AUGUST 26, 2025

CFC FILE: 1790-5382

Town of Collingwood
545 Tenth Line North
Collingwood, ON L9Y 0W1

Attention: **Sheldon Hancock, C.E.T.**
Engineering Technologist

RE: **TRAFFIC OPINION LETTER**
11403, 11453 & 11461 HIGHWAY 26 WEST
REVERIE TOWNHOUSES, TOWN OF COLLINGWOOD, SIMCOE COUNTY

Dear Sheldon.

This letter has been prepared in support of the Official Plan and Zoning By-law Amendments for the Reverie Townhouse Development at 11403, 11453 & 11461 Highway 26. This letter has been prepared to address changes in the quantity and type of units proposed, as the development contemplates stacked townhouses instead of standard townhouse units.

A Traffic Impact Study (TIS) was first completed by Crozier for the site in November 2019. An updated Traffic Impact Study was prepared in July 2020, which reviewed 201 apartment units and 66 townhouse units. Since 2020, the approved apartment buildings are under construction and the existing signal at the intersection of Highway 26 and Waterfall Lane/Prince of Wales Drive has been modified to add the fourth leg and is operational.

The letter reviews the following from the transportation engineering perspective:

- Existing Conditions
- Development Proposal
- Trip Generation
- Impact of Development

A Terms of Reference was circulated to the Town of Collingwood and their peer review consultant. The Terms of Reference proposed by our office, the peer review comments, and our responses have been provided as **Attachment A.**

EXISTING CONDITIONS

The subject lands, east of Waterfall Lane, have an area of 2.35 ha (5.81 ac). The site, which does not include the apartment building currently under construction, is bounded by Highway 26 to the north and east, Prince of Wales Drive and the apartment buildings to the west, and Brandy Lane Drive to the south. As previously noted, the intersection of Highway 26 and Waterfall Lane/Prince of Wales Drive is signalized.

At the intersection, Waterfall Lane provides southbound left and right turn lanes. The east and west approaches on Highway 26 provide left-turn lanes, which extend into continuous two-way centre left-turn lanes. The east approach has a right-turn lane with approximately 50 m of storage length. The south approach provides a 20 m northbound left-turn lane and northbound through-right lanes, which will be formalized with painted markings when construction is completed.

DEVELOPMENT PROPOSAL

The Site Plan prepared by Stantec Consulting Ltd. (dated August 26, 2025) proposes the development of 124 stacked townhouse units on the east side of Prince of Wales Drive. Access to the development remains via Prince of Wales Drive, with an emergency access to Highway 26 proposed at the far east end of the site. Removeable bollards will restrict access to Highway 26.

At the east and west ends of the townhouse development, a total of 20 bicycle parking spaces are provided. The Site Plan proposed 149 vehicle parking spaces including four barrier-free spaces. Parking stats are reviewed further in the Parking Justification Study (Crozier, August 2025) prepared for the site. Within the parking lots, drive-aisles are proposed to be 7.2 m wide, while parking spaces are proposed to be 6.0 m in length and 2.8 m in width. The parking space dimensions adhere to the Town of Collingwood's Zoning By-law requirements. 2.0 m wide concrete sidewalks are proposed throughout providing pedestrian connectivity within the site and to a proposed 3.0 metre multi-use trail along Highway 26.

The Site Plan has been included as **Attachment B** for reference.

TRIP GENERATION

As previously stated, the July 2020 TIS prepared for the overall development reviewed 66 townhouse units and 201 apartment units. As the revised townhouse plan now proposes 124 stacked townhouse units in addition to the apartment units currently under construction, the net difference in trip generation was reviewed.

Trip generation for the proposed stacked townhouse units was forecasted using published data from the Institute of Transportation Engineers (ITE) Trip Generation Manual, 11th Edition. LUC 220 "Multi-Family Housing (Low-Rise)"

Table 1 reviews the net difference in peak hour trips between the 2020 TIS and the updated Site Plan.

Table 1: Net Difference Trip Generation

Land Use	Units	Peak Hour	Number of Trips			Source
			Inbound	Outbound	Total	
"Multi-Family Housing (Low-Rise)"	66	Weekday AM	7	25	32	July 2020 TIS
		Weekday PM	26	15	41	
	124	Weekday AM	15	46	61	11th Edition ITE
		Weekday PM	47	27	74	
Net Difference		Weekday AM	+ 8	+ 21	+ 29	
		Weekday PM	+ 21	+ 12	+ 33	

As there is no change in the proposed apartment units, the net difference in trip generation between the 267 units assessed in the July 2020 TIS and the 325 total units proposed is 29 a.m. and 33 p.m. two-way peak hour trips. **Attachment C** contains the July 2020 TIS for reference.

IMPACT OF DEVELOPMENT

The July 2020 Traffic Impact Study forecasted that the intersection of Highway 26 and Waterfall Lane/Prince of Wales Drive will operate acceptably in the 2033 future total horizon, with a Level of Service 'C' or better with 20.0 s of intersection signal delay and a maximum v/c ratio of 0.88 for the westbound through movement on Highway 26 in the p.m. peak hour. All 95th percentile queuing were forecasted to remain within the available storage.

A check of the additional volumes was completed using the Synchro Model from the July 2020 TIS. A comparison of the 2033 future total operations between the July 2020 TIS and this assessment are outlined in **Table 2**. The addition of 29 a.m. and 33 p.m. two-way peak hour volumes did not change the 2033 future total forecasted Level of Service. In the p.m. peak hour, the intersection signal delay increased by 0.4 s and the maximum v/c ratio increased by 0.01 for the westbound through movement.

Table 2: Highway 26 and Prince of Wales Drive 2033 Operations

Assessment	Peak Hour	Level of Service	Control Delay	V/C Ratio
July 2020 TIS	A.M.	B	11.8 s	0.66 (EBT)
	P.M.	C	20.0 s	0.88 (WBT)
August 2025	A.M.	B	11.8	0.66 (EBT)
	P.M.	C	20.4 s	0.89 (WBT)

It is concluded that the additional volumes generated by the increase in units will have a minimal impact on the signalized intersection and will not require additional improvements. The westbound two-way left turn lane will accommodate additional queueing of vehicles turning into the site from the east, while the 95th percentile queues are forecasted to remain contained in the available storage length.

Attachment D includes the Synchro capacity worksheets from the July 2020 TIS and the review on the revised Site Plan for reference.

CONCLUSIONS

The Site Plan (Stantec, August 26, 2025) proposes 124 stacked townhouse units, revising the previous assessed 66 townhouse units in the July 2020 Traffic Impact Study. The increase in units is forecasted to generate an additional 29 a.m. and 33 p.m. peak hour trips versus those considered in the July 2020 Traffic Impact Study.

The signalized intersection of Highway 26 and Waterfall Lane/Prince of Wales Drive is expected to operate acceptably. The additional volumes generated have a minimal impact on the operation concluded in the July 2020 Traffic Impact Study.

Based on the above, the proposed development can be supported from a transportation perspective. Should you have any questions or require any further information, please do not hesitate to contact the undersigned.

Respectfully submitted by,

C.F. CROZIER & ASSOCIATES INC.

Kerianne Hagan, P.Eng.
Project Engineer, Transportation

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Attachment A

Terms of Reference

AUGUST 26, 2025

CFC FILE: 1790-5382

Town of Collingwood
545 Tenth Line North
Collingwood, ON L9Y 0W1

RE: TERMS OF REFERNCE PEER REVIEW COMMENTS
11403, 11453 & 11461 HIGHWAY 26 WEST
REVERIE TOWNHOUSES, TOWN OF COLLINGWOOD, SIMCOE COUNTY

The following are the Terms of Reference provided to the Town of Collingwood, followed by the peer review comments provided by Tatham Engineering and our responses.

Traffic Opinion Letter

- A Traffic Impact Study for the development was completed in July 2020, which assessed the intersection of Highway 26 and Waterfall Lane/Prince of Wales Drive under signalized conditions in the 2033 horizon. Operations were forecasted to be acceptable, with a LOS 'C', minimal delays and all 95th percentile queueing contained in the available storage.

- The change in trip generation from the 66 townhouses assessed in the 2020 TIS and the proposal for 124 stacked townhouses is 29 two-way a.m. trips and 33 two-way p.m. trips. The TOL will review the change in trip generation and qualitatively discuss the impact to the signalized intersection.

Comment: Review the signalized intersection using Synchro for the 2033 horizon to properly document the impact of the additional units as compared to the previous site plan. The letter should also review the impact to the stop-controlled intersection.

Response: Synchro assessment of the 2033 conditions based on the updated trip generation has been provided. As the 2020 TIS only reviewed the signalized intersection of Highway 26 and Prince of Wales/ Waterfall Lane, our updated assessment has done the same. We are unsure of the stop-controlled intersection this comment refers to.

- The TOL will provide commentary on the changes to the site plan and will review items such as parking stall dimensions, aisle widths, cycling and pedestrian facilities.

- Please advise if vehicle maneuverability drawings will need to be prepared for the site.

Comment: Vehicle swept path assessments will be required, but can be submitted at the SPA stage.

Response: Acknowledged. Swept paths will be provided at the SPA stage.

Parking Justification Study

- The revised site plan proposed 137 parking spaces for the 124 townhouse units, which is a rate of 1.1 spaces per unit, 1 for residential and 0.1 for visitors.
- The Town's Zoning By-law required 2 spaces per single detached, semi-detached and townhouse unit. Stacked townhouses however are not independently defined in the By-law but are similar in function to both townhouses and apartments, as they share both walls and floors but have independent egress points. The Town's By-law requires 0.5 per apartment unit and 0.25 per unit for visitors.

- The PJS will review the By-Law requirements and proposed parking.

- The PJS will review Transportation Tomorrow vehicle ownership data and zoning requirements of comparable municipalities.

Comment: Ensure that rates adopted by other municipalities are reflective of the proposed use as appropriate. Also reference parking demand data provided in ITE Parking Generation Manual, 6th Edition.

Response: Noted.

- The PJS will review proxy site surveys collected by Crozier in 2023 at 417 Peel Street and in 2024 at 528 Tenth Street and 172 Eighth Street in Collingwood. The rate of parking demand of these apartment buildings will be compared against the development to determine an appropriate parking rate.

Comment: Give that 417 Peel Street was fairly new, the occupancy at the time of the surveys should be documented in the report as a low occupancy will skew the parking demand results. If the occupancy at the time of the surveys is not know, we recommend new surveys for 417 Peel Street. For 172 Eighth Street, ensure that the underground parking was included in the parking surveys.

Response: At the time of the parking survey, 417 Peel Street has 148 of 156 units occupied. For 172 Eighth Street, underground parking was included in the parking survey.

- The PJS will review TDM opportunities and assess measures that may further support a reduced parking supply.

Comment: Make sure proposed TDM measures are feasible and appropriate given the location of the site and the characteristics of the transportation network serving the area.

Response: Noted.

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Kerianne Hagan

From: Sheldon Hancock <shancock@collingwood.ca>
Sent: March 12, 2025 8:50 AM
To: Kerianne Hagan
Subject: RE: Silver Creek (Reverie) Townhomes - Terms of Reference

Follow Up Flag: Follow up
Flag Status: Completed

Good morning Kerianne,

I have forwarded this to our peer reviewer for review.

Thanks,

Sheldon Hancock C.E.T.
Engineering Technologist, Growth & Development
t: 705-445-1030 Ext. 4218
www.collingwood.ca

From: Kerianne Hagan <khagan@cfcrozier.ca>
Sent: Friday, March 7, 2025 3:51 PM
To: Sheldon Hancock <shancock@collingwood.ca>
Subject: Silver Creek (Reverie) Townhomes - Terms of Reference

Good Afternoon Sheldon,

I hope this email finds you well and enjoying some sunshine today.

Crozier has been retained to support the OPA and ZBA applications for the updated development plan for 11403 Highway 26. The plan revises the previous proposal for 66 townhouse units and instead proposes 124 stacked townhouse units. The previously approved apartment buildings are under construction and the stop light at the intersection of Highway 26 and Waterfall Lane/Prince of Wales Drive is active. We have prepared the following Terms of Reference for your acceptance regarding the preparation of a Traffic Opinion Letter and Parking Justification Study for the development.

Traffic Opinion Letter

- A Traffic Impact Study for the development was completed in July 2020, which assessed the intersection of Highway 26 and Waterfall Lane/Prince of Wales Drive under signalized conditions in the 2033 horizon. Operations were forecasted to be acceptable, with a LOS 'C', minimal delays and all 95th percentile queueing contained in the available storage.
- The change in trip generation from the 66 townhouses assessed in the 2020 TIS and the proposal for 124 stacked townhouses is 29 two-way a.m. trips and 33 two-way p.m. trips. The TOL will review the change in trip generation and qualitatively discuss the impact to the signalized intersection.
- The TOL will provide commentary on the changes to the site plan and will review items such as parking stall dimensions, aisle widths, cycling and pedestrian facilities.
- Please advise if vehicle maneuverability drawings will need to be prepared for the site.

Parking Justification Study

- The revised site plan proposed 137 parking spaces for the 124 townhouse units, which is a rate of 1.1 spaces per unit, 1 for residential and 0.1 for visitors.
- The Town's Zoning By-law required 2 spaces per single detached, semi-detached and townhouse unit. Stacked townhouses however are not independently defined in the By-law but are similar in function to both townhouses and apartments, as they share both walls and floors but have independent egress points. The Town's By-law requires 0.5 per apartment unit and 0.25 per unit for visitors.
- The PJS will review the By-Law requirements and proposed parking.
- The PJS will review Transportation Tomorrow vehicle ownership data and zoning requirements of comparable municipalities.
- The PJS will review proxy site surveys collected by Crozier in 2023 at 417 Peel Street and in 2024 at 528 Tenth Street and 172 Eighth Street in Collingwood. The rate of parking demand of these apartment buildings will be compared against the development to determine an appropriate parking rate.
- The PJS will review TDM opportunities and assess measures that may further support a reduced parking supply.

Please let me know if you have any questions or comments regarding the proposed Term of Reference. We appreciate your review.

Thank you and have a wonderful day,
Kerianne

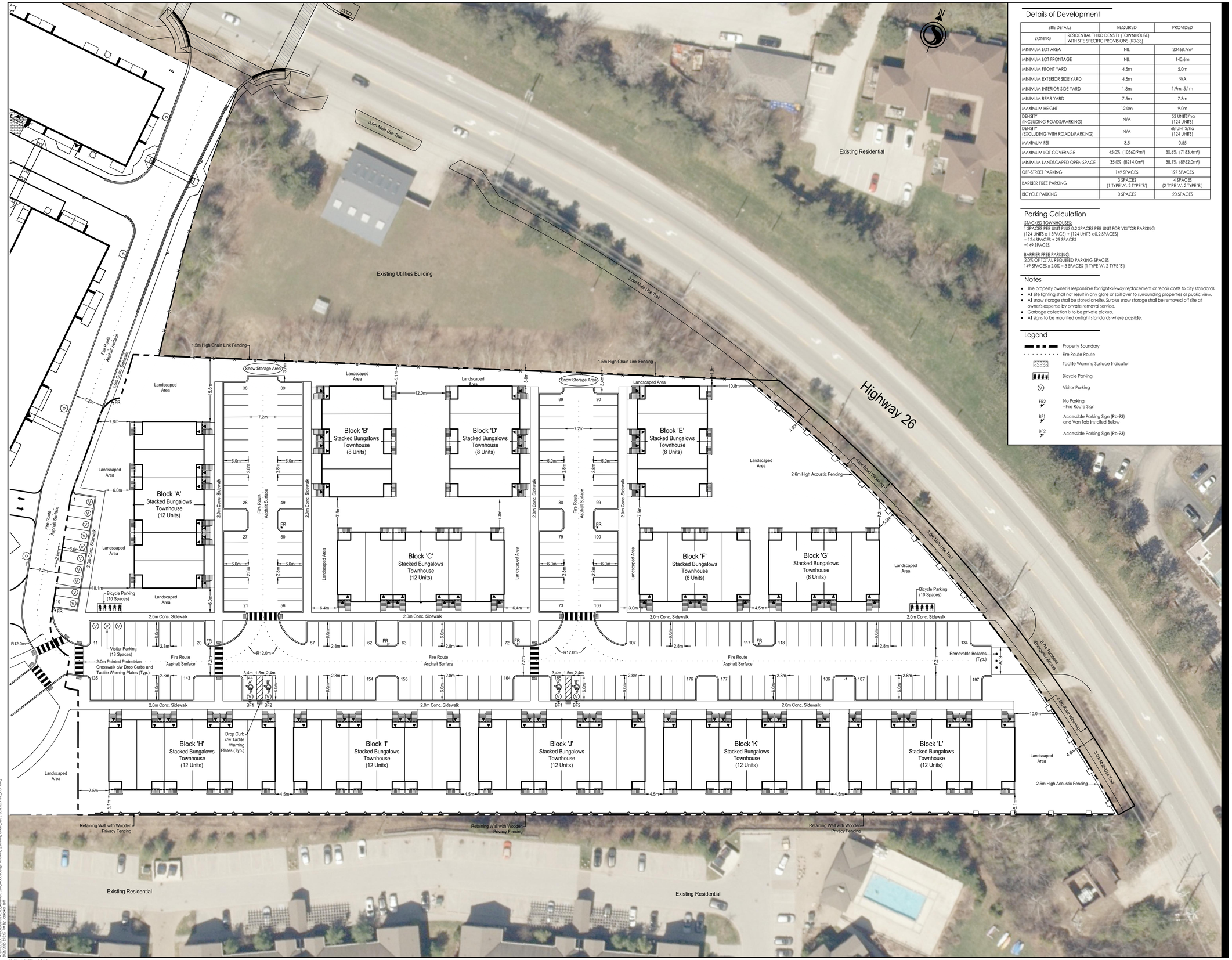
Kerianne Hagan, EIT
Engineering Intern, Transportation
Office: 705.434.3407
Collingwood | Milton | Toronto | Bradford | Guelph

Our award-winning team has done it again.
Read more about our latest recognition.

CROZIER

Attachment B

Site Plan (Stantec, August 2025)



Details of Development

SITE DETAILS	REQUIRED	PROVIDED
ZONING	RESIDENTIAL THIRD DENSITY (TOWNHOUSE) WITH SITE SPECIFIC PROVISIONS (R3-33)	
MINIMUM LOT AREA	NIL	23468.7m²
MINIMUM LOT FRONTAGE	NIL	140.6m
MINIMUM FRONT YARD	4.5m	5.0m
MINIMUM EXTERIOR SIDE YARD	4.5m	N/A
MINIMUM INTERIOR SIDE YARD	1.8m	1.9m, 5.1m
MINIMUM REAR YARD	7.5m	7.8m
MAXIMUM HEIGHT	12.0m	9.0m
DENSITY (INCLUDING ROADS/PARKING)	N/A	53 UNITS/ha (124 UNITS)
DENSITY (EXCLUDING WITH ROADS/PARKING)	N/A	68 UNITS/ha (124 UNITS)
MAXIMUM FSI	3.5	0.55
MAXIMUM LOT COVERAGE	45.0% (10560.9m²)	30.6% (7183.4m²)
MINIMUM LANDSCAPED OPEN SPACE	35.0% (8214.0m²)	38.1% (8962.0m²)
OFF-STREET PARKING	149 SPACES	197 SPACES
BARRIER FREE PARKING	3 SPACES (1 TYPE 'A', 2 TYPE 'B')	4 SPACES (2 TYPE 'A', 2 TYPE 'B')
BICYCLE PARKING	0 SPACES	20 SPACES

Parking Calculation

STACKED TOWNHOUSES:
1 SPACES PER UNIT PLUS 0.2 SPACES PER UNIT FOR VISITOR PARKING
(124 UNITS x 1 SPACE) + (124 UNITS x 0.2 SPACES)
= 124 SPACES + 25 SPACES
=149 SPACES

BARRIER FREE PARKING:
2.0% OF TOTAL REQUIRED PARKING SPACES
149 SPACES x 2.0% = 3 SPACES (1 TYPE 'A', 2 TYPE 'B')

Notes

- The property owner is responsible for right-of-way replacement or repair costs to city standards
- All site lighting shall not result in any glare or spill over to surrounding properties or public view.
- All snow storage shall be stored on-site. Surplus snow storage shall be removed off site at owner's expense by private removal service.
- Garbage collection is to be private pickup.
- All signs to be mounted on light standards where possible.

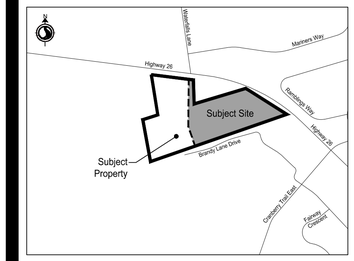
Legend

- Property Boundary
- Fire Route Route
- Tactile Warning Surface Indicator
- Bicycle Parking
- (V) Visitor Parking
- FR2 No Parking – Fire Route Sign
- BF1 Accessible Parking Sign (Rb-93) and Van Tab Installed Below
- BF2 Accessible Parking Sign (Rb-93)

Stantec

Stantec Consulting Ltd.
100-300 Hagey Boulevard
Waterloo ON N2L 0A4
Tel: (519) 579-4410
www.stantec.com

Key Map NTS.



Revision	By	Appd	YYYY.MM.DD
ISSUED FOR ZBA AND OPA	JJ	KR	2025.08.26
File Name: 160321029-555_R-SP	JJ	KR	2024.09.30
	Dwn.	Dsgn.	Chkd. YYYY.MM.DD

Permit-Seal

Client/Project
REID'S HERITAGE HOMES

REVERIE
11403 HIGHWAY 26

COLLINGWOOD, ON

Title
SITE PLAN

Project No.	Scale	Revision	Sheet	Drawing No.
160321029-555	1:400	1	1 of 1	SP-1

Attachment C

Traffic Impact Study Update (Crozier, July 2020)

TRAFFIC IMPACT STUDY

RESIDENCES AT SILVER CREEK
TOWN OF COLLINGWOOD

SKYDEVCO INC.

PREPARED BY:

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

ORIGINAL: NOVEMBER 2019

UPDATE: JULY 2020

CFCA FILE NO. 1790-5382

CROZIER
CONSULTING ENGINEERS

Revision Number	Date	Comments
Rev. 0	November 2019	First Submission
Rev. 1	July 2020	Second Submission

1.0 Executive Summary

CF Crozier & Associates Inc. (Crozier) was retained by Skydevco Inc. (the client) to complete a Traffic Impact Study for the proposed Silver Creek residential development (the site) located at 11403, 11453 and 11461 Highway 26 in the Town of Collingwood, County of Simcoe. A previous Site Plan was prepared by Travis and Associates in 2008 and comprised of 71 single family residential units on the Rolling and Mundell properties. Crozier authored the original Traffic Impact Study in February 2008.

In November 2019, a new TIS was completed based on a revised concept plan and updated turning movement counts. Comments were received from Town staff pertaining to the November 2019 submission. The Town requested an updated assessment that reviewed the expected delay at the entrance to the underground parking garage to confirm vehicles are not anticipated to back out onto Highway 26. This analysis has been completed as in included in **Section 7** of the report. The analysis concludes that the expected queues into the underground parking garage can be accommodated within the site, without interfering with the operations of Highway 26.

The analysis contained within this report is based on a previous version of the Site Plan that proposed 201 apartment units and 66 townhouse units. The Site Plan has since been revised to reflect 200 apartment units and 60 townhouse units. The change results in a decrease of three and four trips in the weekday a.m. and p.m. peak hours, respectively. Accordingly, the results and conclusions contained within this report remain valid when considering the updated Site Plan, as prepared by SRM Architects Inc. dated July 9, 2020.

The site is 5.1 hectares (12.6 acres) in size and is bounded by Highway 26 to the north, Cranberry Trail East and Brandy Lane Drive to the southeast and existing residential lands to the west. The development is proposed to consist of two four-storey apartment buildings with 200 units and 60 townhouse units. The development proposes one access to Highway 26, which will form a four-legged intersection with Waterfalls Lane and Highway 26, as well as an emergency access road to Brandy Lane Drive.

Analysis of 2017 existing traffic operations at the intersection of Highway 26 and Waterfalls Lane indicates that the intersection is operating with a LOS "A" in the weekday a.m. and p.m. peak hours, with reserve capacity for increases in traffic volumes.

The development is expected to be fully built-out by 2023. Per correspondence with the Town of Collingwood, the full build-out horizon year (2023), the five-year horizon (2028) and ten-year horizon (2033) were analyzed. To establish the 2023, 2028 and 2033 future background volumes, a growth rate of 3% was calculated based on the future total volumes established in the Collingwood Transportation Study Update (Burnside, August 2019). To provide a conservative assessment, the 3% growth rate was applied to all movements on the boundary road network.

Analysis of 2033 future background operations indicate that the intersection of Highway 26 and Waterfalls Lane is expected to operate with a LOS "B", with a maximum volume-to-capacity ratio of 0.87 (WBT – p.m.).

Per the Transportation Association of Canada (TAC) Geometric Design Guides for Canadian Roads (GDGCR) guidelines and future total traffic operations, an auxiliary eastbound right-turn lane on Highway 26 is not required to support the proposed development.

The south leg of the intersection is proposed to be constructed with an exclusive northbound left-turn lane, a shared northbound through/right-turn lane and a shared eastbound through/right-turn lane. These lane configurations are consistent with the functional design that is to be submitted as part of the planning application under separate cover. However, refinement to the lane lengths and tapers

can reasonably be expected.

Analysis of 2033 future total operations indicate that the intersection of Highway 26 and Waterfalls Lane is expected to operate at a LOS "B" and "C" in the weekday a.m. and p.m. peak hours, respectively. The addition of the site generated traffic is expected to result in a maximum increase in control delay of 0.9 seconds (p.m.), and a maximum volume-to-capacity ratio increase of 0.03 (EBT – a.m.).

These operations indicate that the intersection is expected to continue operating at good levels of service. The addition of site generated traffic to the boundary road network is expected to minimally impact the traffic operations at the study intersection.

A queuing analysis was undertaken for the operations of the underground parking garage entrance. It was determined that under normal operating conditions, the two vehicle stacking spaces provided within the driveway would be sufficient to accommodate the expected average queue of one vehicle. A sensitivity analysis was undertaken to determine the effects of higher arrival rates and lower service rates. Under scenarios where the arrival rate is doubled and the service is constant, and vice versa, the average queue was calculated to be two vehicles. The sensitivity analysis also determined that an increase in the arrival rate to 1.07 vehicles per minute (64 vehicles per hour) and a 50 percent decrease in service rate would be required before the average queue length equalled the total available stacking spaces of four vehicles. Therefore, the proposed underground parking entrance is expected to operate with minimal queues under normal conditions, with excess queuing space available should arrival rates increase and/or service rates decrease.

The analysis undertaken herein was completed on the basis of a previous version of the Site Plan that proposed 201 apartment units and 66 townhouse units. The Site Plan has since been revised to reflect 200 apartment units and 60 townhouse units. The results and conclusions contained within this report remain valid when considering the updated Site Plan, as prepared by SRM Architects Inc. dated July 9, 2020. Any minor changes to the Plan will not materially affect the conclusions contained within this report. The proposed residential development can be supported from a transportation perspective.

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Table 3: 2028 Future Background Level of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th %ile Queues > Storage
Highway 26 and Waterfalls Lane	Signal	A.M.	A	8.7 s	0.54 (EBT)	None
		P.M.	B	13.5 s	0.74 (WBT)	None

Note[1]: The Level of Service of a signalized intersection is based on the average control delay per vehicle.
Note[2]: The maximum v/c ratio represents the maximum v/c ratio for the minor road approach movements at the intersection.

Table 4: 2033 Future Background Level of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th %ile Queues > Storage
Highway 26 and Waterfalls Lane	Signal	A.M.	B	11.2 s	0.63 (EBT)	None
		P.M.	B	19.1 s	0.87 (WBT)	None

Note[1]: The Level of Service of a signalized intersection is based on the average control delay per vehicle.
Note[2]: The maximum v/c ratio represents the maximum v/c ratio for the minor road approach movements at the intersection.

The intersection of Highway 26 and Waterfalls Lane is expected to operate at a LOS "B" under 2033 future background traffic volume conditions. The intersection is anticipated to experience a maximum control delay of 19.1 seconds (p.m.) and volume-to-capacity ratio of 0.87 (WBT – p.m.). No movements are expected to operate with 95th percentile queue lengths exceeding the available storage lengths. These metrics indicate that the intersections are anticipated to continue operating well, with reserve capacity for increased traffic volumes.

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 following trip generation calculations for the residential development were conducted based on a previous version of the Site Plan that proposed 201 apartment units and 66 townhouse units. The Site Plan has since been revised to reflect 200 apartment units and 60 townhouse units. The change results in a decrease of three and four trips in the weekday a.m. and p.m. peak hours, respectively. Accordingly, the results and conclusions contained within this report remain valid when considering the updated Site Plan, as prepared by SRM Architects Inc. dated July 9, 2020.

The trips generated by the proposed development were forecasted using the information provided in the ITE Trip Generation Manual, 10th Edition. Specifically, Land Use Category 220: Multifamily Housing (Low-Rise) and Land Use Category 221: Multifamily Housing (Mid-Rise) were used to forecast the trip generation of the townhouses and apartments, respectively. The trip generation for each land use is summarized in **Table 5** below. Relevant excerpts from the ITE Trip Generation Manual, 10th Edition have been included as **Appendix H**.

Table 5: Development Trip Generation

Block	Roadway Peak Hour	Weekday Trips		
		Inbound	Outbound	Total
L.U. 220: Multifamily Housing (Low-Rise) (66 Units)	Weekday A.M.	7	25	32
	Weekday P.M.	26	15	41
L.U. 221: Multifamily Housing (Mid-Rise) (201 Units)	Weekday A.M.	18	54	72
	Weekday P.M.	54	34	88
Total	**Weekday A.M.**	**25**	**79**	**104**
	Weekday P.M.	**80**	**49**	**129**

5.2 Trip Distribution and Assignment

The trips generated by the proposed development were distributed to the boundary road network based on observed travel patterns on the boundary road network and the location of employment, retail and commercial destinations for trips within the Town of Collingwood. With the Town of Collingwood Downtown Core and Western Commercial Node located to the east of the subject lands, approximately 70 percent of trips were assumed to arrive from and depart to the east. The remaining 30 percent were assigned to Highway 26 west. This distribution is consistent with those observed at nearby intersections including Highway 26 with Cranberry Trail East, Vacation Inn Drive, Cranberry Trail West and Silver Glen Boulevard.

The trips generated by the proposed development were assigned to the boundary road network as per the distribution illustrated in **Figure 7**. The trip assignment is illustrated in **Figure 8**.

6.0 Total Future 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 8**, being superimposed on the future background traffic volumes in **Figures 4, 5** and **6**. The resulting total traffic volumes for the weekday a.m. and p.m. peak hours are illustrated in **Figures 9, 10** and **11** for the 2023, 2028 and 2033 horizon years.

6.2 Auxiliary Right-Turn Lane Analysis

The eastbound right-turn movement from Highway 26 into the Site Access 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" at signalized intersections in rural and urban areas. **Table 6** summarizes the results of the eastbound right-turn lane warrant analysis.

Table 6: 2033 Future Total Eastbound Right-turn Lane Warrant

Intersection	Roadway Peak Hour	V_A	V_{RT}	$\%V_{RT}$	Warranted
Highway 26 and Waterfalls Lane	Weekday A.M.	831	8	1%	No
	Weekday P.M.	993	24	2%	No

To confirm this, a scenario was conducted under 2033 future total conditions in the weekday a.m and p.m. peak hour assuming an auxiliary eastbound right-turn lane with a minimum storage length requirement of 15 metres. It was determined that the volume-to-capacity ratio for the eastbound through movement is expected to decrease from 0.66 to 0.65 and from 0.78 to 0.76 in the a.m. and p.m. peak hours, respectively, with the implementation of an auxiliary eastbound right-turn lane.

This decrease in volume-to-capacity ratio can be considered negligible, indicating that eastbound right-turn vehicles are expected to minimally impact eastbound through vehicles. Therefore, an auxiliary eastbound right-turn lane at Highway 26 and Waterfalls Lane/the Site Access is not required per TAC GDGCR guidelines and the minimal delays to eastbound through vehicles. **Appendix F** contains the detailed capacity analysis worksheets.

6.3 Intersection Modelling

With the construction of a south leg at the intersection of Highway 26 and Waterfalls Lane, the intersection will now experience westbound left-turn movements. There is currently a two-way centre left-turn lane spanning Highway 26. Accordingly, the storage length was modelled as 20 metres, the minimum per OTM Book 11, and also consistent with the eastbound left-turn lane storage length. The 20-metre storage length was deemed acceptable as the maximum 95th percentile queue length for the westbound left-turn movement is forecasted to be 11.9 metres in length.

The new south leg of the intersection of Highway 26 and Waterfalls Lane was modelled with an exclusive northbound left-turn lane with a storage length of 20 metres, and a shared northbound through/right-turn lane. The existing southbound right-turn lane on Waterfalls Lane is assumed to function as a shared southbound through/right-turn lane, all though no trips have been assigned to the northbound and southbound through movements. The south leg would also incorporate vehicle detection to maintain the semi-actuated function of the intersection.

The intersection is currently undergoing detail design, and a functional design is to be submitted as part of the planning application under separate cover. The lane configurations described above are consistent with the functional design. However, refinement to lane lengths and tapers can reasonably be expected.

6.4 Intersection Operations

Table 7, Table 8 and Table 9 outline the 2023, 2028 and 2033 future total traffic levels of service, respectively, based on the traffic volumes illustrated in **Figures 9, 10** and **11.** The level of service definitions are included in **Appendix E**, with detailed capacity analysis worksheets included in **Appendix F**.

Table 7: 2023 Future Total Level of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th %ile Queues > Storage
Highway 26 and Waterfalls Lane/the Site Access	Signal	A.M.	A	7.9 s	0.49 (EBT)	None
		P.M.	B	10.6 s	0.65 (WBT)	None

Note[1]: The Level of Service of a signalized intersection is based on the average control delay per vehicle.
Note[2]: The maximum v/c ratio represents the maximum v/c ratio for the minor road approach movements at the intersection.

Table 8: 2028 Future Total Level of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th %ile Queues > Storage
Highway 26 and Waterfalls Lane/the Site Access	Signal	A.M.	A	9.2 s	0.57 (EBT)	None
		P.M.	B	14.1 s	0.76 (WBT)	None

Note[1]: The Level of Service of a signalized intersection is based on the average control delay per vehicle.
Note[2]: The maximum v/c ratio represents the maximum v/c ratio for the minor road approach movements at the intersection.

Table 9: 2033 Future Total Level of Service

Intersection	Control	Peak Hour	Level of Service [1]	Control Delay	Maximum v/c ratio [2]	95th %ile Queues > Storage
Highway 26 and Waterfalls Lane/the Site Access	Signal	A.M.	B	11.8 s	0.66 (EBT)	None
		P.M.	C	20.0 s	0.88 (WBT)	None

Note[1]: The Level of Service of a signalized intersection is based on the average control delay per vehicle.
Note[2]: The maximum v/c ratio represents the maximum v/c ratio for the minor road approach movements at the intersection.

The intersection of Highway 26 and Waterfalls Lane/the Site Access is expected to operate at a LOS "B" and "C" in the weekday a.m. and p.m. peak hours, respectively. While the intersection is expected to change from a LOS "B" to "C" between future background and future total conditions in the p.m. peak hour, the increase in delay is only 0.9 seconds. Furthermore, the addition of the site generated traffic is expected to result in a maximum increase in volume-to-capacity ratio of 0.03 (EBT – a.m.). All turning movements are expected to operate with 95th percentile queue lengths that can be contained within the available storage length.

These operations indicate that the intersection is expected to continue operating at good levels of service. The addition of site generated traffic to the boundary road network is expected to minimally impact the traffic operations at the study intersection.

7.0 Underground Parking Garage Queuing Analysis

As requested by the Town, an analysis of the future operations of the underground parking garage entrance was undertaken to determine whether the proposed queuing area is sufficient to accommodate the future vehicular demand.

M/D/1 queue analysis assumes exponentially distributed times between the arrivals of successive vehicles, which is a more realistic representation than the assumption of uniformly distributed arrival times and will predict queuing when the arrival rate is less than the service rate.

Per the Site Plan dated dated July 9, 2020, the access to the parking garage is approximately 12 metres between the building façade and the main internal driveway, which can accommodate two passenger vehicles. From that point, there is also an additional 15 metres of the main internal driveway prior to the crosswalk at Highway 26 to accommodate two additional passenger vehicles.

It was confirmed by the architect that the entry to the proposed underground parking garage will be a traditional overhead garage door which would be activated by a unique FOB provided to each resident. To determine the service rate, a local commercial/residential garage door supplier/installer was contacted to understand typical door speeds.

APPENDIX A

Correspondence

process. Should you require any further information, please feel free to contact the undersigned.

Sincerely,

Emma Perry
NVCA Planner II

MEMORANDUM

To: Kandas Bondarchuk
From: Stuart West
Date: January 24, 2020
Subject: Residences at Silver Creek (Rollings) Development
Preconsultation Application #2
File No.: D00-27-19

Documents received:

- Town of Collingwood, Preconsultation Application form;
- Cover Letter, prepared by Colin Travis, dated November 28, 2019;
- Site Plan, prepared by Masri O Inc. Architects, dated November 29, 2019;
- Concept Elevation, prepared by Masri O Inc. Architects, dated November 29, 2019;
- Shadow Analysis Diagrams, prepared by Masri O Inc., dated November 29, 2019;
- Conceptual Servicing Plan & Conceptual Grading Plan, prepared by Crozier & Associates, dated November 29, 2019;
- Intersection Improvement – Functional Design, prepared by Crozier & Associates, dated November 28, 2019;
- Traffic Impact Study, prepared by Crozier & Associates, dated November 2019;
- Ground Water Level Monitoring, prepared by Peto MacCallum Ltd., dated November 29, 2019;
- Natural Hazards Study Addendum, prepared by Crozier & Associates, dated November 29, 2019;
- Scoped Environmental Impact Statement Update, prepared by Crozier & Associates, dated November 2019;
- Landscape Design Intent, prepared by Crozier & Associates, dated November 11, 2019;
- Various Historical Reports, prepared in 2007 for supporting OPA/ZBA;

Engineering Services Comments:

New comments, based on supporting information provided as part of this application:

1. No apparent stormwater quality or quantity controls are shown on the conceptual Servicing Plan, however we assume the intent will become clearer at the site plan application stage.
2. An encroachment agreement would likely be considered necessary for a private storm sewer within a public ROW.
3. Minimum width of private condominium roads are to be 7.2m wide.
4. Generally the design of the intersection should follow the intentions of the design for Cranberry Trail East & Hwy 26 (with a different developer), to ensure consistency between the two intersections.
5. The Town will review whether an easement or encroachment agreement will be necessary for the entrance encroachment into the Carmichael Reservoir lands.
6. The location of the curb on the north side of Hwy 26 should be located similarly to the curb on the south side of Hwy 26 (adjacent to the 2.0m paved shoulder). This would allow an unobstructed path for pedestrians and bicycles along the shoulder of the road. The curb & gutter, outlet, and rip-rap is currently shown as blocking this access on the north side.
7. The Town of Collingwood would like tactile strips installed at Bus Stops.
8. The dashed white lines denoting the shoulders of Hwy 26 should be a solid white line.
9. Based on 80 trips/hour inbound to the site (approximately 1.3 trips/minute) during the peak hour on a weekday afternoon (as summarized in the TIS), what kind of delay can be expected at the entrance to the underground parking garage? Our concerns would be cars queuing at the entrance to the underground parking garage, and backing out onto Hwy 26, if several cars were to enter the site at the same time. We would suggest revising the location of the underground parking ramp.
10. The height mitigation drawings will need to account for the difference in elevation based on proposed finished grade. We note that there will be approximately 2.0m of fill, which should be identified on Section 01 to Section 04.
11. A construction management plan is to be submitted before execution of the site plan agreement. The scope of this report is identified in the attached document on the last page.
12. Cost of construction securities for the development will need to be provided for asphalt, granular materials, concrete curbs & sidewalks, sediment & erosion controls, landscaping quantities, all watermain infrastructure and all external works. A 3% Engineering Review fee is based on security costs or a minimum of $4,000.00.

<u>Previous Engineering Services Comments, based on 2019/2018 Preconsultation:</u>

13. Buildings should be flood proofed a minimum of 0.3m above the regional high water level of Cranberry Marsh.
14. Town's policy is that all buildings have a minimum 0.5m separation between the Seasonal High Groundwater Level and the <u>Underside of Basement Slab.</u> Groundwater monitoring must be completed with at least two typical rainfall seasons (spring and fall). Groundwater monitoring conclusions and recommendations to be included in the Geotechnical report for this development.

15. A signal plan, intersection improvements, and PHM-125 would be required for the Hwy 26 intersection.
16. Confirm if the second entrance to Brandy Lane is feasible since both roads appear to be private condominium roads. We assume easements would need to be granted by the external property owners. Otherwise, an emergency connection to Hwy 26 will be required.
17. A 4.6m wide road widening is required on Hwy 26 (as shown on the concept plan).
18. A Stormwater Management Report will need to be submitted on behalf of the development addressing post to pre quantity and quality control measures. Storm outlet improvements must be addressed in the report along with quality controls. Flood hazards (high water level) from the Cranberry Marsh should be identified.
19. We note that this site is located within NVCA jurisdictional boundaries and will be subject to their review and comments.
20. Sanitary servicing and downstream capacity to be confirmed through the Town's sanitary model. Modeling work will be conducted by the Town's consultant at the developer's expense. The engineering consultant is to provide notice when the Town should initiate this review.
21. We note that during the Town's Highway 26 Reconstruction project, the Town was given direction to provide only a single residential sized sanitary service to this property. We understand from the applicants that it is likely that a 200mm sanitary service was actually installed, but this should be confirmed by the Owner.

Studies required to be submitted for the proposed development:

- Stormwater Management Report
- Functional Servicing Report
- Traffic Impact Study
- Noise Study
- Geotechnical report
- Construction Management Plan

Sincerely,

Stuart West P.Eng.
Engineering Services
705-445-1292 Ext. 4202 | swest@collingwood.ca

Darren Loro

From: Madeleine Ferguson
Sent: September-27-17 9:39 AM
To: Darren Loro
Subject: FW: Silver Creek TIS - Terms of Reference (CFC#539-4184)

FYI

| **MADELEINE FERGUSON** E.I.T. | C.F. CROZIER & ASSOCIATES
| 40 Huron Street, Suite 301 | Collingwood, ON L9Y 4R3
| cfcrozier.ca | mferguson@cfcrozier.ca | tel 705 446 3510

CROZIER & ASSOCIATES Consulting Engineers
Land development engineering, from the ground up.
Water Resources · Transportation · Structural · Mechanical · Electrical · Building Science

---

From: Madeleine Ferguson
Sent: Wednesday, August 02, 2017 2:29 PM
To: 'John Velick' <jvelick@collingwood.ca>
Cc: Herb Lemon <hlemon@collingwood.ca>
Subject: RE: Silver Creek TIS - Terms of Reference (CFC#539-4184)

Hi John,

Thanks so much for getting back to us. My apologies, the Terms should read an ***eastbound*** right-turn lane. We will adjust our assumptions to include the additional horizon year and record signal timings in the field for use in our analysis.

Have a great day,

| **MADELEINE FERGUSON** E.I.T. | C.F. CROZIER & ASSOCIATES
| 40 Huron Street, Suite 301 | Collingwood, ON L9Y 4R3
| cfcrozier.ca | mferguson@cfcrozier.ca | tel 705 446 3510

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Land development engineering, from the ground up.
Water Resources · Transportation · Structural · Mechanical · Electrical · Building Science

From: John Velick [mailto:jvelick@collingwood.ca]
Sent: Wednesday, August 02, 2017 2:26 PM
To: Madeleine Ferguson <mferguson@cfcrozier.ca>
Cc: Herb Lemon <hlemon@collingwood.ca>
Subject: RE: Silver Creek TIS - Terms of Reference (CFC#539-4184)

Hi Madeleine,

The study horizons should include full build out as well as 5 and 10 year horizons. Other than that, everything else looks good.

I am not sure what you are referring to with respect to the westbound right turn lane. Is that a right turn out of Lighthouse Point? Regardless, the study should analyze all approaches.

I checked the cabinet for some timing plans but could only find the originals that were marked up several times and very confusing; I wouldn't trust them. You will have to record on site. I did find the PHM-125 drawing which I have attached for your reference.

Thank you,

John

John Velick P.Eng.
Manager, Engineering Services

Town of Collingwood
P.O. Box 157, 545 Tenth Line North
Collingwood, ON L9Y 3Z5
705-445-1292 Ext. 4209
jvelick@collingwood.ca | www.collingwood.ca

From: Madeleine Ferguson [mailto:mferguson@cfcrozier.ca]
Sent: Tuesday, July 25, 2017 2:50 PM
To: John Velick
Subject: Silver Creek TIS - Terms of Reference (CFC#539-4184)

Hi John,

I am emailing you to follow up with the voicemail I left earlier this afternoon. C.F. Crozier & Associates has been retained to complete a revised TIS and NIA for the Silver Creek residential development, previously referred to as the Rollings/Mundell Property and The Courts of Glengarry. The original TIS and NIA were submitted in 2008, with the second TIS submitted in 2013. The subject lands are located south of the intersection of Highway 26 and Waterfalls Lane and west of Cranberry Trail East. The development proposes a 5-storey apartment building with 201 units, a 4-storey condo building with 24 units, and 42 townhouse/duplex units.

The primary purpose of the study will be to confirm the adequacy of the signalized intersection to provide access to the site, and whether a westbound right-turn lane will be required.

With this in mind, we propose the following terms of reference for the TIS:

1. The intersection of Highway 26 and Waterfalls Lane and the proposed Site Access will be analyzed in the summer Friday a.m. and p.m. peak hours (7a.m. to 10 a.m. and 4 p.m. to 7 p.m.);

2. The project team will establish and coordinate with the stakeholders' intersection functional signal layout and placement;

3. The study horizon of five years (2022) is assumed to capture full buildout of the development, and will be analyzed;

4. Future traffic volumes will be calculated using an annual compound growth rate of 5.4 percent. This growth rate is consistent with that used in the "Courts of Glengarry Residential Development TIS" completed in January, 2013 by Crozier staff. This assumption aligns with the "Collingwood Transportation Study" (C.C. Tatham & Associates Inc., July 2012). This growth rate accounts for general traffic growth, traffic generation from land development, and traffic diversion from roadway improvements;

5. Using Institute of Transportation Engineer's data, the trip generation characteristics of the residential development will be forecasted and applied to the boundary road network;

6. A trip distribution of 70 percent eastbound and 30 percent westbound will be used, as described in the "Courts of Glengarry Residential Development TIS" (Crozier, 2013);

7. Auxiliary lane warrants will be undertaken to determine the transportation improvements required at the intersection;

We appreciate any feedback you may have on this approach, and kindly request recent signal timings for the intersection of Highway 26 and Waterfalls Lane. Should signal timings not be available, we will use field measurements.

If you have any questions, please do not hesitate to give us a call.

Thanks and Best Regards,

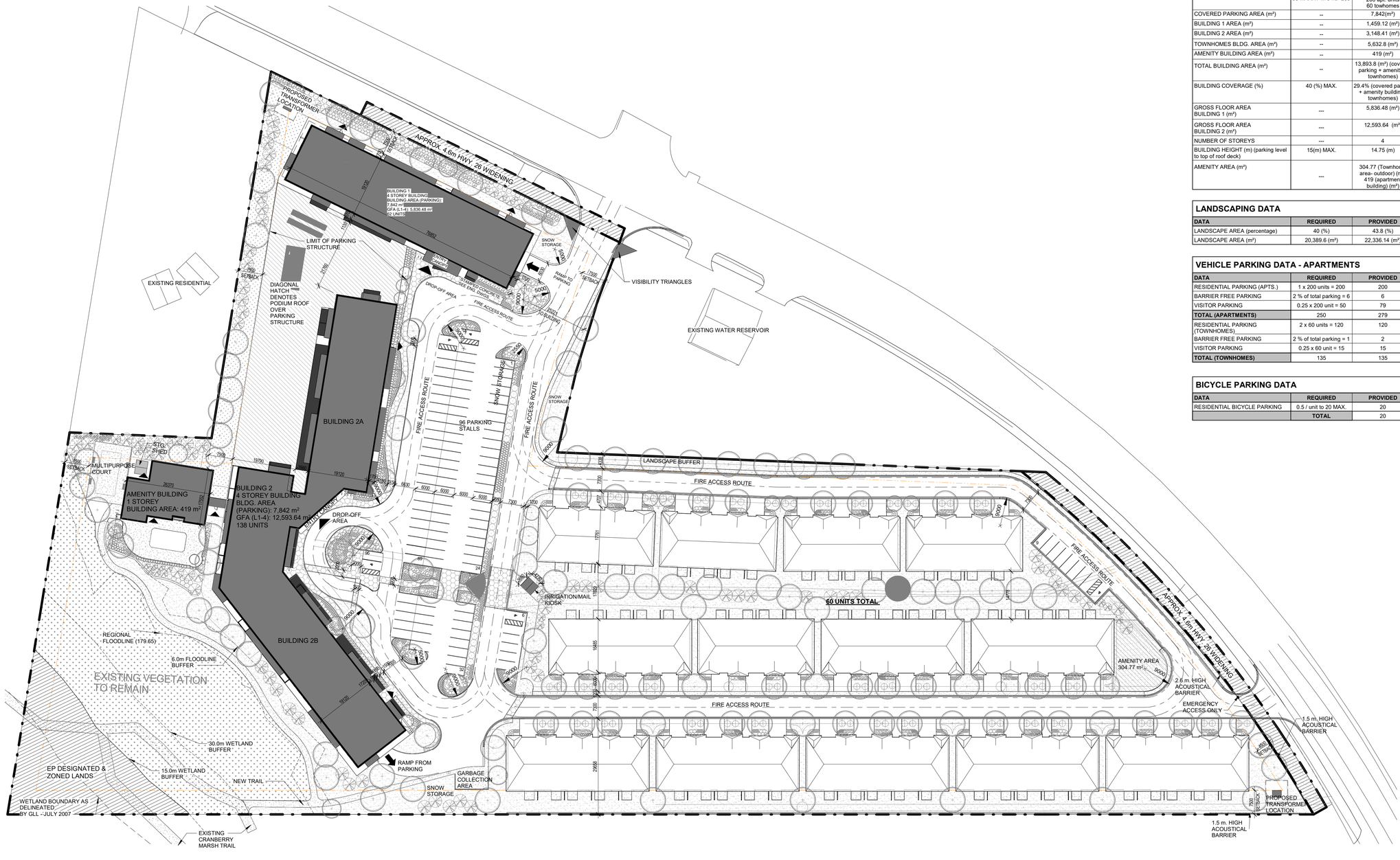
| **MADELEINE FERGUSON** E.I.T. | C.F. CROZIER & ASSOCIATES
| 40 Huron Street, Suite 301 | Collingwood, ON L9Y 4R3
| cfcrozier.ca | mferguson@cfcrozier.ca | tel 705 446 3510

CROZIER & ASSOCIATES Consulting Engineers

Land development engineering, from the ground up.

Water Resources · Transportation · Structural · Mechanical · Electrical · Building Science

Figures



1 SITE PLAN
1 : 600

SITE DATA

11403, 11453, & 11461 Hwy 26 W., Collingwood

DATA		REQUIRED	PROVIDED
ZONING		ZONING - R3-33	
LOT AREA (m²)		50,974(m²) (5.1ha.)	
ROAD WIDENING (m²)		1,047(m²)	
EP LANDS (m²)		2,614.41 (m²)	
NET LOT AREA (m²)		47,313(m²)	
MIN. FRONTAGE (m²)		30 (m)	183.4 (m)
SETBACKS	FRONT YARD (m)	7.5 (m)	7.5 (m)
	INTERIOR SIDE YARD (m)	7.5 (m)	7.5 (m)
	EXTERIOR SIDE YARD (m)	4.5 (m)	4.5 (m)
	REAR YARD (m)	7.5 (m)	7.5 (m)

BUILDING DATA

DATA	REQUIRED	PROVIDED
TOTAL DENSITY (# of units/NET ha.)	20 MIN. x 4.73 ha- 94 55 MAX. x 4.73 ha- 260	260 (units) 200 apt. units 60 townhomes
COVERED PARKING AREA (m²)	--	7,842(m²)
BUILDING 1 AREA (m²)	--	1,459.12 (m²)
BUILDING 2 AREA (m²)	--	3,148.41 (m²)
TOWNHOMES BLDG. AREA (m²)	--	5,632.8 (m²)
AMENITY BUILDING AREA (m²)	--	419 (m²)
TOTAL BUILDING AREA (m²)	--	13,893.8 (m²) (covered parking + amenity + townhomes)
BUILDING COVERAGE (%)	40 (%) MAX.	29.4% (covered parking + amenity building+ townhomes)
GROSS FLOOR AREA BUILDING 1 (m²)	---	5,836.48 (m²)
GROSS FLOOR AREA BUILDING 2 (m²)	---	12,593.64 (m²)
NUMBER OF STOREYS	---	4
BUILDING HEIGHT (m) (parking level to top of roof deck)	15(m) MAX.	14.75 (m)
AMENITY AREA (m²)	---	304.77 (Townhome area- outdoor) (m²) 419 (apartment building) (m²)

LANDSCAPING DATA

DATA	REQUIRED	PROVIDED
LANDSCAPE AREA (percentage)	40 (%)	43.8 (%)
LANDSCAPE AREA (m²)	20,389.6 (m²)	22,336.14 (m²)

VEHICLE PARKING DATA - APARTMENTS

DATA	REQUIRED	PROVIDED
RESIDENTIAL PARKING (APTS.)	1 x 200 units = 200	200
BARRIER FREE PARKING	2 % of total parking = 6	6
VISITOR PARKING	0.25 x 200 unit = 50	79
TOTAL (APARTMENTS)	250	279
RESIDENTIAL PARKING (TOWNHOMES)	2 x 60 units = 120	120
BARRIER FREE PARKING	2 % of total parking = 1	2
VISITOR PARKING	0.25 x 60 unit = 15	15
TOTAL (TOWNHOMES)	135	135

BICYCLE PARKING DATA

DATA	REQUIRED	PROVIDED
RESIDENTIAL BICYCLE PARKING	0.5 / unit to 20 MAX.	20
	TOTAL	20

Project North **True North**

GENERAL NOTES

1. **DO NOT SCALE DRAWINGS**. WRITTEN DIMENSIONS SHALL HAVE PRECEDENCE OVER SCALED DIMENSIONS.
2. ALL WORK SHALL COMPLY WITH THE 2012 ONTARIO BUILDING CODE AND AMENDMENTS.
3. CONTRACTORS MUST CHECK AND VERIFY ALL DIMENSIONS AND SPECIFICATIONS AND REPORT ANY DISCREPANCIES TO THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.
4. ALL CONTRACTORS AND SUB-CONTRACTORS SHALL HAVE A SET OF APPROVED CONSTRUCTION DOCUMENTS ON SITE AT ALL TIMES.
5. ALL DOCUMENTS REMAIN THE PROPERTY OF THE ARCHITECT. UNAUTHORIZED USE, MODIFICATION, AND/OR REPRODUCTION OF THESE DOCUMENTS IS PROHIBITED WITHOUT WRITTEN PERMISSION. THE CONTRACT DOCUMENTS WERE PREPARED BY THE CONSULTANT FOR THE ACCOUNT OF THE OWNER.
6. THE MATERIAL CONTAINED HEREIN REFLECTS THE CONSULTANTS BEST JUDGEMENT IN LIGHT OF THE INFORMATION AVAILABLE TO HIM AT THE TIME OF PREPARATION. ANY USE WHICH A THIRD PARTY MAKES OF THE CONTRACT DOCUMENTS, OR ANY RELIANCE ON/OR DECISIONS TO BE MADE BASED ON THEM ARE THE RESPONSIBILITY OF SUCH THIRD PARTIES.
7. THE CONSULTANT ACCEPTS NO RESPONSIBILITY FOR DAMAGES, IF ANY, SUFFERED BY ANY THIRD PARTY AS A RESULT OF DECISIONS MADE OR ACTIONS BASED ON THE CONTRACT DOCUMENTS.

No.	Date	Revision
2	2020-07-09	ISSUED TO CONSULTANTS
1	2020-07-02	ISSUED TO CONSULTANTS

srm ARCHITECTS INC.

Project No 20027
Project Date
Drawn by MJM
Checked by Checker
Plot Date / Time 2020-07-09 3:14:26 PM

RESIDENCES AT SILVERCREEK
11403,11453,11461 HWY. 26 COLLINGWOOD, ON.

SITE PLAN

Drawing Scale As indicated
Status
Drawing No. A1.1 Revision No.

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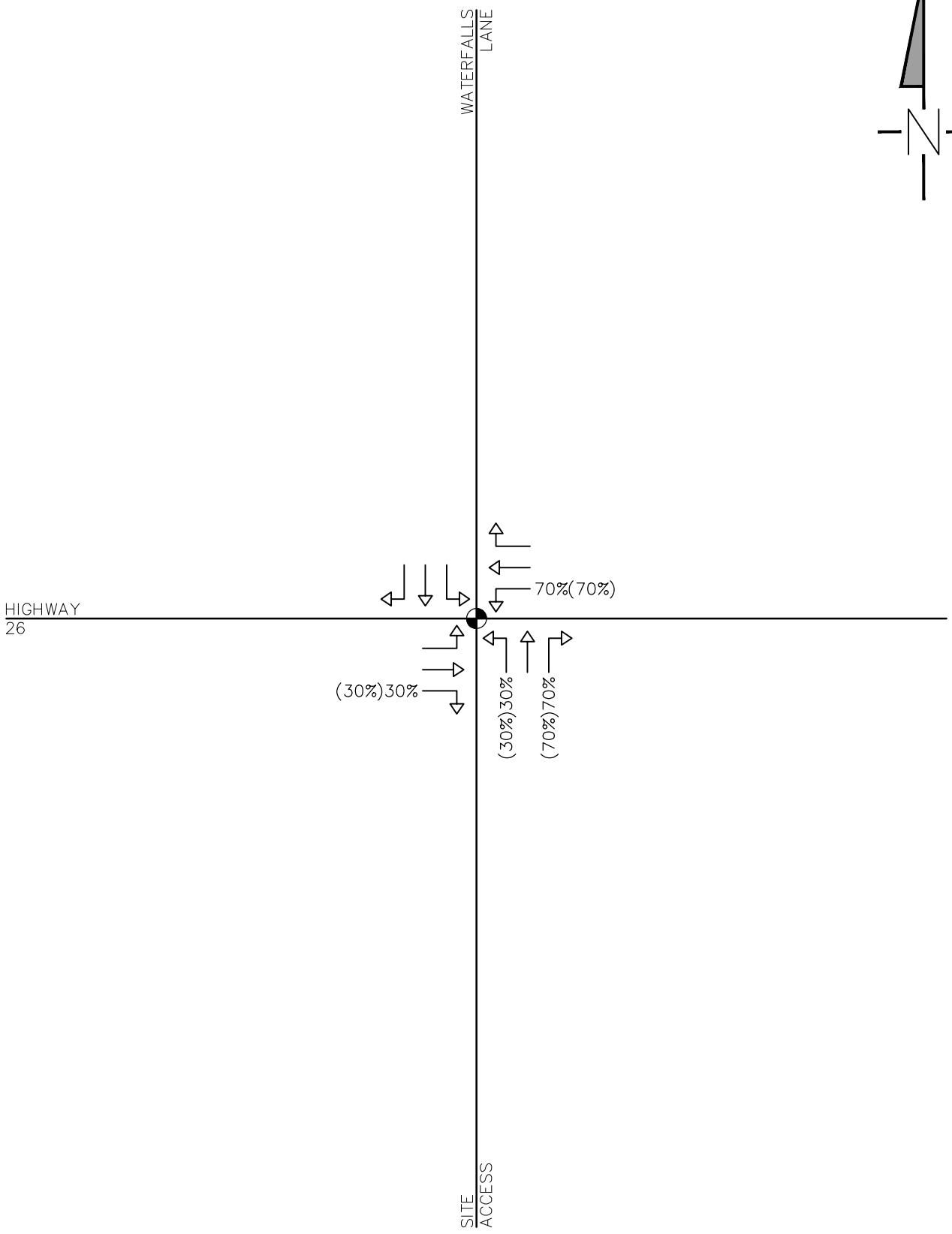


NOTE: THIS FIGURE IS FOR SCHEMATIC PURPOSES ONLY & IS NOT TO BE SCALED.

Legend

SIGNAL CONTROL

XX%(YY%) WEEKDAY AM (WEEKDAY PM)

Project

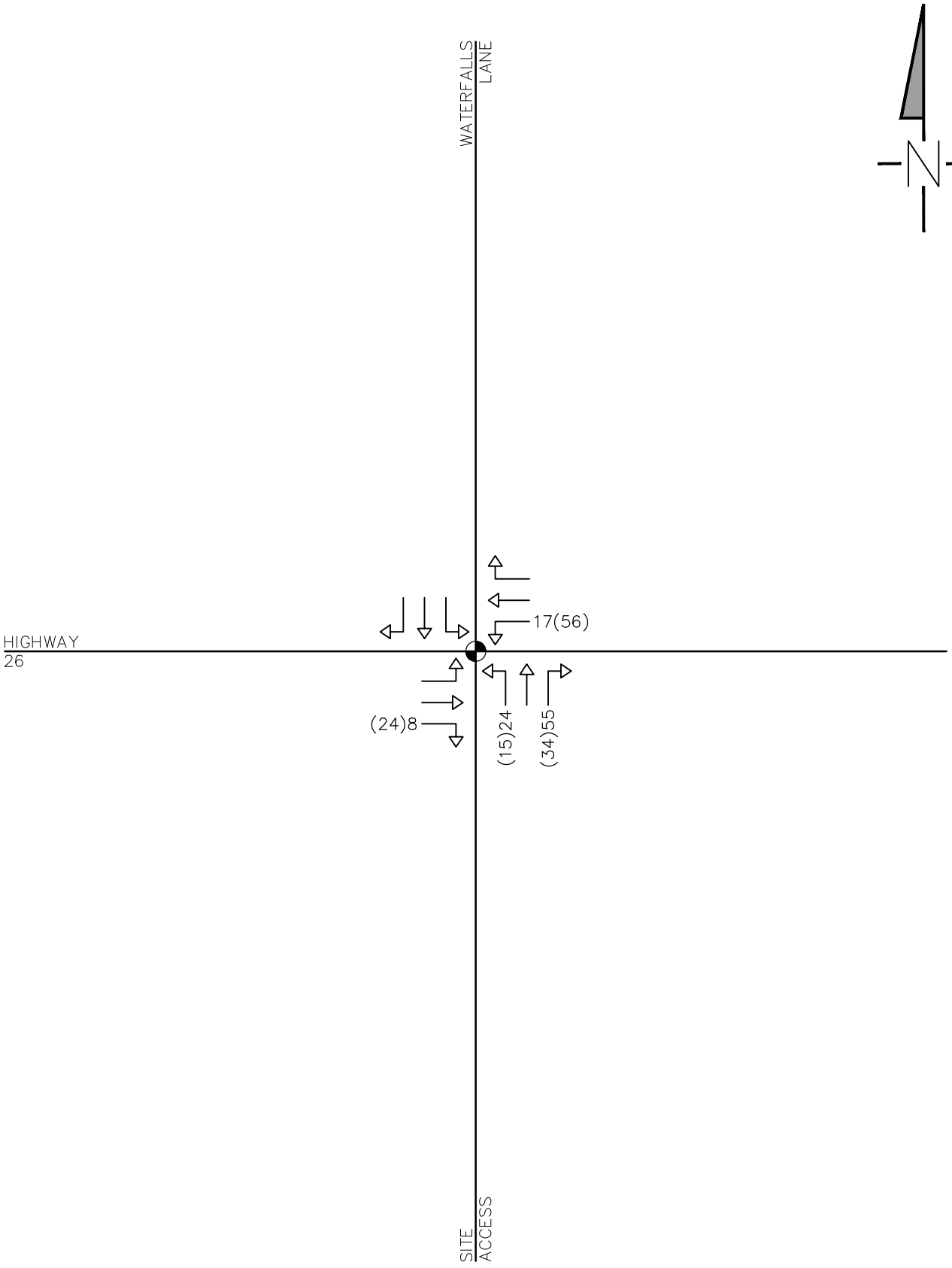
RESIDENCES AT SILVER CREEK

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	Design By	Project	
S.A.	M.F.		1790-5382
Scale	Date	Check By	Drawing
N.T.S.	NOV. 26, 2019	M.F.	FIG. 7



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

Legend

SIGNAL CONTROL

XX(YY) WEEKDAY AM (WEEKDAY PM)

Project

RESIDENCES AT SILVER CREEK

Drawing

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
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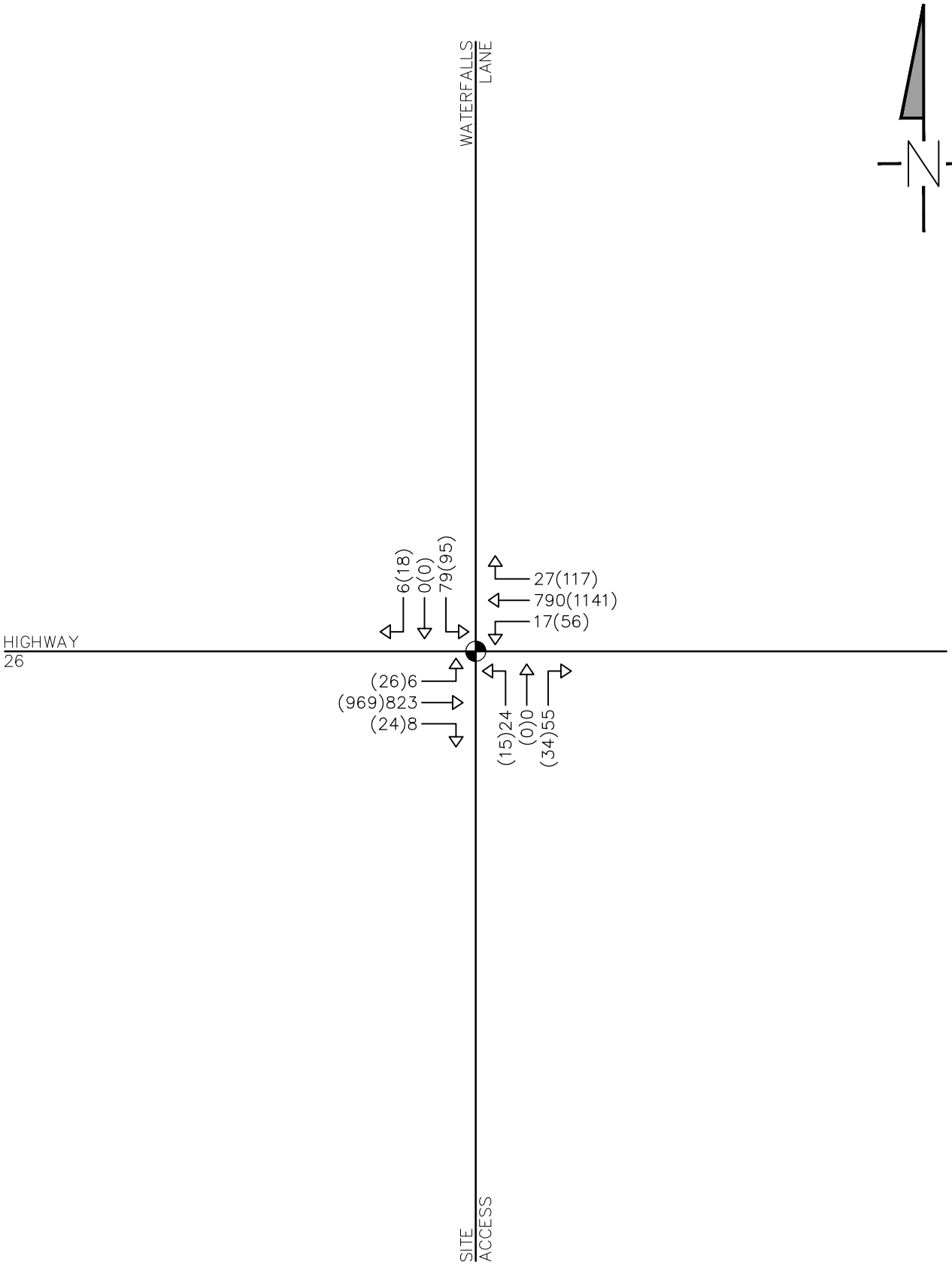
Drawn By	Design By	Project	Scale	Date	Check By	Drawing
S.A.	M.F.	1790-5382	N.T.S.	NOV. 26, 2019	M.F.	FIG. 8



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

Legend

SIGNAL CONTROL

XX(YY) WEEKDAY AM (WEEKDAY PM)

Project

RESIDENCES AT SILVER CREEK

Drawing

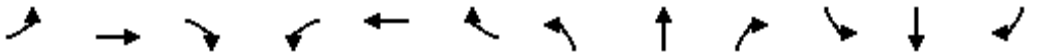
2033 FUTURE TOTAL TRAFFIC VOLUMES

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	Design By	Project	
S.A.	M.F.		1790-5382
Scale	Date	Check By	Drawing
N.T.S.	NOV. 26, 2019	M.F.	FIG. 11

Attachment D

Synchro Capacity Worksheets



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	823	8	17	790	27	24	0	55	79	0	6
Future Volume (vph)	6	823	8	17	790	27	24	0	55	79	0	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	4.0	3.5	3.5	4.0	3.5	3.2	3.5	3.5	3.5	4.0	4.0	4.0
Storage Length (m)	20.0		0.0	20.0		50.0	20.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	20.0			20.0			35.0			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850		0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1885	1823	0	1848	1824	1543	1750	1566	0	1885	1687	0
Flt Permitted	0.264			0.239			0.754			0.719		
Satd. Flow (perm)	524	1823	0	465	1824	1543	1389	1566	0	1427	1687	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				27		93			103	
Link Speed (k/h)		60			60			50			30	
Link Distance (m)		178.5			220.6			76.7			93.2	
Travel Time (s)		10.7			13.2			5.5			11.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	3%	2%	2%	3%	0%	2%	2%	2%	0%	2%	0%
Adj. Flow (vph)	6	866	8	18	832	28	25	0	58	83	0	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	874	0	18	832	28	25	58	0	83	6	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.94	1.01	1.01	0.94	1.01	1.06	1.01	1.01	1.01	0.94	0.94	0.94
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru			Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		10.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
Minimum Split (s)	35.0	35.0		35.0	35.0	35.0	25.0	25.0		25.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0	35.0	25.0	25.0		25.0	25.0	
Total Split (%)	58.3%	58.3%		58.3%	58.3%	58.3%	41.7%	41.7%		41.7%	41.7%	
Maximum Green (s)	28.0	28.0		28.0	28.0	28.0	21.0	21.0		21.0	21.0	
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	2.0	2.0		2.0	2.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max	Max	None	None		None	None	
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	19.0	19.0		19.0	19.0	19.0	12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	37.0	37.0		37.0	37.0	37.0	12.0	12.0		12.0	12.0	
Actuated g/C Ratio	0.73	0.73		0.73	0.73	0.73	0.24	0.24		0.24	0.24	
v/c Ratio	0.02	0.66		0.05	0.62	0.02	0.08	0.13		0.25	0.01	
Control Delay	5.5	12.4		6.1	11.4	2.7	16.0	2.9		18.2	0.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	5.5	12.4		6.1	11.4	2.7	16.0	2.9		18.2	0.0	
LOS	A	B		A	B	A	B	A		B	A	
Approach Delay		12.4			11.1			6.9			16.9	
Approach LOS		B			B			A			B	

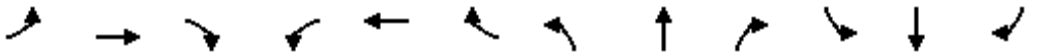
Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 50.7			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 11.8		Intersection LOS: B	
Intersection Capacity Utilization 64.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Site Access/Waterfalls Lane & Highway 26

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	6	874	18	832	28	25	58	83	6
v/c Ratio	0.02	0.66	0.05	0.62	0.02	0.08	0.13	0.25	0.01
Control Delay	5.5	12.4	6.1	11.4	2.7	16.0	2.9	18.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	12.4	6.1	11.4	2.7	16.0	2.9	18.2	0.0
Queue Length 50th (m)	0.2	63.4	0.7	58.0	0.1	1.9	0.0	6.6	0.0
Queue Length 95th (m)	1.5	#138.1	3.1	#127.0	2.5	6.7	4.1	15.9	0.0
Internal Link Dist (m)		154.5		196.6			52.7		69.2
Turn Bay Length (m)	20.0		20.0		50.0	20.0			
Base Capacity (vph)	382	1331	339	1332	1134	575	703	591	759
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.66	0.05	0.62	0.02	0.04	0.08	0.14	0.01

Intersection Summary

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



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	969	24	56	1141	117	15	0	34	95	0	18
Future Volume (vph)	26	969	24	56	1141	117	15	0	34	95	0	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	4.0	3.5	3.5	4.0	3.5	3.2	3.5	3.5	3.5	4.0	4.0	4.0
Storage Length (m)	20.0		0.0	20.0		50.0	20.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	20.0			20.0			35.0			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996				0.850		0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1885	1817	0	1848	1842	1528	1750	1566	0	1848	1548	0
Flt Permitted	0.117			0.143			0.745			0.734		
Satd. Flow (perm)	232	1817	0	278	1842	1528	1372	1566	0	1428	1548	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				84		73			73	
Link Speed (k/h)		60			60			50			30	
Link Distance (m)		178.5			220.6			69.6			93.2	
Travel Time (s)		10.7			13.2			5.0			11.2	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	2%	2%	2%	1%	2%	2%	2%	2%	2%	9%
Adj. Flow (vph)	27	1009	25	58	1189	122	16	0	35	99	0	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	1034	0	58	1189	122	16	35	0	99	19	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.94	1.01	1.01	0.94	1.01	1.06	1.01	1.01	1.01	0.94	0.94	0.94
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru			Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		10.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
Minimum Split (s)	35.0	35.0		35.0	35.0	35.0	25.0	25.0		25.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0	35.0	25.0	25.0		25.0	25.0	
Total Split (%)	58.3%	58.3%		58.3%	58.3%	58.3%	41.7%	41.7%		41.7%	41.7%	
Maximum Green (s)	28.0	28.0		28.0	28.0	28.0	21.0	21.0		21.0	21.0	
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	2.0	2.0		2.0	2.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max	Max	None	None		None	None	
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	19.0	19.0		19.0	19.0	19.0	12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	37.1	37.1		37.1	37.1	37.1	12.0	12.0		12.0	12.0	
Actuated g/C Ratio	0.73	0.73		0.73	0.73	0.73	0.24	0.24		0.24	0.24	
v/c Ratio	0.16	0.78		0.29	0.88	0.11	0.05	0.08		0.29	0.05	
Control Delay	9.1	18.1		11.7	25.2	2.8	15.7	2.3		18.9	0.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	9.1	18.1		11.7	25.2	2.8	15.7	2.3		18.9	0.2	
LOS	A	B		B	C	A	B	A		B	A	
Approach Delay		17.8			22.6			6.5			15.9	
Approach LOS		B			C			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 50.8			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.88			
Intersection Signal Delay: 20.0		Intersection LOS: C	
Intersection Capacity Utilization 81.1%		ICU Level of Service D	
Analysis Period (min) 15			

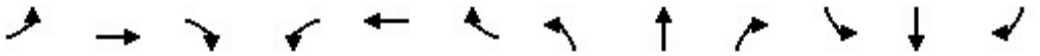
Splits and Phases: 1: Site Access/Waterfalls Lane & Highway 26

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	27	1034	58	1189	122	16	35	99	19
v/c Ratio	0.16	0.78	0.29	0.88	0.11	0.05	0.08	0.29	0.05
Control Delay	9.1	18.1	11.7	25.2	2.8	15.7	2.3	18.9	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.1	18.1	11.7	25.2	2.8	15.7	2.3	18.9	0.2
Queue Length 50th (m)	1.2	~96.9	2.8	~143.8	1.5	1.2	0.0	8.0	0.0
Queue Length 95th (m)	5.5	#177.0	11.9	#208.4	7.0	4.9	2.4	18.3	0.0
Internal Link Dist (m)		154.5		196.6			45.6		69.2
Turn Bay Length (m)	20.0		20.0		50.0	20.0			
Base Capacity (vph)	169	1327	203	1345	1138	567	690	590	683
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.78	0.29	0.88	0.11	0.03	0.05	0.17	0.03

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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

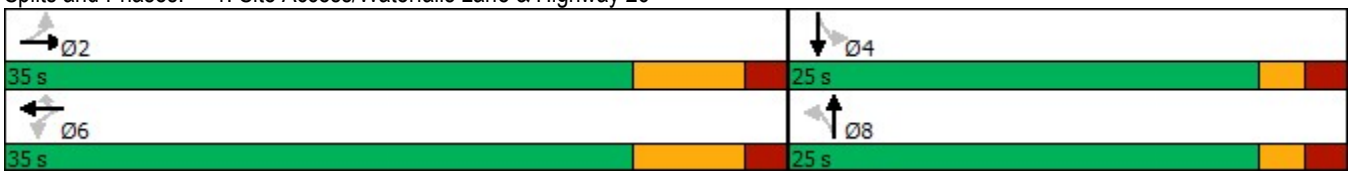


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	6	823	10	23	790	27	30	0	70	79	0	6
Future Volume (vph)	6	823	10	23	790	27	30	0	70	79	0	6
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	4.0	3.5	3.5	4.0	3.5	3.2	3.5	3.5	3.5	4.0	4.0	4.0
Storage Length (m)	20.0		0.0	20.0		50.0	20.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	20.0			20.0			35.0			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998				0.850		0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1885	1821	0	1848	1824	1543	1750	1566	0	1885	1687	0
Flt Permitted	0.264			0.237			0.754			0.709		
Satd. Flow (perm)	524	1821	0	461	1824	1543	1389	1566	0	1407	1687	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				27		93			103	
Link Speed (k/h)		60			60			50			30	
Link Distance (m)		178.5			220.6			76.7			93.2	
Travel Time (s)		10.7			13.2			5.5			11.2	
Peak Hour Factor	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95	0.95
Heavy Vehicles (%)	0%	3%	2%	2%	3%	0%	2%	2%	2%	0%	2%	0%
Adj. Flow (vph)	6	866	11	24	832	28	32	0	74	83	0	6
Shared Lane Traffic (%)												
Lane Group Flow (vph)	6	877	0	24	832	28	32	74	0	83	6	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.94	1.01	1.01	0.94	1.01	1.06	1.01	1.01	1.01	0.94	0.94	0.94
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru			Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		10.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
Minimum Split (s)	35.0	35.0		35.0	35.0	35.0	25.0	25.0		25.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0	35.0	25.0	25.0		25.0	25.0	
Total Split (%)	58.3%	58.3%		58.3%	58.3%	58.3%	41.7%	41.7%		41.7%	41.7%	
Maximum Green (s)	28.0	28.0		28.0	28.0	28.0	21.0	21.0		21.0	21.0	
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	2.0	2.0		2.0	2.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max	Max	None	None		None	None	
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	19.0	19.0		19.0	19.0	19.0	12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	36.9	36.9		36.9	36.9	36.9	12.0	12.0		12.0	12.0	
Actuated g/C Ratio	0.73	0.73		0.73	0.73	0.73	0.24	0.24		0.24	0.24	
v/c Ratio	0.02	0.66		0.07	0.63	0.02	0.10	0.17		0.25	0.01	
Control Delay	5.5	12.6		6.3	11.5	2.7	16.2	4.5		18.2	0.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	5.5	12.6		6.3	11.5	2.7	16.2	4.5		18.2	0.0	
LOS	A	B		A	B	A	B	A		B	A	
Approach Delay		12.6			11.0			8.1			17.0	
Approach LOS		B			B			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 50.6			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.66			
Intersection Signal Delay: 11.8		Intersection LOS: B	
Intersection Capacity Utilization 64.1%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 1: Site Access/Waterfalls Lane & Highway 26



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	6	877	24	832	28	32	74	83	6
v/c Ratio	0.02	0.66	0.07	0.63	0.02	0.10	0.17	0.25	0.01
Control Delay	5.5	12.6	6.3	11.5	2.7	16.2	4.5	18.2	0.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	5.5	12.6	6.3	11.5	2.7	16.2	4.5	18.2	0.0
Queue Length 50th (m)	0.2	64.0	1.0	58.0	0.1	2.4	0.0	6.5	0.0
Queue Length 95th (m)	1.5	#138.7	3.8	#127.0	2.5	7.8	6.3	16.0	0.0
Internal Link Dist (m)		154.5		196.6			52.7		69.2
Turn Bay Length (m)	20.0		20.0		50.0	20.0			
Base Capacity (vph)	382	1328	336	1330	1133	576	704	583	760
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.02	0.66	0.07	0.63	0.02	0.06	0.11	0.14	0.01

Intersection Summary

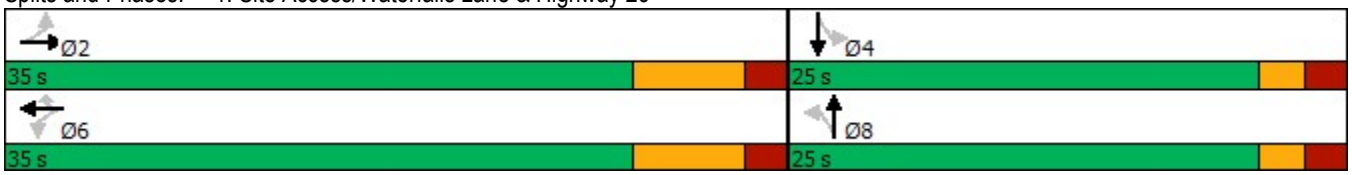
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	26	969	30	71	1141	117	18	0	43	95	0	18
Future Volume (vph)	26	969	30	71	1141	117	18	0	43	95	0	18
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Width (m)	4.0	3.5	3.5	4.0	3.5	3.2	3.5	3.5	3.5	4.0	4.0	4.0
Storage Length (m)	20.0		0.0	20.0		50.0	20.0		0.0	0.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	20.0			20.0			35.0			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996				0.850		0.850			0.850	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1885	1817	0	1848	1842	1528	1750	1566	0	1848	1548	0
Flt Permitted	0.117			0.138			0.745			0.728		
Satd. Flow (perm)	232	1817	0	268	1842	1528	1372	1566	0	1416	1548	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				84		73			73	
Link Speed (k/h)		60			60			50			30	
Link Distance (m)		178.5			220.6			69.6			93.2	
Travel Time (s)		10.7			13.2			5.0			11.2	
Peak Hour Factor	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Heavy Vehicles (%)	0%	3%	2%	2%	2%	1%	2%	2%	2%	2%	2%	9%
Adj. Flow (vph)	27	1009	31	74	1189	122	19	0	45	99	0	19
Shared Lane Traffic (%)												
Lane Group Flow (vph)	27	1040	0	74	1189	122	19	45	0	99	19	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		4.0			4.0			4.0			4.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane		Yes			Yes							
Headway Factor	0.94	1.01	1.01	0.94	1.01	1.06	1.01	1.01	1.01	0.94	0.94	0.94
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2	1	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru			Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	2.0	10.0		10.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		10.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	12.0	12.0		12.0	12.0	12.0	12.0	12.0		12.0	12.0	
Minimum Split (s)	35.0	35.0		35.0	35.0	35.0	25.0	25.0		25.0	25.0	
Total Split (s)	35.0	35.0		35.0	35.0	35.0	25.0	25.0		25.0	25.0	
Total Split (%)	58.3%	58.3%		58.3%	58.3%	58.3%	41.7%	41.7%		41.7%	41.7%	
Maximum Green (s)	28.0	28.0		28.0	28.0	28.0	21.0	21.0		21.0	21.0	
Yellow Time (s)	5.0	5.0		5.0	5.0	5.0	2.0	2.0		2.0	2.0	
All-Red Time (s)	2.0	2.0		2.0	2.0	2.0	2.0	2.0		2.0	2.0	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	7.0	7.0		7.0	7.0	7.0	4.0	4.0		4.0	4.0	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	3.0	3.0		3.0	3.0	3.0	3.0	3.0		3.0	3.0	
Recall Mode	Max	Max		Max	Max	Max	None	None		None	None	
Walk Time (s)	9.0	9.0		9.0	9.0	9.0	9.0	9.0		9.0	9.0	
Flash Dont Walk (s)	19.0	19.0		19.0	19.0	19.0	12.0	12.0		12.0	12.0	
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0		0	0	
Act Effct Green (s)	36.9	36.9		36.9	36.9	36.9	12.0	12.0		12.0	12.0	
Actuated g/C Ratio	0.73	0.73		0.73	0.73	0.73	0.24	0.24		0.24	0.24	
v/c Ratio	0.16	0.78		0.38	0.89	0.11	0.06	0.11		0.29	0.04	
Control Delay	9.2	18.5		16.9	25.4	2.8	15.8	3.3		18.8	0.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	9.2	18.5		16.9	25.4	2.8	15.8	3.3		18.8	0.2	
LOS	A	B		B	C	A	B	A		B	A	
Approach Delay		18.2			23.0			7.0			15.8	
Approach LOS		B			C			A			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 60			
Actuated Cycle Length: 50.6			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 20.4		Intersection LOS: C	
Intersection Capacity Utilization 81.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 1: Site Access/Waterfalls Lane & Highway 26



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	27	1040	74	1189	122	19	45	99	19
v/c Ratio	0.16	0.78	0.38	0.89	0.11	0.06	0.11	0.29	0.04
Control Delay	9.2	18.5	16.9	25.4	2.8	15.8	3.3	18.8	0.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.2	18.5	16.9	25.4	2.8	15.8	3.3	18.8	0.2
Queue Length 50th (m)	1.2	~102.9	3.9	~142.9	1.5	1.4	0.0	7.8	0.0
Queue Length 95th (m)	5.5	#179.1	#21.2	#209.0	7.0	5.5	3.9	18.3	0.0
Internal Link Dist (m)		154.5		196.6			45.6		69.2
Turn Bay Length (m)	20.0		20.0		50.0	20.0			
Base Capacity (vph)	169	1325	195	1343	1136	568	692	587	684
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.16	0.78	0.38	0.89	0.11	0.03	0.07	0.17	0.03

Intersection Summary

~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.

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