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245 Church Street Subdivision Penetanguishene

TRAFFIC IMPACT BRIEF

2857747 Ontario Inc.

File 522682 | July 25, 2023

Document Control

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Date: July 25, 2023		

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Issue	Date	Description
1	July 25, 2023	Final Report

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1 Introduction

Tatham Engineering Limited was retained by 2857747 Ontario Inc. to address the traffic impacts associated with the proposed residential development to be located at 245 Church Street in the Town of Penetanguishene. 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 in consideration of the Town of Penetanguishene requirements. Recognizing that the trip generation associated with the development 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

The road network to be addressed by this study consists of Church Street, O'Reilley Street and Oxley Drive, and their respective intersections. The area road network is illustrated in Figure 2.

2.1.1 Roads

As per *Schedule C: Transportation Network*[1] of the *Town of Penetanguishene Official Plan*[2] Church Street, O'Reilley Street and Oxley Drive are ass classified as local roads, and thus have an assumed planning capacity of 400 vehicles per hour per lane (vphpl). Each road has a 2-lane semi-urban cross section and a 50 km/h speed limit (and thus a design speed of 60 km/h has been assumed). Church Street is oriented north-south, O'Reilley Street is oriented east-west and Oxley Drive has a varying orientation.

2.1.2 Intersection

The intersection of Church Street with O'Reilley Street is a 3-leg intersection with stop control on O'Reilley Street. All approaches consist of a shared turn-through lane.

The intersection of Oxley Drive with O'Reilley Street has the same configuration (eg. 3 leg intersection) albeit it operates under 3-way stop control.

2.2 TRAFFIC VOLUMES

2.2.1 Traffic Counts

To determine existing traffic volumes, traffic counts were conducted at the intersection of Church Street and O'Reilley Street on Thursday April 13, 2023, from 7:00 to 10:00 and 15:00 to 18:00. The observed peak hour traffic volumes, considered reflective of average conditions (given the counts were completed in April), are illustrated in Figure 3 with detailed count sheets provided in Appendix A. Traffic volumes through the intersection of O'Reilley Street and Oxley Drive were projected from the traffic counts, recognizing there are only 2 homes on the south leg of Oxley Drive (thus there will be limited volumes to/from the south).

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[1] *Town of Penetanguishene Official Plan. Schedule C: Transportation Network.* WSP. February 2019.
[2] *Town of Penetanguishene Official Plan*. November 2018.

2.2.2 Seasonal Adjustment

It is recognized that the Town of Penetanguishene is within a recreational area and thus summer conditions are typically reflective of the greatest traffic volumes. Given the location of the site within a local road network, it is unlikely that the study area roads will experience summer seasonal variations. Notwithstanding, to assume a conservative approach, a summer factor of 25% has been applied to the counted volumes on Church Street to reflect the peak summer season.

The adjusted volumes are illustrated in Figure 4.

2.3 TRAFFIC OPERATIONS

The capacity, and hence operations, of a road system is effectively dictated by its intersections. To establish a baseline from which the future traffic volumes and operations can be assessed, the existing intersection operations were reviewed based on the following:

- the 2023 summer traffic volumes;
- the existing intersections configuration and control; and
- procedures outlined in the *2000 Highway Capacity Manual*[3] (using Synchro v.11 software).

For unsignalized intersections, the analysis considers:

- average delay (measured in seconds);
- level of service (LOS); and
- volume to capacity (v/c) for the critical movements (i.e. those operating under stop control)

With respect to the noted metrics:

- a level of service 'A' corresponds to the best operating conditions with minimal delays, whereas level service 'F' corresponds to poor operations resulting from high intersection delays (detailed LOS definitions are provided in Appendix B); and
- a v/c ratio of less than 1.0 indicates the intersection movement/ approach is operating at less than capacity while a v/c ratio of 1.0 indicates capacity has been reached.

A summary of the analysis is provided in Table 1, whereas detailed worksheets are included in Appendix C. Based on the existing volumes, the subject intersections currently provide excellent overall levels of service (LOS A) with minimal delays during both peak hours. As such, no improvements are required to support existing conditions.

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

Table 1: Intersection Operations – 2023

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Church Street & O'Reilley Street	WB LR	stop	9	A	0.02	9	A	0.03
	SB LT	free	1	A	0.00	1	A	0.00
Oxley Drive & O'Reilley Street	EB LR	stop	7	A	0.01	7	A	0.03
	NB LT	stop	7	A	0.00	7	A	0.00
	SB TR	stop	6	A	0.01	7	A	0.02

L left lane T through lane R right lane LT left-through TR through-right LTR left-through-right

3 Proposed Development

This chapter 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

The subject site is located at 245 Church Street in the Town of Penetanguishene (as per Figure 1).

3.2 LAND USE

The proposed residential development will consist of 29 single family units. The site plan is provided in Figure 5.

3.3 ACCESS & CIRCULATION

Access to the proposed development will be largely provided by the extension of Oxley Drive to the south (which can be further extended as part of a future development). Lot 1 will have direct driveway access to Church Street. Given the alignment of Church Street in the immediate study area, good sight lines will be provided to/from the north and to/from the south at the proposed Lot 1 driveway (refer to the photographs of Figure 6) ensuring that vehicles can manoeuvre between Church Street and the Lot 1 driveway in a safe and efficient manner.

Oxley Drive and the internal east-west road will be constructed to municipal standards, providing 1 lane per direction within a 20 metre right-of-way. Given the configuration of the development lot, a cul-de-sac will be provided at the terminus of the internal east-west road. Given the corresponding Town standards, the noted roads will readily accommodate passage and circulation of site generated traffic and typical design vehicles (garbage collection, emergency vehicles, etc.).

3.4 PARKING

Based on the Town's zoning by-law, single-detached dwellings are required to provide 2 parking spaces per dwelling unit. Each residential will provide a minimum of 2 spaces between the driveway and garage, and thus the Town standards will be satisfied.

3.5 TRAFFIC

3.5.1 Trip Generation

The number of vehicle trips to be generated by the proposed development has been determined based on type of use, development size and trip generation rates published in the *ITE Trip Generation Manual, 11th Edition*[4]. Based on the proposed development, trip rates for the *single family detached* (ITE code 210) has been applied.

The associated trip rates and trip estimates are provided in

Table 2.

Table 2: Trip Estimates – 245 Church Street

LAND USE	RATE/ ESTIMATE	VARIABLE/ SIZE	WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			In	Out	Total	In	Out	Total
single family detached (ITE 210)	rate	units	0.18	0.52	0.70	0.59	0.35	0.94
	estimate	29	5	15	20	17	10	27

As indicated, the proposed development is expected to generate 20 trips during the AM peak hour and 27 trips during the PM peak hour (total of inbound and outbound trips).

3.5.2 Trip Distribution

The distribution of the new trips generated by the site has been developed based on distribution data provided in the 2016 Transportation Tomorrow Survey (TTS). The TTS is a comprehensive travel survey conducted in the Greater Golden Horseshoe Area once every five years. As per the *TTS 2016 Data Guide*[5], the 245 Church Street development resides in Traffic Boundary Zone 8574. As such, the trip data was filtered to show all trips to/from the respective traffic zone from which the following distribution was established:

- to/from locations within Penetanguishene – 30%;
- to/from locations outside of Penetanguishene to the south – 40%;
- to/from locations outside of Penetanguishene to the east – 25%; and
- to/from locations outside of Penetanguishene to the west – 5%.

[4] *ITE Trip Generation Manual, 11th Edition.* Institute of Transportation Engineers, September 2021.
[5] *TTS 2016 Data Guide.* Bess Ashby, Research Director, February 2018.

As indicated, 30% of the trips are expected to remain within Penetanguishene, whereas 70% originate from, or are destined to, areas outside the Town. The trips that remain within Penetanguishene were distributed based on additional TTS trip data for the traffic zone within which the development is located. When considering distribution of trips that remain within the Town and the traffic boundary zones to which there trips are travelling to/from, coupled with the travel patterns exhibited in the existing traffic count, the following trip distribution has been assumed:

- to/from the north via Church Street – 25%; and
- to/from the south via Church Street – 75%.

The assignment of the trips generated by the development to the area road network and site access is based on the trip distribution noted above with consideration given to the existing road network and expected travel routes. The resulting site generated traffic volumes assigned to the road network are illustrated in Figure 7. While it is acknowledged that some site traffic my utilize Oxley Drive to access Fuller Avenue, all site traffic has been oriented to/from Church Street to maximize the volumes through the respective intersection. It is also acknowledged that Lot 1 will have direct driveway access to Church Street, albeit the associated volumes (less than 1 trip during each of the AM and PM peak hours) are assumed to travel via O'Reilly Street.

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:

- intersection operations; and
- potential improvements to the study area road network, if necessary.

4.1 ROAD SYSTEM

Other than the extension of Oxley Drive and the construction of a new east-west internal road to support the proposed subdivision, no other road system improvements or changes have been identified that would have bearing on the traffic volumes and operations through the study area. As such, the existing road network has been maintained under the future horizon conditions.

4.2 TRAFFIC VOLUMES

For the purpose of this study a 5-year study horizon (2028) has been considered. Given the limited traffic to be generated by the proposed storage facility on a day-to-day basis, a 5-year horizon is considered sufficient in establishing the potential impacts of the site on the surrounding road network.

4.2.1 Background Growth

Based on the Census data for the years 2011, 2016 and 2021, the population of the Town of Penetanguishene decreased from 9,111 to 8,962, then increased to 10,077 persons, which translates to annual growth of 2.5% between 2016 and 2021, and 1% between 2011 and 2021.

The *Growth Forecast and Land Needs Assessment*[6] for the County of Simcoe anticipates the population of the Town of Penetanguishene will increase from 10,340 in 2021 to 14,390 in 2051 translating to an annual growth of 1.3%.

4.2.2 Background Developments

Further to the historical growth in traffic volumes and anticipated population growth in the area, consideration has been given to other planned developments in the area that are expected to

[6] *Growth Forecasts and Land Needs Assessment*. Prepared by Hemson for the County of Simcoe. March 31, 2022.

contribute additional traffic volumes to the study area road network. In reviewing the Town's website, two developments were found in the close proximity of the site:

- 221 Fox Street Development; and
- 1145 Fuller Avenue Development.

After reviewing the corresponding traffic studies for the background developments, it has been determined that their traffic will not affect the road network, therefore, they have not been considered in this study. It is noted that both *221 Fox Street Development Traffic Assessment*[7] and *1145 Fuller Avenue Traffic Impact Study*[8] identify 2% annual growth.

4.2.3 Overall Background Growth

Based on the above and to maintain consistency with other traffic studies in the area, an annual growth of 2% per annum has been assumed for Church Street. No growth has been applied to the volumes on O'Reilley Street and Oxley Drive, as they primarily service the abutting residential areas which are largely built-out (with the exception of the noted development).

4.2.4 Future Traffic Volumes

The future traffic volumes for the 2028 horizon year are illustrated in Figure 8. The volumes are based on the 2023 volumes, adjusted to reflect annual background growth, summer conditions, background developments volumes (if any) and the volumes generated by the subject development.

4.3 TRAFFIC OPERATIONS

The operations at the intersections of Church Street with O'Reilley Street and Oxley Drive with O'Reilley Street were again investigated to consider the 2028 total traffic volumes. The results of the operational review are provided in Table 3, whereas detailed worksheets are provided in Appendix D.

Based on the total volumes, the subject intersections currently provide excellent overall levels of service (LOS A) with minimal delays during both peak hours. As such, no improvements are required to support future conditions.

Given the minimal volumes at the intersection of Oxley Drive with the new east-west internal road, it was not deemed necessary to consider the operations at this intersection. Suffice to say, excellent operations will be provided assuming stop control on the east-west road.

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[7] *221 Fox Street Development. Traffic Impact Assessment.* WMI & Associates Limited. July 2022.
[8] *1145 Fuller Avenue. Traffic Impact Study*. JD Northcote Engineering Inc. November 22, 2018.

Table 3: Intersection Operations – 2028

INTERSECTION, MOVEMENT & CONTROL			WEEKDAY AM PEAK HOUR			WEEKDAY PM PEAK HOUR		
			Delay	LOS	V/C	Delay	LOS	V/C
Church Street & O'Reilley Street	WB LR	stop	9	A	0.03	9	A	0.04
	SB LT	free	1	A	0.00	2	A	0.01
Oxley Drive & O'Reilley Street	EB LR	stop	7	A	0.02	7	A	0.05
	NB LT	stop	7	A	0.02	7	A	0.01
	SB TR	stop	6	A	0.01	7	A	0.02

L left lane T through lane R right lane LT left-through TR through-right LTR left-through-right

4.4 TURN LANE REQUIREMENTS

Given the limited volumes accessing the site and the relatively low volumes on the study area road system, exclusive turn lanes are not required on Church Street or O'Reilley Street to support the site.

5 Summary

Proposed Development

The study has addressed the transportation impacts associated with the proposed residential development to be located at 245 Church Street in the Town of Penetanguishene. Upon completion, the development is expected to generate an additional 20 trips during AM peak hour and 27 trips during PM peak hour.

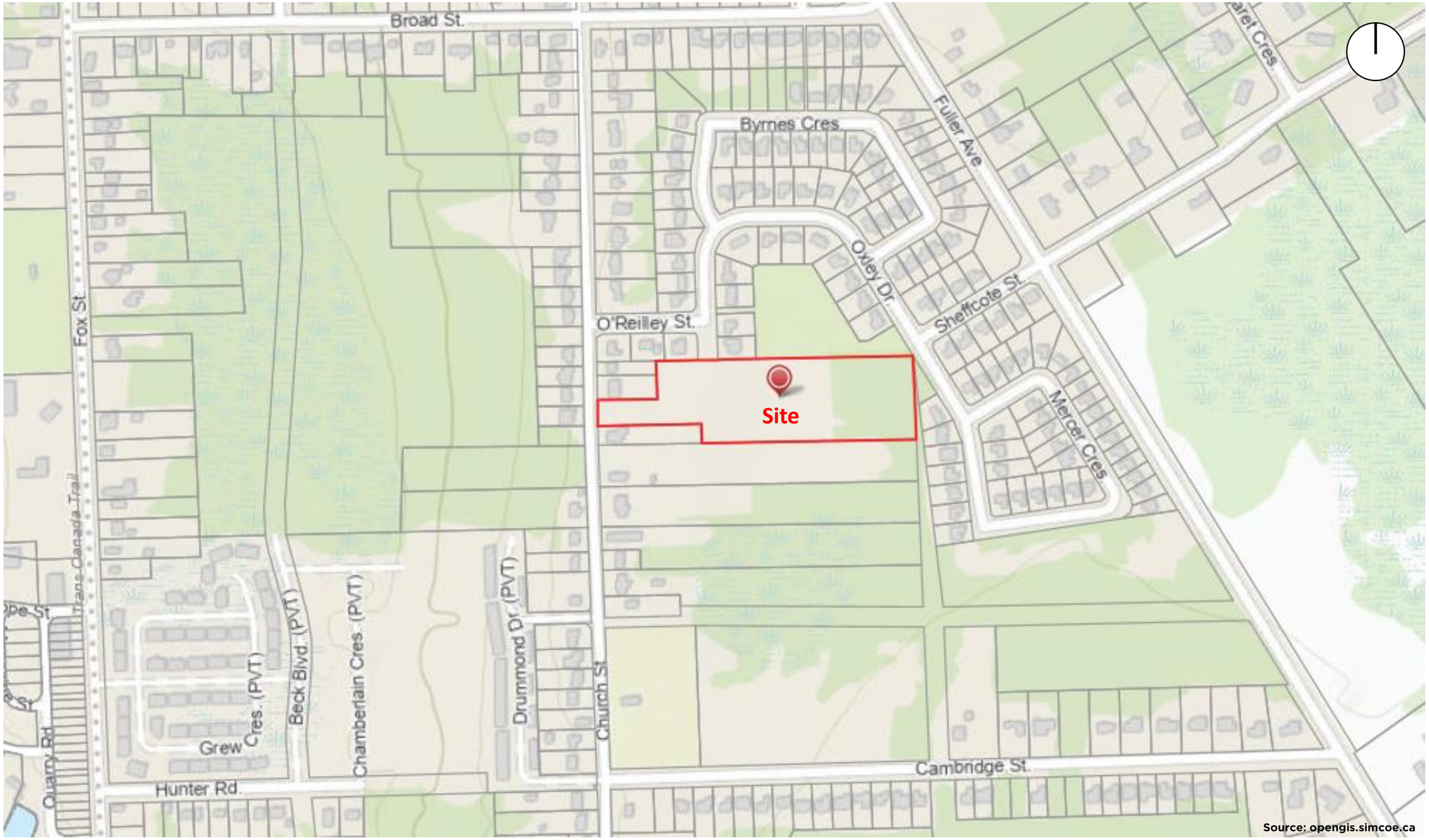
Oxley Drive will be extended southerly to service the site, and a new east-west road constructed internally to support the development. The new roads will be constructed as per Town standards and will become part of the municipal road network upon assumption.

Transportation Impacts

In addressing the study area traffic operations, the intersections of Church Street with O'Reilley Street and Oxley Drive with O'Reilley Street were analysed under existing (2023) and future (2028) horizon periods. Based on the assessment of existing and future conditions, the intersections will provide excellent levels of service and thus no improvements are required to support the proposed development.

Turn Lane Requirements

Given the limited volumes accessing the site, exclusive turn lanes are not warranted to support the site.

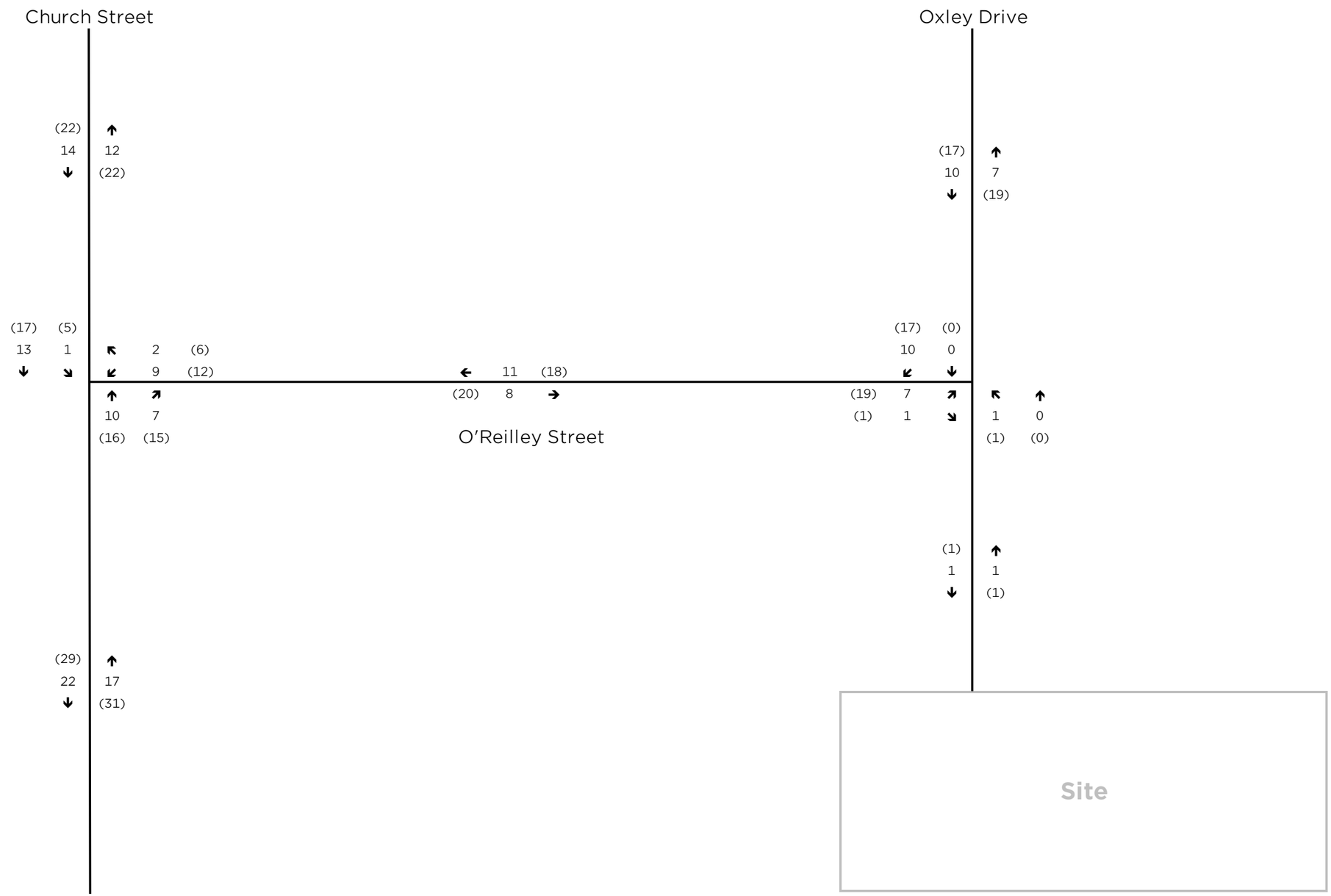


245 CHURCH STREET SUBDIVISION

Figure 1: Site Location

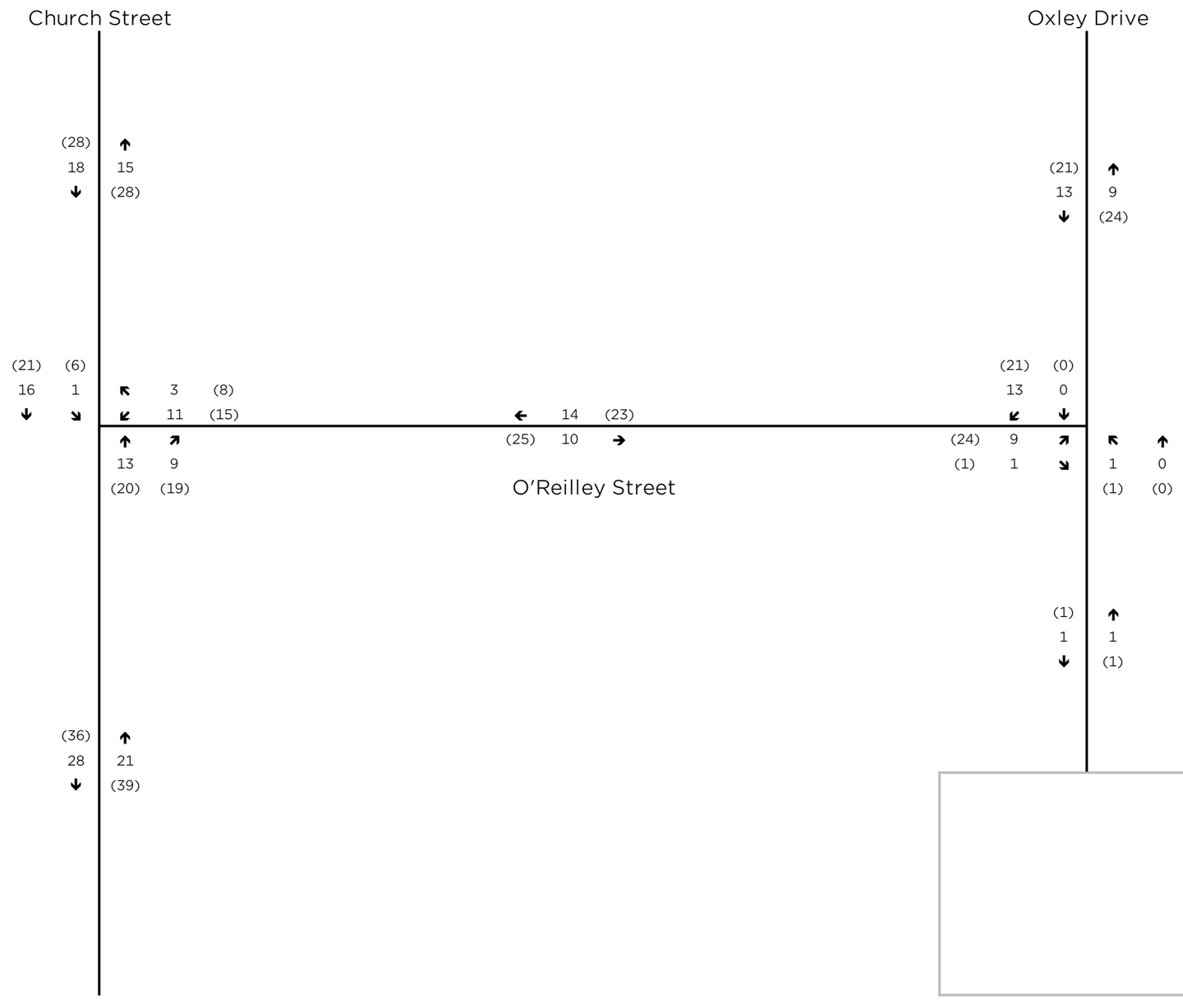
245 CHURCH STREET SUBDIVISION

Figure 2: Area Road Network



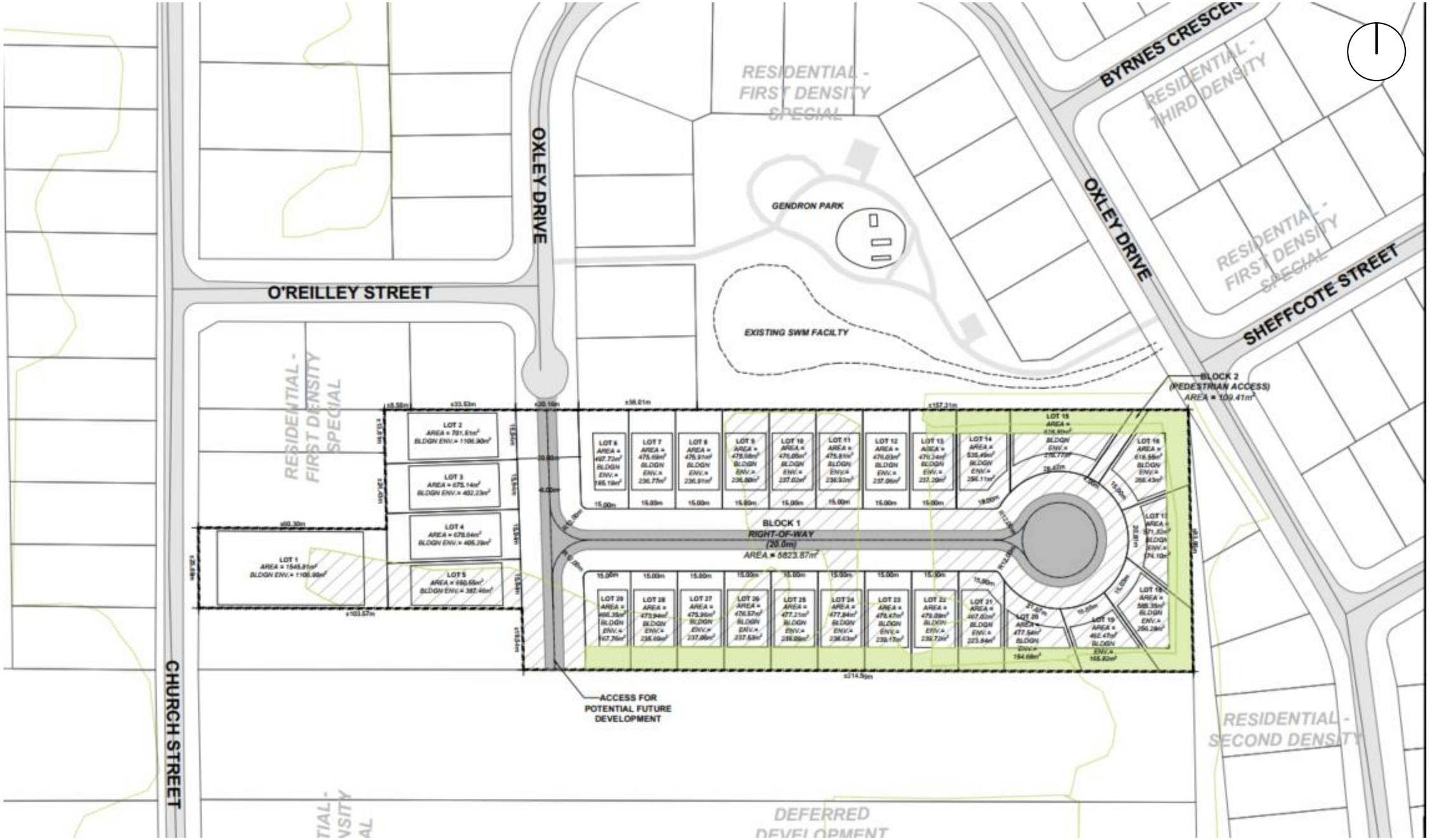
245 CHURCH STREET SUBDIVISION

Figure 3: Traffic Volumes – 2023 Counts



245 CHURCH STREET SUBDIVISION

Figure 4: Traffic Volumes – 2023 Summer



245 CHURCH STREET SUBDIVISION

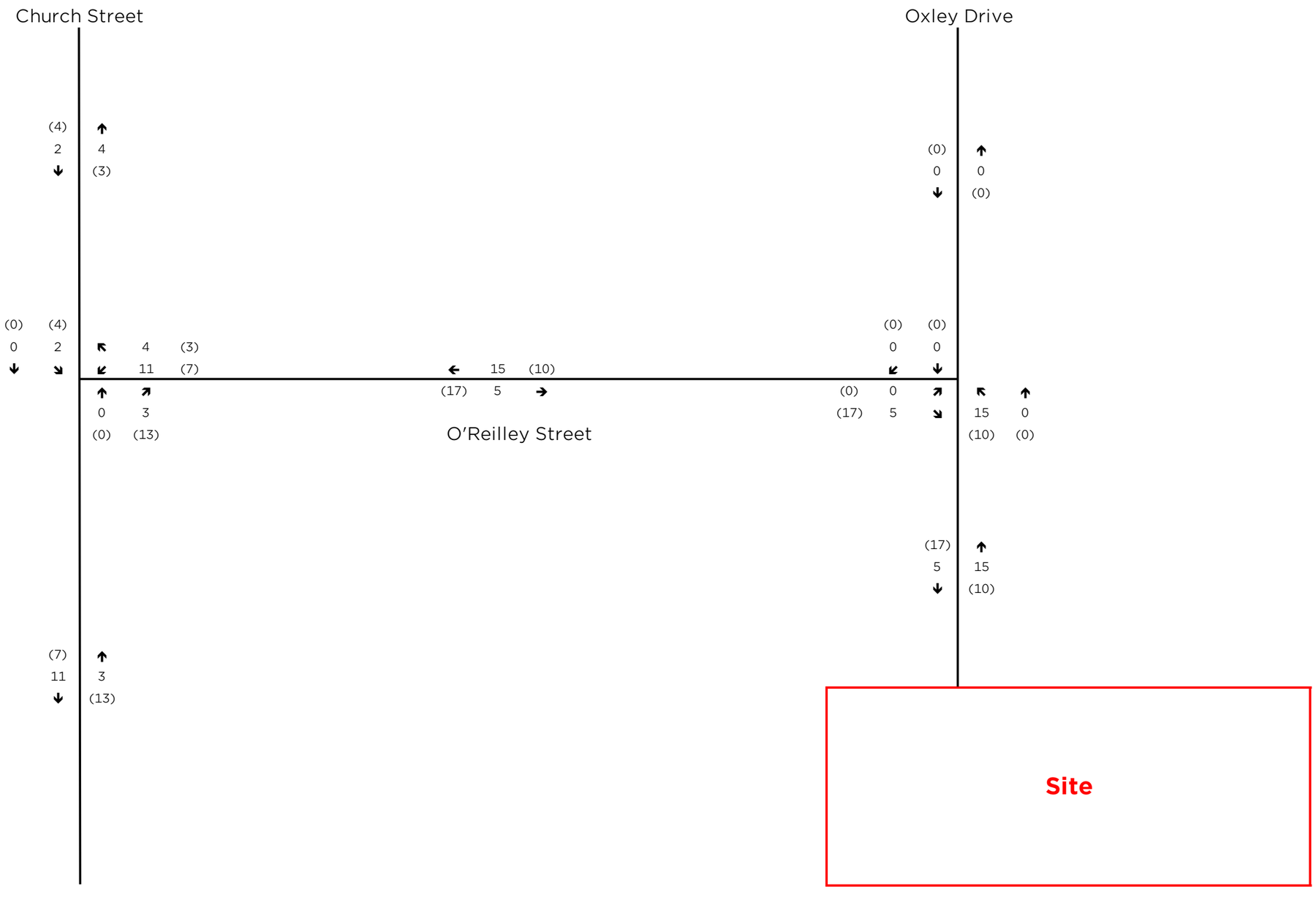
Figure 5: Site Plan

In the area of Lot 1 looking south on Church Street

In the area of Lot 1 looking north on Church Street

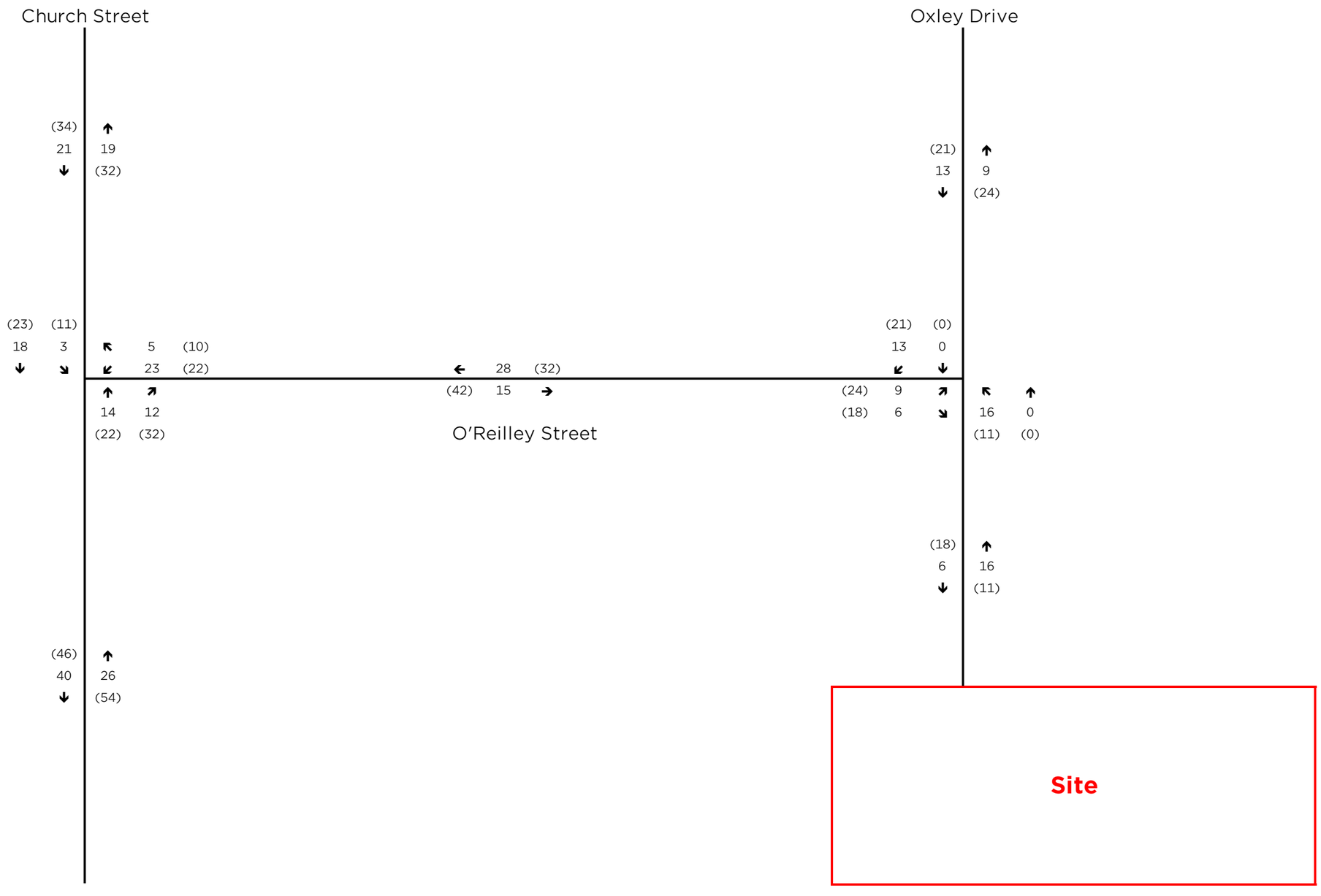
245 CHURCH STREET SUBDIVISION

Figure 6: Sight Lines at Lot 1



245 CHURCH STREET SUBDIVISION

Figure 8: Traffic Volumes – 245 Church Street



245 CHURCH STREET SUBDIVISION

Figure 7: Traffic Volumes – 2028 Total

Appendix A:
Traffic Counts

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Project #23-082 - Tatham Engineering Ltd

Intersection Count Report

Intersection:	Church St & O'Reilley St
Municipality:	Penetanguishene
Count Date:	Thursday, Apr 13, 2023
Site Code:	2308200001
Count Categories:	Cars, Trucks, Bicycles, Pedestrians
Count Period:	07:00-10:00, 15:00-18:00
Weather:	Clear
Comments:	

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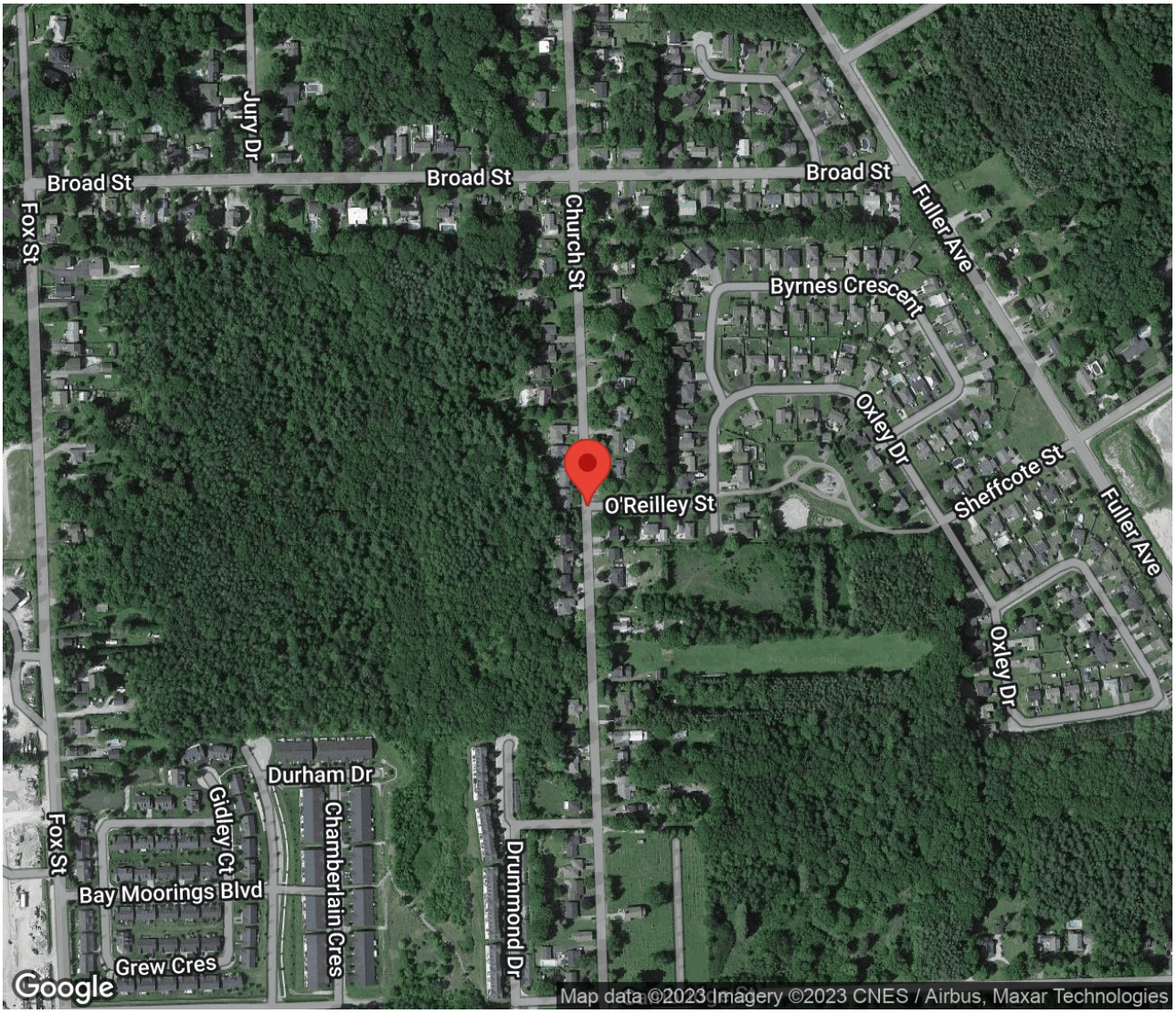
Traffic Count Map

Intersection:	Church St & O'Reilley St
Site Code:	2308200001
Municipality:	Penetanguishene
Count Date:	Apr 13, 2023



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Traffic Count Summary

Intersection:	Church St & O'Reilley St
Site Code:	2308200001
Municipality:	Penetanguishene
Count Date:	Apr 13, 2023

Church St - Traffic Summary

	North Approach Totals						South Approach Totals						
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
Hour	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	Total
07:00 - 08:00	1	11	0	0	12	0	0	5	3	0	8	0	20
08:00 - 09:00	1	13	0	0	14	0	0	10	7	0	17	0	31
09:00 - 10:00	1	13	0	0	14	0	0	8	2	0	10	0	24
BREAK													
15:00 - 16:00	3	11	0	0	14	0	0	13	15	0	28	1	42
16:00 - 17:00	5	15	0	0	20	0	0	23	10	0	33	0	53
17:00 - 18:00	3	8	0	0	11	0	0	13	6	0	19	0	30
GRAND TOTAL	**14**	**71**	**0**	**0**	**85**	**0**	**0**	**72**	**43**	**0**	**115**	**1**	**200**

Ontario Traffic Inc.
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Traffic Count Summary

Intersection:	Church St & O'Reilley St
Site Code:	2308200001
Municipality:	Penetanguishene
Count Date:	Apr 13, 2023

O'Reilley St - Traffic Summary

	East Approach Totals						West Approach Totals						
	Includes Cars, Trucks, Bicycles						Includes Cars, Trucks, Bicycles						
Hour	Left	Thru	Right	U-Turn	Total	Peds	Left	Thru	Right	U-Turn	Total	Peds	Total
07:00 - 08:00	4	0	1	0	5	1	0	0	0	0	0	0	5
08:00 - 09:00	9	0	2	0	11	1	0	0	0	0	0	0	11
09:00 - 10:00	2	0	1	0	3	3	0	0	0	0	0	0	3
BREAK													
15:00 - 16:00	7	0	3	0	10	0	0	0	0	0	0	0	10
16:00 - 17:00	10	0	4	0	14	1	0	0	0	0	0	0	14
17:00 - 18:00	6	0	4	0	10	0	0	0	0	0	0	0	10
GRAND TOTAL	**38**	**0**	**15**	**0**	**53**	**6**	**0**	**0**	**0**	**0**	**0**	**0**	**53**

Ontario Traffic Inc.
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Traffic Count Data

Intersection: Church St & O'Reilley St
Site Code: 2308200001
Municipality: Penetanguishene
Count Date: Apr 13, 2023

North Approach - Church St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
07:00	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
07:15	0	3	0	0	3	0	1	0	0	1	0	0	0	0	0	0
07:30	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	0
07:45	1	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0
08:00	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0
08:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
08:30	1	5	0	0	6	0	1	0	0	1	0	0	0	0	0	0
08:45	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0
09:00	0	4	0	0	4	0	0	0	0	0	0	0	0	0	0	0
09:15	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0
09:30	1	3	0	0	4	0	1	0	0	1	0	0	0	0	0	0
09:45	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	3	33	0	0	36	0	4	0	0	4	0	0	0	0	0	0

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Traffic Count Data

Intersection: Church St & O'Reilley St
Site Code: 2308200001
Municipality: Penetanguishene
Count Date: Apr 13, 2023

North Approach - Church St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	↰	↑	↱	↷	Total	
15:00	1	1	0	0	2	0	0	0	0	0	0	0	0	0	0	0
15:15	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
15:30	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0
15:45	2	5	0	0	7	0	1	0	0	1	0	0	0	0	0	0
16:00	1	3	0	0	4	0	0	0	0	0	0	0	0	0	0	0
16:15	2	5	0	0	7	0	0	0	0	0	0	0	0	0	0	0
16:30	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0
16:45	2	5	0	0	7	0	0	0	0	0	0	0	0	0	0	0
17:00	0	5	0	0	5	0	0	0	0	0	0	0	0	0	0	0
17:15	2	1	0	0	3	1	0	0	0	1	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	2	0	0	2	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	10	33	0	0	43	1	1	0	0	2	0	0	0	0	0	0
GRAND TOTAL	13	66	0	0	79	1	5	0	0	6	0	0	0	0	0	0

Ontario Traffic Inc.
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Traffic Count Data

Intersection: Church St & O'Reilley St
Site Code: 2308200001
Municipality: Penetanguishene
Count Date: Apr 13, 2023

South Approach - Church St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↩	Total	↰	↑	↱	↩	Total	↰	↑	↱	↩	Total	
07:00	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
07:30	0	4	1	0	5	0	0	0	0	0	0	0	0	0	0	0
07:45	0	1	2	0	3	0	0	0	0	0	0	0	0	0	0	0
08:00	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	0
08:15	0	3	0	0	3	0	0	2	0	2	0	0	0	0	0	0
08:30	0	1	0	0	1	0	1	1	0	2	0	0	0	0	0	0
08:45	0	3	3	0	6	0	0	0	0	0	0	0	0	0	0	0
09:00	0	2	0	0	2	0	1	0	0	1	0	0	0	0	0	0
09:15	0	3	0	0	3	0	0	0	0	0	0	0	0	0	0	0
09:30	0	1	1	0	2	0	0	0	0	0	0	0	1	0	1	0
09:45	0	1	0	0	1	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	0	21	8	0	29	0	2	3	0	5	0	0	1	0	1	0

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Church St & O'Reilley St
Site Code: 2308200001
Municipality: Penetanguishene
Count Date: Apr 13, 2023

South Approach - Church St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↩	Total	↰	↑	↱	↩	Total	↰	↑	↱	↩	Total	
15:00	0	4	0	0	4	0	0	2	0	2	0	0	1	0	1	1
15:15	0	1	4	0	5	0	1	0	0	1	0	0	0	0	0	0
15:30	0	2	4	0	6	0	0	1	0	1	0	0	0	0	0	0
15:45	0	5	2	0	7	0	0	1	0	1	0	0	0	0	0	0
16:00	0	4	3	0	7	0	1	0	0	1	0	0	0	0	0	0
16:15	0	4	4	0	8	0	0	0	0	0	0	0	0	0	0	0
16:30	0	7	1	0	8	0	1	0	0	1	0	1	0	0	1	0
16:45	0	3	2	0	5	0	0	0	0	0	0	2	0	0	2	0
17:00	0	7	1	0	8	0	0	0	0	0	0	0	0	0	0	0
17:15	0	1	3	0	4	0	1	0	0	1	0	0	0	0	0	0
17:30	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	0
17:45	0	2	1	0	3	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	0	42	26	0	68	0	4	4	0	8	0	3	1	0	4	1
GRAND TOTAL	0	63	34	0	97	0	6	7	0	13	0	3	2	0	5	1

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Church St & O'Reilley St
Site Code: 2308200001
Municipality: Penetanguishene
Count Date: Apr 13, 2023

East Approach - O'Reilley St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
07:00	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	0
07:15	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	1
07:30	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
07:45	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
08:00	1	0	1	0	2	0	0	0	0	0	0	0	0	0	0	1
08:15	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1	0
08:30	3	0	1	0	4	0	0	0	0	0	0	0	0	0	0	0
08:45	3	0	0	0	3	1	0	0	0	1	0	0	0	0	0	0
09:00	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0
09:15	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	2
09:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
09:45	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	11	0	4	0	15	3	0	0	0	3	1	0	0	0	1	5

Ontario Traffic Inc.
Traffic Monitoring • Services & Products

Traffic Count Data

Intersection: Church St & O'Reilley St
Site Code: 2308200001
Municipality: Penetanguishene
Count Date: Apr 13, 2023

East Approach - O'Reilley St

Start Time	Cars					Trucks					Bicycles					Total Peds
	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	↰	↑	↱	↶	Total	
15:00	1	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0
15:15	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30	2	0	1	0	3	2	0	0	0	2	0	0	0	0	0	0
15:45	0	0	1	0	1	0	0	0	0	0	2	0	1	0	3	0
16:00	2	0	2	0	4	0	0	1	0	1	0	0	0	0	0	0
16:15	4	0	0	0	4	0	0	0	0	0	0	0	0	0	0	0
16:30	2	0	0	0	2	0	0	0	0	0	0	0	0	0	0	0
16:45	2	0	1	0	3	0	0	0	0	0	0	0	0	0	0	1
17:00	3	0	1	0	4	1	0	0	0	1	0	0	0	0	0	0
17:15	2	0	2	0	4	0	0	0	0	0	0	0	0	0	0	0
17:30	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	1	0	1	0	0	0	0	0	0	0	0	0	0	0
SUBTOTAL	18	0	9	0	27	3	0	1	0	4	2	0	1	0	3	1
GRAND TOTAL	29	0	13	0	42	6	0	1	0	7	3	0	1	0	4	6

Peak Hour Diagram

Specified Period
From: 07:00:00
To: 10:00:00

One Hour Peak
From: 08:00:00
To: 09:00:00

Intersection: Church St & O'Reilley St
Site Code: 2308200001
Count Date: Apr 13, 2023

Weather conditions: Clear

**** Unsignalized Intersection ****

Major Road: Church St runs N/S

North Approach

	Out	In	Total
Cars	13	11	24
Trucks	1	1	2
Bicycles	0	0	0
	14	**12**	**26**

Church St

Bicycles	0	0	0
Trucks	1	0	0
Cars	12	1	0
Totals	**13**	**1**	**0**

Peds: 0

Peds: 0

Peds: 1

Totals	**10**	**7**	**0**
Cars	9	4	0
Trucks	1	3	0
Bicycles	0	0	0

East Approach

	Out	In	Total
Cars	9	5	14
Trucks	1	3	4
Bicycles	1	0	1
	11	**8**	**19**

O'Reilley St

	Totals	Cars	Trucks	Bicycles
	0	0	0	0
	2	2	0	0
	9	7	1	1

South Approach

	Out	In	Total
Cars	13	19	32
Trucks	4	2	6
Bicycles	0	1	1
	17	**22**	**39**

Church St

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
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Peak Hour Summary

Intersection:	Church St & O'Reilley St
Site Code:	2308200001
Count Date:	Apr 13, 2023
Period:	07:00 - 10:00

Peak Hour Data (08:00 - 09:00)

Start Time	North Approach Church St						South Approach Church St						East Approach O'Reilley St						West Approach						Total Vehicles
					Peds	Total					Peds	Total					Peds	Total					Peds	Total	
08:00	0	3		0	0	3		2	1	0	0	3	1		1	0	1	2					0		8
08:15	0	1		0	0	1		3	2	0	0	5	1		0	0	0	1					0		7
08:30	1	6		0	0	7		2	1	0	0	3	3		1	0	0	4					0		14
08:45	0	3		0	0	3		3	3	0	0	6	4		0	0	0	4					0		13
Grand Total	**1**	**13**		**0**	**0**	**14**		**10**	**7**	**0**	**0**	**17**	**9**		**2**	**0**	**1**	**11**					**0**	**0**	**42**
Approach %	7.1	92.9		0		-		58.8	41.2	0		-	81.8		18.2	0		-						-	
Totals %	2.4	31		0		33.3		23.8	16.7	0		40.5	21.4		4.8	0		26.2						0	
PHF	**0.25**	**0.54**		**0**		**0.5**		**0.83**	**0.58**	**0**		**0.71**	**0.56**		**0.5**	**0**		**0.69**						**0**	**0.75**
Cars	1	12		0		13		9	4	0		13	7		2	0		9						0	35
% Cars	100	92.3		0		92.9		90	57.1	0		76.5	77.8		100	0		81.8						0	83.3
Trucks	0	1		0		1		1	3	0		4	1		0	0		1						0	6
% Trucks	0	7.7		0		7.1		10	42.9	0		23.5	11.1		0	0		9.1						0	14.3
Bicycles	0	0		0		0		0	0	0		0	1		0	0		1						0	1
% Bicycles	0	0		0		0		0	0	0		0	11.1		0	0		9.1						0	2.4
Peds					0	-					0	-					1	-					0	-	1
% Peds					0	-					0	-					100	-					0	-	

Ontario Traffic Inc.
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Peak Hour Diagram

Specified Period		One Hour Peak	
From:	15:00:00	From:	15:30:00
To:	18:00:00	To:	16:30:00

Intersection: Church St & O'Reilley St
Site Code: 2308200001
Count Date: Apr 13, 2023

Weather conditions: Clear

**** Unsignalized Intersection ****

Major Road: Church St runs N/S

North Approach

	Out	In	Total
Cars	21	19	40
Trucks	1	2	3
Bicycles	0	1	1
	22	**22**	**44**

Church St

Bicycles	0	0	0
Trucks	1	0	0
Cars	16	5	0
Totals	**17**	**5**	**0**

Peds: 0

Peds: 0

Peds: 0

East Approach

	Out	In	Total
Cars	12	18	30
Trucks	3	2	5
Bicycles	3	0	3
	18	**20**	**38**

O'Reilley St

	Totals	Cars	Trucks	Bicycles
	0	0	0	0
	6	4	1	1
	12	8	2	2

Church St

	Totals	16	15	0
Cars		15	13	0
Trucks		1	2	0
Bicycles		0	0	0

South Approach

	Out	In	Total
Cars	28	24	52
Trucks	3	3	6
Bicycles	0	2	2
	31	**29**	**60**

Cars - Trucks - Bicycles

Comments

Ontario Traffic Inc.
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Peak Hour Summary

Intersection:	Church St & O'Reilley St
Site Code:	2308200001
Count Date:	Apr 13, 2023
Period:	15:00 - 18:00

Peak Hour Data (15:30 - 16:30)

Start Time	North Approach Church St						South Approach Church St						East Approach O'Reilley St						West Approach						Total Vehicles
					Peds	Total					Peds	Total					Peds	Total					Peds	Total	
15:30	0	3		0	0	3		2	5	0	0	7	4		1	0	0	5					0		15
15:45	2	6		0	0	8		5	3	0	0	8	2		2	0	0	4					0		20
16:00	1	3		0	0	4		5	3	0	0	8	2		3	0	0	5					0		17
16:15	2	5		0	0	7		4	4	0	0	8	4		0	0	0	4					0		19
Grand Total	**5**	**17**		**0**	**0**	**22**		**16**	**15**	**0**	**0**	**31**	**12**		**6**	**0**	**0**	**18**					**0**	**0**	**71**
Approach %	22.7	77.3		0		-		51.6	48.4	0		-	66.7		33.3	0		-						-	
Totals %	7	23.9		0		31		22.5	21.1	0		43.7	16.9		8.5	0		25.4						0	
PHF	**0.63**	**0.71**		**0**		**0.69**		**0.8**	**0.75**	**0**		**0.97**	**0.75**		**0.5**	**0**		**0.9**						**0**	**0.89**
Cars	5	16		0		21		15	13	0		28	8		4	0		12						0	61
% Cars	100	94.1		0		95.5		93.8	86.7	0		90.3	66.7		66.7	0		66.7						0	85.9
Trucks	0	1		0		1		1	2	0		3	2		1	0		3						0	7
% Trucks	0	5.9		0		4.5		6.3	13.3	0		9.7	16.7		16.7	0		16.7						0	9.9
Bicycles	0	0		0		0		0	0	0		0	2		1	0		3						0	3
% Bicycles	0	0		0		0		0	0	0		0	16.7		16.7	0		16.7						0	4.2
Peds					0	-					0	-					0	-					0	-	0
% Peds					0	-					0	-					0	-					0	-	

Appendix B:
LOS Definitions

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CAPACITY ANALYSIS AT UNSIGNALIZED INTERSECTIONS

Highway Capacity Manual Methodology

The level of service at an unsignalized intersection is determined on the basis of control delay for each critical lane. This method of analysis is taken from the Highway Capacity Manual, Special Report 209, by the Transportation Research Board, 1997.

The average control delay for any particular critical movement (control delay includes initial deceleration, queue move-up time, stopped delay, and final acceleration delay) is a function of the service rate or capacity of the approach and degree of saturation. The level of service criteria for unsignalized intersections is outlined below and is related to ranges in vehicle delay.

Level of Service	Expected Delay to Minor Street Traffic	Average Control Delay 'd' (sec/veh)
A	Little or no delays	$0 < d \leq 10$
B	Short traffic delays	$10 \leq d \leq 15$
C	Average traffic delays	$15 \leq d \leq 25$
D	Long traffic delays	$25 \leq d \leq 35$
E	Very long traffic delays	$35 \leq d \leq 50$
F	Extreme delays with queuing which may cause congestion affecting other traffic movements in the intersection	$d > 50$

Appendix C:
Traffic Operations – Existing

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	11	3	13	9	1	16
Future Volume (Veh/h)	11	3	13	9	1	16
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	12	3	14	10	1	17
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	38	19			24	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	38	19			24	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	99	100			100	
cM capacity (veh/h)	974	1059			1591	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	15	24	18
Volume Left	12	0	1
Volume Right	3	10	0
cSH	990	1700	1591
Volume to Capacity	0.02	0.01	0.00
Queue Length 95th (m)	0.4	0.0	0.0
Control Delay (s)	8.7	0.0	0.4
Lane LOS	A		A
Approach Delay (s)	8.7	0.0	0.4
Approach LOS	A		

Intersection Summary			
Average Delay	2.4		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	9	1	1	0	0	13
Future Volume (vph)	9	1	1	0	0	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	1	1	0	0	14

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	11	1	14
Volume Left (vph)	10	1	0
Volume Right (vph)	1	0	14
Hadj (s)	0.16	0.23	-0.57
Departure Headway (s)	4.1	4.2	3.4
Degree Utilization, x	0.01	0.00	0.01
Capacity (veh/h)	871	847	1062
Control Delay (s)	7.1	7.2	6.4
Approach Delay (s)	7.1	7.2	6.4
Approach LOS	A	A	A

Intersection Summary			
Delay	6.7		
Level of Service	A		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	15	8	20	19	6	21
Future Volume (Veh/h)	15	8	20	19	6	21
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	16	9	22	21	7	23
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	70	32			43	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	70	32			43	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	98	99			100	
cM capacity (veh/h)	931	1041			1566	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	25	43	30
Volume Left	16	0	7
Volume Right	9	21	0
cSH	968	1700	1566
Volume to Capacity	0.03	0.03	0.00
Queue Length 95th (m)	0.6	0.0	0.1
Control Delay (s)	8.8	0.0	1.7
Lane LOS	A		A
Approach Delay (s)	8.8	0.0	1.7
Approach LOS	A		

Intersection Summary			
Average Delay	2.8		
Intersection Capacity Utilization	16.3%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	24	1	1	0	0	21
Future Volume (vph)	24	1	1	0	0	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	1	1	0	0	23

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	27	1	23
Volume Left (vph)	26	1	0
Volume Right (vph)	1	0	23
Hadj (s)	0.20	0.23	-0.57
Departure Headway (s)	4.1	4.2	3.4
Degree Utilization, x	0.03	0.00	0.02
Capacity (veh/h)	857	836	1046
Control Delay (s)	7.3	7.2	6.5
Approach Delay (s)	7.3	7.2	6.5
Approach LOS	A	A	A

Intersection Summary			
Delay	6.9		
Level of Service	A		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

Appendix D:
Traffic Operations – Future Total

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	23	5	14	12	3	18
Future Volume (Veh/h)	23	5	14	12	3	18
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	5	15	13	3	20
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	48	22			28	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	48	22			28	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	100			100	
cM capacity (veh/h)	960	1056			1585	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	30	28	23
Volume Left	25	0	3
Volume Right	5	13	0
cSH	975	1700	1585
Volume to Capacity	0.03	0.02	0.00
Queue Length 95th (m)	0.7	0.0	0.0
Control Delay (s)	8.8	0.0	1.0
Lane LOS	A		A
Approach Delay (s)	8.8	0.0	1.0
Approach LOS	A		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	13.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	9	6	16	0	0	13
Future Volume (vph)	9	6	16	0	0	13
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	10	7	17	0	0	14

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	17	17	14
Volume Left (vph)	10	17	0
Volume Right (vph)	7	0	14
Hadj (s)	-0.10	0.23	-0.57
Departure Headway (s)	3.9	4.2	3.4
Degree Utilization, x	0.02	0.02	0.01
Capacity (veh/h)	917	844	1051
Control Delay (s)	6.9	7.3	6.4
Approach Delay (s)	6.9	7.3	6.4
Approach LOS	A	A	A

Intersection Summary			
Delay	6.9		
Level of Service	A		
Intersection Capacity Utilization	17.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Traffic Volume (veh/h)	22	10	22	32	11	23
Future Volume (Veh/h)	22	10	22	32	11	23
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	24	11	24	35	12	25
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	90	42			59	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	90	42			59	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	97	99			99	
cM capacity (veh/h)	903	1029			1545	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	35	59	37
Volume Left	24	0	12
Volume Right	11	35	0
cSH	939	1700	1545
Volume to Capacity	0.04	0.03	0.01
Queue Length 95th (m)	0.9	0.0	0.2
Control Delay (s)	9.0	0.0	2.4
Lane LOS	A		A
Approach Delay (s)	9.0	0.0	2.4
Approach LOS	A		

Intersection Summary			
Average Delay		3.1	
Intersection Capacity Utilization		18.5%	ICU Level of Service
Analysis Period (min)		15	

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Sign Control	Stop			Stop	Stop	
Traffic Volume (vph)	24	18	11	0	0	21
Future Volume (vph)	24	18	11	0	0	21
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	26	20	12	0	0	23

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total (vph)	46	12	23
Volume Left (vph)	26	12	0
Volume Right (vph)	20	0	23
Hadj (s)	-0.11	0.23	-0.57
Departure Headway (s)	3.9	4.2	3.4
Degree Utilization, x	0.05	0.01	0.02
Capacity (veh/h)	919	825	1026
Control Delay (s)	7.1	7.3	6.5
Approach Delay (s)	7.1	7.3	6.5
Approach LOS	A	A	A

Intersection Summary			
Delay	6.9		
Level of Service	A		
Intersection Capacity Utilization	17.3%	ICU Level of Service	A
Analysis Period (min)	15		