August 23, 2022

Michael Wieszchowski, PE, PTOE - GPI
Ryan Trunko, PE - GPI
Via email: mwieszchowski@gpinet.com and rtrunko@gpinet.com

RE: Traffic Analysis, Crossgates Mall Road at Gabriel Terrace/Dick's Entrance
Town of Guilderland, Albany County, NY
JMT Job No. 20-02057-001

Dear Mr. Wieszchowski and Mr. Trunko:

As a follow-up to the recent project meeting on July 20, 2022, JMT of New York, Inc. (JMT) prepared this letter to summarize the traffic operations of a four-leg intersection at Crossgates Mall Road/Gabriel Terrace/Dick's Entrance. The intersection is currently comprised of three approaches with free flow travel on Crossgates Mall Road east-west and stop control at the Dick's Entrance southbound approach (**see Figure 1**).

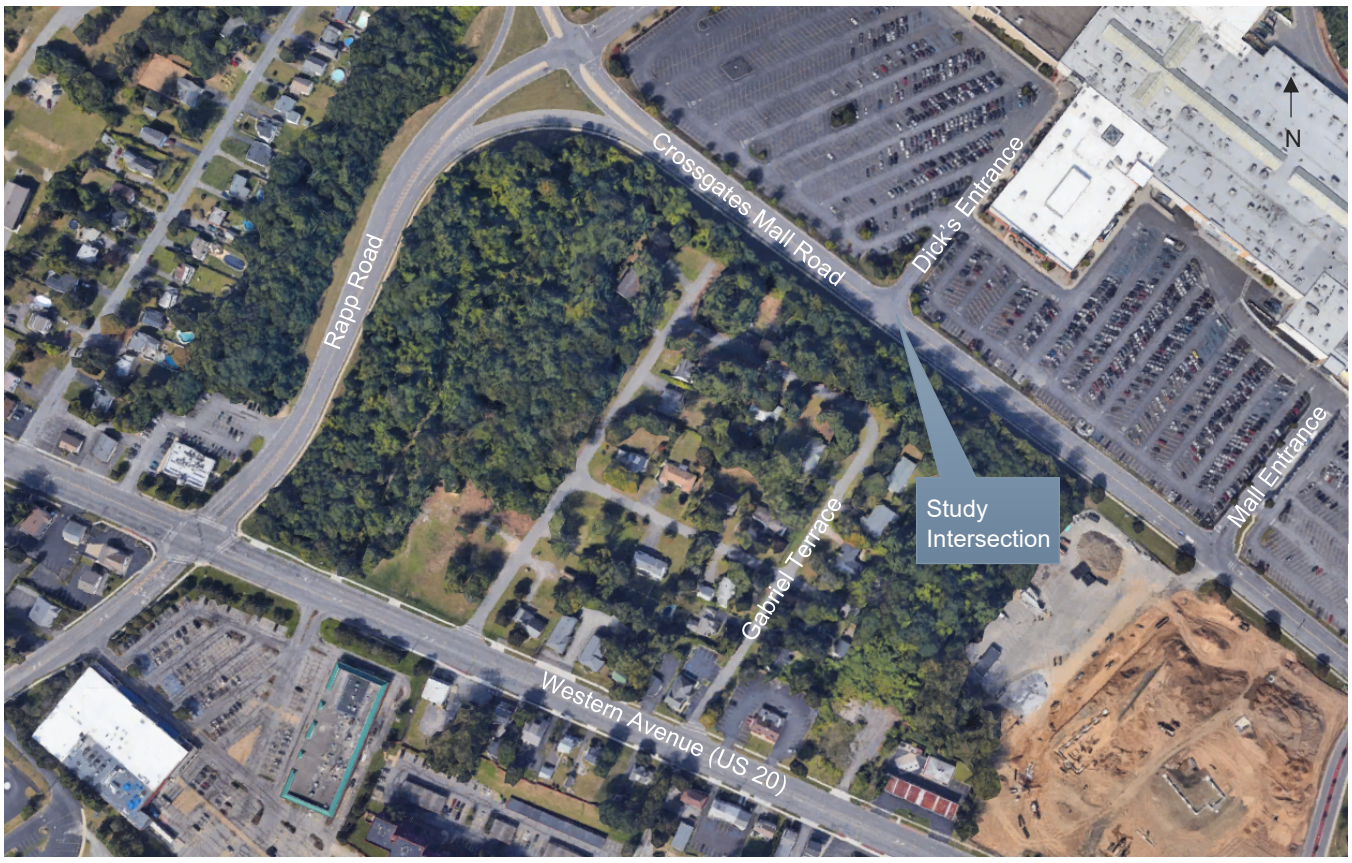


Figure 1: Location Map

Crossgates Mall Road is currently a two-way, 4-lane undivided urban local road with a sidewalk on the south side of the road. Gabriel Terrace currently runs north-south with local access to a residential neighborhood via US 20 (Western Avenue). Consistent with the Final Environmental Impact Statement (FEIS) dated July 29, 2020. the proposed Site 2 development will include the construction of a full-access driveway onto Gabriel Terrace and will extend Gabriel Terrace northbound to Crossgates Mall Road at the intersection with the Dick's Entrance driveway.

This analysis used PM peak hour volumes that were developed as part of Maser's Traffic Impact Study (TIS) dated February 17, 2020 and response to comments letter dated April 20, 2020. The PM peak hour was selected as the analysis period based on the combination of peak existing roadway traffic (weekday PM) and Costco's anticipated hours of operation (10am-8:30pm).

INTERSECTION ALTERNATIVES

JMT analyzed three (3) intersection alternatives for the Crossgates Mall Road/Dick's Entrance/Gabriel Terrace intersection including two-way-stop-control (unsignalized), a coordinated traffic signal (signalized), and a roundabout. The signalized alternative was analyzed in coordination with the adjacent intersections of Crossgates Mall Road/Rapp Road, Crossgates Mall Road/Hotel Drive/Main Mall Entrance, and at Crossgates Mall Road/English Couplet. The signal timings used for the analysis were existing 2018 timings provided by Creighton Manning Engineering, LLP who completed the CDTA preemption plan along the corridor. The timing plans are included in **Attachment 1.**

To compare the three intersection alternatives to the No-Build 2022 condition, JMT performed a capacity analysis using Synchro 11 with results in **Attachment 2**. To verify the roundabout analysis, JMT also provided an HCS 7 output in **Attachment 3.** See **Table 1** for the six levels of service (LOS), with LOS A indicating very low levels of delays and LOS F indicating high levels of delays associated with congestion.

Table 1: Level of Service Summary

Level of Service	Average Stopped Delay (sec./veh.) for v/c ≤1.0	
	Signalized Intersection	Unsignalized Intersection
A	≤10	≤10
B	>10 and ≤20	>10 and ≤15
C	>20 and ≤35	>15 and ≤25
D	>35 and ≤55	>25 and ≤35
E	>55 and ≤80	>35 and ≤50
F	>80	>50

The capacity analysis was conducted for four scenarios: No-Build Year 2022, Build Year 2022 Alt 1 (two-way-stop-control), Build Year 2022 Alt 2 (coordinated traffic signal), and Build Year 2022 Alt 3 (roundabout). The Synchro and HCS outputs are summarized in **Table 2**.

Table 2: Weekday PM Peak Capacity Analysis Summary

Intersection		No-Build Year 2022 *unsignalized*				Build Year 2022 Alt 1 *unsignalized*				Build Year 2022 Alt 2 *signalized*				Build Year 2022 Alt 3 *roundabout*			
	Movement	LOS	Delay (sec)	V/C	95th Queue (ft)	LOS	Delay (sec)	V/C	95th Queue (ft)	LOS	Delay (sec)	V/C	95th Queue (ft)	LOS	Delay (sec)	V/C	95th Queue (ft)
Crossgates Mall Road at Dicks Entrance/ Gabriel Terrace (Node 11)		**A**	**3.3**	**-**	**-**	**E**	**36.3**	**-**	**-**	**A**	**9.9**			**A**	**7.2**	**-**	**-**
EB	Left/Thru	A	8.3	0.03	2												
	Left					A	0.1	0.03	2	A	6.2	0.06	m17				
	Thru	A	0.1	-	-												
	Thru/Right									A	6.4	0.23	m128				
	Approach	*A*	*1.2*	-	-	*A*	*1.0*			*A*	*6.4*	-	-	*A*	*6.0*	*0.25*	*20*
WB	Thru			-	-												
	Left					A	8.0	0.12	6	A	8.5	0.24	117				
	Thru/Right			-	-					A	10.0	0.43	305				
	Approach	*A*	*0.0*	-	-	*A*	*2.0*			*A*	*9.6*	-	-	*A*	*7.9*	*0.48*	*60*
NB	Left/Thru/Right	-	-	-	-	C	22.7	0.52	58	A	8.7	0.49	47				
	Approach	-	-	-	-	*C*	*22.7*			*A*	*8.7*	-	-	*A*	*5.8*	*0.22*	*20*
SB	Left/Thru/Right	C	15.7	0.31	26	F	>50.0	>1.00	208	B	17.9	0.58	59				
	Approach	*C*	*15.7*	-	-	*F*	*>50.0*			*B*	*17.9*	-	-	*A*	*8.2*	*0.24*	*20*

Note 1: Red shaded cell indicates a worsened LOS from No-Build to Build; Green shaded cell indicates an improved LOS from No-Build to Build.
Note 2: “m” in 95th queue means volume for 95th percentile queue is metered by upstream signal.
Note 3: Typical car length assumed 20’ for queue conversion from vehicles to feet.

Table 2 indicates that in the Build Year 2022, the intersection analyzed for Alternative 1 (two-way-stop-control intersection) operates at an acceptable LOS, but the southbound approach operates at a LOS F. Alternative 2 (traffic signal) and Alternative 3 (roundabout) operate at a LOS A or LOS B for both intersections and their approaches. The Crossgates Mall Road corridor will operate acceptably with the Site 2 impacts in Build Year 2022 with either a traffic signal or roundabout installed at the Crossgates Mall Road/Gabriel Terrace/Dick's Entrance intersection.

SIGNAL WARRANT ANALYSIS

A signal warrant analysis was performed for the Crossgates Mall Road/Gabriel Terrace intersection based on the *2009 Manual on Uniform Traffic Control Devices (MUTCD)*. The MUTCD contains nine warrants, of which three were applicable to be evaluated in this analysis (shown in bold below). The speed limit along Crossgates Mall Road is posted at 30 MPH, so the 100% criteria was used for the vehicular volume warrants. The intersection was evaluated as a 1-lane major approach (Crossgates Mall Road) and 1-lane minor approach (Gabriel Terrace/Dick's Entrance).

JMT interpolated the vehicle counts based on existing AADT data available along Western Avenue (US 20). The corridor represents traffic flow in the area and is indicative of the peak weekday traffic at the study area intersection. Each hour of vehicle counts was calculated as a percentage of the peak hour (5:00-6:00 PM) and applied to the Build Year 2022 volumes along Crossgates Mall Road and Gabriel Terrace/Dick's Entrance. The interpolated data is provided in **Attachment 4**. No right-turn-on-red vehicles were subtracted from the minor approach.

- **Warrant #1, Eight-Hour Vehicular Volume**: This warrant was reviewed for eight hours of an average day of traffic volumes on Crossgates Mall Road (major road) and on Gabriel Terrace (minor road) compared to Table 4C-1 of the MUTCD for Conditions A and B.
- **Warrant #2, Four-Hour Vehicular Volume:** This warrant was reviewed for four hours of an average day of traffic volumes on Crossgates Mall Road (major road) and on Gabriel Terrace (minor road) compared to the curve of plotted points in Figure 4C-2 of the MUTCD.
- Warrant #3, Peak Hour: According to the MUTCD, this signal warrant shall be applied only in unusual cases with facilities that attract or discharge large numbers of vehicles over a short time. This is not applicable to the project and was not evaluated.
- Warrant #4, Pedestrian Volume: There is a proposed crosswalk at the Crossgates Mall Road westbound approach and the Gabriel Terrace northbound approach, as well as a pedestrian facility in the form of a sidewalk or multi-use trail along the south side of Crossgates Mall Road, the west side of Gabriel Terrace, and the east side of Dick's Entrance. Pedestrians are anticipated to cross at this intersection, but volumes cannot be predicted at this time. Therefore, this warrant was not evaluated.
- Warrant #5, School Crossing: There is no school in the vicinity of the project. Therefore, this warrant was not evaluated.
- Warrant #6, Coordinated Signal System: This warrant was not evaluated as data is not currently available in a study on the vehicle platooning and progression between intersections on Crossgates Mall Road. In addition, the Crossgates Mall Road/Gabriel Terrace signal would be less than 1,000 feet from adjacent signalized intersections and does not qualify for this warrant. This warrant was not evaluated.

- Warrant #7, Crash Experience: This warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal. Crash data is not available at this location and would not be representative of the proposed intersection configuration. This warrant was not evaluated.
- Warrant #8, Roadway Network: This warrant is intended to review if installing a traffic signal will encourage concentration and organization of traffic flow on a roadway network for the convergence of two or more major routes. This warrant was not evaluated.
- Warrant #9, Intersection Near a Grade Crossing: There is no grade grossing at or near the study intersection. This warrant was not evaluated.

The results of the signal warrant analysis are presented in the table below. The signal warrant sheets are provided in **Attachment 5**.

Table 3: Signal Warrant Summary

Signal Warrants	Warrant Met?
#1 – Eight Hour Volume	**Yes, Condition B**
#2 – Four-Hour Volume	**Yes**
#3 – Peak Hour	Not Evaluated
#4 – Pedestrian Volume	Not Evaluated
#5 – School Crossing	Not Evaluated
#6 – Coordinated Signal System	Not Evaluated
#7 – Crash Experience	Not Evaluated
#8 – Roadway Network	Not Evaluated
#9 – Intersection Near at Grade Crossing	Not Evaluated

The signal warrant analysis illustrates that a signal is warranted at Crossgates Mall Road/Gabriel Terrace/Dick's Entrance based on the Eight-Hour (Warrant #1) and Four-Hour (Warrant #2) Vehicular Volume warrants.

- *Warrant #1:* The peak eight hours evaluated for the warrant were 11:00 am to 7:00 pm. The traffic volumes at the study intersection are high enough to meet the traffic signal criteria for Condition B. Detailed tables are provided in **Attachment 5.**
- *Warrant #2:* The peak four hours evaluated for the warrant were 2:00 pm to 6:00 pm. The traffic volumes at the study intersection are plotted about the curve of the 100% graph. Detailed tables are provided in **Attachment 5.**

EVALUATION

Alternative 1: The proposed Crossgates Mall Road/Gabriel Terrace/Dick's Entrance intersection was evaluated for three intersection treatments: two-way-stop-control, a traffic signal, and a roundabout. Alternative 1 (two-way-stop-control) will result in a LOS F at the Dick's Entrance southbound approach. Based on a site visit, there are potential sight distance concerns for a southbound left-turning vehicle due to the tree coverage and guiderail at the northeaster corner of the intersection. This same approach also has an approximately 8% slope uphill to the stop sign.

Alternative 2: A signalized intersection was analyzed at this location for both capacity and signal warrant. The capacity analysis results indicate the intersection will operate at a LOS A in the Build 2022 condition. A traffic signal warrant analysis was evaluated for Warrants 1 and 2 and the results indicate a signal is warranted at the intersection. The traffic signal will be installed in accordance with the proposed road diet along Crossgates Mall Road. This intersection is located approximately 800-feet east of the Rapp Road/Crossgates Mall Road signalized intersection and 800-feet west of the Crossgates Mall Road/Hotel Drive/Mall Entrance signalized intersection. Coordination is anticipated for the Crossgates Mall Road/Hotel Drive/Main Mall Entrance and Crossgates Mall Road/English Couplet intersections and will be maintained and extend to Crossgates Mall Road/Rapp Road to ensure optimal free-flow speed for a vehicle traveling along Crossgates Mall Road. Synchro reports of a suggested coordinated corridor are provided in **Attachment 3.** The signalized intersection will include protected pedestrian crossings and phases with timings included in the future design plans. A concept plan of the proposed signalized intersection and left-turn lanes at the Crossgates Mall Road eastbound and westbound approaches is located in **Attachment 6**.

Alternative 3: The third intersection alternative included an analysis of a roundabout at the subject location. Analysis indicates the intersection will operate at a LOS A in the Build 2022 condition. A single-lane roundabout with a 135-foot outside diameter is proposed to accommodate the Build 2022 traffic volumes. Each approach would be one lane entering and one lane exiting. The roundabout will not provide pedestrian protection as vehicles do not stop at a roundabout approach. This alternative would require significant off-site grading, a reduction of approximately 30 parking spaces at the mall, new guiderail, and a retaining wall at the southwest corner of the intersection adjacent to the Site 2 building. In addition, the off-site improvements would be on land not owned by the applicant. Roundabouts are also not preferred on signalized corridors such as this one, with two adjacent traffic signals less than 800 feet to the east and west. A concept plan of a single-lane roundabout is located in **Attachment 7**.

CONCLUSION

JMT recommends Alternative 2 (traffic signal coordinated with the rest of the corridor) as the preferred intersection alternative for the Crossgates Mall Road/Gabriel Terrace/Dick's Entrance intersection. The traffic signal will better accommodate vehicular and pedestrian movements, and will match the character of the current Crossgates Mall Road corridor. A roundabout is not recommended at this location as it would be located within a coordinated traffic signal corridor and would substantially alter the footprint of Crossgates Mall Road through construction impacts.

With this letter, we request GPI's review and concurrence of the selected intersection configuration proposed at this location. If you have any questions or need further information, please do not hesitate to contact me at 518-218-5949 or cminkler@jmt.com.

Very truly yours,

JMT of New York, Inc.

Christina M Minkler

Christina Minkler, PE
Vice President

CM/sc

Attachments:

1. Existing Signal Timings
2. Synchro Reports (No Build, Build Alt 1, Build Alt 2, Build Alt 3)
3. HCS Report - Alternative 3
4. Signal Warrant Volume Calculations
5. Signal Warrant Analysis
6. Concept Plan – Traffic Signal
7. Concept Plan – Roundabout

CC: Ken Kovalchik, AICP, Town of Guilderland
David Aitken, Pyramid Management Group, LLC
James Soos, Pyramid Management Group, LLC
Sarah Carroll, PE, PTOE, JMT

ATTACHMENT 1

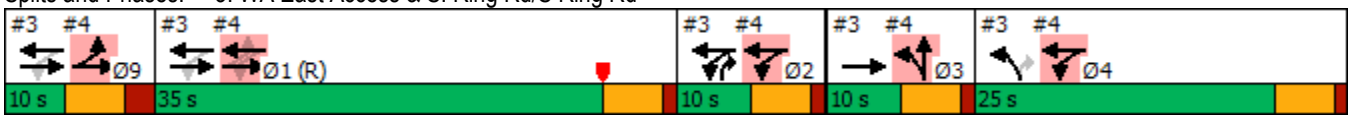
Existing Signal Timings

Phase Number	1	2	3	4	9
Node Number	3	3	3	3	3
Movement	EBWB	WBTL	EBT	NBL	EBWB
Lead/Lag	Lag		Lead	Lag	Lead
Lead-Lag Optimize	Yes		Yes	Yes	Yes
Recall Mode	C-Min	None	None	None	None
Maximum Split (s)	35	10	10	25	10
Maximum Split (%)	38.9%	11.1%	11.1%	27.8%	11.1%
Minimum Split (s)	20	9	9	20	10
Yellow Time (s)	4	4	4	4	4
All-Red Time (s)	1	1	1	1	2
Minimum Initial (s)	15	4	4	15	4
Vehicle Extension (s)	3	3	3	3	3
Minimum Gap (s)	3	3	3	3	3
Time Before Reduce (s)	0	0	0	0	0
Time To Reduce (s)	0	0	0	0	0
Walk Time (s)					
Flash Dont Walk (s)					
Dual Entry	No	Yes	No	No	No
Inhibit Max	Yes	Yes	Yes	Yes	Yes
Start Time (s)	60	5	15	25	50
End Time (s)	5	15	25	50	60
Yield/Force Off (s)	0	10	20	45	54
Yield/Force Off 170(s)	0	10	20	45	54
Local Start Time (s)	60	5	15	25	50
Local Yield (s)	0	10	20	45	54
Local Yield 170(s)	0	10	20	45	54

Intersection Summary		
Cycle Length		90
Control Type	Actuated-Coordinated	
Natural Cycle		70

Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Yellow, Master Intersection

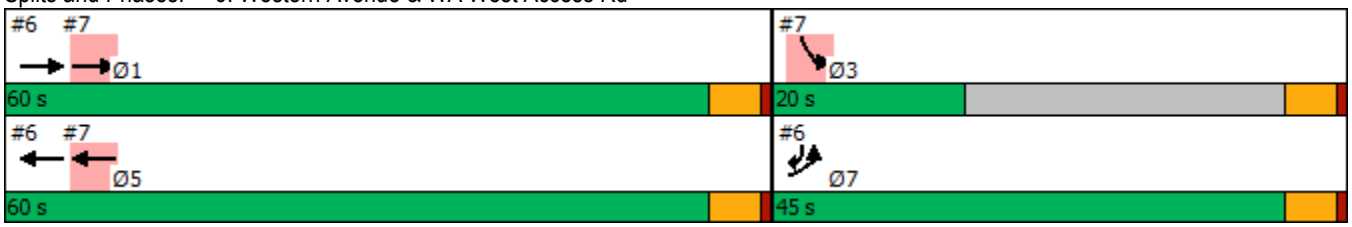
Splits and Phases: 3: WA East Access & S. Ring Rd/S Ring Rd



Phase Number	1	3	5	7
Node Number	6	7	6	6
Movement	EBT	SBL	WBT	EBL
Lead/Lag				
Lead-Lag Optimize				
Recall Mode	Min	None	Min	None
Maximum Split (s)	60	20	60	45
Maximum Split (%)	57.1%	19.0%	57.1%	42.9%
Minimum Split (s)	15	15	15	15
Yellow Time (s)	4	4	4	4
All-Red Time (s)	1	1	1	1
Minimum Initial (s)	10	10	10	10
Vehicle Extension (s)	6	4	6	2
Minimum Gap (s)	6	4	6	2
Time Before Reduce (s)	0	0	0	0
Time To Reduce (s)	0	0	0	0
Walk Time (s)				
Flash Dont Walk (s)				
Dual Entry	Yes	Yes	Yes	No
Inhibit Max	Yes	Yes	Yes	Yes
Start Time (s)	0	60	0	60
End Time (s)	60	0	60	0
Yield/Force Off (s)	55	100	55	100
Yield/Force Off 170(s)	55	100	55	100
Local Start Time (s)	0	60	0	60
Local Yield (s)	55	100	55	100
Local Yield 170(s)	55	100	55	100

Intersection Summary		
Cycle Length		105
Control Type	Actuated-Uncoordinated	
Natural Cycle		40

Splits and Phases: 6: Western Avenue & WA West Access Rd



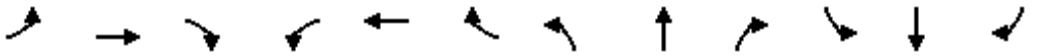
Phase Number	1	3
Movement	EBWB	NBSB
Lead/Lag		
Lead-Lag Optimize		
Recall Mode	C-Min	None
Maximum Split (s)	60	30
Maximum Split (%)	66.7%	33.3%
Minimum Split (s)	20	9
Yellow Time (s)	4	4
All-Red Time (s)	1	1
Minimum Initial (s)	15	4
Vehicle Extension (s)	3	3
Minimum Gap (s)	3	3
Time Before Reduce (s)	0	0
Time To Reduce (s)	0	0
Walk Time (s)		
Flash Dont Walk (s)		
Dual Entry	Yes	Yes
Inhibit Max	Yes	Yes
Start Time (s)	15	75
End Time (s)	75	15
Yield/Force Off (s)	70	10
Yield/Force Off 170(s)	70	10
Local Start Time (s)	35	5
Local Yield (s)	0	30
Local Yield 170(s)	0	30

Intersection Summary	
Cycle Length	90
Control Type	Actuated-Coordinated
Natural Cycle	40
Offset: 70 (78%), Referenced to phase 1:EBWB, Start of Yellow	

Splits and Phases: 5: Parking Lot/Mall Main Ent & S. Ring Rd

ATTACHMENT 2

Synchro Reports

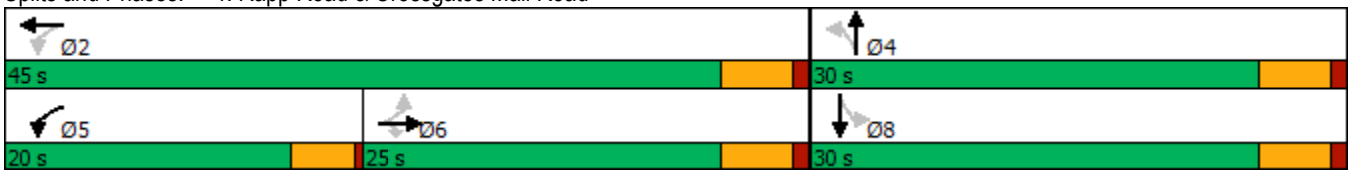


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	56	0	270	77	0	40	56	107	36	181	19
Future Volume (vph)	10	56	0	270	77	0	40	56	107	36	181	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	12	12	12	12	12	12	12	14	14	14
Grade (%)		0%			2%			-2%			4%	
Storage Length (ft)	0		150	0		0	0		0	0		0
Storage Lanes	0		1	1		0	0		1	0		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	0.95	0.95	0.95
Frt									0.850		0.988	
Flt Protected		0.993		0.950				0.980			0.992	
Satd. Flow (prot)	0	1887	1863	1702	1881	0	0	1881	1631	0	3670	0
Flt Permitted		0.962		0.590				0.802			0.900	
Satd. Flow (perm)	0	1828	1863	1057	1881	0	0	1539	1631	0	3330	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)									160		13	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		921			780			467			504	
Travel Time (s)		20.9			17.7			10.6			11.5	
Peak Hour Factor	0.88	0.88	0.92	0.88	0.88	0.92	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	2%	5%	0%	2%	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	11	64	0	307	88	0	45	64	122	41	206	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	75	0	307	88	0	0	109	122	0	269	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			0			0	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.01	1.01	1.01	0.99	0.99	0.99	0.94	0.94	0.94
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1	1	1	1		1	1	1	1	1	
Detector Template	Left		Right				Left			Left		
Leading Detector (ft)	20	6	20	6	6		20	6	6	20	6	
Trailing Detector (ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Position(ft)	0	0	0	0	0		0	0	0	0	0	
Detector 1 Size(ft)	20	6	20	6	6		20	6	6	20	6	
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0		0.0	0.0	0.0	0.0	0.0	
Turn Type	Perm	NA	Perm	pm+pt	NA		Perm	NA	Free	Perm	NA	
Protected Phases		6		5	2			4			8	
Permitted Phases	6		6	2			4		Free	8		
Detector Phase	6	6	6	5	2		4	4		8	8	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	4.0	4.0	4.0	4.0	4.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.0	21.0	21.0	8.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	25.0	25.0	25.0	20.0	45.0		30.0	30.0		30.0	30.0	
Total Split (%)	33.3%	33.3%	33.3%	26.7%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	20.0	20.0	20.0	16.0	40.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0	4.0	3.5	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0	1.0	0.5	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0	0.0	0.0	0.0			0.0			0.0	
Total Lost Time (s)		5.0	5.0	4.0	5.0			5.0			5.0	
Lead/Lag	Lag	Lag	Lag	Lead								
Lead-Lag Optimize?	Yes	Yes	Yes	Yes								
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Max	Max	Max	Max	Max		Max	Max		Max	Max	
Walk Time (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Flash Dont Walk (s)	0.0	0.0	0.0		0.0		0.0	0.0		0.0	0.0	
Pedestrian Calls (#/hr)	0	0	0		0		0	0		0	0	
Act Effct Green (s)		20.0		41.0	40.0			25.0	75.0		25.0	
Actuated g/C Ratio		0.27		0.55	0.53			0.33	1.00		0.33	
v/c Ratio		0.15		0.43	0.09			0.21	0.07		0.24	
Control Delay		22.1		11.6	8.9			19.4	0.1		17.9	
Queue Delay		0.0		0.0	0.0			0.0	0.0		0.0	
Total Delay		22.1		11.6	8.9			19.4	0.1		17.9	
LOS		C		B	A			B	A		B	
Approach Delay		22.1			11.0			9.2			17.9	
Approach LOS		C			B			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 75			
Natural Cycle: 50			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.43			
Intersection Signal Delay: 13.3		Intersection LOS: B	
Intersection Capacity Utilization 45.9%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 4: Rapp Road & Crossgates Mall Road



Intersection	
Int Delay, s/veh	3.3

Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Vol, veh/h	27	171	338	64	77	62
Future Vol, veh/h	27	171	338	64	77	62
Conflicting Peds, #/hr	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Stop	Stop
RT Channelized	-	None	-	None	-	None
Storage Length	-	-	-	-	0	-
Veh in Median Storage, #	-	0	0	-	0	-
Grade, %	-	-2	2	-	4	-
Peak Hour Factor	91	91	91	91	91	91
Heavy Vehicles, %	0	4	0	0	1	28
Mvmt Flow	30	188	371	70	85	68

Major/Minor	Major1		Major2		Minor2	
Conflicting Flow All	441	0	-	0	560	221
Stage 1	-	-	-	-	406	-
Stage 2	-	-	-	-	154	-
Critical Hdwy	4.1	-	-	-	7.62	7.86
Critical Hdwy Stg 1	-	-	-	-	6.62	-
Critical Hdwy Stg 2	-	-	-	-	6.62	-
Follow-up Hdwy	2.2	-	-	-	3.51	3.58
Pot Cap-1 Maneuver	1130	-	-	-	407	691
Stage 1	-	-	-	-	589	-
Stage 2	-	-	-	-	832	-
Platoon blocked, %		-	-	-		
Mov Cap-1 Maneuver	1130	-	-	-	395	691
Mov Cap-2 Maneuver	-	-	-	-	395	-
Stage 1	-	-	-	-	571	-
Stage 2	-	-	-	-	832	-

Approach	EB	WB	SB
HCM Control Delay, s	1.2	0	15.7
HCM LOS			C

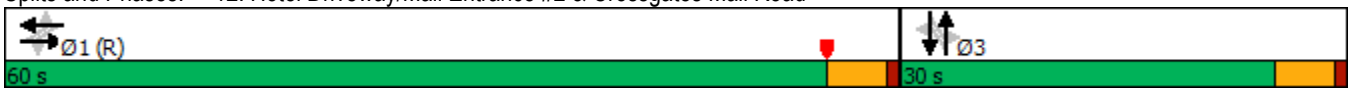
Minor Lane/Major Mvmt	EBL	EBT	WBT	WBR	SBLn1
Capacity (veh/h)	1130	-	-	-	488
HCM Lane V/C Ratio	0.026	-	-	-	0.313
HCM Control Delay (s)	8.3	0.1	-	-	15.7
HCM Lane LOS	A	A	-	-	C
HCM 95th %tile Q(veh)	0.1	-	-	-	1.3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	210	3	7	354	291	1	0	7	199	2	47
Future Volume (vph)	35	210	3	7	354	291	1	0	7	199	2	47
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			0%			0%	
Storage Length (ft)	0		0	0		0	0		0	55		0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								0.97		0.98		
Frt		0.998			0.933			0.882			0.856	
Flt Protected		0.993			0.999			0.994		0.950		
Satd. Flow (prot)	0	3512	0	0	3244	0	0	1622	0	1787	1626	0
Flt Permitted		0.830			0.952			0.981		0.752		
Satd. Flow (perm)	0	2935	0	0	3092	0	0	1601	0	1389	1626	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2			297			24			48	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		786			547			189			414	
Travel Time (s)		17.9			12.4			4.3			9.4	
Confl. Peds. (#/hr)									11	11		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	18%	1%	0%	0%	0%	6%	0%	0%	0%	1%	0%	0%
Adj. Flow (vph)	36	214	3	7	361	297	1	0	7	203	2	48
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	253	0	0	665	0	0	8	0	203	50	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.98	0.98	0.98	1.01	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	21.0	21.0		21.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	55.0	55.0		55.0	55.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		11	11		11	11	
Act Effct Green (s)		61.7			61.7			18.3		18.3	18.3	
Actuated g/C Ratio		0.69			0.69			0.20		0.20	0.20	
v/c Ratio		0.13			0.30			0.02		0.72	0.14	
Control Delay		5.8			1.8			3.0		47.2	9.1	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		5.8			1.8			3.0		47.2	9.1	
LOS		A			A			A		D	A	
Approach Delay		5.8			1.8			3.0			39.7	
Approach LOS		A			A			A			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 56 (62%), Referenced to phase 1:EBWB, Start of Yellow			
Natural Cycle: 45			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 10.8		Intersection LOS: B	
Intersection Capacity Utilization 58.8%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 12: Hotel Driveway/Mall Entrance #2 & Crossgates Mall Road

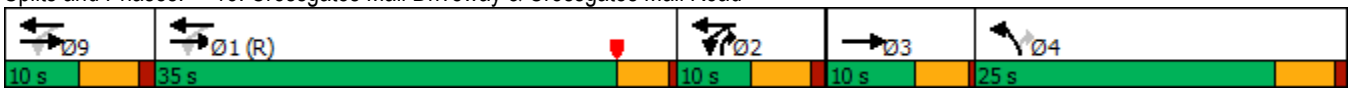


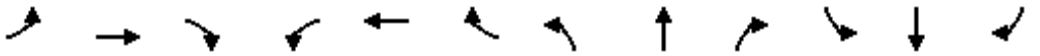
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø3	Ø9
Lane Configurations									
Traffic Volume (vph)	319	97	179	516	136	198			
Future Volume (vph)	319	97	179	516	136	198			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	12	12	11	11	12	12			
Grade (%)	1%			-2%	0%				
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00			
Ped Bike Factor						0.98			
Frt	0.965					0.850			
Flt Protected			0.950		0.950				
Satd. Flow (prot)	3432	0	1762	1801	1787	1599			
Flt Permitted			0.482		0.950				
Satd. Flow (perm)	3432	0	894	1801	1787	1569			
Right Turn on Red		Yes				Yes			
Satd. Flow (RTOR)	63					215			
Link Speed (mph)	30			30	30				
Link Distance (ft)	547			1590	615				
Travel Time (s)	12.4			36.1	14.0				
Confl. Peds. (#/hr)						4			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92			
Heavy Vehicles (%)	1%	1%	0%	3%	1%	1%			
Adj. Flow (vph)	347	105	195	561	148	215			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	452	0	195	561	148	215			
Enter Blocked Intersection	No	No	No	No	No	No			
Lane Alignment	Left	Right	Left	Left	Left	Right			
Median Width(ft)	11			11	12				
Link Offset(ft)	0			0	0				
Crosswalk Width(ft)	16			16	16				
Two way Left Turn Lane									
Headway Factor	1.01	1.01	1.03	1.03	1.00	1.00			
Turning Speed (mph)		9	15		15	9			
Number of Detectors	2		1	2	1	1			
Detector Template	Thru		Left	Thru	Left	Right			
Leading Detector (ft)	100		20	100	20	20			
Trailing Detector (ft)	0		0	0	0	0			
Detector 1 Position(ft)	0		0	0	0	0			
Detector 1 Size(ft)	6		20	6	20	20			
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel									
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0			
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0			
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0			
Detector 2 Position(ft)	94			94					
Detector 2 Size(ft)	6			6					
Detector 2 Type	Cl+Ex			Cl+Ex					
Detector 2 Channel									
Detector 2 Extend (s)	0.0			0.0					
Turn Type	NA		custom	NA	Prot	pm+ov			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø3	Ø9
Protected Phases	9 1 3		2	9 1 2	4	2	1	3	9
Permitted Phases			9 1			4			
Detector Phase	9 1 3		2	9 1 2	4	2			
Switch Phase									
Minimum Initial (s)			4.0		15.0	4.0	4.0	4.0	4.0
Minimum Split (s)			9.0		20.0	9.0	8.0	8.0	21.0
Total Split (s)			10.0		25.0	10.0	35.0	10.0	10.0
Total Split (%)			11.1%		27.8%	11.1%	39%	11%	11%
Maximum Green (s)			5.0		20.0	5.0	31.0	6.0	5.0
Yellow Time (s)			4.0		4.0	4.0	3.5	3.5	4.0
All-Red Time (s)			1.0		1.0	1.0	0.5	0.5	1.0
Lost Time Adjust (s)			0.0		0.0	0.0			
Total Lost Time (s)			5.0		5.0	5.0			
Lead/Lag					Lag		Lag	Lead	Lead
Lead-Lag Optimize?					Yes		Yes	Yes	Yes
Vehicle Extension (s)			3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode			None		None	None	C-Max	None	Max
Walk Time (s)			5.0		5.0	5.0			5.0
Flash Dont Walk (s)			11.0		11.0	11.0			11.0
Pedestrian Calls (#/hr)			0		4	0			0
Act Effct Green (s)	49.5		49.5	54.5	15.5	20.5			
Actuated g/C Ratio	0.55		0.55	0.61	0.17	0.23			
v/c Ratio	0.24		0.36	0.51	0.48	0.41			
Control Delay	4.3		11.7	12.4	39.3	5.2			
Queue Delay	0.0		0.0	0.0	0.0	0.0			
Total Delay	4.3		11.7	12.4	39.3	5.2			
LOS	A		B	B	D	A			
Approach Delay	4.3			12.3	19.1				
Approach LOS	A			B	B				

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Yellow, Master Intersection			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.51			
Intersection Signal Delay: 11.5		Intersection LOS: B	
Intersection Capacity Utilization 48.1%		ICU Level of Service A	
Analysis Period (min) 15			

Splits and Phases: 13: Crossgates Mall Driveway & Crossgates Mall Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	70	232	270	101	78	82	110	107	70	234	19
Future Volume (vph)	10	70	232	270	101	78	82	110	107	70	234	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	13	12	12	12	12	12	12	14	14	14
Grade (%)		0%			2%			-2%			4%	
Storage Length (ft)	0		150	200		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.900			0.935			0.952			0.989	
Flt Protected		0.998		0.950				0.987		0.950		
Satd. Flow (prot)	0	1707	0	1702	1736	0	0	1803	0	1887	1946	0
Flt Permitted		0.989		0.334				0.732		0.480		
Satd. Flow (perm)	0	1691	0	598	1736	0	0	1337	0	953	1946	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		163			66			35			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			785			467			504	
Travel Time (s)		20.8			17.8			10.6			11.5	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	11	80	264	307	115	89	93	125	122	80	266	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	355	0	307	204	0	0	340	0	80	288	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			14			14	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	0.96	1.01	1.01	1.01	0.99	0.99	0.99	0.94	0.94	0.94
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template	Left						Left			Left		
Leading Detector (ft)	20	6		6	6		20	6		20	6	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		6	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			4			8	
Permitted Phases	6			2			4			8		
Detector Phase	6	6		5	2		4	4		8	8	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	15.0	15.0		4.0	15.0		15.0	15.0		4.0	4.0	
Minimum Split (s)	21.0	21.0		9.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	31.0	31.0		22.0	53.0		37.0	37.0		37.0	37.0	
Total Split (%)	34.4%	34.4%		24.4%	58.9%		41.1%	41.1%		41.1%	41.1%	
Maximum Green (s)	26.0	26.0		17.0	48.0		32.0	32.0		32.0	32.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	C-Max		Max	Max		Max	Max	
Walk Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		28.8		48.0	48.0			32.0		32.0	32.0	
Actuated g/C Ratio		0.32		0.53	0.53			0.36		0.36	0.36	
v/c Ratio		0.55		0.62	0.21			0.68		0.24	0.41	
Control Delay		17.5		21.6	11.4			30.3		22.8	23.8	
Queue Delay		0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay		17.5		21.6	11.4			30.3		22.8	23.8	
LOS		B		C	B			C		C	C	
Approach Delay		17.5			17.6			30.3			23.6	
Approach LOS		B			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 25 (28%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 21.7		Intersection LOS: C	
Intersection Capacity Utilization 80.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Rapp Road & Crossgates Mall Road & Crossgates Mall Rd

Intersection	
Int Delay, s/veh	36.3

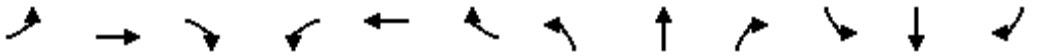
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Vol, veh/h	27	177	32	142	351	64	35	12	152	77	12	62
Future Vol, veh/h	27	177	32	142	351	64	35	12	152	77	12	62
Conflicting Peds, #/hr	0	0	0	0	0	0	0	0	0	0	0	0
Sign Control	Free	Free	Free	Free	Free	Free	Stop	Stop	Stop	Stop	Stop	Stop
RT Channelized	-	-	None	-	-	None	-	-	None	-	-	None
Storage Length	200	-	-	200	-	-	-	-	-	-	-	-
Veh in Median Storage, #	-	0	-	-	0	-	-	0	-	-	0	-
Grade, %	-	-2	-	-	2	-	-	0	-	-	8	-
Peak Hour Factor	91	91	92	92	91	91	92	92	92	91	92	91
Heavy Vehicles, %	0	4	2	2	0	0	2	2	2	1	2	28
Mvmt Flow	30	195	35	154	386	70	38	13	165	85	13	68

Major/Minor	Major1			Major2			Minor1			Minor2		
Conflicting Flow All	456	0	0	230	0	0	1043	1037	213	1091	1019	421
Stage 1	-	-	-	-	-	-	273	273	-	729	729	-
Stage 2	-	-	-	-	-	-	770	764	-	362	290	-
Critical Hdwy	4.1	-	-	4.12	-	-	7.12	6.52	6.22	8.71	8.12	7.28
Critical Hdwy Stg 1	-	-	-	-	-	-	6.12	5.52	-	7.71	7.12	-
Critical Hdwy Stg 2	-	-	-	-	-	-	6.12	5.52	-	7.71	7.12	-
Follow-up Hdwy	2.2	-	-	2.218	-	-	3.518	4.018	3.318	3.509	4.018	3.552
Pot Cap-1 Maneuver	1115	-	-	1338	-	-	207	231	827	119	151	529
Stage 1	-	-	-	-	-	-	733	684	-	301	310	-
Stage 2	-	-	-	-	-	-	393	413	-	561	591	-
Platoon blocked, %		-	-		-	-						
Mov Cap-1 Maneuver	1115	-	-	1338	-	-	149	199	827	~ 81	130	529
Mov Cap-2 Maneuver	-	-	-	-	-	-	149	199	-	~ 81	130	-
Stage 1	-	-	-	-	-	-	713	666	-	293	274	-
Stage 2	-	-	-	-	-	-	289	366	-	428	575	-

Approach	EB	WB	NB	SB
HCM Control Delay, s	1	2	22.7	235.1
HCM LOS			C	F

Minor Lane/Major Mvmt	NBLn1	EBL	EBT	EBR	WBL	WBT	WBR	SBLn1
Capacity (veh/h)	415	1115	-	-	1338	-	-	130
HCM Lane V/C Ratio	0.521	0.027	-	-	0.115	-	-	1.275
HCM Control Delay (s)	22.7	8.3	-	-	8	-	-	235.1
HCM Lane LOS	C	A	-	-	A	-	-	F
HCM 95th %tile Q(veh)	2.9	0.1	-	-	0.4	-	-	10.4

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

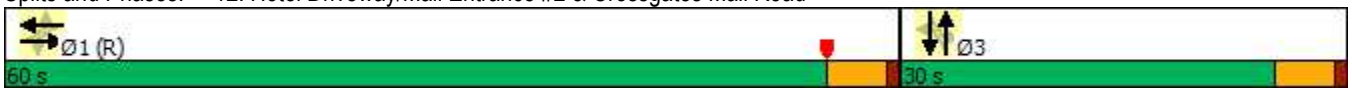


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	399	3	7	497	291	1	0	7	199	2	59
Future Volume (vph)	47	399	3	7	497	291	1	0	7	199	2	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			0%			0%	
Storage Length (ft)	160		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								0.97		0.98		
Frt		0.999			0.945			0.882			0.855	
Flt Protected		0.995						0.994		0.950		
Satd. Flow (prot)	0	3544	0	0	3305	0	0	1622	0	1787	1624	0
Flt Permitted		0.815			0.952			0.980		0.752		
Satd. Flow (perm)	0	2903	0	0	3146	0	0	1599	0	1389	1624	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			235			24			60	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		786			547			394			414	
Travel Time (s)		17.9			12.4			9.0			9.4	
Confl. Peds. (#/hr)									11	11		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	18%	1%	0%	0%	0%	6%	0%	0%	0%	1%	0%	0%
Adj. Flow (vph)	48	407	3	7	507	297	1	0	7	203	2	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	458	0	0	811	0	0	8	0	203	62	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.98	0.98	0.98	1.01	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		9.0	9.0		9.0	9.0	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	55.0	55.0		55.0	55.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		61.6			61.6			18.4		18.4	18.4	
Actuated g/C Ratio		0.68			0.68			0.20		0.20	0.20	
v/c Ratio		0.23			0.36			0.02		0.71	0.16	
Control Delay		4.2			3.7			3.0		46.6	8.5	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		4.2			3.7			3.0		46.6	8.5	
LOS		A			A			A		D	A	
Approach Delay		4.2			3.7			3.0			37.7	
Approach LOS		A			A			A			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 56 (62%), Referenced to phase 1:EBWB, Start of Yellow			
Natural Cycle: 40			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 9.7		Intersection LOS: A	
Intersection Capacity Utilization 66.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 12: Hotel Driveway/Mall Entrance #2 & Crossgates Mall Road

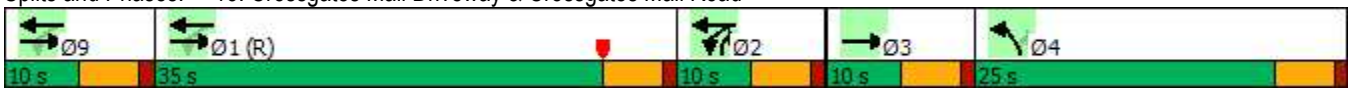


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø3	Ø9
Lane Configurations									
Traffic Volume (vph)	452	153	179	659	136	198			
Future Volume (vph)	452	153	179	659	136	198			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	12	12	11	11	12	12			
Grade (%)	1%			-2%	0%				
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00			
Ped Bike Factor						0.98			
Frt	0.962					0.850			
Flt Protected			0.950		0.950				
Satd. Flow (prot)	3421	0	1762	1801	1787	1599			
Flt Permitted			0.353		0.950				
Satd. Flow (perm)	3421	0	655	1801	1787	1573			
Right Turn on Red		Yes				Yes			
Satd. Flow (RTOR)	74					215			
Link Speed (mph)	30			30	30				
Link Distance (ft)	547			1590	615				
Travel Time (s)	12.4			36.1	14.0				
Confl. Peds. (#/hr)						4			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92			
Heavy Vehicles (%)	1%	1%	0%	3%	1%	1%			
Adj. Flow (vph)	491	166	195	716	148	215			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	657	0	195	716	148	215			
Enter Blocked Intersection	No	No	No	No	No	No			
Lane Alignment	Left	Right	Left	Left	Left	Right			
Median Width(ft)	11			11	12				
Link Offset(ft)	0			0	0				
Crosswalk Width(ft)	16			16	16				
Two way Left Turn Lane									
Headway Factor	1.01	1.01	1.03	1.03	1.00	1.00			
Turning Speed (mph)		9	15		15	9			
Number of Detectors	2		1	2	1	1			
Detector Template	Thru		Left	Thru	Left	Right			
Leading Detector (ft)	100		20	100	20	20			
Trailing Detector (ft)	0		0	0	0	0			
Detector 1 Position(ft)	0		0	0	0	0			
Detector 1 Size(ft)	6		20	6	20	20			
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel									
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0			
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0			
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0			
Detector 2 Position(ft)	94			94					
Detector 2 Size(ft)	6			6					
Detector 2 Type	Cl+Ex			Cl+Ex					
Detector 2 Channel									
Detector 2 Extend (s)	0.0			0.0					
Turn Type	NA		custom	NA	Prot	pm+ov			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø3	Ø9
Protected Phases	9 1 3		2	9 1 2	4	2	1	3	9
Permitted Phases			9 1			4			
Detector Phase	9 1 3		2	9 1 2	4	2			
Switch Phase									
Minimum Initial (s)			4.0		15.0	4.0	15.0	4.0	4.0
Minimum Split (s)			9.0		20.0	9.0	20.0	9.0	10.0
Total Split (s)			10.0		25.0	10.0	35.0	10.0	10.0
Total Split (%)			11.1%		27.8%	11.1%	39%	11%	11%
Maximum Green (s)			5.0		20.0	5.0	30.0	5.0	5.0
Yellow Time (s)			4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)			1.0		1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)			0.0		0.0	0.0			
Total Lost Time (s)			5.0		5.0	5.0			
Lead/Lag					Lag		Lag	Lead	Lead
Lead-Lag Optimize?					Yes		Yes	Yes	Yes
Vehicle Extension (s)			3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode			None		None	None	C-Min	None	None
Walk Time (s)			0.0		0.0	0.0	5.0	5.0	5.0
Flash Dont Walk (s)			0.0		0.0	0.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)			0		0	0	0	0	0
Act Effct Green (s)	47.4		48.9	53.9	15.5	22.6			
Actuated g/C Ratio	0.53		0.54	0.60	0.17	0.25			
v/c Ratio	0.36		0.44	0.66	0.48	0.39			
Control Delay	6.3		14.7	15.8	39.3	4.9			
Queue Delay	0.0		0.0	0.0	0.0	0.0			
Total Delay	6.3		14.7	15.8	39.3	4.9			
LOS	A		B	B	D	A			
Approach Delay	6.3			15.6	18.9				
Approach LOS	A			B	B				

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Yellow, Master Intersection			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 13.1		Intersection LOS: B	
Intersection Capacity Utilization 55.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 13: Crossgates Mall Driveway & Crossgates Mall Road

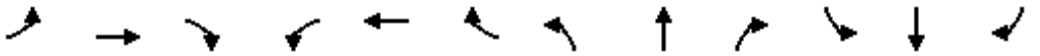


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	70	232	270	101	78	82	110	107	70	234	19
Future Volume (vph)	10	70	232	270	101	78	82	110	107	70	234	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	13	12	12	12	12	12	12	14	14	14
Grade (%)		0%			2%			-2%			4%	
Storage Length (ft)	0		150	200		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	1707	0	1702	1736	0	0	1803	0	1887	1946	0
Flt Permitted		0.989		0.334				0.732		0.480		
Satd. Flow (perm)	0	1691	0	598	1736	0	0	1337	0	953	1946	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		163			66			35			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			785			467			504	
Travel Time (s)		20.8			17.8			10.6			11.5	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	1%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	355	0	307	204	0	0	340	0	80	288	0
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template	Left						Left			Left		
Leading Detector (ft)	20	6		6	6		20	6		20	6	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		6	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			4			8	
Permitted Phases	6			2			4			8		
Detector Phase	6	6		5	2		4	4		8	8	
Switch Phase												
Minimum Initial (s)	15.0	15.0		4.0	15.0		15.0	15.0		4.0	4.0	
Minimum Split (s)	21.0	21.0		9.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	31.0	31.0		22.0	53.0		37.0	37.0		37.0	37.0	
Total Split (%)	34.4%	34.4%		24.4%	58.9%		41.1%	41.1%		41.1%	41.1%	
Maximum Green (s)	26.0	26.0		17.0	48.0		32.0	32.0		32.0	32.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	C-Max	C-Max		None	C-Max		Max	Max		Max	Max	
Walk Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		28.8		48.0	48.0			32.0		32.0	32.0	
Actuated g/C Ratio		0.32		0.53	0.53			0.36		0.36	0.36	
v/c Ratio		0.55		0.62	0.21			0.68		0.24	0.41	
Control Delay		17.5		21.6	11.4			30.3		22.8	23.8	
Queue Delay		0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay		17.5		21.6	11.4			30.3		22.8	23.8	
LOS		B		C	B			C		C	C	
Approach Delay		17.5			17.6			30.3			23.6	
Approach LOS		B			B			C			C	
Queue Length 50th (ft)		85		112	53			146		32	120	
Queue Length 95th (ft)		172		180	98			238		65	184	
Internal Link Dist (ft)		835			705			387			424	
Turn Bay Length (ft)				200								
Base Capacity (vph)		651		527	956			497		338	695	
Starvation Cap Reductn		0		0	0			0		0	0	
Spillback Cap Reductn		0		0	0			0		0	0	
Storage Cap Reductn		0		0	0			0		0	0	
Reduced v/c Ratio		0.55		0.58	0.21			0.68		0.24	0.41	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 25 (28%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 21.7		Intersection LOS: C	
Intersection Capacity Utilization 80.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Rapp Road & Crossgates Mall Road & Crossgates Mall Rd



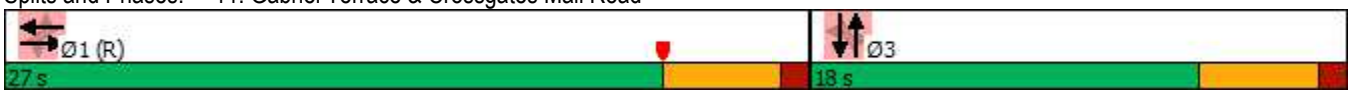
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	27	177	32	142	351	64	35	12	152	77	12	62
Future Volume (vph)	27	177	32	142	351	64	35	12	152	77	12	62
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	11	11	12	12	12	12	12	12	12	15	12	15
Grade (%)		-2%			2%			0%			8%	
Storage Length (ft)	200		0	200		0	0		0	0		0
Storage Lanes	1		0	1		0	0		0	0		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	1762	1748	0	1752	1838	0	0	1656	0	0	1499	0
Flt Permitted	0.471			0.615				0.925			0.748	
Satd. Flow (perm)	874	1748	0	1134	1838	0	0	1546	0	0	1150	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		28			28			165			68	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		785			786			351			424	
Travel Time (s)		17.8			17.9			8.0			9.6	
Peak Hour Factor	0.91	0.91	0.92	0.92	0.91	0.91	0.92	0.92	0.92	0.91	0.92	0.91
Heavy Vehicles (%)	0%	4%	2%	2%	0%	0%	2%	2%	2%	1%	2%	28%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	30	230	0	154	456	0	0	216	0	0	166	0
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template	Left			Left			Left			Left		
Leading Detector (ft)	6	6		6	6		20	6		20	6	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	6	6		6	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		9.0	9.0		9.0	9.0	
Total Split (s)	27.0	27.0		27.0	27.0		18.0	18.0		18.0	18.0	
Total Split (%)	60.0%	60.0%		60.0%	60.0%		40.0%	40.0%		40.0%	40.0%	
Maximum Green (s)	22.0	22.0		22.0	22.0		13.0	13.0		13.0	13.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0			0.0			0.0	
Total Lost Time (s)	5.0	5.0		5.0	5.0			5.0			5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	

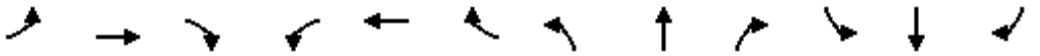
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)	25.8	25.8		25.8	25.8			9.2			9.2	
Actuated g/C Ratio	0.57	0.57		0.57	0.57			0.20			0.20	
v/c Ratio	0.06	0.23		0.24	0.43			0.49			0.58	
Control Delay	6.2	6.4		8.5	10.0			8.7			17.9	
Queue Delay	0.0	0.0		0.0	0.0			0.0			0.0	
Total Delay	6.2	6.4		8.5	10.0			8.7			17.9	
LOS	A	A		A	A			A			B	
Approach Delay		6.4			9.6			8.7			17.9	
Approach LOS		A			A			A			B	
Queue Length 50th (ft)	5	53		33	105			11			22	
Queue Length 95th (ft)	m17	m128		117	305			47			59	
Internal Link Dist (ft)		705			706			271			344	
Turn Bay Length (ft)	200			200								
Base Capacity (vph)	501	1015		651	1067			563			380	
Starvation Cap Reductn	0	0		0	0			0			0	
Spillback Cap Reductn	0	0		0	0			0			0	
Storage Cap Reductn	0	0		0	0			0			0	
Reduced v/c Ratio	0.06	0.23		0.24	0.43			0.38			0.44	

Intersection Summary

Area Type: Other
Cycle Length: 45
Actuated Cycle Length: 45
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Yellow
Natural Cycle: 40
Control Type: Actuated-Coordinated
Maximum v/c Ratio: 0.58
Intersection Signal Delay: 9.9 Intersection LOS: A
Intersection Capacity Utilization 67.9% ICU Level of Service C
Analysis Period (min) 15
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 11: Gabriel Terrace & Crossgates Mall Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	399	3	7	497	291	1	0	7	199	2	59
Future Volume (vph)	47	399	3	7	497	291	1	0	7	199	2	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			0%			0%	
Storage Length (ft)	160		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Satd. Flow (prot)	0	3544	0	0	3305	0	0	1622	0	1787	1624	0
Flt Permitted		0.815			0.952			0.980		0.752		
Satd. Flow (perm)	0	2903	0	0	3146	0	0	1599	0	1389	1624	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			235			24			60	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		786			547			394			414	
Travel Time (s)		17.9			12.4			9.0			9.4	
Confl. Peds. (#/hr)									11	11		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	18%	1%	0%	0%	0%	6%	0%	0%	0%	1%	0%	0%
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	458	0	0	811	0	0	8	0	203	62	0
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		9.0	9.0		9.0	9.0	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	55.0	55.0		55.0	55.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		61.6			61.6			18.4		18.4	18.4	
Actuated g/C Ratio		0.68			0.68			0.20		0.20	0.20	
v/c Ratio		0.23			0.36			0.02		0.71	0.16	
Control Delay		4.2			3.7			3.0		46.6	8.5	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		4.2			3.7			3.0		46.6	8.5	
LOS		A			A			A		D	A	
Approach Delay		4.2			3.7			3.0			37.7	
Approach LOS		A			A			A			D	
Queue Length 50th (ft)		28			7			0		108	1	
Queue Length 95th (ft)		64			141			4		165	29	
Internal Link Dist (ft)		706			467			314			334	
Turn Bay Length (ft)												
Base Capacity (vph)		1992			2233			465		388	498	
Starvation Cap Reductn		0			0			0		0	0	
Spillback Cap Reductn		0			0			0		0	0	
Storage Cap Reductn		0			0			0		0	0	
Reduced v/c Ratio		0.23			0.36			0.02		0.52	0.12	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 56 (62%), Referenced to phase 1:EBWB, Start of Yellow			
Natural Cycle: 40			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 9.7		Intersection LOS: A	
Intersection Capacity Utilization 66.0%		ICU Level of Service C	
Analysis Period (min) 15			

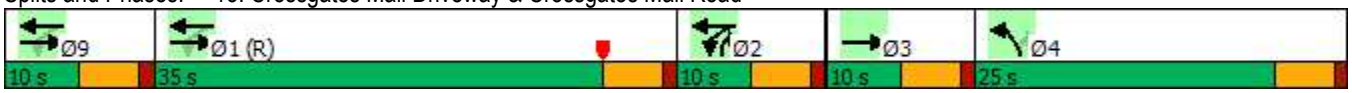
Splits and Phases: 12: Hotel Driveway/Mall Entrance #2 & Crossgates Mall Road

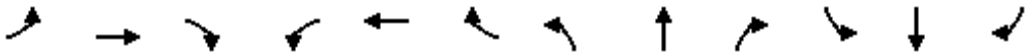
Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø3	Ø9
Lane Configurations									
Traffic Volume (vph)	452	153	179	659	136	198			
Future Volume (vph)	452	153	179	659	136	198			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	12	12	11	11	12	12			
Grade (%)	1%			-2%	0%				
Satd. Flow (prot)	3421	0	1762	1801	1787	1599			
Flt Permitted			0.353		0.950				
Satd. Flow (perm)	3421	0	655	1801	1787	1573			
Right Turn on Red		Yes				Yes			
Satd. Flow (RTOR)	74					215			
Link Speed (mph)	30			30	30				
Link Distance (ft)	547			1590	615				
Travel Time (s)	12.4			36.1	14.0				
Confl. Peds. (#/hr)						4			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92			
Heavy Vehicles (%)	1%	1%	0%	3%	1%	1%			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	657	0	195	716	148	215			
Number of Detectors	2		1	2	1	1			
Detector Template	Thru		Left	Thru	Left	Right			
Leading Detector (ft)	100		20	100	20	20			
Trailing Detector (ft)	0		0	0	0	0			
Detector 1 Position(ft)	0		0	0	0	0			
Detector 1 Size(ft)	6		20	6	20	20			
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel									
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0			
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0			
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0			
Detector 2 Position(ft)	94			94					
Detector 2 Size(ft)	6			6					
Detector 2 Type	Cl+Ex			Cl+Ex					
Detector 2 Channel									
Detector 2 Extend (s)	0.0			0.0					
Turn Type	NA		custom	NA	Prot	pm+ov			
Protected Phases	9 1 3		2	9 1 2	4	2	1	3	9
Permitted Phases			9 1			4			
Detector Phase	9 1 3		2	9 1 2	4	2			
Switch Phase									
Minimum Initial (s)			4.0		15.0	4.0	15.0	4.0	4.0
Minimum Split (s)			9.0		20.0	9.0	20.0	9.0	10.0
Total Split (s)			10.0		25.0	10.0	35.0	10.0	10.0
Total Split (%)			11.1%		27.8%	11.1%	39%	11%	11%
Maximum Green (s)			5.0		20.0	5.0	30.0	5.0	5.0
Yellow Time (s)			4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)			1.0		1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)			0.0		0.0	0.0			
Total Lost Time (s)			5.0		5.0	5.0			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø3	Ø9
Lead/Lag					Lag		Lag	Lead	Lead
Lead-Lag Optimize?					Yes		Yes	Yes	Yes
Vehicle Extension (s)			3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode			None		None	None	C-Min	None	None
Walk Time (s)			0.0		0.0	0.0	5.0	5.0	5.0
Flash Dont Walk (s)			0.0		0.0	0.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)			0		0	0	0	0	0
Act Effct Green (s)	47.4		48.9	53.9	15.5	22.6			
Actuated g/C Ratio	0.53		0.54	0.60	0.17	0.25			
v/c Ratio	0.36		0.44	0.66	0.48	0.39			
Control Delay	6.3		14.7	15.8	39.3	4.9			
Queue Delay	0.0		0.0	0.0	0.0	0.0			
Total Delay	6.3		14.7	15.8	39.3	4.9			
LOS	A		B	B	D	A			
Approach Delay	6.3			15.6	18.9				
Approach LOS	A			B	B				
Queue Length 50th (ft)	30		44	239	77	0			
Queue Length 95th (ft)	68		81	389	133	40			
Internal Link Dist (ft)	467			1510	535				
Turn Bay Length (ft)									
Base Capacity (vph)	1993		443	1081	397	558			
Starvation Cap Reductn	0		0	0	0	0			
Spillback Cap Reductn	0		0	0	0	0			
Storage Cap Reductn	0		0	0	0	0			
Reduced v/c Ratio	0.33		0.44	0.66	0.37	0.39			

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Yellow, Master Intersection			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 13.1		Intersection LOS: B	
Intersection Capacity Utilization 55.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 13: Crossgates Mall Driveway & Crossgates Mall Road





Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	10	70	232	270	101	78	82	110	107	70	234	19
Future Volume (vph)	10	70	232	270	101	78	82	110	107	70	234	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (ft)	12	12	13	12	12	12	12	12	12	14	14	14
Grade (%)		0%			2%			-2%			4%	
Storage Length (ft)	0		150	200		0	0		0	0		0
Storage Lanes	0		0	1		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.900			0.935			0.952			0.989	
Flt Protected		0.998		0.950				0.987		0.950		
Satd. Flow (prot)	0	1707	0	1702	1736	0	0	1803	0	1887	1946	0
Flt Permitted		0.989		0.334				0.732		0.480		
Satd. Flow (perm)	0	1691	0	598	1736	0	0	1337	0	953	1946	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		163			66			35			5	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		915			785			467			504	
Travel Time (s)		20.8			17.8			10.6			11.5	
Peak Hour Factor	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88	0.88
Heavy Vehicles (%)	0%	0%	0%	5%	0%	3%	0%	0%	0%	0%	1%	0%
Adj. Flow (vph)	11	80	264	307	115	89	93	125	122	80	266	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	355	0	307	204	0	0	340	0	80	288	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			14			14	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	0.96	1.01	1.01	1.01	0.99	0.99	0.99	0.94	0.94	0.94
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	1		1	1		1	1		1	1	
Detector Template	Left						Left			Left		
Leading Detector (ft)	20	6		6	6		20	6		20	6	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		6	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Turn Type	Perm	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases		6		5	2			4			8	
Permitted Phases	6			2			4			8		
Detector Phase	6	6		5	2		4	4		8	8	
Switch Phase												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Minimum Initial (s)	15.0	15.0		4.0	15.0		15.0	15.0		4.0	4.0	
Minimum Split (s)	21.0	21.0		9.0	21.0		21.0	21.0		21.0	21.0	
Total Split (s)	31.0	31.0		22.0	53.0		37.0	37.0		37.0	37.0	
Total Split (%)	34.4%	34.4%		24.4%	58.9%		41.1%	41.1%		41.1%	41.1%	
Maximum Green (s)	26.0	26.0		17.0	48.0		32.0	32.0		32.0	32.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0		0.0	0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.0		5.0	5.0			5.0		5.0	5.0	
Lead/Lag	Lag	Lag		Lead								
Lead-Lag Optimize?	Yes	Yes		Yes								
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Max	C-Max		None	C-Max		Max	Max		Max	Max	
Walk Time (s)	5.0	5.0			5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0			11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0			0		0	0		0	0	
Act Effct Green (s)		28.8		48.0	48.0			32.0		32.0	32.0	
Actuated g/C Ratio		0.32		0.53	0.53			0.36		0.36	0.36	
v/c Ratio		0.55		0.62	0.21			0.68		0.24	0.41	
Control Delay		17.5		18.1	8.0			30.3		22.8	23.8	
Queue Delay		0.0		0.0	0.0			0.0		0.0	0.0	
Total Delay		17.5		18.1	8.0			30.3		22.8	23.8	
LOS		B		B	A			C		C	C	
Approach Delay		17.5			14.0			30.3			23.6	
Approach LOS		B			B			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 25 (28%), Referenced to phase 2:WBTL and 6:EBTL, Start of Yellow			
Natural Cycle: 60			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.68			
Intersection Signal Delay: 20.6		Intersection LOS: C	
Intersection Capacity Utilization 80.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Rapp Road & Crossgates Mall Road & Crossgates Mall Rd

Intersection	
Intersection Delay, s/veh	7.2
Intersection LOS	A

Approach	EB	WB	NB	SB
Entry Lanes	1	1	1	1
Conflicting Circle Lanes	1	1	1	1
Adj Approach Flow, veh/h	260	610	216	166
Demand Flow Rate, veh/h	269	613	220	186
Vehicles Circulating, veh/h	256	82	319	582
Vehicles Exiting, veh/h	512	457	206	113
Ped Vol Crossing Leg, #/h	0	0	0	0
Ped Cap Adj	1.000	1.000	1.000	1.000
Approach Delay, s/veh	6.0	7.9	5.8	8.2
Approach LOS	A	A	A	A

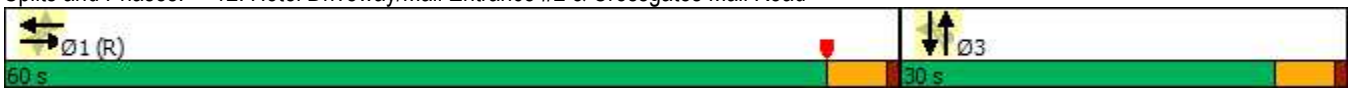
Lane	Left	Left	Left	Left
Designated Moves	LTR	LTR	LTR	LTR
Assumed Moves	LTR	LTR	LTR	LTR
RT Channelized				
Lane Util	1.000	1.000	1.000	1.000
Follow-Up Headway, s	2.609	2.609	2.609	2.609
Critical Headway, s	4.976	4.976	4.976	4.976
Entry Flow, veh/h	269	613	220	186
Cap Entry Lane, veh/h	1063	1269	997	762
Entry HV Adj Factor	0.967	0.995	0.981	0.891
Flow Entry, veh/h	260	610	216	166
Cap Entry, veh/h	1028	1263	977	679
V/C Ratio	0.253	0.483	0.221	0.244
Control Delay, s/veh	6.0	7.9	5.8	8.2
LOS	A	A	A	A
95th %tile Queue, veh	1	3	1	1

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	399	3	7	497	291	1	0	7	199	2	59
Future Volume (vph)	47	399	3	7	497	291	1	0	7	199	2	59
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Grade (%)		-3%			2%			0%			0%	
Storage Length (ft)	160		0	0		0	0		0	0		0
Storage Lanes	1		0	0		0	0		0	1		0
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	0.95	0.95	0.95	0.95	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor								0.97		0.98		
Frt		0.999			0.945			0.882			0.855	
Flt Protected		0.995						0.994		0.950		
Satd. Flow (prot)	0	3544	0	0	3305	0	0	1622	0	1787	1624	0
Flt Permitted		0.815			0.952			0.980		0.752		
Satd. Flow (perm)	0	2903	0	0	3146	0	0	1599	0	1389	1624	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1			235			24			60	
Link Speed (mph)		30			30			30			30	
Link Distance (ft)		786			547			394			414	
Travel Time (s)		17.9			12.4			9.0			9.4	
Confl. Peds. (#/hr)									11	11		
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98	0.98
Heavy Vehicles (%)	18%	1%	0%	0%	0%	6%	0%	0%	0%	1%	0%	0%
Adj. Flow (vph)	48	407	3	7	507	297	1	0	7	203	2	60
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	458	0	0	811	0	0	8	0	203	62	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		0			0			12			12	
Link Offset(ft)		0			0			0			0	
Crosswalk Width(ft)		16			16			16			16	
Two way Left Turn Lane												
Headway Factor	0.98	0.98	0.98	1.01	1.01	1.01	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	15		9	15		9	15		9	15		9
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (ft)	20	100		20	100		20	100		20	100	
Trailing Detector (ft)	0	0		0	0		0	0		0	0	
Detector 1 Position(ft)	0	0		0	0		0	0		0	0	
Detector 1 Size(ft)	20	6		20	6		20	6		20	6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(ft)		94			94			94			94	
Detector 2 Size(ft)		6			6			6			6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases		1			1			3			3	
Permitted Phases	1			1			3			3		
Detector Phase	1	1		1	1		3	3		3	3	
Switch Phase												
Minimum Initial (s)	15.0	15.0		15.0	15.0		4.0	4.0		4.0	4.0	
Minimum Split (s)	20.0	20.0		20.0	20.0		9.0	9.0		9.0	9.0	
Total Split (s)	60.0	60.0		60.0	60.0		30.0	30.0		30.0	30.0	
Total Split (%)	66.7%	66.7%		66.7%	66.7%		33.3%	33.3%		33.3%	33.3%	
Maximum Green (s)	55.0	55.0		55.0	55.0		25.0	25.0		25.0	25.0	
Yellow Time (s)	4.0	4.0		4.0	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	1.0	1.0		1.0	1.0		1.0	1.0		1.0	1.0	
Lost Time Adjust (s)		0.0			0.0			0.0		0.0	0.0	
Total Lost Time (s)		5.0			5.0			5.0		5.0	5.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	C-Min	C-Min		C-Min	C-Min		None	None		None	None	
Walk Time (s)	5.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Flash Dont Walk (s)	11.0	11.0		11.0	11.0		11.0	11.0		11.0	11.0	
Pedestrian Calls (#/hr)	0	0		0	0		0	0		0	0	
Act Effct Green (s)		61.6			61.6			18.4		18.4	18.4	
Actuated g/C Ratio		0.68			0.68			0.20		0.20	0.20	
v/c Ratio		0.23			0.36			0.02		0.71	0.16	
Control Delay		6.4			3.7			3.0		46.6	8.5	
Queue Delay		0.0			0.0			0.0		0.0	0.0	
Total Delay		6.4			3.7			3.0		46.6	8.5	
LOS		A			A			A		D	A	
Approach Delay		6.4			3.7			3.0			37.7	
Approach LOS		A			A			A			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 56 (62%), Referenced to phase 1:EBWB, Start of Yellow			
Natural Cycle: 40			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.71			
Intersection Signal Delay: 10.4		Intersection LOS: B	
Intersection Capacity Utilization 66.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 12: Hotel Driveway/Mall Entrance #2 & Crossgates Mall Road

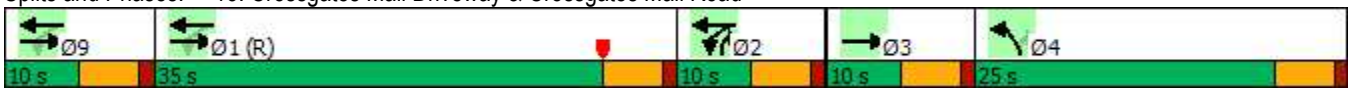


Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø3	Ø9
Lane Configurations									
Traffic Volume (vph)	452	153	179	659	136	198			
Future Volume (vph)	452	153	179	659	136	198			
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900			
Lane Width (ft)	12	12	11	11	12	12			
Grade (%)	1%			-2%	0%				
Lane Util. Factor	0.95	0.95	1.00	1.00	1.00	1.00			
Ped Bike Factor						0.98			
Frt	0.962					0.850			
Flt Protected			0.950		0.950				
Satd. Flow (prot)	3421	0	1762	1801	1787	1599			
Flt Permitted			0.353		0.950				
Satd. Flow (perm)	3421	0	655	1801	1787	1573			
Right Turn on Red		Yes				Yes			
Satd. Flow (RTOR)	74					215			
Link Speed (mph)	30			30	30				
Link Distance (ft)	547			1590	615				
Travel Time (s)	12.4			36.1	14.0				
Confl. Peds. (#/hr)						4			
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92			
Heavy Vehicles (%)	1%	1%	0%	3%	1%	1%			
Adj. Flow (vph)	491	166	195	716	148	215			
Shared Lane Traffic (%)									
Lane Group Flow (vph)	657	0	195	716	148	215			
Enter Blocked Intersection	No	No	No	No	No	No			
Lane Alignment	Left	Right	Left	Left	Left	Right			
Median Width(ft)	11			11	12				
Link Offset(ft)	0			0	0				
Crosswalk Width(ft)	16			16	16				
Two way Left Turn Lane									
Headway Factor	1.01	1.01	1.03	1.03	1.00	1.00			
Turning Speed (mph)		9	15		15	9			
Number of Detectors	2		1	2	1	1			
Detector Template	Thru		Left	Thru	Left	Right			
Leading Detector (ft)	100		20	100	20	20			
Trailing Detector (ft)	0		0	0	0	0			
Detector 1 Position(ft)	0		0	0	0	0			
Detector 1 Size(ft)	6		20	6	20	20			
Detector 1 Type	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex			
Detector 1 Channel									
Detector 1 Extend (s)	0.0		0.0	0.0	0.0	0.0			
Detector 1 Queue (s)	0.0		0.0	0.0	0.0	0.0			
Detector 1 Delay (s)	0.0		0.0	0.0	0.0	0.0			
Detector 2 Position(ft)	94			94					
Detector 2 Size(ft)	6			6					
Detector 2 Type	Cl+Ex			Cl+Ex					
Detector 2 Channel									
Detector 2 Extend (s)	0.0			0.0					
Turn Type	NA		custom	NA	Prot	pm+ov			

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR	Ø1	Ø3	Ø9
Protected Phases	9 1 3		2	9 1 2	4	2	1	3	9
Permitted Phases			9 1			4			
Detector Phase	9 1 3		2	9 1 2	4	2			
Switch Phase									
Minimum Initial (s)			4.0		15.0	4.0	15.0	4.0	4.0
Minimum Split (s)			9.0		20.0	9.0	20.0	9.0	10.0
Total Split (s)			10.0		25.0	10.0	35.0	10.0	10.0
Total Split (%)			11.1%		27.8%	11.1%	39%	11%	11%
Maximum Green (s)			5.0		20.0	5.0	30.0	5.0	5.0
Yellow Time (s)			4.0		4.0	4.0	4.0	4.0	4.0
All-Red Time (s)			1.0		1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)			0.0		0.0	0.0			
Total Lost Time (s)			5.0		5.0	5.0			
Lead/Lag					Lag		Lag	Lead	Lead
Lead-Lag Optimize?					Yes		Yes	Yes	Yes
Vehicle Extension (s)			3.0		3.0	3.0	3.0	3.0	3.0
Recall Mode			None		None	None	C-Min	None	None
Walk Time (s)			0.0		0.0	0.0	5.0	5.0	5.0
Flash Dont Walk (s)			0.0		0.0	0.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)			0		0	0	0	0	0
Act Effct Green (s)	47.4		48.9	53.9	15.5	22.6			
Actuated g/C Ratio	0.53		0.54	0.60	0.17	0.25			
v/c Ratio	0.36		0.44	0.66	0.48	0.39			
Control Delay	5.7		14.7	15.8	39.3	4.9			
Queue Delay	0.0		0.0	0.0	0.0	0.0			
Total Delay	5.7		14.7	15.8	39.3	4.9			
LOS	A		B	B	D	A			
Approach Delay	5.7			15.6	18.9				
Approach LOS	A			B	B				

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 90			
Offset: 0 (0%), Referenced to phase 1:EBWB, Start of Yellow, Master Intersection			
Natural Cycle: 70			
Control Type: Actuated-Coordinated			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 12.8		Intersection LOS: B	
Intersection Capacity Utilization 55.5%		ICU Level of Service B	
Analysis Period (min) 15			

Splits and Phases: 13: Crossgates Mall Driveway & Crossgates Mall Road



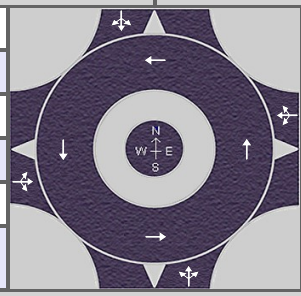
ATTACHMENT 3

HCS Report – Alternative 3

HCS7 Roundabouts Report

General Information

Analyst	JMT
Agency or Co.	
Date Performed	8/21/2022
Analysis Year	2022
Time Analyzed	
Project Description	Site 2 Special Use Permit



Site Information

Intersection	Crossgates at Gabriel
E/W Street Name	Crossgates Mall Road
N/S Street Name	Gabriel Terrace
Analysis Time Period (hrs)	1.00
Peak Hour Factor	0.92
Jurisdiction	

Volume Adjustments and Site Characteristics

Approach	EB				WB				NB				SB			
Movement	U	L	T	R	U	L	T	R	U	L	T	R	U	L	T	R
Number of Lanes (N)	0	0	1	0	0	0	1	0	0	0	1	0	0	0	1	0
Lane Assignment			LTR				LTR				LTR				LTR	
Volume (V), veh/h	0	27	177	32	0	142	351	64	0	35	12	152	0	77	12	62
Percent Heavy Vehicles, %	0	0	4	2	0	2	0	0	0	2	2	2	0	1	2	28
Flow Rate (v_{PCE}), pc/h	0	29	200	35	0	157	382	70	0	39	13	169	0	85	13	86
Right-Turn Bypass	None				None				None				None			
Conflicting Lanes	1				1				1				1			
Pedestrians Crossing, p/h	0				0				0				0			

Critical and Follow-Up Headway Adjustment

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Critical Headway (s)		4.9763			4.9763			4.9763			4.9763	
Follow-Up Headway (s)		2.6087			2.6087			2.6087			2.6087	

Flow Computations, Capacity and v/c Ratios

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Entry Flow (v_e), pc/h		264			609			221			184	
Entry Volume, veh/h		256			606			217			164	
Circulating Flow (v_c), pc/h	255			81			314			578		
Exiting Flow (v_{ex}), pc/h	454			507			112			205		
Capacity (c_{pce}), pc/h		1064			1271			1002			765	
Capacity (c), veh/h		1030			1264			982			683	
v/c Ratio (x)		0.25			0.48			0.22			0.24	

Delay and Level of Service

Approach	EB			WB			NB			SB		
Lane	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass	Left	Right	Bypass
Lane Control Delay (d), s/veh		5.9			7.9			5.8			8.1	
Lane LOS		A			A			A			A	
95% Queue, veh		1.0			2.7			0.8			0.9	
Approach Delay, s/veh	5.9			7.9			5.8			8.1		
Approach LOS	A			A			A			A		
Intersection Delay, s/veh | LOS	7.1						A					

ATTACHMENT 4

Signal Warrant Volume Calculations

ATR Counts on Western Ave (US Route 20)
150' W of Fletcher Rd
NYSDOT STA 110172

	2009 TOTAL COMBINED							% of	Interpolated Data: Gabriel NB	Gabriel SB	Crossgates EB	Crossgates WB	**COMBINED GABRIEL**	**COMBINED CROSSGATES**
BEG	W	R	F	S	S	M	T	Peak Hour						
12:00 AM	0	318	352	578	591	244	315							
1:00 AM	0	161	202	299	372	114	158							
2:00 AM	0	139	129	242	267	87	101							
3:00 AM	0	99	103	155	167	90	117							
4:00 AM	0	177	194	170	141	170	191							
5:00 AM	0	495	481	216	158	451	482							
6:00 AM	0	1909	1680	572	340	1743	1906							
7:00 AM	0	3740	3464	1212	533	3586	3792							
8:00 AM	0	4036	3666	1785	1040	4055	4024							
9:00 AM	0	2912	2864	2493	1554	3037	2979							
10:00 AM	0	2648	2728	2869	1910	2776	2621							
11:00 AM	0	2959	3260	3205	2579	3168	2853	70%					247	559
12:00 PM	0	3577	3959	3536	2893	3454	3309	86%					300	679
1:00 PM	0	3331	3867	3621	3106	3431	3214	84%					293	663
2:00 PM	3648	3533	3858	3504	3029	3531	0	83%					292	661
3:00 PM	4044	3964	4226	3323	2910	3948	0	91%					320	724
4:00 PM	4643	4443	4535	3220	2757	4346	0	98%					343	777
5:00 PM	4935	4930	4626	3126	2511	4645	0	100%	199	151	236	557	350	793
6:00 PM	3738	3467	3571	2847	2032	3330	0	77%					270	612
7:00 PM	2837	2623	2783	2384	1708	2531	0							
8:00 PM	2391	2203	2268	2014	1439	1971	0							
9:00 PM	1666	1736	2053	1753	1005	1517	0							
10:00 PM	1015	998	1342	1406	603	880	0							
11:00 PM	607	614	891	992	472	591	0							

ATTACHMENT 5

Signal Warrant Analysis

Input Data

City: **Town of Guilderland**
County:
District:

Engineer: **JMT**
Date: **August 19, 2022**

Major Street: **Crossgates Mall Road** # Lanes: **1** Major Approach Speed: **30**
Minor Street: **Gabriel Terrace** # Lanes: **1** Minor Approach Speed: **30**

Eight Hour Volumes (Condition A)

Hours	Major Street (total of both approaches)	Minor Street (one direction only)
11:00 AM	559	247
12:00 PM	679	300
1:00 PM	663	293
2:00 PM	661	292
3:00 PM	724	320
4:00 PM	777	343
5:00 PM	793	350
6:00 PM	612	270

Eight Hour Volumes (Condition B)

Hours	Major Street (total of both approaches)	Minor Street (one direction only)
11:00 AM	559	247
12:00 PM	679	300
1:00 PM	663	293
2:00 PM	661	292
3:00 PM	724	320
4:00 PM	777	343
5:00 PM	793	350
6:00 PM	612	270

Highest Four Hour Vehicular Volumes

Hours	Major Street (total of both approaches)	Minor Street (one direction only)
2:00 PM	661	292
3:00 PM	724	320
4:00 PM	777	343
5:00 PM	793	350

Highest Four Hour Pedestrian Volumes

Hours	Major Street (total of both approaches)	Pedestrian Crossings on Major Street
2:00 PM	661	
3:00 PM	724	
4:00 PM	777	
5:00 PM	793	

Vehicular Peak Hour Volumes

Peak Hour	Major Street (total of both approaches)	Minor Street (one direction only)	Total Entering Volume
5:00 PM	793	350	1143

Pedestrian Peak Hour Volumes

Peak Hour	Major Street (total of both approaches)	Pedestrian Crossing Volumes on Major Street

TRAFFIC SIGNAL WARRANT SUMMARY

City:	Town of Guilderland	Engineer:	JMT
County:		Date:	August 19, 2022
District:			

Major Street:	Crossgates Mall Road	Lanes:	1	Major Approach Speed:	30
Minor Street:	Gabriel Terrace	Lanes:	1	Minor Approach Speed:	30

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☐ Yes ☑ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☐ 70% ☑ 100%

WARRANT 1 - EIGHT-HOUR VEHICULAR VOLUME

Warrant 1 is satisfied if Condition A or Condition B is "100%" satisfied for eight hours. ☑ Yes ☐ No

Warrant 1 is also satisfied if both Condition A and Condition B are "80%" satisfied (should only be applied after an adequate trial of other alternatives that could cause less delay and inconvenience to traffic has failed to solve the traffic problems). ☐ Yes ☑ No

Condition A - Minimum Vehicular Volume

Condition A is intended for application at locations where a large volume of intersecting traffic is the principal reason to consider installing a traffic control signal.

100% Satisfied: ☐ Yes ☑ No
80% Satisfied: ☐ Yes ☑ No
70% Satisfied: ☑ Yes ☐ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	Minor	100%[a]	80%[b]	70%[c]	100%[a]	80%[b]	70%[c]
1	1	500	400	350	150	120	105
2 or more	1	600	480	420	150	120	105
2 or more	2 or more	600	480	420	200	160	140
1	2 or more	500	400	350	200	160	140

[a] Basic Minimum hourly volume
[b] Used for combination of Conditions A and B after adequate trial of other remedial measures
[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Street	Eight Highest Hours							
	11:00 AM	12:00 PM	1:00 PM	2:00 PM	3:00 PM	4:00 PM	5:00 PM	6:00 PM
Major	559	679	663	661	724	777	793	612
Minor	247	300	293	292	320	343	350	270

Existing Volumes

TRAFFIC SIGNAL WARRANT SUMMARY

Condition B - Interruption of Continuous Traffic

Condition B is intended for application where Condition A is not satisfied and the traffic volume on a major street is so heavy that traffic on the minor intersecting street suffers excessive delay or conflict in entering or crossing the major street.

Applicable:	☑ Yes	☐ No
100% Satisfied:	☑ Yes	☐ No
80% Satisfied:	☑ Yes	☐ No
70% Satisfied:	☑ Yes	☐ No

Number of Lanes for moving traffic on each approach		Vehicles per hour on major-street (total of both approaches)			Vehicles per hour on minor-street (one direction only)		
Major	**Minor**	**100%[a]**	**80%[b]**	**70%[c]**	**100%[a]**	**80%[b]**	**70%[c]**
1	1	750	600	525	75	60	53
2 or more	1	900	720	630	75	60	53
2 or more	2 or more	900	720	630	100	80	70
1	2 or more	750	600	525	100	80	70

[a] Basic Minimum hourly volume

[b] Used for combination of Conditions A and B after adequate trial of other remedial measures

[c] May be used when the major-street speed exceeds 40 mph or in an isolated community with a population of less than 10,000

Record 8 highest hours and the corresponding major-street and minor-street volumes in the Instructions Sheet.

Eight Highest Hours								
Street	**11:00 AM**	**12:00 PM**	**1:00 PM**	**2:00 PM**	**3:00 PM**	**4:00 PM**	**5:00 PM**	**6:00 PM**
Major	559	679	663	661	724	777	793	612
Minor	247	300	293	292	320	343	350	270

Existing Volumes

TRAFFIC SIGNAL WARRANT SUMMARY

City:	Town of Guilderland	Engineer:	JMT
County:		Date:	August 19, 2022
District:			

Major Street:	Crossgates Mall Road	Lanes:	1	Major Approach Speed:	30
Minor Street:	Gabriel Terrace	Lanes:	1	Minor Approach Speed:	30

MUTCD Electronic Reference to Chapter 4: http://mutcd.fhwa.dot.gov/pdfs/2009r1r2/part4.pdf

Volume Level Criteria

1. Is the posted speed or 85th-percentile of major street > 40 mph (70 km/h)? ☐ Yes ☑ No
2. Is the intersection in a built-up area of an isolated community with a population < 10,000? ☐ Yes ☑ No

"70%" volume level **may** be used if Question 1 **or** 2 above is answered "Yes" ☐ Yes ☑ No

WARRANT 2 - FOUR-HOUR VEHICULAR VOLUME

If all four points lie above the appropriate line, then the warrant is satisfied.

Applicable: ☑ Yes ☐ No

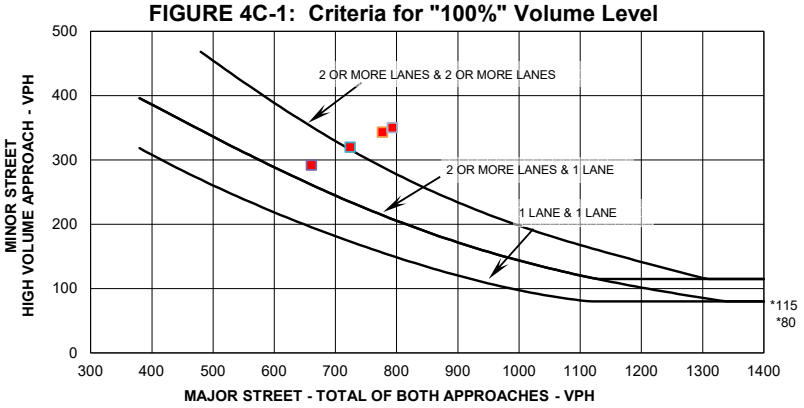
Satisfied: ☑ Yes ☐ No

Plot four volume combinations on the applicable figure below.

100% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street
2:00 PM	661	292
3:00 PM	724	320
4:00 PM	777	343
5:00 PM	793	350

FIGURE 4C-1: Criteria for "100%" Volume Level



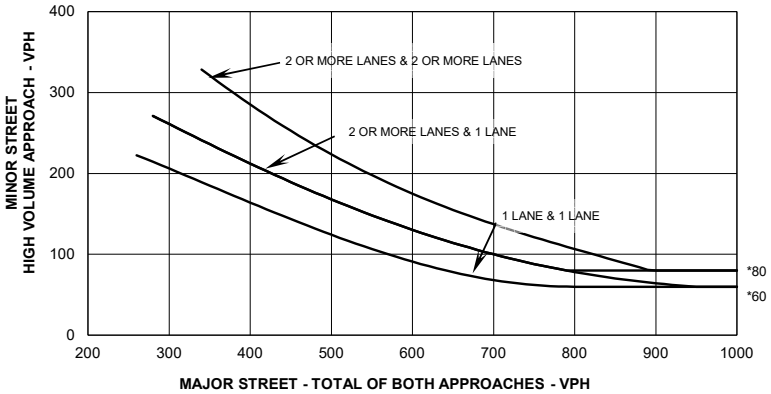
** Note: 115 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 80 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

70% Volume Level

Four Highest Hours	Volumes	
	Major Street	Minor Street

FIGURE 4C-2: Criteria for "70%" Volume Level

(Community Less than 10,000 population or above 70 km/hr (40 mph) on Major Street)



** Note: 80 vph applies as the lower threshold volume for a minor street approach with two or more lanes and 60 vph applies as the lower threshold volume threshold for a minor street approach with one lane.*

ATTACHMENT 6

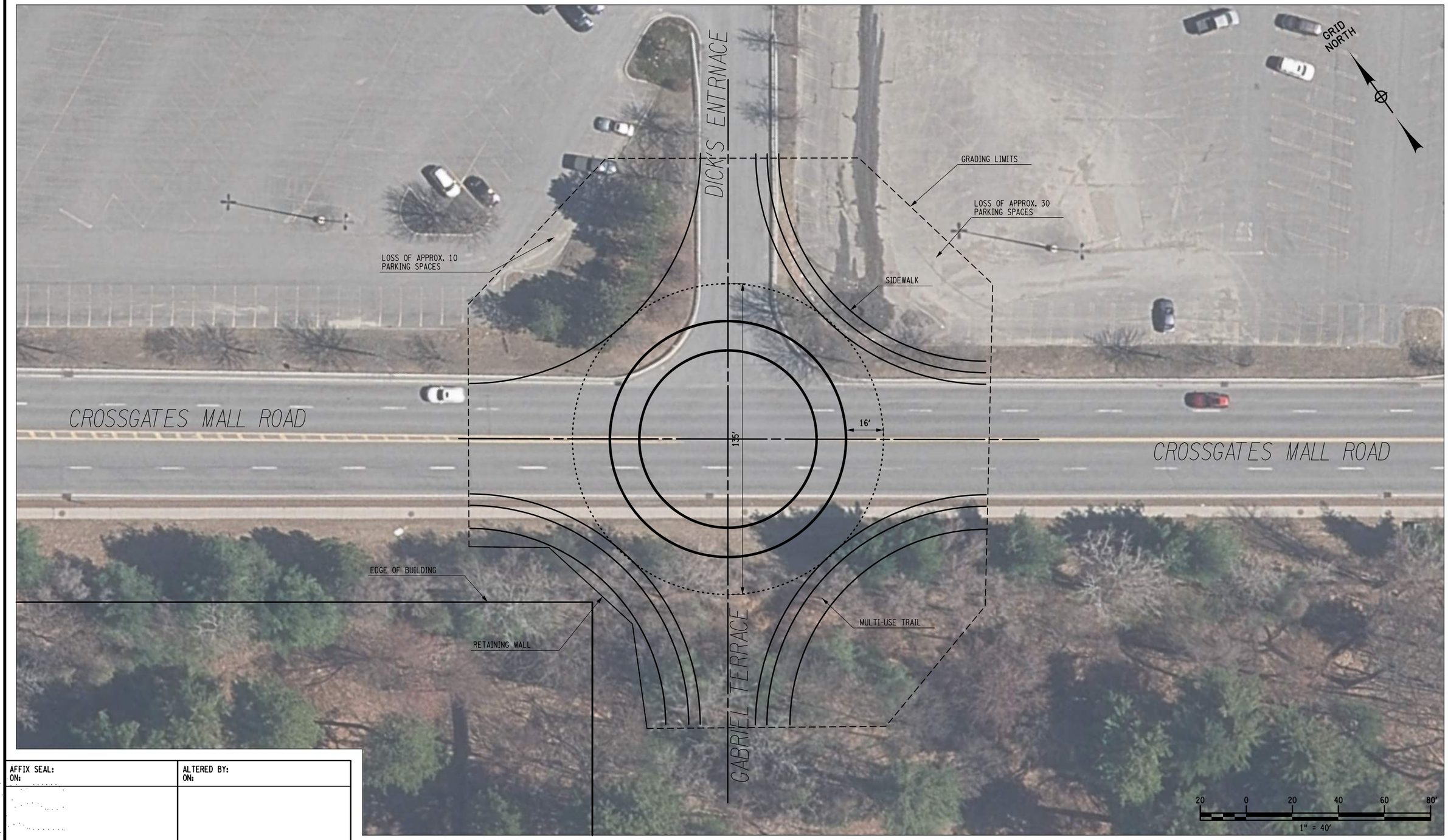
Concept Plan – Traffic Signal

Alternative 2 (Traffic Signal)

Scale: 1"-40'

ATTACHMENT 7

Concept Plan – Roundabout



PROJECT MANAGER
CHECK
DRAFTING
DESIGN
CHECK
JOB MANAGER
DESIGN SUPERVISOR

FILE NAME = 22-01160_wrk_roundabout_mwe.dgn
DATE/TIME = 23-AUG-2022 17:55
USER = scarroll

AFFIX SEAL: ON:	ALTERED BY: ON:

AS-BUILT REVISIONS
DESCRIPTION OF ALTERATIONS:

COUNTY: REGION:

PIN

BRIDGES

CULVERTS

ALL DIMENSIONS IN ft UNLESS OTHERWISE NOTED

CONTRACT NUMBER

CROSSGATES MALL RD / GABRIEL TERR
SINGLE LANE ROUNDABOUT

DRAWING NO. SK-R1
SHEET NO. 1