

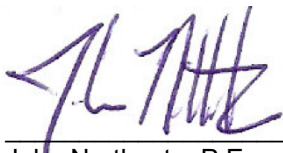
Harbour Point Subdivision – Phases 3 & 4 Town of Penetanguishene

Traffic Impact Study for Bellisle (Penetang) Developments Ltd.

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Executive Summary

This report summarizes the traffic impact study prepared for Phases 3 & 4 of the Harbour Point Subdivision (formerly known as the Bellisle Heights Subdivision), located southeast of the École secondaire Le Caron in the Town of Penetanguishene [Town], County of Simcoe [County]. The report assesses the impact of traffic related to the development on the adjacent roadway and provides recommendations to accommodate this traffic in a safe and efficient manner.

The proposed residential development includes 320 residential units with the following phasing breakdown:

- Phase 1 – 110 single-detached / townhouse units & 30 apartment units
- Phase 2 – 73 single-detached / townhouse units
- Phase 3 – 72 single-detached / townhouse units
- Phase 4 – 35 single-detached / townhouse units

The 110 single-detached units in Phase 1 of the development have been constructed and are currently fully occupied.

Parallel to the north boundary of the subdivision, at some distance, is Poyntz Street with two access streets connecting the subdivision to Poyntz Street. There will be four access streets from the proposed extension of Thompsons Road West, at the southern boundary of the subdivision, resulting in a total of six access streets to the Harbour Point subdivision.

The scope of this analysis includes a review of the following intersections:

- Main Street / Robert Street;
- Main Street / Poyntz Street;
- Owen Street / Poyntz Street;
- Bellisle Road / Poyntz Street; and
- Main Street / Thompsons Road.

Previous submissions for the Harbour Point Subdivision included a connection to John Street. The proposed Harbour Point Subdivision no longer includes the John Street connection, which is reflected in the analysis completed in this study.

Conclusions

1. The proposed Harbour Point Subdivision is expected to generate a total of 144 AM and 193 PM peak hour trips.
2. Detailed turning movement counts were completed for all existing intersections on Thursday, December 14, 2017.
3. An intersection operation analysis was completed at the study area intersections, using the existing (2018) and background (2028) traffic volumes, with the adjacent development traffic and without the Harbour Point Subdivision traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the Harbour Point Subdivision. No geometric lane improvements or traffic signal improvements are recommended within the study area in order to accommodate the anticipated traffic for the existing (2018) or background (2028) scenario.

4. An estimate of the amount of traffic that would be generated by the Harbour Point Subdivision was prepared and assigned to the study area streets and intersections.
5. An intersection operation analysis was completed under total (2028) traffic volumes with the Harbour Point Subdivision operational at the study area intersections, with no connection at John Street and no extension of Thompson Road West to Main Street. This scenario included the planned road improvements on Main Street, as proposed by the Town. No additional geometric lane improvements or traffic signal improvements are recommended within the study area in order to accommodate the anticipated traffic for this scenario.
6. An intersection operation analysis was completed using the total (2028) traffic volumes with the proposed extension to Thompsons Road West to assess the traffic operation for this scenario. This scenario included the planned road improvements on Main Street, as proposed by the Town. Based on our analysis, no additional improvements are required within the study area for this scenario, with the proposed extension of Thompsons Road West.
7. In summary, the Harbour Point Subdivision will not cause any operational issues and will not add a notable delay or congestion to the local roadway network.

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1 Introduction

1.1 Background

Bellisle (Penetang) Developments Ltd [The Developer] is proposing to develop Phases 3 & 4 of the Harbour Point Subdivision (formerly known as the Bellisle Heights Subdivision), located southeast of the École secondaire Le Caron in the Town of Penetanguishene [Town], County of Simcoe [County].

The proposed residential development includes 320 residential units with the following phasing breakdown:

- Phase 1 – 110 single-detached units & 30 apartment units
- Phase 2 – 73 single-detached units
- Phase 3 – 72 single-detached units
- Phase 4 – 35 single-detached units

The 110 single-detached units in Phase 1 of the Harbour Point Subdivision have been constructed and are currently fully occupied.

Parallel to the north boundary of the subdivision, at some distance, is Poyntz Street with two access streets connecting the subdivision to Poyntz Street. There will be four access streets from the proposed extension of Thompsons Road West, at the southern boundary of the subdivision, resulting in a total of six access streets to the Harbour Point subdivision.

The Developer has retained **JD Northcote Engineering Inc.** [JD Engineering] to prepare this traffic impact study in support of the Harbour Point Subdivision.

1.2 Study Area

Figure 1 shows the location of the Harbour Point Subdivision and study area intersections, in relation to the surrounding area. The Draft Plan of Subdivision by De Freitas Engineering Inc. is provided in **Appendix A**.

The Harbour Point Subdivision is bound by undeveloped lands to the west and south, existing residential lands to the east and existing residential lands and the École secondaire Le Caron to the north.

Through consultation with the Town, the following intersections are included in the traffic impact study:

- Main Street / Robert Street;
- Main Street / Poyntz Street;
- Owen Street / Poyntz Street;
- Bellisle Road / Poyntz Street; and
- Main Street / Thompsons Road.

Previous submissions for the Harbour Point Subdivision included a connection to John Street. The proposed Harbour Point Subdivision no longer includes the John Street connection, which is reflected in the analysis completed in this study. The impact of removing the connection to John Street is discussed further in Section 5.2.

Figure 1 – Proposed Site Location and Study Area



1.3 Study Scope and Objectives

The purpose of this study is to identify the potential impacts to traffic flow at the site access and on the surrounding roadway network. The study analysis includes the following tasks:

- Consult with the Town to address any traffic-related issues or concerns they have with the Harbour Point Subdivision;
- Determine existing traffic volumes and circulation patterns;
- Estimate future traffic volumes if the Harbour Point Subdivision was not constructed, including the impact of additional proposed developments in the area;
- Complete level-of-service [LOS] analysis of horizon year (without the Harbour Point Subdivision) traffic conditions and identify operational deficiencies;

- Estimate the amount of traffic that would be generated by the Harbour Point Subdivision and assign to the roadway network;
- Complete LOS analysis of horizon year (with the Harbour Point Subdivision) traffic conditions and identify additional operational deficiencies;
- Identify improvement options to address operational deficiencies;
- Review the impact of the construction of the proposed extension of Thompsons Road West; and
- Document findings and recommendations in a final report.

1.4 Horizon Year and Analysis Periods

Traffic scenarios for the existing year (2018) and 10-year (2028) horizon year were selected for analysis of traffic operations in the study area. The weekday morning [AM] and weekday afternoon [PM] peak hours have been selected as the analysis periods for this study.

2 Information Gathering

2.1 Street and Intersection Characteristics

Main Street is a major arterial road with an urban cross-section, a sidewalk on the east side of the road north of Edward Street and a sidewalk on the west side of the road north of O. L. Dubeau Drive, within the study area. Main Street has a two-lane cross section north of Robert Street, three-lane cross section between Robert Street and Poyntz Street and a four-lane cross section south of Poyntz Street within the study area. Main street has a posted speed limit of 50 km/h and is under the jurisdiction of the Town within the study area.

Robert Street is a two-lane major arterial road with an urban cross section and a sidewalk on both sides of the road, within the study area. Robert Street has an assumed (unposted) speed limit of 50km/h within the study area. Robert Street is under the jurisdiction of the Town, within the study area.

Owen Street is a two-lane local road with an urban cross section and a sidewalk on the west side of the road. Owen Street has an assumed (unposted) speed limit of 50km/h. Owen Street is under the jurisdiction of the Town.

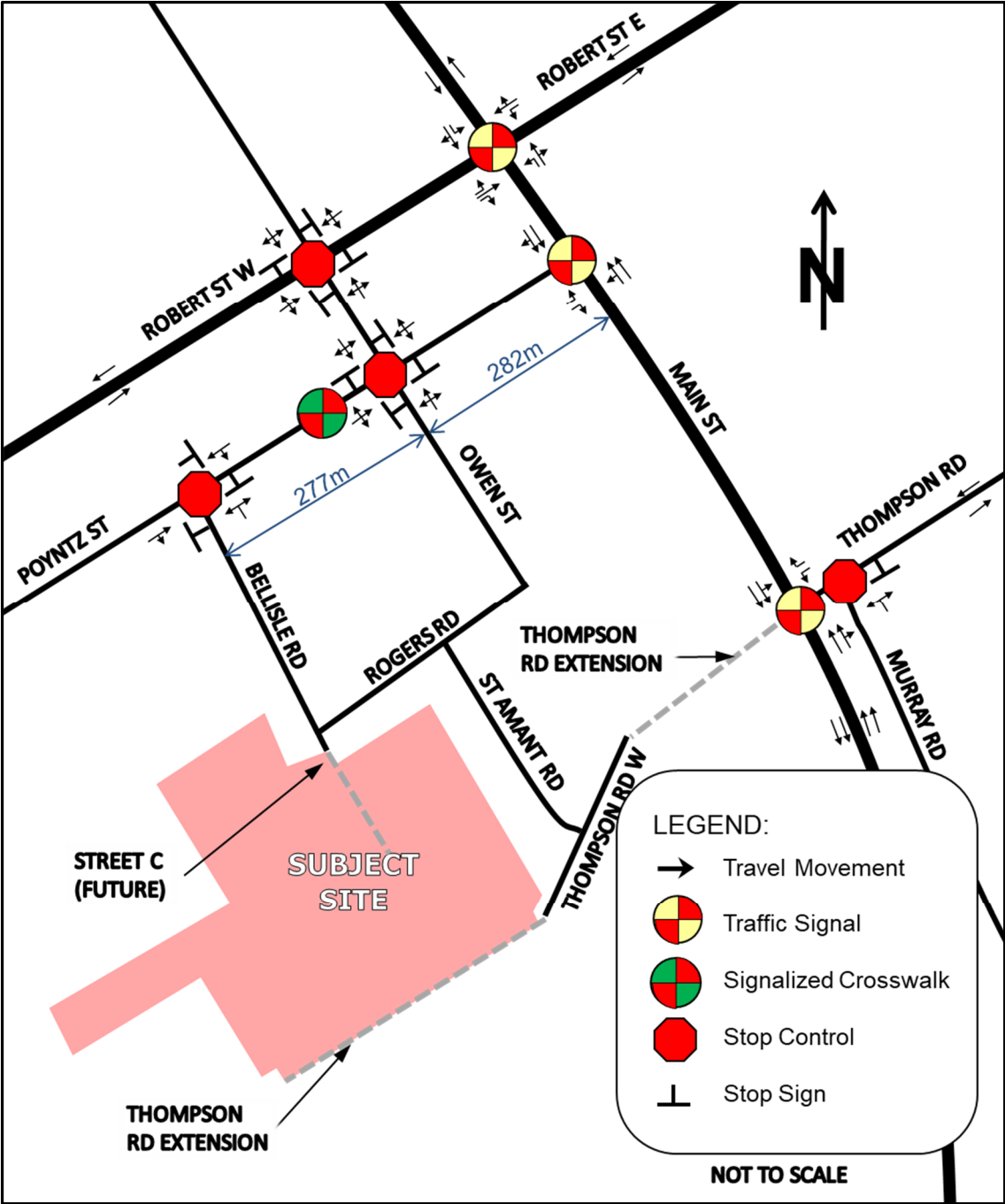
Poyntz Street is a two-lane local road with an urban cross section and a sidewalk on both sides of the road. Poyntz Street has a posted speed limit of 50km/h. Poyntz Street is under the jurisdiction of the Town.

Bellisle Road is a two-lane local road with an urban cross section, a sidewalk on the west side of the road, south of Gignac Drive and a sidewalk on the east side of the road north of Gignac Drive. Bellisle Road has an assumed posted speed limit of 50km/h. Bellisle Road is under the jurisdiction of the Town.

Thompsons Road is a two-lane road with an urban cross section and a sidewalk on the north side of the road. Thompsons Road has a posted speed limit of 50km/h. Thompsons Road East is a collector road and Thompsons Road West (within the subject site) is an arterial road. Thompsons Road is under the jurisdiction of the Town.

The existing intersection spacing and lane configuration within the study area is illustrated in **Figure 2**.

Figure 2 – Existing Intersection Spacing and Lane Configuration with in Study Area



2.2 Local Transportation Infrastructure Improvements

Based on discussions with the Town, the following road improvements are anticipated to begin construction in 2018:

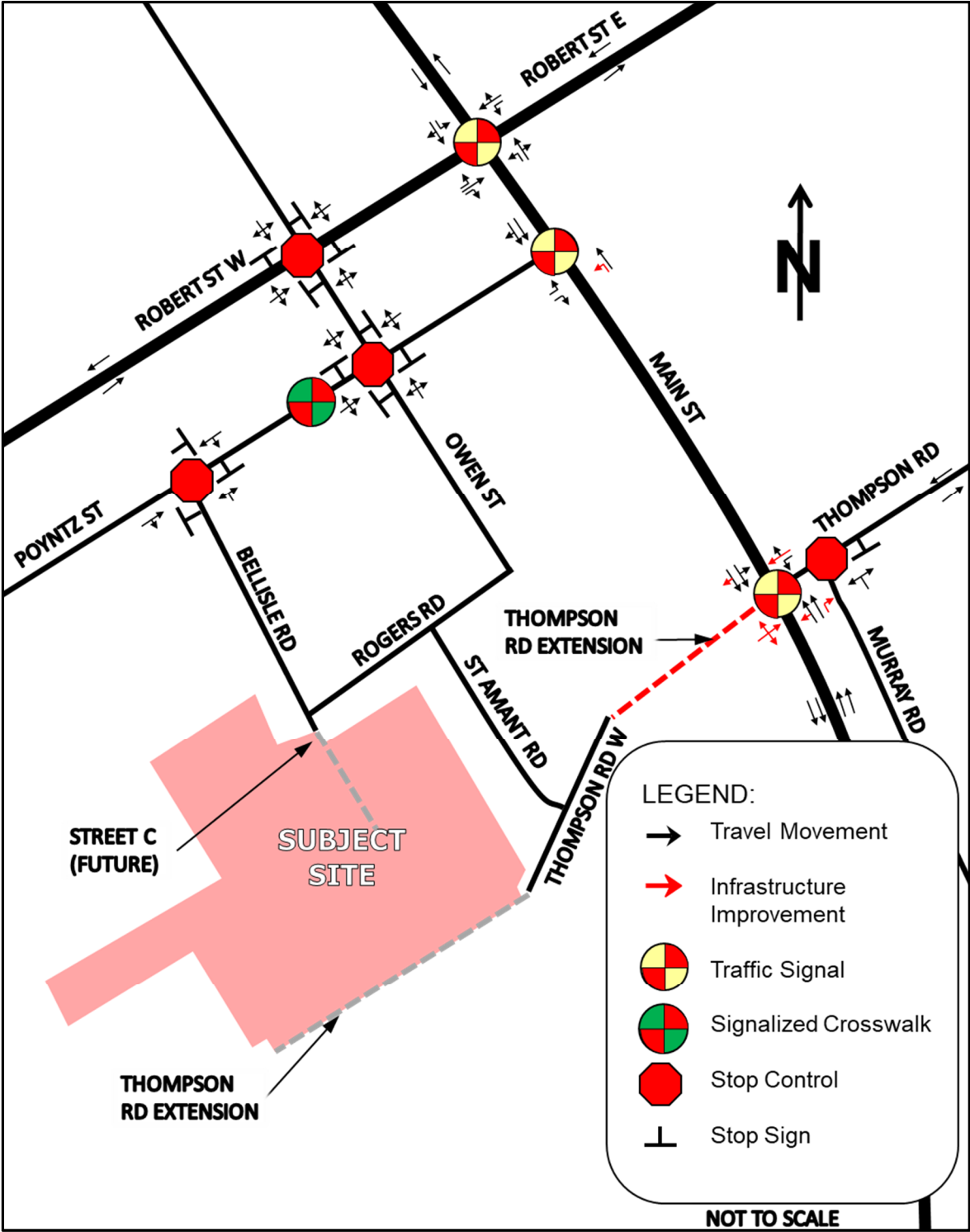
- Main Street (within study area)
 - Reconstruction of Road

Based on discussions with the Town, the following road improvements are anticipated to begin construction in 2020:

- Thompsons Road (within study area)
 - Extension of Thompsons Road to Main Street

The future intersection spacing and lane configuration within the study area is illustrated in **Figure 3**. It is anticipated that all infrastructure improvements are to be completed prior to the background (2028) horizon year. The impact of the Thompsons Road infrastructure improvement noted above is discussed further in Section 6.

Figure 3 – Future Intersection Spacing and Lane Configuration with in Study Area



2.3 Transit Access

The Penetanguishine bus route connects the Town of Penetanguishene with the Town of Midland. This bus route provides bus service to various points of interest within the Town, travelling along sections of Poyntz Street, Main Street, Robert Street and Bellisle Road within the study area.

The Penetanguishene bus route operates between 06:30 – 17:30 on weekdays and 08:30 – 16:30 on Saturdays with service every 60 minutes. There is no bus service on Sundays or Holidays. The closest bus stop to the Harbour Point Subdivision for the Penetanguishine bus route is located in the Village Square Mall. It is noted that this bus route provides a “flag on” service where passengers are not required to be at a bus stop and can “flag down” the along its route to get on the bus.

2.4 Other Developments within the Study Area

Based on discussions with Town staff, there are two planned developments in the study area that will have a notable impact on the local traffic volumes, specifically:

- Shoppers Drug Mart development; and
- Georgian Bay Cancer Support Centre Office Building.

2.4.1 Traffic Generation for the Shoppers Drug Mart Development

The Shoppers Drug Mart development is located in the northwest corner of the Main Street / Poyntz Street intersection.

Based on correspondence with Town staff, the estimated trip generation for the Shoppers Drug Mart development, as calculated in the Traffic Impact Study for said development, is illustrated below in **Table 1**. It is anticipated that this development will be fully built-out prior to the 2028 horizon year.

The number of pass-by trips generated by the above noted adjacent development has been based on the Institute of Transportation Engineers [ITE] *Trip Generation Manual* (10th Edition) [ITE Trip Generation Manual]. The following ITE land use has been applied to estimate the traffic from the Shoppers Drugmart Development:

- ITE land use 880 (Pharmacy/Drugstore without Drive-Through Window)

Table 1 - Estimated Traffic Generation of Shoppers Drug Mart Development

Development	AM Peak Hour			PM Peak Hour		
	IN	OUT	TOTAL	IN	OUT	TOTAL
Shopper Drug Mart	21	11	32	44	44	88
PASS-BY TRIPS (ITE Land Use: 880)*	0	0	0	-23	-23	-46
TOTAL PRIMARY TRIPS	21	11	32	21	21	42

* Shoppers Drug Mart pass-by trips for the AM and PM peak hour are 0% and 53% respectively, according to the ITE data for ITE land use 880.

No transportation modal split has been applied to the above-noted traffic generation calculation.

2.4.2 Traffic Generation for the Georgian Bay Cancer Centre Office Building

The Georgian Bay Cancer Support Centre Office Building is located at 31 Lucy Street and is anticipated to include 5,000 sq.ft. for office, service and activity type uses. It is anticipated that this development will be fully built-out prior to the 2028 horizon year.

The traffic generation for the Georgian Bay Cancer Support Centre Office Building has been based on the ITE Trip Generation Manual. The following ITE land use has been applied to estimate the traffic from the Georgian Bay Cancer Support Centre Office Building:

- ITE land use 715 (Single Tenant Office Building)

The estimated trip generation of the Georgian Bay Cancer Support Centre Office Building is illustrated below in **Table 2**.

Table 2 - Estimated Traffic Generation of the Georgian Bay Cancer Support Centre Office Building

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single Tenant Office Building ITE Land Use: 715	5,000 sq.ft.	8	1	9	1	8	9

No transportation modal split has been applied to the above-noted traffic generation calculation.

2.4.3 Traffic Assignment for the Adjacent Developments

For the purposes of this study it has been assumed that all primary trip traffic generated by the Shoppers Drug Mart development and Georgian Bay Cancer Support Centre Office Building will be new traffic and would not be in the study area if the development was not constructed.

The distribution of traffic for the adjacent developments is assumed to follow the distribution of the existing traffic volumes within the study area, obtained through the detailed turning movement counts.

The estimated distribution of trips generated by the adjacent developments is illustrated in **Table 3**.

Table 3 - Adjacent Developments' Traffic Distribution

Scenario	Direction	Ingress / Egress Traffic Direction								
		Eastbound via Robert Street West*	Southbound via Main Street	Westbound Robert Street East*	Eastbound via Poyntz Street*	Northbound via Bellisle Road	Northbound via Owen Street	Southbound via Owen Street	Northbound via Main Street	Westbound via Thompsons Road
AM	In	16%	9%	13%	8%	3%	2%	6%	29%	13%
	Out	11%	8%	17%	4%	4%	2%	4%	42%	8%
PM	In	11%	8%	12%	9%	2%	1%	5%	41%	12%
	Out	11%	9%	11%	5%	9%	2%	5%	36%	11%

*Based on the location of the Georgian Bay Cancer Support Centre Office Building, Traffic Distribution to and from the east will not be within the study area

Figures A and B in Appendix B illustrate the Shoppers Drug Mart primary and pass-by traffic assignment within the study area.

Figure C in **Appendix B** illustrates the Georgian Bay Cancer Support Centre Office Building traffic assignment within the study area.

2.5 Background Growth Rate

The County's Historical Average Annual Daily Traffic [AADT] for County Road 93 (the extension of Main Street, south of the study area) was reviewed; however historic data near the Town was not available beyond 2006.

The population forecasts from the County's Transportation Master Plan [TMP], the Town's Development Charge Background Study [DCBS] and the Province's Growth Plan for the Greater Golden Horseshoe Area [GP] were reviewed to determine the annual background growth rate expected within the study area. The Town's population statistics for 2006 was compared to the projected population in 2031 from the TMP and the Town's population statistics for 2016 were compared to the projected population in 2031 from the DCBS and GP as illustrated in **Table 4**.

Table 4 – Population Statistics

Year	Population		
	TMP	GP	DCBS
2006	9700	-	-
2016	-	9387	9387
2031	12300	11000	10470
% Growth per Year	1.19%	1.06%	0.73%

The largest background traffic growth rate calculated is 1.19%; however, in order to be conservative and to stay consistent with other recent traffic studies, a background growth rate of 2% has been applied to the existing traffic counts to estimate the background traffic volume within the study area.

2.6 Traffic Counts

Detailed turning movement traffic and pedestrian counts were commissioned by JD Engineering for all existing study area intersections.

Table 5 summarizes the traffic count data collection information.

Table 5 – Traffic Count Data

Intersection (N-S Street / E-W Street)	Count Date	AM Peak Hour	PM Peak Hour	Source
Main Street / Robert Street	Thursday, December 14, 2017	08:00 – 09:00	16:00 – 17:00	JD Eng.*
Main Street / Poyntz Street	Thursday, December 14, 2017	08:00 – 09:00	16:15 – 17:15	JD Eng.*
Owen Street / Poyntz Street	Thursday, December 14, 2017	08:00 – 09:00	16:45 – 17:45	JD Eng.*
Bellisle Road / Poyntz Street	Thursday, December 14, 2017	08:00 – 09:00	17:00 – 18:00	JD Eng.*
Main Street / Thompsons Road	Thursday, December 14, 2017	08:00 – 09:00	16:00 – 17:00	JD Eng.*

*Traffic counts were completed by Accu-Traffic Inc. on behalf of JD Engineering.

Detailed traffic count data can be found in **Appendix C**. The peak hours of traffic generation for the study area intersections generally aligned with the anticipated peak hour of traffic generation by the Harbour Point Subdivision. Although the AM and PM peak periods at all study area intersections did

not exactly align, for the purpose of this report, we have assumed that the AM and PM peak hours are concurrent.

The background traffic growth rates discussed in Section 2.5 has been applied to the traffic volumes noted above to estimate the existing (2018) horizon year traffic volumes.

Heavy vehicle percentages from the traffic count data have also been included in the Synchro analysis.

Figure D in **Appendix B** illustrates the existing (2018) AM and PM peak hour traffic volumes within the study area.

2.7 Horizon Year Traffic Volumes

In addition to the adjacent development traffic volumes (outlined in Section 2.4), the background traffic growth rates discussed in Section 2.5 have also been applied to the existing traffic volumes to estimate the background (2028) horizon year traffic volumes.

Figure E in **Appendix B** illustrates the background (2028) horizon year AM and PM peak hour traffic volumes in the study area.

3 Intersection Operation without Proposed Development

3.1 Introduction

Existing year operational conditions were established to determine how the street network within the study area is currently functioning without the Harbour Point Subdivision. This provides a base case scenario to compare with future development scenarios. Traffic operations within the study area were evaluated using the 2018 traffic volumes with the existing road configuration and traffic control. The intersection performance was measured using the traffic analysis software, Synchro 9, a deterministic model that employs Highway Capacity Manual and Intersection Capacity Utilization methodologies for analyzing intersection operations. These procedures are accepted by provincial and municipal agencies throughout North America.

Synchro 9 enables the study area to be graphically defined in terms of streets and intersections, along with their geometric and traffic control characteristics. The user is able to evaluate both signalized and unsignalized intersections in relation to each other, thus not only providing level of service for the individual intersections, but also enabling an assessment of the impact the various intersections in a network have on each other in terms of spacing, traffic congestion, delay, and queuing.

Individual turning movements with a volume-to-capacity [V/C] ratio of 0.85 or greater are considered to be critical movements and have been highlighted in the LOS tables.

The intersection operations were also evaluated in terms of the LOS. LOS is a common measure of the quality of performance at an intersection and is defined in terms of vehicular delay. This delay includes deceleration delay, queue move-up time, stopped delay, and acceleration delay. LOS is expressed on a scale of A through F, where LOS A represents very little delay (i.e. less than 10 seconds per vehicle) and LOS F represents very high delay (i.e. greater than 50 seconds per vehicle for a stop sign controlled intersection and greater than 80 seconds per vehicle for a signalized intersection).

The LOS criteria for signalized and stop sign controlled intersections are shown in **Table 6**. A description of traffic performance characteristics is included for each LOS.

Table 6 – Level of Service Criteria for Intersections

LOS	LOS Description	Control Delay (seconds per vehicle)	
		Signalized Intersections	Stop Controlled Intersections
A	Very low delay; most vehicles do not stop (Excellent)	less than 10.0	less than 10.0
B	Higher delay; more vehicles stop (Very Good)	between 10.0 and 20.0	between 10.0 and 15.0
C	Higher level of congestion; number of vehicles stopping is significant, although many still pass through intersection without stopping (Good)	between 20.0 and 35.0	between 15.0 and 25.0
D	Congestion becomes noticeable; vehicles must sometimes wait through more than one red light; many vehicles stop (Satisfactory)	between 35.0 and 55.0	between 25.0 and 35.0
E	Vehicles must often wait through more than one red light; considered by many agencies to be the limit of acceptable delay	between 55.0 and 80.0	between 35.0 and 50.0
F	This level is considered to be unacceptable to most drivers; occurs when arrival flow rates exceed the capacity of the intersection (Unacceptable)	greater than 80.0	greater than 50.0

3.2 Existing Intersection Operation

The results of the LOS analysis under existing traffic volumes during the AM and PM peak hour can be found below in **Table 7**. Existing intersection geometry and traffic control have been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix D**.

Table 7 – Existing LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95 th % Queue (m)		V/C	Delay (s)	LOS	95 th % Queue (m)	
				Model	Actual				Model	Actual
Main Street / Robert Street (signalized)	0.27	12.8	B	-	-	0.31	12.1	B	-	-
EBL	0.14	17.2	B	8.2	30.0	0.14	19.5	B	7.9	30.0
EBT	0.43	18.8	B	-	-	0.22	19.9	B	-	-
EBR	0.08	16.8	B	7.6	25.0	0.07	19.1	B	9.7	25.0
WBL	0.47	19.6	B	-	-	0.55	23.5	C	-	-
WBTR	0.30	18.0	B	-	-	0.35	20.6	C	-	-
NBL	0.10	5.8	A	-	-	0.14	4.9	A	-	-
NBTR	0.19	6.2	A	-	-	0.25	5.4	A	-	-
SBL	0.01	5.2	A	1.2	10.0	0.01	4.2	A	1.3	10.0
SBTR	0.16	6.1	A	-	-	0.14	4.8	A	-	-
Main Street / Poyntz Street (signalized)	0.31	57.4	A	-	-	0.33	9.4	A	-	-
EBL	0.29	21.0	C	16.9	28.0	0.36	21.8	C	23.4	28.0
EBR	0.13	20.1	C	-	-	0.11	20.3	C	-	-
NBTL	0.31	5.9	A	-	-	0.33	6.0	A	-	-
SBTR	0.17	4.9	A	-	-	0.15	4.9	A	-	-
Main Street / Thompsons Road (signalized)	0.40	9.4	A	-	-	0.48	9.3	A	-	-
WBL	0.57	25.5	C	38.9	15.0	0.58	25.7	C	44.8	15.0
WBR	0.03	20.4	C	-	-	0.02	20.3	C	-	-
NBTR	0.25	5.8	A	-	-	0.38	6.7	A	-	-
SBTL	0.30	6.2	A	-	-	0.30	6.3	A	-	-
Owen Street / Poyntz Street (unsignalized)	-	9.4	A	-	-	-	9.4	A	-	-
EB	0.29	9.6	A	-	-	0.18	8.6	A	-	-
WB	0.28	9.3	A	-	-	0.39	10.0	A	-	-
Bellisle Road / Poyntz Street (unsignalized)	-	8.2	A	-	-	-	8.7	A	-	-
EBTR	0.24	8.4	A	-	-	0.23	8.2	A	-	-
WBTR	0.17	8.3	A	-	-	0.31	9.2	A	-	-

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1.

The 95th percentile queue for the westbound left turn lane movement at the intersection of Main Street / Thompsons Road (in the AM and PM peak hour) is longer than the existing left turn storage length. Based on our review of the operating capacity of the westbound movements, the additional queuing is not anticipated to result in any operational or traffic safety issues. The 95th percentile queue for this movement is expected to temporarily block the Murray Road / Thompsons Road intersection. The additional queuing in this case would result in potential additional delays for the northbound traffic on Murray Road, entering Thompsons Road. Based on our review of the V/C ratio for westbound movements on Thompsons Road at Main Street, the westbound queue will clear at every phase of the traffic signal, which will provide the opportunity for northbound movements at the Murray Road / Thompson Road intersection. Furthermore, based on the amount of existing development along Murray Road, the volume of traffic at this intersection will be relatively low. Consequently, the temporary queue on Thompson Street, which will block the Murray Road / Thompson Road intersection, will not result in a traffic capacity issue. Furthermore, there are nearby alternative routes

which provide access to Thompsons Road (Maria Street and James Street). Based on the above-noted review, the queuing on Thompsons Road at Main Street will not cause any traffic safety issues and the minor operational traffic constraints for northbound traffic on Murray Road are considered to be acceptable in this case.

The criterion outlined in Section E.7 of the Ontario Ministry of Transportation Geometric Design Standards for Ontario Highways [MTO GDSOH] (60vph minimum right turn volume warrant) has been used to assess whether an auxiliary right turn lane is required at all unsignalized intersections. Based on the above-noted criteria, the minimum traffic volume requirement has been met for a right turn lane at the Bellisle Road / Poyntz Street intersection in the eastbound direction during the PM peak hour and for a right turn lane at the Owen Street / Poyntz Street intersection in the westbound direction in the PM peak hour; however, since both these intersections are all-way stop control and the Synchro analysis shows that the intersections are operating with a very good LOS, a right turn lane is not recommended for these movements.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at any unsignalized intersections (results are provided in **Appendix E**).

No infrastructure improvements are recommended within the study area to accommodate the existing traffic volume.

3.3 Background (2028) Intersection Operation

The results of the LOS analysis under background (2028) traffic volumes during the AM and PM peak hour can be found below in **Table 8**. The lane improvement identified in Section 2.2 with existing traffic control has been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix F**.

Table 8 – Background (2028) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95 th % Queue (m)		V/C	Delay (s)	LOS	95 th % Queue (m)	
				Model	Actual				Model	Actual
Main Street / Robert Street (signalized)	0.34	13.3	B	-	-	0.40	12.1	B	-	-
EBL	0.16	17.0	B	9.4	30.0	0.13	17.2	B	8.9	30.0
EBT	0.47	18.9	B	-	-	0.20	17.5	B	-	-
EBR	0.10	16.6	B	7.8	25.0	0.09	16.9	B	10.7	25.0
WBL	0.56	21.0	C	-	-	0.53	20.6	C	-	-
WBTR	0.34	18.0	B	-	-	0.32	18.2	B	-	-
NBL	0.13	6.6	A	-	-	0.21	6.8	A	-	-
NBTR	0.25	7.2	A	-	-	0.34	7.7	A	-	-
SBL	0.01	5.7	A	1.5	10.0	0.01	5.5	A	1.7	10.0
SBTR	0.21	6.9	A	-	-	0.18	6.4	A	-	-
Main Street / Poyntz Street (signalized)	0.46	10.1	B	-	-	0.47	10.4	B	-	-
EBL	0.36	20.7	C	20.6	28.0	0.47	21.3	C	31.7	28.0
EBR	0.16	19.6	B	-	-	0.14	19.2	B	-	-
NBL	0.49	9.6	A	-	-	0.48	9.5	A	-	-
NBT	0.26	5.9	A	-	-	0.33	6.6	A	-	-
SBTR	0.21	5.4	A	-	-	0.19	5.6	A	-	-
Main Street / Thompsons Road (signalized)	0.48	10.1	B	-	-	0.49	10.0	A	-	-
WBL	0.64	27.0	C	46.7	15.0	0.66	27.6	C	54.8	15.0
WBR	0.04	20.1	C	-	-	0.02	19.9	B	-	-
NBT	0.25	6.2	A	-	-	0.36	7.0	A	-	-
NBR	0.14	5.8	A	11.7	1.0	0.24	6.6	A	22.5	1.0
SBTL	0.37	7.1	A	-	-	0.38	7.2	A	-	-
Owen Street / Poyntz Street (unsignalized)	-	10.6	B	-	-	-	10.7	B	-	-
EB	0.38	11.1	B	-	-	0.23	9.2	A	-	-
WB	0.36	10.6	B	-	-	0.51	11.8	B	-	-
Bellisle Road / Poyntz Street (unsignalized)	-	8.7	A	-	-	-	9.4	A	-	-
EBTR	0.31	9.0	A	-	-	0.29	8.7	A	-	-
WBTL	0.21	8.7	A	-	-	0.39	10.1	B	-	-

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1.

The 95th percentile queue for the eastbound left turn lane movement at the Main Street / Poyntz Street intersection (PM peak hour) is longer than the existing left turn storage length; however, as the additional queue is only marginally longer than the storage length, the additional queueing is not expected to cause any operational or safety concerns in this case.

The 95th percentile queue for the westbound left turn lane movement at the intersection of Main Street / Thompsons Road (in the AM and PM peak hour) is longer than the existing left turn storage length. For the same reasons outlined in Section 3.2, the additional queueing is not anticipated to result in any

operational or traffic safety issues on Thompsons Road and the minor operational traffic constraints for northbound traffic on Murray Road are considered to be acceptable in this case.

The criterion outlined in Section E.7 of the MTO GDSOH (60vph minimum right turn volume warrant) has been used to assess whether an auxiliary right turn lane is required at all unsignalized intersections. Based on the above-noted criteria, the minimum traffic volume requirement has been met for a right turn lane at the Bellisle Road / Poyntz Street intersection in the eastbound direction during the PM peak hour and for a right turn lane at the Owen Street / Poyntz Street intersection in the westbound direction in the PM peak hour; however, since both these intersections are all-way stop control and the Synchro analysis shows that the intersections are operating with a very good LOS, a right turn lane is not recommended for these movements.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at any unsignalized intersections (results are provided in **Appendix E**).

No infrastructure improvements are recommended within the study area to accommodate the background (2028) traffic volume.

4 Proposed Development Traffic Generation and Assignment

4.1 Traffic Generation

The traffic generation for the Harbour Point Subdivision has been based on the ITE Trip Generation Manual. The following ITE land use has been applied to estimate the traffic from the Harbour Point Subdivision:

- ITE land use 210 (Single-Family Detached Housing) – General Urban / Suburban Setting
- ITE land use 221 (Multifamily Housing (Mid-Rise)) – General Urban / Suburban Setting

The estimated trip generation of the Harbour Point Subdivision is illustrated below in **Table 9**. The AM and PM peak traffic generation for the Harbour Point Subdivision does not exactly align with the AM and PM peak hour in the traffic counts; consequently, we have applied the peak hour of adjacent street traffic values provided in the ITE Trip Generation Manual.

Table 9 – Estimated Traffic Generation of Proposed Development

Land Use	Size	AM Peak Hour			PM Peak Hour		
		IN	OUT	TOTAL	IN	OUT	TOTAL
Single-Family Detached Housing ITE Land Use: 210	180 units ¹	33	100	133	113	66	179
Multifamily Housing (Mid-Rise) ITE Land Use: 221	30 units ²	3	8	11	9	5	14
TOTAL TRIP GENERATION		36	108	144	122	71	193

¹ The 110 single-detached units from Phase 1 have already been constructed and have been accounted for in the traffic counts. The traffic generation for ITE Land Use 210 is based on units from Phase 2 (73 single-detached units), Phase 3 (72 single-detached units) and Phase 4 (35 single-detached units)

² The traffic generation for ITE Land Use 221 is based on the future multi-residential units (Block 80) from Phase 1.

No transportation modal split has been applied to the above-noted traffic generation calculation.

4.2 Traffic Assignment

For the purposes of this study, it has been assumed that all traffic generated by the Harbour Point Subdivision will be new traffic and would not be in the study area if the development was not constructed.

The ITE data provides the anticipated percentage of new traffic entering and exiting during the peak hour. The distribution of traffic has been calculated based on the 2011 Transportation Tomorrow Survey [TTS] data for traffic zone 8665, retrieved using the TTS Internet Data Retrieval System [IDRS] (output attached as **Appendix G**). TTS data provides historical origin and destination work trip percentages for specific areas within the Town and the GTHA.

Traffic distribution for the trips generated by the Harbour Point Subdivision during the AM and PM peak hour is expected to generally follow commuter travel patterns. Our analysis is based on egress traffic during the AM peak hour. Logically, the distribution of ingress traffic will follow the inverse of the exiting traffic distribution. For each of the individual areas identified in the TTS data, we have selected the probable route of travel, assuming that people will select their route primarily based on travel time. The road network used in our analysis does not include the planned extension of Thompsons Road. An additional analysis is provided in Section 6 to assess the impact of the planned extension of Thompsons Road.

The distribution of trips is illustrated in **Table 10** using the methodology outlined above.

Table 10 – Proposed Development Traffic Distribution

Travel Direction (to / from)	Percentage of Total Traffic Generation
East via Robert Street	21%
West via Robert Street	12%
North via Main Street	10%
South via Main Street	51%
East via Thompsons Road	6%
TOTAL	100%

Using the traffic distribution pattern noted above, the site traffic assignment for the Harbour Point Subdivision was calculated for the AM and PM peak hour and is illustrated in **Figure F** in **Appendix B**.

4.3 Total Horizon Year Traffic Volumes with the Proposed Development

For the total (2028) horizon year traffic volumes, the Harbour Point Subdivision traffic was added to the background (2028) traffic volumes. The resulting total (2028) horizon year traffic volume for the AM and PM peak hour are illustrated in **Figure G** in **Appendix B**.

5 Intersection Operation with Proposed Development

5.1 Total (2028) Intersection Operation

The results of the LOS analysis under total (2028) traffic volumes excluding the Thompsons Road West connection (discussed further in Section 6) during the AM and PM peak hour can be found below in **Table 11**. The lane improvement identified in Section 2.2 with existing traffic control has been utilized for this scenario. Detailed output of the Synchro analysis can be found in **Appendix H**.

Table 11 – Total (2028) LOS

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95 th % Queue (m)		V/C	Delay (s)	LOS	95 th % Queue (m)	
				Model	Actual				Model	Actual
Main Street / Robert Street (signalized)	0.36	13.5	B	-	-	0.41	12.3	B	-	-
EBL	0.18	17.0	B	10.0	30.0	0.14	16.9	B	9.3	30.0
EBT	0.52	19.3	B	-	-	0.22	17.3	B	-	-
EBR	0.10	16.5	B	7.8	25.0	0.09	16.6	B	10.6	25.0
WBL	0.57	21.4	C	-	-	0.55	20.7	C	-	-
WBTR	0.36	18.0	B	-	-	0.35	18.1	B	-	-
NBL	0.14	6.7	A	-	-	0.21	7.1	A	-	-
NBTR	0.27	7.5	A	-	-	0.36	8.0	A	-	-
SBL	0.01	5.8	A	1.5	10.0	0.01	5.7	A	1.7	10.0
SBTR	0.22	7.0	A	-	-	0.20	6.7	A	-	-
Main Street / Poyntz Street (signalized)	0.52	11.1	B	-	-	0.58	11.4	B	-	-
EBL	0.41	21.0	C	23.2	28.0	0.48	21.4	C	33.3	28.0
EBR	0.21	19.8	B	-	-	0.16	19.2	B	-	-
NBL	0.56	11.0	B	-	-	0.62	12.8	B	-	-
NBT	0.27	6.0	A	-	-	0.33	6.8	A	-	-
SBTR	0.21	5.5	A	-	-	0.20	5.7	A	-	-
Main Street / Thompsons Road (signalized)	0.52	10.1	B	-	-	0.52	10.0	B	-	-
WBL	0.64	27.1	C	46.9	15.0	0.66	27.6	C	54.8	15.0
WBR	0.04	20.1	C	-	-	0.03	19.9	B	-	-
NBT	0.26	6.3	A	-	-	0.39	7.2	A	-	-
NBR	0.14	5.8	A	11.8	1.0	0.24	6.6	A	22.8	1.0
SBTL	0.42	7.4	A	-	-	0.41	7.4	A	-	-
Owen Street / Poyntz Street (unsignalized)	-	13.3	B	-	-	-	13.8	B	-	-
EB	0.59	15.4	C	-	-	0.34	10.8	B	-	-
WB	0.45	12.3	B	-	-	0.67	16.6	C	-	-
Bellisle Road / Poyntz Street (unsignalized)	-	9.8	A	-	-	-	10.0	A	-	-
EBTR	0.34	10.0	B	-	-	0.33	9.5	A	-	-
WBTL	0.24	9.5	A	-	-	0.41	10.9	B	-	-

The 95th percentile queue for the eastbound left turn lane movement at the Main Street / Poyntz Street intersection (PM peak hour) is longer than the existing left turn storage length; however, as the additional queue is only marginally longer than the storage length, the additional queueing is not expected to cause any operational or safety concerns in this case.

The 95th percentile queue for the westbound left turn lane movement at the intersection of Main Street / Thompsons Road (in the AM and PM peak hour) is longer than the existing left turn storage length. For the same reasons outlined in Section 3.2, the additional queueing is not anticipated to result in any operational or traffic safety issues on Thompsons Road and the minor operational traffic constraints for northbound traffic on Murray Road are considered to be acceptable in this case.

The 95th percentile queue for the northbound right turn lane movement at the intersection of Main Street / Thompsons Road (in the AM and PM peak hour) is also longer than the existing left turn storage length. The proposed road improvements on Main Street includes a northbound right turn taper at Thompsons Road, with no dedicated storage length. Consequently, the 95th percentile queue for the northbound right turn movement exceeds the storage length (in the AM and PM peak hour); however, the right turn taper lane is intended to function as a deceleration taper and not specifically to accommodate right turn storage. Consequently, the additional queueing is not expected to cause any operational or safety concerns in this case.

For illustrative purposes, a sensitivity analysis was completed with the auxiliary northbound right turn lane removed in the Synchro model at this intersection, to assess how this intersection would operate when the right turn taper lane is blocked. The results of the above-noted scenario during the AM and PM peak hour can be found below in **Table 12**. Detailed output of the Synchro analysis can be found in **Appendix H**.

Table 12 - Total (2028) LOS Sensitivity Analysis for Main Street / Thompsons Road Intersection

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95 th % Queue (m)		V/C	Delay (s)	LOS	95 th % Queue (m)	
				Model	Actual				Model	Actual
Main Street / Thompsons Road (signalized)	0.52	10.3	B	-	-	0.61	10.7	B	-	-
WBL	0.64	27.1	C	46.9	15.0	0.66	27.6	C	54.8	15.0
WBR	0.04	20.1	C	-	-	0.03	19.9	B	-	-
NBTR	0.33	6.8	A	-	-	0.51	8.3	A	-	-
SBTL	0.42	7.4	A	-	-	0.42	7.5	A	-	-

The results of the LOS analysis indicate that all intersections are operating within the typical design limits noted in Section 3.1.

The criterion outlined in Section E.7 of the MTO GDSOH (60vph minimum right turn volume warrant) has been used to assess whether an auxiliary right turn lane is required at all unsignalized intersections. Based on the above-noted criteria, the minimum traffic volume requirement has been met for a right turn lane at the Bellisle Road / Poyntz Street intersection in the eastbound direction during the PM peak hour and for a right turn lane at the Owen Street / Poyntz Street intersection in the westbound direction in the PM peak hour; however, since both these intersections are all-way stop control and the Synchro analysis shows that the intersections are operating with a very good LOS, a right turn lane is not recommended for these movements.

Based on the Ontario Traffic Manual Book 12 *Signal Justification*, traffic signals are not warranted at all unsignalized intersections (results are provided in **Appendix E**).

No infrastructure improvements are recommended within the study area to accommodate the total (2028) traffic volume.

5.2 John Street Connection

Previous submissions for the Harbour Point Subdivision included a connection to John Street which has been removed from the current site plan. The impact of this is considered to be negligible as there are two alternate connections from the proposed development to the north via Owen Street and Bellisle Road. Furthermore, there are four connections to the south to Thompsons Road West.

6 Thompsons Road West Connection

In order to assess the impact of the Thompsons Road West connection to Main Street, an additional analysis of the total (2028) scenario traffic was completed which included the planned future connection of Thompsons Road West to Main Street.

Using the traffic distribution pattern outlined in **Table 10**, the site traffic assignment was reevaluated to account for the Thompsons Road West connection during the AM and PM peak hour. The revised assignment of the traffic from the Harbour Point Subdivision is illustrated in **Figure H** in **Appendix B**.

In order to account for the redistribution of existing traffic to Thompsons Road West, 1/3 of the eastbound right turn and northbound left turn traffic at the Main Street / Poyntz Street intersection was reassigned to the Main Street / Thompsons Road intersection. This is to account for the traffic to and from the existing development southwest of Main Street / Robert Street. No traffic was reassigned from the Main Street / Robert Street intersection to Thompsons Road as Thompsons Road West will not connect with Robert Street by 2028. For the total (2028) horizon year traffic volumes with the Thompsons Road West connection, the Harbour Point Subdivision traffic with the Thompsons Road West connection was added to the background (2028) traffic volumes with the above noted traffic reassignment. The resulting total (2028) horizon year traffic volume for the AM and PM peak hour are illustrated in **Figure I** in **Appendix B**. **Figure J** in **Appendix B** is provided to illustrate the redistribution of traffic within the study area as a result of the Thompsons Road West connection during the Total (2028) scenario is provided in.

The results of the additional analysis with the Thompsons Road West connection to Main Street, during the AM and PM peak hour, can be found below in **Table 13**. Detailed output of the Synchro analysis can be found in **Appendix H**.

Table 13 - Total (2028) LOS with Thompsons Road West connection at Main Street

Location (N-S Street / E-W Street)	Weekday AM Peak Hour					Weekday PM Peak Hour				
	V/C	Delay (s)	LOS	95 th % Queue (m)		V/C	Delay (s)	LOS	95 th % Queue (m)	
				Model	Actual				Model	Actual
Main Street / Robert Street (signalized)	0.37	13.5	B	-	-	0.42	12.3	B	-	-
EBL	0.17	17.0	B	9.8	30.0	0.13	16.9	B	9.1	30.0
EBT	0.51	19.2	B	-	-	0.21	17.2	B	-	-
EBR	0.10	16.5	B	7.8	25.0	0.09	16.6	B	10.5	25.0
WBL	0.57	21.2	C	-	-	0.56	20.8	C	-	-
WBTR	0.36	18.0	B	-	-	0.35	18.1	B	-	-
NBL	0.14	6.7	A	-	-	0.21	7.1	A	-	-
NBTR	0.28	7.5	A	-	-	0.36	8.0	A	-	-
SBL	0.01	5.8	A	1.5	10.0	0.01	5.7	A	1.7	10.0
SBTR	0.22	7.0	A	-	-	0.20	6.7	A	-	-
Main Street / Poyntz Street (signalized)	0.36	9.5	A	-	-	0.39	9.8	A	-	-
EBL	0.40	21.0	C	22.5	28.0	0.48	21.4	C	32.9	28.0
EBR	0.12	19.4	B	-	-	0.10	18.9	B	-	-
NBL	0.35	7.6	B	-	-	0.36	8.0	A	-	-
NBT	0.27	6.0	A	-	-	0.33	6.8	A	-	-
SBTR	0.21	5.4	A	-	-	0.20	5.7	A	-	-
Main Street / Thompsons Road (signalized)	0.52	12.9	B	-	-	0.65	12.2	B	-	-
EB	0.12	20.1	C	-	-	0.10	20.0	B	-	-
WBL	0.79	36.4	D	56.7	15.0	0.75	32.8	C	65.0	15.0
WBTR	0.06	19.6	B	-	-	0.05	19.7	B	-	-
NBT	0.35	7.6	A	-	-	0.53	9.3	A	-	-
NBR	0.11	6.2	A	6.8	1.0	0.21	6.8	A	17.0	1.0
SB	0.35	7.6	A	-	-	0.36	7.6	A	-	-
Owen Street / Poyntz Street (unsignalized)	-	10.2	B	-	-	-	10.1	B	-	-
EB	0.38	11.0	B	-	-	0.21	9.2	A	-	-
WB	0.25	9.6	A	-	-	0.44	11.0	B	-	-
Bellisle Road / Poyntz Street (unsignalized)	-	9.0	A	-	-	-	9.2	A	-	-
EBTR	0.32	9.3	A	-	-	0.31	9.0	A	-	-
WBTL	0.14	8.6	A	-	-	0.33	9.8	A	-	-

As illustrated above, the local road network will be able to convey the total (2028) horizon year traffic and there is no significant improvement to the study area intersection operation with the Thompsons Road West connection.

7 Summary

Batavia Homes retained **JD Engineering** to prepare this traffic impact study in support of the proposed Phases 3 & 4 of the Harbour Point Subdivision (formerly known as the Bellisle Heights Subdivision) in the Town of Penetanguishene [Town], County of Simcoe [County]. The proposed Site Plan is shown in **Appendix A**. This chapter summarizes the conclusions and recommendations from the study.

The proposed Harbour Point Subdivision includes 320 residential units with the following phasing breakdown:

- Phase 1 – 110 single-detached & 30 apartment units
- Phase 2 – 73 single-detached
- Phase 3 – 72 single-detached
- Phase 4 – 35 single-detached

The 110 single-detached units in Phase 1 of the Harbour Point Subdivision have been constructed and are currently fully occupied.

Previous submissions for the Harbour Point Subdivision included a connection to John Street. The proposed Harbour Point Subdivision no longer includes the John Street connection, which is reflected in the analysis completed in this study.

1. The Harbour Point Subdivision is expected to generate a total of 144 AM and 193 PM peak hour trips.
2. Detailed turning movement counts were completed for all existing intersections on Thursday, December 14, 2017.
3. An intersection operation analysis was completed at the study area intersections, using the existing (2018) and background (2028) traffic volumes, with the adjacent development traffic and without the Harbour Point Subdivision traffic. This enabled a review of existing and future traffic deficiencies that would be present without the influence of the Harbour Point Subdivision. No geometric lane improvements or traffic signal improvements are recommended within the study area in order to accommodate the anticipated traffic for the existing (2018) or background (2028) scenario.
4. An estimate of the amount of traffic that would be generated by the Harbour Point Subdivision was prepared and assigned to the study area streets and intersections.
5. An intersection operation analysis was completed under total (2028) traffic volumes with the Harbour Point Subdivision operational at the study area intersections, with no connection at John Street and no extension of Thompson Road West to Main Street. This scenario included the planned road improvements on Main Street, as proposed by the Town. No additional geometric lane improvements or traffic signal improvements are recommended within the study area in order to accommodate the anticipated traffic for this scenario.
6. An intersection operation analysis was completed using the total (2028) traffic volumes with the proposed extension to Thompsons Road West to assess the traffic operation for this scenario. This scenario included the planned road improvements on Main Street, as proposed by the Town. Based on our analysis, no additional improvements are required within the study area for this scenario, with the proposed extension of Thompsons Road West.
7. In summary, the Harbour Point Subdivision will not cause any operational issues and will not add a notable delay or congestion to the local roadway network.

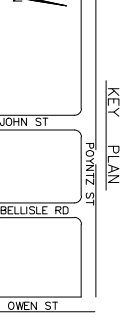
Appendix A – Site Plan

DRAFT PLAN OF SUBDIVISION
 PART OF EAST HALF OF LOT 114
 CONCESSION 1
 WEST OF PENETANGUISHENE ROAD
 TOWN OF PENETANGUISHENE
 COUNTY OF SIMCOE

SCALE - 1 : 1000

INFORMATION REQUIRED UNDER SECTION 51(17)
 OF THE PLANNING ACT, RSO 1990

- (a) AS INDICATED ON PLAN
- (b) KEY PLAN ILLUSTRATION
- (c) PROPOSED USES: RESIDENTIAL, AGRIC & FUTURE
- (d) ADJACENT USES: RESIDENTIAL, AGRIC & FUTURE
- (e) AS INDICATED ON PLAN
- (f) AS SET OUT BY THE MUNICIPAL
- (g) SANDY SILT SOIL
- (h) AS INDICATED ON PLAN
- (i) MUNICIPAL STORMS AVAILABLE INCLUDE WATER, SEWER AND STORM SEWERS
- (j) AS INDICATED ON PLAN



DATE	DESCRIPTION

SURVEYOR'S CERTIFICATE

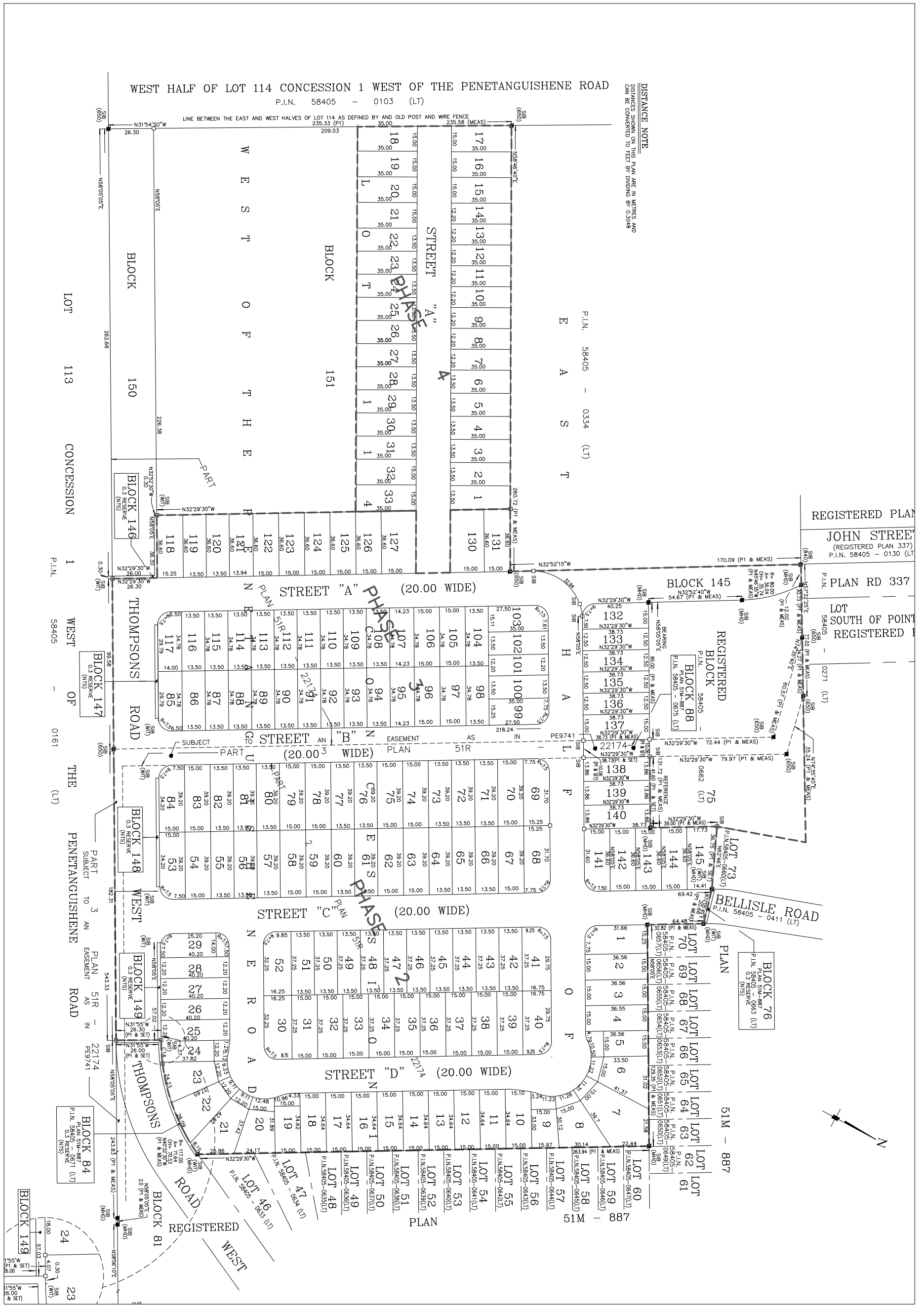
I hereby certify that the boundary of the land to be subdivided and its relationship to the adjacent lands are accurately and correctly shown on this plan.

dated Apr 28, 2018

[Signature]
 Rodney G. Reynolds Ontario Land Surveyor

LOCATION	INTENDED USE	UNITS	AREA
STREET A/B/C	ROAD ALLOWANCE	21	0.27ha
THOMPSONS RD	ROAD ALLOWANCE	21	0.27ha
LOTS 1-29	RESIDENTIAL(1.22m FRONTAGE)	09	0.29ha
LOTS 30-43	RESIDENTIAL(1.50m FRONTAGE)	14	0.33ha
LOTS 44-58	RESIDENTIAL(1.50m FRONTAGE)	15	0.34ha
LOTS 59-60	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 61-62	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 63-64	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 65-66	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 67-68	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 69-70	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 71-72	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 73-74	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 75-76	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 77-78	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 79-80	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 81-82	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 83-84	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 85-86	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 87-88	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 89-90	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 91-92	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 93-94	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 95-96	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 97-98	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 99-100	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 101-102	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 103-104	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 105-106	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 107-108	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 109-110	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 111-112	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 113-114	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 115-116	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 117-118	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 119-120	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 121-122	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 123-124	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 125-126	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 127-128	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 129-130	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 131-132	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 133-134	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 135-136	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 137-138	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 139-140	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 141-142	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 143-144	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 145-146	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 147-148	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 149-150	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 151-152	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 153-154	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 155-156	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 157-158	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 159-160	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 161-162	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 163-164	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 165-166	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 167-168	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 169-170	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 171-172	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 173-174	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 175-176	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 177-178	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 179-180	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 181-182	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 183-184	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 185-186	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 187-188	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 189-190	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 191-192	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 193-194	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 195-196	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 197-198	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
LOTS 199-200	RESIDENTIAL(1.50m FRONTAGE)	2	0.02ha
TOTAL	FUTURE ROAD ALLOWANCE	16.59ha	16.59ha

DE FREITAS ENGINEERING INC
 15 WATFIELD CRES UNIT 1000, ONTARIO, CANADA
 TEL: (905) 463-1008



DISTANCE NOTE
 DISTANCES SHOWN ON THIS PLAN ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

Appendix B – Traffic Volume Figures

FIGURE INDEX:

FIGURE A	Adjacent Development Traffic Volumes – Shoppers Drugmart Primary Traffic
FIGURE B	Adjacent Development Traffic Volumes – Shoppers Drugmart Pass-by Traffic
FIGURE C	Adjacent Development Traffic Volumes – Georgian Bay Cancer Centre Office Building
FIGURE D	Existing Traffic Volumes
FIGURE E	Background (2028) Traffic Volumes
FIGURE F	Site Traffic Assignment Excluding the Thompsons Road West Connection
FIGURE G	Total (2028) Traffic Volumes Excluding the Thompsons Road West Connection
FIGURE H	Site Traffic Assignment Including the Thompsons Road West Connection
FIGURE I	Total (2028) Traffic Volumes Including the Thompsons Road West Connection
FIGURE J	Total (2028) Traffic Volume Redistribution – Thompsons Road West Connection

Figure A - Adjacent Development Traffic Volumes – Shoppers Drugmart Primary Traffic

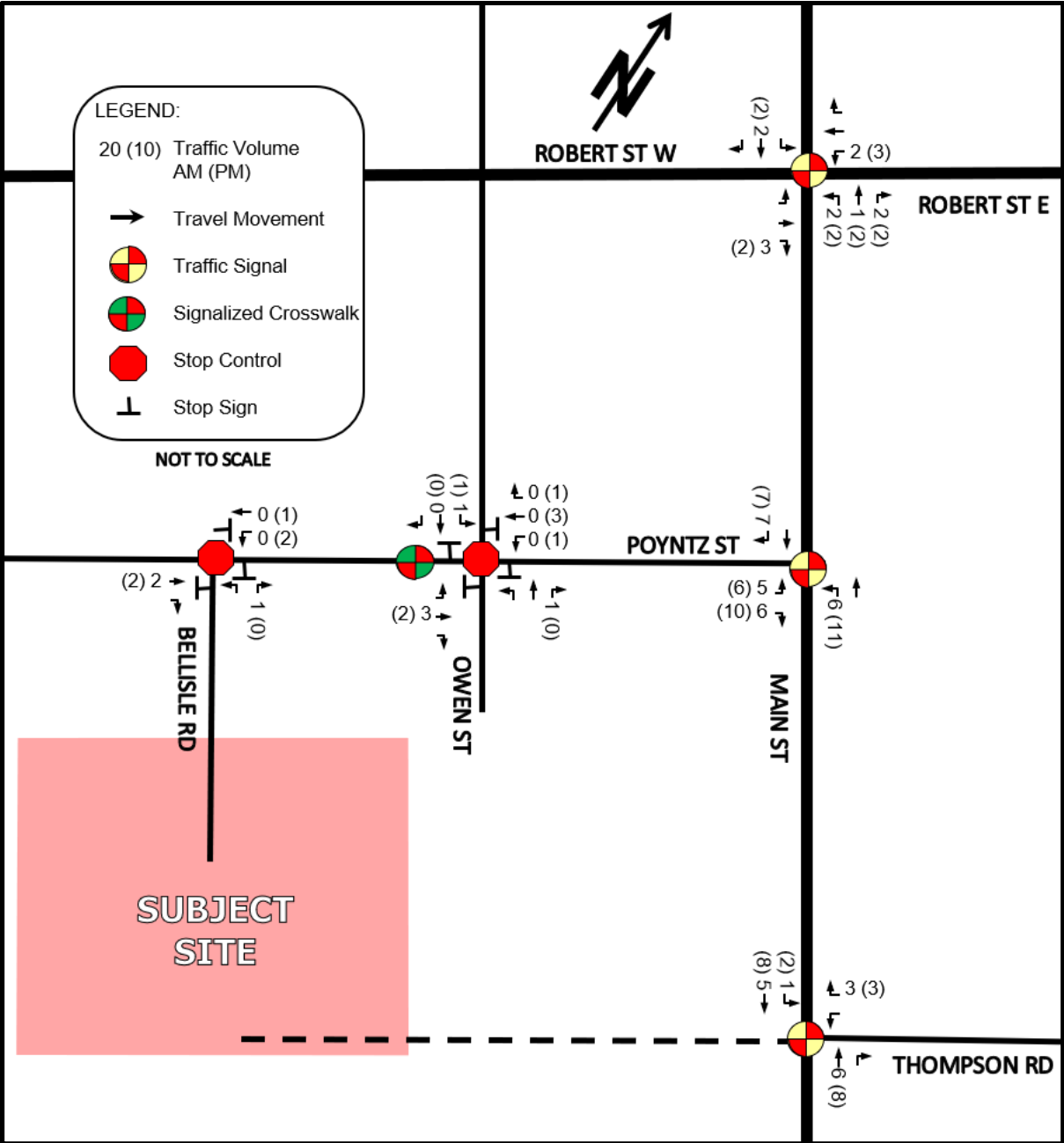


Figure B - Adjacent Development Traffic Volumes – Shoppers Drugmart Pass-by Traffic

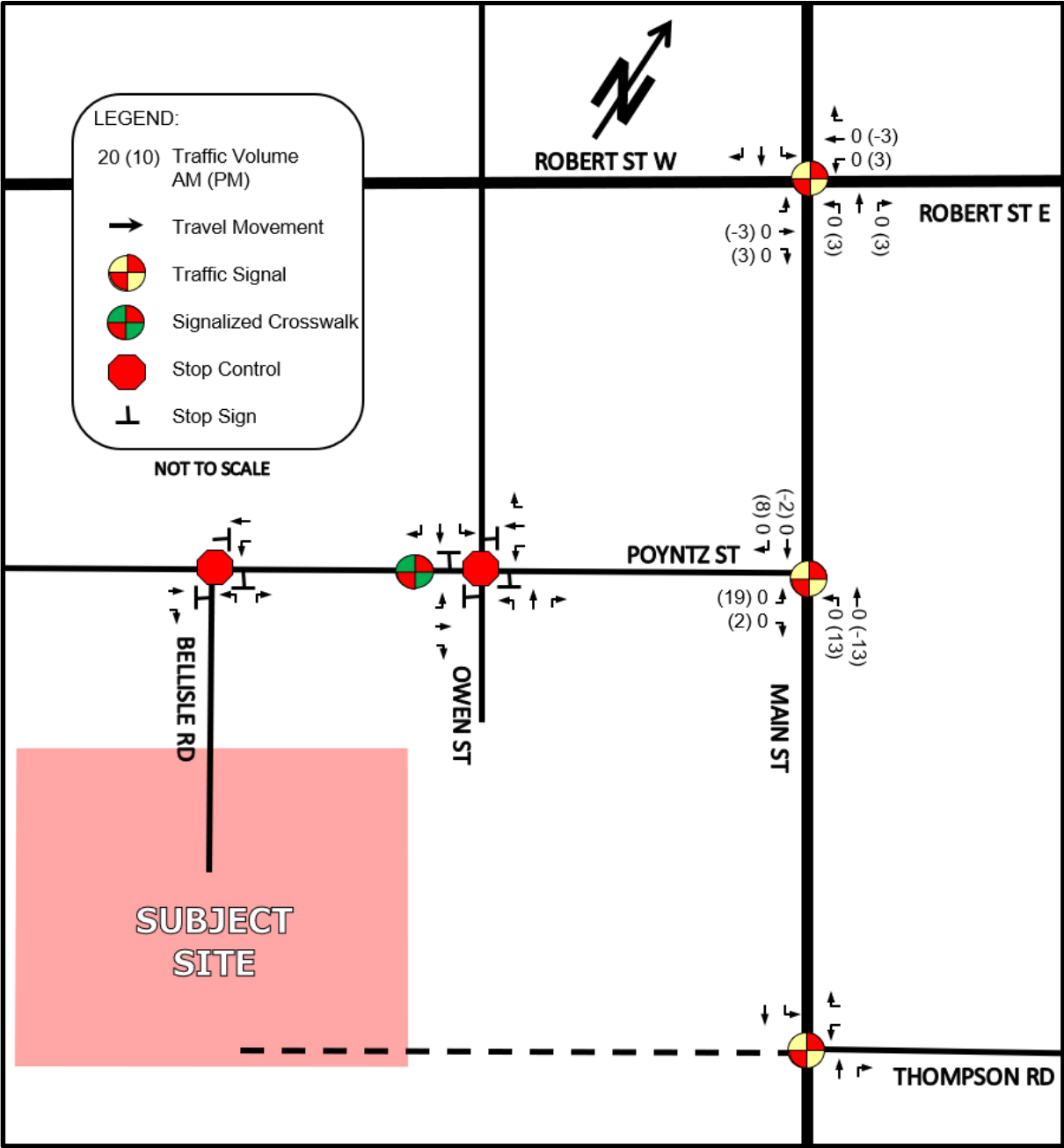


Figure C - Adjacent Development Traffic Volumes – Georgian Bay Cancer Centre Office Building

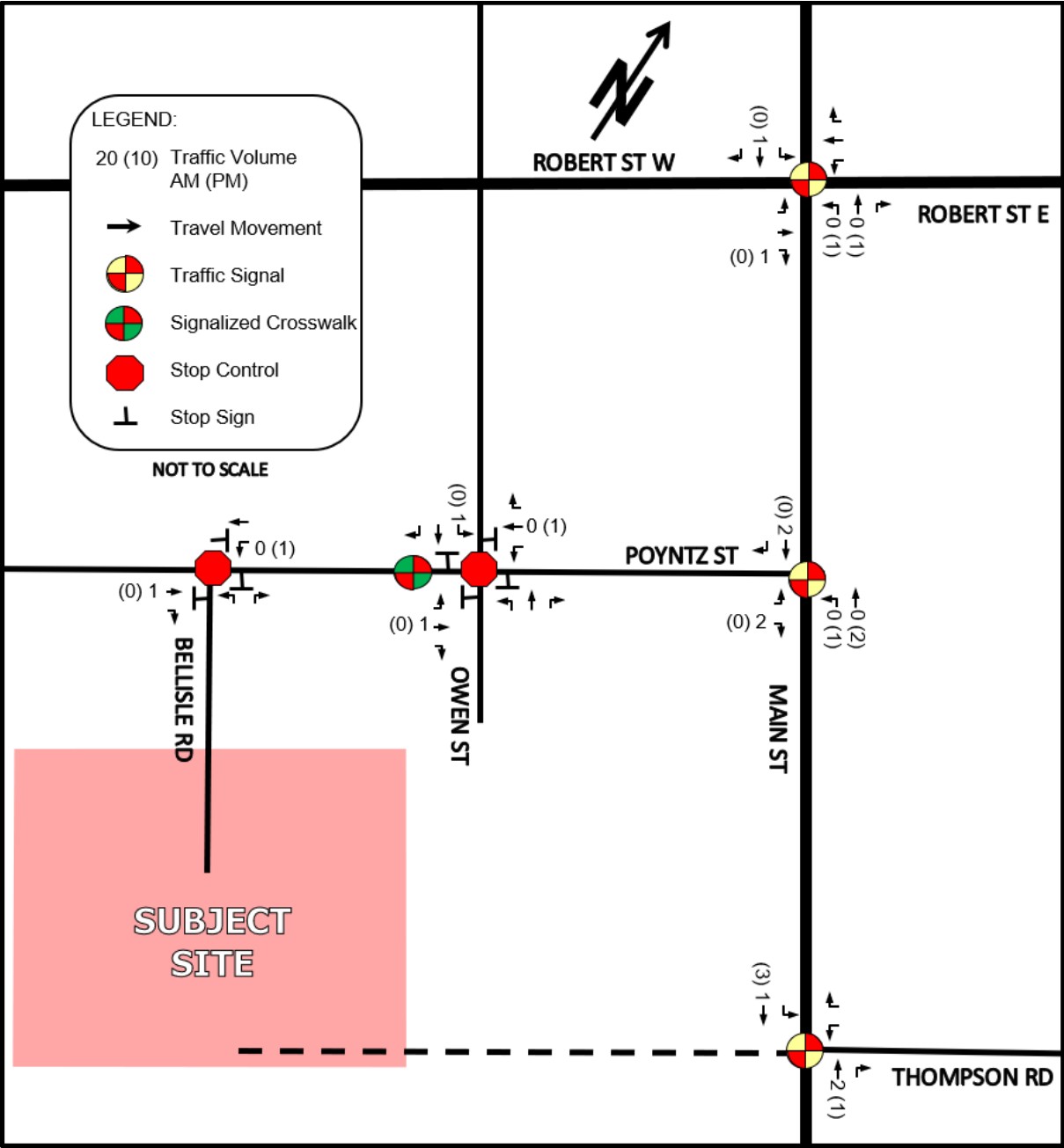


Figure D – Existing Peak Hour Traffic Volumes

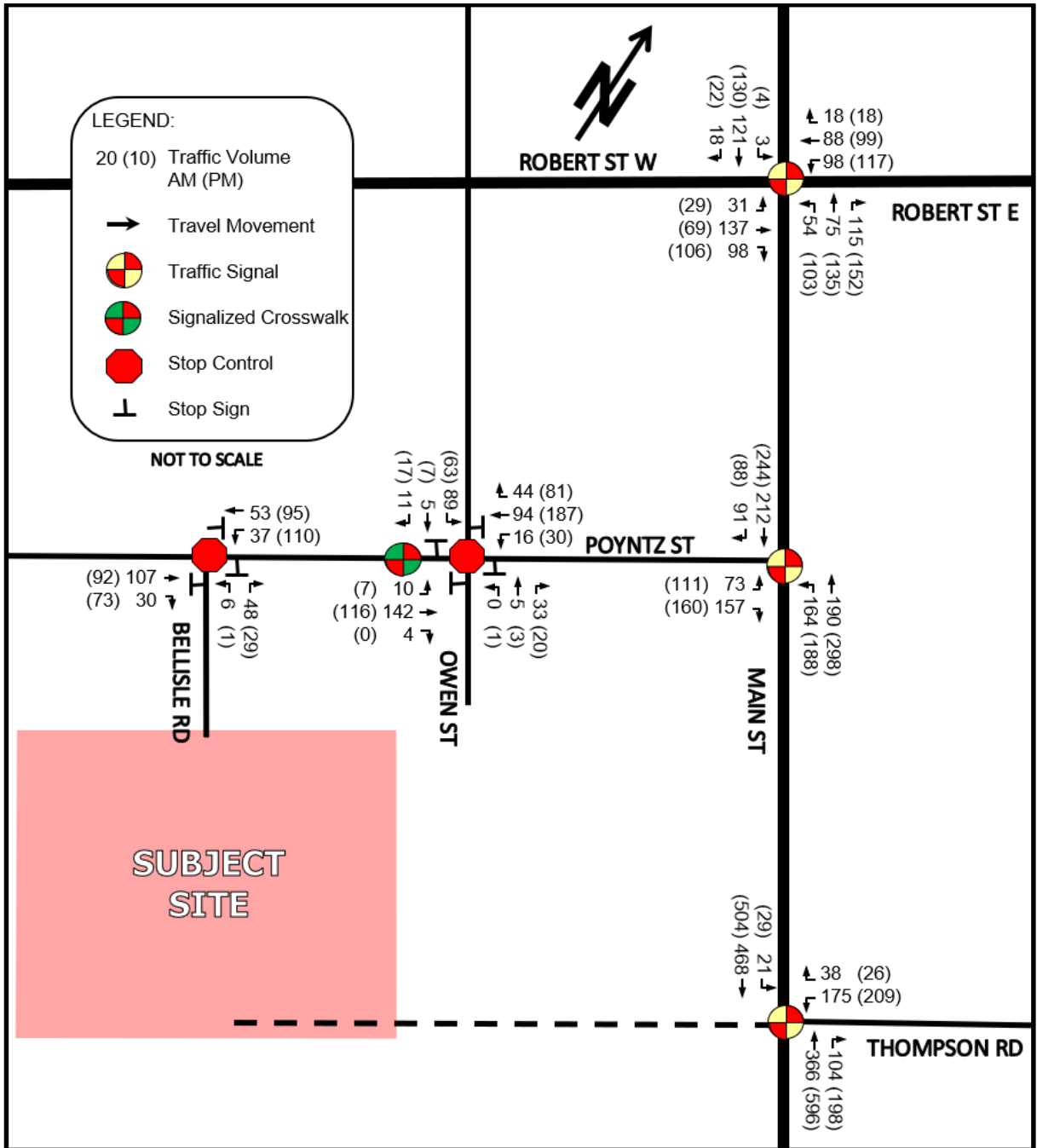


Figure E – Background (2028) Traffic Volumes

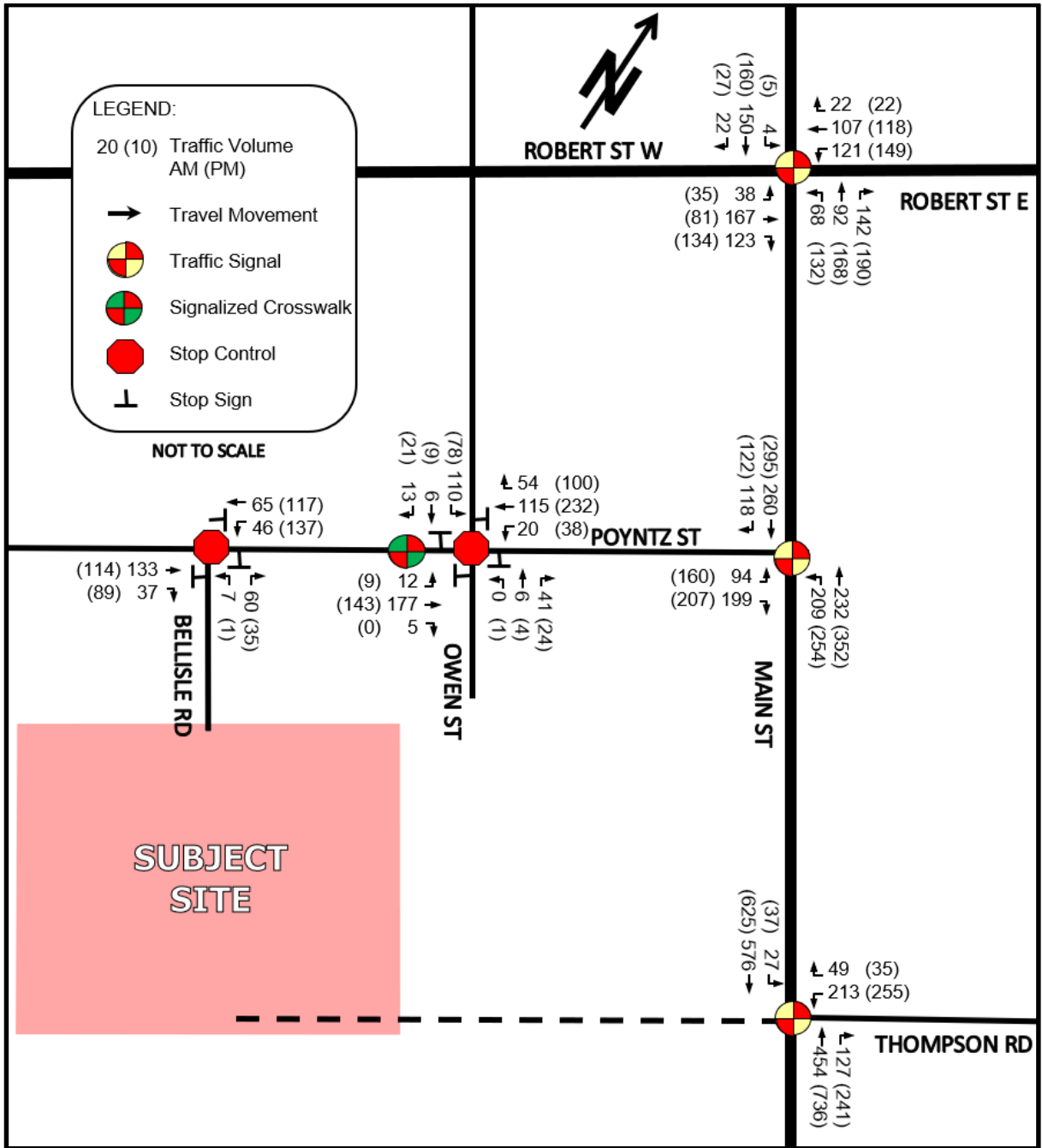


Figure F – Site Traffic Assignment Excluding the Thompsons Road West Connection

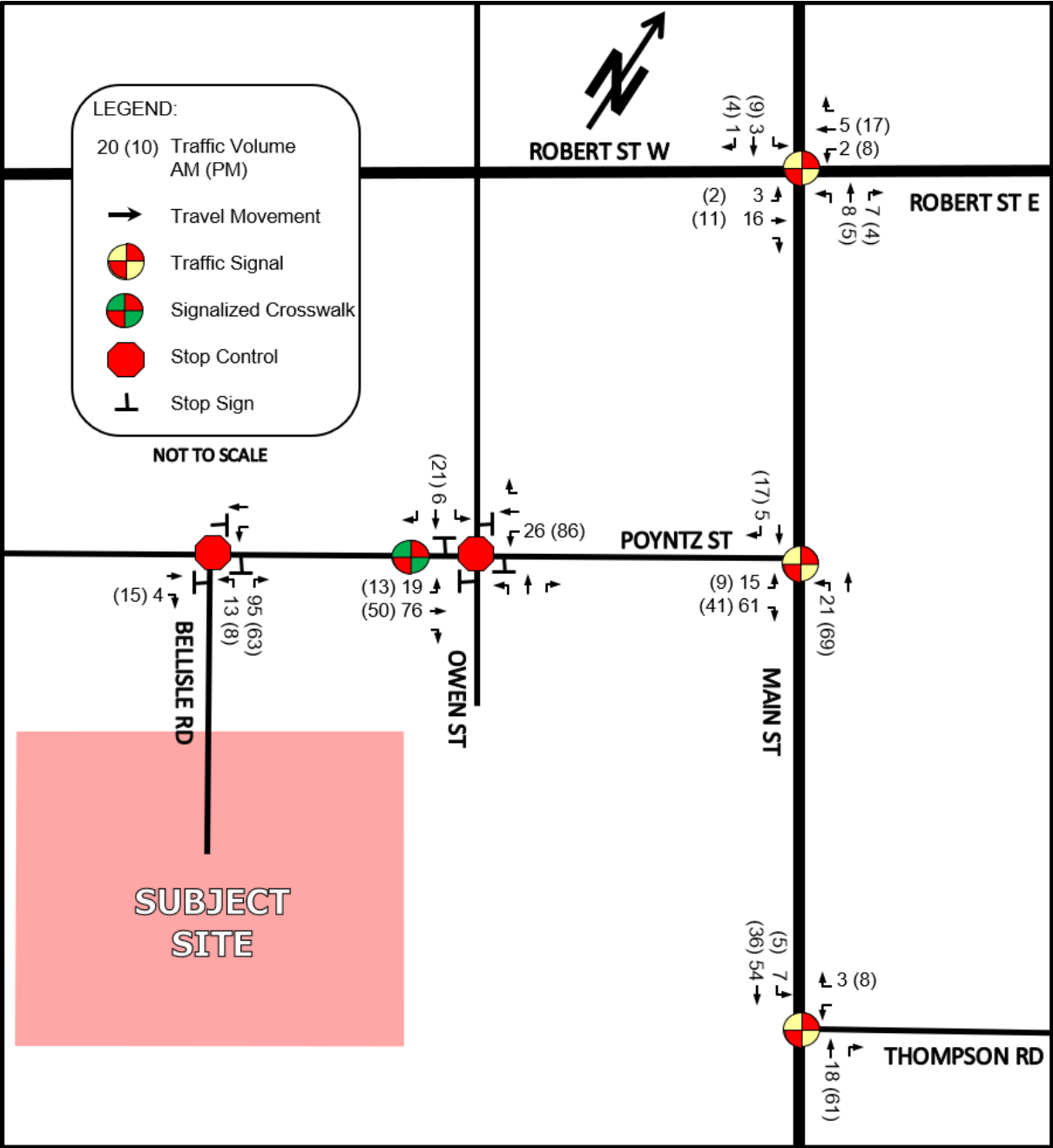


Figure G – Total (2028) Traffic Volumes Excluding the Thompsons Road West Connection

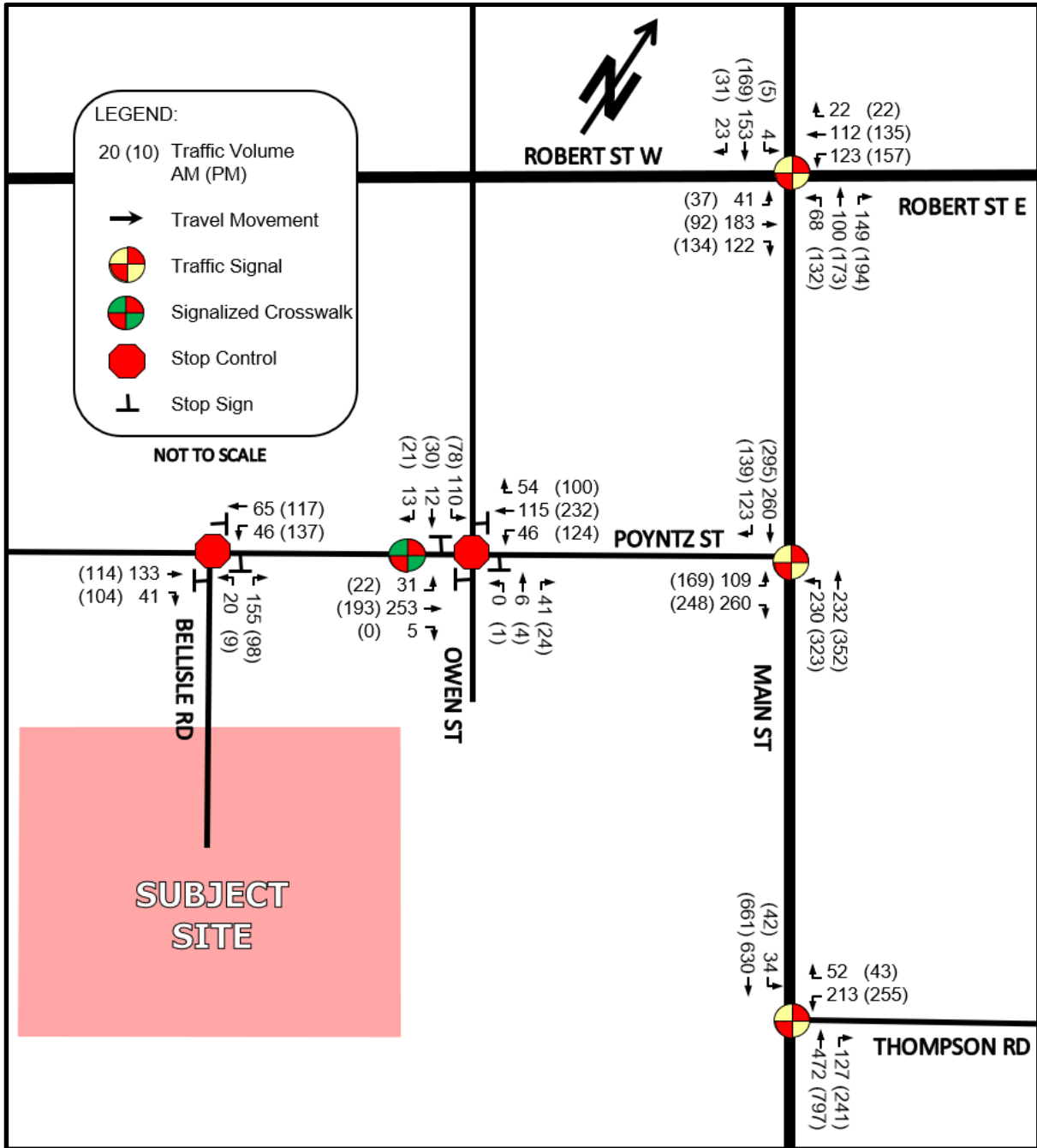


Figure H – Site Traffic Assignment Including the Thompsons Road West Connection

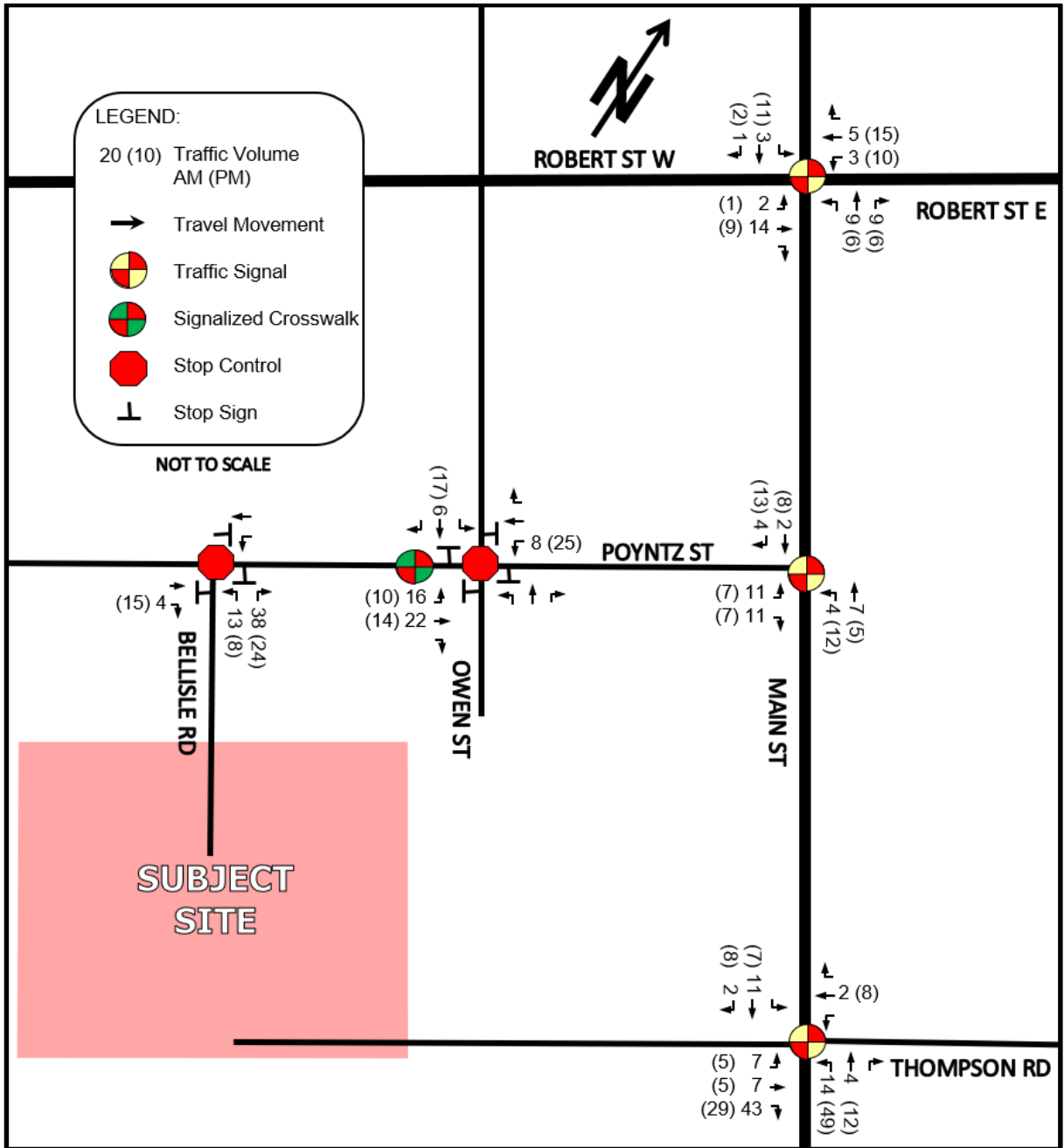


Figure I – Total (2028) Traffic Volumes Including the Thompsons Road West Connection

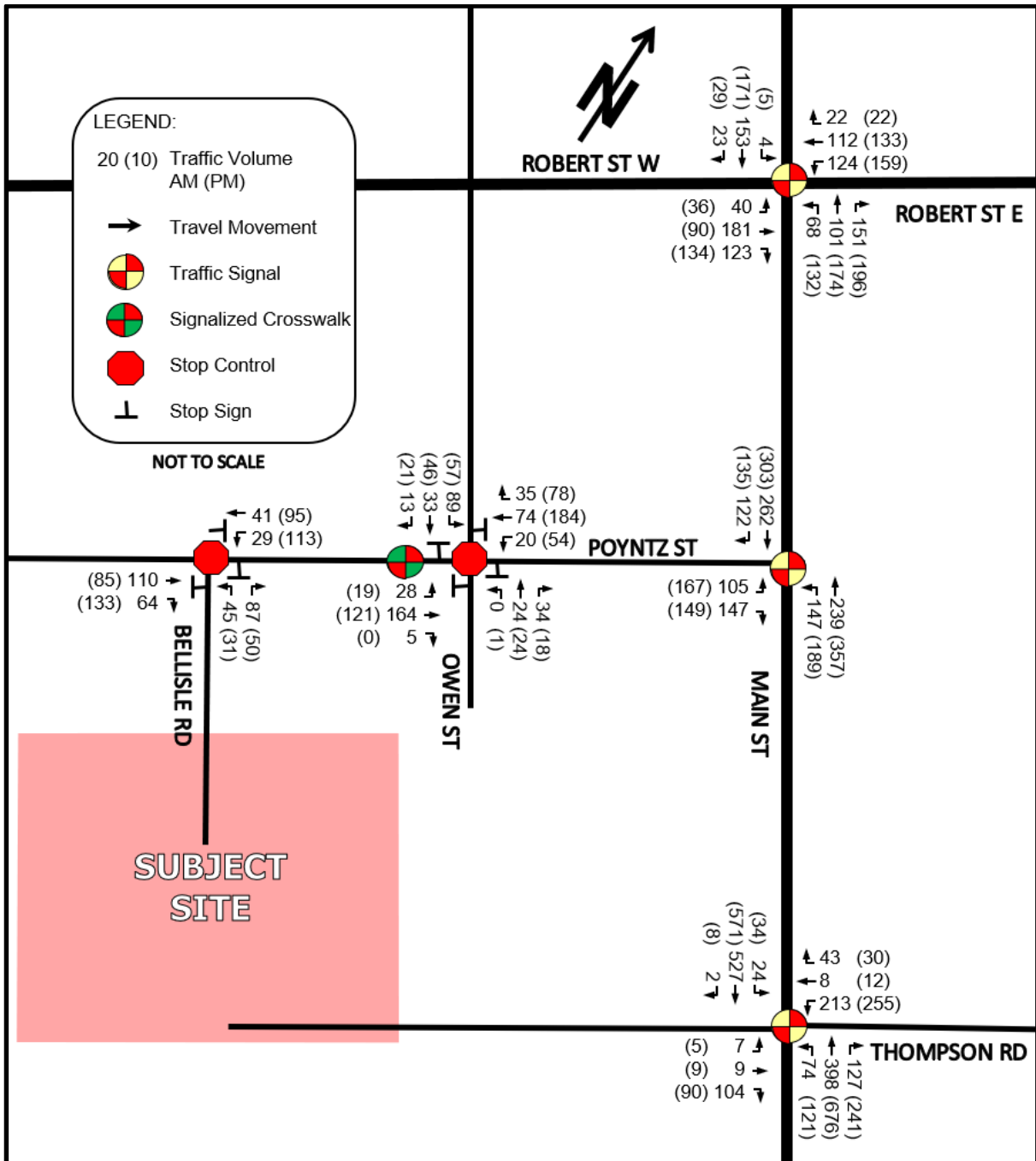
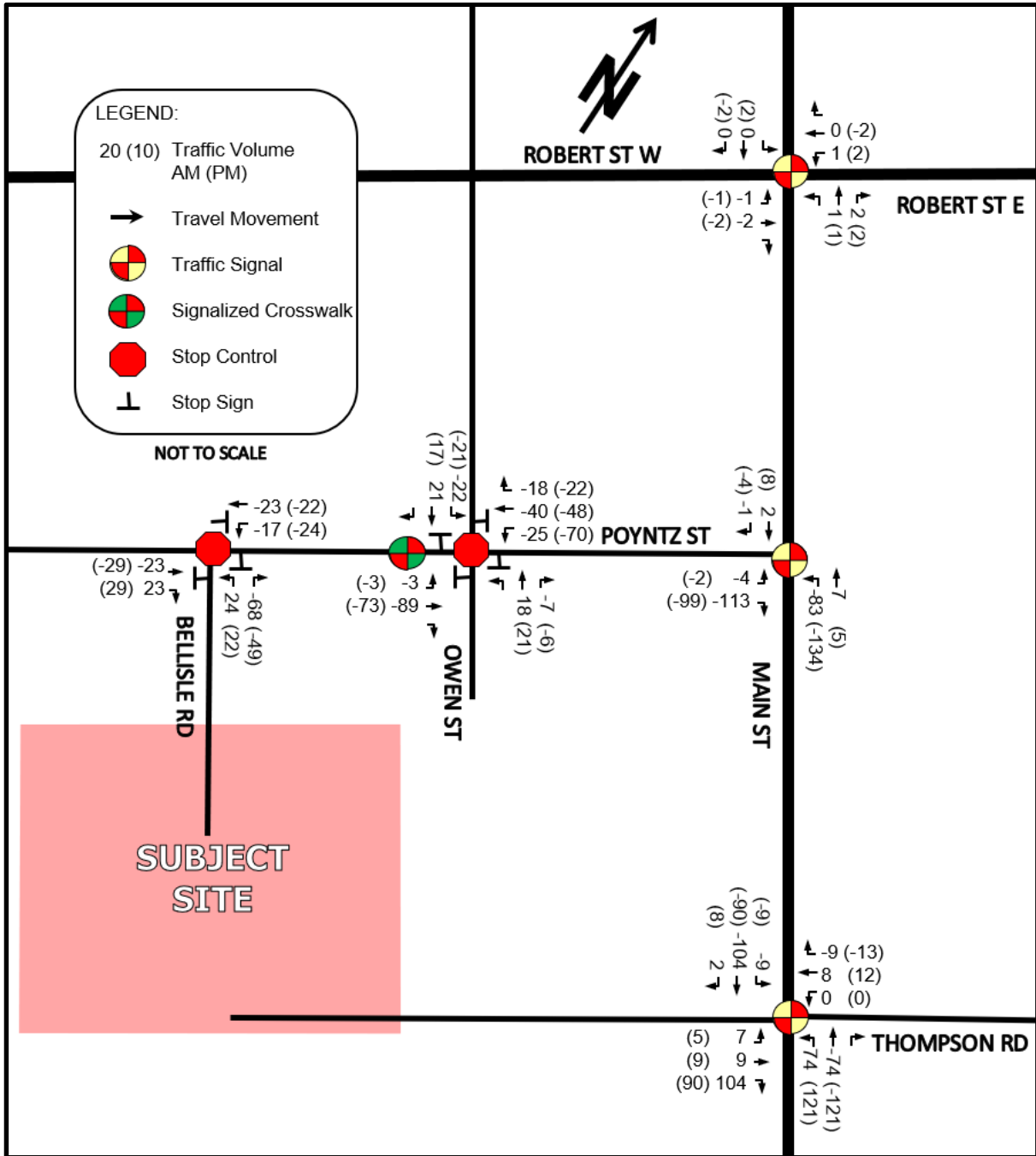


Figure J – Total (2028) Traffic Volume Redistribution – Thompsons Road West Connection



Appendix C – Traffic Count Data

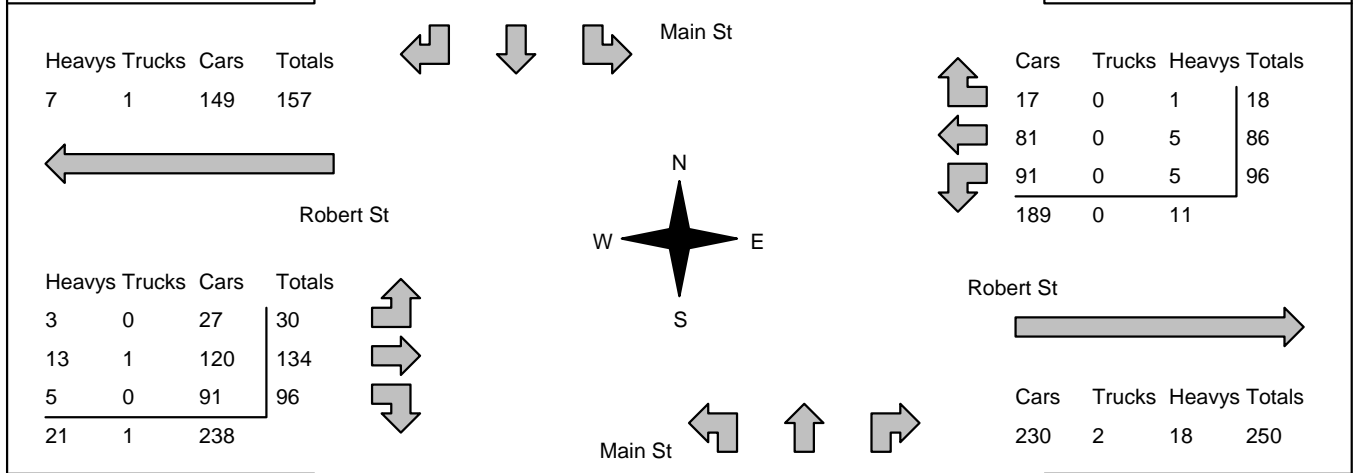
Accu-Traffic Inc.

Morning Peak Diagram	Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 8:00:00 To: 9:00:00
-----------------------------	---	--

Municipality: Penetanguishene Site #: 1725900001 Intersection: Main St & Robert St TFR File #: 1 Count date: 14-Dec-17	Weather conditions: Person counted: Person prepared: Person checked:
---	---

** Signalized Intersection **	Major Road: Main St runs N/S
--------------------------------------	-------------------------------------

North Leg Total: 262 North Entering: 140 North Peds: 1 Peds Cross: \boxtimes	<table style="border-collapse: collapse; margin: auto;"> <tr><td>Heavys</td><td>1</td><td>6</td><td>1</td><td style="border-left: 1px solid black;">8</td></tr> <tr><td>Trucks</td><td>0</td><td>1</td><td>0</td><td style="border-left: 1px solid black;">1</td></tr> <tr><td>Cars</td><td>17</td><td>112</td><td>2</td><td style="border-left: 1px solid black;">131</td></tr> <tr><td>Totals</td><td>18</td><td>119</td><td>3</td><td style="border-left: 1px solid black;"></td></tr> </table>	Heavys	1	6	1	8	Trucks	0	1	0	1	Cars	17	112	2	131	Totals	18	119	3		<table style="border-collapse: collapse; margin: auto;"> <tr><td>Heavys</td><td>6</td></tr> <tr><td>Trucks</td><td>2</td></tr> <tr><td>Cars</td><td>114</td></tr> <tr><td>Totals</td><td>122</td></tr> </table>	Heavys	6	Trucks	2	Cars	114	Totals	122	East Leg Total: 450 East Entering: 200 East Peds: 3 Peds Cross: \boxtimes
Heavys	1	6	1	8																											
Trucks	0	1	0	1																											
Cars	17	112	2	131																											
Totals	18	119	3																												
Heavys	6																														
Trucks	2																														
Cars	114																														
Totals	122																														



Peds Cross: \boxtimes West Peds: 7 West Entering: 260 West Leg Total: 417	<table style="border-collapse: collapse; margin: auto;"> <tr><td>Cars</td><td>294</td></tr> <tr><td>Trucks</td><td>1</td></tr> <tr><td>Heavys</td><td>16</td></tr> <tr><td>Totals</td><td>311</td></tr> </table>	Cars	294	Trucks	1	Heavys	16	Totals	311	<table style="border-collapse: collapse; margin: auto;"> <tr><td>Cars</td><td>51</td><td>70</td><td>108</td><td style="border-left: 1px solid black;">229</td></tr> <tr><td>Trucks</td><td>1</td><td>2</td><td>1</td><td style="border-left: 1px solid black;">4</td></tr> <tr><td>Heavys</td><td>1</td><td>2</td><td>4</td><td style="border-left: 1px solid black;">7</td></tr> <tr><td>Totals</td><td>53</td><td>74</td><td>113</td><td style="border-left: 1px solid black;"></td></tr> </table>	Cars	51	70	108	229	Trucks	1	2	1	4	Heavys	1	2	4	7	Totals	53	74	113		Peds Cross: \boxtimes South Peds: 1 South Entering: 240 South Leg Total: 551
Cars	294																														
Trucks	1																														
Heavys	16																														
Totals	311																														
Cars	51	70	108	229																											
Trucks	1	2	1	4																											
Heavys	1	2	4	7																											
Totals	53	74	113																												

Comments

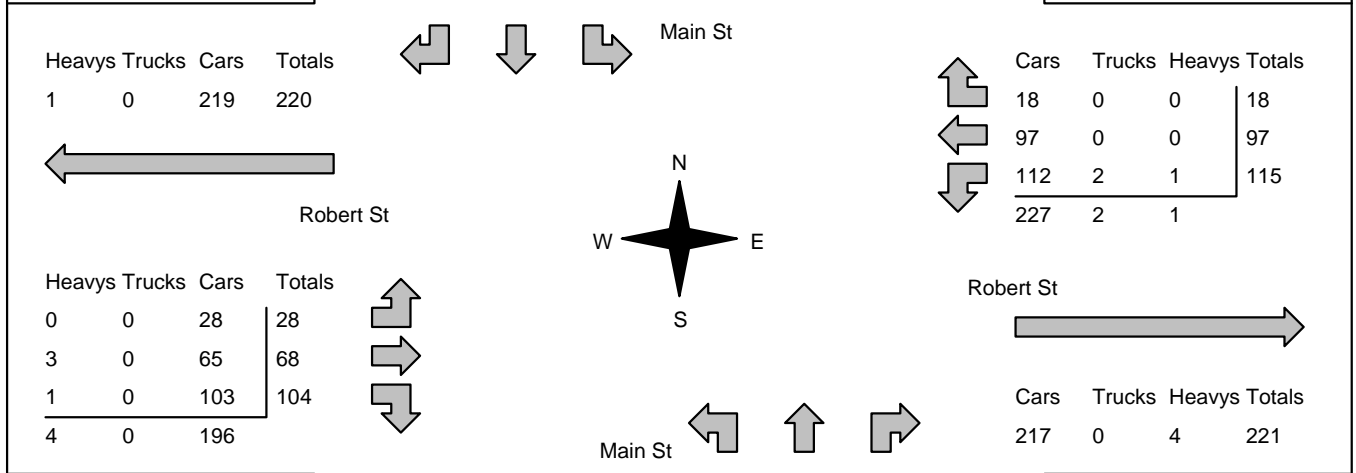
Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 16:00:00 To: 19:00:00	One Hour Peak From: 16:00:00 To: 17:00:00
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Municipality: Penetanguishene Site #: 1725900001 Intersection: Main St & Robert St TFR File #: 1 Count date: 14-Dec-17	Weather conditions: Person counted: Person prepared: Person checked:
---	---

** Signalized Intersection **	Major Road: Main St runs N/S
--------------------------------------	-------------------------------------

North Leg Total: 331 North Entering: 153 North Peds: 5 Peds Cross: \boxtimes	<table style="margin: auto;"> <tr><td>Heavys</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Trucks</td><td>0</td><td>1</td><td>0</td><td>1</td></tr> <tr><td>Cars</td><td>22</td><td>125</td><td>4</td><td>151</td></tr> <tr><td>Totals</td><td>22</td><td>127</td><td>4</td><td></td></tr> </table>	Heavys	0	1	0	1	Trucks	0	1	0	1	Cars	22	125	4	151	Totals	22	127	4		<table style="margin: auto;"> <tr><td>Heavys</td><td>0</td></tr> <tr><td>Trucks</td><td>2</td></tr> <tr><td>Cars</td><td>176</td></tr> <tr><td>Totals</td><td>178</td></tr> </table>	Heavys	0	Trucks	2	Cars	176	Totals	178	East Leg Total: 451 East Entering: 230 East Peds: 25 Peds Cross: \boxtimes
Heavys	0	1	0	1																											
Trucks	0	1	0	1																											
Cars	22	125	4	151																											
Totals	22	127	4																												
Heavys	0																														
Trucks	2																														
Cars	176																														
Totals	178																														



Peds Cross: \boxtimes West Peds: 11 West Entering: 200 West Leg Total: 420	<table style="margin: auto;"> <tr><td>Cars</td><td>340</td></tr> <tr><td>Trucks</td><td>3</td></tr> <tr><td>Heavys</td><td>3</td></tr> <tr><td>Totals</td><td>346</td></tr> </table>	Cars	340	Trucks	3	Heavys	3	Totals	346	<table style="margin: auto;"> <tr><td>Cars</td><td>100</td><td>130</td><td>148</td><td>378</td></tr> <tr><td>Trucks</td><td>0</td><td>2</td><td>0</td><td>2</td></tr> <tr><td>Heavys</td><td>1</td><td>0</td><td>1</td><td>2</td></tr> <tr><td>Totals</td><td>101</td><td>132</td><td>149</td><td></td></tr> </table>	Cars	100	130	148	378	Trucks	0	2	0	2	Heavys	1	0	1	2	Totals	101	132	149		Peds Cross: \boxtimes South Peds: 8 South Entering: 382 South Leg Total: 728
Cars	340																														
Trucks	3																														
Heavys	3																														
Totals	346																														
Cars	100	130	148	378																											
Trucks	0	2	0	2																											
Heavys	1	0	1	2																											
Totals	101	132	149																												

Comments

Accu-Traffic Inc.

Total Count Diagram

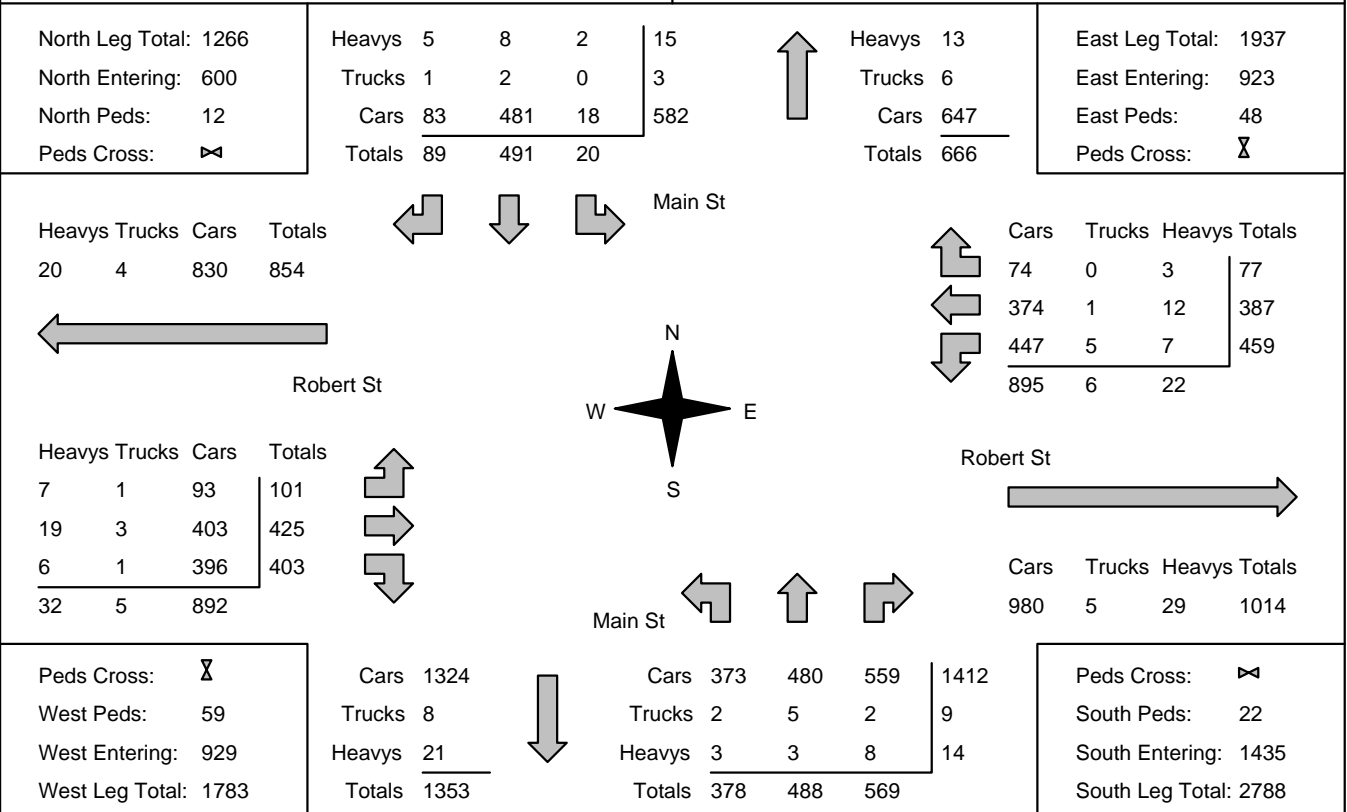
Municipality: Penetanguishene
Site #: 1725900001
Intersection: Main St & Robert St
TFR File #: 1
Count date: 14-Dec-17

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Main St runs N/S



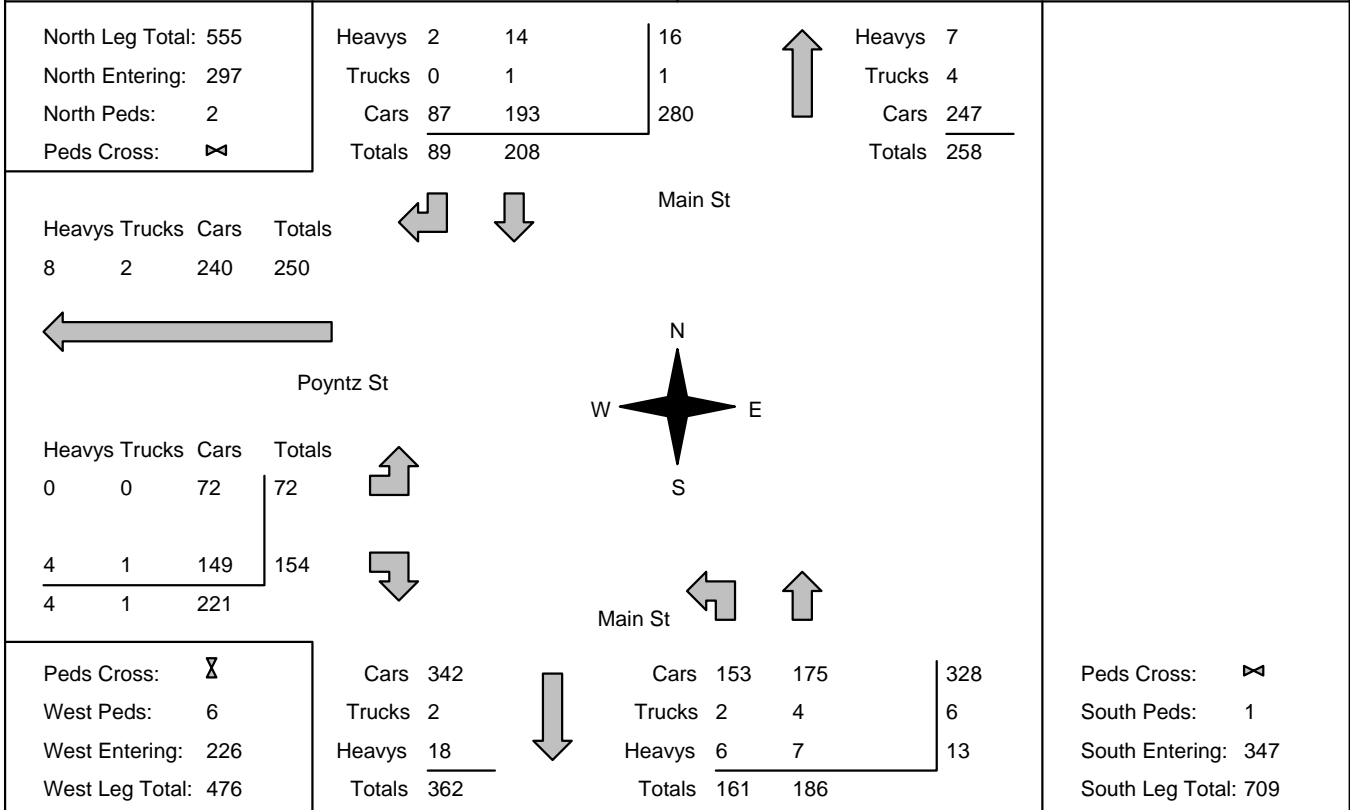
Comments

Accu-Traffic Inc.

Morning Peak Diagram	Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 8:00:00 To: 9:00:00
-----------------------------	---	--

Municipality: Penetanguishene Site #: 1725900002 Intersection: Main St & Poyntz St TFR File #: 1 Count date: 14-Dec-17	Weather conditions: Person counted: Person prepared: Person checked:
---	---

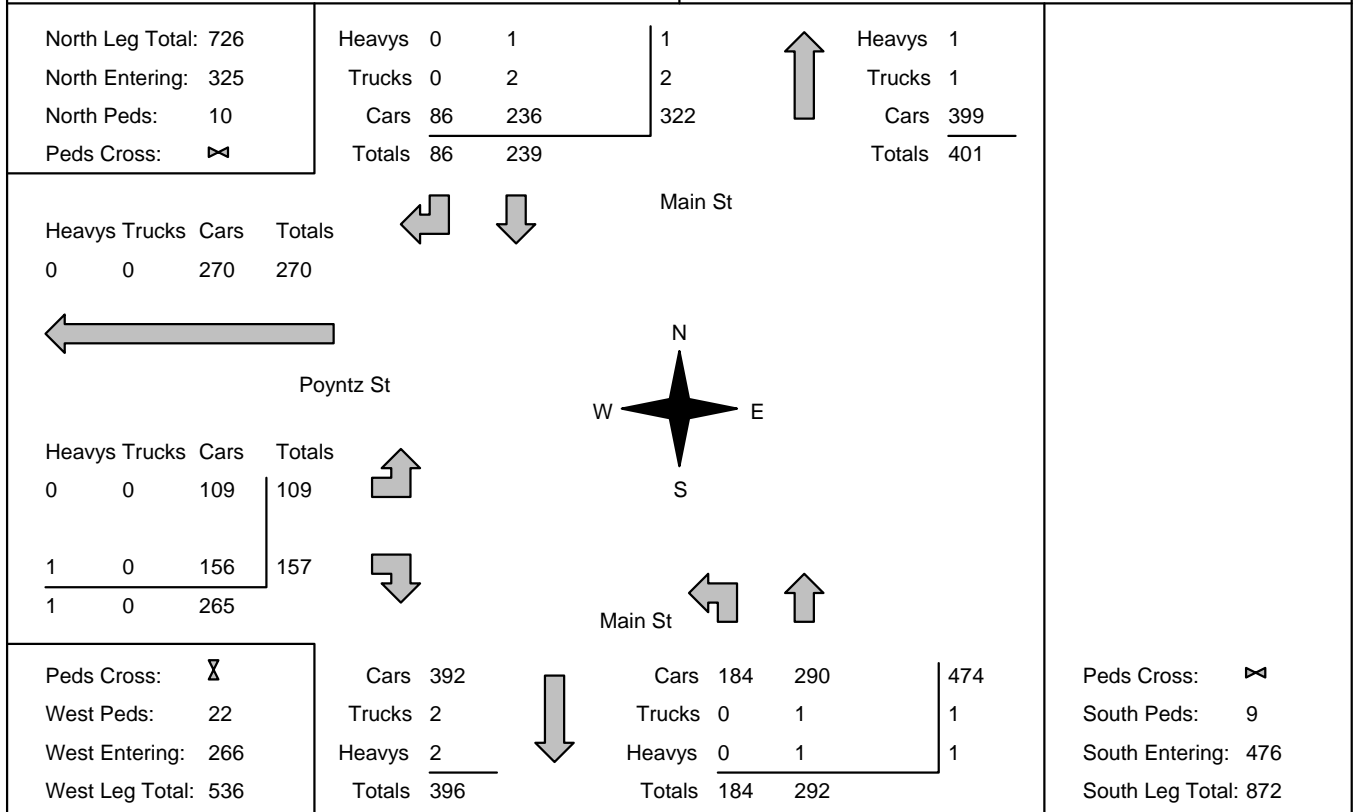
** Signalized Intersection **	Major Road: Main St runs N/S
--------------------------------------	-------------------------------------



Comments

Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 16:00:00 To: 19:00:00	One Hour Peak From: 16:15:00 To: 17:15:00
Municipality: Penetanguishene Site #: 1725900002 Intersection: Main St & Poyntz St TFR File #: 1 Count date: 14-Dec-17	Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **		Major Road: Main St runs N/S



Comments

Accu-Traffic Inc.

Total Count Diagram

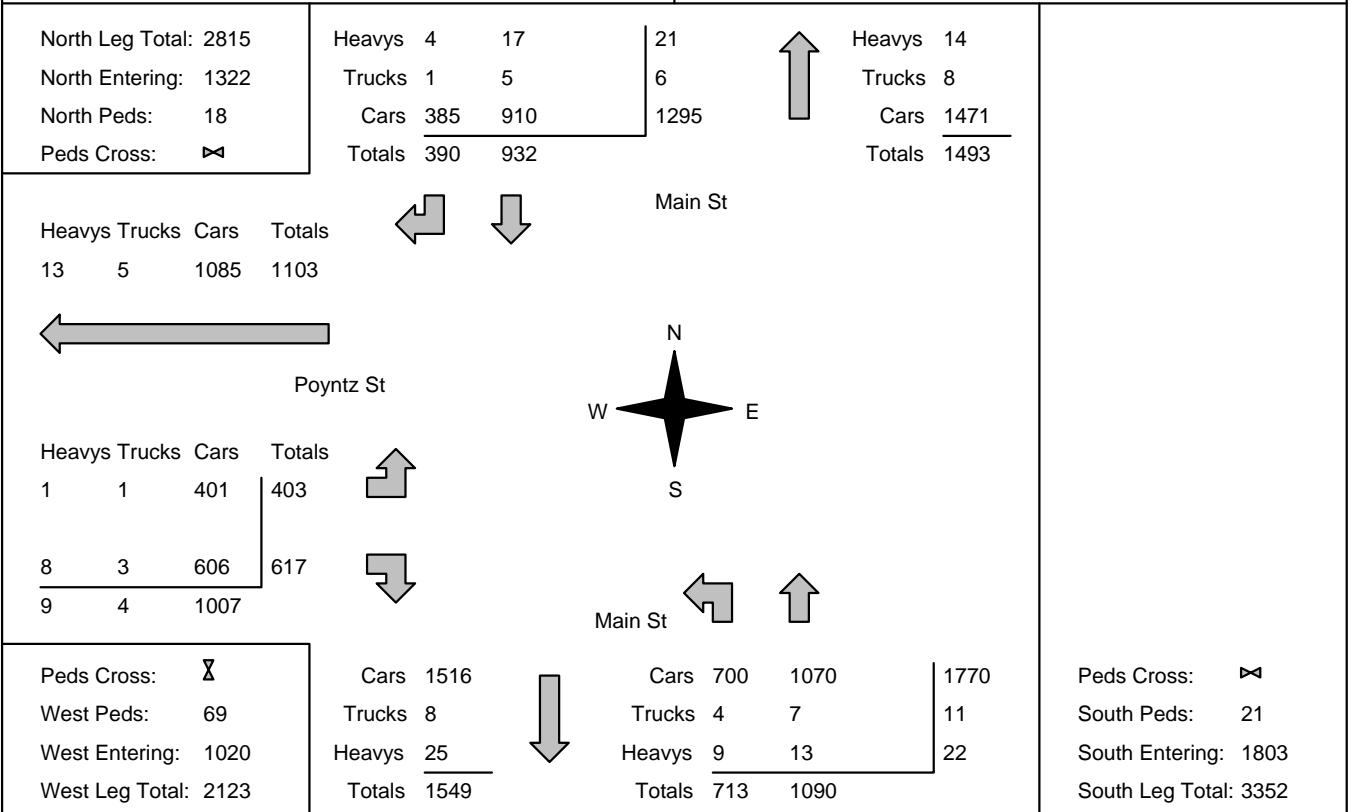
Municipality: Penetanguishene
Site #: 1725900002
Intersection: Main St & Poyntz St
TFR File #: 1
Count date: 14-Dec-17

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Main St runs N/S




Comments

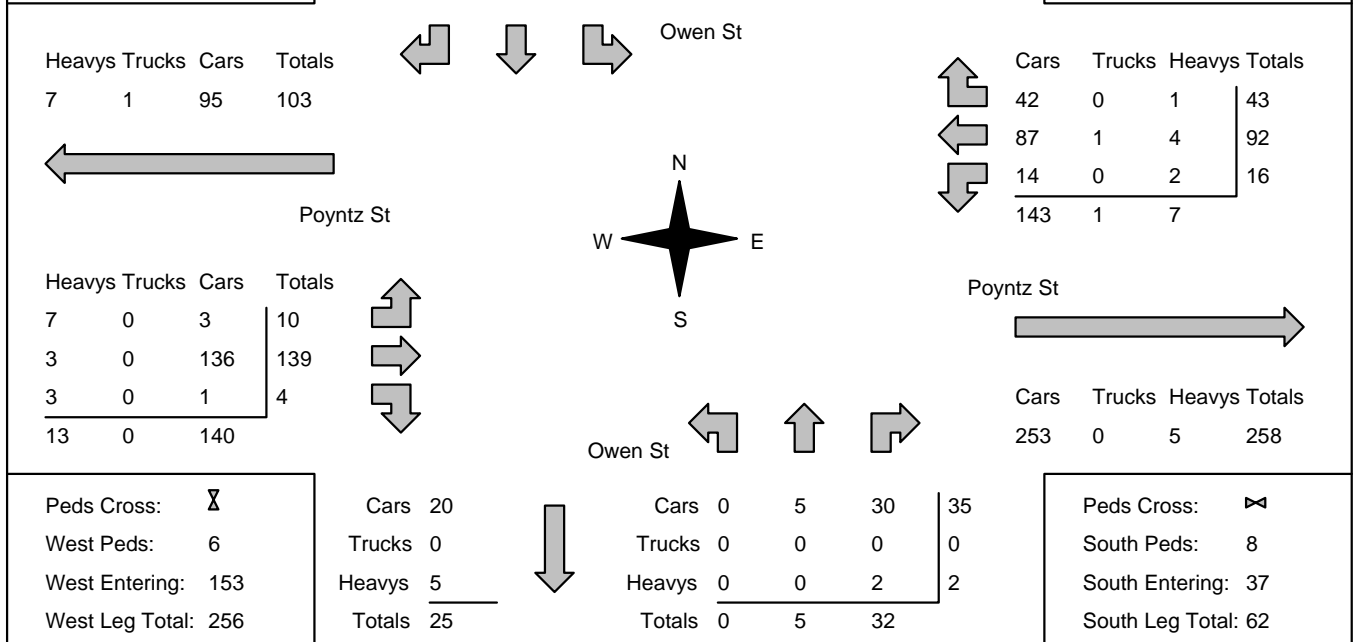
Accu-Traffic Inc.

Morning Peak Diagram	Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 8:00:00 To: 9:00:00
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Municipality: Penetanguishene Site #: 1725900003 Intersection: Poyntz St & Owen St TFR File #: 1 Count date: 14-Dec-17	Weather conditions: Person counted: Person prepared: Person checked:
---	---

** Signalized Intersection **	Major Road: Poyntz St runs W/E
--------------------------------------	---------------------------------------

North Leg Total: 161 North Entering: 103 North Peds: 5 Peds Cross: \boxtimes	<table style="border-collapse: collapse;"> <tr><td>Heavys</td><td>3</td><td>0</td><td>0</td><td style="border-left: 1px solid black;">3</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td style="border-left: 1px solid black;">0</td></tr> <tr><td>Cars</td><td>8</td><td>5</td><td>87</td><td style="border-left: 1px solid black;">100</td></tr> <tr><td>Totals</td><td>11</td><td>5</td><td>87</td><td style="border-left: 1px solid black;"></td></tr> </table>	Heavys	3	0	0	3	Trucks	0	0	0	0	Cars	8	5	87	100	Totals	11	5	87			<table style="border-collapse: collapse;"> <tr><td>Heavys</td><td>8</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cars</td><td>50</td></tr> <tr><td>Totals</td><td>58</td></tr> </table>	Heavys	8	Trucks	0	Cars	50	Totals	58	East Leg Total: 409 East Entering: 151 East Peds: 5 Peds Cross: \boxtimes
Heavys	3	0	0	3																												
Trucks	0	0	0	0																												
Cars	8	5	87	100																												
Totals	11	5	87																													
Heavys	8																															
Trucks	0																															
Cars	50																															
Totals	58																															



Comments

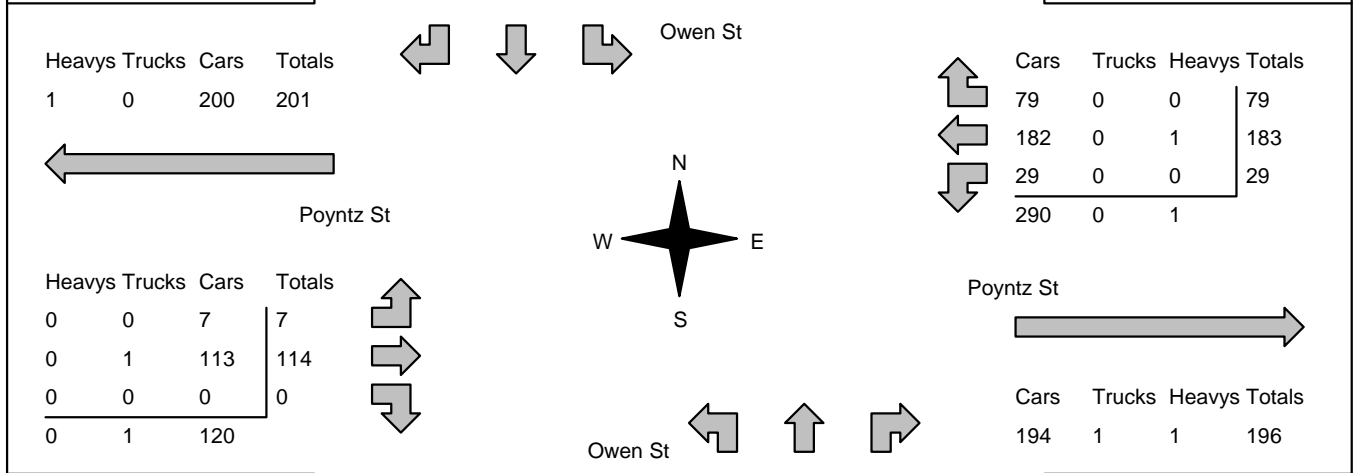
Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 16:00:00 To: 19:00:00	One Hour Peak From: 16:45:00 To: 17:45:00
-------------------------------	---	--

Municipality: Penetanguishene Site #: 1725900003 Intersection: Poyntz St & Owen St TFR File #: 1 Count date: 14-Dec-17	Weather conditions: Person counted: Person prepared: Person checked:
---	---

** Signalized Intersection **	Major Road: Poyntz St runs W/E
--------------------------------------	---------------------------------------

North Leg Total: 175 North Entering: 86 North Peds: 1 Peds Cross: ☒	<table style="border-collapse: collapse; margin: auto;"> <tr><td>Heavys</td><td>0</td><td>0</td><td>1</td><td>1</td></tr> <tr><td>Trucks</td><td>0</td><td>0</td><td>0</td><td>0</td></tr> <tr><td>Cars</td><td>17</td><td>7</td><td>61</td><td>85</td></tr> <tr><td>Totals</td><td>17</td><td>7</td><td>62</td><td></td></tr> </table>	Heavys	0	0	1	1	Trucks	0	0	0	0	Cars	17	7	61	85	Totals	17	7	62		<table style="border-collapse: collapse; margin: auto;"> <tr><td>Heavys</td><td>0</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Cars</td><td>89</td></tr> <tr><td>Totals</td><td>89</td></tr> </table>	Heavys	0	Trucks	0	Cars	89	Totals	89	East Leg Total: 487 East Entering: 291 East Peds: 4 Peds Cross: ☒
Heavys	0	0	1	1																											
Trucks	0	0	0	0																											
Cars	17	7	61	85																											
Totals	17	7	62																												
Heavys	0																														
Trucks	0																														
Cars	89																														
Totals	89																														



Peds Cross: ☒ West Peds: 1 West Entering: 121 West Leg Total: 322	<table style="border-collapse: collapse;"> <tr><td>Cars</td><td>36</td></tr> <tr><td>Trucks</td><td>0</td></tr> <tr><td>Heavys</td><td>0</td></tr> <tr><td>Totals</td><td>36</td></tr> </table>	Cars	36	Trucks	0	Heavys	0	Totals	36		Peds Cross: ☒ South Peds: 10 South Entering: 24 South Leg Total: 60
Cars	36										
Trucks	0										
Heavys	0										
Totals	36										

Comments

Accu-Traffic Inc.

Total Count Diagram

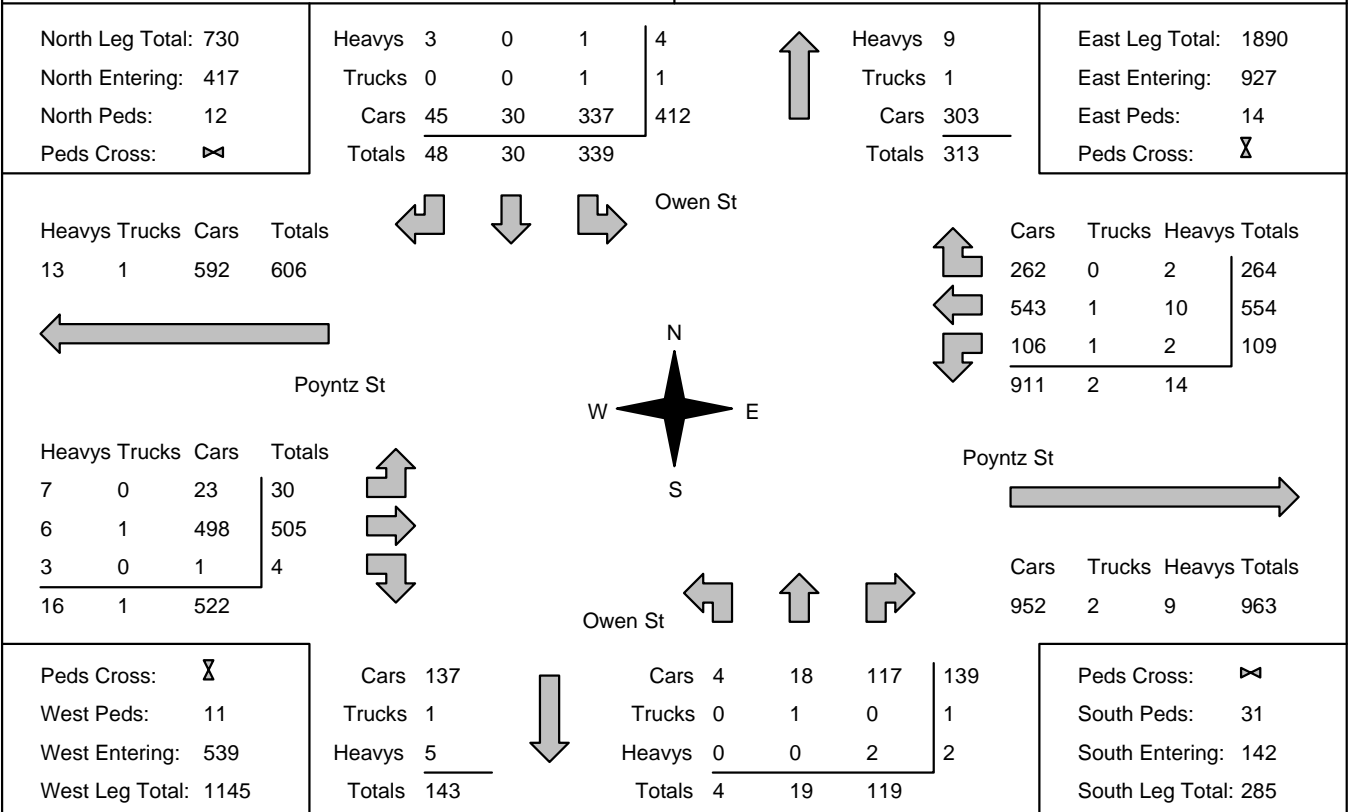
Municipality: Penetanguishene
Site #: 1725900003
Intersection: Poyntz St & Owen St
TFR File #: 1
Count date: 14-Dec-17

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****

Major Road: Poyntz St runs W/E

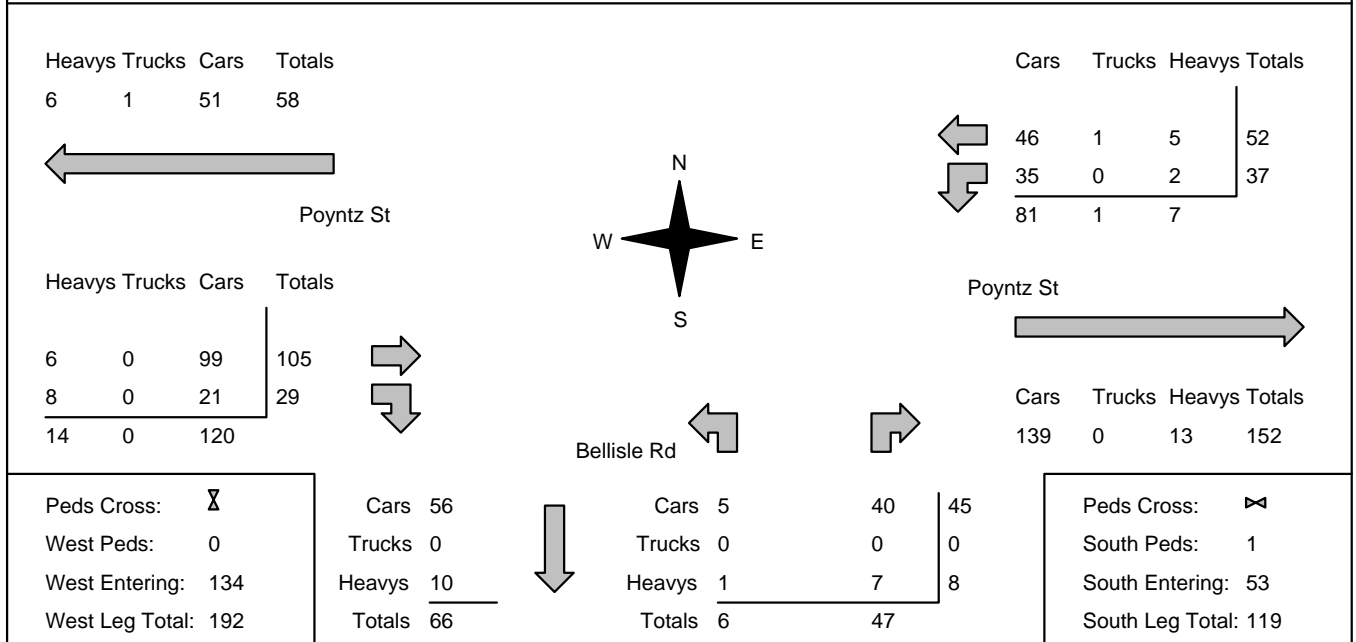


Comments

Accu-Traffic Inc.

Morning Peak Diagram	Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 8:00:00 To: 9:00:00
Municipality: Penetanguishene Site #: 1725900004 Intersection: Poyntz St & Bellisle Rd TFR File #: 1 Count date: 14-Dec-17	Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **	Major Road: Poyntz St runs W/E	

	East Leg Total: 241 East Entering: 89 East Peds: 4 Peds Cross: 8
--	---

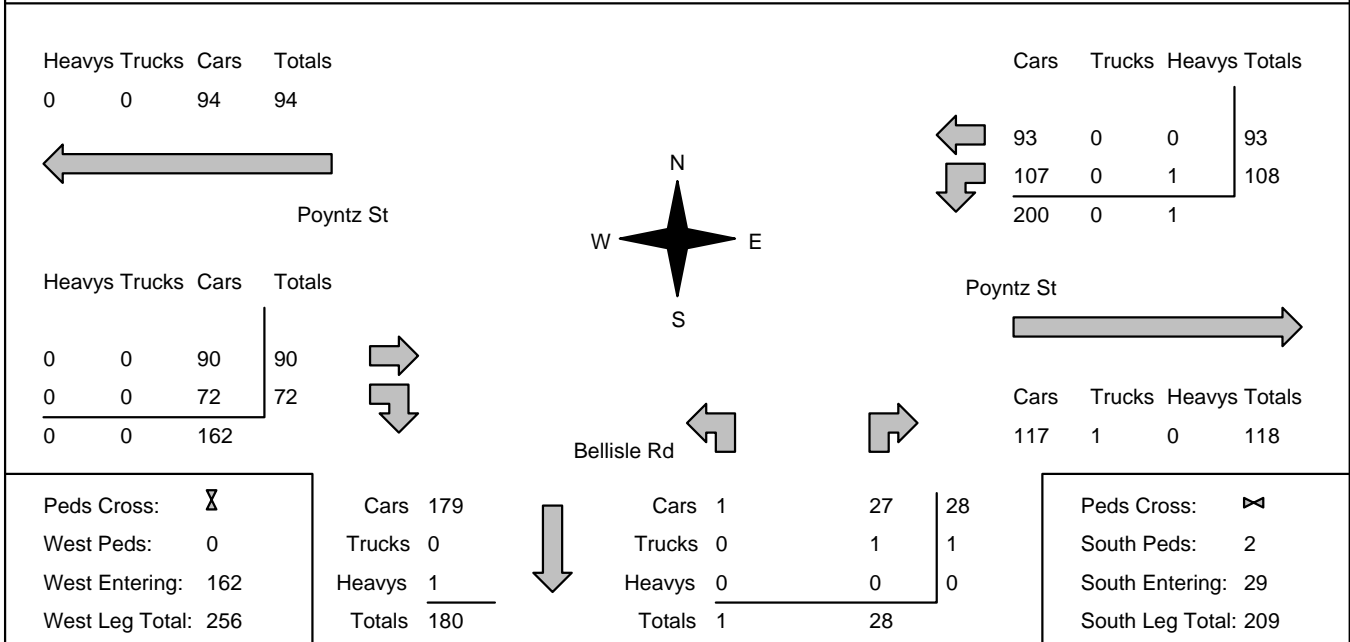


Comments

Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 16:00:00 To: 19:00:00	One Hour Peak From: 17:00:00 To: 18:00:00
Municipality: Penetanguishene Site #: 1725900004 Intersection: Poyntz St & Bellisle Rd TFR File #: 1 Count date: 14-Dec-17	Weather conditions: Person counted: Person prepared: Person checked:	
** Non-Signalized Intersection **	Major Road: Poyntz St runs W/E	

East Leg Total: 319
East Entering: 201
East Peds: 8
Peds Cross: 8



Comments

Accu-Traffic Inc.

Total Count Diagram

Municipality: Penetanguishene
Site #: 1725900004
Intersection: Poyntz St & Bellisle Rd
TFR File #: 1
Count date: 14-Dec-17

Weather conditions:

Person counted:
Person prepared:
Person checked:

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

Major Road: Poyntz St runs W/E

East Leg Total: 1096
 East Entering: 580
 East Peds: 14
 Peds Cross: 8

Heavys	Trucks	Cars	Totals
8	1	386	395



Poyntz St

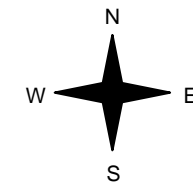
Cars	Trucks	Heavys	Totals
368	1	7	376
198	0	6	204
566	1	13	



Poyntz St



Heavys	Trucks	Cars	Totals
9	0	383	392
8	0	105	113
17	0	488	



Bellisle Rd

Cars	Trucks	Heavys	Totals
499	1	16	516



Peds Cross: 8
 West Peds: 1
 West Entering: 505
 West Leg Total: 900

Cars	303
Trucks	0
Heavys	14
Totals	317



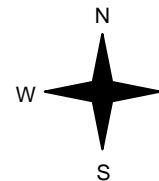
Cars	18	116	134
Trucks	0	1	1
Heavys	1	7	8
Totals	19	124	

Peds Cross: 4
 South Peds: 4
 South Entering: 143
 South Leg Total: 460

Comments

Accu-Traffic Inc.

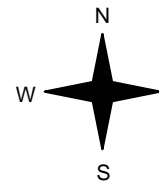
Morning Peak Diagram	Specified Period From: 7:00:00 To: 9:00:00	One Hour Peak From: 8:00:00 To: 9:00:00
Municipality: Penetanguishene Site #: 1725900005 Intersection: Main St & Thompson Rd TFR File #: 1 Count date: 14-Dec-17	Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **	Major Road: Main St runs N/S	

North Leg Total: 876 North Entering: 480 North Peds: 3 Peds Cross: ☒	<table style="margin: auto;"> <tr> <td style="padding: 5px;">Heavys</td> <td style="padding: 5px;">17</td> <td style="padding: 5px;">2</td> <td style="padding: 5px;">19</td> <td style="padding: 5px; text-align: center;">↑</td> <td style="padding: 5px;">Heavys</td> <td style="padding: 5px;">13</td> <td colspan="2"></td> </tr> <tr> <td style="padding: 5px;">Trucks</td> <td style="padding: 5px;">6</td> <td style="padding: 5px;">0</td> <td style="padding: 5px;">6</td> <td></td> <td style="padding: 5px;">Trucks</td> <td style="padding: 5px;">5</td> <td colspan="2"></td> </tr> <tr> <td style="padding: 5px;">Cars</td> <td style="padding: 5px;">436</td> <td style="padding: 5px;">19</td> <td style="padding: 5px;">455</td> <td></td> <td style="padding: 5px;">Cars</td> <td style="padding: 5px;">378</td> <td colspan="2"></td> </tr> <tr> <td style="padding: 5px;">Totals</td> <td style="padding: 5px;">459</td> <td style="padding: 5px;">21</td> <td></td> <td></td> <td style="padding: 5px;">Totals</td> <td style="padding: 5px;">396</td> <td colspan="2"></td> </tr> </table> <p style="text-align: center;">Main St</p>  <p style="text-align: center;">Main St</p> <table style="margin: auto;"> <tr> <td style="padding: 5px;">Cars</td> <td style="padding: 5px;">602</td> <td style="padding: 5px;">342</td> <td style="padding: 5px;">91</td> <td style="padding: 5px;">433</td> <td colspan="4"></td> </tr> <tr> <td style="padding: 5px;">Trucks</td> <td style="padding: 5px;">7</td> <td style="padding: 5px;">5</td> <td style="padding: 5px;">0</td> <td style="padding: 5px;">5</td> <td colspan="4"></td> </tr> <tr> <td style="padding: 5px;">Heavys</td> <td style="padding: 5px;">22</td> <td style="padding: 5px;">12</td> <td style="padding: 5px;">11</td> <td style="padding: 5px;">23</td> <td colspan="4"></td> </tr> <tr> <td style="padding: 5px;">Totals</td> <td style="padding: 5px;">631</td> <td style="padding: 5px;">359</td> <td style="padding: 5px;">102</td> <td></td> <td colspan="4"></td> </tr> </table>	Heavys	17	2	19	↑	Heavys	13			Trucks	6	0	6		Trucks	5			Cars	436	19	455		Cars	378			Totals	459	21			Totals	396			Cars	602	342	91	433					Trucks	7	5	0	5					Heavys	22	12	11	23					Totals	631	359	102						<table style="margin: auto;"> <tr> <td style="padding: 5px;">East Leg Total:</td> <td style="padding: 5px;">332</td> </tr> <tr> <td style="padding: 5px;">East Entering:</td> <td style="padding: 5px;">209</td> </tr> <tr> <td style="padding: 5px;">East Peds:</td> <td style="padding: 5px;">0</td> </tr> <tr> <td style="padding: 5px;">Peds Cross:</td> <td style="padding: 5px;">☒</td> </tr> </table> <table style="margin: auto;"> <tr> <td style="padding: 5px;">Cars</td> <td style="padding: 5px;">36</td> <td style="padding: 5px;">0</td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">37</td> </tr> <tr> <td style="padding: 5px;">Trucks</td> <td style="padding: 5px;">166</td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">5</td> <td style="padding: 5px;">172</td> </tr> <tr> <td style="padding: 5px;">Heavys</td> <td style="padding: 5px;">202</td> <td style="padding: 5px;">1</td> <td style="padding: 5px;">6</td> <td></td> </tr> </table> <p style="text-align: center;">Thompson Rd</p> <table style="margin: auto;"> <tr> <td style="padding: 5px;">Cars</td> <td style="padding: 5px;">110</td> <td style="padding: 5px;">0</td> <td style="padding: 5px;">13</td> <td style="padding: 5px;">123</td> </tr> </table>	East Leg Total:	332	East Entering:	209	East Peds:	0	Peds Cross:	☒	Cars	36	0	1	37	Trucks	166	1	5	172	Heavys	202	1	6		Cars	110	0	13	123
Heavys	17	2	19	↑	Heavys	13																																																																																																
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Comments

Accu-Traffic Inc.

Afternoon Peak Diagram	Specified Period From: 16:00:00 To: 19:00:00	One Hour Peak From: 16:00:00 To: 17:00:00
Municipality: Penetanguishene Site #: 1725900005 Intersection: Main St & Thompson Rd TFR File #: 1 Count date: 14-Dec-17	Weather conditions: Person counted: Person prepared: Person checked:	
** Signalized Intersection **	Major Road: Main St runs N/S	

North Leg Total: 1131 North Entering: 522 North Peds: 0 Peds Cross: <input checked="" type="checkbox"/>	<table style="margin: auto;"> <tr> <td style="text-align: right;">Heavys</td><td style="text-align: center;">6</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">6</td><td rowspan="4" style="font-size: 2em; vertical-align: middle;">↑</td><td style="text-align: left;">Heavys</td><td style="text-align: center;">5</td></tr> <tr> <td style="text-align: right;">Trucks</td><td style="text-align: center;">4</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">4</td><td style="text-align: left;">Trucks</td><td style="text-align: center;">3</td></tr> <tr> <td style="text-align: right;">Cars</td><td style="text-align: center;">484</td><td style="text-align: center;">28</td><td style="border-left: 1px solid black; text-align: center;">512</td><td style="text-align: left;">Cars</td><td style="text-align: center;">601</td></tr> <tr> <td style="text-align: right;">Totals</td><td style="text-align: center;">494</td><td style="text-align: center;">28</td><td style="border-left: 1px solid black;"></td><td style="text-align: left;">Totals</td><td style="text-align: center;">609</td></tr> </table> <p style="text-align: center;">Main St</p>  <p style="text-align: center;">Main St</p> <table style="margin: auto;"> <tr> <td style="text-align: right;">Cars</td><td style="text-align: center;">24</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">1</td><td style="text-align: center;">25</td></tr> <tr> <td style="text-align: right;">Trucks</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black;"></td><td></td></tr> <tr> <td style="text-align: right;">Heavys</td><td style="text-align: center;">0</td><td style="text-align: center;">4</td><td style="border-left: 1px solid black;"></td><td style="text-align: center;">4</td></tr> <tr> <td style="text-align: right;">Totals</td><td style="text-align: center;">225</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black;"></td><td style="text-align: center;">205</td></tr> </table> <p style="text-align: center;">Thompson Rd</p> <table style="margin: auto;"> <tr> <td style="text-align: right;">Cars</td><td style="text-align: center;">217</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">5</td><td style="text-align: center;">222</td></tr> <tr> <td style="text-align: right;">Trucks</td><td style="text-align: center;">0</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black;"></td><td></td></tr> <tr> <td style="text-align: right;">Heavys</td><td style="text-align: center;">0</td><td style="text-align: center;">5</td><td style="border-left: 1px solid black;"></td><td style="text-align: center;">5</td></tr> <tr> <td style="text-align: right;">Totals</td><td style="text-align: center;">217</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black;"></td><td style="text-align: center;">222</td></tr> </table>	Heavys	6	0	6	↑	Heavys	5	Trucks	4	0	4	Trucks	3	Cars	484	28	512	Cars	601	Totals	494	28		Totals	609	Cars	24	0	1	25	Trucks	0	0			Heavys	0	4		4	Totals	225	0		205	Cars	217	0	5	222	Trucks	0	0			Heavys	0	5		5	Totals	217	0		222	<table style="margin: auto;"> <tr> <td style="text-align: right;">East Leg Total:</td><td style="text-align: center;">452</td></tr> <tr> <td style="text-align: right;">East Entering:</td><td style="text-align: center;">230</td></tr> <tr> <td style="text-align: right;">East Peds:</td><td style="text-align: center;">0</td></tr> <tr> <td style="text-align: right;">Peds Cross:</td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> </table>	East Leg Total:	452	East Entering:	230	East Peds:	0	Peds Cross:	<input checked="" type="checkbox"/>
Heavys	6	0	6	↑	Heavys		5																																																																				
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<table style="margin: auto;"> <tr> <td style="text-align: right;">Cars</td><td style="text-align: center;">685</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">0</td><td style="text-align: center;">685</td></tr> <tr> <td style="text-align: right;">Trucks</td><td style="text-align: center;">4</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black;"></td><td style="text-align: center;">4</td></tr> <tr> <td style="text-align: right;">Heavys</td><td style="text-align: center;">10</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black;"></td><td style="text-align: center;">10</td></tr> <tr> <td style="text-align: right;">Totals</td><td style="text-align: center;">699</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black;"></td><td style="text-align: center;">699</td></tr> </table>	Cars	685	0	0	685	Trucks	4	0		4	Heavys	10	0		10	Totals	699	0		699	<table style="margin: auto;"> <tr> <td style="text-align: right;">Cars</td><td style="text-align: center;">577</td><td style="text-align: center;">189</td><td style="border-left: 1px solid black; text-align: center;">766</td></tr> <tr> <td style="text-align: right;">Trucks</td><td style="text-align: center;">3</td><td style="text-align: center;">0</td><td style="border-left: 1px solid black; text-align: center;">3</td></tr> <tr> <td style="text-align: right;">Heavys</td><td style="text-align: center;">4</td><td style="text-align: center;">5</td><td style="border-left: 1px solid black; text-align: center;">9</td></tr> <tr> <td style="text-align: right;">Totals</td><td style="text-align: center;">584</td><td style="text-align: center;">194</td><td style="border-left: 1px solid black;"></td></tr> </table>	Cars	577	189	766	Trucks	3	0	3	Heavys	4	5	9	Totals	584	194		<table style="margin: auto;"> <tr> <td style="text-align: right;">Peds Cross:</td><td style="text-align: center;"><input checked="" type="checkbox"/></td></tr> <tr> <td style="text-align: right;">South Peds:</td><td style="text-align: center;">0</td></tr> <tr> <td style="text-align: right;">South Entering:</td><td style="text-align: center;">778</td></tr> <tr> <td style="text-align: right;">South Leg Total:</td><td style="text-align: center;">1477</td></tr> </table>	Peds Cross:	<input checked="" type="checkbox"/>	South Peds:	0	South Entering:	778	South Leg Total:	1477																													
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Comments

Accu-Traffic Inc.

Total Count Diagram

Municipality: Penetanguishene
Site #: 1725900005
Intersection: Main St & Thompson Rd
TFR File #: 1
Count date: 14-Dec-17

Weather conditions:

Person counted:
Person prepared:
Person checked:

**** Signalized Intersection ****


Major Road: Main St runs N/S

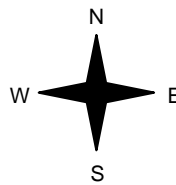
North Leg Total: 4262
 North Entering: 2089
 North Peds: 5
 Peds Cross: 

Heavys	31	3	34
Trucks	20	1	21
Cars	1922	112	2034
Totals	1973	116	

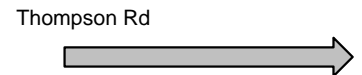


Heavys	30
Trucks	14
Cars	2129
Totals	2173

East Leg Total: 1714
 East Entering: 883
 East Peds: 1
 Peds Cross: 




	Cars	Trucks	Heavys	Totals
Northbound	124	0	5	129
Southbound	732	5	17	754
Totals	856	5	22	



	Cars	Trucks	Heavys	Totals
Eastbound	799	4	28	831

Cars	2654	Cars	2005	687	2692
Trucks	25	Trucks	14	3	17
Heavys	48	Heavys	25	25	50
Totals	2727	Totals	2044	715	

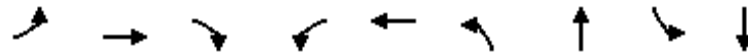
Peds Cross: 
 South Peds: 1
 South Entering: 2759
 South Leg Total: 5486

Comments

Appendix D – Synchro Analysis Output – Existing Traffic Volumes

Bellisle Heights Subdivision
1: Main St & Robert St

Queues
Existing AM Peak Hour

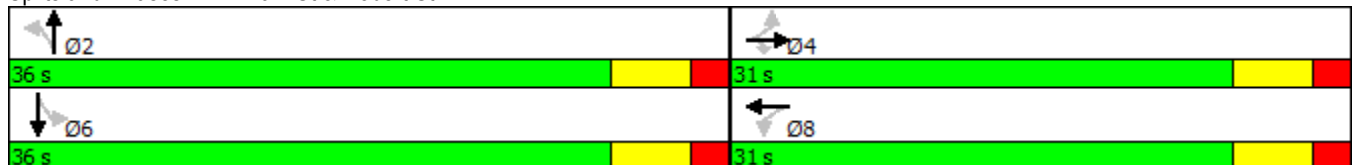


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↑	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	31	137	98	98	88	54	75	3	121
Future Volume (vph)	31	137	98	98	88	54	75	3	121
Lane Group Flow (vph)	39	173	124	124	134	68	241	4	176
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	36.0	36.0	36.0	36.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	36.0	36.0	36.0	36.0
Total Split (%)	46.3%	46.3%	46.3%	46.3%	46.3%	53.7%	53.7%	53.7%	53.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
v/c Ratio	0.14	0.43	0.28	0.47	0.32	0.10	0.24	0.01	0.17
Control Delay	18.0	21.5	5.9	24.5	17.6	6.7	3.6	6.3	6.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.0	21.5	5.9	24.5	17.6	6.7	3.6	6.3	6.2
Queue Length 50th (m)	3.2	15.2	0.0	11.0	9.9	2.6	3.7	0.2	6.4
Queue Length 95th (m)	8.2	25.5	7.6	20.6	18.7	7.5	11.2	1.2	14.6
Internal Link Dist (m)		253.7			92.3		140.3		209.3
Turn Bay Length (m)	30.0		25.0					10.0	
Base Capacity (vph)	594	877	809	573	869	669	1006	646	1036
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	0.07	0.20	0.15	0.22	0.15	0.10	0.24	0.01	0.17

Intersection Summary

Cycle Length: 67
 Actuated Cycle Length: 53.7
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: Main St & Robert St



Bellisle Heights Subdivision
1: Main St & Robert St

HCM Signalized Intersection Capacity Analysis
Existing AM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	31	137	98	98	88	18	54	75	115	3	121	18
Future Volume (vph)	31	137	98	98	88	18	54	75	115	3	121	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.99	1.00	1.00		1.00	0.99		1.00	1.00	
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	0.97		1.00	0.91		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)	1803	1881	1595	1804	1844		1761	1683		1803	1840	
Flt Permitted	0.67	1.00	1.00	0.65	1.00		0.65	1.00		0.61	1.00	
Satd. Flow (perm)	1274	1881	1595	1230	1844		1198	1683		1156	1840	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	39	173	124	124	111	23	68	95	146	4	153	23
RTOR Reduction (vph)	0	0	97	0	14	0	0	64	0	0	7	0
Lane Group Flow (vph)	39	173	27	124	120	0	68	177	0	4	169	0
Confl. Peds. (#/hr)	1		1	1		1	7		3	3		7
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	2%	3%	1%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	11.6	11.6	11.6	11.6	11.6		30.0	30.0		30.0	30.0	
Effective Green, g (s)	11.6	11.6	11.6	11.6	11.6		30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.22	0.22	0.22	0.22	0.22		0.56	0.56		0.56	0.56	
Clearance Time (s)	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	275	407	345	266	399		670	941		647	1029	
v/s Ratio Prot		0.09			0.07			c0.10			0.09	
v/s Ratio Perm	0.03		0.02	c0.10			0.06			0.00		
v/c Ratio	0.14	0.43	0.08	0.47	0.30		0.10	0.19		0.01	0.16	
Uniform Delay, d1	17.0	18.1	16.7	18.3	17.6		5.5	5.8		5.2	5.7	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.7	0.1	1.3	0.4		0.3	0.4		0.0	0.3	
Delay (s)	17.2	18.8	16.8	19.6	18.0		5.8	6.2		5.2	6.1	
Level of Service	B	B	B	B	B		A	A		A	A	
Approach Delay (s)		17.9			18.8			6.2			6.0	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			12.8			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.27									
Actuated Cycle Length (s)			53.6			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			75.4%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Bellisle Heights Subdivision
2: Main St & Poyntz St

Queues
Existing AM Peak Hour

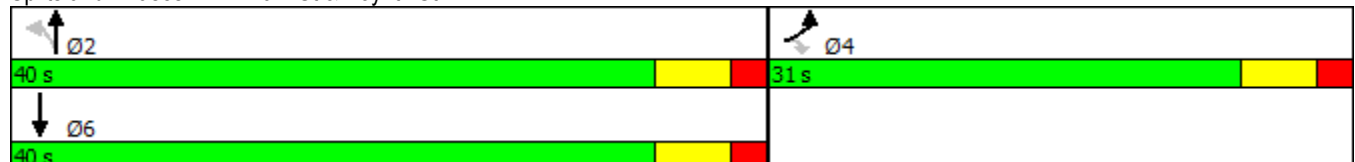


Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	73	157	164	190	212
Future Volume (vph)	73	157	164	190	212
Lane Group Flow (vph)	94	201	0	454	389
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	30.0	30.0	40.0	40.0	40.0
Total Split (s)	31.0	31.0	40.0	40.0	40.0
Total Split (%)	43.7%	43.7%	56.3%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
v/c Ratio	0.29	0.45		0.31	0.18
Control Delay	22.7	7.4		6.1	3.6
Queue Delay	0.0	0.0		0.0	0.0
Total Delay	22.7	7.4		6.1	3.6
Queue Length 50th (m)	8.8	0.0		10.5	5.5
Queue Length 95th (m)	16.9	9.6		14.8	8.6
Internal Link Dist (m)	255.0			488.9	140.3
Turn Bay Length (m)	28.0				
Base Capacity (vph)	787	801		1451	2127
Starvation Cap Reductn	0	0		0	0
Spillback Cap Reductn	0	0		0	0
Storage Cap Reductn	0	0		0	0
Reduced v/c Ratio	0.12	0.25		0.31	0.18

Intersection Summary

Cycle Length: 71
 Actuated Cycle Length: 57.4
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 2: Main St & Poyntz St



Bellisle Heights Subdivision
2: Main St & Poyntz St

HCM Signalized Intersection Capacity Analysis
Existing AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	73	157	164	190	212	91
Future Volume (vph)	73	157	164	190	212	91
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frbp, ped/bikes	1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.95	
Flt Protected	0.95	1.00		0.98	1.00	
Satd. Flow (prot)	1805	1579		3470	3397	
Flt Permitted	0.95	1.00		0.67	1.00	
Satd. Flow (perm)	1805	1579		2367	3397	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	94	201	210	244	272	117
RTOR Reduction (vph)	0	165	0	0	45	0
Lane Group Flow (vph)	94	36	0	454	344	0
Confl. Peds. (#/hr)	2	1	6			6
Heavy Vehicles (%)	0%	1%	1%	2%	1%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.2	10.2		35.2	35.2	
Effective Green, g (s)	10.2	10.2		35.2	35.2	
Actuated g/C Ratio	0.18	0.18		0.61	0.61	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	320	280		1451	2083	
v/s Ratio Prot	c0.05				0.10	
v/s Ratio Perm		0.02		c0.19		
v/c Ratio	0.29	0.13		0.31	0.17	
Uniform Delay, d1	20.5	19.9		5.3	4.8	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.5	0.2		0.6	0.2	
Delay (s)	21.0	20.1		5.9	4.9	
Level of Service	C	C		A	A	
Approach Delay (s)	20.4			5.9	4.9	
Approach LOS	C			A	A	

Intersection Summary

HCM 2000 Control Delay	9.3	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.31		
Actuated Cycle Length (s)	57.4	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Bellisle Heights Subdivision
3: Main St & Thompson Rd

Queues
Existing AM Peak Hour



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	175	38	366	21	468
Future Volume (vph)	175	38	366	21	468
Lane Group Flow (vph)	211	46	566	0	589
Turn Type	Perm	Perm	NA	pm+pt	NA
Protected Phases			2	1	6
Permitted Phases	8	8		6	
Detector Phase	8	8	2	1	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	5.0	8.0	34.0
Minimum Split (s)	24.0	24.0	30.0	15.0	45.0
Total Split (s)	24.0	24.0	30.0	15.0	45.0
Total Split (%)	34.8%	34.8%	43.5%	21.7%	65.2%
Yellow Time (s)	4.0	4.0	3.5	3.0	4.0
All-Red Time (s)	2.0	2.0	1.5	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0	5.0		6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	Max	None	Max
v/c Ratio	0.57	0.13	0.26		0.30
Control Delay	29.2	7.8	5.7		7.1
Queue Delay	0.0	0.0	0.0		0.0
Total Delay	29.2	7.8	5.7		7.1
Queue Length 50th (m)	23.9	0.0	12.9		16.4
Queue Length 95th (m)	38.9	6.1	21.3		26.2
Internal Link Dist (m)	452.9		413.1		488.9
Turn Bay Length (m)	15.0				
Base Capacity (vph)	497	478	2173		1992
Starvation Cap Reductn	0	0	0		0
Spillback Cap Reductn	0	0	0		0
Storage Cap Reductn	0	0	0		0
Reduced v/c Ratio	0.42	0.10	0.26		0.30

Intersection Summary












Cycle Length: 69
 Actuated Cycle Length: 64.6
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 3: Main St & Thompson Rd



Bellisle Heights Subdivision
3: Main St & Thompson Rd

HCM Signalized Intersection Capacity Analysis
Existing AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						 
Traffic Volume (vph)	175	38	366	104	21	468
Future Volume (vph)	175	38	366	104	21	468
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0			6.0
Lane Util. Factor	1.00	1.00	0.95			0.95
Frpb, ped/bikes	1.00	0.99	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	0.97			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1781	1594	3463			3568
Flt Permitted	0.95	1.00	1.00			0.92
Satd. Flow (perm)	1781	1594	3463			3289
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	211	46	441	125	25	564
RTOR Reduction (vph)	0	36	22	0	0	0
Lane Group Flow (vph)	211	10	544	0	0	589
Confl. Peds. (#/hr)	3	1				
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%
Turn Type	Perm	Perm	NA		pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	13.4	13.4	40.1			39.1
Effective Green, g (s)	13.4	13.4	40.1			39.1
Actuated g/C Ratio	0.21	0.21	0.62			0.61
Clearance Time (s)	6.0	6.0	5.0			6.0
Vehicle Extension (s)	4.0	4.0	1.0			4.0
Lane Grp Cap (vph)	370	331	2152			1993
v/s Ratio Prot			0.16			
v/s Ratio Perm	c0.12	0.01				c0.18
v/c Ratio	0.57	0.03	0.25			0.30
Uniform Delay, d1	23.0	20.4	5.5			6.1
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	2.5	0.0	0.3			0.1
Delay (s)	25.5	20.4	5.8			6.2
Level of Service	C	C	A			A
Approach Delay (s)	24.6		5.8			6.2
Approach LOS	C		A			A

















Intersection Summary

HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	64.5	Sum of lost time (s)	16.0
Intersection Capacity Utilization	48.3%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group

Bellisle Heights Subdivision
4: Owen St & Poyntz St

HCM Unsignalized Intersection Capacity Analysis
Existing AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	10	142	4	16	94	44	0	5	33	89	5	11
Future Volume (vph)	10	142	4	16	94	44	0	5	33	89	5	11
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	14	203	6	23	134	63	0	7	47	127	7	16
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	223	220	54	150								
Volume Left (vph)	14	23	0	127								
Volume Right (vph)	6	63	47	16								
Hadj (s)	0.00	-0.14	-0.52	0.11								
Departure Headway (s)	4.7	4.6	4.7	5.1								
Degree Utilization, x	0.29	0.28	0.07	0.21								
Capacity (veh/h)	722	744	684	642								
Control Delay (s)	9.6	9.3	8.0	9.5								
Approach Delay (s)	9.6	9.3	8.0	9.5								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.4									
Level of Service			A									
Intersection Capacity Utilization			32.3%	ICU Level of Service	A							
Analysis Period (min)			15									

Bellisle Heights Subdivision
5: Bellisle Rd & Poyntz St

HCM Unsignalized Intersection Capacity Analysis
Existing AM Peak Hour



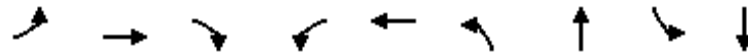
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↶	↷
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	107	30	38	53	6	48
Future Volume (vph)	107	30	38	53	6	48
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	165	46	58	82	9	74

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	211	140	83
Volume Left (vph)	0	58	9
Volume Right (vph)	46	0	74
Hadj (s)	-0.13	0.10	-0.51
Departure Headway (s)	4.1	4.4	4.1
Degree Utilization, x	0.24	0.17	0.10
Capacity (veh/h)	855	787	800
Control Delay (s)	8.4	8.3	7.6
Approach Delay (s)	8.4	8.3	7.6
Approach LOS	A	A	A

Intersection Summary		
Delay		8.2
Level of Service		A
Intersection Capacity Utilization	27.4%	ICU Level of Service
Analysis Period (min)		15

Bellisle Heights Subdivision
1: Main St & Robert St

Queues
Existing PM Peak Hour

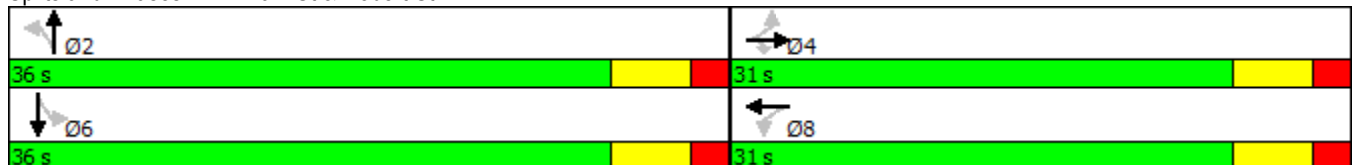


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	29	69	106	117	99	103	135	4	130
Future Volume (vph)	29	69	106	117	99	103	135	4	130
Lane Group Flow (vph)	30	72	110	122	122	107	299	4	158
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	36.0	36.0	36.0	36.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	36.0	36.0	36.0	36.0
Total Split (%)	46.3%	46.3%	46.3%	46.3%	46.3%	53.7%	53.7%	53.7%	53.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
v/c Ratio	0.11	0.18	0.26	0.44	0.30	0.13	0.26	0.01	0.13
Control Delay	17.8	18.2	6.2	23.7	17.7	6.7	4.7	6.0	5.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.8	18.2	6.2	23.7	17.7	6.7	4.7	6.0	5.7
Queue Length 50th (m)	2.5	6.0	0.0	10.8	9.0	4.2	7.6	0.2	5.5
Queue Length 95th (m)	7.9	14.4	9.7	23.5	20.4	12.3	21.3	1.3	14.8
Internal Link Dist (m)		253.7			92.3		140.3		209.3
Turn Bay Length (m)	30.0		25.0					10.0	
Base Capacity (vph)	604	895	805	620	880	801	1144	703	1194
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	0.05	0.08	0.14	0.20	0.14	0.13	0.26	0.01	0.13

Intersection Summary

Cycle Length: 67
 Actuated Cycle Length: 53.1
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 1: Main St & Robert St



Bellisle Heights Subdivision
1: Main St & Robert St

HCM Signalized Intersection Capacity Analysis
Existing PM Peak Hour

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	29	69	106	117	99	18	103	135	152	4	130	22
Future Volume (vph)	29	69	106	117	99	18	103	135	152	4	130	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.92		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)	1796	1900	1587	1761	1848		1791	1709		1788	1835	
Flt Permitted	0.68	1.00	1.00	0.71	1.00		0.66	1.00		0.58	1.00	
Satd. Flow (perm)	1283	1900	1587	1316	1848		1238	1709		1087	1835	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	30	72	110	122	103	19	107	141	158	4	135	23
RTOR Reduction (vph)	0	0	91	0	13	0	0	42	0	0	7	0
Lane Group Flow (vph)	30	72	19	122	109	0	107	257	0	4	151	0
Confl. Peds. (#/hr)	5		8	8		5	11		26	26		11
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	2%	0%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	9.2	9.2	9.2	9.2	9.2		33.2	33.2		33.2	33.2	
Effective Green, g (s)	9.2	9.2	9.2	9.2	9.2		33.2	33.2		33.2	33.2	
Actuated g/C Ratio	0.17	0.17	0.17	0.17	0.17		0.61	0.61		0.61	0.61	
Clearance Time (s)	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	216	321	268	222	312		755	1042		663	1119	
v/s Ratio Prot		0.04			0.06			c0.15			0.08	
v/s Ratio Perm	0.02		0.01	c0.09			0.09			0.00		
v/c Ratio	0.14	0.22	0.07	0.55	0.35		0.14	0.25		0.01	0.14	
Uniform Delay, d1	19.2	19.5	19.0	20.7	20.0		4.5	4.9		4.1	4.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.4	0.1	2.8	0.7		0.4	0.6		0.0	0.3	
Delay (s)	19.5	19.9	19.1	23.5	20.6		4.9	5.4		4.2	4.8	
Level of Service	B	B	B	C	C		A	A		A	A	
Approach Delay (s)		19.4			22.1			5.3			4.7	
Approach LOS		B			C			A			A	
Intersection Summary												
HCM 2000 Control Delay			12.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.31									
Actuated Cycle Length (s)			54.4			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			67.5%			ICU Level of Service				C		
Analysis Period (min)			15									
c Critical Lane Group												

Bellisle Heights Subdivision
2: Main St & Poyntz St

Queues
Existing PM Peak Hour

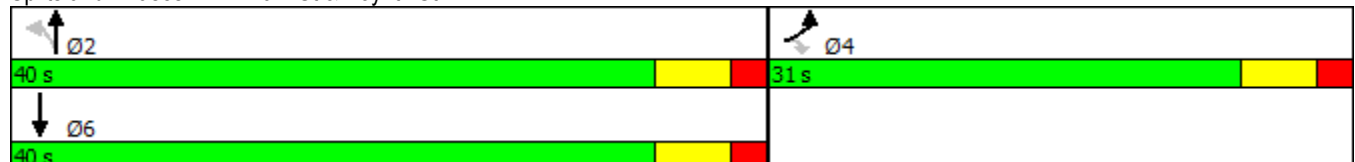


Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	111	160	188	298	244
Future Volume (vph)	111	160	188	298	244
Lane Group Flow (vph)	116	167	0	506	346
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	30.0	30.0	40.0	40.0	40.0
Total Split (s)	31.0	31.0	40.0	40.0	40.0
Total Split (%)	43.7%	43.7%	56.3%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0
Total Lost Time (s)	6.0	6.0		6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
v/c Ratio	0.36	0.40		0.33	0.16
Control Delay	23.7	7.2		6.3	3.8
Queue Delay	0.0	0.0		0.0	0.0
Total Delay	23.7	7.2		6.3	3.8
Queue Length 50th (m)	11.0	0.0		11.8	5.1
Queue Length 95th (m)	23.4	13.0		21.1	10.5
Internal Link Dist (m)	255.0			488.9	140.3
Turn Bay Length (m)	28.0				
Base Capacity (vph)	773	774		1552	2129
Starvation Cap Reductn	0	0		0	0
Spillback Cap Reductn	0	0		0	0
Storage Cap Reductn	0	0		0	0
Reduced v/c Ratio	0.15	0.22		0.33	0.16

Intersection Summary

Cycle Length: 71
 Actuated Cycle Length: 58.6
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 2: Main St & Poyntz St



Bellisle Heights Subdivision
2: Main St & Poyntz St

HCM Signalized Intersection Capacity Analysis
Existing PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	111	160	188	298	244	88
Future Volume (vph)	111	160	188	298	244	88
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		0.95	0.95	
Frbp, ped/bikes	1.00	0.98		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00	
Frt	1.00	0.85		1.00	0.96	
Flt Protected	0.95	1.00		0.98	1.00	
Satd. Flow (prot)	1805	1585		3525	3405	
Flt Permitted	0.95	1.00		0.70	1.00	
Satd. Flow (perm)	1805	1585		2523	3405	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	116	167	196	310	254	92
RTOR Reduction (vph)	0	137	0	0	35	0
Lane Group Flow (vph)	116	30	0	506	311	0
Confl. Peds. (#/hr)	10	9	22			22
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.5	10.5		36.1	36.1	
Effective Green, g (s)	10.5	10.5		36.1	36.1	
Actuated g/C Ratio	0.18	0.18		0.62	0.62	
Clearance Time (s)	6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	323	284		1554	2097	
v/s Ratio Prot	c0.06				0.09	
v/s Ratio Perm		0.02		c0.20		
v/c Ratio	0.36	0.11		0.33	0.15	
Uniform Delay, d1	21.1	20.1		5.4	4.8	
Progression Factor	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.7	0.2		0.6	0.1	
Delay (s)	21.8	20.3		6.0	4.9	
Level of Service	C	C		A	A	
Approach Delay (s)	20.9			6.0	4.9	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.4	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.33		
Actuated Cycle Length (s)	58.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.0%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Bellisle Heights Subdivision
3: Main St & Thompson Rd

Queues
Existing PM Peak Hour



Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	209	26	596	29	504
Future Volume (vph)	209	26	596	29	504
Lane Group Flow (vph)	222	28	845	0	567
Turn Type	Perm	Perm	NA	pm+pt	NA
Protected Phases			2	1	6
Permitted Phases	8	8		6	
Detector Phase	8	8	2	1	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	5.0	8.0	34.0
Minimum Split (s)	24.0	24.0	30.0	15.0	45.0
Total Split (s)	24.0	24.0	30.0	15.0	45.0
Total Split (%)	34.8%	34.8%	43.5%	21.7%	65.2%
Yellow Time (s)	4.0	4.0	3.5	3.0	4.0
All-Red Time (s)	2.0	2.0	1.5	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0	5.0		6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	Max	None	Max
v/c Ratio	0.58	0.08	0.39		0.30
Control Delay	29.4	8.8	6.7		7.2
Queue Delay	0.0	0.0	0.0		0.0
Total Delay	29.4	8.8	6.7		7.2
Queue Length 50th (m)	25.4	0.0	22.0		16.1
Queue Length 95th (m)	44.8	5.6	38.1		28.3
Internal Link Dist (m)	452.9		413.1		488.9
Turn Bay Length (m)	15.0				
Base Capacity (vph)	502	469	2162		1906
Starvation Cap Reductn	0	0	0		0
Spillback Cap Reductn	0	0	0		0
Storage Cap Reductn	0	0	0		0
Reduced v/c Ratio	0.44	0.06	0.39		0.30

Intersection Summary













Cycle Length: 69
 Actuated Cycle Length: 64.8
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 3: Main St & Thompson Rd



















Bellisle Heights Subdivision
3: Main St & Thompson Rd

HCM Signalized Intersection Capacity Analysis
Existing PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (vph)	209	26	596	198	29	504
Future Volume (vph)	209	26	596	198	29	504
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0			6.0
Lane Util. Factor	1.00	1.00	0.95			0.95
Frt	1.00	0.85	0.96			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1805	1615	3449			3566
Flt Permitted	0.95	1.00	1.00			0.88
Satd. Flow (perm)	1805	1615	3449			3161
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	222	28	634	211	31	536
RTOR Reduction (vph)	0	22	28	0	0	0
Lane Group Flow (vph)	222	6	817	0	0	567
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Turn Type	Perm	Perm	NA		pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	13.7	13.7	40.1			39.1
Effective Green, g (s)	13.7	13.7	40.1			39.1
Actuated g/C Ratio	0.21	0.21	0.62			0.60
Clearance Time (s)	6.0	6.0	5.0			6.0
Vehicle Extension (s)	4.0	4.0	1.0			4.0
Lane Grp Cap (vph)	381	341	2134			1907
v/s Ratio Prot			c0.24			
v/s Ratio Perm	c0.12	0.00				0.18
v/c Ratio	0.58	0.02	0.38			0.30
Uniform Delay, d1	23.0	20.2	6.2			6.2
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	2.7	0.0	0.5			0.1
Delay (s)	25.7	20.3	6.7			6.3
Level of Service	C	C	A			A
Approach Delay (s)	25.1		6.7			6.3
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			9.3		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			64.8		Sum of lost time (s)	16.0
Intersection Capacity Utilization			57.2%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

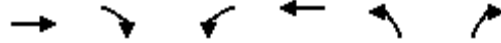
Bellisle Heights Subdivision
4: Owen St & Poyntz St

HCM Unsignalized Intersection Capacity Analysis
Existing PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	7	116	0	30	187	81	1	3	20	63	7	17
Future Volume (vph)	7	116	0	30	187	81	1	3	20	63	7	17
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	8	130	0	34	210	91	1	3	22	71	8	19
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	138	335	26	98								
Volume Left (vph)	8	34	1	71								
Volume Right (vph)	0	91	22	19								
Hadj (s)	0.03	-0.14	-0.50	0.03								
Departure Headway (s)	4.6	4.2	4.6	5.0								
Degree Utilization, x	0.18	0.39	0.03	0.14								
Capacity (veh/h)	748	819	692	650								
Control Delay (s)	8.6	10.0	7.8	8.8								
Approach Delay (s)	8.6	10.0	7.8	8.8								
Approach LOS	A	A	A	A								
Intersection Summary												
Delay			9.4									
Level of Service			A									
Intersection Capacity Utilization			41.4%	ICU Level of Service	A							
Analysis Period (min)			15									

Bellisle Heights Subdivision
5: Bellisle Rd & Poyntz St

HCM Unsignalized Intersection Capacity Analysis
Existing PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖		↗
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	92	73	110	95	1	29
Future Volume (vph)	92	73	110	95	1	29
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	116	92	139	120	1	37

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	208	259	38
Volume Left (vph)	0	139	1
Volume Right (vph)	92	0	37
Hadj (s)	-0.27	0.11	-0.51
Departure Headway (s)	4.0	4.3	4.4
Degree Utilization, x	0.23	0.31	0.05
Capacity (veh/h)	883	816	742
Control Delay (s)	8.2	9.2	7.6
Approach Delay (s)	8.2	9.2	7.6
Approach LOS	A	A	A

Intersection Summary			
Delay		8.7	
Level of Service		A	
Intersection Capacity Utilization	36.4%		ICU Level of Service
Analysis Period (min)		15	A

Appendix E – OTM Signal Justification Sheets

Justification No. 7 - 2028 Total Traffic Excluding Thompson Street Extension (Critical Case)

Owen St / Poyntz St

Justification	Description	Compliance			Signal Warrant	Underground Provisions Warrant	
		Rest. Flow	Sectional				Entire %
			Numerical	%			
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	720	378	53%	42%	NO	
	B. Vehicle volume, along minor streets (average hour)	170	85	50%		NO	
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	254	35%	29%	NO	
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	63	84%		NO	

Justification No. 7 - 2028 Total Traffic Excluding Thompson Street Extension (Critical Case)

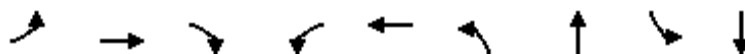
Owen St / Poytnz St

Justification	Description	Compliance			Signal Warrant	Underground Provisions Warrant	
		Rest. Flow	Sectional				Entire %
			Numerical	%			
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour)	720	260	36%	23%	NO	NO
	B. Vehicle volume, along minor streets (average hour)	255	71	28%		NO	NO
2. Delay to cross traffic	A. Vehicle volume, major street (average hour)	720	153	21%	12%	NO	NO
	B. Combined vehicle and pedestrian volume crossing artery from minor streets (average hour)	75	11	15%		NO	NO

Appendix F – Synchro Analysis Output – Background Traffic Volumes

Bellisle Heights Subdivision
3: Main St & Robert St

Queues
Background (2028) AM Peak Hour

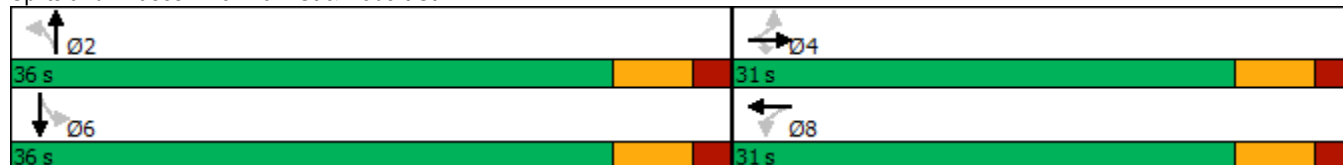


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	38	167	123	121	107	68	92	4	150
Future Volume (vph)	38	167	123	121	107	68	92	4	150
Lane Group Flow (vph)	48	211	156	153	163	86	296	5	218
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	36.0	36.0	36.0	36.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	36.0	36.0	36.0	36.0
Total Split (%)	46.3%	46.3%	46.3%	46.3%	46.3%	53.7%	53.7%	53.7%	53.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
v/c Ratio	0.16	0.47	0.32	0.56	0.36	0.13	0.30	0.01	0.22
Control Delay	17.6	21.6	5.3	26.7	17.7	7.9	4.8	7.2	7.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.6	21.6	5.3	26.7	17.7	7.9	4.8	7.2	7.4
Queue Length 50th (m)	4.0	19.0	0.0	14.1	12.6	3.8	6.4	0.2	9.3
Queue Length 95th (m)	9.4	29.8	7.8	24.8	22.0	10.2	16.5	1.5	20.2
Internal Link Dist (m)		114.9			92.3		140.3		209.3
Turn Bay Length (m)	30.0		25.0					10.0	
Base Capacity (vph)	564	864	803	530	848	640	995	599	1011
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	0.09	0.24	0.19	0.29	0.19	0.13	0.30	0.01	0.22

Intersection Summary























Cycle Length: 67
 Actuated Cycle Length: 55.1
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 3: Main St & Robert St



Bellisle Heights Subdivision
3: Main St & Robert St

HCM Signalized Intersection Capacity Analysis
Background (2028) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	38	167	123	121	107	22	68	92	142	4	150	22
Future Volume (vph)	38	167	123	121	107	22	68	92	142	4	150	22
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.97		1.00	0.91		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)	1803	1900	1581	1768	1844		1794	1699		1802	1841	
Flt Permitted	0.65	1.00	1.00	0.63	1.00		0.62	1.00		0.58	1.00	
Satd. Flow (perm)	1241	1900	1581	1165	1844		1174	1699		1099	1841	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	48	211	156	153	135	28	86	116	180	5	190	28
RTOR Reduction (vph)	0	0	119	0	14	0	0	69	0	0	6	0
Lane Group Flow (vph)	48	211	37	153	149	0	86	227	0	5	212	0
Confl. Peds. (#/hr)	1		1	1		1	9		4	4		9
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	2%	0%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	13.0	13.0	13.0	13.0	13.0		30.1	30.1		30.1	30.1	
Effective Green, g (s)	13.0	13.0	13.0	13.0	13.0		30.1	30.1		30.1	30.1	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24		0.55	0.55		0.55	0.55	
Clearance Time (s)	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	292	448	373	274	435		641	928		600	1005	
v/s Ratio Prot		0.11			0.08			c0.13			0.11	
v/s Ratio Perm	0.04		0.02	c0.13			0.07			0.00		
v/c Ratio	0.16	0.47	0.10	0.56	0.34		0.13	0.25		0.01	0.21	
Uniform Delay, d1	16.7	18.1	16.5	18.5	17.5		6.1	6.5		5.7	6.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	0.8	0.1	2.5	0.5		0.4	0.6		0.0	0.5	
Delay (s)	17.0	18.9	16.6	21.0	18.0		6.6	7.2		5.7	6.9	
Level of Service	B	B	B	C	B		A	A		A	A	
Approach Delay (s)		17.8			19.4			7.0			6.9	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			13.3				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.34									
Actuated Cycle Length (s)			55.1				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			75.8%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Bellisle Heights Subdivision
8: Main St & Poyntz St

Queues
Background (2028) AM Peak Hour

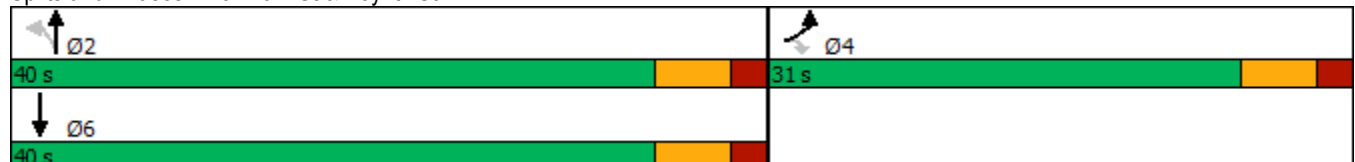


Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	94	199	209	232	260
Future Volume (vph)	94	199	209	232	260
Lane Group Flow (vph)	121	255	268	297	484
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	30.0	30.0	40.0	40.0	40.0
Total Split (s)	31.0	31.0	40.0	40.0	40.0
Total Split (%)	43.7%	43.7%	56.3%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
v/c Ratio	0.36	0.51	0.49	0.26	0.23
Control Delay	23.5	7.3	10.5	6.2	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	23.5	7.3	10.5	6.2	4.0
Queue Length 50th (m)	11.6	0.0	13.6	12.5	7.1
Queue Length 95th (m)	20.6	10.0	25.9	20.9	11.3
Internal Link Dist (m)	255.0			488.9	140.3
Turn Bay Length (m)	28.0				
Base Capacity (vph)	798	847	542	1143	2096
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.15	0.30	0.49	0.26	0.23

Intersection Summary

Cycle Length: 71
 Actuated Cycle Length: 56.5
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 8: Main St & Poyntz St



Bellisle Heights Subdivision
8: Main St & Poyntz St

HCM Signalized Intersection Capacity Analysis
Background (2028) AM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	94	199	209	232	260	118
Future Volume (vph)	94	199	209	232	260	118
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1805	1595	1800	1900	3390	
Flt Permitted	0.95	1.00	0.48	1.00	1.00	
Satd. Flow (perm)	1805	1595	902	1900	3390	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	121	255	268	297	333	151
RTOR Reduction (vph)	0	208	0	0	56	0
Lane Group Flow (vph)	121	47	268	297	428	0
Confl. Peds. (#/hr)	2	1	7			7
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.5	10.5	34.0	34.0	34.0	
Effective Green, g (s)	10.5	10.5	34.0	34.0	34.0	
Actuated g/C Ratio	0.19	0.19	0.60	0.60	0.60	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	335	296	542	1143	2040	
v/s Ratio Prot	c0.07			0.16	0.13	
v/s Ratio Perm		0.03	c0.30			
v/c Ratio	0.36	0.16	0.49	0.26	0.21	
Uniform Delay, d1	20.1	19.3	6.4	5.3	5.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.7	0.3	3.2	0.6	0.2	
Delay (s)	20.7	19.6	9.6	5.9	5.4	
Level of Service	C	B	A	A	A	
Approach Delay (s)	19.9			7.6	5.4	
Approach LOS	B			A	A	

Intersection Summary

HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	56.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Bellisle Heights Subdivision
13: Main St & Thompson Rd

Queues
Background (2028) AM Peak Hour



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	213	49	454	127	27	576
Future Volume (vph)	213	49	454	127	27	576
Lane Group Flow (vph)	257	59	547	153	0	727
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	5.0	8.0	34.0
Minimum Split (s)	24.0	24.0	30.0	30.0	15.0	45.0
Total Split (s)	24.0	24.0	30.0	30.0	15.0	45.0
Total Split (%)	34.8%	34.8%	43.5%	43.5%	21.7%	65.2%
Yellow Time (s)	4.0	4.0	3.5	3.5	3.0	4.0
All-Red Time (s)	2.0	2.0	1.5	1.5	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0	5.0	5.0		6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Max	Max	None	Max
v/c Ratio	0.64	0.15	0.25	0.15		0.38
Control Delay	30.9	7.2	6.7	4.8		8.2
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	30.9	7.2	6.7	4.8		8.2
Queue Length 50th (m)	30.0	0.0	15.3	5.1		23.4
Queue Length 95th (m)	46.7	6.9	22.7	11.7		33.3
Internal Link Dist (m)	452.9		413.1			488.9
Turn Bay Length (m)	15.0			1.0		
Base Capacity (vph)	492	479	2175	1002		1937
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.52	0.12	0.25	0.15		0.38

Intersection Summary














Cycle Length: 69
 Actuated Cycle Length: 65.9
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 13: Main St & Thompson Rd



















Bellisle Heights Subdivision
13: Main St & Thompson Rd

HCM Signalized Intersection Capacity Analysis
Background (2028) AM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations			 			 
Traffic Volume (vph)	213	49	454	127	27	576
Future Volume (vph)	213	49	454	127	27	576
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	5.0		6.0
Lane Util. Factor	1.00	1.00	0.95	1.00		0.95
Frbp, ped/bikes	1.00	0.99	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1797	1594	3574	1615		3568
Flt Permitted	0.95	1.00	1.00	1.00		0.91
Satd. Flow (perm)	1797	1594	3574	1615		3266
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	257	59	547	153	33	694
RTOR Reduction (vph)	0	46	0	19	0	0
Lane Group Flow (vph)	257	13	547	134	0	727
Confl. Peds. (#/hr)	4	1				
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	14.7	14.7	40.1	40.1		39.1
Effective Green, g (s)	14.7	14.7	40.1	40.1		39.1
Actuated g/C Ratio	0.22	0.22	0.61	0.61		0.59
Clearance Time (s)	6.0	6.0	5.0	5.0		6.0
Vehicle Extension (s)	4.0	4.0	1.0	1.0		4.0
Lane Grp Cap (vph)	401	356	2178	984		1940
v/s Ratio Prot			0.15			
v/s Ratio Perm	c0.14	0.01		0.08		c0.22
v/c Ratio	0.64	0.04	0.25	0.14		0.37
Uniform Delay, d1	23.2	20.0	5.9	5.5		7.0
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	3.9	0.1	0.3	0.3		0.1
Delay (s)	27.0	20.1	6.2	5.8		7.1
Level of Service	C	C	A	A		A
Approach Delay (s)	25.7		6.1			7.1
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			10.1		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.48			
Actuated Cycle Length (s)			65.8		Sum of lost time (s)	16.0
Intersection Capacity Utilization			57.7%		ICU Level of Service	B
Analysis Period (min)			15			
c Critical Lane Group						

Bellisle Heights Subdivision
7: Owen St & Poyntz St

HCM Unsignalized Intersection Capacity Analysis
Background (2028) AM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	12	177	5	20	115	54	0	6	41	110	6	13
Future Volume (vph)	12	177	5	20	115	54	0	6	41	110	6	13
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	17	253	7	29	164	77	0	9	59	157	9	19
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	277	270	68	185								
Volume Left (vph)	17	29	0	157								
Volume Right (vph)	7	77	59	19								
Hadj (s)	0.01	-0.15	-0.52	0.11								
Departure Headway (s)	5.0	4.9	5.1	5.5								
Degree Utilization, x	0.38	0.36	0.10	0.28								
Capacity (veh/h)	679	699	604	598								
Control Delay (s)	11.1	10.6	8.6	10.6								
Approach Delay (s)	11.1	10.6	8.6	10.6								
Approach LOS	B	B	A	B								
Intersection Summary												
Delay			10.6									
Level of Service			B									
Intersection Capacity Utilization			36.6%	ICU Level of Service	A							
Analysis Period (min)			15									

Bellisle Heights Subdivision
6: Bellisle Rd & Poyntz St

HCM Unsignalized Intersection Capacity Analysis
Background (2028) AM Peak Hour



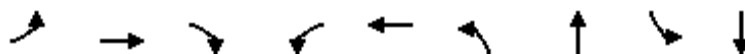
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↘	↙
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	133	37	46	65	7	60
Future Volume (vph)	133	37	46	65	7	60
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	205	57	71	100	11	92

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	262	171	103
Volume Left (vph)	0	71	11
Volume Right (vph)	57	0	92
Hadj (s)	-0.13	0.08	-0.45
Departure Headway (s)	4.2	4.5	4.4
Degree Utilization, x	0.31	0.21	0.13
Capacity (veh/h)	834	768	749
Control Delay (s)	9.0	8.7	8.0
Approach Delay (s)	9.0	8.7	8.0
Approach LOS	A	A	A

Intersection Summary			
Delay		8.7	
Level of Service		A	
Intersection Capacity Utilization	31.3%		ICU Level of Service
Analysis Period (min)		15	A

Bellisle Heights Subdivision
3: Main St & Robert St

Queues
Background (2028) PM Peak Hour

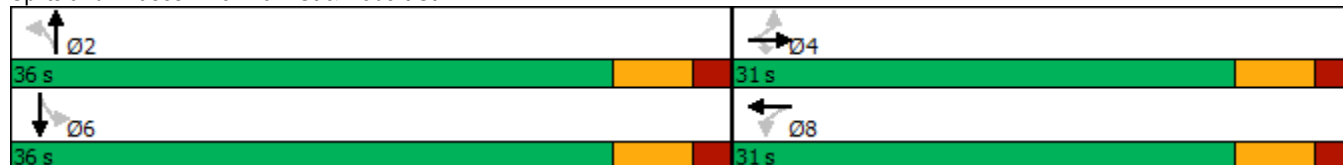


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	35	81	134	149	118	132	168	5	160
Future Volume (vph)	35	81	134	149	118	132	168	5	160
Lane Group Flow (vph)	36	84	140	155	146	138	373	5	195
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	36.0	36.0	36.0	36.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	36.0	36.0	36.0	36.0
Total Split (%)	46.3%	46.3%	46.3%	46.3%	46.3%	53.7%	53.7%	53.7%	53.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
v/c Ratio	0.13	0.20	0.30	0.53	0.34	0.21	0.38	0.01	0.19
Control Delay	17.4	17.8	5.6	25.6	17.7	8.0	6.5	6.8	6.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	17.8	5.6	25.6	17.7	8.0	6.5	6.8	6.8
Queue Length 50th (m)	3.0	7.0	0.0	14.1	11.2	6.1	12.1	0.2	7.7
Queue Length 95th (m)	8.9	16.0	10.7	29.1	23.7	17.3	32.5	1.7	20.2
Internal Link Dist (m)		114.9			92.3		140.3		209.3
Turn Bay Length (m)	30.0		25.0					10.0	
Base Capacity (vph)	570	864	786	587	848	663	994	556	1025
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	0.06	0.10	0.18	0.26	0.17	0.21	0.38	0.01	0.19

Intersection Summary






















Cycle Length: 67
 Actuated Cycle Length: 55.1
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 3: Main St & Robert St



Bellisle Heights Subdivision
3: Main St & Robert St

HCM Signalized Intersection Capacity Analysis
Background (2028) PM Peak Hour

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	35	81	134	149	118	22	132	168	190	5	160	27
Future Volume (vph)	35	81	134	149	118	22	132	168	190	5	160	27
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.92		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)	1795	1900	1565	1752	1847		1789	1706		1786	1835	
Flt Permitted	0.66	1.00	1.00	0.70	1.00		0.64	1.00		0.53	1.00	
Satd. Flow (perm)	1255	1900	1565	1295	1847		1196	1706		1002	1835	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	36	84	140	155	123	23	138	175	198	5	167	28
RTOR Reduction (vph)	0	0	108	0	12	0	0	49	0	0	7	0
Lane Group Flow (vph)	36	84	32	155	134	0	138	324	0	5	188	0
Confl. Peds. (#/hr)	6		10	10		6	13		32	32		13
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	2%	0%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	12.4	12.4	12.4	12.4	12.4		30.6	30.6		30.6	30.6	
Effective Green, g (s)	12.4	12.4	12.4	12.4	12.4		30.6	30.6		30.6	30.6	
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23		0.56	0.56		0.56	0.56	
Clearance Time (s)	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	282	428	352	291	416		665	949		557	1020	
v/s Ratio Prot		0.04			0.07			c0.19			0.10	
v/s Ratio Perm	0.03		0.02	c0.12			0.12			0.00		
v/c Ratio	0.13	0.20	0.09	0.53	0.32		0.21	0.34		0.01	0.18	
Uniform Delay, d1	17.0	17.3	16.8	18.7	17.8		6.1	6.7		5.4	6.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2	0.1	1.9	0.4		0.7	1.0		0.0	0.4	
Delay (s)	17.2	17.5	16.9	20.6	18.2		6.8	7.7		5.5	6.4	
Level of Service	B	B	B	C	B		A	A		A	A	
Approach Delay (s)		17.2			19.5			7.4			6.4	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			12.1			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.40									
Actuated Cycle Length (s)			55.0			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			78.3%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Bellisle Heights Subdivision
8: Main St & Poyntz St

Queues
Background (2028) PM Peak Hour

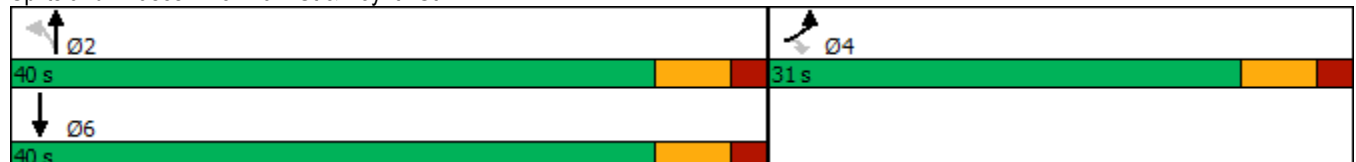


Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	160	207	254	352	295
Future Volume (vph)	160	207	254	352	295
Lane Group Flow (vph)	167	216	265	367	434
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	30.0	30.0	40.0	40.0	40.0
Total Split (s)	31.0	31.0	40.0	40.0	40.0
Total Split (%)	43.7%	43.7%	56.3%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
v/c Ratio	0.47	0.45	0.48	0.33	0.21
Control Delay	25.0	6.7	10.7	7.2	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	6.7	10.7	7.2	4.3
Queue Length 50th (m)	16.4	0.0	13.5	16.6	6.5
Queue Length 95th (m)	31.7	14.3	35.5	35.2	14.3
Internal Link Dist (m)	255.0			488.9	140.3
Turn Bay Length (m)	28.0				
Base Capacity (vph)	787	810	554	1126	2053
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.21	0.27	0.48	0.33	0.21

Intersection Summary

Cycle Length: 71
 Actuated Cycle Length: 57.4
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 8: Main St & Poyntz St



Bellisle Heights Subdivision
8: Main St & Poyntz St

HCM Signalized Intersection Capacity Analysis
Background (2028) PM Peak Hour



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	160	207	254	352	295	122
Future Volume (vph)	160	207	254	352	295	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.96	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1805	1583	1783	1900	3385	
Flt Permitted	0.95	1.00	0.50	1.00	1.00	
Satd. Flow (perm)	1805	1583	938	1900	3385	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	167	216	265	367	307	127
RTOR Reduction (vph)	0	173	0	0	50	0
Lane Group Flow (vph)	167	43	265	367	384	0
Confl. Peds. (#/hr)	12	11	27			27
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	11.3	11.3	34.0	34.0	34.0	
Effective Green, g (s)	11.3	11.3	34.0	34.0	34.0	
Actuated g/C Ratio	0.20	0.20	0.59	0.59	0.59	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	355	312	556	1127	2008	
v/s Ratio Prot	c0.09			0.19	0.11	
v/s Ratio Perm		0.03	c0.28			
v/c Ratio	0.47	0.14	0.48	0.33	0.19	
Uniform Delay, d1	20.4	19.0	6.6	5.9	5.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.2	2.9	0.8	0.2	
Delay (s)	21.3	19.2	9.5	6.6	5.6	
Level of Service	C	B	A	A	A	
Approach Delay (s)	20.1			7.8	5.6	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	10.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.47		
Actuated Cycle Length (s)	57.3	Sum of lost time (s)	12.0
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Bellisle Heights Subdivision
13: Main St & Thompson Rd

Queues
Background (2028) PM Peak Hour



Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	255	35	736	241	37	625
Future Volume (vph)	255	35	736	241	37	625
Lane Group Flow (vph)	271	37	783	256	0	704
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	5.0	8.0	34.0
Minimum Split (s)	24.0	24.0	30.0	30.0	15.0	45.0
Total Split (s)	24.0	24.0	30.0	30.0	15.0	45.0
Total Split (%)	34.8%	34.8%	43.5%	43.5%	21.7%	65.2%
Yellow Time (s)	4.0	4.0	3.5	3.5	3.0	4.0
All-Red Time (s)	2.0	2.0	1.5	1.5	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0	5.0	5.0		6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Max	Max	None	Max
v/c Ratio	0.66	0.09	0.36	0.26		0.38
Control Delay	31.6	8.0	7.6	5.9		8.3
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	31.6	8.0	7.6	5.9		8.3
Queue Length 50th (m)	31.9	0.0	24.5	10.6		23.2
Queue Length 95th (m)	54.8	6.3	37.6	22.5		36.4
Internal Link Dist (m)	452.9		413.1			488.9
Turn Bay Length (m)	15.0			1.0		
Base Capacity (vph)	492	467	2166	1001		1859
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.55	0.08	0.36	0.26		0.38

Intersection Summary












Cycle Length: 69
 Actuated Cycle Length: 66.1
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 13: Main St & Thompson Rd



Bellisle Heights Subdivision
13: Main St & Thompson Rd

HCM Signalized Intersection Capacity Analysis
Background (2028) PM Peak Hour

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	255	35	736	241	37	625
Future Volume (vph)	255	35	736	241	37	625
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	5.0		6.0
Lane Util. Factor	1.00	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1805	1615	3574	1615		3566
Flt Permitted	0.95	1.00	1.00	1.00		0.88
Satd. Flow (perm)	1805	1615	3574	1615		3146
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	271	37	783	256	39	665
RTOR Reduction (vph)	0	29	0	22	0	0
Lane Group Flow (vph)	271	8	783	234	0	704
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	15.0	15.0	40.1	40.1		39.1
Effective Green, g (s)	15.0	15.0	40.1	40.1		39.1
Actuated g/C Ratio	0.23	0.23	0.61	0.61		0.59
Clearance Time (s)	6.0	6.0	5.0	5.0		6.0
Vehicle Extension (s)	4.0	4.0	1.0	1.0		4.0
Lane Grp Cap (vph)	409	366	2168	979		1860
v/s Ratio Prot			0.22			
v/s Ratio Perm	c0.15	0.01		0.14		c0.22
v/c Ratio	0.66	0.02	0.36	0.24		0.38
Uniform Delay, d1	23.2	19.9	6.5	6.0		7.1
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	4.4	0.0	0.5	0.6		0.1
Delay (s)	27.6	19.9	7.0	6.6		7.2
Level of Service	C	B	A	A		A
Approach Delay (s)	26.7		6.9			7.2
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			10.0		HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio			0.49			
Actuated Cycle Length (s)			66.1		Sum of lost time (s)	16.0
Intersection Capacity Utilization			69.1%		ICU Level of Service	C
Analysis Period (min)			15			
c	Critical Lane Group					

Bellisle Heights Subdivision
7: Owen St & Poyntz St

HCM Unsignalized Intersection Capacity Analysis
Background (2028) PM Peak Hour



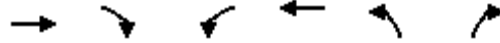
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕			↕			↕			↕	
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	9	143	0	38	232	100	1	4	24	78	9	21
Future Volume (vph)	9	143	0	38	232	100	1	4	24	78	9	21
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	10	161	0	43	261	112	1	4	27	88	10	24

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total (vph)	171	416	32	122
Volume Left (vph)	10	43	1	88
Volume Right (vph)	0	112	27	24
Hadj (s)	0.03	-0.14	-0.50	0.03
Departure Headway (s)	4.8	4.4	5.0	5.3
Degree Utilization, x	0.23	0.51	0.04	0.18
Capacity (veh/h)	701	791	619	608
Control Delay (s)	9.2	11.8	8.2	9.5
Approach Delay (s)	9.2	11.8	8.2	9.5
Approach LOS	A	B	A	A

Intersection Summary			
Delay		10.7	
Level of Service		B	
Intersection Capacity Utilization	50.4%		ICU Level of Service A
Analysis Period (min)		15	

Bellisle Heights Subdivision
6: Bellisle Rd & Poyntz St

HCM Unsignalized Intersection Capacity Analysis
Background (2028) PM Peak Hour



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↘	↙
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	114	89	137	117	1	35
Future Volume (vph)	114	89	137	117	1	35
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	144	113	173	148	1	44

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	257	321	45
Volume Left (vph)	0	173	1
Volume Right (vph)	113	0	44
Hadj (s)	-0.26	0.11	-0.52
Departure Headway (s)	4.1	4.4	4.6
Degree Utilization, x	0.29	0.39	0.06
Capacity (veh/h)	862	803	692
Control Delay (s)	8.7	10.1	7.9
Approach Delay (s)	8.7	10.1	7.9
Approach LOS	A	B	A

Intersection Summary		
Delay		9.4
Level of Service		A
Intersection Capacity Utilization	41.6%	ICU Level of Service
Analysis Period (min)		15
		A

Appendix G – Transportation Tomorrow Survey – Excerpt

<p>Tue Dec 19 2017 16:48:30 GMT-0500 (Eastern Standard Time) - Run Time: 3448ms</p> <p>Cross Tabulation Query Form - Trip - 2011 Row: Planning district of destination - pd_dest Column: 2006 GTA zone of household - gta06_hhld</p> <p>Filters: (2006 GTA zone of household - gta06_hhld In 8665); and (Start time of trip - start_time In 700 - 900); and (Trip purpose of destination - purp_dest In W)</p> <p>Trip 2011 ROW : pd_dest COLUMN : gta06_hhld</p>	<p>Tue Dec 19 2017 16:51:30 GMT-0500 (Eastern Standard Time) - Run Time: 4340ms</p> <p>Cross Tabulation Query Form - Trip - 2011 Row: 2006 GTA zone of destination - gta06_dest Column: 2006 GTA zone of household - gta06_hhld</p> <p>Filters: (2006 GTA zone of household - gta06_hhld In 8665); and (Start time of trip - start_time In 700 - 900); and (Trip purpose of destination - purp_dest In W); and</p>
---	--



TTS Cross Tabulation

Cross Tabulation Query Form - Trip - 2011

Filter Variables

Group Attributes

Grouping file: No file chosen

Filter Selection +

2006 GTA zone of household In 8665

 Start time of trip In 700 - 900

 Trip purpose of destination In W

Output

Comma-delimited table
 Column format

Thu Mar 01 2018 17:29:10 GMT-0500 (Eastern Standard Time) - Run Time: 2347ms

Cross Tabulation Query Form - Trip - 2011

Row: Planning district of destination - pd_dest
 Column: 2006 GTA zone of household - gta06_hhld

Filters:
 2006 GTA zone of household - gta06_hhld In 8665
 and
 Start time of trip - start_time In 700 - 900
 and
 Trip purpose of destination - purp_dest In W

Trip 2011
 ROW : pd_dest
 COLUMN : gta06_hhld

pd_dest	gta06_hhld	total
82	8665	15
129	8665	43
130	8665	167
131	8665	197
132	8665	25
147	8665	28



TTS Cross Tabulation

Cross Tabulation Query Form - Trip - 2011

Filter Variables

2006 GTA zone of desti... 2006 GTA zone of hous... (Optional) Table Attribute

Group Attributes

Row Grouping Column Grouping Table Grouping
Grouping file: Choose File No file chosen

Filter Selection +

2006 GTA zone of household In 8665
And
Start time of trip In 700 - 900
And
Trip purpose of destination In W
Add Delete

Output

Comma-delimited table Column format Expansion Factor On Click to Select Load Load
Execute Query Select All Save As

Thu Mar 01 2018 17:31:09 GMT-0500 (Eastern Standard Time) - Run Time: 2231ms

Cross Tabulation Query Form - Trip - 2011

Row: 2006 GTA zone of destination - gta06_dest
Column: 2006 GTA zone of household - gta06_hh1d

Filters:
2006 GTA zone of household - gta06_hh1d In 8665
and
Start time of trip - start_time In 700 - 900
and
Trip purpose of destination - purp_dest In W

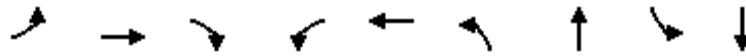
Trip 2011
ROW : gta06_dest
COLUMN : gta06_hh1d
Table with 3 columns: gta06_dest, gta06_hh1d, total

Appendix H – Synchro Analysis Output – Total Traffic Volumes

Bellisle Heights Subdivision
3: Main St & Robert St

Queues

Total (2028) AM Peak Hour - No Thompson Rd. Ext.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↑	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	41	183	123	123	112	68	100	4	153
Future Volume (vph)	41	183	123	123	112	68	100	4	153
Lane Group Flow (vph)	52	232	156	156	170	86	316	5	223
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	36.0	36.0	36.0	36.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	36.0	36.0	36.0	36.0
Total Split (%)	46.3%	46.3%	46.3%	46.3%	46.3%	53.7%	53.7%	53.7%	53.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
v/c Ratio	0.18	0.52	0.32	0.57	0.38	0.14	0.32	0.01	0.22
Control Delay	17.7	22.5	5.3	27.4	18.0	8.1	5.3	7.2	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	22.5	5.3	27.4	18.0	8.1	5.3	7.2	7.6
Queue Length 50th (m)	4.3	21.2	0.0	14.5	13.4	3.8	7.8	0.2	9.6
Queue Length 95th (m)	10.0	32.7	7.8	25.4	22.8	10.4	19.0	1.5	20.9
Internal Link Dist (m)		114.9			92.3		140.3		209.3
Turn Bay Length (m)	30.0		25.0					10.0	
Base Capacity (vph)	560	853	801	519	846	623	982	587	1008
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	0.09	0.27	0.19	0.30	0.20	0.14	0.32	0.01	0.22

Intersection Summary

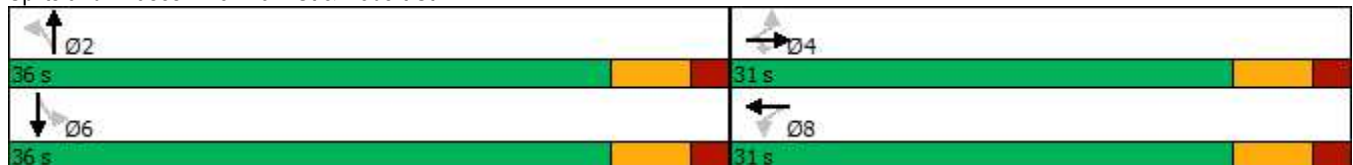
Cycle Length: 67

Actuated Cycle Length: 55.3

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Splits and Phases: 3: Main St & Robert St



Bellisle Heights Subdivision
3: Main St & Robert St

HCM Signalized Intersection Capacity Analysis
Total (2028) AM Peak Hour - No Thompson Rd. Ext.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	41	183	123	123	112	22	68	100	149	4	153	23
Future Volume (vph)	41	183	123	123	112	22	68	100	149	4	153	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.91		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)	1803	1881	1581	1804	1847		1759	1685		1802	1840	
Flt Permitted	0.65	1.00	1.00	0.60	1.00		0.62	1.00		0.57	1.00	
Satd. Flow (perm)	1233	1881	1581	1145	1847		1146	1685		1079	1840	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	52	232	156	156	142	28	86	127	189	5	194	29
RTOR Reduction (vph)	0	0	119	0	13	0	0	66	0	0	7	0
Lane Group Flow (vph)	52	232	37	156	157	0	86	250	0	5	216	0
Confl. Peds. (#/hr)	1		1	1		1	9		4	4		9
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	2%	3%	1%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	13.2	13.2	13.2	13.2	13.2		30.1	30.1		30.1	30.1	
Effective Green, g (s)	13.2	13.2	13.2	13.2	13.2		30.1	30.1		30.1	30.1	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24		0.54	0.54		0.54	0.54	
Clearance Time (s)	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	294	448	377	273	440		623	917		587	1001	
v/s Ratio Prot		0.12			0.09			c0.15			0.12	
v/s Ratio Perm	0.04		0.02	c0.14			0.08			0.00		
v/c Ratio	0.18	0.52	0.10	0.57	0.36		0.14	0.27		0.01	0.22	
Uniform Delay, d1	16.7	18.3	16.4	18.6	17.5		6.2	6.7		5.8	6.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.0	0.1	2.9	0.5		0.5	0.7		0.0	0.5	
Delay (s)	17.0	19.3	16.5	21.4	18.0		6.7	7.5		5.8	7.0	
Level of Service	B	B	B	C	B		A	A		A	A	
Approach Delay (s)		18.0			19.7			7.3			7.0	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			13.5			HCM 2000 Level of Service				B		
HCM 2000 Volume to Capacity ratio			0.36									
Actuated Cycle Length (s)			55.3			Sum of lost time (s)				12.0		
Intersection Capacity Utilization			76.6%			ICU Level of Service				D		
Analysis Period (min)			15									
c Critical Lane Group												

Bellisle Heights Subdivision
8: Main St & Poyntz St

Queues
Total (2028) AM Peak Hour - No Thompson Rd. Ext.

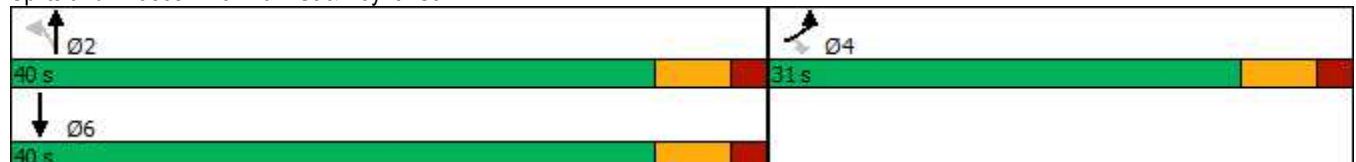


Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations	↶	↷	↶	↷	↷
Traffic Volume (vph)	109	260	230	232	260
Future Volume (vph)	109	260	230	232	260
Lane Group Flow (vph)	140	333	295	297	491
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	30.0	30.0	40.0	40.0	40.0
Total Split (s)	31.0	31.0	40.0	40.0	40.0
Total Split (%)	43.7%	43.7%	56.3%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
v/c Ratio	0.41	0.58	0.56	0.27	0.24
Control Delay	24.1	7.5	12.3	6.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	24.1	7.5	12.3	6.4	4.0
Queue Length 50th (m)	13.5	0.0	15.8	12.6	7.0
Queue Length 95th (m)	23.2	10.4	31.4	22.1	11.6
Internal Link Dist (m)	255.0			488.9	140.3
Turn Bay Length (m)	28.0				
Base Capacity (vph)	794	880	530	1115	2087
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.18	0.38	0.56	0.27	0.24

Intersection Summary

Cycle Length: 71
 Actuated Cycle Length: 56.8
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 8: Main St & Poyntz St



Bellisle Heights Subdivision
8: Main St & Poyntz St

HCM Signalized Intersection Capacity Analysis
Total (2028) AM Peak Hour - No Thompson Rd. Ext.














Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	109	260	230	232	260	123
Future Volume (vph)	109	260	230	232	260	123
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1805	1579	1782	1863	3384	
Flt Permitted	0.95	1.00	0.47	1.00	1.00	
Satd. Flow (perm)	1805	1579	887	1863	3384	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	140	333	295	297	333	158
RTOR Reduction (vph)	0	270	0	0	62	0
Lane Group Flow (vph)	140	63	295	297	429	0
Confl. Peds. (#/hr)	2	1	7			7
Heavy Vehicles (%)	0%	1%	1%	2%	1%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.8	10.8	34.0	34.0	34.0	
Effective Green, g (s)	10.8	10.8	34.0	34.0	34.0	
Actuated g/C Ratio	0.19	0.19	0.60	0.60	0.60	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	343	300	530	1115	2025	
v/s Ratio Prot	c0.08			0.16	0.13	
v/s Ratio Perm		0.04	c0.33			
v/c Ratio	0.41	0.21	0.56	0.27	0.21	
Uniform Delay, d1	20.2	19.4	6.9	5.4	5.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.4	4.2	0.6	0.2	
Delay (s)	21.0	19.8	11.0	6.0	5.5	
Level of Service	C	B	B	A	A	
Approach Delay (s)	20.1			8.5	5.5	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	11.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	56.8	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Bellisle Heights Subdivision
13: Main St & Thompson Rd

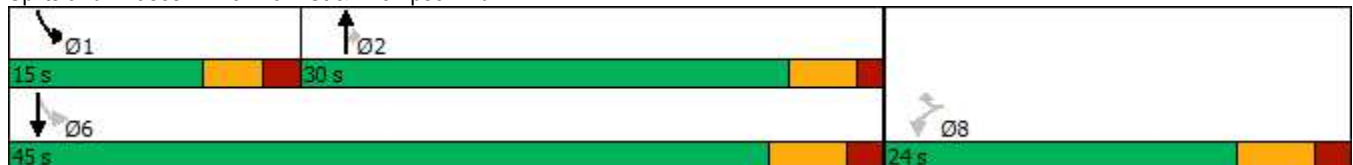
Queues
Total (2028) AM Peak Hour - No Thompson Rd. Ext.

						
Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	213	52	472	127	34	630
Future Volume (vph)	213	52	472	127	34	630
Lane Group Flow (vph)	257	63	569	153	0	800
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	5.0	8.0	34.0
Minimum Split (s)	24.0	24.0	30.0	30.0	15.0	45.0
Total Split (s)	24.0	24.0	30.0	30.0	15.0	45.0
Total Split (%)	34.8%	34.8%	43.5%	43.5%	21.7%	65.2%
Yellow Time (s)	4.0	4.0	3.5	3.5	3.0	4.0
All-Red Time (s)	2.0	2.0	1.5	1.5	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0	5.0	5.0		6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Max	Max	None	Max
v/c Ratio	0.64	0.16	0.26	0.15		0.42
Control Delay	31.1	7.0	6.8	4.9		8.5
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	31.1	7.0	6.8	4.9		8.5
Queue Length 50th (m)	30.1	0.0	16.2	5.2		26.7
Queue Length 95th (m)	46.9	7.0	23.7	11.8		37.4
Internal Link Dist (m)	452.9		413.1			488.9
Turn Bay Length (m)	15.0			1.0		
Base Capacity (vph)	487	482	2174	1000		1913
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.53	0.13	0.26	0.15		0.42

Intersection Summary












Cycle Length: 69
 Actuated Cycle Length: 65.9
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 13: Main St & Thompson Rd



Bellisle Heights Subdivision
13: Main St & Thompson Rd

HCM Signalized Intersection Capacity Analysis
Total (2028) AM Peak Hour - No Thompson Rd. Ext.

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	213	52	472	127	34	630
Future Volume (vph)	213	52	472	127	34	630
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	5.0		6.0
Lane Util. Factor	1.00	1.00	0.95	1.00		0.95
Frbp, ped/bikes	1.00	0.99	1.00	1.00		1.00
Flpb, ped/bikes	1.00	1.00	1.00	1.00		1.00
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1779	1594	3574	1615		3567
Flt Permitted	0.95	1.00	1.00	1.00		0.90
Satd. Flow (perm)	1779	1594	3574	1615		3225
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	257	63	569	153	41	759
RTOR Reduction (vph)	0	49	0	18	0	0
Lane Group Flow (vph)	257	14	569	135	0	800
Confl. Peds. (#/hr)	4	1				
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	14.8	14.8	40.1	40.1		39.1
Effective Green, g (s)	14.8	14.8	40.1	40.1		39.1
Actuated g/C Ratio	0.22	0.22	0.61	0.61		0.59
Clearance Time (s)	6.0	6.0	5.0	5.0		6.0
Vehicle Extension (s)	4.0	4.0	1.0	1.0		4.0
Lane Grp Cap (vph)	399	357	2174	982		1913
v/s Ratio Prot			0.16			
v/s Ratio Perm	c0.14	0.01		0.08		c0.25
v/c Ratio	0.64	0.04	0.26	0.14		0.42
Uniform Delay, d1	23.2	20.0	6.0	5.5		7.2
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	4.0	0.1	0.3	0.3		0.1
Delay (s)	27.1	20.1	6.3	5.8		7.4
Level of Service	C	C	A	A		A
Approach Delay (s)	25.7		6.2			7.4
Approach LOS	C		A			A

Intersection Summary

















HCM 2000 Control Delay	10.1	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.52		
Actuated Cycle Length (s)	65.9	Sum of lost time (s)	16.0
Intersection Capacity Utilization	64.6%	ICU Level of Service	C
Analysis Period (min)	15		

c Critical Lane Group

Bellisle Heights Subdivision
7: Owen St & Poyntz St

HCM Unsignalized Intersection Capacity Analysis

Total (2028) AM Peak Hour - No Thompson Rd. Ext.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	31	253	5	46	115	54	0	6	41	110	12	13
Future Volume (vph)	31	253	5	46	115	54	0	6	41	110	12	13
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	44	361	7	66	164	77	0	9	59	157	17	19
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	412	307	68	193								
Volume Left (vph)	44	66	0	157								
Volume Right (vph)	7	77	59	19								
Hadj (s)	0.01	-0.10	-0.52	0.10								
Departure Headway (s)	5.2	5.2	5.7	6.0								
Degree Utilization, x	0.59	0.45	0.11	0.32								
Capacity (veh/h)	666	651	518	539								
Control Delay (s)	15.4	12.3	9.4	11.8								
Approach Delay (s)	15.4	12.3	9.4	11.8								
Approach LOS	C	B	A	B								
Intersection Summary												
Delay			13.3									
Level of Service			B									
Intersection Capacity Utilization			41.7%	ICU Level of Service	A							
Analysis Period (min)			15									

Bellisle Heights Subdivision
6: Bellisle Rd & Poyntz St

HCM Unsignalized Intersection Capacity Analysis
Total (2028) AM Peak Hour - No Thompson Rd. Ext.



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↙	↘
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	133	41	46	65	20	155
Future Volume (vph)	133	41	46	65	20	155
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	205	63	71	100	31	238

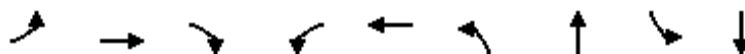
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	268	171	269
Volume Left (vph)	0	71	31
Volume Right (vph)	63	0	238
Hadj (s)	-0.14	0.10	-0.51
Departure Headway (s)	4.6	5.0	4.4
Degree Utilization, x	0.34	0.24	0.33
Capacity (veh/h)	732	676	755
Control Delay (s)	10.0	9.5	9.6
Approach Delay (s)	10.0	9.5	9.6
Approach LOS	B	A	A

Intersection Summary			
Delay		9.8	
Level of Service		A	
Intersection Capacity Utilization	37.1%		ICU Level of Service
Analysis Period (min)		15	A

Bellisle Heights Subdivision
3: Main St & Robert St

Queues

Total (2028) PM Peak Hour - No Thompson Rd. Ext.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↑	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	37	92	134	157	135	132	173	5	169
Future Volume (vph)	37	92	134	157	135	132	173	5	169
Lane Group Flow (vph)	39	96	140	164	164	138	382	5	208
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	36.0	36.0	36.0	36.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	36.0	36.0	36.0	36.0
Total Split (%)	46.3%	46.3%	46.3%	46.3%	46.3%	53.7%	53.7%	53.7%	53.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
v/c Ratio	0.14	0.22	0.30	0.55	0.37	0.21	0.39	0.01	0.21
Control Delay	17.3	17.9	5.5	26.0	18.4	8.3	6.9	7.0	7.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.3	17.9	5.5	26.0	18.4	8.3	6.9	7.0	7.1
Queue Length 50th (m)	3.2	8.1	0.0	15.0	13.1	6.2	13.0	0.2	8.5
Queue Length 95th (m)	9.3	17.8	10.6	30.6	26.4	17.8	34.9	1.7	22.0
Internal Link Dist (m)		114.9			92.3		140.3		209.3
Turn Bay Length (m)	30.0		25.0					10.0	
Base Capacity (vph)	562	867	789	584	854	646	982	538	1011
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	0.07	0.11	0.18	0.28	0.19	0.21	0.39	0.01	0.21

Intersection Summary

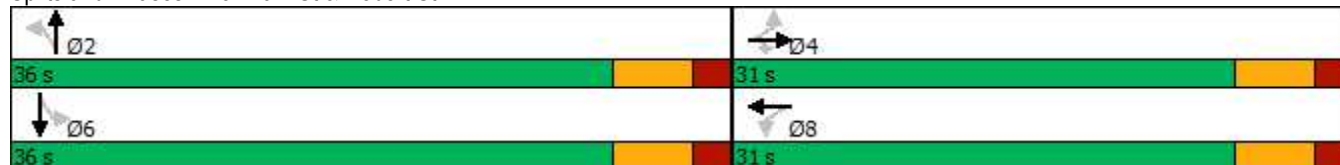
Cycle Length: 67

Actuated Cycle Length: 54.9

Natural Cycle: 70






















Control Type: Semi Act-Uncoord

Splits and Phases: 3: Main St & Robert St



Bellisle Heights Subdivision
3: Main St & Robert St

HCM Signalized Intersection Capacity Analysis
Total (2028) PM Peak Hour - No Thompson Rd. Ext.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	37	92	134	157	135	22	132	173	194	5	169	31
Future Volume (vph)	37	92	134	157	135	22	132	173	194	5	169	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.92		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)	1795	1900	1565	1752	1853		1789	1706		1787	1832	
Flt Permitted	0.65	1.00	1.00	0.69	1.00		0.63	1.00		0.52	1.00	
Satd. Flow (perm)	1234	1900	1565	1281	1853		1182	1706		984	1832	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	39	96	140	164	141	23	138	180	202	5	176	32
RTOR Reduction (vph)	0	0	107	0	11	0	0	49	0	0	8	0
Lane Group Flow (vph)	39	96	33	164	153	0	138	333	0	5	200	0
Confl. Peds. (#/hr)	6		10	10		6	13		32	32		13
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	2%	0%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	12.8	12.8	12.8	12.8	12.8		30.1	30.1		30.1	30.1	
Effective Green, g (s)	12.8	12.8	12.8	12.8	12.8		30.1	30.1		30.1	30.1	
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23		0.55	0.55		0.55	0.55	
Clearance Time (s)	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	287	442	364	298	432		648	935		539	1004	
v/s Ratio Prot		0.05			0.08			c0.20			0.11	
v/s Ratio Perm	0.03		0.02	c0.13			0.12			0.01		
v/c Ratio	0.14	0.22	0.09	0.55	0.35		0.21	0.36		0.01	0.20	
Uniform Delay, d1	16.7	17.0	16.5	18.5	17.6		6.3	7.0		5.6	6.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2	0.1	2.2	0.5		0.8	1.1		0.0	0.4	
Delay (s)	16.9	17.3	16.6	20.7	18.1		7.1	8.0		5.7	6.7	
Level of Service	B	B	B	C	B		A	A		A	A	
Approach Delay (s)		16.9			19.4			7.8			6.7	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			12.3			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.41									
Actuated Cycle Length (s)			54.9			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			78.7%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Bellisle Heights Subdivision
8: Main St & Poyntz St

Queues
Total (2028) PM Peak Hour - No Thompson Rd. Ext.

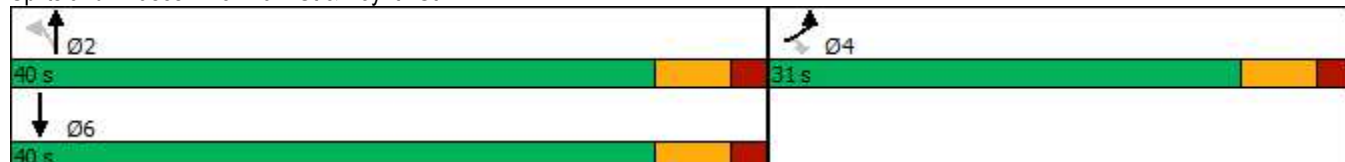


Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations	↶	↷	↶	↶	↶↷
Traffic Volume (vph)	169	248	323	352	295
Future Volume (vph)	169	248	323	352	295
Lane Group Flow (vph)	176	258	336	367	452
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	30.0	30.0	40.0	40.0	40.0
Total Split (s)	31.0	31.0	40.0	40.0	40.0
Total Split (%)	43.7%	43.7%	56.3%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
v/c Ratio	0.49	0.49	0.62	0.33	0.22
Control Delay	25.2	6.7	14.6	7.3	4.2
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	6.7	14.6	7.3	4.2
Queue Length 50th (m)	17.4	0.0	19.7	16.9	6.5
Queue Length 95th (m)	33.3	15.5	53.8	36.0	14.5
Internal Link Dist (m)	255.0			488.9	140.3
Turn Bay Length (m)	28.0				
Base Capacity (vph)	783	832	542	1122	2044
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.31	0.62	0.33	0.22

Intersection Summary

Cycle Length: 71
 Actuated Cycle Length: 57.6
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 8: Main St & Poyntz St



Bellisle Heights Subdivision
8: Main St & Poyntz St

HCM Signalized Intersection Capacity Analysis
Total (2028) PM Peak Hour - No Thompson Rd. Ext.



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	169	248	323	352	295	139
Future Volume (vph)	169	248	323	352	295	139
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1805	1583	1783	1900	3367	
Flt Permitted	0.95	1.00	0.49	1.00	1.00	
Satd. Flow (perm)	1805	1583	922	1900	3367	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	176	258	336	367	307	145
RTOR Reduction (vph)	0	206	0	0	59	0
Lane Group Flow (vph)	176	52	336	367	393	0
Confl. Peds. (#/hr)	12	11	27			27
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	11.6	11.6	34.0	34.0	34.0	
Effective Green, g (s)	11.6	11.6	34.0	34.0	34.0	
Actuated g/C Ratio	0.20	0.20	0.59	0.59	0.59	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	363	318	544	1121	1987	
v/s Ratio Prot	c0.10			0.19	0.12	
v/s Ratio Perm		0.03	c0.36			
v/c Ratio	0.48	0.16	0.62	0.33	0.20	
Uniform Delay, d1	20.4	19.0	7.6	6.0	5.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.2	5.2	0.8	0.2	
Delay (s)	21.4	19.2	12.8	6.8	5.7	
Level of Service	C	B	B	A	A	
Approach Delay (s)	20.1			9.7	5.7	
Approach LOS	C			A	A	

Intersection Summary

HCM 2000 Control Delay	11.4	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.58		
Actuated Cycle Length (s)	57.6	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.3%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Bellisle Heights Subdivision
13: Main St & Thompson Rd

Queues
Total (2028) PM Peak Hour - No Thompson Rd. Ext.

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	255	43	797	241	42	661
Future Volume (vph)	255	43	797	241	42	661
Lane Group Flow (vph)	271	46	848	256	0	748
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Detector Phase	8	8	2	2	1	6
Switch Phase						
Minimum Initial (s)	8.0	8.0	5.0	5.0	8.0	34.0
Minimum Split (s)	24.0	24.0	30.0	30.0	15.0	45.0
Total Split (s)	24.0	24.0	30.0	30.0	15.0	45.0
Total Split (%)	34.8%	34.8%	43.5%	43.5%	21.7%	65.2%
Yellow Time (s)	4.0	4.0	3.5	3.5	3.0	4.0
All-Red Time (s)	2.0	2.0	1.5	1.5	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0	5.0	5.0		6.0
Lead/Lag			Lag	Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	Yes	
Recall Mode	None	None	Max	Max	None	Max
v/c Ratio	0.66	0.11	0.39	0.26		0.41
Control Delay	31.6	7.6	7.8	6.0		8.6
Queue Delay	0.0	0.0	0.0	0.0		0.0
Total Delay	31.6	7.6	7.8	6.0		8.6
Queue Length 50th (m)	31.9	0.0	27.2	10.8		25.3
Queue Length 95th (m)	54.8	7.1	41.4	22.8		39.4
Internal Link Dist (m)	452.9		413.1			488.9
Turn Bay Length (m)	15.0			1.0		
Base Capacity (vph)	492	474	2166	999		1822
Starvation Cap Reductn	0	0	0	0		0
Spillback Cap Reductn	0	0	0	0		0
Storage Cap Reductn	0	0	0	0		0
Reduced v/c Ratio	0.55	0.10	0.39	0.26		0.41

Intersection Summary












Cycle Length: 69
 Actuated Cycle Length: 66.1
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 13: Main St & Thompson Rd



Bellisle Heights Subdivision
13: Main St & Thompson Rd

















HCM Signalized Intersection Capacity Analysis
Total (2028) PM Peak Hour - No Thompson Rd. Ext.

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	255	43	797	241	42	661
Future Volume (vph)	255	43	797	241	42	661
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0	5.0		6.0
Lane Util. Factor	1.00	1.00	0.95	1.00		0.95
Frt	1.00	0.85	1.00	0.85		1.00
Flt Protected	0.95	1.00	1.00	1.00		1.00
Satd. Flow (prot)	1805	1615	3574	1615		3566
Flt Permitted	0.95	1.00	1.00	1.00		0.86
Satd. Flow (perm)	1805	1615	3574	1615		3082
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	271	46	848	256	45	703
RTOR Reduction (vph)	0	36	0	21	0	0
Lane Group Flow (vph)	271	10	848	235	0	748
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Turn Type	Perm	Perm	NA	Perm	pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8		2	6	
Actuated Green, G (s)	15.0	15.0	40.1	40.1		39.1
Effective Green, g (s)	15.0	15.0	40.1	40.1		39.1
Actuated g/C Ratio	0.23	0.23	0.61	0.61		0.59
Clearance Time (s)	6.0	6.0	5.0	5.0		6.0
Vehicle Extension (s)	4.0	4.0	1.0	1.0		4.0
Lane Grp Cap (vph)	409	366	2168	979		1823
v/s Ratio Prot			0.24			
v/s Ratio Perm	c0.15	0.01		0.15		c0.24
v/c Ratio	0.66	0.03	0.39	0.24		0.41
Uniform Delay, d1	23.2	19.9	6.7	6.0		7.3
Progression Factor	1.00	1.00	1.00	1.00		1.00
Incremental Delay, d2	4.4	0.0	0.5	0.6		0.2
Delay (s)	27.6	19.9	7.2	6.6		7.4
Level of Service	C	B	A	A		A
Approach Delay (s)	26.5		7.1			7.4
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			10.0		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			66.1		Sum of lost time (s)	16.0
Intersection Capacity Utilization			74.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Bellisle Heights Subdivision
7: Owen St & Poyntz St

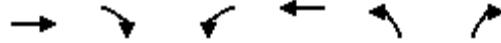
HCM Unsignalized Intersection Capacity Analysis

Total (2028) PM Peak Hour - No Thompson Rd. Ext.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	22	193	0	124	232	100	1	4	24	78	30	21
Future Volume (vph)	22	193	0	124	232	100	1	4	24	78	30	21
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	25	217	0	139	261	112	1	4	27	88	34	24
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	242	512	32	146								
Volume Left (vph)	25	139	1	88								
Volume Right (vph)	0	112	27	24								
Hadj (s)	0.04	-0.08	-0.50	0.02								
Departure Headway (s)	5.1	4.7	5.5	5.8								
Degree Utilization, x	0.34	0.67	0.05	0.24								
Capacity (veh/h)	662	748	543	552								
Control Delay (s)	10.8	16.6	8.8	10.6								
Approach Delay (s)	10.8	16.6	8.8	10.6								
Approach LOS	B	C	A	B								
Intersection Summary												
Delay			13.9									
Level of Service			B									
Intersection Capacity Utilization			61.1%	ICU Level of Service	B							
Analysis Period (min)			15									

Bellisle Heights Subdivision
6: Bellisle Rd & Poyntz St

HCM Unsignalized Intersection Capacity Analysis
Total (2028) PM Peak Hour - No Thompson Rd. Ext.



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↗			↖		↗
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	114	104	137	117	9	98
Future Volume (vph)	114	104	137	117	9	98
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	144	132	173	148	11	124

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	276	321	135
Volume Left (vph)	0	173	11
Volume Right (vph)	132	0	124
Hadj (s)	-0.29	0.11	-0.47
Departure Headway (s)	4.3	4.7	4.8
Degree Utilization, x	0.33	0.41	0.18
Capacity (veh/h)	800	745	671
Control Delay (s)	9.5	10.9	8.8
Approach Delay (s)	9.5	10.9	8.8
Approach LOS	A	B	A

Intersection Summary		
Delay		10.0
Level of Service		A
Intersection Capacity Utilization	45.4%	ICU Level of Service
Analysis Period (min)		15

Bellisle Heights Subdivision
13: Main St & Thompson Rd

Queues

Total (2028) AM Peak Hour - No Thompson Rd. Ext. No NBR Lane

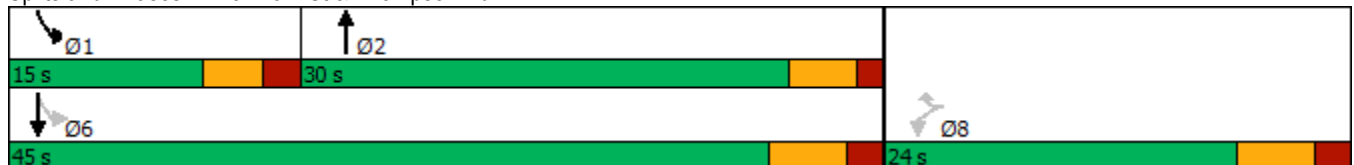


Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Configurations					
Traffic Volume (vph)	213	52	472	34	630
Future Volume (vph)	213	52	472	34	630
Lane Group Flow (vph)	257	63	722	0	800
Turn Type	Perm	Perm	NA	pm+pt	NA
Protected Phases			2	1	6
Permitted Phases	8	8		6	
Detector Phase	8	8	2	1	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	5.0	8.0	34.0
Minimum Split (s)	24.0	24.0	30.0	15.0	45.0
Total Split (s)	24.0	24.0	30.0	15.0	45.0
Total Split (%)	34.8%	34.8%	43.5%	21.7%	65.2%
Yellow Time (s)	4.0	4.0	3.5	3.0	4.0
All-Red Time (s)	2.0	2.0	1.5	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0	5.0		6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	Max	None	Max
v/c Ratio	0.64	0.16	0.34		0.42
Control Delay	31.1	7.0	6.8		8.6
Queue Delay	0.0	0.0	0.0		0.0
Total Delay	31.1	7.0	6.8		8.6
Queue Length 50th (m)	30.1	0.0	19.8		26.8
Queue Length 95th (m)	46.9	7.0	28.5		37.6
Internal Link Dist (m)	452.9		413.1		488.9
Turn Bay Length (m)	15.0				
Base Capacity (vph)	487	482	2130		1883
Starvation Cap Reductn	0	0	0		0
Spillback Cap Reductn	0	0	0		0
Storage Cap Reductn	0	0	0		0
Reduced v/c Ratio	0.53	0.13	0.34		0.42

Intersection Summary












Cycle Length: 69
 Actuated Cycle Length: 65.9
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 13: Main St & Thompson Rd



Bellisle Heights Subdivision
13: Main St & Thompson Rd

HCM Signalized Intersection Capacity Analysis
Total (2028) AM Peak Hour - No Thompson Rd. Ext. No NBR Lane

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	213	52	472	127	34	630
Future Volume (vph)	213	52	472	127	34	630
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0			6.0
Lane Util. Factor	1.00	1.00	0.95			0.95
Frbp, ped/bikes	1.00	0.99	1.00			1.00
Flpb, ped/bikes	1.00	1.00	1.00			1.00
Frt	1.00	0.85	0.97			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1779	1594	3468			3567
Flt Permitted	0.95	1.00	1.00			0.89
Satd. Flow (perm)	1779	1594	3468			3176
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83
Adj. Flow (vph)	257	63	569	153	41	759
RTOR Reduction (vph)	0	49	22	0	0	0
Lane Group Flow (vph)	257	14	700	0	0	800
Confl. Peds. (#/hr)	4	1				
Heavy Vehicles (%)	1%	0%	1%	0%	0%	1%
Turn Type	Perm	Perm	NA		pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	14.8	14.8	40.1			39.1
Effective Green, g (s)	14.8	14.8	40.1			39.1
Actuated g/C Ratio	0.22	0.22	0.61			0.59
Clearance Time (s)	6.0	6.0	5.0			6.0
Vehicle Extension (s)	4.0	4.0	1.0			4.0
Lane Grp Cap (vph)	399	357	2110			1884
v/s Ratio Prot			0.20			
v/s Ratio Perm	c0.14	0.01				c0.25
v/c Ratio	0.64	0.04	0.33			0.42
Uniform Delay, d1	23.2	20.0	6.3			7.3
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	4.0	0.1	0.4			0.2
Delay (s)	27.1	20.1	6.8			7.4
Level of Service	C	C	A			A
Approach Delay (s)	25.7		6.8			7.4
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			10.3		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.52			
Actuated Cycle Length (s)			65.9		Sum of lost time (s)	16.0
Intersection Capacity Utilization			64.6%		ICU Level of Service	C
Analysis Period (min)			15			
c Critical Lane Group						

Bellisle Heights Subdivision
13: Main St & Thompson Rd

Queues

Total (2028) PM Peak Hour - No Thompson Rd. Ext. No NBR Lane

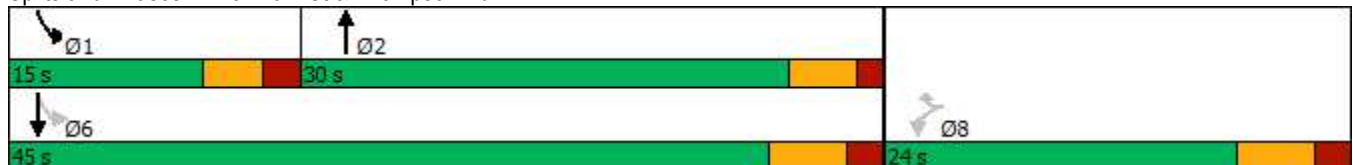


Lane Group	WBL	WBR	NBT	SBL	SBT
Lane Configurations	↘	↗	↕↔	↘	↗
Traffic Volume (vph)	255	43	797	42	661
Future Volume (vph)	255	43	797	42	661
Lane Group Flow (vph)	271	46	1104	0	748
Turn Type	Perm	Perm	NA	pm+pt	NA
Protected Phases			2	1	6
Permitted Phases	8	8		6	
Detector Phase	8	8	2	1	6
Switch Phase					
Minimum Initial (s)	8.0	8.0	5.0	8.0	34.0
Minimum Split (s)	24.0	24.0	30.0	15.0	45.0
Total Split (s)	24.0	24.0	30.0	15.0	45.0
Total Split (%)	34.8%	34.8%	43.5%	21.7%	65.2%
Yellow Time (s)	4.0	4.0	3.5	3.0	4.0
All-Red Time (s)	2.0	2.0	1.5	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0		0.0
Total Lost Time (s)	6.0	6.0	5.0		6.0
Lead/Lag			Lag	Lead	
Lead-Lag Optimize?			Yes	Yes	
Recall Mode	None	None	Max	None	Max
v/c Ratio	0.66	0.11	0.52		0.43
Control Delay	31.6	7.6	8.5		8.8
Queue Delay	0.0	0.0	0.0		0.0
Total Delay	31.6	7.6	8.5		8.8
Queue Length 50th (m)	31.9	0.0	36.6		25.5
Queue Length 95th (m)	54.8	7.1	55.9		40.1
Internal Link Dist (m)	452.9		413.1		488.9
Turn Bay Length (m)	15.0				
Base Capacity (vph)	492	474	2120		1759
Starvation Cap Reductn	0	0	0		0
Spillback Cap Reductn	0	0	0		0
Storage Cap Reductn	0	0	0		0
Reduced v/c Ratio	0.55	0.10	0.52		0.43

Intersection Summary











Cycle Length: 69
 Actuated Cycle Length: 66.1
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 13: Main St & Thompson Rd



Bellisle Heights Subdivision
13: Main St & Thompson Rd

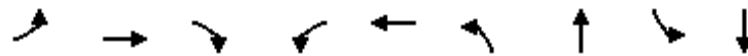
HCM Signalized Intersection Capacity Analysis
Total (2028) PM Peak Hour - No Thompson Rd. Ext. No NBR Lane

						
Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (vph)	255	43	797	241	42	661
Future Volume (vph)	255	43	797	241	42	661
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	5.0			6.0
Lane Util. Factor	1.00	1.00	0.95			0.95
Frt	1.00	0.85	0.97			1.00
Flt Protected	0.95	1.00	1.00			1.00
Satd. Flow (prot)	1805	1615	3458			3566
Flt Permitted	0.95	1.00	1.00			0.83
Satd. Flow (perm)	1805	1615	3458			2977
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	271	46	848	256	45	703
RTOR Reduction (vph)	0	36	25	0	0	0
Lane Group Flow (vph)	271	10	1079	0	0	748
Heavy Vehicles (%)	0%	0%	1%	0%	0%	1%
Turn Type	Perm	Perm	NA		pm+pt	NA
Protected Phases			2		1	6
Permitted Phases	8	8			6	
Actuated Green, G (s)	15.0	15.0	40.1			39.1
Effective Green, g (s)	15.0	15.0	40.1			39.1
Actuated g/C Ratio	0.23	0.23	0.61			0.59
Clearance Time (s)	6.0	6.0	5.0			6.0
Vehicle Extension (s)	4.0	4.0	1.0			4.0
Lane Grp Cap (vph)	409	366	2097			1760
v/s Ratio Prot			c0.31			
v/s Ratio Perm	c0.15	0.01				0.25
v/c Ratio	0.66	0.03	0.51			0.42
Uniform Delay, d1	23.2	19.9	7.4			7.4
Progression Factor	1.00	1.00	1.00			1.00
Incremental Delay, d2	4.4	0.0	0.9			0.2
Delay (s)	27.6	19.9	8.3			7.5
Level of Service	C	B	A			A
Approach Delay (s)	26.5		8.3			7.5
Approach LOS	C		A			A
Intersection Summary						
HCM 2000 Control Delay			10.7		HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.61			
Actuated Cycle Length (s)			66.1		Sum of lost time (s)	16.0
Intersection Capacity Utilization			74.0%		ICU Level of Service	D
Analysis Period (min)			15			
c Critical Lane Group						

Bellisle Heights Subdivision
3: Main St & Robert St

Queues

Total (2028) AM Peak Hour - Thompson Rd. Ext.

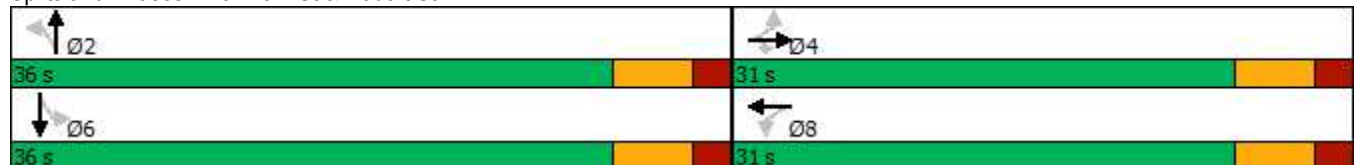


Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↑	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	40	181	123	124	112	68	101	4	153
Future Volume (vph)	40	181	123	124	112	68	101	4	153
Lane Group Flow (vph)	51	229	156	157	170	86	319	5	223
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	36.0	36.0	36.0	36.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	36.0	36.0	36.0	36.0
Total Split (%)	46.3%	46.3%	46.3%	46.3%	46.3%	53.7%	53.7%	53.7%	53.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
v/c Ratio	0.17	0.51	0.32	0.57	0.38	0.14	0.32	0.01	0.22
Control Delay	17.7	22.4	5.3	27.2	18.0	8.1	5.3	7.2	7.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.7	22.4	5.3	27.2	18.0	8.1	5.3	7.2	7.6
Queue Length 50th (m)	4.3	20.9	0.0	14.6	13.4	3.8	8.0	0.2	9.6
Queue Length 95th (m)	9.8	32.3	7.8	25.4	22.8	10.4	19.2	1.5	20.9
Internal Link Dist (m)		114.9			92.3		140.3		209.3
Turn Bay Length (m)	30.0		25.0					10.0	
Base Capacity (vph)	560	853	801	524	846	623	982	585	1008
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	0.09	0.27	0.19	0.30	0.20	0.14	0.32	0.01	0.22

Intersection Summary






















Cycle Length: 67
 Actuated Cycle Length: 55.3
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 3: Main St & Robert St



Bellisle Heights Subdivision
3: Main St & Robert St

HCM Signalized Intersection Capacity Analysis
Total (2028) AM Peak Hour - Thompson Rd. Ext.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	40	181	123	124	112	22	68	101	151	4	153	23
Future Volume (vph)	40	181	123	124	112	22	68	101	151	4	153	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.98	1.00	1.00		1.00	0.99		1.00	1.00	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00		0.99	1.00		1.00	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.91		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)	1803	1881	1581	1803	1847		1759	1684		1802	1840	
Flt Permitted	0.65	1.00	1.00	0.61	1.00		0.62	1.00		0.57	1.00	
Satd. Flow (perm)	1233	1881	1581	1157	1847		1146	1684		1076	1840	
Peak-hour factor, PHF	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79	0.79
Adj. Flow (vph)	51	229	156	157	142	28	86	128	191	5	194	29
RTOR Reduction (vph)	0	0	119	0	13	0	0	66	0	0	7	0
Lane Group Flow (vph)	51	229	37	157	157	0	86	253	0	5	216	0
Confl. Peds. (#/hr)	1		1	1		1	9		4	4		9
Heavy Vehicles (%)	0%	1%	0%	0%	0%	0%	2%	3%	1%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	13.2	13.2	13.2	13.2	13.2		30.1	30.1		30.1	30.1	
Effective Green, g (s)	13.2	13.2	13.2	13.2	13.2		30.1	30.1		30.1	30.1	
Actuated g/C Ratio	0.24	0.24	0.24	0.24	0.24		0.54	0.54		0.54	0.54	
Clearance Time (s)	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	294	448	377	276	440		623	916		585	1001	
v/s Ratio Prot		0.12			0.09			c0.15			0.12	
v/s Ratio Perm	0.04		0.02	c0.14			0.08			0.00		
v/c Ratio	0.17	0.51	0.10	0.57	0.36		0.14	0.28		0.01	0.22	
Uniform Delay, d1	16.7	18.3	16.4	18.5	17.5		6.2	6.8		5.8	6.5	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	1.0	0.1	2.7	0.5		0.5	0.7		0.0	0.5	
Delay (s)	17.0	19.2	16.5	21.2	18.0		6.7	7.5		5.8	7.0	
Level of Service	B	B	B	C	B		A	A		A	A	
Approach Delay (s)		18.0			19.6			7.3			7.0	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			13.5				HCM 2000 Level of Service				B	
HCM 2000 Volume to Capacity ratio			0.37									
Actuated Cycle Length (s)			55.3				Sum of lost time (s)			12.0		
Intersection Capacity Utilization			76.5%				ICU Level of Service			D		
Analysis Period (min)			15									
c Critical Lane Group												

Bellisle Heights Subdivision
8: Main St & Poyntz St

Queues
Total (2028) AM Peak Hour - Thompson Rd. Ext.

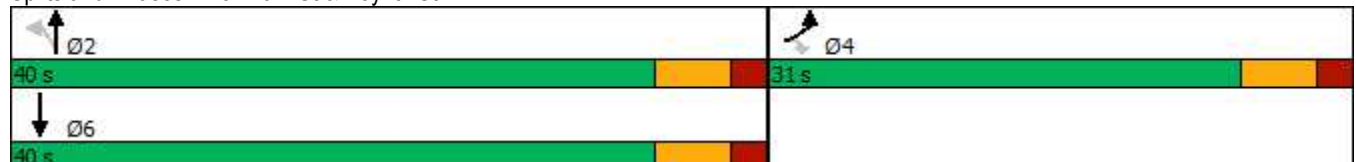


Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations					
Traffic Volume (vph)	105	147	147	239	262
Future Volume (vph)	105	147	147	239	262
Lane Group Flow (vph)	135	188	188	306	492
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	30.0	30.0	40.0	40.0	40.0
Total Split (s)	31.0	31.0	40.0	40.0	40.0
Total Split (%)	43.7%	43.7%	56.3%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
v/c Ratio	0.40	0.42	0.35	0.27	0.24
Control Delay	24.0	6.9	8.4	6.4	4.0
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	24.0	6.9	8.4	6.4	4.0
Queue Length 50th (m)	13.0	0.0	8.5	13.0	7.2
Queue Length 95th (m)	22.5	9.1	17.6	22.4	11.7
Internal Link Dist (m)	255.0			488.9	140.3
Turn Bay Length (m)	28.0				
Base Capacity (vph)	793	798	531	1119	2091
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.17	0.24	0.35	0.27	0.24

Intersection Summary

Cycle Length: 71
 Actuated Cycle Length: 56.9
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 8: Main St & Poyntz St



Bellisle Heights Subdivision
8: Main St & Poyntz St

HCM Signalized Intersection Capacity Analysis

Total (2028) AM Peak Hour - Thompson Rd. Ext.



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	105	147	147	239	262	122
Future Volume (vph)	105	147	147	239	262	122
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.99	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1805	1579	1782	1863	3387	
Flt Permitted	0.95	1.00	0.47	1.00	1.00	
Satd. Flow (perm)	1805	1579	886	1863	3387	
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	135	188	188	306	336	156
RTOR Reduction (vph)	0	153	0	0	59	0
Lane Group Flow (vph)	135	35	188	306	433	0
Confl. Peds. (#/hr)	2	1	7			7
Heavy Vehicles (%)	0%	1%	1%	2%	1%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	10.7	10.7	34.2	34.2	34.2	
Effective Green, g (s)	10.7	10.7	34.2	34.2	34.2	
Actuated g/C Ratio	0.19	0.19	0.60	0.60	0.60	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	339	296	532	1119	2035	
v/s Ratio Prot	c0.07			0.16	0.13	
v/s Ratio Perm		0.02	c0.21			
v/c Ratio	0.40	0.12	0.35	0.27	0.21	
Uniform Delay, d1	20.3	19.2	5.7	5.4	5.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	0.8	0.2	1.8	0.6	0.2	
Delay (s)	21.0	19.4	7.6	6.0	5.4	
Level of Service	C	B	A	A	A	
Approach Delay (s)	20.1			6.6	5.4	
Approach LOS	C			A	A	

Intersection Summary			
HCM 2000 Control Delay	9.5	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.36		
Actuated Cycle Length (s)	56.9	Sum of lost time (s)	12.0
Intersection Capacity Utilization	80.4%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Bellisle Heights Subdivision
 13: Main St & Thompson St/Thompson Rd

Queues
 Total (2028) AM Peak Hour - Thompson Rd. Ext.

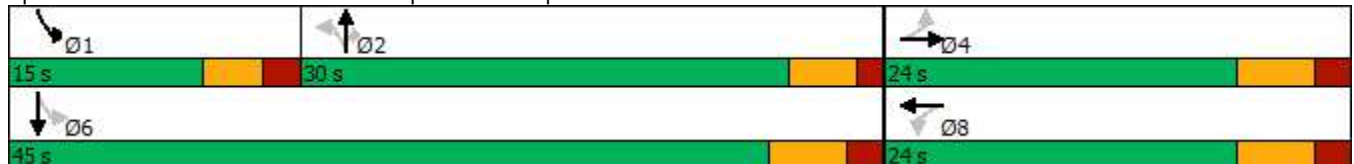


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↕	↗	↖		↕	↗		↕
Traffic Volume (vph)	7	9	213	8	74	398	127	24	527
Future Volume (vph)	7	9	213	8	74	398	127	24	527
Lane Group Flow (vph)	0	144	257	62	0	569	153	0	666
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases		4		8		2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	8	8	2	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	5.0	5.0	5.0	8.0	34.0
Minimum Split (s)	24.0	24.0	24.0	24.0	30.0	30.0	30.0	15.0	45.0
Total Split (s)	24.0	24.0	24.0	24.0	30.0	30.0	30.0	15.0	45.0
Total Split (%)	34.8%	34.8%	34.8%	34.8%	43.5%	43.5%	43.5%	21.7%	65.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.5	1.5	1.5	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		5.0	5.0		6.0
Lead/Lag					Lag	Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	Max	Max	Max	None	Max
v/c Ratio		0.29	0.79	0.14		0.35	0.15		0.35
Control Delay		7.5	43.1	8.8		8.1	2.4		8.5
Queue Delay		0.0	0.0	0.0		0.0	0.0		0.0
Total Delay		7.5	43.1	8.8		8.1	2.4		8.5
Queue Length 50th (m)		1.9	31.9	1.0		19.3	1.4		23.4
Queue Length 95th (m)		12.2	#56.7	8.1		25.6	6.8		30.0
Internal Link Dist (m)		194.7		452.9		413.1			488.9
Turn Bay Length (m)			15.0				1.0		
Base Capacity (vph)		527	357	475		1635	1009		1892
Starvation Cap Reductn		0	0	0		0	0		0
Spillback Cap Reductn		0	0	0		0	0		0
Storage Cap Reductn		0	0	0		0	0		0
Reduced v/c Ratio		0.27	0.72	0.13		0.35	0.15		0.35

Intersection Summary

Cycle Length: 69
 Actuated Cycle Length: 67.5
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 13: Main St & Thompson St/Thompson Rd



Bellisle Heights Subdivision
13: Main St & Thompson St/Thompson Rd

















HCM Signalized Intersection Capacity Analysis
Total (2028) AM Peak Hour - Thompson Rd. Ext.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR	
Lane Configurations													
Traffic Volume (vph)	7	9	104	213	8	43	74	398	127	24	527	2	
Future Volume (vph)	7	9	104	213	8	43	74	398	127	24	527	2	
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	
Total Lost time (s)		6.0		6.0	6.0			5.0	5.0		6.0		
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95		
Frbp, ped/bikes		0.99		1.00	0.99			1.00	1.00		1.00		
Flpb, ped/bikes		1.00		1.00	1.00			1.00	1.00		1.00		
Frt		0.88		1.00	0.87			1.00	0.85		1.00		
Flt Protected		1.00		0.95	1.00			0.99	1.00		1.00		
Satd. Flow (prot)		1653		1786	1638			3552	1615		3567		
Flt Permitted		0.98		0.71	1.00			0.77	1.00		0.92		
Satd. Flow (perm)		1633		1340	1638			2755	1615		3272		
Peak-hour factor, PHF	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	0.83	
Adj. Flow (vph)	8	11	125	257	10	52	89	480	153	29	635	2	
RTOR Reduction (vph)	0	95	0	0	39	0	0	0	51	0	0	0	
Lane Group Flow (vph)	0	49	0	257	23	0	0	569	102	0	666	0	
Confl. Peds. (#/hr)	4		1	1		4							
Heavy Vehicles (%)	0%	0%	0%	1%	0%	0%	0%	1%	0%	0%	1%	0%	
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA		
Protected Phases		4			8			2		1	6		
Permitted Phases	4			8			2		2	6			
Actuated Green, G (s)		16.4		16.4	16.4			40.0	40.0		39.0		
Effective Green, g (s)		16.4		16.4	16.4			40.0	40.0		39.0		
Actuated g/C Ratio		0.24		0.24	0.24			0.59	0.59		0.58		
Clearance Time (s)		6.0		6.0	6.0			5.0	5.0		6.0		
Vehicle Extension (s)		4.0		4.0	4.0			1.0	1.0		4.0		
Lane Grp Cap (vph)		397		326	398			1635	958		1893		
v/s Ratio Prot					0.01								
v/s Ratio Perm		0.03		c0.19				c0.21	0.06		0.20		
v/c Ratio		0.12		0.79	0.06			0.35	0.11		0.35		
Uniform Delay, d1		19.9		23.9	19.6			7.0	5.9		7.5		
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00		
Incremental Delay, d2		0.2		12.6	0.1			0.6	0.2		0.1		
Delay (s)		20.1		36.4	19.6			7.6	6.2		7.6		
Level of Service		C		D	B			A	A		A		
Approach Delay (s)		20.1			33.2			7.3			7.6		
Approach LOS		C			C			A			A		
Intersection Summary													
HCM 2000 Control Delay			12.9									HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio			0.52										
Actuated Cycle Length (s)			67.4									Sum of lost time (s)	16.0
Intersection Capacity Utilization			74.1%									ICU Level of Service	D
Analysis Period (min)			15										
c Critical Lane Group													

Bellisle Heights Subdivision
7: Owen St & Poyntz St

HCM Unsignalized Intersection Capacity Analysis

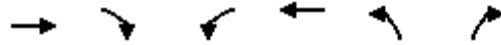
Total (2028) AM Peak Hour - Thompson Rd. Ext.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	28	164	5	20	74	35	0	24	34	89	33	13
Future Volume (vph)	28	164	5	20	74	35	0	24	34	89	33	13
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	40	234	7	29	106	50	0	34	49	127	47	19
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	281	185	83	193								
Volume Left (vph)	40	29	0	127								
Volume Right (vph)	7	50	49	19								
Hadj (s)	0.01	-0.12	-0.35	0.07								
Departure Headway (s)	4.9	4.9	5.0	5.3								
Degree Utilization, x	0.38	0.25	0.12	0.28								
Capacity (veh/h)	691	679	623	627								
Control Delay (s)	11.0	9.6	8.7	10.4								
Approach Delay (s)	11.0	9.6	8.7	10.4								
Approach LOS	B	A	A	B								
Intersection Summary												
Delay			10.2									
Level of Service			B									
Intersection Capacity Utilization			34.6%	ICU Level of Service	A							
Analysis Period (min)			15									

Bellisle Heights Subdivision
6: Bellisle Rd & Poyntz St

HCM Unsignalized Intersection Capacity Analysis

Total (2028) AM Peak Hour - Thompson Rd. Ext.



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	→			←	↵	↵
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	110	64	29	41	45	87
Future Volume (vph)	110	64	29	41	45	87
Peak Hour Factor	0.65	0.65	0.65	0.65	0.65	0.65
Hourly flow rate (vph)	169	98	45	63	69	134

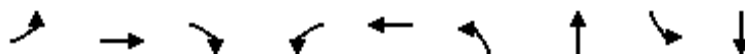
Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	267	108	203
Volume Left (vph)	0	45	69
Volume Right (vph)	98	0	134
Hadj (s)	-0.22	0.10	-0.33
Departure Headway (s)	4.3	4.8	4.4
Degree Utilization, x	0.32	0.14	0.25
Capacity (veh/h)	794	705	760
Control Delay (s)	9.3	8.6	8.9
Approach Delay (s)	9.3	8.6	8.9
Approach LOS	A	A	A

Intersection Summary			
Delay		9.0	
Level of Service		A	
Intersection Capacity Utilization	32.6%		ICU Level of Service
Analysis Period (min)		15	A

Bellisle Heights Subdivision
3: Main St & Robert St

Queues

Total (2028) PM Peak Hour - Thompson Rd. Ext.



Lane Group	EBL	EBT	EBR	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations	↖	↑	↗	↖	↗	↖	↗	↖	↗
Traffic Volume (vph)	36	90	134	159	133	132	174	5	171
Future Volume (vph)	36	90	134	159	133	132	174	5	171
Lane Group Flow (vph)	38	94	140	166	162	138	385	5	208
Turn Type	Perm	NA	Perm	Perm	NA	Perm	NA	Perm	NA
Protected Phases		4			8		2		6
Permitted Phases	4		4	8		2		6	
Detector Phase	4	4	4	8	8	2	2	6	6
Switch Phase									
Minimum Initial (s)	10.0	10.0	10.0	10.0	10.0	16.0	16.0	16.0	16.0
Minimum Split (s)	30.0	30.0	30.0	30.0	30.0	36.0	36.0	36.0	36.0
Total Split (s)	31.0	31.0	31.0	31.0	31.0	36.0	36.0	36.0	36.0
Total Split (%)	46.3%	46.3%	46.3%	46.3%	46.3%	53.7%	53.7%	53.7%	53.7%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	None	Max	Max	Max	Max
v/c Ratio	0.13	0.21	0.30	0.56	0.37	0.21	0.39	0.01	0.21
Control Delay	17.2	17.8	5.5	26.0	18.2	8.4	7.0	7.2	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.2	17.8	5.5	26.0	18.2	8.4	7.0	7.2	7.2
Queue Length 50th (m)	3.1	7.9	0.0	15.3	12.9	6.3	13.2	0.2	8.6
Queue Length 95th (m)	9.1	17.4	10.5	30.9	26.2	17.9	35.3	1.7	22.2
Internal Link Dist (m)		114.9			92.3		140.3		209.3
Turn Bay Length (m)	30.0		25.0					10.0	
Base Capacity (vph)	563	866	788	584	852	645	982	535	1010
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	0.07	0.11	0.18	0.28	0.19	0.21	0.39	0.01	0.21

Intersection Summary

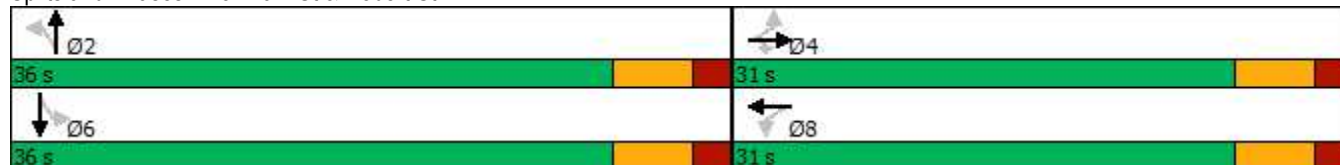
Cycle Length: 67

Actuated Cycle Length: 55

Natural Cycle: 70

Control Type: Semi Act-Uncoord

Splits and Phases: 3: Main St & Robert St



Bellisle Heights Subdivision
3: Main St & Robert St

HCM Signalized Intersection Capacity Analysis
Total (2028) PM Peak Hour - Thompson Rd. Ext.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	36	90	134	159	133	22	132	174	196	5	171	29
Future Volume (vph)	36	90	134	159	133	22	132	174	196	5	171	29
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00	0.97	1.00	1.00		1.00	0.98		1.00	1.00	
Flpb, ped/bikes	0.99	1.00	1.00	0.99	1.00		0.99	1.00		0.99	1.00	
Frt	1.00	1.00	0.85	1.00	0.98		1.00	0.92		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)	1795	1900	1565	1752	1852		1789	1706		1787	1835	
Flt Permitted	0.65	1.00	1.00	0.70	1.00		0.63	1.00		0.52	1.00	
Satd. Flow (perm)	1237	1900	1565	1284	1852		1182	1706		979	1835	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	38	94	140	166	139	23	138	181	204	5	178	30
RTOR Reduction (vph)	0	0	107	0	11	0	0	50	0	0	7	0
Lane Group Flow (vph)	38	94	33	166	151	0	138	335	0	5	201	0
Confl. Peds. (#/hr)	6		10	10		6	13		32	32		13
Heavy Vehicles (%)	0%	0%	0%	2%	0%	0%	0%	2%	0%	0%	1%	0%
Turn Type	Perm	NA	Perm	Perm	NA		Perm	NA		Perm	NA	
Protected Phases		4			8			2			6	
Permitted Phases	4		4	8			2			6		
Actuated Green, G (s)	12.8	12.8	12.8	12.8	12.8		30.1	30.1		30.1	30.1	
Effective Green, g (s)	12.8	12.8	12.8	12.8	12.8		30.1	30.1		30.1	30.1	
Actuated g/C Ratio	0.23	0.23	0.23	0.23	0.23		0.55	0.55		0.55	0.55	
Clearance Time (s)	6.0	6.0	6.0	6.0	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	3.0	
Lane Grp Cap (vph)	288	442	364	299	431		648	935		536	1006	
v/s Ratio Prot		0.05			0.08			c0.20			0.11	
v/s Ratio Perm	0.03		0.02	c0.13			0.12			0.01		
v/c Ratio	0.13	0.21	0.09	0.56	0.35		0.21	0.36		0.01	0.20	
Uniform Delay, d1	16.7	17.0	16.5	18.5	17.6		6.3	7.0		5.6	6.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.2	0.1	2.2	0.5		0.8	1.1		0.0	0.4	
Delay (s)	16.9	17.2	16.6	20.8	18.1		7.1	8.0		5.7	6.7	
Level of Service	B	B	B	C	B		A	A		A	A	
Approach Delay (s)		16.9			19.4			7.8			6.7	
Approach LOS		B			B			A			A	
Intersection Summary												
HCM 2000 Control Delay			12.3			HCM 2000 Level of Service			B			
HCM 2000 Volume to Capacity ratio			0.42									
Actuated Cycle Length (s)			54.9			Sum of lost time (s)			12.0			
Intersection Capacity Utilization			78.8%			ICU Level of Service			D			
Analysis Period (min)			15									
c Critical Lane Group												

Bellisle Heights Subdivision
8: Main St & Poyntz St

Queues
Total (2028) PM Peak Hour - Thompson Rd. Ext.

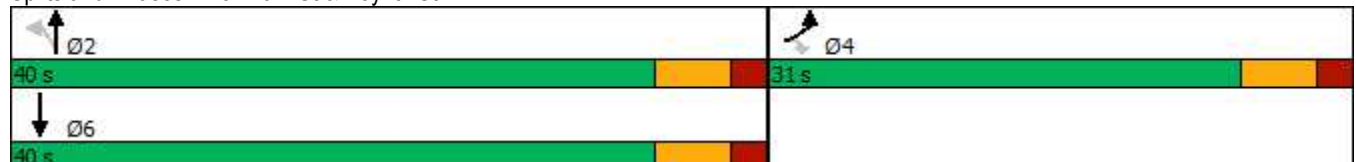


Lane Group	EBL	EBR	NBL	NBT	SBT
Lane Configurations	↖	↗	↖	↑	↗↖
Traffic Volume (vph)	167	149	189	357	303
Future Volume (vph)	167	149	189	357	303
Lane Group Flow (vph)	174	155	197	372	457
Turn Type	Prot	Perm	Perm	NA	NA
Protected Phases	4			2	6
Permitted Phases		4	2		
Detector Phase	4	4	2	2	6
Switch Phase					
Minimum Initial (s)	10.0	10.0	34.0	34.0	34.0
Minimum Split (s)	30.0	30.0	40.0	40.0	40.0
Total Split (s)	31.0	31.0	40.0	40.0	40.0
Total Split (%)	43.7%	43.7%	56.3%	56.3%	56.3%
Yellow Time (s)	4.0	4.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	6.0	6.0	6.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	None	None	Max	Max	Max
v/c Ratio	0.48	0.35	0.36	0.33	0.22
Control Delay	25.2	6.5	9.1	7.3	4.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	6.5	9.1	7.3	4.3
Queue Length 50th (m)	17.2	0.0	9.3	17.2	6.8
Queue Length 95th (m)	32.9	12.2	24.9	36.4	14.9
Internal Link Dist (m)	255.0			488.9	140.3
Turn Bay Length (m)	28.0				
Base Capacity (vph)	784	774	540	1123	2048
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.22	0.20	0.36	0.33	0.22

Intersection Summary

Cycle Length: 71
 Actuated Cycle Length: 57.6
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord

Splits and Phases: 8: Main St & Poyntz St



Bellisle Heights Subdivision
8: Main St & Poyntz St

HCM Signalized Intersection Capacity Analysis
Total (2028) PM Peak Hour - Thompson Rd. Ext.



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	167	149	189	357	303	135
Future Volume (vph)	167	149	189	357	303	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	6.0	6.0	6.0	
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	
Frpb, ped/bikes	1.00	0.98	1.00	1.00	0.99	
Flpb, ped/bikes	1.00	1.00	0.99	1.00	1.00	
Frt	1.00	0.85	1.00	1.00	0.95	
Flt Protected	0.95	1.00	0.95	1.00	1.00	
Satd. Flow (prot)	1805	1583	1783	1900	3375	
Flt Permitted	0.95	1.00	0.49	1.00	1.00	
Satd. Flow (perm)	1805	1583	917	1900	3375	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	174	155	197	372	316	141
RTOR Reduction (vph)	0	124	0	0	56	0
Lane Group Flow (vph)	174	31	197	372	401	0
Confl. Peds. (#/hr)	12	11	27			27
Heavy Vehicles (%)	0%	0%	0%	0%	1%	0%
Turn Type	Prot	Perm	Perm	NA	NA	
Protected Phases	4			2	6	
Permitted Phases		4	2			
Actuated Green, G (s)	11.5	11.5	34.0	34.0	34.0	
Effective Green, g (s)	11.5	11.5	34.0	34.0	34.0	
Actuated g/C Ratio	0.20	0.20	0.59	0.59	0.59	
Clearance Time (s)	6.0	6.0	6.0	6.0	6.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	
Lane Grp Cap (vph)	361	316	542	1123	1995	
v/s Ratio Prot	c0.10			0.20	0.12	
v/s Ratio Perm		0.02	c0.21			
v/c Ratio	0.48	0.10	0.36	0.33	0.20	
Uniform Delay, d1	20.4	18.8	6.1	6.0	5.4	
Progression Factor	1.00	1.00	1.00	1.00	1.00	
Incremental Delay, d2	1.0	0.1	1.9	0.8	0.2	
Delay (s)	21.4	18.9	8.0	6.8	5.7	
Level of Service	C	B	A	A	A	
Approach Delay (s)	20.2			7.2	5.7	
Approach LOS	C			A	A	

Intersection Summary

HCM 2000 Control Delay	9.8	HCM 2000 Level of Service	A
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	57.5	Sum of lost time (s)	12.0
Intersection Capacity Utilization	84.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Bellisle Heights Subdivision
 13: Main St & Thompson St/Thompson Rd

Queues
 Total (2028) PM Peak Hour - Thompson Rd. Ext.

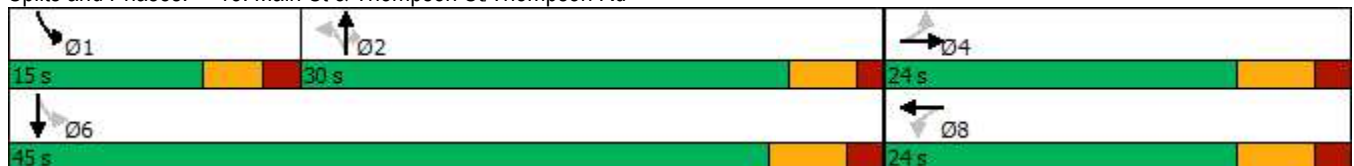


Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	NBR	SBL	SBT
Lane Configurations		↕	↗	↘		↕	↗		↕
Traffic Volume (vph)	5	9	255	12	121	676	241	34	571
Future Volume (vph)	5	9	255	12	121	676	241	34	571
Lane Group Flow (vph)	0	111	271	45	0	848	256	0	652
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	pm+pt	NA
Protected Phases		4		8		2		1	6
Permitted Phases	4		8		2		2	6	
Detector Phase	4	4	8	8	2	2	2	1	6
Switch Phase									
Minimum Initial (s)	8.0	8.0	8.0	8.0	5.0	5.0	5.0	8.0	34.0
Minimum Split (s)	24.0	24.0	24.0	24.0	30.0	30.0	30.0	15.0	45.0
Total Split (s)	24.0	24.0	24.0	24.0	30.0	30.0	30.0	15.0	45.0
Total Split (%)	34.8%	34.8%	34.8%	34.8%	43.5%	43.5%	43.5%	21.7%	65.2%
Yellow Time (s)	4.0	4.0	4.0	4.0	3.5	3.5	3.5	3.0	4.0
All-Red Time (s)	2.0	2.0	2.0	2.0	1.5	1.5	1.5	2.0	2.0
Lost Time Adjust (s)		0.0	0.0	0.0		0.0	0.0		0.0
Total Lost Time (s)		6.0	6.0	6.0		5.0	5.0		6.0
Lead/Lag					Lag	Lag	Lag	Lead	
Lead-Lag Optimize?					Yes	Yes	Yes	Yes	
Recall Mode	None	None	None	None	Max	Max	Max	None	Max
v/c Ratio		0.24	0.75	0.10		0.53	0.25		0.36
Control Delay		7.8	38.4	10.7		9.9	4.3		8.5
Queue Delay		0.0	0.0	0.0		0.0	0.0		0.0
Total Delay		7.8	38.4	10.7		9.9	4.3		8.5
Queue Length 50th (m)		1.5	33.1	1.3		33.3	7.2		22.9
Queue Length 95th (m)		12.5	#65.0	8.5		48.3	17.0		33.2
Internal Link Dist (m)		194.7		452.9		413.1			488.9
Turn Bay Length (m)			15.0				1.0		
Base Capacity (vph)		514	401	478		1594	1012		1816
Starvation Cap Reductn		0	0	0		0	0		0
Spillback Cap Reductn		0	0	0		0	0		0
Storage Cap Reductn		0	0	0		0	0		0
Reduced v/c Ratio		0.22	0.68	0.09		0.53	0.25		0.36

Intersection Summary

Cycle Length: 69
 Actuated Cycle Length: 67.3
 Natural Cycle: 70
 Control Type: Semi Act-Uncoord
 # 95th percentile volume exceeds capacity, queue may be longer.
 Queue shown is maximum after two cycles.

Splits and Phases: 13: Main St & Thompson St/Thompson Rd



Bellisle Heights Subdivision
13: Main St & Thompson St/Thompson Rd

HCM Signalized Intersection Capacity Analysis
Total (2028) PM Peak Hour - Thompson Rd. Ext.



















Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations		↕		↕	↕			↕	↕		↕	
Traffic Volume (vph)	5	9	90	255	12	30	121	676	241	34	571	8
Future Volume (vph)	5	9	90	255	12	30	121	676	241	34	571	8
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.0		6.0	6.0			5.0	5.0		6.0	
Lane Util. Factor		1.00		1.00	1.00			0.95	1.00		0.95	
Frt		0.88		1.00	0.89			1.00	0.85		1.00	
Flt Protected		1.00		0.95	1.00			0.99	1.00		1.00	
Satd. Flow (prot)		1674		1805	1697			3553	1615		3559	
Flt Permitted		0.99		0.79	1.00			0.75	1.00		0.88	
Satd. Flow (perm)		1660		1498	1697			2679	1615		3127	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	5	10	96	271	13	32	129	719	256	36	607	9
RTOR Reduction (vph)	0	73	0	0	24	0	0	0	51	0	1	0
Lane Group Flow (vph)	0	38	0	271	21	0	0	848	205	0	651	0
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Turn Type	Perm	NA		Perm	NA		Perm	NA	Perm	pm+pt	NA	
Protected Phases		4			8			2		1	6	
Permitted Phases	4			8			2		2	6		
Actuated Green, G (s)		16.2		16.2	16.2			40.1	40.1		39.1	
Effective Green, g (s)		16.2		16.2	16.2			40.1	40.1		39.1	
Actuated g/C Ratio		0.24		0.24	0.24			0.60	0.60		0.58	
Clearance Time (s)		6.0		6.0	6.0			5.0	5.0		6.0	
Vehicle Extension (s)		4.0		4.0	4.0			1.0	1.0		4.0	
Lane Grp Cap (vph)		399		360	408			1596	962		1816	
v/s Ratio Prot					0.01							
v/s Ratio Perm		0.02		c0.18				c0.32	0.13		0.21	
v/c Ratio		0.10		0.75	0.05			0.53	0.21		0.36	
Uniform Delay, d1		19.9		23.7	19.6			8.0	6.3		7.5	
Progression Factor		1.00		1.00	1.00			1.00	1.00		1.00	
Incremental Delay, d2		0.1		9.1	0.1			1.3	0.5		0.1	
Delay (s)		20.0		32.8	19.7			9.3	6.8		7.6	
Level of Service		B		C	B			A	A		A	
Approach Delay (s)		20.0			31.0			8.7			7.6	
Approach LOS		B			C			A			A	

Intersection Summary		
HCM 2000 Control Delay	12.2	HCM 2000 Level of Service
HCM 2000 Volume to Capacity ratio	0.65	B
Actuated Cycle Length (s)	67.3	Sum of lost time (s)
Intersection Capacity Utilization	85.5%	16.0
Analysis Period (min)	15	ICU Level of Service
c Critical Lane Group		E

Bellisle Heights Subdivision
7: Owen St & Poyntz St

HCM Unsignalized Intersection Capacity Analysis

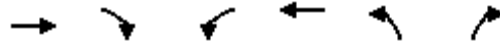
Total (2028) PM Peak Hour - Thompson Rd. Ext.

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	19	121	0	54	184	78	1	24	18	57	46	21
Future Volume (vph)	19	121	0	54	184	78	1	24	18	57	46	21
Peak Hour Factor	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89	0.89
Hourly flow rate (vph)	21	136	0	61	207	88	1	27	20	64	52	24
Direction, Lane #	EB 1	WB 1	NB 1	SB 1								
Volume Total (vph)	157	356	48	140								
Volume Left (vph)	21	61	1	64								
Volume Right (vph)	0	88	20	24								
Hadj (s)	0.04	-0.11	-0.25	-0.01								
Departure Headway (s)	4.9	4.5	5.1	5.2								
Degree Utilization, x	0.21	0.44	0.07	0.20								
Capacity (veh/h)	691	768	623	631								
Control Delay (s)	9.2	11.0	8.5	9.5								
Approach Delay (s)	9.2	11.0	8.5	9.5								
Approach LOS	A	B	A	A								
Intersection Summary												
Delay			10.1									
Level of Service			B									
Intersection Capacity Utilization			45.4%	ICU Level of Service	A							
Analysis Period (min)			15									

Bellisle Heights Subdivision
6: Bellisle Rd & Poyntz St

HCM Unsignalized Intersection Capacity Analysis

Total (2028) PM Peak Hour - Thompson Rd. Ext.



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↔			↔	↔	
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	85	133	113	95	31	50
Future Volume (vph)	85	133	113	95	31	50
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	108	168	143	120	39	63

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total (vph)	276	263	102
Volume Left (vph)	0	143	39
Volume Right (vph)	168	0	63
Hadj (s)	-0.37	0.11	-0.25
Departure Headway (s)	4.1	4.6	4.8
Degree Utilization, x	0.31	0.33	0.14
Capacity (veh/h)	851	762	678
Control Delay (s)	9.0	9.8	8.6
Approach Delay (s)	9.0	9.8	8.6
Approach LOS	A	A	A

Intersection Summary			
Delay		9.2	
Level of Service		A	
Intersection Capacity Utilization	41.7%		ICU Level of Service
Analysis Period (min)		15	A