

TRAFFIC IMPACT STUDY
BRIDGEWATER ON GEORGIAN BAY (COLLINGWOOD)
CONSULATE DEVELOPMENT (ONTARIO) INC.

PREPARED BY:
C.F. CROZIER & ASSOCIATES INC.
40 HURON STREET, SUITE 301
COLLINGWOOD, ON L9Y4R3

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Identification	Date	Description of Work
Draft Submission	March 2018	Project Team Review

1.0 EXECUTIVE SUMMARY

C.F. Crozier & Associates Inc. (Crozier) was retained by Consulate Development (Ontario) Inc. to complete a revised Traffic Impact Study in support of a Zoning By-law Amendment for the proposed Bridgewater on Georgian Bay (Collingwood) Residential Subdivision. The proposed development is bounded by environmental protection lands owned by the proponent to the west, Highway 26 to the south, Princeton Shores Blvd to the east, and existing residential developments to the north.

The analysis contained within this report included the following key intersections:

- Highway 26 and Silver Glen Boulevard
- Highway 26 and Cranberry Trail West

Analysis of traffic operations at the study intersections indicate the following:

- The intersections are operating acceptably under 2018 existing traffic conditions, and are expected to continue operating efficiently under future background traffic conditions through the 2025, 2030 and 2035 horizon years.
- A signal warrant was undertaken at the intersection of Highway 26 and Silver Glen Boulevard under 2025 through 2035 future total conditions, and the results indicate that signals are warranted under all scenarios.
- A functional design was completed for auxiliary turn lanes at the intersection of Highway 26 and Silver Glen Boulevard. It was calculated that a westbound right-turn lane of 50 metres, an eastbound left-turn lane of 20 metres, and a southbound left-turn lane of 45 metres would be required. All dimensions should be confirmed at the detailed design stage.
- The analysis of future total traffic operations indicated that 95th percentile queues can be contained within the proposed storage lengths.
- The intersections are expected to continue operating efficiently under future total traffic conditions, when compared with future background operations.

The analysis undertaken within was prepared using the most recent Site Plan prepared by Guthrie Muscovitch Architects, dated March 2, 2018. Any minor changes to the Plan will not materially affect the conclusions contained within this report.

Therefore, the proposed development can be supported from a transportation operations and safety perspective.

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2.0 INTRODUCTION

2.1 Background

CF Crozier & Associates Inc. (Crozier) was retained by Consulate Development (Ontario) Inc. to complete a revised Traffic Impact Study (TIS) for the Bridgewater on Georgian Bay residential development located in the Town of Collingwood, County of Simcoe. The Subject Property is bounded by environmental protection lands owned by the proponent to the west, Highway 26 to the south, Princeton Shores Blvd to the east, and existing residential developments to the north. The location of the Subject Property is reflected on the development Site Location Plan included as **Figure 1**.

Crozier staff completed the original TIS in February 2007, which was based on a unit count of 39 single family detached units and 350 medium/high density residential units, and the entrance to the development formed the fourth leg of the intersection of Highway 26 and Cranberry Trail West. The February 2007 TIS recommended signalization of the intersection of Highway 26 and Cranberry Trail West. The concept plan has recently been revised, and proposes 539 townhouses and 116 apartment units, for a total of 655 mid-rise multi-family units. The proposed development is discussed further in Section 2.3.

2.2 Purpose

This TIS addendum is being prepared to support the Zoning By-law Amendment for the Bridgewater on Georgian Bay residential development.

The purpose of the study was to assess the impacts of the proposed development on the boundary road network and to recommend any required mitigation measures, if warranted.

The study reviews the following main aspects of the proposed residential development from a transportation engineering perspective:

- Existing, future background, and future total traffic operations at the intersections of Highway 26 and Cranberry Trail West, and Highway 26 and Silver Glen Boulevard/Site Access
- Forecasted trip generation of the proposed development
- Signal warrant at the intersection of Highway 26 and Silver Glen Boulevard/Site Access
- Auxiliary lane requirements at the intersection of Highway 26 and Silver Glen Boulevard/Site Access

The Terms of Reference for the study were confirmed with Town staff, with correspondence included in **Appendix A**.

The study has been prepared based on the "Transportation Impact Analyses for Site Development", Institute of Transportation Engineers (ITE) guidelines, and agreed upon Terms of Reference with Town, with the associated analyses and findings outlined herein.

2.3 Development Proposal

As noted previously, the site plan was recently revised, and proposes an additional 266 units. The original and current site statistics have been summarized in **Table 1** below. The entrance to the development will form the fourth leg of the intersection of Highway 26 and Silver Glen Blvd. The most recent site plan has been included as **Figure 2**.

Table 1: Development Site Statistics

Development Type	Unit Type	Original Concept Plan	Current Concept Plan
Residential	Single Family Detached	39	0
	Condominium/ Townhouse	350	539
	Apartment	0	116

3.0 EXISTING CONDITIONS

3.1 Development Lands

The Subject Lands are approximately 37.2 hectares (92 acres), of which approximately 12.1 hectares will comprise of medium and high density residential units, and is legally described as Part of Lots 48, 49, and 50, Concession 11. The Subject Lands are currently zoned as a mix of "Residential (R3)," "Environmental Protection (EP-3)," and "Recreational (REC-3)" per the Town of Collingwood's Comprehensive Zoning By-law 2010-40. The lands are also designated a mix of "Environmental Protection" and "Residential" in the Official Plan of the Town of Collingwood. Relevant Zoning By-law and Official Plan excerpts have been included in **Appendix B**.

3.2 Study Area

The Subject Lands are bounded by the Silver Creek to the west, Highway 26 to the south, Princeton Shores Boulevard to the east, and Princeton Shores Boulevard/Bartlett Boulevard to the north.

The study area encompasses the boundary road network surrounding the Subject Lands, and is described in Section 3.3.

3.3 Boundary Road Network

The boundary road network is described in **Table 2** below.

Table 2: Boundary Road Network Summary

Road	Lanes	Posted Speed	Classification	Jurisdiction
Highway 26 (East of Silver Glen Boulevard)	3	60 km/h	Arterial	Town of Collingwood
Highway 26 (West of Silver Glen Boulevard)	2			
Cranberry Trail West	2	50 km/h	Collector	Town of Collingwood
Silver Glen Boulevard (First 150 m south of Highway 26)	2	50 km/h (Unposted)	Local	Town of Collingwood
Silver Glen Boulevard			Private	Private

3.4 Key Intersections

The following are the key intersections contained within this study area. **Figure 3** illustrates the existing traffic controls and lane configurations at each intersection.

- Highway 26 and Silver Glen Boulevard
- Highway 26 and Cranberry Trail West

3.5 Active Transportation Network

The active transportation facilities on the boundary road network have been summarized in **Table 3** below.

Table 3: Active Transportation Network

Road	Pedestrian Facilities	Cycling Facilities	Transit Routes	Typical Headways
Highway 26 (East of Cranberry Trail West)	Off-road Trail (Vacation Inn Trail)		Crosstown Route	60 mins
Highway 26 (West of Cranberry Trail West)	Off-road Trail (Vacation Inn Trail extension to Silver Glen Boulevard)		None	N/A
Cranberry Trail West	None	On-road Bike Route	Crosstown Route	60 mins
Silver Glen Boulevard (First 150 m south of Highway 26)	1.5 metres sidewalk on the west side of the roadway	None	None	N/A
Silver Glen Boulevard	None	None	None	N/A

The Collingwood Transit map illustrates the closest bus stops to the Site and has been included in **Appendix C** for reference. There are three Crosstown Route bus stops along Cranberry Trail West. Additionally, there is another Crosstown Route bus stop on Highway 26 at Vacation Inn Drive. The Crosstown Route maintains a headway of 60 minutes throughout the day.

3.6 Traffic Data

Turning movement counts for the boundary road network were undertaken by Spectrum Traffic Data Inc. staff from 6:00 a.m. to 10:00 a.m. and 3:00 p.m. to 7:00 p.m. on Thursday, March 1, 2018. The traffic count data is summarized in **Appendix D**.

To adjust the traffic volumes for the peak summer driving season, winter average daily traffic (WADT) and summer average daily traffic (SADT) volumes from the MTO "Provincial Highways Traffic Volumes, 1988-2016" for the adjacent segment of Highway 26 to the west were compared and a seasonal adjustment factor of 1.43 was calculated. **Figure 4** illustrates the 2018 seasonally adjusted existing traffic volumes.

Peak hour factors (PHF) associated with the weekday a.m. and p.m. peak hours were calculated for each intersection within the study area based on the existing traffic volumes.

Table 4 outlines the PHFs as calculated and applied to the model for the study intersections.

Table 4: Peak Hour Factors

Intersection	Peak Hour	Peak Hour Factor
Highway 26 and Silver Glen Boulevard	7:45 – 8:45 a.m.	0.98
	4:30 – 5:30 p.m.	0.99
Highway 26 and Cranberry Trail West	7:45 – 8:45 a.m.	0.94
	4:30 – 5:30 p.m.	0.94

3.7 Intersection Operations

The operations of the critical intersections were analyzed on the basis of the traffic volumes illustrated in **Figure 4. Table 5** summarizes the 2018 traffic levels of service for the counts taken at the intersection under seasonally adjusted existing conditions. The Level of Service (LOS) definitions for stop-controlled intersections are included in **Appendix E**. Detailed capacity analyses are included in **Appendix F**.

The south approaches on Silver Glen Boulevard and Cranberry Trail West have a width of approximately seven metres. Accordingly, the intersection was assumed to operate with dedicated northbound right- and left-turn lanes. For modelling purposes, the approaches were modeled with a left-turn lane as a continuation of the through lane, and right-turn lane with 15 metres of storage. As noted below, all 95th percentile queues can be contained within the available storage lengths.

Table 5: 2018 Existing Traffic Levels of Service

Intersection	Control	Peak Hour	Level of Service	Control Delay	Maximum V/C Ratio	95 th %ile Queues > Storage
Highway 26 and Silver Glen Boulevard	Stop	Weekday A.M.	B	13.1 s	0.35 (WBT)	None
		Weekday P.M.	B	14.3 s	0.50 (WBT)	None
Highway 26 and Cranberry Trail West	Stop	Weekday A.M.	B	13.5 s	0.38 (WBT)	None
		Weekday P.M.	C	16.0 s	0.54 (WBT)	None

Note: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach, i.e. Cranberry Trail West and Silver Glen Boulevard.

The metrics summarized above indicate that the study intersections operate at a LOS "C" or better in the weekday a.m. and p.m. peak hours, with minimal delay and reserve capacity for increases in traffic volumes. It can also be seen that no movements are operating with 95th percentile queues exceeding the available storage.

4.0 FUTURE BACKGROUND CONDITIONS

4.1 Horizon Years

The development is expected to be fully built-out by 2025. Per correspondence with the Town of Collingwood, the full build-out year plus the five-year and ten-year horizons must be analyzed. Therefore, the full build-out horizon year (2025), the five-year horizon (2030) and ten-year horizon (2035) were analyzed.

4.2 Growth Rate

To determine growth rates for the study, the *Environmental Study Report: Highway 26 West from 280 m West of Princeton Shores Boulevard to Harbour Street Improvements* completed by R.J. Burnside and Associates in April 2014 (referred to as the Highway 26 ESR) was reviewed. The two-way peak hour volumes were analyzed on the segment of Highway 26 immediately east of Cranberry Trail West under the “existing” 2013 conditions and future background 2028 conditions. The future background volumes include future background traffic growth and background development traffic. Growth rates of 1.49% and 1.28% compounded annually were calculated for the a.m. and p.m. peak periods, respectively.

Additionally, historical Annual Average Daily Traffic (AADT) and Summer Average Daily Traffic (SADT) volumes from 2008-2016 were analyzed on Highway 26 from Long Point Road to Grey Road 21. Average growth rates of 0.26% and 0.40% compounded annually were calculated using the AADT and SADT volumes, respectively.

Therefore, a growth rate of 1.5% compounded annually was applied to all traffic volumes on the boundary road network. This growth rate was confirmed by Town Staff (see **Appendix A** for correspondence).

Appendix G contains the detailed growth rate documentation and analysis.

4.3 Future Roadway Improvements

No capacity improvements have been identified for the boundary roads within the study horizons.

4.4 Background Development Trip Generation

The Silver Glen residential development is located south of Highway 26, directly opposite the Subject Property. At the time of the traffic surveys being taken, 20 townhouse units were still unoccupied. Accordingly, the trip generation of the remaining 20 units was calculated using the fitted curve equations provided in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, for Land Use Category 220 “Multifamily Housing (Low-Rise)”. The trip generation results are summarized in Table 6: Silver Glen Trip Generation below.

Table 6: Silver Glen Trip Generation

Use	Peak Hour	Number of Trips		
		Inbound	Outbound	Total
L.U. 220: Multifamily Housing (Low-Rise) (20 units)	Weekday A.M.	2	8	10
	Weekday P.M.	9	5	14

The trips generated by the Silver Glen residential development were distributed to the boundary road network based on existing travel patterns. As discussed in Section 5.2, 70 percent of trips were distributed to the east, and 30 percent of trips were distributed to the west on Highway 26. The Silver Glen Trip Distribution and assignment have been illustrated in **Figure 5** and **Figure 6**, respectively.

4.5 Intersection Operations

The 2025, 2030 and 2035 future background traffic levels of service are summarized in **Table 7**, **Table 8** and **Table 9**, respectively, based on the future background traffic volumes illustrated in **Figures 7, 8**, and **9**, with detailed capacity analyses included in **Appendix F**.

Table 7: 2025 Future Background Levels of Service

Intersection	Control	Peak Hour	Level of Service	Control Delay	Maximum V/C Ratio	95th %ile Queues > Storage
Highway 26 and Silver Glen Boulevard	Stop	Weekday A.M.	B	14.1 s	0.39 (WBT)	None
		Weekday P.M.	C	15.6 s	0.55 (WBT)	None
Highway 26 and Cranberry Trail West	Stop	Weekday A.M.	B	14.5 s	0.42 (WBT)	None
		Weekday P.M.	C	17.6 s	0.60 (WBT)	None

Note: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach, i.e. Cranberry Trail West and Silver Glen Boulevard.

Table 8: 2030 Future Background Levels of Service

Intersection	Control	Peak Hour	Level of Service	Control Delay	Maximum V/C Ratio	95th %ile Queues > Storage
Highway 26 and Silver Glen Boulevard	Stop	Weekday A.M.	B	14.8 s	0.42 (WBT)	None
		Weekday P.M.	C	16.6 s	0.59 (WBT)	None
Highway 26 and Cranberry Trail West	Stop	Weekday A.M.	C	15.4 s	0.46 (WBT)	None
		Weekday P.M.	C	19.1 s	0.65 (WBT)	None

Note: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach, i.e. Cranberry Trail West and Silver Glen Boulevard.

Table 9: 2035 Future Background Levels of Service

Intersection	Control	Peak Hour	Level of Service	Control Delay	Maximum V/C Ratio	95th %ile Queues > Storage
Highway 26 and Silver Glen Boulevard	Stop	Weekday A.M.	C	15.7 s	0.45 (WBT)	None
		Weekday P.M.	C	17.8 s	0.64 (WBT)	None
Highway 26 and Cranberry Trail West	Stop	Weekday A.M.	C	16.4 s	0.49 (WBT)	None
		Weekday P.M.	C	20.8 s	0.70 (WBT)	None

Note: The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach, i.e. Cranberry Trail West and Silver Glen Boulevard.

The metrics listed above indicate that the study intersections are expected to operate at a LOS "C" in the weekday a.m. and p.m. peak hours, under 2035 future background conditions. The intersection experiences minimal delay, has reserve capacity for increases in traffic volumes, and the 95th percentile queues can be contained within the existing storage.

5.0 SITE GENERATED TRAFFIC

5.1 Trip Generation

The proposed development will result in additional vehicles on the boundary road network that previously did not exist. The proposed development will also result in additional turning movements at the boundary road intersections.

The trip generation of the residential townhomes was forecasted using the fitted curve equations found in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, under Land Use Category 220 "Multifamily Housing (Low-Rise)".

The trip generation of the residential apartment building was forecasted using the fitted curve equations found in the Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition, under Land Use Category 221 "Multifamily Housing (Mid-Rise)".

The forecasted trips are tabulated in **Table 10**.

Table 10: Trip Generation

Subject Property Use	Roadway Peak Hour	Number of Trips		
		Inbound	Outbound	Total
LU 220: Multifamily Housing (Low-Rise) (539 Units)	Weekday A.M.	54	182	236
	Weekday P.M.	167	98	265
LU 221: Multifamily Housing (Mid-Rise) (116 Units)	Weekday A.M.	10	30	40
	Weekday P.M.	31	20	51
Total	Weekday A.M.	64	212	276
	Weekday P.M.	198	118	316

5.2 Trip Distribution and Assignment

The trips generated by the proposed development were distributed to the boundary road network based on the travel patterns observed at the intersection of Highway 26 and Silver Glen Boulevard. The distributions were similar in both the a.m. and p.m. peak hours, with approximately 70 percent arriving from and departing to the east, and 30 percent arriving from and departing to the west.

This distribution is consistent with the location of employment, retail and service destinations. The Town of Collingwood is a net importer of jobs, and is the site of regional "big box" stores, as well as the majority of services in the regional area. Therefore, the distribution was deemed to be representative of the future trip characteristics of the proposed development, and 70 percent of the trips were judged to arrive from/depart to the east towards Collingwood, and the remaining 30 percent of the trips were judged to arrive from/depart to the west towards the Town of Blue Mountains.

The trips generated by the proposed development were assigned to the boundary road network as per the distribution illustrated in **Figure 10**. The trip assignment is illustrated in **Figure 11**.

6.0 FUTURE TOTAL CONDITIONS

6.1 Basis of Assessment

The traffic impacts arising from the proposed development were assessed on the basis of the site generated traffic, illustrated in **Figure 11**, being superimposed on the future background traffic volumes in **Figures 7, 8 and 9**. The resulting total traffic volumes for the weekday a.m. and p.m. peak hours are illustrated in **Figures 12, 13 and 14** for the 2025, 2030 and 2035 horizon years.

6.2 Traffic Signal Warrants

Traffic signal warrants were undertaken at the intersection of Highway 26 and Silver Glen Boulevard for the 2025, 2030 and 2035 future total traffic conditions. The analysis followed the procedures specified in Chapter 4 of the "Ontario Traffic Manual – Book 12", March 2012. Justifications 1 (Minimum Vehicular Volume), 2 (delay to Cross Traffic), 3 (Combination of Justifications 1 and 2), and 4 (4-Hour Volume) were selected as the most appropriate warrants with which to assess the intersections.

Justifications 1 to 4 were based on eight hour traffic volumes, which were derived as a percentage of the forecasted peak hour traffic volumes used in the operations analysis.

Despite Highway 26 having a posted speed limit of 60 km/h, the conditions on the road network indicate free flow conditions, and accordingly, the signal warrants were undertaken for rural conditions.

This assessment determined that signals are warranted under 2025, 2030 and 2035 future total conditions due to the high volumes on all approaches and the delay to cross traffic. The signal warrant sheets for the future total conditions have been included in **Appendix H**.

6.3 Auxiliary Right-Turn Lane

The westbound right-turn movement from Highway 26 into the Site was analyzed for auxiliary right-turn lane requirements.

Section 9.14.2 of the Transportation Association of Canada (TAC) Geometric Design Guides for Canadian Roads (GDGCR) suggests the implementation of "an auxiliary right-turn lane without separate signal indication when the volume of right-turning traffic is 10% to 20% of the total approaching volume". In the 2025 weekday p.m. peak hour under future total conditions, the westbound approach is expected to experience 115 vehicles per hour turning right, 929 vehicles per hour travelling straight, and 32 vehicles per hour turning left, totalling 1076 vehicles per hour. The forecasted eastbound right-turn volume consists of approximately 10.6% of the total approach volume, indicating that a westbound right turn lane should be implemented to reduce the delay to the through vehicles.

The eastbound approach currently consists of a through lane and a right-turn taper. However, given the implementation of signals at the intersection, a full turn-lane with taper and parallel length will be required in order to provide additional deceleration length and storage for right-turning vehicles.

A functional design was completed for an eastbound and westbound right-turn lane using the approach described in Section 9.14.2 of the TAC GDGCR. Per Table 9.14.2, for roads with a 70 km/h design speed, a minimum taper length of 60 metres should be provided, with a parallel length of 50 metres.

The sufficiency of this lane configuration was confirmed using Synchro modeling software. It was found that the eastbound and westbound 95th percentile queues are not expected to exceed one vehicle. Accordingly, the taper and parallel lengths are sufficient to provide storage and deceleration for right-turning vehicles.

The exact dimensions of the auxiliary turn-lanes should be confirmed at the detailed design stage.

Relevant TAC GDGCR excerpts have been included in **Appendix I**.

6.4 Auxiliary Left-Turn Lane

The existing westbound left turn lane will require a corresponding eastbound left turn lane at the intersection. Accordingly, a functional design was completed for an eastbound left-turn lane using the approach described in Section 9.17.3 of the TAC GDGCR. Per Table 9.17.1, for roads with a 70 km/h design speed, a minimum taper length of 55 metres should be provided. Deceleration was assumed to be completed within the taper length, per Section 9.17.4.2. A storage length of 20 metres was calculated using the following equation (9.14.1):

$$S = \frac{NL}{30} * 2.$$

A functional design was also completed for a southbound left-turn lane. Using a design speed of 50 km/h, a minimum taper length of 15 metres and storage of 45 metres should be provided.

The sufficiency of these lane configurations was confirmed using Synchro modeling software. It was found that the 95th percentile eastbound and southbound queues are not expected to exceed 4.0 metres and 29.5 metres respectively. Accordingly, the taper and parallel length are sufficient to provide storage and deceleration for left-turning vehicles.

The exact dimensions of the auxiliary turn-lanes should be confirmed at the detailed design stage.

Relevant TAC GDGCR excerpts have been included in **Appendix I**.

6.5 Intersection Modelling

As discussed previously, the construction of a north leg at the intersection of Highway 26 and Silver Glen Boulevard will introduce westbound right-turns and eastbound left-turns at the intersection. Accordingly, a functional design was completed for both movements, following the procedure outlined in the TAC GDGCR. The details regarding these auxiliary lane designs are described in Sections 6.3 and 6.4.

The new north leg of the intersection of Highway 26 and Silver Glen Boulevard was modelled with an exclusive southbound left-turn lane, with a calculated storage length of 45 metres, and a shared southbound through/right-turn lane. Similarly, the existing south approach was also assumed to function with an exclusive left-turn lane with a storage of 15 metres, and shared through/right-turn lane.

In order to establish signal timings for the proposed signalized intersection, signal timings observed at the intersection of Highway 26 and Waterfalls lane were used to establish intergreen times, as well as pedestrian crossing times. Synchro modeling software was then used to determine the optimized cycle length and maximum green times.

6.6 Intersection Operations

Table 11, Table 12, and Table 13 outline the 2025, 2030 and 2035 total background traffic levels of service, respectively, based on the future total traffic volumes illustrated in **Figures 12, 13 and 14**, with detailed capacity analyses included in **Appendix F**.

Table 11: 2025 Future Total Levels of Service

Intersection	Control	Peak Hour	Level of Service	Control Delay	Maximum V/C Ratio	95th %ile Queues > Storage
Highway 26 and Silver Glen Boulevard	Proposed Signal	Weekday A.M.	B	11.5 s	0.66 (WBT)	None
		Weekday P.M.	A	9.0 s	0.68 (WBT)	None
Highway 26 and Cranberry Trail West	Stop	Weekday A.M.	C	16.8 s	0.49 (EBT)	None
		Weekday P.M.	C	20.2 s	0.69 (WBT)	None

Note: The Level of Service of a signalized intersection is based on the average control delay per vehicle.
The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach, i.e. Cranberry Trail West and Silver Glen Boulevard.

Table 12: 2030 Future Total Levels of Service

Intersection	Control	Peak Hour	Level of Service	Control Delay	Maximum V/C Ratio	95th %ile Queues > Storage
Highway 26 and Silver Glen Boulevard	Proposed Signal	Weekday A.M.	B	12.1 s	0.71 (WBT)	None
		Weekday P.M.	A	9.8 s	0.74 (WBT)	None
Highway 26 and Cranberry Trail West	Stop	Weekday A.M.	C	18.2 s	0.52 (EBT)	None
		Weekday P.M.	C	22.3 s	0.73 (WBT)	None

Note: The Level of Service of a signalized intersection is based on the average control delay per vehicle.
The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach, i.e. Cranberry Trail West and Silver Glen Boulevard.

Table 13: 2035 Future Total Levels of Service

Intersection	Control	Peak Hour	Level of Service	Control Delay	Maximum V/C Ratio	95th %ile Queues > Storage
Highway 26 and Silver Glen Boulevard	Proposed Signal	Weekday A.M.	B	13.0 s	0.76 (WBT)	None
		Weekday P.M.	B	10.8 s	0.79 (WBT)	None
Highway 26 and Cranberry Trail West	Stop	Weekday A.M.	C	19.9 s	0.55 (EBT)	None
		Weekday P.M.	D	25.1 s	0.78 (WBT)	None

Note: The Level of Service of a signalized intersection is based on the average control delay per vehicle.
The Level of Service of a stop-controlled intersection is based on the delay associated with the critical minor road approach, i.e. Cranberry Trail West and Silver Glen Boulevard.

The study intersections are expected to continue operating with acceptable levels of service under 2035 future total traffic conditions. The intersection of Highway 26 and Cranberry Trail West is expected to operate at a LOS "D" in the weekday p.m. peak hour, and experience a maximum increase in

control delay of 4.3 seconds when compared with future background conditions, indicating that the increase in traffic generated by the site is expected to have a minimal impact to the intersection operations. Further, given the implementation of signals at the intersection of Highway 26 and Silver Glen Boulevard, the operations are expected to improve to a LOS "B", with a maximum control delay of 11.9 seconds in the a.m. peak hour. All movements are anticipated to operate with volume-to-capacity ratios within the critical threshold, and all 95th percentile queues are expected to be contained within the available storage.

Therefore, the addition of site traffic to the boundary road network is expected to minimally impact traffic operations.

7.0 CONCLUSIONS

The detailed analysis contained within this report has resulted in the following key findings:

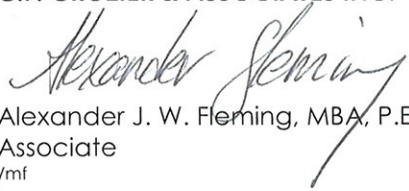
- Analysis of 2018 seasonally adjusted existing traffic operations at the study intersections indicate that the intersection is currently operating at LOS "C" or better during the weekday a.m. and p.m. peak hour with reserve capacity for future background growth;
- Examination of the 2025, 2030 and 2035 future background traffic conditions indicate that the study intersections are anticipated to continue operating efficiently at a LOS "C" in the weekday a.m. and p.m. peak hours;
- Signal warrants were undertaken at the intersection of Highway 26 and Silver Glen Boulevard and the results indicate that signals are warranted under 2025 through 2035 future total traffic conditions.
- Per the Transportation Association of Canada (TAC) Geometric Design Guides for Canadian Roads (GDGCR) guidelines and future total traffic operations, an auxiliary westbound right-turn lane, eastbound left-turn lane, and southbound left-turn lane are required under future total conditions. All dimensions should be confirmed at the detailed design stage;
- Examination of the 2025 through 2035 future total traffic conditions indicate that the study intersections are anticipated to continue to operate at a LOS "D" or better in the weekday a.m. and p.m. peak hours; and,

The analysis undertaken within was prepared using the most recent Site Plan prepared by Guthrie Muscovitch Architects, dated March 2, 2018. Any minor changes to the Plan will not materially affect the conclusions contained within this report.

The addition of site traffic to the boundary road network is expected to minimally impact traffic operations. In conclusion, the Site Plan can be supported from a traffic operations perspective.

Respectfully submitted by,

C.F. CROZIER & ASSOCIATES INC.


Alexander J. W. Fleming, MBA, P.Eng.
Associate
/mf

C.F. CROZIER & ASSOCIATES INC.


Madeleine N. Ferguson, EIT
Engineering Intern

J:\100\131 - Consulate Development (Ontario) Inc\2543\Reports\Traffic\2543_TIS Addendum.docx

APPENDIX A

Correspondence

Madeleine Ferguson

From: Alex Fleming
Sent: Thursday, March 15, 2018 11:24 AM
To: John Velick
Cc: Madeleine Ferguson; Herb Lemon
Subject: RE: Consulate Development

Hi John,

Thanks for that, much appreciated.
Regards,
Alex

| **ALEXANDER FLEMING**, MBA, P.Eng. | ASSOCIATE | C.F. CROZIER & ASSOCIATES
| 2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4
| cfcrozier.ca | afleming@cfcrozier.ca | tel 905 875 0026



Land development engineering, from the ground up.

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From: John Velick <jvelick@collingwood.ca>
Sent: Thursday, March 15, 2018 8:59 AM
To: Alex Fleming <afleming@cfcrozier.ca>
Cc: Madeleine Ferguson <mferguson@cfcrozier.ca>; Herb Lemon <hlemon@collingwood.ca>
Subject: RE: Consulate Development

Hi Alex,

I have no issues with the scope below.

I can confirm that the Town owns the first 150m (approx.) of Silver Glen Blvd.

John

John Velick P.Eng.
Manager, Engineering Services

Town of Collingwood
P.O. Box 157, 545 Tenth Line North
Collingwood, ON L9Y 3Z5

From: Alex Fleming [<mailto:afleming@cfcrozier.ca>]
Sent: Wednesday, March 14, 2018 2:14 PM
To: John Velick
Cc: Madeleine Ferguson
Subject: Consulate Development

Hi John,

It was nice chatting with you earlier today. I thought it might be helpful to send you an email detailing what we discussed, plus a couple of other elements. We've been retained to complete a revised Traffic Impact Study for the Consulate lands located on the north side of Highway 26, west of Princeton Shores Blvd, and directly opposite Silver Glen Blvd.

Our staff completed the original TIS in February 2007, which was based on a unit count of 39 single family detached units and 350 medium/high density residential units, and entrance to the development formed the fourth leg of the intersection of Highway 26 and Cranberry Trails West. The site plan has recently been revised, and proposes 539 townhouses and 116 apartment units, for a total of 655 mid-rise multi-family units. The entrance to the development will form the fourth leg of the intersection of Highway 26 and Silver Glen Blvd. The 2007 study concluded signals were needed at the site entrance, I expect that the update will reach the same conclusion.

Given the revised development proposal, we will be following this scope of work for the updated TIS:

1. The following intersections will be analyzed in the weekday a.m. and p.m. peak hours (6 a.m. to 10 a.m. and 3 p.m. to 7 p.m.)
 - a. Highway 26 and Silver Glen Blvd
 - b. Highway 26 and Cranberry Trail West
2. The study horizons of full build-out (assumed 2025) as well as five (2030) and ten (2035) years beyond will be analyzed.
3. We assume a growth rate of 1.5% will be acceptable, as previously discussed for the Silver Creek residential development, located approximately 1 km east of the subject lands. This growth rate was assumed to capture the background growth in the area, as described in the *Environmental Study Report: Highway 26 West from 280 m West of Princeton Shores Boulevard to Harbour Street Improvements* completed by R.J. Burnside and Associates in April 2014.
4. The trip generation characteristics of the site will be forecasted using the rates provided in the ITE Trip Generation Manual, 10th Edition. These trips will be applied to the boundary road network using either Transportation Tomorrow Survey (TTS) data, or existing turning movements at Silver Glen Blvd and Cranberry Trail West.
5. An auxiliary lane warrant will be completed to determine the eastbound left-turn lane and westbound right-turn lane requirements at the site entrance.
6. A signal warrant will be completed at the intersection of Highway 26 and the Site Access/Silver Glen Blvd to determine if signals are warranted (we believe this will be so), changes to lane configurations, and establish optimized signal timings.

You were going to check that Silver Glen Boulevard was a public road at Highway 26, which we both believe is the case.

Thanks,

Alex

| **ALEXANDER FLEMING**, MBA, P.Eng. | ASSOCIATE | C.F. CROZIER & ASSOCIATES

| 2800 High Point Drive, Suite 100 | Milton, ON L9T 6P4

| cfcrozier.ca | afleming@cfcrozier.ca | tel 905 875 0026



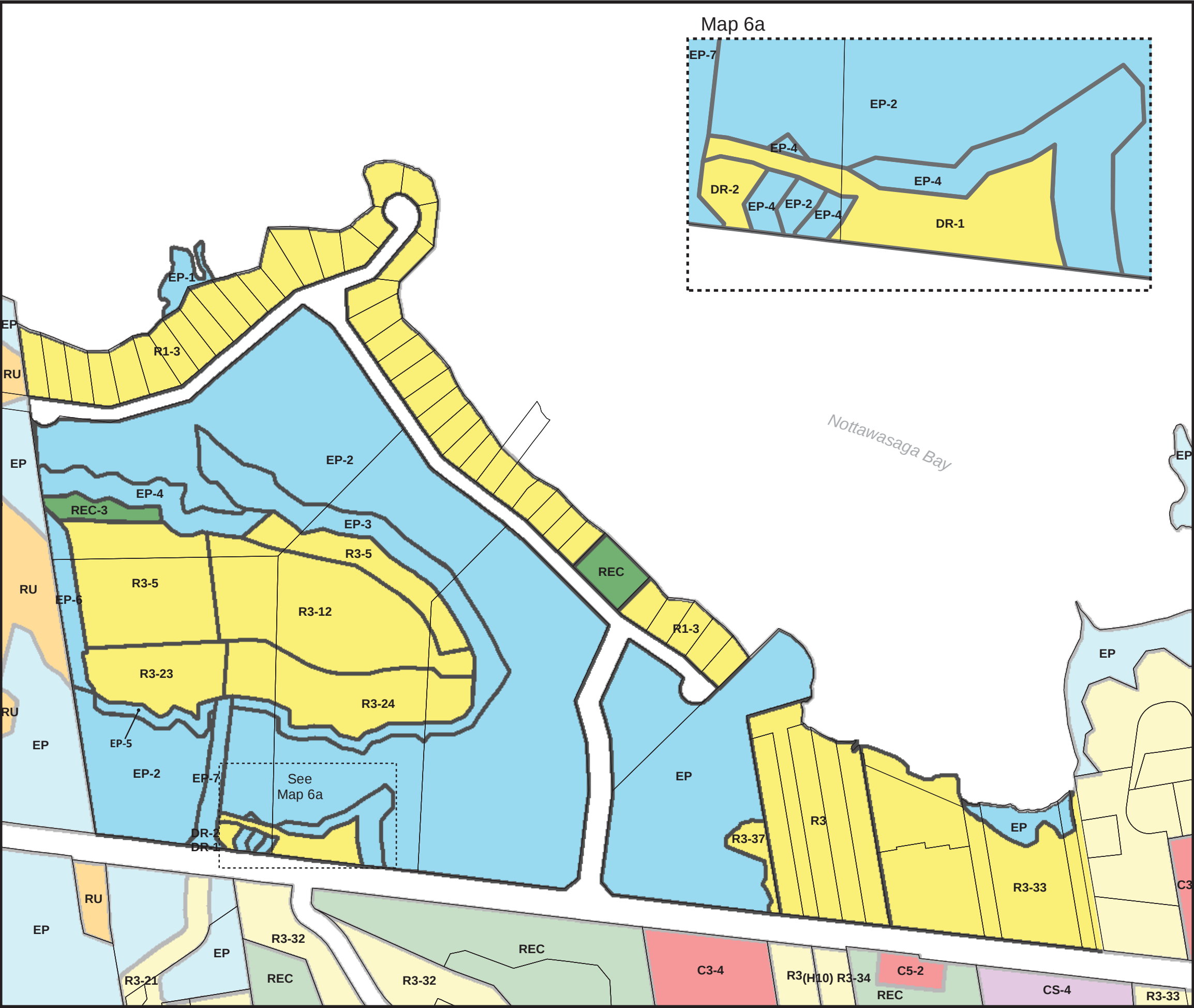
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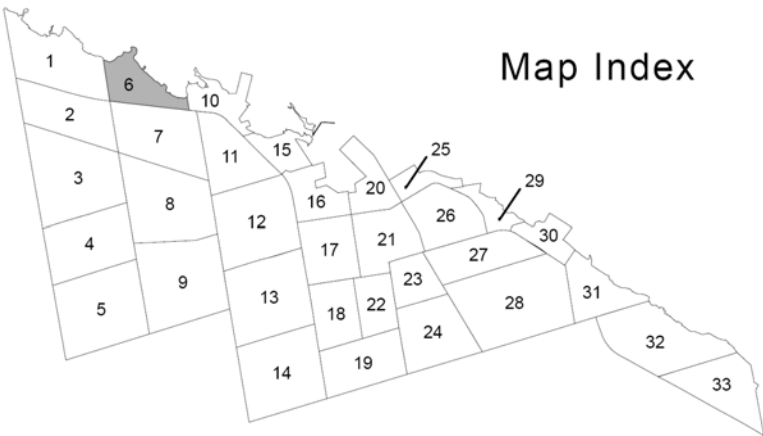
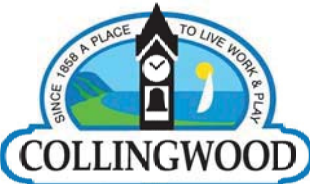
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APPENDIX B

Zoning By-Law and Official Plan Excerpts



Collingwood Zoning By-Law
Schedule 'A' - Map 6



REVISIONS

No.	Date	By-law
1	Oct 7, 2010	OMB Decision-Appeal No. 2
2	Nov 8, 2012	OMB Decision-Appeal No. 3
3		
4		
5		
6		
7		
8		
9		
10		

1:5000

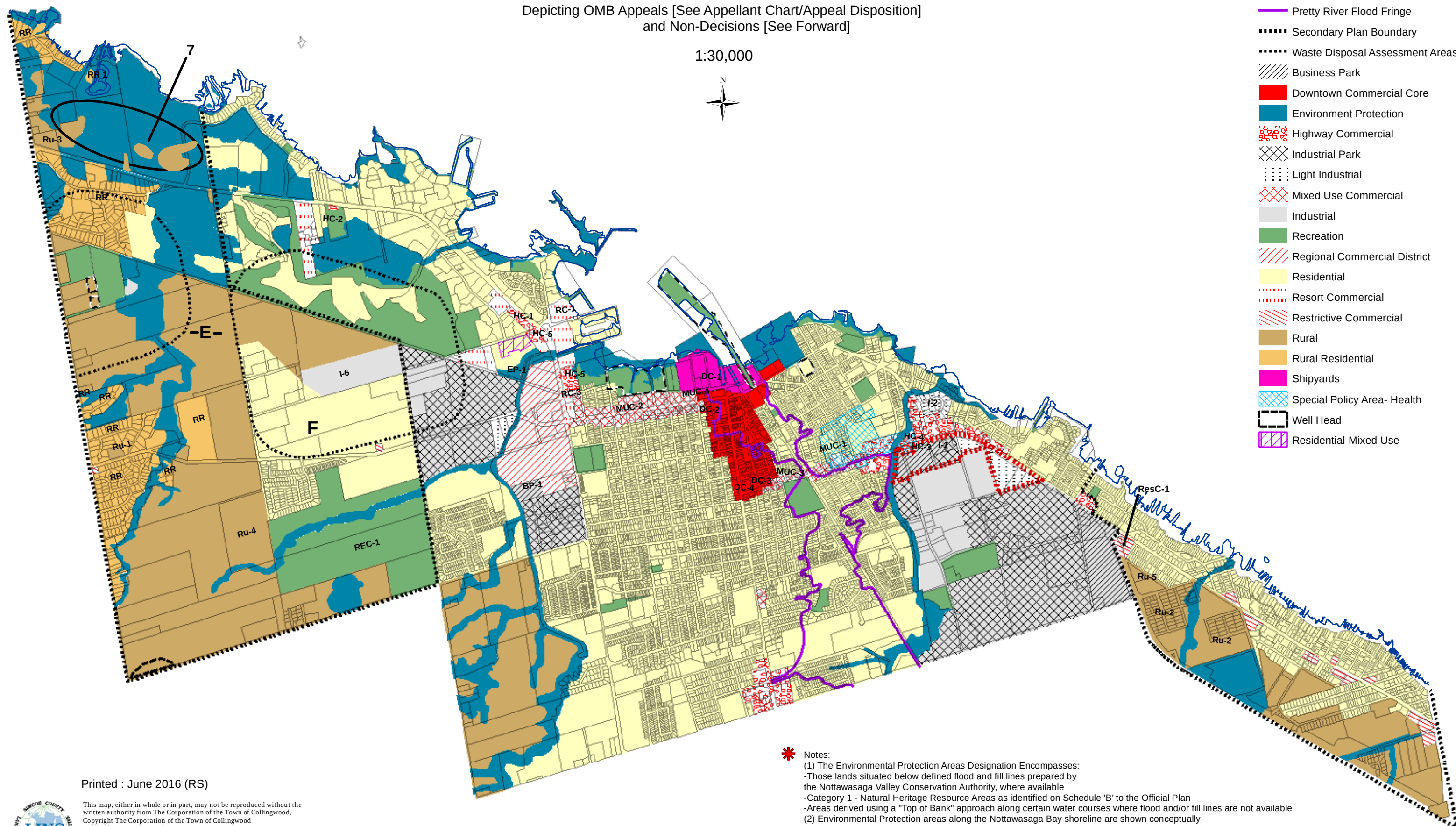
Revised by:
RS

Produced by the Town of Collingwood, Planning Services.
The information contained herein is believed to be correct,
however, the Town assumes no liability for negligence, inaccuracies
or omissions. This drawing is not a legal survey.

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1:30,000



Notes:

(1) The Environmental Protection Areas Designation Encompasses:

-Those lands situated below defined flood and fill lines prepared by the Nottawasaga Valley Conservation Authority, where available

-Category 1 - Natural Heritage Resource Areas as identified on Schedule 'B' to the Official Plan

-Areas derived using a "Top of Bank" approach along certain water courses where flood and/or fill lines are not available

(2) Environmental Protection areas along the Nottawasaga Bay shoreline are shown conceptually

(3) The precise location of the Environmental Protection areas designation shall, in all cases,

(5) The precise location of the Environmental Protection areas designation shall, in a future development, be determined as development proceeds in consultation with The County of Simcoe.

(Nottawasaga Valley Conservation Authority) and the Town of Collingwood.

(Nottawasaga valley Conservation Authority) and the town of Collingwood.

Printed : June 2016 (RS)

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APPENDIX C

Transit Schedules

Four Ways to Discover Collingwood

prc parks recreation culture

Whether you're a swimmer, skater, artist, or AquaFit enthusiast, Collingwood has the recreational & cultural activities that your family will enjoy. Check out the activity guide to find out what's happening.

www.collingwood.ca/communityactivityguide



Did you know that Collingwood has nearly 70 kilometres of recreational trails for cyclists, walkers, joggers, skiers, and snowshoers? There's a trail leading to every major point of interest in the Town, including the beaches of Sunset Point, the scenic lookout at Millennium Park, and the tranquil gardens of the Arboretum.

www.collingwood.ca/trails



From learning about the rich ship-building history to accessing educational & cultural experiences, it's easy to get inspired at the Collingwood Museum and the Collingwood Public Library.

www.collingwood.ca/museum
www.collingwoodpubliclibrary.ca



Collingwood's historic Downtown is filled with fantastic shopping. Discover trendy fashions, unique home décor, and creative spaces full of artisans and galleries. Enjoy a great meal in an award-winning restaurant or cozy up with a hot drink in one of the many cafés.

www.collingwooddowntown.com

Colltrans ~Catch the Spirit!



Colltrans, the Town of Collingwood's public transportation system, provides a convenient alternative to driving within Collingwood. There are 3 regularly scheduled transit routes and the frequency of pickup at the downtown terminal is every thirty minutes. Route maps are available online at www.collingwood.ca or at Town Hall and various other locations.

Bus services operate on all days except statutory holidays. The terminal for Collingwood's public transit is located on the corner of Second St. and Pine St., adjacent to the municipal parking lot at 100 Pine St. Currently, the terminal is located outdoors and is outfitted with two shelters.

Transfers may only be made at the terminal.

Buses are wheelchair accessible and may also be used for mobility scooters, pull behind shopping carts, as well as strollers. All buses also have bike racks which are available at no additional charge. All buses operate on bio-diesel.

Fare Structure - Single Fares	
Colltrans Adults	\$2.00
Colltrans Seniors/Students	\$1.50
Colltrans Children (5 & Under)	FREE
Collingwood Blue Mountain Link	\$2.00 (All Riders)
Collingwood Wasaga Beach Link	\$2.00 (All Riders)
Red Cross Para-Transit	\$3.50 (One Way)
Fare Structure - Monthly Passes	
Colltrans Adults	\$40.00
Colltrans Seniors/Students	\$30.00
Collingwood Blue Mountain Link	\$40.00
Collingwood Wasaga Beach Link	\$40.00
UNIVERSAL PASS*	\$120.00
*Valid on Colltrans, Wasaga Beach Transit, and Link Bus.	

Colltrans Operating Hours	
Monday-Friday	6:30am - 9:00pm
Saturday	7:00am - 6:00pm
Sunday	9:00am - 5:00pm

Red Cross Para-Transit is also available within the Town of Collingwood. Hours are Monday-Friday 7:00am-5:00pm Please contact 705-721-3313 x 5266 to apply for eligibility or to arrange for service.

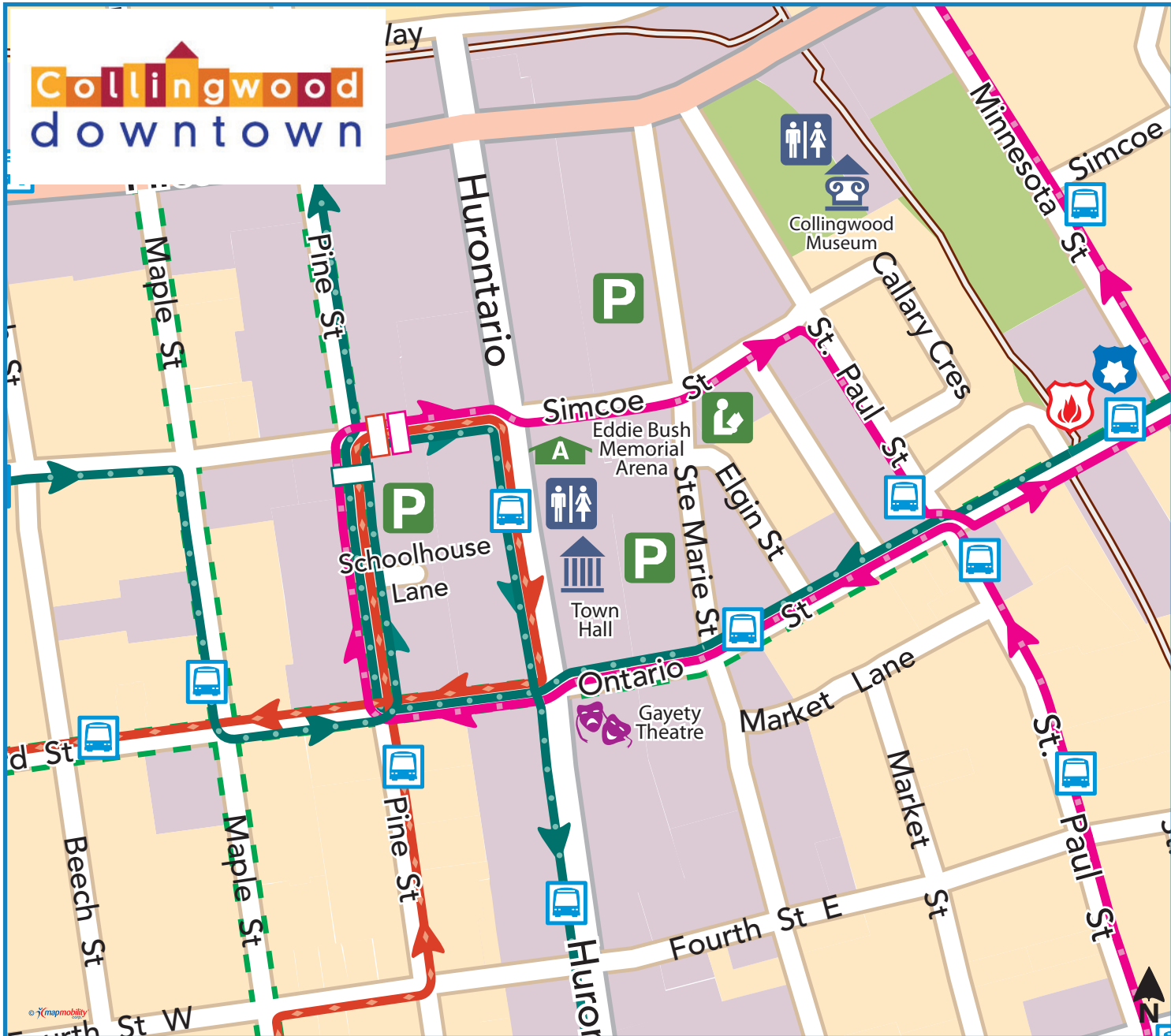
Collingwood Accessible Shuttle Service.

The town of Collingwood offers an Accessible shuttle service which operates similar to a taxi service to accommodate on demand service for accessible passengers. Fares are based upon a metered rate set by the town of Collingwood Taxi By-law. Hours of Operation are from 8:00am-Midnight 7 Days a week. To book the service please contact Sinton Transportation at 705-446-1196 and follow the prompts for accessible shuttle.

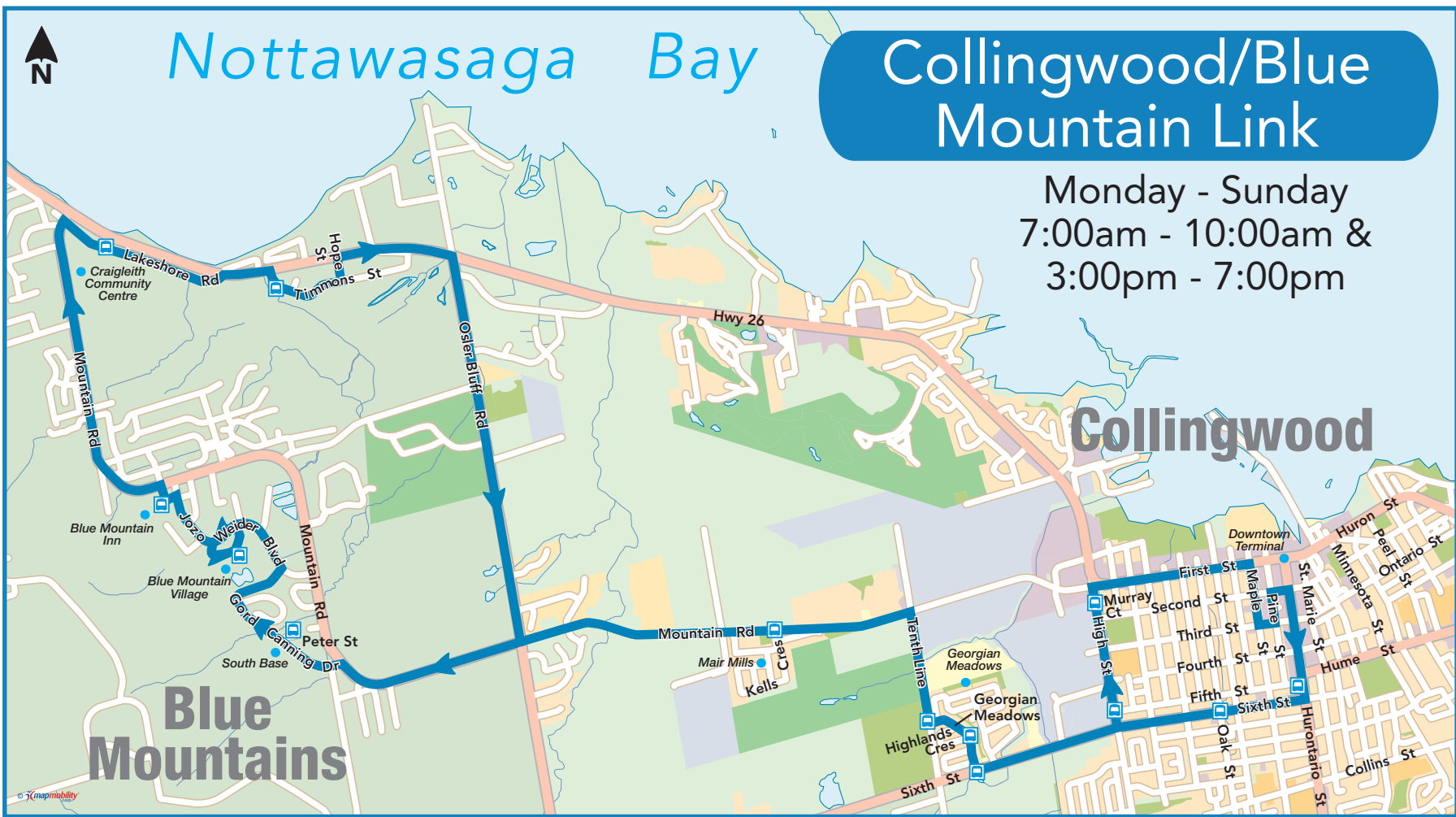
Additional Colltrans Information.

Please visit our website at www.collingwood.ca for more information regarding complaints, concerns, and suggestions as well as information on new stops and shelters. Our website will also contain information on construction detours/delays as well as disruptions to service. If transit is to be cancelled due to inclement weather, please tune into local radio for updates on service or call us at 705-446-1196.

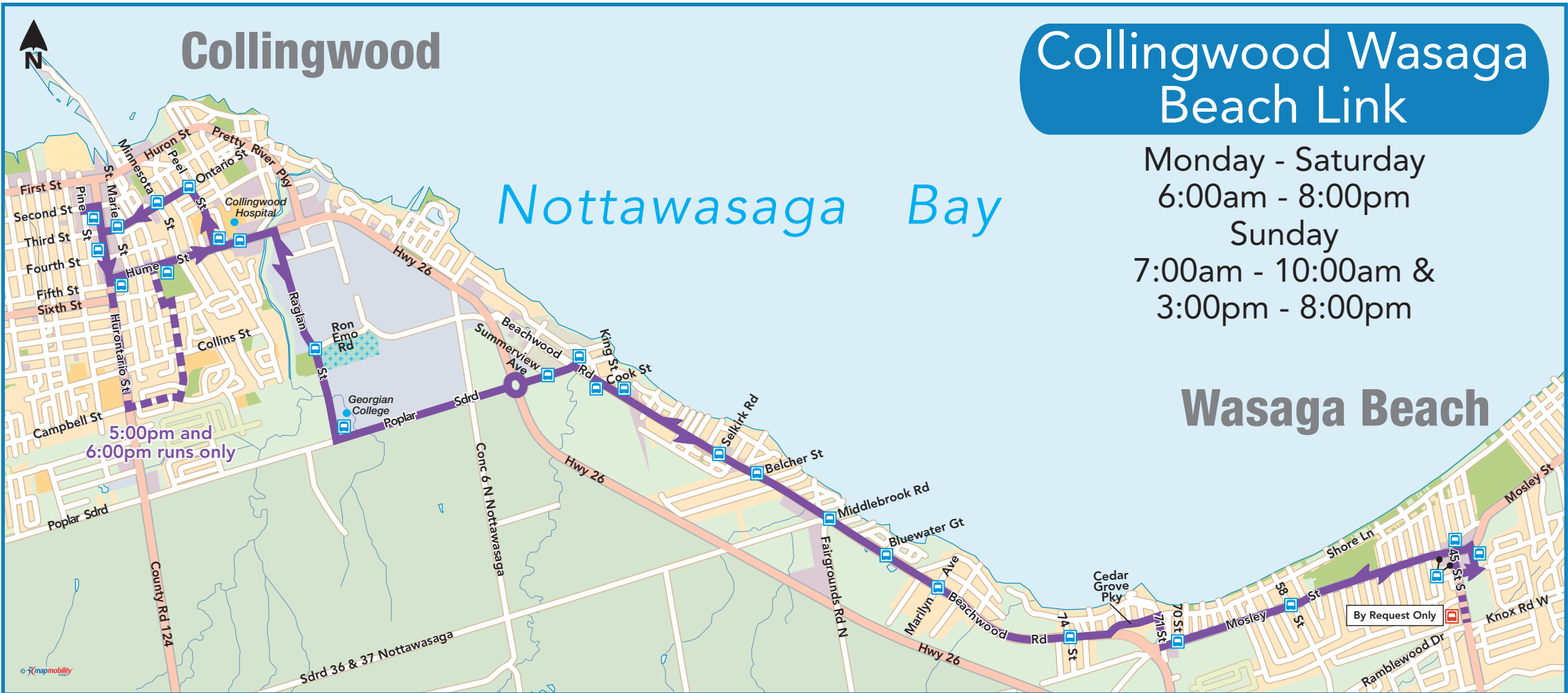
Bicycle racks are available for use at no extra cost.



Collingwood Wasaga Beach Transit Link Stops	
Travelling to Wasaga Beach	Minutes Past The Hour
BEGINS AT 100 PINE STREET	
Hurontario Street at TD Bank (Colltrans Stop)	:01
Hurontario Street at Macs (Colltrans Stop)	:01
St. Marie Street and Hume Street (Colltrans Stop)	:02
YMCA on Hume Street (Colltrans Stop)	:02
Hume Street at Minnesota	:03
TSC Hardware Store (Colltrans Stop)	:04
Raglan Street at Ron Emo Drive	:06
Georgian College	:07
Poplar Sideroad at Summerview Avenue	:10
Beachwood and Poplar Sideroad	:10
Hwy 26 and Cook Street off Highway	:11
Relax Inn	:12
Rockdell Restaurant	:12
Fairgrounds Road (Right Turn Lane)	:13
Bluewater Gate Entrance	:13
Krown Rust Control/Pennzoil	:14
Wasaga Motel	:15
Lorna Dunes	:17
58th Street at Lights	:18
Home Hardware on Mosely (Current Stop)	:19
45th Street at IDA (Current Stop)	:20
Ramblewood Medical Centre (BY REQUEST ONLY)	N/A
Travelling to Collingwood	Minutes Past The Hour
BEGINS AT SUPERSTORE	
Mosely Street Tim Hortons (Current Stop)	:31
58th Street at Traffic Signals	:33
Lorna Dunes Mini Putt	:34
74th Street on paved shoulder	:36
Marilyn Avenue on paved shoulder	:37
Bluewater Gate at Entrance	:38
Middlebrook Road on side of road	:38
Rockdell Restaurant	:39
Relax Inn	:39
Hwy 26 and King Street off Highway	:40
Wellington Street	:40
Poplar Sideroad at Summerview Avenue	:41
Georgian College	:44
Raglan Street at Ron Emo Drive	:45
Tim Hortons	:48
Collingwood G&M Hospital at Heidelberg Inn	:48
Peel Street across from Hanna Motors	:49
Peel Street and Ontario Street	:50
Ontario Street and Minnesota Street (Colltrans Stop)	:51
Ontario Street and St. Marie Street (Colltrans Stop)	:52



Collingwood / Blue Mountain Transits Link	
Collingwood Terminal	Georgian Meadows (Outbound)
Blue Mountain Village	Craigleith
Georgian Meadows (Inbound)	
Monday-Sunday	
7:00	7:06 7:16 7:27 7:37
8:00	8:06 8:16 8:27 8:37
9:00	9:06 9:16 9:27 9:37
10:00	
3:00	3:06 3:16 3:27 3:37
4:00	4:06 4:16 4:27 4:37
5:00	5:06 5:16 5:27 5:37
6:00	6:06 6:16 6:27 6:37
7:00	



Collingwood Wasaga Beach Link

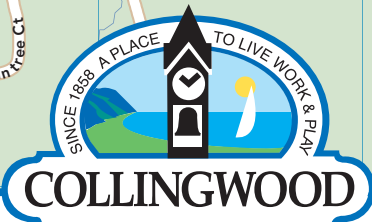
Monday - Saturday
6:00am - 8:00pm
Sunday
7:00am - 10:00am &
3:00pm - 8:00pm

Wasaga Beach

Crosstown Route															
Terminal	YMCA	Hospital	Ron Emo Rd	Georgian College	Elliot & St Clair	Sunset Pt.	Terminal	Balsam @ Mall	Lighthouse Pt.	Cranberry Links	Georgian Manor	P.R. Academy	Dawson & Oxbow	Mall	Oak & Second
Monday-Friday															
7:00	7:02	7:03	7:06	7:11	7:17	7:21	7:25	7:34	7:36	7:38	7:41	7:42	7:45	7:47	7:50
8:00	8:02	8:03	8:06	8:11	8:17	8:21	8:25	8:34	8:36	8:38	8:41	8:42	8:45	8:47	8:50
9:00	9:02	9:03	9:06	9:11	9:17	9:21	9:25	9:34	9:36	9:38	9:41	9:42	9:45	9:47	9:50
10:00	10:02	10:03	10:06	10:11	10:17	10:21	10:25	10:34	10:36	10:38	10:41	10:42	10:45	10:47	10:50
11:00	11:02	11:03	11:06	11:11	11:17	11:21	11:25	11:34	11:36	11:38	11:41	11:42	11:45	11:47	11:50
12:00	12:02	12:03	12:06	12:11	12:17	12:21	12:25	12:34	12:36	12:38	12:41	12:42	12:45	12:47	12:50
1:00	1:02	1:03	1:06	1:11	1:17	1:21	1:25	1:34	1:36	1:38	1:41	1:42	1:45	1:47	1:50
2:00	2:02	2:03	2:06	2:11	2:17	2:21	2:25	2:34	2:36	2:38	2:41	2:42	2:45	2:47	2:50
3:00	3:02	3:03	3:06	3:11	3:17	3:21	3:25	3:34	3:36	3:38	3:41	3:42	3:45	3:47	3:50
4:00	4:02	4:03	4:06	4:11	4:17	4:21	4:25	4:34	4:36	4:38	4:41	4:42	4:45	4:47	4:50
5:00	5:02	5:03	5:06	5:11	5:17	5:21	5:25	5:34	5:36	5:38	5:41	5:42	5:45	5:47	5:50
6:00	6:02	6:03	6:06	6:11	6:17	6:21	6:25	6:34	6:36	6:38	6:41	6:42	6:45	6:47	6:50
7:00	7:02	7:03	7:06	7:11	7:17	7:21	7:25	7:34	7:36	7:38	7:41	7:42	7:45	7:47	7:50
8:00	8:02	8:03	8:06	8:11	8:17	8:21	8:25	8:34	8:36	8:38	8:41	8:42	8:45	8:47	8:50
Saturday															
7:00	7:02	7:03	7:06	7:11	7:17	7:21	7:25	7:34	7:36	7:38	7:41	7:42	7:45	7:47	7:50
8:00	8:02	8:03	8:06	8:11	8:17	8:21	8:25	8:34	8:36	8:38	8:41	8:42	8:45	8:47	8:50
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12:00	12:02	12:03	12:06	12:11	12:17	12:21	12:25	12:34	12:36	12:38	12:41	12:42	12:45	12:47	12:50
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2:00	2:02	2:03	2:06	2:11	2:17	2:21	2:25	2:34	2:36	2:38	2:41	2:42	2:45	2:47	2:50
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5:00	5:02	5:03	5:06	5:11	5:17	5:21	5:25	5:34	5:36	5:38	5:41	5:42	5:45	5:47	5:50
Sunday															
9:00	9:02	9:03	9:06	9:11	9:17	9:21	9:25	9:34	9:36	9:38	9:41	9:42	9:45	9:47	9:50
10:00	10:02	10:03	10:06	10:11	10:17	10:21	10:25	10:34	10:36	10:38	10:41	10:42	10:45	10:47	10:50
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3:00	3:02	3:03	3:06	3:11	3:17	3:21	3:25	3:34	3:36	3:38	3:41	3:42	3:45	3:47	3:50
4:00	4:02	4:03	4:06	4:11	4:17	4:21	4:25	4:34	4:36	4:38	4:41	4:42	4:45	4:47	4:50

East Route

Terminal	Bay Haven	Sunset Manor	Hospital	Jean Vanier	CCI	YMCA	Ontario & St. Marie	Terminal
Monday-Friday								
6:30	6:36	6:38	6:41	6:44	6:47	6:50	6:52	6:55
7:00	7:06	7:08	7:11	7:14	7:17	7:20	7:22	7:25
7:30	7:36	7:38	7:41	7:44	7:47	7:50	7:52	7:55
8:00	8:06	8:08	8:11	8:14	8:17	8:20	8:22	8:25
8:30	8:36	8:38	8:41	8:44	8:47	8:50	8:52	8:55
9:30	9:36	9:38	9:41	9:44	9:47	9:50	9:52	9:55
10:30	10:36	10:38	10:41	10:44	10:47	10:50	10:52	10:55
11:30	11:36	11:38	11:41	11:44	11:47	11:50	11:52	11:55
12:30	12:36	12:38	12:41	12:44	12:47	12:50	12:52	12:55
1:30	1:36	1:38	1:41	1:44	1:47	1:50	1:52	1:55
2:30	2:36	2:38	2:41	2:44	2:47	2:50	2:52	2:55
3:00	3:06	3:08	3:11	3:14	3:17	3:20	3:22	3:25
3:30	3:36	3:38	3:41	3:44	3:47	3:50	3:52	3:55
4:00	4:06	4:08	4:11	4:14	4:17	4:20	4:22	4:25
4:30	4:36	4:38	4:41	4:44	4:47	4:50	4:52	4:55
5:00	5:06	5:08	5:11	5:14	5:17	5:20	5:22	5:25
5:30	5:36	5:38	5:41	5:44	5:47	5:50	5:52	5:55
6:30	6:36	6:38	6:41	6:44	6:47	6:50	6:52	6:55
7:30	7:36	7:38	7:41	7:44	7:47	7:50	7:52	7:55
8:30	8:36	8:38	8:41	8:44	8:47	8:50	8:52	8:55
Saturday								
7:00	7:06	7:08	7:11	7:14	7:17	7:20	7:22	7:25
7:30	7:36	7:38	7:41	7:44	7:47	7:50	7:52	7:55
8:00	8:06	8:08	8:11	8:14	8:17	8:20	8:22	8:25
8:30	8:36	8:38	8:41	8:44	8:47	8:50	8:52	8:55
9:00	9:06	9:08	9:11	9:14	9:17	9:20	9:22	9:25
9:30	9:36	9:38	9:41	9:44	9:47	9:50	9:52	9:55
10:00	10:06	10:08	10:11	10:14	10:17	10:20	10:22	10:25
10:30	10:36	10:38	10:41	10:44	10:47	10:50	10:52	10:55
11:00	11:06	11:08						
11:30	11:36	11:38						



- | | | | | | |
|---|---------------------------|---|-------------------|---|--------------------|
|  | Blue Mountain Link |  | Town Hall |  | Fishing Area |
|  | Crosstown Route (Trolley) |  | Fire Station |  | Off Leash Dog Park |
|  | East Route |  | Police Station |  | Picnic Area |
|  | Wasaga Beach Link |  | Hospital |  | Playground |
|  | West Route |  | Library |  | Skateboard Park |
|  | Transit Terminal |  | Parking Lot |  | Swimming Pool |
|  | Collingwood Trails |  | Point of Interest |  | Tennis Court |
|  | Safer Bike Routes |  | Tourism Office |  | Built-up |
|  | Bus Stop |  | Live Theatre |  | Cemetery |
|  | Boat Launch |  | Shopping Centre |  | Commercial |
|  | Marina |  | Arena |  | Golf Course |
|  | Museum |  | Birding Area |  | Industrial |
|  | Public Washroom |  | Beach |  | Institutional |
|  | Scenic Lookout |  | Curling Club |  | Park |
|  | School | | | | |

 **iMapmobility** 2015
50 Ronson Dr. Suite 150
Toronto, ON, CANADA M9W 1B3
tel: 416.244.7881 fax: 416.244.5422
www.imapmobility.com



APPENDIX D

Traffic Data



Turning Movement Count (1 . HIGHWAY 26 & SILVER GLEN BLVD)

Start Time	E Approach HIGHWAY 26					S Approach SILVER GLEN BLVD					W Approach HIGHWAY 26					Int. Total (15 min)		Int. Total (1 hr)	
	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	U-Turn W:W	Peds W:	Approach Total				
06:00:00	24	0	0	0	24	1	0	0	0	1	0	20	0	0	20	45			
06:15:00	21	0	0	0	21	0	1	0	0	1	0	22	0	0	22	44			
06:30:00	30	0	0	0	30	1	1	0	0	2	1	41	0	0	42	74			
06:45:00	42	0	0	0	42	2	0	0	0	2	0	45	0	0	45	89		252	
07:00:00	60	1	0	0	61	0	0	0	0	0	1	50	0	0	51	112		319	
07:15:00	96	3	0	0	99	2	0	0	0	2	3	41	0	0	44	145		420	
07:30:00	92	0	0	0	92	3	3	0	0	6	1	65	0	0	66	164		510	
07:45:00	112	6	0	0	118	4	0	0	0	4	2	86	0	0	88	210		631	
08:00:00	99	4	0	0	103	7	3	1	0	11	3	101	0	0	104	218		737	
08:15:00	86	7	0	0	93	6	4	0	0	10	3	102	0	0	105	208		800	
08:30:00	113	2	0	0	115	4	1	0	0	5	2	97	0	0	99	219		855	
08:45:00	91	2	0	0	93	6	1	0	1	7	0	107	0	0	107	207		852	
09:00:00	93	4	0	0	97	5	2	0	0	7	1	82	0	0	83	187		821	
09:15:00	78	4	0	0	82	6	2	0	0	8	1	92	0	0	93	183		796	
09:30:00	89	3	0	0	92	7	3	0	2	10	0	86	0	0	86	188		765	
09:45:00	77	2	0	0	79	2	2	0	0	4	1	90	0	0	91	174		732	
BREAK																			
15:00:00	103	7	0	0	110	4	2	0	0	6	0	84	0	0	84	200			
15:15:00	84	6	0	0	90	3	1	0	0	4	5	105	0	0	110	204			
15:30:00	104	4	0	1	108	5	0	0	0	5	0	137	0	0	137	250			
15:45:00	131	2	0	0	133	5	0	0	2	5	2	113	0	0	115	253		907	
16:00:00	145	4	0	0	149	4	4	1	0	9	3	105	0	0	108	266		973	
16:15:00	129	6	0	0	135	5	0	0	0	5	1	120	0	0	121	261		1030	
16:30:00	144	4	0	0	148	2	2	0	2	4	2	120	0	0	122	274		1054	



16:45:00	137	5	0	0	142	2	3	0	0	5	1	126	0	0	127	274	1075
17:00:00	142	3	1	0	146	5	1	1	2	7	2	115	0	0	117	270	1079
17:15:00	162	4	0	0	166	3	0	0	0	3	0	97	0	0	97	266	1084
17:30:00	116	9	0	0	125	6	3	0	0	9	4	80	0	0	84	218	1028
17:45:00	116	6	0	0	122	3	4	0	0	7	0	71	0	0	71	200	954
18:00:00	118	4	0	0	122	2	0	0	1	2	0	72	0	0	72	196	880
18:15:00	119	5	0	0	124	2	0	0	0	2	2	82	0	0	84	210	824
18:30:00	76	2	0	0	78	2	1	0	0	3	1	65	0	0	66	147	753
18:45:00	94	2	1	0	97	3	1	0	0	4	0	53	1	0	54	155	708
Grand Total	3123	111	2	1	3236	112	45	3	10	160	42	2672	1	0	2715	6111	-
Approach%	96.5%	3.4%	0.1%		-	70%	28.1%	1.9%		-	1.5%	98.4%	0%		-	-	-
Totals %	51.1%	1.8%	0%		53%	1.8%	0.7%	0%		2.6%	0.7%	43.7%	0%		44.4%	-	-
Heavy	99	4	0		-	5	2	0		-	5	86	0		-	-	-
Heavy %	3.2%	3.6%	0%		-	4.5%	4.4%	0%		-	11.9%	3.2%	0%		-	-	-
Bicycles	-	-	-		-	-	-	-		-	-	-	-		-	-	-
Bicycle %	-	-	-		-	-	-	-		-	-	-	-		-	-	-



Peak Hour: 07:45 AM - 08:45 AM Weather: Mostly Cloudy (0.7 °C)

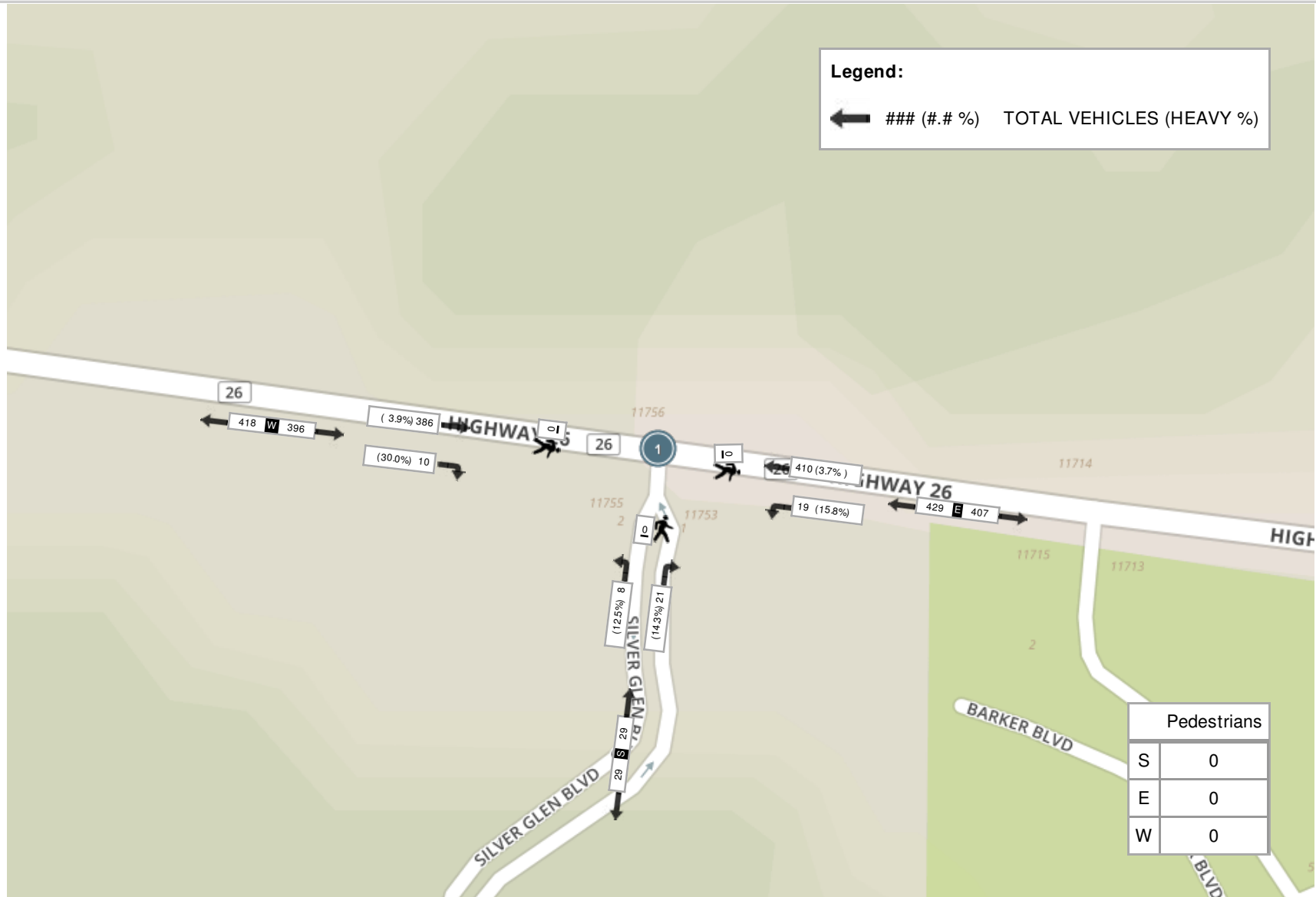
Start Time	E Approach HIGHWAY 26					S Approach SILVER GLEN BLVD					W Approach HIGHWAY 26					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
07:45:00	112	6	0	0	118	4	0	0	0	4	2	86	0	0	88	210
08:00:00	99	4	0	0	103	7	3	1	0	11	3	101	0	0	104	218
08:15:00	86	7	0	0	93	6	4	0	0	10	3	102	0	0	105	208
08:30:00	113	2	0	0	115	4	1	0	0	5	2	97	0	0	99	219
Grand Total	410	19	0	0	429	21	8	1	0	30	10	386	0	0	396	855
Approach%	95.6%	4.4%	0%		-	70%	26.7%	3.3%		-	2.5%	97.5%	0%		-	-
Totals %	48%	2.2%	0%		50.2%	2.5%	0.9%	0.1%		3.5%	1.2%	45.1%	0%		46.3%	-
PHF	0.91	0.68	0		0.91	0.75	0.5	0.25		0.68	0.83	0.95	0		0.94	-
Heavy	15	3	0		18	3	1	0		4	3	15	0		18	-
Heavy %	3.7%	15.8%	0%		4.2%	14.3%	12.5%	0%		13.3%	30%	3.9%	0%		4.5%	-
Lights	395	16	0		411	18	7	1		26	7	371	0		378	-
Lights %	96.3%	84.2%	0%		95.8%	85.7%	87.5%	100%		86.7%	70%	96.1%	0%		95.5%	-
Single-Unit Trucks	11	3	0		14	3	0	0		3	2	6	0		8	-
Single-Unit Trucks %	2.7%	15.8%	0%		3.3%	14.3%	0%	0%		10%	20%	1.6%	0%		2%	-
Buses	2	0	0		2	0	1	0		1	1	5	0		6	-
Buses %	0.5%	0%	0%		0.5%	0%	12.5%	0%		3.3%	10%	1.3%	0%		1.5%	-
Articulated Trucks	2	0	0		2	0	0	0		0	0	4	0		4	-
Articulated Trucks %	0.5%	0%	0%		0.5%	0%	0%	0%		0%	0%	1%	0%		1%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%		-	-	-	0%		-	-	-	0%		-



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast (4.1 °C)

Start Time	E Approach HIGHWAY 26					S Approach SILVER GLEN BLVD					W Approach HIGHWAY 26					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
16:30:00	144	4	0	0	148	2	2	0	2	4	2	120	0	0	122	274
16:45:00	137	5	0	0	142	2	3	0	0	5	1	126	0	0	127	274
17:00:00	142	3	1	0	146	5	1	1	2	7	2	115	0	0	117	270
17:15:00	162	4	0	0	166	3	0	0	0	3	0	97	0	0	97	266
Grand Total	585	16	1	0	602	12	6	1	4	19	5	458	0	0	463	1084
Approach%	97.2%	2.7%	0.2%		-	63.2%	31.6%	5.3%		-	1.1%	98.9%	0%		-	-
Totals %	54%	1.5%	0.1%		55.5%	1.1%	0.6%	0.1%		1.8%	0.5%	42.3%	0%		42.7%	-
PHF	0.9	0.8	0.25		0.91	0.6	0.5	0.25		0.68	0.63	0.91	0		0.91	-
Heavy	10	0	0		10	0	0	0		0	0	13	0		13	-
Heavy %	1.7%	0%	0%		1.7%	0%	0%	0%		0%	0%	2.8%	0%		2.8%	-
Lights	575	16	1		592	12	6	1		19	5	445	0		450	-
Lights %	98.3%	100%	100%		98.3%	100%	100%	100%		100%	100%	97.2%	0%		97.2%	-
Single-Unit Trucks	9	0	0		9	0	0	0		0	0	9	0		9	-
Single-Unit Trucks %	1.5%	0%	0%		1.5%	0%	0%	0%		0%	0%	2%	0%		1.9%	-
Buses	0	0	0		0	0	0	0		0	0	2	0		2	-
Buses %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0.4%	0%		0.4%	-
Articulated Trucks	1	0	0		1	0	0	0		0	0	2	0		2	-
Articulated Trucks %	0.2%	0%	0%		0.2%	0%	0%	0%		0%	0%	0.4%	0%		0.4%	-
Pedestrians	-	-	-	0	-	-	-	-	4	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	100%	-	-	-	-	0%	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mostly Cloudy (0.7 °C)





Turning Movement Count (2 . HIGHWAY 26 & CRANBERRY TRAIL W)

Start Time	E Approach HIGHWAY 26					S Approach CRANBERRY TRAIL W					W Approach HIGHWAY 26					Int. Total (15 min)		Int. Total (1 hr)	
	Thru E:W	Left E:S	U-Turn E:E	Peds E:	Approach Total	Right S:E	Left S:W	U-Turn S:S	Peds S:	Approach Total	Right W:S	Thru W:E	U-Turn W:W	Peds W:	Approach Total				
06:00:00	25	0	0	0	25	1	0	0	0	1	0	21	0	0	21	47			
06:15:00	21	0	0	0	21	2	0	0	0	2	0	21	0	0	21	44			
06:30:00	31	1	0	0	32	4	0	0	0	4	1	41	0	0	42	78			
06:45:00	40	2	0	0	42	0	0	0	0	0	0	47	0	0	47	89		258	
07:00:00	62	0	0	0	62	0	1	0	0	1	0	50	0	0	50	113		324	
07:15:00	93	0	0	0	93	1	1	0	0	2	0	43	0	0	43	138		418	
07:30:00	95	4	0	0	99	2	1	0	0	3	0	67	0	0	67	169		509	
07:45:00	115	1	0	0	116	6	1	0	0	7	1	92	0	0	93	216		636	
08:00:00	104	0	0	0	104	4	2	0	0	6	2	104	0	0	106	216		739	
08:15:00	89	3	0	0	92	1	2	0	0	3	3	108	0	0	111	206		807	
08:30:00	116	4	0	0	120	12	3	0	0	15	4	93	0	0	97	232		870	
08:45:00	88	1	0	0	89	9	1	0	0	10	1	113	0	0	114	213		867	
09:00:00	95	2	0	0	97	2	3	0	0	5	1	88	0	0	89	191		842	
09:15:00	83	0	0	0	83	4	1	0	0	5	1	95	0	0	96	184		820	
09:30:00	92	1	0	0	93	5	3	0	0	8	2	91	0	0	93	194		782	
09:45:00	74	4	0	0	78	2	2	0	0	4	1	90	0	0	91	173		742	
BREAK																			
15:00:00	106	9	0	0	115	4	1	0	0	5	1	97	0	0	98	218			
15:15:00	91	5	0	0	96	3	1	0	0	4	3	109	0	0	112	212			
15:30:00	105	11	0	0	116	5	2	0	0	7	1	145	0	0	146	269			
15:45:00	130	4	0	0	134	6	3	0	2	9	1	123	0	0	124	267		966	
16:00:00	148	8	0	0	156	4	1	0	0	5	3	106	0	0	109	270		1018	
16:15:00	130	5	0	0	135	7	1	0	0	8	3	119	0	0	122	265		1071	
16:30:00	157	14	0	0	171	6	2	0	2	8	4	118	0	0	122	301		1103	



16:45:00	134	8	0	0	142	0	2	0	1	2	0	131	0	0	131	275	1111
17:00:00	144	4	0	0	148	4	1	0	0	5	3	116	0	0	119	272	1113
17:15:00	165	12	0	0	177	1	3	0	0	4	2	98	0	0	100	281	1129
17:30:00	122	4	0	0	126	7	1	0	0	8	2	84	0	0	86	220	1048
17:45:00	121	1	0	0	122	1	0	0	0	1	1	71	0	0	72	195	968
18:00:00	121	6	0	0	127	3	1	0	0	4	1	74	0	0	75	206	902
18:15:00	121	5	0	0	126	3	1	0	0	4	1	86	0	0	87	217	838
18:30:00	79	6	0	0	85	3	1	0	0	4	0	64	0	0	64	153	771
18:45:00	96	3	0	0	99	2	0	0	0	2	3	59	0	0	62	163	739
Grand Total	3193	128	0	0	3321	114	42	0	5	156	46	2764	0	0	2810	6287	-

Approach%	96.1%	3.9%	0%	-	73.1%	26.9%	0%	-	1.6%	98.4%	0%	-	-	-
Totals %	50.8%	2%	0%	52.8%	1.8%	0.7%	0%	2.5%	0.7%	44%	0%	44.7%	-	-
Heavy	104	11	0	-	11	2	0	-	2	97	0	-	-	-
Heavy %	3.3%	8.6%	0%	-	9.6%	4.8%	0%	-	4.3%	3.5%	0%	-	-	-
Bicycles	2	0	0	-	0	0	0	-	0	0	0	-	-	-
Bicycle %	0.1%	0%	0%	-	0%	0%	0%	-	0%	0%	0%	-	-	-



Peak Hour: 07:45 AM - 08:45 AM Weather: Mostly Cloudy (0.7 °C)

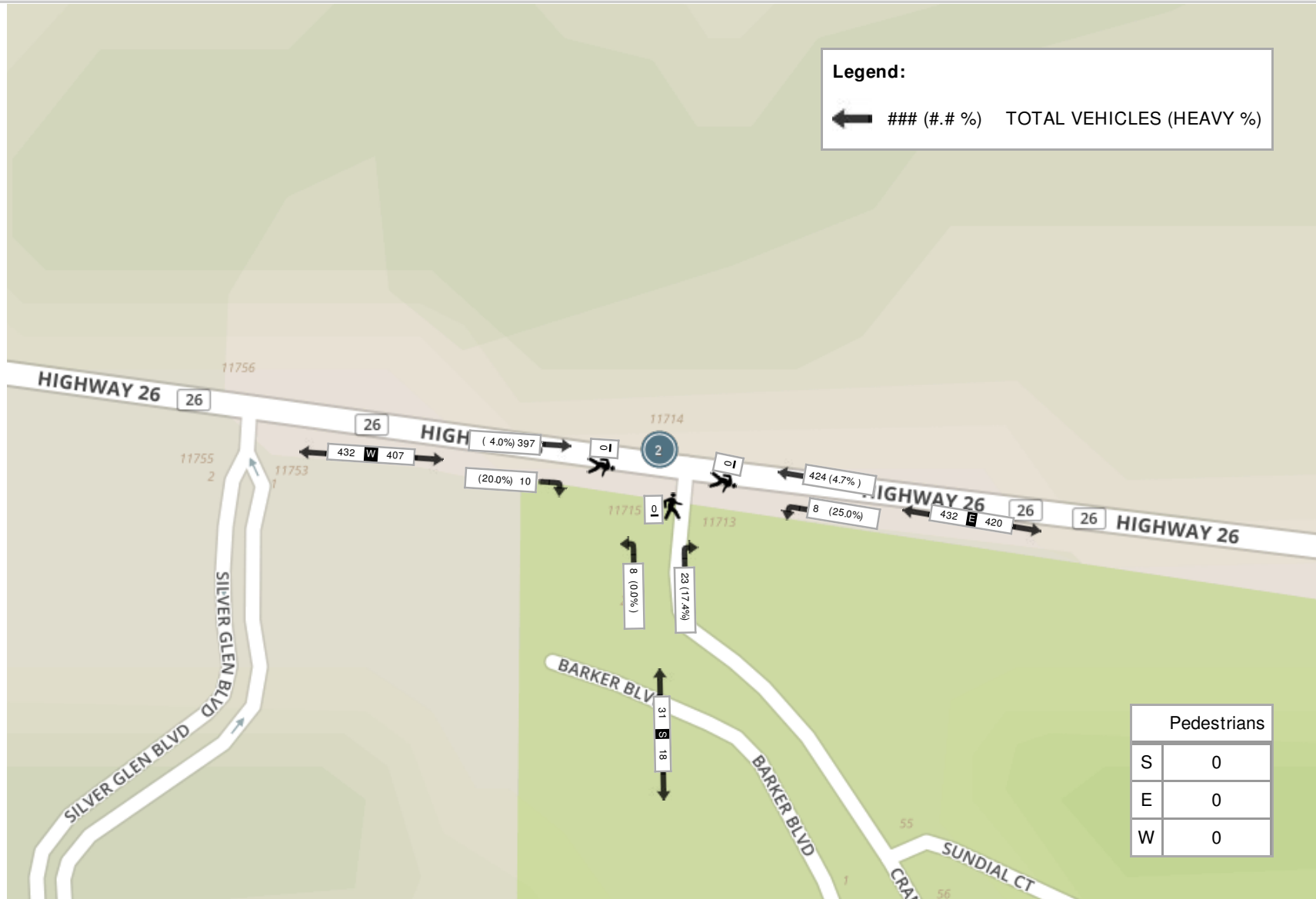
Start Time	E Approach HIGHWAY 26					S Approach CRANBERRY TRAIL W					W Approach HIGHWAY 26					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
07:45:00	115	1	0	0	116	6	1	0	0	7	1	92	0	0	93	216
08:00:00	104	0	0	0	104	4	2	0	0	6	2	104	0	0	106	216
08:15:00	89	3	0	0	92	1	2	0	0	3	3	108	0	0	111	206
08:30:00	116	4	0	0	120	12	3	0	0	15	4	93	0	0	97	232
Grand Total	424	8	0	0	432	23	8	0	0	31	10	397	0	0	407	870
Approach%	98.1%	1.9%	0%		-	74.2%	25.8%	0%		-	2.5%	97.5%	0%		-	-
Totals %	48.7%	0.9%	0%		49.7%	2.6%	0.9%	0%		3.6%	1.1%	45.6%	0%		46.8%	-
PHF	0.91	0.5	0		0.9	0.48	0.67	0		0.52	0.63	0.92	0		0.92	-
Heavy	20	2	0		22	4	0	0		4	2	16	0		18	-
Heavy %	4.7%	25%	0%		5.1%	17.4%	0%	0%		12.9%	20%	4%	0%		4.4%	-
Lights	404	6	0		410	19	8	0		27	8	381	0		389	-
Lights %	95.3%	75%	0%		94.9%	82.6%	100%	0%		87.1%	80%	96%	0%		95.6%	-
Single-Unit Trucks	15	1	0		16	1	0	0		1	0	8	0		8	-
Single-Unit Trucks %	3.5%	12.5%	0%		3.7%	4.3%	0%	0%		3.2%	0%	2%	0%		2%	-
Buses	2	1	0		3	3	0	0		3	1	3	0		4	-
Buses %	0.5%	12.5%	0%		0.7%	13%	0%	0%		9.7%	10%	0.8%	0%		1%	-
Articulated Trucks	3	0	0		3	0	0	0		0	1	5	0		6	-
Articulated Trucks %	0.7%	0%	0%		0.7%	0%	0%	0%		0%	10%	1.3%	0%		1.5%	-
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-
Bicycles on Road	0	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-



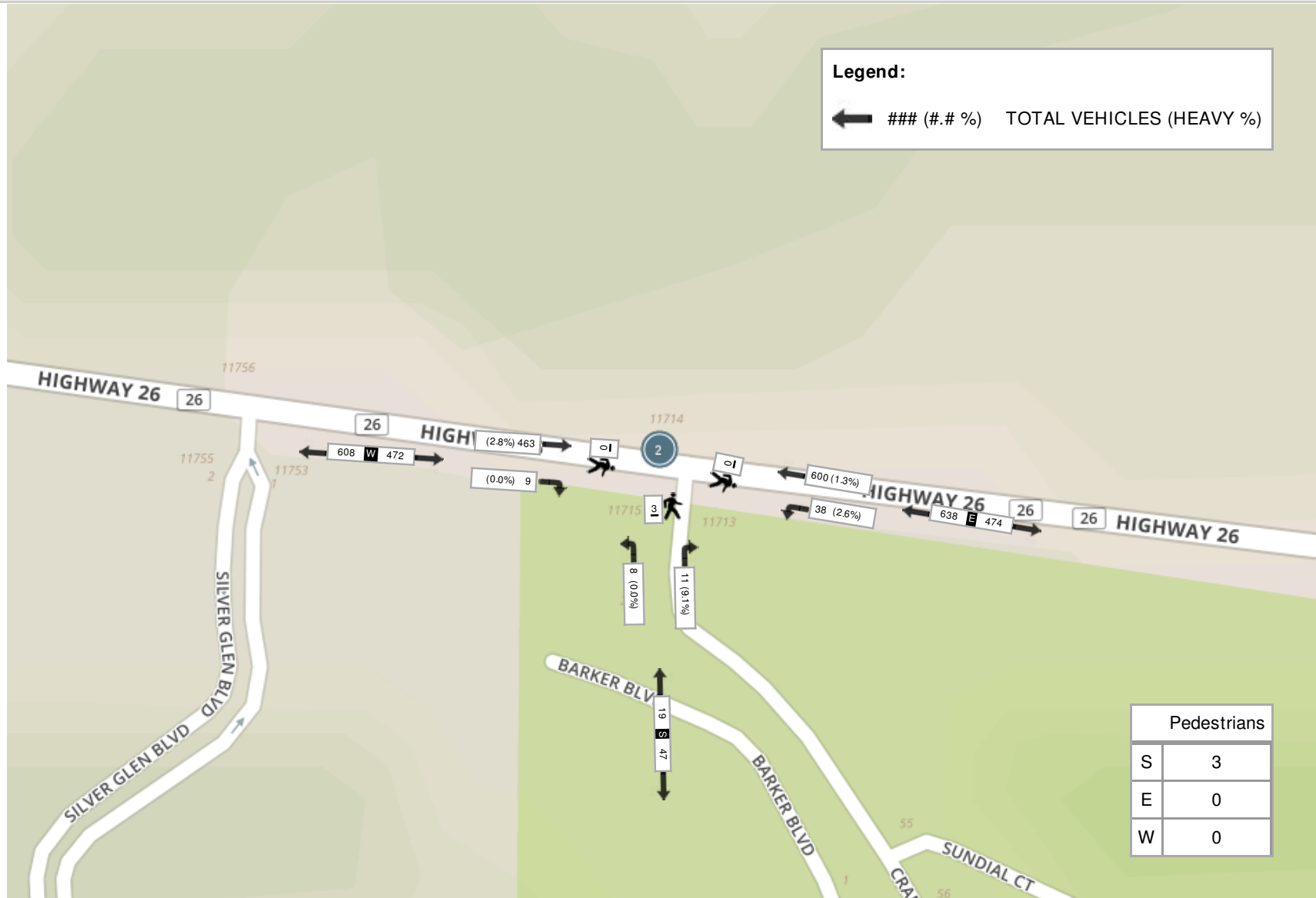
Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast (4.1 °C)

Start Time	E Approach HIGHWAY 26					S Approach CRANBERRY TRAIL W					W Approach HIGHWAY 26					Int. Total (15 min)
	Thru	Left	U-Turn	Peds	Approach Total	Right	Left	U-Turn	Peds	Approach Total	Right	Thru	U-Turn	Peds	Approach Total	
16:30:00	157	14	0	0	171	6	2	0	2	8	4	118	0	0	122	301
16:45:00	134	8	0	0	142	0	2	0	1	2	0	131	0	0	131	275
17:00:00	144	4	0	0	148	4	1	0	0	5	3	116	0	0	119	272
17:15:00	165	12	0	0	177	1	3	0	0	4	2	98	0	0	100	281
Grand Total	600	38	0	0	638	11	8	0	3	19	9	463	0	0	472	1129
Approach%	94%	6%	0%		-	57.9%	42.1%	0%		-	1.9%	98.1%	0%		-	-
Totals %	53.1%	3.4%	0%		56.5%	1%	0.7%	0%		1.7%	0.8%	41%	0%		41.8%	-
PHF	0.91	0.68	0		0.9	0.46	0.67	0		0.59	0.56	0.88	0		0.9	-
Heavy	8	1	0		9	1	0	0		1	0	13	0		13	-
Heavy %	1.3%	2.6%	0%		1.4%	9.1%	0%	0%		5.3%	0%	2.8%	0%		2.8%	-
Lights	592	37	0		629	10	8	0		18	9	450	0		459	-
Lights %	98.7%	97.4%	0%		98.6%	90.9%	100%	0%		94.7%	100%	97.2%	0%		97.2%	-
Single-Unit Trucks	8	0	0		8	0	0	0		0	0	9	0		9	-
Single-Unit Trucks %	1.3%	0%	0%		1.3%	0%	0%	0%		0%	0%	1.9%	0%		1.9%	-
Buses	0	1	0		1	1	0	0		1	0	2	0		2	-
Buses %	0%	2.6%	0%		0.2%	9.1%	0%	0%		5.3%	0%	0.4%	0%		0.4%	-
Articulated Trucks	0	0	0		0	0	0	0		0	0	2	0		2	-
Articulated Trucks %	0%	0%	0%		0%	0%	0%	0%		0%	0%	0.4%	0%		0.4%	-
Pedestrians	-	-	-	0	-	-	-	-	3	-	-	-	-	0	-	-
Pedestrians%	-	-	-	0%	-	-	-	-	100%	-	-	-	-	0%	-	-
Bicycles on Road	1	0	0	0	-	0	0	0	0	-	0	0	0	0	-	-
Bicycles on Road%	-	-	-	0%	-	-	-	-	0%	-	-	-	-	0%	-	-

Peak Hour: 07:45 AM - 08:45 AM Weather: Mostly Cloudy (0.7 °C)



Peak Hour: 04:30 PM - 05:30 PM Weather: Overcast (4.1 °C)



APPENDIX E

LOS Definitions

Level of Service Definitions

Two-Way Stop Controlled Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Large and frequent gaps in traffic on the main roadway. Queuing on the minor street is rare.
B	> 10 and ≤ 15	VERY GOOD. Many gaps exist in traffic on the main roadway. Queuing on the minor street is minimal.
C	> 15 and ≤ 25	GOOD. Fewer gaps exist in traffic on the main roadway. Delay on minor approach becomes more noticeable.
D	> 25 and ≤ 35	FAIR. Infrequent and shorter gaps in traffic on the main roadway. Queue lengths develop on the minor street.
E	> 35 and ≤ 50	POOR. Very infrequent gaps in traffic on the main roadway. Queue lengths become noticeable.
F	> 50	UNSATISFACTORY. Very few gaps in traffic on the main roadway. Excessive delay with significant queue lengths on the minor street.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

Signalized Intersections

Level of Service	Control Delay per Vehicle (seconds)	Interpretation
A	≤ 10	EXCELLENT. Extremely favourable progression with most vehicles arriving during the green phase. Most vehicles do not stop and short cycle lengths may contribute to low delay.
B	> 10 and ≤ 20	VERY GOOD. Very good progression and/or short cycle lengths with slightly more vehicles stopping than LOS "A" causing slightly higher levels of average delay.
C	> 20 and ≤ 35	GOOD. Fair progression and longer cycle lengths lead to a greater number of vehicles stopping than LOS "B".
D	> 35 and ≤ 55	FAIR. Congestion becomes noticeable with higher average delays resulting from a combination of long cycle lengths, high volume-to-capacity ratios and unfavourable progression.
E	> 55 and ≤ 80	POOR. Lengthy delays values are indicative of poor progression, long cycle lengths and high volume-to-capacity ratios. Individual cycle failures are common with individual movement failures also common.
F	> 80	UNSATISFACTORY. Indicative of oversaturated conditions with vehicular demand greater than the capacity of the intersection.

Adapted from Highway Capacity Manual 2000, Transportation Research Board

APPENDIX F

Detailed Capacity Analysis Worksheets

HCM Unsignalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2018 Existing - AM

03/20/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	552	15	28	587	12	31
Future Volume (Veh/h)	552	15	28	587	12	31
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	563	15	29	599	12	32
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			TWLT		
Median storage (veh)				2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			578		1220	563
vC1, stage 1 conf vol					563	
vC2, stage 2 conf vol					657	
vCu, unblocked vol			578		1220	563
tC, single (s)			4.1		6.5	6.3
tC, 2 stage (s)					5.5	
tF (s)			2.2		3.6	3.4
p0 queue free %			97		97	94
cM capacity (veh/h)			986		392	504
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	563	15	29	599	44	
Volume Left	0	0	29	0	12	
Volume Right	0	15	0	0	32	
cSH	1700	1700	986	1700	692	
Volume to Capacity	0.33	0.01	0.03	0.35	0.06	
Queue Length 95th (m)	0.0	0.0	0.7	0.0	1.5	
Control Delay (s)	0.0	0.0	8.8	0.0	13.1	
Lane LOS			A		B	
Approach Delay (s)	0.0		0.4		13.1	
Approach LOS					B	
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			40.9%		ICU Level of Service	A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

2018 Existing - AM

03/20/2018

								
Movement	EBT	EBR	WBL	WBT	NBL	NBR		
Lane Configurations								
Traffic Volume (veh/h)	568	15	12	607	12	33		
Future Volume (Veh/h)	568	15	12	607	12	33		
Sign Control	Free			Free	Stop			
Grade	0%			0%	0%			
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94		
Hourly flow rate (vph)	604	16	13	646	13	35		
Pedestrians								
Lane Width (m)								
Walking Speed (m/s)								
Percent Blockage								
Right turn flare (veh)						2		
Median type	TWLTL		TWLTL					
Median storage veh)	2		2					
Upstream signal (m)								
pX, platoon unblocked								
vC, conflicting volume			620			1276 604		
vC1, stage 1 conf vol						604		
vC2, stage 2 conf vol						672		
vCu, unblocked vol			620			1276 604		
tC, single (s)			4.3			6.4 6.4		
tC, 2 stage (s)						5.4		
tF (s)			2.4			3.5 3.5		
p0 queue free %			98			97 93		
cM capacity (veh/h)			859			401 472		
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1			
Volume Total	604	16	13	646	48			
Volume Left	0	0	13	0	13			
Volume Right	0	16	0	0	35			
cSH	1700	1700	859	1700	647			
Volume to Capacity	0.36	0.01	0.02	0.38	0.07			
Queue Length 95th (m)	0.0	0.0	0.4	0.0	1.8			
Control Delay (s)	0.0	0.0	9.3	0.0	13.5			
Lane LOS			A		B			
Approach Delay (s)	0.0		0.2		13.5			
Approach LOS					B			
Intersection Summary								
Average Delay			0.6					
Intersection Capacity Utilization			41.9%	ICU Level of Service		A		
Analysis Period (min)			15					

HCM Unsignalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2018 Existing - PM

03/20/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	655	8	23	837	9	18
Future Volume (Veh/h)	655	8	23	837	9	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	662	8	23	845	9	18
Pedestrians	4			4	4	
Lane Width (m)	3.5			3.5	3.2	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						2
Median type	None			TWLTL		
Median storage veh)	2					
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume				674	1561	670
vC1, stage 1 conf vol				666		
vC2, stage 2 conf vol				895		
vCu, unblocked vol				674	1561	670
tC, single (s)				4.1	6.4	6.2
tC, 2 stage (s)				5.4		
tF (s)				2.2	3.5	3.3
p0 queue free %				98	97	96
cM capacity (veh/h)				924	324	457
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	662	8	23	845	27	
Volume Left	0	0	23	0	9	
Volume Right	0	8	0	0	18	
cSH	1700	1700	924	1700	686	
Volume to Capacity	0.39	0.00	0.02	0.50	0.04	
Queue Length 95th (m)	0.0	0.0	0.6	0.0	0.9	
Control Delay (s)	0.0	0.0	9.0	0.0	14.3	
Lane LOS				A	B	
Approach Delay (s)	0.0	0.2		14.3		
Approach LOS	B					
Intersection Summary						
Average Delay	0.4					
Intersection Capacity Utilization	55.3%			ICU Level of Service		B
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

2018 Existing - PM
03/20/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	663	13	55	858	12	16
Future Volume (Veh/h)	663	13	55	858	12	16
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	705	14	59	913	13	17
Pedestrians	3			3	3	
Lane Width (m)	3.5			3.5	3.5	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						2
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			722			1742
vC1, stage 1 conf vol						708
vC2, stage 2 conf vol						1034
vCu, unblocked vol			722			1742
tC, single (s)			4.1			6.4
tC, 2 stage (s)						5.4
tF (s)			2.2			3.5
p0 queue free %			93			95
cM capacity (veh/h)			873			274
						419
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	705	14	59	913	30	
Volume Left	0	0	59	0	13	
Volume Right	0	14	0	0	17	
cSH	1700	1700	873	1700	633	
Volume to Capacity	0.41	0.01	0.07	0.54	0.05	
Queue Length 95th (m)	0.0	0.0	1.6	0.0	1.1	
Control Delay (s)	0.0	0.0	9.4	0.0	16.0	
Lane LOS			A	C		
Approach Delay (s)	0.0		0.6		16.0	
Approach LOS						C
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			56.1%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2025 Future Background - AM

03/22/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↶	↷	↑	↶	↷
Traffic Volume (veh/h)	613	17	33	651	15	40
Future Volume (Veh/h)	613	17	33	651	15	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	626	17	34	664	15	41
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None		TWLTL			
Median storage veh	2					
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			643	1358		626
vC1, stage 1 conf vol			626			
vC2, stage 2 conf vol			732			
vCu, unblocked vol			643	1358		626
tC, single (s)			4.1	6.5		6.3
tC, 2 stage (s)			5.5			
tF (s)			2.2	3.6		3.4
p0 queue free %			96	96		91
cM capacity (veh/h)			932	355		463
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	626	17	34	664	56	
Volume Left	0	0	34	0	15	
Volume Right	0	17	0	0	41	
cSH	1700	1700	932	1700	633	
Volume to Capacity	0.37	0.01	0.04	0.39	0.09	
Queue Length 95th (m)	0.0	0.0	0.9	0.0	2.2	
Control Delay (s)	0.0	0.0	9.0	0.0	14.1	
Lane LOS			A		B	
Approach Delay (s)	0.0	0.4		14.1		
Approach LOS	B					
Intersection Summary						
Average Delay	0.8					
Intersection Capacity Utilization	44.3%			ICU Level of Service		A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

2025 Future Background - AM

03/22/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↙	↗
Traffic Volume (veh/h)	636	17	13	676	13	37
Future Volume (Veh/h)	636	17	13	676	13	37
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	677	18	14	719	14	39
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			695		1424	677
vC1, stage 1 conf vol					677	
vC2, stage 2 conf vol					747	
vCu, unblocked vol			695		1424	677
tC, single (s)			4.3		6.4	6.4
tC, 2 stage (s)					5.4	
tF (s)			2.4		3.5	3.5
p0 queue free %			98		96	91
cM capacity (veh/h)			803		363	428
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	677	18	14	719	53	
Volume Left	0	0	14	0	14	
Volume Right	0	18	0	0	39	
cSH	1700	1700	803	1700	581	
Volume to Capacity	0.40	0.01	0.02	0.42	0.09	
Queue Length 95th (m)	0.0	0.0	0.4	0.0	2.3	
Control Delay (s)	0.0	0.0	9.6	0.0	14.5	
Lane LOS			A		B	
Approach Delay (s)	0.0		0.2		14.5	
Approach LOS					B	
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			45.6%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2025 Future Background - PM

03/23/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	727	12	32	929	12	23
Future Volume (Veh/h)	727	12	32	929	12	23
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	734	12	32	938	12	23
Pedestrians	4			4	4	
Lane Width (m)	3.5			3.5	3.2	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						2
Median type	None			TWLTL		
Median storage veh)	2					
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			750		1744	742
vC1, stage 1 conf vol					738	
vC2, stage 2 conf vol					1006	
vCu, unblocked vol			750		1744	742
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			96		96	94
cM capacity (veh/h)			865		284	416
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	734	12	32	938	35	
Volume Left	0	0	32	0	12	
Volume Right	0	12	0	0	23	
cSH	1700	1700	865	1700	633	
Volume to Capacity	0.43	0.01	0.04	0.55	0.06	
Queue Length 95th (m)	0.0	0.0	0.9	0.0	1.3	
Control Delay (s)	0.0	0.0	9.3	0.0	15.6	
Lane LOS			A		C	
Approach Delay (s)	0.0		0.3		15.6	
Approach LOS						C
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization			60.1%	ICU Level of Service		B
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

2025 Future Background - PM

03/23/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	739	14	61	958	13	18
Future Volume (Veh/h)	739	14	61	958	13	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	786	15	65	1019	14	19
Pedestrians	3			3	3	
Lane Width (m)	3.5			3.5	3.5	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						2
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			804			1941
vC1, stage 1 conf vol						789
vC2, stage 2 conf vol						1152
vCu, unblocked vol			804			1941
tC, single (s)			4.1			6.4
tC, 2 stage (s)						5.4
tF (s)			2.2			3.5
p0 queue free %			92			94
cM capacity (veh/h)			814			238
						376
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	786	15	65	1019	33	
Volume Left	0	0	65	0	14	
Volume Right	0	15	0	0	19	
cSH	1700	1700	814	1700	561	
Volume to Capacity	0.46	0.01	0.08	0.60	0.06	
Queue Length 95th (m)	0.0	0.0	2.0	0.0	1.4	
Control Delay (s)	0.0	0.0	9.8	0.0	17.6	
Lane LOS			A	C		
Approach Delay (s)	0.0		0.6		17.6	
Approach LOS						C
Intersection Summary						
Average Delay			0.6			
Intersection Capacity Utilization			61.4%	ICU Level of Service		B
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2030 Future Background - AM

03/22/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	660	18	35	701	16	43
Future Volume (Veh/h)	660	18	35	701	16	43
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	673	18	36	715	16	44
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None		TWLTL			
Median storage veh	2					
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			691	1460		673
vC1, stage 1 conf vol			673			
vC2, stage 2 conf vol			787			
vCu, unblocked vol			691	1460		673
tC, single (s)			4.1	6.5		6.3
tC, 2 stage (s)			5.5			
tF (s)			2.2	3.6		3.4
p0 queue free %			96	95		90
cM capacity (veh/h)			895	331		435
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	673	18	36	715	60	
Volume Left	0	0	36	0	16	
Volume Right	0	18	0	0	44	
cSH	1700	1700	895	1700	593	
Volume to Capacity	0.40	0.01	0.04	0.42	0.10	
Queue Length 95th (m)	0.0	0.0	1.0	0.0	2.6	
Control Delay (s)	0.0	0.0	9.2	0.0	14.8	
Lane LOS			A		B	
Approach Delay (s)	0.0	0.4		14.8		
Approach LOS	B					
Intersection Summary						
Average Delay	0.8					
Intersection Capacity Utilization	46.9%			ICU Level of Service		A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

2030 Future Background - AM

03/22/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↙	↗
Traffic Volume (veh/h)	685	18	14	728	14	40
Future Volume (Veh/h)	685	18	14	728	14	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	729	19	15	774	15	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	TWLTL		TWLTL			
Median storage veh)	2		2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			748	1533		729
vC1, stage 1 conf vol					729	
vC2, stage 2 conf vol					804	
vCu, unblocked vol			748	1533		729
tC, single (s)			4.3	6.4		6.4
tC, 2 stage (s)					5.4	
tF (s)			2.4	3.5		3.5
p0 queue free %			98	96		89
cM capacity (veh/h)			765	338		399
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	729	19	15	774	58	
Volume Left	0	0	15	0	15	
Volume Right	0	19	0	0	43	
cSH	1700	1700	765	1700	538	
Volume to Capacity	0.43	0.01	0.02	0.46	0.11	
Queue Length 95th (m)	0.0	0.0	0.5	0.0	2.7	
Control Delay (s)	0.0	0.0	9.8	0.0	15.4	
Lane LOS			A		C	
Approach Delay (s)	0.0	0.2		15.4		
Approach LOS					C	
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			48.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2030 Future Background - PM

03/22/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↙	↗
Traffic Volume (veh/h)	783	13	34	1001	13	25
Future Volume (Veh/h)	783	13	34	1001	13	25
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	791	13	34	1011	13	25
Pedestrians	4			4	4	
Lane Width (m)	3.5			3.5	3.2	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						2
Median type	None			TWLTL		
Median storage veh)	2					
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			808			1878
vC1, stage 1 conf vol					795	799
vC2, stage 2 conf vol					1083	
vCu, unblocked vol			808			1878
tC, single (s)			4.1			6.4
tC, 2 stage (s)					5.4	6.2
tF (s)			2.2			3.5
p0 queue free %			96			95
cM capacity (veh/h)			823			259
					386	
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	791	13	34	1011	38	
Volume Left	0	0	34	0	13	
Volume Right	0	13	0	0	25	
cSH	1700	1700	823	1700	587	
Volume to Capacity	0.47	0.01	0.04	0.59	0.06	
Queue Length 95th (m)	0.0	0.0	1.0	0.0	1.6	
Control Delay (s)	0.0	0.0	9.6	0.0	16.6	
Lane LOS			A		C	
Approach Delay (s)	0.0	0.3		16.6		
Approach LOS						C
Intersection Summary						
Average Delay	0.5					
Intersection Capacity Utilization	63.9%			ICU Level of Service		B
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

2030 Future Background - PM

03/22/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	796	15	66	1032	14	19
Future Volume (Veh/h)	796	15	66	1032	14	19
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	847	16	70	1098	15	20
Pedestrians	3			3	3	
Lane Width (m)	3.5			3.5	3.5	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						2
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			866		2091	853
vC1, stage 1 conf vol					850	
vC2, stage 2 conf vol					1241	
vCu, unblocked vol			866		2091	853
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.4
p0 queue free %			91		93	94
cM capacity (veh/h)			771		214	347
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	847	16	70	1098	35	
Volume Left	0	0	70	0	15	
Volume Right	0	16	0	0	20	
cSH	1700	1700	771	1700	498	
Volume to Capacity	0.50	0.01	0.09	0.65	0.07	
Queue Length 95th (m)	0.0	0.0	2.3	0.0	1.7	
Control Delay (s)	0.0	0.0	10.1	0.0	19.1	
Lane LOS			B		C	
Approach Delay (s)	0.0		0.6		19.1	
Approach LOS						C
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			65.3%		ICU Level of Service	C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2035 Future Background - AM

03/22/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	711	19	38	755	17	46
Future Volume (Veh/h)	711	19	38	755	17	46
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.98	0.98	0.98	0.98	0.98	0.98
Hourly flow rate (vph)	726	19	39	770	17	47
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None		TWLTL			
Median storage veh)	2					
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			745	1574		726
vC1, stage 1 conf vol			726			
vC2, stage 2 conf vol			848			
vCu, unblocked vol			745	1574		726
tC, single (s)			4.1	6.5		6.3
tC, 2 stage (s)			5.5			
tF (s)			2.2	3.6		3.4
p0 queue free %			95	94		88
cM capacity (veh/h)			854	306		405
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	726	19	39	770	64	
Volume Left	0	0	39	0	17	
Volume Right	0	19	0	0	47	
cSH	1700	1700	854	1700	552	
Volume to Capacity	0.43	0.01	0.05	0.45	0.12	
Queue Length 95th (m)	0.0	0.0	1.1	0.0	3.0	
Control Delay (s)	0.0	0.0	9.4	0.0	15.7	
Lane LOS			A		C	
Approach Delay (s)	0.0	0.5		15.7		
Approach LOS	C					
Intersection Summary						
Average Delay	0.8					
Intersection Capacity Utilization	49.7%			ICU Level of Service		A
Analysis Period (min)	15					

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

2035 Future Background - AM

03/22/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↙	↑	↙	↗
Traffic Volume (veh/h)	737	19	15	784	15	43
Future Volume (Veh/h)	737	19	15	784	15	43
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	784	20	16	834	16	46
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	TWLTL		TWLTL			
Median storage veh)	2		2			
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			804	1650		784
vC1, stage 1 conf vol			784			
vC2, stage 2 conf vol			866			
vCu, unblocked vol			804	1650		784
tC, single (s)			4.3	6.4		6.4
tC, 2 stage (s)			5.4			
tF (s)			2.4	3.5		3.5
p0 queue free %			98	95		88
cM capacity (veh/h)			728	313		370
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	784	20	16	834	62	
Volume Left	0	0	16	0	16	
Volume Right	0	20	0	0	46	
cSH	1700	1700	728	1700	499	
Volume to Capacity	0.46	0.01	0.02	0.49	0.12	
Queue Length 95th (m)	0.0	0.0	0.5	0.0	3.2	
Control Delay (s)	0.0	0.0	10.1	0.0	16.4	
Lane LOS			B		C	
Approach Delay (s)	0.0	0.2		16.4		
Approach LOS			C			
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			51.3%	ICU Level of Service		A
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2035 Future Background - PM

03/22/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↗	↘	↑	↘	↗
Traffic Volume (veh/h)	844	14	36	1078	14	27
Future Volume (Veh/h)	844	14	36	1078	14	27
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.99	0.99	0.99	0.99	0.99	0.99
Hourly flow rate (vph)	853	14	36	1089	14	27
Pedestrians	4			4	4	
Lane Width (m)	3.5			3.5	3.2	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						2
Median type	None			TWLTL		
Median storage veh)				2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			871		2022	861
vC1, stage 1 conf vol					857	
vC2, stage 2 conf vol					1165	
vCu, unblocked vol			871		2022	861
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.3
p0 queue free %			95		94	92
cM capacity (veh/h)			780		235	356
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	853	14	36	1089	41	
Volume Left	0	0	36	0	14	
Volume Right	0	14	0	0	27	
cSH	1700	1700	780	1700	540	
Volume to Capacity	0.50	0.01	0.05	0.64	0.08	
Queue Length 95th (m)	0.0	0.0	1.1	0.0	1.9	
Control Delay (s)	0.0	0.0	9.8	0.0	17.8	
Lane LOS			A		C	
Approach Delay (s)	0.0		0.3		17.8	
Approach LOS					C	
Intersection Summary						
Average Delay			0.5			
Intersection Capacity Utilization			68.0%	ICU Level of Service		C
Analysis Period (min)			15			

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

2035 Future Background - PM

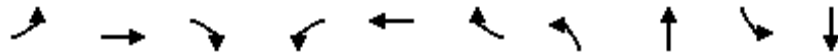
03/22/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	857	16	71	1111	15	20
Future Volume (Veh/h)	857	16	71	1111	15	20
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	912	17	76	1182	16	21
Pedestrians	3			3	3	
Lane Width (m)	3.5			3.5	3.5	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						2
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume				932	2252	918
vC1, stage 1 conf vol					915	
vC2, stage 2 conf vol					1337	
vCu, unblocked vol				932	2252	918
tC, single (s)				4.1	6.4	6.3
tC, 2 stage (s)					5.4	
tF (s)				2.2	3.5	3.4
p0 queue free %				90	92	93
cM capacity (veh/h)				728	190	318
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	912	17	76	1182	37	
Volume Left	0	0	76	0	16	
Volume Right	0	17	0	0	21	
cSH	1700	1700	728	1700	439	
Volume to Capacity	0.54	0.01	0.10	0.70	0.08	
Queue Length 95th (m)	0.0	0.0	2.6	0.0	2.1	
Control Delay (s)	0.0	0.0	10.5	0.0	20.8	
Lane LOS				B	C	
Approach Delay (s)	0.0	0.6			20.8	
Approach LOS						C
Intersection Summary						
Average Delay				0.7		
Intersection Capacity Utilization				69.4%	ICU Level of Service	C
Analysis Period (min)				15		

Queues
1: Silver Glen Blvd & Highway 26

2025 Future Total - AM

03/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	21	626	17	34	664	49	15	41	161	70
v/c Ratio	0.05	0.53	0.02	0.08	0.62	0.05	0.06	0.08	0.51	0.13
Control Delay	6.7	10.0	3.5	6.9	12.7	2.5	17.2	0.3	25.3	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.7	10.0	3.5	6.9	12.7	2.5	17.2	0.3	25.3	0.5
Queue Length 50th (m)	0.8	34.4	0.0	1.3	40.4	0.0	1.2	0.0	14.7	0.0
Queue Length 95th (m)	3.9	76.7	2.3	5.4	#100.9	3.7	4.9	0.0	29.4	0.0
Internal Link Dist (m)	364.2				111.3				77.4	
Turn Bay Length (m)	20.0		50.0	115.0		50.0	15.0		45.0	
Base Capacity (vph)	418	1185	812	439	1063	1044	418	651	493	698
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.53	0.02	0.08	0.62	0.05	0.04	0.06	0.33	0.10

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2025 Future Total - AM

03/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	613	17	33	651	45	15	0	40	148	0	64
Future Volume (vph)	19	613	17	33	651	45	15	0	40	148	0	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.2	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	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	1.00	0.85	1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1807	1229	1716	1620	1566	1526	1401		1750	1566	
Flt Permitted	0.35	1.00	1.00	0.37	1.00	1.00	0.71	1.00		0.73	1.00	
Satd. Flow (perm)	637	1807	1229	671	1620	1566	1143	1401		1345	1566	
Peak-hour factor, PHF	0.92	0.98	0.98	0.98	0.98	0.92	0.98	0.92	0.98	0.92	0.92	0.92
Adj. Flow (vph)	21	626	17	34	664	49	15	0	41	161	0	70
RTOR Reduction (vph)	0	0	6	0	0	19	0	33	0	0	57	0
Lane Group Flow (vph)	21	626	11	34	664	30	15	8	0	161	13	0
Heavy Vehicles (%)	2%	4%	30%	4%	16%	2%	13%	2%	14%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	36.2	36.2	36.2	36.2	36.2	36.2	11.0	11.0		11.0	11.0	
Effective Green, g (s)	36.2	36.2	36.2	36.2	36.2	36.2	11.0	11.0		11.0	11.0	
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.62	0.62	0.19	0.19		0.19	0.19	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	396	1123	764	417	1007	974	216	264		254	295	
v/s Ratio Prot		0.35			c0.41			0.01			0.01	
v/s Ratio Perm	0.03		0.01	0.05		0.02	0.01			c0.12		
v/c Ratio	0.05	0.56	0.01	0.08	0.66	0.03	0.07	0.03		0.63	0.04	
Uniform Delay, d1	4.3	6.4	4.2	4.4	7.0	4.2	19.4	19.2		21.7	19.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	2.0	0.0	0.4	3.4	0.1	0.1	0.0		5.1	0.1	
Delay (s)	4.6	8.4	4.2	4.8	10.4	4.3	19.5	19.3		26.8	19.4	
Level of Service	A		A	A	B	A	B	B		C	B	
Approach Delay (s)		8.1			9.8			19.4			24.6	
Approach LOS		A			A			B			C	
Intersection Summary												
HCM 2000 Control Delay			11.5				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.65									
Actuated Cycle Length (s)			58.2				Sum of lost time (s)			11.0		
Intersection Capacity Utilization			58.3%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

2025 Future Total - AM

03/29/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	784	17	13	721	13	37
Future Volume (Veh/h)	784	17	13	721	13	37
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	834	18	14	767	14	39
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None	TWLTL				
Median storage veh	2					
Upstream signal (m)	135					
pX, platoon unblocked			0.73		0.73	0.73
vC, conflicting volume			852		1629	834
vC1, stage 1 conf vol					834	
vC2, stage 2 conf vol					795	
vCu, unblocked vol			611		1677	587
tC, single (s)			4.3		6.4	6.4
tC, 2 stage (s)					5.4	
tF (s)			2.4		3.5	3.5
p0 queue free %			98		95	89
cM capacity (veh/h)			631		299	352
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	834	18	14	767	53	
Volume Left	0	0	14	0	14	
Volume Right	0	18	0	0	39	
cSH	1700	1700	631	1700	478	
Volume to Capacity	0.49	0.01	0.02	0.45	0.11	
Queue Length 95th (m)	0.0	0.0	0.5	0.0	2.8	
Control Delay (s)	0.0	0.0	10.8	0.0	16.8	
Lane LOS			B	C		
Approach Delay (s)	0.0		0.2		16.8	
Approach LOS						C
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization			51.3%	ICU Level of Service		A
Analysis Period (min)	15					

Queues
1: Silver Glen Blvd & Highway 26

2025 Future Total - PM
03/29/2018

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	64	734	12	32	938	151	12	23	90	38
v/c Ratio	0.19	0.52	0.01	0.07	0.66	0.12	0.06	0.05	0.43	0.10
Control Delay	6.0	7.0	2.2	4.3	9.5	1.2	29.9	0.2	38.4	0.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.0	7.0	2.2	4.3	9.5	1.2	29.9	0.2	38.4	0.5
Queue Length 50th (m)	2.7	44.1	0.0	1.2	68.6	0.5	1.6	0.0	12.8	0.0
Queue Length 95th (m)	8.4	80.6	1.4	4.2	128.9	5.5	6.1	0.0	26.4	0.0
Internal Link Dist (m)	364.2			111.3			77.4			83.8
Turn Bay Length (m)	20.0		50.0	115.0		50.0	15.0		45.0	
Base Capacity (vph)	334	1404	1200	489	1418	1237	334	575	347	518
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.19	0.52	0.01	0.07	0.66	0.12	0.04	0.04	0.26	0.07
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2025 Future Total - PM

03/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	727	12	32	929	139	12	0	23	83	0	35
Future Volume (vph)	59	727	12	32	929	139	12	0	23	83	0	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.2	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	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	1.00	0.97		1.00	1.00	
Flpb, ped/bikes	1.00	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	1.00	0.85	1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1824	1556	1782	1842	1566	1712	1553		1750	1566	
Flt Permitted	0.24	1.00	1.00	0.34	1.00	1.00	0.73	1.00		0.74	1.00	
Satd. Flow (perm)	435	1824	1556	635	1842	1566	1320	1553		1367	1566	
Peak-hour factor, PHF	0.92	0.99	0.99	0.99	0.99	0.92	0.99	0.92	0.99	0.92	0.92	0.92
Adj. Flow (vph)	64	734	12	32	938	151	12	0	23	90	0	38
RTOR Reduction (vph)	0	0	3	0	0	35	0	20	0	0	33	0
Lane Group Flow (vph)	64	734	9	32	938	116	12	3	0	90	5	0
Confl. Peds. (#/hr)			4	4			4		4			
Heavy Vehicles (%)	2%	3%	0%	0%	2%	2%	0%	2%	0%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	62.2	62.2	62.2	62.2	62.2	62.2	10.3	10.3		10.3	10.3	
Effective Green, g (s)	62.2	62.2	62.2	62.2	62.2	62.2	10.3	10.3		10.3	10.3	
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.74	0.74	0.12	0.12		0.12	0.12	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	324	1358	1159	473	1372	1166	162	191		168	193	
v/s Ratio Prot		0.40			c0.51			0.00			0.00	
v/s Ratio Perm	0.15		0.01	0.05		0.07	0.01			c0.07		
v/c Ratio	0.20	0.54	0.01	0.07	0.68	0.10	0.07	0.01		0.54	0.02	
Uniform Delay, d1	3.2	4.5	2.7	2.9	5.5	2.9	32.4	32.1		34.4	32.2	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.4	1.5	0.0	0.3	2.8	0.2	0.2	0.0		3.3	0.1	
Delay (s)	4.5	6.1	2.7	3.1	8.3	3.1	32.6	32.2		37.6	32.2	
Level of Service	A	A	A	A	A	A	C	C		D	C	
Approach Delay (s)		5.9			7.5			32.3			36.0	
Approach LOS		A			A			C			D	
Intersection Summary												
HCM 2000 Control Delay			9.0									
HCM 2000 Volume to Capacity ratio			0.66									
Actuated Cycle Length (s)			83.5							11.0		
Intersection Capacity Utilization			69.5%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

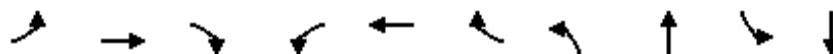
2025 Future Total - PM

03/29/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	822	14	61	1097	13	18
Future Volume (Veh/h)	822	14	61	1097	13	18
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	874	15	65	1167	14	19
Pedestrians	3			3	3	
Lane Width (m)	3.5			3.5	3.5	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						2
Median type	None			TWLTL		
Median storage veh)	2					
Upstream signal (m)	135					
pX, platoon unblocked			0.78		0.78	0.78
vC, conflicting volume			892		2177	880
vC1, stage 1 conf vol					877	
vC2, stage 2 conf vol					1300	
vCu, unblocked vol			723		2365	708
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.4
p0 queue free %			90		93	94
cM capacity (veh/h)			683		193	329
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	874	15	65	1167	33	
Volume Left	0	0	65	0	14	
Volume Right	0	15	0	0	19	
cSH	1700	1700	683	1700	454	
Volume to Capacity	0.51	0.01	0.10	0.69	0.07	
Queue Length 95th (m)	0.0	0.0	2.4	0.0	1.8	
Control Delay (s)	0.0	0.0	10.8	0.0	20.2	
Lane LOS				B	C	
Approach Delay (s)	0.0		0.6		20.2	
Approach LOS						C
Intersection Summary						
Average Delay	0.6					
Intersection Capacity Utilization	68.7%			ICU Level of Service		C
Analysis Period (min)	15					

Queues
1: Silver Glen Blvd & Highway 26

2030 Future Total - AM
03/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	21	673	18	36	715	49	16	44	161	70
v/c Ratio	0.06	0.57	0.02	0.09	0.67	0.05	0.06	0.09	0.51	0.14
Control Delay	6.8	10.7	3.5	7.1	14.3	2.5	17.2	0.4	25.4	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	10.7	3.5	7.1	14.3	2.5	17.2	0.4	25.4	0.6
Queue Length 50th (m)	0.8	38.6	0.0	1.4	46.0	0.0	1.3	0.0	14.7	0.0
Queue Length 95th (m)	3.9	86.3	2.3	5.8	#125.4	3.7	5.0	0.0	29.5	0.0
Internal Link Dist (m)		364.2			111.3			77.4		109.3
Turn Bay Length (m)	20.0		50.0	115.0		50.0	15.0		45.0	
Base Capacity (vph)	377	1185	812	402	1063	1044	418	635	491	682
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.57	0.02	0.09	0.67	0.05	0.04	0.07	0.33	0.10

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2030 Future Total - AM

03/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	660	18	35	701	45	16	0	43	148	0	64
Future Volume (vph)	19	660	18	35	701	45	16	0	43	148	0	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.2	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	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	1.00	0.85	1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1807	1229	1716	1620	1566	1526	1401		1750	1566	
Flt Permitted	0.31	1.00	1.00	0.34	1.00	1.00	0.71	1.00		0.73	1.00	
Satd. Flow (perm)	575	1807	1229	614	1620	1566	1143	1401		1342	1566	
Peak-hour factor, PHF	0.92	0.98	0.98	0.98	0.98	0.92	0.98	0.92	0.98	0.92	0.92	0.92
Adj. Flow (vph)	21	673	18	36	715	49	16	0	44	161	0	70
RTOR Reduction (vph)	0	0	7	0	0	19	0	36	0	0	57	0
Lane Group Flow (vph)	21	673	11	36	715	30	16	8	0	161	13	0
Heavy Vehicles (%)	2%	4%	30%	4%	16%	2%	13%	2%	14%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	36.2	36.2	36.2	36.2	36.2	36.2	11.0	11.0		11.0	11.0	
Effective Green, g (s)	36.2	36.2	36.2	36.2	36.2	36.2	11.0	11.0		11.0	11.0	
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.62	0.62	0.19	0.19		0.19	0.19	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	357	1123	764	381	1007	974	216	264		253	295	
v/s Ratio Prot		0.37			c0.44			0.01			0.01	
v/s Ratio Perm	0.04		0.01	0.06		0.02	0.01			c0.12		
v/c Ratio	0.06	0.60	0.01	0.09	0.71	0.03	0.07	0.03		0.64	0.04	
Uniform Delay, d1	4.3	6.6	4.2	4.4	7.4	4.2	19.4	19.3		21.8	19.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	2.4	0.0	0.5	4.2	0.1	0.1	0.0		5.2	0.1	
Delay (s)	4.6	9.0	4.2	4.9	11.7	4.3	19.6	19.3		26.9	19.4	
Level of Service	A	A	A	A	B	A	B	B		C	B	
Approach Delay (s)		8.7			10.9			19.4			24.6	
Approach LOS		A			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			12.1									
HCM 2000 Volume to Capacity ratio			0.69									
Actuated Cycle Length (s)			58.2									
Intersection Capacity Utilization			60.9%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

2030 Future Total - AM
03/29/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	833	18	14	773	14	40
Future Volume (Veh/h)	833	18	14	773	14	40
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	886	19	15	822	15	43
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			TWLT		
Median storage veh				2		
Upstream signal (m)	135					
pX, platoon unblocked			0.70		0.70	0.70
vC, conflicting volume			905		1738	886
vC1, stage 1 conf vol					886	
vC2, stage 2 conf vol					852	
vCu, unblocked vol			651		1840	624
tC, single (s)			4.3		6.4	6.4
tC, 2 stage (s)					5.4	
tF (s)			2.4		3.5	3.5
p0 queue free %			97		95	87
cM capacity (veh/h)			585		274	322
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	886	19	15	822	58	
Volume Left	0	0	15	0	15	
Volume Right	0	19	0	0	43	
cSH	1700	1700	585	1700	434	
Volume to Capacity	0.52	0.01	0.03	0.48	0.13	
Queue Length 95th (m)	0.0	0.0	0.6	0.0	3.5	
Control Delay (s)	0.0	0.0	11.3	0.0	18.2	
Lane LOS			B		C	
Approach Delay (s)	0.0		0.2		18.2	
Approach LOS					C	
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			53.8%	ICU Level of Service		A
Analysis Period (min)			15			

Queues
1: Silver Glen Blvd & Highway 26

2035 Future Total - PM
03/29/2018

										
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	64	791	13	34	1011	151	13	25	90	38
v/c Ratio	0.23	0.56	0.01	0.08	0.71	0.12	0.06	0.06	0.43	0.11
Control Delay	6.8	7.6	2.1	4.4	11.0	1.4	30.1	0.3	38.3	0.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	6.8	7.6	2.1	4.4	11.0	1.4	30.1	0.3	38.3	0.6
Queue Length 50th (m)	2.8	50.4	0.0	1.3	80.6	0.9	1.8	0.0	12.8	0.0
Queue Length 95th (m)	9.2	92.3	1.5	4.4	155.2	6.0	6.5	0.0	26.4	0.0
Internal Link Dist (m)		364.2			111.3			77.4		83.8
Turn Bay Length (m)	20.0		50.0	115.0		50.0	15.0		45.0	
Base Capacity (vph)	284	1403	1199	446	1417	1234	335	556	347	501
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.56	0.01	0.08	0.71	0.12	0.04	0.04	0.26	0.08
Intersection Summary										

HCM Signalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2035 Future Total - PM

03/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	783	13	34	1001	139	13	0	25	83	0	35
Future Volume (vph)	59	783	13	34	1001	139	13	0	25	83	0	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.2	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	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	1.00	0.97		1.00	1.00	
Flpb, ped/bikes	1.00	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	1.00	0.85	1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1824	1556	1782	1842	1566	1712	1553		1750	1566	
Flt Permitted	0.20	1.00	1.00	0.31	1.00	1.00	0.73	1.00		0.74	1.00	
Satd. Flow (perm)	370	1824	1556	580	1842	1566	1320	1553		1365	1566	
Peak-hour factor, PHF	0.92	0.99	0.99	0.99	0.99	0.92	0.99	0.92	0.99	0.92	0.92	0.92
Adj. Flow (vph)	64	791	13	34	1011	151	13	0	25	90	0	38
RTOR Reduction (vph)	0	0	3	0	0	32	0	22	0	0	33	0
Lane Group Flow (vph)	64	791	10	34	1011	119	13	3	0	90	5	0
Confl. Peds. (#/hr)			4	4			4		4			
Heavy Vehicles (%)	2%	3%	0%	0%	2%	2%	0%	2%	0%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	62.1	62.1	62.1	62.1	62.1	62.1	10.3	10.3		10.3	10.3	
Effective Green, g (s)	62.1	62.1	62.1	62.1	62.1	62.1	10.3	10.3		10.3	10.3	
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.74	0.74	0.12	0.12		0.12	0.12	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	275	1358	1158	431	1371	1166	163	191		168	193	
v/s Ratio Prot		0.43			c0.55			0.00			0.00	
v/s Ratio Perm	0.17		0.01	0.06		0.08	0.01			c0.07		
v/c Ratio	0.23	0.58	0.01	0.08	0.74	0.10	0.08	0.02		0.54	0.02	
Uniform Delay, d1	3.3	4.8	2.7	2.9	6.0	2.9	32.4	32.1		34.3	32.1	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	1.8	0.0	0.4	3.6	0.2	0.2	0.0		3.3	0.1	
Delay (s)	5.3	6.6	2.8	3.2	9.6	3.1	32.6	32.1		37.6	32.2	
Level of Service	A	A	A	A	A	A	C	C		D	C	
Approach Delay (s)		6.5			8.6			32.3			36.0	
Approach LOS		A			A			C			D	
Intersection Summary												
HCM 2000 Control Delay			9.8									
HCM 2000 Volume to Capacity ratio			0.71									
Actuated Cycle Length (s)			83.4							11.0		
Intersection Capacity Utilization			73.1%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

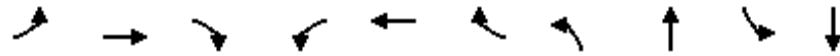
2035 Future Total - PM
03/29/2018

						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	879	15	66	1171	14	19
Future Volume (Veh/h)	879	15	66	1171	14	19
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	935	16	70	1246	15	20
Pedestrians	3			3	3	
Lane Width (m)	3.5			3.5	3.5	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						2
Median type	None			TWLTL		
Median storage veh	2					
Upstream signal (m)	135					
pX, platoon unblocked			0.75		0.75	0.75
vC, conflicting volume			954		2327	941
vC1, stage 1 conf vol					938	
vC2, stage 2 conf vol					1389	
vCu, unblocked vol			775		2598	758
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.4
p0 queue free %			89		91	93
cM capacity (veh/h)			628		171	297
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	935	16	70	1246	35	
Volume Left	0	0	70	0	15	
Volume Right	0	16	0	0	20	
cSH	1700	1700	628	1700	399	
Volume to Capacity	0.55	0.01	0.11	0.73	0.09	
Queue Length 95th (m)	0.0	0.0	2.8	0.0	2.2	
Control Delay (s)	0.0	0.0	11.4	0.0	22.3	
Lane LOS				B	C	
Approach Delay (s)	0.0		0.6		22.3	
Approach LOS						C
Intersection Summary						
Average Delay				0.7		
Intersection Capacity Utilization				72.6%	ICU Level of Service	C
Analysis Period (min)				15		

Queues
1: Silver Glen Blvd & Highway 26

2035 Future Total - AM

03/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	21	726	19	39	770	49	17	47	161	70
v/c Ratio	0.06	0.61	0.02	0.11	0.73	0.05	0.06	0.10	0.51	0.15
Control Delay	7.1	11.8	3.4	7.4	16.3	2.5	17.3	0.5	25.4	0.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	7.1	11.8	3.4	7.4	16.3	2.5	17.3	0.5	25.4	0.8
Queue Length 50th (m)	0.8	43.6	0.0	1.5	52.8	0.0	1.4	0.0	14.7	0.0
Queue Length 95th (m)	4.0	98.6	2.4	6.3	#140.5	3.8	5.3	0.0	29.5	0.8
Internal Link Dist (m)	364.2				111.3				77.4	
Turn Bay Length (m)	20.0		50.0	115.0		50.0	15.0		45.0	
Base Capacity (vph)	333	1184	812	361	1062	1043	418	619	489	667
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.06	0.61	0.02	0.11	0.73	0.05	0.04	0.08	0.33	0.10

Intersection Summary

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

HCM Signalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2035 Future Total - AM

03/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	19	711	19	38	755	45	17	0	46	148	0	64
Future Volume (vph)	19	711	19	38	755	45	17	0	46	148	0	64
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.2	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	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	1.00	0.85	1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1807	1229	1716	1620	1566	1526	1401		1750	1566	
Flt Permitted	0.28	1.00	1.00	0.30	1.00	1.00	0.71	1.00		0.73	1.00	
Satd. Flow (perm)	509	1807	1229	551	1620	1566	1143	1401		1338	1566	
Peak-hour factor, PHF	0.92	0.98	0.98	0.98	0.98	0.92	0.98	0.92	0.98	0.92	0.92	0.92
Adj. Flow (vph)	21	726	19	39	770	49	17	0	47	161	0	70
RTOR Reduction (vph)	0	0	7	0	0	19	0	38	0	0	57	0
Lane Group Flow (vph)	21	726	12	39	770	30	17	9	0	161	13	0
Heavy Vehicles (%)	2%	4%	30%	4%	16%	2%	13%	2%	14%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	36.2	36.2	36.2	36.2	36.2	36.2	11.0	11.0		11.0	11.0	
Effective Green, g (s)	36.2	36.2	36.2	36.2	36.2	36.2	11.0	11.0		11.0	11.0	
Actuated g/C Ratio	0.62	0.62	0.62	0.62	0.62	0.62	0.19	0.19		0.19	0.19	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	316	1123	764	342	1007	974	216	264		252	295	
v/s Ratio Prot		0.40			c0.48			0.01			0.01	
v/s Ratio Perm	0.04		0.01	0.07		0.02	0.01			c0.12		
v/c Ratio	0.07	0.65	0.02	0.11	0.76	0.03	0.08	0.03		0.64	0.04	
Uniform Delay, d1	4.3	7.0	4.2	4.5	7.9	4.2	19.4	19.3		21.8	19.3	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	2.9	0.0	0.7	5.5	0.1	0.2	0.1		5.2	0.1	
Delay (s)	4.7	9.8	4.2	5.2	13.4	4.3	19.6	19.3		27.0	19.4	
Level of Service	A	A	A	A	B	A	B	B		C	B	
Approach Delay (s)		9.6			12.5			19.4			24.7	
Approach LOS		A			B			B			C	
Intersection Summary												
HCM 2000 Control Delay			13.0				HCM 2000 Level of Service			B		
HCM 2000 Volume to Capacity ratio			0.73									
Actuated Cycle Length (s)			58.2				Sum of lost time (s)			11.0		
Intersection Capacity Utilization			63.8%				ICU Level of Service			B		
Analysis Period (min)			15									

c Critical Lane Group

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

2035 Future Total - AM
03/29/2018

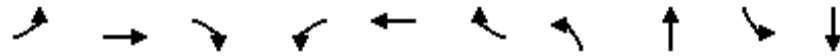
						
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	885	19	15	829	15	43
Future Volume (Veh/h)	885	19	15	829	15	43
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	941	20	16	882	16	46
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						2
Median type	None			TWLT		
Median storage veh				2		
Upstream signal (m)	135					
pX, platoon unblocked			0.67		0.67	0.67
vC, conflicting volume			961		1855	941
vC1, stage 1 conf vol					941	
vC2, stage 2 conf vol					914	
vCu, unblocked vol			690		2034	660
tC, single (s)			4.3		6.4	6.4
tC, 2 stage (s)					5.4	
tF (s)			2.4		3.5	3.5
p0 queue free %			97		94	84
cM capacity (veh/h)			537		249	291
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	941	20	16	882	62	
Volume Left	0	0	16	0	16	
Volume Right	0	20	0	0	46	
cSH	1700	1700	537	1700	393	
Volume to Capacity	0.55	0.01	0.03	0.52	0.16	
Queue Length 95th (m)	0.0	0.0	0.7	0.0	4.2	
Control Delay (s)	0.0	0.0	11.9	0.0	19.9	
Lane LOS			B		C	
Approach Delay (s)	0.0		0.2		19.9	
Approach LOS					C	
Intersection Summary						
Average Delay			0.7			
Intersection Capacity Utilization			56.6%	ICU Level of Service		B
Analysis Period (min)			15			

Queues

1: Silver Glen Blvd & Highway 26

2035 Future Total - PM

03/29/2018



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	64	853	14	36	1089	151	14	27	90	38
v/c Ratio	0.28	0.61	0.01	0.09	0.77	0.12	0.07	0.07	0.43	0.11
Control Delay	8.6	8.4	2.0	4.6	13.2	1.5	30.1	0.3	38.3	0.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.6	8.4	2.0	4.6	13.2	1.5	30.1	0.3	38.3	0.7
Queue Length 50th (m)	2.9	57.7	0.0	1.4	95.8	1.2	1.9	0.0	12.8	0.0
Queue Length 95th (m)	10.7	107.0	1.6	4.7	#226.6	6.5	6.8	0.0	26.4	0.0
Internal Link Dist (m)		364.2			111.3			77.4		83.8
Turn Bay Length (m)	20.0		50.0	115.0		50.0	15.0		45.0	
Base Capacity (vph)	229	1402	1199	401	1416	1231	336	537	347	486
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.61	0.01	0.09	0.77	0.12	0.04	0.05	0.26	0.08

Intersection Summary

95th percentile volume exceeds capacity, queue may be longer.

Queue shown is maximum after two cycles.

HCM Signalized Intersection Capacity Analysis

1: Silver Glen Blvd & Highway 26

2035 Future Total - PM

03/29/2018

												
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	59	844	14	36	1078	139	14	0	27	83	0	35
Future Volume (vph)	59	844	14	36	1078	139	14	0	27	83	0	35
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width	3.5	3.5	3.5	3.5	3.5	3.5	3.2	3.5	3.2	3.5	3.5	3.5
Total Lost time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Lane Util. Factor	1.00	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	1.00	0.97		1.00	1.00	
Flpb, ped/bikes	1.00	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	1.00	0.85	1.00	0.85		1.00	0.85	
Flt Protected	0.95	1.00	1.00	0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1750	1824	1556	1782	1842	1566	1712	1553		1750	1566	
Flt Permitted	0.16	1.00	1.00	0.28	1.00	1.00	0.73	1.00		0.74	1.00	
Satd. Flow (perm)	299	1824	1556	521	1842	1566	1320	1553		1362	1566	
Peak-hour factor, PHF	0.92	0.99	0.99	0.99	0.99	0.92	0.99	0.92	0.99	0.92	0.92	0.92
Adj. Flow (vph)	64	853	14	36	1089	151	14	0	27	90	0	38
RTOR Reduction (vph)	0	0	4	0	0	30	0	24	0	0	33	0
Lane Group Flow (vph)	64	853	10	36	1089	121	14	3	0	90	5	0
Confl. Peds. (#/hr)			4	4			4		4			
Heavy Vehicles (%)	2%	3%	0%	0%	2%	2%	0%	2%	0%	2%	2%	2%
Turn Type	Perm	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	61.9	61.9	61.9	61.9	61.9	61.9	10.3	10.3		10.3	10.3	
Effective Green, g (s)	61.9	61.9	61.9	61.9	61.9	61.9	10.3	10.3		10.3	10.3	
Actuated g/C Ratio	0.74	0.74	0.74	0.74	0.74	0.74	0.12	0.12		0.12	0.12	
Clearance Time (s)	7.0	7.0	7.0	7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	222	1357	1157	387	1370	1165	163	192		168	193	
v/s Ratio Prot		0.47			c0.59			0.00			0.00	
v/s Ratio Perm	0.21		0.01	0.07		0.08	0.01			c0.07		
v/c Ratio	0.29	0.63	0.01	0.09	0.79	0.10	0.09	0.02		0.54	0.02	
Uniform Delay, d1	3.5	5.1	2.7	2.9	6.7	3.0	32.3	32.0		34.2	32.0	
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.3	2.2	0.0	0.5	4.8	0.2	0.2	0.0		3.3	0.1	
Delay (s)	6.7	7.3	2.8	3.4	11.5	3.1	32.5	32.0		37.5	32.1	
Level of Service	A	A	A	A	B	A	C	C		D	C	
Approach Delay (s)		7.2			10.3			32.2			35.9	
Approach LOS		A			B			C			D	
Intersection Summary												
HCM 2000 Control Delay			10.8									
HCM 2000 Volume to Capacity ratio			0.76									
Actuated Cycle Length (s)			83.2							11.0		
Intersection Capacity Utilization			77.2%									
Analysis Period (min)			15									
c Critical Lane Group												

HCM Unsignalized Intersection Capacity Analysis

2: Cranberry Trail W & Highway 26

2035 Future Total - PM

03/29/2018

	→	↘	↙	←	↖	↗
Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations	↑	↑	↑	↑	↑	↑
Traffic Volume (veh/h)	940	16	71	1250	15	20
Future Volume (Veh/h)	940	16	71	1250	15	20
Sign Control	Free		Free		Stop	
Grade	0%		0%		0%	
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	1000	17	76	1330	16	21
Pedestrians	3			3	3	
Lane Width (m)	3.5			3.5	3.5	
Walking Speed (m/s)	1.1			1.1	1.1	
Percent Blockage	0			0	0	
Right turn flare (veh)						2
Median type	None		TWLTL			
Median storage (veh)			2			
Upstream signal (m)	135					
pX, platoon unblocked			0.71		0.71	0.71
vC, conflicting volume			1020		2488	1006
vC1, stage 1 conf vol					1003	
vC2, stage 2 conf vol					1485	
vCu, unblocked vol			829		2882	809
tC, single (s)			4.1		6.4	6.3
tC, 2 stage (s)					5.4	
tF (s)			2.2		3.5	3.4
p0 queue free %			87		89	92
cM capacity (veh/h)			569		149	263
Direction, Lane #	EB 1	EB 2	WB 1	WB 2	NB 1	
Volume Total	1000	17	76	1330	37	
Volume Left	0	0	76	0	16	
Volume Right	0	17	0	0	21	
cSH	1700	1700	569	1700	345	
Volume to Capacity	0.59	0.01	0.13	0.78	0.11	
Queue Length 95th (m)	0.0	0.0	3.5	0.0	2.7	
Control Delay (s)	0.0	0.0	12.3	0.0	25.1	
Lane LOS			B		D	
Approach Delay (s)	0.0		0.7		25.1	
Approach LOS					D	
Intersection Summary						
Average Delay			0.8			
Intersection Capacity Utilization			76.7%		ICU Level of Service	D
Analysis Period (min)			15			

APPENDIX G

Growth Rate Analysis

Environmental Study Report

HIGHWAY 26 WEST FROM 280 m WEST OF PRINCETON SHORES BOULEVARD TO HARBOUR STREET IMPROVEMENTS

MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT

Prepared By:

R.J. Burnside & Associates Limited
3 Ronell Crescent, Collingwood, ON L9Y 4J6

Prepared for:

Town of Collingwood

April 2014

File No: 300032131.0000

The material in this report reflects best judgement in light of the information available at the time of preparation. Any use which a third party makes of this report, or any reliance on or decisions made based on it, are the responsibilities of such third parties. R.J. Burnside & Associates Limited accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.



Technical Memorandum

Memorandum No.:	Traffic Memo No. 1	File No.:	300032131
Project:	Class Environmental Assessment Highway 26 – Harbour Street to West of Princeton Shores Boulevard Town of Collingwood		
Date:	February 20, 2013	Revision Date:	
Submitted To:	Ron Kerr, P. Eng.		
Submitted By:	Henry Centen, P. Eng.		
Reviewed By:			

This technical memorandum considers the opportunities and constraints associated with the traffic and transportation operations along the Highway 26 corridor, from Harbour Street to west of Princeton Shores Boulevard, in the Town of Collingwood. This review is completed as part of a Class Environmental Assessment for improvements to Highway 26, in the study area.

1.0 Class Environmental Assessment Considerations

The Town of Collingwood has identified the need to rehabilitate Highway 26 in the study area, due to its deteriorated condition and increasing traffic demands. This section of Highway 26 is a Highway Connecting Link, under the jurisdiction of the Town of Collingwood. Ongoing growth in background traffic, along with forecast development, requires the Town to consider traffic demands that are within the life cycle of the anticipated rehabilitation work. Therefore, for the purposes of establishing traffic constraints, the design requirements have been assessed for a fifteen year time horizon (year 2028). For comparative purposes, the existing traffic operations (2013) have also been analyzed, assuming existing lane configurations, existing traffic controls and existing development. Existing conditions are shown on Figure OV1 (aerial base drawing), attached to this technical memorandum, as well as on Figure TR1 (see Appendix A).

The Town's previous planning work (i.e. Five Year Needs Program), identifies the need to rehabilitate the existing pavement and widen the road to include a continuous centre left turn lane, at an estimated cost of \$3.5 M. Under the provisions of the Environmental Assessment Act, such a project requires environmental review as a Schedule C project, under the Class Environmental Assessment (Class EA) process. The requirements of the Class EA will be confirmed as part of the planning process.

This technical memorandum provides a preliminary assessment of the traffic and transportation operational issues along the corridor, from 280 metres west of Princeton Shores Boulevard to Harbour Street, which is the primary segment delineated by the Town's Terms of Reference (TOR), for review under the Class EA. The TOR also requests consideration of implementing a slip-by lane at the Silver Creek Drive intersection. Therefore some consideration has also been given to traffic operations in a secondary study area, from 280 metres west of Princeton Shores Boulevard to west of Silver Creek Drive. However the planning work in this secondary study area is considered to be outside of the Class EA.

This memo considers the technical environment associated with the proposed undertaking. Additional details pertaining to other environmental assessment considerations (e.g. natural, cultural, and economic environments) are not part of memo, but are dealt with under separate cover.

2.0 Analysis of Traffic Operations

2.1 Traffic Volume Forecasts

Traffic volumes along the corridor were forecast based on the following previous transportation studies:

- Transportation Study, Town of Collingwood; prepared for the Town of Collingwood by C.C. Tatham & Associates Ltd.; dated July 9, 2012.
- Comprehensive Transportation Strategic Plan; prepared for the Town of the Blue Mountains by C. C. Tatham & Associates Ltd and AECOM; dated March 2010.
- Technical Report, Traffic Operations Review, Highway 26 Planning Study; prepared for the Ministry of Transportation by McCormick Rankin Corporation; dated May 2004.
- Highway 26 Transportation Study, Georgian Triangle Area; Municipal Partners Meeting; prepared for the Ministry of Transportation by AECOM; dated December, 2011.

The studies prepared for the Town of Collingwood and the Town of the Blue Mountains have provided turning movement data for the intersections of Highway 26 / Harbour Street and for Highway 26 / Grey Road 21 (Osler Bluff Road). The traffic forecasts were adjusted to rationalize the assumptions made in the two studies, and to balance the traffic between these intersections.

Traffic volume additions/drops are made along the corridor, based on existing and proposed developments in this area. Where available, these forecasts are based on previously prepared Traffic Impact Studies (TIS). The following TIS reports were reviewed to assess background traffic data:

- Signal Warrant Analysis, Highway 26 and Gun Club Road / Cranberry Trail East; prepared by C. C. Tatham & Associates Ltd.; dated August 22, 2012.
- Traffic Impact Study, Rollings / Mundell Property; prepared by C.F. Crozier & Associates Inc.; dated February 2008

- Traffic Impact Study, The Preserve at Georgian Bay; prepared by C. F. Crozier & Associates Inc.; dated February 2007
- Master Servicing Plan, The Preserve at Georgian Bay; prepared by C.R. Crozier & Associates inc.; dated March 2012
- Traffic Impact Study Update, Balmoral Village; prepared by C. F. Crozier & Associates Inc.; dated July 2011
- Traffic Impact Study, Tanglewood at Cranberry Village; prepared by C. F. Crozier & Associates Inc.; dated June 2007
- Traffic Impact Study, Huntingwood Trails; prepared by C. F. Crozier & Associates Inc.; dated June 2009
- Traffic Impact Study, Anchorage Development; prepared by C. C. Tatham & Associates Ltd.; dated August 2011
- Site Servicing Report, Waterstone Development; prepared by C. F. Crozier & Associates Inc.; dated November 2007
- Traffic Impact Assessment, Pretty River Academy; prepared by Cansult Tatham Ltd.; dated April 2005.

The preliminary planned intersection improvements, to accommodate new development, are shown on Figure TR1 (Appendix A). It is noted that the timing and details, of the developments identified, are still subject to change as their planning process proceeds. Consideration of their completion, in this study, provides a sensitivity analysis, when compared with existing traffic operations, to inform the design requirements that may be considered under the present project. Further input should be obtained from the Town, during the detailed design process, to confirm whether the staging of development-related projects should proceed at this time as part of the improvement works (i.e. front-ended), or whether the works should be implemented as part of a future development project.

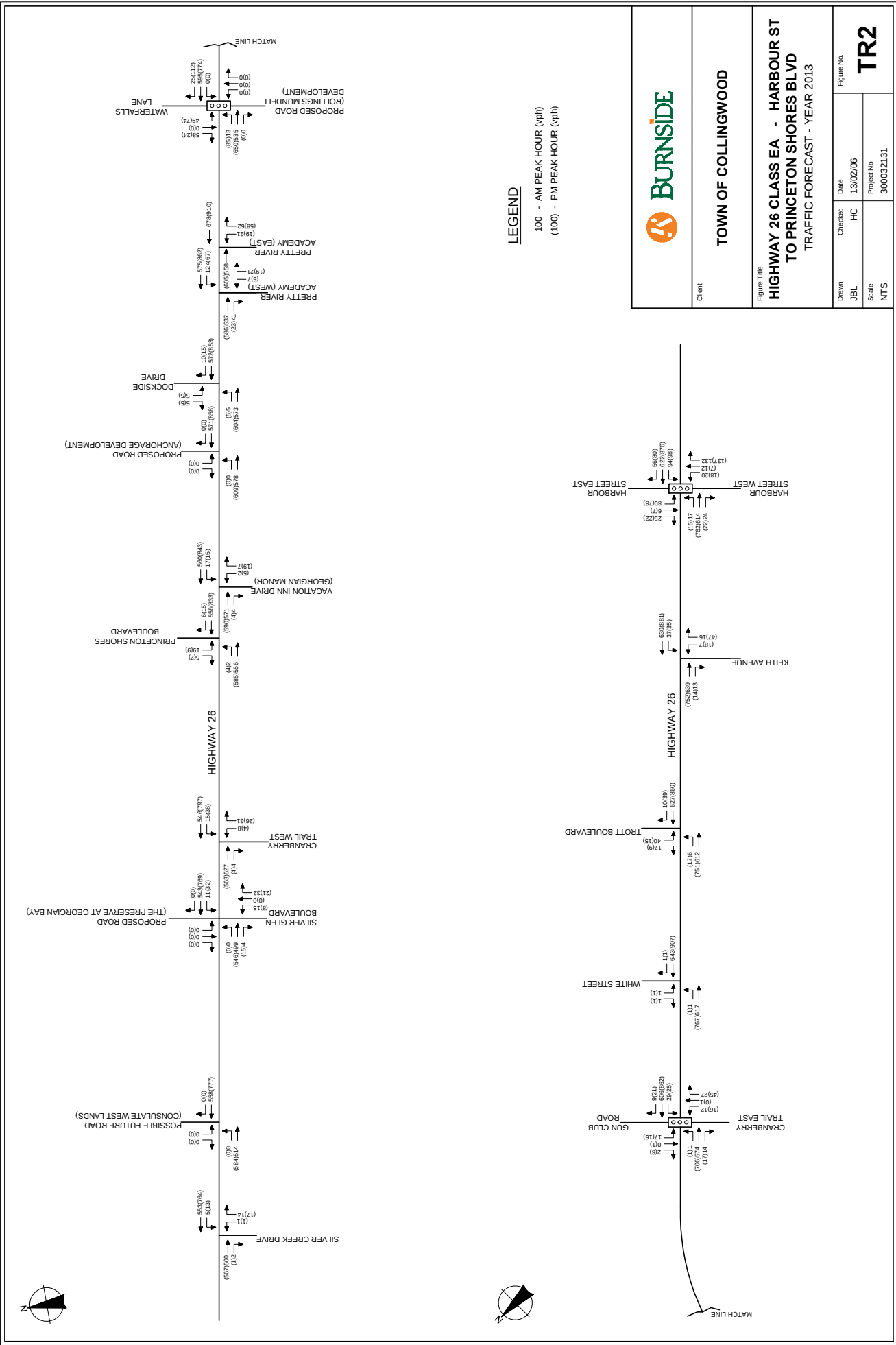
Where previous studies were not available, traffic volumes were forecast based on trip generation rates, provided in the Trip Generation Manual, 9th Edition (Institute of Transportation Engineers), and an assessment of existing / proposed development in the immediate study area.

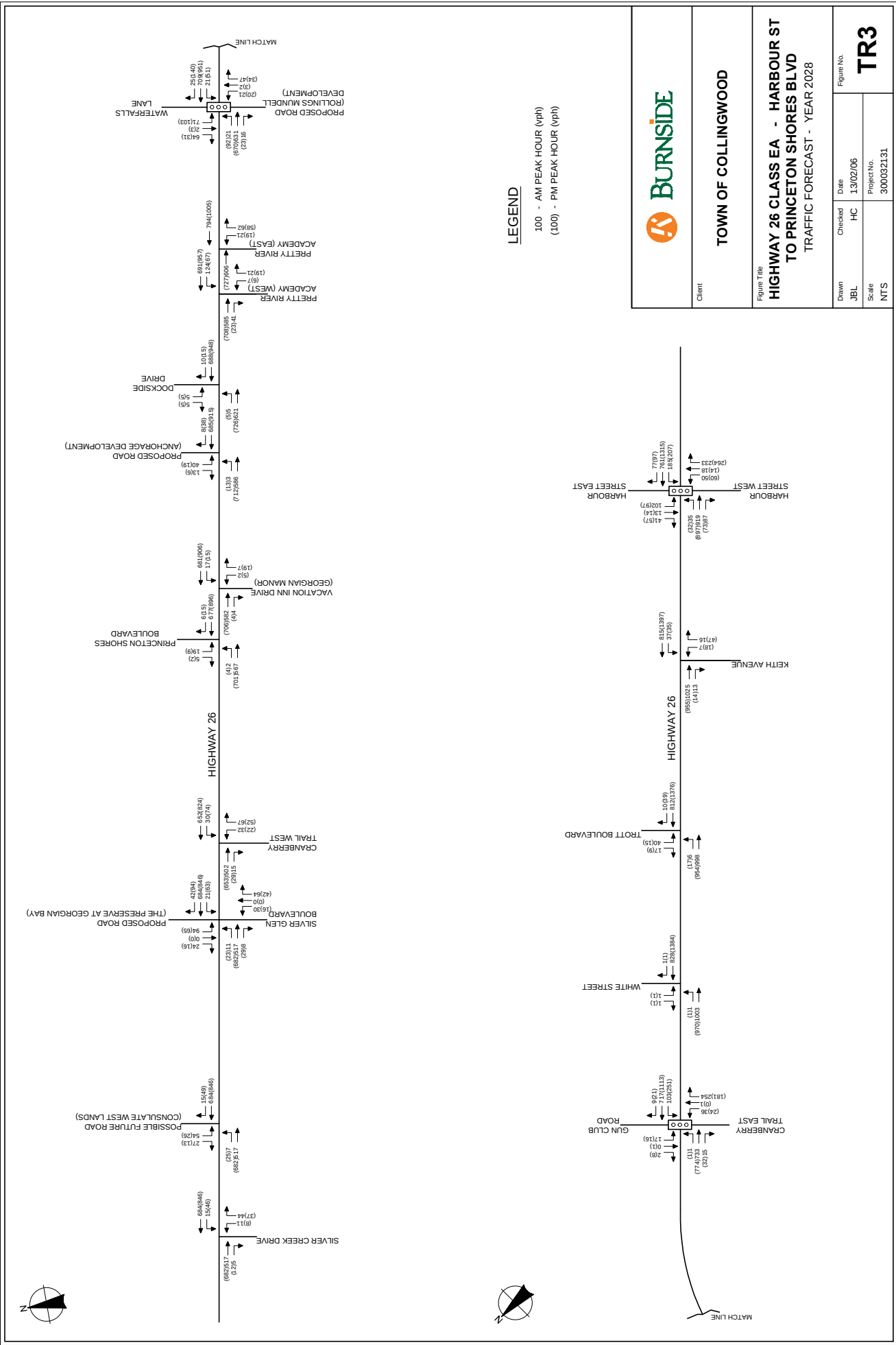
The forecast turning movements for the primary intersections along the corridor are show on Figure TR2 (2013) and on Figure TR3 (2028).

2.2 Identification of Traffic Alternatives

In the study area, Highway 26 is a two lane arterial road, which provides access to abutting development (existing and proposed), while providing a highway connecting link for through traffic travelling to the broader area. In the study area, the posted speeds along Highway 26 are as follows:

- 50 km/h to just north of Harbour Street
- 60 km/h from just north of Harbour Street to just west of Silver Glen Boulevard
- 70 km/h from just west of Silver Glen Boulevard to just east of County Road 21 (Osler Bluff Road), where the speed decreases again to 60 km/h.





Highway 26 Growth Rates - ESR

Highway 26 east of Waterfalls Lane

AM Peak Period

Year	EB Volume (veh/hr)	WB volume (veh/hr)	Two-way Volume (veh/hr)	Growth Rate
2013	584	620	1204	1.49%
2028	749	755	1504	

PM Peak Period

Year	EB Volume (veh/hr)	WB volume (veh/hr)	Two-way Volume (veh/hr)	Growth Rate
2013	724	886	1610	1.28%
2028	807	1142	1949	

Eastbound volumes were determined using the eastbound "exiting" volumes at Highway 26 and Waterfalls Lane (i.e. NBR, EBT, and SBL)

Westbound volumes were determined using the westbound "entering" volumes at Highway 26 and Waterfalls Lane (i.e. WBL, WBT, and WBR)



Ministry of
Transportation

Highway
Standards
Branch

Traffic
Office

Provincial Highways

Traffic Volumes

1988-2016

King's Highways / Secondary Highways / Tertiary Roads

Ministry Contact:

Traffic Office (905)-704-2960

Abstract:

This annual publication contains averaged traffic volume information and accident rate information for each of the sections of highway under MTO jurisdiction.

Key Words:

Annual Average Daily Traffic volume (AADT), Summer Average Daily Traffic volume (SADT), Summer Average Weekday Traffic volume (SAWDT), Winter Average Daily Traffic volume (WADT), Accident Rate (AR)

Distance (KM)

The length of the section in kilometres reported to one decimal place.

Pattern Type

One of 14 pattern types that represent the seasonal variation of the traffic flow on the section indicated. A graphical presentation of these pattern types has been included on the following page.

The 14 pattern types represent the traffic flow variation on the whole network. They include:

Variation Types

LOW	UC	urban commuter
	SC	suburban commuter
	C	commuter
INTER	IC	intermediate commuter
	CR	commuter recreation
	IR	intermediate recreation
	CTR	commuter tourist recreation
	IT	intermediate tourist
HIGH	LT	low tourist
	T	tourist
	HT	high tourist
	LR	low recreation
	R	recreation
	HR	high recreation
	UNKN	unknown
	UNCL	unclassified
	NEW	new volume section

The first three are generally referred to as Low Variation Curves (or commuter travel); the next five as Intermediate Variation Curves

(a blend of all types of traffic); and the last six as High Variation Curves. For the last group, the first three represent tourist travel and the second three, recreational travel; this sub-grouping is distinguished by the relationship of weekend to weekday traffic.

There are two additional codes in the pattern type column. "UNC" indicates that the AADT was calculated using adjustment factors from an unclassified (i.e. new) permanent counting station. "NEW" indicates that this is a new volume section and there is insufficient data to assign a pattern type.

AADT

Annual Average Daily Traffic; defined as the average twenty four hour, two way traffic for the period January 1st to December 31st.

SADT

Summer Average Daily Traffic; defined as the average twenty four hour, two way traffic for the period July 1st to August 31st including weekends.

SAWDT

Summer Average Weekday Traffic; defined as the average twenty four hour, two way traffic for the period July 1st to August 31st, excluding weekends.

WADT

Winter Average Daily Traffic; defined as the average twenty four hour, two way traffic for the period January 1st to March 31st, plus December 1st to December 31st, including weekends.

Highway	Location Description	Dist. (KM)	Year	Pattern Type	AADT	SADT	SAWDT	WADT	AR
26	POPLAR SDRD ROUNDABOUT	0.9	2016	UNKN	N/A	N/A	N/A	N/A	N/A
26	6 TH LINE\OLD HWY 26 (HWY 7148) - START OF NA	10.6							
26	LONG POINT RD (N)/GREY RD 21 (S) - END OF NA	2.7	1988	CTR	6,700	8,700	8,000	5,500	1.9
			1989	CTR	7,000	8,900	8,300	5,800	1.8
			1990	CTR	7,350	9,100	8,400	6,600	1.2
			1991	CTR	7,550	9,200	8,600	6,700	1.9
			1992	CTR	7,700	9,400	8,700	6,900	1.7
			1993	CTR	7,300	9,100	8,800	6,200	1.5
			1994	CTR	7,200	9,200	8,800	6,050	1.5
			1995	CTR	7,200	9,200	8,850	6,050	1.1
			1996	CTR	7,450	9,250	8,200	6,550	1.6
			1997	CTR	7,500	9,600	9,250	6,300	0.8
			1998	CTR	7,550	9,600	9,200	6,350	0.8
			1999	CTR	7,600	9,600	9,200	6,400	1.5
			2000	CTR	7,950	10,000	9,600	6,700	0.6
			2001	CTR	8,100	10,200	9,800	6,800	1.4
			2002	CTR	8,450	10,700	10,200	7,150	1.0
			2003	CTR	8,650	10,900	10,500	7,350	0.9
			2004	CTR	8,550	10,600	10,200	7,250	1.1
			2005	CTR	8,550	10,600	10,200	7,250	0.6
			2006	CTR	8,550	10,600	10,100	7,250	1.4
			2007	CTR	8,750	10,800	10,700	7,400	1.7
			2008	CTR	8,550	10,300	10,300	7,200	0.8
			2009	CTR	8,950	10,800	10,400	7,550	1.1
			2010	CTR	8,900	10,700	10,300	7,550	1.1
			2011	CTR	8,900	10,400	10,500	7,900	N/A
			2012	CTR	8,300	9,950	9,800	7,050	N/A
			2013	CTR	8,400	10,100	10,300	7,150	N/A
			2014	CTR	8,500	10,400	10,500	7,250	N/A
			2015	CTR	8,600	10,500	10,600	7,300	N/A
			2016	CTR	8,700	10,600	10,700	7,400	N/A
26	GREY RD 19 (S)	10.2	1988	CR	5,750	6,600	6,400	5,000	0.9
			1989	CR	6,150	7,000	6,900	5,400	1.0

MTO Highway 26 - Long point Road to Grey Road 21

Year	AADT	Year-to-Year Increase	Average Increase
2008	8550	4.68%	0.26%
2009	8950	-0.56%	
2010	8900	0.00%	
2011	8900	-6.74%	
2012	8300	1.20%	
2013	8400	1.19%	
2014	8500	1.18%	
2015	8600	1.16%	
2016	8700		

Year	SADT	Year-to-Year Increase	Average Increase
2008	10300	4.85%	0.40%
2009	10800	-0.93%	
2010	10700	-2.80%	
2011	10400	-4.33%	
2012	9950	1.51%	
2013	10100	2.97%	
2014	10400	0.96%	
2015	10500	0.95%	
2016	10600		

APPENDIX H

Signal Warrant Sheets

Input Data Sheet

[Analysis Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)
[GO TO Justification:](#)

What are the intersecting roadways?

Hwy 26 and Silver Glen Blvd

What is the direction of the Main Road street?

East-West

When was the data collected?

Future Total 2025

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road?

1

b.- Number of lanes on the Minor Road?

1

c.- How many approaches?

4

d.- What is the operating environment?

Rural

Population < 10,000

AND

Speed >= 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	4	129	4	3	0	8	7	137	9	31	0	13	0
8:00	10	313	9	8	0	20	17	332	23	75	0	33	0
9:00	19	613	17	15	0	40	33	651	45	148	0	64	0
10:00	13	417	12	10	0	27	22	443	31	101	0	44	0
16:00	44	538	9	9	0	17	24	687	103	61	0	26	0
17:00	58	720	12	12	0	23	32	920	138	82	0	35	0
18:00	59	727	12	12	0	23	32	929	139	83	0	35	0
19:00	43	531	9	9	0	17	23	678	101	61	0	26	0
Total	250	3,987	82	78	0	176	190	4,777	589	642	0	275	0

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

* Include only collisions that are susceptible to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	23%		34%		30%		100%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									2,000

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	23%		34%		30%		100%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Hwy 26 and Silver Glen Blvd

Count Date: Future Total 2025

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 Lanes		2 or More Lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:00	8:00	9:00	10:00	16:00	17:00	18:00	19:00				
	☒	☐	☐	☐												
1A	480	720	600	900	345	839	1,645	1,119	1,518	2,030	2,051	1,497				
	COMPLIANCE %				72	100	100	100	100	100	100	100	772	96		
1B	120	170	120	170	56	136	267	182	113	151	153	112				
	COMPLIANCE %				47	100	100	100	94	100	100	93	734	92		
Free Flow					Both 1A and 1B 100% Fullfilled each of 8 hours								Yes ☐		No ☒	
Signal Justification 1:					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☒		No ☐	

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☒	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	10:00	16:00	17:00	18:00	19:00		
2A	480	720	600	900	289	703	1,378	937	1,405	1,879	1,898	1,386		
	COMPLIANCE %				60	100	100	100	100	100	100	100	760	95
2B	50	75	50	75	34	83	163	111	70	94	95	69		
	COMPLIANCE %				68	100	100	100	100	100	100	100	768	96
Free Flow					Both 2A and 2B 100% Fullfilled each of 8 hours								Yes ☐	No ☒
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes ☒	No ☐

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume	YES ☒	NO ☐	YES ☒	NO ☐
Justification 2	Delay Cross Traffic	YES ☒	NO ☐	JUSTIFIED	

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	9:00	1,587	212	80	100 %	100 %
	16:00	1,606	87	80	100 %	
	17:00	2,148	117	80	100 %	
	18:00	2,170	118	80	100 %	

Results Sheet

[Input Sheet](#)
[Analysis Sheet](#)
[Proposed Collision](#)

Intersection: Hwy 26 and Silver Glen Blvd

Count Date: Future Total 2025

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A Total Volume	96	%	☐	☒
	B Crossing Volume	92	%	☐	☒
2. Delay to Cross Traffic	A Main Road	95	%	☐	☒
	B Crossing Road	96	%	☐	☒
3. Combination	A Justificaton 1	92	%	☒	☐
	B Justification 2	95	%	☐	☐
4. 4-Hr Volume		100	%	☒	☐

5. Collision Experience	0	%	☐	☒
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6. Pedestrians	A Volume	Justification not met	☐	☒
	B Delay	Justification not met	☐	☒

Input Data Sheet

[Analysis Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)
[GO TO Justification:](#)

What are the intersecting roadways?

Hwy 26 and Silver Glen Blvd

What is the direction of the Main Road street?

East-West

When was the data collected?

Future Total 2030

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road?

1

b.- Number of lanes on the Minor Road?

1

c.- How many approaches?

4

d.- What is the operating environment?

Rural

Population < 10,000

AND

Speed >= 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	4	139	4	3	0	9	7	147	9	31	0	13	0
8:00	10	337	9	8	0	22	18	358	23	75	0	33	0
9:00	19	660	18	16	0	43	35	701	45	148	0	64	0
10:00	13	449	12	11	0	29	24	477	31	101	0	44	0
16:00	44	579	10	10	0	19	25	741	103	61	0	26	0
17:00	58	775	13	13	0	25	34	991	138	82	0	35	0
18:00	59	783	13	13	0	25	34	1,001	139	83	0	35	0
19:00	43	572	9	9	0	18	25	731	101	61	0	26	0
Total	250	4,293	88	83	0	190	202	5,146	589	642	0	275	0

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

* Include only collisions that are susceptible to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	23%		34%		30%		100%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									2,000

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	23%		34%		30%		100%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Hwy 26 and Silver Glen Blvd

Count Date: Future Total 2030

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 Lanes		2 or More Lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:00	8:00	9:00	10:00	16:00	17:00	18:00	19:00				
	☒	☐	☐	☐												
1A	480	720	600	900	367	892	1,749	1,189	1,617	2,163	2,185	1,595	777	97		
	COMPLIANCE %				77	100	100	100	100	100	100	100				
1B	120	170	120	170	57	138	271	184	115	154	156	114	739	92		
	COMPLIANCE %				47	100	100	100	96	100	100	95				
Free Flow					Both 1A and 1B 100% Fullfilled each of 8 hours								Yes ☐		No ☒	
Signal Justification 1:					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☒		No ☐	

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW ☒	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	10:00	16:00	17:00	18:00	19:00				
2A	480	720	600	900	310	754	1,478	1,005	1,501	2,009	2,029	1,481				
	COMPLIANCE %				65	100	100	100	100	100	100	100	765	96		
2B	50	75	50	75	34	84	164	112	71	95	96	70				
	COMPLIANCE %				69	100	100	100	100	100	100	100			769	96
Free Flow					Both 2A and 2B 100% Fullfilled each of 8 hours								Yes	☐	No	☒
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes	☒	No	☐

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume	YES ☒	NO ☐	YES ☒	NO ☐
Justification 2	Delay Cross Traffic	YES ☒	NO ☐	JUSTIFIED	

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	16:00	1,501	87	80	100 %	100 %
	17:00	2,009	117	80	100 %	
	18:00	2,029	118	80	100 %	
	19:00	1,481	86	80	100 %	

Results Sheet

[Input Sheet](#)
[Analysis Sheet](#)
[Proposed Collision](#)

Intersection: Hwy 26 and Silver Glen Blvd

Count Date: Future Total 2030

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A Total Volume	97	%	☐	☒
	B Crossing Volume	92	%	☐	☒
2. Delay to Cross Traffic	A Main Road	96	%	☐	☒
	B Crossing Road	96	%	☐	☒
3. Combination	A Justificaton 1	92	%	☒	☐
	B Justification 2	96	%	☐	☐
4. 4-Hr Volume		100	%	☒	☐

5. Collision Experience	0	%	☐	☒
-------------------------	---	---	--------------------------	-------------------------------------

6. Pedestrians	A Volume	Justification not met	☐	☒
	B Delay	Justification not met	☐	☒

Input Data Sheet

[Analysis Sheet](#)
[Results Sheet](#)
[Proposed Collision](#)
[GO TO Justification:](#)

What are the intersecting roadways?

Hwy 26 and Silver Glen Blvd

What is the direction of the Main Road street?

East-West

When was the data collected?

Future Total 2035

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road?

1

b.- Number of lanes on the Minor Road?

1

c.- How many approaches?

4

d.- What is the operating environment?

Rural

Population < 10,000

AND

Speed >= 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Eastbound Approach			Minor Northbound Approach			Main Westbound Approach			Minor Southbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	4	149	4	4	0	10	8	159	9	31	0	13	0
8:00	10	363	10	9	0	23	19	385	23	75	0	33	0
9:00	19	711	19	17	0	46	38	755	45	148	0	64	0
10:00	13	483	13	12	0	31	26	513	31	101	0	44	0
16:00	44	625	10	10	0	20	27	798	103	61	0	26	0
17:00	58	836	14	14	0	27	36	1,067	138	82	0	35	0
18:00	59	844	14	14	0	27	36	1,078	139	83	0	35	0
19:00	43	616	10	10	0	20	26	787	101	61	0	26	0
Total	250	4,627	94	89	0	204	216	5,542	589	642	0	275	0

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

* Include only collisions that are susceptible to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	23%		34%		30%		100%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									2,000

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	23%		34%		30%		100%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet

Results Sheet

Proposed Collision

GO TO Justification:

Intersection: Hwy 26 and Silver Glen Blvd

Count Date: Future Total 2035

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 Lanes		2 or More Lanes		Hour Ending											
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW	7:00	8:00	9:00	10:00	16:00	17:00	18:00	19:00				
	☒	☐	☐	☐												
1A	480	720	600	900	391	950	1,862	1,266	1,723	2,306	2,329	1,700				
	COMPLIANCE %				81	100	100	100	100	100	100	100	781	98		
1B	120	170	120	170	58	140	275	187	118	157	159	116				
	COMPLIANCE %				48	100	100	100	98	100	100	97	743	93		
Free Flow					Both 1A and 1B 100% Fullfilled each of 8 hours								Yes ☐		No ☒	
Signal Justification 1:					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☒		No ☐	

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent		
	1 lanes		2 or More lanes		Hour Ending											
Flow Condition	FREE FLOW ☒	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	10:00	16:00	17:00	18:00	19:00				
2A	480	720	600	900	333	809	1,587	1,079	1,606	2,148	2,170	1,584	769	96		
	COMPLIANCE %				69	100	100	100	100	100	100	100				
2B	50	75	50	75	35	84	165	112	72	96	97	71				
	COMPLIANCE %				69	100	100	100	100	100	100	100	769	96		
Free Flow					Both 2A and 2B 100% Fullfilled each of 8 hours								Yes	☐	No	☒
Signal Justification 2:					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes	☒	No	☐

Justification 3: Combination

Combination Justification 1 and 2

Justification Satisfied 80% or More				Two Justifications Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume	YES ☒	NO ☐	YES ☒	NO ☐
Justification 2	Delay Cross Traffic	YES ☒	NO ☐	JUSTIFIED	

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main)	Heaviest Minor Approach	Required Value	Average % Compliance	Overall % Compliance
		X	Y (actual)	Y (warrant threshold)		
Justification 4	9:00	1,587	212	80	100 %	100 %
	16:00	1,606	87	80	100 %	
	17:00	2,148	117	80	100 %	
	18:00	2,170	118	80	100 %	

Results Sheet

[Input Sheet](#)
[Analysis Sheet](#)
[Proposed Collision](#)

Intersection: Hwy 26 and Silver Glen Blvd

Count Date: Future Total 2035

Summary Results

Justification		Compliance		Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A Total Volume	98	%	☐	☒
	B Crossing Volume	93	%	☐	☒
2. Delay to Cross Traffic	A Main Road	96	%	☐	☒
	B Crossing Road	96	%	☐	☒
3. Combination	A Justificaton 1	93	%	☒	☐
	B Justification 2	96	%	☐	☐
4. 4-Hr Volume		100	%	☒	☐

5. Collision Experience	0	%	☐	☒
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6. Pedestrians	A Volume	Justification not met	☐	☒
	B Delay	Justification not met	☐	☒

APPENDIX I

TAC GDGCR Excerpts

Auxiliary lanes, at an intersection, serve as storage lanes, deceleration lanes, or a combination of the two. They can be used to minimize hazard and inconvenience, to increase capacity, and to promote operating efficiency where vehicles exit or enter the roadway. Acceleration lanes are seldom used along urban roads, except for freeways and expressways, and are commonly used for higher-speed rural roads. Added lanes on the departure legs of an intersection may be considered for capacity, access, or safety reasons.

Auxiliary lanes may be either left- or right-turn lanes adjacent to the through lanes and in the same direction of travel. Left-turn lanes can be added with or without divisional islands. A divisional island effectively provides a measure of protection for vehicles queued to make a left turn at an intersection, and can be used for the placement of traffic control devices and as a pedestrian refuge. In existing urban locations where right-of-way is limited or where opportunities for widening are restricted by adjacent development, it may not be possible to introduce a divisional island. The feasibility of an island may also be influenced by the access needs of the adjacent land uses.

9.14.2 GUIDELINES FOR THE APPLICATION OF RIGHT-TURN TAPER AND BAY TAPERS WITH AUXILIARY LANES

Right- and left-turn tapers are normally provided at all at-grade intersections along major roads and expressways. The consistent use of auxiliary lanes along major roads is often achieved through local policies related to classification, design speed, and volume warrants. Along minor arterials and collectors, the implementation of auxiliary turn lanes is considered on the basis of many factors, including speed, design volumes, right-of-way availability, collision potential, access locations, intersection spacing, cyclist and pedestrian needs, and implications on transit operation.

Right-turn tapers may be provided without auxiliary lanes on intersection approach legs to permit the right-turn movement at the intersection with less interference to the through traffic. Right-turn tapers normally connect to a separate right-turning roadway at a major channelized intersection.

Where it is desirable to flare an intersection to better accommodate the right-turn movement, it is generally preferable to incorporate a right-turn auxiliary lane as part of the design. The auxiliary lane serves to separate the through and right-turning traffic well in advance of the intersection, causes less deceleration of the turning traffic in the through lanes, and provides a storage area for turning vehicles stopped for pedestrians crossing the roadway on the green signal. Tapers without parallel lanes may also be a disadvantage to through cyclists in determining a safe travel path through the intersection.

The following guidelines are suggested for the use of a right-turn auxiliary lane on urban and rural roads. Refer to other publications, including the latest version of the TRB *Highway Capacity Manual*, for more detailed procedures on determining the need for tapers and auxiliary lanes.

Unsignalized:

- When the volume of decelerating or accelerating vehicles compared with the through traffic volume causes undue hazard.

Signalized:

- Right-turn lane without separate signal indication when the volume of right-turning traffic is 10% to 20% of the total approaching volume.
- Right-turn lane with separate indication when right-turn traffic is greater than 20% of the total approaching volume.

Right-turn taper lengths are a function of design speed and are calculated based on the ratios presented in **Table 9.14.1**. Lane widths (w) vary (see **Chapter 4**). Some agencies use reduced taper ratios in constrained urban environments where lower speeds are desired and where property constraints exist.

Table 9.14.1: Right-Turn Tapers without Auxiliary Lanes

Design Speed (km/h) (through roadway)	Taper Ratio	Taper Length for $w = 3.5$ (m)	Horizontal Curve ^a (R)
50	15:1	53	500
60	18:1	63	750
70	21:1	74	1,000
80	24:1	84	1,200

Note : a) Flat radii as indicated can be used rather than tangent alignment for right-turn tapers.

The taper can be a straight line or a larger radius curve (see **Table 9.14.1** for suggested horizontal curve values); curves are typically used in an urban environment where curb and gutter is provided and straight tapers in a rural environment where curb and gutter is not used.

Shortened taper lengths may be considered for intersections on curve to provide a visible break from the through lanes. On high-speed roads, the taper length should generally conform to that discussed in **Chapter 10**.

occur exclusively within the auxiliary lane, although in an urban environment, deceleration (up to 15 km/h) over the bay taper is normally tolerable (especially in a peak-hour condition).

Suggested taper and parallel lengths are shown in **Table 9.14.2** and illustrated in **Figure 9.14.4**. Adjustments for intersections on curves are discussed in **Section 18.8**.

Table 9.14.2: Right-Turn Taper with Parallel Deceleration Lane Design

Design Speed (km/h)	Taper Ratio ^a Design Domain	Radius for Reverse ^a Curves (m)	Parallel Lane Length ^b Design Domain
50	11:1–17:1	90–150	35–75
60	14:1–17:1	150	40–90
70	17:1–20:1	150–220	50–110
80 ^c	17:1–24:1	150–300	60–130

Notes: a) Taper may be straight line or may be symmetrical reverse curves; length is derived from design values calculated for a 3 s lane change criterion for the appropriate operating speed.

b) Additional parallel lane length may be required for storage.

c) For higher design speeds, refer to **Chapter 10**.

The tapers can be made smooth by using horizontal curves at the beginning and end of transitions. The radii of the horizontal curves typically vary from about 500 m for tapers at a design speed of 50 km/h, to 3,000 m for tapers at a design speed of 120 km/h.

Where space to develop tapers is limited, the taper length could also be based on running speed rather than design speed. Gradual approach and departure tapers are particularly important for the higher design speeds. It is also desirable to provide decision sight distance for the taper areas to enhance safe operation. Combinations of minimum sight distance and minimum taper ratios should be avoided.

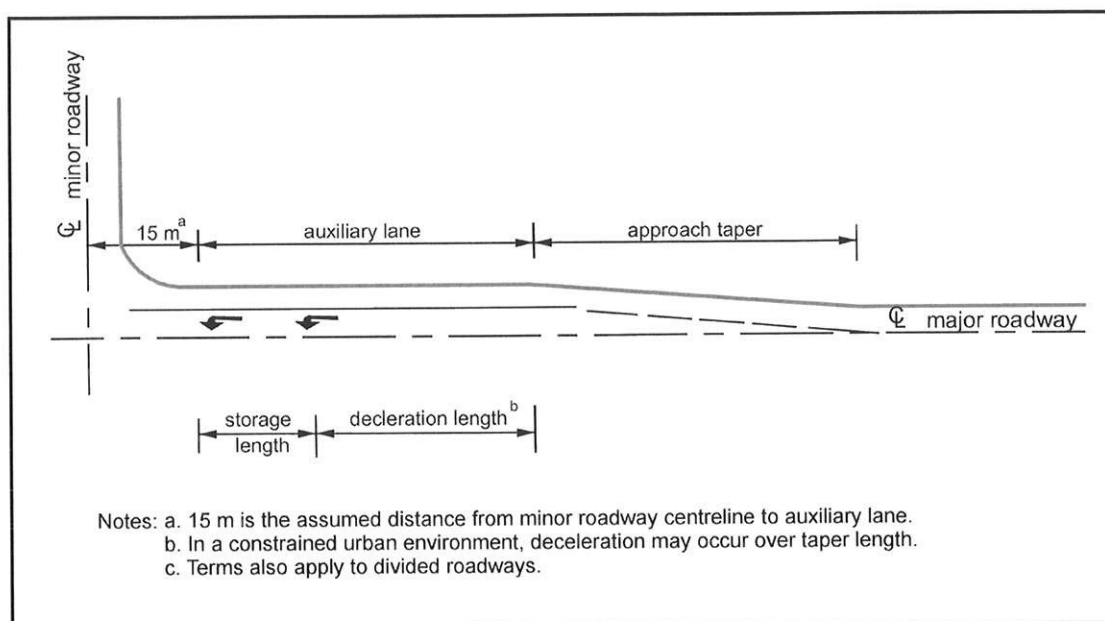


Figure 9.17.1: Left-Turn Lane, Pictorial Description of Terms

Table 9.17.1: Approach and Departure Taper Ratios and Lengths for Left Turns at Intersections

Design Speed (km/h)	Design Domain for Taper Ratio	Horizontal Curve to Smooth Taper R (m)
50	8:1 – 30:1	500
60	15:1 – 36:1	750
70	15:1 – 42:1	1,000
80	15:1 – 48:1	1,200
90	27:1 – 54:1	1,500
100	30:1 – 60:1	2,000
110	33:1 – 66:1	2,500
120	36:1 – 72:1	3,000

Table 9.17.3: Bay Tapers Symmetrical Reverse Curves

Design Speed (km/h)	Taper Ratio Design Domain	Radii (m)
50	10:1	90–150
60	10:1–12:1	150
70	10:1–18:1	150–220
80	13:1–20:1	150–300

Note: For higher design speeds, the 80 km/h design speed dimensions are used and the storage length is increased to provide deceleration length.

9.17.4.2 Deceleration Requirements

In the design of left-turn auxiliary lanes, it is important to consider the deceleration requirements. The minimum deceleration length is based on the distance needed for the driver to brake comfortably to come to a full stop at the intersection. Desirably, the distance needed for deceleration is provided by the auxiliary lane, exclusive of storage requirements. In urban conditions, it is often not feasible to provide both the deceleration distance and storage length due to other considerations, such as intersection spacing, access needs, and other physical controls. In these cases, the taper length may be used for deceleration distance. The deceleration distances for a range of speeds are provided in **Chapter 2**.

9.17.4.3 Storage Length

The storage length is normally designed to accommodate not only left-turning vehicles. It is also made sufficiently long so that vehicles queued in the through lanes do not block the entrance to the turning lane. As a minimum, the auxiliary lane length should be determined by checking that the storage length plus the bay taper length is equal to the deceleration length required for the design speed. Ideally, however, storage length should be provided in addition to deceleration length.

The storage length required to accommodate the left-turning vehicles depends on the number of left-turning vehicles approaching the intersection and whether or not the intersection is, or will be, signalized.

For an unsignalized intersection, storage length can be calculated using the equation outlined in Section 9.14. If the intersection is to be signalized, either initially or in the future, the turn lane provided is normally sufficiently long to store the left-turning traffic and to clear the equivalent per-lane volume of traffic stored on the through lanes, during unsaturated flow conditions. Additional storage length must be provided for larger design vehicles. The minimum storage length that should be provided is 15 m (see Section 9.17.2).

9.17.4.4 Run-out Lane

The run-out lane terminates the bypass lane on the far side of the intersection. The width of the parallel section of the run-out lane is the same as that of the bypass lane. The taper length varies with the design speed and is the same as that applied to the acceleration lane (see **Chapter 10**). The run-out lane is shown in **Figure 9.17.2** and **Figure 9.17.3**.

Figures

Figure 1:	Site Location Plan
Figure 2:	Site Plan
Figure 3:	Existing Traffic Control and Lane Configurations
Figure 4:	2018 Seasonally Adjusted Existing Traffic Volumes
Figure 5:	Silver Glen Trip Distribution
Figure 6:	Silver Glen Trip Assignment
Figure 7:	2025 Future Background Traffic Volumes
Figure 8:	2030 Future Background Traffic Volumes
Figure 9:	2035 Future Background Traffic Volumes
Figure 10:	Trip Distribution
Figure 11:	Trip Assignment
Figure 12:	2025 Future Total Traffic Volumes
Figure 13:	2030 Future Total Traffic Volumes
Figure 14:	2035 Future Total Traffic Volumes



Legend



= SUBJECT LANDS

Project

BRIDGEWATER ON GEORGIAN BAY
(COLLINGWOOD)

Drawing

SITE LOCATION PLAN

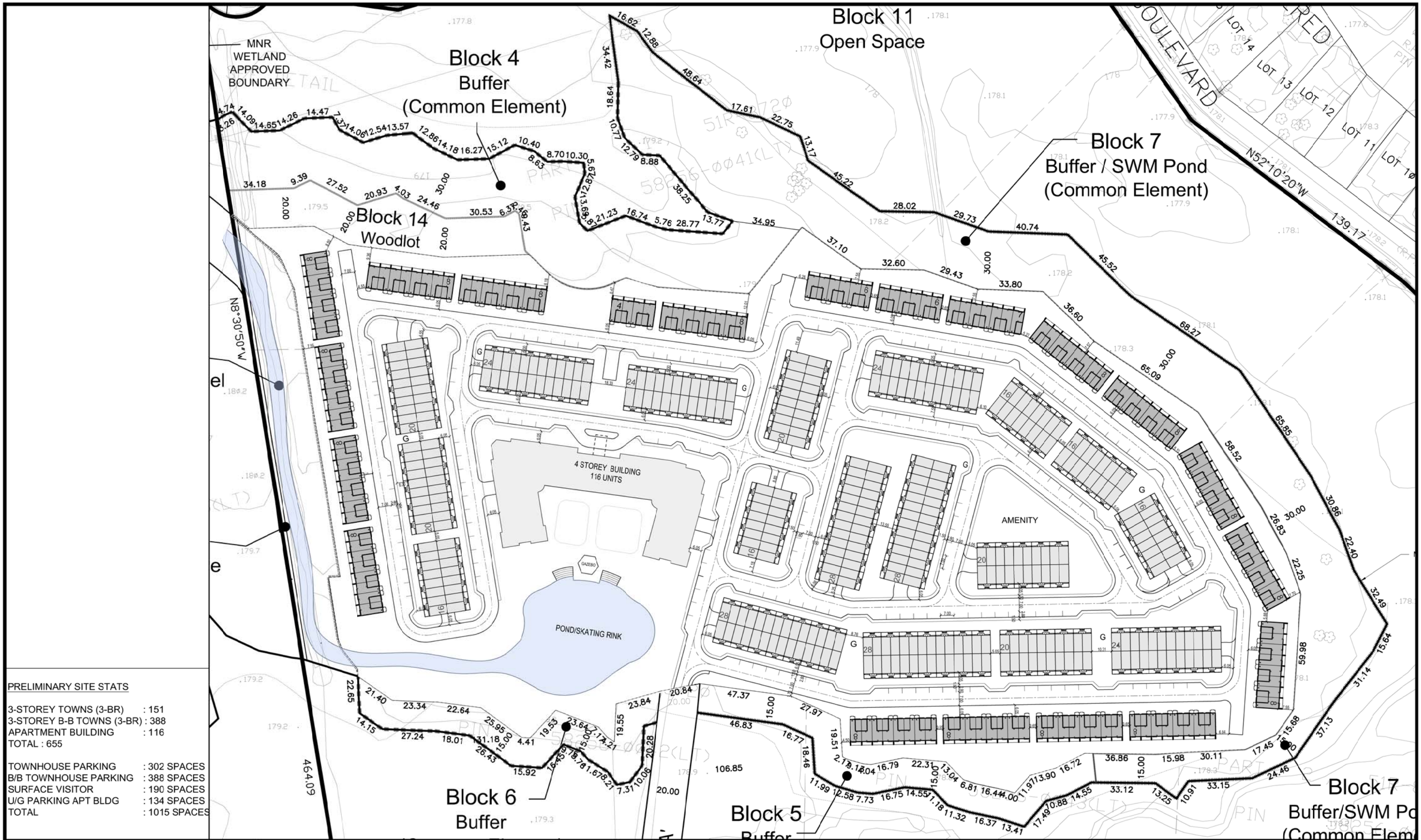


**CROZIER
& ASSOCIATES**
Consulting Engineers

THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE
301, COLLINGWOOD, ON
L9Y 4R3

705-446-3510 T
705-446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	K.J.L.	Design By	M.F.	Project	131-2543
Scale	N.T.S.	Date	MAR. 26, 2018	Check By	M.F.
				Drawing	FIG. 1



PRELIMINARY SITE STATS	
3-STOREY TOWNS (3-BR)	: 151
3-STOREY B-B TOWNS (3-BR)	: 388
APARTMENT BUILDING	: 116
TOTAL	: 655
TOWNHOUSE PARKING	: 302 SPACES
B/B TOWNHOUSE PARKING	: 388 SPACES
SURFACE VISITOR	: 190 SPACES
U/G PARKING APT BLDG	: 134 SPACES
TOTAL	: 1015 SPACES

GUTHRIE MUSCOVITCH
ARCHITECTS

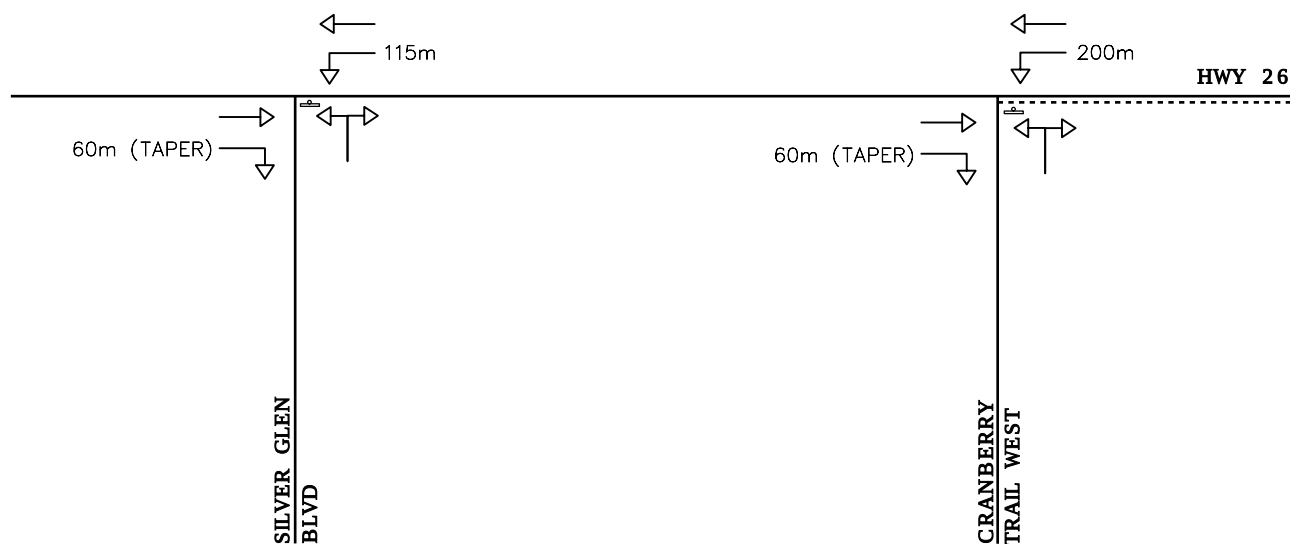
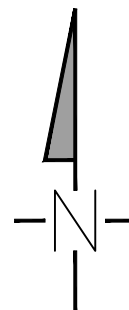
Tel:(416) 252-5679 Fax: (416) 252-9637
770 Brown's Line, Toronto, Ontario M8W 3W2

CONCEPT SITE PLAN

THE PRESERVE AT GEORGIAN BAY

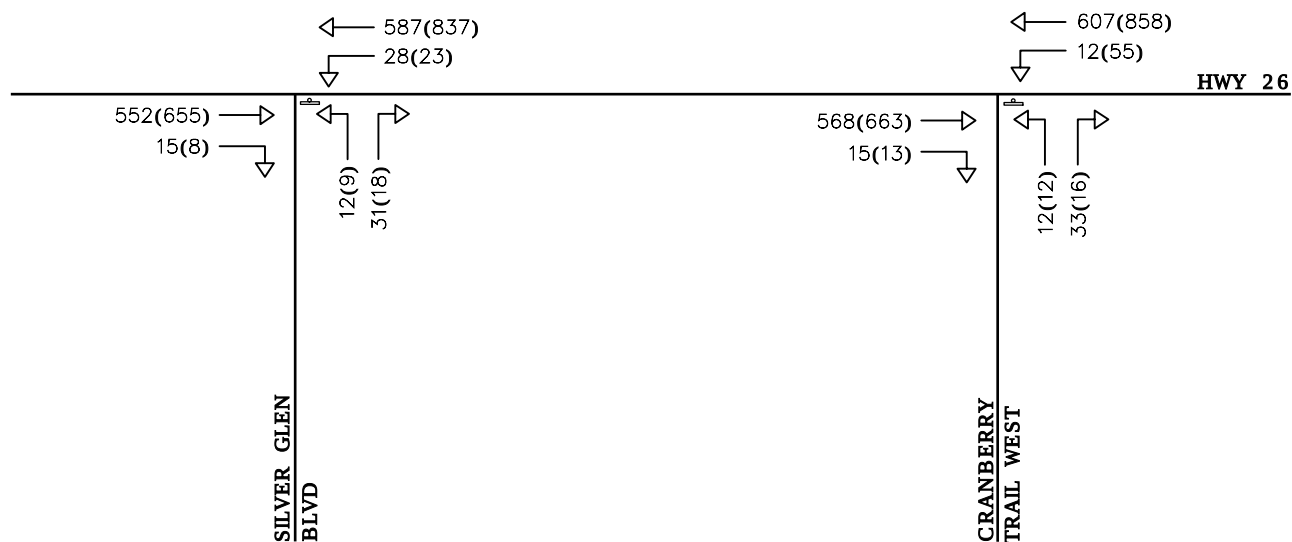
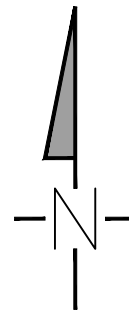
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CLIENT: CONSULATE DEVELOPMENT GROUP

March 2, 2018
SCALE 1:1750



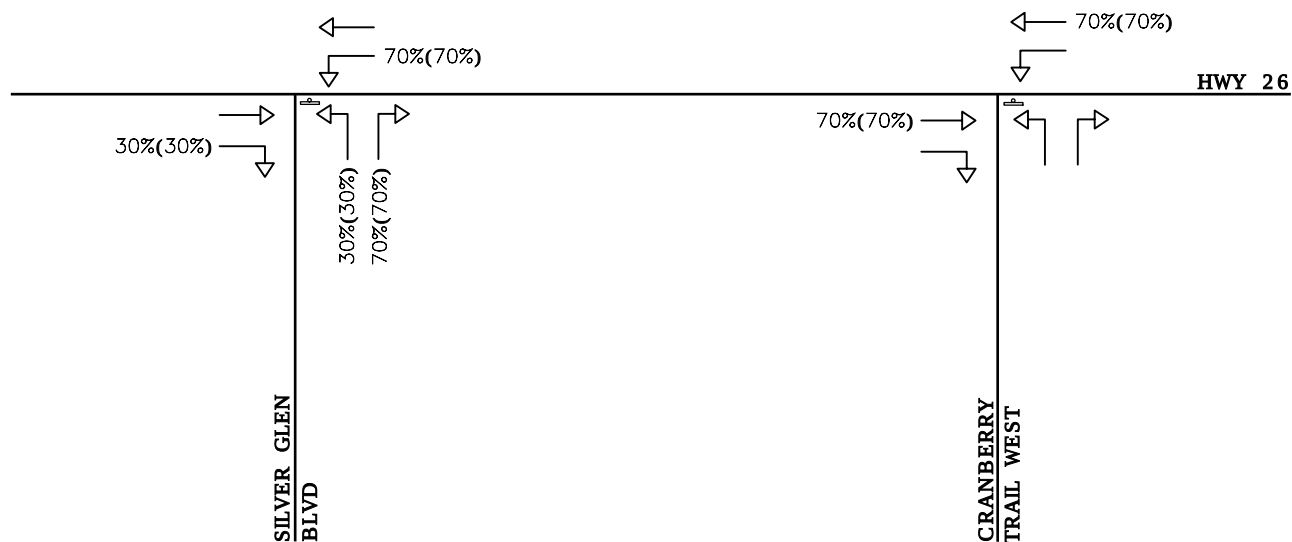
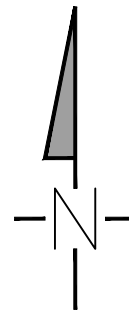
NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend --- OFF-ROAD TRAIL ⏏ STOP CONTROL xx(yy) WEEKDAY AM (WEEKDAY PM)	Project BRIDGEWATER ON GEORGIAN BAY (COLLINGWOOD) Drawing EXISTING TRAFFIC VOLUMES TRAFFIC CONTROLS AND LANE CONFIGURATIONS	CROZIER & ASSOCIATES Consulting Engineers THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA Drawn By J.I.M. Design By M.N.F. Project 131 - 2543 Scale N.T.S. Date MAR. 26, 2018 Check By M.N.F. Drawing FIG. 3
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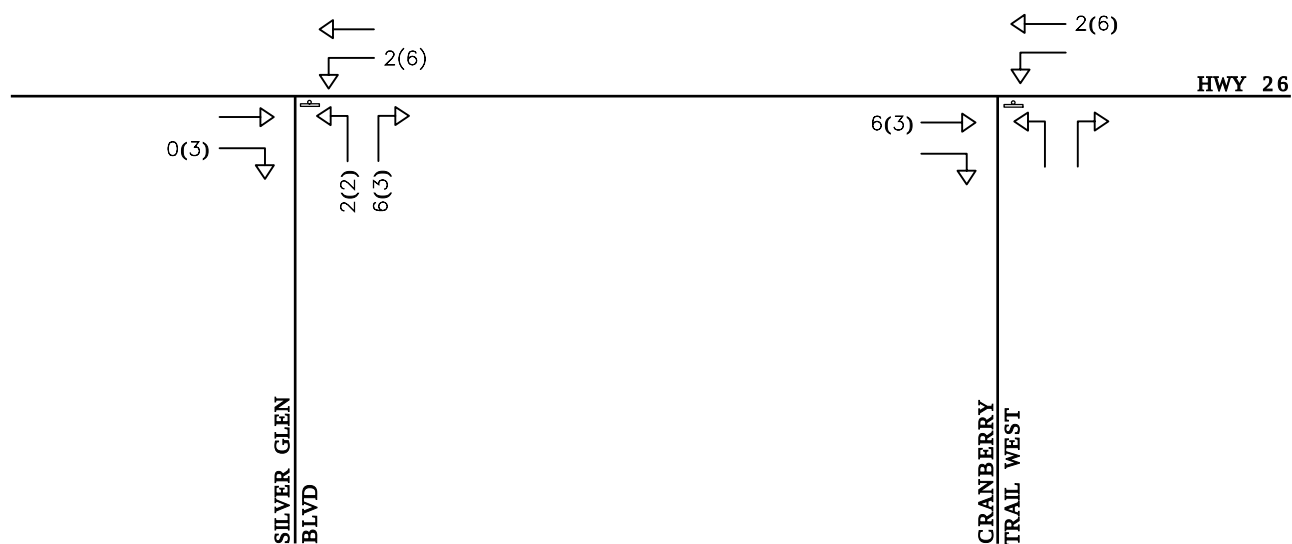
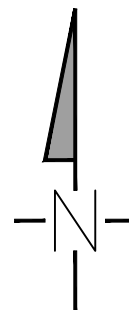
NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend  SIGNAL CONTROL  STOP CONTROL xx(yy) WEEKDAY AM (WEEKDAY PM)	Project BRIDGEWATER ON GEORGIAN BAY (COLLINGWOOD) Drawing SEASONALLY ADJUSTED 2018 EXISTING TRAFFIC VOLUMES	 CROZIER & ASSOCIATES Consulting Engineers THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA Drawn By J.I.M. Design By M.N.F. Project 131 - 2543 Scale N.T.S. Date MAR. 22, 2018 Check By M.N.F. Drawing FIG. 4
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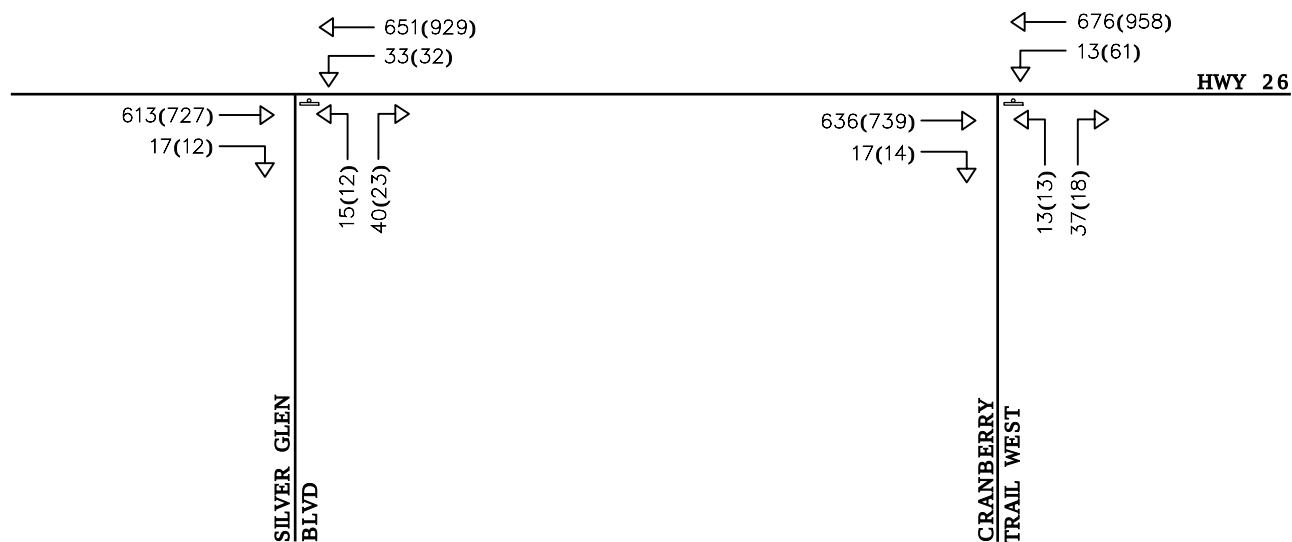
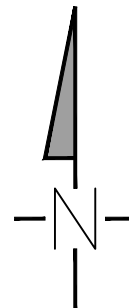
NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend  SIGNAL CONTROL  STOP CONTROL xx(yy) WEEKDAY AM (WEEKDAY PM)	Project BRIDGEWATER ON GEORGIAN BAY (COLLINGWOOD) Drawing SILVER GLEN TRIP DISTRIBUTION	CROZIER & ASSOCIATES Consulting Engineers THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA <table border="1" data-bbox="992 1965 1515 2018"> <tr> <td>Drawn By</td><td>J.I.M.</td><td>Design By</td><td>M.N.F.</td><td>Project</td><td>131 - 2543</td></tr> <tr> <td>Scale</td><td>N.T.S.</td><td>Date</td><td>MAR. 26, 2018</td><td>Check By</td><td>M.N.F.</td></tr> <tr> <td></td><td></td><td></td><td></td><td>Drawing</td><td>FIG. 5</td></tr> </table>				Drawn By	J.I.M.	Design By	M.N.F.	Project	131 - 2543	Scale	N.T.S.	Date	MAR. 26, 2018	Check By	M.N.F.					Drawing	FIG. 5
Drawn By	J.I.M.	Design By	M.N.F.	Project	131 - 2543																		
Scale	N.T.S.	Date	MAR. 26, 2018	Check By	M.N.F.																		
				Drawing	FIG. 5																		



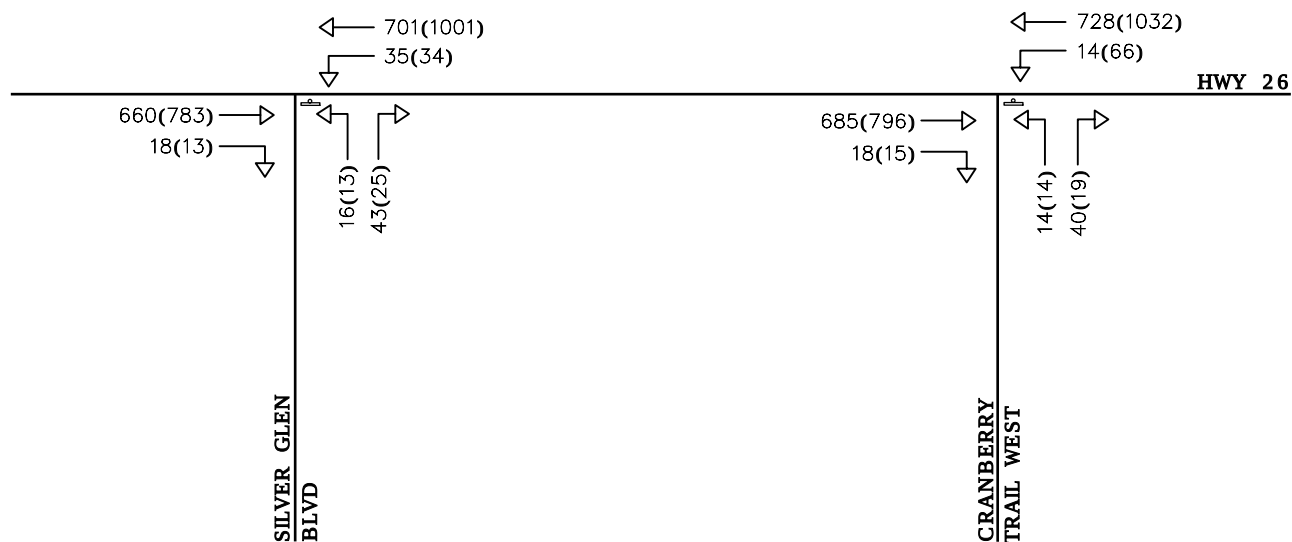
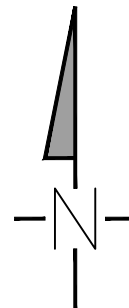
NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend  SIGNAL CONTROL  STOP CONTROL  WEEKDAY AM (WEEKDAY PM)	Project BRIDGEWATER ON GEORGIAN BAY (COLLINGWOOD) Drawing SILVER GLEN TRIP ASSIGNMENT	 CROZIER & ASSOCIATES Consulting Engineers THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA <table><tr><td>Drawn By</td><td>J.I.M.</td><td>Design By</td><td>M.N.F.</td><td>Project</td><td>131 - 2543</td></tr><tr><td>Scale</td><td>N.T.S.</td><td>Date</td><td>MAR. 26, 2018</td><td>Check By</td><td>M.N.F.</td></tr><tr><td colspan="5"></td><td>Drawing</td><td>FIG. 6</td></tr></table>	Drawn By	J.I.M.	Design By	M.N.F.	Project	131 - 2543	Scale	N.T.S.	Date	MAR. 26, 2018	Check By	M.N.F.						Drawing	FIG. 6
Drawn By	J.I.M.	Design By	M.N.F.	Project	131 - 2543																
Scale	N.T.S.	Date	MAR. 26, 2018	Check By	M.N.F.																
					Drawing	FIG. 6															



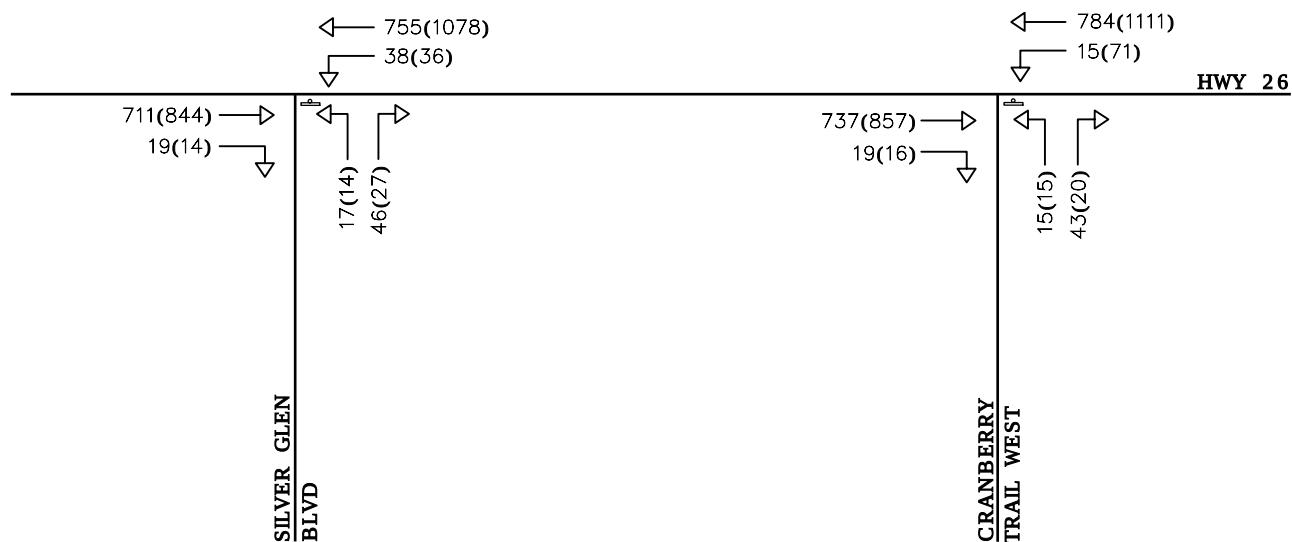
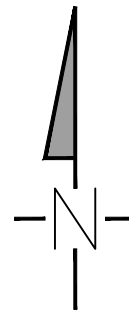
NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend  SIGNAL CONTROL  STOP CONTROL  WEEKDAY AM (WEEKDAY PM)	Project BRIDGEWATER ON GEORGIAN BAY (COLLINGWOOD)	 CROZIER & ASSOCIATES Consulting Engineers THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA
	Drawing 2025 FUTURE BACKGROUND TRAFFIC VOLUMES	



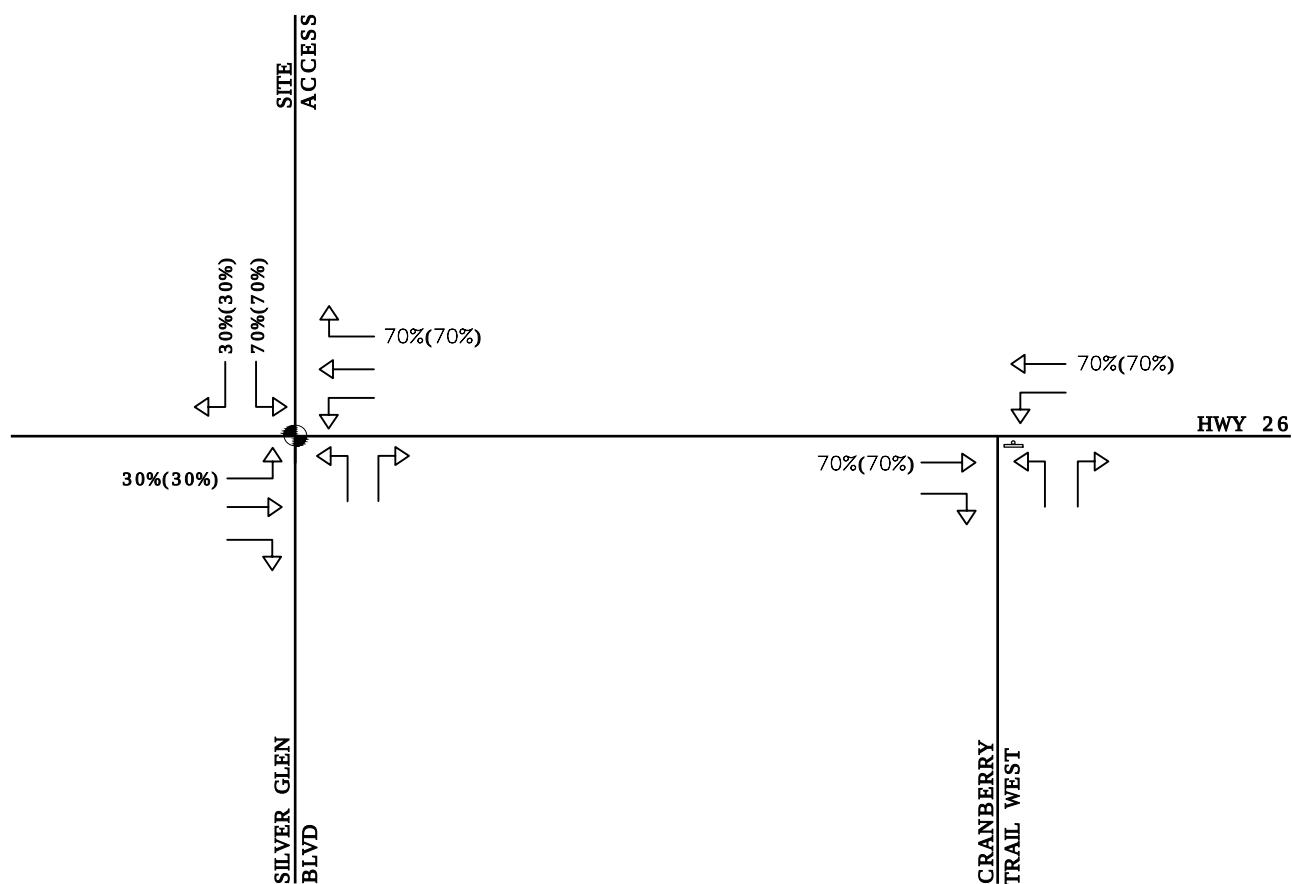
NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend  SIGNAL CONTROL  STOP CONTROL xx(yy) WEEKDAY AM (WEEKDAY PM)	Project BRIDGEWATER ON GEORGIAN BAY (COLLINGWOOD)	 CROZIER & ASSOCIATES Consulting Engineers THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA	
	Drawing 2030 FUTURE BACKGROUND TRAFFIC VOLUMES		Drawn By J.I.M. Design By M.N.F. Project 131 - 2543
			Scale N.T.S. Date MAR. 26, 2018 Check By M.N.F. Drawing FIG. 8



NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend  SIGNAL CONTROL  STOP CONTROL  WEEKDAY AM (WEEKDAY PM)	Project BRIDGEWATER ON GEORGIAN BAY (COLLINGWOOD) Drawing 2035 FUTURE BACKGROUND TRAFFIC VOLUMES	 CROZIER & ASSOCIATES Consulting Engineers THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA Drawn By J.I.M. Design By M.N.F. Project 131 - 2543 Scale N.T.S. Date MAR. 26, 2018 Check By M.N.F. Drawing FIG. 9
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Legend

	SIGNAL CONTROL
	STOP CONTROL
xx(yy)	WEEKDAY AM (WEEKDAY PM)

Drawing

TRIP DISTRIBUTION

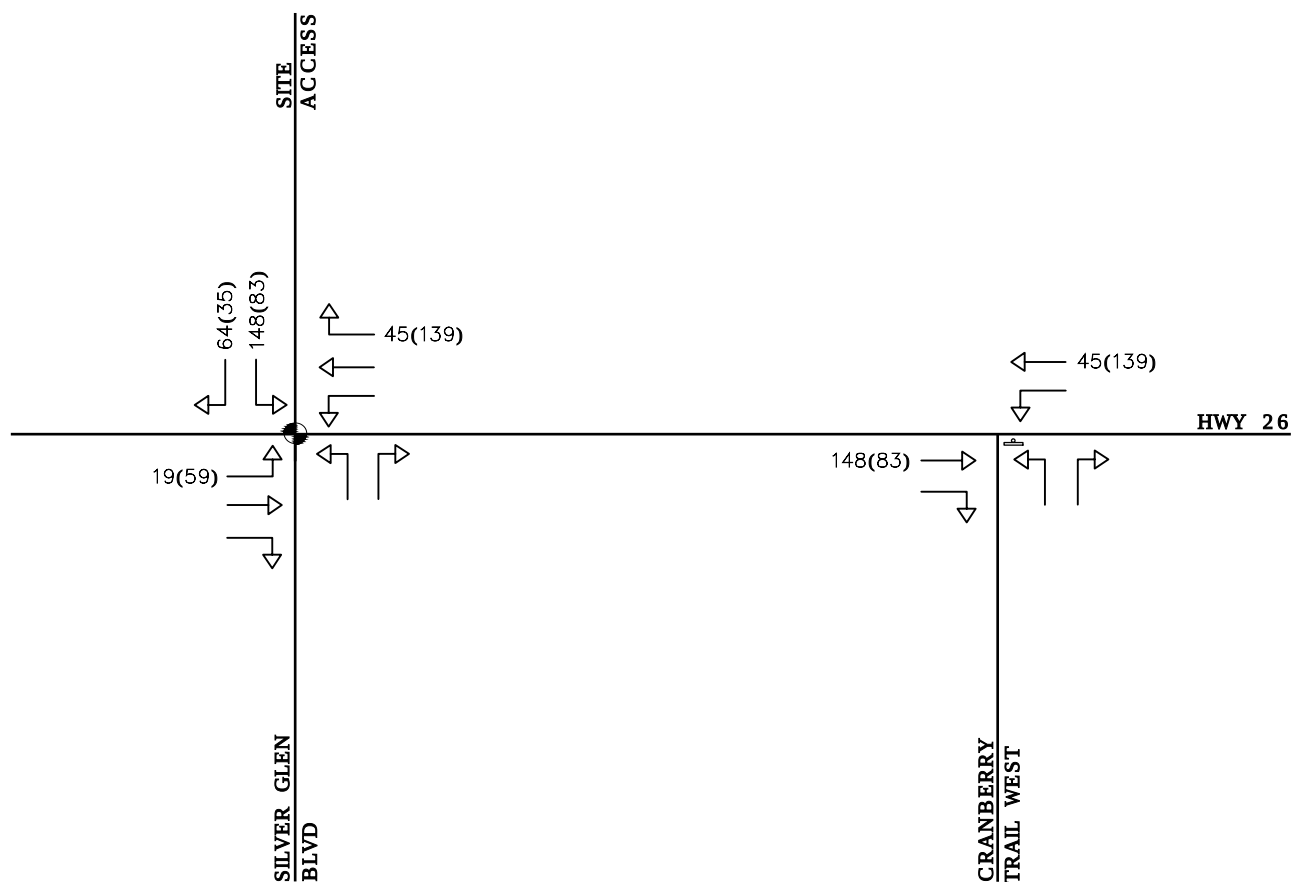
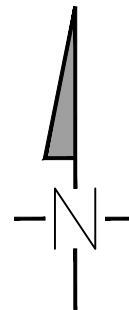


**CROZIER
& ASSOCIATES**
Consulting Engineers

THE HARBOUREDGE BUILDING,
40 HURON STREET, SUITE
301, COLLINGWOOD, ON
L9Y 4R3

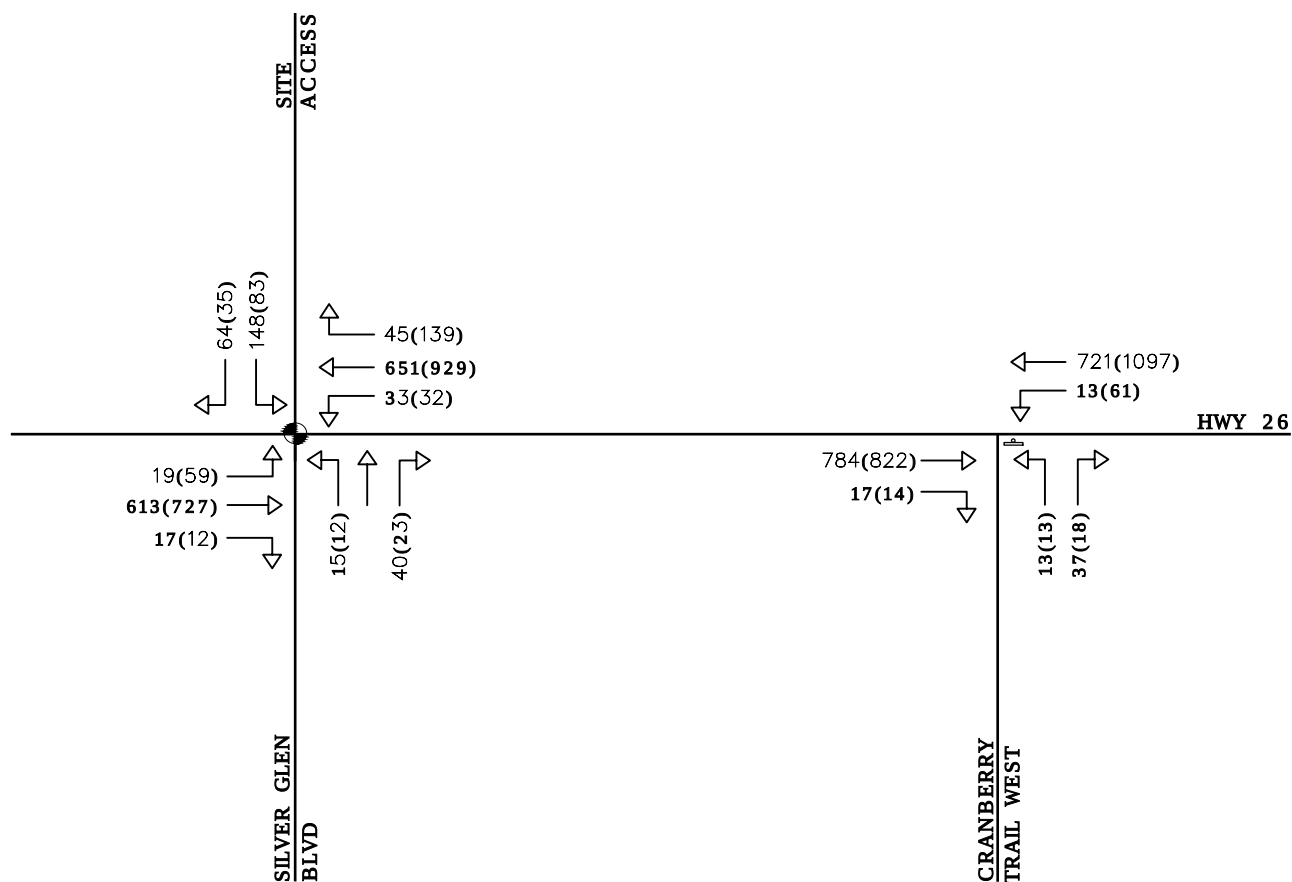
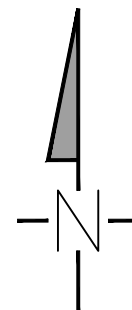
705-446-3510 T
705-446-3520 F
WWW.CFCROZIER.CA
INFO@CFCROZIER.CA

Drawn By	J.I.M.	Design By	M.N.F.	Project	131 - 2543
Scale	N.T.S.	Date	MAR. 22, 2018	Check By	M.N.F.
				Drawing	FIG. 10



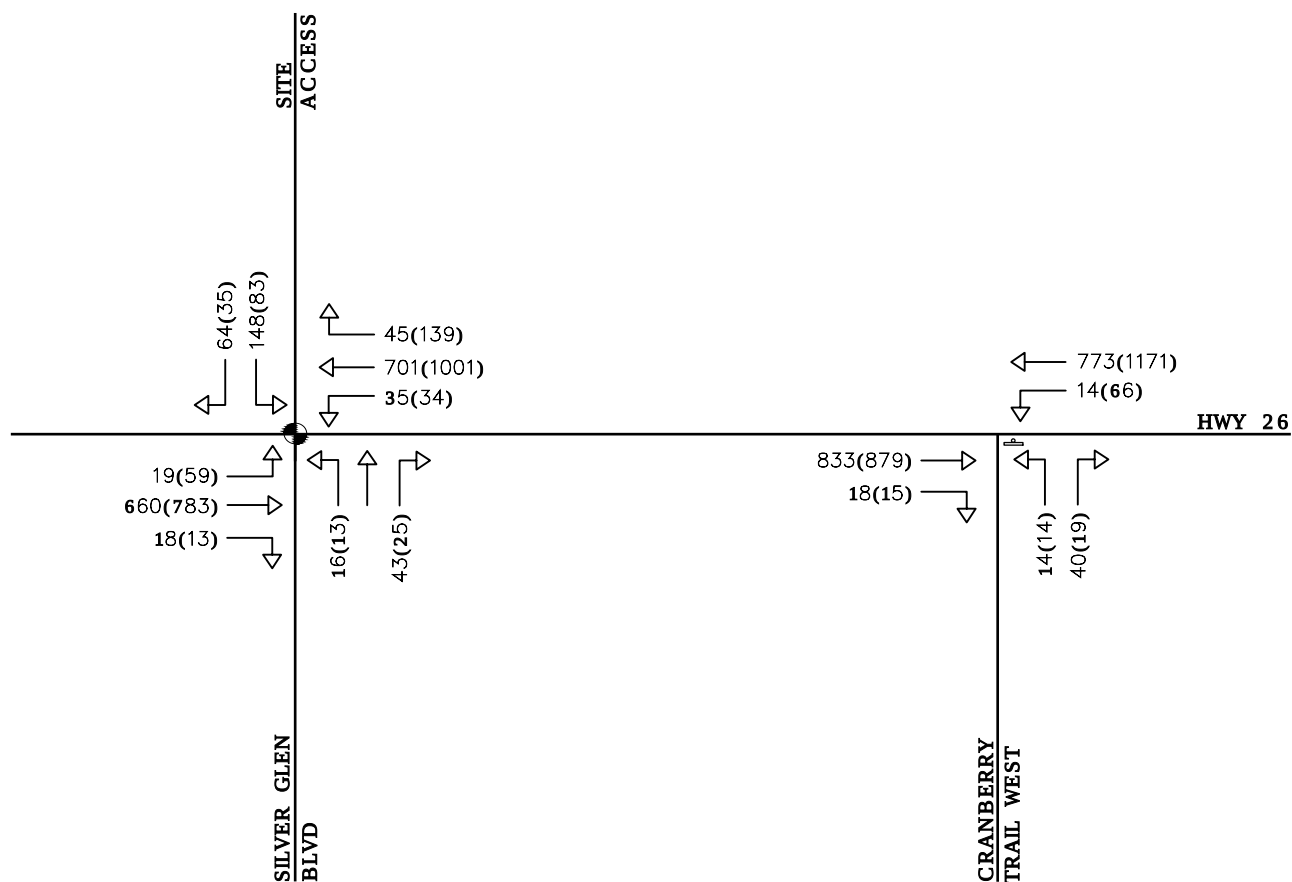
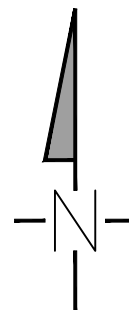
NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend  SIGNAL CONTROL  STOP CONTROL xx(yy) WEEKDAY AM (WEEKDAY PM)	Project BRIDGEWATER ON GEORGIAN BAY (COLLINGWOOD)	 CROZIER & ASSOCIATES Consulting Engineers THE HARBOUREDGE BUILDING 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA	
	Drawing TRIP ASSIGNMENT		Drawn By J.I.M. Design By M.N.F. Project 131 - 2543
	Scale N.T.S. Date MAR. 29, 2018 Check By M.N.F. Drawing FIG. 11		



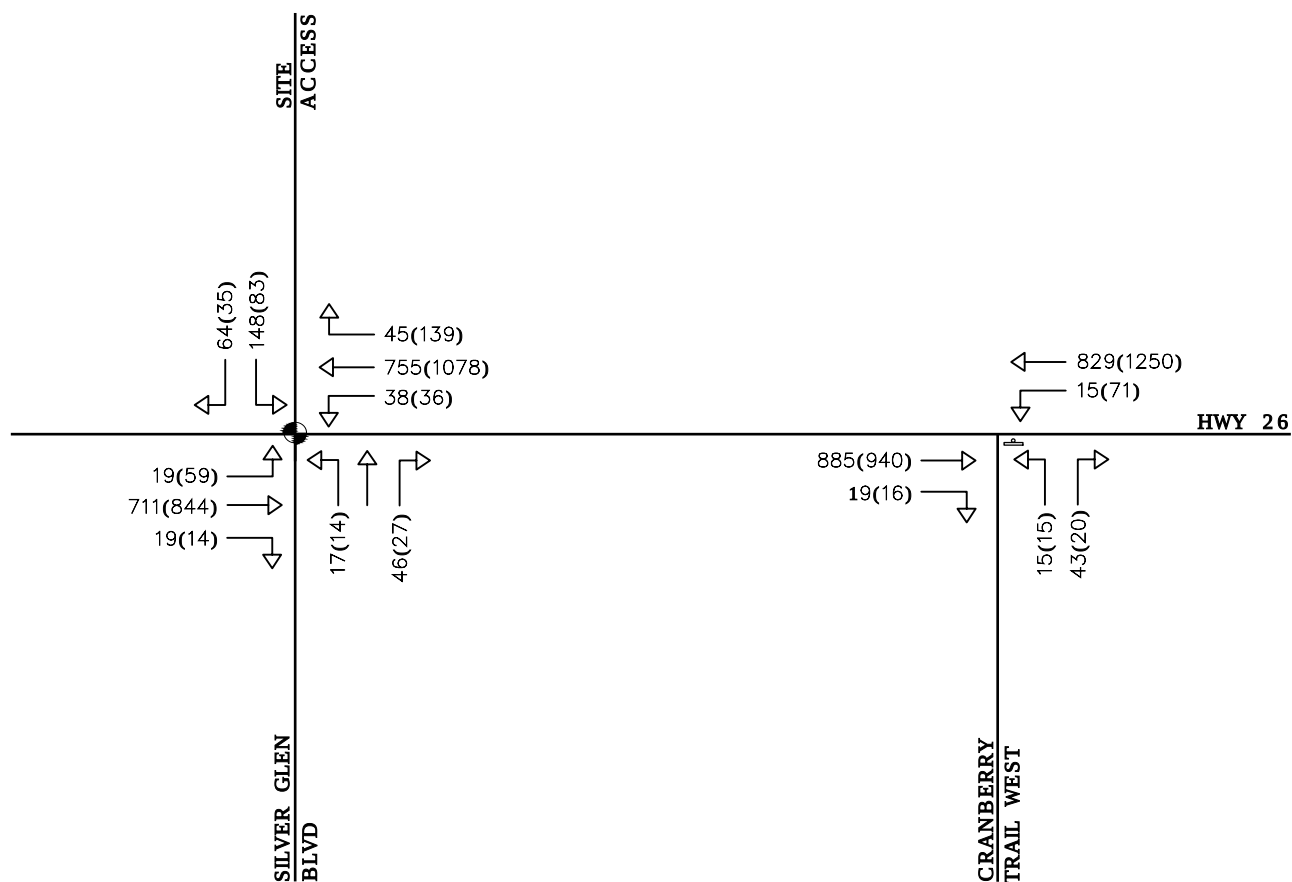
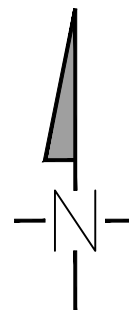
NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend SIGNAL CONTROL STOP CONTROL xx(yy) WEEKDAY AM (WEEKDAY PM)	Project BRIDGEWATER ON GEORGIAN BAY (COLLINGWOOD)	CROZIER & ASSOCIATES Consulting Engineers THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA																				
	Drawing 2025 FUTURE TOTAL TRAFFIC VOLUMES	<table border="1"> <tr> <td>Drawn By</td><td>J.I.M.</td><td>Design By</td><td>M.N.F.</td><td>Project</td><td>131 - 2543</td></tr> <tr> <td>Scale</td><td>N.T.S.</td><td>Date</td><td>MAR. 29, 2018</td><td>Check By</td><td>M.N.F.</td></tr> <tr> <td></td><td></td><td></td><td></td><td>Drawing</td><td>FIG. 12</td></tr> </table>				Drawn By	J.I.M.	Design By	M.N.F.	Project	131 - 2543	Scale	N.T.S.	Date	MAR. 29, 2018	Check By	M.N.F.					Drawing
Drawn By	J.I.M.	Design By	M.N.F.	Project	131 - 2543																	
Scale	N.T.S.	Date	MAR. 29, 2018	Check By	M.N.F.																	
				Drawing	FIG. 12																	



NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend  SIGNAL CONTROL  STOP CONTROL  WEEKDAY AM (WEEKDAY PM)	Project BRIDGEWATER ON GEORGIAN BAY (COLLINGWOOD) Drawing 2030 FUTURE TOTAL TRAFFIC VOLUMES	 CROZIER & ASSOCIATES Consulting Engineers THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA Drawn By J.I.M. Design By M.N.F. Project 131 - 2543 Scale N.T.S. Date MAR. 29, 2018 Check By M.N.F. Drawing FIG. 13
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NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend  SIGNAL CONTROL  STOP CONTROL xx(yy) WEEKDAY AM (WEEKDAY PM)	Project BRIDGEWATER ON GEORGIAN BAY (COLLINGWOOD)	 CROZIER & ASSOCIATES Consulting Engineers THE HARBOUREDGE BUILDING, 40 HURON STREET, SUITE 301, COLLINGWOOD, ON L9Y 4R3 705-446-3510 T 705-446-3520 F WWW.CFCROZIER.CA INFO@CFCROZIER.CA
	Drawing 2035 FUTURE TOTAL TRAFFIC VOLUMES	