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Cranberry Marsh Estates

TRAFFIC IMPACT BRIEF

Hill Ridge Homes

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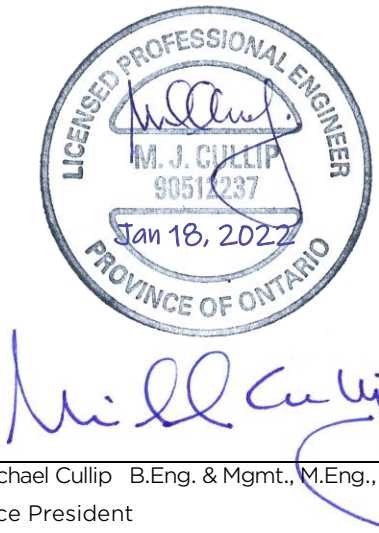	
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Issue	Date	Description
1	January 18, 2022	Draft Plan Submission

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1 Introduction

Tatham Engineering Limited was retained by Hill Ridge Homes to prepare a Traffic Impact Brief in support of Draft Plan Approval for the proposed Cranberry Marsh Estates Residential Development in the Town of Collingwood. The location of the development site is illustrated in Figure 1.

The purpose of this study is to review the proposed development from a transportation perspective, addressing site traffic volumes, on-site circulation, parking requirements and potential impacts to the adjacent road system. Recognizing that the trip generation associated with the proposed expansion will not be significant, the scope of the study has been limited to a traffic brief with a focus on the following:

- existing conditions, including a description of the study area road network, traffic volumes, operations and planned/proposed improvements;
- details of the proposed development and anticipated trip generation;
- on-site circulation and parking provision; and
- transportation impacts associated with the proposed development.

2 Existing Conditions

This chapter will describe the road network, traffic volumes and operations for the existing conditions.

2.1 ROAD NETWORK

Across the front of the subject site, Highway 26 is a 3-lane highway providing one lane of travel in each direction in addition to a continuous centre turn (which extends from Cranberry Trail West to the west to Cranberry Trail East to the east). Despite being an MTO provincial highway, the road is under the jurisdiction of the Town of Collingwood through the MTO's connecting link program. There are paved shoulders on both sides of the highway; across the front of the development site, the south shoulder is marked so as to serve as a right turn taper/lane to serve the adjacent Greentree Gardens and Emporium.

From the development site to the west and to the east, the road is relatively straight and flat. Through the study area, the road has a posted speed limit of 60 km/h and hence a design speed of 70 km/h has been assumed (posted speed + 10 km/h).

Photographs of the road system are provided in Figure 2.

2.2 TRANSIT NETWORK

The Town of Collingwood operates the Crosstown route along Highway 26 across the front of the development site as illustrated in Figure 3. Bus stops are provided at the following locations:

- Georgian Bay Hotel (240 metres to the west of the subject site); and
- Pretty River Academy (290 metres to the east).

The Crosstown route provides service throughout the Town, including connections to the remaining transit routes serving the Town and immediate areas (including Wasaga Beach and Blue Mountain) via the Main Terminal.

2.3 TRAFFIC VOLUMES

Given the time of year, the implications of COVID-19 on travel demands and patterns, and in consideration of the scope of work, new traffic counts on Highway 26 were not undertaken. Rather, traffic volumes were obtained from the *Collingwood Transportation Study Update*[1] which included consideration for the intersection of Highway 26 with Cranberry Trail East, located

[1] *Collingwood Transportation Study Update*. RJ Burnside and Associates Limited, August 2019.

approximately 1.1 km east of the subject site (count data is provided in Appendix A). As there are a number of developments located between Cranberry Trail East and the subject site (and recognizing that the majority of the associated traffic volumes would be to/from the east), the volumes across the front of the subject site are likely less than those realized at Cranberry Trail East. Notwithstanding, it is assumed that the volumes on Highway 26 remain relatively consistent, thus ensuring a conservative approach to the study.

The corresponding 2019 summer AM and PM weekday peak hour traffic volumes are illustrated in Figure 4. Projections for the 2022 horizon (representative of existing conditions) have been established in consideration of the 2019 volumes and employing the growth levels and assumptions as employed in the *Collingwood Transportation Study Update.* The resulting 2022 traffic volumes are illustrated in Figure 5.

2.4 TRAFFIC OPERATIONS

The assessment of existing conditions establishes the baseline operating conditions of the road network and provides an indication of the available capacity within the system. The assessment considers the following:

- the peak hour operations of Highway 26 based on the peak directional volumes;
- an assumed lane capacity of 900 vehicles per hour (vph) as per the *Collingwood Transportation Study Update*; and
- the provision of one through lane per direction.

The resulting road section operations are summarized in Table 1. As noted, Highway 26 is currently operating at 75% or less of its assumed planning capacity and thus there is significant reserve capacity to accommodate additional growth.

Table 1: 2022 Road Section Operations

ROAD SECTION & LANES / DIRECTION		CAPACITY[1]		TRAFFIC VOLUMES (vph)		VOLUME TO CAPACITY	
		WB	EB	WB	EB	WB	EB
Highway 26	1	900	900	674	633	0.75	0.70

[1] Capacity is denoted as vehicles per hour per direction

3 Proposed Development

This section will provide additional details with respect to the proposed development, including its location, the projected site generated traffic volumes and the assignment of such to the adjacent road network.

3.1 LOCATION & LAND-USE

The subject site is located at 11589 Highway 26 in the Town of Collingwood (as per Figure 1). The property is bound by Highway 26 to the north, residential development to the west, the Greentree Gardens and Emporium to the east and undeveloped natural lands to the south.

The proposed development will consist of 26 townhouse residential units as detailed in the site plan provided in Figure 6. Full build-out is assumed by 2026.

3.2 SITE ACCESS

3.2.1 Access Location & Configuration

The site will be served by a 7.2 metre wide condominium road with direct access to Highway 26. The access will be located approximately 35 metres west of the Greentree Gardens and Emporium west access and 230 metres east of the Georgian Manor access (measured centreline to centreline).

At the property line with Highway 26, the access will be 8.2 metres in width, thereby satisfying the Town requirements for a minimum width of 7.5 metres for an entrance to a group of cluster of homes, including a private condominium development.

3.2.2 Access Spacing

The Transportation Association of Canada's (TAC) *Geometric Design Guide for Canadian Roads* suggests a spacing of 35 to 40 metres (measured centerline to centerline) between accesses along an arterial road. The proposed location of the site access point provides approximately 35 metres of spacing between itself and the access to the east. Given the TAC's guidelines and in consideration of the limited traffic volumes expected to utilize the access points in question, the proposed location of the site access is considered appropriate.

3.2.3 Access Sightlines

An analysis of the available sight lines at the site access has been undertaken considering both minimum stopping sight distance and intersection sight distance as per TAC guidelines and defined below.

- Minimum stopping sight distance provides sufficient distance for an approaching motorist to observe a hazard in the road and bring their vehicle to a complete stop prior to the hazard.
- Intersection sight distance allows a vehicle to enter a main road from a side street (or site access) and attain the appropriate operating speed without significantly impacting the operating speed of an approaching vehicle.

The corresponding sight distance requirements are provided in Table 2. Similarly, the available sight distances are also noted (and further evident in the photos of Figure 2). As Highway 26 is relatively straight and flat through the study area, the available sight distances exceed the minimum stopping sight distance and the intersection sight distance requirements. In this regard, the site access location is considered appropriate without the need for sight line improvements.

Table 2: Sight Line Assessment

ACCESS	DESIGN SPEED	STOPPING SIGHT DISTANCE	INTERSECTION SIGHT DISTANCE		SIGHT DISTANCE TO/FROM	
			Left Turn	Right Turn	East	West
Site Access	70 km/h	105 m	150 m	130 m	>300 m	>300 m

3.3 SITE CIRCULATION

3.3.1 Vehicle Circulation

At the south end of the site, a cul-de-sac will be provided with a 31.2 metre diameter (thus exceeding the Town standard of 30 metres). The road width and provision of a cul-de-sac will ensure ready access and circulation within the site, and a suitable means of turnaround for service and emergency vehicles.

3.3.2 Pedestrian & Bicycle Circulation

A 3.0 metre asphalt sidewalk will be provided along the east side of the internal access road to accommodate pedestrian and bicycle travel through the site. The trail will provide connectivity to:

- the Highway 26 corridor to the north (which includes a multi-use trail on the south side of the highway and ready access to transit service as previously noted); and
- the Cranberry Marsh trail system to the south.

Bicycle parking will also be provided at the north end of the site, just prior to the Highway 26 trail connection.

3.4 SITE PARKING

As per the Town's zoning by-law, a residential townhouse must provide 2 parking spaces per unit. When considering a group of cluster of residential units (defined as 2 or more detached residential buildings on the same lot), an additional 0.25 parking spaces per unit are required for visitor parking.

As indicated on the site plan, each residential unit will be provided with 2 parking spaces – 1 on the driveway and 1 in the garage. In addition, 7 visitor parking spaces will be provided at the cul-de-sac, thus addressing the visitor parking requirements (26 units x 0.25 = 6.5 spaces). In this regard, the proposed parking supply satisfies the overall Town requirements.

3.5 SITE TRAFFIC

3.5.1 Trip Generation

The number of vehicle trips to be generated by the proposed development for the weekday AM and PM peak hours has been determined based on type of use, development size, and trip generation rates as per the *ITE Trip Generation Manual, 10th Edition*. Based on the proposed development, trip rates for the following ITE land use category has been employed:

- *multifamily housing -low-rise(1 or 2 storey)* - ITE code 220.

The associated trip rates and trip estimates are provided in Table 3 and Table 4 respectively. As indicated, the proposed development is expected to generate 12 trips during the AM peak hour and 14 trips during the PM peak hour, which is considered negligible.

Table 3: Trip Rates

LAND USE	VARIABLE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		In	Out	Total	In	Out	Total
multifamily housing - low-rise (ITE 220)	units	0.11	0.35	0.46	0.35	0.21	0.56

Table 4: Trip Estimates

LAND USE	UNITS	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
		In	Out	Total	In	Out	Total
Townhouses	26 units	3	9	12	9	5	14

3.5.2 Trip Distribution & Assignment

Given the proximity of the development to the Town of Collingwood, and in consideration of other urban areas to the east and west of the site, it is assumed that the majority of travel will be oriented to/from the east. For purposes of this assessment, the following distribution has been assumed:

- 25% to/from the west via Highway 26; and
- 75% to/from the east via Highway 26.

The resulting site generated traffic assigned to the road network is illustrated in Figure 7.

4 Future Conditions

This chapter will address the resulting impacts of the proposed development on the adjacent road system. The following areas are to be addressed:

- operations at the study area road system and site access; and
- potential improvements to the study area road network, if necessary.

4.1 TRAFFIC VOLUMES

For the purpose of this study, 2026 and 2031 horizons have been considered to assess the impact of the development on the road network - 2026 represents assumed full build-out of the site, whereas 2031 reflects a further 5-year horizon (also coinciding with a future horizon year as considered in the *Collingwood Transportation Study Update*).

Traffic volumes for the 2026 and 2031 horizon years have been determined from volume projections as provided in the *Collingwood Transportation Study Update*, which considered the following:

- an annual background growth rate of 0.5%; and
- development specific growth associated with approximately 90 planned and proposed developments within the Town (relevant excerpts are provided in Appendix B).

It is noted that the *Collingwood Transportation Study Update* appears to have included the development of the subject site in with the redevelopment of the adjacent Greentree Gardens and Emporium site immediately to the east (88 residential units considered). Notwithstanding, the noted site generated traffic volumes as presented previously have been considered in addition to the projections of the *Collingwood Transportation Study Update*.

As the *Collingwood Transportation Study Update* did not provide traffic projections specifically for the 2026 horizon, such were interpolated from the 2019 and 2031 volumes, assuming a constant growth over the corresponding planning horizon (considering both background and development growth).

The total traffic volumes for the 2026 and 2031 horizons are provided in Figure 8 and Figure 9 respectively.

4.2 TRAFFIC OPERATIONS

4.2.1 Road Section Operations

The operations of Highway 26 across the front of the development site were again investigated considering the 2026 and 2031 traffic volumes, a summary of which is provided in Table 5.

Table 5: 2026 & 2031 Road Section Operations

YEAR, ROAD SECTION & LANES / DIRECTION			CAPACITY[1]		TRAFFIC VOLUMES (vph)		VOLUME TO CAPACITY	
			WB	EB	WB	EB	WB	EB
2026	Highway 26	1	900	900	776	710	0.86	0.79
2031	Highway 26	1	900	900	896	820	**1.00**	0.91

[1] Capacity is denoted as vehicles per hour per direction

As noted, during the 2026 horizon, the highway is expected to operate at 86% or less of its available capacity, whereas during the 2031 horizon, the theoretical planning capacity will be reached (thus resulting in a v/c ratio of 1.0). It is noted however that the above assessment does not specifically consider the benefits of the existing centre turn lane. As documented in the *Collingwood Transportation Study Update*, the provision of a centre turn lane can effectively increase the capacity of the adjacent through lane by 25%, recognizing that left turn movements will be completed from a separate lane, thereby not impacting the through movement. In this regard, the capacity of Highway 26 could be considered as high as 1125 vehicles per hour (900 vph x 1.25) which can readily accommodate the projected volumes.

4.2.2 Intersection Operations

The site access operations have also been reviewed based on the peak 2026 and 2031 traffic volumes, procedures outlined in the *2000 Highway Capacity Manual*[2] (using Synchro v.10 software) and assuming stop control on the site access (with a single entry lane and single exit lane). While a paved shoulder is currently provided on Highway 26 that facilitates right turn movements into the adjacent site, no right turn provisions have been assumed in the analysis (ie. the eastbound lane on Highway 26 is assumed to accommodate the through and right turn movements).

For unsignalized intersections, the review considers the average delay (measured in seconds), level of service and volume to capacity for the critical movements, namely the noted stop-controlled movements. LOS A corresponds to the best operating condition with minimal delays

[2] Highway Capacity Manual. Transportation Research Board, Washington DC, 2000.

whereas LOS F corresponds to unacceptable operations resulting from high intersection delays. A v/c ratio of less than 1.0 indicates operations less than capacity, whereas a v/c of 1.0 indicates capacity has been reached.

A summary of the site access operations is provided in Table 6 whereas detailed operations worksheets are included in Appendix C.

Table 6: 2026 & 2031 Intersection Operations

YEAR, INTERSECTION, CONTROL & MOVEMENT				WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
				Delay	LOS	V/C	Delay	LOS	V/C
2026	Site Access & Hwy 26	stop	NB Left + Right	20	C	0.05	27	D	0.06
		free	WB Left	9	A	0.01	9	A	0.01
2031	Site Access & Hwy 26	stop	NB Left + Right	23	C	0.06	35	D	0.08
		free	WB Left	10	A	0.01	10	A	0.01

As noted, the site access intersection is expected to provide acceptable operations (LOS D or better) through 2031 based on the projected traffic volumes and noted intersection control and configuration. It is noted that the operational assessment has assumed a minimum volume of 5 vehicles per hour per movement to/from the site (which is greater than the projected volumes in most cases) and thus reflects a more conservative approach.

In addition, the assessment does not consider the benefit that the centre turn lane on Highway 26 will provide to left turning vehicles exiting the site. As required, left turning motorists can complete their turn in 2 steps

- Step 1: turn into the centre turn lane; and
- Step 2 accelerate to highway speed and merge with westbound travel.

With consideration for the centre turn lane and assuming 2 vehicles at a time can make use of it in the manner prescribed, the delays to the exiting traffic will be reduced. In considering the 2031 operations (the most critical), the delay during the AM peak hour will be reduced from 23 to 16 seconds (LOS C maintained) and the delay during the PM peak hour will be reduced from 35 to 17 seconds (LOS D improved to LOS C). The corresponding worksheets with consideration for the centre turn lane are included in Appendix C.

4.2.3 Queue Operations

Queue operations have also been considered for the following movements:

- northbound left and right turns (combined movement) from the site; and
- westbound left turn to the site.

As there is a centre turn lane on Highway 26, the available storage for the westbound left turn lane is considered significant, albeit a length of 20 metres has been considered in the assessment so as not to extend beyond the access to Wyldewood Cove on the north side of the highway. Similarly, a length of 20 metres has been assumed on the site access to ensure that queues do not extend beyond the driveway of the first residential unit.

The results of the queue operations are summarized in Table 7 for the following measures:

- the probability of a queue free state (ie. no queue); and
- the 95th percentile queue, which will only be exceeded 5% of the time.

Table 7: 2026 & 2031 Queue Operations

YEAR, INTERSECTION, CONTROL & MOVEMENT			LANE LENGTH (m)	WEEKDAY AM PEAK HOUR		WEEKDAY PM PEAK HOUR	
				P0%	95th	P0%	95th
2026	Site Access & Hwy 26	NB Left + Right	20	97-98%	1m	96-99%	1m
		WB Left	20	99	<1	99	<1
2026	Site Access & Hwy 26	NB Left + Right	20	96-98	2	94-99	2
		WB Left	20	99	<1	99	<1

P0% - probably of no queue (%) 95th – 95th percentile queue (metres)

As noted, the occurrence of queues will be minimal as will the anticipated 95th percentile queue lengths. Is this regard, the proposed site access queue operations are not expected to have any adverse impacts to the operations of Highway 26 or the immediately adjacent site access points (as the westbound queue will be minimal, there will be no issue of queues blocking the adjacent access points). Corresponding queue measures are indicated on the worksheets provided in Appendix C.

4.3 TURN LANE REQUIREMENTS

Notwithstanding the acceptable traffic operations, the need for exclusive turn lanes to service the site have been considered.

4.3.1 Right Turn Lanes

Right turn lanes are generally warranted where right turn volumes exceed 60 vehicles per hour and/or impede through traffic. In considering this threshold, an eastbound right turn lane on Highway 26 to serve the site access is not required.

4.3.2 Left Turn Lanes

There is currently a centre turn lane on Highway 26 that accommodates left turn movements and thus there are no further requirements.

5 Summary

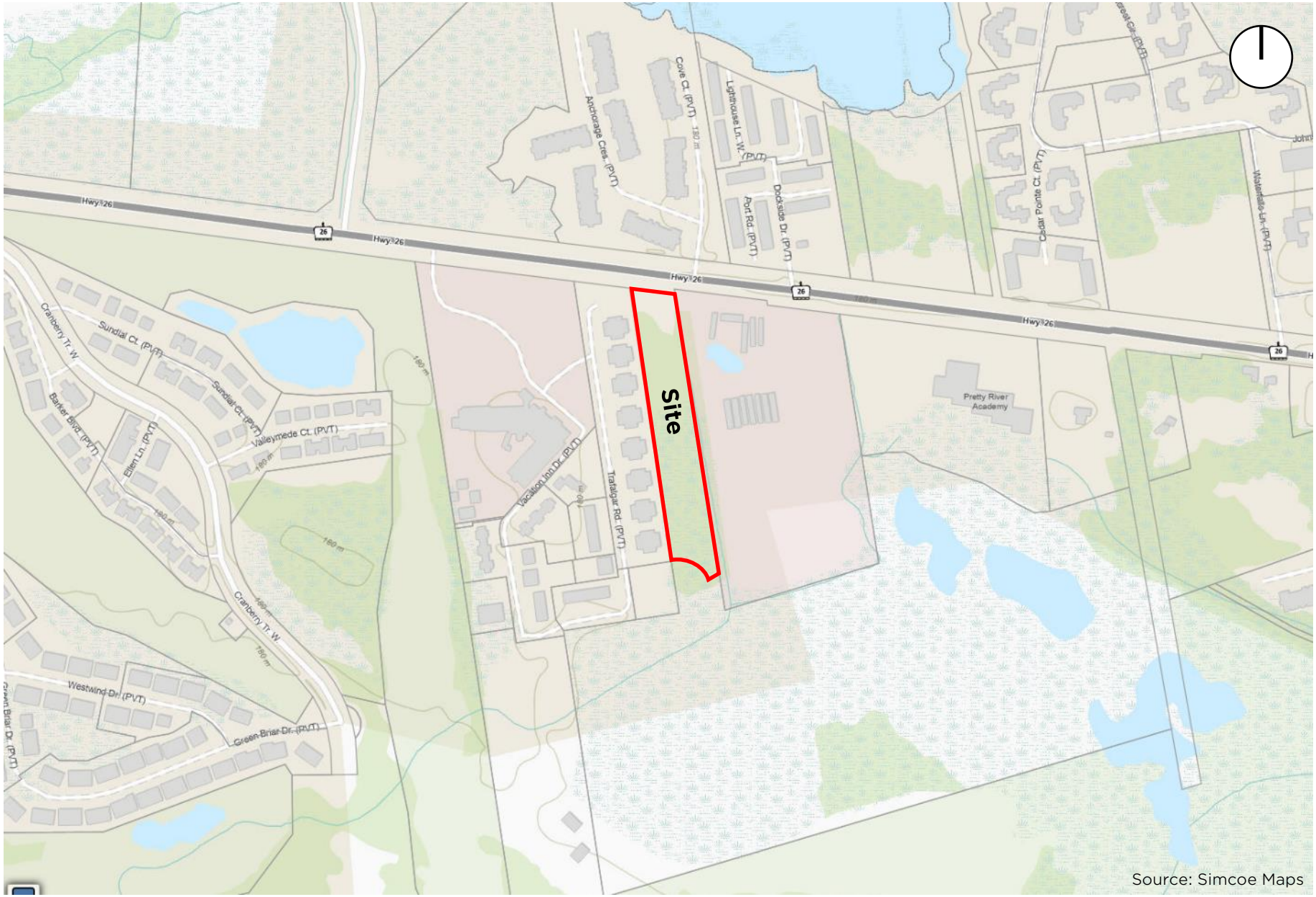
Given the limited traffic volume to be generated by the development of the site and in considering the traffic volumes on the road system, such will not have any significant operational impacts on the operations of Highway 26 and the surrounding lands. The operational assessment of the site access indicates that the intersection will experience adequate levels of service and average traffic delays for the northbound movements exiting the site through the 2031 horizon year. Therefore no operational improvements are required.

The proposed location for the site access was also reviewed to ensure the provision of adequate spacing between the site access and the Greentree Gardens and Emporium access. In consideration of the projected traffic volumes and the Transportation Association of Canada's driveway spacing guidelines for accesses onto an arterial road, the proposed location for the site access is considered appropriate. Furthermore, a review of the expected traffic queues indicates that such will be minimal and thus no interference is expected to highway operations and/or adjacent access operations.

A left turn lane currently exists on Highway 26 to serve the site and thus there are no further requirements in this regard. Given the minimal right turn volumes, a right turn lane is not required at the site access. Notwithstanding this, it is recognized that the Town of Collingwood standard requires a 30 metre right turn taper at highway entrances (to a width of 3.5 metres) and thus the shoulder area can be utilized accordingly.

The available sight lines on Highway 26 to the east and west of the site access exceed the minimum stopping sight distance requirement for a design speed of 70 km/h. Vehicles manoeuvring to and fromthe site can do so in a safe and efficient manner. As such, no further improvements are required to address sight line constraints.

Given the site location, residents will have ready access to Collingwood transit which operates on Highway 26 (Crosstown route) and provides service through the town with connections to other transit routes via the Main Terminal. The site will also provide connections to the trail system along Highway 26 to the north (including provisions for bicycle parking) and the Cranberry Marsh trail system to the south, for use by pedestrians and cyclists alike. In this regard, the development will foster opportunity for active transportation.



CRANBERRY MARSH ESTATES

Figure 1: Site Location

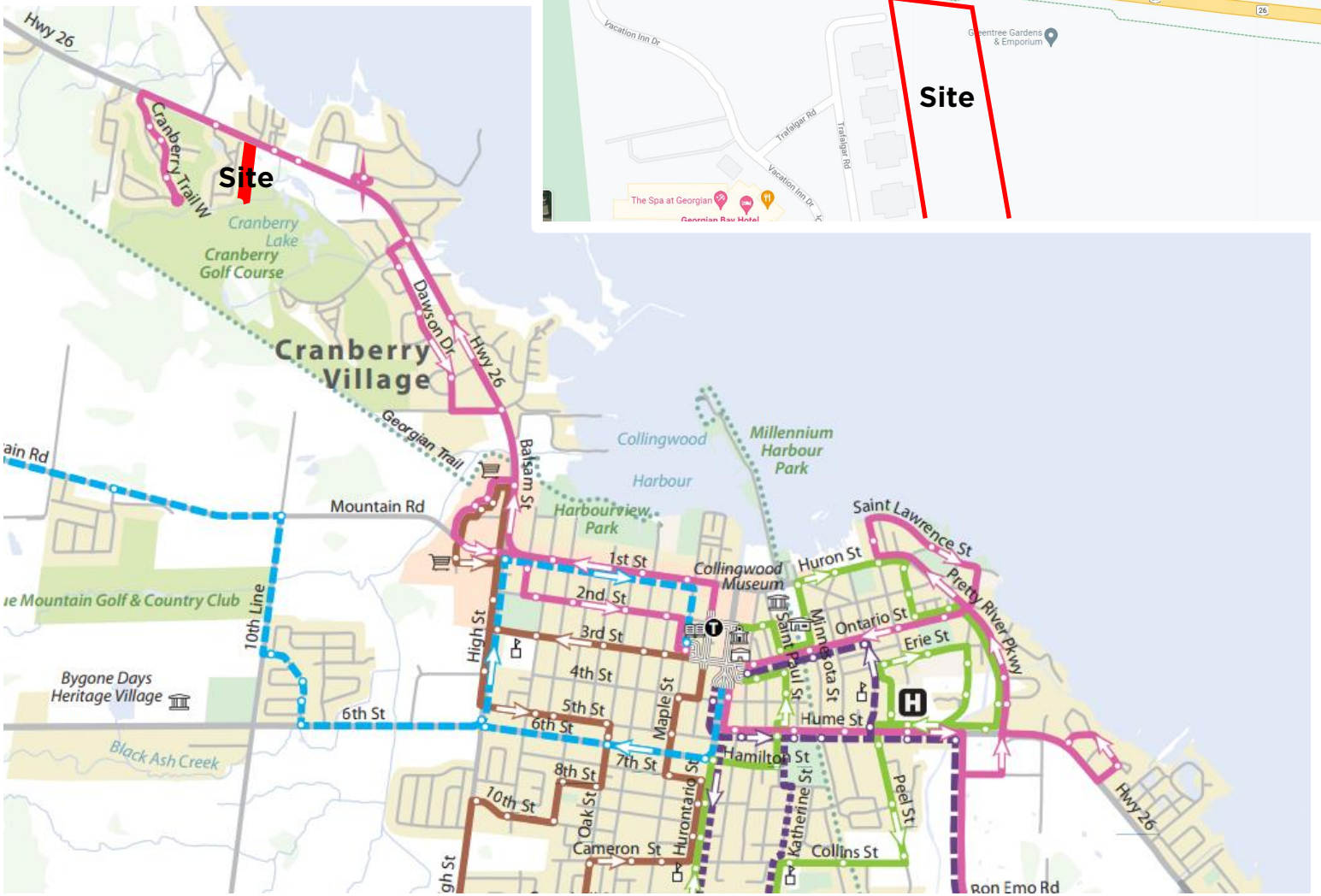
↑ Looking east along Highway 26 from the site

↓ Looking east along Highway 26 from the site

CRANBERRY MARSH ESTATES

Figure 2: Area Road Network

Transit routes

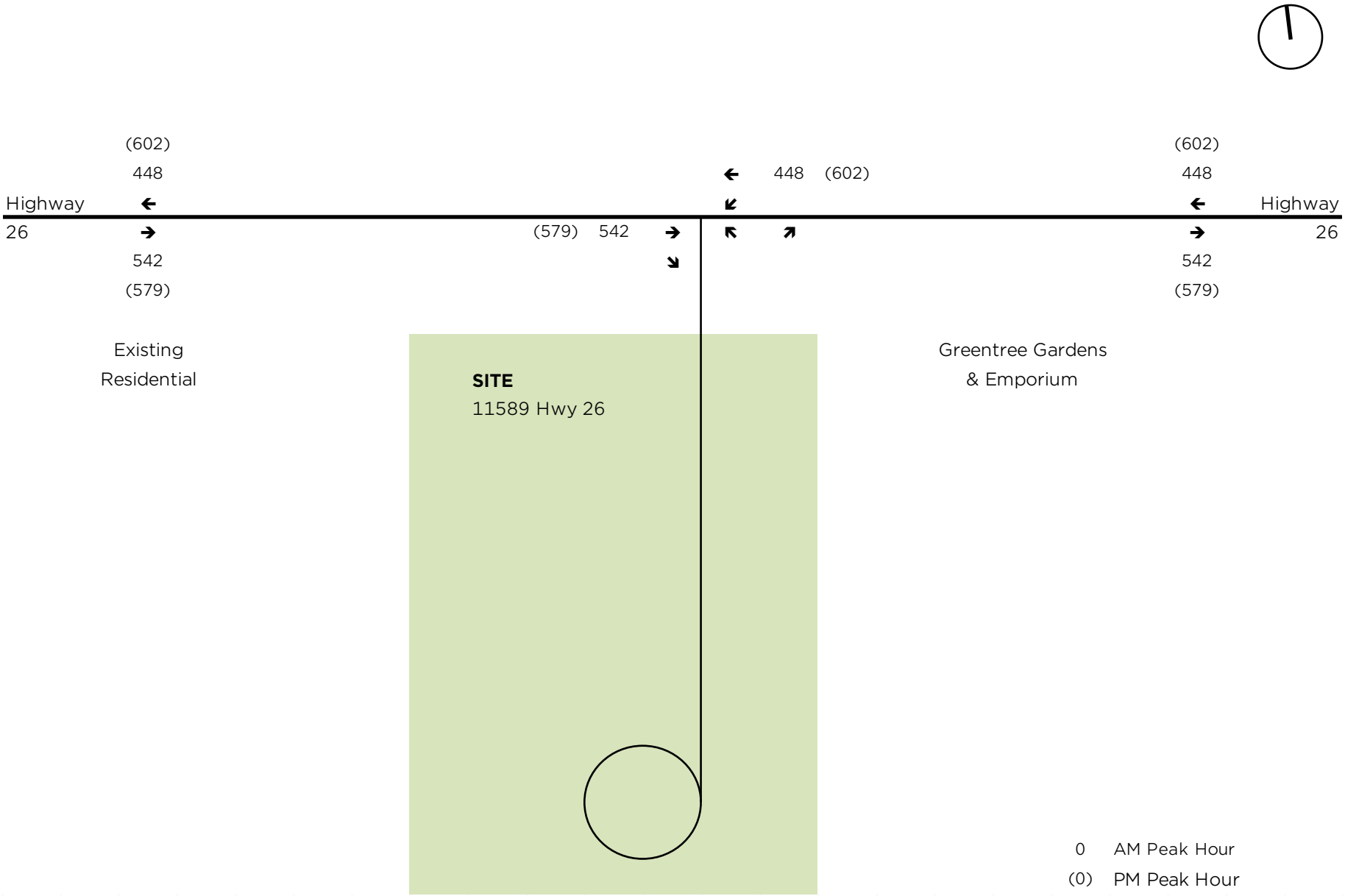


Adjacent bus stops (Crosstown Route)

Source: Google Maps

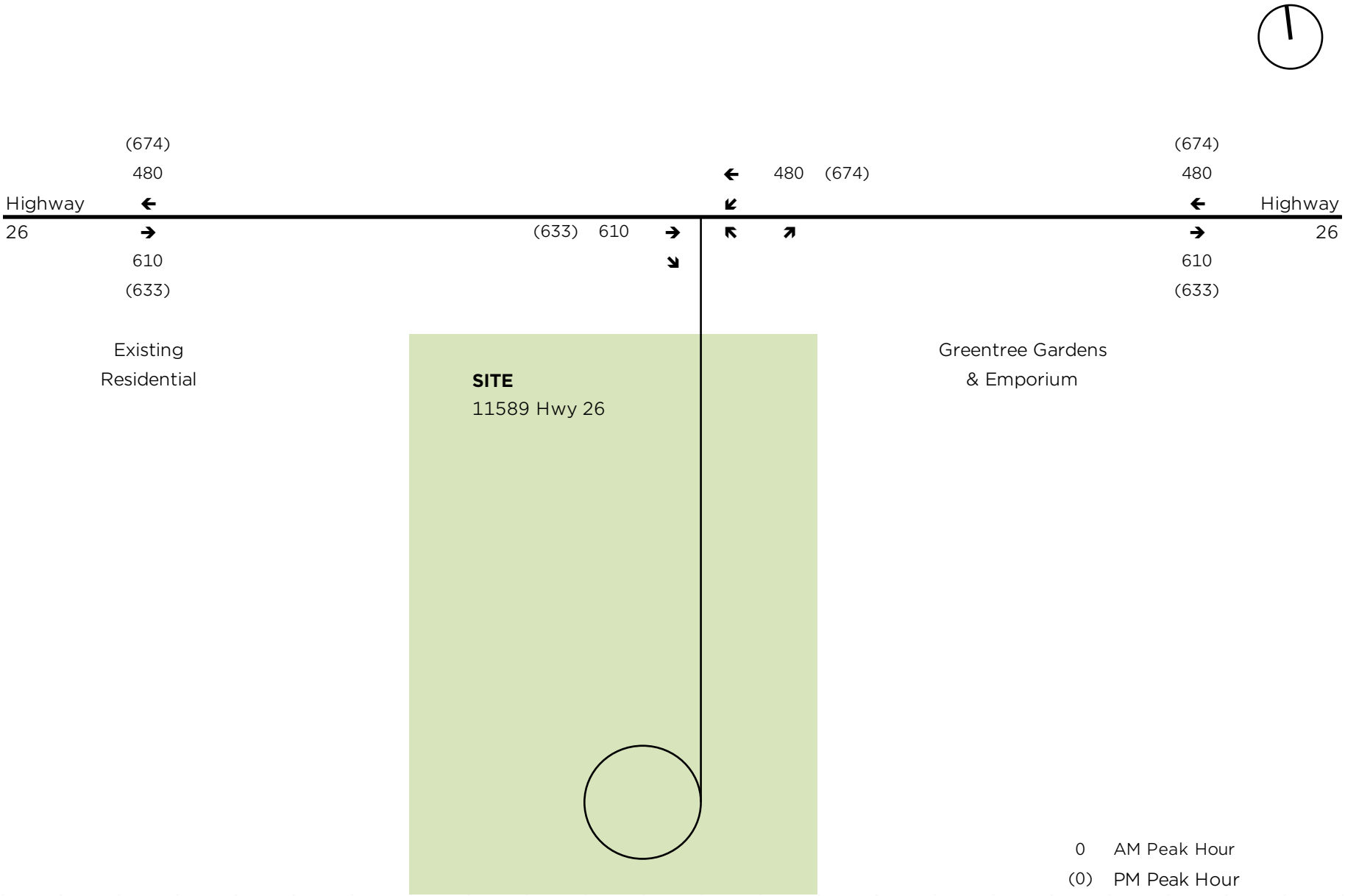
CRANBERRY MARSH ESTATES

Figure 3: Area Transit Network



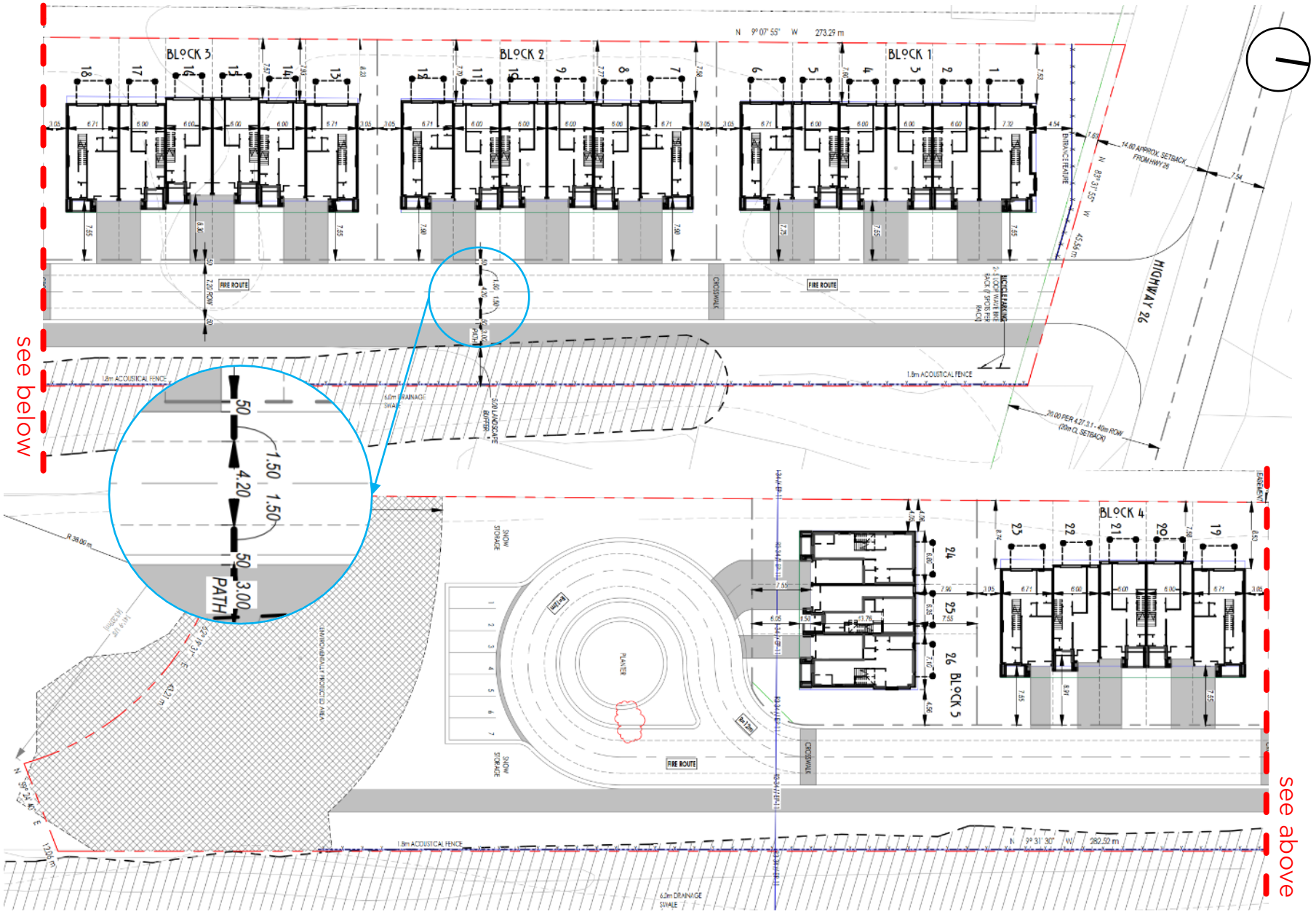
CRANBERRY MARSH ESTATES

Figure 4: 2019 Traffic Volumes



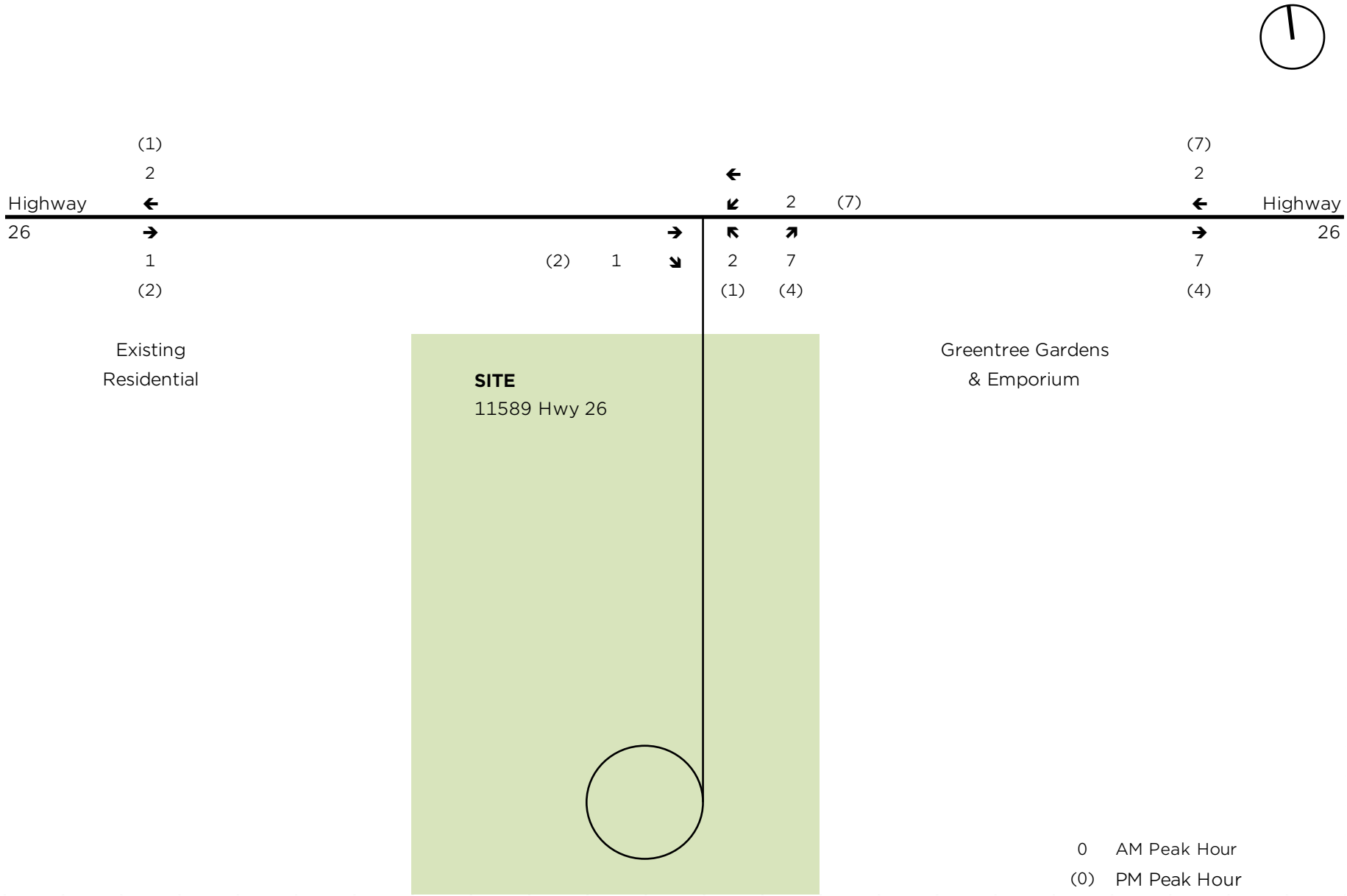
CRANBERRY MARSH ESTATES

Figure 5: 2022 Traffic Volumes



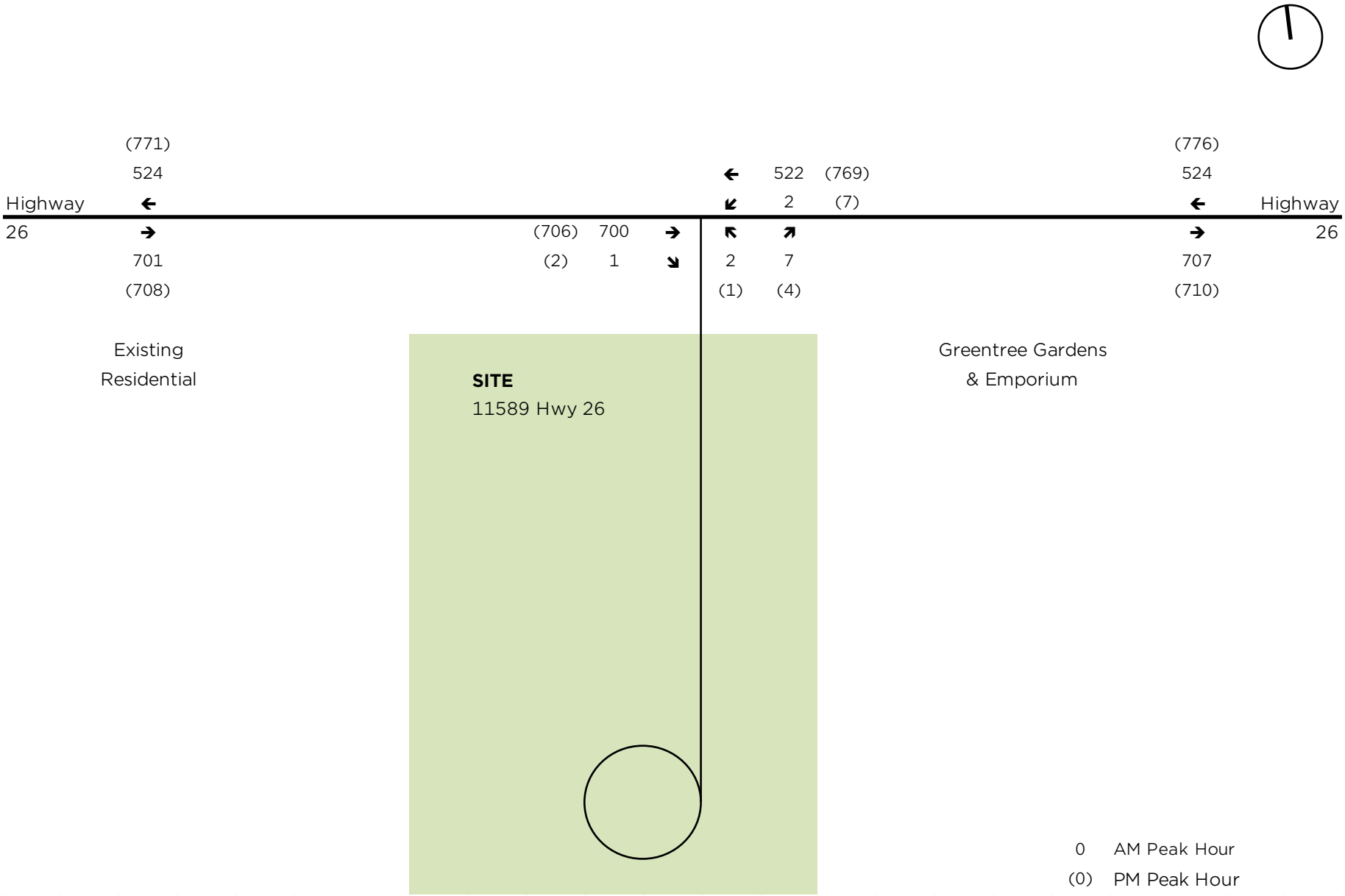
CRANBERRY MARSH ESTATES

Figure 6: Site Plan



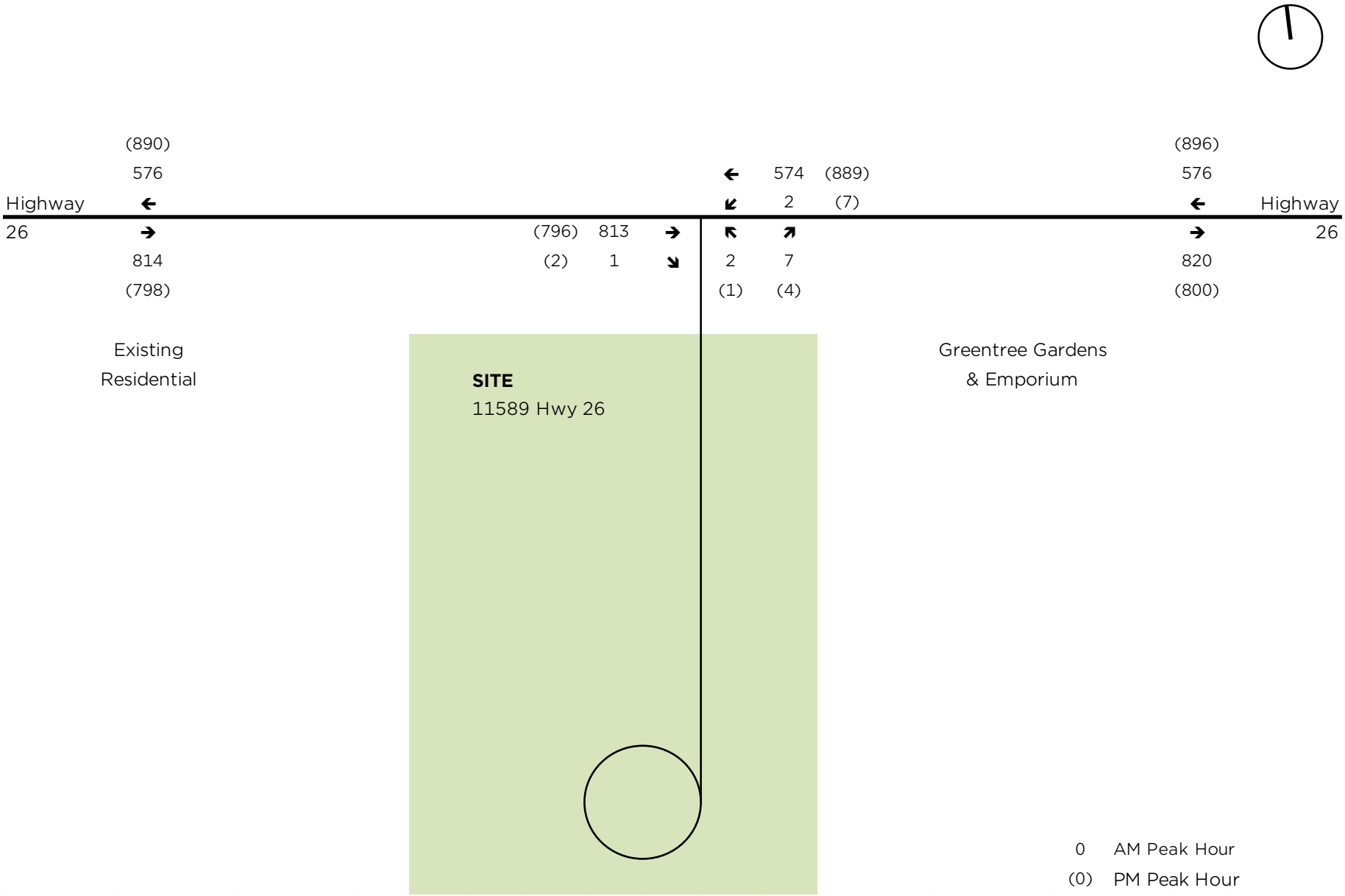
CRANBERRY MARSH ESTATES

Figure 7: Site Traffic Volumes



CRANBERRY MARSH ESTATES

Figure 8: 2026 Traffic Volumes



CRANBERRY MARSH ESTATES

Figure 9: 2031 Traffic Volumes

Appendix A:
Traffic Counts

Ontario Traffic Inc.

Morning Peak Diagram

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

One Hour Peak
From: 8:00:00
To: 9:00:00

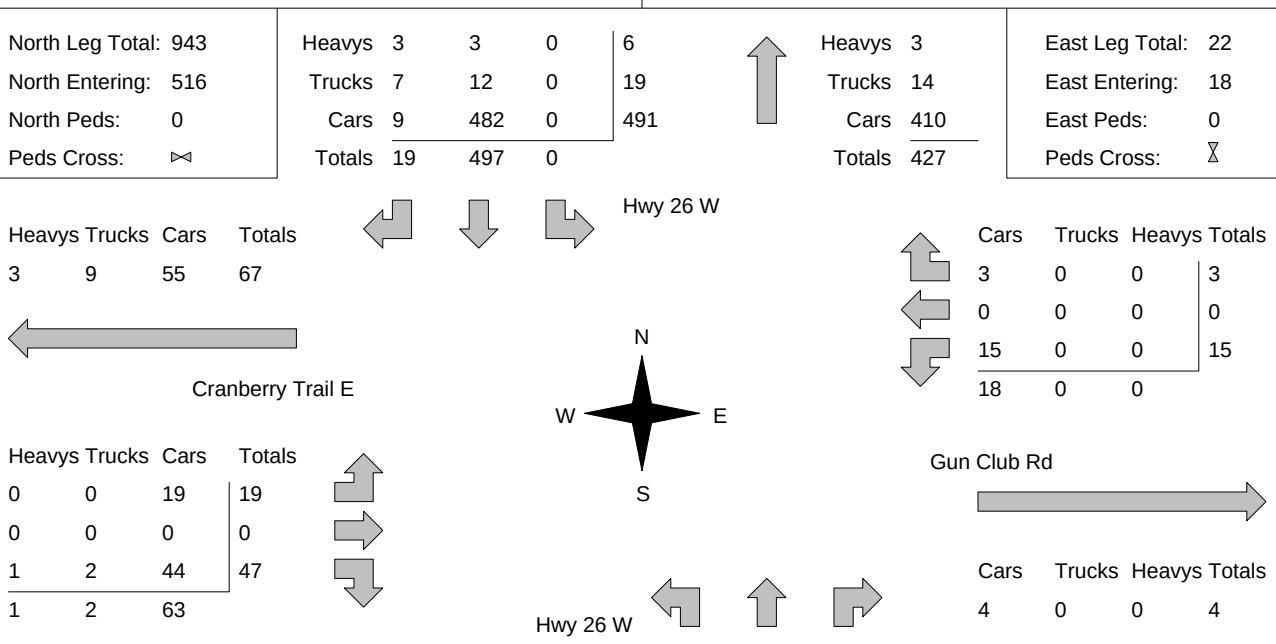
Municipality: Collingwood
Site #: 1842000001
Intersection: Hwy 26 W & Cranberry Trail E-Gun
TFR File #: 1
Count date: 12-Dec-18

Weather conditions:

Person(s) who counted:

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

Major Road: Hwy 26 W runs N/S



Comments

Ontario Traffic Inc.

Afternoon Peak Diagram

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

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

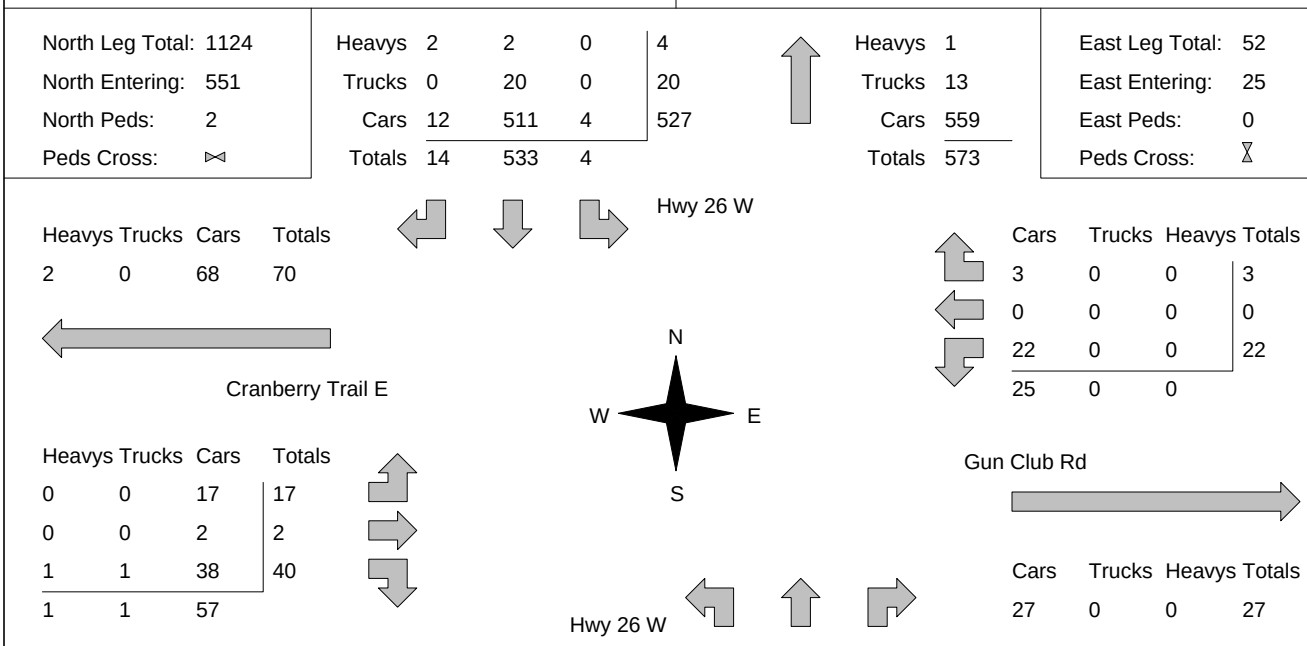
Municipality: Collingwood
Site #: 1842000001
Intersection: Hwy 26 W & Cranberry Trail E-Gun
TFR File #: 1
Count date: 12-Dec-18

Weather conditions:

Person(s) who counted:

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

Major Road: Hwy 26 W runs N/S



Comments

Appendix B: Collingwood Transportation Study Update Excerpts

Collingwood Transportation Study Update

Town of Collingwood
97 Hurontario Street
Collingwood, ON L9Y 3Z5

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

August 2019
300043606.0000

Figure 10: Town of Collingwood Future Development Map (Cole Engineering)

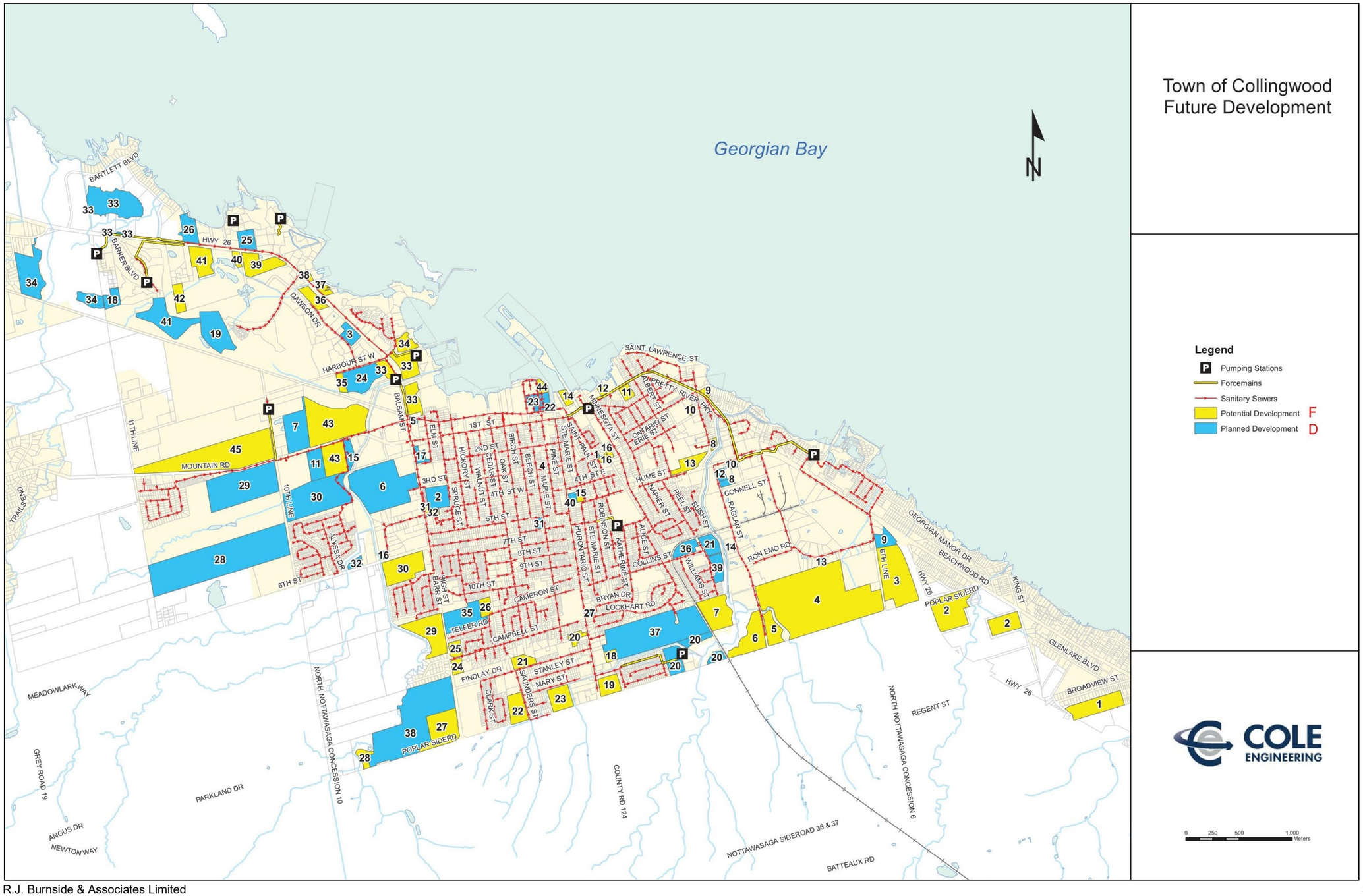


Table 15: Town of Collingwood Medium-Term Developments (Horizon Year 2031)

ID	Name	Land Use	Area (HA)	Number of Residential Units	ICI Development	Estimated Residential Population	Estimated Occupancy 2018	Forecasted Occupancy 2031	Forecasted Occupancy 2041
7F	King (452 Raglan)	Residential	7.44	57 - singles, 205 townhouses		657		100%	
11F	Parkridge	Office	1.40		40,000 sq.ft. commercial			100%	
14F	Duncap Waterfront Hotel	Residential and Hotel	1.15	80 apartments	40 hotel rooms	152		100%	
20F	Blackmoor Gate Property	Residential	1.35	34 - singles and semis		99		100%	
30F	580 Sixth Street and adjacent property	Residential	8.42	114 - townhouses, 128 apartments		517		50%	100%
39F	Silvercreek Development	Residential	5.57	267 apartments		507		100%	
43F	Mountain Street Industrial Property	Commercial / Industrial	24.16		9,097 sq.m. commercial / industrial			100%	
44F	Huronic Village	Residential		13 - townhouses		31		100%	
45F-A	Panorama North	Residential	20.10	122 - singles, 580 - townhouses, 219 - apartments		2162		50%	100%
1D	Ambulance Station	Community Services	0.15					100%	
2D	Mountainview Public School	Community Services	4.11					100%	
3D	Cranberry Inn extension	Commercial	2.20					100%	
4D	Third Street	Commercial	0.06					100%	
5D	10 Balsam Commercial Plaza	Commercial	0.40					100%	
6D	Regional Commercial District	Commercial	21.07					100%	
7D	Van Dolder's	Industrial	8.09		12,806 sq.m commercial / industrial		20%	100%	
8D	Ace Cabs	Industrial	0.78					100%	
9D	BMC Automotive	Industrial	2.50					100%	
10D	Collingwood Service Station	Industrial	0.38					100%	
11D	Georgian Bay Biomed	Industrial	4.00		8,700 sq.m. marijuana grow-op			100%	
12D	Dunn Hotel	Industrial	0.88					100%	
13D	Isowater	Industrial	0.41					100%	
14D	360 Raglan	Industrial	0.40					100%	
15D	100 Mountain Road	Commercial / Industrial	2.12		1,784 sq.m. commercial / industrial			100%	
16D	Stewart Road Reservoir	Other	0.50					100%	
17D	Affordable Housing Project	Residential	1.32	147 - apartments		279		100%	
18D	Silver Glen	Residential	2.27	50 - townhouses		120		100%	
19D	Blue Fairways	Residential	8.49	262 - townhouses		629	80%	100%	
20D	Pretty River Estates Phase 2	Residential	7.19	21 - singles and semis, 152 - townhouses		426		100%	
21D	Riverside Midrise	Residential	2.85	156 - townhouses		374		100%	
22D	Shipyards Condo E	Residential	1.48	28 - townhouses		67		100%	
23D	Mackinaw Village	Residential	1.21	28 - townhouses		67	15%	100%	
24D	Balmoral	Residential and Commercial	6.95	54 - semis, 199 townhouses	2,800 sq.m.	624	50%	100%	
28D	Linksview	Residential and School	40.68	439 - singles, 8 - townhouses, 190 - apartments	School	1653		80%	100%
29D	Mair Mills Village	Residential	19.70	127 - singles, 192 - apartments	1,130 sq.m. commercial	733		100%	
30D	Red Maple (Consar Development)	Residential	17.89	131 - singles and semis, 147 - townhouses		733		100%	
33D	The Preserve at Georgian Bay (Bridgewater)	Residential	37.16	539 - townhouses, 116 - apartments		1514		100%	
36D	Riverside Townhomes	Residential	2.54	57 - townhouses		137		100%	
37D	Eden Oak McNabb	Residential	27.00	256 - singles and semis, 120 - townhouses		1,030		100%	
38D	Summitview Phases 1 and 2	Residential	31.58	233 - singles and semis, 173 - townhouses		1,091		100%	
39D	Harmony Living	Residential	2.45	80 - townhouses		192		100%	
40D	Monaco	Residential and Commercial	0.76	260 - condo apartments	2,600 sq.m.	494		100%	
42D	Mountaincroft Residential (Final Phase)	Residential		69 singles		200		100%	
43D	410 Raglan Street	Industrial	2.21		6,689 sq.m. warehouse			100%	
*	Windfall Medium Density	Residential		242 condo units				100%	
*	Windfall	Residential		571 - singles and townhouse units				100%	
*	Second Nature	Residential		236 - singles and townhouse units				100%	
*	Nederand Development	Residential		121 - singles				100%	

* Known Town of The Blue Mountains developments in close proximity to Collingwood that were specifically considered in the traffic projections and analysis in this study.

Table 16: Town of Collingwood Long-Term Developments (Horizon Year 2041)

ID	Name	Land Use	Area (HA)	Number of Residential Units	ICI Development	Estimated Residential Population	Estimated Occupancy 2018	Forecasted Occupancy 2031	Forecasted Occupancy 2041
1F	Braeside	Residential	7.26	15 - singles		44		0%	100%
2F	Batteaux Creek Subdivision (Beachwood Estates)	Residential	15.28	20 - singles		58		0%	100%
3F	2906 Sixth Street and 7026 Poplar Sideroad	Industrial	14.99					0%	100%
4F	Eden Oaks Industrial	Industrial	50.73					0%	100%
6F	Poplar and Raglan	Industrial	7.29					0%	100%
8F	Memory Care Facility	Hospital	0.61			72		0%	100%
9F	500 Ontario Street	Residential	0.64	60 - townhouses		144		0%	100%
10F	Legion Redevelopment	Residential	0.44			70		0%	100%
12F	Courthouse	Residential	0.57	68 - townhouses		163		0%	100%
13F	Hospital	Hospital	3.00					0%	100%
15F	282 Ste. Marie Street	Residential and Commercial	0.48	69 - condominiums	929 sq.m commercial	168		0%	100%
16F	Reinhart Warehouse	Residential	1.19	23 - singles and semis		67		0%	100%
18F	Church Severance	Residential	1.16	44 - singles and semis		128		0%	100%
19F	Poplar and Hurontario	Highway Commercial	3.26					0%	100%
21F	Findlay Property	Residential	2.20	22 - singles and semis		64		0%	100%
22F	50 Saunders Drive	Residential	4.17	74 - singles and semis		215		0%	100%
23F	Old Organic Farm	Residential	4.32	76 - singles and semis		221		0%	100%
24F	Collingwood Nursing Home	Residential	1.41	47 - singles and semis		136		0%	100%
25F	197 Campbell Street	Residential	1.62	32 - singles and semis		93		0%	100%
26F	Property adjacent to Helen Court Homes	Residential	1.84	59 - singles and semis		171		0%	100%
27F	Northwest corner of Poplar and High Street (Summitview Phase 3)	Residential	8.94	340 - singles and semis		986		0%	100%
28F	8070 Poplar Sideroad	Residential	1.56	30 - singles and semis		87		0%	100%
29F	Fumo property located on the west side of High Street	Residential	8.86	300 - singles and semis		870		0%	100%
31F	115 High Street	Residential	0.21	15 - townhouses		36		0%	100%
32F	121 High Street	Residential	0.75	6 - townhouses		15		0%	100%
33F	Commercial / hotel development	Commercial	9.63						
34F	Living Waters	Hotel	2.34	253 - hotel units (apartments)		481		0%	100%
35F	16 Harbour Street or Law property	Residential	1.18	23 - singles and semis		67		0%	100%
36F	Dawson Drive East property	Residential	2.46	48 - singles and semis		139		0%	100%
37F	White Street property	Residential	1.02	20 - singles and semis		58		0%	100%
38F	#38F - Gunn Club Road	Residential	0.49	10 - singles and semis		29		0%	100%
40F	Griffith's property	Residential	1.02	30 - singles and semis		87		0%	100%
41F	Greentree property	Residential	4.93	88 - singles and semis		255		0%	100%
42F	Georgian Manor Resorts	Residential	2.49	150 apartments		285		0%	100%
45F-B	Remainder of Mair Mills North	Residential	7.00	Assume same density as Panorama North development		750		0%	50%
25D	Harhay	Residential	2.81	154 - townhouses		370		0%	100%
27D	655 Hurontario Street Apartments	Residential	0.42	32 - apartments		77		0%	100%
31D	Victoria Annex	Residential	0.60	19 - townhouses		46		0%	100%
32D	Georgian Meadows	Residential	1.01	25 - townhouses		60		0%	100%
34D	Huntingwood	Residential	11.82	92 - singles and semis, 62 - townhouses		416		0%	100%
35D	Helen Court Homes	Residential	7.56	66 - singles and semis, 189 - townhouses		645		0%	100%
41D	Cranberry	Residential	9.14	314 - townhouses		754		0%	100%

Appendix C:
Intersection Operations

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	700	5	5	522	5	7
Future Volume (Veh/h)	700	5	5	522	5	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	761	5	5	567	5	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			766		1340	764
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			766		1340	764
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		97	98
cM capacity (veh/h)			847		167	404

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	766	5	567	13
Volume Left	0	5	0	5
Volume Right	5	0	0	8
cSH	1700	847	1700	261
Volume to Capacity	0.45	0.01	0.33	0.05
Queue Length 95th (m)	0.0	0.1	0.0	1.2
Control Delay (s)	0.0	9.3	0.0	19.5
Lane LOS		A		C
Approach Delay (s)	0.0	0.1		19.5
Approach LOS				C

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	47.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	706	5	7	769	5	5
Future Volume (Veh/h)	706	5	7	769	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	767	5	8	836	5	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			772		1622	770
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			772		1622	770
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		96	99
cM capacity (veh/h)			843		112	401

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	772	8	836	10
Volume Left	0	8	0	5
Volume Right	5	0	0	5
cSH	1700	843	1700	175
Volume to Capacity	0.45	0.01	0.49	0.06
Queue Length 95th (m)	0.0	0.2	0.0	1.4
Control Delay (s)	0.0	9.3	0.0	26.8
Lane LOS		A		D
Approach Delay (s)	0.0	0.1		26.8
Approach LOS				D

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	50.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	813	5	5	574	5	7
Future Volume (Veh/h)	813	5	5	574	5	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	884	5	5	624	5	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			889		1520	886
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			889		1520	886
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		96	98
cM capacity (veh/h)			762		130	343

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	889	5	624	13
Volume Left	0	5	0	5
Volume Right	5	0	0	8
cSH	1700	762	1700	210
Volume to Capacity	0.52	0.01	0.37	0.06
Queue Length 95th (m)	0.0	0.2	0.0	1.5
Control Delay (s)	0.0	9.8	0.0	23.3
Lane LOS		A		C
Approach Delay (s)	0.0	0.1		23.3
Approach LOS				C

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	796	5	7	889	5	5
Future Volume (Veh/h)	796	5	7	889	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	865	5	8	966	5	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			870		1850	868
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			870		1850	868
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			99		94	99
cM capacity (veh/h)			775		81	352

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	870	8	966	10
Volume Left	0	8	0	5
Volume Right	5	0	0	5
cSH	1700	775	1700	132
Volume to Capacity	0.51	0.01	0.57	0.08
Queue Length 95th (m)	0.0	0.2	0.0	1.8
Control Delay (s)	0.0	9.7	0.0	34.6
Lane LOS		A		D
Approach Delay (s)	0.0	0.1		34.6
Approach LOS				D

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	813	5	5	574	5	7
Future Volume (Veh/h)	813	5	5	574	5	7
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	884	5	5	624	5	8
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			889		1520	886
vC1, stage 1 conf vol					886	
vC2, stage 2 conf vol					634	
vCu, unblocked vol			889		1520	886
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 %			99		99	98
cM capacity (veh/h)			762		335	343

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	889	5	624	13
Volume Left	0	5	0	5
Volume Right	5	0	0	8
cSH	1700	762	1700	340
Volume to Capacity	0.52	0.01	0.37	0.04
Queue Length 95th (m)	0.0	0.2	0.0	0.9
Control Delay (s)	0.0	9.8	0.0	16.0
Lane LOS		A		C
Approach Delay (s)	0.0	0.1		16.0
Approach LOS				C

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	53.1%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	796	5	7	889	5	5
Future Volume (Veh/h)	796	5	7	889	5	5
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	865	5	8	966	5	5
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	TWLTL			TWLTL		
Median storage veh)	2			2		
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume			870		1850	868
vC1, stage 1 conf vol					868	
vC2, stage 2 conf vol					982	
vCu, unblocked vol			870		1850	868
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 %			99		98	99
cM capacity (veh/h)			775		275	352

Direction, Lane #	EB 1	WB 1	WB 2	NB 1
Volume Total	870	8	966	10
Volume Left	0	8	0	5
Volume Right	5	0	0	5
cSH	1700	775	1700	309
Volume to Capacity	0.51	0.01	0.57	0.03
Queue Length 95th (m)	0.0	0.2	0.0	0.8
Control Delay (s)	0.0	9.7	0.0	17.0
Lane LOS		A		C
Approach Delay (s)	0.0	0.1		17.0
Approach LOS				C

Intersection Summary			
Average Delay	0.1		
Intersection Capacity Utilization	56.8%	ICU Level of Service	B
Analysis Period (min)	15		