545-565 Big Bay Point Road Traffic Impact and Parking Study Report

Barrie, Ontario

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1.0 Introduction

TraffMobility Engineering Inc. ("TraffMobility") was retained by Midnight Building Group to undertake a Traffic Impact and Parking Study ("TIPS") as part of the Zoning By-law and Official Plan Amendment application for a proposed residential development at 545-565 Big Bay Point Road, Barrie, Ontario. The analysis approach, results, and findings are documented in this report. The City of Barrie ("City") approved terms of reference ("TOR") for this study is provided in **Appendix A**.

1.1 Study Area

The subject site is located on the south side of the Big Bay Point Road between Ashford Drive and Montgomery Drive as shown in **Figure 1**. There will be two site accesses to the adjacent road network, one via Montgomery Drive and the other via Ashford Drive.

Figure 1: Site Location and Study Intersections

The study area for the analysis includes the following key intersections:

- Big Bay Point Road at Dodson Road / Ashford Drive (signalized)
- Big Bay Point Road at Montgomery Drive (unsignalized)
- Yonge Street at Madelaine Drive / Ashford Drive (signalized)
- Yonge Street at Montgomery Drive (unsignalized)
- Montgomery Drive Site Access
- Ashford Drive Site Access

1.2 Study Methodology

The study conducted a thorough review of the existing and future planned transportation infrastructure for all travel modes within the study area including connectivity to the adjacent transportation network. Analyses were conducted to identify transportation infrastructure required to support and connect the proposed development to the adjacent transportation network.

1.2.1 Active Transportation and Transit Assessment

Existing and planned active transportation infrastructure within the vicinity of the proposed development were reviewed to determine connectivity and convenience for pedestrians and cyclists. Accessibility to existing and future transit service from the proposed development was reviewed and a site-specific transportation demand management (TDM) plan was developed to support and promote non-auto modes of travel.

1.2.2 Traffic Operations Assessment

The study assessed traffic operations under existing (2024) conditions and the following future horizon years:

- Opening Year (2027) Background Conditions
- Opening Year (2027) Future Conditions
- Future (2032) Background Conditions (5 years after Opening Year)
- Future (2032) Total Conditions (5 years after Opening Year)
- Future (2037) Background Conditions (10 years after Opening Year)
- Future (2037) Total Conditions (10 years after Opening Year)

Intersection operations were assessed using the Synchro 11 software which utilizes the Highway Capacity Manual ("HCM") methodology published by the Transportation Research Board National Research Council. Synchro 11 can analyze both signalized and unsignalized intersections in a road corridor or network considering the spacing, interaction, queues, and operations between intersections.

Intersection operations performance metrics are reported in terms of Level of Service ("LOS"), volume to capacity ("v/c") ratios, and 95th percentile queues. Level of Service is based on the average control delay per vehicle for a given movement. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between 'A' and 'F', with 'F' being the longest delay. **Table 1** summarizes the LOS criteria for signalized and unsignalized intersections.

Table 1: Intersection Level of Service Criteria

Level of Service	Average Control Delay per Vehicle (second / vehicle)	
	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 following criteria were used to identify critical movements as outlined in the City's Transportation Impact Study ("TIS") guidelines:

- Threshold criteria for signalized intersections:
    - Level of service for overall intersection operations exceeds LOS D
    - v/c ratios for overall intersections operations, through movements, or shared through/turning movements increase to 0.85 or above
    - v/c ratios for exclusive movements increase to 0.85 or above
    - Where the 50th and 95th percentile queue lengths exceed available turning lane storage
    - Queues for exclusive left and right turn lanes that are inaccessible due to the through lane queue length
- Threshold criteria for unsignalized intersections:
    - Level of Service, based on average per vehicle, on individual movements exceed LOS E
    - Estimated 95th percentile queue lengths for an individual movement exceed the available queue storage

1.2.3 Site Plan Review

A detailed site plan review was conducted which included a review of the proposed site accesses design and site circulation to ensure efficient and safe operations. The proposed parking supply for the site was reviewed to determine if it is sufficient to accommodate expected parking demand. An assessment of the loading operation was also conducted.

1.3 Data Collection

Existing turning movement counts were obtained from the City and from traffic counts commissioned by TraffMobility during the weekday AM peak period (7:00 am to 9:00 am) and the weekday PM peak period (4:00 pm to 6:00 pm). A summary of the traffic data collected is provided in **Table 2**.

Existing signal timing plans were provided by the City. A copy of the existing turning movement counts, and signal timing plans is provided in **Appendix B**.

Table 2: Turning Movement Counts Summary

Intersection	Count Date	Source
Big Bay Point Road at Montgomery Drive (unsignalized)	October 30, 2024	Traffic-Survey-Analysis Inc.
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)	March 19, 2024	City of Barrie
Yonge Street at Montgomery Drive (unsignalized)	October 30, 2024	Traffic-Survey-Analysis Inc.
Yonge Street at Madelaine Drive / Ashford Drive (signalized)	March 28, 2024	City of Barrie

2.0 Existing (2024) Conditions

Traffic operations under existing conditions were analyzed for the peak hours during the weekday AM (7:00 am to 9:00 am) and the weekday PM (4:00 pm to 6:00 pm) peak periods using the Synchro 11 software.

2.1 Existing (2024) Intersection Operations

Existing intersection operations were analyzed using the lane configurations illustrated in **Figure 2** and the existing (2024) traffic volumes are shown in **Figure 3**. The analysis results are provided in **Table 3** and **Table 4** for capacity analysis and queue analysis, respectively. Detailed calculations are provided in **Appendix C**.

The analysis results in **Table 3** indicate that all movements at the study intersections are operating with acceptable LOS and residual capacity during the weekday AM and weekday PM peak hours under existing conditions.

The queueing summary in **Table 4** shows that queues are accommodated within the available storage.

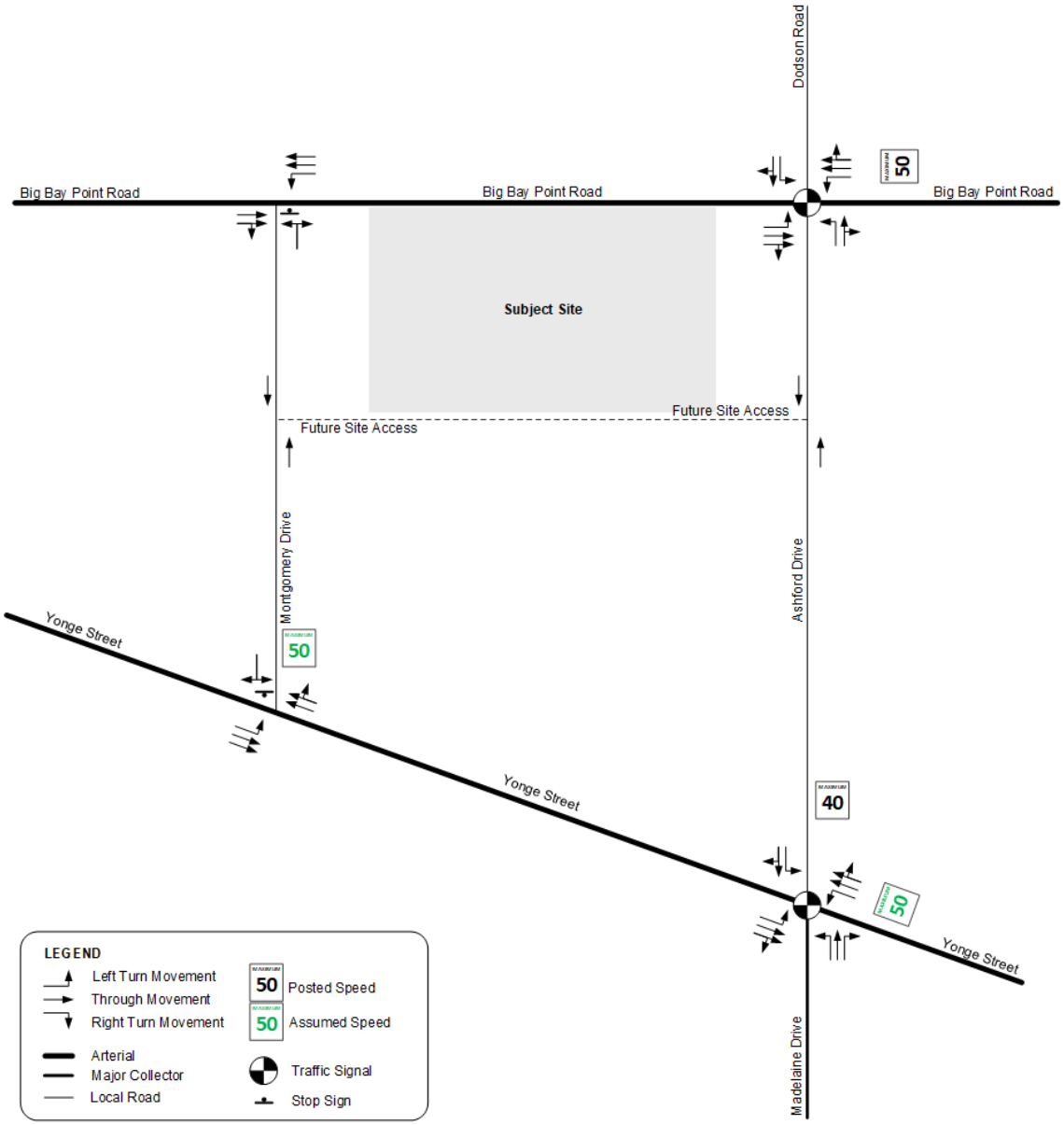


Figure 2: Existing (2024) Intersection Lane Configuration

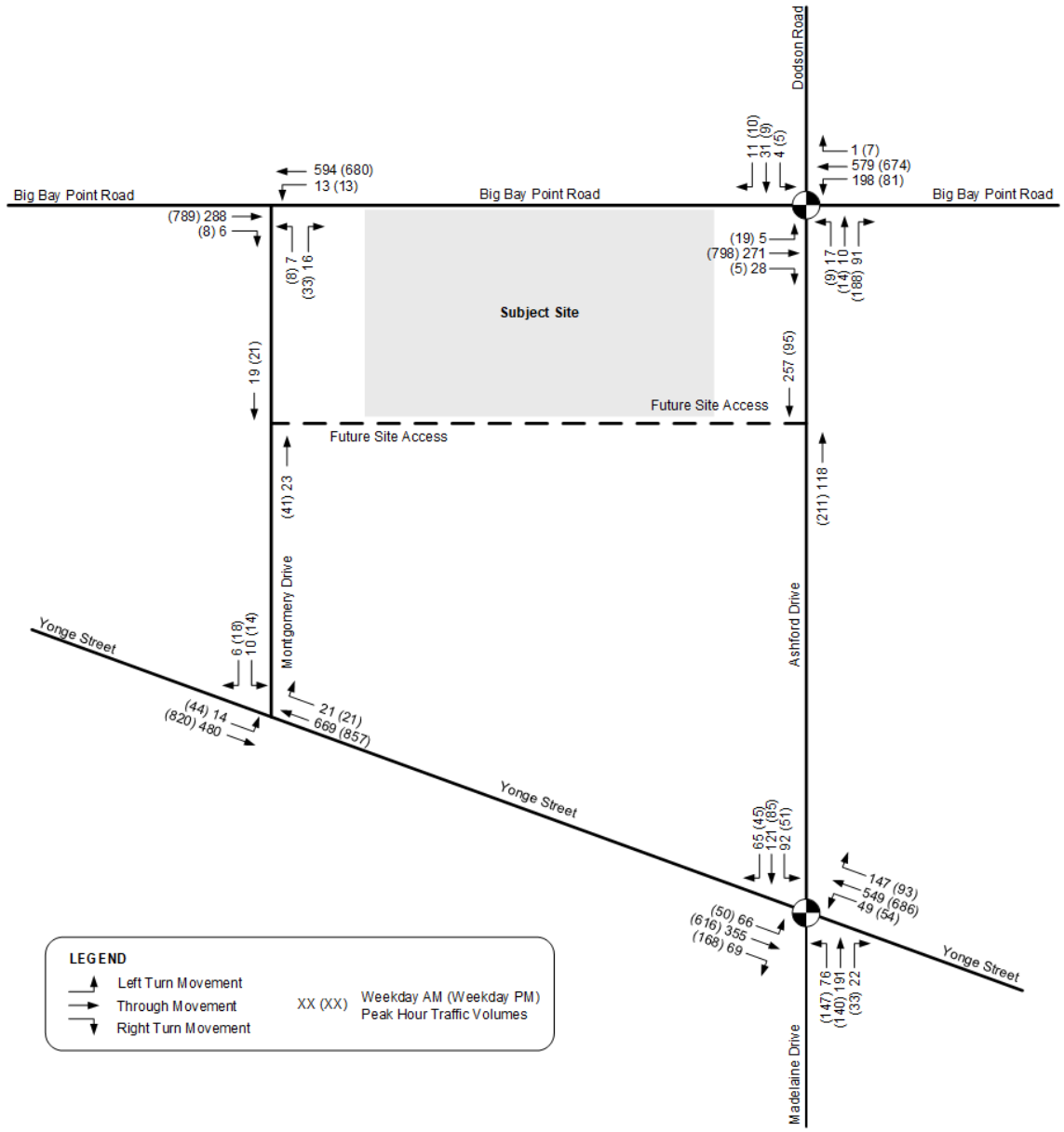


Figure 3: Existing (2024) Traffic Volumes

Table 3: Existing (2024) Conditions Intersection Operations

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)						
Overall	C	21	0.15	B	20	0.16
EBL	A	6	0.01	A	6	0.04
EBTR	A	7	0.15	A	9	0.40
WBL	A	3	0.26	A	5	0.19
WBTR	A	5	0.26	A	7	0.33

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
NBL	D	36	0.14	C	32	0.05
NBTR	D	36	0.14	C	33	0.20
SBL	C	35	0.03	C	32	0.05
SBTR	D	36	0.21	C	32	0.05
Yonge Street at Madelaine Drive / Ashford Drive (signalized)						
Overall	C	31	0.33	C	32	0.35
EBL	D	40	0.36	D	47	0.64
EBT	D	54	0.68	D	50	0.56
EBR	D	43	0.02	D	44	0.02
WBL	D	39	0.42	D	42	0.23
WBTR	D	49	0.59	D	51	0.52
NBL	A	10	0.09	A	10	0.15
NBTR	B	17	0.41	B	15	0.42
SBL	B	11	0.17	A	10	0.14
SBTR	B	14	0.24	B	15	0.43
Big Bay Point Road at Montgomery Drive (unsignalized)						
EBTR	A	0	0.12	A	0	0.34
WBL	A	8	0.01	A	10	0.02
WBT	A	0	0.19	A	0	0.22
NBLR	A	10	0.03	B	13	0.09
Yonge Street at Montgomery Drive (unsignalized)						
WBLR	B	12	0.03	B	14	0.07
NBTR	A	0	0.29	A	0	0.37
SBL	A	10	0.02	B	11	0.06
SBT	A	0	0.15	A	0	0.26

Note: LOS – level of service, v/c ratio – volume to capacity ratio

Table 4: Existing (2024) Conditions Queueing Summary

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)					
EBL	<7	<7	<7	<7	50
EBTR	11	19	11	19	>300

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
WBL	8	13	8	13	25
WBTR	14	34	14	34	>300
NBL	<7	9	<7	9	20
NBTR	<7	17	<7	17	>50
SBL	<7	<7	<7	<7	25
SBTR	<7	15	<7	15	150
Yonge Street at Madelaine Drive / Ashford Drive (signalized)					
EBL	16	27	16	27	30
EBT	50	72	50	72	>200
EBR	<7	<7	<7	<7	>200
WBL	19	32	19	32	75
WBTR	43	65	43	65	>200
NBL	<7	10	<7	10	95
NBTR	52	79	52	79	>300
SBL	<7	13	<7	13	180
SBTR	28	44	28	44	270
Big Bay Point Road at Montgomery Drive (unsignalized)					
EBTR	-	<7	-	<7	>200
WBL	-	<7	-	<7	40
NBLR	-	<7	-	<7	>50
Yonge Street at Montgomery Drive (unsignalized)					
WBLR	-	<7	-	<7	125
NBTR	-	<7	-	<7	175
SBL	-	<7	-	<7	50

2.2 Pedestrian and Cyclist Infrastructure

Existing sidewalks connect the proposed site to Big Bay Point Road, Yonge Street and the adjacent community as illustrated in **Figure 4**. Sidewalks along Montgomery Drive connect the site to bus stops along Big Bay Point Road and Yonge Street, schools and parks, and a commercial area west of the site. This well-established sidewalk network provides pedestrians with accessible and convenient options to navigate the community for local trips within a 15-minute walk range.

Existing facilities for bikes are limited within the study area. It is noted that there is a trail system north of Big Bay Point Road which connections to downtown Barrie; however, currently there is a gap in the network from the proposed site to this trail system.

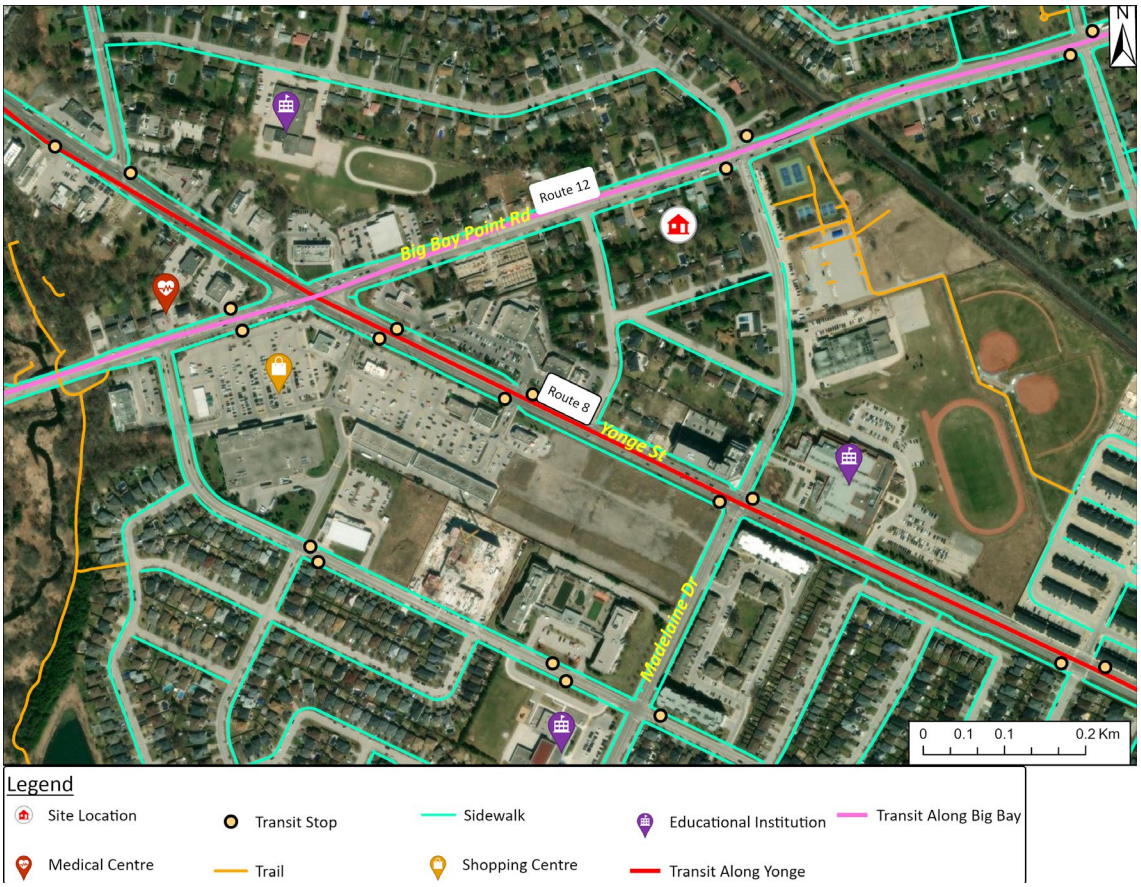


Figure 4: Existing Active Transportation Network

2.3 Transit Services

The subject site is well-served by public transit provided by Barrie Transit. The bus routes that directly serve the subject site include Route #12 (Georgian Mall/ 12 Barrie South GO) along Big Bay Point Road, Route #8A (RVH/Yonge) and Route #8B (Crosstown/Essa) along Yonge Street. The stop for Route #12 is located at the front of the subject site by the Big Bay Point Road and Dodson Road / Ashford Drive intersection. Route #8A and #8B can be accessed at the Big Bay Point Road and Yonge Street intersection approximately 400 metres (less than 8-minute walk) from the subject site. A map of Barrie Transit Network with the location of the subject site is shown **Figure 5**.

The routes connect the subject site to Barrie South GO station, Allandale Waterfront GO Station, Park Place Transit Hub, and the Downtown Terminal, enabling enhanced connectivity with other modes of transit. The routes currently run a peak frequency of 30 minutes on weekday days. In 2025, Route #8 (Yonge) will be renamed Route #102 with an increased frequency of 15 minutes along the same corridor, indicating further improvements on transit service to the neighbourhood.

Figure 5: Existing Transit Routes

3.0 Future Background Conditions

Traffic operations under future background conditions were analyzed for the weekday AM and the weekday PM peak hours using the Synchro 11 software. The following three (3) future horizon years were assessed:

- Opening Year (2027)
- Future 2032 (5 years after Opening Year)
- Future 2037 (10 years after Opening Year)

Future background traffic for the study area consists of two components: traffic growth outside the study area and adjacent development site traffic within the study area. The future background conditions assessment is based on projected background traffic growth and transportation improvements planned for the study area corresponding to the horizon year.

3.1 Future Planned Transportation Improvements

There are no planned future roadways or intersection improvements in the vicinity of the study area by the horizon years of 2027, 2032 and 2037. Cycling facilities are planned along Big Bay Point Road and Yonge Street within the vicinity of proposed development as per the Mobility Network Map in the City's Official Plan.

3.2 Future Traffic Growth

The compound annual growth rates ("CAGR"), summarized in **Table 5**, were used in the analysis to determine the traffic growth component of future background traffic along Big Bay Point Road and Yonge Street for the horizon years. The growth rates were provided by City staff.

Table 5: Traffic Growth Rates

Roadway	Compound Annual Growth Rates (CAGR)	
	Up to 2031	From 2031 to 2041
Big Bay Point Road	3.2%	3.3%
Yonge Street	2.0%	2.0%

3.3 Future Background Developments

The following adjacent background developments were identified from the City's website on active development projects and considered in the study:

- **520 and 526 Big Bay Point Road:** 46 units in a 6-storey apartment building
- **521, 527 and 531 Big Bay Point Road:** 58 townhouse units in three buildings
- **515 Big Bay Point Road and 623 Yonge Street:** expansion of an existing gas station with a new drive-thru restaurant
- **667-675 Yonge Street:** mixed-use development with 249 residential units and 797.3 m^2 (8582 ft^2) of retail space
- **681 and 685 Yonge Street:** mixed-use development with 176 residential units and 532.3 m^2 (5729.62 ft^2) of retail space

The adjacent background development locations are shown in **Figure 6**. The site trips for the adjacent background developments were obtained from the relevant Traffic Impact Study ("TIS") reports available on the City's development projects website. It is noted that site trips for 521, 527 and 531 Big Bay Point Road and 681 Yonge Street were obtained from the TIS report prepared for 667-675 Yonge Street. Excerpts from the TIS reports showing the adjacent background developments site trips are provided in **Appendix D**.

The adjacent background developments site trips are shown in **Figure 7** to **Figure 11**, and the combined site generated trips from these background developments are shown in **Figure 12**.

Figure 6: Background Development Locations

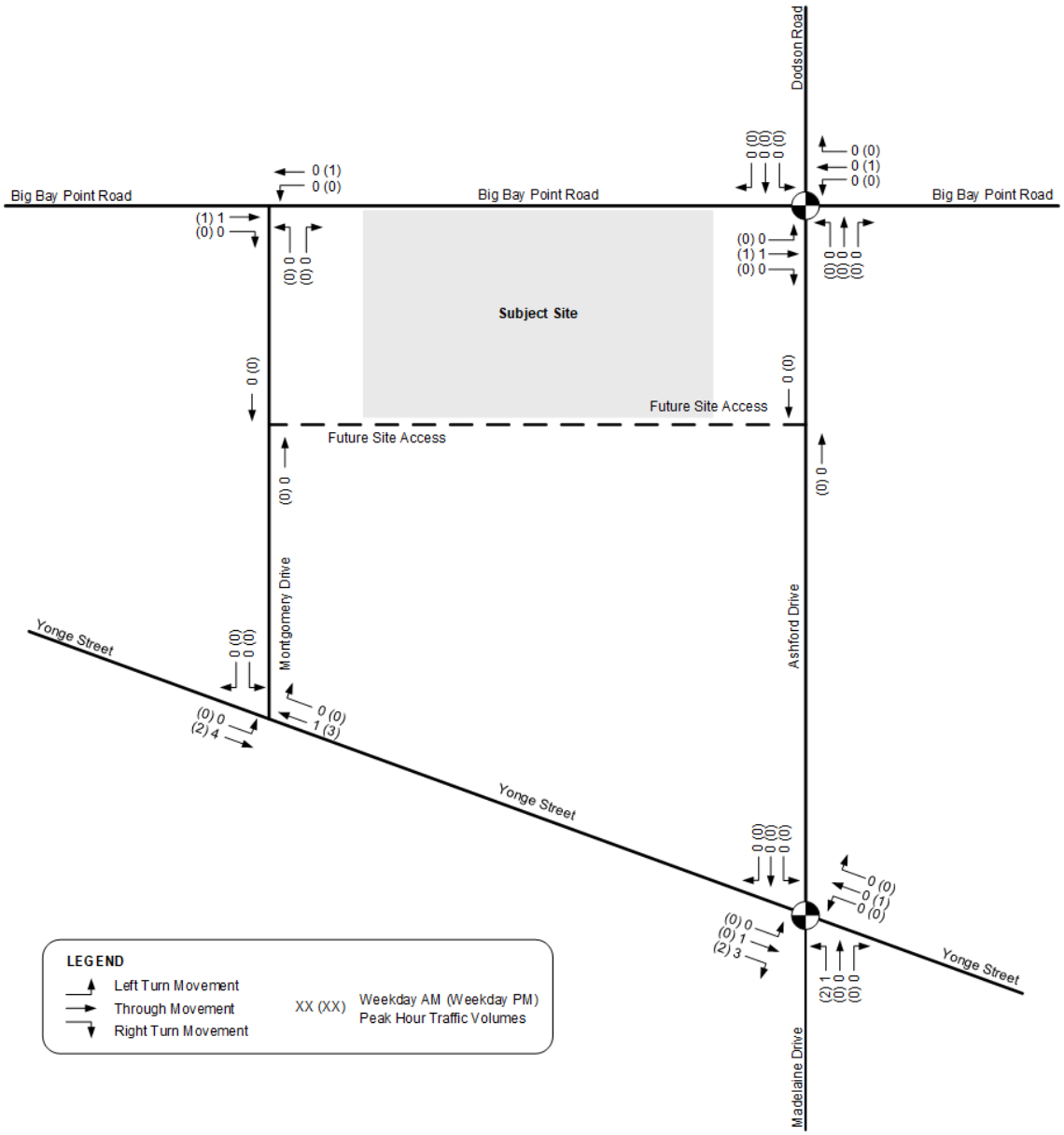


Figure 7: 520 and 526 Big Bay Point Road Site Trips

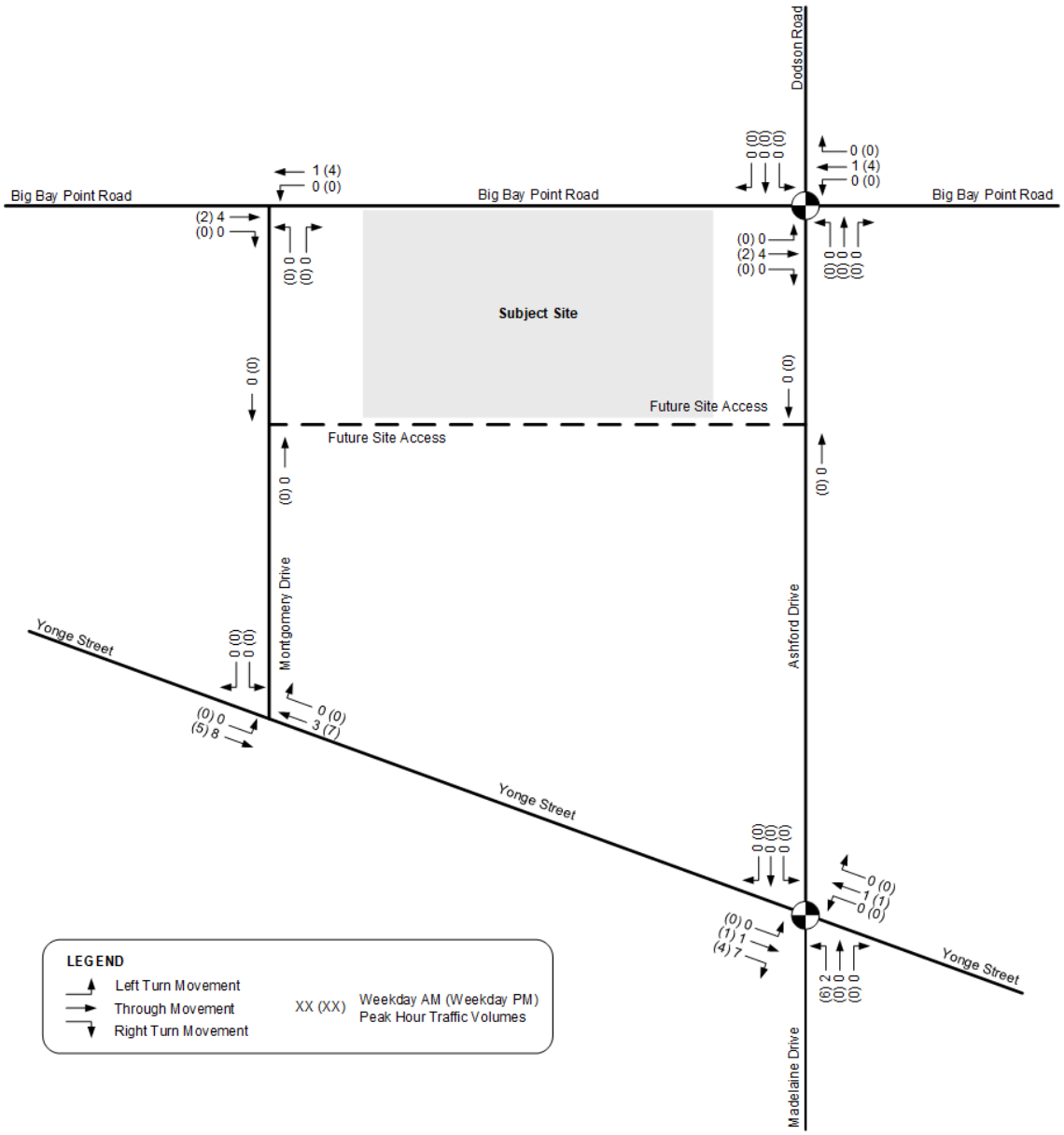


Figure 8: 521, 527 and 531 Big Bay Point Road Site Trips

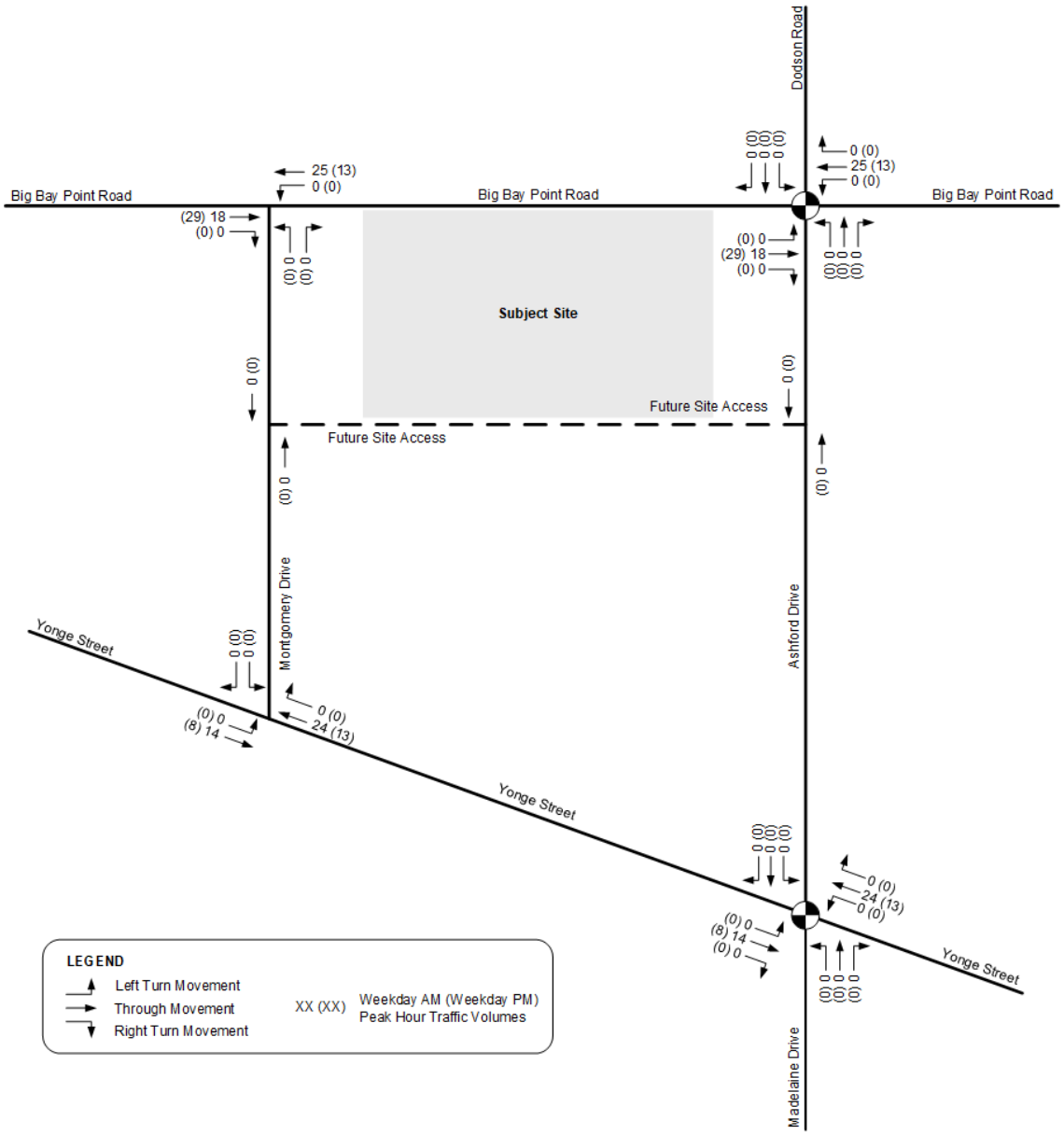


Figure 9: 623 Yonge Street and 515 Big Bay Point Road Site Trips

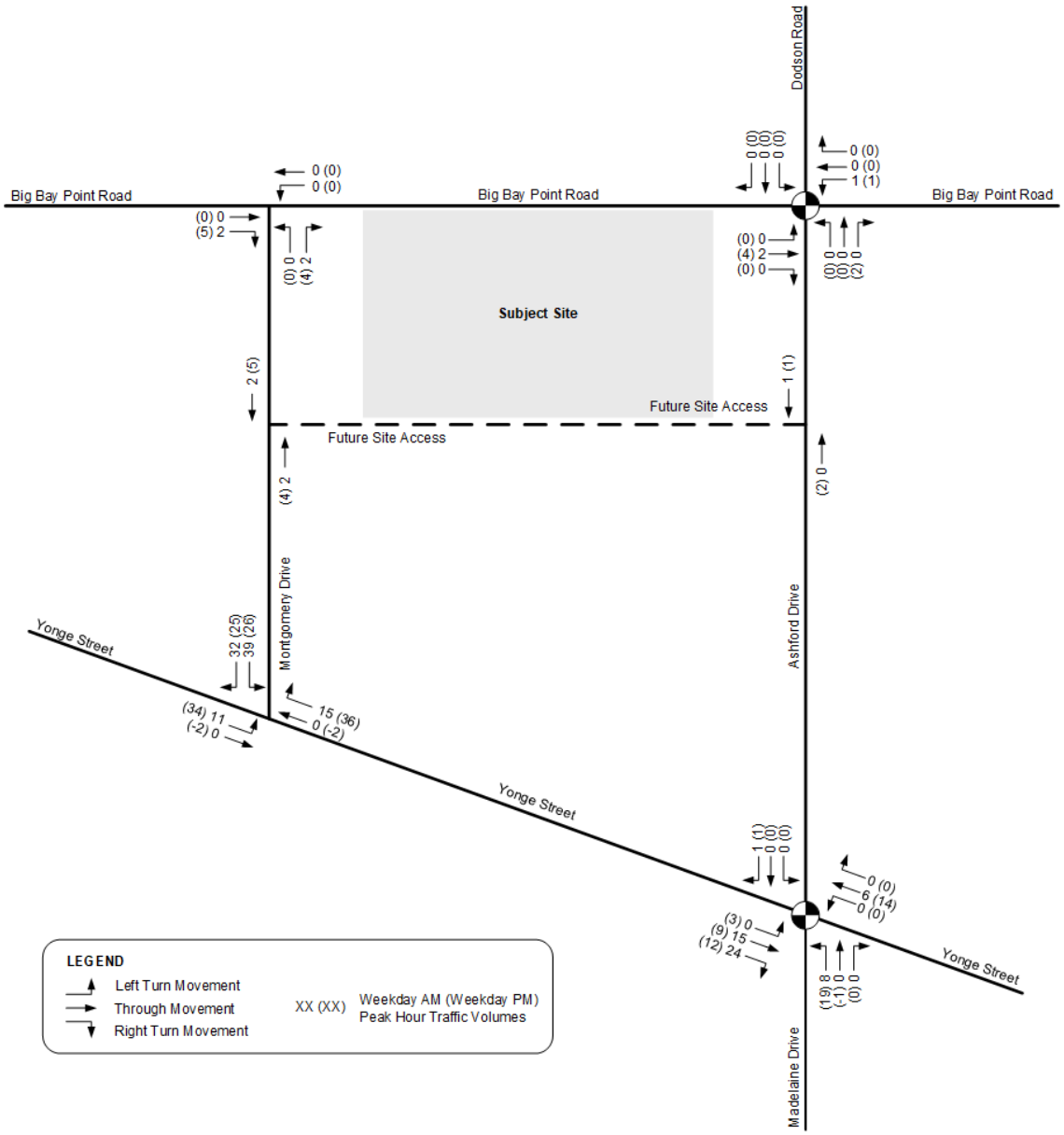


Figure 10: 667-675 Yonge Street Site Trips

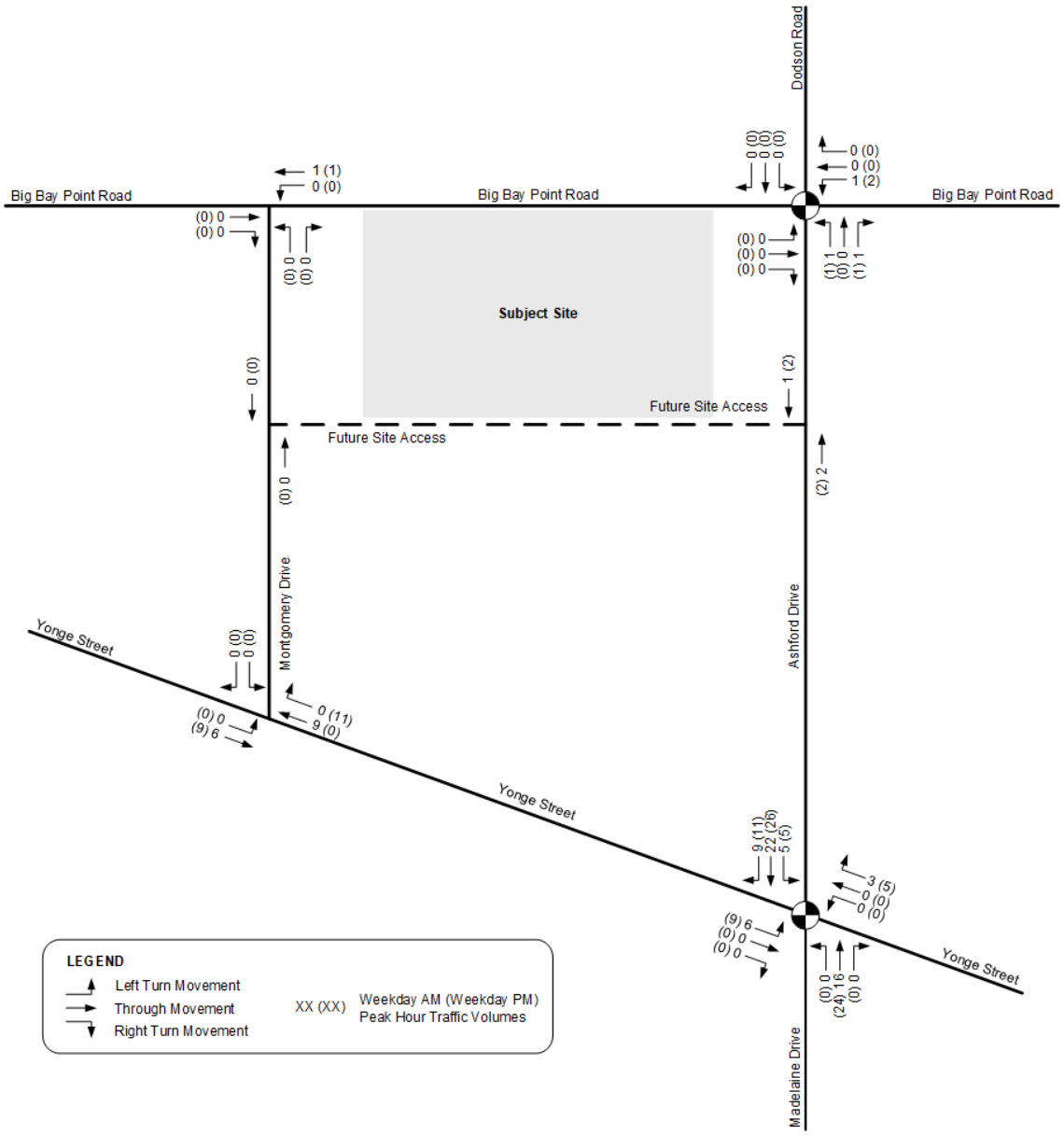


Figure 11: 681 Yonge Street Site Trips

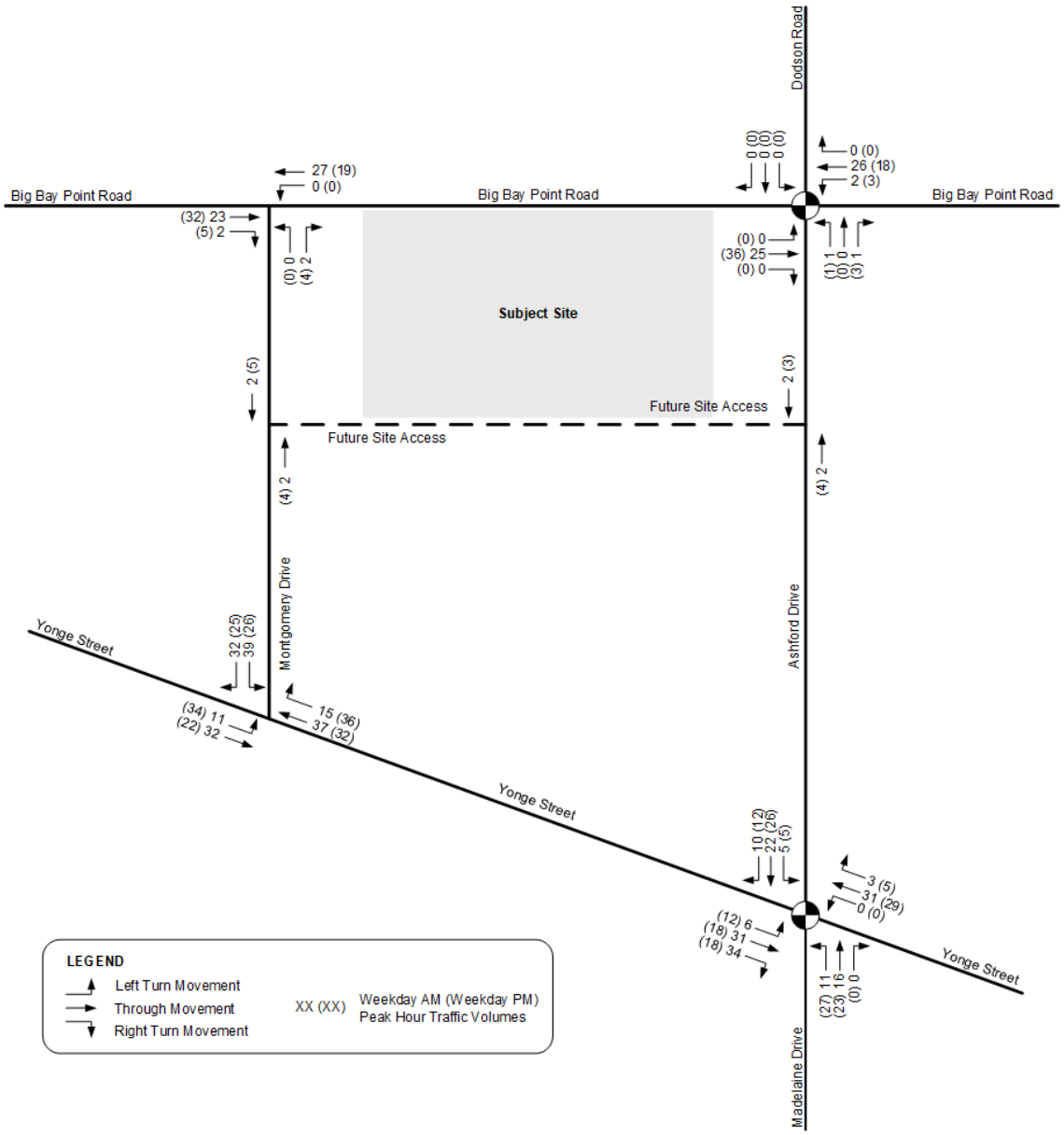


Figure 12: Background Developments Combined Site Trips

3.4 Opening Year (2027) Background Intersection Operations

Opening year (2027) background traffic volumes were estimated using growth rates from **Table 5** applied to the existing through traffic volumes along Big Bay Point Road and Yonge Street (**Figure 3**) and the resulting volumes due to background traffic growth are shown in **Figure 13**.

The opening year (2027) background traffic volumes shown in **Figure 14** were derived by adding the background traffic growth shown in **Figure 13** to the total site trips from the adjacent background developments in **Figure 12**.

Opening year (2027) background intersection operations were analyzed using the existing lane configurations illustrated in **Figure 2** and the opening year (2027) background traffic volumes from

Figure 14. The analysis results are provided in **Table 6** and **Table 7** for capacity analysis and queue analysis, respectively. Detailed calculations are provided in **Appendix E**.

The analysis results in **Table 6** indicate that all movements at the study intersections are expected to operate with residual capacity during the weekday AM and the weekday PM peak hours under opening year (2027) background conditions.

Moreover, the queue analysis results in **Table 7** indicate that queues can be accommodated within the available storage under opening year (2027) background conditions except for the eastbound left turn at the Yonge Street and Madelaine Drive / Ashford Drive intersection during the weekday PM peak hour.

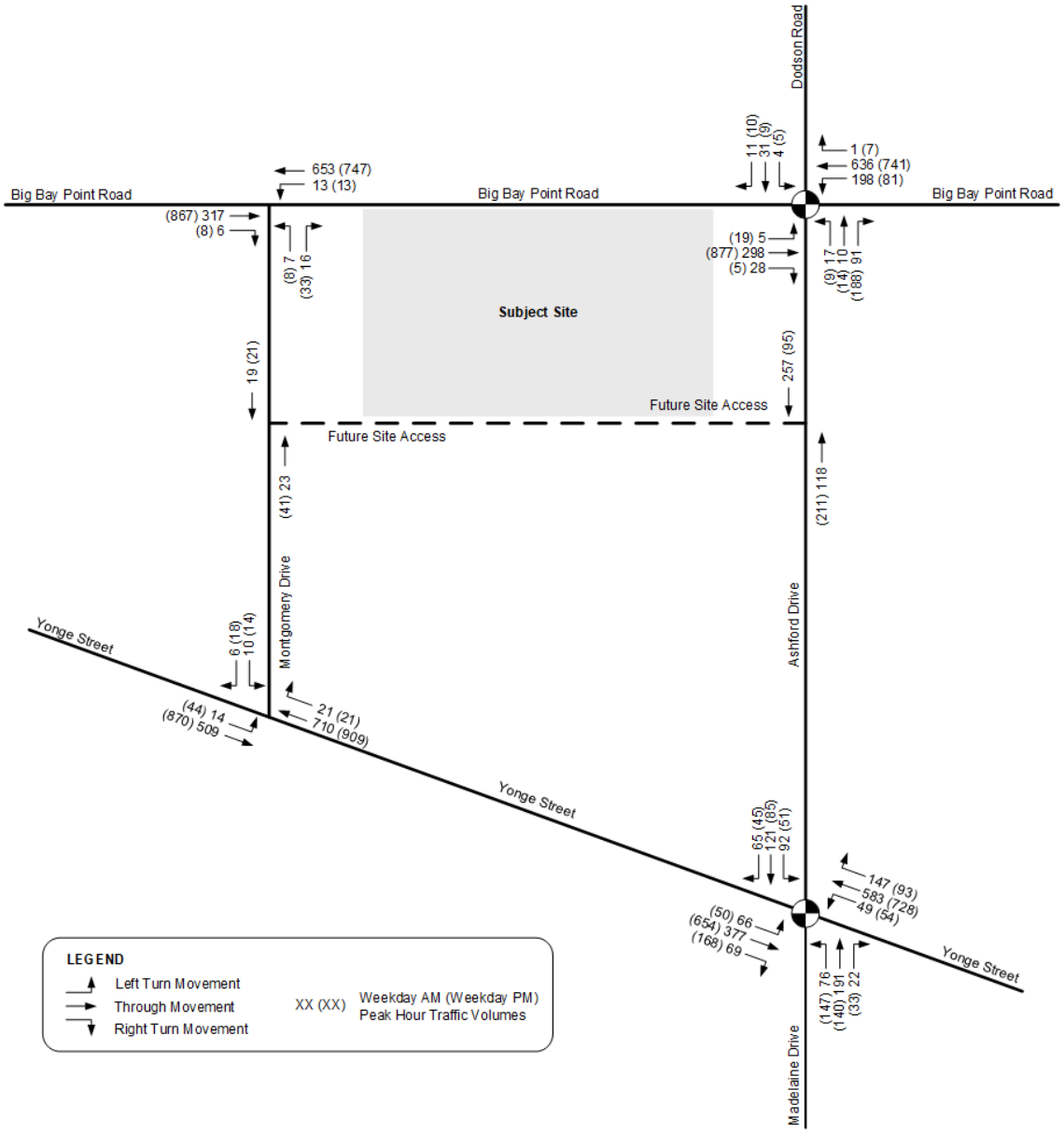


Figure 13: Opening Year (2027) Background Traffic Growth

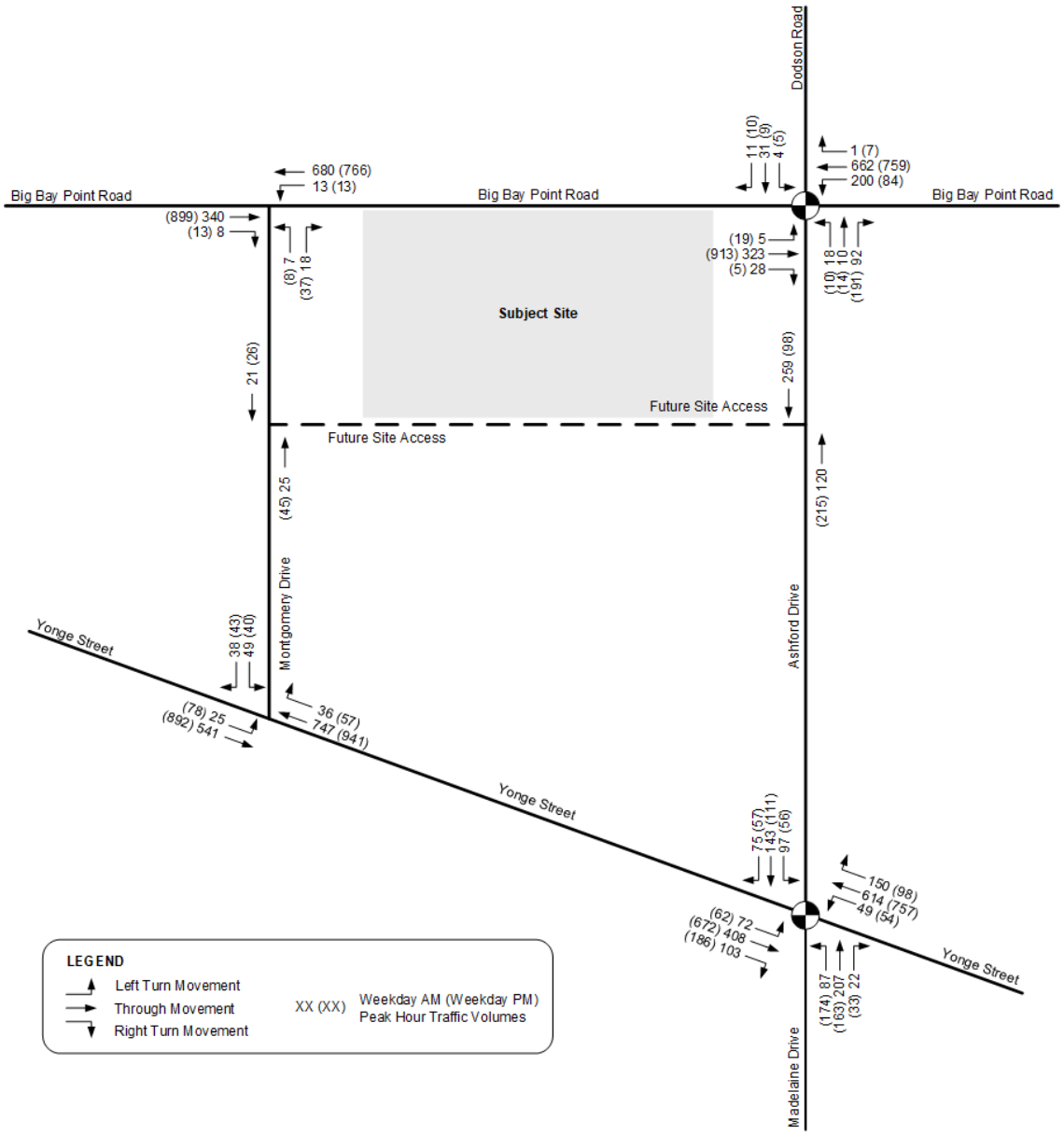


Figure 14: Opening Year (2027) Background Traffic Volumes

Table 6: Opening Year (2027) Background Conditions Intersection Operations

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)						
Overall	C	21	0.16	B	20	0.18
EBL	A	6	0.01	A	6	0.05
EBTR	A	7	0.18	A	10	0.46
WBL	A	3	0.28	A	5	0.22
WBTR	A	5	0.29	A	8	0.37

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
NBL	D	36	0.16	C	32	0.06
NBTR	D	36	0.14	C	33	0.20
SBL	C	35	0.03	C	32	0.05
SBTR	D	36	0.21	C	32	0.05
Yonge Street at Madelaine Drive / Ashford Drive (signalized)						
Overall	C	32	0.38	C	34	0.41
EBL	D	40	0.44	E	62	0.81
EBT	D	55	0.71	D	51	0.60
EBR	D	42	0.02	D	43	0.02
WBL	D	40	0.46	D	41	0.26
WBTR	E	57	0.73	D	54	0.65
NBL	B	11	0.10	B	10	0.17
NBTR	B	18	0.45	B	17	0.47
SBL	B	11	0.21	B	11	0.19
SBTR	B	15	0.29	B	17	0.48
Big Bay Point Road at Montgomery Drive (unsignalized)						
EBTR	A	0	0.15	A	0	0.38
WBL	A	9	0.01	B	11	0.02
WBT	A	0	0.22	A	0	0.24
NBLR	B	11	0.04	B	15	0.11
Yonge Street at Montgomery Drive (unsignalized)						
WBLR	B	14	0.17	C	17	0.22
NBTR	A	0	0.32	A	0	0.40
SBL	A	10	0.03	B	11	0.12
SBT	A	0	0.17	A	0	0.29

Note: LOS – level of service, v/c ratio – volume to capacity ratio

Table 7: Opening Year (2027) Background Conditions Queueing Summary

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)					
EBL	<7	<7	<7	<7	50
EBTR	14	22	43	65	>300

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
WBL	8	13	<7	7	25
WBTR	17	39	20	51	>300
NBL	<7	10	<7	<7	20
NBTR	<7	17	<7	22	>50
SBL	<7	<7	<7	<7	25
SBTR	<7	15	<7	8	150
Yonge Street at Madelaine Drive / Ashford Drive (signalized)					
EBL	18	30	**39**	**61**	30
EBT	53	75	42	63	>200
EBR	<7	<7	<7	<7	>200
WBL	20	32	12	22	75
WBTR	51	75	39	60	>200
NBL	<7	11	<7	11	95
NBTR	61	93	67	99	>300
SBL	<7	15	<7	12	180
SBTR	36	56	66	97	270
Big Bay Point Road at Montgomery Drive (unsignalized)					
EBTR	-	<7	-	<7	>200
WBL	-	<7	-	<7	40
NBLR	-	<7	-	<7	>50
Yonge Street at Montgomery Drive (unsignalized)					
WBLR	-	<7	-	<7	125
NBTR	-	<7	-	<7	175
SBL	-	<7	-	<7	50

3.4.1 Opening Year (2027) Background Conditions Mitigation Measures

The following mitigation measure was assessed to see if the eastbound left turn queues during the weekday PM peak hour at the intersection of Yonge Street and Madelaine Drive / Ashford Drive can be improved during Opening Year (2027) Future Background conditions:

- Signal timing splits were optimized at this intersection during the weekday AM and the weekday PM peak hours.

The results from the proposed signal timing splits optimization are presented in **Table 8** and detailed calculations are provided in **Appendix F**. The results show that the intersection operation will improve with signal timing splits optimization; however, the eastbound left turn queues are still expected to

exceed the available storage with LOD 'D' and v/c ratio of 0.73. The recommended signal timing improvements at the intersection of Yonge Street and Madelaine Drive / Ashford Drive were carried through to all future background and future total conditions during the weekday PM peak hour.

Table 8: Opening Year (2027) Background Conditions Operations with Optimized Signal Timing

Intersection / Movement	PM Peak Hour					Available Storage
	LOS	Delay (s)	v/c ratio	50th Percentile Queue (m)	95th Percentile Queue (m)	
Yonge Street at Madelaine Drive / Ashford Drive (signalized)						
Overall	C	25	0.56	-	-	-
EBL	D	48	0.73	**38**	**56**	30
EBT	D	46	0.53	41	61	>200
EBR	D	40	0.02	<7	<7	>200
WBL	D	41	0.24	11	21	75
WBTR	D	54	0.65	39	60	>200
NBL	B	11	0.17	<7	11	95
NBTR	B	17	0.49	70	103	>300
SBL	B	11	0.20	<7	13	180
SBTR	B	17	0.49	69	101	270

3.5 Future (2032) Background Intersection Operations

Future (2032) background traffic volumes were estimated using growth rates from **Table 5** applied to the existing through traffic volumes along Big Bay Point Road and Yonge Street (**Figure 3**) and the resulting volumes due to background traffic growth are shown in **Figure 15**.

The future (2032) background traffic volumes shown in **Figure 16** were derived by adding the background traffic growth shown in **Figure 15** to the site trips from the adjacent background developments in **Figure 12**.

Future (2032) background intersection operations were analyzed using the existing lane configurations illustrated in **Figure 2** and the future (2032) background traffic volumes from **Figure 16**. The analysis results are provided in **Table 9** and **Table 10** for capacity analysis and queue analysis, respectively. Detailed calculations are provided in **Appendix G**.

The analysis results in **Table 9** indicate that all movements at the study intersections are expected to operate with residual capacity during the weekday AM and the weekday PM peak hours under future (2032) background conditions.

Moreover, the queue analysis results in **Table 10** indicate that queues can be accommodated within the available storage under future (2032) background conditions except for the eastbound left turn at the Yonge Street and Madelaine Drive / Ashford Drive intersection during the weekday PM peak hour.

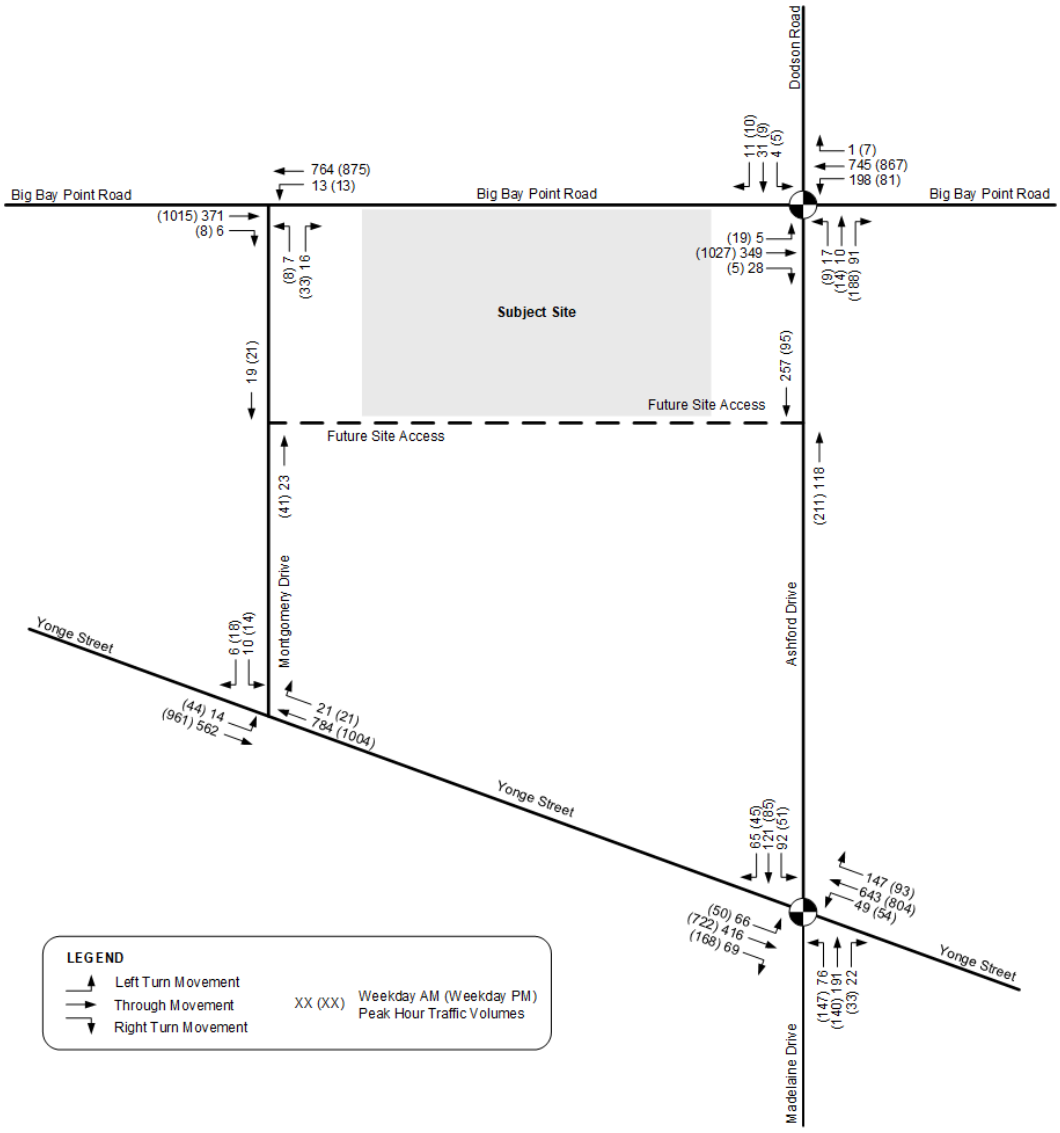


Figure 15: Future (2032) Background Traffic Growth

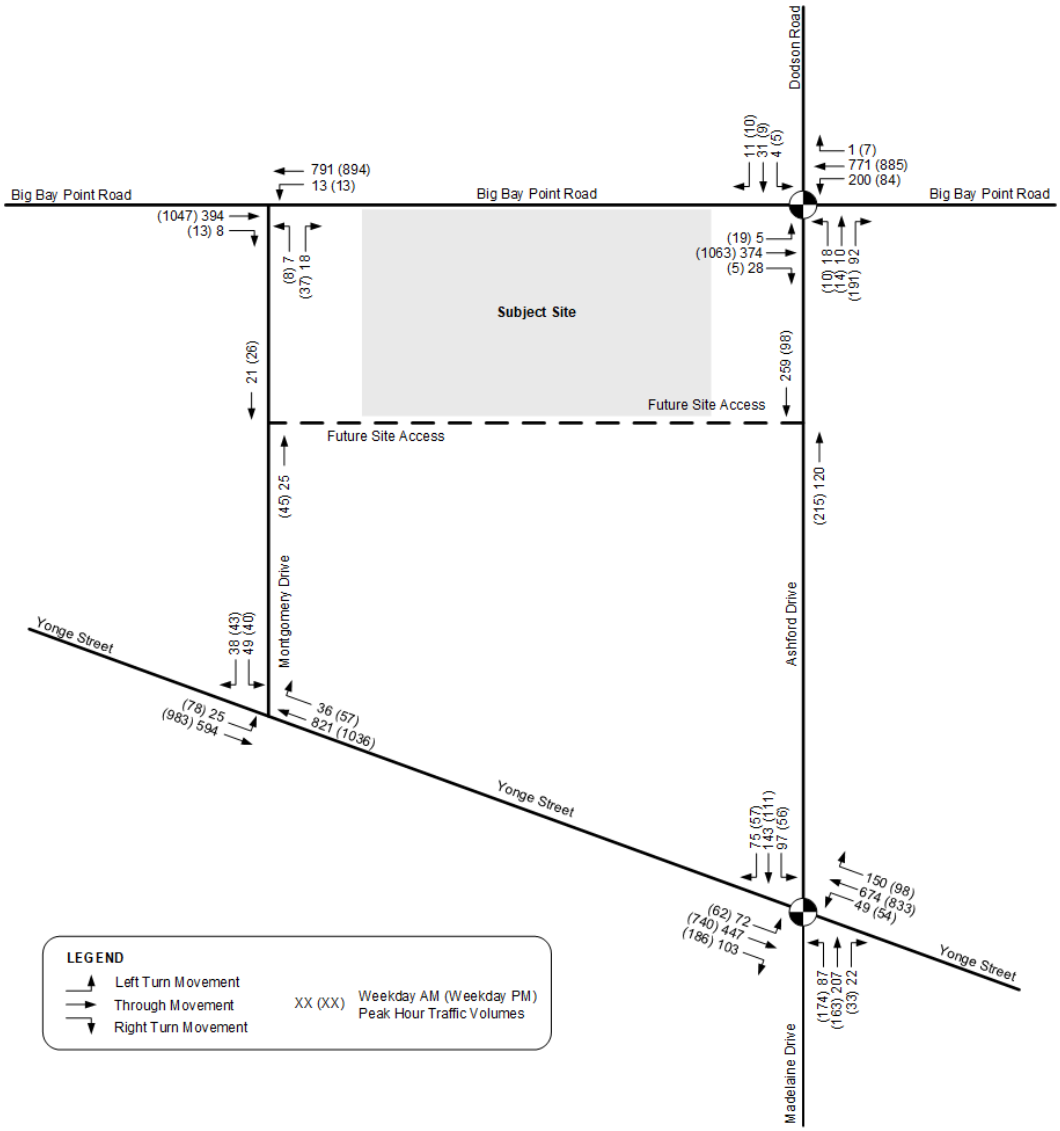


Figure 16: Future (2032) Background Traffic Volumes

Table 9: Future (2032) Background Conditions Intersection Operations

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)						
Overall	C	21	0.17	B	20	0.21
EBL	A	6	0.01	A	6	0.06
EBTR	A	8	0.2	B	11	0.53
WBL	A	3	0.29	A	6	0.26
WBTR	A	6	0.34	A	8	0.43
NBL	D	36	0.16	C	32	0.06
NBTR	D	36	0.14	C	33	0.2

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
SBL	C	35	0.03	C	32	0.05
SBTR	D	36	0.21	C	32	0.05
Yonge Street at Madelaine Drive / Ashford Drive (signalized)						
Overall	C	32	0.39	C	32	0.40
EBL	D	40	0.44	D	48	0.73
EBT	D	55	0.71	D	46	0.53
EBR	D	42	0.02	D	41	0.02
WBL	D	40	0.46	D	42	0.24
WBTR	E	57	0.73	D	55	0.65
NBL	B	11	0.11	B	12	0.19
NBTR	B	18	0.48	B	18	0.53
SBL	B	11	0.22	B	12	0.22
SBTR	B	16	0.32	B	18	0.53
Big Bay Point Road at Montgomery Drive (unsignalized)						
EBTR	A	0	0.17	A	0	0.45
WBL	A	9	0.01	B	11	0.02
WBT	A	0	0.25	A	0	0.29
NBLR	B	11	0.04	C	16	0.13
Yonge Street at Montgomery Drive (unsignalized)						
WBLR	B	14	0.18	C	18	0.24
NBTR	A	0	0.35	A	0	0.44
SBL	A	10	0.03	B	12	0.13
SBT	A	0	0.19	A	0	0.31

Note: LOS – level of service, v/c ratio – volume to capacity ratio

Table 10: Future (2032) Background Conditions Queueing Summary

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)					
EBL	<7	<7	<7	<7	50
EBTR	16	25	54	80	>300
WBL	8	13	<7	7	25
WBTR	21	47	25	62	>300

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
NBL	<7	10	<7	<7	20
NBTR	<7	17	<7	22	>50
SBL	<7	<7	<7	<7	25
SBTR	<7	15	<7	8	150
Yonge Street at Madelaine Drive / Ashford Drive (signalized)					
EBL	18	30	**38**	**56**	30
EBT	53	75	41	61	>200
EBR	<7	<7	<7	<7	>200
WBL	20	32	11	21	75
WBTR	51	75	39	60	>200
NBL	<7	11	<7	11	95
NBTR	68	103	79	115	>300
SBL	<7	15	<7	13	180
SBTR	40	61	77	113	270
Big Bay Point Road at Montgomery Drive (unsignalized)					
EBTR	-	<7	-	<7	>200
WBL	-	<7	-	<7	40
NBLR	-	<7	-	<7	>50
Yonge Street at Montgomery Drive (unsignalized)					
WBLR	-	<7	-	7	125
NBTR	-	<7	-	<7	175
SBL	-	<7	-	<7	50

3.6 Future (2037) Background Intersection Operations

Future (2037) background traffic volumes were estimated using growth rates from **Table 5** applied to the existing through traffic volumes along Big Bay Point Road and Yonge Street (**Figure 3**) and the resulting volumes due to background traffic growth are shown in **Figure 17**.

The future (2037) background traffic volumes shown in **Figure 18** were derived by adding the background traffic growth shown in **Figure 17** to the site trips from the adjacent background developments in **Figure 12**.

Future (2037) background intersection operations were analyzed using the existing lane configurations illustrated in **Figure 2** and the future (2037) background traffic volumes from **Figure 18**. The analysis results are provided in **Table 11** and **Table 12** for capacity analysis and queue analysis, respectively. Detailed calculations are provided in **Appendix H**.

The analysis results in **Table 11** indicate that all movements at the study intersections are expected to operate with residual capacity during the weekday AM and the weekday PM peak hours under future (2037) background conditions.

Moreover, the queue analysis results in **Table 12** indicate that queues can be accommodated within the available storage under future (2037) background conditions except for the eastbound left turn at the Yonge Street and Madelaine Drive / Ashford Drive intersection during the weekday PM peak hour.

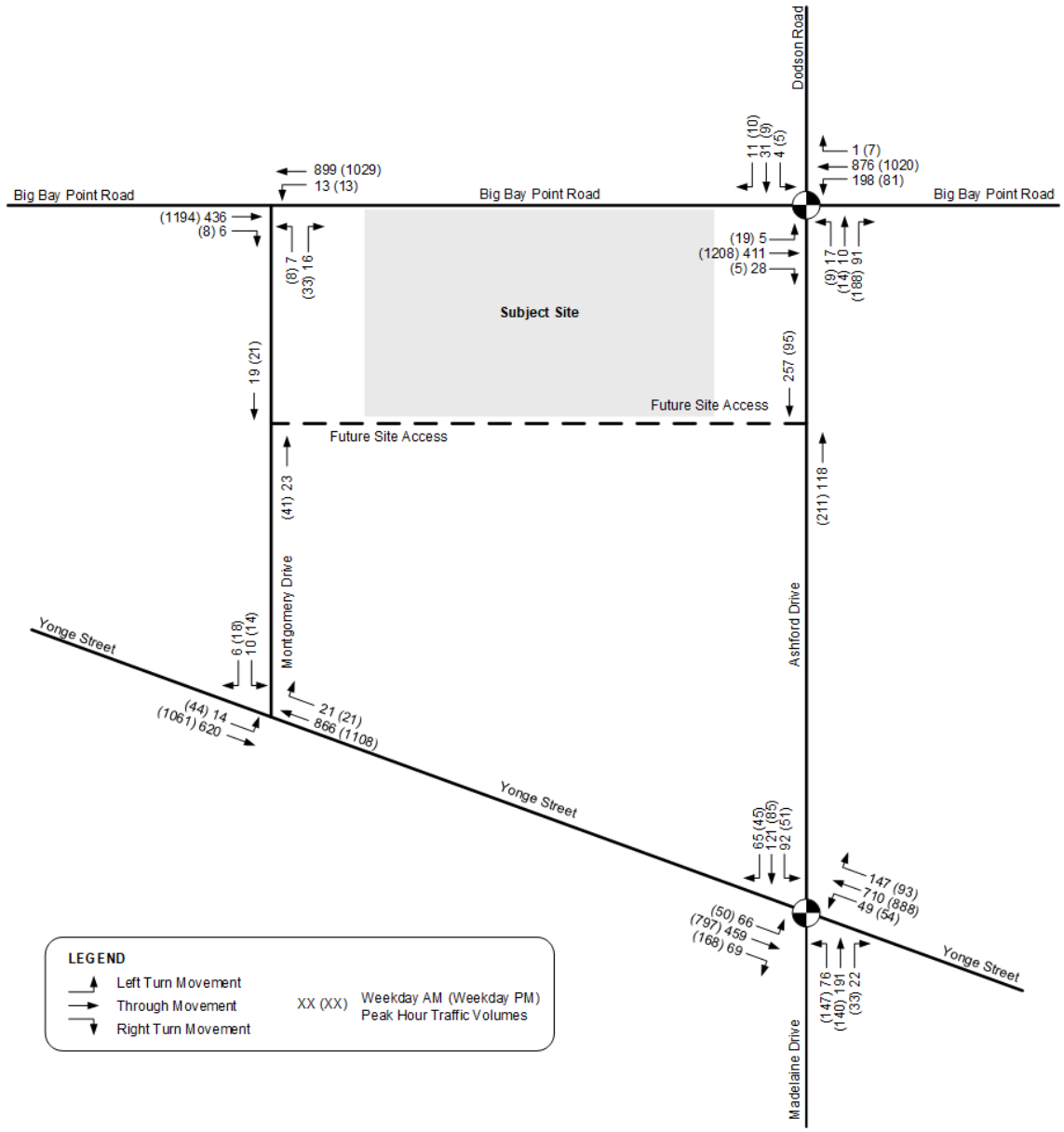


Figure 17: Future (2037) Background Traffic Growth

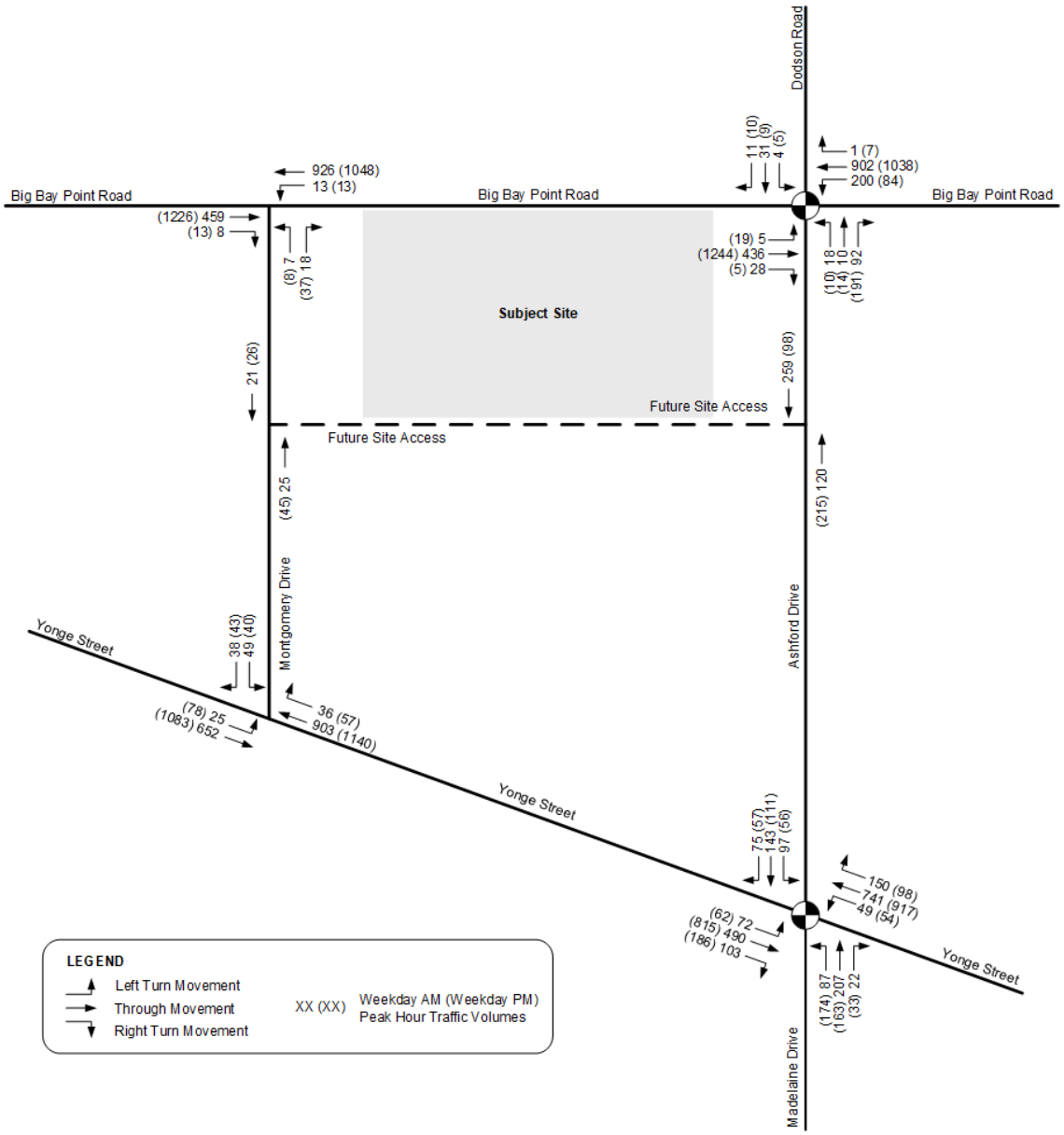


Figure 18: Future (2037) Background Traffic Volumes

Table 11: Future (2037) Background Conditions Intersection Operations

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)						
Overall	C	21	0.19	B	20	0.24
EBL	A	6	0.01	A	6	0.07
EBTR	A	8	0.24	B	12	0.62
WBL	A	3	0.3	A	7	0.32
WBTR	A	6	0.4	A	9	0.5

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
NBL	D	36	0.16	C	32	0.06
NBTR	D	36	0.14	C	33	0.21
SBL	C	35	0.03	C	32	0.05
SBTR	D	36	0.21	C	32	0.05
Yonge Street at Madelaine Drive / Ashford Drive (signalized)						
Overall	C	32	0.40	C	33	0.42
EBL	D	40	0.44	D	48	0.73
EBT	D	55	0.71	D	46	0.53
EBR	D	42	0.02	D	41	0.02
WBL	D	40	0.46	D	42	0.24
WBTR	E	57	0.73	D	55	0.65
NBL	B	11	0.12	B	12	0.21
NBTR	B	19	0.52	B	19	0.58
SBL	B	12	0.24	B	12	0.24
SBTR	B	16	0.34	B	19	0.57
Big Bay Point Road at Montgomery Drive (unsignalized)						
EBTR	A	0	0.20	A	0	0.52
WBL	A	9	0.01	B	13	0.03
WBT	A	0	0.3	A	0	0.34
NBLR	B	11	0.04	C	19	0.15
Yonge Street at Montgomery Drive (unsignalized)						
WBLR	B	15	0.19	C	19	0.26
NBTR	A	0	0.39	A	0	0.49
SBL	B	10	0.04	B	13	0.15
SBT	A	0	0.21	A	0	0.35

Note: LOS – level of service, v/c ratio – volume to capacity ratio

Table 12: Future (2037) Background Conditions Queueing Summary

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)					
EBL	<7	<7	<7	<7	50
EBTR	19	29	69	103	>300

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
WBL	8	13	<7	7	25
WBTR	26	57	31	77	>300
NBL	<7	10	<7	<7	20
NBTR	<7	17	<7	23	>50
SBL	<7	<7	<7	<7	25
SBTR	<7	15	<7	8	150
Yonge Street at Madelaine Drive / Ashford Drive (signalized)					
EBL	18	30	**38**	**56**	30
EBT	53	75	41	61	>200
EBR	<7	<7	<7	<7	>200
WBL	20	32	11	21	75
WBTR	51	75	39	60	>200
NBL	<7	11	<7	11	95
NBTR	77	114	90	130	>300
SBL	<7	15	<7	13	180
SBTR	44	67	87	126	270
Big Bay Point Road at Montgomery Drive (unsignalized)					
EBTR	-	<7	-	<7	>200
WBL	-	<7	-	<7	40
NBLR	-	<7	-	<7	>50
Yonge Street at Montgomery Drive (unsignalized)					
WBLR	-	<7	-	8	125
NBTR	-	<7	-	<7	175
SBL	-	<7	-	<7	50

4.0 Proposed Development

4.1 Development Concept

The proposed development consists of two 6-story apartment buildings that include a total of 456 residential units. A total of 327 parking spaces will be provided on site for the proposed development. Vehicular access to the site will be an internal roadway between Montgomery Road and Ashford Drive. The site concept plan is provided in **Appendix I**.

4.2 Compatibility with the Transportation Master Plan

The population growth due to the proposed residential development and the adjacent background developments were estimated to determine if the proposed development is compatible with the City's Transportation Master Plan ("TMP"). The relative locations of the subject site and adjacent background development are illustrated in **Figure 6**. The subject site is located within Traffic Zone 14 as shown in **Figure 19**.

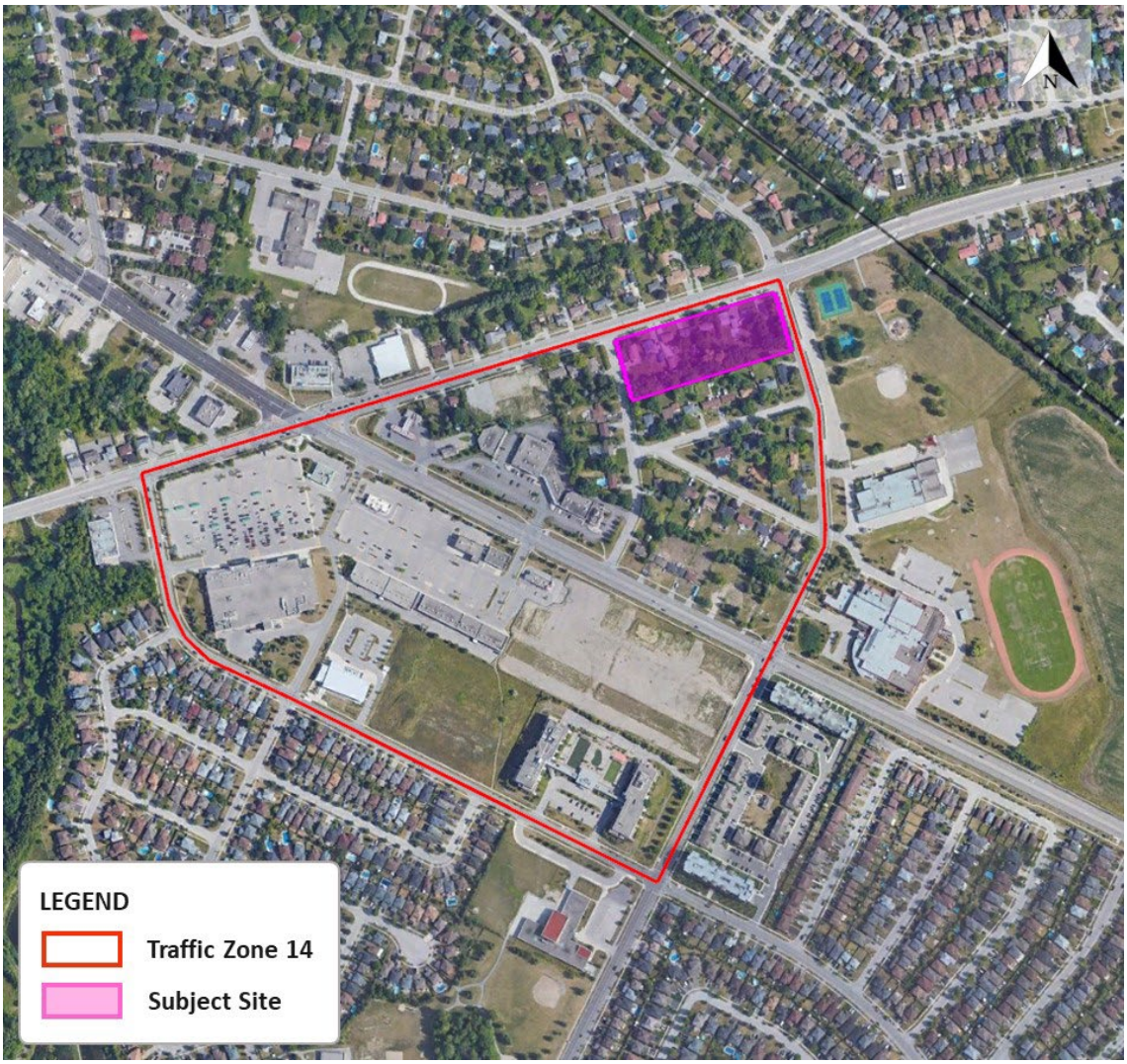


Figure 19: Traffic Zone 14 and Subject Site Location

The numbers of persons expected to be added to Traffic Zone 14 from the adjacent background developments and the subject site were estimated based on the number of residential units added by these developments and the average number of persons per household obtained from 2016 TTS data. The 2016 TTS data showing the number of persons per household by dwelling type is provided in **Appendix J**.

The proposed development will add 456 residential units and a summary of the forecasted population for Traffic Zone 14 is provided in **Table 13**. The results show that the forecasted population from the proposed residential development and the adjacent background development is expected to be higher

than the forecasted population in the City's TMP; however, it is noted that the City's TMP is currently being updated and Traffic Zone 14 is within an intensification corridor where the proposed residential development complements existing commercial developments and the density supports transit. Therefore, the proposed development is considered compatible with the City's TMP and Official Plan.

Table 13: Traffic Zone 14 Forecasted Population

Developments	People per Household		Forecasted Population
	Townhouse	Apartment	
545-565 Big Bay Point Road (subject site) – 456 apartment units	1.6	1.5	684
520 and 526 Big Bay Point Road – 46 apartment units			69
521, 527 and 531 Big Bay Point Road – 58 townhouses			93
667-675 Yonge Street – 227 apartment units			341
681 and 685 Yonge Street – 176 apartment units			264
Estimated Population Growth from Planned and Proposed Developments			1,451
Existing Population from TMP			447
2041 Population Forecasted from Planned and Proposed Developments			1,898
2041 Forecasted Population from TMP			1,275

4.3 Trip Generation

The Land Use Codes that align with the site characteristics of the proposed development from the Institute of Transportation Engineers (ITE) Trip Generation Manual 11th Edition is Mid-Rise Multifamily Housing (LU Code 221). The site location is in a general urban environment that is not adjacent to rail transit and relevant excerpts from the ITE Trip Generation Manual are provided in **Appendix K**.

The projected trip generation for the proposed development during the weekday AM and the weekday PM peak hours of adjacent street traffic are summarized in **Table 14**.

Table 14: Trip Generation Summary

ITE Land Use	Units	Parameter	AM Peak Hour			PM Peak Hour		
			In	Out	Total	In	Out	Total
Mid-Rise Multifamily Housing (ITE LU Code 221)	456	Equation	T = 0.44 (X) – 11.61			T = 0.39 (X) + 0.34		
		Auto Trips	43	146	189	109	69	178
		Net Auto Trips	**43**	**146**	**189**	**109**	**69**	**178**

As detailed in **Table 14**, the proposed development is expected to generate 189 new auto trips during the weekday AM peak hour (43 trips in / 146 trips out) and 178 new auto trips during the weekday PM peak hour (109 trips in / 69 trips out).

4.4 Trip Distribution

The existing road network allows the vehicular travels in north-south direction via Yonge Street and in the east-west direction via Big Bay Point Road. Alternatively, north-south travels can take Dodson Road-Ashford Drive-Madelaine Drive corridor adjacent to the site. Based on the road network described and existing travel patterns on the adjacent streets, the resulting trip distribution is summarized in **Table 15**.

The resulting site generated trips for the proposed development are illustrated in **Figure 20**.

Table 15: Trip Distribution Summary

From / To	Via	Inbound	Outbound
North	Yonge Street	25%	25%
	Ashford Drive-Dodson Road	1%	1%
South	Yonge Street	20%	20%
	Ashford Drive-Madelaine Drive	15%	15%
East	Big Bay Point Road	14%	14%
West	Big Bay Point Road	25%	25%
Total		**100%**	**100%**

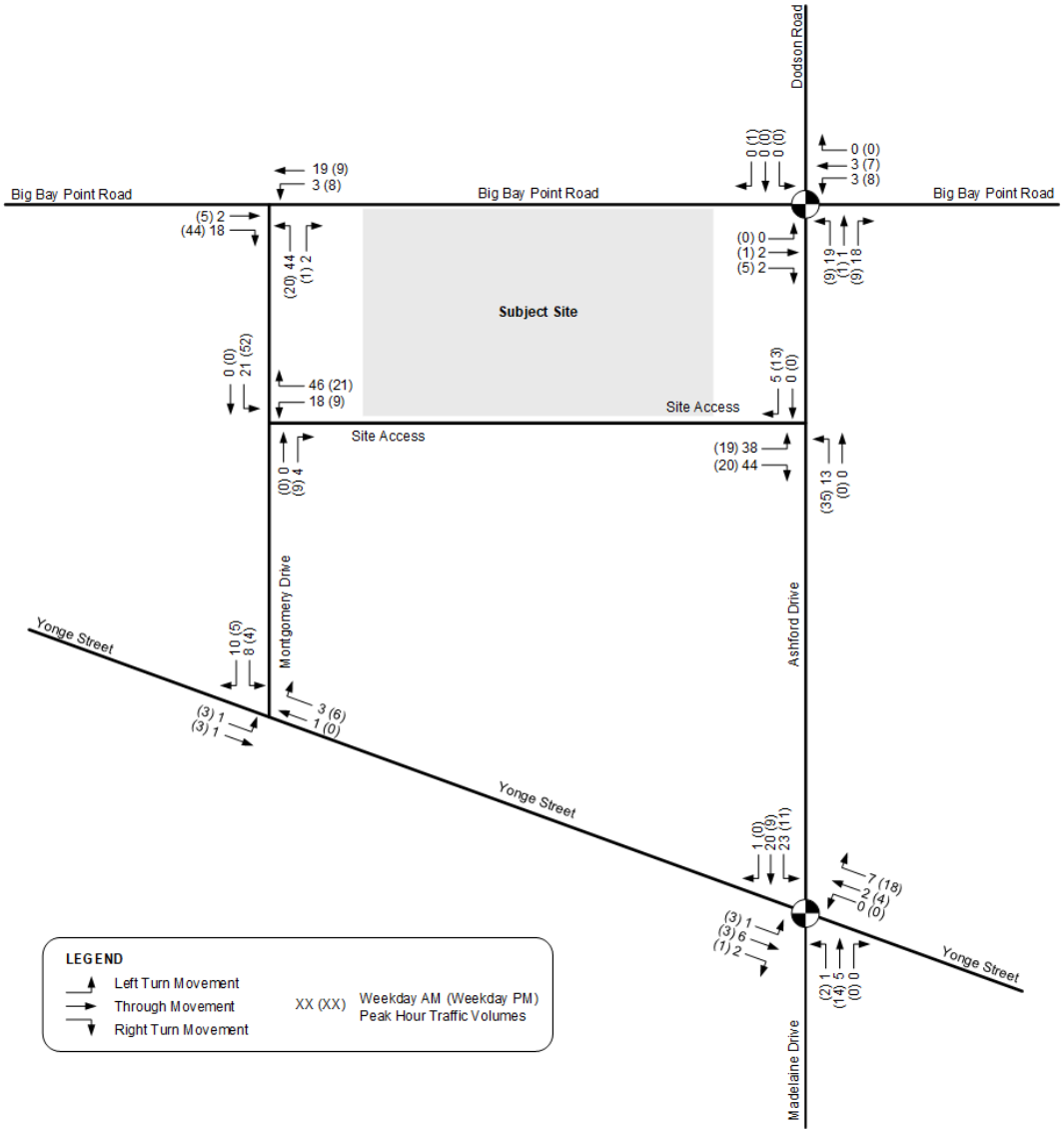


Figure 20: Total Site Traffic

5.0 Future Total Conditions

Traffic operations under future total conditions were analyzed for the weekday AM and the weekday PM peak hours using the Synchro 11 software and the future lane configurations with the proposed development illustrated in **Figure 21**. The following three (3) future horizon years were assessed:

- Opening Year (2027)
- Future 2032 (5 years after Opening Year)
- Future 2037 (10 years after Opening Year)

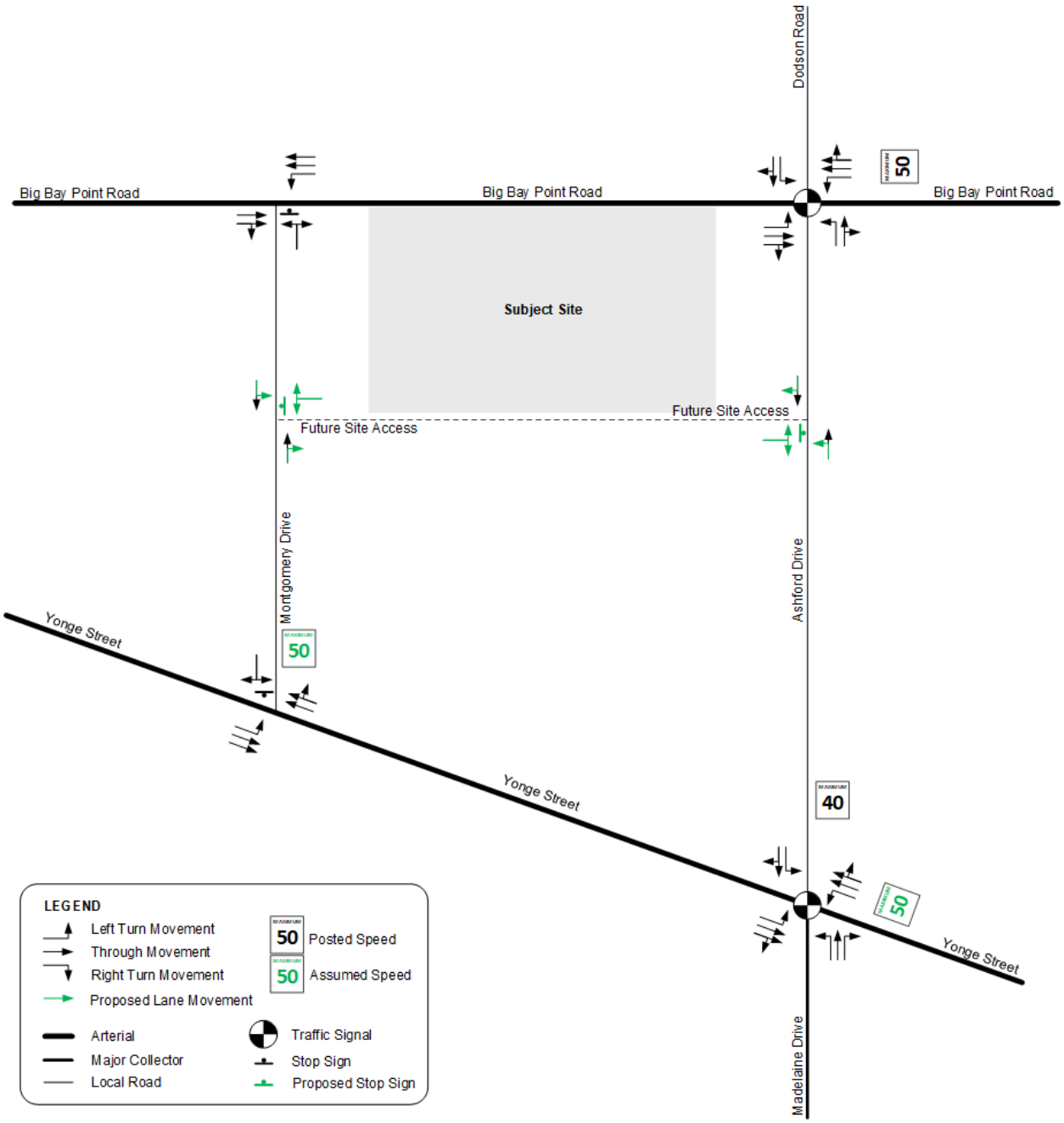


Figure 21: Future (2027) Intersection Lane Configuration

5.1 Opening Year (2027) Total Intersection Operations

The opening year (2027) total traffic volumes were estimated by adding the site traffic (**Figure 20**) to the opening year (2027) background volumes (**Figure 14**). The resulting opening year (2027) total traffic volumes are illustrated in **Figure 22**. The analysis results are provided in **Table 16** and **Table 17** for capacity analysis and queue analysis, respectively. Detailed calculations are provided in **Appendix L**.

The analysis results in **Table 16** indicate that all movements at the study intersections are expected to operate with residual capacity during the weekday AM and weekday PM peak hours under opening year (2027) total conditions.

Moreover, the analysis results in **Table 17** indicate that queues can be accommodated within the available storage under opening year (2027) total conditions except for the eastbound left turn at the Yonge Street and Madelaine Drive / Ashford Drive intersection during the weekday PM peak hour.

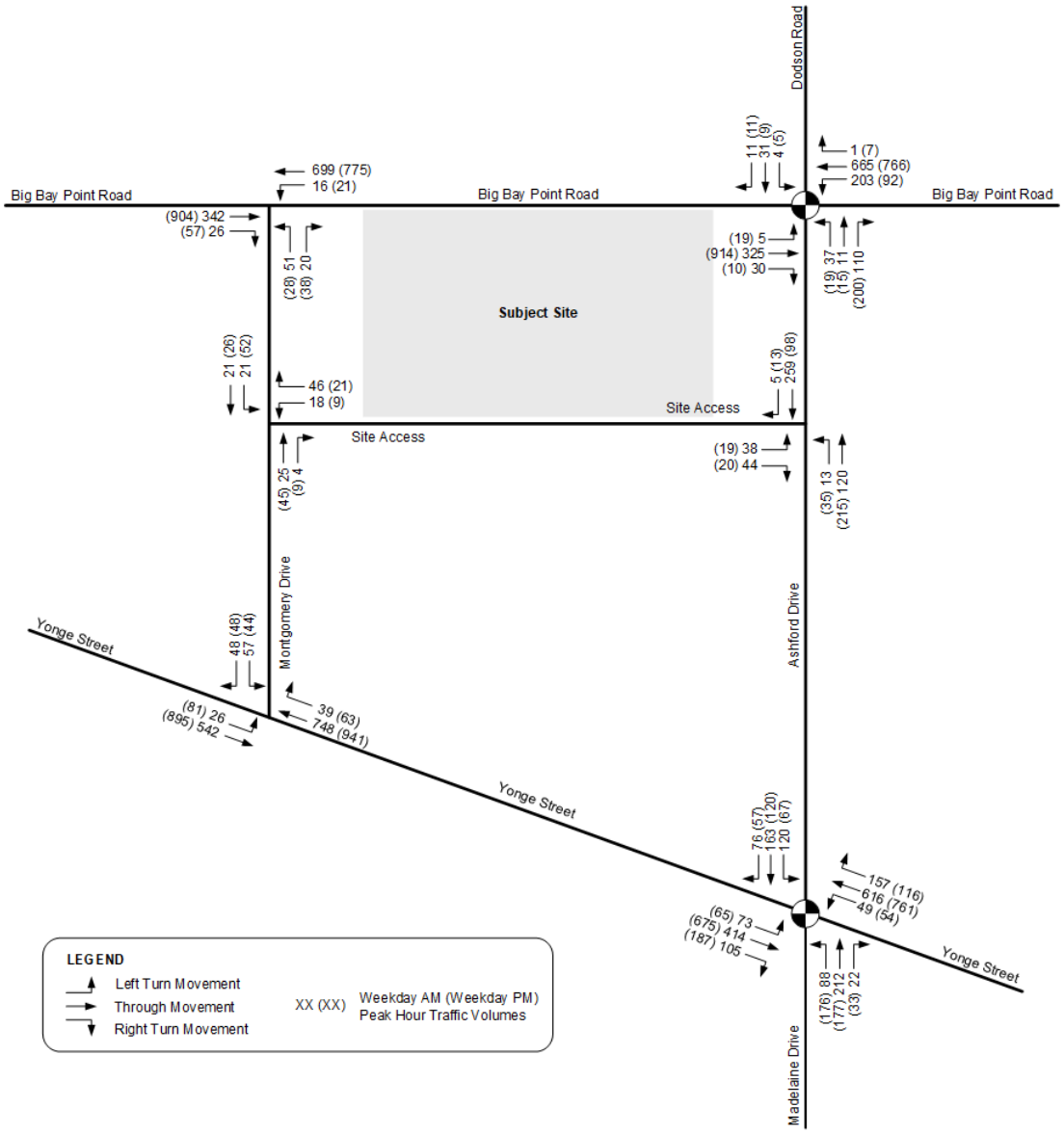


Figure 22: Opening Year (2027) Total Traffic Volumes

Table 16: Opening Year (2027) Total Conditions Intersection Operations

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)						
Overall	C	21	0.17	B	20	0.19
EBL	A	7	0.01	A	6	0.05
EBTR	A	8	0.19	A	10	0.46
WBL	A	4	0.29	A	5	0.25
WBTR	A	6	0.30	A	8	0.37
NBL	D	36	0.24	C	32	0.11
NBTR	C	35	0.14	C	33	0.21
SBL	C	34	0.03	C	32	0.05
SBTR	C	35	0.16	C	32	0.05
Yonge Street at Madelaine Drive / Ashford Drive (signalized)						
Overall	C	32	0.39	C	32	0.41
EBL	D	39	0.45	D	48	0.73
EBT	D	52	0.69	D	47	0.56
EBR	D	41	0.02	D	40	0.02
WBL	D	40	0.54	D	41	0.30
WBTR	E	57	0.75	D	55	0.67
NBL	B	11	0.11	B	12	0.18
NBTR	B	19	0.47	B	19	0.51
SBL	B	12	0.22	B	12	0.22
SBTR	B	16	0.30	B	18	0.50
Big Bay Point Road at Montgomery Drive (unsignalized)						
EBTR	A	0	0.15	A	0	0.39
WBL	A	9	0.01	B	11	0.03
WBT	A	0	0.22	A	0	0.25
NBLR	B	12	0.12	C	18	0.19
Yonge Street at Montgomery Drive (unsignalized)						
WBLR	B	14	0.21	C	17	0.25
NBTR	A	0	0.32	A	0	0.40
SBL	A	10	0.03	B	11	0.13
SBT	A	0	0.17	A	0	0.29
Montgomery Drive and Site Access (unsignalized)						
WBLR	A	9	0.07	A	9	0.04

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
NBTR	A	0	0.02	A	0	0.03
SBLT	A	4	0.01	A	6	0.04
Ashford Drive and Site Access (unsignalized)						
EBLR	B	12	0.13	B	11	0.06
NBLT	A	1	0.01	A	2	0.03
SBTR	A	0	0.17	A	0	0.07

Note: LOS – level of service, v/c ratio – volume to capacity ratio

Table 17: Opening Year (2027) Total Conditions Queueing Summary

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)					
EBL	<7	<7	<7	<7	50
EBTR	14	22	44	67	>300
WBL	8	14	<7	8	25
WBTR	17	40	21	52	>300
NBL	<7	16	<7	10	20
NBTR	<7	18	<7	22	>50
SBL	<7	<7	<7	<7	25
SBTR	<7	15	<7	8	150
Yonge Street at Madelaine Drive / Ashford Drive (signalized)					
EBL	18	29	**39**	**56**	30
EBT	54	76	45	65	>200
EBR	<7	<7	<7	<7	>200
WBL	24	38	14	24	75
WBTR	57	81	41	63	>200
NBL	<7	11	<7	12	95
NBTR	65	97	74	108	>300
SBL	<7	16	<7	13	180
SBTR	38	59	70	104	270
Big Bay Point Road at Montgomery Drive (unsignalized)					
EBTR	-	<7	-	<7	>200
WBL	-	<7	-	<7	40

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
NBLR	-	<7	-	<7	>50
Yonge Street at Montgomery Drive (unsignalized)					
WBLR	-	<7	-	8	125
NBTR	-	<7	-	<7	175
SBL	-	<7	-	<7	50
Montgomery Drive at Site Access (unsignalized)					
WBLR	-	<7	-	<7	90
NBTR	-	<7	-	<7	70
SBLT	-	<7	-	<7	60
Ashford Drive at Site Access (unsignalized)					
EBLR	-	<7	-	<7	90
NBLT	-	<7	-	<7	70
SBTR	-	<7	-	<7	60

5.2 Future (2032) Total Intersection Operations

Future (2032) total traffic volumes were estimated by adding the site traffic (**Figure 20**) to the future (2032) background volumes (**Figure 16**). The resulting future (2032) total traffic volumes are illustrated in **Figure 23**. The analysis results are provided in **Table 18** and **Table 19** for capacity analysis and queue analysis, respectively. Detailed calculations are provided in **Appendix M**.

The analysis results in **Table 18** indicate that all movements at the study intersections are expected to operate with residual capacity during the weekday AM and weekday PM peak hours under future (2032) total conditions.

Moreover, the analysis results in **Table 19** indicate that queues can be accommodated within the available storage under future (2032) total conditions except for the eastbound left turn at the Yonge Street and Madelaine Drive / Ashford Drive intersection during the weekday PM peak hour.

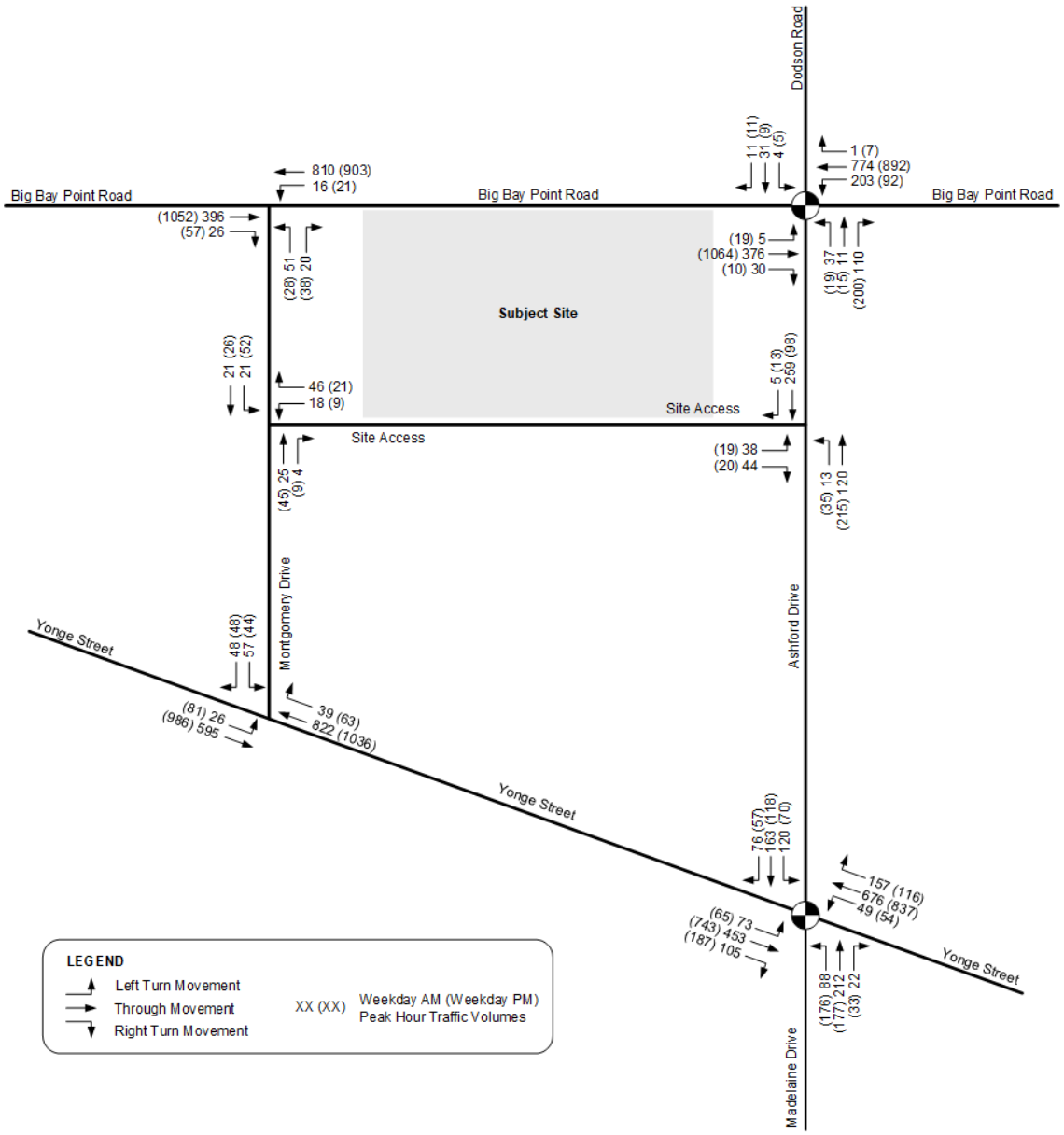


Figure 23: Future (2032) Total Traffic Volumes

Table 18: Future (2032) Total Conditions Intersection Operations

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)						
Overall	C	21	0.18	B	20	0.22
EBL	A	7	0.01	A	6	0.06
EBTR	A	9	0.21	B	11	0.53
WBL	A	4	0.31	A	6	0.29
WBTR	A	7	0.35	A	8	0.43

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
NBL	D	36	0.24	C	32	0.11
NBTR	C	35	0.14	C	33	0.21
SBL	C	34	0.03	C	32	0.05
SBTR	C	35	0.16	C	32	0.05
Yonge Street at Madelaine Drive / Ashford Drive (signalized)						
Overall	C	32	0.40	C	33	0.42
EBL	D	39	0.45	D	48	0.73
EBT	D	52	0.69	D	47	0.56
EBR	D	41	0.02	D	40	0.02
WBL	D	40	0.54	D	41	0.30
WBTR	E	57	0.75	D	55	0.67
NBL	B	11	0.11	B	12	0.19
NBTR	B	19	0.50	B	19	0.55
SBL	B	12	0.23	B	12	0.24
SBTR	B	16	0.33	B	19	0.54
Big Bay Point Road at Montgomery Drive (unsignalized)						
EBTR	A	0	0.17	A	0	0.45
WBL	A	9	0.02	B	12	0.04
WBT	A	0	0.26	A	0	0.29
NBLR	B	13	0.13	C	20	0.23
Yonge Street at Montgomery Drive (unsignalized)						
WBLR	B	14	0.22	C	18	0.26
NBTR	A	0	0.35	A	0	0.44
SBL	A	10	0.04	B	12	0.14
SBT	A	0	0.19	A	0	0.32
Montgomery Drive and Site Access (unsignalized)						
WBLR	A	9	0.07	A	9	0.04
NBTR	A	0	0.02	A	0	0.03
SBLT	A	4	0.01	A	6	0.04
Ashford Drive and Site Access (unsignalized)						
EBLR	B	12	0.13	B	11	0.06
NBLT	A	1	0.01	A	2	0.03
SBTR	A	0	0.17	A	0	0.07

Note: LOS – level of service, v/c ratio – volume to capacity ratio

Table 19: Future (2032) Total Conditions Queueing Summary

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)					
EBL	<7	<7	<7	<7	50
EBTR	16	26	55	82	>300
WBL	8	14	<7	8	25
WBTR	21	48	25	63	>300
NBL	<7	16	<7	10	20
NBTR	<7	18	<7	22	>50
SBL	<7	<7	<7	<7	25
SBTR	<7	15	<7	8	150
Yonge Street at Madelaine Drive / Ashford Drive (signalized)					
EBL	18	29	**39**	**56**	30
EBT	54	76	45	65	>200
EBR	<7	<7	<7	<7	>200
WBL	24	38	14	24	75
WBTR	57	81	41	63	>200
NBL	<7	11	<7	12	95
NBTR	72	108	83	121	>300
SBL	<7	16	<7	13	180
SBTR	42	64	79	115	270
Big Bay Point Road at Montgomery Drive (unsignalized)					
EBTR	-	<7	-	<7	>200
WBL	-	<7	-	<7	40
NBLR	-	<7	-	<7	>50
Yonge Street at Montgomery Drive (unsignalized)					
WBLR	-	<7	-	8	125
NBTR	-	<7	-	<7	175
SBL	-	<7	-	<7	50
Montgomery Drive at Site Access (unsignalized)					
WBLR	-	<7	-	<7	90
NBTR	-	<7	-	<7	70
SBLT	-	<7	-	<7	60

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
Ashford Drive at Site Access (unsignalized)					
EBLR	-	<7	-	<7	90
NBLT	-	<7	-	<7	70
SBTR	-	<7	-	<7	60

5.3 Future (2037) Total Intersection Operations

Future (2037) total traffic volumes were estimated by adding the site traffic (**Figure 20**) to the future (2037) background volumes (**Figure 18**). The resulting future (2037) total traffic volumes are illustrated in **Figure 24**. The analysis results are provided in **Table 20** and Table 21 for capacity analysis and queue analysis, respectively. Detailed calculations are provided in **Appendix N**.

The analysis results in **Table 20** indicate that all movements at the study intersections are expected to operate with residual capacity during the weekday AM and weekday PM peak hours under future (2037) total conditions.

Moreover, the analysis results in **Table 21** indicate that queues can be accommodated within the available storage under future (2037) total conditions except for the eastbound left turn at the Yonge Street and Madelaine Drive / Ashford Drive intersection during the weekday PM peak hour.

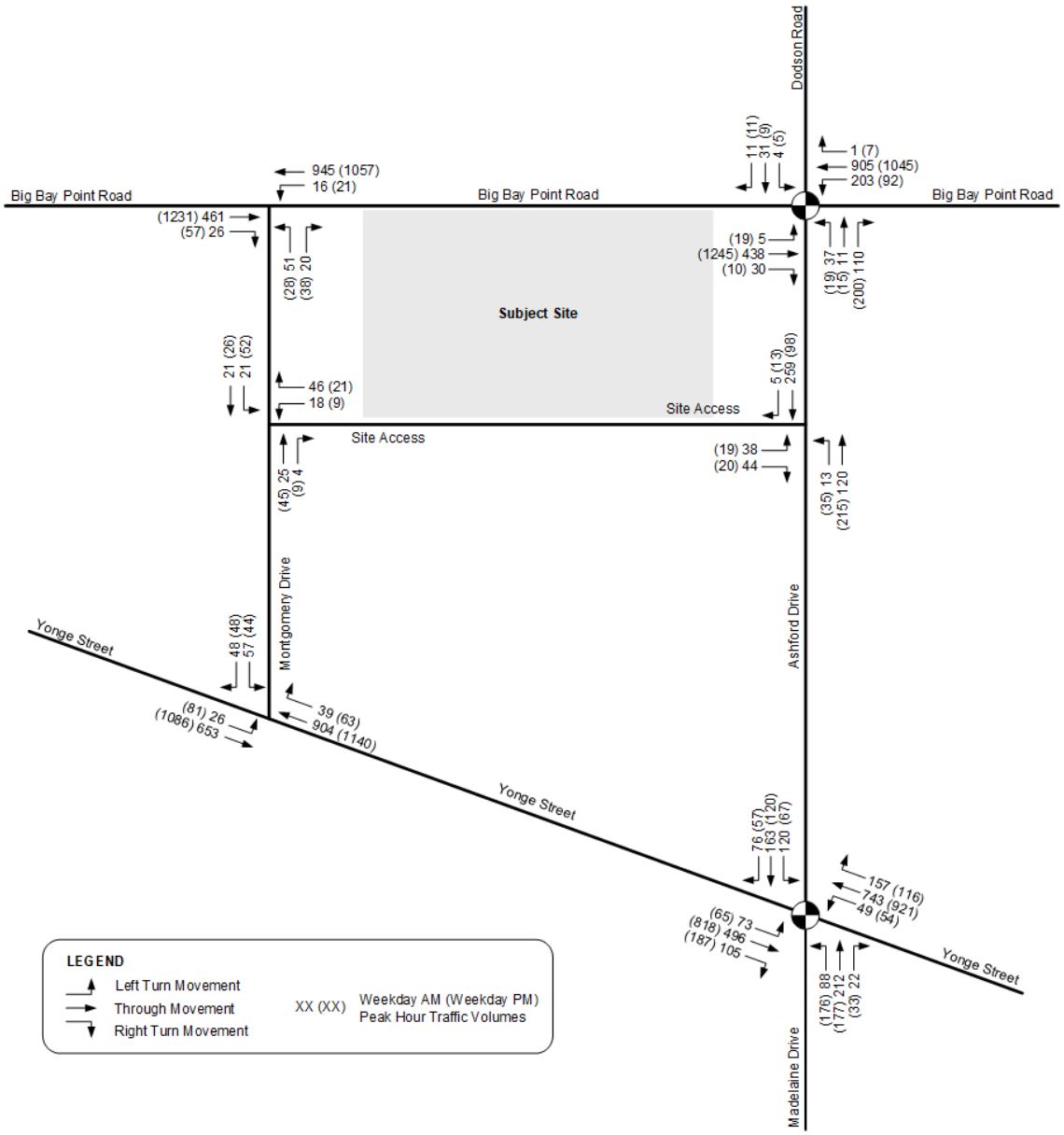


Figure 24: Future (2037) Total Traffic Volumes

Table 20: Future (2037) Total Conditions Intersection Operations

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)						
Overall	C	21	0.20	C	21	0.25
EBL	A	7	0.01	A	6	0.07
EBTR	A	9	0.25	B	12	0.63
WBL	A	4	0.32	A	8	0.35
WBTR	A	7	0.41	A	9	0.50

Intersection / Movement	AM Peak Hour			PM Peak Hour		
	LOS	Delay (s)	v/c ratio	LOS	Delay (s)	v/c ratio
NBL	D	36	0.24	C	32	0.11
NBTR	C	35	0.14	C	33	0.26
SBL	C	34	0.03	C	32	0.05
SBTR	C	35	0.16	C	32	0.05
Yonge Street at Madelaine Drive / Ashford Drive (signalized)						
Overall	C	32	0.41	C	33	0.44
EBL	D	39	0.45	D	48	0.73
EBT	D	52	0.69	D	47	0.56
EBR	D	41	0.02	D	40	0.02
WBL	D	40	0.54	D	41	0.30
WBTR	E	57	0.75	D	55	0.67
NBL	B	12	0.12	B	13	0.21
NBTR	B	20	0.54	B	20	0.60
SBL	B	13	0.25	B	13	0.27
SBTR	B	17	0.35	B	20	0.58
Big Bay Point Road at Montgomery Drive (unsignalized)						
EBTR	A	0	0.20	A	0	0.52
WBL	A	9	0.02	B	13	0.05
WBT	A	0	0.30	A	0	0.34
NBLR	B	13	0.14	C	25	0.28
Yonge Street at Montgomery Drive (unsignalized)						
WBLR	B	15	0.23	C	20	0.29
NBTR	A	0	0.39	A	0	0.49
SBL	A	10	0.04	B	13	0.15
SBT	A	0	0.21	A	0	0.35
Montgomery Drive and Site Access (unsignalized)						
WBLR	A	9	0.07	A	9	0.04
NBTR	A	0	0.02	A	0	0.03
SBLT	A	4	0.01	A	6	0.04
Ashford Drive and Site Access (unsignalized)						
EBLR	B	12	0.13	B	11	0.06
NBLT	A	1	0.01	A	2	0.03
SBTR	A	0	0.17	A	0	0.07

Note: LOS – level of service, v/c ratio – volume to capacity ratio

Table 21: Future (2037) Total Conditions Queueing Summary

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
Big Bay Point Road at Dodson Road / Ashford Drive (signalized)					
EBL	<7	<7	<7	<7	50
EBTR	19	30	69	109	>300
WBL	8	14	<7	8	25
WBTR	26	59	32	80	>300
NBL	<7	16	<7	10	20
NBTR	<7	18	<7	25	>50
SBL	<7	<7	<7	<7	25
SBTR	<7	15	<7	8	150
Yonge Street at Madelaine Drive / Ashford Drive (signalized)					
EBL	18	29	**39**	**56**	30
EBT	54	76	45	65	>200
EBR	<7	<7	<7	<7	>200
WBL	24	38	14	24	75
WBTR	57	81	41	63	>200
NBL	<7	11	<7	12	95
NBTR	80	120	94	137	>300
SBL	<7	16	<7	13	180
SBTR	46	70	89	129	270
Big Bay Point Road at Montgomery Drive (unsignalized)					
EBTR	-	<7	-	<7	>200
WBL	-	<7	-	<7	40
NBLR	-	<7	-	9	>50
Yonge Street at Montgomery Drive (unsignalized)					
WBLR	-	7	-	9	125
NBTR	-	<7	-	<7	175
SBL	-	<7	-	<7	50
Montgomery Drive at Site Access (unsignalized)					
WBLR	-	<7	-	<7	90
NBTR	-	<7	-	<7	70
SBLT	-	<7	-	<7	60

Intersection / Movement	AM Peak Hour		PM Peak Hour		Available Storage (m)
	50th Percentile Queue (m)	95th Percentile Queue (m)	50th Percentile Queue (m)	95th Percentile Queue (m)	
Ashford Drive at Site Access (unsignalized)					
EBLR	-	<7	-	<7	90
NBLT	-	<7	-	<7	70
SBTR	-	<7	-	<7	60

6.0 Site Circulation and Access Review

6.1 Site Plan and Access Review

The proposed development will consist of 456 residential units in two 6-storey apartment buildings and 327 parking spaces will be provided on site. Access to/from the proposed development will be provided via two new accesses fronting on Montgomery Drive and Ashford Drive respectively, and an internal driveway will connect the two access points through the site. Walkways are also proposed along the internal driveway and will connect to existing sidewalks along Montgomery Drive, as shown in **Figure 25**.

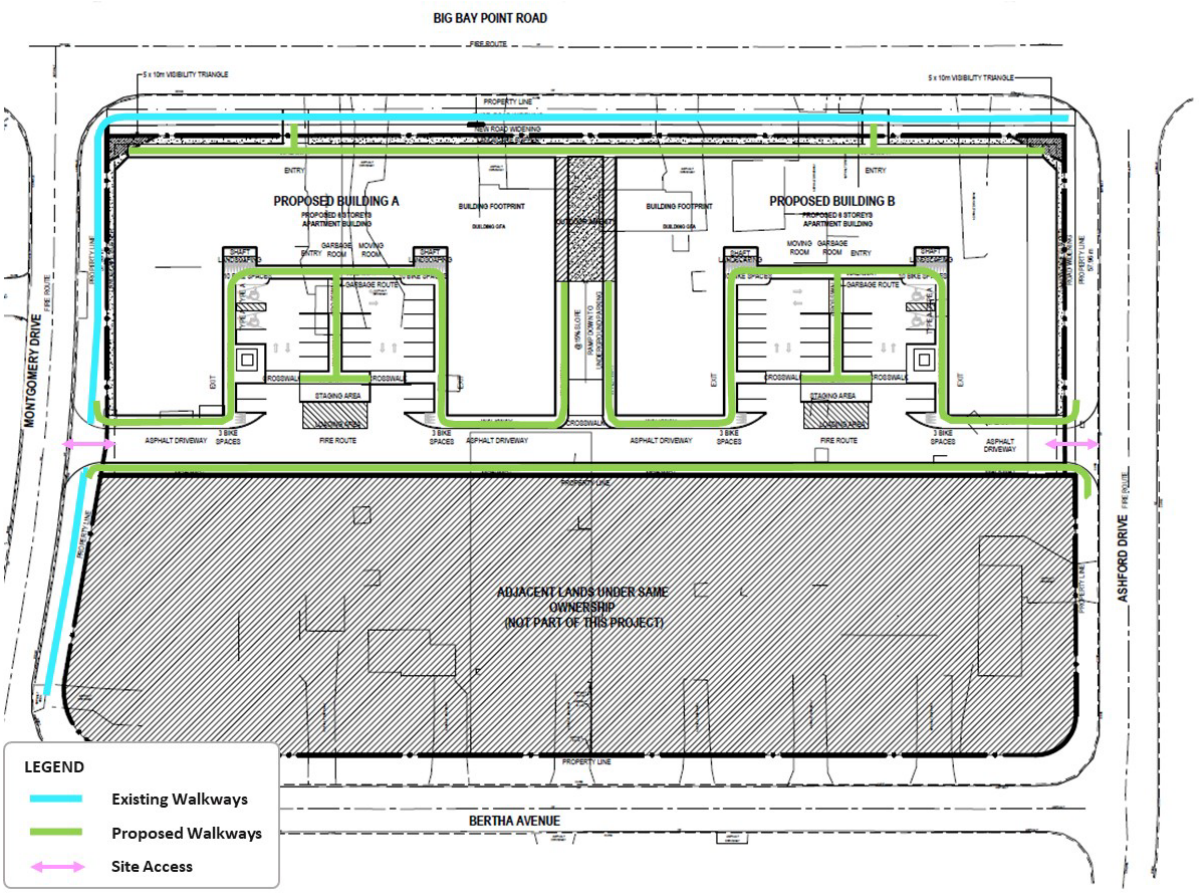


Figure 25: Proposed Walkways and Site Accesses

6.2 Site Circulation

A swept path analysis was undertaken for the site plan to assess the site circulation using the following design vehicles and the resulting vehicle manoeuvring diagrams are provided in **Appendix O**. As per the City of Barrie Transportation Impact Study Guidelines, heavy single unit truck was used for solid waste handling; therefore, this design vehicle was used for both deliveries and garbage pick-up.

1. Heavy Single Unit Truck (TAC Geometric Design Guide for Canadian Roads, 1999)
2. Aerial Fire Truck (TAC Geometric Design Guide for Canadian Roads, 1999)
3. Passenger Car (TAC Geometric Design Guide for Canadian Roads, 1999)

The vehicle manoeuvring diagrams in **Appendix O** indicate that the all the vehicles listed above can be accommodated at the site access and internally through the site. Moreover, the swept path analysis results in **Appendix O** also indicate that the passenger car can be accommodated at the designated parking spaces.

6.3 Sightline Review

Clear sightlines between vehicles and pedestrians are provided on the site plan at the two accesses with Montgomery Drive and Ashford Drive at the internal walkways. No sightline issues were observed on the site plan.

6.4 Access Review

The driveway throat length at both site accesses is approximately 30 m which exceeds the suggested minimum distance of 25 m stated in the Transportation Association of Canada (“TAC”) Geometric Design Guide for apartment buildings with over 200 units and access to a collector roadway. It is noted that the two site accesses connect to local roadways.

6.5 Turn Lanes Warrant Analysis

6.5.1 Left Turn Lanes

A left turn warrant analysis was conducted based on the criteria outlined in the “MTO Design Supplement for TAC Geometric Design for Canadian Roads)” to determine if a left turn lane is warranted on Montgomery Drive and Ashford Drive at the proposed site accesses under future total conditions. A design speed of 50 km/h was considered in the analysis since Ashford Drive is posted at 40 km/h and the configuration of Montgomery Drive supports a 50 km/h design speed.

The left turn warrant analysis results indicate that left turn lanes are not warranted on Montgomery Drive and Ashford Drive under future total (2037) conditions during the weekday AM and the weekday PM peak hours. Detailed left turn warrant calculations are provided in **Appendix P**.

6.5.2 Right Turn Lanes

The northbound right turning volumes at the intersection of Montgomery Drive and Site Access are forecasted to be 4 and 9 during the weekday future total (2037) AM and PM peak hours, respectively. An exclusive northbound right turn lane at Montogomery Drive is not recommended since the turning volumes are very low and the capacity analysis at this intersection indicate that the northbound right turn is expected to operate with a level of service ‘A’ under future total (2037) conditions.

Similarly, a southbound right turn lane along Ashford Drive at site access is not recommended with forecasted right volumes of 5 and 13 during the weekday future total (2037) AM and PM peak hours,

respectively. The southbound right turn is expected to operate with a level of service 'A' under future total (2037) conditions.

7.0 Parking Assessment

The proposed development will consist of two 6-storey residential buildings that will include a total of 456 units (228 units in each building). A total of 327 parking spaces will be provided on site which is a parking supply rate of 0.72 spaces per unit.

The parking spaces dimensions meets the City's Zoning By-law 2009-141, Section 4.6.2.5, which states a minimum width of 2.7 metres and a minimum length of 5.5 metres for 90-degree angle parking. Additionally, a total of 304 bike parking spaces will be provided although there is no requirement in the City's Zoning By-law for bike parking.

7.1 Parking Zoning By-law Requirement

According to City of Barrie By-Law 2009-141, the proposed development is categorized as "residential building containing more than 3 dwelling units" and the following standard is applicable to the subject site:

- Total Number of Standard Parking Spaces Required – Residential building containing more than 3 dwelling units:
    - 1.5 spaces per dwelling unit

Relevant excerpts from the City's Zoning By-law 2009-141 are provided in **Appendix Q**.

Based on the By-law requirement, the parking supply for the proposed development is summarized in **Table 22**. It is noted that the parking supply proposed for the development is deficient by 356 parking spaces under the City's Zoning By-Law.

According to Section 4.6.4 of the City's Zoning By-law, the site requires one barrier free parking space plus 3% of the total required parking spaces. This results in a requirement for eleven (11) Type A and eleven (11) Type B barrier free parking spaces. The site plan provides a total of 22 barrier free parking spaces, consisting of ten (10) Type A and twelve (12) Type B accessible parking spaces.

Table 22: Zoning By-law Parking Requirement

Land Use	Units	Type	By-law Requirement	Calculated Parking Supply per By-law	Proposed Parking Supply	Surplus (Deficiency)
Residential Building Containing more than 3 dwelling Units	456	Resident	1.5 space per dwelling unit	684	327	(356)
			Total	**684**	**327**	**(356)**
			Parking Space Ratio per Dwelling Unit	**1.50**	**0.72**	**(0.78)**

7.2 Parking Justification

It is noted that the proposed parking supply for the development has a deficiency of 356 parking spaces compared to the required number of parking spaces as per the City's Zoning by-law; therefore, a

detailed parking justification study was conducted to assess whether the proposed number of parking spaces will meet the anticipated demand for the development.

7.2.1 Transit

As highlighted in **Section 2.3**, Barrie Transit currently provides frequent bus services along Big Bay Point Road and Yonge Street, with buses running every 30 minutes throughout the peak periods.

The City's future transit plan for 2025 will replace the current Route #8 (Yonge) with a new Route # 102 with an increased frequency of 15 minutes along Yonge Street as shown in **Figure 26**. The proximity of two bus routes enhances the site's connectivity and provides residents with efficient public transportation options to key locations throughout Barrie. The new Route #102 will provide direct link to major educational and transit hubs, facilitating residents with easier commutes and access to city amenities.

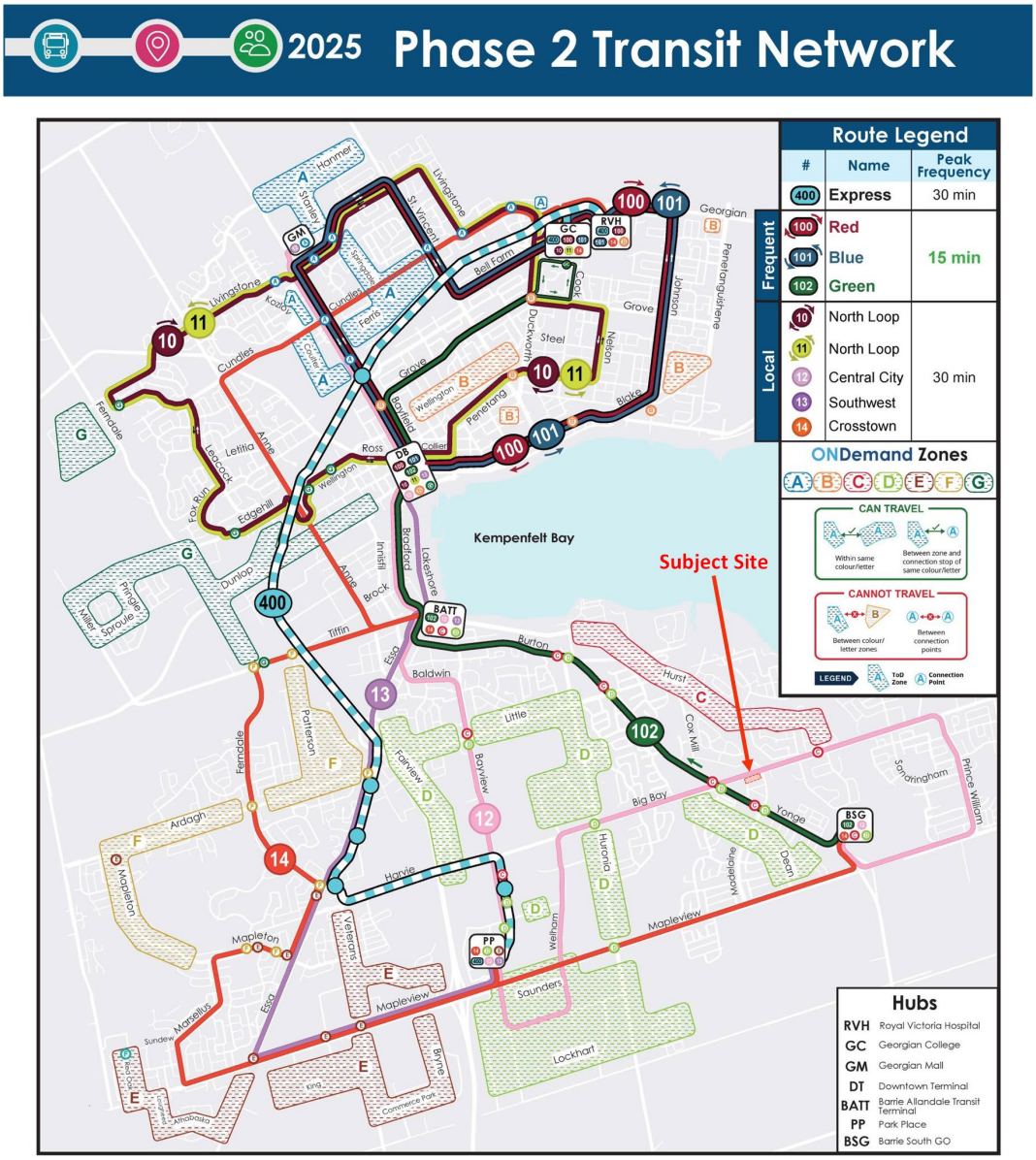


Figure 26: Barrie Future Transit Network

The subject site will have convenient access to existing and future enhanced transit routes which can reduce residents auto dependency:

- Route #12 stops directly in front of the subject site. This existing route provides connections between two GO Stations, multiple shopping malls, and the Downtown Terminal, offering residents easy access to major transportation hubs and commercial areas.
- The future Route #102 can be accessed approximately 400 metres from the subject site, at the Yonge Street and Big Bay Point intersection. This route serves as a direct south-north connector in the city, linking several important destinations including Barrie South GO Station, Allandale Waterfront GO Station, Downtown Terminal, and Georgian College.

7.2.2 Active Transportation

Walk Score is an open data source that measures a location's walkability but evaluating the subject site's proximity to amenities and services essential to an average person's daily life. For each address, Walk Score analyzes hundreds of walking routes to amenities in the neighbourhood. Walk Score also evaluates a location's pedestrian friendliness by analyzing population density and road characteristics.

The subject site has a Walk Score of 76[1] out of 100, indicating that most of the errands can be completed on foot in this neighbourhood. The score is significantly higher than the average Walk Score of 25 for the City of Barrie overall, highlighting the superior walkability of the site. Various commercial establishments, educational institutions, and a medical centre are accessible within 15-minute walk range as illustrated in **Figure 27** and **Figure 28**.

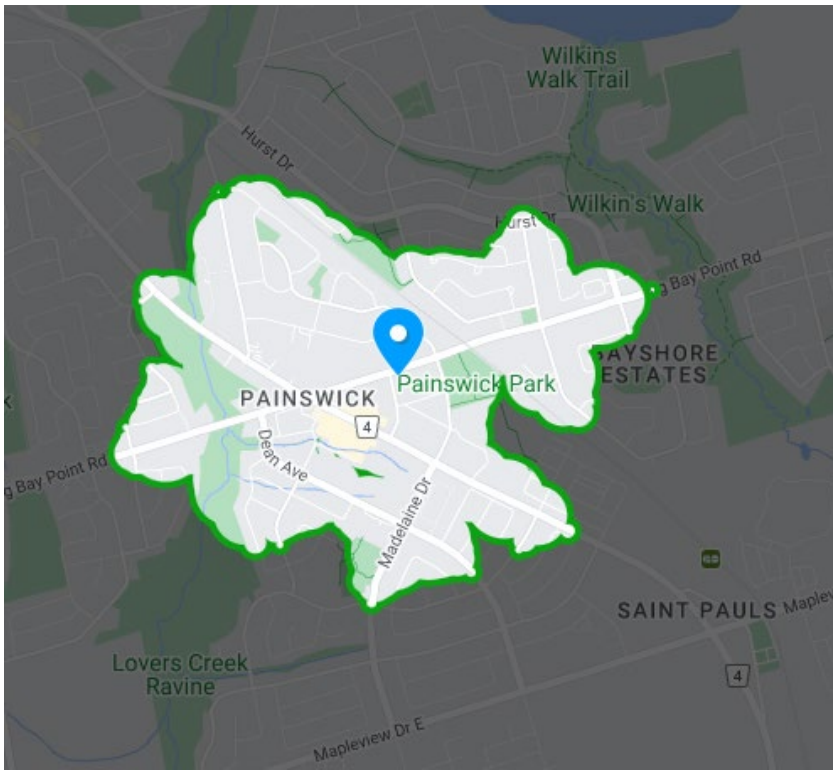


Figure 27: 15-Minute Travel Time Map by Walk

[1] https://www.walkscore.com/score/545-big-bay-point-rd-barrie-on-canada (accessed November 2024)

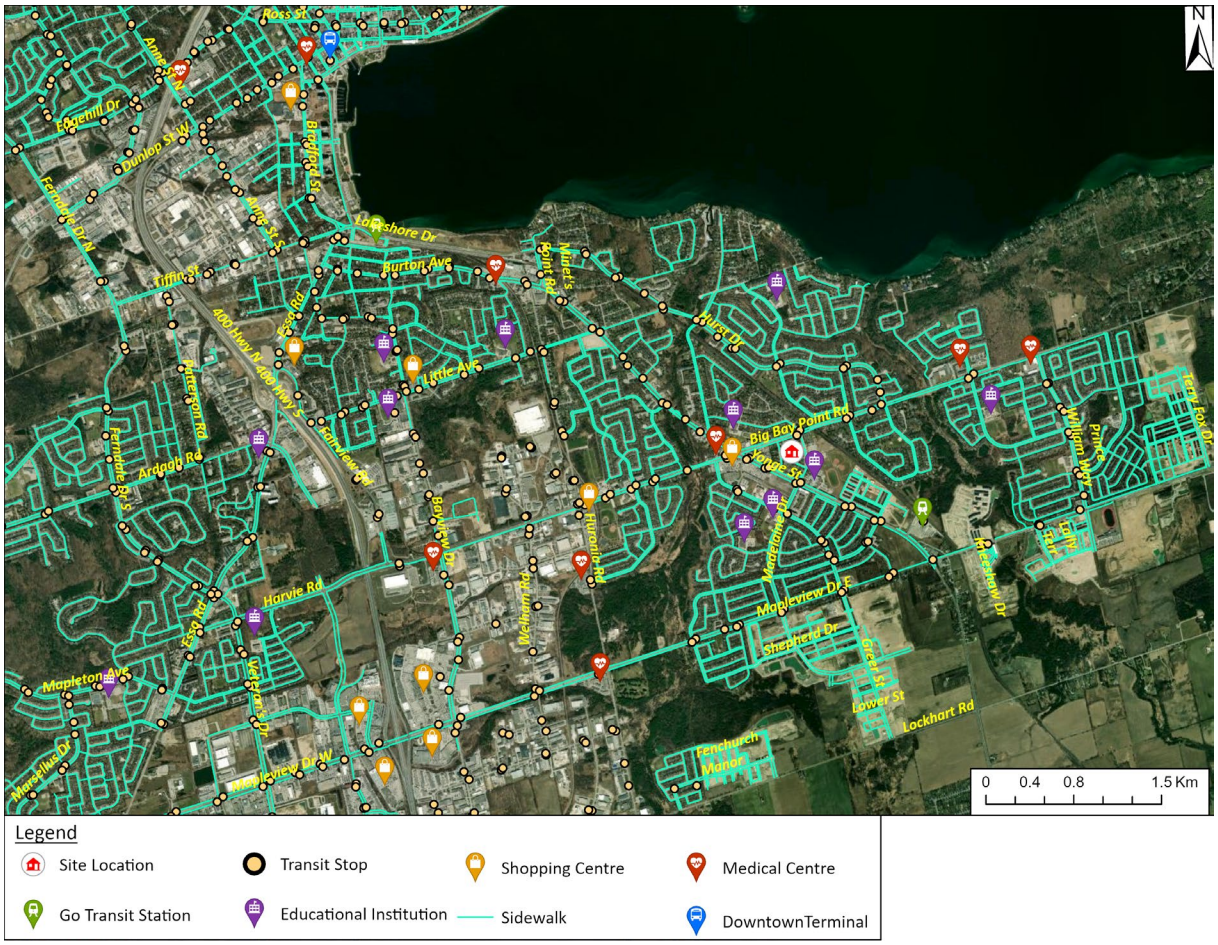


Figure 28: Existing Sidewalk Network including Connectivity to Transit Stops

The City's new Official Plan, approved by the province in 2023, includes an extensive cycling infrastructure network throughout the City of Barrie. Both Big Bay Point Road and Yonge Street, the two major roads adjacent to the subject site have plans for dedicated cycling facility which will connect the subject site to existing and planned cycling and trail network across the City.

Although not mandated by the City's Zoning By-law, the site plan proactively includes a total of 304 bicycle parking spaces. This provision of bike parking is expected to encourage residents to use active transportation in the future, aligning with the City's Official Plan.

A map of the planned cycling facilities network is provided in **Appendix R**.

7.2.3 New Parking Requirements for Strategic Growth Areas / Intensification Corridors Comparison

With the recent approval of Barrie's Official Plan 2051, the City developed a draft Zoning By-law. According to the draft Zoning By-law, the subject is located at the boundary of Parking District 3 and Parking District 5 as shown in **Figure 29**. Its proximity to Parking District 3 (Strategic Growth Areas / Intensification Corridors) supports the application of the parking ratio for Parking District 3.

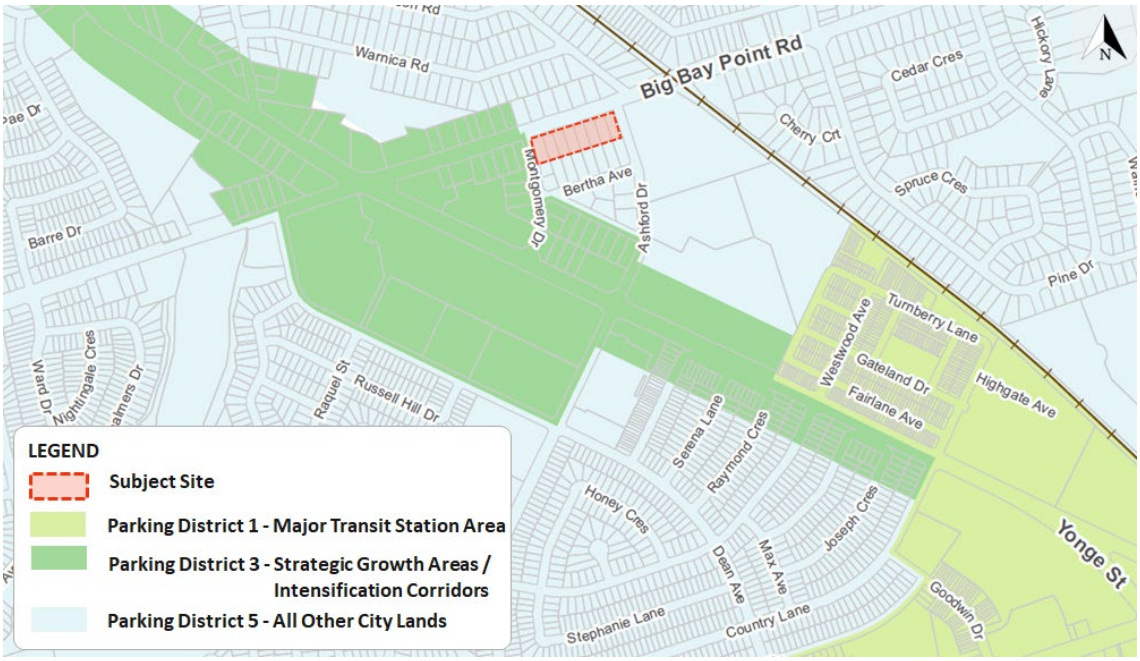


Figure 29: Draft Zoning By-law Parking District Map

The required By-law parking supply for the proposed development using Parking District 3 requirement is summarized in **Table 23**. When applying these requirements, the proposed parking supply shows a deficiency of only 37 parking spaces. While a deficiency still exists, it is significantly reduced compared to the existing Zoning By-law, which resulted in a shortage of 356 parking spaces for the proposed development. This comparison with the City's draft Zoning By-law better aligns with the City's vision for development along and adjacent to Yonge Street and in Traffic Zone 14.

It is proposed to have 10% of the units be affordable units (46 units), which will be occupied by lower-income individuals and families. These units will not be allocated a parking space as it is expected that the demographic will not have a private automobile. With the exclusion of these units, the market-rate units will have a parking ratio supply of 0.80 spaces per unit which meets the proposed parking requirement for Parking District 3 (strategic growth areas / intensification corridors).

Table 23: Draft Zoning By-law Vehicular Parking Requirement for Parking District 3

Parking District	Units	Type	By-law Requirement	Calculated Parking Supply per By-law	Proposed Parking Supply	Surplus (Deficiency)
District 3 – Strategic Growth Area and Intensification Corridors	456	Resident	Minimum of 0.7 spaces per dwelling unit	319	327	(37)
		Visitor	Minimum of 0.1 spaces per dwelling unit	46		
Total				**365**	**327**	**(37)**
Parking Space Ratio per Dwelling Unit				**0.80**	**0.72**	**(0.08)**

7.2.4 Delivery Services and Rideshare

Several deliveries and rideshare options are available to help people meet their essential needs without owning a car. Direct delivery services from large retailers including Sobeys, Zehrs, Walmart, and smaller local retailers are available across the City of Barrie. Same-day grocery, food, and convenience store item deliveries are also easily accessible through specialty delivery services like Uber Eats, Skip the Dishes, and DoorDash. Additionally, there are several ridesharing services that residents in the City of Barrie can easily access: Uber and Lyft are ridesharing companies which service the Barrie area and residents also have the option to join ridesharing groups on Facebook to arrange carpooling. These ridesharing options allow residents to travel across the city without the need to own a car.

7.2.5 Proxy Sites

Two apartment buildings in the City of Barrie were surveyed as proxy sites to determine parking utilization rate for similar developments. The proxy sites were selected based on their similarities to the subject site in terms of land use type, density (number of units), proximity to downtown, proximity to essential businesses and services, and access to transit.

The 2 Kozlov Street site is an apartment building located north of the downtown Barrie and adjacent to various commercial establishments. The building has 157 residential units, and 194 parking spaces are provided on site for residents and visitors.

The 30 Hanmer Street site is a new residential development opened in 2023 and is located in the northern outskirt of Barrie. The apartment building is about 800 metres away from the RioCan Georgian Mall, a major shopping centre in Barrie. The building has 116 residential units, and 167 parking spaces are provided on site.

A third proxy site was selected; however, due to construction activities at this site it was not possible to conduct the parking survey at the time this report was prepared.

The two proxy sites and key statistics are summarized below in **Table 24**. A copy of the parking survey data from the proxy sites is provided in **Appendix S**.

Table 24: Proxy Survey Results

Proxy Site Location	Total Units	Total Occupied Units	Parking Supply	Parking Supply Ratio	Peak Parking Utilization	Parking Utilization Ratio
2 Kozlov St, Barrie, ON L4N 5A1	157	152	194	1.24 per unit	138	0.91
30 Hanmer St W, Barrie, ON L4N 7H6	116	112	167	1.44 per unit	107	0.96

The proposed parking supply rate at the subject site is approximately 0.72 spaces per unit, which is lower than the parking utilization ratios of 0.91 and 0.96 spaces per unit observed in proxy surveys of similar apartment buildings. However, several factors are considered in support of the subject site's proposed parking supply compared to the two proxy sites:

- The subject site is located only 1.25 km from the Barrie South GO Station, while the surveyed properties are approximately 2.5 km from their nearest major transit hub, Downtown Terminal, where they can access GO Transit.

- One of the surveyed properties, 30 Hanmer Street West with a parking demand ratio of 0.96 spaces per unit, has its nearest bus stop at Georgian Mall, approximately a 13-minute walk away.

Considering the subject site's proximity to several bus stops and the Barrie South GO Station, the proposed parking supply of 0.72 spaces per unit is expected to adequately meet the parking demand when accompanied by site-specific transportation demand management strategies.

8.0 Transportation Demand Management (TDM) Plan

Transportation demand management ("TDM") is a set of strategies and initiatives used to improve transportation efficiency (i.e., reduce congestion), encourage use of alternative travel modes, and reduce reliance on single vehicle occupancy. The following TDM measures can be considered to further reduce the parking demand for the proposed development.

8.1.1 Unbundling Parking Spaces from Units

Auto parking spaces can be unbundled from the rental of the dwelling units, an excellent TDM measure which allows prospective residents to consider limiting the number of parking spaces they need which reduces the parking demand at the proposed development. If all the parking spaces are not utilized after rental of the units, the vacant spaces can be converted to other uses such as bicycle storage or carshare spaces.

8.1.2 Transit Services

Encourage residents to use transit as an alternative travel mode since the subject site is well served by frequent transit service. Residents can be provided with a package which includes pamphlets/maps outlining available transit routes and major destinations to/from the subject site.

As a part of the package, offering a 10-Ride Card can be an effective way to encourage transit use. Additionally, providing brief instructions on how to use mobile fares via HotSpot App or Website would help reduce barriers using the bus pass system for those who prefer using non-paper tickets.

The City offers various support options for residents, including free fare for certain age groups, Family Day Pass, Monthly Pass for various groups, Licence 2 Ride, Georgian College U-Pass, and Transit Field Trip Pass. Detailed descriptions of each option, including definitions, eligibility criteria, and any relevant information, will help residents better understand and utilize transit services as a convenient and cost-effective mode of transportation.

8.1.3 Active Transportation

The subject site is in a highly walkable area where most errands can be completed on foot. Additionally, the City's plan on expanding the cycle facilities across the city will further encourage residents to use active transportation and reduce the demand for auto use.

Residents can be provided with pamphlets/maps that outline areas within 5, 10, 15, 20, 25, and 30-minute walking distances from the site, as well as the locations of key amenities within these distances. Including a list of those key amenities categorized by type, such as grocery stores, restaurants, pharmacies, and educational institutions, will offer a clearer understanding of the diverse amenities accessible by walking from the subject site.

8.1.4 On-Site Bicycle Parking Spaces

The development will provide a total of 304 bicycle parking spaces on-site, despite the City's Zoning By-law not mandating bicycle parking facilities. This proactive approach aligns with and supports the City's plans to expand cycling facilities across the urban area.

Long-term bicycle parking spaces will be in secure bike storage rooms inside the building while short-term bicycle parking spaces will be available next to the main entrances of both buildings.

8.1.5 Shuttle Bus Between the Subject Site and Barrie South GO Station

The proposed development will offer a shuttle service connecting the subject site to the Barrie South GO Station. This service will operate during peak periods, providing residents with a convenient and reliable transit option. By offering this dedicated shuttle, the development aims to enhance the tenant experience and strongly encourage the use of public transportation.

8.1.6 A Real-Time Transit Information Display Board

The proposed development will provide a real-time transit information display board in the residential lobby, where tenants and visitors can wait inside until transit vehicles are nearby based on the information provided.

While residents can access such information through the City's MyRideBarrie website, the display board will ensure that the transit information is readily available to all residents, including those who may lack internet access or feel less comfortable with digital technology.

9.0 Pavement Marking and Signage Plan

A pavement marking and signage plan for the proposed development is provided in **Appendix T**. This plan shows designation of parking spaces and standard provincial signage on parking restriction areas including fire route signage.

10.0 Construction Management and Parking Plan

A construction management and parking plan is provided in **Appendix U** for the proposed development which discusses the strategy for managing the delivery of construction materials, parking of trades people, pedestrian movements, and any impacts to existing on-street parking and access management for adjacent properties.

11.0 Conclusions

Based on the analysis results, the following key conclusions can be made:

Existing Conditions

- The analysis results indicate that all movements at the study is operating with acceptable level of service and residual capacity during the weekday AM and the weekday PM peak hours under existing (2024) conditions. Moreover, the analysis results indicate that queues can be accommodated within the available storge.

Future Background Conditions

- The analysis results indicate that all movements at the study intersection is expected to operate with acceptable level of service and residual capacity during the weekday AM and the weekday

PM peak hours under background conditions for opening year (2027) and the 2032 and 2037 horizons.

- Optimization of signal timing splits at the Yonge Street / Ashford Drive-Madelaine Drive intersection is proposed as a mitigation measure under the opening year (2027) background conditions. This mitigation measure is carried forward for all future background and future total conditions.
- The analysis results indicate that queues can be accommodated within the available storge within the available storage under background conditions for opening year and the 2032 and 2037 horizons except for the eastbound left turn at the Yonge Street and Madelaine Drive / Ashford Drive intersection during the weekday PM peak hour.

Site Traffic Trip Generation

- The site is expected to generate 189 bi-directional new auto trips during the weekday AM peak hour and 178 bi-directional new auto trips during the weekday PM peak hour.

Future Total Conditions

- The analysis results indicate that all movements at the study intersection is expected to operate with acceptable level of service and residual capacity during the weekday AM and the weekday PM peak hours under future total conditions for opening year (2027) and the 2032 and 2037 horizons.
- The analysis results indicate that queues can be accommodated within the available storge within the available storage under future total conditions for opening year and the 2032 and 2037 horizons except for the eastbound left turn at the Yonge Street and Madelaine Drive / Ashford Drive intersection during the weekday PM peak hour.
- No additional mitigation measures to the signal timing splits optimization at the Yonge Street / Ashford Drive-Madelaine Drive intersection are required to support operations under future total conditions.

Site Plan and Access Review

- Swept path analysis shows that heavy single unit trucks (design vehicle for garbage trucks as per the City of Barrie's guidelines), fire trucks can be accommodated at the site access and internally through the site. The swept path analysis also shows that a passenger car be accommodated at the designated parking spaces.
- No sightline issues were observed on the site plan.
- Driveway clear throat lengths at the two site accesses are adequate for the proposed development.
- Dedicated left and right turn lanes are not warranted at the site accesses at Montgomery Drive and Ashford Drive.

Parking Supply

- The proposed parking supply for the development is below the City's Zoning by-law requirement. The findings from a detailed parking justification study supplemented with a site-specific transportation demand management (TDM) plan show that the subject site's expected parking demand can be accommodated by the proposed parking supply.

TRAFFMOBILITY

Appendix A

Terms of Reference

TRAFFMOBILITY

MEMO

To: D. Chan, P.Eng. (Transportation Planning, City of Barrie)

From: Rudy Sooklall

cc: Ashali Walia, Layla Agabani (Midnight Building)

Date: September 17, 2024

Subject Terms of Reference and Traffic Data Request for 545-565 Big Bay Point Road Traffic Impact and Parking Study - Barrie File: D28-058-2024

1.0 Introduction

A Traffic Impact and Parking Study ("TIPS") is required to support the Zoning By-law / Official Plan Amendment application for a residential development located at 545-565 Big Bay Point Road in the City of Barrie ("City"), Ontario. The proposed development includes 504 residential units in 2 six-storey buildings. The proposed parking supply is 331 spaces for the residential units. The draft site plan is provided in **Attachment A**.

2.0 Terms of Reference

The proposed Terms of Reference ("TOR") for the TIPS are provided below. The TOR is based on pre-consultation comments dated July 29, 2024 provided by the City and the City's Transportation Impact Study Guidelines.

2.1 Compatibility with Transportation Master Plan

A review of the population and employment forecasts contained within Appendix E of the City's Transportation Master Plan ("TMP") for the traffic zone of the subject site will be conducted to determine if the proposed development, and other proposed and approved developments within the traffic zone aligns with forecasts for the 2031 and 2041 planning horizon years.

It is noted that if the population and employment forecasts are higher than those in Appendix E of the TMP, the applicant will need to cover the cost for the City's consultant to run additional macro modelling to generate input for consideration in the traffic study.

2.2 Study Area and Intersections

The subject site is located south of Big Bay Point Road between Montgomery Drive and Ashford Drive with site accesses via Montgomery Drive and Ashford Drive as shown in **Figure 1**.

The following study intersections are proposed which would constitute the study area limits:

- Big Bay Point Road / Montgomery Drive (unsignalized)
- Big Bay Point Road / Ashford Drive (signalized)

- Yonge Street / Montgomery Drive (unsignalized)
- Yonge Street / Ashford Drive (signalized)
- Montgomery Drive / Site Access
- Ashford Drive / Site Access

2.3 Data Collection and Analysis Period

Since the proposed development has only residential land uses, analysis periods will be the weekday AM and weekday PM peak periods at the study intersections shown in **Figure 1**. Additional traffic information will be collected from the City, including proposed adjacent background development details/ site trips, and prevailing growth rates in the study area.

Traffic capacity analyses for the horizon years as outlined in **Section 2.4** will be conducted for the weekday AM (7:00 AM to 9:00 AM) and weekday PM (4:00 PM to 6:00 PM) peak periods.

Figure 1: Site Location and Study Intersections

2.4 Existing Transportation Network in the Study Area

The study will provide an overview of the existing conditions within the study area by providing descriptions of key transportation elements. These items will include roadway classification, posted speed, number of lanes, transit service, sidewalk, and bike lane provisions.

2.5 Horizon Years for the Traffic Analysis

The following horizon years for the traffic analysis are proposed for this study:

- 2024 Existing Conditions
- Opening Year Background Conditions (without the proposed development site traffic)

- Opening Year Future Total Conditions (with the proposed development site traffic)
- 5 years after Opening Future Background Conditions (without the proposed development site traffic)
- 5 years after Opening Year Future Total Conditions (with the proposed development site traffic)
- 10 years after Opening Future Background Conditions (without the proposed development site traffic)
- 10 years after Opening Year Future Total Conditions (with the proposed development site traffic)

2.6 Site Trip Generation

Peak hour trip generation for the proposed development will be forecasted using the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition. A combination of access to the adjacent road network and 2016 TTS study area origin-destination (O-D) patterns will be used to determine the proposed development auto site trips distribution.

2.7 Background Growth and Development Information

To estimate the background traffic generated by other developments in the area, it is requested that the City identify and share land use, trip generation and site trip information for the adjacent developments including residential development. In addition, we request that the City share an appropriate traffic growth rate to be considered in the study.

2.8 Capacity Analysis Software

It is proposed to use the Synchro 11 software for the traffic analyses unless otherwise specified. This study will use the Highway Capacity Manual (HCM) outputs.

2.9 Site Circulation and Access Review

A site circulation review of the site and proposed parking layout will be conducted. The circulation review of garbage truck, delivery truck, and fire truck movements will be conducted at the proposed site access and through the site using swept path analysis to confirm that the design vehicles can be accommodated. Moreover, a functional review of the parking layout and access arrangement will be conducted with swept path analyses for the key movements in and out of the site.

A sightline analysis will be conducted at the proposed site access to identify any vertical and horizontal curves or physical obstructions that may require modifications to ensure safe access and egress to/from the site.

A warrant analysis will be conducted in accordance with the “Transportation Association of Canada Geometric Design Guide” to determine if any turning lanes (i.e., auxiliary lanes) will be warranted at the site accesses. The proposed design speed for this analysis will be 10 km/h over the posted speed limit, i.e., a posted speed of 50 km/h will have a 60 km/h design speed.

2.10 Parking Study

A parking study will be conducted to support the proposed parking supply for the development. The study will include a review of the City’s parking by-law, and parking proxy surveys will be conducted at three (3) similar sites within the City to support the proposed parking supply. Weekday surveys will be conducted from 12:00 PM to 12:00 AM only since this is a residential development and the weekday period is typically the worst case for residential land uses. The locations of the three (3) proxy sites will be submitted to the City for approval before proceeding with the surveys.

Review and recommend appropriate Transportation Demand Management (TDM) measures and initiatives that are applicable to the City and the proposed development.

2.11 Pavement Marking and Signage Plan

Prepare a functional design for new pavement marking and signs within the site. The plan will show clear delineation of circulation routes and designation of parking spaces and depict use of standard provincial signage on parking restriction areas including fire route signage.

2.12 Construction Management and Parking Plan

Prepare a construction traffic management and parking plan to discuss the strategy for managing the delivery of construction materials, parking of trades people, pedestrian movements, and any impacts to existing on-street parking and access management for adjacent properties, etc.

Review current parking regulation of the surrounding roadways to determine the potential impacts with overflow parking for trades people and how these can be accommodated / mitigated.

2.13 Documentation

A draft Traffic Impact and Parking Study report documenting the methodology, assumptions, and findings of the study will be prepared. The draft report will be sent to the City for review and comments. The report will be finalized by addressing comments received from the City.

3.0 Traffic Data Request

TraffMobility is requesting the following data from the City for use in this study:

- Site traffic volumes from planned developments in the study area to be included in the forecast of future background traffic volumes.
- Most recent weekday turning movement counts (TMC) at:
    - Big Bay Point Road / Montgomery Drive (unsignalized)
    - Big Bay Point Road / Ashford Drive (signalized)
    - Yonge Street / Montgomery Drive (unsignalized)
    - Yonge Street / Ashford Drive (signalized)
- Existing traffic signal plans at:
    - Big Bay Point Road / Ashford Drive (signalized)
    - Yonge Street / Ashford Drive (signalized)
- Traffic growth rate to be used in the study.

Thank you for your time and please feel free to contact the undersigned should you have any questions.

Sincerely,

TraffMobility Engineering Inc.

Rudy Sooklall, P.Eng.
Director of Transportation
cell: 416-526-8408
email: rudy.sooklall@traffmobility.com

Attachments:
Attachment A – Draft Site Plan

Appendix B

Existing Turning Movement Count
and Signal Timing Data

Big Bay Point Road & Montgomery Drive

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

Municipality: Barrie
Site #: 0000004001
Intersection: Big Bay Point Road & Montgomery
TFR File #: 1
Count date: 30-Oct-2024

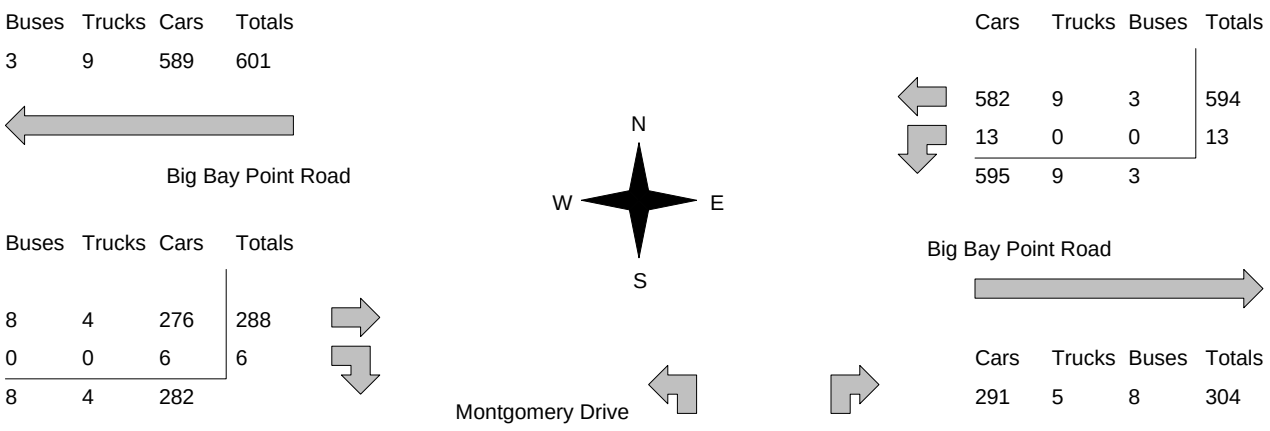
Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Big Bay Point Road runs W/E

East Leg Total: 911
East Entering: 607
East Peds: 0
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 0
West Entering: 294
West Leg Total: 895

Cars 19
Trucks 0
Buses 0
Totals 19

Cars 7 15 22
Trucks 0 1 1
Buses 0 0 0
Totals 7 16

Peds Cross: ⋈
South Peds: 1
South Entering: 23
South Leg Total: 42

Comments

Big Bay Point Road & Montgomery Drive

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:30:00
To: 17:30:00

Municipality: Barrie
Site #: 0000004001
Intersection: Big Bay Point Road & Montgomery
TFR File #: 1
Count date: 30-Oct-2024

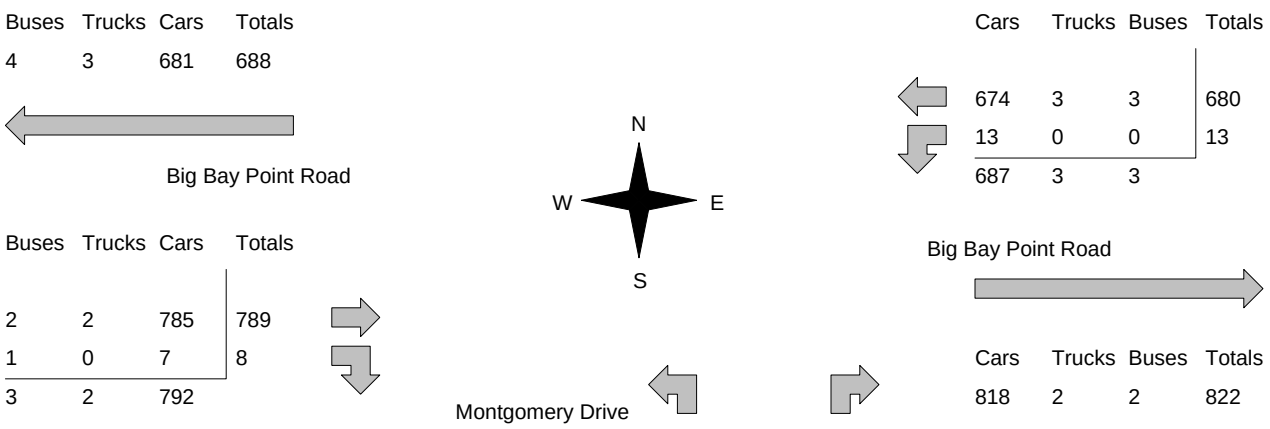
Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Big Bay Point Road runs W/E

East Leg Total: 1515
East Entering: 693
East Peds: 0
Peds Cross: ⧖



Peds Cross: ⧖
West Peds: 0
West Entering: 797
West Leg Total: 1485

Cars 20
Trucks 0
Buses 1
Totals 21

Cars 7 33 40
Trucks 0 0 0
Buses 1 0 1
Totals 8 33

Peds Cross: ⋈
South Peds: 2
South Entering: 41
South Leg Total: 62

Comments

Big Bay Point Road & Montgomery Drive

Total Count Diagram

Municipality: Barrie
Site #: 0000004001
Intersection: Big Bay Point Road & Montgomery
TFR File #: 1
Count date: 30-Oct-2024

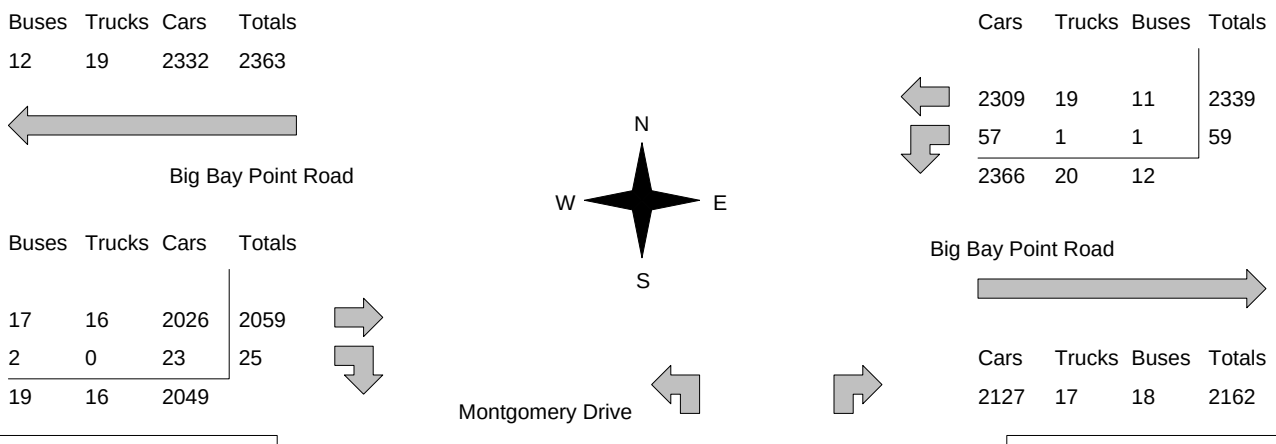
Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Big Bay Point Road runs W/E

East Leg Total: 4560
East Entering: 2398
East Peds: 0
Peds Cross:



Peds Cross:
West Peds: 0
West Entering: 2084
West Leg Total: 4447

Cars 80
Trucks 1
Buses 3
Totals 84

Cars 23 101 124
Trucks 0 1 1
Buses 1 1 2
Totals 24 103

Peds Cross:
South Peds: 8
South Entering: 127
South Leg Total: 211

Comments

Big Bay Point Road & Montgomery Drive
Traffic Count Summary

Intersection: Big Bay Point Road & Montgomery | **Count Date:** 30-Oct-2024 | **Municipality:** Barrie

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Buses: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	0	0	0	0	0	19
9:00:00	0	0	0	0	0	18
16:00:00	0	0	0	0	0	0
17:00:00	0	0	0	0	0	45
18:00:00	0	0	0	0	0	45
Totals:	0	0	0	0	0	127

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Buses: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	4	0	15	19	0
9:00:00	7	0	11	18	1
16:00:00	0	0	0	0	0
17:00:00	9	0	36	45	1
18:00:00	4	0	41	45	6
Totals:	24	0	103	127	8

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Buses: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	18	505	0	523	0	753
9:00:00	12	580	0	592	0	883
16:00:00	0	0	0	0	0	0
17:00:00	13	625	0	638	0	1421
18:00:00	16	629	0	645	0	1425
Totals:	59	2339	0	2398	0	4482

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Buses: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	0	226	4	230	0
9:00:00	0	286	5	291	0
16:00:00	0	0	0	0	0
17:00:00	0	774	9	783	0
18:00:00	0	773	7	780	0
Totals:	0	2059	25	2084	0

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	4	7	0	788	9	4	795

Yonge Street & Montgomery Drive

Morning Peak Diagram

Specified Period
From: 7:00:00
To: 9:00:00

One Hour Peak
From: 7:45:00
To: 8:45:00

Municipality: Barrie
Site #: 0000004002
Intersection: Yonge Street & Montgomery Drive
TFR File #: 1
Count date: 30-Oct-2024

Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Yonge Street runs W/E

North Leg Total: 51
North Entering: 16
North Peds: 7
Peds Cross: ⋈

Buses	0	0	0
Trucks	0	0	0
Cars	6	10	16
Totals	6	10	

Buses	0
Trucks	1
Cars	34
Totals	35

East Leg Total: 1115
East Entering: 690
East Peds: 0
Peds Cross: ⧖

Montgomery Drive

Buses	Trucks	Cars	Totals
9	4	662	675

Cars	Trucks	Buses	Totals
21	0	0	21
656	4	9	669
677	4	9	

Yonge Street

N
W E
S

Buses	Trucks	Cars	Totals
0	1	13	14
5	8	402	415
5	9	415	

Yonge Street

Cars	Trucks	Buses	Totals
412	8	5	425

Peds Cross: ⧖
West Peds: 0
West Entering: 429
West Leg Total: 1104

Comments

Yonge Street & Montgomery Drive

Afternoon Peak Diagram

Specified Period
From: 15:00:00
To: 18:00:00

One Hour Peak
From: 16:45:00
To: 17:45:00

Municipality: Barrie
Site #: 0000004002
Intersection: Yonge Street & Montgomery Drive
TFR File #: 1
Count date: 30-Oct-2024

Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

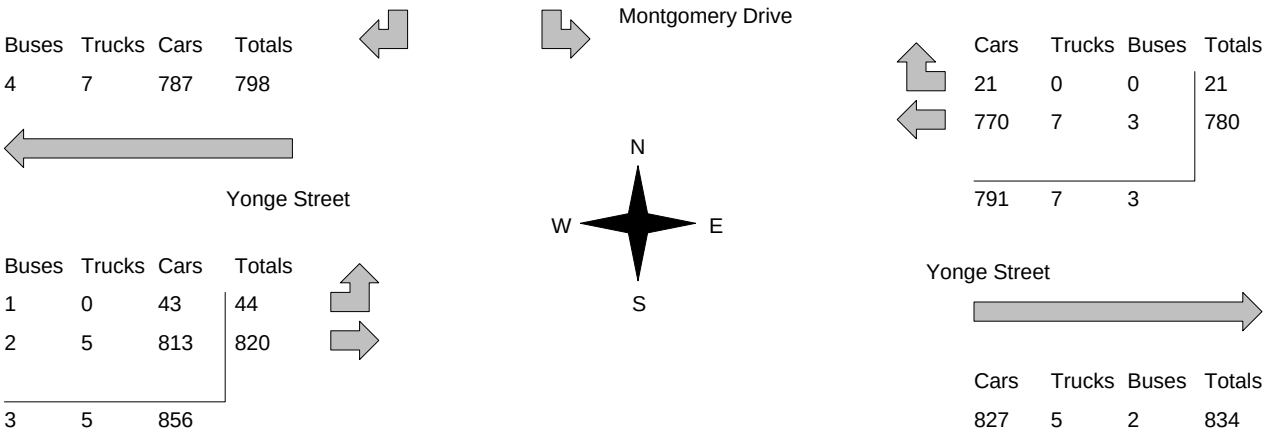
Major Road: Yonge Street runs W/E

North Leg Total: 97
North Entering: 32
North Peds: 28
Peds Cross: ⋈

Buses	1	0	1
Trucks	0	0	0
Cars	17	14	31
Totals	18	14	

Buses	1
Trucks	0
Cars	64
Totals	65

East Leg Total: 1635
East Entering: 801
East Peds: 1
Peds Cross: ⋈



Peds Cross: ⋈
West Peds: 0
West Entering: 864
West Leg Total: 1662

Comments

Yonge Street & Montgomery Drive

Total Count Diagram

Municipality: Barrie
Site #: 0000004002
Intersection: Yonge Street & Montgomery Drive
TFR File #: 1
Count date: 30-Oct-2024

Weather conditions:
Clear

Person(s) who counted:

**** Non-Signalized Intersection ****

Major Road: Yonge Street runs W/E

North Leg Total: 270
North Entering: 99
North Peds: 57
Peds Cross: ⋈

Buses	1	2	3
Trucks	3	1	4
Cars	45	47	92
Totals	49	50	

Buses	1
Trucks	1
Cars	169
Totals	171

East Leg Total: 5106
East Entering: 2663
East Peds: 1
Peds Cross: ⧗

Montgomery Drive

Buses	Trucks	Cars	Totals
23	30	2589	2642

Cars	Trucks	Buses	Totals
70	0	0	70
2544	27	22	2593
2614	27	22	

Yonge Street

N
W E
S

Buses	Trucks	Cars	Totals
1	1	99	101
22	23	2348	2393
23	24	2447	

Yonge Street

Cars	Trucks	Buses	Totals
2395	24	24	2443

Peds Cross: ⧗
West Peds: 1
West Entering: 2494
West Leg Total: 5136

Comments

Yonge Street & Montgomery Drive
Traffic Count Summary

Intersection: Yonge Street & Montgomery Drive | **Count Date:** 30-Oct-2024 | **Municipality:** Barrie

North Approach Totals

Hour Ending	Includes Cars, Trucks, & Buses: Left	Thru	Right	Grand Total	Total Peds	North/South Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	18	0	9	27	6	27
9:00:00	8	0	7	15	4	15
16:00:00	0	0	0	0	0	0
17:00:00	10	0	18	28	19	28
18:00:00	14	0	15	29	28	29
Totals:	50	0	49	99	57	99

South Approach Totals

Hour Ending	Includes Cars, Trucks, & Buses: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	0	0	0	0	0
9:00:00	0	0	0	0	0
16:00:00	0	0	0	0	0
17:00:00	0	0	0	0	0
18:00:00	0	0	0	0	0
	0	0	0	0	0

East Approach Totals

Hour Ending	Includes Cars, Trucks, & Buses: Left	Thru	Right	Grand Total	Total Peds	East/West Total Approaches
7:00:00	0	0	0	0	0	0
8:00:00	0	467	16	483	0	896
9:00:00	0	636	16	652	0	1070
16:00:00	0	0	0	0	0	0
17:00:00	0	740	20	760	1	1585
18:00:00	0	750	18	768	0	1606
Totals:	0	2593	70	2663	1	5157

West Approach Totals

Hour Ending	Includes Cars, Trucks, & Buses: Left	Thru	Right	Grand Total	Total Peds
7:00:00	0	0	0	0	0
8:00:00	13	400	0	413	1
9:00:00	11	407	0	418	0
16:00:00	0	0	0	0	0
17:00:00	33	792	0	825	0
18:00:00	44	794	0	838	0
	101	2393	0	2494	1

Calculated Values for Traffic Crossing Major Street

Hours Ending:	7:00	8:00	9:00	16:00	17:00	17:00	18:00	18:00
Crossing Values:	0	19	8	0	844	11	14	866

Ontario Traffic Inc.
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Project #24-035 - City of Barrie

Intersection Count Report

Intersection:	Big Bay Point Rd & Ashford Dr - Dodson Rd
Municipality:	Barrie
Count Date:	Tuesday, Mar 19, 2024
Site Code:	2403500039
Count Categories:	Cars, Trucks, Bicycles, Pedestrians
Count Period:	07:00-09:00, 11:00-14:00, 15:00-18:00
Weather:	Clear
Comments:	

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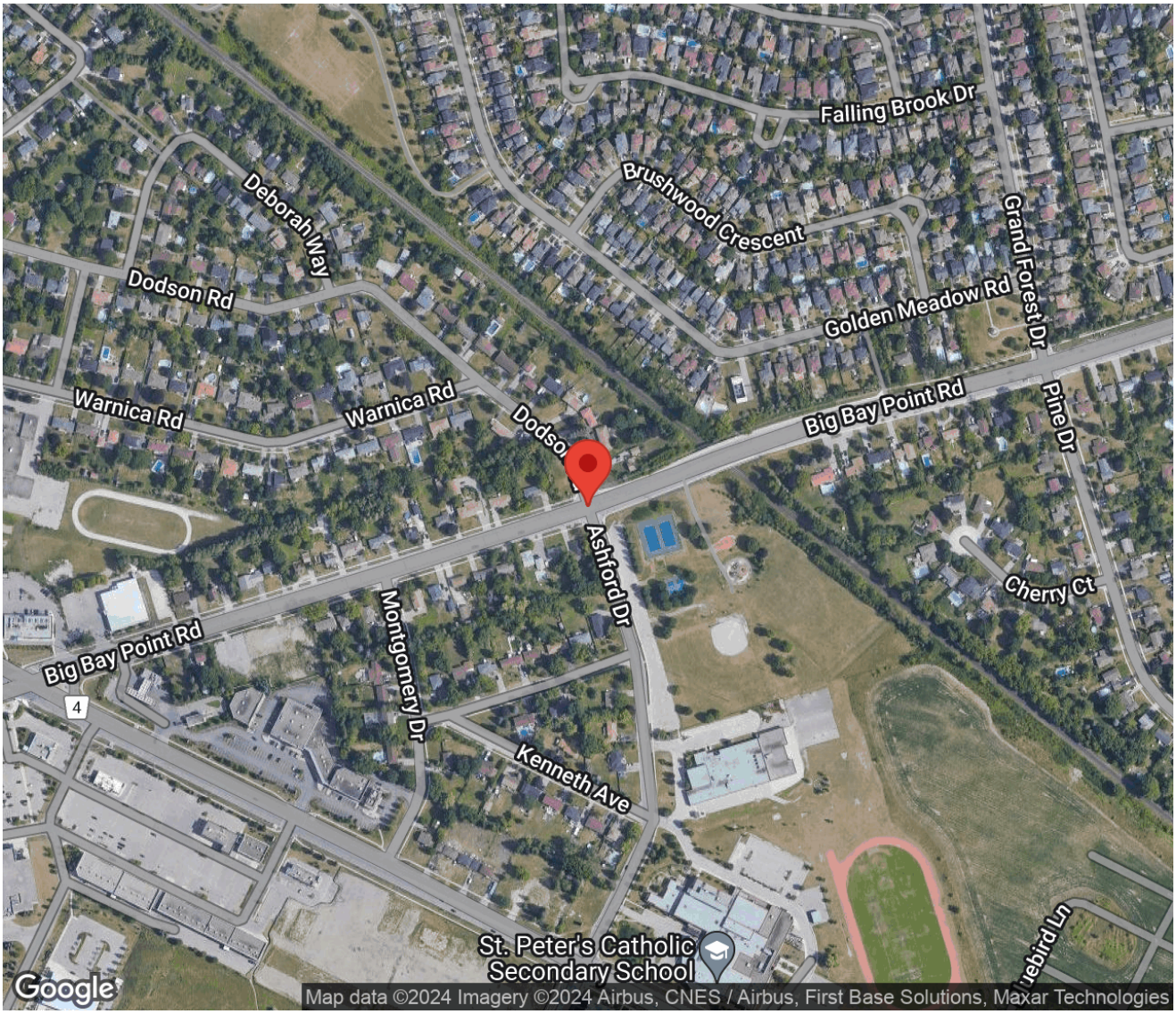
Traffic Count Map

Intersection:	Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code:	2403500039
Municipality:	Barrie
Count Date:	Mar 19, 2024



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Traffic Count Summary

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

Dodson Rd - Traffic Summary

	North Approach Totals						South Approach Totals						
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
Hour	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	Total
07:00 - 08:00	3	29	8	0	40	0	13	4	63	0	80	0	120
08:00 - 09:00	10	23	16	0	49	0	21	21	85	0	127	12	176
BREAK													
11:00 - 12:00	4	8	6	0	18	0	5	5	55	0	65	2	83
12:00 - 13:00	2	7	7	0	16	0	8	7	94	0	109	3	125
13:00 - 14:00	6	12	13	0	31	0	6	9	84	0	99	1	130
BREAK													
15:00 - 16:00	19	26	22	0	67	5	19	37	189	0	245	4	312
16:00 - 17:00	6	10	10	0	26	1	11	16	183	0	210	2	236
17:00 - 18:00	8	10	16	0	34	0	4	17	177	0	198	3	232
GRAND TOTAL	**58**	**125**	**98**	**0**	**281**	**6**	**87**	**116**	**930**	**0**	**1133**	**27**	**1414**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Summary

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

Big Bay Point Rd - Traffic Summary

	East Approach Totals						West Approach Totals						
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
Hour	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	Total
07:00 - 08:00	202	405	2	0	609	9	0	148	22	0	170	1	779
08:00 - 09:00	142	466	12	0	620	3	9	250	24	0	283	6	903
BREAK													
11:00 - 12:00	57	403	4	0	464	2	7	281	12	0	300	2	764
12:00 - 13:00	73	469	5	0	547	0	2	347	15	0	364	0	911
13:00 - 14:00	68	415	5	0	488	0	9	321	11	0	341	0	829
BREAK													
15:00 - 16:00	90	464	16	1	571	0	29	522	7	0	558	3	1129
16:00 - 17:00	91	562	6	0	659	1	19	588	7	0	614	4	1273
17:00 - 18:00	60	416	7	0	483	3	7	587	7	0	601	1	1084
GRAND TOTAL	**783**	**3600**	**57**	**1**	**4441**	**18**	**82**	**3044**	**105**	**0**	**3231**	**17**	**7672**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

North Approach - Dodson Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
					Total					Total					Total	
07:00	0	1	1	0	2	0	0	0	0	0	0	0	0	0	0	0
07:15	0	4	2	0	6	0	0	0	0	0	0	0	0	0	0	0
07:30	2	5	2	0	9	0	0	0	0	0	0	0	0	0	0	0
07:45	1	19	3	0	23	0	0	0	0	0	0	0	0	0	0	0
08:00	1	2	4	0	7	0	0	0	0	0	0	0	0	0	0	0
08:15	2	3	3	0	8	0	0	0	0	0	0	0	0	0	0	0
08:30	0	7	1	0	8	0	0	0	0	0	0	0	0	0	0	0
08:45	7	9	8	0	24	0	2	0	0	2	0	0	0	0	0	0
SUBTOTAL	13	50	24	0	87	0	2	0	0	2	0	0	0	0	0	0

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

North Approach - Dodson Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
					Total					Total					Total	
11:00	1	1	2	0	4	0	0	0	0	0	0	0	0	0	0	0
11:15	1	3	2	0	6	0	0	0	0	0	0	0	0	0	0	0
11:30	1	2	2	0	5	0	0	0	0	0	0	0	0	0	0	0
11:45	1	2	0	0	3	0	0	0	0	0	0	0	0	0	0	0
12:00	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	0
12:15	2	2	2	0	6	0	0	0	0	0	0	0	0	0	0	0
12:30	0	2	2	0	4	0	0	0	0	0	0	0	0	0	0	0
12:45	0	1	2	0	3	0	0	0	0	0	0	0	0	0	0	0
13:00	2	4	0	0	6	0	0	1	0	1	0	0	0	0	0	0
13:15	1	0	2	0	3	0	0	0	0	0	0	0	0	0	0	0
13:30	2	5	9	0	16	0	0	0	0	0	0	0	0	0	0	0
13:45	1	3	1	0	5	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	12	27	25	0	64	0	0	1	0	1	0	0	0	0	0	0

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

North Approach - Dodson Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
15:00	1	6	0	0	7	0	0	0	0	0	0	0	0	0	0	0
15:15	2	2	3	0	7	0	0	0	0	0	0	0	0	0	0	1
15:30	12	12	17	0	41	1	1	0	0	2	0	0	0	0	0	2
15:45	3	5	2	0	10	0	0	0	0	0	0	0	0	0	0	2
16:00	2	5	3	0	10	0	0	0	0	0	0	0	0	0	0	0
16:15	1	3	4	0	8	0	0	0	0	0	0	0	0	0	0	0
16:30	3	1	0	0	4	0	0	0	0	0	0	0	0	0	0	0
16:45	0	1	3	0	4	0	0	0	0	0	0	0	0	0	0	1
17:00	1	4	3	0	8	0	0	0	0	0	0	0	0	0	0	0
17:15	1	3	3	0	7	0	0	0	0	0	0	0	0	0	0	0
17:30	3	3	4	0	10	0	0	0	0	0	0	0	0	0	0	0
17:45	3	0	6	0	9	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	32	45	48	0	125	1	1	0	0	2	0	0	0	0	0	6
GRAND TOTAL	**57**	**122**	**97**	**0**	**276**	**1**	**3**	**1**	**0**	**5**	**0**	**0**	**0**	**0**	**0**	**6**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

South Approach - Ashford Dr

Start Time	Cars					Trucks					Bicycles					Total Peds
					Total					Total					Total	
07:00	0	1	4	0	5	0	0	2	0	2	0	0	0	0	0	0
07:15	1	0	6	0	7	0	1	0	0	1	0	0	0	0	0	0
07:30	6	1	10	0	17	0	0	2	0	2	0	0	0	0	0	0
07:45	6	1	39	0	46	0	0	0	0	0	0	0	0	0	0	0
08:00	1	3	17	0	21	0	0	1	0	1	0	0	0	0	0	0
08:15	2	1	17	0	20	0	0	0	0	0	0	0	0	0	0	1
08:30	8	5	17	0	30	0	0	0	0	0	0	0	0	0	0	7
08:45	10	12	32	0	54	0	0	1	0	1	0	0	0	0	0	4
SUBTOTAL	34	24	142	0	200	0	1	6	0	7	0	0	0	0	0	12

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

South Approach - Ashford Dr

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
11:00	1	1	10	0	12	0	0	1	0	1	0	0	0	0	0	0
11:15	0	2	11	0	13	0	0	0	0	0	0	0	0	0	0	0
11:30	1	1	11	0	13	0	0	0	0	0	0	0	0	0	0	1
11:45	3	1	22	0	26	0	0	0	0	0	0	0	0	0	0	1
12:00	4	1	29	0	34	0	0	1	0	1	0	0	0	0	0	0
12:15	2	1	10	0	13	0	0	0	0	0	0	0	0	0	0	2
12:30	1	3	26	0	30	0	0	1	0	1	0	0	0	0	0	0
12:45	1	2	27	0	30	0	0	0	0	0	0	0	0	0	0	1
13:00	2	4	21	0	27	0	0	1	0	1	0	0	0	0	0	1
13:15	1	2	21	0	24	0	0	0	0	0	0	0	0	0	0	0
13:30	1	2	21	0	24	0	0	0	0	0	0	0	0	0	0	0
13:45	2	1	19	0	22	0	0	1	0	1	0	0	0	0	0	0
SUBTOTAL	19	21	228	0	268	0	0	5	0	5	0	0	0	0	0	6

Ontario Traffic Inc.
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Traffic Count Data

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

South Approach - Ashford Dr

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
15:00	3	9	39	0	51	0	0	1	0	1	0	0	0	0	0	1
15:15	11	18	54	0	83	0	0	3	0	3	0	0	0	0	0	3
15:30	3	7	46	0	56	0	0	1	0	1	0	0	0	0	0	0
15:45	2	2	43	0	47	0	1	2	0	3	0	0	0	0	0	0
16:00	2	4	36	0	42	0	0	0	0	0	0	0	0	0	0	1
16:15	5	3	45	0	53	0	0	0	0	0	0	0	0	0	0	0
16:30	3	3	53	0	59	0	0	0	0	0	0	0	0	0	0	1
16:45	1	6	49	0	56	0	0	0	0	0	0	0	0	0	0	0
17:00	0	2	41	0	43	0	0	0	0	0	0	0	0	0	0	2
17:15	3	6	52	0	61	0	0	0	0	0	0	0	0	0	0	1
17:30	1	4	45	0	50	0	0	0	0	0	0	0	0	0	0	0
17:45	0	5	38	0	43	0	0	1	0	1	0	0	0	0	0	0
SUBTOTAL	34	69	541	0	644	0	1	8	0	9	0	0	0	0	0	9
GRAND TOTAL	87	114	911	0	1112	0	2	19	0	21	0	0	0	0	0	27

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

East Approach - Big Bay Point Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
07:00	18	76	1	0	95	1	1	0	0	2	0	0	0	0	0	0
07:15	31	88	0	0	119	0	2	0	0	2	0	0	0	0	0	0
07:30	53	117	1	0	171	3	3	0	0	6	0	0	0	0	0	5
07:45	96	116	0	0	212	0	2	0	0	2	0	0	0	0	0	4
08:00	30	93	0	0	123	2	3	0	0	5	0	0	0	0	0	0
08:15	28	109	0	0	137	0	2	0	0	2	0	0	0	0	0	2
08:30	41	135	1	0	177	1	6	0	0	7	0	0	0	0	0	0
08:45	37	115	11	0	163	3	3	0	0	6	0	0	0	0	0	1
SUBTOTAL	334	849	14	0	1197	10	22	0	0	32	0	0	0	0	0	12

Ontario Traffic Inc.
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Traffic Count Data

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

East Approach - Big Bay Point Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
11:00	9	101	0	0	110	0	5	0	0	5	0	0	0	0	0	1
11:15	17	88	1	0	106	1	1	0	0	2	0	0	0	0	0	0
11:30	15	101	2	0	118	0	5	0	0	5	0	0	0	0	0	1
11:45	15	100	1	0	116	0	2	0	0	2	0	0	0	0	0	0
12:00	20	108	2	0	130	0	5	0	0	5	0	0	0	0	0	0
12:15	16	128	1	0	145	0	1	0	0	1	0	0	0	0	0	0
12:30	25	118	1	0	144	0	3	1	0	4	0	0	0	0	0	0
12:45	12	103	0	0	115	0	3	0	0	3	0	0	0	0	0	0
13:00	15	110	3	0	128	0	1	0	0	1	0	0	0	0	0	0
13:15	8	93	0	0	101	1	2	0	0	3	0	0	0	0	0	0
13:30	14	104	2	0	120	1	1	0	0	2	0	0	0	0	0	0
13:45	28	102	0	0	130	1	2	0	0	3	0	0	0	0	0	0
SUBTOTAL	194	1256	13	0	1463	4	31	1	0	36	0	0	0	0	0	2

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

East Approach - Big Bay Point Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	
15:00	30	96	1	1	128	0	5	0	0	5	0	0	0	0	0	0
15:15	18	86	6	0	110	0	0	1	0	1	0	0	0	0	0	0
15:30	27	146	5	0	178	1	2	0	0	3	0	0	0	0	0	0
15:45	14	127	3	0	144	0	2	0	0	2	0	0	0	0	0	0
16:00	24	130	2	0	156	0	1	0	0	1	0	0	0	0	0	0
16:15	17	127	1	0	145	0	4	0	0	4	0	0	0	0	0	1
16:30	29	135	2	0	166	0	2	0	0	2	0	0	0	0	0	0
16:45	21	159	1	0	181	0	4	0	0	4	0	0	0	0	0	0
17:00	14	111	3	0	128	0	1	0	0	1	0	0	0	0	0	2
17:15	12	102	0	0	114	0	0	0	0	0	0	0	0	0	0	0
17:30	14	108	2	0	124	0	2	0	0	2	0	0	0	0	0	0
17:45	20	90	2	0	112	0	2	0	0	2	0	0	0	0	0	1
SUBTOTAL	240	1417	28	1	1686	1	25	1	0	27	0	0	0	0	0	4
GRAND TOTAL	768	3522	55	1	4346	15	78	2	0	95	0	0	0	0	0	18

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

West Approach - Big Bay Point Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
					Total					Total					Total	
07:00	0	28	2	0	30	0	1	0	0	1	0	0	0	0	0	0
07:15	0	34	5	0	39	0	2	0	0	2	0	0	0	0	0	1
07:30	0	36	8	0	44	0	1	0	0	1	0	0	0	0	0	0
07:45	0	42	7	0	49	0	4	0	0	4	0	0	0	0	0	0
08:00	1	56	6	0	63	0	2	0	0	2	0	0	0	0	0	0
08:15	1	61	10	0	72	0	3	0	0	3	0	0	0	0	0	0
08:30	3	60	5	0	68	0	1	0	0	1	0	0	0	0	0	3
08:45	4	61	3	0	68	0	6	0	0	6	0	0	0	0	0	3
SUBTOTAL	9	378	46	0	433	0	20	0	0	20	0	0	0	0	0	7

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

West Approach - Big Bay Point Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
11:00	3	71	1	0	75	0	2	0	0	2	0	0	0	0	0	2
11:15	1	69	0	0	70	0	3	1	0	4	0	0	0	0	0	0
11:30	1	67	3	0	71	0	0	0	0	0	0	0	0	0	0	0
11:45	2	66	7	0	75	0	3	0	0	3	0	0	0	0	0	0
12:00	1	87	7	0	95	0	2	0	0	2	0	0	0	0	0	0
12:15	0	81	1	0	82	0	1	0	0	1	0	0	0	0	0	0
12:30	1	85	4	0	90	0	2	0	0	2	0	1	0	0	1	0
12:45	0	85	3	0	88	0	3	0	0	3	0	0	0	0	0	0
13:00	3	80	1	0	84	0	1	1	0	2	0	0	0	0	0	0
13:15	2	89	1	0	92	0	1	0	0	1	0	0	0	0	0	0
13:30	3	69	2	0	74	0	2	0	0	2	0	0	0	0	0	0
13:45	1	76	6	0	83	0	3	0	0	3	0	0	0	0	0	0
SUBTOTAL	18	925	36	0	979	0	23	2	0	25	0	1	0	0	1	2

Ontario Traffic Inc.
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Traffic Count Data

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Municipality: Barrie
Count Date: Mar 19, 2024

West Approach - Big Bay Point Rd

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
15:00	3	129	5	0	137	0	0	0	0	0	0	0	0	0	0	0
15:15	12	132	2	0	146	0	1	0	0	1	0	0	0	0	0	3
15:30	6	106	0	0	112	0	5	0	0	5	0	0	0	0	0	0
15:45	7	146	0	0	153	1	3	0	0	4	0	0	0	0	0	0
16:00	2	113	4	0	119	0	3	0	0	3	0	0	0	0	0	0
16:15	0	150	0	0	150	0	1	0	0	1	0	0	0	0	0	0
16:30	12	148	0	0	160	0	1	0	0	1	0	0	0	0	0	3
16:45	5	171	3	0	179	0	1	0	0	1	0	0	0	0	0	1
17:00	2	177	2	0	181	0	0	0	0	0	0	0	0	0	0	0
17:15	2	159	1	0	162	0	2	0	0	2	0	0	0	0	0	0
17:30	1	123	2	0	126	0	1	0	0	1	0	0	0	0	0	1
17:45	2	124	2	0	128	0	1	0	0	1	0	0	0	0	0	0
SUBTOTAL	54	1678	21	0	1753	1	19	0	0	20	0	0	0	0	0	8
GRAND TOTAL	81	2981	103	0	3165	1	62	2	0	65	0	1	0	0	1	17

Peak Hour Diagram

Specified Period
From: 07:00:00
To: 09:00:00

One Hour Peak
From: 07:45:00
To: 08:45:00

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Count Date: Mar 19, 2024

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs E/W

North Approach

	Out	In	Total
Cars	46	16	62
Trucks	0	0	0
Bicycles	0	0	0
	46	**16**	**62**

Dodson Rd

Bicycles	0	0	0	0
Trucks	0	0	0	0
Cars	11	31	4	0
Totals	**11**	**31**	**4**	**0**

Peds: 0

East Approach

	Out	In	Total
Cars	649	313	962
Trucks	16	11	27
Bicycles	0	0	0
	665	**324**	**989**

Big Bay Point Rd

Bicycles	Trucks	Cars	Totals
0	0	0	**0**
0	0	5	**5**
0	10	219	**229**
0	0	28	**28**

Peds: 3

Peds: 6

Big Bay Point Rd

Totals	Cars	Trucks	Bicycles
0	0	0	0
1	1	0	0
466	453	13	0
198	195	3	0

Peds: 8

West Approach

	Out	In	Total
Cars	252	481	733
Trucks	10	13	23
Bicycles	0	0	0
	262	**494**	**756**

Ashford Dr

Totals	**17**	**10**	**91**	**0**
Cars	17	10	90	0
Trucks	0	0	1	0
Bicycles	0	0	0	0

South Approach

	Out	In	Total
Cars	117	254	371
Trucks	1	3	4
Bicycles	0	0	0
	118	**257**	**375**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Summary

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Count Date: Mar 19, 2024
Period: 07:00 - 09:00

Peak Hour Data (07:45 - 08:45)

Start Time	North Approach Dodson Rd						South Approach Ashford Dr						East Approach Big Bay Point Rd						West Approach Big Bay Point Rd						Total Vehicles
					Peds	Total					Peds	Total					Peds	Total					Peds	Total	
07:45	1	19	3	0	0	23	6	1	39	0	0	46	96	118	0	0	4	214	0	46	7	0	0	53	336
08:00	1	2	4	0	0	7	1	3	18	0	0	22	32	96	0	0	0	128	1	58	6	0	0	65	222
08:15	2	3	3	0	0	8	2	1	17	0	1	20	28	111	0	0	2	139	1	64	10	0	0	75	242
08:30	0	7	1	0	0	8	8	5	17	0	7	30	42	141	1	0	0	184	3	61	5	0	3	69	291
Grand Total	**4**	**31**	**11**	**0**	**0**	**46**	**17**	**10**	**91**	**0**	**8**	**118**	**198**	**466**	**1**	**0**	**6**	**665**	**5**	**229**	**28**	**0**	**3**	**262**	**1091**
Approach %	8.7	67.4	23.9	0		-	14.4	8.5	77.1	0		-	29.8	70.1	0.2	0		-	1.9	87.4	10.7	0		-	
Totals %	0.4	2.8	1	0		4.2	1.6	0.9	8.3	0		10.8	18.1	42.7	0.1	0		61	0.5	21	2.6	0		24	
PHF	**0.5**	**0.41**	**0.69**	**0**		**0.5**	**0.53**	**0.5**	**0.58**	**0**		**0.64**	**0.52**	**0.83**	**0.25**	**0**		**0.78**	**0.42**	**0.89**	**0.7**	**0**		**0.87**	**0.81**
Cars	4	31	11	0		46	17	10	90	0		117	195	453	1	0		649	5	219	28	0		252	1064
% Cars	100	100	100	0		100	100	100	98.9	0		99.2	98.5	97.2	100	0		97.6	100	95.6	100	0		96.2	97.5
Trucks	0	0	0	0		0	0	0	1	0		1	3	13	0	0		16	0	10	0	0		10	27
% Trucks	0	0	0	0		0	0	0	1.1	0		0.8	1.5	2.8	0	0		2.4	0	4.4	0	0		3.8	2.5
Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0
% Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0
Peds					0	-					8	-					6	-					3	-	17
% Peds					0	-					47.1	-					35.3	-					17.6	-	

Peak Hour Diagram

Specified Period
From: 11:00:00
To: 14:00:00

One Hour Peak
From: 12:00:00
To: 13:00:00

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Count Date: Mar 19, 2024

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs E/W

North Approach

	Out	In	Total
Cars	16	13	29
Trucks	0	1	1
Bicycles	0	0	0
	16	**14**	**30**

Dodson Rd

Bicycles	0	0	0	0
Trucks	0	0	0	0
Cars	7	7	2	0
Totals	**7**	**7**	**2**	**0**

Peds: 0

East Approach

	Out	In	Total
Cars	534	432	966
Trucks	13	10	23
Bicycles	0	1	1
	547	**443**	**990**

Big Bay Point Rd

Bicycles	Trucks	Cars	Totals
0	0	0	**0**
0	0	2	**2**
1	8	338	**347**
0	0	15	**15**

Peds: 0

Peds: 0

Big Bay Point Rd

Totals	Cars	Trucks	Bicycles
0	0	0	0
5	4	1	0
469	457	12	0
73	73	0	0

Peds: 3

West Approach

	Out	In	Total
Cars	355	472	827
Trucks	8	12	20
Bicycles	1	0	1
	364	**484**	**848**

Ashford Dr

Totals	**8**	**7**	**94**	**0**
Cars	8	7	92	0
Trucks	0	0	2	0
Bicycles	0	0	0	0

South Approach

	Out	In	Total
Cars	107	95	202
Trucks	2	0	2
Bicycles	0	0	0
	109	**95**	**204**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
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Peak Hour Summary

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Count Date: Mar 19, 2024
Period: 11:00 - 14:00

Peak Hour Data (12:00 - 13:00)

Start Time	North Approach Dodson Rd						South Approach Ashford Dr						East Approach Big Bay Point Rd						West Approach Big Bay Point Rd						Total Vehicles
					Peds	Total					Peds	Total					Peds	Total					Peds	Total	
12:00	0	2	1	0	0	3	4	1	30	0	0	35	20	113	2	0	0	135	1	89	7	0	0	97	270
12:15	2	2	2	0	0	6	2	1	10	0	2	13	16	129	1	0	0	146	0	82	1	0	0	83	248
12:30	0	2	2	0	0	4	1	3	27	0	0	31	25	121	2	0	0	148	1	88	4	0	0	93	276
12:45	0	1	2	0	0	3	1	2	27	0	1	30	12	106	0	0	0	118	0	88	3	0	0	91	242
Grand Total	**2**	**7**	**7**	**0**	**0**	**16**	**8**	**7**	**94**	**0**	**3**	**109**	**73**	**469**	**5**	**0**	**0**	**547**	**2**	**347**	**15**	**0**	**0**	**364**	**1036**
Approach %	12.5	43.8	43.8	0		-	7.3	6.4	86.2	0		-	13.3	85.7	0.9	0		-	0.5	95.3	4.1	0		-	
Totals %	0.2	0.7	0.7	0		1.5	0.8	0.7	9.1	0		10.5	7	45.3	0.5	0		52.8	0.2	33.5	1.4	0		35.1	
PHF	**0.25**	**0.88**	**0.88**	**0**		**0.67**	**0.5**	**0.58**	**0.78**	**0**		**0.78**	**0.73**	**0.91**	**0.63**	**0**		**0.92**	**0.5**	**0.97**	**0.54**	**0**		**0.94**	**0.94**
Cars	2	7	7	0		16	8	7	92	0		107	73	457	4	0		534	2	338	15	0		355	1012
% Cars	100	100	100	0		100	100	100	97.9	0		98.2	100	97.4	80	0		97.6	100	97.4	100	0		97.5	97.7
Trucks	0	0	0	0		0	0	0	2	0		2	0	12	1	0		13	0	8	0	0		8	23
% Trucks	0	0	0	0		0	0	0	2.1	0		1.8	0	2.6	20	0		2.4	0	2.3	0	0		2.2	2.2
Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	1	0	0		1	1
% Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0.3	0	0		0.3	0.1
Peds					0	-					3	-					0	-					0	-	3
% Peds					0	-					100	-					0	-					0	-	

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Peak Hour Diagram

Specified Period		One Hour Peak	
From:	15:00:00	From:	16:15:00
To:	18:00:00	To:	17:15:00

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Count Date: Mar 19, 2024

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Big Bay Point Rd runs E/W

North Approach

	Out	In	Total
Cars	24	40	64
Trucks	0	0	0
Bicycles	0	0	0
	24	**40**	**64**

Dodson Rd

Bicycles	0	0	0	0
Trucks	0	0	0	0
Cars	10	9	5	0
Totals	**10**	**9**	**5**	**0**

Peds: 1

East Approach

	Out	In	Total
Cars	620	839	1459
Trucks	11	3	14
Bicycles	0	0	0
	631	**842**	**1473**

Big Bay Point Rd

Bicycles	Trucks	Cars	Totals	
0	0	0	**0**	
0	0	19	**19**	
0	3	646	**649**	
0	0	5	**5**	

Peds: 4

Peds: 3

Big Bay Point Rd

	Totals	Cars	Trucks	Bicycles
	0	0	0	0
	7	7	0	0
	543	532	11	0
	81	81	0	0

Peds: 3

West Approach

	Out	In	Total
Cars	670	551	1221
Trucks	3	11	14
Bicycles	0	0	0
	673	**562**	**1235**

Ashford Dr

Totals	**9**	**14**	**188**	**0**
Cars	9	14	188	0
Trucks	0	0	0	0
Bicycles	0	0	0	0

South Approach

	Out	In	Total
Cars	211	95	306
Trucks	0	0	0
Bicycles	0	0	0
	211	**95**	**306**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
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Peak Hour Summary

Intersection: Big Bay Point Rd & Ashford Dr - Dodson Rd
Site Code: 2403500039
Count Date: Mar 19, 2024
Period: 15:00 - 18:00

Peak Hour Data (16:15 - 17:15)

Start Time	North Approach Dodson Rd						South Approach Ashford Dr						East Approach Big Bay Point Rd						West Approach Big Bay Point Rd						Total Vehicles
					Peds	Total					Peds	Total					Peds	Total					Peds	Total	
16:15	1	3	4	0	0	8	5	3	45	0	0	53	17	131	1	0	1	149	0	151	0	0	0	151	361
16:30	3	1	0	0	0	4	3	3	53	0	1	59	29	137	2	0	0	168	12	149	0	0	3	161	392
16:45	0	1	3	0	1	4	1	6	49	0	0	56	21	163	1	0	0	185	5	172	3	0	1	180	425
17:00	1	4	3	0	0	8	0	2	41	0	2	43	14	112	3	0	2	129	2	177	2	0	0	181	361
Grand Total	**5**	**9**	**10**	**0**	**1**	**24**	**9**	**14**	**188**	**0**	**3**	**211**	**81**	**543**	**7**	**0**	**3**	**631**	**19**	**649**	**5**	**0**	**4**	**673**	**1539**
Approach %	20.8	37.5	41.7	0		-	4.3	6.6	89.1	0		-	12.8	86.1	1.1	0		-	2.8	96.4	0.7	0		-	
Totals %	0.3	0.6	0.6	0		1.6	0.6	0.9	12.2	0		13.7	5.3	35.3	0.5	0		41	1.2	42.2	0.3	0		43.7	
PHF	**0.42**	**0.56**	**0.63**	**0**		**0.75**	**0.45**	**0.58**	**0.89**	**0**		**0.89**	**0.7**	**0.83**	**0.58**	**0**		**0.85**	**0.4**	**0.92**	**0.42**	**0**		**0.93**	**0.91**
Cars	5	9	10	0		24	9	14	188	0		211	81	532	7	0		620	19	646	5	0		670	1525
% Cars	100	100	100	0		100	100	100	100	0		100	100	98	100	0		98.3	100	99.5	100	0		99.6	99.1
Trucks	0	0	0	0		0	0	0	0	0		0	0	11	0	0		11	0	3	0	0		3	14
% Trucks	0	0	0	0		0	0	0	0	0		0	0	2	0	0		1.7	0	0.5	0	0		0.4	0.9
Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0
% Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0
Peds					1	-					3	-					3	-					4	-	11
% Peds					9.1	-					27.3	-					27.3	-					36.4	-	

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Project #24-035 - City of Barrie

Intersection Count Report

Intersection:	Yonge St & Ashford Dr - Madelaine Dr
Municipality:	Barrie
Count Date:	Thursday, Mar 28, 2024
Site Code:	2403500199
Count Categories:	Cars, Trucks, Bicycles, Pedestrians
Count Period:	07:00-09:00, 11:00-14:00, 15:00-18:00
Weather:	Clear
Comments:	

Ontario Traffic Inc.
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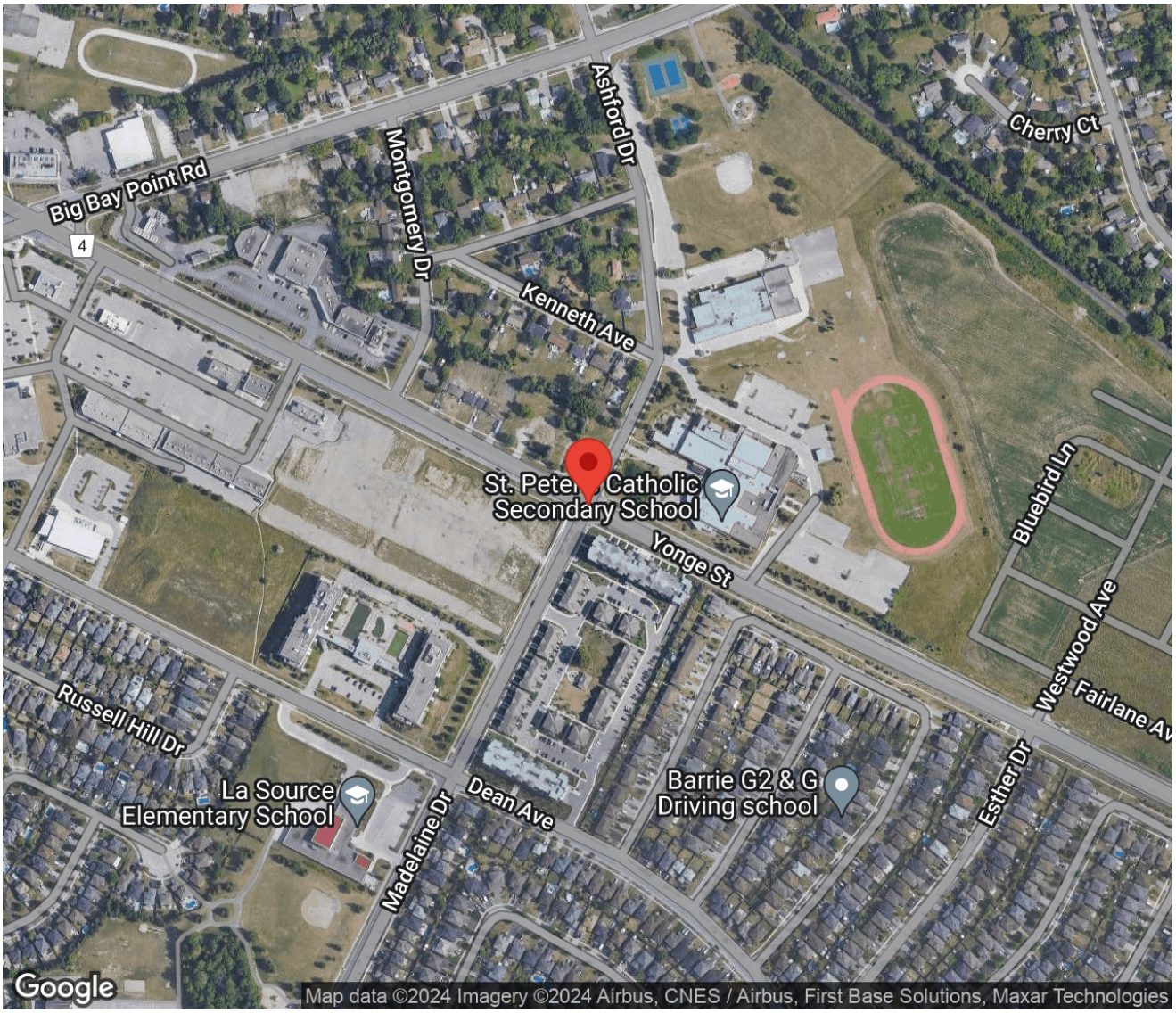
Traffic Count Map

Intersection:	Yonge St & Ashford Dr - Madelaine Dr
Site Code:	2403500199
Municipality:	Barrie
Count Date:	Mar 28, 2024



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Traffic Count Summary

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

Ashford Dr - Traffic Summary

Hour	North Approach Totals (Includes Cars, Trucks, Bicycles)						South Approach Totals (Includes Cars, Trucks, Bicycles)						Total
	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	
07:00 - 08:00	81	109	47	0	237	4	57	129	31	0	217	27	454
08:00 - 09:00	95	117	57	0	269	13	88	161	18	0	267	10	536
BREAK													
11:00 - 12:00	40	49	24	0	113	32	123	55	27	0	205	46	318
12:00 - 13:00	39	54	32	0	125	38	132	77	24	0	233	66	358
13:00 - 14:00	26	45	33	0	104	12	120	79	21	0	220	17	324
BREAK													
15:00 - 16:00	48	79	50	0	177	22	135	167	33	0	335	7	512
16:00 - 17:00	40	75	42	0	157	9	153	107	30	0	290	11	447
17:00 - 18:00	42	61	26	0	129	17	140	120	31	0	291	12	420
GRAND TOTAL	**411**	**589**	**311**	**0**	**1311**	**147**	**948**	**895**	**215**	**0**	**2058**	**196**	**3369**

Ontario Traffic Inc.
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Traffic Count Summary

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

Yonge St - Traffic Summary

	East Approach Totals						West Approach Totals						
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
Hour	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	Total
07:00 - 08:00	32	391	123	0	546	42	76	327	59	0	462	7	1008
08:00 - 09:00	39	476	109	0	624	35	44	355	81	0	480	5	1104
BREAK													
11:00 - 12:00	20	518	53	0	591	43	48	463	120	0	631	46	1222
12:00 - 13:00	24	568	49	0	641	57	53	514	143	0	710	75	1351
13:00 - 14:00	21	558	70	0	649	8	62	480	124	0	666	10	1315
BREAK													
15:00 - 16:00	58	666	106	0	830	52	57	565	161	0	783	21	1613
16:00 - 17:00	26	677	61	0	764	10	43	641	182	0	866	0	1630
17:00 - 18:00	32	659	71	0	762	14	39	642	149	0	830	11	1592
GRAND TOTAL	**252**	**4513**	**642**	**0**	**5407**	**261**	**422**	**3987**	**1019**	**0**	**5428**	**175**	**10835**

Ontario Traffic Inc.
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Traffic Count Data

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

North Approach - Ashford Dr

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
07:00	15	16	3	0	34	0	0	0	0	0	0	0	0	0	0	0
07:15	13	23	5	0	41	0	0	1	0	1	0	0	0	0	0	0
07:30	23	28	18	0	69	0	0	0	0	0	0	0	0	0	0	4
07:45	30	42	20	0	92	0	0	0	0	0	0	0	0	0	0	0
08:00	27	25	21	0	73	0	0	0	0	0	0	0	0	0	0	1
08:15	11	12	9	0	32	0	0	0	0	0	0	0	0	0	0	5
08:30	23	42	15	0	80	1	0	0	0	1	0	0	0	0	0	5
08:45	31	38	11	0	80	2	0	1	0	3	0	0	0	0	0	2
SUBTOTAL	173	226	102	0	501	3	0	2	0	5	0	0	0	0	0	17

Ontario Traffic Inc.
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Traffic Count Data

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

North Approach - Ashford Dr

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
11:00	7	12	5	0	24	1	1	0	0	2	0	0	0	0	0	12
11:15	11	16	7	0	34	0	0	0	0	0	0	0	0	0	0	8
11:30	4	16	2	0	22	0	0	0	0	0	0	0	0	0	0	7
11:45	17	4	10	0	31	0	0	0	0	0	0	0	0	0	0	5
12:00	9	13	12	0	34	0	0	0	0	0	0	0	0	0	0	10
12:15	8	15	5	0	28	0	0	0	0	0	0	0	0	0	0	10
12:30	13	9	9	0	31	0	0	0	0	0	0	0	0	0	0	12
12:45	9	17	6	0	32	0	0	0	0	0	0	0	0	0	0	6
13:00	7	12	8	0	27	0	0	0	0	0	0	0	0	0	0	3
13:15	6	10	7	0	23	0	0	1	0	1	0	0	0	0	0	0
13:30	10	13	7	0	30	0	0	0	0	0	0	0	0	0	0	1
13:45	3	10	10	0	23	0	0	0	0	0	0	0	0	0	0	8
SUBTOTAL	104	147	88	0	339	1	1	1	0	3	0	0	0	0	0	82

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Traffic Count Data

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

North Approach - Ashford Dr

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
15:00	13	14	12	0	39	0	0	0	0	0	0	0	0	0	0	10
15:15	11	20	13	0	44	1	0	1	0	2	0	0	0	0	0	3
15:30	16	23	11	0	50	0	2	0	0	2	0	0	0	0	0	4
15:45	7	20	13	0	40	0	0	0	0	0	0	0	0	0	0	5
16:00	15	19	7	0	41	1	1	0	0	2	0	0	0	0	0	2
16:15	8	20	10	0	38	0	0	0	0	0	0	0	0	0	0	3
16:30	8	20	15	0	43	0	0	1	0	1	0	0	0	0	0	1
16:45	8	15	9	0	32	0	0	0	0	0	0	0	0	0	0	3
17:00	14	13	7	0	34	0	0	1	0	1	0	0	0	0	0	7
17:15	10	15	7	0	32	0	0	0	0	0	0	0	0	0	0	4
17:30	9	22	3	0	34	0	0	0	0	0	0	0	0	0	0	2
17:45	9	11	8	0	28	0	0	0	0	0	0	0	0	0	0	4
SUBTOTAL	128	212	115	0	455	2	3	3	0	8	0	0	0	0	0	48
GRAND TOTAL	405	585	305	0	1295	6	4	6	0	16	0	0	0	0	0	147

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Traffic Count Data

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

South Approach - Madelaine Dr

Start Time	Cars					Trucks					Bicycles					Total Peds
					Total					Total					Total	
07:00	8	5	7	0	20	0	3	0	0	3	0	0	0	0	0	2
07:15	14	17	6	0	37	0	1	0	0	1	0	0	0	0	0	4
07:30	19	28	11	0	58	0	0	0	0	0	0	0	0	0	0	3
07:45	16	73	7	0	96	0	2	0	0	2	0	0	0	0	0	18
08:00	26	35	7	0	68	1	0	0	0	1	0	0	0	0	0	2
08:15	15	30	4	0	49	1	0	1	0	2	0	0	0	0	0	3
08:30	16	51	3	0	70	1	0	0	0	1	0	0	0	0	0	2
08:45	26	45	3	0	74	2	0	0	0	2	0	0	0	0	0	3
SUBTOTAL	140	284	48	0	472	5	6	1	0	12	0	0	0	0	0	37

Ontario Traffic Inc.
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Traffic Count Data

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

South Approach - Madelaine Dr

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
11:00	23	11	6	0	40	0	0	0	0	0	0	0	0	0	0	9
11:15	28	18	6	0	52	0	0	0	0	0	0	0	0	0	0	28
11:30	36	14	4	0	54	0	0	0	0	0	0	0	0	0	0	2
11:45	36	12	9	0	57	0	0	2	0	2	0	0	0	0	0	7
12:00	37	19	9	0	65	0	0	0	0	0	0	0	0	0	0	5
12:15	24	19	3	0	46	0	0	0	0	0	0	0	0	0	0	21
12:30	37	25	5	0	67	0	0	0	0	0	0	0	0	0	0	35
12:45	34	14	7	0	55	0	0	0	0	0	0	0	0	0	0	5
13:00	21	24	4	0	49	0	1	0	0	1	0	0	0	0	0	6
13:15	31	10	9	0	50	0	1	1	0	2	0	0	0	0	0	4
13:30	33	20	2	0	55	1	1	0	0	2	0	0	0	0	0	5
13:45	33	21	4	0	58	1	1	1	0	3	0	0	0	0	0	2
SUBTOTAL	373	207	68	0	648	2	4	4	0	10	0	0	0	0	0	129

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

South Approach - Madelaine Dr

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
15:00	32	52	8	0	92	0	0	0	0	0	0	0	0	0	0	2
15:15	28	38	11	0	77	1	3	0	0	4	0	0	0	0	0	0
15:30	33	26	4	0	63	2	0	0	0	2	0	0	0	0	0	2
15:45	37	47	8	0	92	2	1	2	0	5	0	0	0	0	0	3
16:00	43	24	8	0	75	1	1	0	0	2	0	0	0	0	0	1
16:15	41	24	7	0	72	0	1	0	0	1	0	0	0	0	0	2
16:30	39	40	5	0	84	0	0	0	0	0	0	0	0	0	0	3
16:45	29	17	10	0	56	0	0	0	0	0	0	0	0	0	0	5
17:00	39	35	14	0	88	0	1	0	0	1	0	0	0	0	0	1
17:15	38	27	2	0	67	1	1	0	0	2	0	0	0	0	0	3
17:30	29	33	6	0	68	0	0	0	0	0	0	0	0	0	0	4
17:45	32	23	7	0	62	1	0	2	0	3	0	0	0	0	0	4
SUBTOTAL	420	386	90	0	896	8	8	4	0	20	0	0	0	0	0	30
GRAND TOTAL	933	877	206	0	2016	15	18	9	0	42	0	0	0	0	0	196

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

East Approach - Yonge St

Start Time	Cars					Trucks					Bicycles					Total Peds
					Total					Total					Total	
07:00	0	65	6	0	71	0	2	0	0	2	0	0	0	0	0	1
07:15	4	78	8	0	90	0	3	0	0	3	0	0	0	0	0	1
07:30	6	92	29	0	127	0	3	13	0	16	0	0	0	0	0	8
07:45	21	142	63	0	226	1	6	4	0	11	0	0	0	0	0	32
08:00	12	107	30	0	149	0	6	1	0	7	0	0	0	0	0	5
08:15	6	122	13	0	141	0	4	0	0	4	0	0	0	0	0	4
08:30	9	105	36	0	150	0	1	0	0	1	0	0	0	0	0	16
08:45	11	126	28	0	165	1	5	1	0	7	0	0	0	0	0	10
SUBTOTAL	69	837	213	0	1119	2	30	19	0	51	0	0	0	0	0	77

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

East Approach - Yonge St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
11:00	6	111	11	0	128	0	1	0	0	1	0	0	0	0	0	4
11:15	3	126	7	0	136	0	2	0	0	2	0	0	0	0	0	29
11:30	4	116	14	0	134	0	3	1	0	4	0	0	0	0	0	0
11:45	7	155	20	0	182	0	4	0	0	4	0	0	0	0	0	10
12:00	10	143	13	0	166	0	2	0	0	2	0	0	0	0	0	3
12:15	4	145	5	0	154	0	2	0	0	2	0	0	0	0	0	15
12:30	5	132	16	0	153	0	5	0	0	5	0	0	0	0	0	35
12:45	5	136	15	0	156	0	3	0	0	3	0	0	0	0	0	4
13:00	5	135	7	0	147	0	3	0	0	3	0	0	0	0	0	3
13:15	4	142	10	0	156	1	4	0	0	5	0	0	0	0	0	2
13:30	6	138	18	0	162	0	3	0	0	3	0	0	0	0	0	3
13:45	5	126	33	0	164	0	7	2	0	9	0	0	0	0	0	0
SUBTOTAL	64	1605	169	0	1838	1	39	3	0	43	0	0	0	0	0	108

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

East Approach - Yonge St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
15:00	12	147	30	0	189	0	4	1	0	5	0	0	0	0	0	21
15:15	28	152	24	0	204	1	3	2	0	6	0	0	0	0	0	22
15:30	9	191	22	0	222	0	3	0	0	3	0	0	0	0	0	4
15:45	8	163	26	0	197	0	3	1	0	4	0	0	0	0	0	5
16:00	8	168	17	0	193	0	3	1	0	4	0	0	0	0	0	4
16:15	4	162	10	0	176	0	3	0	0	3	0	0	0	0	0	3
16:30	8	153	18	0	179	0	2	0	0	2	0	0	0	0	0	2
16:45	6	184	15	0	205	0	2	0	0	2	0	0	0	0	0	1
17:00	7	161	22	0	190	0	3	0	0	3	0	0	0	0	0	4
17:15	11	157	16	0	184	0	1	0	0	1	0	0	0	0	0	4
17:30	8	210	19	0	237	0	3	0	0	3	0	0	0	0	0	1
17:45	6	122	14	0	142	0	2	0	0	2	0	0	0	0	0	5
SUBTOTAL	115	1970	233	0	2318	1	32	5	0	38	0	0	0	0	0	76
GRAND TOTAL	**248**	**4412**	**615**	**0**	**5275**	**4**	**101**	**27**	**0**	**132**	**0**	**0**	**0**	**0**	**0**	**261**

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

West Approach - Yonge St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	↰	↑	↱	↻	Total	
07:00	5	74	9	0	88	0	5	0	0	5	0	0	0	0	0	0
07:15	12	81	23	0	116	0	0	1	0	1	0	0	0	0	0	2
07:30	26	73	9	0	108	1	2	2	0	5	0	0	0	0	0	4
07:45	31	88	14	0	133	1	4	1	0	6	0	0	0	0	0	1
08:00	20	88	13	0	121	0	8	0	0	8	0	0	0	0	0	0
08:15	6	75	18	0	99	0	2	0	0	2	0	0	0	0	0	1
08:30	8	87	23	0	118	0	3	0	0	3	0	0	0	0	0	4
08:45	10	87	26	0	123	0	5	1	0	6	0	0	0	0	0	0
SUBTOTAL	118	653	135	0	906	2	29	5	0	36	0	0	0	0	0	12

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

West Approach - Yonge St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
11:00	11	97	23	0	131	0	8	1	0	9	0	0	0	0	0	12
11:15	13	115	26	0	154	0	4	1	0	5	0	0	0	0	0	25
11:30	11	108	31	0	150	0	1	0	0	1	0	0	0	0	0	6
11:45	13	128	38	0	179	0	2	0	0	2	0	0	0	0	0	3
12:00	8	111	32	0	151	0	2	0	0	2	0	0	0	0	0	13
12:15	16	126	37	0	179	0	2	0	0	2	0	0	0	0	0	3
12:30	18	117	37	0	172	0	3	0	0	3	0	0	0	0	0	54
12:45	11	148	37	0	196	0	5	0	0	5	0	0	0	0	0	5
13:00	12	112	32	0	156	0	3	0	0	3	0	0	0	0	0	1
13:15	9	134	33	0	176	0	1	1	0	2	0	0	0	0	0	4
13:30	16	118	26	0	160	0	1	0	0	1	0	0	0	0	0	0
13:45	25	108	32	0	165	0	3	0	0	3	0	0	0	0	0	5
SUBTOTAL	163	1422	384	0	1969	0	35	3	0	38	0	0	0	0	0	131

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Municipality: Barrie
Count Date: Mar 28, 2024

West Approach - Yonge St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
15:00	14	136	34	0	184	0	6	0	0	6	0	0	0	0	0	6
15:15	15	170	38	0	223	1	4	0	0	5	0	0	0	0	0	1
15:30	11	122	39	0	172	0	2	2	0	4	0	0	0	0	0	9
15:45	16	120	48	0	184	0	5	0	0	5	0	0	0	0	0	5
16:00	7	163	41	0	211	0	4	0	0	4	0	0	0	0	0	0
16:15	7	165	28	0	200	0	6	0	0	6	0	0	0	0	0	0
16:30	12	151	54	0	217	0	2	0	0	2	0	0	0	0	0	0
16:45	17	144	59	0	220	0	6	0	0	6	0	0	0	0	0	0
17:00	7	137	42	0	186	0	2	0	0	2	0	0	0	0	0	3
17:15	11	190	38	0	239	0	2	1	0	3	0	0	0	0	0	0
17:30	8	168	31	0	207	0	2	2	0	4	0	0	0	0	0	3
17:45	13	138	35	0	186	0	3	0	0	3	0	0	0	0	0	5
SUBTOTAL	138	1804	487	0	2429	1	44	5	0	50	0	0	0	0	0	32
GRAND TOTAL	**419**	**3879**	**1006**	**0**	**5304**	**3**	**108**	**13**	**0**	**124**	**0**	**0**	**0**	**0**	**0**	**175**

Peak Hour Diagram

Specified Period
From: 07:00:00
To: 09:00:00

One Hour Peak
From: 07:45:00
To: 08:45:00

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Count Date: Mar 28, 2024

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Yonge St runs E/W

North Approach

	Out	In	Total
Cars	277	396	673
Trucks	1	8	9
Bicycles	0	0	0
	278	**404**	**682**

Ashford Dr

Bicycles	0	0	0	0
Trucks	0	0	1	0
Cars	65	121	91	0
Totals	**65**	**121**	**92**	**0**

East Approach

	Out	In	Total
Cars	666	450	1116
Trucks	23	19	42
Bicycles	0	0	0
	689	**469**	**1158**

Yonge St

Bicycles	Trucks	Cars	Totals	
0	0	0	**0**	U-turn
0	1	65	**66**	Through
0	17	338	**355**	Right
0	1	68	**69**	Left

Peds: 11

Peds: 6

Peds: 57

Peds: 25

Yonge St

	Totals	Cars	Trucks	Bicycles
U-turn	**0**	0	0	0
Through	**147**	142	5	0
Left	**493**	476	17	0
Right	**49**	48	1	0

West Approach

	Out	In	Total
Cars	471	614	1085
Trucks	19	20	39
Bicycles	0	0	0
	490	**634**	**1124**

Madelaine Dr

Totals	**76**	**191**	**22**	**0**
Cars	73	189	21	0
Trucks	3	2	1	0
Bicycles	0	0	0	0

South Approach

	Out	In	Total
Cars	283	237	520
Trucks	6	2	8
Bicycles	0	0	0
	289	**239**	**528**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Summary

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Count Date: Mar 28, 2024
Period: 07:00 - 09:00

Peak Hour Data (07:45 - 08:45)

Start Time	North Approach Ashford Dr						South Approach Madelaine Dr						East Approach Yonge St						West Approach Yonge St						Total Vehicles
					Peds	Total					Peds	Total					Peds	Total					Peds	Total	
07:45	30	42	20	0	0	92	16	75	7	0	18	98	22	148	67	0	32	237	32	92	15	0	1	139	566
08:00	27	25	21	0	1	73	27	35	7	0	2	69	12	113	31	0	5	156	20	96	13	0	0	129	427
08:15	11	12	9	0	5	32	16	30	5	0	3	51	6	126	13	0	4	145	6	77	18	0	1	101	329
08:30	24	42	15	0	5	81	17	51	3	0	2	71	9	106	36	0	16	151	8	90	23	0	4	121	424
Grand Total	**92**	**121**	**65**	**0**	**11**	**278**	**76**	**191**	**22**	**0**	**25**	**289**	**49**	**493**	**147**	**0**	**57**	**689**	**66**	**355**	**69**	**0**	**6**	**490**	**1746**
Approach %	33.1	43.5	23.4	0		-	26.3	66.1	7.6	0		-	7.1	71.6	21.3	0		-	13.5	72.4	14.1	0		-	
Totals %	5.3	6.9	3.7	0		15.9	4.4	10.9	1.3	0		16.6	2.8	28.2	8.4	0		39.5	3.8	20.3	4	0		28.1	
PHF	**0.77**	**0.72**	**0.77**	**0**		**0.76**	**0.7**	**0.64**	**0.79**	**0**		**0.74**	**0.56**	**0.83**	**0.55**	**0**		**0.73**	**0.52**	**0.92**	**0.75**	**0**		**0.88**	**0.77**
Cars	91	121	65	0		277	73	189	21	0		283	48	476	142	0		666	65	338	68	0		471	1697
% Cars	98.9	100	100	0		99.6	96.1	99	95.5	0		97.9	98	96.6	96.6	0		96.7	98.5	95.2	98.6	0		96.1	97.2
Trucks	1	0	0	0		1	3	2	1	0		6	1	17	5	0		23	1	17	1	0		19	49
% Trucks	1.1	0	0	0		0.4	3.9	1	4.5	0		2.1	2	3.4	3.4	0		3.3	1.5	4.8	1.4	0		3.9	2.8
Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0
% Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0
Peds					11	-					25	-					57	-					6	-	99
% Peds					11.1	-					25.3	-					57.6	-					6.1	-	

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Diagram

Specified Period		One Hour Peak	
From:	11:00:00	From:	11:45:00
To:	14:00:00	To:	12:45:00

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Count Date: Mar 28, 2024

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Yonge St runs E/W

North Approach

	Out	In	Total
Cars	124	184	308
Trucks	0	0	0
Bicycles	0	0	0
	124	**184**	**308**

Ashford Dr

Bicycles	0	0	0	0
Trucks	0	0	0	0
Cars	36	41	47	0
Totals	**36**	**41**	**47**	**0**

East Approach

	Out	In	Total
Cars	655	555	1210
Trucks	13	11	24
Bicycles	0	0	0
	668	**566**	**1234**

Peds: 37

Yonge St

Bicycles	Trucks	Cars	Totals
0	0	0	**0**
0	0	55	**55**
0	9	482	**491**
0	0	144	**144**

Peds: 73

Peds: 63

Yonge St

	Totals	Cars	Trucks	Bicycles
	0	0	0	0
	54	54	0	0
	588	575	13	0
	26	26	0	0

Peds: 68

West Approach

	Out	In	Total
Cars	681	745	1426
Trucks	9	13	22
Bicycles	0	0	0
	690	**758**	**1448**

Totals	**134**	**75**	**28**	**0**
Cars	134	75	26	0
Trucks	0	0	2	0
Bicycles	0	0	0	0

Madelaine Dr

South Approach

	Out	In	Total
Cars	235	211	446
Trucks	2	0	2
Bicycles	0	0	0
	237	**211**	**448**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Summary

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Count Date: Mar 28, 2024
Period: 11:00 - 14:00

Peak Hour Data (11:45 - 12:45)

Start Time	North Approach Ashford Dr						South Approach Madelaine Dr						East Approach Yonge St						West Approach Yonge St						Total Vehicles
					Peds	Total					Peds	Total					Peds	Total					Peds	Total	
11:45	17	4	10	0	5	31	36	12	11	0	7	59	7	159	20	0	10	186	13	130	38	0	3	181	457
12:00	9	13	12	0	10	34	37	19	9	0	5	65	10	145	13	0	3	168	8	113	32	0	13	153	420
12:15	8	15	5	0	10	28	24	19	3	0	21	46	4	147	5	0	15	156	16	128	37	0	3	181	411
12:30	13	9	9	0	12	31	37	25	5	0	35	67	5	137	16	0	35	158	18	120	37	0	54	175	431
Grand Total	**47**	**41**	**36**	**0**	**37**	**124**	**134**	**75**	**28**	**0**	**68**	**237**	**26**	**588**	**54**	**0**	**63**	**668**	**55**	**491**	**144**	**0**	**73**	**690**	**1719**
Approach %	37.9	33.1	29	0		-	56.5	31.6	11.8	0		-	3.9	88	8.1	0		-	8	71.2	20.9	0		-	
Totals %	2.7	2.4	2.1	0		7.2	7.8	4.4	1.6	0		13.8	1.5	34.2	3.1	0		38.9	3.2	28.6	8.4	0		40.1	
PHF	**0.69**	**0.68**	**0.75**	**0**		**0.91**	**0.91**	**0.75**	**0.64**	**0**		**0.88**	**0.65**	**0.92**	**0.68**	**0**		**0.9**	**0.76**	**0.94**	**0.95**	**0**		**0.95**	**0.94**
Cars	47	41	36	0		124	134	75	26	0		235	26	575	54	0		655	55	482	144	0		681	1695
% Cars	100	100	100	0		100	100	100	92.9	0		99.2	100	97.8	100	0		98.1	100	98.2	100	0		98.7	98.6
Trucks	0	0	0	0		0	0	0	2	0		2	0	13	0	0		13	0	9	0	0		9	24
% Trucks	0	0	0	0		0	0	0	7.1	0		0.8	0	2.2	0	0		1.9	0	1.8	0	0		1.3	1.4
Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0
% Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0
Peds					37	-					68	-					63	-					73	-	241
% Peds					15.4	-					28.2	-					26.1	-					30.3	-	

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Diagram

Specified Period		One Hour Peak	
From:	15:00:00	From:	15:15:00
To:	18:00:00	To:	16:15:00

Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Count Date: Mar 28, 2024

Weather conditions: Clear

**** Signalized Intersection ****

Major Road: Yonge St runs E/W

North Approach

	Out	In	Total
Cars	175	273	448
Trucks	6	10	16
Bicycles	0	0	0
	181	**283**	**464**

Ashford Dr

Bicycles	0	0	0	0
Trucks	1	3	2	0
Cars	44	82	49	0
Totals	**45**	**85**	**51**	**0**

East Approach

	Out	In	Total
Cars	816	655	1471
Trucks	17	19	36
Bicycles	0	0	0
	833	**674**	**1507**

Peds: 14

Yonge St

Bicycles	Trucks	Cars	Totals
0	0	0	**0**
0	1	49	**50**
0	15	575	**590**
0	2	166	**168**

Peds: 15

Peds: 35

Yonge St

Totals	Cars	Trucks	Bicycles
0	0	0	0
93	89	4	0
686	674	12	0
54	53	1	0

Peds: 6

West Approach

	Out	In	Total
Cars	790	859	1649
Trucks	18	19	37
Bicycles	0	0	0
	808	**878**	**1686**

Madelaine Dr

Totals	**147**	**140**	**33**	**0**
Cars	141	135	31	0
Trucks	6	5	2	0
Bicycles	0	0	0	0

South Approach

	Out	In	Total
Cars	307	301	608
Trucks	13	6	19
Bicycles	0	0	0
	320	**307**	**627**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Peak Hour Summary

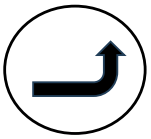
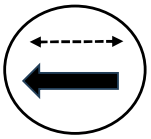
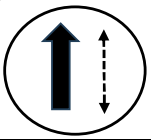
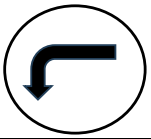
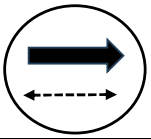
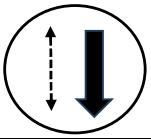
Intersection: Yonge St & Ashford Dr - Madelaine Dr
Site Code: 2403500199
Count Date: Mar 28, 2024
Period: 15:00 - 18:00

Peak Hour Data (15:15 - 16:15)

Start Time	North Approach Ashford Dr						South Approach Madelaine Dr						East Approach Yonge St						West Approach Yonge St						Total Vehicles
					Peds	Total					Peds	Total					Peds	Total					Peds	Total	
15:15	12	20	14	0	3	46	29	41	11	0	0	81	29	155	26	0	22	210	16	174	38	0	1	228	565
15:30	16	25	11	0	4	52	35	26	4	0	2	65	9	194	22	0	4	225	11	124	41	0	9	176	518
15:45	7	20	13	0	5	40	39	48	10	0	3	97	8	166	27	0	5	201	16	125	48	0	5	189	527
16:00	16	20	7	0	2	43	44	25	8	0	1	77	8	171	18	0	4	197	7	167	41	0	0	215	532
Grand Total	**51**	**85**	**45**	**0**	**14**	**181**	**147**	**140**	**33**	**0**	**6**	**320**	**54**	**686**	**93**	**0**	**35**	**833**	**50**	**590**	**168**	**0**	**15**	**808**	**2142**
Approach %	28.2	47	24.9	0		-	45.9	43.8	10.3	0		-	6.5	82.4	11.2	0		-	6.2	73	20.8	0		-	
Totals %	2.4	4	2.1	0		8.5	6.9	6.5	1.5	0		14.9	2.5	32	4.3	0		38.9	2.3	27.5	7.8	0		37.7	
PHF	**0.8**	**0.85**	**0.8**	**0**		**0.87**	**0.84**	**0.73**	**0.75**	**0**		**0.82**	**0.47**	**0.88**	**0.86**	**0**		**0.93**	**0.78**	**0.85**	**0.88**	**0**		**0.89**	**0.95**
Cars	49	82	44	0		175	141	135	31	0		307	53	674	89	0		816	49	575	166	0		790	2088
% Cars	96.1	96.5	97.8	0		96.7	95.9	96.4	93.9	0		95.9	98.1	98.3	95.7	0		98	98	97.5	98.8	0		97.8	97.5
Trucks	2	3	1	0		6	6	5	2	0		13	1	12	4	0		17	1	15	2	0		18	54
% Trucks	3.9	3.5	2.2	0		3.3	4.1	3.6	6.1	0		4.1	1.9	1.7	4.3	0		2	2	2.5	1.2	0		2.2	2.5
Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0
% Bicycles	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0	0	0	0		0	0
Peds					14	-					6	-					35	-					15	-	70
% Peds					20	-					8.6	-					50	-					21.4	-	

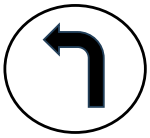
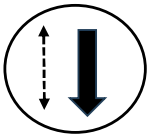
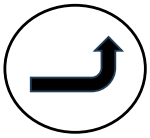
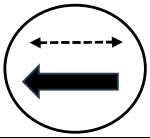
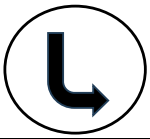
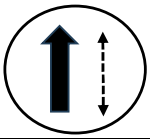
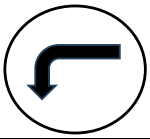
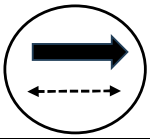
City of Barrie Traffic Signal Timing Card

LOCATION:	Mapleview Drive East & Bayview Drive		WARD:	8/9
ID NUMBER:	124		CONTROLLER/CABINET TYPE:	ASC/3-1000 / TS2
PREPARED BY:	Nathaniel Booth		CONFLICT MONITOR:	MMU 16E
CHECKED BY:	Nathaniel Booth		DESIGN WALK SPEED:	1.25 m/s
DATE:	October 22, 2024		CONTROLLER FIRMWARE:	

NEMA Phase		Base	AM	OFF	PM	Phase Mode	Notes
		All Other Times	Not in use	Not in use	Not in use	(Fixed / Callable / Protected / Permissive)	N
	Pattern	Pattern 1	Pattern 2	Pattern 3	Pattern 4		
	Action Plan	Plan 1	Plan 2	Plan 3	Plan 4		
Big Bay Point Rd 1 	WLK FDW MIN 7 MAX1 10 AMB 3 ALR 1 SPLIT					Callable Protected/Permissive	
Big Bay Point Rd 2 	WLK 30 FDW 18 MIN 48 MAX1 48 AMB 4 ALR 2 SPLIT					Fixed	
3 Not in use	WLK FDW MIN MAX1 AMB ALR SPLIT						
Ashford Dr 4 	WLK 7 FDW 22 MIN 10 MAX1 29 AMB 4 ALR 2 SPLIT					Callable	
Big Bay Point Rd 5 	WLK FDW MIN 7 MAX1 10 AMB 3 ALR 1 SPLIT					Callable Protected/Permissive	
Big Bay Point Rd 6 	WLK 30 FDW 18 MIN 48 MAX1 48 AMB 4 ALR 2 SPLIT					Fixed	
7 Not in use	WLK FDW MIN MAX1 AMB ALR SPLIT						
Dodson Rd 8 	WLK 7 FDW 22 MIN 10 MAX1 29 AMB 4 ALR 2 SPLIT					Callable	
	CL OFF	FREE FREE	- -	- -	- -		

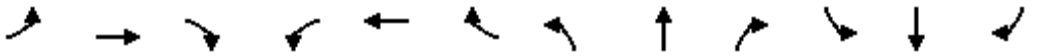
City of Barrie Traffic Signal Timing Card

LOCATION:	Yonge Street @ Ashford Drive/Madelaine Drive	WARD:	9
ID NUMBER:	88	CONTROLLER/CABINET TYPE:	Cobalt/TS2
PREPARED BY:	Nathaniel Booth	CONFLICT MONITOR:	MMU 16E
CHECKED BY:	Nathaniel Booth	DESIGN WALK SPEED:	1.1 m/s
DATE:	October 22, 2024	CONTROLLER FIRMWARE:	

NEMA Phase		Base	AM	OFF	PM	Phase Mode	Notes
		All Other Times	06:00 - 09:00 M-F	09:00 - 15:30, 19:00 - 21:00 M-F 09:00 - 21:00 WKND	15:30 - 19:00 M-F	(Fixed / Callable / Protected / Permissive)	N
	Pattern	Pattern 1	Pattern 2	Pattern 3	Pattern 4		
	Action Plan	Plan 1	Plan 2	Plan 3	Plan 4		
Yonge St 1 	WLK					Callable Protected/Permissive	
	FDW						
	MIN 7						
	MAX1 7						
	AMB 3						
	ALR 1						
	SPLIT	-	12	12	12		
Yonge St 2 	WLK 7					Fixed	
	FDW 24						
	MIN 31						
	MAX1 31						
	AMB 4						
	ALR 2						
	SPLIT	-	55	55	55		
Madelaine Dr 3 	WLK					Callable Fully Protected	
	FDW						
	MIN 7						
	MAX1 7						
	AMB 3						
	ALR 1						
	SPLIT	-	12	12	12		
Ashford Dr 4 	WLK 7					Callable	
	FDW 28						
	MIN 10						
	MAX1 35						
	AMB 4						
	ALR 2						
	SPLIT	-	41	41	41		
Yonge St 5 	WLK					Callable Fully Protected	
	FDW						
	MIN 7						
	MAX1 7						
	AMB 3						
	ALR 1						
	SPLIT	-	12	12	12		
Yonge St 6 	WLK 7					Fixed	
	FDW 24						
	MIN 31						
	MAX1 31						
	AMB 4						
	ALR 2						
	SPLIT	-	55	55	55		
Ashford Dr 7 	WLK					Callable Protected/Permissive	
	FDW						
	MIN 7						
	MAX1 7						
	AMB 3						
	ALR 1						
	SPLIT	-	12	12	12		
Madelaine Dr 8 	WLK 7					Callable	
	FDW 28						
	MIN 10						
	MAX1 35						
	AMB 4						
	ALR 2						
	SPLIT	-	41	41	41		
	CL	FREE	120	120	120		
	OFF	FREE	34	68	60		

Appendix C

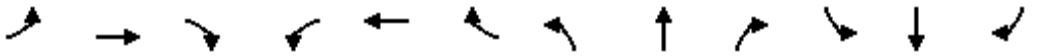
Existing (2024) Intersection Operation Calculations



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	271	28	198	579	1	17	10	91	4	31	11
Future Volume (vph)	5	271	28	198	579	1	17	10	91	4	31	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.86		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1803	3428		1768	3504		1805	1601		1794	1826	
Flt Permitted	0.41	1.00		0.52	1.00		0.73	1.00		0.69	1.00	
Satd. Flow (perm)	784	3428		959	3504		1381	1601		1296	1826	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	295	30	215	629	1	18	11	99	4	34	12
RTOR Reduction (vph)	0	5	0	0	0	0	0	90	0	0	11	0
Lane Group Flow (vph)	5	320	0	215	630	0	18	20	0	4	35	0
Confl. Peds. (#/hr)	6		3	3		6			8	8		
Heavy Vehicles (%)	0%	4%	0%	2%	3%	0%	0%	0%	1%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.1	51.8		64.1	58.8		7.7	7.7		7.7	7.7	
Effective Green, g (s)	53.1	51.8		64.1	58.8		7.7	7.7		7.7	7.7	
Actuated g/C Ratio	0.63	0.62		0.76	0.70		0.09	0.09		0.09	0.09	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	512	2118		813	2458		126	147		119	167	
v/s Ratio Prot	0.00	0.09		c0.03	0.18			0.01			c0.02	
v/s Ratio Perm	0.01			c0.18			0.01			0.00		
v/c Ratio	0.01	0.15		0.26	0.26		0.14	0.14		0.03	0.21	
Uniform Delay, d1	5.6	6.7		2.8	4.5		35.0	35.0		34.7	35.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.2	0.3		0.5	0.4		0.1	0.6	
Delay (s)	5.6	6.9		2.9	4.8		35.5	35.4		34.8	35.9	
Level of Service	A	A		A	A		D	D		C	D	
Approach Delay (s)		6.9			4.3			35.4			35.8	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	9.1	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	83.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

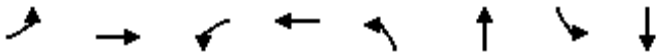
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	76	191	22	92	121	65	49	549	147	66	355	69
Future Volume (vph)	76	191	22	92	121	65	49	549	147	66	355	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.97		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.97		1.00	0.98	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1730	1881	1481	1777	1786		1750	3309		1754	3365	
Flt Permitted	0.46	1.00	1.00	0.37	1.00		0.47	1.00		0.31	1.00	
Satd. Flow (perm)	842	1881	1481	695	1786		869	3309		577	3365	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	83	208	24	100	132	71	53	597	160	72	386	75
RTOR Reduction (vph)	0	0	20	0	19	0	0	15	0	0	10	0
Lane Group Flow (vph)	83	208	4	100	184	0	53	742	0	72	451	0
Confl. Peds. (#/hr)	11		25	25		11	6		57	57		6
Heavy Vehicles (%)	4%	1%	5%	1%	0%	0%	3%	3%	2%	2%	5%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	25.9	19.5	19.5	28.7	20.9		72.4	66.4		73.0	66.7	
Effective Green, g (s)	25.9	19.5	19.5	28.7	20.9		72.4	66.4		73.0	66.7	
Actuated g/C Ratio	0.22	0.16	0.16	0.24	0.17		0.60	0.55		0.61	0.56	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	229	305	240	236	311		568	1830		412	1870	
v/s Ratio Prot	0.02	c0.11		c0.03	0.10		0.00	c0.22		c0.01	0.13	
v/s Ratio Perm	0.06		0.00	0.07			0.05			0.10		
v/c Ratio	0.36	0.68	0.02	0.42	0.59		0.09	0.41		0.17	0.24	
Uniform Delay, d1	38.9	47.3	42.2	37.1	45.6		9.8	15.4		10.0	13.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.0	6.2	0.0	1.2	3.0		0.1	0.7		0.2	0.3	
Delay (s)	39.9	53.5	42.2	38.4	48.6		9.8	16.1		10.2	14.0	
Level of Service	D	D	D	D	D		A	B		B	B	
Approach Delay (s)		49.0			45.2			15.7			13.5	
Approach LOS		D			D			B			B	

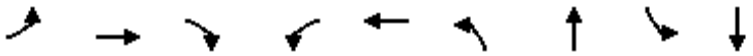
Intersection Summary			
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	325	215	630	18	110	4	46
v/c Ratio	0.01	0.15	0.26	0.24	0.10	0.38	0.02	0.19
Control Delay	2.8	7.5	3.4	4.7	34.3	13.7	33.0	28.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	7.5	3.4	4.7	34.3	13.7	33.0	28.4
Queue Length 50th (m)	0.2	11.3	7.6	14.4	2.7	1.6	0.6	5.1
Queue Length 95th (m)	0.8	18.5	13.2	33.6	9.1	16.5	3.6	15.2
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	728	2102	861	2665	510	653	478	682
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.15	0.25	0.24	0.04	0.17	0.01	0.07

Intersection Summary



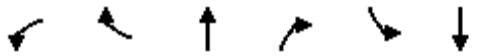
Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	83	208	24	100	203	53	757	72	461
v/c Ratio	0.32	0.71	0.08	0.42	0.62	0.09	0.40	0.16	0.24
Control Delay	35.5	61.2	0.5	38.0	49.1	8.7	16.0	9.1	13.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	35.5	61.2	0.5	38.0	49.1	8.7	16.0	9.1	13.9
Queue Length 50th (m)	15.8	49.5	0.0	19.2	42.7	4.2	52.2	5.8	28.1
Queue Length 95th (m)	27.1	71.6	0.0	31.5	64.8	10.4	78.6	13.2	44.3
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	259	548	502	240	537	613	1890	444	1927
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.32	0.38	0.05	0.42	0.38	0.09	0.40	0.16	0.24

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	288	6	13	594	7	16
Future Volume (Veh/h)	288	6	13	594	7	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	313	7	14	646	8	17
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.97	
vC, conflicting volume			321		668	161
vC1, stage 1 conf vol					318	
vC2, stage 2 conf vol					351	
vCu, unblocked vol			321		585	161
tC, single (s)			4.1		6.8	7.0
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.4
p0 queue free %			99		99	98
cM capacity (veh/h)			1249		610	842

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	209	111	14	323	323	25
Volume Left	0	0	14	0	0	8
Volume Right	0	7	0	0	0	17
cSH	1700	1700	1249	1700	1700	751
Volume to Capacity	0.12	0.07	0.01	0.19	0.19	0.03
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.0	0.8
Control Delay (s)	0.0	0.0	7.9	0.0	0.0	10.0
Lane LOS			A			A
Approach Delay (s)	0.0		0.2			10.0
Approach LOS						A

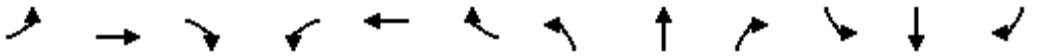
Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	26.4%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	10	6	669	21	14	480
Future Volume (Veh/h)	10	6	669	21	14	480
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	11	7	727	23	15	522
Pedestrians	7					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.91	0.91			0.91	
vC, conflicting volume	1036	382			757	
vC1, stage 1 conf vol	746					
vC2, stage 2 conf vol	291					
vCu, unblocked vol	840	120			533	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.3	
p0 queue free %	98	99			98	
cM capacity (veh/h)	464	827			901	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	18	485	265	15	261	261
Volume Left	11	0	0	15	0	0
Volume Right	7	0	23	0	0	0
cSH	560	1700	1700	901	1700	1700
Volume to Capacity	0.03	0.29	0.16	0.02	0.15	0.15
Queue Length 95th (m)	0.8	0.0	0.0	0.4	0.0	0.0
Control Delay (s)	11.6	0.0	0.0	9.1	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	11.6	0.0		0.3		
Approach LOS	B					

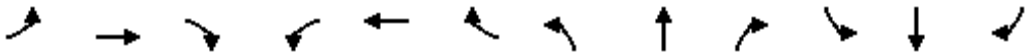
Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	29.2%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	798	5	81	674	7	9	14	188	5	9	10
Future Volume (vph)	19	798	5	81	674	7	9	14	188	5	9	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3606		1805	3533		1804	1612		1802	1739	
Flt Permitted	0.37	1.00		0.28	1.00		0.74	1.00		0.39	1.00	
Satd. Flow (perm)	703	3606		525	3533		1412	1612		746	1739	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	867	5	88	733	8	10	15	204	5	10	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	178	0	0	10	0
Lane Group Flow (vph)	21	872	0	88	741	0	10	41	0	5	11	0
Confl. Peds. (#/hr)	3		4	4		3	1		3	3		1
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	52.5	49.8		58.3	52.7		10.6	10.6		10.6	10.6	
Effective Green, g (s)	52.5	49.8		58.3	52.7		10.6	10.6		10.6	10.6	
Actuated g/C Ratio	0.64	0.61		0.71	0.64		0.13	0.13		0.13	0.13	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	486	2189		460	2270		182	208		96	224	
v/s Ratio Prot	0.00	c0.24		c0.01	0.21			c0.03			0.01	
v/s Ratio Perm	0.03			0.12			0.01			0.01		
v/c Ratio	0.04	0.40		0.19	0.33		0.05	0.20		0.05	0.05	
Uniform Delay, d1	5.4	8.3		4.0	6.6		31.3	31.9		31.3	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.5		0.2	0.4		0.1	0.5		0.2	0.1	
Delay (s)	5.4	8.9		4.2	7.0		31.4	32.4		31.5	31.4	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		8.8			6.7			32.3			31.4	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	10.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.9%	ICU Level of Service	C
Analysis Period (min)	15		

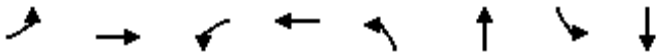
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	147	140	33	51	85	45	54	686	93	50	616	168
Future Volume (vph)	147	140	33	51	85	45	54	686	93	50	616	168
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	0.99	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1727	1827	1496	1731	1728		1768	3432		1762	3385	
Flt Permitted	0.50	1.00	1.00	0.59	1.00		0.28	1.00		0.28	1.00	
Satd. Flow (perm)	906	1827	1496	1076	1728		522	3432		527	3385	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	160	152	36	55	92	49	59	746	101	54	670	183
RTOR Reduction (vph)	0	0	31	0	20	0	0	6	0	0	15	0
Lane Group Flow (vph)	160	152	5	55	121	0	59	841	0	54	838	0
Confl. Peds. (#/hr)	14		6	6		14	15		35	35		15
Heavy Vehicles (%)	4%	4%	6%	4%	4%	2%	2%	2%	4%	2%	3%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	25.9	17.9	17.9	22.5	16.2		75.9	69.9		75.7	69.8	
Effective Green, g (s)	25.9	17.9	17.9	22.5	16.2		75.9	69.9		75.7	69.8	
Actuated g/C Ratio	0.22	0.15	0.15	0.19	0.13		0.63	0.58		0.63	0.58	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	250	272	223	236	233		392	1999		393	1968	
v/s Ratio Prot	c0.04	0.08		0.01	0.07		c0.01	0.24		0.01	c0.25	
v/s Ratio Perm	c0.10		0.00	0.03			0.09			0.08		
v/c Ratio	0.64	0.56	0.02	0.23	0.52		0.15	0.42		0.14	0.43	
Uniform Delay, d1	41.5	47.4	43.6	40.9	48.3		8.9	13.9		8.9	14.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	5.5	2.5	0.0	0.5	2.0		0.2	0.7		0.2	0.7	
Delay (s)	47.0	49.9	43.6	41.4	50.2		9.1	14.5		9.1	14.6	
Level of Service	D	D	D	D	D		A	B		A	B	
Approach Delay (s)		47.9			47.8			14.2			14.3	
Approach LOS		D			D			B			B	

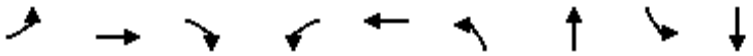
Intersection Summary			
HCM 2000 Control Delay	22.0	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	72.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	21	872	88	741	10	219	5	21
v/c Ratio	0.04	0.40	0.18	0.32	0.05	0.56	0.05	0.09
Control Delay	3.1	9.4	3.8	7.0	31.8	12.5	32.4	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.1	9.4	3.8	7.0	31.8	12.5	32.4	22.3
Queue Length 50th (m)	0.7	36.3	2.9	17.5	1.5	2.2	0.7	1.5
Queue Length 95th (m)	2.5	54.5	7.1	44.3	6.0	21.7	4.0	7.8
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	651	2185	547	2338	516	718	272	643
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.40	0.16	0.32	0.02	0.31	0.02	0.03

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	160	152	36	55	141	59	847	54	853
v/c Ratio	0.63	0.56	0.12	0.21	0.59	0.14	0.41	0.13	0.42
Control Delay	50.0	56.1	0.8	35.7	50.3	7.7	14.6	7.7	14.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	50.0	56.1	0.8	35.7	50.3	7.7	14.6	7.7	14.4
Queue Length 50th (m)	33.1	36.3	0.0	10.7	27.8	4.3	57.3	3.9	56.4
Queue Length 95th (m)	50.5	56.2	0.0	20.6	47.1	10.1	83.1	9.5	82.6
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	252	532	507	270	520	431	2053	430	2031
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.63	0.29	0.07	0.20	0.27	0.14	0.41	0.13	0.42

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	789	8	13	680	8	33
Future Volume (Veh/h)	789	8	13	680	8	33
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	858	9	14	739	9	36
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.92	
vC, conflicting volume			869		1262	436
vC1, stage 1 conf vol					864	
vC2, stage 2 conf vol					398	
vCu, unblocked vol			869		1120	436
tC, single (s)			4.1		7.1	7.0
tC, 2 stage (s)					6.1	
tF (s)			2.2		3.6	3.3
p0 queue free %			98		97	94
cM capacity (veh/h)			783		325	565

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	572	295	14	370	370	45
Volume Left	0	0	14	0	0	9
Volume Right	0	9	0	0	0	36
cSH	1700	1700	783	1700	1700	492
Volume to Capacity	0.34	0.17	0.02	0.22	0.22	0.09
Queue Length 95th (m)	0.0	0.0	0.4	0.0	0.0	2.4
Control Delay (s)	0.0	0.0	9.7	0.0	0.0	13.0
Lane LOS			A			B
Approach Delay (s)	0.0		0.2			13.0
Approach LOS						B

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	32.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	14	18	857	21	44	820
Future Volume (Veh/h)	14	18	857	21	44	820
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	15	20	932	23	48	891
Pedestrians	28		1			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.88	0.88			0.88	
vC, conflicting volume	1514	506			983	
vC1, stage 1 conf vol	972					
vC2, stage 2 conf vol	542					
vCu, unblocked vol	1316	172			714	
tC, single (s)	6.8	7.0			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.4			2.2	
p0 queue free %	95	97			94	
cM capacity (veh/h)	327	714			760	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	35	621	334	48	446	446
Volume Left	15	0	0	48	0	0
Volume Right	20	0	23	0	0	0
cSH	474	1700	1700	760	1700	1700
Volume to Capacity	0.07	0.37	0.20	0.06	0.26	0.26
Queue Length 95th (m)	1.9	0.0	0.0	1.6	0.0	0.0
Control Delay (s)	13.2	0.0	0.0	10.1	0.0	0.0
Lane LOS	B			B		
Approach Delay (s)	13.2	0.0		0.5		
Approach LOS	B					

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	41.1%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D

Background Development Site Trips Excerpts

Figure 5 – 681-685 Yonge Street Development Traffic Assignment

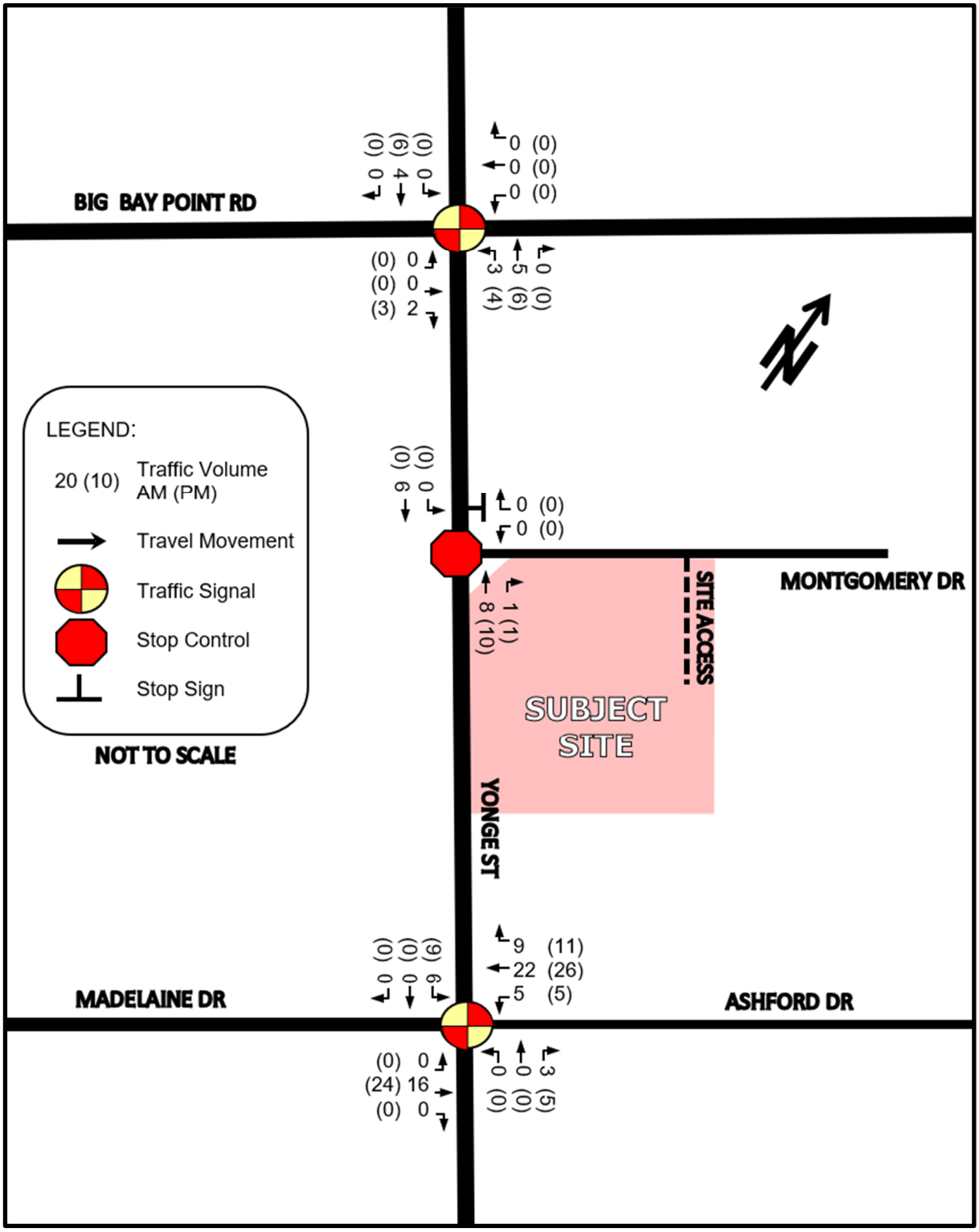


Figure 12 – 521,527& 531 Big Bay Point Road Development Traffic Assignment

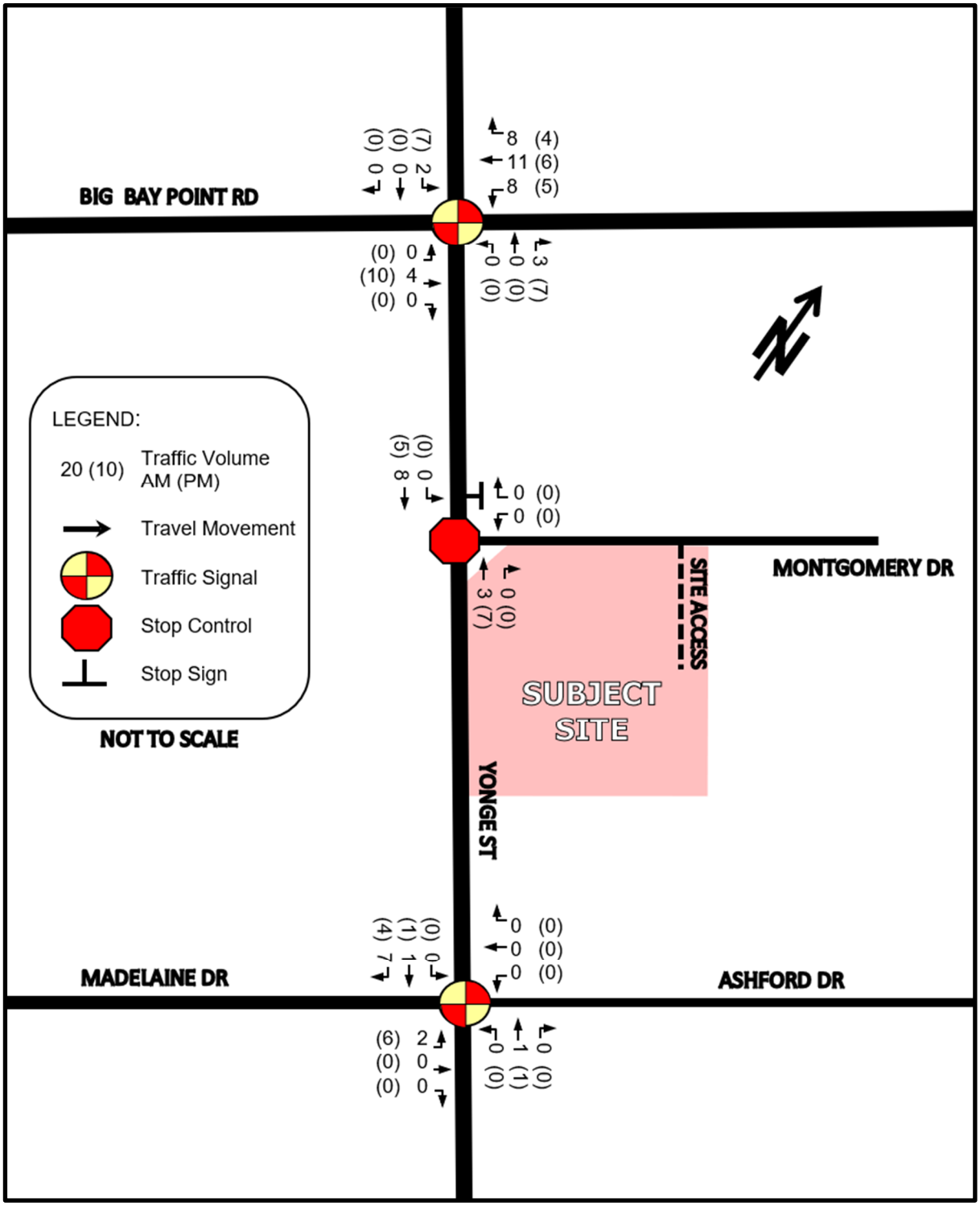


Figure 13 – 520 & 526 Big Bay Point Road Development Traffic Assignment

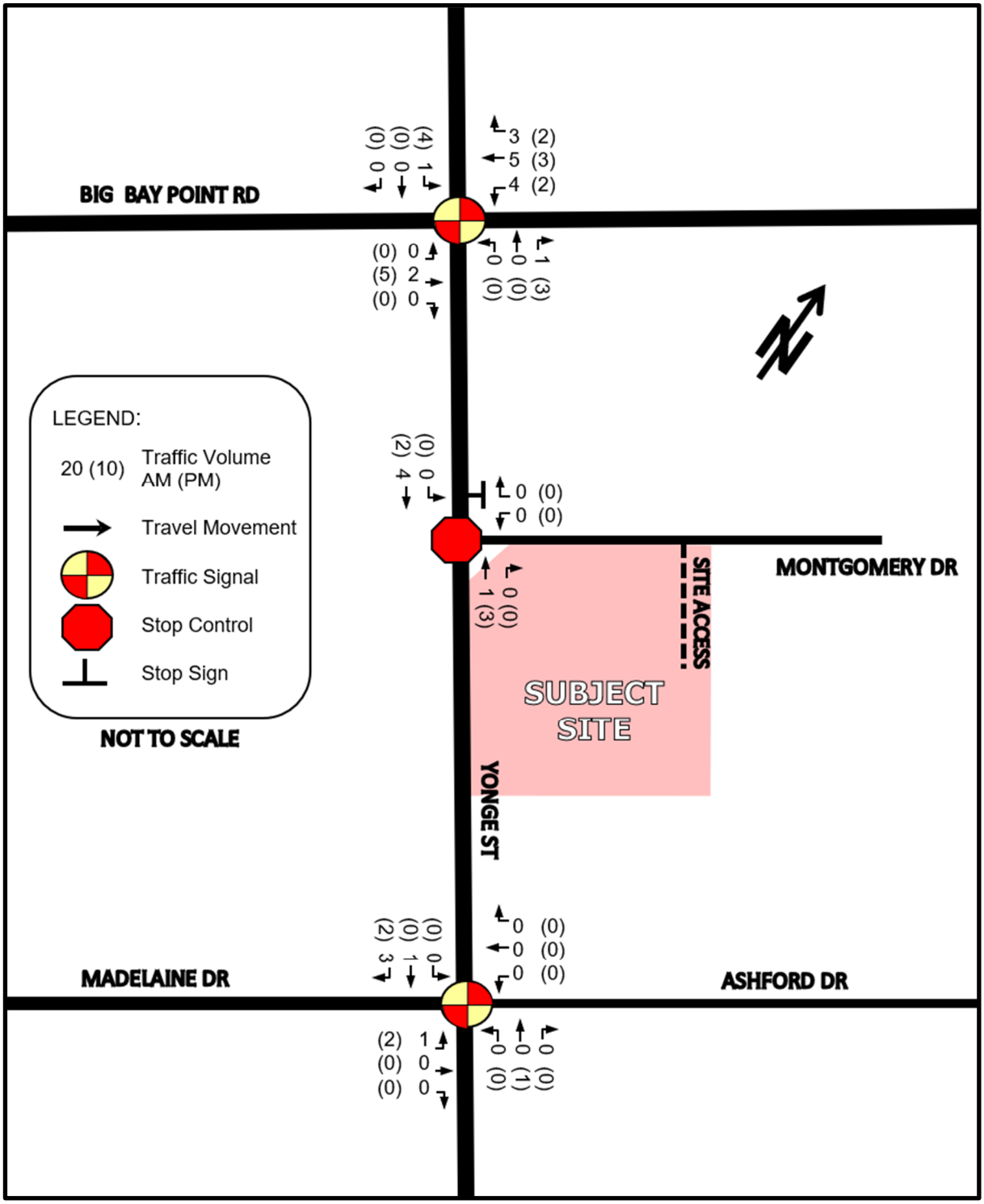


Figure 22 – Proposed Development Traffic Assignment – Total

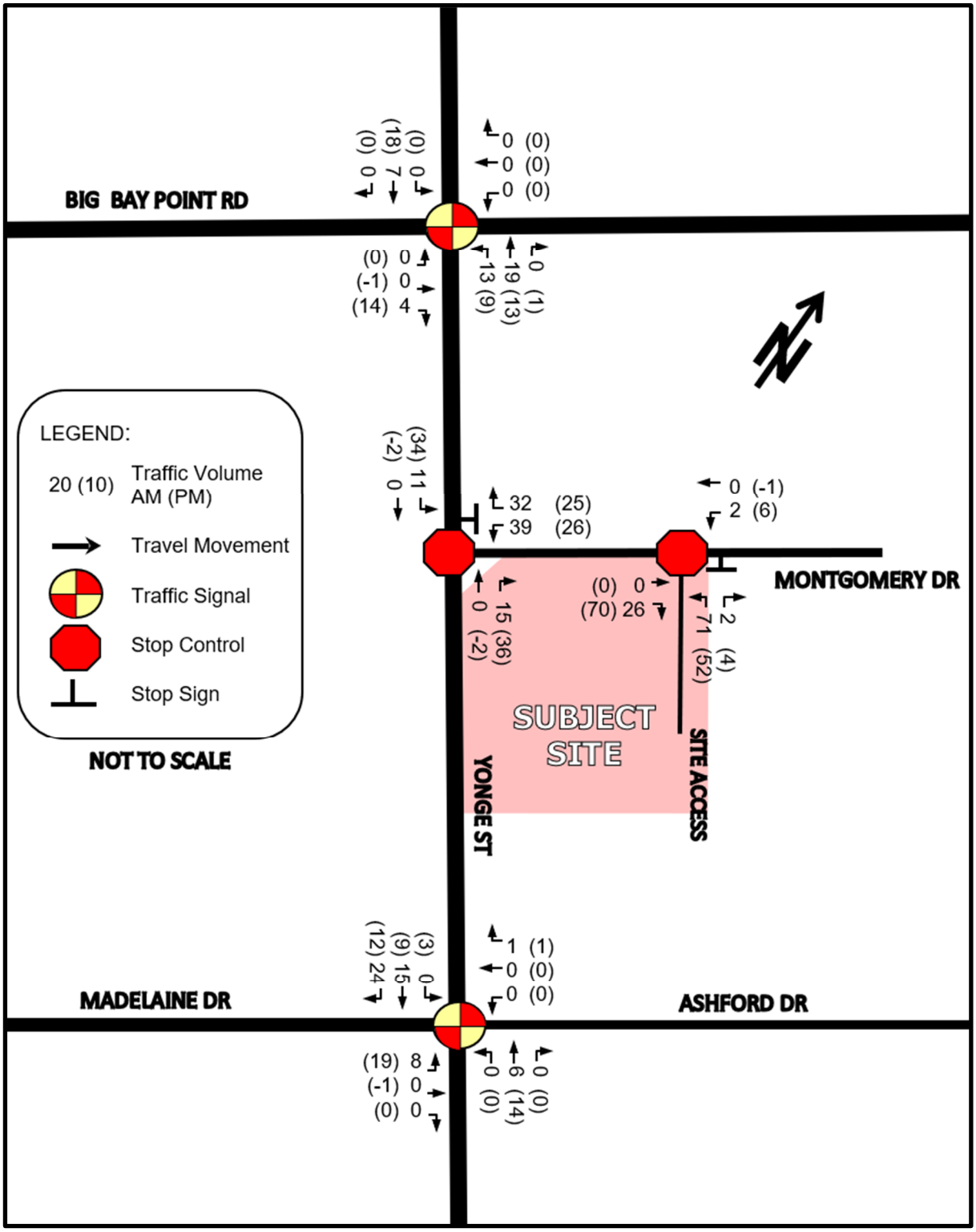
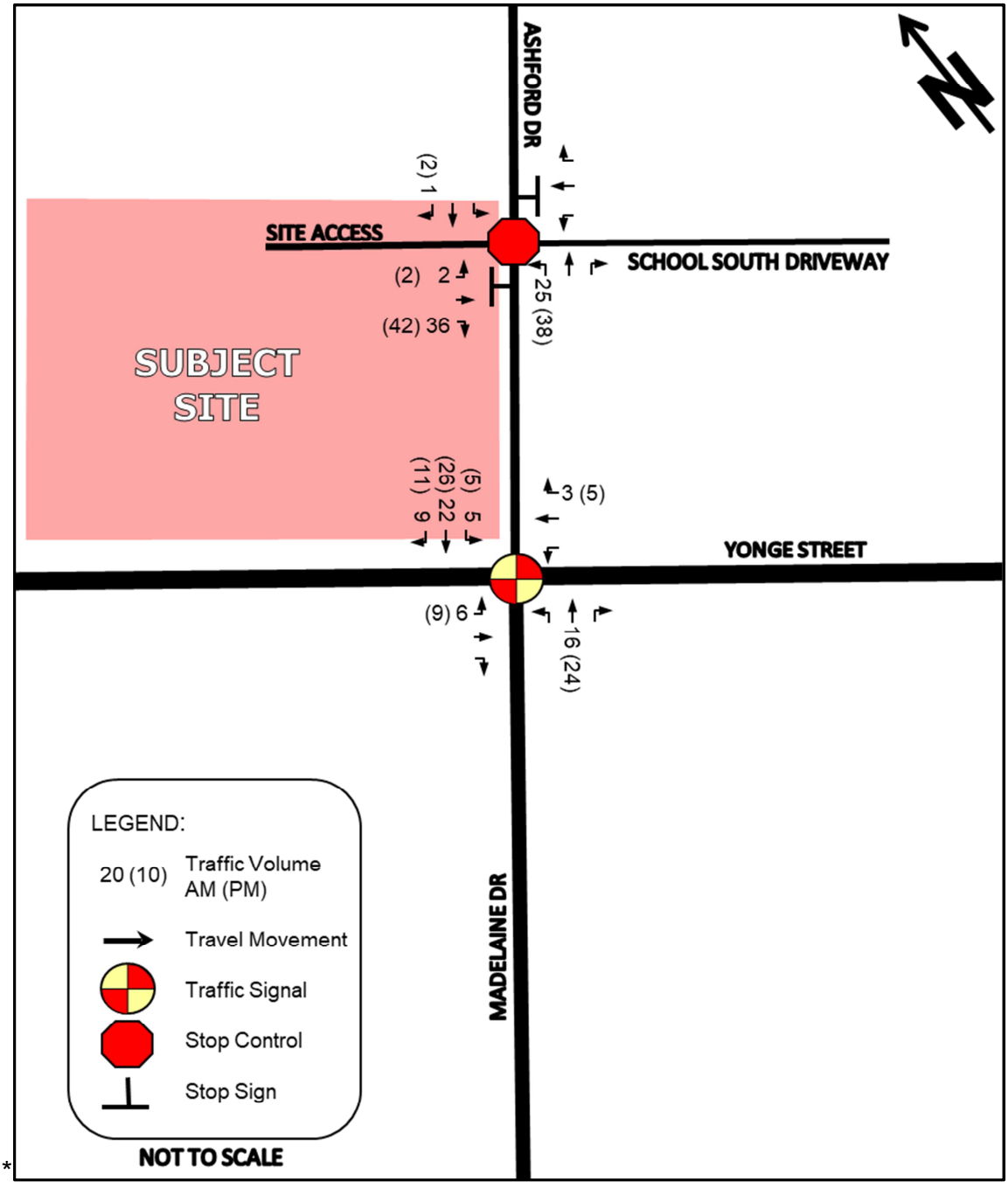
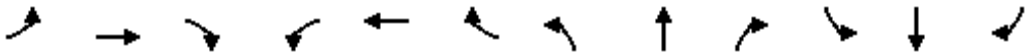


Figure 10 – Traffic Assignment for Proposed Development



Appendix E

Opening Year (2027) Background Intersection Operation Calculations (Synchro)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	323	28	200	662	1	18	10	92	4	31	11
Future Volume (vph)	5	323	28	200	662	1	18	10	92	4	31	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.86		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3434		1768	3504		1805	1601		1794	1826	
Flt Permitted	0.38	1.00		0.49	1.00		0.73	1.00		0.69	1.00	
Satd. Flow (perm)	717	3434		909	3504		1381	1601		1295	1826	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	351	30	217	720	1	20	11	100	4	34	12
RTOR Reduction (vph)	0	4	0	0	0	0	0	91	0	0	11	0
Lane Group Flow (vph)	5	377	0	217	721	0	20	20	0	4	35	0
Confl. Peds. (#/hr)	6		3	3		6			8	8		
Heavy Vehicles (%)	0%	4%	0%	2%	3%	0%	0%	0%	1%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.1	51.8		64.1	58.8		7.7	7.7		7.7	7.7	
Effective Green, g (s)	53.1	51.8		64.1	58.8		7.7	7.7		7.7	7.7	
Actuated g/C Ratio	0.63	0.62		0.76	0.70		0.09	0.09		0.09	0.09	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	471	2122		780	2458		126	147		118	167	
v/s Ratio Prot	0.00	0.11		c0.03	c0.21			0.01			c0.02	
v/s Ratio Perm	0.01			0.19			0.01			0.00		
v/c Ratio	0.01	0.18		0.28	0.29		0.16	0.14		0.03	0.21	
Uniform Delay, d1	5.6	6.9		2.8	4.7		35.1	35.0		34.7	35.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.2	0.3		0.6	0.4		0.1	0.6	
Delay (s)	5.6	7.0		3.0	5.0		35.7	35.4		34.8	35.9	
Level of Service	A	A		A	A		D	D		C	D	
Approach Delay (s)		7.0			4.5			35.5			35.8	
Approach LOS		A			A			D			D	

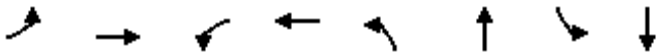
Intersection Summary			
HCM 2000 Control Delay	8.9	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.30		
Actuated Cycle Length (s)	83.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	207	22	97	143	75	49	614	150	72	408	103
Future Volume (vph)	87	207	22	97	143	75	49	614	150	72	408	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.97		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1732	1881	1481	1777	1787		1750	3322		1758	3347	
Flt Permitted	0.33	1.00	1.00	0.36	1.00		0.42	1.00		0.28	1.00	
Satd. Flow (perm)	607	1881	1481	680	1787		769	3322		514	3347	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	225	24	105	155	82	53	667	163	78	443	112
RTOR Reduction (vph)	0	0	20	0	18	0	0	14	0	0	14	0
Lane Group Flow (vph)	95	225	4	105	219	0	53	816	0	78	541	0
Confl. Peds. (#/hr)	11		25	25		11	6		57	57		6
Heavy Vehicles (%)	4%	1%	5%	1%	0%	0%	3%	3%	2%	2%	5%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	27.9	20.1	20.1	27.9	20.1		71.6	65.6		72.6	66.1	
Effective Green, g (s)	27.9	20.1	20.1	27.9	20.1		71.6	65.6		72.6	66.1	
Actuated g/C Ratio	0.23	0.17	0.17	0.23	0.17		0.60	0.55		0.60	0.55	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	214	315	248	229	299		507	1816		378	1843	
v/s Ratio Prot	0.03	0.12		c0.03	c0.12		0.01	c0.25		c0.01	0.16	
v/s Ratio Perm	0.07		0.00	0.08			0.06			0.11		
v/c Ratio	0.44	0.71	0.02	0.46	0.73		0.10	0.45		0.21	0.29	
Uniform Delay, d1	37.8	47.2	41.7	37.9	47.4		10.1	16.3		10.5	14.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	7.5	0.0	1.5	8.9		0.1	0.8		0.3	0.4	
Delay (s)	39.2	54.7	41.7	39.3	56.3		10.2	17.2		10.7	14.8	
Level of Service	D	D	D	D	E		B	B		B	B	
Approach Delay (s)		49.5			51.1			16.7			14.3	
Approach LOS		D			D			B			B	

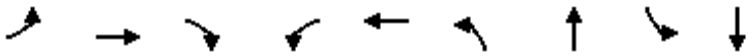
Intersection Summary			
HCM 2000 Control Delay	26.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	381	217	721	20	111	4	46
v/c Ratio	0.01	0.18	0.27	0.27	0.11	0.38	0.02	0.19
Control Delay	2.8	7.8	3.5	4.9	34.4	13.6	33.0	28.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	7.8	3.5	4.9	34.4	13.6	33.0	28.4
Queue Length 50th (m)	0.2	13.6	7.7	17.0	3.0	1.6	0.6	5.1
Queue Length 95th (m)	0.9	21.8	13.4	39.2	9.6	16.5	3.6	15.2
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	686	2104	827	2664	510	653	477	682
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.18	0.26	0.27	0.04	0.17	0.01	0.07

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	95	225	24	105	237	53	830	78	555
v/c Ratio	0.43	0.72	0.07	0.44	0.75	0.10	0.45	0.20	0.30
Control Delay	37.2	59.6	0.4	37.3	57.0	9.5	17.8	10.1	15.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	59.6	0.4	37.3	57.0	9.5	17.8	10.1	15.1
Queue Length 50th (m)	17.9	53.4	0.0	19.8	51.4	4.4	61.3	6.5	35.6
Queue Length 95th (m)	29.5	75.4	0.0	31.8	74.8	11.0	92.7	14.9	55.8
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	226	548	502	243	536	546	1853	406	1880
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.41	0.05	0.43	0.44	0.10	0.45	0.19	0.30

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	340	8	13	680	7	18
Future Volume (Veh/h)	340	8	13	680	7	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	370	9	14	739	8	20
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.95	
vC, conflicting volume			380		773	190
vC1, stage 1 conf vol					376	
vC2, stage 2 conf vol					398	
vCu, unblocked vol			380		647	190
tC, single (s)			4.1		6.8	7.0
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.4
p0 queue free %			99		99	98
cM capacity (veh/h)			1189		576	806

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	247	132	14	370	370	28
Volume Left	0	0	14	0	0	8
Volume Right	0	9	0	0	0	20
cSH	1700	1700	1189	1700	1700	723
Volume to Capacity	0.15	0.08	0.01	0.22	0.22	0.04
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.0	1.0
Control Delay (s)	0.0	0.0	8.1	0.0	0.0	10.2
Lane LOS			A			B
Approach Delay (s)	0.0		0.1			10.2
Approach LOS						B

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	28.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	49	38	747	36	25	541
Future Volume (Veh/h)	49	38	747	36	25	541
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	41	812	39	27	588
Pedestrians	7					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.89	0.89			0.89	
vC, conflicting volume	1186	432			858	
vC1, stage 1 conf vol	838					
vC2, stage 2 conf vol	348					
vCu, unblocked vol	952	101			581	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.3	
p0 queue free %	87	95			97	
cM capacity (veh/h)	423	829			841	

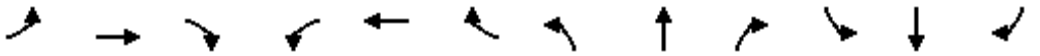
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	94	541	310	27	294	294
Volume Left	53	0	0	27	0	0
Volume Right	41	0	39	0	0	0
cSH	538	1700	1700	841	1700	1700
Volume to Capacity	0.17	0.32	0.18	0.03	0.17	0.17
Queue Length 95th (m)	5.0	0.0	0.0	0.8	0.0	0.0
Control Delay (s)	13.1	0.0	0.0	9.4	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	13.1	0.0		0.4		
Approach LOS	B					

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	33.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	913	5	84	759	7	10	14	191	5	9	10
Future Volume (vph)	19	913	5	84	759	7	10	14	191	5	9	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3607		1805	3534		1804	1612		1802	1739	
Flt Permitted	0.33	1.00		0.23	1.00		0.74	1.00		0.38	1.00	
Satd. Flow (perm)	635	3607		441	3534		1412	1612		720	1739	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	992	5	91	825	8	11	15	208	5	10	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	181	0	0	10	0
Lane Group Flow (vph)	21	997	0	91	833	0	11	42	0	5	11	0
Confl. Peds. (#/hr)	3		4	4		3	1		3	3		1
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	52.5	49.8		58.3	52.7		10.6	10.6		10.6	10.6	
Effective Green, g (s)	52.5	49.8		58.3	52.7		10.6	10.6		10.6	10.6	
Actuated g/C Ratio	0.64	0.61		0.71	0.64		0.13	0.13		0.13	0.13	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	445	2190		406	2271		182	208		93	224	
v/s Ratio Prot	0.00	c0.28		c0.02	0.24			c0.03			0.01	
v/s Ratio Perm	0.03			0.14			0.01			0.01		
v/c Ratio	0.05	0.46		0.22	0.37		0.06	0.20		0.05	0.05	
Uniform Delay, d1	5.4	8.7		4.4	6.8		31.3	31.9		31.3	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.7		0.3	0.5		0.1	0.5		0.2	0.1	
Delay (s)	5.4	9.4		4.6	7.3		31.5	32.4		31.5	31.4	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		9.3			7.0			32.4			31.4	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

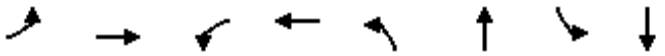
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	174	163	33	56	111	57	54	757	98	62	672	186
Future Volume (vph)	174	163	33	56	111	57	54	757	98	62	672	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1729	1827	1496	1732	1730		1768	3436		1764	3384	
Flt Permitted	0.40	1.00	1.00	0.53	1.00		0.25	1.00		0.25	1.00	
Satd. Flow (perm)	727	1827	1496	957	1730		460	3436		459	3384	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	189	177	36	61	121	62	59	823	107	67	730	202
RTOR Reduction (vph)	0	0	30	0	19	0	0	6	0	0	15	0
Lane Group Flow (vph)	189	177	6	61	164	0	59	924	0	67	917	0
Confl. Peds. (#/hr)	14		6	6		14	15		35	35		15
Heavy Vehicles (%)	4%	4%	6%	4%	4%	2%	2%	2%	4%	2%	3%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	27.3	19.3	19.3	23.9	17.6		74.3	68.3		74.5	68.4	
Effective Green, g (s)	27.3	19.3	19.3	23.9	17.6		74.3	68.3		74.5	68.4	
Actuated g/C Ratio	0.23	0.16	0.16	0.20	0.15		0.62	0.57		0.62	0.57	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	232	293	240	231	253		350	1955		351	1928	
v/s Ratio Prot	c0.05	0.10		0.01	0.09		0.01	0.27		c0.01	c0.27	
v/s Ratio Perm	c0.13		0.00	0.04			0.10			0.11		
v/c Ratio	0.81	0.60	0.02	0.26	0.65		0.17	0.47		0.19	0.48	
Uniform Delay, d1	42.7	46.8	42.4	39.9	48.3		9.8	15.2		9.8	15.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	19.3	3.5	0.0	0.6	5.6		0.2	0.8		0.3	0.8	
Delay (s)	62.0	50.3	42.5	40.5	53.9		10.0	16.1		10.1	16.1	
Level of Service	E	D	D	D	D		B	B		B	B	
Approach Delay (s)		55.1			50.6			15.7			15.7	
Approach LOS		E			D			B			B	

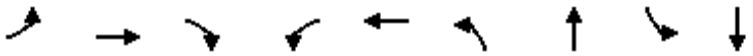
Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	21	997	91	833	11	223	5	21
v/c Ratio	0.04	0.46	0.21	0.36	0.06	0.56	0.05	0.09
Control Delay	3.1	10.0	4.1	7.3	31.9	12.4	32.4	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.1	10.0	4.1	7.3	31.9	12.4	32.4	22.3
Queue Length 50th (m)	0.7	43.4	3.0	20.3	1.6	2.2	0.7	1.5
Queue Length 95th (m)	2.5	65.0	7.3	51.0	6.3	22.0	4.0	7.8
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	611	2185	495	2340	516	721	263	643
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.46	0.18	0.36	0.02	0.31	0.02	0.03

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	189	177	36	61	183	59	930	67	932
v/c Ratio	0.81	0.60	0.11	0.23	0.70	0.16	0.46	0.18	0.47
Control Delay	64.4	56.1	0.7	34.9	57.0	8.6	16.4	8.7	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	64.4	56.1	0.7	34.9	57.0	8.6	16.4	8.7	16.0
Queue Length 50th (m)	39.1	42.3	0.0	11.7	38.5	4.5	67.4	5.1	66.3
Queue Length 95th (m)	#61.3	63.0	0.0	21.6	60.2	10.8	99.3	12.0	97.3
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	234	532	507	265	520	388	2007	386	1987
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.81	0.33	0.07	0.23	0.35	0.15	0.46	0.17	0.47

Intersection Summary

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

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	899	13	13	766	8	37
Future Volume (Veh/h)	899	13	13	766	8	37
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	977	14	14	833	9	40
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.90	
vC, conflicting volume			993		1430	498
vC1, stage 1 conf vol					986	
vC2, stage 2 conf vol					444	
vCu, unblocked vol			993		1262	498
tC, single (s)			4.1		7.1	7.0
tC, 2 stage (s)					6.1	
tF (s)			2.2		3.6	3.3
p0 queue free %			98		97	92
cM capacity (veh/h)			703		280	515

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	651	340	14	416	416	49
Volume Left	0	0	14	0	0	9
Volume Right	0	14	0	0	0	40
cSH	1700	1700	703	1700	1700	446
Volume to Capacity	0.38	0.20	0.02	0.24	0.24	0.11
Queue Length 95th (m)	0.0	0.0	0.5	0.0	0.0	2.9
Control Delay (s)	0.0	0.0	10.2	0.0	0.0	14.1
Lane LOS			B			B
Approach Delay (s)	0.0		0.2			14.1
Approach LOS						B

Intersection Summary				
Average Delay	0.4			
Intersection Capacity Utilization	35.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	40	43	941	57	78	892
Future Volume (Veh/h)	40	43	941	57	78	892
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	47	1023	62	85	970
Pedestrians	28		1			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.86	0.86			0.86	
vC, conflicting volume	1738	570			1113	
vC1, stage 1 conf vol	1082					
vC2, stage 2 conf vol	656					
vCu, unblocked vol	1527	165			798	
tC, single (s)	6.8	7.0			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.4			2.2	
p0 queue free %	84	93			88	
cM capacity (veh/h)	277	702			686	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	90	682	403	85	485	485
Volume Left	43	0	0	85	0	0
Volume Right	47	0	62	0	0	0
cSH	405	1700	1700	686	1700	1700
Volume to Capacity	0.22	0.40	0.24	0.12	0.29	0.29
Queue Length 95th (m)	6.7	0.0	0.0	3.4	0.0	0.0
Control Delay (s)	16.4	0.0	0.0	11.0	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	16.4	0.0		0.9		
Approach LOS	C					

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

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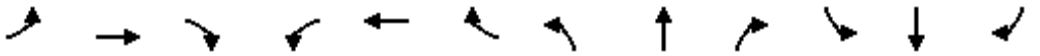
Appendix F

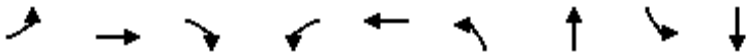
Opening Year (2027) Background Intersection Operation Calculations (Synchro) with Optimized Signal Timings



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	174	163	33	56	111	57	54	757	98	62	672	186
Future Volume (vph)	174	163	33	56	111	57	54	757	98	62	672	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1730	1827	1496	1730	1730		1768	3436		1764	3384	
Flt Permitted	0.36	1.00	1.00	0.63	1.00		0.24	1.00		0.24	1.00	
Satd. Flow (perm)	647	1827	1496	1156	1730		452	3436		448	3384	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	189	177	36	61	121	62	59	823	107	67	730	202
RTOR Reduction (vph)	0	0	29	0	19	0	0	6	0	0	16	0
Lane Group Flow (vph)	189	177	7	61	164	0	59	924	0	67	916	0
Confl. Peds. (#/hr)	14		6	6		14	15		35	35		15
Heavy Vehicles (%)	4%	4%	6%	4%	4%	2%	2%	2%	4%	2%	3%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	31.5	21.9	21.9	23.1	17.5		72.3	66.3		72.7	66.5	
Effective Green, g (s)	31.5	21.9	21.9	23.1	17.5		72.3	66.3		72.7	66.5	
Actuated g/C Ratio	0.26	0.18	0.18	0.19	0.15		0.60	0.55		0.61	0.55	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	260	333	273	249	252		338	1898		339	1875	
v/s Ratio Prot	c0.06	0.10		0.01	0.09		0.01	0.27		c0.01	c0.27	
v/s Ratio Perm	c0.13		0.00	0.04			0.10			0.11		
v/c Ratio	0.73	0.53	0.02	0.24	0.65		0.17	0.49		0.20	0.49	
Uniform Delay, d1	37.8	44.4	40.3	40.6	48.4		10.7	16.4		10.6	16.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.7	1.6	0.0	0.5	5.9		0.2	0.9		0.3	0.9	
Delay (s)	47.5	46.0	40.3	41.1	54.3		10.9	17.3		10.9	17.3	
Level of Service	D	D	D	D	D		B	B		B	B	
Approach Delay (s)		46.2			51.0			16.9			16.8	
Approach LOS		D			D			B			B	

Intersection Summary			
HCM 2000 Control Delay	24.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.56		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

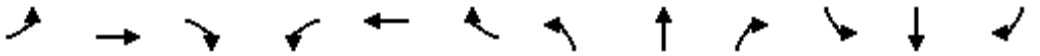


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	189	177	36	61	183	59	930	67	932
v/c Ratio	0.72	0.53	0.10	0.22	0.71	0.16	0.48	0.18	0.48
Control Delay	51.9	50.6	0.6	33.2	57.4	9.4	17.7	9.5	17.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	50.6	0.6	33.2	57.4	9.4	17.7	9.5	17.3
Queue Length 50th (m)	38.3	41.1	0.0	11.4	38.6	4.7	70.1	5.4	68.8
Queue Length 95th (m)	55.9	60.9	0.0	21.0	60.2	11.3	103.2	12.6	101.3
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	261	578	542	281	520	367	1952	365	1933
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.31	0.07	0.22	0.35	0.16	0.48	0.18	0.48

Intersection Summary

Appendix G

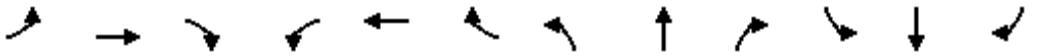
Future (2032) Background Intersection Operation Calculations (Synchro)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	374	28	200	771	1	18	10	92	4	31	11
Future Volume (vph)	5	374	28	200	771	1	18	10	92	4	31	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.86		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3439		1769	3504		1805	1601		1794	1826	
Flt Permitted	0.34	1.00		0.46	1.00		0.73	1.00		0.69	1.00	
Satd. Flow (perm)	638	3439		861	3504		1381	1601		1295	1826	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	407	30	217	838	1	20	11	100	4	34	12
RTOR Reduction (vph)	0	4	0	0	0	0	0	91	0	0	11	0
Lane Group Flow (vph)	5	433	0	217	839	0	20	20	0	4	35	0
Confl. Peds. (#/hr)	6		3	3		6			8	8		
Heavy Vehicles (%)	0%	4%	0%	2%	3%	0%	0%	0%	1%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.1	51.8		64.1	58.8		7.7	7.7		7.7	7.7	
Effective Green, g (s)	53.1	51.8		64.1	58.8		7.7	7.7		7.7	7.7	
Actuated g/C Ratio	0.63	0.62		0.76	0.70		0.09	0.09		0.09	0.09	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	422	2125		748	2458		126	147		118	167	
v/s Ratio Prot	0.00	0.13		c0.03	c0.24			0.01			c0.02	
v/s Ratio Perm	0.01			0.19			0.01			0.00		
v/c Ratio	0.01	0.20		0.29	0.34		0.16	0.14		0.03	0.21	
Uniform Delay, d1	5.6	7.0		2.8	4.9		35.1	35.0		34.7	35.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.2	0.4		0.6	0.4		0.1	0.6	
Delay (s)	5.7	7.2		3.0	5.3		35.7	35.4		34.8	35.9	
Level of Service	A	A		A	A		D	D		C	D	
Approach Delay (s)		7.2			4.8			35.5			35.8	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.34		
Actuated Cycle Length (s)	83.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

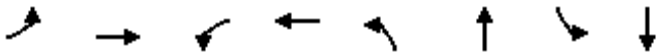
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	207	22	97	143	75	49	674	150	72	447	103
Future Volume (vph)	87	207	22	97	143	75	49	674	150	72	447	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1732	1881	1481	1777	1787		1751	3336		1760	3354	
Flt Permitted	0.33	1.00	1.00	0.36	1.00		0.39	1.00		0.25	1.00	
Satd. Flow (perm)	607	1881	1481	680	1787		726	3336		466	3354	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	225	24	105	155	82	53	733	163	78	486	112
RTOR Reduction (vph)	0	0	20	0	18	0	0	12	0	0	13	0
Lane Group Flow (vph)	95	225	4	105	219	0	53	884	0	78	585	0
Confl. Peds. (#/hr)	11		25	25		11	6		57	57		6
Heavy Vehicles (%)	4%	1%	5%	1%	0%	0%	3%	3%	2%	2%	5%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	27.9	20.1	20.1	27.9	20.1		71.6	65.6		72.6	66.1	
Effective Green, g (s)	27.9	20.1	20.1	27.9	20.1		71.6	65.6		72.6	66.1	
Actuated g/C Ratio	0.23	0.17	0.17	0.23	0.17		0.60	0.55		0.60	0.55	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	214	315	248	229	299		484	1823		352	1847	
v/s Ratio Prot	0.03	0.12		c0.03	c0.12		0.01	c0.26		c0.01	0.17	
v/s Ratio Perm	0.07		0.00	0.08			0.06			0.12		
v/c Ratio	0.44	0.71	0.02	0.46	0.73		0.11	0.48		0.22	0.32	
Uniform Delay, d1	37.8	47.2	41.7	37.9	47.4		10.2	16.8		10.7	14.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	7.5	0.0	1.5	8.9		0.1	0.9		0.3	0.5	
Delay (s)	39.2	54.7	41.7	39.3	56.3		10.3	17.7		11.0	15.1	
Level of Service	D	D	D	D	E		B	B		B	B	
Approach Delay (s)		49.5			51.1			17.3			14.6	
Approach LOS		D			D			B			B	

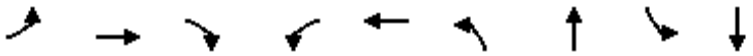
Intersection Summary			
HCM 2000 Control Delay	26.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.51		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	437	217	839	20	111	4	46
v/c Ratio	0.01	0.21	0.28	0.31	0.11	0.38	0.02	0.19
Control Delay	2.8	8.0	3.6	5.1	34.4	13.6	33.0	28.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	8.0	3.6	5.1	34.4	13.6	33.0	28.4
Queue Length 50th (m)	0.2	16.1	7.7	20.6	3.0	1.6	0.6	5.1
Queue Length 95th (m)	0.9	25.2	13.4	47.0	9.6	16.5	3.6	15.2
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	635	2107	795	2664	510	653	477	682
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.21	0.27	0.31	0.04	0.17	0.01	0.07

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	95	225	24	105	237	53	896	78	598
v/c Ratio	0.43	0.72	0.07	0.44	0.75	0.10	0.48	0.21	0.32
Control Delay	37.2	59.6	0.4	37.3	57.0	9.5	18.5	10.3	15.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	59.6	0.4	37.3	57.0	9.5	18.5	10.3	15.6
Queue Length 50th (m)	17.9	53.4	0.0	19.8	51.4	4.4	68.4	6.5	39.5
Queue Length 95th (m)	29.5	75.4	0.0	31.8	74.8	11.0	102.6	14.9	61.1
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	226	548	502	243	536	522	1859	380	1882
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.41	0.05	0.43	0.44	0.10	0.48	0.21	0.32

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	394	8	13	791	7	18
Future Volume (Veh/h)	394	8	13	791	7	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	428	9	14	860	8	20
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.92	
vC, conflicting volume			438		892	220
vC1, stage 1 conf vol					434	
vC2, stage 2 conf vol					458	
vCu, unblocked vol			438		713	220
tC, single (s)			4.1		6.8	7.0
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.4
p0 queue free %			99		99	97
cM capacity (veh/h)			1132		540	772

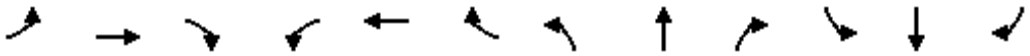
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	285	152	14	430	430	28
Volume Left	0	0	14	0	0	8
Volume Right	0	9	0	0	0	20
cSH	1700	1700	1132	1700	1700	688
Volume to Capacity	0.17	0.09	0.01	0.25	0.25	0.04
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.0	1.0
Control Delay (s)	0.0	0.0	8.2	0.0	0.0	10.5
Lane LOS			A			B
Approach Delay (s)	0.0		0.1			10.5
Approach LOS						B

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	31.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	49	38	821	36	25	594
Future Volume (Veh/h)	49	38	821	36	25	594
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	41	892	39	27	646
Pedestrians	7					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.87	0.87			0.87	
vC, conflicting volume	1296	472			938	
vC1, stage 1 conf vol	918					
vC2, stage 2 conf vol	377					
vCu, unblocked vol	1031	81			618	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.3	
p0 queue free %	87	95			97	
cM capacity (veh/h)	395	835			796	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	94	595	336	27	323	323
Volume Left	53	0	0	27	0	0
Volume Right	41	0	39	0	0	0
cSH	512	1700	1700	796	1700	1700
Volume to Capacity	0.18	0.35	0.20	0.03	0.19	0.19
Queue Length 95th (m)	5.3	0.0	0.0	0.8	0.0	0.0
Control Delay (s)	13.6	0.0	0.0	9.7	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	13.6	0.0		0.4		
Approach LOS	B					

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	1063	5	84	885	7	10	14	191	5	9	10
Future Volume (vph)	19	1063	5	84	885	7	10	14	191	5	9	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3607		1805	3535		1804	1612		1802	1739	
Flt Permitted	0.28	1.00		0.18	1.00		0.74	1.00		0.38	1.00	
Satd. Flow (perm)	531	3607		346	3535		1412	1612		720	1739	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	1155	5	91	962	8	11	15	208	5	10	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	181	0	0	10	0
Lane Group Flow (vph)	21	1160	0	91	970	0	11	42	0	5	11	0
Confl. Peds. (#/hr)	3		4	4		3	1		3	3		1
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	52.5	49.8		58.3	52.7		10.6	10.6		10.6	10.6	
Effective Green, g (s)	52.5	49.8		58.3	52.7		10.6	10.6		10.6	10.6	
Actuated g/C Ratio	0.64	0.61		0.71	0.64		0.13	0.13		0.13	0.13	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	381	2190		345	2271		182	208		93	224	
v/s Ratio Prot	0.00	c0.32		c0.02	0.27			c0.03			0.01	
v/s Ratio Perm	0.03			0.17			0.01			0.01		
v/c Ratio	0.06	0.53		0.26	0.43		0.06	0.20		0.05	0.05	
Uniform Delay, d1	5.4	9.3		5.0	7.2		31.3	31.9		31.3	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.9		0.4	0.6		0.1	0.5		0.2	0.1	
Delay (s)	5.5	10.2		5.4	7.8		31.5	32.4		31.5	31.4	
Level of Service	A	B		A	A		C	C		C	C	
Approach Delay (s)		10.2			7.6			32.4			31.4	
Approach LOS		B			A			C			C	

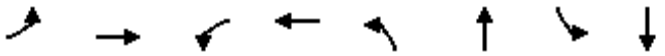
Intersection Summary			
HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.45		
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	174	163	33	56	111	57	54	833	98	62	740	186
Future Volume (vph)	174	163	33	56	111	57	54	833	98	62	740	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1730	1827	1496	1730	1730		1769	3444		1766	3393	
Flt Permitted	0.36	1.00	1.00	0.63	1.00		0.22	1.00		0.21	1.00	
Satd. Flow (perm)	647	1827	1496	1156	1730		402	3444		394	3393	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	189	177	36	61	121	62	59	905	107	67	804	202
RTOR Reduction (vph)	0	0	29	0	19	0	0	6	0	0	14	0
Lane Group Flow (vph)	189	177	7	61	164	0	59	1006	0	67	992	0
Confl. Peds. (#/hr)	14		6	6		14	15		35	35		15
Heavy Vehicles (%)	4%	4%	6%	4%	4%	2%	2%	2%	4%	2%	3%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	31.5	21.9	21.9	23.1	17.5		72.3	66.3		72.7	66.5	
Effective Green, g (s)	31.5	21.9	21.9	23.1	17.5		72.3	66.3		72.7	66.5	
Actuated g/C Ratio	0.26	0.18	0.18	0.19	0.15		0.60	0.55		0.61	0.55	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	260	333	273	249	252		310	1902		309	1880	
v/s Ratio Prot	c0.06	0.10		0.01	0.09		0.01	0.29		c0.01	c0.29	
v/s Ratio Perm	c0.13		0.00	0.04			0.11			0.12		
v/c Ratio	0.73	0.53	0.02	0.24	0.65		0.19	0.53		0.22	0.53	
Uniform Delay, d1	37.8	44.4	40.3	40.6	48.4		11.0	17.0		11.0	16.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.7	1.6	0.0	0.5	5.9		0.3	1.1		0.4	1.1	
Delay (s)	47.5	46.0	40.3	41.1	54.3		11.3	18.0		11.4	17.9	
Level of Service	D	D	D	D	D		B	B		B	B	
Approach Delay (s)		46.2			51.0			17.7			17.5	
Approach LOS		D			D			B			B	

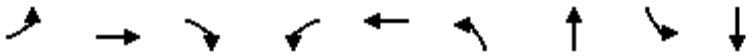
Intersection Summary			
HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.59		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	21	1160	91	970	11	223	5	21
v/c Ratio	0.04	0.53	0.24	0.41	0.06	0.56	0.05	0.09
Control Delay	3.2	10.9	4.5	7.8	31.9	12.4	32.4	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	10.9	4.5	7.8	31.9	12.4	32.4	22.3
Queue Length 50th (m)	0.7	54.0	3.0	25.0	1.6	2.2	0.7	1.5
Queue Length 95th (m)	2.5	79.8	7.3	61.9	6.3	22.0	4.0	7.8
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	547	2185	438	2340	516	721	263	643
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.53	0.21	0.41	0.02	0.31	0.02	0.03

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	189	177	36	61	183	59	1012	67	1006
v/c Ratio	0.72	0.53	0.10	0.22	0.71	0.17	0.52	0.20	0.52
Control Delay	51.9	50.6	0.6	33.2	57.4	9.6	18.4	9.7	18.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	50.6	0.6	33.2	57.4	9.6	18.4	9.7	18.0
Queue Length 50th (m)	38.3	41.1	0.0	11.4	38.6	4.7	78.8	5.4	77.0
Queue Length 95th (m)	55.9	60.9	0.0	21.0	60.2	11.3	115.4	12.6	112.7
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	261	578	542	281	520	338	1955	335	1938
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.31	0.07	0.22	0.35	0.17	0.52	0.20	0.52

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1047	13	13	894	8	37
Future Volume (Veh/h)	1047	13	13	894	8	37
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1138	14	14	972	9	40
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.87	
vC, conflicting volume			1154		1661	578
vC1, stage 1 conf vol					1147	
vC2, stage 2 conf vol					514	
vCu, unblocked vol			1154		1462	578
tC, single (s)			4.1		7.0	7.0
tC, 2 stage (s)					6.0	
tF (s)			2.2		3.6	3.3
p0 queue free %			98		96	91
cM capacity (veh/h)			612		232	456

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	759	393	14	486	486	49
Volume Left	0	0	14	0	0	9
Volume Right	0	14	0	0	0	40
cSH	1700	1700	612	1700	1700	387
Volume to Capacity	0.45	0.23	0.02	0.29	0.29	0.13
Queue Length 95th (m)	0.0	0.0	0.6	0.0	0.0	3.4
Control Delay (s)	0.0	0.0	11.0	0.0	0.0	15.6
Lane LOS			B			C
Approach Delay (s)	0.0		0.2			15.6
Approach LOS						C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		

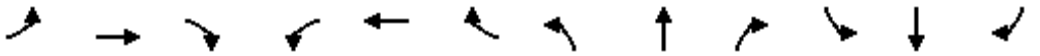
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	40	43	1036	57	78	983
Future Volume (Veh/h)	40	43	1036	57	78	983
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	47	1126	62	85	1068
Pedestrians	28		1			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.83	0.83			0.83	
vC, conflicting volume	1890	622			1216	
vC1, stage 1 conf vol	1185					
vC2, stage 2 conf vol	705					
vCu, unblocked vol	1658	126			844	
tC, single (s)	6.8	7.0			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.4			2.2	
p0 queue free %	83	93			87	
cM capacity (veh/h)	252	718			637	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	90	751	437	85	534	534
Volume Left	43	0	0	85	0	0
Volume Right	47	0	62	0	0	0
cSH	381	1700	1700	637	1700	1700
Volume to Capacity	0.24	0.44	0.26	0.13	0.31	0.31
Queue Length 95th (m)	7.2	0.0	0.0	3.7	0.0	0.0
Control Delay (s)	17.3	0.0	0.0	11.5	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	17.3	0.0		0.8		
Approach LOS	C					

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	49.8%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix H

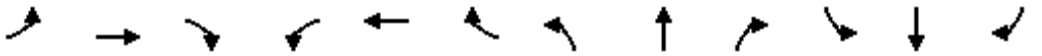
Future (2037) Background Intersection Operation Calculations (Synchro)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	436	28	200	902	1	18	10	92	4	31	11
Future Volume (vph)	5	436	28	200	902	1	18	10	92	4	31	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.86		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3443		1769	3504		1805	1601		1794	1826	
Flt Permitted	0.29	1.00		0.43	1.00		0.73	1.00		0.69	1.00	
Satd. Flow (perm)	555	3443		807	3504		1381	1601		1295	1826	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	474	30	217	980	1	20	11	100	4	34	12
RTOR Reduction (vph)	0	3	0	0	0	0	0	91	0	0	11	0
Lane Group Flow (vph)	5	501	0	217	981	0	20	20	0	4	35	0
Confl. Peds. (#/hr)	6		3	3		6			8	8		
Heavy Vehicles (%)	0%	4%	0%	2%	3%	0%	0%	0%	1%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	53.1	51.8		64.1	58.8		7.7	7.7		7.7	7.7	
Effective Green, g (s)	53.1	51.8		64.1	58.8		7.7	7.7		7.7	7.7	
Actuated g/C Ratio	0.63	0.62		0.76	0.70		0.09	0.09		0.09	0.09	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	371	2128		712	2458		126	147		118	167	
v/s Ratio Prot	0.00	0.15		c0.03	c0.28			0.01			c0.02	
v/s Ratio Perm	0.01			0.20			0.01			0.00		
v/c Ratio	0.01	0.24		0.30	0.40		0.16	0.14		0.03	0.21	
Uniform Delay, d1	5.6	7.2		2.8	5.2		35.1	35.0		34.7	35.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.3		0.2	0.5		0.6	0.4		0.1	0.6	
Delay (s)	5.7	7.4		3.0	5.7		35.7	35.4		34.8	35.9	
Level of Service	A	A		A	A		D	D		C	D	
Approach Delay (s)		7.4			5.2			35.5			35.8	
Approach LOS		A			A			D			D	

Intersection Summary			
HCM 2000 Control Delay	8.7	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	83.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.5%	ICU Level of Service	D
Analysis Period (min)	15		

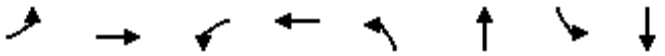
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	87	207	22	97	143	75	49	741	150	72	490	103
Future Volume (vph)	87	207	22	97	143	75	49	741	150	72	490	103
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1732	1881	1481	1777	1787		1751	3348		1763	3360	
Flt Permitted	0.33	1.00	1.00	0.36	1.00		0.37	1.00		0.22	1.00	
Satd. Flow (perm)	607	1881	1481	680	1787		681	3348		416	3360	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	95	225	24	105	155	82	53	805	163	78	533	112
RTOR Reduction (vph)	0	0	20	0	18	0	0	11	0	0	11	0
Lane Group Flow (vph)	95	225	4	105	219	0	53	957	0	78	634	0
Confl. Peds. (#/hr)	11		25	25		11	6		57	57		6
Heavy Vehicles (%)	4%	1%	5%	1%	0%	0%	3%	3%	2%	2%	5%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	27.9	20.1	20.1	27.9	20.1		71.6	65.6		72.6	66.1	
Effective Green, g (s)	27.9	20.1	20.1	27.9	20.1		71.6	65.6		72.6	66.1	
Actuated g/C Ratio	0.23	0.17	0.17	0.23	0.17		0.60	0.55		0.60	0.55	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	214	315	248	229	299		459	1830		324	1850	
v/s Ratio Prot	0.03	0.12		c0.03	c0.12		0.01	c0.29		c0.01	0.19	
v/s Ratio Perm	0.07		0.00	0.08			0.06			0.13		
v/c Ratio	0.44	0.71	0.02	0.46	0.73		0.12	0.52		0.24	0.34	
Uniform Delay, d1	37.8	47.2	41.7	37.9	47.4		10.2	17.3		11.0	14.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	7.5	0.0	1.5	8.9		0.1	1.1		0.4	0.5	
Delay (s)	39.2	54.7	41.7	39.3	56.3		10.3	18.3		11.4	15.4	
Level of Service	D	D	D	D	E		B	B		B	B	
Approach Delay (s)		49.5			51.1			17.9			15.0	
Approach LOS		D			D			B			B	

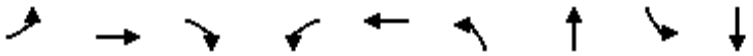
Intersection Summary			
HCM 2000 Control Delay	26.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.6%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	504	217	981	20	111	4	46
v/c Ratio	0.01	0.24	0.29	0.37	0.11	0.38	0.02	0.19
Control Delay	2.8	8.2	3.7	5.5	34.4	13.6	33.0	28.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	8.2	3.7	5.5	34.4	13.6	33.0	28.4
Queue Length 50th (m)	0.2	19.1	7.7	25.5	3.0	1.6	0.6	5.1
Queue Length 95th (m)	0.9	29.2	13.4	57.4	9.6	16.5	3.6	15.2
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	582	2108	759	2664	510	653	477	682
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.24	0.29	0.37	0.04	0.17	0.01	0.07

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	95	225	24	105	237	53	968	78	645
v/c Ratio	0.43	0.72	0.07	0.44	0.75	0.11	0.52	0.23	0.34
Control Delay	37.2	59.6	0.4	37.3	57.0	9.6	19.3	10.5	16.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	37.2	59.6	0.4	37.3	57.0	9.6	19.3	10.5	16.0
Queue Length 50th (m)	17.9	53.4	0.0	19.8	51.4	4.4	76.5	6.5	43.7
Queue Length 95th (m)	29.5	75.4	0.0	31.8	74.8	11.0	113.8	14.9	67.2
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	226	548	502	243	536	496	1864	353	1884
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.42	0.41	0.05	0.43	0.44	0.11	0.52	0.22	0.34

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	459	8	13	926	7	18
Future Volume (Veh/h)	459	8	13	926	7	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	499	9	14	1007	8	20
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.89	
vC, conflicting volume			509		1036	255
vC1, stage 1 conf vol					504	
vC2, stage 2 conf vol					532	
vCu, unblocked vol			509		797	255
tC, single (s)			4.1		6.8	7.0
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.4
p0 queue free %			99		98	97
cM capacity (veh/h)			1066		499	732

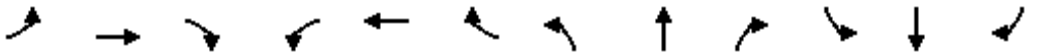
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	333	175	14	504	504	28
Volume Left	0	0	14	0	0	8
Volume Right	0	9	0	0	0	20
cSH	1700	1700	1066	1700	1700	646
Volume to Capacity	0.20	0.10	0.01	0.30	0.30	0.04
Queue Length 95th (m)	0.0	0.0	0.3	0.0	0.0	1.1
Control Delay (s)	0.0	0.0	8.4	0.0	0.0	10.8
Lane LOS			A			B
Approach Delay (s)	0.0		0.1			10.8
Approach LOS						B

Intersection Summary				
Average Delay	0.3			
Intersection Capacity Utilization	35.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	49	38	903	36	25	652
Future Volume (Veh/h)	49	38	903	36	25	652
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	53	41	982	39	27	709
Pedestrians	7					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.84	0.84			0.84	
vC, conflicting volume	1417	518			1028	
vC1, stage 1 conf vol	1008					
vC2, stage 2 conf vol	408					
vCu, unblocked vol	1124	58			663	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.3	
p0 queue free %	85	95			96	
cM capacity (veh/h)	364	840			745	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	94	655	366	27	354	354
Volume Left	53	0	0	27	0	0
Volume Right	41	0	39	0	0	0
cSH	484	1700	1700	745	1700	1700
Volume to Capacity	0.19	0.39	0.22	0.04	0.21	0.21
Queue Length 95th (m)	5.7	0.0	0.0	0.9	0.0	0.0
Control Delay (s)	14.2	0.0	0.0	10.0	0.0	0.0
Lane LOS	B			B		
Approach Delay (s)	14.2	0.0		0.4		
Approach LOS	B					

Intersection Summary			
Average Delay	0.9		
Intersection Capacity Utilization	37.8%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	1244	5	84	1038	7	10	14	191	5	9	10
Future Volume (vph)	19	1244	5	84	1038	7	10	14	191	5	9	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3608		1805	3535		1804	1612		1802	1739	
Flt Permitted	0.22	1.00		0.13	1.00		0.74	1.00		0.38	1.00	
Satd. Flow (perm)	422	3608		249	3535		1412	1612		723	1739	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	1352	5	91	1128	8	11	15	208	5	10	11
RTOR Reduction (vph)	0	0	0	0	0	0	0	178	0	0	10	0
Lane Group Flow (vph)	21	1357	0	91	1136	0	11	45	0	5	11	0
Confl. Peds. (#/hr)	3		4	4		3	1		3	3		1
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	52.5	49.8		58.5	52.8		10.7	10.7		10.7	10.7	
Effective Green, g (s)	52.5	49.8		58.5	52.8		10.7	10.7		10.7	10.7	
Actuated g/C Ratio	0.64	0.61		0.71	0.64		0.13	0.13		0.13	0.13	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	314	2185		285	2270		183	209		94	226	
v/s Ratio Prot	0.00	c0.38		c0.02	0.32			c0.03			0.01	
v/s Ratio Perm	0.04			0.21			0.01			0.01		
v/c Ratio	0.07	0.62		0.32	0.50		0.06	0.21		0.05	0.05	
Uniform Delay, d1	5.6	10.2		6.3	7.7		31.3	32.0		31.3	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.3		0.7	0.8		0.1	0.5		0.2	0.1	
Delay (s)	5.7	11.6		6.9	8.5		31.5	32.5		31.5	31.4	
Level of Service	A	B		A	A		C	C		C	C	
Approach Delay (s)		11.5			8.4			32.5			31.4	
Approach LOS		B			A			C			C	

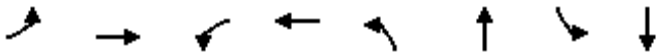
Intersection Summary			
HCM 2000 Control Delay	12.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	82.2	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.1%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	174	163	33	56	111	57	54	917	98	62	815	186
Future Volume (vph)	174	163	33	56	111	57	54	917	98	62	815	186
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1730	1827	1496	1730	1730		1769	3452		1767	3401	
Flt Permitted	0.36	1.00	1.00	0.63	1.00		0.19	1.00		0.18	1.00	
Satd. Flow (perm)	647	1827	1496	1156	1730		351	3452		338	3401	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	189	177	36	61	121	62	59	997	107	67	886	202
RTOR Reduction (vph)	0	0	29	0	19	0	0	5	0	0	12	0
Lane Group Flow (vph)	189	177	7	61	164	0	59	1099	0	67	1076	0
Confl. Peds. (#/hr)	14		6	6		14	15		35	35		15
Heavy Vehicles (%)	4%	4%	6%	4%	4%	2%	2%	2%	4%	2%	3%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	31.5	21.9	21.9	23.1	17.5		72.3	66.3		72.7	66.5	
Effective Green, g (s)	31.5	21.9	21.9	23.1	17.5		72.3	66.3		72.7	66.5	
Actuated g/C Ratio	0.26	0.18	0.18	0.19	0.15		0.60	0.55		0.61	0.55	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	260	333	273	249	252		282	1907		278	1884	
v/s Ratio Prot	c0.06	0.10		0.01	0.09		0.01	c0.32		c0.01	0.32	
v/s Ratio Perm	c0.13		0.00	0.04			0.12			0.13		
v/c Ratio	0.73	0.53	0.02	0.24	0.65		0.21	0.58		0.24	0.57	
Uniform Delay, d1	37.8	44.4	40.3	40.6	48.4		11.5	17.6		11.6	17.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.7	1.6	0.0	0.5	5.9		0.4	1.3		0.5	1.3	
Delay (s)	47.5	46.0	40.3	41.1	54.3		11.8	18.9		12.0	18.7	
Level of Service	D	D	D	D	D		B	B		B	B	
Approach Delay (s)		46.2			51.0			18.5			18.3	
Approach LOS		D			D			B			B	

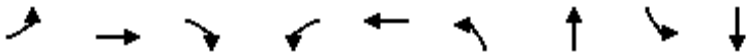
Intersection Summary			
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.62		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	77.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	21	1357	91	1136	11	223	5	21
v/c Ratio	0.05	0.62	0.28	0.49	0.06	0.57	0.05	0.09
Control Delay	3.3	12.4	5.2	8.5	32.0	12.8	32.6	22.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.3	12.4	5.2	8.5	32.0	12.8	32.6	22.3
Queue Length 50th (m)	0.7	68.7	3.0	31.4	1.6	2.6	0.7	1.5
Queue Length 95th (m)	2.5	103.4	7.4	77.0	6.2	22.6	4.0	7.9
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	481	2180	379	2341	515	718	263	642
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.62	0.24	0.49	0.02	0.31	0.02	0.03

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	189	177	36	61	183	59	1104	67	1088
v/c Ratio	0.72	0.53	0.10	0.22	0.71	0.19	0.56	0.22	0.56
Control Delay	51.9	50.6	0.6	33.2	57.4	9.8	19.4	10.1	18.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.9	50.6	0.6	33.2	57.4	9.8	19.4	10.1	18.9
Queue Length 50th (m)	38.3	41.1	0.0	11.4	38.6	4.7	89.7	5.4	86.8
Queue Length 95th (m)	55.9	60.9	0.0	21.0	60.2	11.3	130.3	12.6	126.1
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	261	578	542	281	520	309	1958	303	1941
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.72	0.31	0.07	0.22	0.35	0.19	0.56	0.22	0.56

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1226	13	13	1048	8	37
Future Volume (Veh/h)	1226	13	13	1048	8	37
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1333	14	14	1139	9	40
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.83	
vC, conflicting volume			1349		1940	676
vC1, stage 1 conf vol					1342	
vC2, stage 2 conf vol					598	
vCu, unblocked vol			1349		1719	676
tC, single (s)			4.1		7.0	7.0
tC, 2 stage (s)					6.0	
tF (s)			2.2		3.6	3.3
p0 queue free %			97		95	90
cM capacity (veh/h)			516		182	393

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	889	458	14	570	570	49
Volume Left	0	0	14	0	0	9
Volume Right	0	14	0	0	0	40
cSH	1700	1700	516	1700	1700	324
Volume to Capacity	0.52	0.27	0.03	0.34	0.34	0.15
Queue Length 95th (m)	0.0	0.0	0.7	0.0	0.0	4.2
Control Delay (s)	0.0	0.0	12.2	0.0	0.0	18.1
Lane LOS			B			C
Approach Delay (s)	0.0		0.1			18.1
Approach LOS						C

Intersection Summary			
Average Delay	0.4		
Intersection Capacity Utilization	44.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	40	43	1140	57	78	1083
Future Volume (Veh/h)	40	43	1140	57	78	1083
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	43	47	1239	62	85	1177
Pedestrians	28		1			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.80	0.80			0.80	
vC, conflicting volume	2058	678			1329	
vC1, stage 1 conf vol	1298					
vC2, stage 2 conf vol	760					
vCu, unblocked vol	1822	97			911	
tC, single (s)	6.8	7.0			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.4			2.2	
p0 queue free %	81	94			85	
cM capacity (veh/h)	225	724			581	

Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	90	826	475	85	588	588
Volume Left	43	0	0	85	0	0
Volume Right	47	0	62	0	0	0
cSH	352	1700	1700	581	1700	1700
Volume to Capacity	0.26	0.49	0.28	0.15	0.35	0.35
Queue Length 95th (m)	8.0	0.0	0.0	4.1	0.0	0.0
Control Delay (s)	18.7	0.0	0.0	12.3	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	18.7	0.0		0.8		
Approach LOS	C					

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix I

Site Plan

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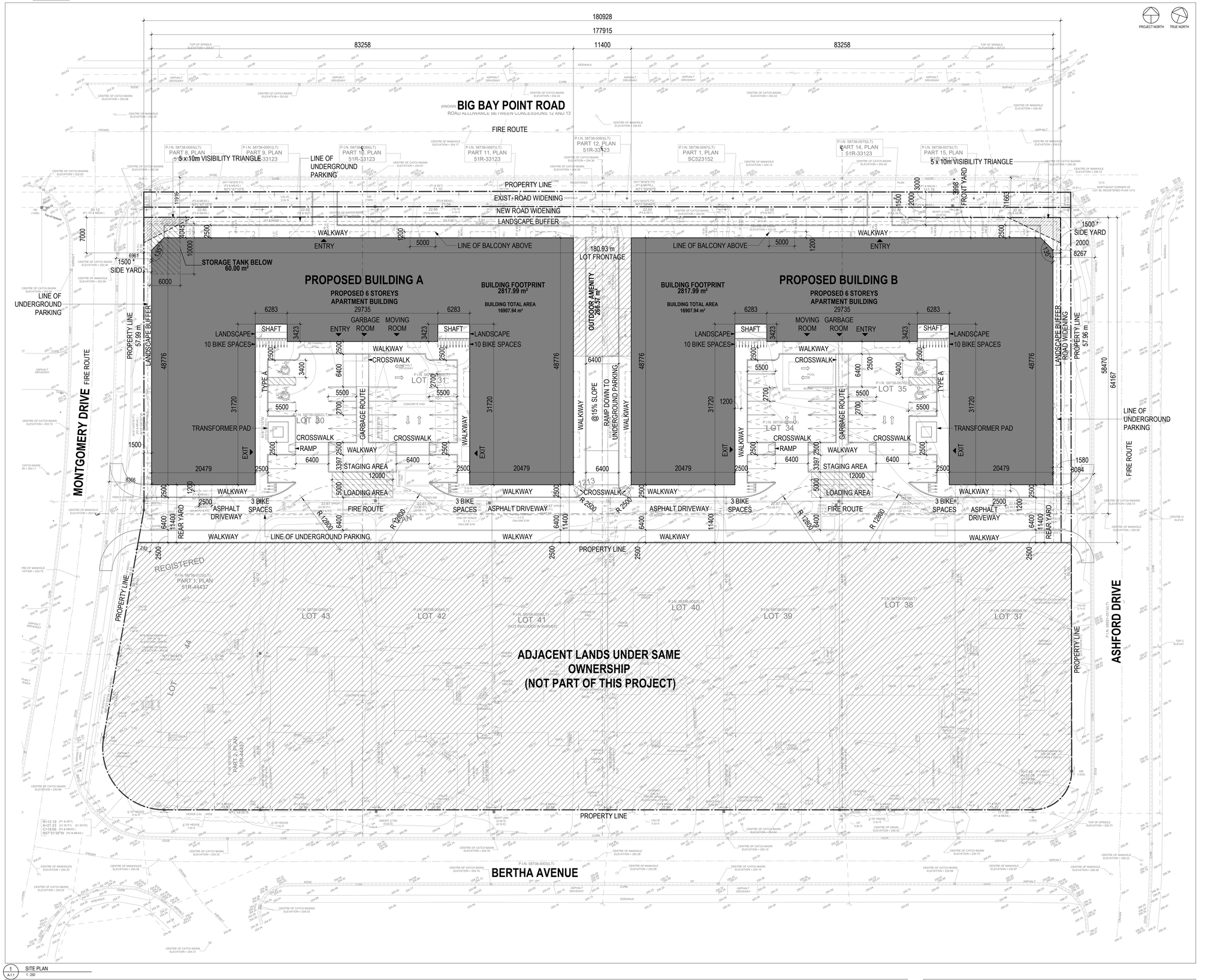

1 SITE PLAN
A-1.1 1 : 250

2 CONTEXT PLAN
A-1.1 1 : 10000

GENERAL PROJECT STATISTICS

STATISTIC	PROPOSED
USE	APART. DWELLING
ZONE	CURRENT: R1 / PROPOSED: RA2-1
# STOREYS	6
# UNDERGROUND LEVELS	1
# UNITS	456 (228 EACH BUILDING)
# PARKING SPACES	327 (0.72 PER UNIT)
# BICYCLE PARKING SPACES	304 (0.66 PER UNIT)
AREA OF AMENITY	2487.8 m²
# LOCKERS	484 (1.06 PER UNIT)

SITE STATISTICS

STATISTIC	REQUIRED	PROPOSED
LOT AREA (MIN.)	1300 m²	11633.92 m²
LOT FRONTAGE (MIN.)	30 m	180.93 m
FRONT YARD (MIN.) BIG BAY POINT ROAD	7 m	3.99 m*
SIDE YARD (MIN.) MONTGOMERY DRIVE AND ASHFORD DRIVE	5 m	1.5 m*
REAR YARD (MIN.)	7 m	11.4 m
LANDSCAPED OPEN SPACE (MIN.)	35 % 4071.87 m²	24%* 2732.7 m²
LOT COVERAGE (MAX.)	35 % 4071.87 m²	48.44 %* 5635.98 m²
GFA (MAX. % OF LOT AREA)	200 % 23267.84 m²	233 %* 27164.4 m²
BUILDING HEIGHT (MAX.)	30 m	19.5 m

PARKING STATISTICS

STATISTIC	REQUIRED	PROPOSED
PARKING STANDARDS 1.5 x 456 UNITS = 684 SPACES	684 SPACES (1.5 PER UNIT)	327 SPACES (0.72 PER UNIT)
BARRIER FREE PARKING 1 + (0.03 x 684 SPACES) = 21.52 SPACES	22 SPACES 1 SPACE + 3% OF REQUIRED	22 SPACES 1 SPACE + 3% OF REQUIRED
BICYCLE PARKING SPACES	-	304 (0.66 PER UNIT)
DRIVE AISLE (MIN.)	6.4 m	6.0 m*
PARKING FOR APARTMENT DWELLINGS	REQUIRED	PROPOSED
PARKING SPACES INCLUDING AISLES REQUIRED FOR AN APARTMENT DWELLING UNIT IN ANY ZONE SHALL HAVE A MAXIMUM LOT COVERAGE OF 35%.		26 % 3056.07 m²
A MAXIMUM OF 20% OF THE TOTAL PARKING AREA REQUIRED FOR AN APARTMENT BUILDING SHALL BE PERMITTED IN THE FRONT YARD.		NONE IN FRONT YARD
LANDSCAPED BUFFER AREAS	REQUIRED	PROPOSED
PARKING AREAS PROVIDING 4 OR MORE SPACES ADJOINING A RESIDENTIALLY ZONED LOT REQUIRED A CONTINUOUS LANDSCAPED BUFFER AREA WITH A MIN. WIDTH OF 3M AND A CONTINUOUS TIGHT BOARD FENCE WITH A MIN. HEIGHT OF 2M ALONG THE LOT LINE 3M ALONG SIDE AND REAR LOT LINES		NONE ALONG THE LOT LINE REAR - NONE EXT. SIDE - 1.5 m* INT. SIDE - 1.5 m*

(*) SITE-SPECIFIC ZONING PROVISIONS

3 PROJECT STATISTICS
A-1.1 N/A

UNITS SCHEDULE

# BEDROOM	TYPE	AMOUNT	m²	SF
1 BED/STUDIO	TYPE A	100	52.7 m²	567 SF
1 BED/STUDIO	TYPE A+	220	55.7 m²	600 SF
1 BED/STUDIO	TYPE B	2	66.0 m²	711 SF
1 BED/STUDIO	TYPE B+	10	69.0 m²	743 SF
1 BED/STUDIO	TYPE E	4	46.2 m²	497 SF
1 BED/STUDIO	TYPE E+	20	49.2 m²	529 SF
1 BED/STUDIO	TYPE H	20	55.7 m²	600 SF
2 BED	TYPE C	2	69.0 m²	743 SF
2 BED	TYPE C+	10	72.0 m²	775 SF
2 BED	TYPE D	14	71.3 m²	768 SF
2 BED	TYPE D+	10	74.3 m²	800 SF
2 BED	TYPE F	4	65.7 m²	707 SF
2 BED	TYPE I	20	85.4 m²	919 SF
3 BED	TYPE G	20	94.2 m²	1014 SF
TOTAL		456		

GROSS FLOOR AREA SCHEDULE

TYPE	m²	SF
OTHER	75.5 m²	813 SF
TYPE A	5272.1 m²	56748 SF
TYPE A+	12258.6 m²	131950 SF
TYPE B	132.1 m²	1421 SF
TYPE B+	690.3 m²	7430 SF
TYPE C	138.0 m²	1486 SF
TYPE C+	720.2 m²	7752 SF
TYPE D	998.4 m²	10747 SF
TYPE D+	743.1 m²	7999 SF
TYPE E	184.7 m²	1988 SF
TYPE E+	983.6 m²	10587 SF
TYPE F	262.8 m²	2829 SF
TYPE G	1883.3 m²	20272 SF
TYPE H	1114.4 m²	11995 SF
TYPE I	1707.3 m²	18378 SF
TOTAL	27164.4 m²	292395 SF

AMENITY SCHEDULE

LEVEL	TYPE	m²	SF
LEVEL 1	AMENITY	318.7 m²	3431 SF
LEVEL 1	LANDSCAPE	477.8 m²	5143 SF
LEVEL 1	LANDSCAPE AMENITY	266.6 m²	2869 SF
LEVEL 1	TERRACE	180.0 m²	1937 SF
LEVEL 2	BALCONY	234.0 m²	2519 SF
LEVEL 3	BALCONY	234.0 m²	2519 SF
LEVEL 4	BALCONY	234.0 m²	2519 SF
LEVEL 5	BALCONY	234.0 m²	2519 SF
LEVEL 6	AMENITY	74.7 m²	804 SF
LEVEL 6	BALCONY	234.0 m²	2519 SF
TOTAL		2487.8 m²	26779 SF

LANDSCAPE SCHEDULE

LEVEL	TYPE	m²	SF
LEVEL 1	LANDSCAPE	477.8 m²	5143 SF
LEVEL 1	LANDSCAPE AMENITY	266.6 m²	2869 SF
LEVEL 1	LANDSCAPE WALKWAY	1988.4 m²	21403 SF
TOTAL		2732.7 m²	29415 SF

PARKING SCHEDULE

Level	TYPE	PROPOSED
LEVEL 1	2.70m x 5.70m	38
LEVEL 1	3.40 m x 5.70 m (BF - TYPE A)	4
		42
P1	2.70m x 5.70m	267
P1	3.10 m x 5.70 m (BF - TYPE B)	12
P1	3.40 m x 5.70 m (BF - TYPE A)	6
		285
TOTAL		327

LOCKERS SCHEDULE

LEVEL	TYPE	COUNT
LEVEL 2	1000 x 1500	116
LEVEL 3	1000 x 1500	116
LEVEL 4	1000 x 1500	116
LEVEL 5	1000 x 1500	116
LEVEL 6	1000 x 1500	20
TOTAL		484

BICYCLE PARKING SCHEDULE

Level	TYPE	PROPOSED
LEVEL 1	0.60m x 1.8m (BICYCLE PARKING)	176
P1	0.60m x 1.8m (BICYCLE PARKING)	128
TOTAL		304

4 PROJECT SCHEDULES
A-1.1 N/A

5 AREA SCHEDULES
A-1.1 N/A

ALL WORK SHALL BE CARRIED OUT IN ACCORDANCE WITH THE LATEST ONTARIO BUILDING CODE.

USE ONLY LATEST REVISED DRAWINGS MARKED AS "ISSUED FOR CONSTRUCTION"

CONTRACTOR IS TO CHECK AND VERIFY ALL DIMENSIONS AND CONDITIONS ON THE PROJECT AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK. DRAWINGS ARE NOT TO BE SCALED.

CONTRACT DOCUMENTS ARE THE COPYRIGHT OF THE CONSULTANTS AND SHALL NOT BE USED OR REPRODUCED WITHOUT AUTHORIZATION. DOCUMENTS ARE TO BE RETURNED UPON COMPLETION OF THE PROJECT.

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SEALS

PRELIMINARY

REVISIONS

#	DATE	REMARKS
03	2024.11.18	RE ISSUED FOR SITE PLAN APPROVAL
01	2024.11.07	ISSUED FOR SITE PLAN APPROVAL

PROJECT TITLE
APARTMENT BUILDING
545-565 BIG BAY POINT ROAD, BARRIE ON

DRAWING TITLE
SITE PLAN

DRAWN BY
DS

SCALE
As indicated

DATE
NOVEMBER 2024

CHECKED BY
FL

PROJECT NUMBER
24-666

DRAWING NUMBER
A-1.1

TRAFFMOBILITY

Appendix J

TTS Data Analysis

Cross Tabulation Query Form - Person - 2016

Row: 2006 GTA zone of household - gta06_hhld
Column: No. of persons in household - n_person
Table: Type of dwelling unit - dwell_type

Filters:
(2006 GTA zone of household - gta06_hhld In 8529)

undefined
ROW : gta06_hhld
COLUMN : n_person

TABLE : **dwell_type (House)**

gta06_hhld	n_person	total
8529	1	224
8529	2	1091
8529	3	1298
8529	4	2696
8529	5	1470
8529	6	1115
Total		**7894**

TABLE : **dwell_type (Apartment)**

gta06_hhld	n_person	total
8529	1	188
8529	2	277
8529	3	62
Total		**527**

TABLE : **dwell_type (Townhouse)**

gta06_hhld	n_person	total
8529	1	138
8529	2	121
8529	3	115
Total		**374**

Cross Tabulation Query Form - Household - 2016

Row: 2006 GTA zone of household - gta06_hhld
Column: No. of persons in household - n_person
Table: Type of dwelling unit - dwell_type

Filters:
2006 GTA zone of household - gta06_hhld In 8529

undefined
ROW : gta06_hhld
COLUMN : n_person

TABLE : **dwell_type (House)**

gta06_hhld	n_person	total
8529	1	224
8529	2	545
8529	3	433
8529	4	674
8529	5	294
8529	6	186
Total		**2356**

TABLE : **dwell_type (Apartment)**

gta06_hhld	n_person	total
8529	1	188
8529	2	138
8529	3	21
Total		**347**

TABLE : **dwell_type (Townhouse)**

gta06_hhld	n_person	total
8529	1	138
8529	2	61
8529	3	38
Total		**237**

Summary of Population, and Household for Zone 8529 based on 2016 TTS data

Dwell Type	Number of Household	Number of People	Number of People per Household
House	2356	7894	3.4
Apartment	347	527	1.5
Townhouse	237	374	1.6

Population Calculation based on Proposed Developments in Zone 14 based on TMP

Developments	Units		People per household		Total People
	Townhouse	Apartment	Townhouse	Apartment	
520 and 526 Big Bay Point Road		46	1.6	1.5	70
521, 527 and 531 Big Bay Point Road	58				92
667-675 Yonge Street		227			345
681 and 685 Yonge Street		176			267
545 Big Bay Point Road		456			693
				Total	1466

Appendix K

ITE Trip Generation Manual Excerpts

Land Use: 221
Multifamily Housing (Mid-Rise)

Description

Mid-rise multifamily housing includes apartments and condominiums located in a building that has between four and 10 floors of living space. Access to individual dwelling units is through an outside building entrance, a lobby, elevator, and a set of hallways.

Multifamily housing (low-rise) (Land Use 220), multifamily housing (high-rise) (Land Use 222), off-campus student apartment (mid-rise) (Land Use 226), and mid-rise residential with ground-floor commercial (Land Use 231) are related land uses.

Land Use Subcategory

Data are presented for two subcategories for this land use: (1) not close to rail transit and (2) close to rail transit. A site is considered close to rail transit if the walking distance between the residential site entrance and the closest rail transit station entrance is ½ mile or less.

Additional Data

For the six sites for which both the number of residents and the number of occupied dwelling units were available, there were an average of 2.5 residents per occupied dwelling unit.

For the five sites for which the numbers of both total dwelling units and occupied dwelling units were available, an average of 96 percent of the total dwelling units were occupied.

The technical appendices provide supporting information on time-of-day distributions for this land use. The appendices can be accessed through either the ITETripGen web app or the trip generation resource page on the ITE website (https://www.ite.org/technical-resources/topics/trip-and-parking-generation/).

It is expected that the number of bedrooms and number of residents are likely correlated to the trips generated by a residential site. To assist in future analysis, trip generation studies of all multifamily housing should attempt to obtain information on occupancy rate and on the mix of residential unit sizes (i.e., number of units by number of bedrooms at the site complex).

The sites were surveyed in the 1990s, the 2000s, the 2010s, and the 2020s in Alberta (CAN), California, District of Columbia, Florida, Georgia, Illinois, Maryland, Massachusetts, Minnesota, Montana, New Jersey, New York, Ontario (CAN), Oregon, Utah, and Virginia.

Source Numbers

168, 188, 204, 305, 306, 321, 818, 857, 862, 866, 901, 904, 910, 949, 951, 959, 963, 964, 966, 967, 969, 970, 1004, 1014, 1022, 1023, 1025, 1031, 1032, 1035, 1047, 1056, 1057, 1058, 1071, 1076

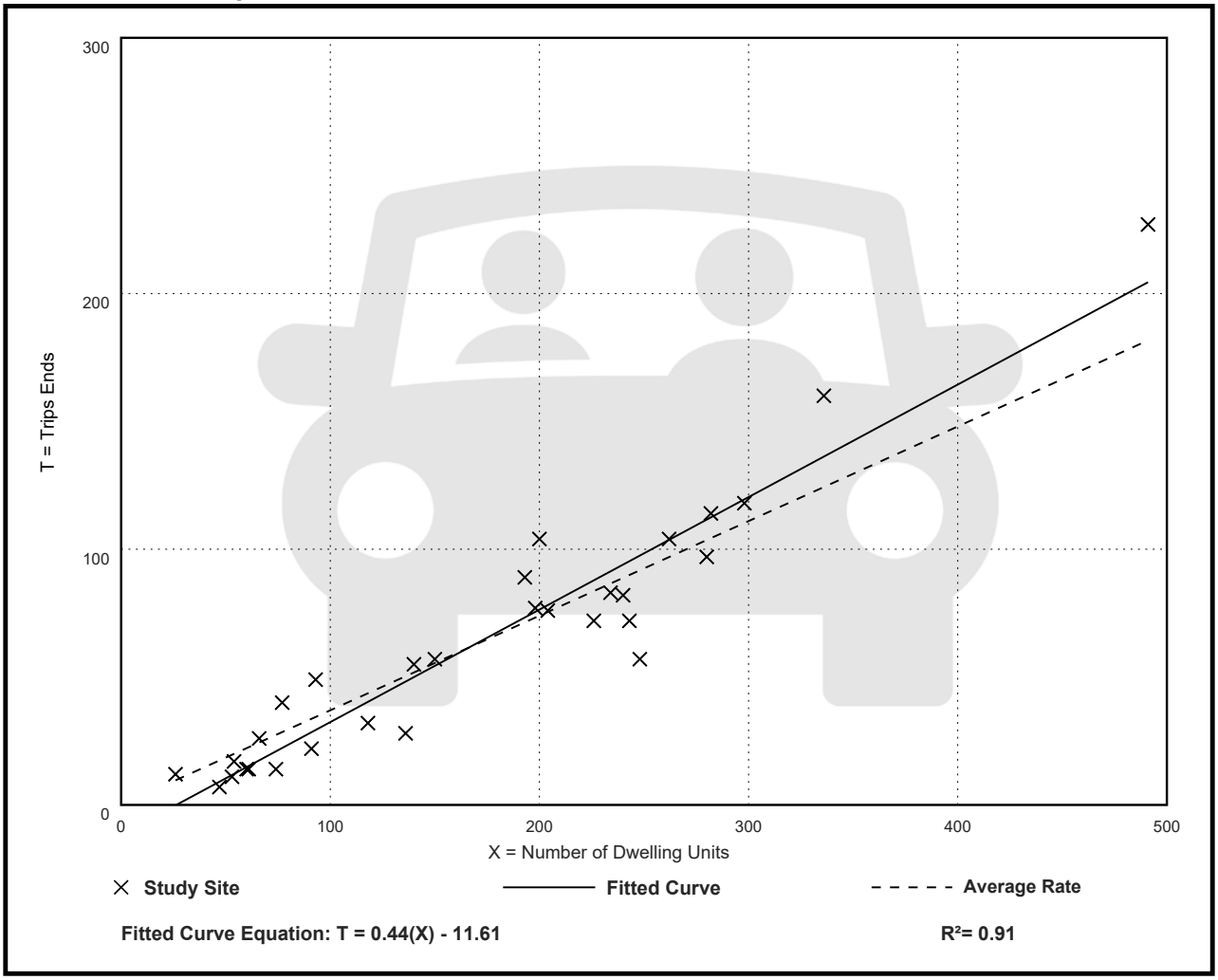
Multifamily Housing (Mid-Rise)
Not Close to Rail Transit (221)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 7 and 9 a.m.
Setting/Location: General Urban/Suburban
Number of Studies: 30
Avg. Num. of Dwelling Units: 173
Directional Distribution: 23% entering, 77% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.37	0.15 - 0.53	0.09

Data Plot and Equation



Fitted Curve Equation: T = 0.44(X) - 11.61

R^2= 0.91

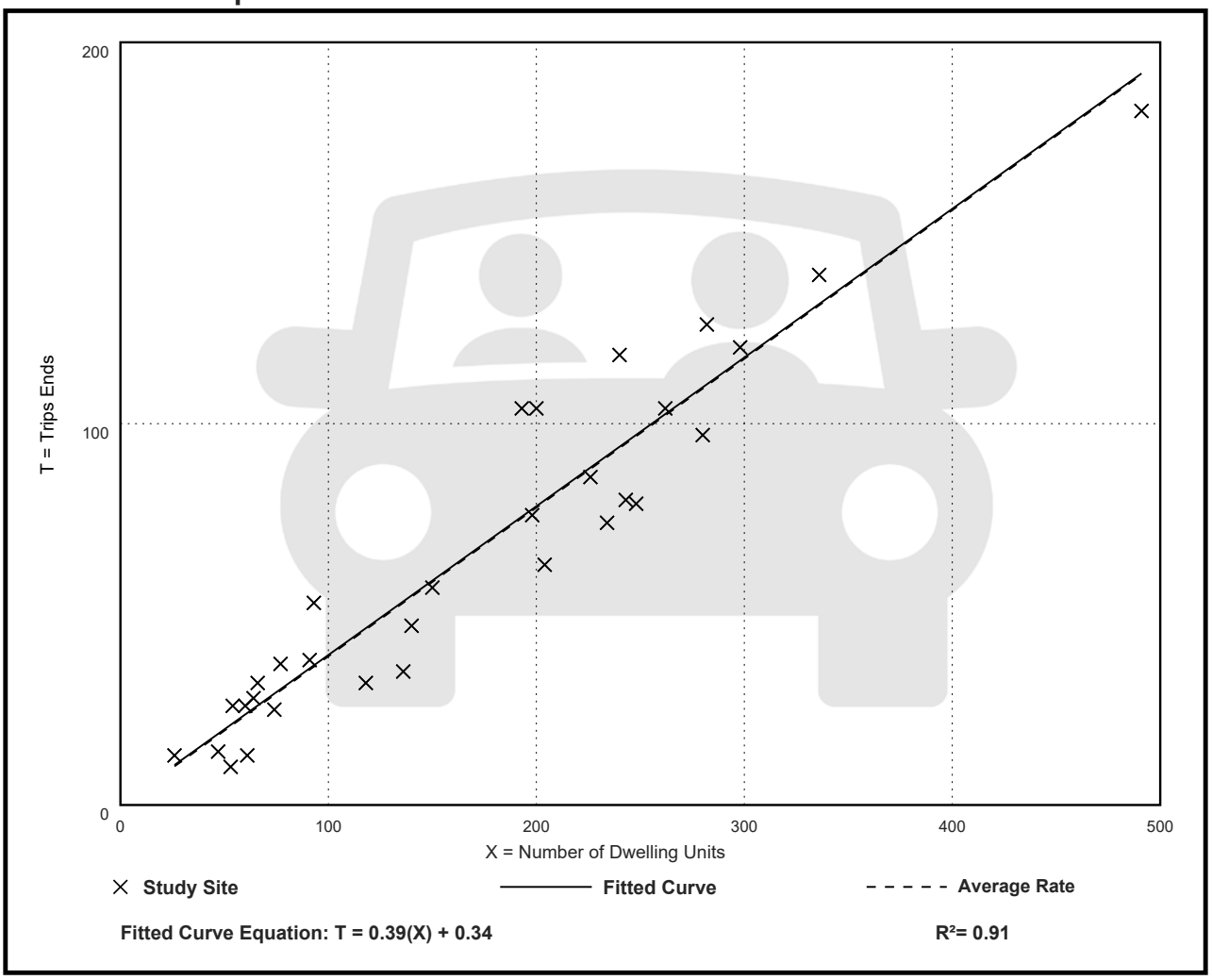
Multifamily Housing (Mid-Rise)
Not Close to Rail Transit (221)

Vehicle Trip Ends vs: Dwelling Units
On a: Weekday,
Peak Hour of Adjacent Street Traffic,
One Hour Between 4 and 6 p.m.
Setting/Location: General Urban/Suburban
Number of Studies: 31
Avg. Num. of Dwelling Units: 169
Directional Distribution: 61% entering, 39% exiting

Vehicle Trip Generation per Dwelling Unit

Average Rate	Range of Rates	Standard Deviation
0.39	0.19 - 0.57	0.08

Data Plot and Equation



Appendix L

Opening Year (2027) Total Intersection Operation Calculations (Synchro)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	325	30	203	665	1	37	11	110	4	31	11
Future Volume (vph)	5	325	30	203	665	1	37	11	110	4	31	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.86		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3431		1768	3504		1805	1598		1794	1826	
Flt Permitted	0.38	1.00		0.49	1.00		0.73	1.00		0.67	1.00	
Satd. Flow (perm)	715	3431		904	3504		1381	1598		1270	1826	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	353	33	221	723	1	40	12	120	4	34	12
RTOR Reduction (vph)	0	5	0	0	0	0	0	106	0	0	11	0
Lane Group Flow (vph)	5	381	0	221	724	0	40	26	0	4	35	0
Confl. Peds. (#/hr)	6		3	3		6			8	8		
Heavy Vehicles (%)	0%	4%	0%	2%	3%	0%	0%	0%	1%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	52.6	51.2		63.6	58.2		10.2	10.2		10.2	10.2	
Effective Green, g (s)	52.6	51.2		63.6	58.2		10.2	10.2		10.2	10.2	
Actuated g/C Ratio	0.61	0.60		0.74	0.68		0.12	0.12		0.12	0.12	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	456	2047		754	2376		164	189		150	217	
v/s Ratio Prot	0.00	0.11		c0.03	c0.21			0.02			0.02	
v/s Ratio Perm	0.01			0.19			c0.03			0.00		
v/c Ratio	0.01	0.19		0.29	0.30		0.24	0.14		0.03	0.16	
Uniform Delay, d1	6.4	7.8		3.4	5.6		34.3	33.9		33.4	34.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.2	0.3		0.8	0.3		0.1	0.4	
Delay (s)	6.5	8.0		3.6	5.9		35.1	34.2		33.5	34.3	
Level of Service	A	A		A	A		D	C		C	C	
Approach Delay (s)		8.0			5.4			34.4			34.3	
Approach LOS		A			A			C			C	

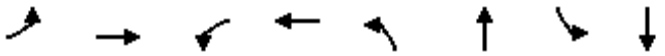
Intersection Summary			
HCM 2000 Control Delay	10.2	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	85.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	212	22	120	163	76	49	616	157	73	414	105
Future Volume (vph)	88	212	22	120	163	76	49	616	157	73	414	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.97		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1732	1881	1481	1777	1796		1750	3316		1759	3347	
Flt Permitted	0.31	1.00	1.00	0.37	1.00		0.41	1.00		0.27	1.00	
Satd. Flow (perm)	560	1881	1481	690	1796		756	3316		497	3347	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	230	24	130	177	83	53	670	171	79	450	114
RTOR Reduction (vph)	0	0	20	0	16	0	0	15	0	0	15	0
Lane Group Flow (vph)	96	230	4	130	244	0	53	826	0	79	549	0
Confl. Peds. (#/hr)	11		25	25		11	6		57	57		6
Heavy Vehicles (%)	4%	1%	5%	1%	0%	0%	3%	3%	2%	2%	5%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	29.2	21.4	21.4	29.6	21.6		70.0	64.0		71.2	64.6	
Effective Green, g (s)	29.2	21.4	21.4	29.6	21.6		70.0	64.0		71.2	64.6	
Actuated g/C Ratio	0.24	0.18	0.18	0.25	0.18		0.58	0.53		0.59	0.54	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	212	335	264	242	323		490	1768		364	1801	
v/s Ratio Prot	0.03	0.12		c0.04	c0.14		0.01	c0.25		c0.01	0.16	
v/s Ratio Perm	0.08		0.00	0.10			0.06			0.12		
v/c Ratio	0.45	0.69	0.02	0.54	0.75		0.11	0.47		0.22	0.30	
Uniform Delay, d1	36.9	46.2	40.6	37.1	46.7		10.8	17.4		11.2	15.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	5.7	0.0	2.3	9.6		0.1	0.9		0.3	0.4	
Delay (s)	38.4	51.9	40.7	39.4	56.3		10.9	18.3		11.5	15.7	
Level of Service	D	D	D	D	E		B	B		B	B	
Approach Delay (s)		47.4			50.6			17.9			15.2	
Approach LOS		D			D			B			B	

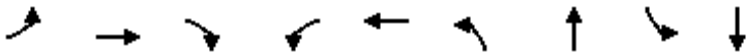
Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	386	221	724	40	132	4	46
v/c Ratio	0.01	0.19	0.29	0.29	0.24	0.44	0.03	0.20
Control Delay	2.8	8.3	3.8	5.4	36.9	13.5	32.8	28.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	8.3	3.8	5.4	36.9	13.5	32.8	28.5
Queue Length 50th (m)	0.2	13.8	7.9	17.1	6.1	1.8	0.6	5.1
Queue Length 95th (m)	0.9	22.3	14.1	40.2	15.8	17.9	3.6	15.2
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	650	2000	785	2472	485	638	446	649
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.19	0.28	0.29	0.08	0.21	0.01	0.07

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	96	230	24	130	260	53	841	79	564
v/c Ratio	0.43	0.68	0.07	0.51	0.76	0.10	0.47	0.20	0.31
Control Delay	36.2	56.0	0.4	38.7	57.4	10.2	19.0	10.9	16.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	56.0	0.4	38.7	57.4	10.2	19.0	10.9	16.1
Queue Length 50th (m)	17.7	53.9	0.0	24.4	57.3	4.6	64.5	6.9	37.6
Queue Length 95th (m)	29.0	75.5	0.0	37.5	81.4	11.4	97.4	15.6	58.7
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	224	548	502	253	537	528	1806	392	1836
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.42	0.05	0.51	0.48	0.10	0.47	0.20	0.31

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	342	26	16	699	51	20
Future Volume (Veh/h)	342	26	16	699	51	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	372	28	17	760	55	22
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.94	
vC, conflicting volume			401		801	201
vC1, stage 1 conf vol					387	
vC2, stage 2 conf vol					414	
vCu, unblocked vol			401		653	201
tC, single (s)			4.1		6.8	7.0
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.4
p0 queue free %			99		90	97
cM capacity (veh/h)			1168		569	793

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	248	152	17	380	380	77
Volume Left	0	0	17	0	0	55
Volume Right	0	28	0	0	0	22
cSH	1700	1700	1168	1700	1700	619
Volume to Capacity	0.15	0.09	0.01	0.22	0.22	0.12
Queue Length 95th (m)	0.0	0.0	0.4	0.0	0.0	3.4
Control Delay (s)	0.0	0.0	8.1	0.0	0.0	11.6
Lane LOS			A			B
Approach Delay (s)	0.0		0.2			11.6
Approach LOS						B

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	30.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	57	48	748	39	26	542
Future Volume (Veh/h)	57	48	748	39	26	542
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	52	813	42	28	589
Pedestrians	7					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.88	0.88			0.88	
vC, conflicting volume	1192	434			862	
vC1, stage 1 conf vol	841					
vC2, stage 2 conf vol	350					
vCu, unblocked vol	944	83			569	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.3	
p0 queue free %	85	94			97	
cM capacity (veh/h)	426	845			844	

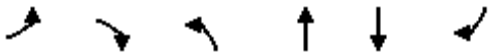
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	114	542	313	28	294	294
Volume Left	62	0	0	28	0	0
Volume Right	52	0	42	0	0	0
cSH	550	1700	1700	844	1700	1700
Volume to Capacity	0.21	0.32	0.18	0.03	0.17	0.17
Queue Length 95th (m)	6.2	0.0	0.0	0.8	0.0	0.0
Control Delay (s)	13.2	0.0	0.0	9.4	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	13.2	0.0		0.4		
Approach LOS	B					

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	34.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	46	25	4	21	21
Future Volume (Veh/h)	18	46	25	4	21	21
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	50	27	4	23	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	98	29			31	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	98	29			31	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	95			99	
cM capacity (veh/h)	893	1052			1595	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	70	31	46
Volume Left	20	0	23
Volume Right	50	4	0
cSH	1001	1700	1595
Volume to Capacity	0.07	0.02	0.01
Queue Length 95th (m)	1.8	0.0	0.4
Control Delay (s)	8.9	0.0	3.7
Lane LOS	A		A
Approach Delay (s)	8.9	0.0	3.7
Approach LOS	A		

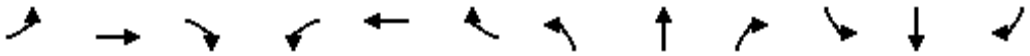
Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	19.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	44	13	120	259	5
Future Volume (Veh/h)	38	44	13	120	259	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	48	14	130	282	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				398	57	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	442	284	287			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	400	235	238			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	94	99			
cM capacity (veh/h)	580	777	1289			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	89	144	287
Volume Left	41	14	0
Volume Right	48	0	5
cSH	672	1289	1700
Volume to Capacity	0.13	0.01	0.17
Queue Length 95th (m)	3.6	0.3	0.0
Control Delay (s)	11.2	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	11.2	0.8	0.0
Approach LOS	B		

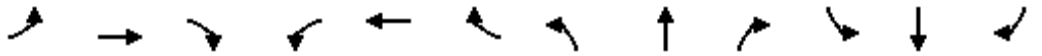
Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	914	10	92	766	7	19	15	200	5	9	11
Future Volume (vph)	19	914	10	92	766	7	19	15	200	5	9	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3603		1805	3534		1804	1613		1802	1732	
Flt Permitted	0.33	1.00		0.23	1.00		0.74	1.00		0.37	1.00	
Satd. Flow (perm)	629	3603		436	3534		1411	1613		709	1732	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	993	11	100	833	8	21	16	217	5	10	12
RTOR Reduction (vph)	0	0	0	0	0	0	0	189	0	0	10	0
Lane Group Flow (vph)	21	1004	0	100	841	0	21	44	0	5	12	0
Confl. Peds. (#/hr)	3		4	4		3	1		3	3		1
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	52.5	49.8		58.3	52.7		10.7	10.7		10.7	10.7	
Effective Green, g (s)	52.5	49.8		58.3	52.7		10.7	10.7		10.7	10.7	
Actuated g/C Ratio	0.64	0.61		0.71	0.64		0.13	0.13		0.13	0.13	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	440	2185		402	2268		183	210		92	225	
v/s Ratio Prot	0.00	c0.28		c0.02	0.24			c0.03			0.01	
v/s Ratio Perm	0.03			0.16			0.01			0.01		
v/c Ratio	0.05	0.46		0.25	0.37		0.11	0.21		0.05	0.05	
Uniform Delay, d1	5.4	8.8		4.4	6.9		31.5	31.9		31.3	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.7		0.3	0.5		0.3	0.5		0.2	0.1	
Delay (s)	5.4	9.5		4.8	7.4		31.8	32.4		31.5	31.4	
Level of Service	A	A		A	A		C	C		C	C	
Approach Delay (s)		9.4			7.1			32.4			31.4	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	11.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	82.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

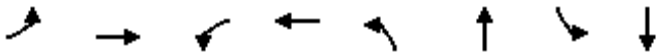
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	176	177	33	67	120	57	54	761	116	65	675	187
Future Volume (vph)	176	177	33	67	120	57	54	761	116	65	675	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1730	1827	1496	1731	1735		1768	3421		1765	3384	
Flt Permitted	0.35	1.00	1.00	0.59	1.00		0.24	1.00		0.23	1.00	
Satd. Flow (perm)	629	1827	1496	1082	1735		444	3421		428	3384	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	191	192	36	73	130	62	59	827	126	71	734	203
RTOR Reduction (vph)	0	0	29	0	17	0	0	8	0	0	16	0
Lane Group Flow (vph)	191	192	7	73	175	0	59	945	0	71	921	0
Confl. Peds. (#/hr)	14		6	6		14	15		35	35		15
Heavy Vehicles (%)	4%	4%	6%	4%	4%	2%	2%	2%	4%	2%	3%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	32.2	22.6	22.6	23.8	18.2		71.6	65.5		72.0	65.7	
Effective Green, g (s)	32.2	22.6	22.6	23.8	18.2		71.6	65.5		72.0	65.7	
Actuated g/C Ratio	0.27	0.19	0.19	0.20	0.15		0.60	0.55		0.60	0.55	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	260	344	281	244	263		332	1867		326	1852	
v/s Ratio Prot	c0.06	0.11		0.01	0.10		0.01	c0.28		c0.01	0.27	
v/s Ratio Perm	c0.14		0.00	0.05			0.10			0.12		
v/c Ratio	0.73	0.56	0.02	0.30	0.67		0.18	0.51		0.22	0.50	
Uniform Delay, d1	37.4	44.2	39.7	40.3	48.0		11.0	17.1		11.1	16.9	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.3	2.0	0.0	0.7	6.2		0.3	1.0		0.3	1.0	
Delay (s)	47.6	46.1	39.7	41.0	54.3		11.3	18.1		11.5	17.8	
Level of Service	D	D	D	D	D		B	B		B	B	
Approach Delay (s)		46.3			50.6			17.7			17.4	
Approach LOS		D			D			B			B	

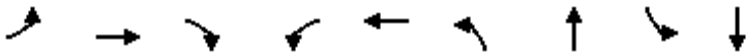
Intersection Summary			
HCM 2000 Control Delay	25.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	75.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	21	1004	100	841	21	233	5	22
v/c Ratio	0.04	0.46	0.23	0.36	0.11	0.58	0.05	0.09
Control Delay	3.2	10.2	4.2	7.4	32.9	12.5	32.6	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	10.2	4.2	7.4	32.9	12.5	32.6	21.7
Queue Length 50th (m)	0.7	43.9	3.3	20.5	3.1	2.3	0.7	1.5
Queue Length 95th (m)	2.5	66.7	8.0	52.0	9.7	22.4	4.0	8.0
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	605	2179	493	2340	515	726	258	640
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.03	0.46	0.20	0.36	0.04	0.32	0.02	0.03

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	191	192	36	73	192	59	953	71	937
v/c Ratio	0.73	0.56	0.10	0.27	0.72	0.16	0.50	0.20	0.49
Control Delay	51.7	50.8	0.5	33.7	58.0	9.7	18.5	10.0	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.7	50.8	0.5	33.7	58.0	9.7	18.5	10.0	17.8
Queue Length 50th (m)	38.5	44.6	0.0	13.7	41.3	4.8	73.6	5.8	70.2
Queue Length 95th (m)	55.7	65.2	0.0	24.0	63.0	11.5	108.3	13.4	103.5
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	262	578	542	275	520	360	1919	354	1915
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.33	0.07	0.27	0.37	0.16	0.50	0.20	0.49

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	904	57	21	775	28	38
Future Volume (Veh/h)	904	57	21	775	28	38
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	983	62	23	842	30	41
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.90	
vC, conflicting volume			1047		1483	524
vC1, stage 1 conf vol					1016	
vC2, stage 2 conf vol					467	
vCu, unblocked vol			1047		1320	524
tC, single (s)			4.1		7.0	7.0
tC, 2 stage (s)					6.0	
tF (s)			2.2		3.6	3.3
p0 queue free %			97		89	92
cM capacity (veh/h)			671		271	494

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	655	390	23	421	421	71
Volume Left	0	0	23	0	0	30
Volume Right	0	62	0	0	0	41
cSH	1700	1700	671	1700	1700	366
Volume to Capacity	0.39	0.23	0.03	0.25	0.25	0.19
Queue Length 95th (m)	0.0	0.0	0.9	0.0	0.0	5.7
Control Delay (s)	0.0	0.0	10.6	0.0	0.0	17.2
Lane LOS			B			C
Approach Delay (s)	0.0		0.3			17.2
Approach LOS						C

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	37.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	44	48	941	63	81	895
Future Volume (Veh/h)	44	48	941	63	81	895
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	52	1023	68	88	973
Pedestrians	28		1			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.84	0.84			0.84	
vC, conflicting volume	1748	574			1119	
vC1, stage 1 conf vol	1085					
vC2, stage 2 conf vol	664					
vCu, unblocked vol	1517	125			771	
tC, single (s)	6.8	7.0			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.4			2.2	
p0 queue free %	83	93			87	
cM capacity (veh/h)	279	733			692	

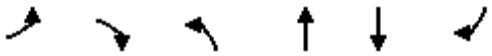
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	100	682	409	88	486	486
Volume Left	48	0	0	88	0	0
Volume Right	52	0	68	0	0	0
cSH	412	1700	1700	692	1700	1700
Volume to Capacity	0.24	0.40	0.24	0.13	0.29	0.29
Queue Length 95th (m)	7.5	0.0	0.0	3.5	0.0	0.0
Control Delay (s)	16.5	0.0	0.0	11.0	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	16.5	0.0		0.9		
Approach LOS	C					

Intersection Summary			
Average Delay	1.2		
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	21	45	9	52	26
Future Volume (Veh/h)	9	21	45	9	52	26
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	23	49	10	57	28
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	196	54			59	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	196	54			59	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			96	
cM capacity (veh/h)	768	1019			1558	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	33	59	85
Volume Left	10	0	57
Volume Right	23	10	0
cSH	927	1700	1558
Volume to Capacity	0.04	0.03	0.04
Queue Length 95th (m)	0.9	0.0	0.9
Control Delay (s)	9.0	0.0	5.1
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	5.1
Approach LOS	A		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	20	35	215	98	13
Future Volume (Veh/h)	19	20	35	215	98	13
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	22	38	234	107	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				398	57	
pX, platoon unblocked	1.00	1.00	1.00			
vC, conflicting volume	424	114	121			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	420	108	116			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	98	97			
cM capacity (veh/h)	576	947	1480			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	43	272	121
Volume Left	21	38	0
Volume Right	22	0	14
cSH	721	1480	1700
Volume to Capacity	0.06	0.03	0.07
Queue Length 95th (m)	1.5	0.6	0.0
Control Delay (s)	10.3	1.2	0.0
Lane LOS	B	A	
Approach Delay (s)	10.3	1.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		

TRAFFMOBILITY

Appendix M

Future (2032) Total Intersection Operation Calculations (Synchro)

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	376	30	203	774	1	37	11	110	4	31	11
Future Volume (vph)	5	376	30	203	774	1	37	11	110	4	31	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.86		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3436		1769	3504		1805	1598		1794	1826	
Flt Permitted	0.34	1.00		0.46	1.00		0.73	1.00		0.67	1.00	
Satd. Flow (perm)	637	3436		856	3504		1381	1598		1270	1826	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	409	33	221	841	1	40	12	120	4	34	12
RTOR Reduction (vph)	0	4	0	0	0	0	0	106	0	0	11	0
Lane Group Flow (vph)	5	438	0	221	842	0	40	26	0	4	35	0
Confl. Peds. (#/hr)	6		3	3		6			8	8		
Heavy Vehicles (%)	0%	4%	0%	2%	3%	0%	0%	0%	1%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	52.6	51.2		63.6	58.2		10.2	10.2		10.2	10.2	
Effective Green, g (s)	52.6	51.2		63.6	58.2		10.2	10.2		10.2	10.2	
Actuated g/C Ratio	0.61	0.60		0.74	0.68		0.12	0.12		0.12	0.12	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	409	2050		723	2376		164	189		150	217	
v/s Ratio Prot	0.00	0.13		c0.03	c0.24			0.02			0.02	
v/s Ratio Perm	0.01			0.20			c0.03			0.00		
v/c Ratio	0.01	0.21		0.31	0.35		0.24	0.14		0.03	0.16	
Uniform Delay, d1	6.4	8.0		3.4	5.8		34.3	33.9		33.4	34.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.2		0.2	0.4		0.8	0.3		0.1	0.4	
Delay (s)	6.5	8.2		3.6	6.3		35.1	34.2		33.5	34.3	
Level of Service	A	A		A	A		D	C		C	C	
Approach Delay (s)		8.2			5.7			34.4			34.3	
Approach LOS		A			A			C			C	

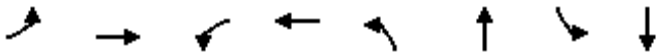
Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.35		
Actuated Cycle Length (s)	85.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	212	22	120	163	76	49	676	157	73	453	105
Future Volume (vph)	88	212	22	120	163	76	49	676	157	73	453	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1732	1881	1481	1777	1796		1751	3329		1761	3353	
Flt Permitted	0.31	1.00	1.00	0.37	1.00		0.39	1.00		0.24	1.00	
Satd. Flow (perm)	560	1881	1481	690	1796		714	3329		450	3353	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	230	24	130	177	83	53	735	171	79	492	114
RTOR Reduction (vph)	0	0	20	0	16	0	0	13	0	0	13	0
Lane Group Flow (vph)	96	230	4	130	244	0	53	893	0	79	593	0
Confl. Peds. (#/hr)	11		25	25		11	6		57	57		6
Heavy Vehicles (%)	4%	1%	5%	1%	0%	0%	3%	3%	2%	2%	5%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	29.2	21.4	21.4	29.6	21.6		70.0	64.0		71.2	64.6	
Effective Green, g (s)	29.2	21.4	21.4	29.6	21.6		70.0	64.0		71.2	64.6	
Actuated g/C Ratio	0.24	0.18	0.18	0.25	0.18		0.58	0.53		0.59	0.54	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	212	335	264	242	323		468	1775		339	1805	
v/s Ratio Prot	0.03	0.12		c0.04	c0.14		0.01	c0.27		c0.01	0.18	
v/s Ratio Perm	0.08		0.00	0.10			0.06			0.13		
v/c Ratio	0.45	0.69	0.02	0.54	0.75		0.11	0.50		0.23	0.33	
Uniform Delay, d1	36.9	46.2	40.6	37.1	46.7		10.9	17.9		11.4	15.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	5.7	0.0	2.3	9.6		0.1	1.0		0.4	0.5	
Delay (s)	38.4	51.9	40.7	39.4	56.3		11.0	18.9		11.8	16.0	
Level of Service	D	D	D	D	E		B	B		B	B	
Approach Delay (s)		47.4			50.6			18.4			15.5	
Approach LOS		D			D			B			B	

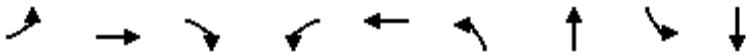
Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	442	221	842	40	132	4	46
v/c Ratio	0.01	0.22	0.30	0.34	0.24	0.44	0.03	0.20
Control Delay	2.8	8.6	3.9	5.7	36.9	13.5	32.8	28.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	8.6	3.9	5.7	36.9	13.5	32.8	28.5
Queue Length 50th (m)	0.2	16.3	7.9	20.7	6.1	1.8	0.6	5.1
Queue Length 95th (m)	0.9	25.7	14.1	48.1	15.8	17.9	3.6	15.2
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	603	2003	754	2472	485	638	446	649
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.22	0.29	0.34	0.08	0.21	0.01	0.07

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	96	230	24	130	260	53	906	79	606
v/c Ratio	0.43	0.68	0.07	0.51	0.76	0.11	0.50	0.22	0.33
Control Delay	36.2	56.0	0.4	38.7	57.4	10.2	19.8	11.1	16.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	56.0	0.4	38.7	57.4	10.2	19.8	11.1	16.6
Queue Length 50th (m)	17.7	53.9	0.0	24.4	57.3	4.6	71.8	6.9	41.5
Queue Length 95th (m)	29.0	75.5	0.0	37.5	81.4	11.4	107.6	15.6	64.2
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	224	548	502	253	537	505	1810	367	1838
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.42	0.05	0.51	0.48	0.10	0.50	0.22	0.33

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	396	26	16	810	51	20
Future Volume (Veh/h)	396	26	16	810	51	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	430	28	17	880	55	22
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.91	
vC, conflicting volume			459		919	230
vC1, stage 1 conf vol					445	
vC2, stage 2 conf vol					474	
vCu, unblocked vol			459		718	230
tC, single (s)			4.1		6.8	7.0
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.4
p0 queue free %			98		90	97
cM capacity (veh/h)			1112		535	760

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	287	171	17	440	440	77
Volume Left	0	0	17	0	0	55
Volume Right	0	28	0	0	0	22
cSH	1700	1700	1112	1700	1700	584
Volume to Capacity	0.17	0.10	0.02	0.26	0.26	0.13
Queue Length 95th (m)	0.0	0.0	0.4	0.0	0.0	3.6
Control Delay (s)	0.0	0.0	8.3	0.0	0.0	12.1
Lane LOS			A			B
Approach Delay (s)	0.0		0.2			12.1
Approach LOS						B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	33.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	57	48	822	39	26	595
Future Volume (Veh/h)	57	48	822	39	26	595
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	52	893	42	28	647
Pedestrians	7					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.86	0.86			0.86	
vC, conflicting volume	1300	474			942	
vC1, stage 1 conf vol	921					
vC2, stage 2 conf vol	380					
vCu, unblocked vol	1022	61			605	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.3	
p0 queue free %	84	94			96	
cM capacity (veh/h)	397	853			799	

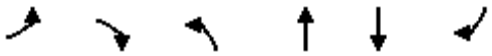
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	114	595	340	28	324	324
Volume Left	62	0	0	28	0	0
Volume Right	52	0	42	0	0	0
cSH	525	1700	1700	799	1700	1700
Volume to Capacity	0.22	0.35	0.20	0.04	0.19	0.19
Queue Length 95th (m)	6.5	0.0	0.0	0.9	0.0	0.0
Control Delay (s)	13.7	0.0	0.0	9.7	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	13.7	0.0		0.4		
Approach LOS	B					

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	46	25	4	21	21
Future Volume (Veh/h)	18	46	25	4	21	21
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	50	27	4	23	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	98	29			31	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	98	29			31	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	95			99	
cM capacity (veh/h)	893	1052			1595	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	70	31	46
Volume Left	20	0	23
Volume Right	50	4	0
cSH	1001	1700	1595
Volume to Capacity	0.07	0.02	0.01
Queue Length 95th (m)	1.8	0.0	0.4
Control Delay (s)	8.9	0.0	3.7
Lane LOS	A		A
Approach Delay (s)	8.9	0.0	3.7
Approach LOS	A		

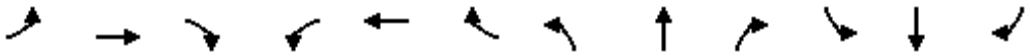
Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	19.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	44	13	120	259	5
Future Volume (Veh/h)	38	44	13	120	259	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	48	14	130	282	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				398	57	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	442	284	287			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	400	235	238			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	94	99			
cM capacity (veh/h)	580	777	1289			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	89	144	287
Volume Left	41	14	0
Volume Right	48	0	5
cSH	672	1289	1700
Volume to Capacity	0.13	0.01	0.17
Queue Length 95th (m)	3.6	0.3	0.0
Control Delay (s)	11.2	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	11.2	0.8	0.0
Approach LOS	B		

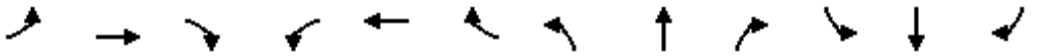
Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	1064	10	92	892	7	19	15	200	5	9	11
Future Volume (vph)	19	1064	10	92	892	7	19	15	200	5	9	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3604		1805	3535		1804	1613		1802	1732	
Flt Permitted	0.28	1.00		0.18	1.00		0.74	1.00		0.37	1.00	
Satd. Flow (perm)	524	3604		341	3535		1411	1613		709	1732	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	1157	11	100	970	8	21	16	217	5	10	12
RTOR Reduction (vph)	0	0	0	0	0	0	0	189	0	0	10	0
Lane Group Flow (vph)	21	1168	0	100	978	0	21	44	0	5	12	0
Confl. Peds. (#/hr)	3		4	4		3	1		3	3		1
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	52.5	49.8		58.3	52.7		10.7	10.7		10.7	10.7	
Effective Green, g (s)	52.5	49.8		58.3	52.7		10.7	10.7		10.7	10.7	
Actuated g/C Ratio	0.64	0.61		0.71	0.64		0.13	0.13		0.13	0.13	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	377	2186		342	2269		183	210		92	225	
v/s Ratio Prot	0.00	c0.32		c0.02	0.28			c0.03			0.01	
v/s Ratio Perm	0.03			0.19			0.01			0.01		
v/c Ratio	0.06	0.53		0.29	0.43		0.11	0.21		0.05	0.05	
Uniform Delay, d1	5.5	9.4		5.1	7.3		31.5	31.9		31.3	31.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.9		0.5	0.6		0.3	0.5		0.2	0.1	
Delay (s)	5.5	10.3		5.6	7.9		31.8	32.4		31.5	31.4	
Level of Service	A	B		A	A		C	C		C	C	
Approach Delay (s)		10.3			7.7			32.4			31.4	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	11.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	82.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

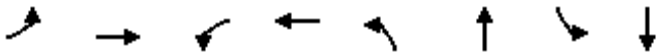
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	176	177	33	67	120	57	54	837	116	65	743	187
Future Volume (vph)	176	177	33	67	120	57	54	837	116	65	743	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1730	1827	1496	1731	1735		1769	3430		1766	3393	
Flt Permitted	0.35	1.00	1.00	0.59	1.00		0.21	1.00		0.20	1.00	
Satd. Flow (perm)	629	1827	1496	1082	1735		394	3430		374	3393	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	191	192	36	73	130	62	59	910	126	71	808	203
RTOR Reduction (vph)	0	0	29	0	17	0	0	7	0	0	14	0
Lane Group Flow (vph)	191	192	7	73	175	0	59	1029	0	71	997	0
Confl. Peds. (#/hr)	14		6	6		14	15		35	35		15
Heavy Vehicles (%)	4%	4%	6%	4%	4%	2%	2%	2%	4%	2%	3%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	32.2	22.6	22.6	23.8	18.2		71.6	65.5		72.0	65.7	
Effective Green, g (s)	32.2	22.6	22.6	23.8	18.2		71.6	65.5		72.0	65.7	
Actuated g/C Ratio	0.27	0.19	0.19	0.20	0.15		0.60	0.55		0.60	0.55	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	260	344	281	244	263		304	1872		297	1857	
v/s Ratio Prot	c0.06	0.11		0.01	0.10		0.01	c0.30		c0.01	0.29	
v/s Ratio Perm	c0.14		0.00	0.05			0.11			0.13		
v/c Ratio	0.73	0.56	0.02	0.30	0.67		0.19	0.55		0.24	0.54	
Uniform Delay, d1	37.4	44.2	39.7	40.3	48.0		11.4	17.7		11.5	17.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.3	2.0	0.0	0.7	6.2		0.3	1.2		0.4	1.1	
Delay (s)	47.6	46.1	39.7	41.0	54.3		11.7	18.8		12.0	18.5	
Level of Service	D	D	D	D	D		B	B		B	B	
Approach Delay (s)		46.3			50.6			18.5			18.1	
Approach LOS		D			D			B			B	

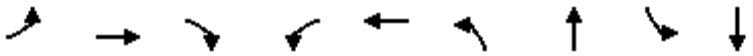
Intersection Summary			
HCM 2000 Control Delay	25.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.60		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	21	1168	100	978	21	233	5	22
v/c Ratio	0.04	0.54	0.26	0.42	0.11	0.58	0.05	0.09
Control Delay	3.2	11.0	4.8	7.9	32.9	12.5	32.6	21.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.2	11.0	4.8	7.9	32.9	12.5	32.6	21.7
Queue Length 50th (m)	0.7	54.5	3.3	25.3	3.1	2.3	0.7	1.5
Queue Length 95th (m)	2.5	82.0	8.0	63.0	9.7	22.4	4.0	8.0
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	543	2182	435	2340	515	726	258	640
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.54	0.23	0.42	0.04	0.32	0.02	0.03

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	191	192	36	73	192	59	1036	71	1011
v/c Ratio	0.73	0.56	0.10	0.27	0.72	0.18	0.54	0.22	0.53
Control Delay	51.7	50.8	0.5	33.7	58.0	9.9	19.3	10.3	18.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.7	50.8	0.5	33.7	58.0	9.9	19.3	10.3	18.6
Queue Length 50th (m)	38.5	44.6	0.0	13.7	41.3	4.8	82.9	5.8	78.7
Queue Length 95th (m)	55.7	65.2	0.0	24.0	63.0	11.5	121.4	13.4	114.8
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	262	578	542	275	520	332	1925	323	1917
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.33	0.07	0.27	0.37	0.18	0.54	0.22	0.53

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1052	57	21	903	28	38
Future Volume (Veh/h)	1052	57	21	903	28	38
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1143	62	23	982	30	41
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.87	
vC, conflicting volume			1207		1713	604
vC1, stage 1 conf vol					1176	
vC2, stage 2 conf vol					537	
vCu, unblocked vol			1207		1521	604
tC, single (s)			4.1		7.0	7.0
tC, 2 stage (s)					6.0	
tF (s)			2.2		3.6	3.3
p0 queue free %			96		87	91
cM capacity (veh/h)			584		222	438

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	762	443	23	491	491	71
Volume Left	0	0	23	0	0	30
Volume Right	0	62	0	0	0	41
cSH	1700	1700	584	1700	1700	311
Volume to Capacity	0.45	0.26	0.04	0.29	0.29	0.23
Queue Length 95th (m)	0.0	0.0	1.0	0.0	0.0	6.9
Control Delay (s)	0.0	0.0	11.4	0.0	0.0	20.0
Lane LOS			B			C
Approach Delay (s)	0.0		0.3			20.0
Approach LOS						C

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	41.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	44	48	1036	63	81	986
Future Volume (Veh/h)	44	48	1036	63	81	986
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	52	1126	68	88	1072
Pedestrians	28		1			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.82	0.82			0.82	
vC, conflicting volume	1901	625			1222	
vC1, stage 1 conf vol	1188					
vC2, stage 2 conf vol	713					
vCu, unblocked vol	1659	102			831	
tC, single (s)	6.8	7.0			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.4			2.2	
p0 queue free %	81	93			86	
cM capacity (veh/h)	252	737			638	

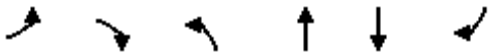
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	100	751	443	88	536	536
Volume Left	48	0	0	88	0	0
Volume Right	52	0	68	0	0	0
cSH	383	1700	1700	638	1700	1700
Volume to Capacity	0.26	0.44	0.26	0.14	0.32	0.32
Queue Length 95th (m)	8.2	0.0	0.0	3.8	0.0	0.0
Control Delay (s)	17.7	0.0	0.0	11.5	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	17.7	0.0		0.9		
Approach LOS	C					

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	50.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	21	45	9	52	26
Future Volume (Veh/h)	9	21	45	9	52	26
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	23	49	10	57	28
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	196	54			59	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	196	54			59	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			96	
cM capacity (veh/h)	768	1019			1558	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	33	59	85
Volume Left	10	0	57
Volume Right	23	10	0
cSH	927	1700	1558
Volume to Capacity	0.04	0.03	0.04
Queue Length 95th (m)	0.9	0.0	0.9
Control Delay (s)	9.0	0.0	5.1
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	5.1
Approach LOS	A		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		



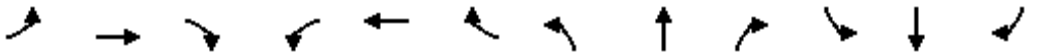
Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	20	35	215	98	13
Future Volume (Veh/h)	19	20	35	215	98	13
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	22	38	234	107	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				398	57	
pX, platoon unblocked	1.00	1.00	1.00			
vC, conflicting volume	424	114	121			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	420	108	116			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	98	97			
cM capacity (veh/h)	576	947	1480			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	43	272	121
Volume Left	21	38	0
Volume Right	22	0	14
cSH	721	1480	1700
Volume to Capacity	0.06	0.03	0.07
Queue Length 95th (m)	1.5	0.6	0.0
Control Delay (s)	10.3	1.2	0.0
Lane LOS	B	A	
Approach Delay (s)	10.3	1.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix N

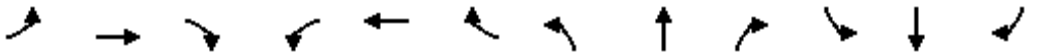
Future (2037) Total Intersection Operation Calculations (Synchro)



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	5	438	30	203	905	1	37	11	110	4	31	11
Future Volume (vph)	5	438	30	203	905	1	37	11	110	4	31	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.99		1.00	1.00		1.00	0.86		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1804	3441		1769	3504		1805	1598		1794	1826	
Flt Permitted	0.29	1.00		0.43	1.00		0.73	1.00		0.67	1.00	
Satd. Flow (perm)	553	3441		801	3504		1381	1598		1270	1826	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	5	476	33	221	984	1	40	12	120	4	34	12
RTOR Reduction (vph)	0	4	0	0	0	0	0	106	0	0	11	0
Lane Group Flow (vph)	5	505	0	221	985	0	40	26	0	4	35	0
Confl. Peds. (#/hr)	6		3	3		6			8	8		
Heavy Vehicles (%)	0%	4%	0%	2%	3%	0%	0%	0%	1%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	52.6	51.2		63.6	58.2		10.2	10.2		10.2	10.2	
Effective Green, g (s)	52.6	51.2		63.6	58.2		10.2	10.2		10.2	10.2	
Actuated g/C Ratio	0.61	0.60		0.74	0.68		0.12	0.12		0.12	0.12	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	359	2053		688	2376		164	189		150	217	
v/s Ratio Prot	0.00	0.15		c0.03	c0.28			0.02			0.02	
v/s Ratio Perm	0.01			0.21			c0.03			0.00		
v/c Ratio	0.01	0.25		0.32	0.41		0.24	0.14		0.03	0.16	
Uniform Delay, d1	6.4	8.2		3.4	6.2		34.3	33.9		33.4	34.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.0	0.3		0.3	0.5		0.8	0.3		0.1	0.4	
Delay (s)	6.5	8.5		3.7	6.7		35.1	34.2		33.5	34.3	
Level of Service	A	A		A	A		D	C		C	C	
Approach Delay (s)		8.4			6.2			34.4			34.3	
Approach LOS		A			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	10.0	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	85.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	76.9%	ICU Level of Service	D
Analysis Period (min)	15		

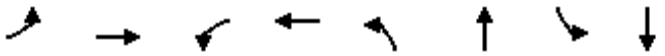
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	88	212	22	120	163	76	49	743	157	73	496	105
Future Volume (vph)	88	212	22	120	163	76	49	743	157	73	496	105
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.96	1.00	0.99		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	0.99	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1732	1881	1481	1777	1796		1751	3342		1763	3359	
Flt Permitted	0.31	1.00	1.00	0.37	1.00		0.36	1.00		0.22	1.00	
Satd. Flow (perm)	560	1881	1481	690	1796		669	3342		400	3359	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	96	230	24	130	177	83	53	808	171	79	539	114
RTOR Reduction (vph)	0	0	20	0	16	0	0	12	0	0	12	0
Lane Group Flow (vph)	96	230	4	130	244	0	53	967	0	79	641	0
Confl. Peds. (#/hr)	11		25	25		11	6		57	57		6
Heavy Vehicles (%)	4%	1%	5%	1%	0%	0%	3%	3%	2%	2%	5%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	29.2	21.4	21.4	29.6	21.6		70.0	64.0		71.2	64.6	
Effective Green, g (s)	29.2	21.4	21.4	29.6	21.6		70.0	64.0		71.2	64.6	
Actuated g/C Ratio	0.24	0.18	0.18	0.25	0.18		0.58	0.53		0.59	0.54	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	212	335	264	242	323		444	1782		312	1808	
v/s Ratio Prot	0.03	0.12		c0.04	c0.14		0.01	c0.29		c0.01	0.19	
v/s Ratio Perm	0.08		0.00	0.10			0.06			0.14		
v/c Ratio	0.45	0.69	0.02	0.54	0.75		0.12	0.54		0.25	0.35	
Uniform Delay, d1	36.9	46.2	40.6	37.1	46.7		10.9	18.4		11.8	15.8	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.5	5.7	0.0	2.3	9.6		0.1	1.2		0.4	0.5	
Delay (s)	38.4	51.9	40.7	39.4	56.3		11.1	19.6		12.2	16.4	
Level of Service	D	D	D	D	E		B	B		B	B	
Approach Delay (s)		47.4			50.6			19.1			15.9	
Approach LOS		D			D			B			B	

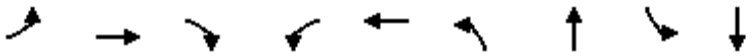
Intersection Summary			
HCM 2000 Control Delay	27.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.57		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	76.8%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	5	509	221	985	40	132	4	46
v/c Ratio	0.01	0.25	0.32	0.40	0.24	0.44	0.03	0.20
Control Delay	2.8	8.9	4.1	6.2	36.9	13.5	32.8	28.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	2.8	8.9	4.1	6.2	36.9	13.5	32.8	28.5
Queue Length 50th (m)	0.2	19.3	7.9	25.6	6.1	1.8	0.6	5.1
Queue Length 95th (m)	0.9	29.9	14.1	58.8	15.8	17.9	3.6	15.2
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	553	2004	720	2472	485	638	446	649
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.01	0.25	0.31	0.40	0.08	0.21	0.01	0.07

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	96	230	24	130	260	53	979	79	653
v/c Ratio	0.43	0.68	0.07	0.51	0.76	0.11	0.54	0.24	0.35
Control Delay	36.2	56.0	0.4	38.7	57.4	10.3	20.6	11.3	17.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.2	56.0	0.4	38.7	57.4	10.3	20.6	11.3	17.0
Queue Length 50th (m)	17.7	53.9	0.0	24.4	57.3	4.6	80.4	6.9	46.0
Queue Length 95th (m)	29.0	75.5	0.0	37.5	81.4	11.4	119.7	15.6	70.3
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	224	548	502	253	537	481	1816	340	1840
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.43	0.42	0.05	0.51	0.48	0.11	0.54	0.23	0.35

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	461	26	16	945	51	20
Future Volume (Veh/h)	461	26	16	945	51	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	501	28	17	1027	55	22
Pedestrians					1	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.88	
vC, conflicting volume			530		1064	266
vC1, stage 1 conf vol					516	
vC2, stage 2 conf vol					548	
vCu, unblocked vol			530		800	266
tC, single (s)			4.1		6.8	7.0
tC, 2 stage (s)					5.8	
tF (s)			2.2		3.5	3.4
p0 queue free %			98		89	97
cM capacity (veh/h)			1047		494	720

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	334	195	17	514	514	77
Volume Left	0	0	17	0	0	55
Volume Right	0	28	0	0	0	22
cSH	1700	1700	1047	1700	1700	543
Volume to Capacity	0.20	0.11	0.02	0.30	0.30	0.14
Queue Length 95th (m)	0.0	0.0	0.4	0.0	0.0	3.9
Control Delay (s)	0.0	0.0	8.5	0.0	0.0	12.7
Lane LOS			A			B
Approach Delay (s)	0.0		0.1			12.7
Approach LOS						B

Intersection Summary			
Average Delay	0.7		
Intersection Capacity Utilization	36.8%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	57	48	904	39	26	653
Future Volume (Veh/h)	57	48	904	39	26	653
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	62	52	983	42	28	710
Pedestrians	7					
Lane Width (m)	3.6					
Walking Speed (m/s)	1.2					
Percent Blockage	1					
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.84	0.84			0.84	
vC, conflicting volume	1422	520			1032	
vC1, stage 1 conf vol	1011					
vC2, stage 2 conf vol	411					
vCu, unblocked vol	1113	34			647	
tC, single (s)	6.8	6.9			4.2	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.3			2.3	
p0 queue free %	83	94			96	
cM capacity (veh/h)	367	863			750	

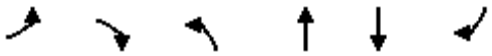
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	114	655	370	28	355	355
Volume Left	62	0	0	28	0	0
Volume Right	52	0	42	0	0	0
cSH	498	1700	1700	750	1700	1700
Volume to Capacity	0.23	0.39	0.22	0.04	0.21	0.21
Queue Length 95th (m)	7.0	0.0	0.0	0.9	0.0	0.0
Control Delay (s)	14.4	0.0	0.0	10.0	0.0	0.0
Lane LOS	B			A		
Approach Delay (s)	14.4	0.0		0.4		
Approach LOS	B					

Intersection Summary			
Average Delay	1.0		
Intersection Capacity Utilization	39.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	18	46	25	4	21	21
Future Volume (Veh/h)	18	46	25	4	21	21
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	20	50	27	4	23	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	98	29			31	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	98	29			31	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	95			99	
cM capacity (veh/h)	893	1052			1595	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	70	31	46
Volume Left	20	0	23
Volume Right	50	4	0
cSH	1001	1700	1595
Volume to Capacity	0.07	0.02	0.01
Queue Length 95th (m)	1.8	0.0	0.4
Control Delay (s)	8.9	0.0	3.7
Lane LOS	A		A
Approach Delay (s)	8.9	0.0	3.7
Approach LOS	A		

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	19.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	44	13	120	259	5
Future Volume (Veh/h)	38	44	13	120	259	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	41	48	14	130	282	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				398	57	
pX, platoon unblocked	0.96	0.96	0.96			
vC, conflicting volume	442	284	287			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	400	235	238			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	93	94	99			
cM capacity (veh/h)	580	777	1289			

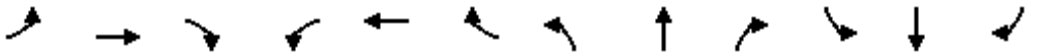
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	89	144	287
Volume Left	41	14	0
Volume Right	48	0	5
cSH	672	1289	1700
Volume to Capacity	0.13	0.01	0.17
Queue Length 95th (m)	3.6	0.3	0.0
Control Delay (s)	11.2	0.8	0.0
Lane LOS	B	A	
Approach Delay (s)	11.2	0.8	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.1		
Intersection Capacity Utilization	28.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	1245	10	92	1045	7	19	15	200	5	9	11
Future Volume (vph)	19	1245	10	92	1045	7	19	15	200	5	9	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00		1.00	0.86		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3605		1805	3535		1804	1612		1802	1732	
Flt Permitted	0.22	1.00		0.13	1.00		0.74	1.00		0.37	1.00	
Satd. Flow (perm)	417	3605		244	3535		1410	1612		703	1732	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	21	1353	11	100	1136	8	21	16	217	5	10	12
RTOR Reduction (vph)	0	0	0	0	0	0	0	178	0	0	10	0
Lane Group Flow (vph)	21	1364	0	100	1144	0	21	55	0	5	12	0
Confl. Peds. (#/hr)	3		4	4		3	1		3	3		1
Heavy Vehicles (%)	0%	0%	0%	0%	2%	0%	0%	0%	0%	0%	0%	0%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	5	2		1	6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	52.6	49.9		58.8	53.0		10.8	10.8		10.8	10.8	
Effective Green, g (s)	52.6	49.9		58.8	53.0		10.8	10.8		10.8	10.8	
Actuated g/C Ratio	0.64	0.60		0.71	0.64		0.13	0.13		0.13	0.13	
Clearance Time (s)	4.0	6.0		4.0	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	311	2180		283	2270		184	211		92	226	
v/s Ratio Prot	0.00	c0.38		c0.02	0.32			c0.03			0.01	
v/s Ratio Perm	0.04			0.23			0.01			0.01		
v/c Ratio	0.07	0.63		0.35	0.50		0.11	0.26		0.05	0.05	
Uniform Delay, d1	5.7	10.4		6.5	7.8		31.6	32.3		31.4	31.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	1.4		0.8	0.8		0.3	0.7		0.2	0.1	
Delay (s)	5.8	11.7		7.3	8.6		31.9	32.9		31.6	31.5	
Level of Service	A	B		A	A		C	C		C	C	
Approach Delay (s)		11.6			8.5			32.8			31.5	
Approach LOS		B			A			C			C	

Intersection Summary			
HCM 2000 Control Delay	12.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.54		
Actuated Cycle Length (s)	82.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

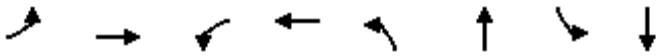
c Critical Lane Group



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	176	177	33	67	120	57	54	921	116	65	818	187
Future Volume (vph)	176	177	33	67	120	57	54	921	116	65	818	187
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.95		1.00	0.98		1.00	0.97	
Flt Protected	0.95	1.00	1.00	0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1730	1827	1496	1731	1735		1769	3439		1767	3401	
Flt Permitted	0.35	1.00	1.00	0.59	1.00		0.18	1.00		0.17	1.00	
Satd. Flow (perm)	629	1827	1496	1082	1735		344	3439		320	3401	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	191	192	36	73	130	62	59	1001	126	71	889	203
RTOR Reduction (vph)	0	0	29	0	17	0	0	6	0	0	12	0
Lane Group Flow (vph)	191	192	7	73	175	0	59	1121	0	71	1080	0
Confl. Peds. (#/hr)	14		6	6		14	15		35	35		15
Heavy Vehicles (%)	4%	4%	6%	4%	4%	2%	2%	2%	4%	2%	3%	1%
Turn Type	pm+pt	NA	Perm	pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	32.2	22.6	22.6	23.8	18.2		71.6	65.5		72.0	65.7	
Effective Green, g (s)	32.2	22.6	22.6	23.8	18.2		71.6	65.5		72.0	65.7	
Actuated g/C Ratio	0.27	0.19	0.19	0.20	0.15		0.60	0.55		0.60	0.55	
Clearance Time (s)	4.0	6.0	6.0	4.0	6.0		4.0	6.0		4.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	260	344	281	244	263		277	1877		267	1862	
v/s Ratio Prot	c0.06	0.11		0.01	0.10		0.01	c0.33		c0.01	0.32	
v/s Ratio Perm	c0.14		0.00	0.05			0.12			0.15		
v/c Ratio	0.73	0.56	0.02	0.30	0.67		0.21	0.60		0.27	0.58	
Uniform Delay, d1	37.4	44.2	39.7	40.3	48.0		11.9	18.4		12.2	18.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	10.3	2.0	0.0	0.7	6.2		0.4	1.4		0.5	1.3	
Delay (s)	47.6	46.1	39.7	41.0	54.3		12.2	19.8		12.7	19.3	
Level of Service	D	D	D	D	D		B	B		B	B	
Approach Delay (s)		46.3			50.6			19.4			18.9	
Approach LOS		D			D			B			B	

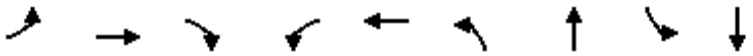
Intersection Summary			
HCM 2000 Control Delay	25.7	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.64		
Actuated Cycle Length (s)	120.0	Sum of lost time (s)	20.0
Intersection Capacity Utilization	79.0%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group



Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	21	1364	100	1144	21	233	5	22
v/c Ratio	0.05	0.63	0.31	0.49	0.11	0.59	0.05	0.09
Control Delay	3.4	12.7	5.6	8.7	32.9	14.0	32.6	21.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	3.4	12.7	5.6	8.7	32.9	14.0	32.6	21.8
Queue Length 50th (m)	0.7	69.2	3.3	31.7	3.1	4.1	0.7	1.5
Queue Length 95th (m)	2.6	109.0	8.3	79.6	9.7	25.2	4.0	8.2
Internal Link Dist (m)		182.3		310.7		32.8		265.6
Turn Bay Length (m)	50.0		25.0		20.0		25.0	
Base Capacity (vph)	476	2174	376	2339	513	717	255	638
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.04	0.63	0.27	0.49	0.04	0.32	0.02	0.03

Intersection Summary



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	191	192	36	73	192	59	1127	71	1092
v/c Ratio	0.73	0.56	0.10	0.27	0.72	0.19	0.58	0.24	0.57
Control Delay	51.7	50.8	0.5	33.7	58.0	10.2	20.3	10.6	19.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	51.7	50.8	0.5	33.7	58.0	10.2	20.3	10.6	19.5
Queue Length 50th (m)	38.5	44.6	0.0	13.7	41.3	4.8	94.1	5.8	88.5
Queue Length 95th (m)	55.7	65.2	0.0	24.0	63.0	11.5	136.7	13.4	128.5
Internal Link Dist (m)		330.5			125.6		632.1		185.9
Turn Bay Length (m)	30.0			75.0		95.0		180.0	
Base Capacity (vph)	262	578	542	275	520	304	1928	293	1920
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.33	0.07	0.27	0.37	0.19	0.58	0.24	0.57

Intersection Summary

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	1231	57	21	1057	28	38
Future Volume (Veh/h)	1231	57	21	1057	28	38
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	1338	62	23	1149	30	41
Pedestrians					2	
Lane Width (m)					3.6	
Walking Speed (m/s)					1.2	
Percent Blockage					0	
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)				206		
pX, platoon unblocked					0.83	
vC, conflicting volume			1402		1992	702
vC1, stage 1 conf vol					1371	
vC2, stage 2 conf vol					620	
vCu, unblocked vol			1402		1781	702
tC, single (s)			4.1		7.0	7.0
tC, 2 stage (s)					6.0	
tF (s)			2.2		3.6	3.3
p0 queue free %			95		83	89
cM capacity (veh/h)			493		175	378

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	NB 1
Volume Total	892	508	23	574	574	71
Volume Left	0	0	23	0	0	30
Volume Right	0	62	0	0	0	41
cSH	1700	1700	493	1700	1700	253
Volume to Capacity	0.52	0.30	0.05	0.34	0.34	0.28
Queue Length 95th (m)	0.0	0.0	1.2	0.0	0.0	8.9
Control Delay (s)	0.0	0.0	12.7	0.0	0.0	24.7
Lane LOS			B			C
Approach Delay (s)	0.0		0.2			24.7
Approach LOS						C

Intersection Summary			
Average Delay	0.8		
Intersection Capacity Utilization	46.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	44	48	1140	63	81	1086
Future Volume (Veh/h)	44	48	1140	63	81	1086
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	48	52	1239	68	88	1180
Pedestrians	28		1			
Lane Width (m)	3.6		3.6			
Walking Speed (m/s)	1.2		1.2			
Percent Blockage	2		0			
Right turn flare (veh)						
Median type			TWLTL			TWLTL
Median storage veh)			2			2
Upstream signal (m)			210			
pX, platoon unblocked	0.79	0.79			0.79	
vC, conflicting volume	2068	682			1335	
vC1, stage 1 conf vol	1301					
vC2, stage 2 conf vol	767					
vCu, unblocked vol	1822	70			896	
tC, single (s)	6.8	7.0			4.1	
tC, 2 stage (s)	5.8					
tF (s)	3.5	3.4			2.2	
p0 queue free %	79	93			85	
cM capacity (veh/h)	225	746			582	

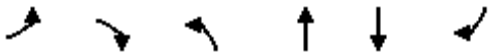
Direction, Lane #	WB 1	NB 1	NB 2	SB 1	SB 2	SB 3
Volume Total	100	826	481	88	590	590
Volume Left	48	0	0	88	0	0
Volume Right	52	0	68	0	0	0
cSH	354	1700	1700	582	1700	1700
Volume to Capacity	0.28	0.49	0.28	0.15	0.35	0.35
Queue Length 95th (m)	9.1	0.0	0.0	4.2	0.0	0.0
Control Delay (s)	19.1	0.0	0.0	12.3	0.0	0.0
Lane LOS	C			B		
Approach Delay (s)	19.1	0.0		0.9		
Approach LOS	C					

Intersection Summary			
Average Delay	1.1		
Intersection Capacity Utilization	53.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	9	21	45	9	52	26
Future Volume (Veh/h)	9	21	45	9	52	26
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	23	49	10	57	28
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	196	54			59	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	196	54			59	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	98			96	
cM capacity (veh/h)	768	1019			1558	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	33	59	85
Volume Left	10	0	57
Volume Right	23	10	0
cSH	927	1700	1558
Volume to Capacity	0.04	0.03	0.04
Queue Length 95th (m)	0.9	0.0	0.9
Control Delay (s)	9.0	0.0	5.1
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	5.1
Approach LOS	A		

Intersection Summary			
Average Delay	4.1		
Intersection Capacity Utilization	20.9%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	20	35	215	98	13
Future Volume (Veh/h)	19	20	35	215	98	13
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	21	22	38	234	107	14
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				398	57	
pX, platoon unblocked	1.00	1.00	1.00			
vC, conflicting volume	424	114	121			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	420	108	115			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	98	97			
cM capacity (veh/h)	576	947	1480			

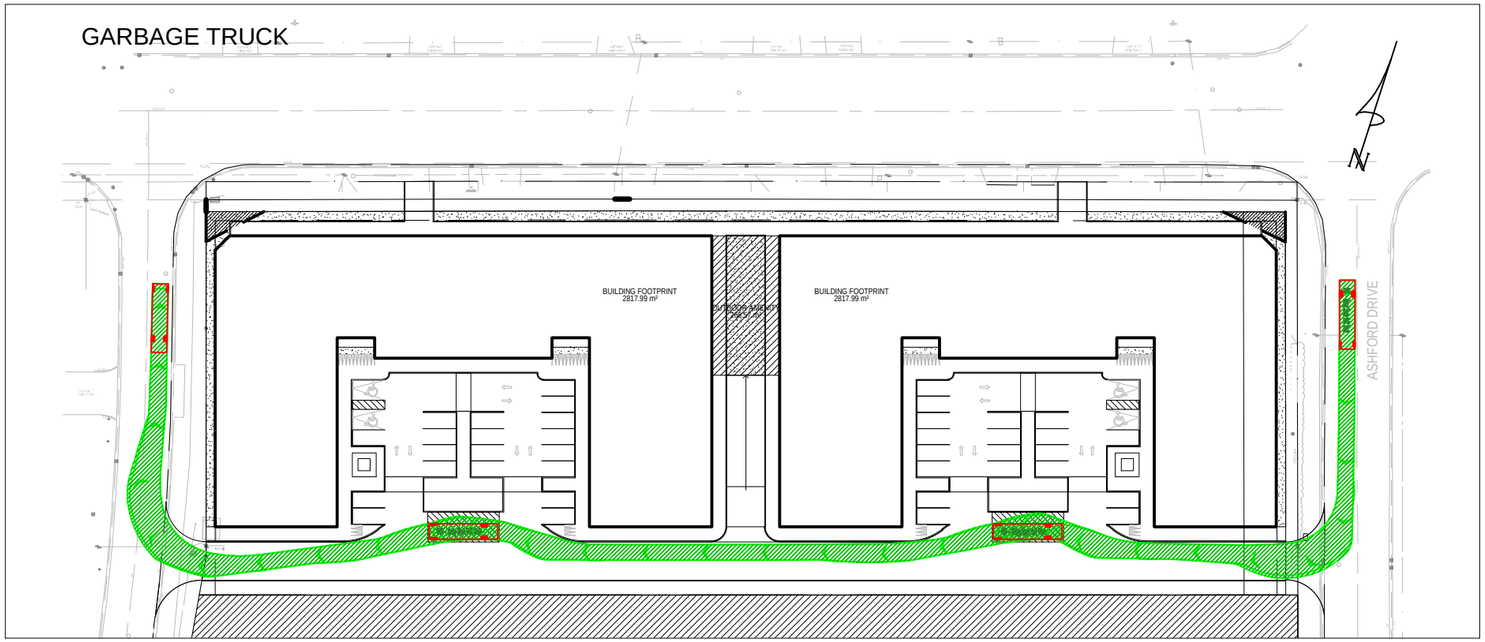
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	43	272	121
Volume Left	21	38	0
Volume Right	22	0	14
cSH	721	1480	1700
Volume to Capacity	0.06	0.03	0.07
Queue Length 95th (m)	1.5	0.6	0.0
Control Delay (s)	10.3	1.2	0.0
Lane LOS	B	A	
Approach Delay (s)	10.3	1.2	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	1.8		
Intersection Capacity Utilization	29.9%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix O

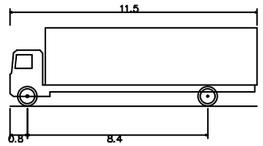
Vehicle Manoeuvring Diagrams

GARBAGE TRUCK



LEGEND:

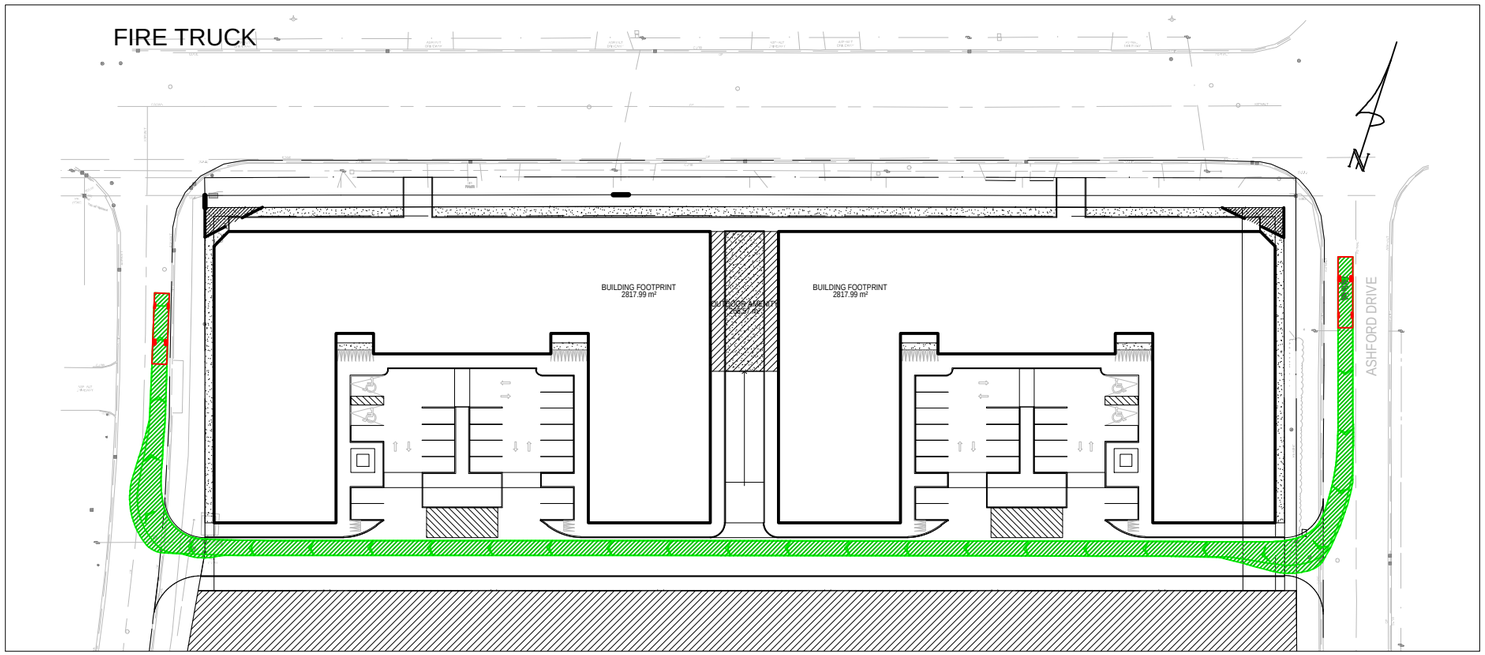
- FORWARD PATH
- REVERSE PATH

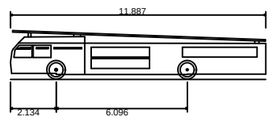


HSU - Heavy Single Unit Truck

Overall Length	11.500m
Overall Width	2.600m
Overall Body Height	3.650m
Min Body Ground Clearance	0.445m
Track Width	2.600m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	14.100m

FIRE TRUCK





Aerial Fire Truck

Overall Length	11.887m
Overall Width	2.489m
Overall Body Height	2.286m
Min Body Ground Clearance	0.229m
Track Width	2.489m
Lock-to-lock time	5.00s
Max Wheel Angle	45.00°

REV.	SUBMISSION	DATE	INITIAL
A	FIRST SUBMISSION	11/18/2024	MY

545-565 BIG BAY POINT ROAD
TRAFFIC IMPACT AND PARKING STUDY

SWEPT PATH ANALYSIS

TRAFFMOBILITY

DESIGN	M.Y.	DRAWN	C.J.	CHECKED	M.Y.	CONTRACT No.	PTRAN2024033
SCALE:	1:1000		DRAWING NUMBER	GARBAGE TRUCK AND FIRE TRUCK			
DATE:	NOVEMBER 18, 2024						

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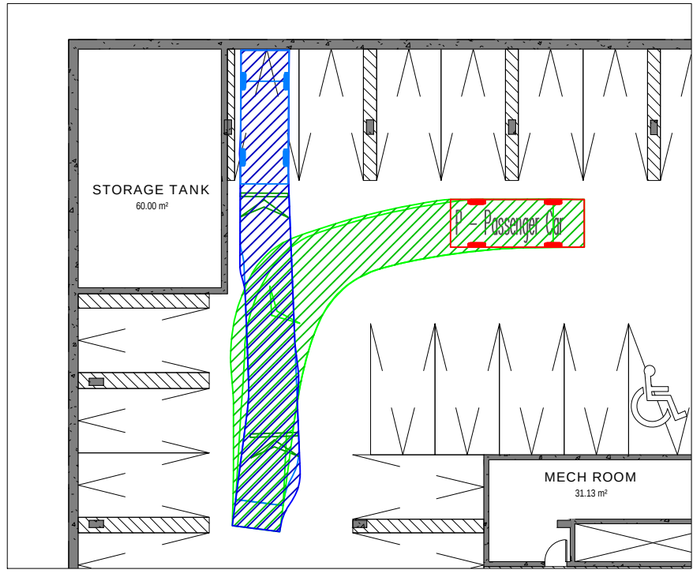

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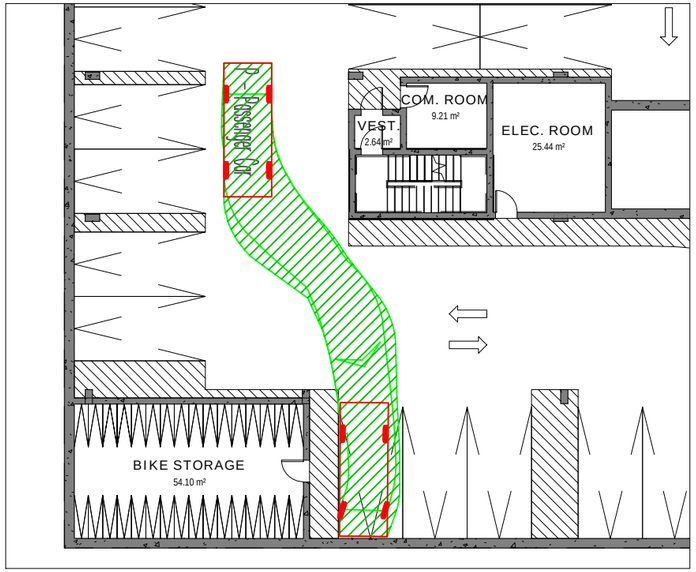

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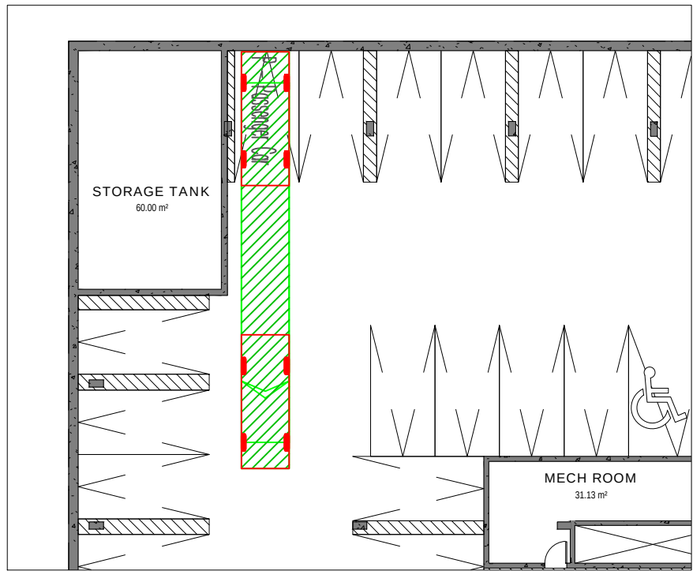

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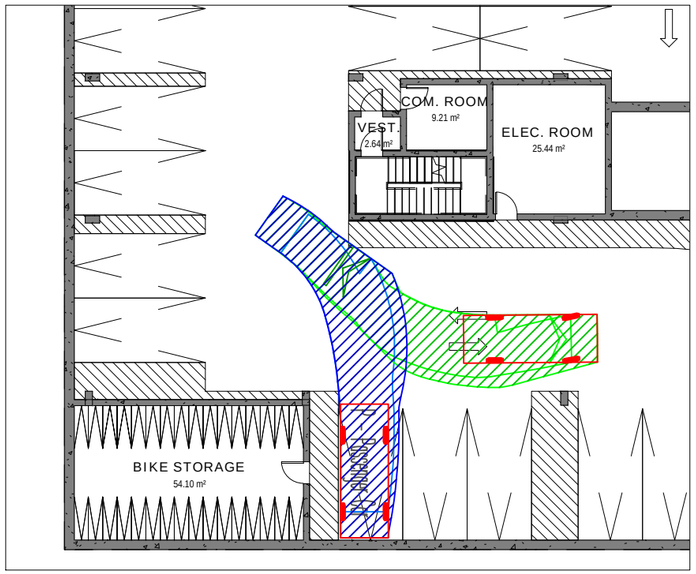
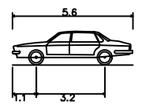


LEGEND:

- FORWARD PATH
- REVERSE PATH



P - Passenger Car

Overall Length	5.600m
Overall Width	2.000m
Overall Body Height	1.555m
Min Body Ground Clearance	0.340m
Track Width	2.000m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.300m

REV.	SUBMISSION	DATE	INITIAL
A	FIRST SUBMISSION	11/18/2024	MY

545-565 BIG BAY POINT ROAD
TRAFFIC IMPACT AND PARKING STUDY

SWEPT PATH ANALYSIS

TRAFFMOBILITY

DESIGN	M.Y.	DRAWN	C.J.	CHECKED	M.Y.	CONTRACT No.	PTRAN2024033
SCALE:	1:250		DRAWING NUMBER	PASSENGER CARS 1			
DATE:	NOVEMBER 18, 2024						

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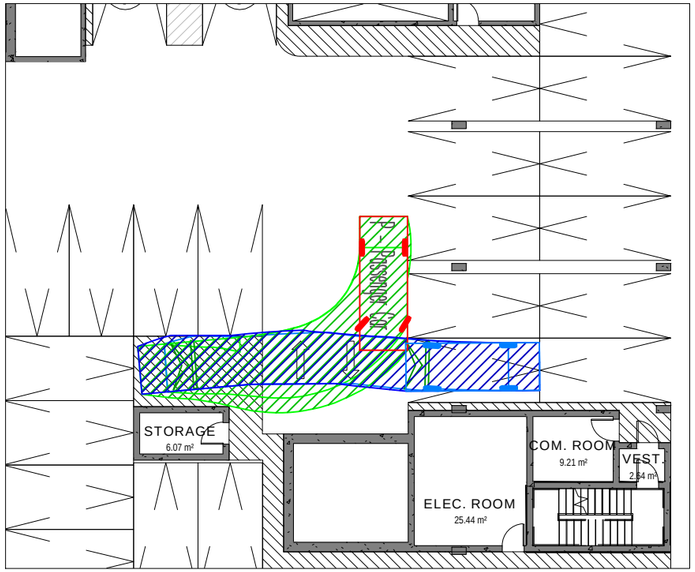

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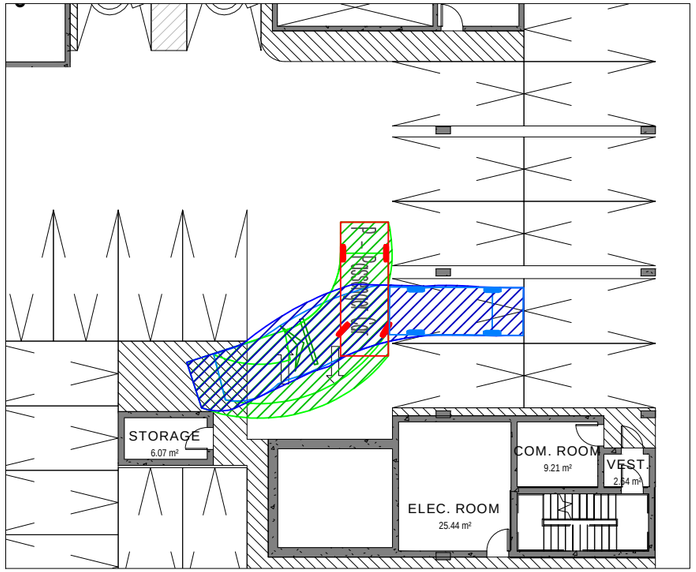

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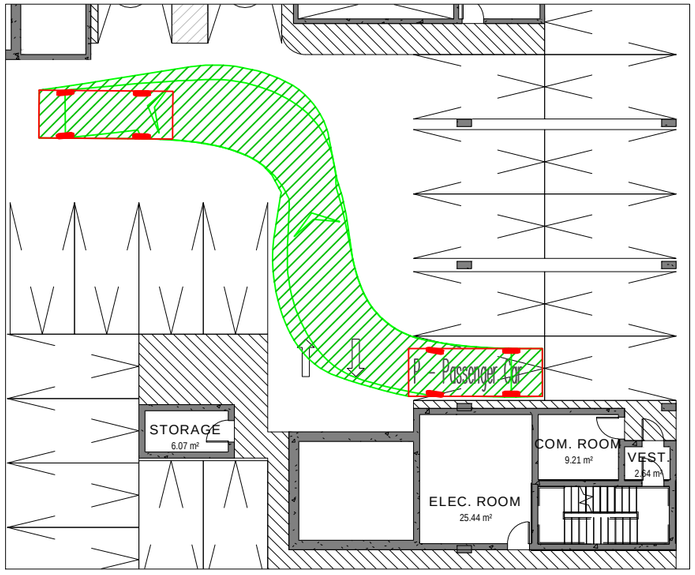

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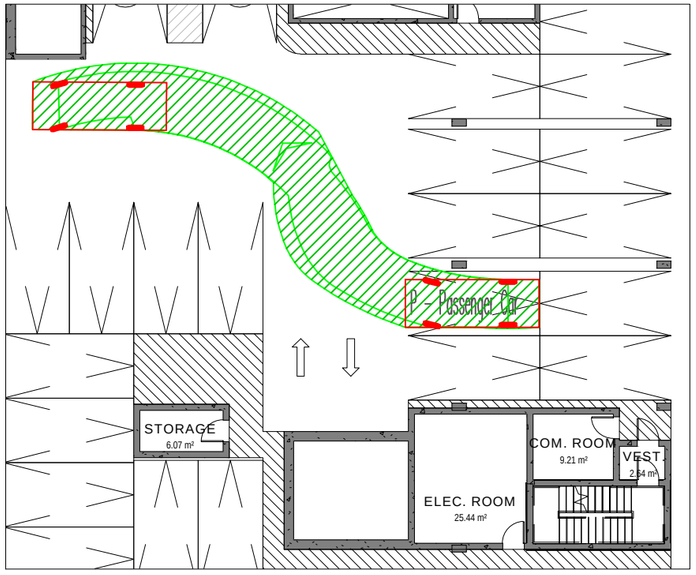
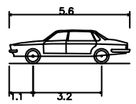


LEGEND:

- FORWARD PATH
- REVERSE PATH



P - Passenger Car	
Overall Length	5.600m
Overall Width	2.000m
Overall Body Height	1.555m
Min Body Ground Clearance	0.340m
Track Width	2.000m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.300m

REV.	SUBMISSION	DATE	INITIAL
A	FIRST SUBMISSION	11/18/2024	MY

545-565 BIG BAY POINT ROAD
TRAFFIC IMPACT AND PARKING STUDY

SWEPT PATH ANALYSIS

TRAFFMOBILITY

DESIGN	M.Y.	DRAWN	C.J.	CHECKED	M.Y.	CONTRACT No.	PTRAN2024033
SCALE:	1:250		DRAWING NUMBER	PASSENGER CARS 2			
DATE:	NOVEMBER 18, 2024						

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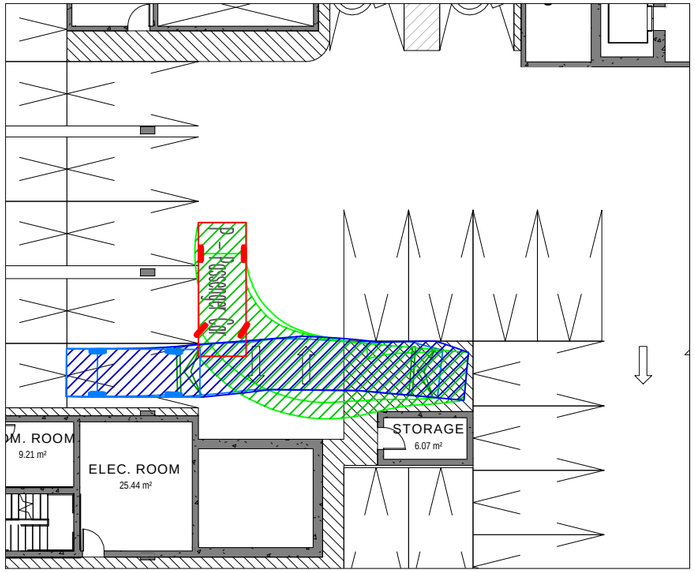

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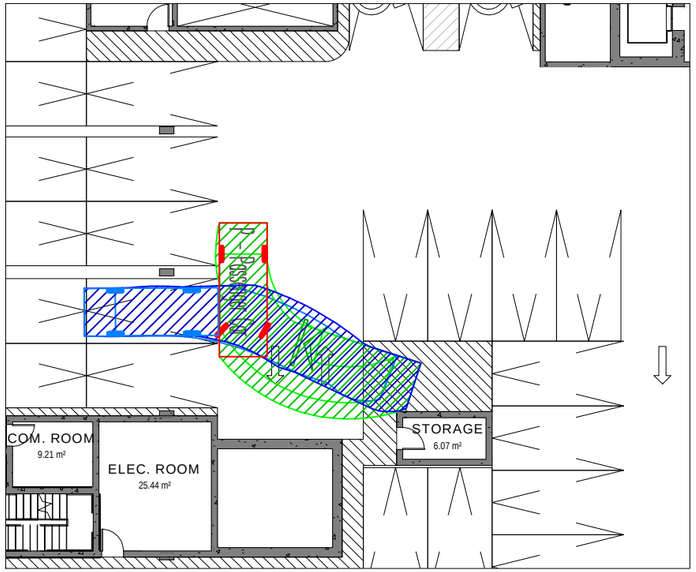

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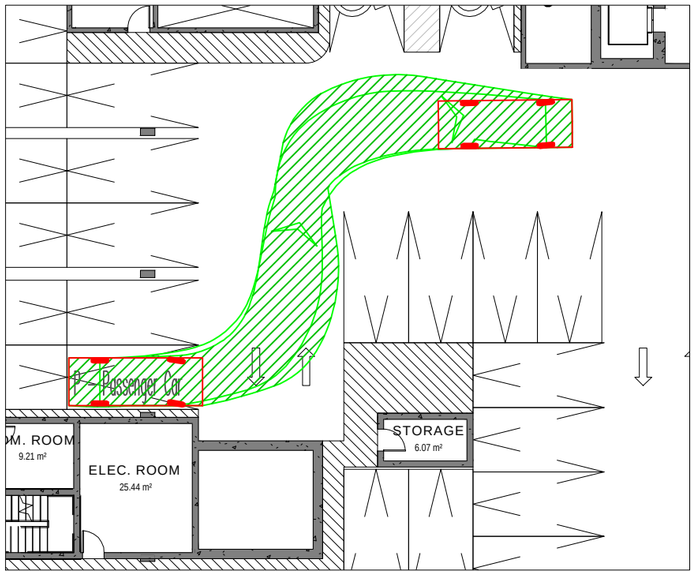

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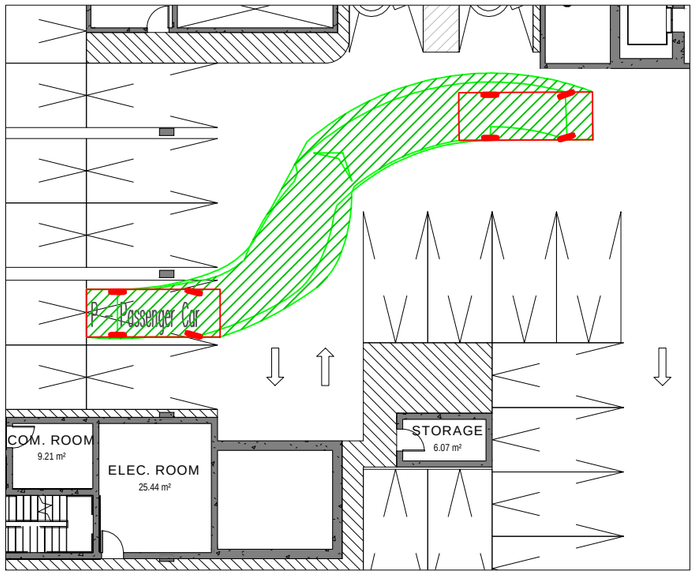
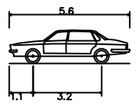


LEGEND:

FORWARD PATH

REVERSE PATH



P - Passenger Car

Overall Length	5.600m
Overall Width	2.000m
Overall Body Height	1.555m
Min Body Ground Clearance	0.340m
Track Width	2.000m
Lock-to-lock time	4.00s
Curb to Curb Turning Radius	6.300m

REV.	SUBMISSION	DATE	INITIAL
A	FIRST SUBMISSION	11/18/2024	MY

545-565 BIG BAY POINT ROAD
TRAFFIC IMPACT AND PARKING STUDY

SWEPT PATH ANALYSIS

TRAFFMOBILITY

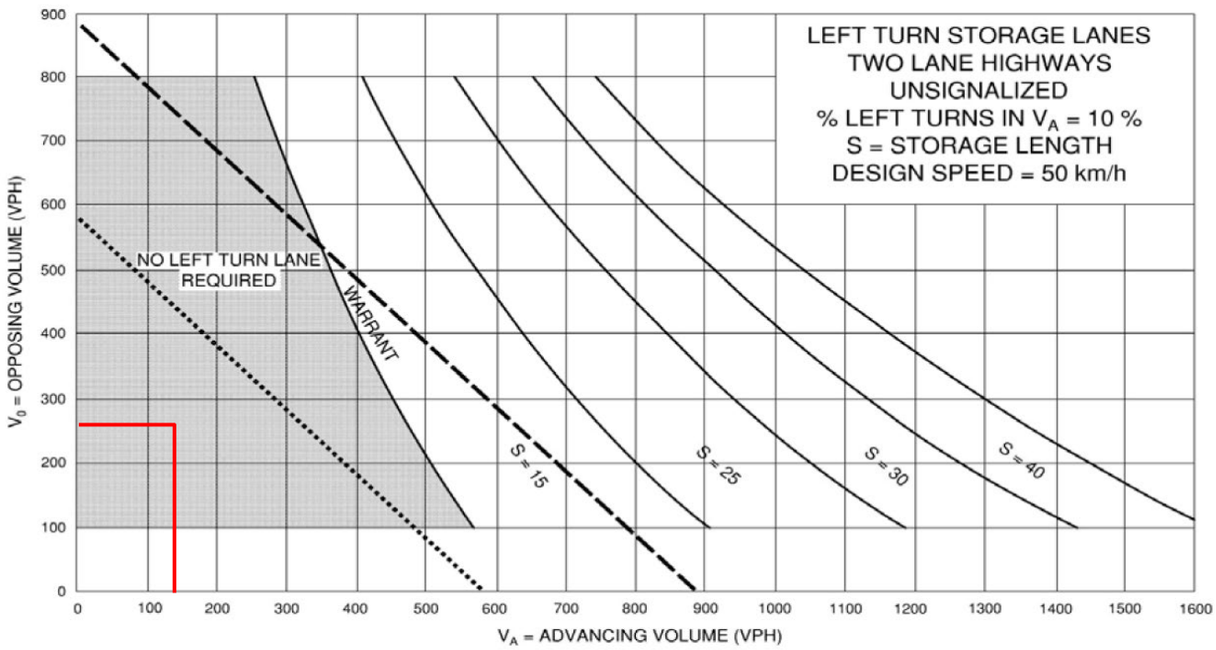
DESIGN	M.Y.	DRAWN	C.J.	CHECKED	M.Y.	CONTRACT No.	PTRAN2024033
SCALE:	1:250		DRAWING NUMBER	PASSENGER CARS 3			
DATE:	NOVEMBER 18, 2024						

Appendix P

Left Turn Lane Warrants

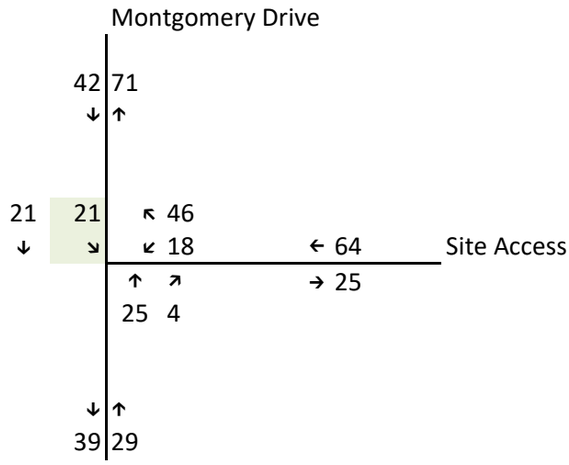
AM Future Total (2037) Left Turn Warrant Analysis - Ashford Drive and Site Access

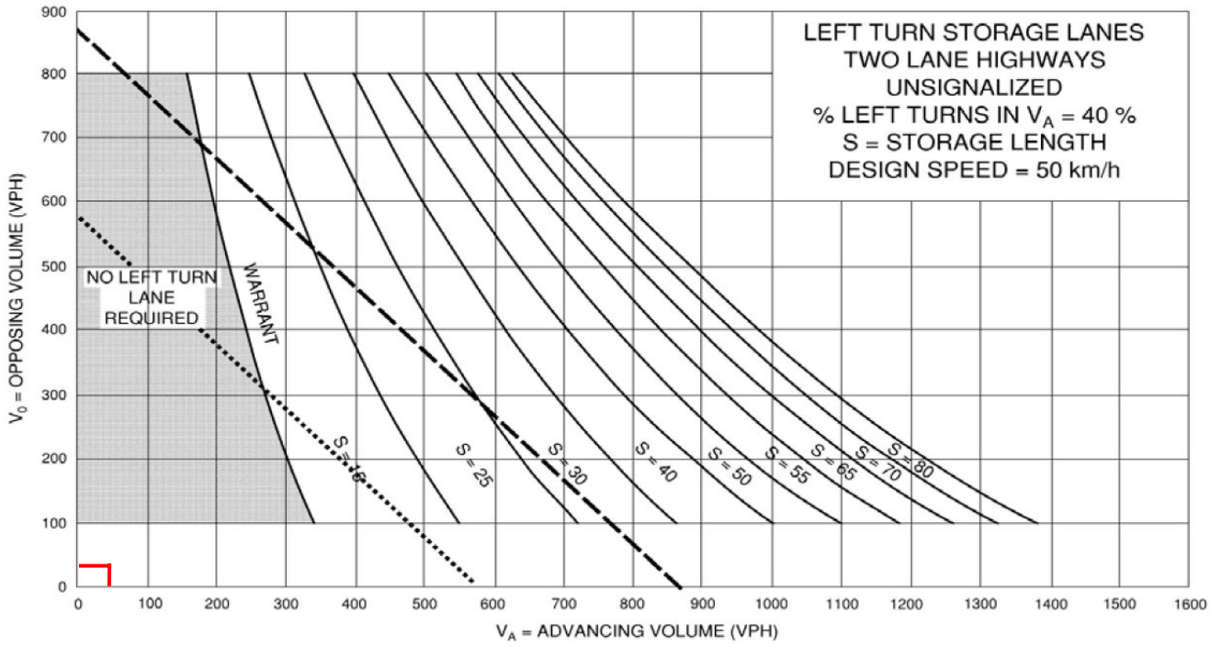
Design Speed =	50
Advancing Traffic Vol (VA) =	133
Opposing Traffic Vol (VO) =	264
Left Turn Traffic Vol (VL) =	13
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**9.8**



AM Future Total (2037) Left Turn Warrant Analysis - Montgomery Drive and Site Access

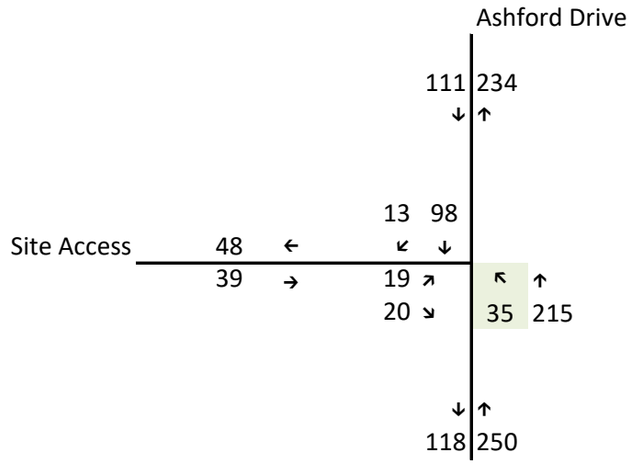
Design Speed =	50
Advancing Traffic Vol (VA) =	42
Opposing Traffic Vol (VO) =	29
Left Turn Traffic Vol (VL) =	21
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**50.0**

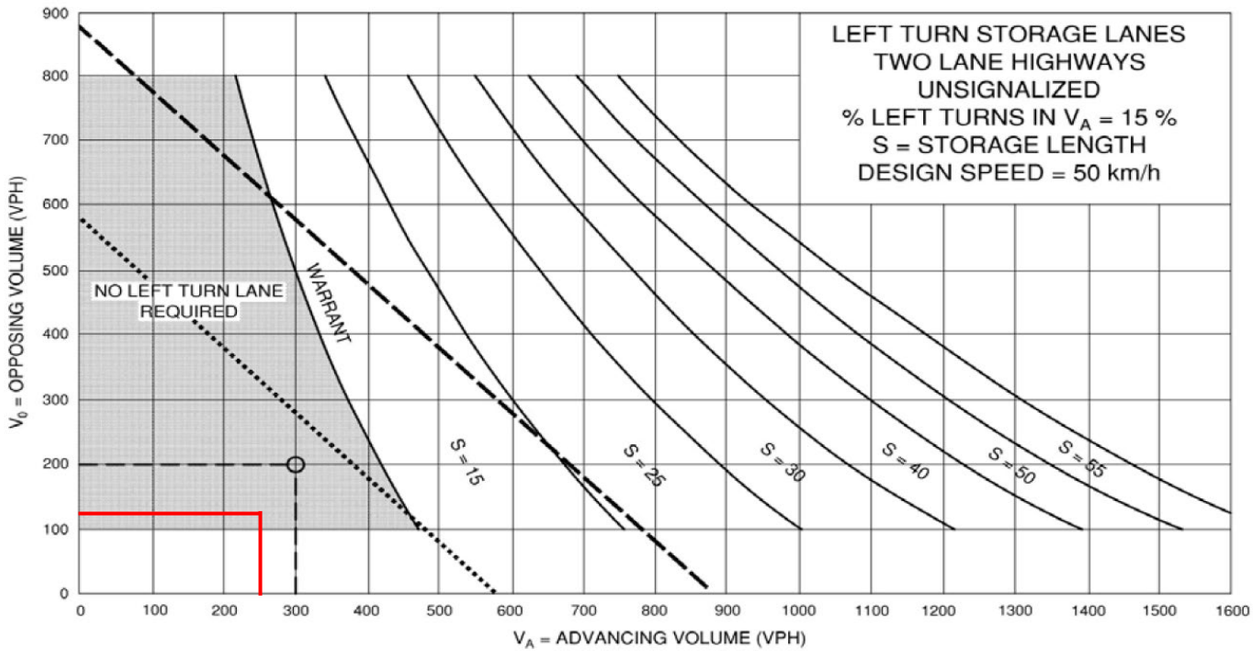




PM Future Total (2037) Left Turn Warrant Analysis - Ashford Drive and Site Access

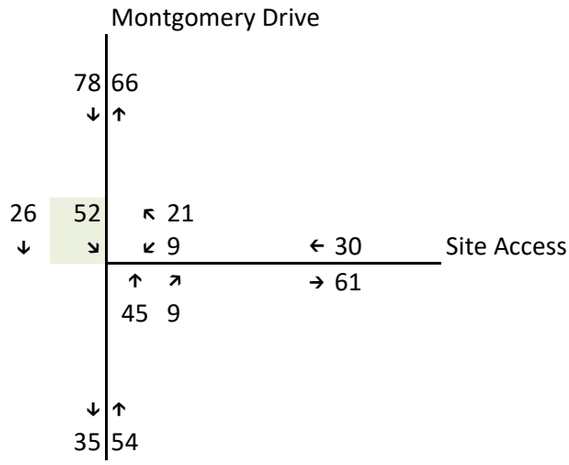
Design Speed =	50
Advancing Traffic Vol (VA) =	250
Opposing Traffic Vol (VO) =	111
Left Turn Traffic Vol (VL) =	35
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**14.0**

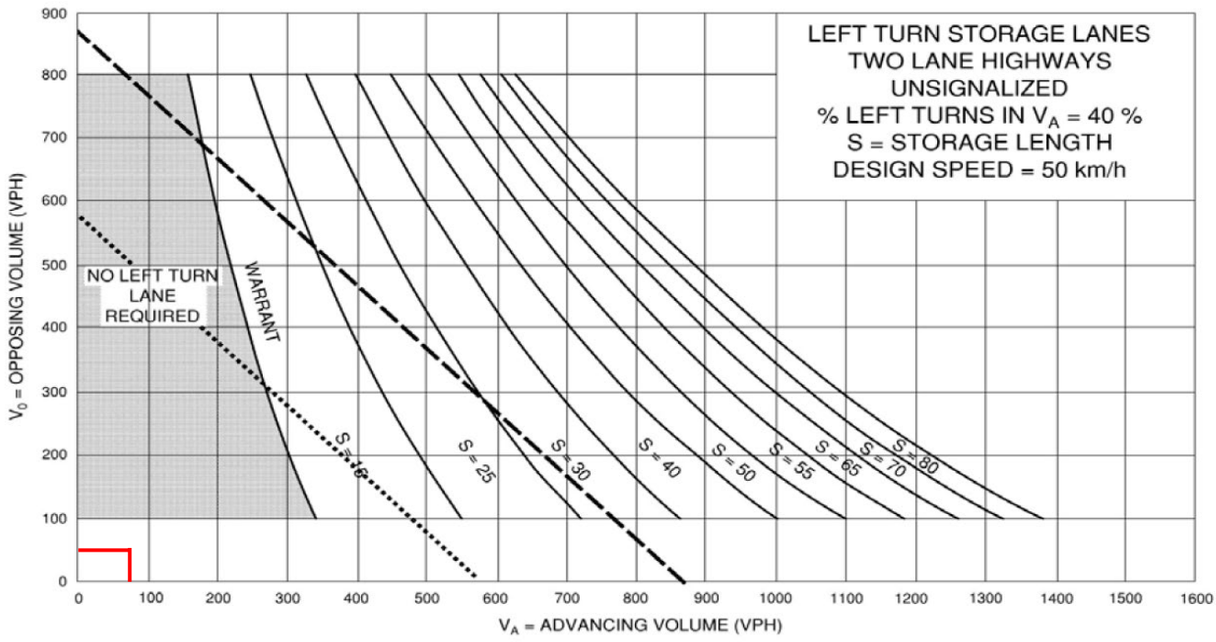




PM Future Total (2037) Left Turn Warrant Analysis - Montgomery Drive and Site Access

Design Speed =	50
Advancing Traffic Vol (VA) =	78
Opposing Traffic Vol (VO) =	54
Left Turn Traffic Vol (VL) =	52
Formula =	(LT x 100) / VA
% of Left Turning Veh's =	**66.7**





Appendix Q

Zoning By-Law Excerpts

Table 4.6	
Uses	**Parking Standards**
Abattoir	1 space per 100m² of *gross floor area*
Accessory Retail	1 space per 30m² of *gross floor area* min. 2 spaces.
Adult Entertainment Parlour	1 space per 2 persons
Animal Shelter	1 space per 30m² of *gross floor area* office space
Arcade or Game Establishment	1 space per 4 persons
Arena	1 space per 4 persons
Art Gallery	1 space per 30m² of *gross floor area* min. 2 spaces
Assembly Hall	1 space per 4 persons
Assisted Living Facility	1 space per 2 suites/units
Automotive Leasing Establishment	1 space per 50m² of gross floor area min. 2 spaces
Automotive Repair Establishment	1 space per 50m² of *gross floor area* min. 2 spaces
Automotive Sales Establishment	1 space per 50m² of *gross floor area* min. 2 spaces
Automotive Service Station	1 space per 50m² of *gross floor area* min. 2 spaces
Bakery	1 space per 70m² of *gross floor area*
Bank	1 space per 30m² of *gross floor area*
Bed and Breakfast Establishment	1 space per guest bedroom, plus 1 space for the owners
Boarding Lodging Rooming House, Small	1 space for every 2 *tenants* accommodated. Tandem parking will be permitted.
Boarding Lodging Rooming House, Large	1 space for every 2 *tenants* accommodated. Tandem parking will not be permitted.
Building Supply Centre	1 space per 70m² of *gross floor area*
Bus Terminal	1 space per 50m² of *gross floor area* min. 2 spaces
Bus Transfer Station	1 space per 50m² of *gross floor area* min. 2 spaces
Car Wash	1 space per 70m² of *gross floor area*
Child Care	1 space per classroom and 1 per office
City Hall	1 space per 30m² of *gross floor area*
College	1 space per classroom and office plus 1 space per 10 students
Commercial School	1 space per student (person)
Commercial uses otherwise not defined	1 space per 50m² of *gross floor area* min. 2 spaces
Community Centre	1 space per 4 persons
Concrete Product Manufacturing	1 space per 70m² of *gross floor area*
Concrete Ready Mix Plant	1 space per 70m² of *gross floor area*
Conference Centre	1 space per 4 persons
Converted Dwelling	1 space per *dwelling unit*
Court House	1 space per 50m² of *gross floor area*
Custom Workshop	1 space per 50m² of *gross floor area*
Data Processing Centre a) Office b) Non-office uses	*a)* 1 space per 30m² of *gross floor area* b) 1 space per 1000m² of *gross floor area (2014-007, amended by 2014-071)*
Dormitory	1 space per 2 students to be accommodated. Tandem parking will not be permitted.
Elementary School	1 space per classroom and office
Emergency Services Depot	1 space per 100m² of *gross floor area*
Entertainment Establishment	1 space per 4 persons
Excavation/Processing of minerals	1 space per 10, 000m² of *lot area*

Table 4.6	
Uses	**Parking Standards**
Fitness or Health Club	1 space per 2 persons
Foundry	1 space per 70m² of *gross floor area*
Funeral Establishment	1 space per 30m² of *gross floor area* min. 2 spaces
Gaol	1 space 100m² of *gross floor area*
Group Home	1 space per *dwelling unit*
Golf Course	1 space per tee
Golf Driving Range (outdoor)	1 space per tee
Heavy Equipment Dealer	1 space per 50m² of *gross floor area*
Hospital	1 space per 50m² of *gross floor area*
Hotel/Motel	1 space per room or *suite*
Industrial School	1 space per student (person)
Industrial uses otherwise not defined	1 space per 70m² of *gross floor area* min. 2 spaces
Institutional uses otherwise not defined	1 space per 50m² of *gross floor area*
Kennel	1 space per 30m² of *gross floor area* of office space
Laundry or Dry Cleaning	1 space per 50m² of *gross floor area*
Library	1 space per 30m² of *gross floor area* min. 2 spaces
Local Convenience Retail	1 space per 30m² of *gross floor area*
Manufacturing and Processing in wholly enclosed building	1 space per 70m² of *gross floor area*
Manufacturing of Noxious Products	1 space per 70m² of *gross floor area*
Marina	1 space per slip
Material Recovery Facility	1 space per 70m² of *gross floor area*
Miniature Golf (outdoor)	1 space per hole
Museum	1 space per 30m² of *gross floor area* min. 2 spaces
Nightclub	1 space per 4 persons (By-law 2012-086)
Nursery or Garden Supply Centre	1 space per 70m² of *gross floor area*
Office	1 space per 30m² of *gross floor area* min. 2 spaces
Office, Medical	1 space per 15m² of *gross floor area*
Outdoor Storage	1 space per 1000m² of *lot area*
Outdoor Storage of Sand, Gravel, Stone, Soil or Salt	1 space per 1000m² of *lot area*
Personal Service Store	1 space per 30m² of *gross floor area*
Photography Studio	1 space per 30m² of *gross floor area*
Place of Worship	1 space per 5 persons in the sanctuary
Police Station	1 space per 30m² of *gross floor area* min. 2 spaces
Printing and Publishing	1 space per 70m² of *gross floor area*
Private Academy, Philanthropic or Religious School	1 space per classroom and office
Private Club	1 space per 4 persons
Rail Transfer Facility	1 space per 1000m² of *gross floor area*
Recreational Establishment	1 space per 2 persons
Recyclable Materials Transfer Station or Recycling Facility	1 space per 70m² of *gross floor area*
Religious Institution	1 space per 7 persons
Rental store	1 space per 50m² of *gross floor area*
Research/Development Facility	1 space per 70m² of *gross floor area*

Table 4.6	
Uses	**Parking Standards**
Residential building containing not more than 3 dwelling units	1.5 space per *dwelling unit*. Tandem parking will be permitted. (By-law 2019-115)
Residential building containing more than 3 dwelling units	1.5 spaces per *dwelling unit*
Residential dwelling(s) in the Urban Growth Centre (see Appendix "C").	1 space per dwelling unit(s) (By-law 2014-110)
Residential uses located within a Mixed Use zone	1 space per dwelling unit (By-law 2015-097)
Restaurant	1 space per 4 persons
Retail Store	1 space per 30m^2 of *gross floor area* min. 2 spaces
Secondary School	1 space per classroom and per office plus 1 space per 10 students
Self Storage	1 space per 500m^2 of *gross floor area*
Service Store	1 space per 50m^2 of *gross floor area*
Shopping Centre	1 space per 18.6m^2 of *gross leasable floor area*
Social Services Facility	1 space per 30m^2 of *gross floor* area min. 2 spaces. No parking is required in the Urban Growth Centre. (By-law 2016-057)
Theatre	1 space for every 4 persons
Training and Rehabilitation Centre	1 space per 50m^2 of *gross floor area*
Truck Terminal	1 space per 1,000m^2 of *gross floor area*
University	1 space per classroom and per office plus 1 space per 10 students
Veterinary Clinic	1 space per 50m^2 of *gross floor area* min. 2 spaces
Warehousing excluding Self Storage	1 space per 1,000m^2 of *gross floor area*
Wholesale Establishment	1 space per 50m^2 of *gross floor area*

4.6.2 Parking

4.6.2.1 *Parking spaces* shall be provided and maintained in accordance with the following requirements and shall be provided on the same *lot* as the *building* or *use* for which they are required.

4.6.2.2 Parking Based on Occupancy

Where parking provisions in Table 4.6 relate to spaces per person or student, this shall be calculated based on the maximum number of persons which can be accommodated within the *use* according to the Ontario Building Code, as amended, unless otherwise specified.

4.6.2.3 Parking - Multiple Uses

That notwithstanding the parking requirements set out in Table 4.6, where there are 2 or more permitted uses in any *building* or on any *lot*, the following parking requirements shall apply:

a) Multiple Uses in Industrial Zones: A minimum of 1 parking space per 40m^2 of gross floor area shall be required except where the data processing centre is in combination with another use, in which case the data processing centre components shall be at the rate identified in Table 4.6 and the additional multiple uses shall be at a rate of 1 parking space per 40m^2.

b) Multiple Uses in Commercial Zones: A minimum of 1 parking space per 24m^2 of gross floor area shall be required except where residential uses are in combination with another use, in which case the residential use components shall be at the rate identified in Table 4.6 and the additional multiple uses shall be at a rate of 1 parking space per 24m^2.

c) For development that existed prior to the passing of this By-law (December 7, 2015), when change of use occurs, the less restrictive of the standard parking rate or the blended parking rate for multiple uses in accordance with a) and b) can be applied. (By-law 2015-129)

4.6.2.4 Parking - Additions to Building or Uses

Enlargements to any *buildings* or *uses* shall be provided with additional *parking spaces* in accordance with the provisions of Section 4.6 of this By-law. Such spaces being additional to any existing *parking spaces* but need not exceed the minimum number required by Section 4.6 for both the original *buildings* or *uses* plus the enlargements.

4.6.2.5 Size of Parking Spaces

Each *parking space*, with the exception of barrier free *parking spaces and parallel parking spaces*, shall have a minimum width of 2.7m and a minimum length of 5.5m and shall include such additional area (aisle) as required which shall have a minimum width in accordance with the following standards:

Angle of Parking	Minimum Aisle Width
30 degrees	2.8m(1)
45 degrees	3.4m(1)
60 degrees	5.2m(1)
90 degrees	6.4m

(1) One way traffic only shall apply to these minimum aisle widths.

Except where tandem parking is permitted, each parking space shall have unfettered access to the municipal road, to a *driveway* or to an aisle.

4.6.2.5.1 Notwithstanding any provisions to the contrary, structural columns in a parking structure may encroach into a parking space provided that the minimum width of the parking space is not less than 2.5m. Encroachment into the standard parking space width of 2.7m is not permitted where a wall, fence or similar full length obstruction is abutting any parking space. (By-law 2016-003)

4.6.2.6 Surface Treatment

All required non-residential *parking spaces*, *driveway*s, aisles and *loading spaces* shall be constructed and maintained with a stable surface such as portland cement, asphaltic binder or paving stones and curbed with a continuous poured concrete curb, except as provided for in Sections 7.3.3.1, 9.3.2.1 and 10.3.1.1. *Parking spaces, parking areas, driveways,* and aisles in Residential Zones shall comply with Section 5.3.6. (By-law 2019-115)

Where more than 3 *parking spaces* are required on a *lot*, all *parking spaces* shall be clearly marked to identify the size and location of the spaces.

4.6.2.7 Lighting

Where lighting facilities are provided in conjunction with any parking and *loading spaces*, such lighting shall be so arranged as to deflect light onto the *parking spaces* and away from adjoining properties or *streets*.

4.6.3 Additional Parking Standards

4.6.3.1 Parking is not required for commercial uses and places of worship in the Central Area Commercial (C1) Zone.

4.6.3.2 Off-street parking spaces in a Shopping Centre Commercial (C3) Zone shall be provided at the minimum of 1 space for each 18.6m^2 of gross leasable area of the shopping centre buildings irrespective of the use that is permitted.

4.6.3.3 The Urban Growth Centre shall refer to the geographic area as delineated in Appendix “C”.

4.6.4 Barrier Free Parking

a) When more than 4 *parking spaces* are required on a *lot*, barrier free *parking spaces* for the exclusive *use* of persons with disabilities shall be identified with a provincially regulated vertical sign displaying the international symbol for disabled access. Barrier free *parking spaces* shall be included in the calculation of required parking and shall be provided in accordance with the following standards:

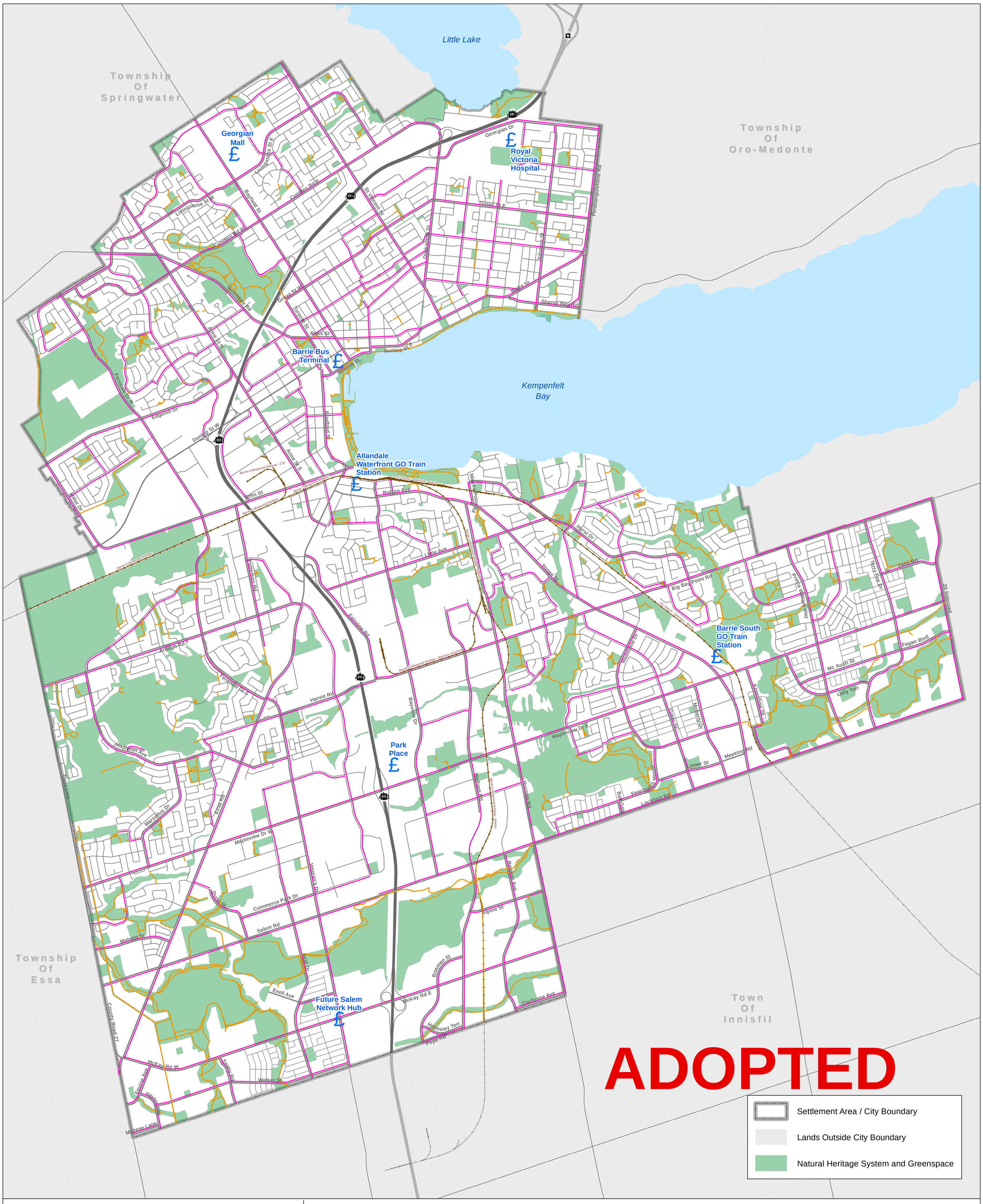
Required Parking	Barrier Free Parking	
	Type A – min. width of 3.4m, access aisle width of 1.5m	Type B – min. width of 3.1m, access aisle width of 1.5m
5 to 25 spaces	1 space	-
26 to 50 spaces	1 space	1 space
51 to 75 spaces	1 space	2 spaces
76 to 100 spaces	2 spaces	2 spaces
Over 100 spaces	1 space plus 3% of required parking spaces	

b) Where there is potential conflict in the calculation of Barrier Free spaces, the Accessibility for Ontarians with Disabilities Act (AODA) applies.

c) Where an odd number of barrier free parking spaces are required, the odd-numbered space may be a Type B parking space.

Appendix R

Barrie Planned Cycling Network



OFFICIAL PLAN

MAP 4a
Mobility Network

February 2022

Road Network

- Highway
- Major Road
- Ramp
- Local Road

Alternative Transportation Networks

- £ Network Hub (approx. location)
- Cycling Network
- Multi-use Trail (within parks)
- Railway

* Certain features like roads, parks and trails within the undeveloped designated greenfield area are conceptual and subject to change.

0 1 2 km

Development Services 3/2/2022

Appendix S

Parking Survey Data

Traffic Survey Analysis Inc.
25 Mojave Cres., Richmond Hill, ON, L4S 1R4
Tel: (647) 278-3643, e-mail: david@tsa-inc.ca

Location - 2 Kozlov Street, Barrie

Day of survey: October 30, 2024

Surface Parking

Period (from/to)		Residential Parking			Visitor Parking		
		Regular	Disabled	Bikes	Regular	Disabled	Trades Parking
Total parking spaces		80	0	0	12	2	2
12:00	12:30	38			7	1	2
12:30	13:00	34			6	1	2
13:00	13:30	35			6	1	2
13:30	14:00	34			6	1	2
14:00	14:30	34			5	0	2
14:30	15:00	31			4	0	2
15:00	15:30	31			4	0	2
15:30	16:00	39			6	1	1
16:00	16:30	40			8	0	1
16:30	17:00	41			11	0	1
17:00	17:30	44			11	0	0
17:30	18:00	41			8	0	1
18:00	18:30	47			11	1	1
18:30	19:00	51			9	0	1
19:00	19:30	52			9	0	1
19:30	20:00	50			9	0	1
20:00	20:30	53			9	0	0
20:30	21:00	55			9	0	0
21:00	21:30	59			11	0	0
21:30	22:00	59			11	0	0
22:00	22:30	60			10	0	0
22:30	23:00	60			10	0	0
23:00	23:30	59			10	0	0
23:30	0:00	60			10	0	0

Underground Parking

Period (from/to)		Residential Parking			Visitor Parking		
		Regular	Disabled	Bikes	Regular	Disabled	Bikes
Total parking spaces		98	0	27	0	0	0
12:00	12:30	44		20			
12:30	13:00	43		20			
13:00	13:30	44		20			
13:30	14:00	44		20			
14:00	14:30	43		20			
14:30	15:00	44		20			
15:00	15:30	42		20			
15:30	16:00	41		20			
16:00	16:30	42		20			
16:30	17:00	42		20			
17:00	17:30	45		20			
17:30	18:00	49		20			
18:00	18:30	54		20			
18:30	19:00	54		20			
19:00	19:30	54		20			
19:30	20:00	54		20			
20:00	20:30	57		20			
20:30	21:00	59		20			
21:00	21:30	63		20			
21:30	22:00	63		20			
22:00	22:30	65		20			
22:30	23:00	65		20			
23:00	23:30	66		20			
23:30	0:00	68		20			

Traffic Survey Analysis Inc.
25 Mojave Cres., Richmond Hill, ON, L4S 1R4
Tel: (647) 278-3643, e-mail: david@tsa-inc.ca

Location - 30 Hanmer Street W, Barrie

Day of survey: October 30, 2024

Surface Parking

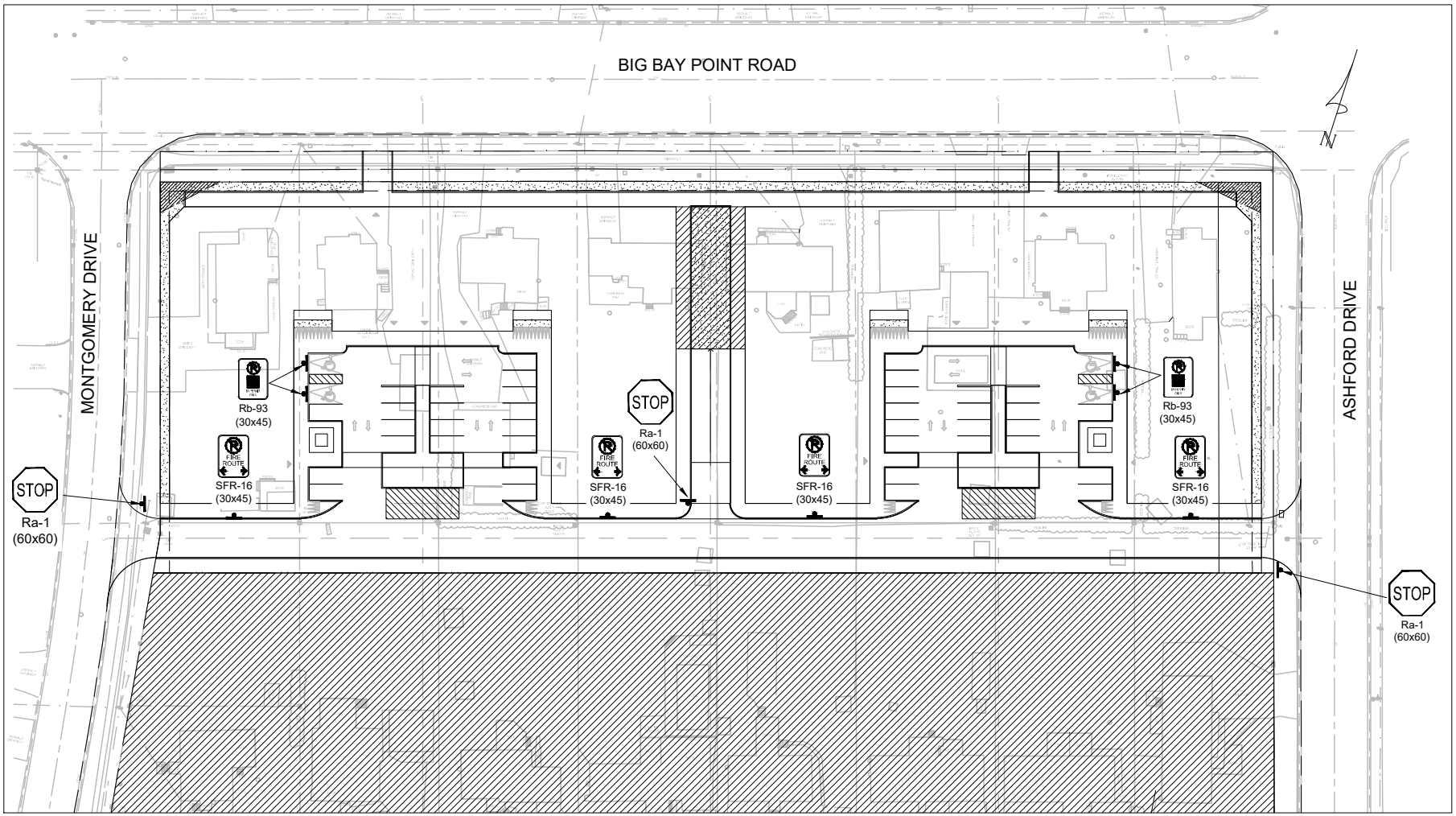
Period (from/to)		Residential Parking			Visitor Parking		
		Regular	Disabled	Bikes	Regular	Disabled	Bikes
Total parking spaces		152	6	N/A	9	0	0
12:00	12:30	53	3		4		
12:30	13:00	41	4		4		
13:00	13:30	44	3		3		
13:30	14:00	45	3		4		
14:00	14:30	46	4		4		
14:30	15:00	45	4		4		
15:00	15:30	44	4		4		
15:30	16:00	50	4		5		
16:00	16:30	58	4		3		
16:30	17:00	55	4		2		
17:00	17:30	62	4		2		
17:30	18:00	68	4		2		
18:00	18:30	75	4		1		
18:30	19:00	85	4		1		
19:00	19:30	89	4		1		
19:30	20:00	90	4		2		
20:00	20:30	93	4		3		
20:30	21:00	96	4		4		
21:00	21:30	97	4		3		
21:30	22:00	97	4		3		
22:00	22:30	98	4		3		
22:30	23:00	98	4		3		
23:00	23:30	100	4		3		
23:30	0:00	98	4		3		

Underground Parking - N/A

Period (from/to)		Residential Parking			Visitor Parking		
		Regular	Disabled	Bikes	Regular	Disabled	Bikes
Total parking spaces		0	0	0	0	0	0
12:00	12:30						
12:30	13:00						
13:00	13:30						
13:30	14:00						
14:00	14:30						
14:30	15:00						
15:00	15:30						
15:30	16:00						
16:00	16:30						
16:30	17:00						
17:00	17:30						
17:30	18:00						
18:00	18:30						
18:30	19:00						
19:00	19:30						
19:30	20:00						
20:00	20:30						
20:30	21:00						
21:00	21:30						
21:30	22:00						
22:00	22:30						
22:30	23:00						
23:00	23:30						
23:30	0:00						

Appendix T

Pavement Marking and Signage Plan



				545-565 BIG BAY POINT ROAD TRAFFIC IMPACT AND PARKING STUDY
A	FIRST SUBMISSION	11/07/2024	MY	
REV.	SUBMISSION	DATE	INITIAL	PAVEMENT MARKING AND SIGNAGE

TRAFFMOBILITY

DESIGN	M.Y.	DRAWN	M.Y.	CHECKED	M.Y.	CONTRACT No.	PTRAN2024033
SCALE:	1:1000			DRAWING NUMBER		PMK 1	
DATE:	NOVEMBER 7, 2024						

TRAFFMOBILITY

Appendix U

Construction Management and Parking Plan

545-565 Big Bay Point Road Construction Management and Parking Plan

Barrie, Ontario

Date: November 7, 2024

Prepared for:
Midnight Building Group
1185 Queensway East, Unit 9A
Mississauga, ON L4Y 1S1

Prepared by:
TraffMobility Engineering Inc.
9131 Keele Street, Unit A4
Vaughan, ON L4K 0G7

City of Barrie File:
D28-058-2024

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Document Revision History

Rev	Description	Prepared / Revised By	Reviewed By	Approved By	Date Issued (M/D/Y)
R0	Construction Management and Parking Plan for ZBA and OPA Submission	M. Yang	R. Sooklall	M. Yang R. Sooklall	11/07/2024

1.0 Construction Management and Parking Plan

The Construction Management and Parking Plan ("CMP") was developed to provide recommendations to address anticipated traffic impacts on streets adjacent to development site for the duration of the construction work. These impacts include traffic increase, access closures, road/lane closures on public roads, and parking control outside of site limits but within the City of Barrie's ('City') road allowances. This plan should be confirmed and refined by the Owner's Contractor(s) prior to construction start.

1.1 Construction Laydown and Parking

The subject site is located south of Big Bay Point Road between Montgomery Drive and Ashford Drive. It occupies half of the street block. The south half of the block is owned by the same developer and will be used for construction laydown and staff parking as depicted in **Figure 1**. The Owner's Contractor should use site control measures to contain activities and impact within the site as much as possible, these include but not limited to:

- Use of silt fence barriers around the entire block to prevent debris flyout and dust pollution in the neighbourhood.
- Stabilize travel surface with compacted gravel layer and/or construction entrance mats to prevent muck tracking onto public streets.

Figure 1: Site Location and Construction Laydown and Parking Area

The Owner's Contractor should prepare the laydown area and dedicate areas for parking to minimize need for off-site parking. Should parking within site be deemed insufficient, the Owner's Contractor shall arrange shuttle bus services for shift workers or encourage carpooling. On-street parking should be prohibited.

1.2 Construction Access Control

Construction vehicles including heavy vehicles such as dump trucks, delivery trucks, etc. will require access to the site to support construction activities. It is recommended that two site accesses be constructed at the location of the final site entrances on Montgomery Drive and Ashford Drive. The Montgomery Drive access should be used as the primary access to avoid adding traffic to Ashford Drive as it is the main route used by school pick-up/drop-off traffic. Construction traffic should avoid using the secondary access unless its necessary during off-school peak periods. To prevent construction traffic infiltration on neighborhood streets, access to the site should be via Big Bay Point Road as depicted in **Figure 2**.

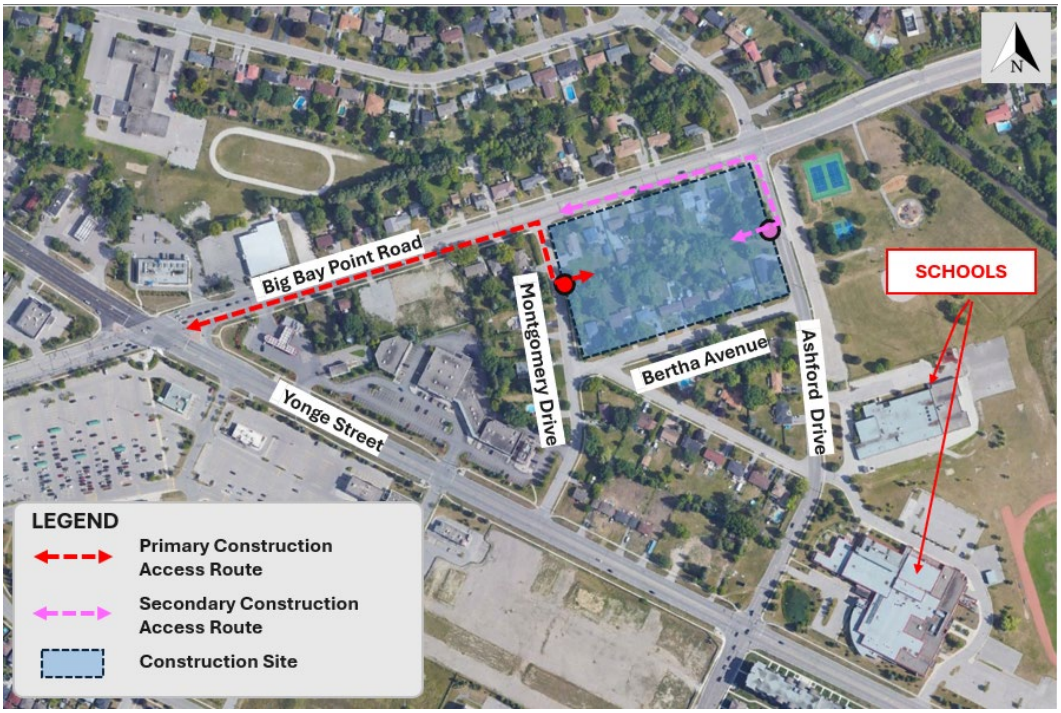


Figure 2: Proposed Construction Accesses

1.3 Road Closures

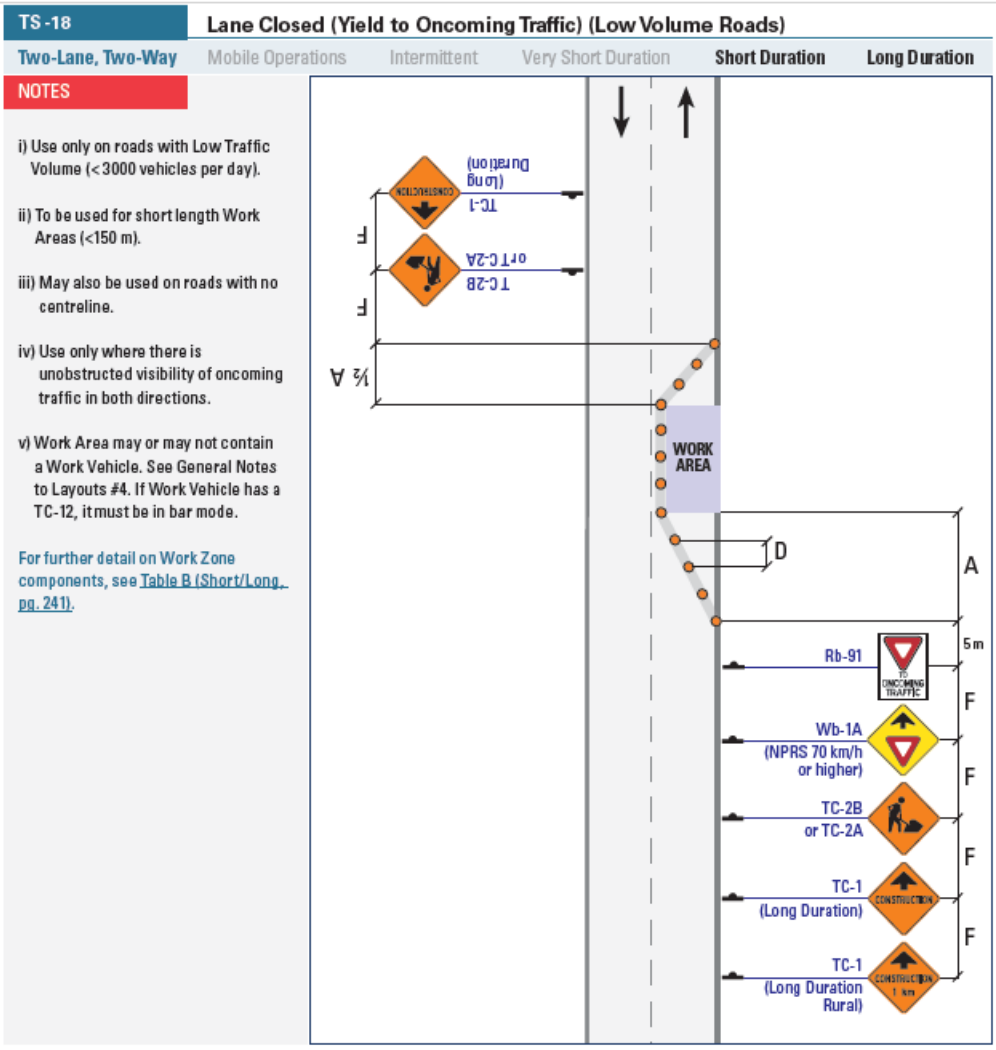
It is anticipated that most of the construction activities will be contained within the construction site. For any activities outside of the construction site limits, such as sidewalk and curb tie-ins to existing City infrastructure at the two accesses on Montgomery Drive and Ashford Drive and any road reinstatement work within City road allowance, lane closures or encroachments will be required. The following minimum requirements shall be met for the implementation of lane closures:

i. No lane closures are permitted on weekdays between the hours of 6:30 a.m. to 9:30 a.m. and 2:30 p.m. to 5:30 p.m.;
ii. Any lane closures or lane encroachments that occur must be signed in accordance with the Ontario Traffic Manual (OTM) Book 7 “Temporary Conditions”;
iii. Safe pedestrian access must be maintained at all times by the Owner’s Contractor. As such, safe passage for all pedestrians, including pedestrians with disabilities (blind, hearing impaired, on wheelchairs, etc.), must be ensured by the Owner’s Contractor;

iv. The characteristic and placement of all signs and traffic control or management shall conform to the standards of the Ontario Traffic Manual (OTM) Book 7 “Temporary Conditions” and as per the Occupational Health and Safety Act;
v. At the end of each lane closure, all temporary signs and other traffic control equipment should be removed and stored within the site limits; and
vi. The manufacture and the erection of all signs for any traffic closures shall be the responsibility of the Contractor.

Weekend lane closures on Montgomery Drive and Ashford Drive may be required to facilitate the construction of the new curbs, boulevards, and sidewalks around the development site. It is recommended that the weekend lane closures of these roads be carried out on separate weekends to minimise the disruption from the closures and maintain pedestrian access.

The OTM Book 7 typical traffic control layout for single lane closures on bi-direction lanes as shown in **Figure 3** can be applied on Montgomery Drive and Ashford Drive. Pedestrian access shall be maintained along east side of Montgomery Drive as depicted in **Figure 4**.



TS-18 Lane Closed (Yield to Oncoming Traffic) (Low Volume Roads)

Two-Lane, Two-Way | Mobile Operations | Intermittent | Very Short Duration | **Short Duration** | Long Duration

NOTES

i) Use only on roads with Low Traffic Volume (<3000 vehicles per day).

ii) To be used for short length Work Areas (<150 m).

iii) May also be used on roads with no centreline.

iv) Use only where there is unobstructed visibility of oncoming traffic in both directions.

v) Work Area may or may not contain a Work Vehicle. See General Notes to Layouts #4. If Work Vehicle has a TC-12, it must be in bar mode.

For further detail on Work Zone components, see Table B (Short/Long, pg. 241).

		Normal Posted Regulatory Speed (km/h)				
Label	Description	50	60	70	80	90
A	Taper Length for Full Lane Closure (m)	60	85	155	180	200
D	Maximum Distance between Markers (m)	6	9	9	12	12
	Minimum Number of Markers for Taper	5	7	9	11	13
F	Distance between Construction Signs (m)	50	90	120	140	150

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Figure 3: OTM Book 7 – Single Lane Closure with Yield Control

Figure 4: Sidewalk Access to be Maintained

1.4 Emergency Contact

The Contractor must make available a 24-hour contact throughout the duration of the project to manage and address any traffic management related issues arising from the construction activities.