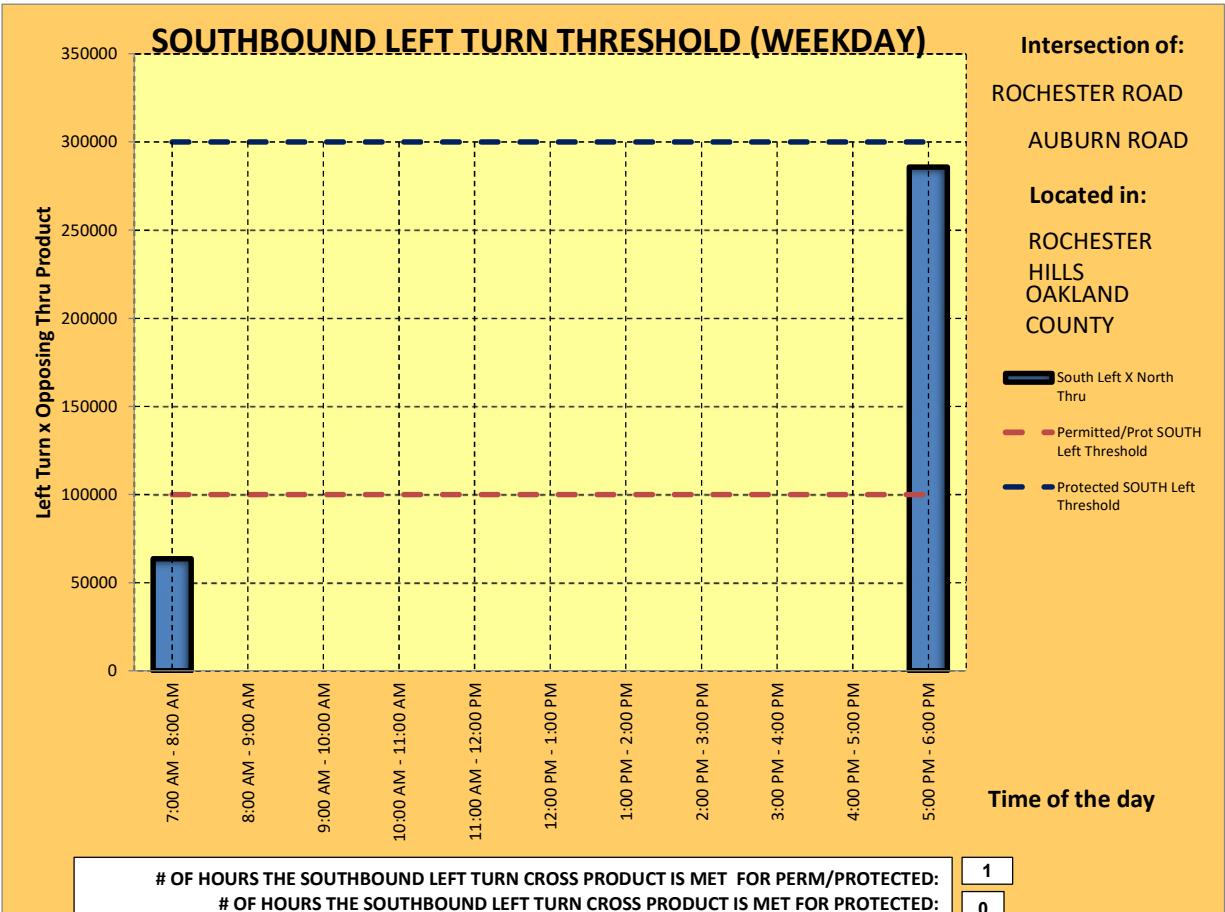
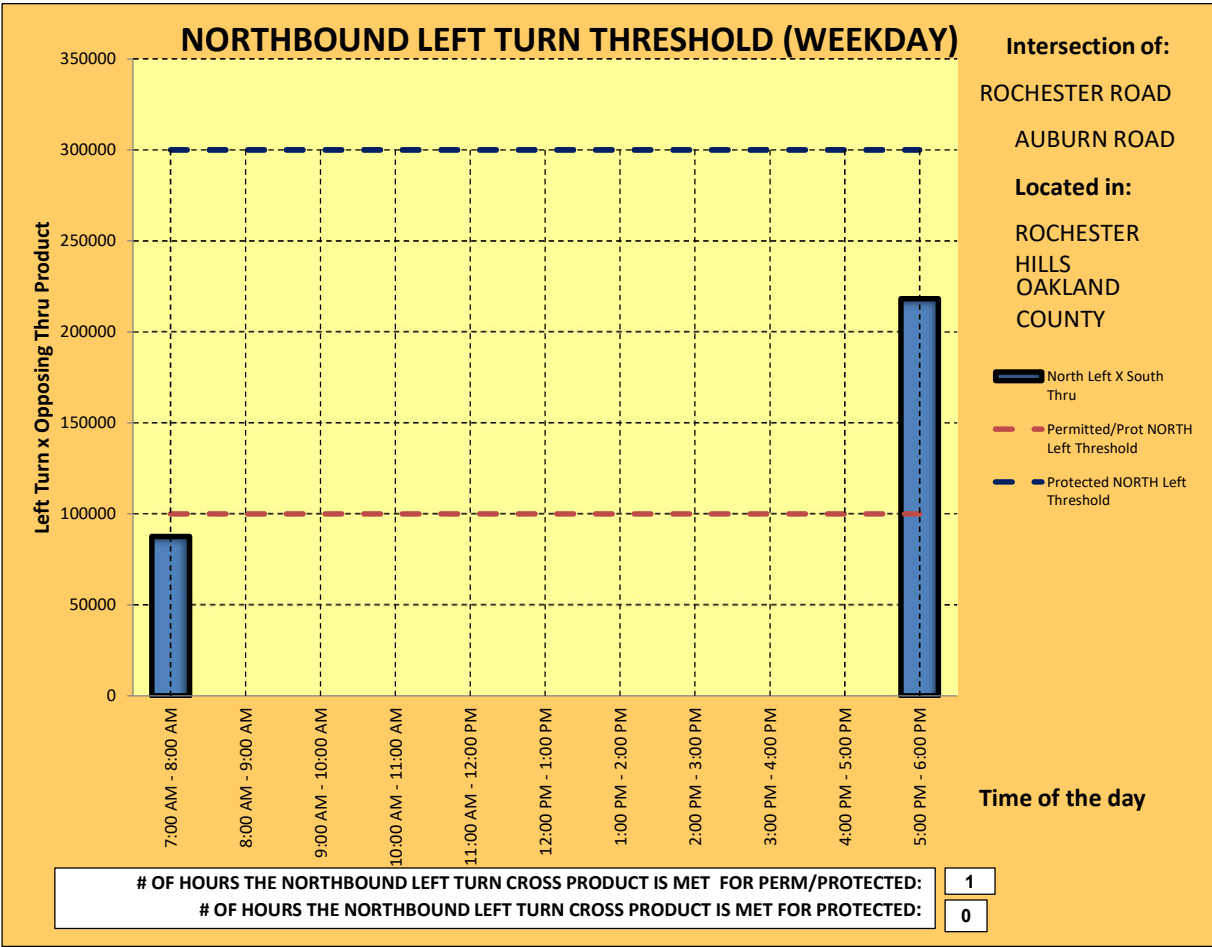
EASTBOUND AND WESTBOUND LEFT TURN PHASE THRESHOLDS			
Please enter Data in Yellow Boxes ONLY			
CONDITIONS		Items to Consider for Protected Only	Items to Consider for Permissive/Protected
EASTBOUND LEFT TURN GEOMETRY			
No. of Opposing WESTbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing WESTbound Right Turn Only Lanes	0		N/A
What is the Opposing WESTbound speed limit or 85%ile? (mph)	45	NO	N / A
No. of EASTbound Left Turning Lanes	1	NO	N / A
What is the EASTbound sight distance in the field? (ft)	566	NO	YES
Minimum Required Sight Distance (ft)	397		
WESTBOUND LEFT TURN GEOMETRY			
No. of Opposing EASTbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing EASTbound Right Turn Only Lanes	0		N/A
What is the Opposing EASTbound speed limit or 85%ile? (mph)	50	YES	N / A
No. of WESTbound Left Turning Lanes	1	NO	N / A
What is the WESTbound sight distance in the field? (ft)	566	NO	YES
Minimum Required Sight Distance (ft)	441		
TRAFFIC CHARACTERISTICS			
EASTbound Left Turn Vol (vph)	210		YES
WESTbound Left Turn Vol (vph)	231		YES
Cross Product of LEFT TURN EAST (See Chart Below)	87990	NO	NO
Cross Product of LEFT TURN WEST (See Chart Below)	128205	NO	YES
CRASH HISTORY			
Is there an existing permissive/protected or permissive/protected LT phase?		YES	
"One Left Turn Movement" refers to		Eastbound	
ONE LEFT TURN MOVEMENT	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
TWO LEFT TURN MOVEMENTS	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
EASTbound Left Turn DELAY per vehicle? Sec. / Veh.	96.5		YES
EASTbound TOTAL Left Turn DELAY? Veh-Hr	5.63		
WESTbound Left Turn DELAY per vehicle? Sec. / Veh.	98.8		YES
WESTbound TOTAL Left Turn DELAY? Veh-Hr	6.34		

Left-turn phasing should only be approved and installed after a comprehensive engineering study indicates such an operation is necessary for the safe and efficient operation of an intersection. The type of left-turn phasing will be determined based on data from the engineering study which includes the amount of delay experienced by left-turning traffic, crash patterns that may be occurring and available capacity of the intersection.



NORTHBOUND AND SOUTHBOUND LEFT TURN PHASE THRESHOLDS			
Please enter Data in Yellow Boxes ONLY			
CONDITIONS		Items to Consider for Protected Only	Items to Consider for Permissive/Protected
NORTHBOUND LEFT TURN GEOMETRY			
No. of Opposing SOUTHbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing SOUTHbound Right Turn Only Lanes	1		N/A
What is the Opposing SOUTHbound speed limit or 85%ile? (mph)	50	YES	N / A
No. of NORTHbound Left Turning Lanes	1	NO	N / A
What is the NORTHbound sight distance in the field? (ft)	484	NO	YES
Minimum Required Sight Distance (ft)	478		
SOUTHBOUND LEFT TURN GEOMETRY			
No. of Opposing NORTHbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing NORTHbound Right Turn Only Lanes	1		N/A
What is the Opposing NORTHbound speed limit or 85%ile? (mph)	50	YES	N / A
No. of SOUTHbound Left Turning Lanes	1	NO	N / A
What is the SOUTHbound sight distance in the field? (ft)	484	NO	YES
Minimum Required Sight Distance (ft)	478		
TRAFFIC CHARACTERISTICS			
NORTHbound Left Turn Vol (vph)	151		YES
SOUTHbound Left Turn Vol (vph)	187		YES
Cross Product of LEFT TURN NORTH (See Chart Below)	218346	NO	YES
Cross Product of LEFT TURN SOUTH (See Chart Below)	285736	NO	YES
CRASH HISTORY			
Is there an existing permissive/protected or permissive/protected LT phase?	YES		
"One Left Turn Movement" refers to	Northbound		
ONE LEFT TURN MOVEMENT	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
TWO LEFT TURN MOVEMENTS	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
NORTHbound Left Turn DELAY per vehicle? Sec. / Veh.	87.5		YES
NORTHbound TOTAL Left Turn DELAY? Veh-Hr	3.67		YES
SOUTHbound Left Turn DELAY per vehicle? Sec. / Veh.	101.4		YES
SOUTHbound TOTAL Left Turn DELAY? Veh-Hr	5.27		YES

Left-turn phasing should only be approved and installed after a comprehensive engineering study indicates such an operation is necessary for the safe and efficient operation of an intersection. The type of left-turn phasing will be determined based on data from the engineering study which includes the amount of delay experienced by left-turning traffic, crash patterns that may be occurring and available capacity of the intersection.



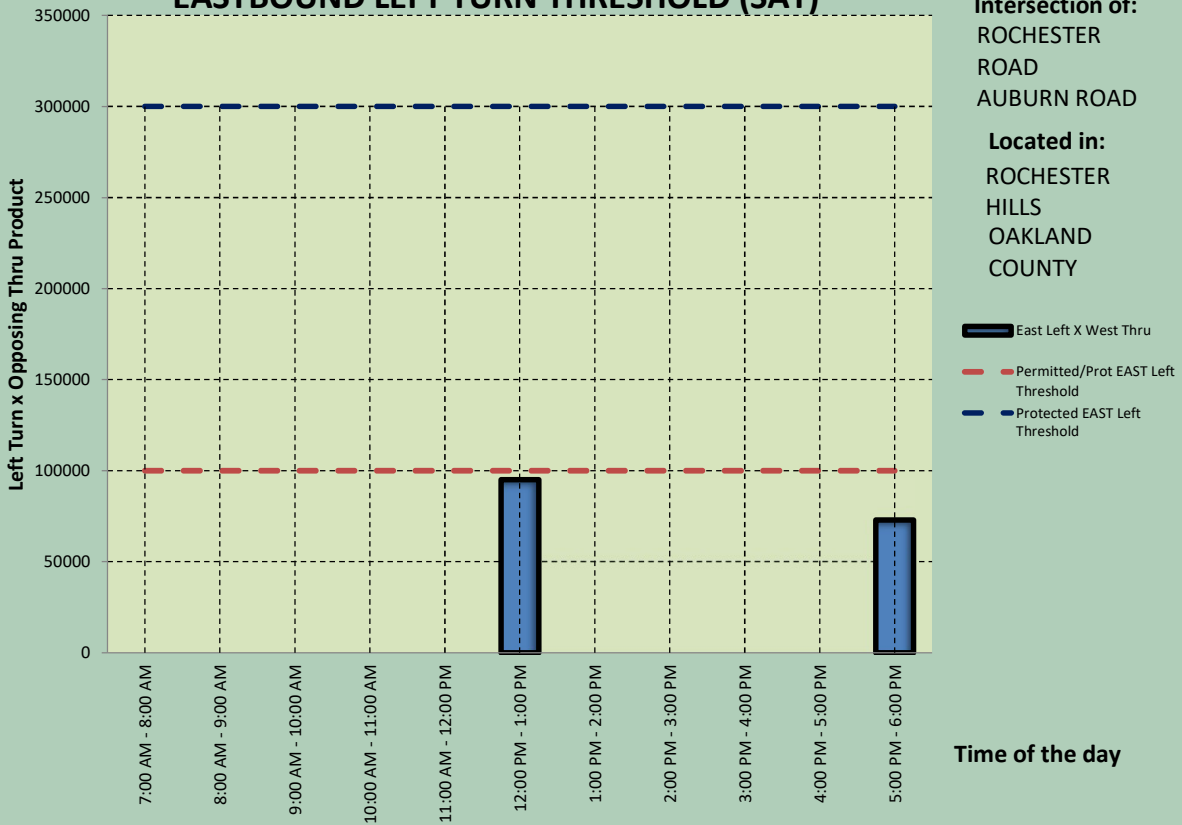
EASTBOUND AND WESTBOUND LEFT TURN PHASE THRESHOLDS			
Please enter Data in Yellow Boxes ONLY			
CONDITIONS		Items to Consider for Protected Only	Items to Consider for Permissive/Protected
EASTBOUND LEFT TURN GEOMETRY			
No. of Opposing WESTbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing WESTbound Right Turn Only Lanes	0		N/A
What is the Opposing WESTbound speed limit or 85%ile? (mph)	45	NO	N / A
No. of EASTbound Left Turning Lanes	1	NO	N / A
What is the EASTbound sight distance in the field? (ft)	566	NO	YES
Minimum Required Sight Distance (ft)	397		
WESTBOUND LEFT TURN GEOMETRY			
No. of Opposing EASTbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing EASTbound Right Turn Only Lanes	0		N/A
What is the Opposing EASTbound speed limit or 85%ile? (mph)	50	YES	N / A
No. of WESTbound Left Turning Lanes	1	NO	N / A
What is the WESTbound sight distance in the field? (ft)	566	NO	YES
Minimum Required Sight Distance (ft)	441		
TRAFFIC CHARACTERISTICS			
EASTbound Left Turn Vol (vph)	213		YES
WESTbound Left Turn Vol (vph)	255		YES
Cross Product of LEFT TURN EAST (See Chart Below)	94998	NO	NO
Cross Product of LEFT TURN WEST (See Chart Below)	98430	NO	NO
CRASH HISTORY			
Is there an existing permissive/protected or permissive/protected LT phase?	YES		
"One Left Turn Movement" refers to	Eastbound		
ONE LEFT TURN MOVEMENT	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
TWO LEFT TURN MOVEMENTS	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
EASTbound Left Turn DELAY per vehicle? Sec. / Veh.	99.5		YES
EASTbound TOTAL Left Turn DELAY? Veh-Hr	5.89		YES
WESTbound Left Turn DELAY per vehicle? Sec. / Veh.	92.9		YES
WESTbound TOTAL Left Turn DELAY? Veh-Hr	6.58		YES

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EASTBOUND LEFT TURN THRESHOLD (SAT)

Intersection of:
ROCHESTER
ROAD
AUBURN ROAD

Located in:
ROCHESTER
HILLS
OAKLAND
COUNTY



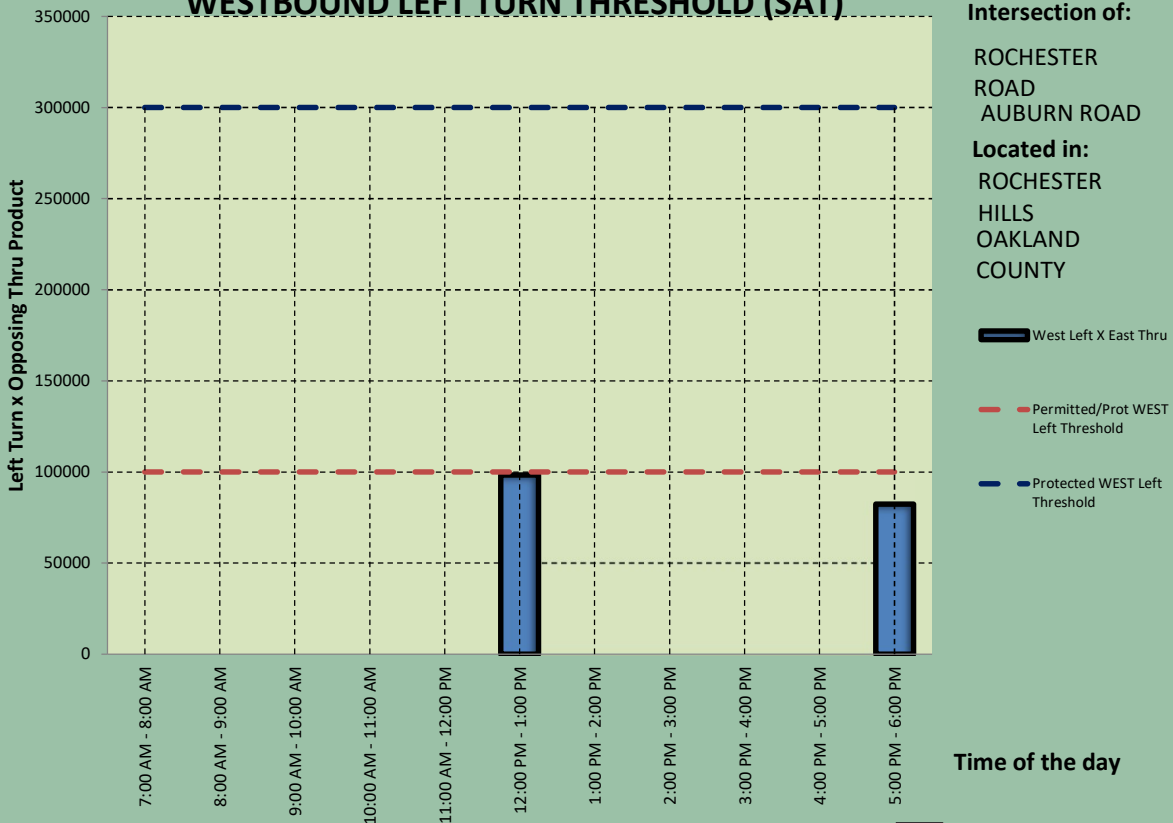
OF HOURS THE EASTBOUND LEFT TURN CROSS PRODUCT IS MET FOR PERM/PROTECTED:

0
0

WESTBOUND LEFT TURN THRESHOLD (SAT)

Intersection of:
ROCHESTER
ROAD
AUBURN ROAD

Located in:
ROCHESTER
HILLS
OAKLAND
COUNTY



OF HOURS THE WESTBOUND LEFT TURN CROSS PRODUCT IS MET FOR PERM/PROTECTED:

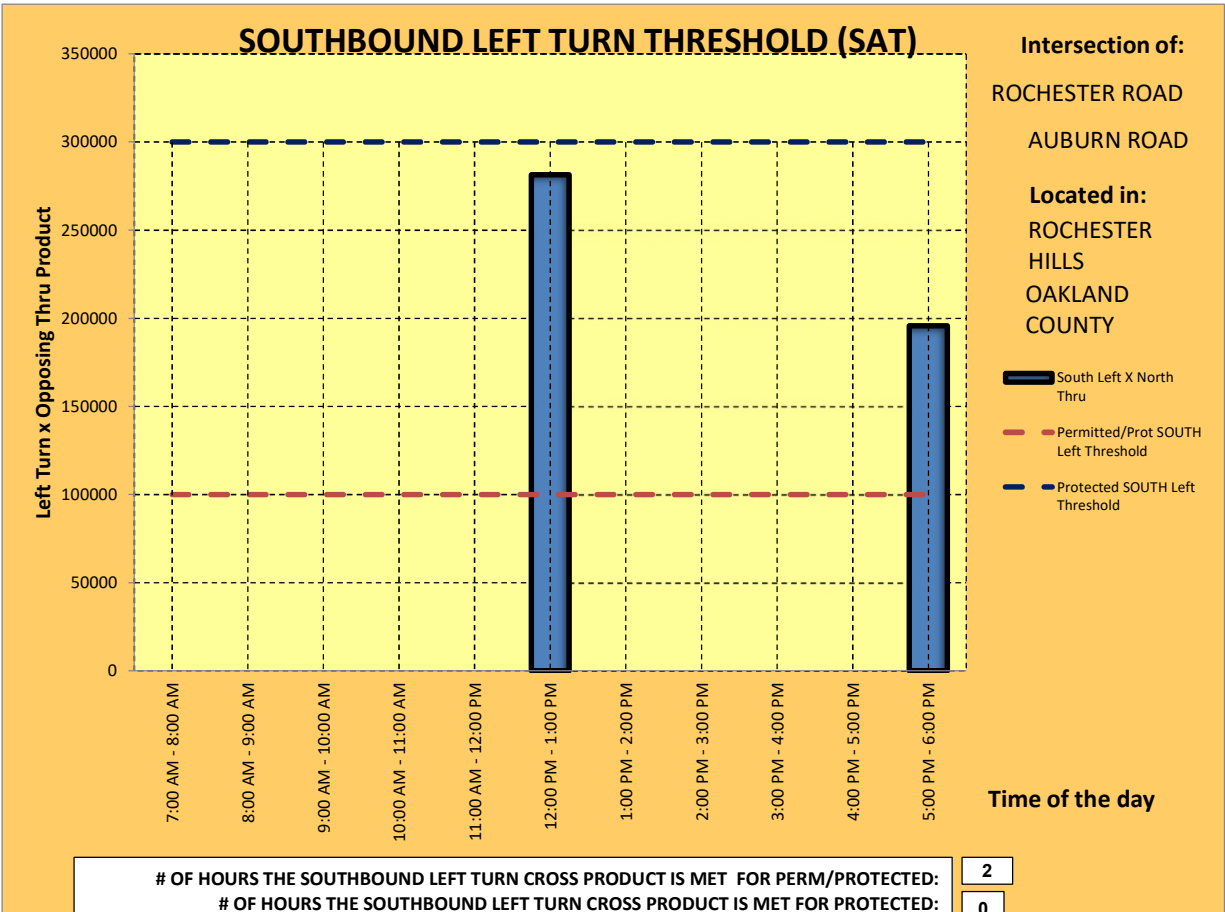
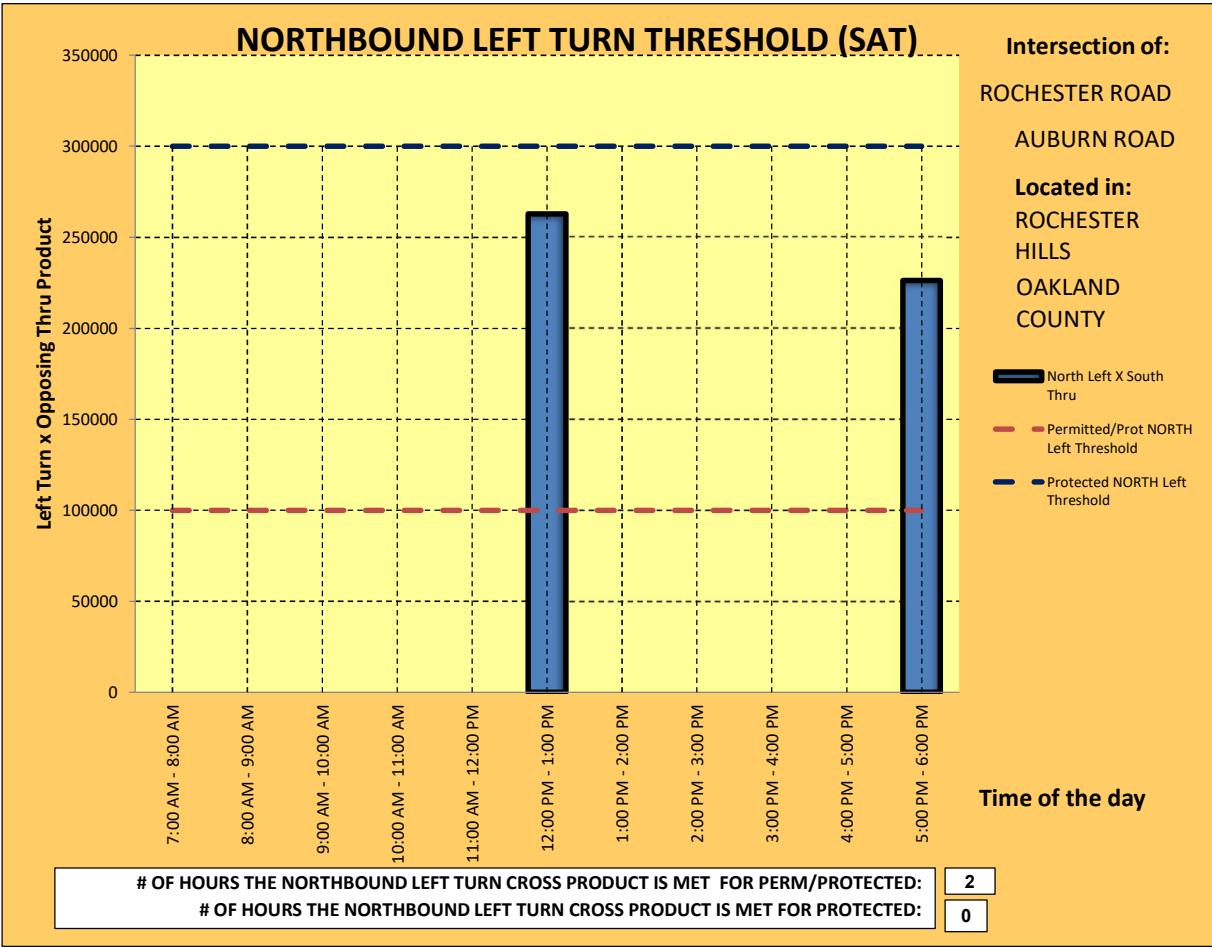
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OF HOURS THE WESTBOUND LEFT TURN CROSS PRODUCT IS MET FOR PROTECTED:

0

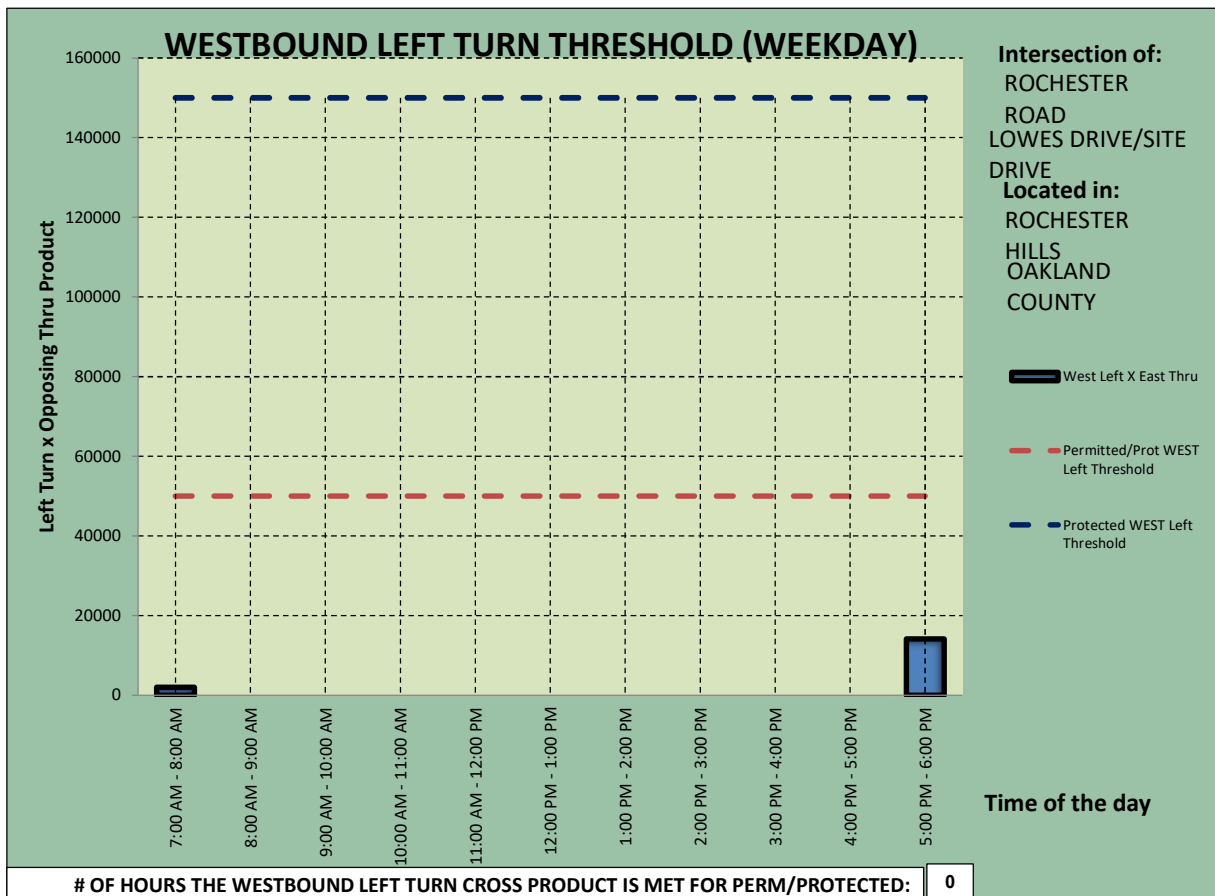
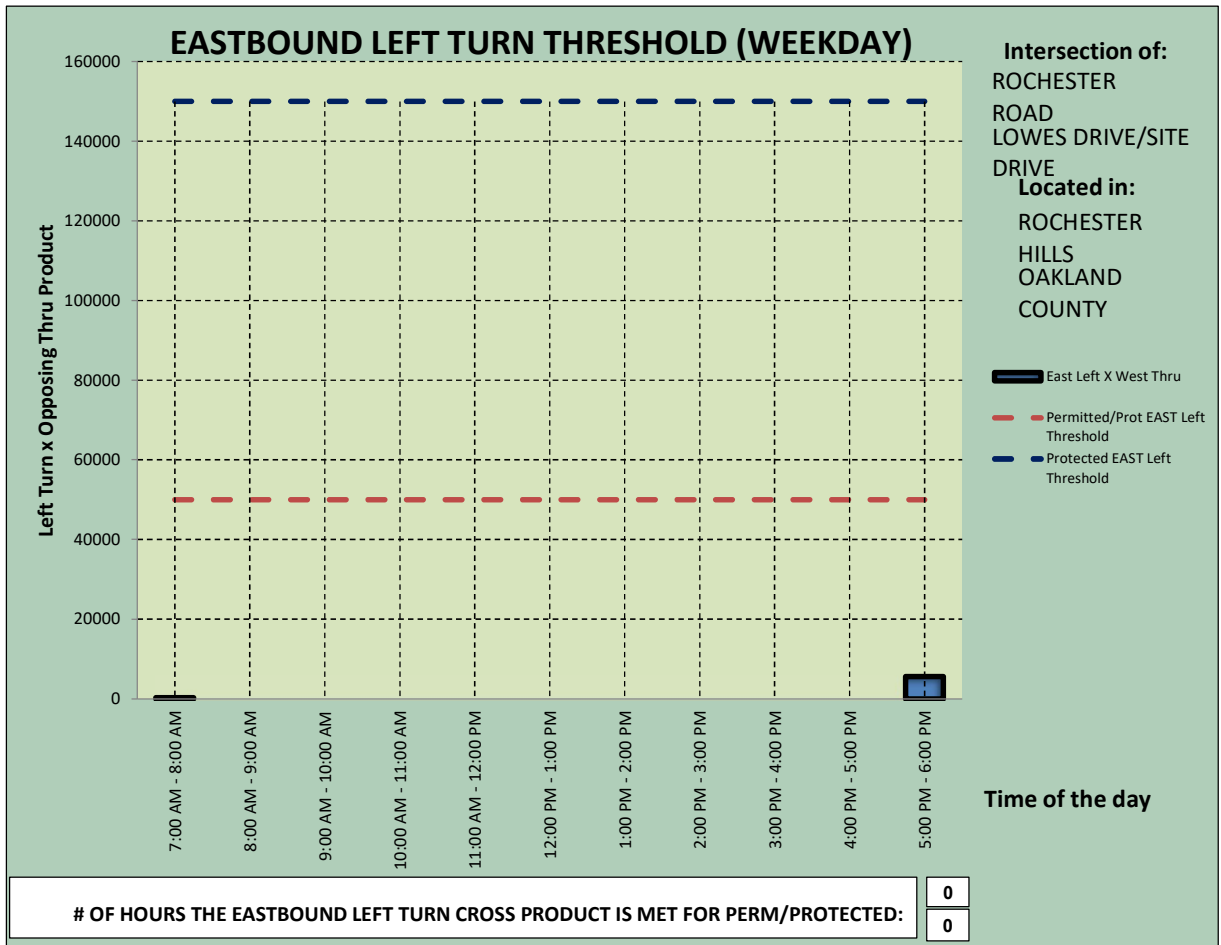
NORTHBOUND AND SOUTHBOUND LEFT TURN PHASE THRESHOLDS			
Please enter Data in Yellow Boxes ONLY			
CONDITIONS		Items to Consider for Protected Only	Items to Consider for Permissive/Protected
NORTHBOUND LEFT TURN GEOMETRY			
No. of Opposing SOUTHbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing SOUTHbound Right Turn Only Lanes	1		N/A
What is the Opposing SOUTHbound speed limit or 85%ile? (mph)	50	YES	N / A
No. of NORTHbound Left Turning Lanes	1	NO	N / A
What is the NORTHbound sight distance in the field? (ft)	484	NO	YES
Minimum Required Sight Distance (ft)	478		
SOUTHBOUND LEFT TURN GEOMETRY			
No. of Opposing NORTHbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing NORTHbound Right Turn Only Lanes	1		N/A
What is the Opposing NORTHbound speed limit or 85%ile? (mph)	50	YES	N / A
No. of SOUTHbound Left Turning Lanes	1	NO	N / A
What is the SOUTHbound sight distance in the field? (ft)	484	NO	YES
Minimum Required Sight Distance (ft)	478		
TRAFFIC CHARACTERISTICS			
NORTHbound Left Turn Vol (vph)	175		YES
SOUTHbound Left Turn Vol (vph)	185		YES
Cross Product of LEFT TURN NORTH (See Chart Below)	262845	NO	YES
Cross Product of LEFT TURN SOUTH (See Chart Below)	281570	NO	YES
CRASH HISTORY			
Is there an existing permissive/protected or permissive/protected LT phase?	YES		
"One Left Turn Movement" refers to	Northbound		
ONE LEFT TURN MOVEMENT	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
TWO LEFT TURN MOVEMENTS	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
NORTHbound Left Turn DELAY per vehicle? Sec. / Veh.	99.3		YES
NORTHbound TOTAL Left Turn DELAY? Veh-Hr	4.83		
SOUTHbound Left Turn DELAY per vehicle? Sec. / Veh.	109.6		YES
SOUTHbound TOTAL Left Turn DELAY? Veh-Hr	5.63		

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EASTBOUND AND WESTBOUND LEFT TURN PHASE THRESHOLDS			
Please enter Data in Yellow Boxes ONLY			
CONDITIONS		Items to Consider for Protected Only	Items to Consider for Permissive/Protected
EASTBOUND LEFT TURN GEOMETRY			
No. of Opposing WESTbound Thru Lanes (include combination thru lanes)	1	NO	YES
No. of Opposing WESTbound Right Turn Only Lanes	0		N/A
What is the Opposing WESTbound speed limit or 85%ile? (mph)	25	NO	N / A
No. of EASTbound Left Turning Lanes	1	NO	N / A
What is the EASTbound sight distance in the field? (ft)	566	NO	YES
Minimum Required Sight Distance (ft)	202		
WESTBOUND LEFT TURN GEOMETRY			
No. of Opposing EASTbound Thru Lanes (include combination thru lanes)	1	NO	YES
No. of Opposing EASTbound Right Turn Only Lanes	0		N/A
What is the Opposing EASTbound speed limit or 85%ile? (mph)	25	NO	N / A
No. of WESTbound Left Turning Lanes	1	NO	N / A
What is the WESTbound sight distance in the field? (ft)	566	NO	YES
Minimum Required Sight Distance (ft)	202		
TRAFFIC CHARACTERISTICS			
EASTbound Left Turn Vol (vph)	89	NO	
WESTbound Left Turn Vol (vph)	147	YES	
Cross Product of LEFT TURN EAST (See Chart Below)	5607	NO	NO
Cross Product of LEFT TURN WEST (See Chart Below)	14112	NO	NO
CRASH HISTORY			
Is there an existing permissive/protected or permissive/protected LT phase?		NO	
"One Left Turn Movement" refers to		Eastbound	
ONE LEFT TURN MOVEMENT	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
TWO LEFT TURN MOVEMENTS	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
EASTbound Left Turn DELAY per vehicle? Sec. / Veh.	50.6	NO	
EASTbound TOTAL Left Turn DELAY? Veh-Hr	1.25		
WESTbound Left Turn DELAY per vehicle? Sec. / Veh.	104	YES	
WESTbound TOTAL Left Turn DELAY? Veh-Hr	4.25		

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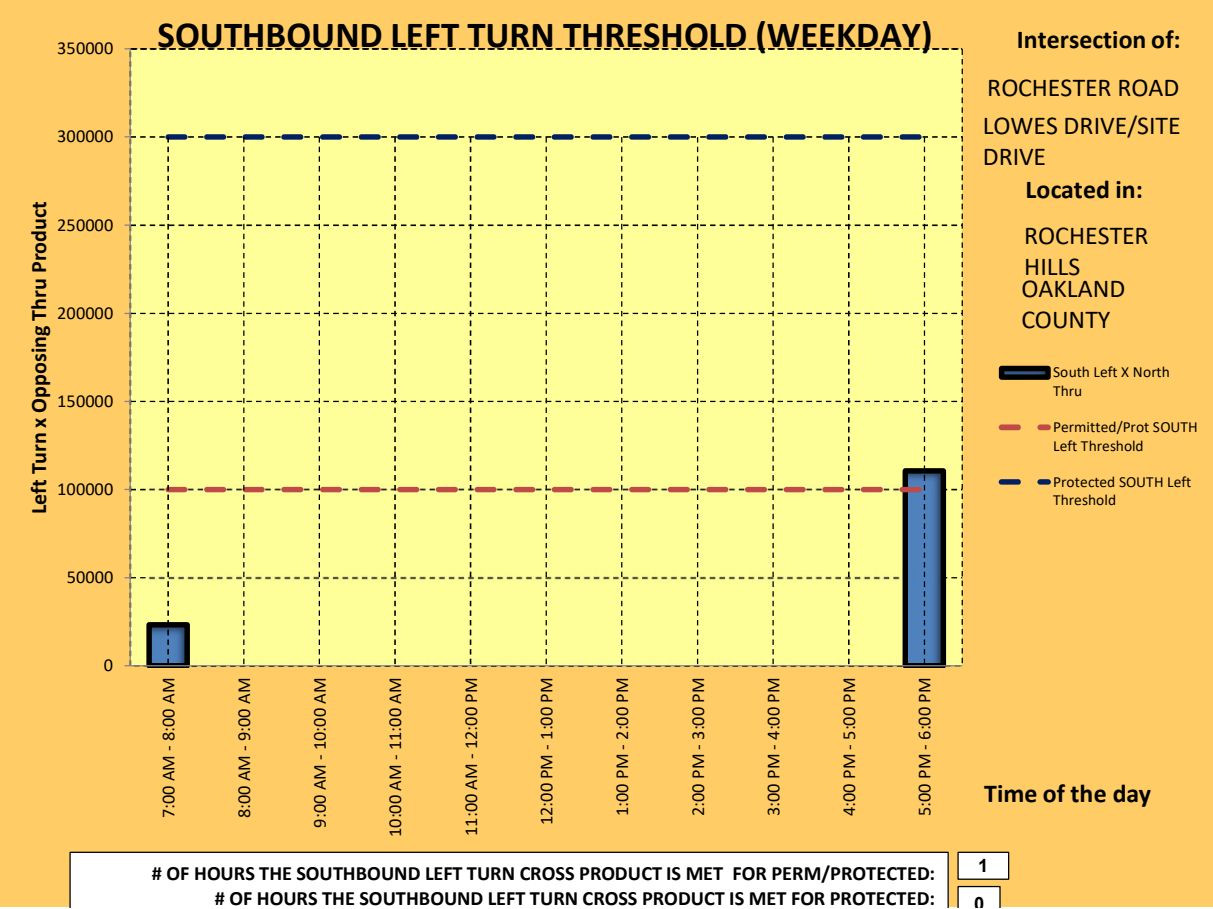
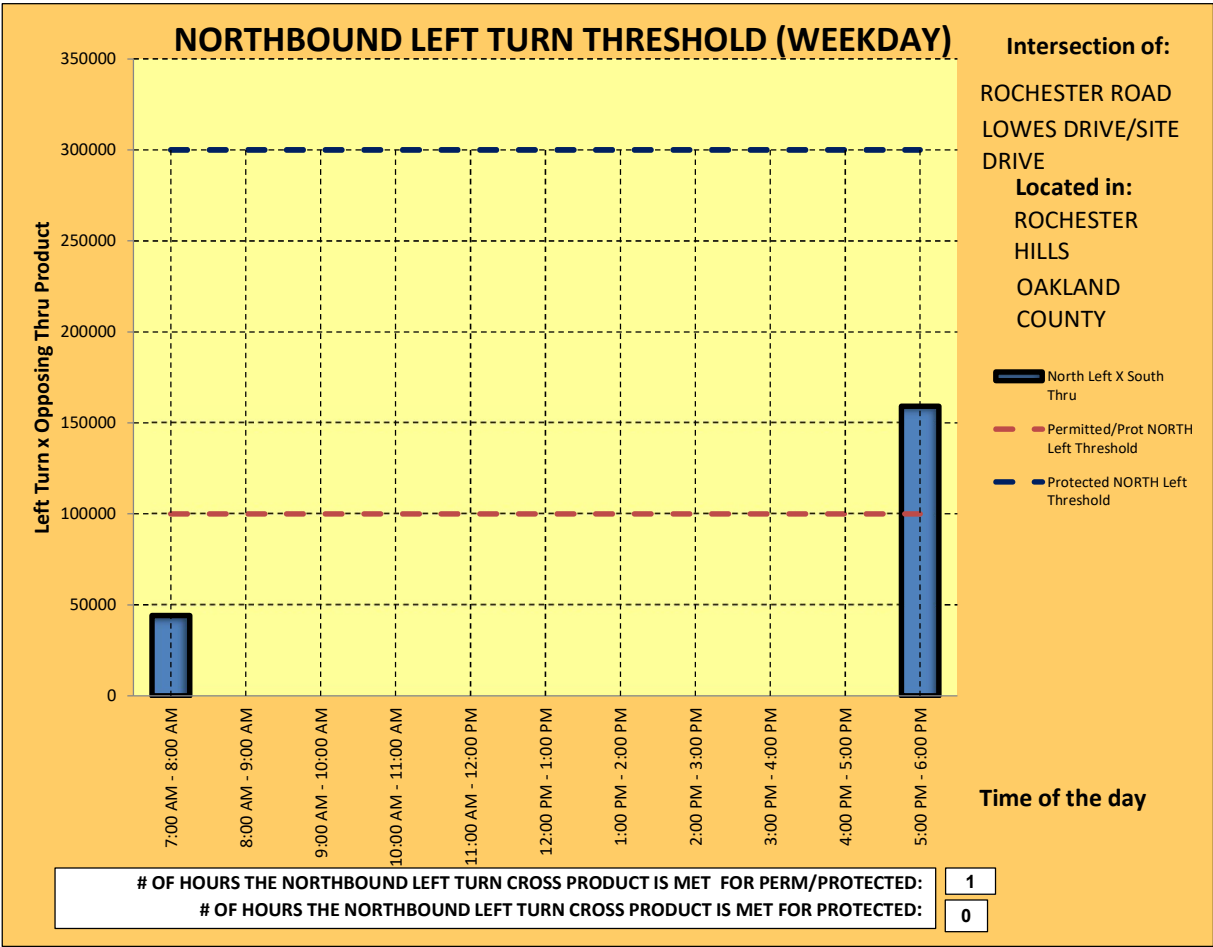


NORTHBOUND AND SOUTHBOUND LEFT TURN PHASE THRESHOLDS

Please enter Data in Yellow Boxes ONLY

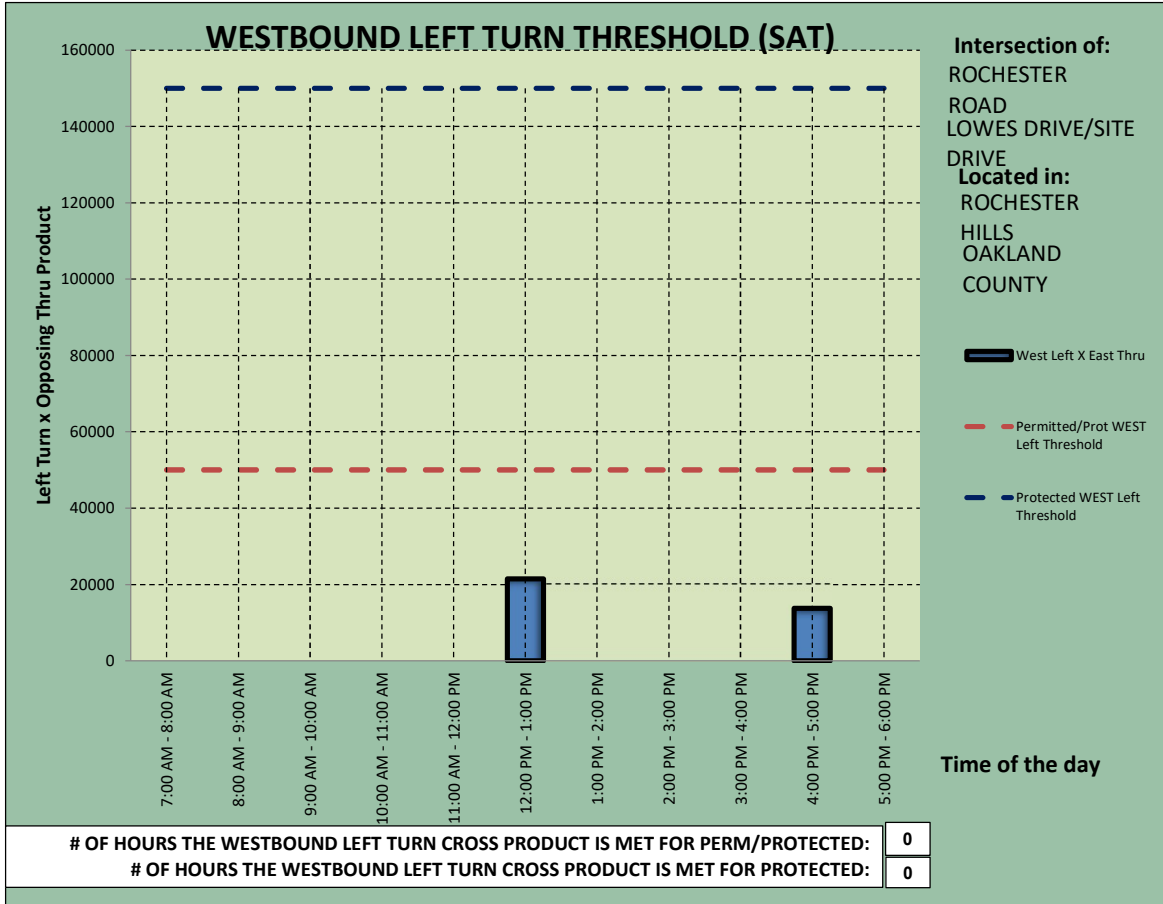
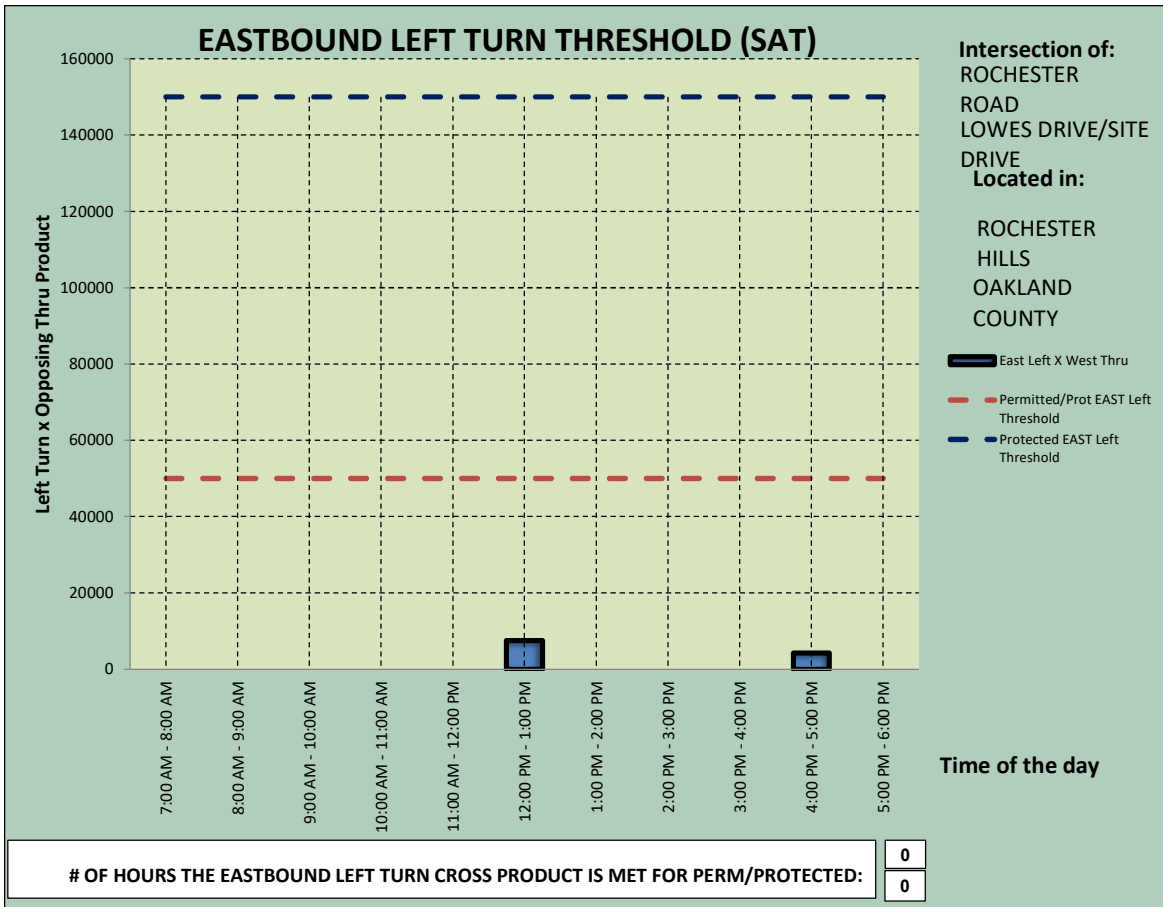
CONDITIONS		Items to Consider for Protected Only	Items to Consider for Permissive/Protected
NORTHBOUND LEFT TURN GEOMETRY			
No. of Opposing SOUTHbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing SOUTHbound Right Turn Only Lanes	1		N/A
What is the Opposing SOUTHbound speed limit or 85%ile? (mph)	50	YES	N / A
No. of NORTHbound Left Turning Lanes	1	NO	N / A
What is the NORTHbound sight distance in the field? (ft)	484	NO	YES
Minimum Required Sight Distance (ft)	478		
SOUTHBOUND LEFT TURN GEOMETRY			
No. of Opposing NORTHbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing NORTHbound Right Turn Only Lanes	1		N/A
What is the Opposing NORTHbound speed limit or 85%ile? (mph)	50	YES	N / A
No. of SOUTHbound Left Turning Lanes	1	NO	N / A
What is the SOUTHbound sight distance in the field? (ft)	484	NO	YES
Minimum Required Sight Distance (ft)	478		
TRAFFIC CHARACTERISTICS			
NORTHbound Left Turn Vol (vph)	97		YES
SOUTHbound Left Turn Vol (vph)	65		NO
Cross Product of LEFT TURN NORTH (See Chart Below)	159177	NO	YES
Cross Product of LEFT TURN SOUTH (See Chart Below)	110630	NO	YES
CRASH HISTORY			
Is there an existing permissive/protected or permissive/protected LT phase?		NO	
"One Left Turn Movement" refers to		Northbound	
ONE LEFT TURN MOVEMENT	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
TWO LEFT TURN MOVEMENTS	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
NORTHbound Left Turn DELAY per vehicle? Sec. / Veh.		4.4	
NORTHbound TOTAL Left Turn DELAY? Veh-Hr		0.12	NO
SOUTHbound Left Turn DELAY per vehicle? Sec. / Veh.		2.6	
SOUTHbound TOTAL Left Turn DELAY? Veh-Hr		0.05	NO

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EASTBOUND AND WESTBOUND LEFT TURN PHASE THRESHOLDS			
Please enter Data in Yellow Boxes ONLY			
CONDITIONS		Items to Consider for Protected Only	Items to Consider for Permissive/Protected
EASTBOUND LEFT TURN GEOMETRY			
No. of Opposing WESTbound Thru Lanes (include combination thru lanes)	1	NO	YES
No. of Opposing WESTbound Right Turn Only Lanes	0		N/A
What is the Opposing WESTbound speed limit or 85%ile? (mph)	25	NO	N / A
No. of EASTbound Left Turning Lanes	1	NO	N / A
What is the EASTbound sight distance in the field? (ft)	566	NO	YES
Minimum Required Sight Distance (ft)	202		
WESTBOUND LEFT TURN GEOMETRY			
No. of Opposing EASTbound Thru Lanes (include combination thru lanes)	1	NO	YES
No. of Opposing EASTbound Right Turn Only Lanes	0		N/A
What is the Opposing EASTbound speed limit or 85%ile? (mph)	25	NO	N / A
No. of WESTbound Left Turning Lanes	1	NO	N / A
What is the WESTbound sight distance in the field? (ft)	566	NO	YES
Minimum Required Sight Distance (ft)	202		
TRAFFIC CHARACTERISTICS			
EASTbound Left Turn Vol (vph)	104		YES
WESTbound Left Turn Vol (vph)	201		YES
Cross Product of LEFT TURN EAST (See Chart Below)	7488	NO	NO
Cross Product of LEFT TURN WEST (See Chart Below)	21507	NO	NO
CRASH HISTORY			
Is there an existing permissive/protected or permissive/protected LT phase?	NO		
"One Left Turn Movement" refers to	Eastbound		
ONE LEFT TURN MOVEMENT	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
TWO LEFT TURN MOVEMENTS	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
EASTbound Left Turn DELAY per vehicle? Sec. / Veh.	40.1		NO
EASTbound TOTAL Left Turn DELAY? Veh-Hr	1.16		
WESTbound Left Turn DELAY per vehicle? Sec. / Veh.	125.2		YES
WESTbound TOTAL Left Turn DELAY? Veh-Hr	6.99		

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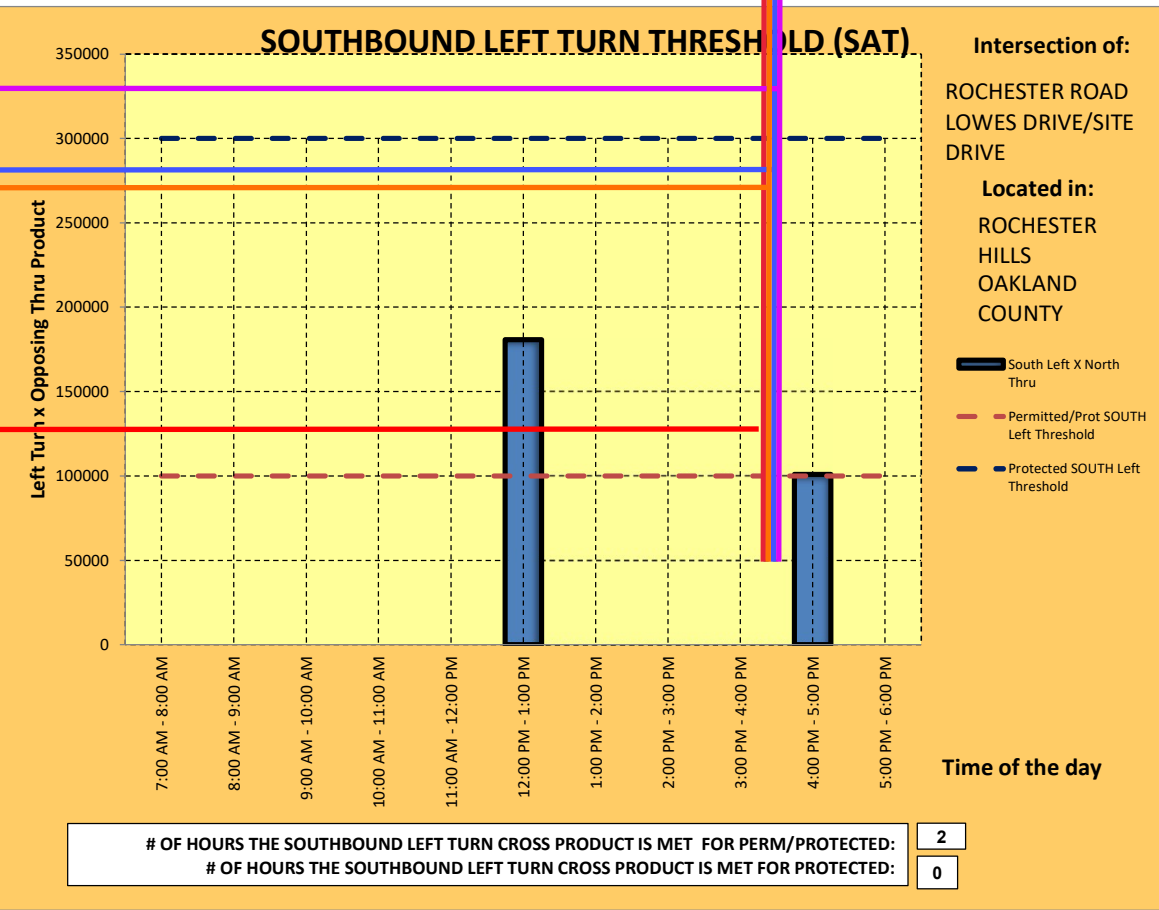
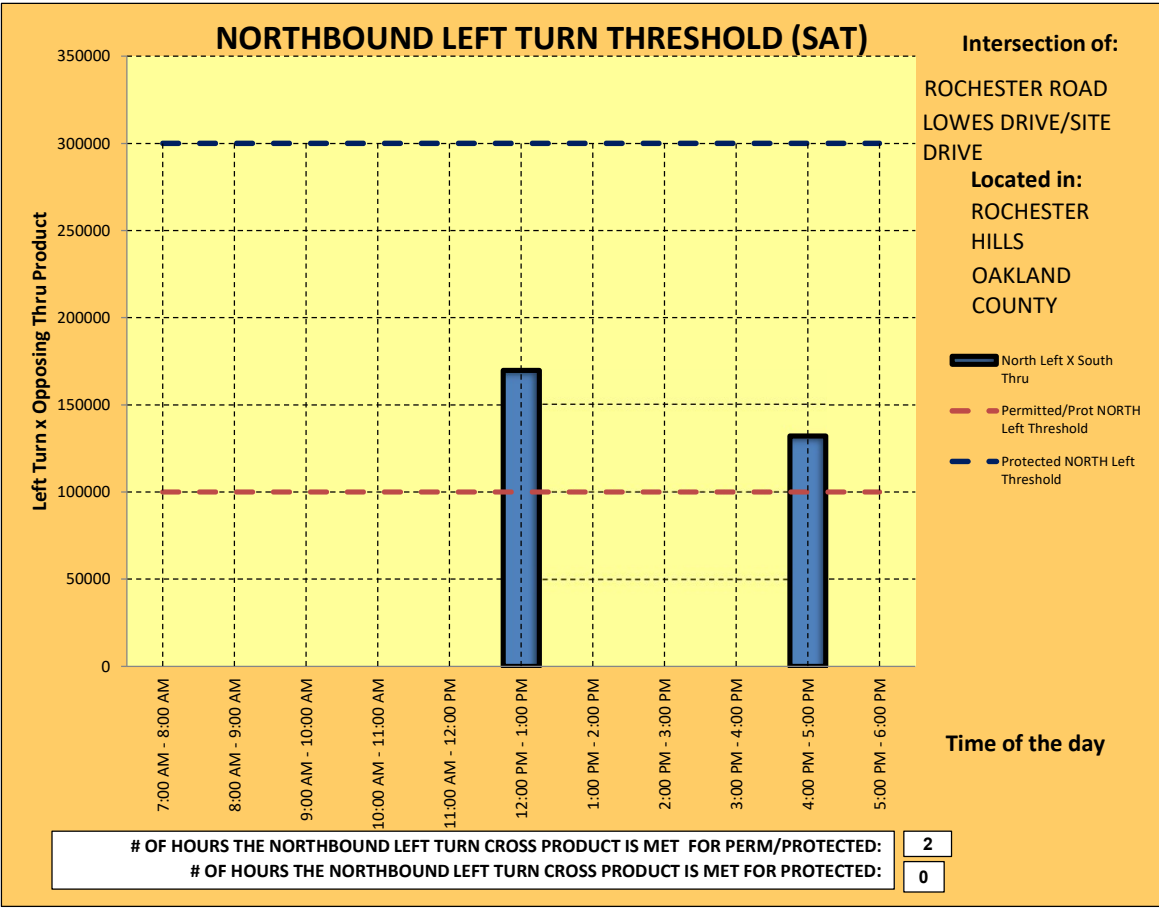


NORTHBOUND AND SOUTHBOUND LEFT TURN PHASE THRESHOLDS

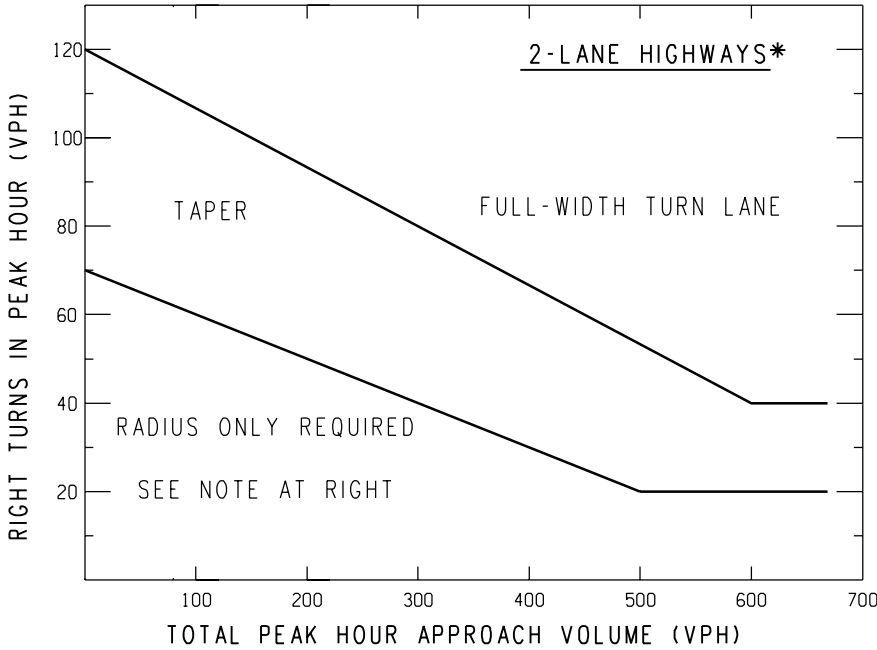
Please enter Data in Yellow Boxes ONLY

CONDITIONS		Items to Consider for Protected Only	Items to Consider for Permissive/Protected
NORTHBOUND LEFT TURN GEOMETRY			
No. of Opposing SOUTHbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing SOUTHbound Right Turn Only Lanes	1		N/A
What is the Opposing SOUTHbound speed limit or 85%ile? (mph)	50	YES	N / A
No. of NORTHbound Left Turning Lanes	1	NO	N / A
What is the NORTHbound sight distance in the field? (ft)	484	NO	YES
Minimum Required Sight Distance (ft)	478		
SOUTHBOUND LEFT TURN GEOMETRY			
No. of Opposing NORTHbound Thru Lanes (include combination thru lanes)	2	NO	YES
No. of Opposing NORTHbound Right Turn Only Lanes	1		N/A
What is the Opposing NORTHbound speed limit or 85%ile? (mph)	50	YES	N / A
No. of SOUTHbound Left Turning Lanes	1	NO	N / A
What is the SOUTHbound sight distance in the field? (ft)	484	NO	YES
Minimum Required Sight Distance (ft)	478		
TRAFFIC CHARACTERISTICS			
NORTHbound Left Turn Vol (vph)	99		YES
SOUTHbound Left Turn Vol (vph)	113		YES
Cross Product of LEFT TURN NORTH (See Chart Below)	169686	NO	YES
Cross Product of LEFT TURN SOUTH (See Chart Below)	180800	NO	YES
CRASH HISTORY			
Is there an existing permissive/protected or permissive/protected LT phase?	NO		
"One Left Turn Movement" refers to	Northbound		
ONE LEFT TURN MOVEMENT	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
TWO LEFT TURN MOVEMENTS	Crash History for 12 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
	Crash History for 24 Month Period		
	Enter Number of Correctable crashes? (Left-Turn Head-On)	0	NO
NORTHbound Left Turn DELAY per vehicle? Sec. / Veh.	4.8	NO	
NORTHbound TOTAL Left Turn DELAY? Veh-Hr	0.13		
SOUTHbound Left Turn DELAY per vehicle? Sec. / Veh.	4.6	NO	
SOUTHbound TOTAL Left Turn DELAY? Veh-Hr	0.14		

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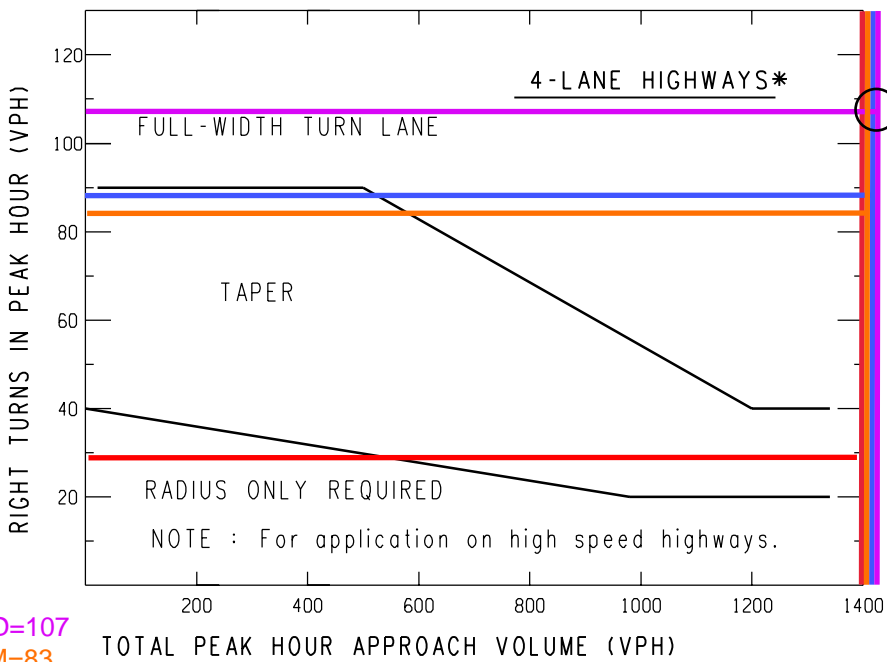


Rochester Road (M-150) & Site Drive



NOTE:
 For posted speeds at or under 45 mph, peak hour right turns greater than 40 vph, and total peak hour approach less than 300 vph, adjust right turn volumes.

Adjust peak hour right turns = Peak hour right turns - 20



*If a center left-turn lane exists (i.e. 3 or 5 lane highway), subtract the number of left turns in approach volume from the total approach volume to get an adjusted total approach volume.


AM=29
 PM=87
 SAT MD=107
 SAT PM=83

AM=1430
 PM=1657
 SAT MD=1736
 SAT PM=1502

Full-Width Turn Lane Recommended

Sample Problem:
 The Design Speed is 55 mph. The Peak Hour Approach Volume is 300 vph. The Number of Right Turns in the Peak Hour is 100 vph. Determine if a right turn lane is recommended.

Solution:
 Figure indicates that the intersection of 300 vph and 100 vph is located above the upper trend line; thus, a right-turn lane may be recommended.

 TRAFFIC AND SAFETY NOTE	TRAFFIC VOLUME GUIDELINES FOR RIGHT-TURN LANES AND TAPERS	
DRAWN BY: MTS	08/05/2004	604A
CHECKED BY: JAT	PLAN DATE:	
FILE: K:/DGN/ts notes/Note604A tsn.dgn		SHEET 2 OF 2 REV. 08/05/2004



Memorandum

To: Mr. Brandon Schram

From: Jill M. Bauer, PE, PTOE and Jeffery A. Morden, PE, PTOE

Date: September 9, 2021

RE: Trip Generation and Drive-Through Queue Analysis for Chick-Fil-A

ROWE Professional Services Company has completed a trip generation analysis and a drive-through queue length analysis to determine the absolute maximum and average maximum vehicle queue length for Chick-Fil-A developments in Michigan.

ROWE collected vehicle entrance/exit data and vehicle queue data on Thursday, August 26, 2021 during the weekday AM (7 a.m. to 9 a.m.) and PM (4 p.m. to 6 p.m.) peak hours and Saturday, August 28, 2021 for the Midday (12 p.m. to 2 p.m.) and PM (5 p.m. to 7 p.m.) peak hours at the following three (3) Chick-Fil-A sites located in Caledonia, Kalamazoo, and Okemos, MI:

1. M-6 and Kalamazoo Avenue (Caledonia, MI)
2. Main Street and Drake Road (Kalamazoo, MI)
3. Grand River Road (Okemos, MI)

Trip Generation Analysis

The peak hour trip generation analysis was conducted for the weekday AM and PM peak hours, and Saturday Midday and PM peak hours. The number of vehicles entering and exiting the restaurant at the driveways were counted in 15-minute intervals throughout the analysis periods. Table 1 presents the site locations peak hours and size for each location.

Table 1: Site Location Peak Hours and Size

Location	Weekday		Weekend		Size (SF)
	AM Peak	PM Peak	MD Peak	PM Peak	
Caledonia	7:30-8:30 a.m.	5:00-6:00 p.m.	12:45-1:45 p.m.	5:45-6:45 p.m.	4,877
Kalamazoo	8:00-9:00 a.m.	5:00-6:00 p.m.	12:45-1:45 p.m.	5:30-6:30 p.m.	4,996
Okemos	8:00-9:00 a.m.	5:00-6:00 p.m.	12:45-1:45 p.m.	5:00-6:00 p.m.	4,730

The average number of total trips for the weekday AM peak hour is 106 trips (53 in, 53 out). The average number of total trips for weekday PM peak hour is 315 trips (158 in, 157 out). The average number of total trips for the Saturday Midday peak hour is 376 trips (186 in, and 190 out). The average number of total trips for the Saturday PM peak hour is 304 trips (152 in, 152 out). Table 2 presents the trip generation for the three site locations. The highlighted row presents the peak

trip generation numbers for the peak hour. The full results of the trip generation analysis are included with this memorandum.

Table 2: Trip Generation

		Caledonia			Kalamazoo ¹			Okemos			Average ²		
		In	Out	Total	In	Out	Total	In	Out	Total	In	Out	Total
Weekday (8-26-21)	7a-8a	76	68	144	18	7	25	37	35	72	44	37	80
	8a-9a	79	77	156	34	28	62	40	45	85	51	50	101
	AM Peak	84	87	171	34	28	62	40	45	85	53	53	106
	4p-5p	121	122	243	136	127	263	125	144	269	127	131	258
	5p-6p	163	148	311	142	146	288	170	177	347	158	157	315
	PM Peak	163	148	311	142	146	288	170	177	347	158	157	315
Weekend (8-28-21)	12p-1p	157	157	314	170	157	327	197	202	399	175	172	347
	1p-2p	164	171	335	164	169	333	215	219	434	181	186	367
	Midday Peak	171	168	339	168	173	341	218	229	447	186	190	376
	5p-6p	106	100	206	125	139	264	200	201	401	144	147	290
	6p-7p	109	108	217	121	135	256	178	200	378	136	148	284
	PM Peak	118	115	233	138	140	278	200	201	401	152	152	304

¹ Location does not open until 8:00 a.m.

² Straight Average

The results of this analysis support previously observed trip generation at Chick-fil-A locations in neighboring states.

Drive-Through Queue Analysis

The peak hour drive-through queue analysis was conducted for the weekday AM and PM peak hours, and Saturday Midday and PM peak hours. The number of vehicles in the drive-through queue were counted throughout the analysis periods. The peak hour times and size of the study locations based on trip generation can be found in Table 1. The results of the queue analysis revealed, for weekday AM peak hour, the absolute maximum queue was 12 vehicles with an average queue of 8 vehicles. For the weekday PM peak hour, the absolute maximum queue was 41 with an average queue of 30 vehicles. For the Saturday Midday peak hour, the absolute maximum queue was 41 with an average queue of 31. For the Saturday PM peak hour, the absolute maximum queue was 38 vehicles with an average queue of 32 vehicle. The full results of the queue length analysis are shown in Table 4.

Table 4: Maximum Vehicle Queue (Vehicles)

		Caledonia	Kalamazoo ¹	Okemos	Average ²
Weekday (8-26-21)	7:00-8:00 a.m.	8	4	7	6
	8:00-9:00 a.m.	12	7	5	8
	AM Peak	12	7	5	8
	4:00-5:00 p.m.	14	36	24	25
	5:00-6:00 p.m.	30	41	19	30
	PM Peak	30	41	19	30
Weekend (8-28-21)	12:00-1:00 p.m.	25	37	28	30
	1:00-2:00 p.m.	23	41	27	30
	MD Peak	25	41	27	31
	5:00-6:00 p.m.	12	32	26	23
	6:00-7:00 p.m.	32	38	25	32
	PM Peak	32	38	26	32

¹ Location does not open until 8:00 a.m.

² Straight Average

Based on these results, it is recommended the proposed Chick-Fil-A restaurant should be able to accommodate 32 vehicles in the main drive-through queue area and should have an overflow area that can accommodate at least 9 additional vehicles without impeding operations of the parking lot.