Niagara Village Transportation Study

2592693 Ontario Inc.

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R.J. Burnside & Associates Limited
6990 Creditview Road, Unit 2
Mississauga ON L5N 8R9 CANADA

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R.J. Burnside & Associates Limited

Report Prepared By:

Cindy Chung, EIT
Transportation Planner
CC:cv

Report Reviewed By:

David Argue, P.Eng., PTOE
Vice President - Transportation

Executive Summary

The existing Thundering Water Golf Club located in the south area of the developed portion of the City of Niagara Falls. The club is proposed to be redevelopment by 2592693 Ontario Inc. The proposed development will consist of a total 1,134 units of residential development with 930 m^2 (101,010 ft^2) of commercial space.

Access to the proposed development will be provided via the following connections:

- Drummond Road,
- Oldfield Road, and
- Ramsey Road.

Drummond Road and Oldfield Road will be extended and connected with Ramsey Road. Oldfield Road will be as an east-west connection that will swing to the south east of Drummond Road to connect to Ramsey Road. Drummond Road will extend to the south and swing to the east to connect to Ramsey Road.

Thundering Waters Boulevard currently provides a connection to the golf course and will remain in its present form but is not proposed to be connected to the new development. A future connection will be protected to allow the connection.

The CP Montrose Subdivision (railway track) runs through the proposed development. As a result, within the proposed development, two at-grade crossing points are proposed.

Official Plan Amendment, Zoning By-law Amendment and Draft Plan applications will be required. R.J. Burnside & Associates Limited (Burnside) was retained to undertake the Transportation Study among other studies, which forms part of those applications.

Existing Conditions

Under existing conditions, all study intersections are operating with excess capacity during both peak hours.

The southbound left turn queue at the Drummond Road / McLeod Road intersection exceeds the existing storage by one to two vehicles during the weekday AM and PM peak hours and the City may want to review to provide additional storage.

Background 2026 Conditions

Intersections within the study area are projected to operate with excess capacity with some exceptions, which can be mitigated as follows.

At the Drummond Road and McLeod Road intersection, it is recommended that the existing afternoon signal timing plan be optimized while maintaining the existing cycle length. With the signal timing adjustments, all movements will have excess capacity.

Due to background growth (including the Riverfront Community Development), Chippawa Parkway and Lyons Creek Road intersections with Stanley Avenue will exceed capacity during both peak hours as stop-controlled intersections. Although the intersections are not warranted for a signal under OTM Book 12, it is recommended that a traffic signal be implemented due to operations. This is consistent with the Riverfront TIS. In addition, at the Stanley Avenue / Chippawa Parkway intersection, the following improvements consisted in the Riverfront TIS are also needed:

- Exclusive left turn lanes for all approaches;
- Exclusive southbound right turn lane.

With the recommended improvements at both intersections, all movements will have excess capacity.

Total 2026 Conditions

Under total 2026 conditions, all study intersections are projected to operate with excess capacity during both peak hours with the exception of the Drummond Road / McLeod Road intersection. The Region's has plans to make improvements along McLeod Road by 2031. Consistent with the Riverfront TIS conclusions, it is recommended that the following 2031 improvements be accelerated and be implemented under total 2026 conditions to assist with capacity constraints:

- Exclusive northbound left turn lane;
- Exclusive westbound left turn lane; and
- Exclusive eastbound left turn lane.

With the recommended improvements, all movements will have excess capacity.

Background 2031 Conditions

The Region completed an EA along McLeod Road / Marineland Parkway in 2010 with improvements expected to be started by 2026 and in place by 2031. The following improvements are planned:

- Drummond Road / McLeod Road intersection:
  - Additional eastbound, westbound and northbound left turn lanes
  - Additional southbound right turn lane
- Marineland Parkway / Portage Road intersection:
  - Additional eastbound left turn lane

The improvements are considered in the 2031 background conditions.

Under background 2031 conditions with the planned improvements by the Region, all study intersections will operate with excess capacity and will experience level of service D or better with the exception of Stanley Road intersections with Progress Street and Don Murie Street. The eastbound movements at both intersections will experience a delay resulting in a level of service D. It is recommended that exclusive turn lanes be added at both the intersections to improve the volume to capacity ratio and the delay to left turns from the side streets for left turns will remain similar. No additional recommendations are made at this time. The City should monitor both these intersections for additional improvements.

Total 2031 Conditions

With the recommended and planned improvements, under total 2031 conditions, all study intersections are projected to operate with excess capacity during both peak hours.

Queue Review

Synchro 95th percentile queues were reviewed for all movements. Based upon the existing queues, there are no improvements recommended. Table A summarizes the recommended improvements due to critical movements (queues projected to exceed existing or proposed storage).

Table A: Summary of Queue Review

Intersections	Movements	Implementation Year	Recommended Improvements
Drummond / McLeod	SBL	Existing	The City should be monitoring as the queue is exceeding the existing storage.
	WBL	Total 2026	The queues will spill onto the through lane during the PM peak hour. The storage length in the planned EA is not sufficient to accommodate for the projected queue and widening will be needed to further lengthen the planned storage length. It is recommended that the City monitor this movement for mitigations. As the projected queue can utilized the through movement as additional storage, no further recommendations are made at this time.
	NBL	Total 2026	The storage length in the planned EA is not sufficient to accommodate for the projected queue. It should be lengthened to 60 m to accommodate for projected queue. This can be timed with widening of McLeod Road.

Table A: Summary of Queue Review continued

Intersections	Movements	Implementation Year	Recommended Improvements
Stanley / Chippawa	EBL and NBL	Background 2026	Recommended storage of 60 m
	WBL, SBL and SBR		Recommended storage of 30 m.
Stanley / Lyons Creek	EBL	Background 2026	Recommended storage of 137 m.

Road Classification

All roads within the development will be classed as local roads with the exception of the continuation of Drummond Road and Oldfield Road. It is recommended that these two roadways be identified and designated as collector roads and provide road allowance in accordance with City standards.

Traffic Control

All roads within the development are recommended to have 2-way stop control with the exception of Drummond Road Extension / Oldfield Road Extension intersection, which is recommended to be under all-way stop control.

Proposed Railway Crossing

There will be two at-grade crossing within the development occurring north of Drummond Extension / Street F / Street C and Oldfield Extension / Street C intersections. It is recommended that the railway crossing warning system be located at the south leg of the both intersections, approximately a minimum of 15.0 m from the centre of the intersection. Traffic heading northbound will be stopped at the rail before crossing the intersection. While traffic heading southbound will be stopped at the intersection. Eastbound and westbound traffic at both intersections will not be affected.

Proposed Pedestrian and Cyclist Accommodation

The site is well designed to accommodate access by all modes of travel.

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Abbreviations

The following summarizes abbreviations that are utilized within this report:

- City – City of Niagara
- CP – Canadian Pacific
- ITE – Institute of Transportation Engineers
- LOS – level of service
- LUC – Land Use Code
- Region – Niagara Region
- TOR – Terms of Reference
- Traffic Movements
  - EB – Eastbound
  - SB – Southbound
  - NB – Northbound
  - WB – Westbound
  - L – left turn
  - T – through
  - R – right turn
  - LT – shared left-through movement
  - LTR – shared left-through-right movement
  - TR – shared through-right movement
- TTS – Transportation Tomorrow Survey
- v/c – volume to capacity ratio

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1.0 Introduction

1.1 Background

2592693 Ontario Inc. (the Client) is planning for the redevelopment of the existing Thundering Water Golf Club located in the City of Niagara Falls. The site is generally located south of McLeod Road / Marineland Parkway and west of Stanley Avenue. The location of the subject site is illustrated in Figure 1.

Figure 1: Site Location

The concept plan for the proposed redevelopment is residential with some commercial space. An Official Plan Amendment, a Zoning By-law Amendment and a Draft Plan of Subdivision applications will be required for the development. R.J. Burnside &

Associates Limited (Burnside) was retained to undertake a Transportation Study among other studies, which would be part of those applications.

1.2 Scope of Work

Prior to this study, Niagara Region (the Region) and the City of Niagara Falls (the City) had requested for the following memos to be provided:

- Proposed Connection Review
- Trip Generation and Attraction Analysis
- Trip Distribution Analysis

Comments and feedback were provided by the Region and City were received on November 5, 2018 and November 14, 2018, respectively. Updated memos incorporating their feedback were resent for their review. The Region confirmed that they have no further comment in an email dated November 21, 2018. The memos are provided in Appendix A.

The essential change to the concept plan from the 2018 memos are the number of residential units and commercial space has change, and there will not be direct access to Thundering Waters Boulevard. The intent and approach outlined in the memos has been followed.

The study scope of work summarized below was discussed and confirmed with the Region and City staff prior to conducting the study.

Analysis Scenarios	• Existing traffic conditions • 2026 background and total traffic conditions • 2031 background and total traffic conditions
Analysis Time Periods	• Weekday AM peak hour (7:00 AM – 9:00 AM) • Weekday PM peak hour (4:00 PM – 6:00 PM)
Analysis Intersections	• Drummond Road / McLeod Road • Drummond Road / Oldfield Road • Marineland Parkway / Stanley Avenue / Thundering Waters Boulevard • Marineland Parkway / Stanley Avenue (South Leg) • Marineland Parkway / Portage Road • Ramsey Road / Stanley Avenue • Progress Street / Stanley Avenue • Don Murie Street / Stanley Avenue • Chippawa Parkway / Stanley Avenue • Lyons Creek Road / Stanley Avenue

Also, the following documentations were used as relevant background information:

- *Niagara Falls Sustainable Transportation Master Plan Final Report (*City TMP), AECOM Canada Limited, October 2011
- *Niagara Region Transportation Master Plan (*Region TMP), IBI Group, October 2017
- *Riverfront Community Transportation Assessment (*Riverfront Community TIS), Paradigm Transportation Solutions Limited (Paradigm), April 2018

1.3 Intersection Analysis Methodology

Intersection operations were assessed for intersections in the study area using the software program Synchro 9, which employs methodology from the *Highway Capacity Manual (HCM2000 and HCM 2010)*, published by the Transportation Research Board National Research Council. Synchro 9 can analyze both signalized and stop controlled intersections in a road corridor or network taking into account spacing, interaction, queues and operations between intersections. The analysis has utilized the HCM2000 methodology.

Signalized intersection analysis considers two separate measures of performance:

- The capacity of all intersection movements, which is based on a volume to capacity ratio that measure of the degree of capacity utilized.
- The level of service (LOS) for all intersection movements, which is based on the average control delay per vehicle for the various movements through the intersection and overall. Delay is an indicator of how long a vehicle must wait to complete a movement and is represented by a letter between A and F, with F being the longest delay. The link between LOS and delay (in seconds) for signalized intersections is summarized below.

Level of Service	Control Delay per Vehicle(s)
A	≤10
B	> 10 – 20
C	> 20 – 35
D	> 35 – 55
E	> 55 – 80
F	> 80

Stop controlled intersection analysis considers two separate measures of performance:

- The capacity of the intersection's critical movements, which is based on a volume to capacity ratio.
- The level of service for the critical movements, which is based on the average control delay per vehicle for the various critical movements within the intersection. The link between LOS and delay (in seconds) for stop controlled intersections is summarized below.

Level of Service	Control Delay per Vehicle(s)
A	0 – 10
B	> 10 – 15
C	> 15 – 25
D	> 25 – 35
E	> 35 – 50
F	> 50

2.0 Existing Conditions

2.1 Area Context

The subject site is currently occupied by Thundering Water Golf Club located in the south area of the built-up portion of the City. A Canadian Pacific (CP) rail corridor runs through the middle of the site, essentially splitting it in two. Adjacent to the CP rail corridor is the Conrail Drainage Channel, which is a drainage feature that conveys upstream flows ultimately to the Welland River located southwest of the site. To the north is McLeod Road / Marineland Parkway; to the east is Stanley Avenue; to the south is Ramsey Road; and to the west is Drummond Road, industrial lands and provisionally significant wetland.

The site is bounded single-family homes to the north, vacant lands / industrial lands and residential development to the west and industrial uses to the east and south. Major roadways by the site include Regional Road 49 (McLeod Road / Marineland Parkway) to the north, Stanley Avenue to the east, and Queen Elizabeth Way (QEW) to the west.

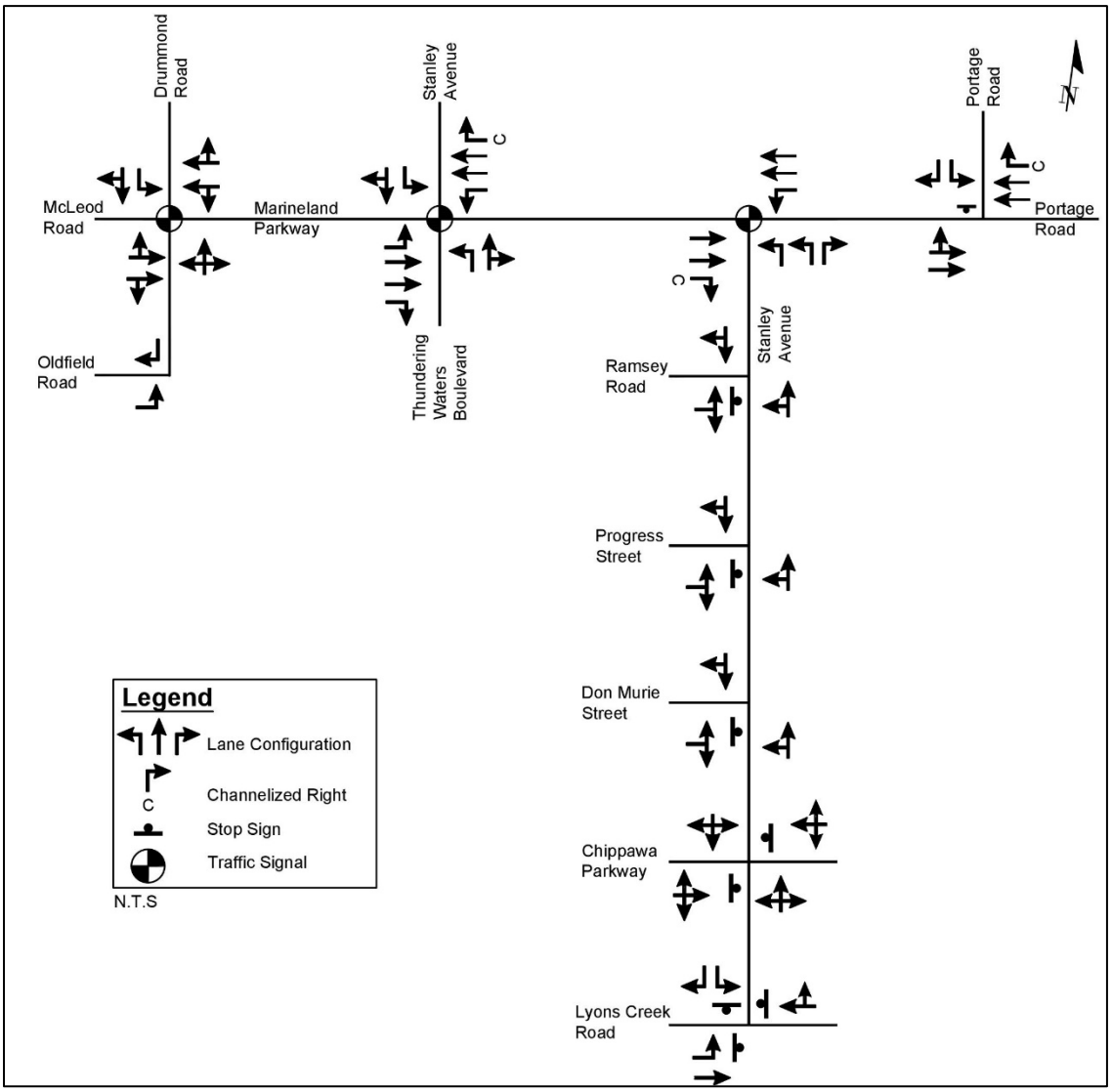
The subject site is located within an area where intensification through mix-use development is encouraged. For example, the vacant lands adjacent to the site are part of the Riverfront Community (formerly known as Thundering Waters Secondary Plan area). Details regarding this development will be provided in Section 3.2.

2.2 Road Network

The existing road network is described below and illustrated in Figure 2, including existing traffic control.

Drummond Road	Drummond Road is a north-south arterial road, north of McLeod Road and transitions into a local road, south of McLeod Road. The roadway is under the jurisdiction of the City. Drummond Road has a posted speed limit of 50 km/h and consists of a 2-lane urban cross section. Bicycle lanes are provided on both sides of the road and terminates at Hawkins Street / Village Crescent (north of McLeod Road). Sidewalks are provided on both sides of the street. Parking is prohibited on both sides of the street, north of McLeod Road and parking is prohibited on the east side, south of McLeod Road.

Figure 2: Existing Road Network



McLeod Road / Marineland Parkway / Portage Road (Region Road 49)	McLeod Road / Marineland Parkway is an east-west arterial road. Approximately 200 m east of Alex Avenue, the roadway transitions into Marineland Parkway and continues east as a collector road. The roadway then transitions into Portage Road, east of Portage Road. The roadway is under the jurisdiction of the Region west of Stanley Avenue (south leg) and is under the jurisdiction of the City east of Stanley Avenue. McLeod Road has a 4-lane urban cross section with a posted speed limit of 50 km/h. Sidewalks are provided on both sides and the sidewalk to the south terminates east of Drummond Road. The sidewalk to the north continues and terminates when the roadway transitions to Marineland Parkway. Parking is prohibited on both sides of the road. Marineland Parkway consists of a 2-lane urban cross section with a posted speed limit of 50 km/h. Sidewalks are provided on the north side of the road, east of Stanley Avenue (north leg) and terminates at the south leg of Stanley Avenue. Sidewalks are then continued on the south side of the road. Parking is prohibited on both sides of the road. East of Portage Road (north leg), Marineland Parkway continues as Portage Road. The roadway consists of a 4-lane urban cross section with an assumed unposted speed limit of 50 km/h. Sidewalks are provided on the south side and terminates 330 m, east of Portage Road (north leg).
Portage Road (north leg)	Portage Road (north leg) is a north south arterial road under the jurisdiction of the City. The roadway consists of a 2-lane rural cross section with a posted speed limit of 50 km/h. Sidewalks are provided on the west side of the road and terminates 200 m north of the Portage Road / Marineland Parkway intersection. Stopping is prohibited on both sides of the road.
Oldfield Road	Oldfield Road is an east west arterial road under the jurisdiction of the City. The roadway consists of a 2-lane rural cross section with an assumed unposted speed limit of 50 km/h. Sidewalks are provided on the north side of the road and terminates west of Sam Iorfida Drive. To the west of Dorchester Road, Oldfield Road continues as Dorchester Road.

Stanley Avenue (Regional Road 102) / Thundering Waters Boulevard	Stanley Avenue is a north-south major arterial road under the jurisdiction of the Region. The roadway offsets at Marineland Parkway creating west Stanley Avenue and east Stanley Avenue, which are approximately 270 m apart. Stanley Avenue (north leg) has a 4-lane urban cross section with a posted speed limit of 50 km/h. Sidewalks are provided on both sides of the road and the sidewalk to the east terminates at McLeod Road. Bicycle lanes are provided on both sides of the road. Parking is prohibited on both sides of the road. Stanley Avenue (north leg), south of Marineland Parkway, transitions into a local road named Thundering Waters Boulevard. Thundering Waters Boulevard consists of a 2-lane urban cross section with an assumed unposted speed limit of 50 km/h. Thundering Waters Boulevard currently is a private road and provides access to Thundering Waters Golf Club and a residential community. Stanley Avenue (south leg), south of Marineland Parkway, consists of a 2-lane rural cross section with a posted speed limit of 60 km/h. Parking is prohibited on both sides of the road.
Ramsey Road	Ramsey Road is an east-west collector road under the jurisdiction of the City. The roadway consists of a 2-lane rural cross section with a posted speed limit of 50 km/h.
Progress Street	Progress Street is an east-west collector road under the jurisdiction of the City. The roadway consists of a 2-lane urban cross section with an assumed unposted speed limit of 50 km/h. Parking is prohibited on the north side of the road.
Don Murie Street	Don Murie Street is an east-west collector road under the jurisdiction of the City. The roadway consists of a 2-lane urban cross section with an assumed unposted speed limit of 50 km/h. Parking is prohibited on the south side of the road.

Chippawa Parkway	Chippawa Parkway is an east-west roadway consisting of a 2-lane rural cross section under the jurisdiction of the City. The roadway is classified as an arterial road, west of Stanley Avenue and transitions into a collector road to the east. Chippawa Parkway has a posted speed limit of 60 km/h.
Lyons Creek Road (Regional Road 47)	Lyons Creek Road is an east-west arterial road under the jurisdiction of the Region. The roadway consists of a 2-lane rural cross section. The roadway has a posted speed limit of 60 km/h east of Stanley Avenue and a posted speed limit of 70 km/h west of Stanley Avenue. Bicycle lanes are provided on both sides of the road

2.3 Rail Line

A CP rail corridor runs through the middle of the site, which is an existing tertiary spur rail line owned by CP that is classified as an Industrial Spur Line. The rail line is identified to be CP Montrose Subdivision and services the industrial facilities in the area. It is classified as an Industrial Spur Line. Table 1 summarizes the information provided by CP for this rail line. Other detailed information can be found in Appendix B.

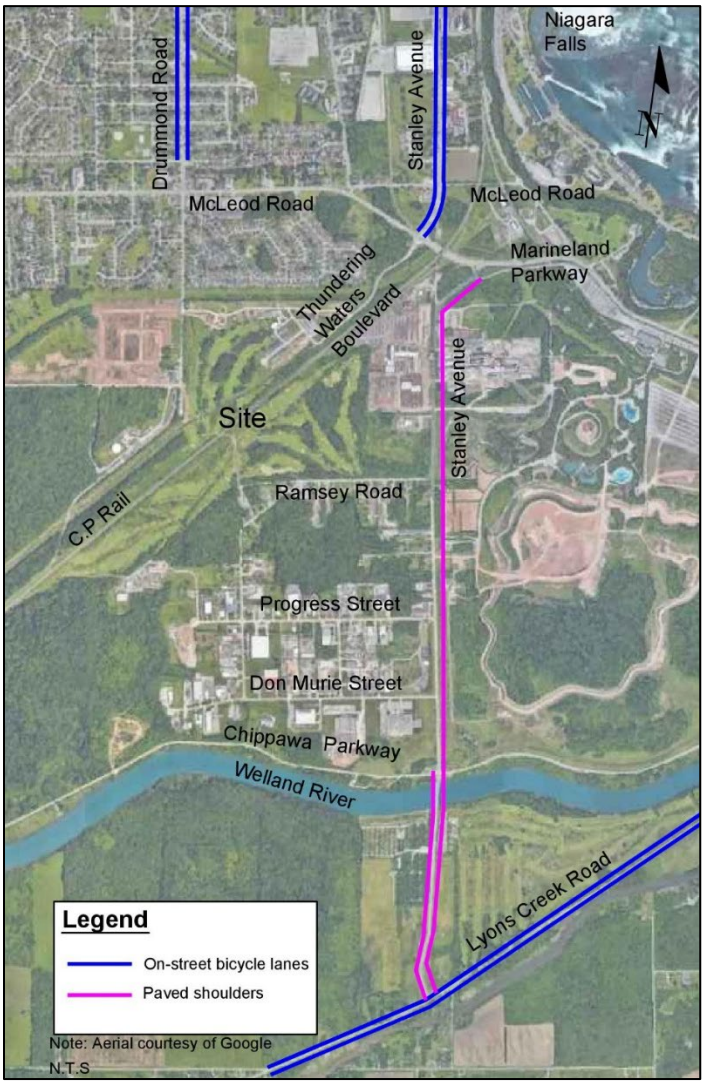
Table 1: CP Montrose Subdivision Status

Attributes	Values
Number of freight trains between 7:00AM to 11:00PM	0
Number of freight trains between 11:00PM to 7:00AM	2
Maximum cars per train freight	20
Number of locomotives per train	2
Maximum permissible train speed	41 km/h (25 mph)
Normal train speed	25 km/h (15 mph)

2.4 Cycling Network

Cycling infrastructures consist of on-street bicycle lanes and paved shoulders. Existing cycling facilities are shown in Figure 3.

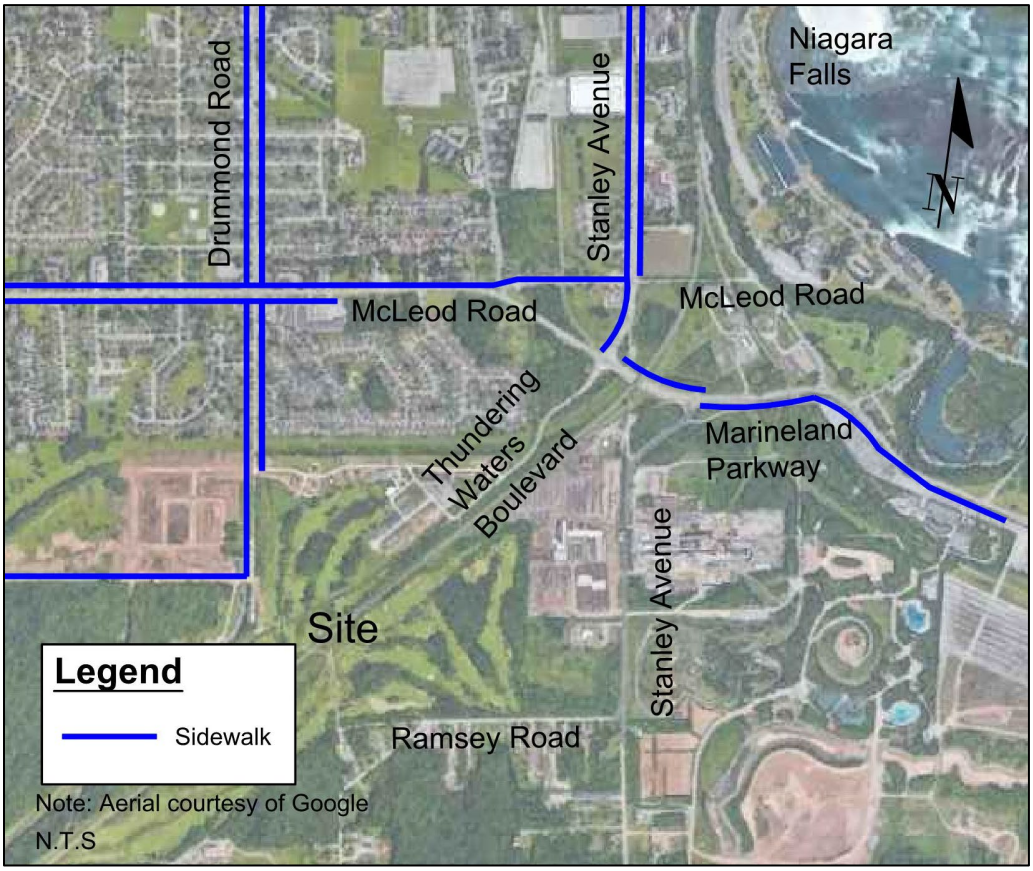
Figure 3: Existing Cycling Network



2.5 Pedestrian Network

Pedestrian infrastructure consists of sidewalks. Existing pedestrian facilities on the major roads are shown in Figure 4.

Figure 4: Existing Pedestrian Network



2.6 Transit

Niagara Falls Transit provides several bus routes north of the site 7 days a week. Transit stops are located at the following intersections:

- McLeod Road / Drummond Road
- Marineland Parkway / East Stanley Road

The transit stops are approximately a 10 to 12-minute walk from the site. Table 2 summarizes the route frequency during the adjacent street peak period.

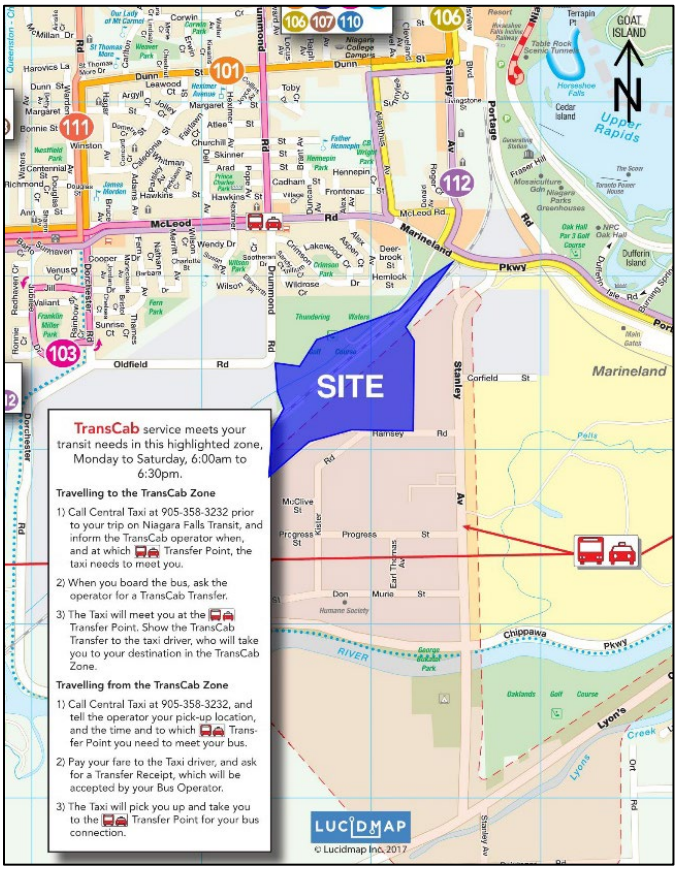
Table 2: Transit Service

Route Number	Direction	Via	Frequency
103	Between Niagara Square Shopping Centre and To Main & Ferry	McLeod Road and Drummond Road	60 minutes
203 (Evenings and Sundays)			30 minutes
106	Between Main & Ferry and Chippawa Area	Stanley Avenue and Marineland Parkway	60 minutes
206 (Evenings and Sundays)			30 minutes
112	Between Niagara Square Shopping Centre and Chippawa Area	Marineland Parkway and McLeod Road	60 minutes

South of the site is served by Niagara TransCab, who provides services for areas of the City not served by regular Niagara Falls Transit. TransCab operate Monday to Saturday 6:00 AM to 7:15 PM. The cab will pick up the user at a booked time and connect them to a regular Niagara Transit bus route.

Local transit routes and TransCab service area are illustrated in Figure 5.

Figure 5: Existing Transit Routes



Reference: Niagara Transit

2.7 Existing Traffic Volumes

Existing traffic counts were undertaken during the weekday morning (7:00 AM to 9:00 AM) and afternoon (4:00 PM to 6:00 PM) peak periods. These periods were selected to reflect the peak travel characteristics of this particular type of development. The turning movement counts for all study intersections were conducted by Pyramid Traffic Inc., on behalf of Burnside on Thursday, March 22, 2018 with the exception of the intersections summarized in Table 3. The turning movement counts for these intersections were taken from the Riverfront Community TIS.

Table 3: Traffic Count Exceptions

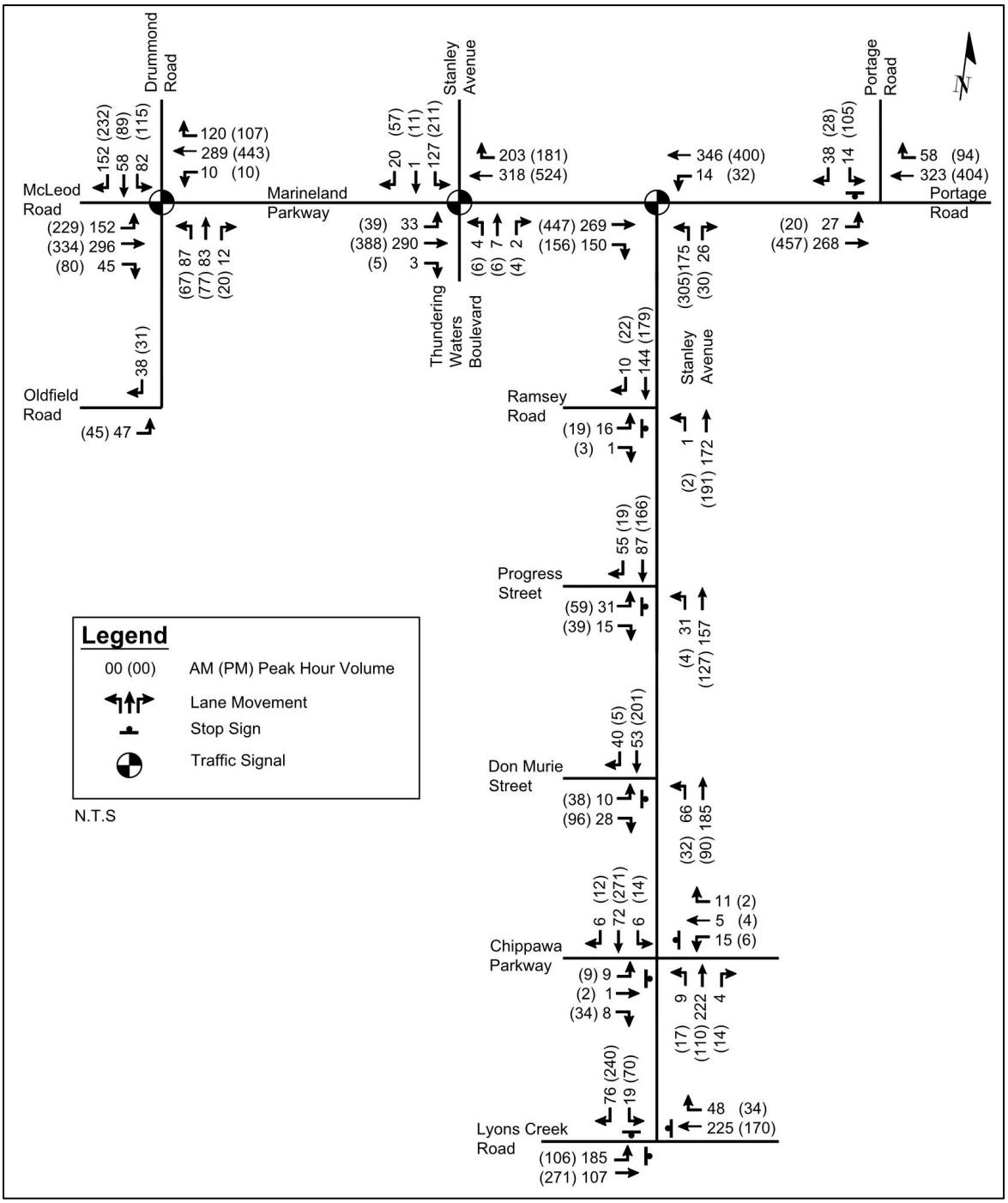
Location	Dates
Marineland Parkway / Stanley Avenue (south leg)	Wednesday, September 9, 2015
Marineland Parkway / Portage Road	Wednesday, September 2, 2015
Drummond Road Oldfield Road [1]	April 2017

Notes: 1. As noted in the Riverfront Community TIS, the counts at this intersection was provided to them by the City.

To be consistent with the Riverfront Community TIS, an annual growth rate of 1% was applied to the traffic volumes to represent the existing year (2018). A minor imbalance was observed in the traffic data along Marineland Parkway / Portage Road. Adjustments were made to be consistent with the Riverfront Community TIS and historical counts patterns.

The existing traffic counts are illustrated Figure 6 and traffic counts are provided in Appendix C.

Figure 6: Existing Traffic Volumes



3.0 Future Background Conditions

Future background traffic consists of existing traffic, background traffic growth and traffic from other developments. Background traffic growth and traffic from other developments are discussed below. The horizon year of 2026 and 2031 were selected for the analysis. Future road network, transit and active transportation improvements in the vicinity of the site and within the study's horizon year, are also discussed.

3.1 Background Traffic Growth

The existing traffic counts collected by Burnside in March 2018, 2015 counts in the Riverfront Community TIS, City's 2012 and 2015 average annual daily traffic (AADTs) were reviewed. The traffic data generally indicates a negative growth trend for the study area. However, for a more conservative approach and to be consistent with the Riverfront Community TIS, a growth rate of 0.5% compounded annually was applied to all movements long McLeod Road / Marineland Parkway / Portage Road and a growth rate of 1% compounded annually was applied to all other study intersections. No growth was applied to turning movements associated with Oldfield Road and Thundering Waters Boulevard.

3.2 Background Developments

As discussed with the City, two background developments were identified to be within the vicinity of the site and are anticipated to be built within the study horizon years as follows.

Riverfront Community

- This proposed development was formerly known as the Thundering Waters Secondary Plan.
- Located south of Oldfield Road and west of the site.
- Proposed development is 312 condominium/townhomes, 567 single detached homes, 238 continuing care / retirement facility rooms, 450 hotel rooms, and 26,012 m^2 (280,000 ft^2) of retail space.
- Weekday AM and PM peak hour site volumes were based on Riverfront Community TIS.

Nina's Court Condominium

- Located southeast of Old Mcleod Road / Marineland Parkway.
- Proposed development is 43 townhomes and 125 condominium units.
- Weekday AM and PM peak hour site volumes were based on *Nina's Court Traffic Impact Study*, prepared by Paradigm, dated May 2017. As the intersection at Lyons Creek Road and Stanley Avenue was not part of their study intersection, assumptions were made based on existing travel patterns.

The related background development traffic figures are provided in Appendix D.

3.3 Future Road Network

The Region completed an Environmental Assessment (EA) along McLeod Road / Marineland Parkway in 2010. The following improvements are planned in the EA:

- At Drummond Road / McLeod Road intersection:
  - Additional eastbound, westbound and northbound left turn lanes
  - Additional southbound right turn lane
- At Marineland Parkway / Portage Road intersection:
  - Additional eastbound left turn lane

For the above improvements, the Region had indicated that construction will begin 2026 and completed by 2031. Therefore, the improvements are considered in the 2031 background conditions.

3.4 Transit and Active Transportation Improvements

There are no planned transit, pedestrian and cyclist facility improvements planned within the study area up to the study horizon years.

3.5 Future Background Traffic Volumes

Background traffic volumes consist of the application of the growth per annum (up to the horizon year 2026 and 2031) to existing volumes as shown in Figure 6, in addition to traffic from background developments. The resulting traffic volumes are illustrated in Figure 7 and Figure 8 for horizon years 2026 and 2031, respectively.

Figure 7 : 2026 Background Traffic Volumes

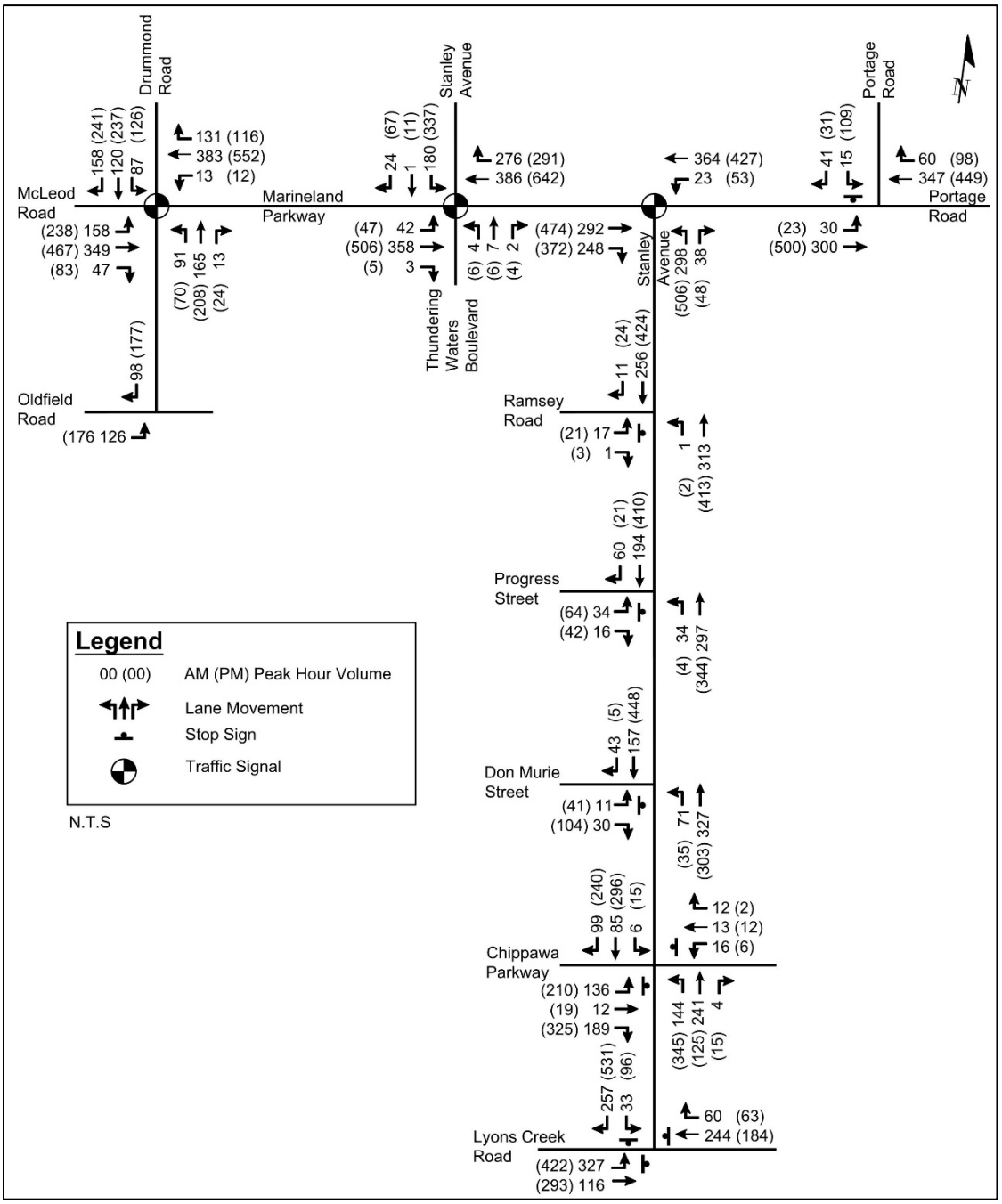
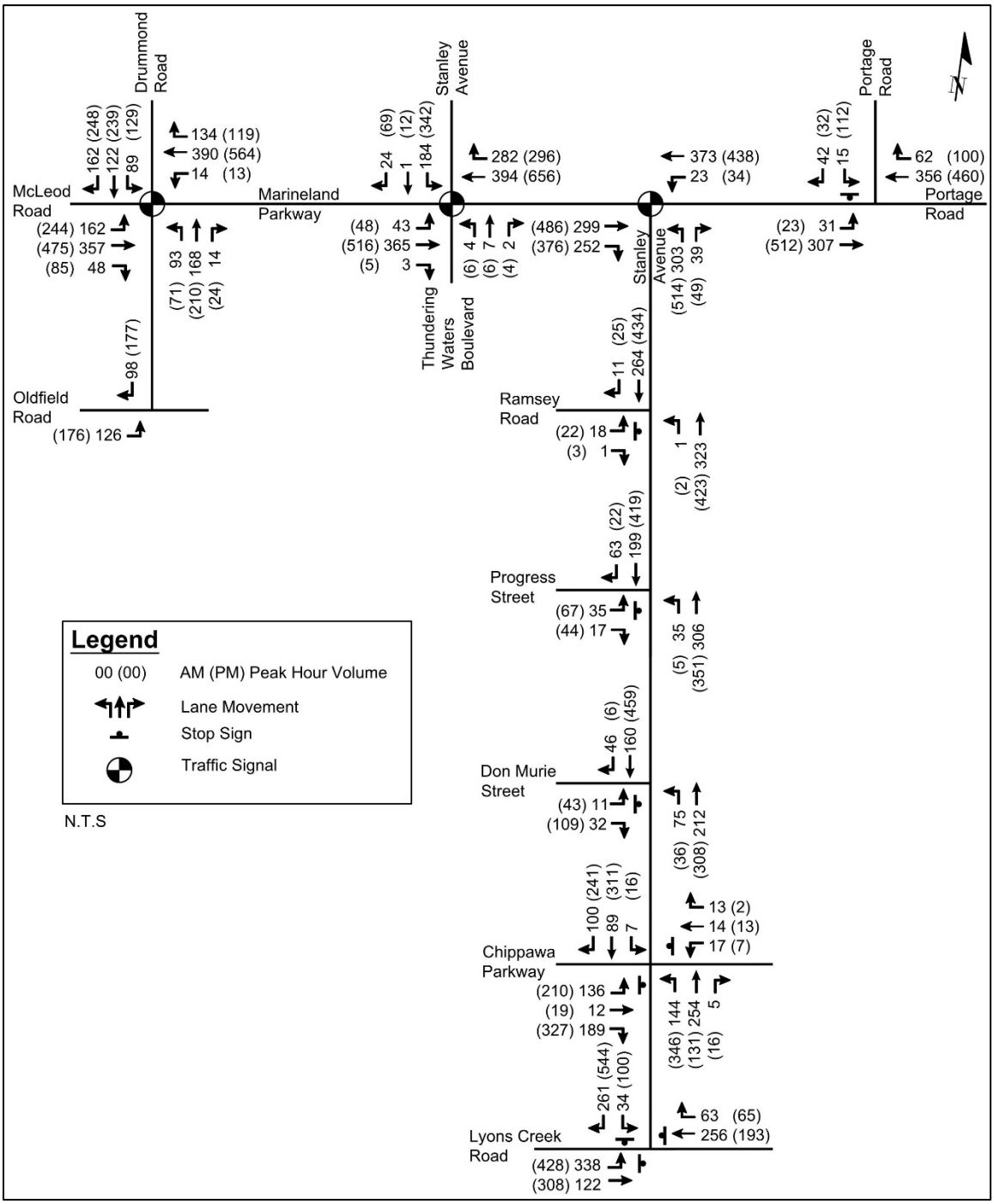


Figure 8 : 2031 Background Traffic Volumes



4.0 Proposed Development

The proposed development will consist the following:

- 232 single detached residential homes
- 39 street townhomes
- 103 low density residential units
- 522 medium density residential units
- 201 mixed use medium density residential units
- 37 retirement homes
- 930 m^2 (10,010 ft^2) of commercial (as part of the mixed use)

In total, the proposed development will have 1,134 units of residential development with 930 m^2 (10,010 ft^2) of commercial space. The proposed concept plan is provided in Figure 9. Access to the proposed development will be provided via the following connections:

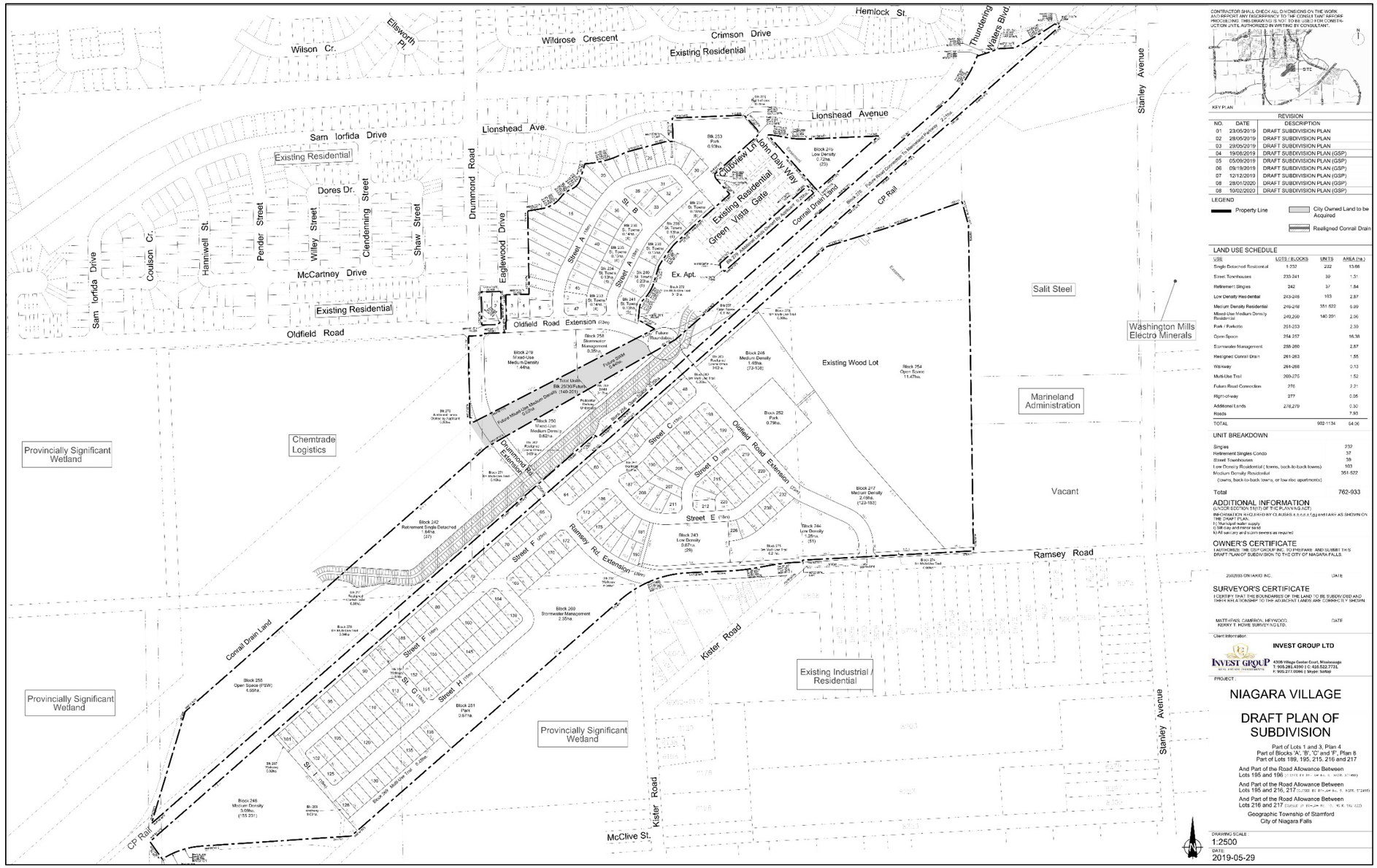
- John Daly Way (to a couple on infill residential lots)
- Drummond Road
- Oldfield Road
- Ramsey Road

Drummond Road and Oldfield Road will be extended and connected to Ramsey Road. For the purpose of this report, Drummond Road is assumed to be a north-south connection, while Oldfield Road will be as an east-west connection, east of Drummond Road and then continues as a north-south connection as it ties into Ramsey Road. Thundering Waters Boulevard could be extended in the future for a connection with Oldfield Road extension. With this connection, a future roundabout could be considered. However, at this time, Thundering Waters Boulevard is not proposed to be extended as its connection to Marineland Parkway is as a private road.

As mentioned in Section 2.1, CP Montrose Subdivision runs through the proposed development. As a result, within the proposed development there will be two at-grade crossing.

The realignment of the Conrail Drainage Channel is also proposed through a section of the development.

Figure 9: Concept Plan



CONTRACTOR SHALL CHECK ALL DIMENSIONS ON THE WORK AND REPORT ANY DISCREPANCY TO THE CONSULTANT BEFORE PROCEEDING. THIS DRAWING IS NOT TO BE USED FOR CONSTRUCTION UNTIL AUTHORIZED IN WRITING BY CONSULTANT.

KEY PLAN

REVISION		
NO.	DATE	DESCRIPTION
01	23/05/2019	DRAFT SUBDIVISION PLAN
02	28/05/2019	DRAFT SUBDIVISION PLAN
03	29/05/2019	DRAFT SUBDIVISION PLAN
04	19/08/2019	DRAFT SUBDIVISION PLAN (GSP)
05	05/09/2019	DRAFT SUBDIVISION PLAN (GSP)
06	09/19/2019	DRAFT SUBDIVISION PLAN (GSP)
07	12/12/2019	DRAFT SUBDIVISION PLAN (GSP)
08	28/01/2020	DRAFT SUBDIVISION PLAN (GSP)
09	10/02/2020	DRAFT SUBDIVISION PLAN (GSP)

LEGEND

Property Line | City Owned Land to be Acquired | Realigned Conrail Drain

LAND USE SCHEDULE

USE	LOTS / BLOCKS	UNITS	AREA (ha.)
Single Detached Residential	1-232	232	13.66
Street Townhouses	233-241	39	1.51
Retirement Singles	242	37	1.84
Low Density Residential	243-248	103	2.87
Medium Density Residential	249-258	351-522	9.99
Mixed-Use Medium Density Residential	249-250	140-201	2.06
Park / Parkette	251-253		2.39
Open Space	254-257		16.36
Stormwater Management	258-260		2.87
Realigned Conrail Drain	261-263		1.55
Walkway	264-268		0.13
Multi-Use Trail	269-275		1.52
Future Road Connection	276		2.21
Right-of-way	277		0.05
Additional Lands	278,279		0.30
Roads			7.93
TOTAL		902-1134	64.06

UNIT BREAKDOWN

Singles	232
Retirement Singles Condo	37
Street Townhouses	39
Low Density Residential (towns, back-to-back towns)	103
Medium Density Residential (towns, back-to-back towns, or low rise apartments)	351-522
Total	762-933

ADDITIONAL INFORMATION

(UNDER SECTION 51(17) OF THE PLANNING ACT)

INFORMATION REQUIRED BY CLAUSES 51(17)(a) and (d) ARE AS SHOWN ON THE DRAFT PLAN.

51(17)(b) type of water supply
51(17)(c) type of storm sewers
ALL necessary and storm sewers as required

OWNER'S CERTIFICATE

I AUTHORIZE THE GSP GROUP INC. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CITY OF NIAGARA FALLS.

2592693 ONTARIO INC. DATE

SURVEYOR'S CERTIFICATE

I CERTIFY THAT THE BOUNDARIES OF THE LAND TO BE SUBDIVIDED AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE CORRECTLY SHOWN.

MATTHEWS, CAMERON, HEYWOOD, KERRY T. HOWE SURVEYING LTD. DATE

Client Information:

INVEST GROUP LTD

INVEST GROUP REAL ESTATE INVESTMENTS
4309 Village Center Court, Mississauga
T: 905.281.4390 | C: 416.522.7731
F: 905.277.0066 | Skype: ilorfida

PROJECT:

NIAGARA VILLAGE

DRAFT PLAN OF SUBDIVISION

Part of Lots 1 and 3, Plan 4
Part of Blocks 'A', 'B', 'C' and 'F', Plan 8
Part of Lots 189, 195, 215, 216 and 217

And Part of the Road Allowance Between Lots 195 and 196 (CLOSED BY INSTRUMENT No. RO28, 577449)

And Part of the Road Allowance Between Lots 195 and 216, 217 (CLOSED BY INSTRUMENT No. RO28, 577449)

And Part of the Road Allowance Between Lots 216 and 217 (CLOSED BY INSTRUMENT No. RO28, 582322)

Geographic Township of Stamford
City of Niagara Falls

DRAWING SCALE: 1:2500

DATE: 2019-05-29

4.1 Trip Generation

Trip generation for the proposed development was based upon the information contained in the publication *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE). The following land use code (LUC) was used in the generation of trips based on a general urban / suburban environment:

- Single detached residential homes: Single-Family Detached Housing (LUC 210)
- Street townhomes: Multifamily Housing – Low-Rise (LUC 220)
- Low, Medium density and mixed-use medium density residential units (blocks): Multifamily Housing – Mid-Rise (LUC 221)
- Retirement homes: Senior Adult Housing – Detached (LUC 251)
- Retail: Shopping Centre (LUC 820)

For the commercial or retail part of the development, there are three types of trips: new trips, internal capture and also pass-by

New trips are additional traffic added to the road network. The primary purpose of the trip is to visit the development. For example, the customer would leave their home, travel to the development and return home.

Interaction trips are those that make stops at multiple adjacent facilities. There can be two types: external and internal interaction (internal capture). External interaction would occur for trips travelling between other adjacent developments. For the purpose of this analysis, no external interaction trips were applied. Internal interaction trips are trips that make stops at multiple adjacent facilities within the site. This is a key characteristic of the development in that the proposed land uses will be complementary with each other and will result in some internal trips between uses that will not reach the external road system. In this case, internal trips would be from the on-site residents. For example, residents living in the proposed units may shop at the retail component of the development. As a result, these residents will not have to leave the site. In this case, internal capture trips could include interaction between the residential and retail. The proposed retail component is predominantly meant to serve local residents within the development. A conservative internal capture of 40% was assumed for both peak hours.

Pass-by trips are trips that are already using the road network and passing by the site. For example, a person leaves work and sees the development on their way home or plans on visiting the development on their way home along their typical route. They do not add any additional trips to the road network but result in adjustments to traffic volumes at the site driveways only. Pass-by rates for this site were derived based upon experience and information published in the *Trip Generation Handbook, 3rd Edition*, published by ITE. A pass-by rate of 10% and 30% were assumed for the AM and PM peak hour respectively.

The resulting trip generation is summarized in Table 4. Note that the trip generation was completed for an earlier site plan with more residential units. As a result, the analysis presented in this report will still be conservative and no updates were required.

Table 4: Development Trip Generation Summary

Land Use (Size)		Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Residential	**Single-Family Detached Housing (LUC 210) - 243 units**						
	New Trips	48	143	191	157	92	249
	Multifamily Housing - Low-Rise (LUC 220) - 39 units						
	New Trips	4	15	19	16	10	26
	Multifamily Housing - Mid-Rise (LUC 221) - 828 units						
	New Trips	77	220	297	222	144	366
	Senior Adult Housing - Detached (LUC 251) - 32 units						
	New Trips	6	11	17	12	8	20
	Total Residential – 1,142 units						
	Residential Total New Trips	**135**	**389**	**524**	**407**	**254**	**661**
Commercial	**Shopping Centre (LUC 820) - 10,010.44 ft²**						
	Total Trips	16	14	30	56	60	116
	Interaction (AM/PM: 40%)	-3	-9	-12	-22	-25	-47
	Pass-by (AM/PM: 10% / 30%)	-3	-3	-6	-18	-18	-36
	Commercial New Trips	**10**	**1**	**12**	**16**	**17**	**33**
Total	**Development Total**						
	Total Trips	151	403	554	463	314	777
	Interaction	-3	-9	-12	-22	-25	-47
	Pass-by	-3	-3	-6	-18	-18	-36
	Development Total New Trips	**145**	**391**	**536**	**423**	**271**	**694**

Based upon the current site plan, there would be 29 fewer trips in the AM peak hour and 42 fewer trips in the PM peak hour. This will not affect our analysis.

4.2 Trip Distribution and Assignment

Trip distribution and assignment of new residential trips were based upon existing traffic patterns, the available road network, and a review of the 2016 Transportation Tomorrow Survey (TTS) results published by the Data Management Group at the University of Toronto Transportation Research Institute. TTS does not provide data on specific home to work trips within the areas of the City. Assumptions were made for the based on the City's Official Plan future land uses, urban structure plan and general location of employment area within the City.

The assumed retail distribution for the site is a result of an analysis of where customers will originate and be destined to in the expected trade area. It takes into account route choice and the assumption that many residents will take the easiest path to the development. In the development of the distribution, Burnside reviewed the Niagara Falls census tract areas to determine the potential catchment area for the retail. Adjacent wards including Welland and Thorold were not taken into consideration due to the size of the proposed retail development. The proposed retail is predominantly meant to serve local residents within the development. Once the catchment area was determined, the population for each census tract areas were reviewed. Trip distribution for each of the areas was based upon the available road network and expected origins / destination of patrons. Route choice was carefully reviewed, where it was assumed that shoppers and employees will take the shortest and least congested route to/from the development.

The estimated distribution of site trips is summarized in Table 5.

Table 5: Trip Distribution

To/From	Via	Residential Distribution	Retail Distribution
North	Drummond Road	15%	25%
	Stanley Avenue	16%	20%
	Portage Road	3%	10%
East	Portage Road / Marineland Parkway	10%	5%
	Lyons Creek Road	3%	5%
West	McLeod Road	40%	25%
	Lyons Creek Road	12%	10%
Internal	Industrial Lands [1]	1%	-
	Total	**100%**	**100%**

Notes: 1. Industrial lands located west of Stanley Avenue between Ramsey Road and Chippawa Parkway.

Development generated trips, pass-by, interaction trips and total site trips are illustrated in Figure 10 to Figure 13, respectively.

Figure 10: New Development Trips

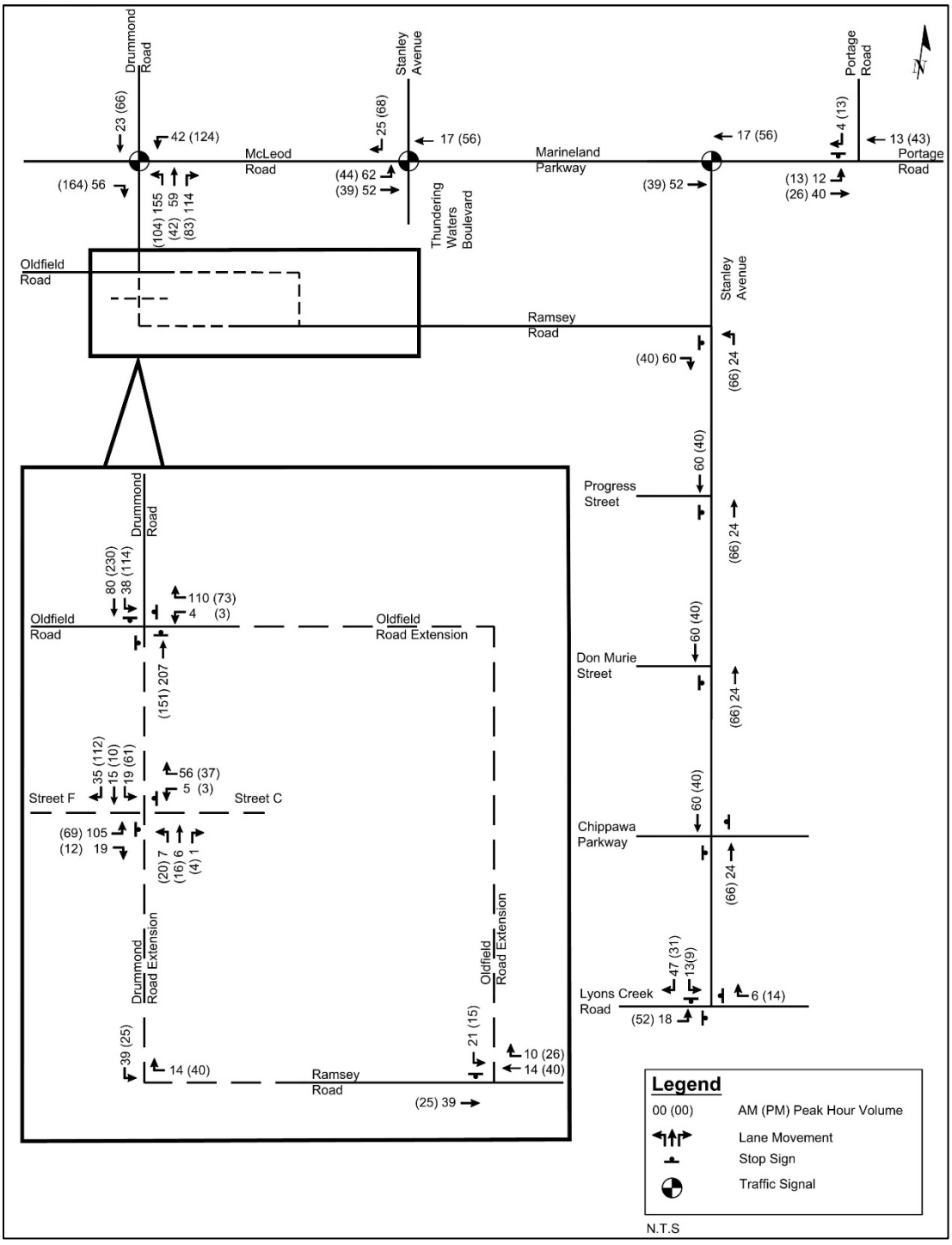


Figure 11: Pass-by Trips

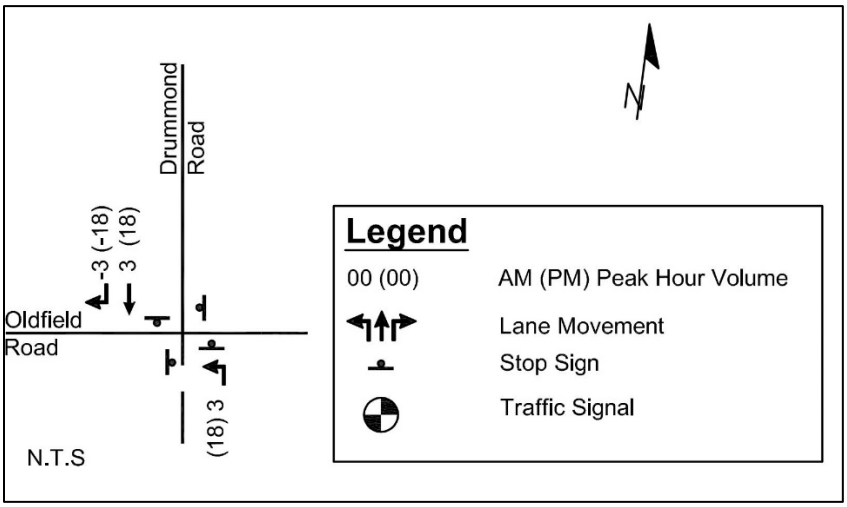


Figure 12: Interaction Trips

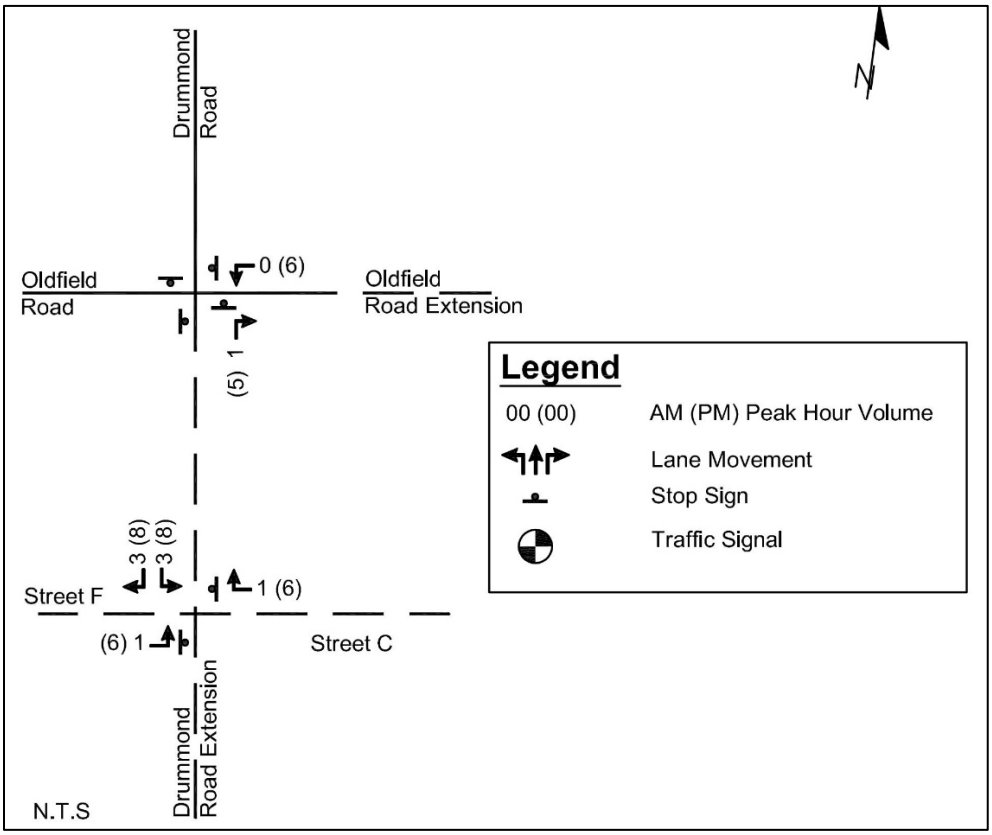
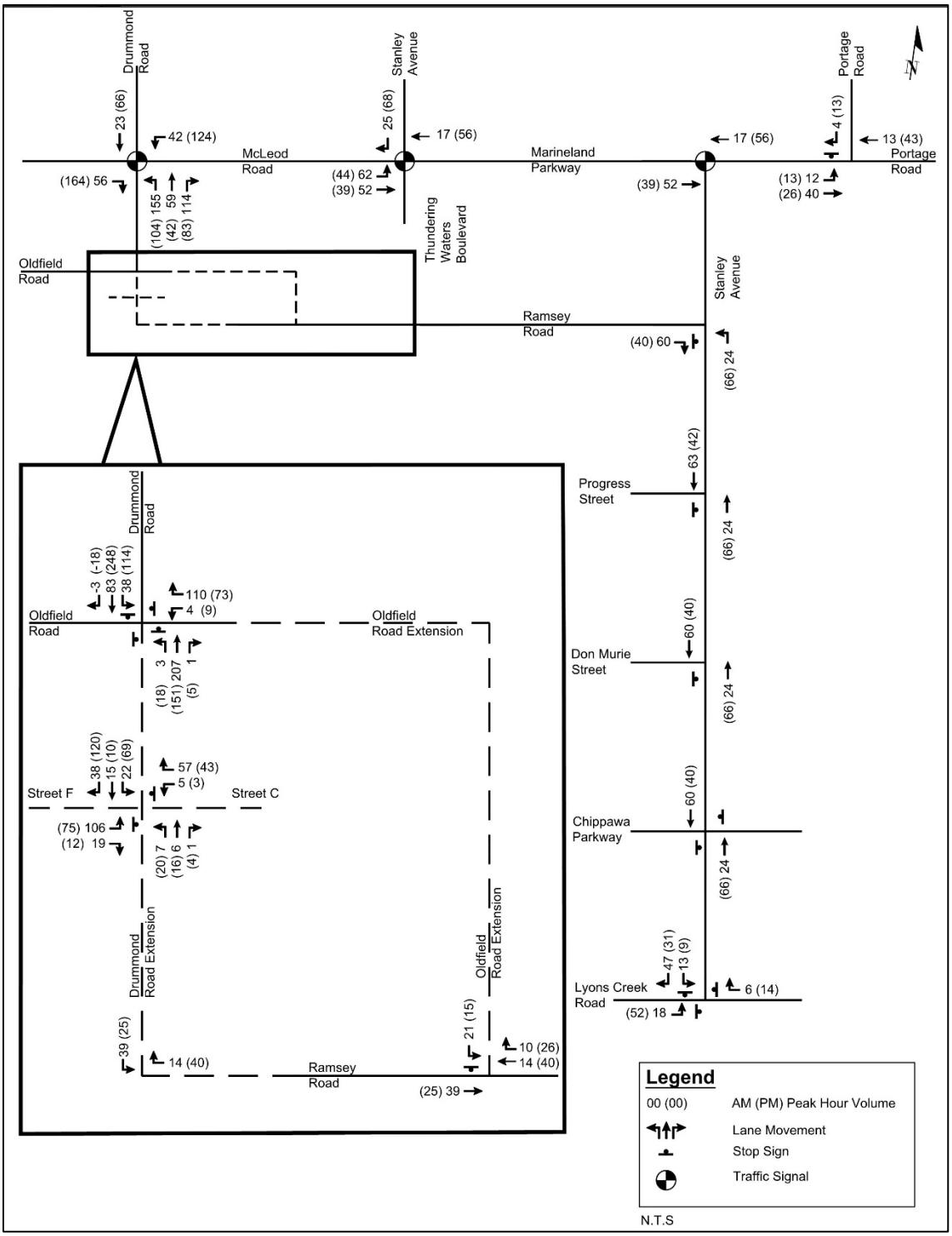


Figure 13: Total Development Trips



5.0 Total Traffic Conditions

5.1 Total Traffic Volumes

Total traffic volumes consist of background traffic volumes for horizon years 2026 and 2031 plus the site trips illustrated in Figure 13. The resulting 2026 and 2031 total traffic volumes are in Figure 14 and Figure 15, respectively.

Figure 14: 2026 Total Traffic Volumes

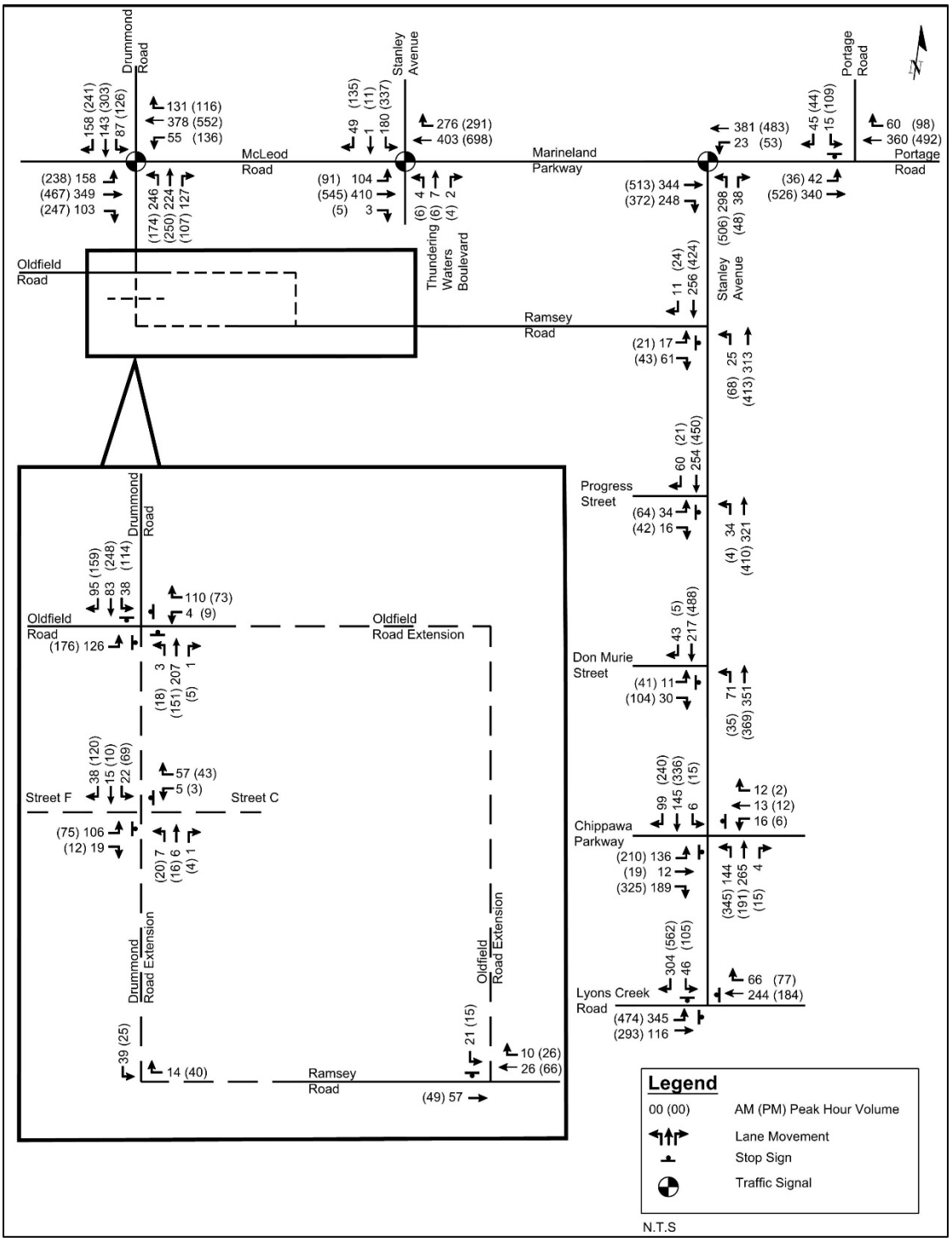
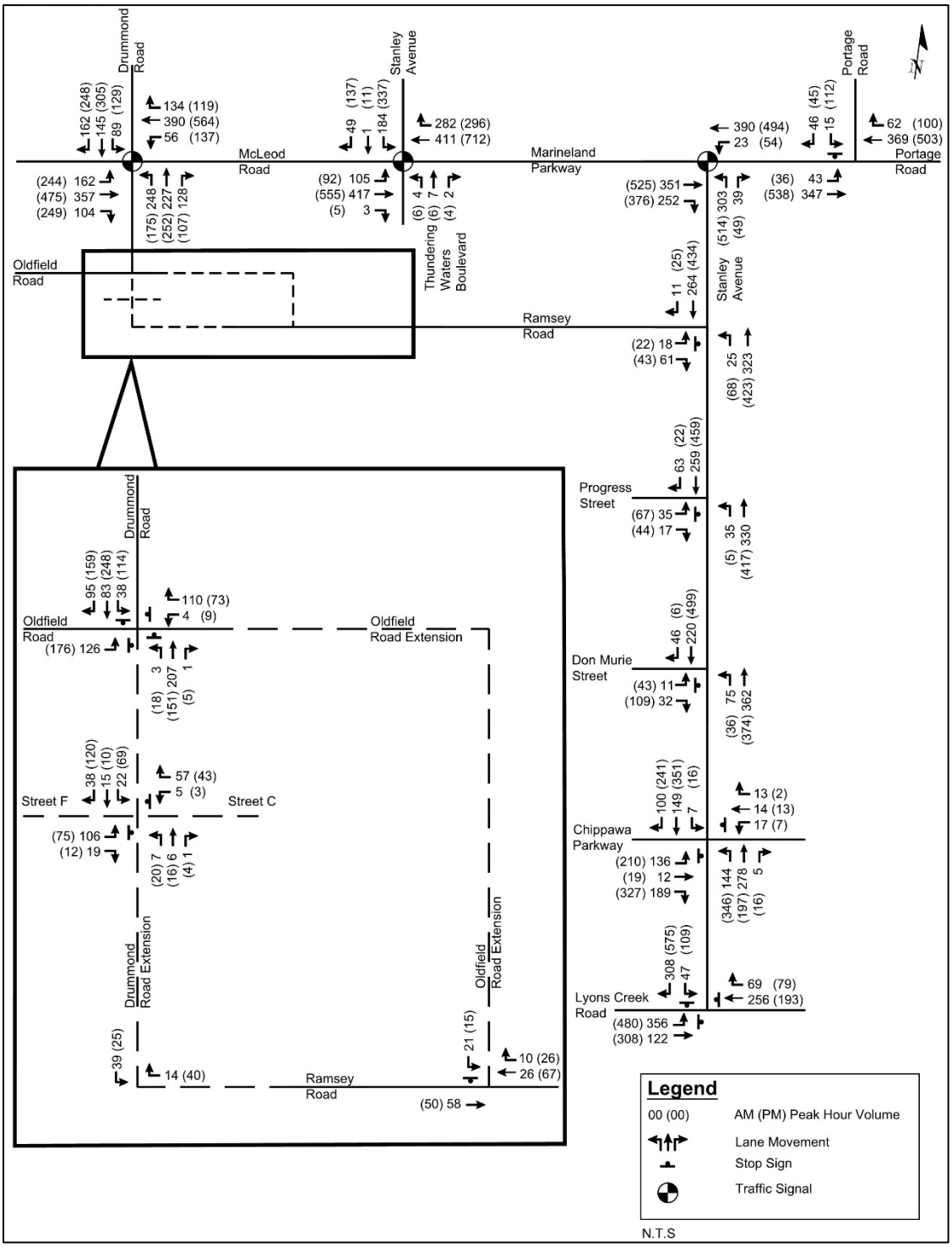


Figure 15: 2031 Total Traffic Volumes



6.0 Traffic Operations Analysis

Traffic operations analyses were conducted under existing and future traffic conditions for the weekday AM and PM peak hours at study area intersections. Queueing was reviewed using Synchro's 95th percentile queue. A comparison of the existing storage and projected queues are summarized for all movements. Detailed Synchro reports are provided in Appendix E to Appendix I for existing, 2026 and 2031 background and total conditions, respectively.

6.1 Drummond Road / McLeod Road Intersection

Existing and future traffic operations are summarized in Table 6 for the Drummond Road / McLeod Road intersection.

Table 6: Drummond / McLeod Operations

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Existing Conditions							
Overall	-	0.46	B	-	0.55	B	-
EBLTR	300+	0.43	B	44	0.58	B	62
WBLTR	300+	0.26	B	30	0.33	B	42
NBLTR	300+	0.47	C	53	0.46	C	47
SBL	20	0.24	C	26	0.30	C	33
SBTR	300+	0.26	C	32	0.45	C	60
Background 2026 Conditions							
Overall	-	0.63	C	-	1.00	D	-
EBLTR	300+	0.51	B	53	0.74	C	88
WBLTR	300+	0.33	B	41	0.40	B	54
NBLTR	300+	0.77	D	95	1.34	F	138
SBL	20	0.30	C	28	0.44	C	39
SBTR	300+	0.46	C	63	0.81	D	138
Background 2026 Conditions (Recommended Improvements: Optimization)							
Overall	-	Not needed for AM Peak Hour			0.85	C	-
EBLTR	300+				0.85	C	114
WBLTR	300+				0.46	B	63
NBLTR	300+				0.80	D	103
SBL	20				0.34	C	34
SBTR	300+				0.68	C	112

Table 6: Drummond / McLeod Operations continued

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Background 2031 Conditions							
Overall	-	0.38	C	-	0.62	C	-
EBL	95	0.40	B	27	0.83	D	56
EBTR	300+	0.24	B	31	0.35	B	49
WBL	25	0.05	B	6	0.04	C	6
WBTR	300+	0.40	C	56	0.53	C	74
NBL	24	0.24	C	28	0.18	C	20
NBTR	300+	0.31	C	48	0.33	C	52
SBL	48 [2]	0.27	C	28	0.33	C	34
SBT	300+	0.22	C	34	0.33	C	54
SBR	50	0.00	D	42	0.00	D	49
Total 2026 Conditions							
Overall	-	1.16	F	-	1.50	F	-
EBLTR	300+	0.57	B	59	1.32	F	177
WBLTR	300+	0.42	B	48	1.16dl[1]	F	145
NBLTR	300+	2.03	F	277	1.57	F	227
SBL	20	0.38	C	30	0.35	B	31
SBTR	300+	0.52	C	72	0.65	C	117
Total 2026 Conditions (with recommended improvements)							
Overall	-	0.60	C	-	0.85	C	-
EBL	95	0.54	C	36	0.82	D	59
EBTR	300+	0.36	C	46	0.50	C	66
WBL	25	0.36	D	24	0.72	E	57
WBTR	300+	0.62	D	69	0.69	D	85
NBL	24	0.61	C	37	0.83	E	73
NBTR	300+	0.44	B	69	0.45	C	72
SBL	20	0.25	B	22	0.35	C	32
SBTR	300+	0.36	B	52	0.68	C	122
Total 2031 Conditions							
Overall	-	0.53	C	-	0.67	C	-
EBL	95	0.56	C	37	0.86	D	66
EBTR	300+	0.36	C	47	0.50	C	68
WBL	25	0.37	D	25	0.74	E	58
WBTR	300+	0.63	D	70	0.71	D	88
NBL	24	0.46	C	58	0.43	C	44
NBTR	300+	0.44	B	70	0.46	C	73
SBL	48 [2]	0.25	B	23	0.36	C	33
SBT	300+	0.18	B	30	0.37	B	63
SBR	50	0.11	B	11	0.17	B	13

Note: 1. dl = defacto left lane
2. Taper creates more storage; as a result, the storage length is closer to the reported length.

Existing Conditions

Under existing conditions during both peak hours, all movements are operating with excess capacity and level of service C or better. The southbound left turn queue exceeds storage by 6 m and 13 m during AM and PM peak hour, respectively. This is equivalent to one to two vehicles. The City should review and lengthen the storage if required.

Future 2026 Conditions

Under background 2026 conditions during both peak hours, the intersection will operate with excess capacity with the exception of the northbound approach during the PM peak hour. The northbound left-through-right movement is projected to exceed capacity and will experience a delay resulting in level of service F. As this is a background concern, it is recommended that the City monitor this intersection for improvement. It appears that the existing PM signal timing plan can be optimized, while maintaining the existing cycle length to provide more capacity. The operation for this improvement is summarized in Table 6 and details can be found in Appendix J.

The southbound left turn queue will continue to exceed storage by one to two vehicles length. As per existing recommendations, the City should be monitoring this.

Under total 2026 conditions, the northbound approach will exceed capacity during both peak hours. Also, the eastbound and westbound approach is projected to exceed capacity during the PM peak hour. As mentioned, in Section 3.3 improvements for this intersection is part of the Region's planned EA that will occurred in 2031. However, some improvements should be brought forward sooner including:

- Exclusive northbound left turn lane
- Exclusive westbound left turn lane
- Exclusive eastbound left turn lane

This also coincides with Riverfront TIS, which recommended that all of the planned improvements (including the exclusive southbound right turn lane) in the EA be implemented in 2026.

With the recommended improvements, all movements will have excess capacity as illustrated in Table 6 and details can be found in Appendix K.

There are several movements with projected queue lengths that exceed storage. This includes:

- Westbound left turn queue: exceeds 36 m during PM peak hour.
- Northbound left turn queue: exceeds 47 m and 52 m during AM and PM peak hour, respectively.

Both movements will exceed the planned storage in the EA. For the westbound left turn, it appears more property will be required to lengthen the storage. The Region should consider lengthening the storage for this movement.

For the northbound left turn, it appears there is sufficient right-of-way to extend the storage to 60 m to accommodate for the projected queue. It is recommended that the Region considers lengthening the storage.

Future 2031 Conditions

Under background and total 2031 conditions with the planned improvements as per the Region's EA, all movements will operate with excess capacity during both peak hours.

Under total 2031 conditions, the movements with projected queue lengths that exceed storage include:

- Westbound left turn queue: exceeds 37 m during PM peak hour.
- Northbound left turn queue: exceeds 37 m and 21 m during AM and PM peak hour, respectively.

Similarly, it is recommended that the Region considers lengthening the storage for the northbound left turn to 60 m and the westbound left turn to 62 m.

6.2 Stanley Avenue / Marineland Parkway / Thundering Waters Boulevard Intersection

Existing and future traffic operations at the Stanley Avenue / Marineland Parkway / Thundering Waters Boulevard intersection are summarized in Table 7.

Table 7: Stanley / Marineland / Thundering Waters Operations

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Existing Conditions							
Overall	-	0.26	B	-	0.39	B	-
EBL	120	0.06	A	6	0.09	B	7
EBT	300+	0.16	B	20	0.21	B	26
EBR	40	0.00	A	0	0.00	A	0
WBL	27	0.00	A	0	0.00	A	0
WBT	250	0.21	B	29	0.33	B	46
WBR	67	0.15	B	12	0.12	B	11
NBL	30	0.01	C	3	0.02	C	3
NBTR	300+	0.01	C	4	0.01	C	4
SBL	200+	0.33	C	33	0.50	C	53
SBTR	200+	0.02	C	5	0.06	C	10

Table 7: Stanley / Marineland / Thundering Waters Operations continued

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Background 2026 Conditions							
Overall	-	0.34	B	-	0.55	B	-
EBL	120	0.09	B	8	0.13	B	8
EBT	300+	0.20	B	25	0.28	B	34
EBR	40	0.00	A	0	0.00	A	0
WBL	27	0.00	A	0	0.00	A	0
WBT	250	0.26	B	35	0.40	B	58
WBR	67	0.20	B	14	0.19	B	14
NBL	30	0.01	C	3	0.02	C	3
NBTR	300+	0.01	C	4	0.01	C	4
SBL	200+	0.46	C	47	0.80	D	101
SBTR	200+	0.02	C	6	0.06	C	11
Background 2031 Conditions							
Overall	-	0.34	B	-	0.56	B	-
EBL	120	0.09	B	8	0.13	B	8
EBT	300+	0.20	B	25	0.28	B	35
EBR	40	0.00	A	0	0.00	A	0
WBL	27	0.00	A	0	0.00	A	0
WBT	250	0.27	B	36	0.41	B	59
WBR	67	0.21	B	14	0.19	B	14
NBL	30	0.01	C	3	0.02	C	3
NBTR	300+	0.01	C	4	0.01	C	4
SBL	200+	0.48	C	48	0.81	D	103
SBTR	200+	0.02	C	6	0.07	C	11
Total 2026 Conditions							
Overall	-	0.35	B	-	0.58	B	-
EBL	120	0.22	B	16	0.25	B	14
EBT	300+	0.23	B	28	0.30	B	37
EBR	40	0.00	A	0	0.00	A	0
WBL	27	0.00	A	0	0.00	A	0
WBT	250	0.29	B	38	0.46	B	66
WBR	67	0.20	B	15	0.19	B	15
NBL	30	0.01	C	3	0.02	C	3
NBTR	300+	0.01	C	4	0.01	C	4
SBL	200+	0.46	C	47	0.80	D	101
SBTR	200+	0.04	C	8	0.11	C	14

Table 7: Stanley / Marineland / Thundering Waters Operations continued

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Total 2031 Conditions							
Overall	-	0.36	B	-	0.59	C	-
EBL	120	0.22	B	16	0.26	B	14
EBT	300+	0.23	B	29	0.30	B	38
EBR	40	0.00	A	0	0.00	A	0
WBL	27	0.00	A	0	0.00	A	0
WBT	250	0.30	B	38	0.47	B	67
WBR	67	0.21	B	15	0.19	B	15
NBL	30	0.01	C	3	0.02	C	5
NBTR	300+	0.01	C	4	0.01	C	5
SBL	200+	0.48	C	48	0.81	D	103
SBTR	200+	0.04	C	8	0.11	C	14

Under existing, background and total conditions during both peak hours, all movements are and will operate with excess capacity and a level of service D or better. All queues and projected queues are and will be within existing storage.

6.3 Stanley Avenue / Marineland Parkway Intersection

Existing and future traffic operations are summarized in Table 8 for the Stanley Avenue / Marineland Parkway intersection.

Table 8: Stanley Avenue / Marineland Parkway Operations

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Existing Conditions							
Overall	-	0.21	B	-	0.29	B	-
EBT	250	0.21	B	22	0.34	B	37
EBR	200+	0.11	B	10	0.12	B	11
WBL	50	0.04	B	5	0.11	B	9
WBT	300+	0.27	B	28	0.30	B	33
NBL	100+	0.15	B	15	0.24	B	25
NBR	71	0.02	B	4	0.02	B	5

Table 8: Stanley Avenue / Marineland Parkway Operations continued

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Background 2026 Conditions							
Overall	-	0.27	B	-	0.38	B	-
EBT	250	0.23	B	24	0.36	B	39
EBR	200+	0.18	B	13	0.28	B	15
WBL	50	0.06	B	7	0.19	B	13
WBT	300+	0.28	B	30	0.32	B	35
NBL	100+	0.26	B	25	0.40	B	41
NBR	71	0.03	B	5	0.03	B	6
Background 2031 Conditions							
Overall	-	0.28	B	-	0.39	B	-
EBT	250	0.23	B	25	0.37	B	40
EBR	200+	0.18	B	13	0.28	B	16
WBL	50	0.06	B	7	0.20	B	14
WBT	300+	0.29	B	30	0.33	B	36
NBL	100+	0.26	B	25	0.41	B	42
NBR	71	0.03	B	5	0.03	B	6
Total 2026 Conditions							
Overall	-	0.28	B	-	0.40	B	-
EBT	250	0.27	B	28	0.39	B	42
EBR	200+	0.18	B	13	0.28	B	15
WBL	50	0.07	B	7	0.21	B	14
WBT	300+	0.30	B	31	0.37	B	40
NBL	100+	0.26	B	25	0.40	B	41
NBR	71	0.03	B	5	0.03	B	6
Total 2031 Conditions							
Overall	-	0.28	B	-	0.41	B	-
EBT	250	0.27	B	29	0.40	B	43
EBR	200+	0.18	B	13	0.28	B	16
WBL	50	0.07	B	7	0.21	B	14
WBT	300+	0.30	B	32	0.38	B	41
NBL	100+	0.26	B	25	0.41	B	42
NBR	71	0.03	B	5	0.03	B	6

Under existing, background and total conditions during both peak hours, all movements are and will operate with excess capacity and a level of service B. All queues and projected queues are and will be within existing storage.

6.4 Marineland Parkway / Portage Road Intersection

Existing and future traffic operations at the Marineland Parkway / Portage Road intersection are summarized in Table 9.

Table 9: Marineland Parkway / Portage Road Operations

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Existing Conditions							
EBLT	300+	0.03	A	1	0.02	A	1
SBL	66	0.03	B	1	0.30	C	10
SBR	200+	0.05	A	1	0.04	A	1
Background 2026 Conditions							
EBLT	300+	0.03	A	1	0.02	A	1
SBL	66	0.04	B	1	0.34	C	11
SBR	200+	0.06	A	1	0.04	A	1
Background 2031 Conditions							
EBL	300+	0.03	A	1	0.02	A	1
SBL	66	0.04	B	1	0.37	C	12
SBR	200+	0.06	A	1	0.05	B	1
Total 2026 Conditions							
EBLT	300+	0.04	A	1	0.04	A	1
SBL	66	0.04	C	1	0.38	C	13
SBR	200+	0.06	A	2	0.07	B	2
Total 2031 Conditions							
EBL	300+	0.04	A	1	0.04	A	1
SBL	66	0.04	C	1	0.42	D	15
SBR	200+	0.06	B	2	0.07	B	2

Under existing, background and total conditions during both peak hours, all critical movements are and will operate with excess capacity and a level of service D or better. All queues and projected queues are and will be within existing storage.

6.5 Stanley Road / Ramsey Road Intersection

Existing and future traffic operations are summarized in Table 10 for the Stanley Road / Ramsey Road intersection.

Table 10: Stanley Road / Ramsey Road Operations

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Existing Conditions							
EBLR	200+	0.04	B	1	0.05	B	1
NBLT	200+	0.00	A	0	0.00	A	1
Background 2026 Conditions							
EBLR	200+	0.07	C	2	0.12	C	3
NBLT	200+	0.00	A	0	0.00	A	1

Table 10: Stanley Road / Ramsey Road Operations continued

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Background 2031 Conditions							
EBLR	200+	0.08	C	2	0.13	C	3
NBLT	200+	0.00	A	1	0.00	A	1
Total 2026 Conditions							
EBLR	200+	0.20	B	6	0.26	C	8
NBLT	200+	0.03	A	1	0.09	A	2
Total 2031 Conditions							
EBLR	200+	0.21	B	6	0.27	C	8
NBLT	200+	0.03	A	1	0.09	A	2

Under existing, background and total conditions during both peak hours, all critical movements are and will operate with excess capacity and a level of service C or better. All queues and projected queues are and will be within existing storage.

6.6 Stanley Road / Progress Street Intersection

Existing and future traffic operations at the Stanley Road / Progress Street intersection are summarized in Table 11.

Table 11: Stanley Road / Progress Street Operations

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Existing Conditions							
EBLR	200+	0.10	B	3	0.19	B	5
NBLT	200+	0.03	A	1	0.00	A	1
Background 2026 Conditions							
EBLR	200+	0.16	C	4	0.42	C	15
NBLT	200+	0.04	A	1	0.01	A	1
Background 2031 Conditions							
EBLR	200+	0.17	C	5	0.46	D	17
NBLT	200+	0.04	A	1	0.01	A	1
Background 2031 Conditions (Recommended improvement: exclusive eastbound)							
EBL	30	0.14	C	4	0.35	D	11
EBR	200+	0.03	B	1	0.11	B	3
NBLT	200+	0.04	A	1	0.01	A	1
Total 2026 Conditions							
EBLR	200+	0.19	C	5	0.50	D	20
NBLT	200+	0.04	A	1	0.01	A	1

Table 11: Stanley Road / Progress Street Operations continued

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Total 2026 Conditions (Recommended improvement: exclusive eastbound)							
EBL	30	0.16	C	4	0.39	D	13
EBR	200+	0.03	B	1	0.11	B	3
NBLT	200+	0.04	A	1	0.01	A	1
Total 2031 Conditions							
EBL	30	0.16	C	4	0.42	D	15
EBR	200+	0.04	b	1	0.12	B	3
NBLT	200+	0.04	A	1	0.01	A	1

Under existing, background and total conditions during both peak hours, all critical movements are and will operate with excess capacity and a level of service C or better with the exception of the eastbound movement.

Under total 2026 and background 2031 conditions during the PM peak hour, the eastbound movement will experience a delay of 30 seconds and 26 seconds, respectively resulting in a level of service D. Under both conditions, site traffic will not contribute to the eastbound movements. Under total conditions, development traffic will contribute approximately 12% to the northbound and southbound through movements. There will be delays for vehicles to make a left or right out of Progress Street. It is recommended that an exclusive eastbound turn lane be added in either total 2026 conditions or background 2031 conditions. This will result in a significant improvement in the volume to capacity ratio, but delay will remain similar for left turns from the Progress Street. As there will be sufficient capacity, no further recommendation is made at this time.

All queues and projected queues are and will be within existing storage.

6.7 Stanley Road / Don Murie Street Intersection

Existing and future traffic operations are summarized in Table 12 for the Stanley Road / Don Murie Street intersection.

Table 12: Stanley Road / Don Murie Street Operations

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Existing Conditions							
EBLR	200+	0.08	B	2	0.27	B	8
NBLT	200+	0.07	A	2	0.04	A	1
Background 2026 Conditions							
EBLR	200+	0.12	B	3	0.54	D	24
NBLT	200+	0.08	A	2	0.06	A	1
Background 2031 Conditions							
EBLR	200+	0.13	B	3	0.60	D	28
NBLT	200+	0.09	A	2	0.06	A	2
Background 2031 Conditions (Recommended improvement: exclusive eastbound)							
EBL	30	0.06	C	2	0.30	D	9
EBR	200+	0.06	B	2	0.31	C	10
NBLT	200+	0.09	A	1	0.06	A	2
Total 2026 Conditions							
EBLR	200+	0.14	C	4	0.65	E	32
NBLT	200+	0.09	A	2	0.06	A	2
Total 2026 Conditions (Recommended improvement: exclusive eastbound)							
EBL	30	0.07	C	2	0.34	E	11
EBR	200+	0.07	B	2	0.31	C	10
NBLT	200+	0.09	A	2	0.06	A	2
Total 2031 Conditions							
EBL	30	0.08	C	2	0.38	E	12
EBR	200+	0.07	B	2	0.33	C	11
NBLT	200+	0.09	A	2	0.07	A	2

Under existing, background and total conditions during both peak hours, all critical movements are and will operate with excess capacity and a level of service C or better with the exception of the eastbound movement.

Under total 2026 and background 2031 conditions during the PM peak hour, the eastbound movement will experience a delay of 37 seconds and 31 seconds, respectively resulting in a level of service E and D respectfully. Under both conditions, site traffic will not contribute to the eastbound movements. Under total conditions, development traffic will contribute approximately 12% to the northbound and southbound through movements. There will be delays for vehicles to make a left or right out of Don Murie Street. It is recommended that an exclusive eastbound turn lane be added in either total 2026 conditions or background 2031 conditions. This will result in a significant improvement in volume to capacity ratio, with delays remaining the same for left turn movements from Don Murie Street. As there will be sufficient capacity with the additional turn lanes, no further recommendation is made at this time.

All queues and projected queues are and will be within existing storage.

6.8 Stanley Road / Chippawa Parkway Intersection

Existing and future traffic operations at the Stanley Road / Chippawa Parkway intersection are summarized in Table 13.

Table 13: Stanley Road / Chippawa Parkway Operations

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Existing Conditions							
EBLTR	200+	0.03	B	1	0.10	B	3
WBLTR	200+	0.06	B	2	0.04	B	1
NBLTR	200+	0.01	A	1	0.02	A	1
SBLTR	200+	0.01	A	1	0.01	A	1
Background 2026 Conditions							
EBLTR	200+	1.02	F	97	8.40	F	NA[1]
WBLTR	200+	0.22	D	6	2.37	F	32
NBLTR	200+	0.14	A	4	0.48	B	20
SBLTR	200+	0.01	A	1	0.01	A	1
Background 2026 Conditions (Recommended Improvements: Signalized)							
Overall	-	0.34	B	-	0.70	C	-
EBL	60	0.69	D	42	0.72	D	54
EBTR	200+	0.23	D	16	0.32	C	13
WBL	30	0.14	C	8	0.11	D	5
WBTR	200+	0.05	C	8	0.18	D	8
NBL	60	0.25	A	6	0.64	B	50
NBTR	200+	0.23	A	9	0.16	A	24
SBL	30	0.01	A	2	0.04	B	7
SBT	200+	0.09	A	13	0.51	C	85
SBR	30	0.08	A	5	0.32	C	33
Background 2031 Conditions							
Overall	-	0.34	B	-	0.71	C	-
EBL	60	0.69	D	42	0.72	D	54
EBTR	200+	0.23	D	16	0.32	C	13
WBL	30	0.14	C	8	0.12	D	6
WBTR	200+	0.06	C	9	0.20	D	9
NBL	60	0.25	A	6	0.65	C	54
NBTR	200+	0.25	A	9	0.17	A	25
SBL	30	0.01	A	2	0.05	B	8
SBT	200+	0.10	A	14	0.56	C	99
SBR	30	0.09	A	5	0.34	C	36

Table 13: Stanley Road / Chippawa Parkway Operations continued

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Total 2026 Conditions							
Overall	-	0.35	B	-	0.73	C	-
EBL	60	0.69	D	42	0.72	D	54
EBTR	200+	0.23	D	16	0.32	C	13
WBL	30	0.14	C	8	0.11	D	5
WBTR	200+	0.05	C	8	0.18	D	8
NBL	60	0.26	A	6	0.67	C	57
NBTR	200+	0.26	A	10	0.24	B	32
SBL	30	0.01	A	2	0.05	B	7
SBT	200+	0.17	A	22	0.60	C	111
SBR	30	0.08	A	5	0.35	C	39
Total 2031 Conditions							
Overall	-	0.36	B	-	0.75	C	-
EBL	60	0.69	D	42	0.72	D	54
EBTR	200+	0.23	D	16	0.32	C	13
WBL	30	0.14	C	8	0.12	D	6
WBTR	200+	0.06	C	9	0.20	D	9
NBL	60	0.27	A	6	0.69	C	58
NBTR	200+	0.27	A	10	0.25	B	32
SBL	30	0.01	A	2	0.05	B	8
SBT	200+	0.17	A	22	0.63	C	120
SBR	30	0.09	A	5	0.36	C	40

Note: 1. Synchro reported an “Error” as queue length was too large.

Existing Conditions

Under existing conditions, all movements have excess capacity and a level of service B or better.

Future 2026 Conditions

Under background 2026 condition, the eastbound approach will exceed capacity and will experience a delay resulting in a level of service F during both peak hours. In addition, the westbound approach will exceed capacity during the PM peak hour. All other movements have excess capacity and level of service B or better.

This is primarily due to background developments and growth i.e. Riverfront Community Development. It is recommended that the City monitor this intersection for improvements. A traffic signal can improve the operations. As a result, a traffic signal warrant analysis for this intersection under background conditions was conducted based

on the methodology contained in the Ontario Traffic Manual Book 12 (OTM Book 12), published by Ministry of Transportation.

The results are summarized in Table 14. Detailed analyses are provided in Appendix L.

Table 14: Stanley / Chippawa Signal Warrant Analysis

Justification	Justification 1 Minimum Vehicular Volume[1]		Justification 2 Delay to Cross Traffic [1]		Justification 3 Combination [2]	
	1A	1B	2A	2B	3A	3B
Compliance	89%	140%	56%	133%	89%	56%
Justified	No		No		No	

Note: 1. 1A and 2A are total intersection volumes while 1B and 2B are crossing (of the main road) volumes.
2. 3A is Justification 1, while 3B is Justification 2.

For each justification, the lower percentage governs the warrant. A signal can be warranted by just one of the justifications, provided that it meets the threshold for both categories. The threshold required for each justification is 120% for projected volumes. Although this justification is met for the crossing road, it is not met for the major road. Therefore, a traffic signal is not warranted based upon the OTM. However, it is our opinion that a traffic signal is needed for operations and hence recommended, which is consistent with the Riverfront TIS. They also recommended the following additional improvements:

- Exclusive eastbound, westbound, northbound, southbound left turn lanes
- Exclusive southbound right turn lane

As illustrated in Table 13 with signalization and recommended lane configuration, the intersection will have excess capacity. Detail synchro reports can be found in Appendix J. The intersection will continue to have excess capacity under total conditions as a signalized intersection.

In addition, it is recommended that eastbound and northbound left turn lanes have a storage of 60 m and the remaining exclusive turn lanes all have a storage of 30 m.

Future 2031 Conditions

Under 2031 conditions, all movements will have excess capacity and a level of service D or better.

6.9 Stanley Road / Lyons Creek Road Intersection

Existing and future traffic operations are summarized in Table 15 for the Stanley Road / Lyons Creek Road intersection.

Table 15: Stanley Road / Lyons Creek Road Operations

Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Existing Conditions							
EBL	53	0.16	A	4	0.10	A	3
SBL	35	0.07	C	2	0.26	C	8
SBR	200+	0.11	B	3	0.35	B	12
Background 2026 Conditions							
EBL	53	0.29	A	9	0.42	B	16
SBL	35	0.25	E	7	1.73	F	78
SBR	200+	0.39	B	14	0.81	D	66
Background 2026 Conditions (Recommended Improvements: Signalized)							
Overall	-	0.46	B	-	0.65	C	-
EBL	53	0.59	B	67	0.73	B	88
EBT	200+	0.12	A	17	0.27	A	33
WBTR	200+	0.30	B	40	0.22	A	25
SBL	35	0.08	C	10	0.30	D	34
SBR	200+	0.20	C	10	0.40	D	18
Background 2031 Conditions							
Overall	-	0.49	B	-	0.67	C	-
EBL	53	0.63	B	72	0.76	B	94
EBT	200+	0.12	A	18	0.28	A	35
WBTR	200+	0.31	B	43	0.24	A	26
SBL	35	0.09	C	11	0.32	D	35
SBR	200+	0.21	C	10	0.41	D	18
Total 2026 Conditions							
Overall	-	0.50	C	-	0.74	C	-
EBL	53	0.63	B	74	0.84	C	121
EBT	200+	0.12	A	17	0.27	A	33
WBTR	200+	0.30	B	41	0.24	A	26
SBL	35	0.12	C	15	0.33	D	37
SBR	200+	0.24	D	18	0.42	D	18
Total 2031 Conditions							
Overall	-	0.53	C	-	0.76	C	-
EBL	53	0.67	B	81	0.87	C	137
EBT	200+	0.12	A	18	0.28	A	35
WBTR	200+	0.32	B	43	0.25	A	27
SBL	35	0.13	C	15	0.35	D	38
SBR	200+	0.24	D	18	0.43	D	18

Existing Conditions

Under existing conditions, all movements have excess capacity and a level of service C or better.

Future 2026 Conditions

Under background 2026 condition, the southbound left will exceed capacity and will experience a delay resulting in a level of service F during the PM peak hour. All other movements will have excess capacity and level of service E or better. This is primarily due to background development i.e. Riverfront Community Development. It is recommended that the City monitor this intersection for improvements. A traffic signal can improve the operations. As a result, a traffic signal warrant analysis for this intersection under background conditions was conducted based on OTM Book 12. The results are summarized in Table 16. Detailed analyses are provided in Appendix L.

Table 16: Stanley Road / Lyons Creek Road Signal Warrant Analysis

Justification	Justification 1 Minimum Vehicular Volume[1]		Justification 2 Delay to Cross Traffic [1]		Justification 3 Combination [2]	
	1A	1B	2A	2B	3A	3B
Compliance	91%	135%	59%	433%	91%	43%
Justified	No		No		No	

Note: 1. 1A and 2A are total intersection volumes while 1B and 2B are crossing (of the main road) volumes.
2. 3A is Justification 1, while 3B is Justification 2.

For each justification, the lower percentage governs the warrant. A signal can be warranted by just one of the justifications, provided that it meets the threshold for both categories. The threshold required for each justification is 120% for projected volumes. Justifications are not met; therefore, a traffic signal is not warranted based upon the OTM. However, it is our opinion that a traffic signal is needed for operations and hence recommended. This coincides with the Riverfront TIS recommendations.

As illustrated in Table 15 with signalization, the intersection will have excess capacity. Detail synchro reports can be found in Appendix J. The intersection will continue to have excess capacity under total conditions as a signalized intersection.

In addition, under 2026 conditions, the eastbound left turn queue will exceed storage by 68 m during the PM peak hour. The development will only contribute approximately 11% to this movement. The majority of the storage is being utilized by the background traffic and it is recommended that the Region considers this improvement. It appears that there is sufficient space to widen to accommodate for the projected queue length.

Future 2031 Conditions

Under 2031 conditions, all movements will have excess capacity and a level of service E or better.

6.10 Development Access Intersections

The development access intersections include the following:

- Drummond Road / Oldfield Road / Drummond Extension / Oldfield Extension intersection
- Drummond Extension / Street F / Street C intersection
- Oldfield Road Extension / Ramsey Road intersection

The internal traffic volumes do not differ between total 2026 and 2031; as a result, total 2031 operations are summarized in Table 17 below. Note that Synchro does not report queues for all-way stop control.

Table 17: Site Access Intersection Operations

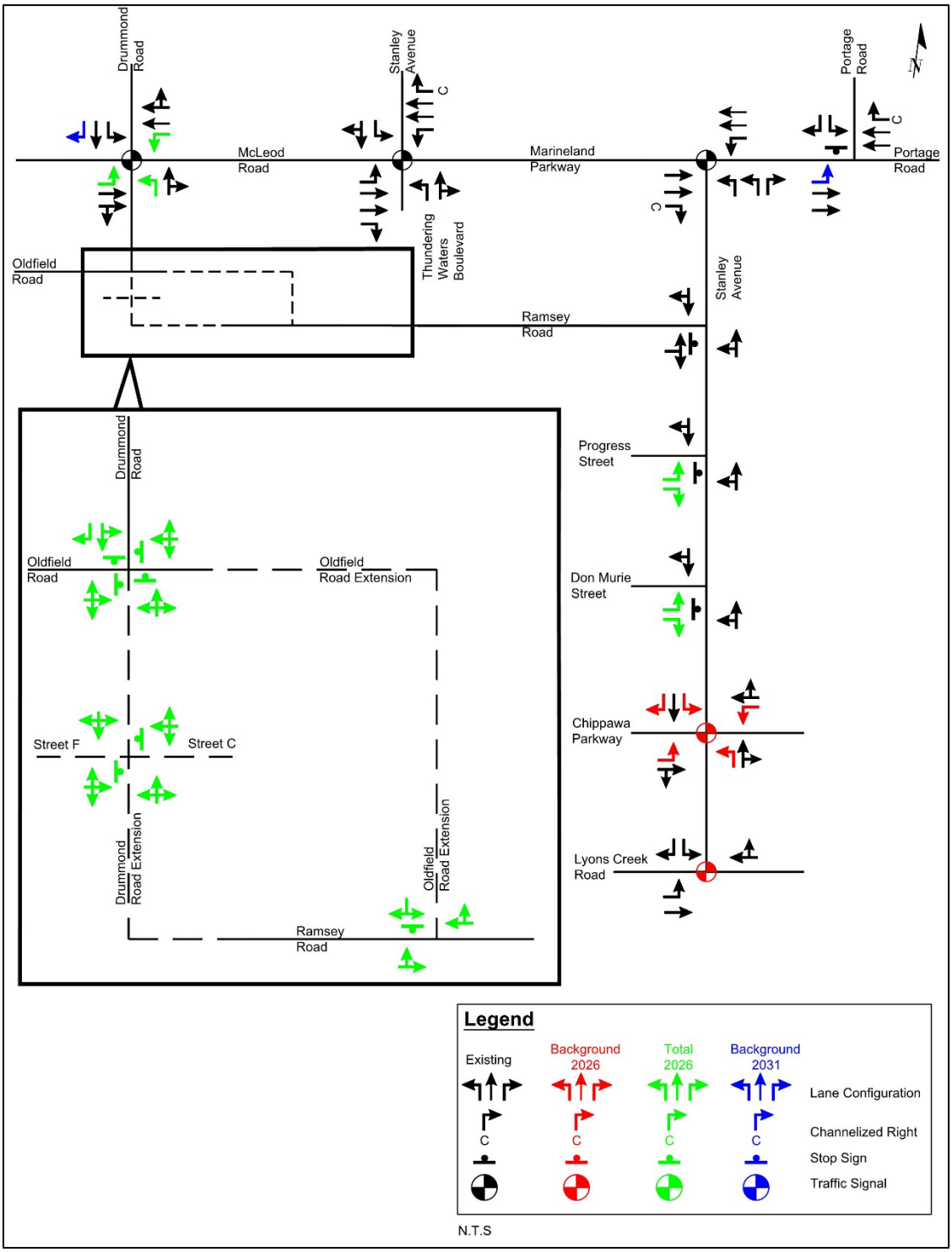
Intersection & Movement	Existing Storage / Link Distance (m)	Weekday AM Peak Hour			Weekday PM Peak Hour		
		v/c	LOS	95th Queue (m)	v/c	LOS	95th Queue (m)
Drummond / Oldfield / Drummond Extension / Oldfield Extension (All-way Stop)							
EBLTR	200+	0.21	A	-	0.32	B	-
WBLTR	200+	0.17	A	-	0.14	A	-
NBLTR	200+	0.35	B	-	0.30	B	-
SBLT	200+	0.22	A	-	0.64	B	-
Drummond Extension / Street F / Street C (Two-way Stop)							
EBLTR	200+	0.19	B	5	0.17	B	5
WBLTR	200+	0.09	A	2	0.06	A	2
NBLTR	200+	0.01	A	1	0.02	A	1
SBLTR	35 [1]	0.02	A	1	0.06	A	1
Oldfield Extension / Ramsey Road (Two-way Stop)							
SBLR	200+	0.03	A	1	0.02	A	1

Note: 1. Length to CP Rail

All intersections will have excess capacity and a level of service B or better for critical movements. All projected queues will be within storage length.

The proposed and recommended future road network is illustrated in Figure 16.

Figure 16: Proposed and Recommended Road Network



7.0 Concept Plan Review

7.1 Road Classification

All roads within the development are recommended to be designated as local roads based on function and the required traffic capacity with the exception of the continuation of Drummond Road and Oldfield Road. Due to the connectivity of the two roadways, it is recommended these two proposed streets be designated as collector roads.

7.2 Traffic Control

All roads within the development are recommended to have 2-way stop control. It is also recommended that the intersection of Drummond Road extension and Oldfield Road extension be under all-way stop control.

7.3 Proposed Railway Crossing

As mentioned, there will be two at-grade crossings within the development occurring north of Drummond Extension / Street F / Street C and Oldfield Extension / Street C intersections. As mentioned in Section 2.3, the rail line is primarily servicing the industrial area. The service occurs outside the morning and afternoon peak and provides infrequent services (two trains per day between the hours of 11:00 PM and 7:00 AM). There will be minimal vehicular impact and operation concerns at the crossing. It is recommended that the railway crossing warning system be located at the south leg of the both intersections, approximately 15 metres from the centre of the intersection. Traffic, both vehicular and pedestrian entering the intersections will be governed by the crossing's warning system in an appropriate design for ultimate safety considerations. Details will be subjected to rail authority approval and also determined through the detailed design of the roads.

7.4 Proposed Pedestrian and Cyclist Accommodation

Pedestrian accommodation will be provided by sidewalks on one side of all local streets and both sides of the collector street. Currently, there are on-street bike lanes on Stanley Avenue and Drummond Street, north of McLeod. It is recommended that signed bike routes be extended into the development from the two roadways and where appropriate to connect with existing and future active transportation pathways and facilities.

8.0 Conclusion

8.1 Existing Conditions

Under existing conditions, all study intersections are operating with excess capacity during both peak hours. The McLeod Road / Drummond Road intersection southbound left turn queue is extending beyond the existing storage during the weekday AM and PM peak hours by one to two vehicles. The City may want to consider lengthening of this lane.

8.2 Background Conditions

Background 2026 Conditions

Under 2026 background conditions, all study intersections will operate with excess capacity and will experience a level of service C or better except for:

- Drummond Road / McLeod Road Intersection
- Stanley Avenue / Chippawa Parkway
- Stanley Avenue / Lyons Creek Road

At the Drummond Road / McLeod Road intersection, the northbound left-through-right movement is projected to exceed capacity and will experience a delay resulting in level of service F during the PM peak hour. It is recommended that the existing PM peak hour signal timing plan be optimized, while maintaining the existing cycle length. With the signal timing adjustments, all movements will have excess capacity.

At the Stanley Avenue / Chippawa Parkway intersection, the eastbound movement is projected to exceed capacity during both the AM and PM peak hours and the westbound movement will exceed capacity during the PM peak hour. This is primarily due to background development i.e. Riverfront Community Development. The following is recommended and is consistent with the Riverfront TIS:

- Signalization
  - Although it does not warrant a signal based on OTM Book 12, a signal is recommended for operations.
- Exclusive eastbound, westbound, northbound, southbound left turn lanes
- Exclusive southbound right turn lane

With the recommended improvements, all movements will have excess capacity.

At the Stanley Avenue / Lyons Creek Road intersection during the PM peak hour, the southbound left turn movement will exceed capacity. This is primarily due to background development i.e. Riverfront Community Development. The intersection does not warrant

a signal under OTM Book 12; however, it is recommended for operations. With signalization, all movements will have excess capacity.

Background 2031 Conditions

Under background 2031 conditions with the planned improvements by the Region, all study intersections will operate with excess capacity with the exception of Stanley Road intersections with Progress Street and Don Murie Street. The eastbound movements at both intersections will experience a delay resulting in a level of service D. It is recommended that exclusive turn lanes be added at both the intersections, this will significantly improve the volume to capacity ratio, while the delay for left turns from the minor street will remain similar. As there will be sufficient capacity, no additional recommendations are made at this time. The City should monitor both these intersections for additional improvements.

8.3 Total Conditions

Under total 2026 conditions, all study intersections are projected to operate with excess capacity during both peak hours with the exception of the Drummond Road / McLeod Road intersection. There are several movements that will exceed capacity during both peak hours. This intersection is part of the Region's planned improvements to McLeod Road that are expected to occur in 2031. The Riverfront TIS recommended that all of the planned improvements in the EA be implemented in 2026. It is recommended that the following improvements be implemented at the Drummond Road / McLeod Road intersection under total 2026 conditions:

- Exclusive northbound left turn lane
- Exclusive westbound left turn lane
- Exclusive eastbound left turn lane

With the recommended improvements, all movements will have excess capacity.

With the recommended and planned improvements, under total 2031 conditions, all study intersections are projected to operate with excess capacity during both peak hours.

8.4 Queue Review

Synchro's 95th percentile queues were reviewed for all movements. Critical movements with projected queues that will extend pass existing storage or link distances are summarized below for each condition.

Existing Conditions

Under existing conditions, the southbound left turn queue at Drummond Road / McLeod Road intersection exceeds storage by 6 m and 13 m during AM and PM peak hour, respectively. This is equivalent to one to two vehicles. The City should consider lengthening the left turn lane.

Horizon Year 2026 and 2029 Conditions

The queue results for both respective horizon years are very similar. Table 18 summarizes the critical movements (queues projected to exceed existing or proposed storage) of each intersection and provides the recommended improvements and timing of those improvements.

Table 18: Summary of Queue Review

Intersections	Movements	Implementation Year	Recommended Improvements
Drummond / McLeod	WBL	Total 2026	The queues will spill onto the through lane during the PM peak hour. The storage length in the planned EA is not sufficient to accommodate for the projected queue and widening will be needed to further lengthen the planned storage length. It is recommended that the City monitor this movement for mitigations. As the projected queue can utilized the through movement as additional storage, no further recommendations are made at this time.
	NBL	Total 2026	The storage length in the planned EA is not sufficient to accommodate for the projected queue. It should be lengthened to 60 m to accommodate for projected queue. This can be timed with widening of McLeod Road.
Stanley / Chippawa	EBL and NBL	Background 2026	Recommended storage of 60 m
	WBL, SBL and SBR		Recommended storage of 30 m.
Stanley / Lyons Creek	EBL	Background 2026	Recommended storage of 137 m.

8.5 Concept Plan Review

Road Classification

All roads within the development will be designated and classified as local roads with the exception of the continuation of Drummond Road and Oldfield Road. It is recommended that these two to be classified as collector roads.

Traffic Control

All roads within the development are recommended to have 2-way stop control with the exception of the Drummond Road Extension / Oldfield Road Extension intersection, which is recommended to be under all-way stop control.

Proposed Railway Crossing

There will be two at-grade crossing within the development occurring north of Drummond Extension /Street F / Street C and Oldfield Extension / Street C intersections. It is recommended that the railway crossing warning system be located at the south leg of the both intersections, approximately 15 metres from the centre of the intersection. Rail traffic is expected to be minimal and therefore will have limited impacts on any vehicular crossings. Details for rail crossing and intersection layouts can be confirmed through design process.

Proposed Pedestrian and Cyclist Accommodation

The site is well designed to accommodate access by all modes of travel.

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Appendix A

Technical Memos to Region and City

R.J. Burnside & Associates Limited 1465 Pickering Parkway Suite 200 Pickering ON L1V 7G7 CANADA
telephone (905) 420-5777 **fax** (905) 420-5247 **web** www.rjburnside.com

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Technical Memorandum

Proposed Connection Review Update

Date: November 13, 2018 **Project No.:** 300041230.0000

Project Name: Niagara Village - Thundering Waters Village

Client Name: Niagara Village Land Owners Group

Submitted To: Robert Alguire (Niagara Region) and John Grubich (City of Niagara Falls)

Submitted By: Cindy Chung, EIT, Transportation Planner

Reviewed By: Brad Hale, Senior Transportation Specialist

Niagara Village Land Owners Group (Client) is planning for the redevelopment of the existing Thundering Waters Golf Club located in the City of Niagara Falls. Official Plan Amendment, Zoning By-law Amendment and Draft Plan applications will be required. R.J. Burnside & Associates Limited (Burnside) was retained to undertake a Transportation Study, which will form parts of those applications. As per the pre-consultation meeting on August 2, 2018 and an email dated September 28, 2018, the Niagara Region (Region) had requested for the following memos to be provided prior to the submission of the Transportation Study:

- Trip Generation and Attraction Analysis
- Proposed Connection Review
- Trip Distribution Analysis

All three memos were submitted to the Region and City on Wednesday, October 17, 2018. The Region had provided feedback on Monday, November 5, 2018. All feedback and comments are incorporated into this updated memo. The focus of this memo is with respect to the second noted study above. The other two studies are the subjects of separate memos. As discussed with the Region, the following were reviewed for this memo:

- Planned Road Network Improvements;
- Planned Transit and Active Transportation Improvements;
- Proposed Development Road Network Connections;
- Proposed Transit Accommodation; and
- Proposed Pedestrian and Cyclist Accommodation.

Details are discussed in the following sections of this memo.

1.0 Planned Road Network Improvements

The Region completed an Environmental Assessment (EA) along McLeod Road / Marineland Parkway in 2010. The following improvements are planned in the EA:

- At Drummond Road / McLeod Road intersection:
  - Additional eastbound, westbound and northbound left-turn lanes
  - Additional southbound right-turn lane
- At Marineland Parkway / Portage Road intersection:
  - Additional eastbound left-turn lane

For the above improvements, the Region's Capital Plan indicates that design and construction will be undertaken in the 2026 – 2031 planning horizon. Therefore, the improvements are considered in the 2031 background conditions.

2.0 Planned Transit and Active Transportation Improvements

There is no planned transit, pedestrian facility and cyclist facility improvements within the study horizon year.

Currently, Niagara Transit (City) provides several bus routes north of the site 7 days per week. Transit stops are located at the following intersections:

- McLeod Road / Drummond Road
- Marineland Parkway / East Stanley Road

The transit stops are approximately a 10 to 12 minute walk from the proposed development. Table 1 summarizes the route frequency during the adjacent street peak period.

Table 1: Transit Service

Route Number	Direction	Via	Frequency
103	Between Niagara Square Shopping Centre and To Main & Ferry	McLeod Road and Drummond Road	60 minutes
203 (Evenings and Sundays)			30 minutes
106	Between Main & Ferry and Chippawa Area	Stanley Avenue and Marineland Parkway	60 minutes
206 (Evenings and Sundays)			30 minutes
112	Between Niagara Square Shopping Centre and Chippawa Area	Marineland Parkway and McLeod Road	60 minutes

South of the proposed development is served by Niagara TransCab, which provides services for areas of the City not served by regular Niagara transit. The TransCab operate Monday to Saturday 6:00 AM to 6:00 PM. The cab will pick up the user at a booked time and connect them to a regular Niagara Transit bus route.

As per the Region's comment, Niagara Regional Transit would also be considered in our analysis and approach for the overall review of the need for the development. Currently, Niagara Regional Transit Route 22 and Route 60/65 provide services along Montrose Road. There are no stops within the vicinity of the proposed development

Pedestrian infrastructure consists of sidewalks and cycling infrastructures consist of on-street bicycle lanes and paved shoulders.

Attachment 1 illustrates the existing transit services, pedestrian facilities and cyclist facilities.

3.0 Proposed Development

3.1 Proposed Connection

As the proposed development site plan is currently being refined, the intention is to have access to the proposed development be provided via the following connections:

- Thundering Waters Boulevard
- John Daly Way
- Drummond Road
- Oldfield Road
- Ramsey Road

Attachment 2 illustrates the proposed connections. Analysis will be undertaken at the above connections as site traffic will be assigned to these intersections. If deficiencies are noted, further analysis will be performed to determine necessary improvements to operate under capacity and at adequate levels of service.

All roads within the development will be classified as local roads based on function and the required traffic capacity with the exception of the continuation of Drummond Road (Street B) and Thundering Waters Boulevard. Due to the connectivity of the two roadways, they are recommended to be classified as collector roads.

3.2 Proposed Railway Crossing

An existing tertiary branch rail line owned by Canadian Pacific (CP) runs through the proposed development. The rail line is identified to be CP Montrose Subdivision and services the industrial facilities within the adjacent area. Within the proposed development, there will be two

at-grade crossings. The Transportation Study will analyze and taken into consideration the following:

- Traffic operations at the crossing
- Potential queueing across the railway crossing

As requested by the Region, we acknowledged that there can be potential for the crossing to be not approved by authorities. However, we are still proposing the two crossing and approval from authorities will be pursued and dealt with during the process. When that time comes, an alternative plan for the development will be discuss. But currently, we will be moving forward with the two crossings.

3.3 Proposed Transit Services

An analysis will be conducted of possible transit routing through the development to provide access to transit by the majority of future residents. It will be based on access to transit within a 5-10 minute walk or a 400 m radius was used from the route to determine accessibility.

3.4 Proposed Pedestrian and Cyclist Accommodation

Pedestrian accommodation will be provided by sidewalks on one side of all local streets and both sides of the collector street. Currently, there are on-street bike lanes on Stanley Avenue and Drummond Street, north of McLeod. As the proposed development site plan is still conceptual, it is recommended that signed bike routes be extended into the development from the two roadways.

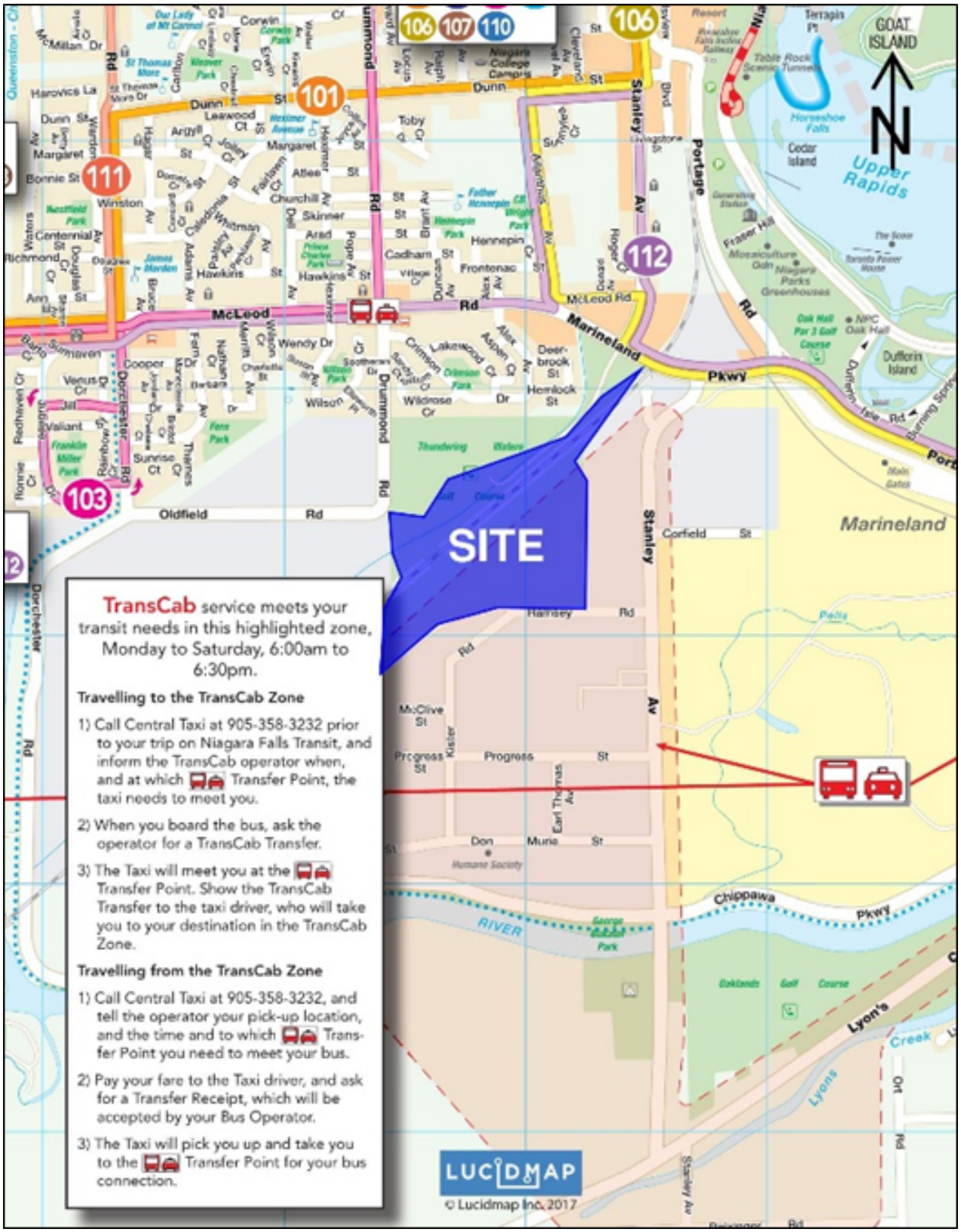
Should you have any questions or concerns, please contact our office.

R.J. Burnside & Associates Limited

CC:cv

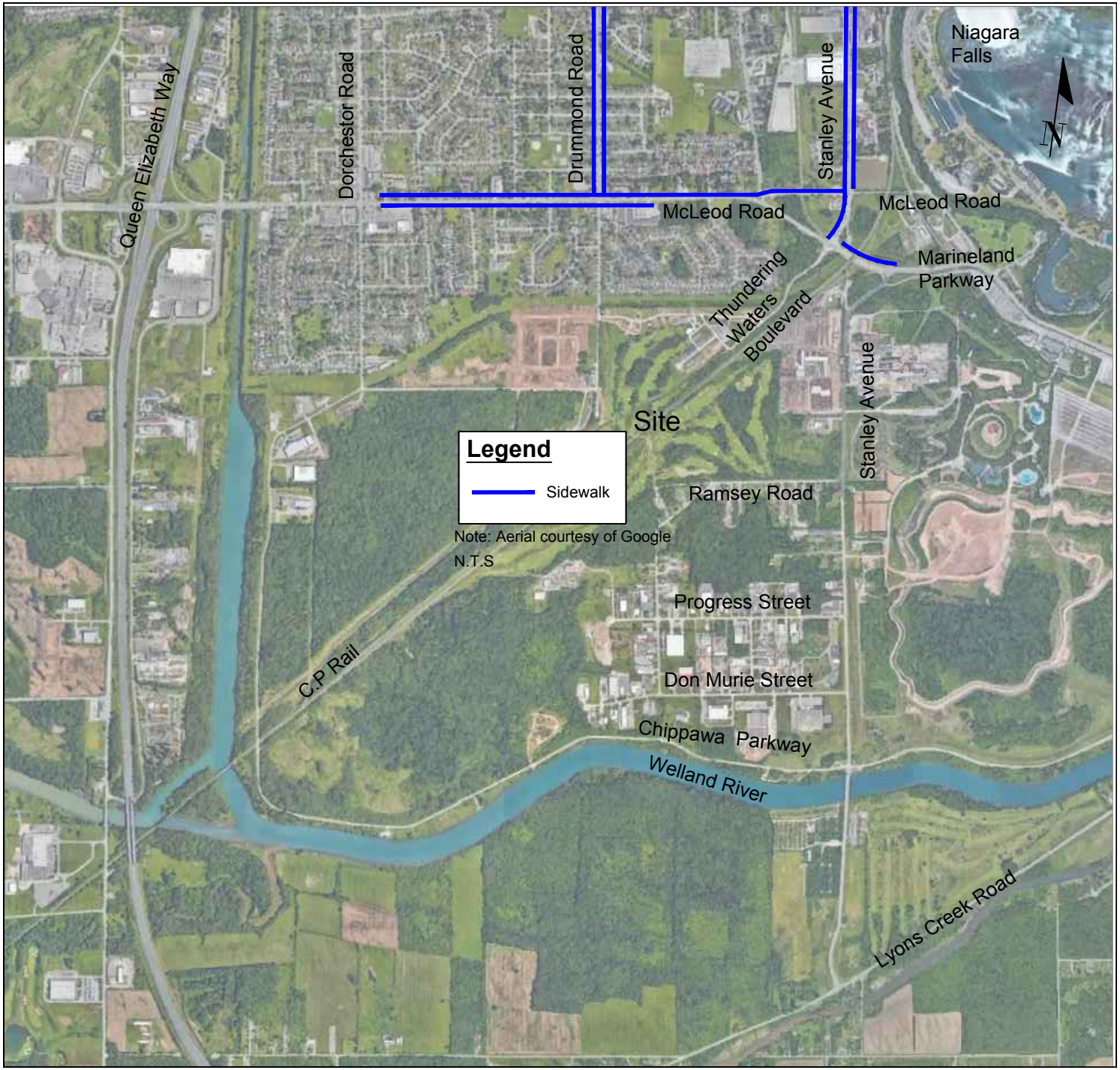
Enclosure(s) Attachment 1: Existing Transit Services, Pedestrian and Cyclist Facilities
Attachment 2: Proposed Connections

Existing Transit Services

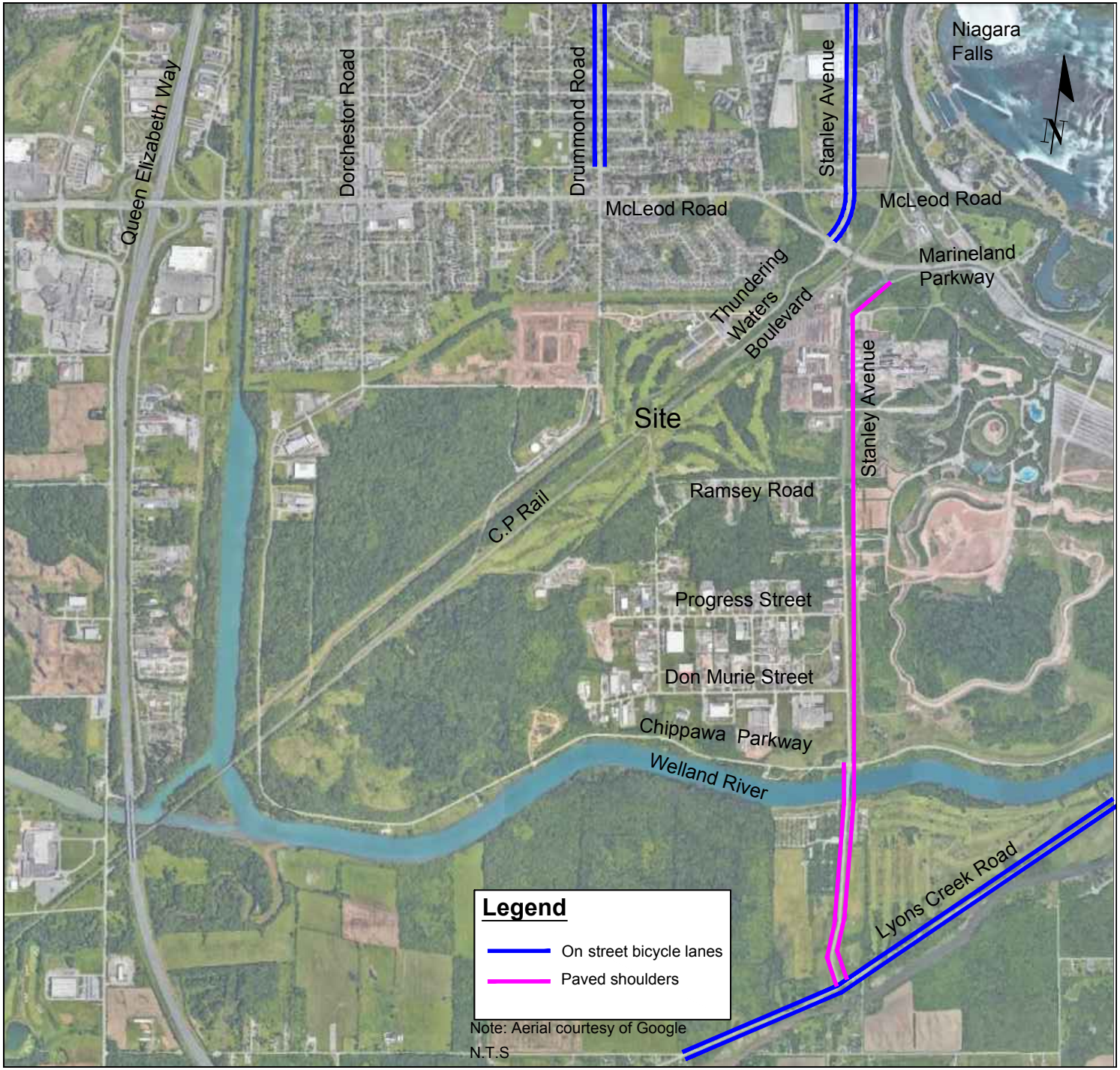


Reference: Niagara Transit

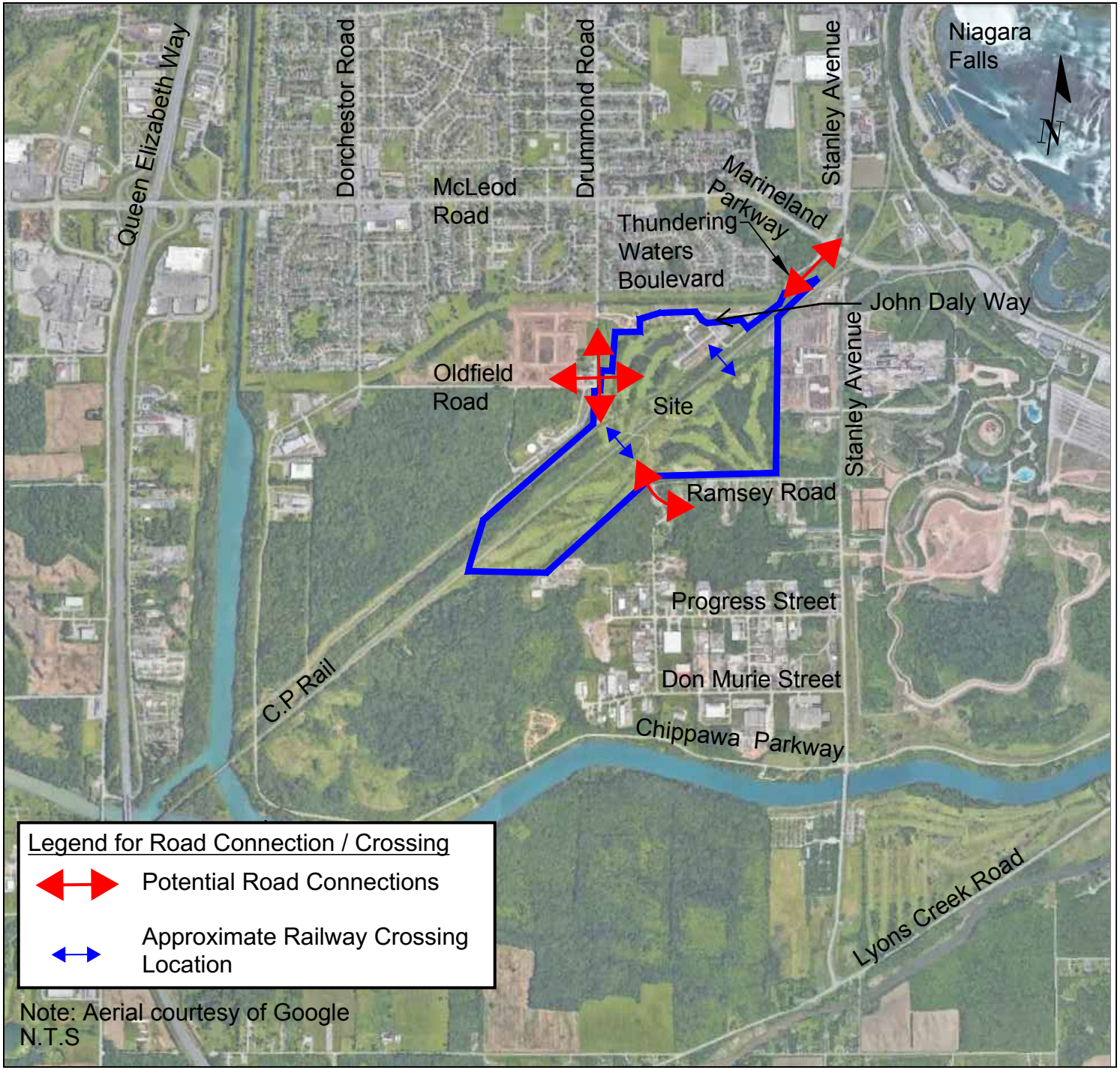
Existing Pedestrian Facilities



Existing Cycling Facilities



Attachment 2



R.J. Burnside & Associates Limited 1465 Pickering Parkway Suite 200 Pickering ON L1V 7G7 CANADA
telephone (905) 420-5777 **fax** (905) 420-5247 **web** www.rjburnside.com

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Technical Memorandum

Trip Generation and Attraction Analysis Update

Date: November 13, 2018 **Project No.:** 300041230.0000

Project Name: Niagara Village - Thundering Waters Village

Client Name: Niagara Village Land Owners Group

Submitted To: Robert Alguire (Niagara Region) and John Grubich (City of Niagara Falls)

Submitted By: Cindy Chung, EIT, Transportation Planner

Reviewed By: Brad Hale, Senior Transportation Specialist

Niagara Village Land Owners Group (Client) is planning for the redevelopment of the existing Thundering Waters Golf Club located in the City of Niagara Falls. Official Plan Amendment, Zoning By-law Amendment and Draft Plan applications will be required. R.J. Burnside & Associates Limited (Burnside) was retained to undertake a Transportation Study, which will form parts of those applications. As per the pre-consultation meeting on August 2, 2018 and an email dated September 28, 2018, the Niagara Region (Region) had requested for the following memos to be provided prior to the submission of the Transportation Study:

- Trip Generation and Attraction Analysis
- Proposed Connection Review
- Trip Distribution Analysis

All three memos were submitted to the Region and City on Wednesday, October 17, 2018. The Region had provided feedback on Monday, November 5, 2018. All feedback and comments are incorporated into this updated memo. The focus of this memo is with respect to the first noted study above. The other two studies are the subjects of separate memos. As discussed with the Region, the following were reviewed for this memo:

- Classification of Land Use Codes (LUC) from *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE) with the proposed land uses,
- Trips generated based on full build-out of the development, and
- Development of a phasing strategy.

Details are discussed in the following sections of this memo.

1.0 Proposed Development

The proposed development is intended to consist the following:

- 362 villa homes (see land use classification in the section below)
- 345 townhomes
- 60 residential apartment units
- 242 mixed use residential units
- 111 retirement homes
- 6,605 m^2 (71,096 ft^2) commercial space

In total, the propose development will have 1,120 units of residential development with 6,605 m^2 (71,096 ft^2) of commercial space. At this stage, the proposed development is being refined and there may be minor adjustments to the accounts above.

2.0 Trip Generation and Attraction

Trip generation for the proposed development was based upon the information contained in the publication *Trip Generation Manual, 10th Edition* published by the Institute of Transportation Engineers (ITE). The following land use codes (LUC) were used in the generation of trips:

- Villa homes: Single-Family Detached Housing (LUC 210)
- Townhomes: Multifamily Housing – Mid-Rise (LUC 221)
- Residential apartments and mixed-use residential units: Multifamily Housing – High-Rise (LUC 222)
- Retirement homes: Senior Adult Housing – Detached (LUC 251)
- Commercial: Shopping Centre (LUC 820)

The City and Region have a collective transportation vision to achieve a greater sustainable transportation system by promoting and encouraging alternative modes of travel, including walking, cycling and transit. A review was conducted of the following:

- *Niagara Region Transportation Master Plan – Context, Vision and Directions Report,* prepared by IBI Group, dated April 2016 (Region TMP)
- *Niagara Falls Sustainable Transportation Master Plan,* prepared by AECOM, dated October 2011 (City TMP)
- Data from 2016 Transportation Tomorrow Survey (TTS)
- *Riverfront Community Transportation Assessment*, prepared by Paradigm Transportation Solutions Limited, dated April 2018 (Riverfront TIS)

Existing and projected travel mode percentages with the associated sources are summarized in Table 1.

Table 1: Travel Mode Comparisons

Source	Non-Auto Travel Mode (transit, walking, cycling and other non-auto based modes)
Region TMP: Existing	10%
City TMP: Existing	8%
City TMP: Targeted 2031	18%
2016 TTS: Planning District 57[1]	18%[2]
Riverfront TIS	10%

Notes: 1. Planning District 57 is City of Niagara Falls.
2. Includes school bus, which accounts for 8%.

As a result, a non-modal split of 10% was assumed for all land uses and for both peak periods. This is consistent with the existing modal split, Riverfront TIS and at the same time recognizes the City's projected target of achieving a greater non-auto travel mode.

For residential component, all generated trips will be assumed to be new trips. The new trips will account for all home based work and vice versa trips. For the commercial or retail part of the development, there are three types of trips: new trips, internal capture and pass-by. As well, due to the location of the development, diverted link trips are also considered.

New trips are additional traffic added to the road network. The primary purpose of the trip is to visit the development. For example, the customer would leave their home, travel to the development and return home. Therefore, the primary trip purpose was to visit the development.

Interaction trips are trips that make stops at multiple adjacent facilities. There can be two types: external and internal interaction (internal capture). External interaction would occur for trips travelling between other adjacent developments. The external interaction will be accounted for in the new trips, no addition reduction will need to be applied. Internal interaction trips are trips that make stops at multiple adjacent facilities within the site. In this case, internal trips would be from the onsite residents. The proposed retail component is predominantly meant to serve local residents within the development. A conservative internal capture of 30% was assumed for both peak hours. This is based on our experience with similar size and use of development.

Pass-by trips are trips that are already using the road network and passing by the site. For example, a person leaves work and happens to see the development on their way home or plans on visiting the development on their way home along their typical route. They continue on their way home after shopping. They do not add any additional trips to the road network but result in adjustments to traffic volumes at the site driveways only. Pass-by rates for this site were derived based upon experience and information published in the Trip Generation

Manual, 9th Edition and 10th Edition. A pass-by rate of 10% were assumed for the AM and PM peak hour.

Diverted link trips attract traffic on roadways within the vicinity of the development. For example, a person leaves work to head home, but diverts from their usual route to visit the site/development. Diverted trips may add traffic to streets adjacent to a site and could remove trips on streets from which it was diverted from. In this case, it is expected that the proposed commercial may attract some residential neighborhood east and west of Drummond Road and south of McLeod Road. We assumed a diverted link rate for the PM peak hour and was derived based upon experience and knowledge of travel patterns within the study area. A diverted link rate of 20% was assumed.

The resulting trip generation is summarized in Table 2.

Table 2: Site Trip Generation Summary

Land Use (Size)		Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Residential	**Single-Family Detached Housing (LUC 210) - 362 units**						
	Total Trips	67	201	268	226	132	358
	Non-Modal Split (10%)	-7	-20	-27	-23	-13	-36
	New Trips	60	181	241	203	119	322
	Multifamily Housing - Mid-Rise (LUC 221) - 345 units						
	Total Trips	32	92	124	93	59	152
	Non-Modal Split (10%)	-3	-9	-12	-9	-6	-15
	New Trips	29	83	112	84	53	137
	Multifamily Housing - High-Rise (LUC 222) - 302 units						
	Total Trips	23	74	97	68	43	111
	Non-Modal Split (10%)	-2	-8	-10	-7	-4	-11
	New Trips	21	66	87	61	39	100
	Senior Adult Housing - Detached (LUC 251) - 111 units						
	Total Trips	15	29	44	32	20	52
	Non-Modal Split (10%)	-1	-3	-4	-3	-2	-5
	New Trips	14	26	40	29	18	47
	Total Residential – 1,120 units						
	Total Trips	137	396	533	419	254	673
	Non-Modal Split Total	-13	-40	-53	-42	-25	-67
	New Trips	124	356	480	377	229	606

Table 2: Site Trip Generation Summary continued

Land Use (Size)		Weekday AM Peak Hour			Weekday PM Peak Hour		
		In	Out	Total	In	Out	Total
Commercial	**Shopping Centre (LUC 820) - 71,096 ft²**						
	Total Trips	116	71	187	203	219	422
	Non-Modal Split (10%)	-12	-7	-19	-20	-22	-42
	Interaction (AM/PM: 30%)	-31	-19	-50	-55	-59	-114
	Pass-by (AM/PM: 10%)	-9	-9	-18	-19	-19	-38
	Diverted Link (PM: 20%)	-	-	-	-38	-38	-76
	New Trips	64	36	100	71	81	152
Total	**Site Total**						
	Total Trips	253	467	720	622	473	1,095
	Non-Modal Split	-25	-47	-72	-62	-47	-109
	Interaction	-31	-19	-50	-55	-59	-114
	Pass-by	-9	-9	-18	-19	-19	-38
	Diverted Link	-	-	-	-38	-38	-76
	New Trips	188	392	580	448	310	758

3.0 Development Phasing Assessment

With the size of the development, a phasing strategy for the development will be considered and analyzed to coincide with traffic capacity of the road network. This will ensure that adequate levels of service at all the study intersections are maintained at each development phasing time period.

A review of the area road improvements planned by the City and the Region will be conducted. Those improvements will be assessed and a suitable phasing strategy for the development to coincide with traffic capacity in order to ensure adequate levels of service at all intersections within the study area are maintained at each development phasing time period.

We will assess and identify specific road and or intersection improvements that are required to support specific phasing of development over and above the future Capital Works projects being undertaken by the agencies. Details to the access requirements related to the phasing strategy outlined in this study.

Should you have any questions or concerns, please contact our office.

R.J. Burnside & Associates Limited

CC:cv

R.J. Burnside & Associates Limited 1465 Pickering Parkway Suite 200 Pickering ON L1V 7G7 CANADA
telephone (905) 420-5777 **fax** (905) 420-5247 **web** www.rjburnside.com

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Technical Memorandum

Trip Distribution Update

Date: November 13, 2018 **Project No.:** 300041230.0000

Project Name: Niagara Village - Thundering Waters Village

Client Name: Niagara Village Land Owners Group

Submitted To: Robert Alguire (Niagara Region) and John Grubich (City of Niagara Falls)

Submitted By: Cindy Chung, EIT, Transportation Planner

Reviewed By: Brad Hale, Senior Transportation Specialist

Niagara Village Land Owners Group (Client) is planning for the redevelopment of the existing Thundering Waters Golf Club located in the City of Niagara Falls. Official Plan Amendment, Zoning By-law Amendment and Draft Plan applications will be required. R.J. Burnside & Associates Limited (Burnside) was retained to undertake a Transportation Study, which will form parts of those applications. As per the pre-consultation meeting on August 2, 2018 and an email dated September 28, 2018, the Niagara Region (Region) had requested for the following memos to be provided prior to the submission of the Transportation Study:

- Trip Generation and Attraction Analysis
- Proposed Connection Review
- Trip Distribution Analysis

All three memos were submitted to the Region and City on Wednesday, October 17, 2018. The Region had provided feedback on Monday, November 5, 2018. All feedback and comments are incorporated into this updated memo. The focus of this memo is with respect to the last noted study above. The other two studies are the subjects of separate memos. As discussed with the Region, the following were reviewed for this memo:

- Existing Travel Pattern Analysis;
- Trip Distribution based on 2016 Transportation Tomorrow Survey (TTS) and Retail Catchment Area;
- Other Background Development Distribution; and
- Proposed Distribution for the development.

Details are discussed in the following sections of this memo.

1.0 Existing Travel Pattern Review

Existing traffic counts were conducted by Pyramid Traffic Inc. at study intersections, on behalf of Burnside, for the weekday morning (7:00 AM to 9:00 AM) and afternoon (4:00 PM to 6:00 PM) peak periods on Thursday, March 22, 2018 except for:

- Marineland Parkway / Stanley Avenue (east leg) intersection
- Marineland Parkway / Portage Road intersection

The turning movement counts from the above intersections were taken from the *Riverfront Community Transportation Assessment* (Riverfront Community TIS), prepared by Paradigm Transportation Solutions Limited, dated April 2018. The weekday morning and afternoon peak period counts were taken on Wednesday, September 2, 2015 for Marineland Parkway / Portage Road intersection and Wednesday, September 9, 2015 for Marineland Parkway / Stanley Avenue intersection. To be consistent with the Riverfront Community TIS, an annual growth rate of 1% was applied to the traffic volumes to represent the existing year (2018). A minor imbalance was observed in the traffic data. Adjustments were made at Marineland Parkway / Stanley Road / Thundering Waters Boulevard intersection to be consistent with the Riverfront Community TIS and historical counts patterns. This includes adjustments to the following movements:

- Southbound left turn
- Eastbound through
- Westbound right turn
- Westbound through

The existing traffic counts are provided in Attachment 1. Table 1 summarizes the existing travel patterns for weekday AM and PM peak hours. As requested by the Region, Attachment 1 also provides a figure illustrating the distribution of the existing travel patterns.

Table 1: Existing Travel Patterns

To / From	Via	Weekday AM Peak Hour		Weekday PM Peak Hour	
		Trips	%	Trips	%
East	Portage Road / Marineland Parkway	545	23%	861	27%
	Lyons Creek Road	67	3%	104	3%
West	McLeod Road	717	30%	924	29%
	Lyons Creek Road	261	11%	346	11%

Table 1: Existing Travel Patterns continued

To / From	Via	Weekday AM Peak Hour		Weekday PM Peak Hour	
		Trips	%	Trips	%
North	Drummond Road	343	14%	388	12%
	Stanley Avenue	391	16%	495	16%
	Portage Road	60	3%	48	2%
Total		**2,341**	**100%**	**3,166**	**100%**

2.0 2016 Transportation Tomorrow Survey and Retail Catchment Area Review

Trip distribution and assignment of new residential trips were based upon existing traffic patterns, the available road network, and a review of the 2016 Transportation Tomorrow Survey (TTS) results published by the Data Management Group at the University of Toronto Transportation Research Institute. TTS does not provide data on specific home to work trips within the areas of the City. Assumptions were made for the based on the City's Official Plan future land uses, urban structure plan and general location of employment area within the City. Detailed route choices using TTS are provided in Attachment 2. As requested by the Region, Attachment 2 also provides a figure illustrating the residential distribution based on TTS.

The assumed retail distribution for the site is a result of an analysis of where customers will originate and be destined to. It takes into account route choice and the assumption that many residents will take the easiest path to the development. In the development of the distribution, Burnside reviewed the Niagara Falls census tract areas to determine the potential catchment area for the retail. Adjacent wards including Welland and Thorold were not taken into consideration due to the size of the proposed retail development. The proposed retail is predominantly meant to serve local residents within the development. Once the catchment area was determined, the population for each census tract areas were reviewed. Trip distribution for each of the areas was based upon the available road network and expected origins / destination of patrons. Route choice was carefully reviewed, where it was assumed that shoppers and employees will take the shortest and least congested route to/from the development. Detailed census tracts area, catchment area calculations and route choices are provided in Attachment 3. As requested by the Region, Attachment 3 also provides a figure illustrating the retail distribution based on catchment area.

The estimated distribution for residential and retail site trips is summarized in Table 2. The same distribution was assumed for both peak periods.

Table 2: Distribution based on 2016 TTS and Retail Catchment Area

To / From	Via	Residential Distribution	Retail Distribution
East	Portage Road / Marineland Parkway	2%	3%
	Lyons Creek Road	3%	7%
West	McLeod Road	37%	16%
	Lyons Creek Road	12%	5%
North	Drummond Road	28%	31%
	Stanley Avenue	16%	29%
	Portage Road	2%	9%
Total		**100%**	**100%**

3.0 Comparison with Background Developments

As discussed with the City, there are two background developments planned within the vicinity of the site that are anticipated to be built within the study horizon years. This includes:

- Riverfront Community Development
  - Located south-west of the site.
  - Consists of 26,012.85 m^2 (280,000 ft^2) of retail-commercial, 312 condominium / townhomes, 567 single-detached homes, 238 continuing care retirement rooms and 450 hotel rooms.
  - Trip distribution was based on findings in Riverfront Community TIS.
- Nina Court Residential Development
  - Located south-east of McLeod Road / Marineland Parkway / Alex Avenue intersection
  - Consists of 168 condominium / townhomes.
  - Trip distribution was based on findings in *Nina's Court on Marineland Transportation Impact Study*, prepared by Paradigm Transportation Solutions Limited, dated May 2017.

Distribution of the trips generated from the two background developments were reviewed and summarized in Table 3. As both developments included different road networks, the distributions were summarized based on our study's road network. Excerpts from the two reports are provided in Attachment 4. As requested by the Region, Attachment 4 also provides figures illustrating the distribution of both background developments.

Table 3: Background Developments' Assumed Distribution

To / From	Via	Riverfront Community	Nina's Court	
			AM Peak Hour	PM Peak Hour
East	Portage Road / Marineland Parkway	4%[1]	15%	15%
	Lyons Creek Road	2%	-[2]	-[2]
West	McLeod Road	43% [3]	41%	37%
	Lyons Creek Road	10% [3]	-[2]	-[2]
North	Drummond Road	11%	9%	10%
	Stanley Avenue	10%	13%	13%
	Portage Road	-	3%	4%
Other Considerations	Internal [4]	20%	-	-
	To / From South Stanley Avenue	-	9%	8%
	To / From East / West Dunn Street	-	5%	8%
	To / From South Drummond Road	-	5%	5%
Total		**100%**	**100%**	**100%**

Note: 1. Includes 2% to / from east of Chippawa Parkway as the trips are most likely to be coming to and from east of Portage Road.
2. Was not part of the Study's road network but could be part of the 8% to / from south Stanley Avenue.
3. Assumed that half of the trips to / from south of QEW and Montrose will be utilizing McLeod Road. The remaining will be utilizing Lyons Creek Road.
4. Internal includes Internal North: Walmart site via Dorchester – McLeod – Oakwood, Dorchester – McLeod, Drummond – McLeod via Oldfield, adjacent lands south of McLeod and Internal South: Lyons Creek via Chippawa - Stanley

4.0 Proposed Trip Distribution

The estimated distribution for residential and retail site trips is based on the review of all the information above. Table 4 summarizes the comparison and provides the proposed distribution to be used in the Transportation Study. Also, note that an 1% distribution was assumed to account for residents from the development working at the industrial lands located west of Stanley Avenue between Ramsey Road and Chippawa Parkway. The same distribution was assumed for both peak periods. As requested by the Region, Attachment 5 also provides a figure illustrating the proposed distribution used for the Transportation Study.

Table 4: Trip Distribution Comparison and Proposed Distribution

To / From	Via	Existing Travel Patterns		2016 TTS and Retail Catchment		Background Development [1]		Proposed Distribution for Transportation Study	
		AM Peak %	PM Peak %	Residential	Retail	Riverfront Community	Nina Court[2]	Residential	Retail
East	Portage Road / Marineland Parkway	23%	27%	2%	3%	4%	15%	**10%**	**5%**
	Lyons Creek Road	3%	3%	3%	7%	2%	-[3]	**3%**	**5%**
West	McLeod Road	30%	29%	37%	16%	43%	41%	**40%**	**25%**
	Lyons Creek Road	11%	11%	12%	5%	10%	-[3]	**12%**	**10%**
North	Drummond Road	14%	12%	28%	31%	11%	9%	**15%**	**25%**
	Stanley Avenue	16%	16%	16%	28%	10%	13%	**16%**	**20%**
	Portage Road	3%	2%	2%	10%	-	3%	**3%**	**10%**
Internal	Industrial Lands [4]	-	-	-	-	-	-	**1%**	**-**
Total		**100 %**	**100%**	**100%**	**100%**	**80%**	**81%**	**100%**	**100%**

Note: 1. Only the trip distribution for the study road network was compared. Details for the remaining distribution can be found in the previous sections of this memo.
2. Only AM peak hour distribution was considered.
3. Was not part of the Study's road network, but to / from east and west via Lyons Creek Road would be part of the 8% to/from south Stanley Avenue.
4. Industrial lands located west of Stanley Avenue between Ramsey Road and Chippawa Parkway.

Should you have any questions or concerns, please contact our office.

R.J. Burnside & Associates Limited

CC:cv

Enclosure(s) Attachment 1: Existing Traffic Volumes
Attachment 2: TTS 2016 Residential Route Choices
Attachment 3: Retail Catchment Area
Attachment 4: Excerpts from Background Development Traffic Studies
Attachment 5: Proposed Distribution for Transportation Study Figure

Attachment 1

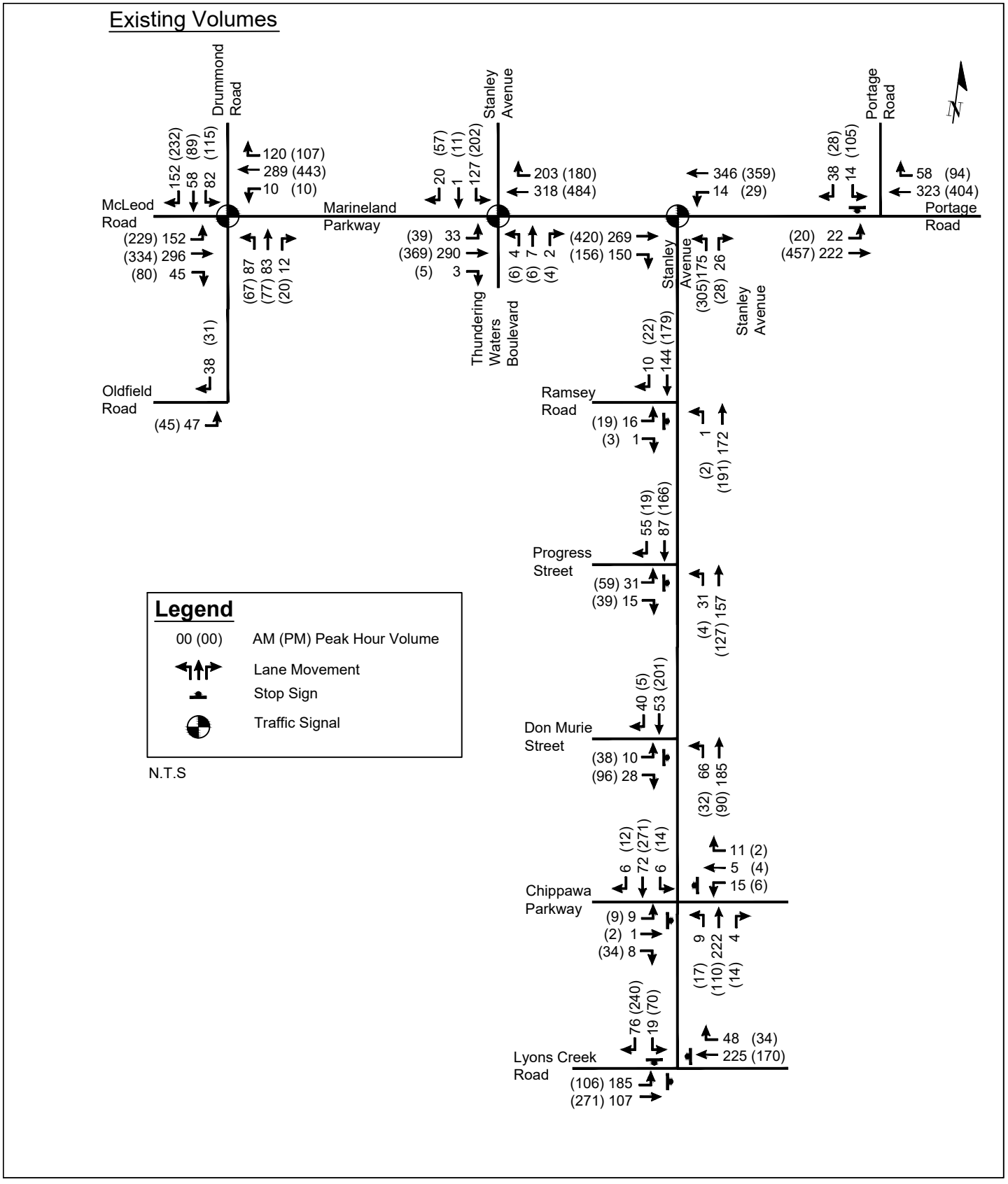
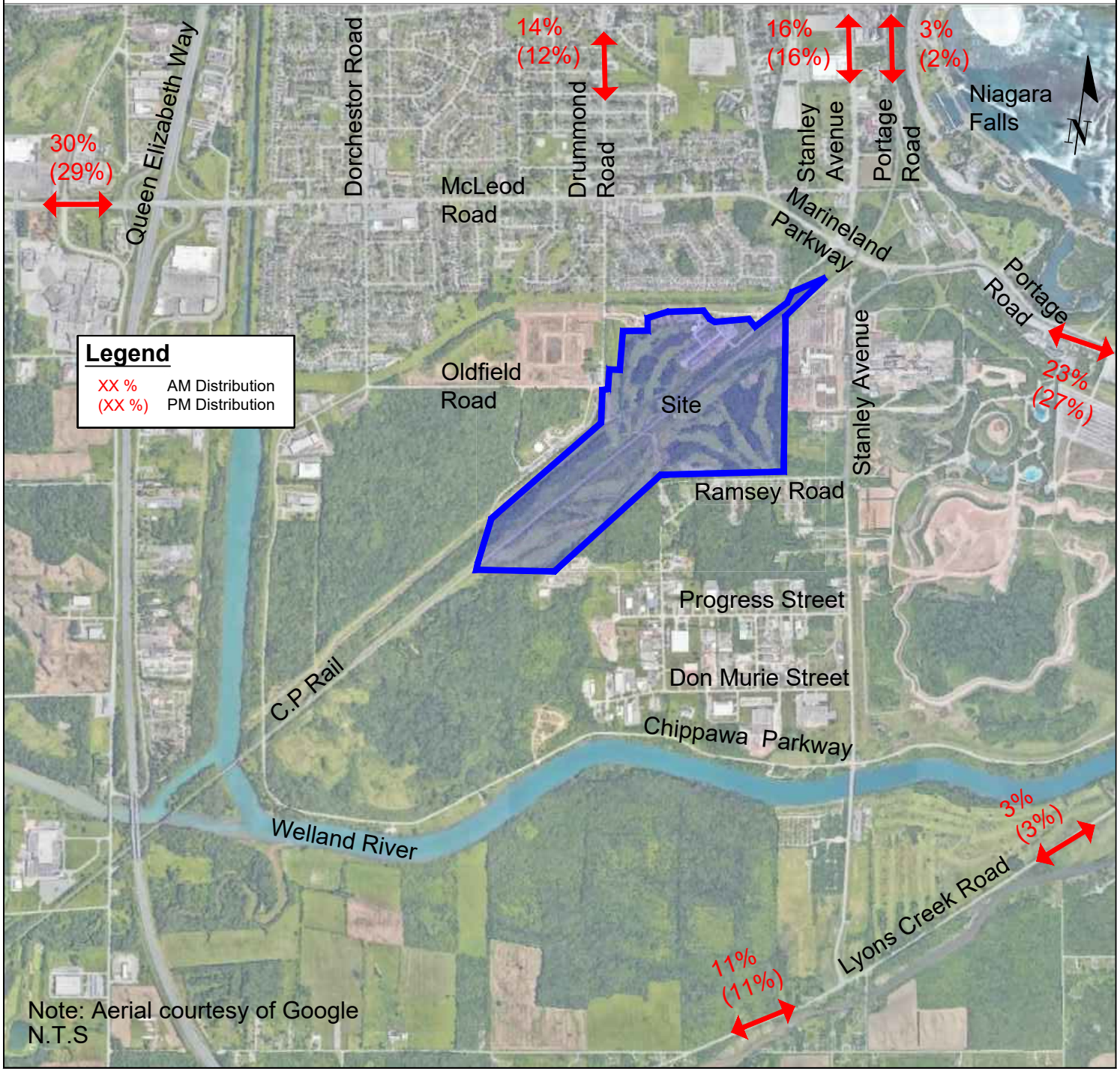


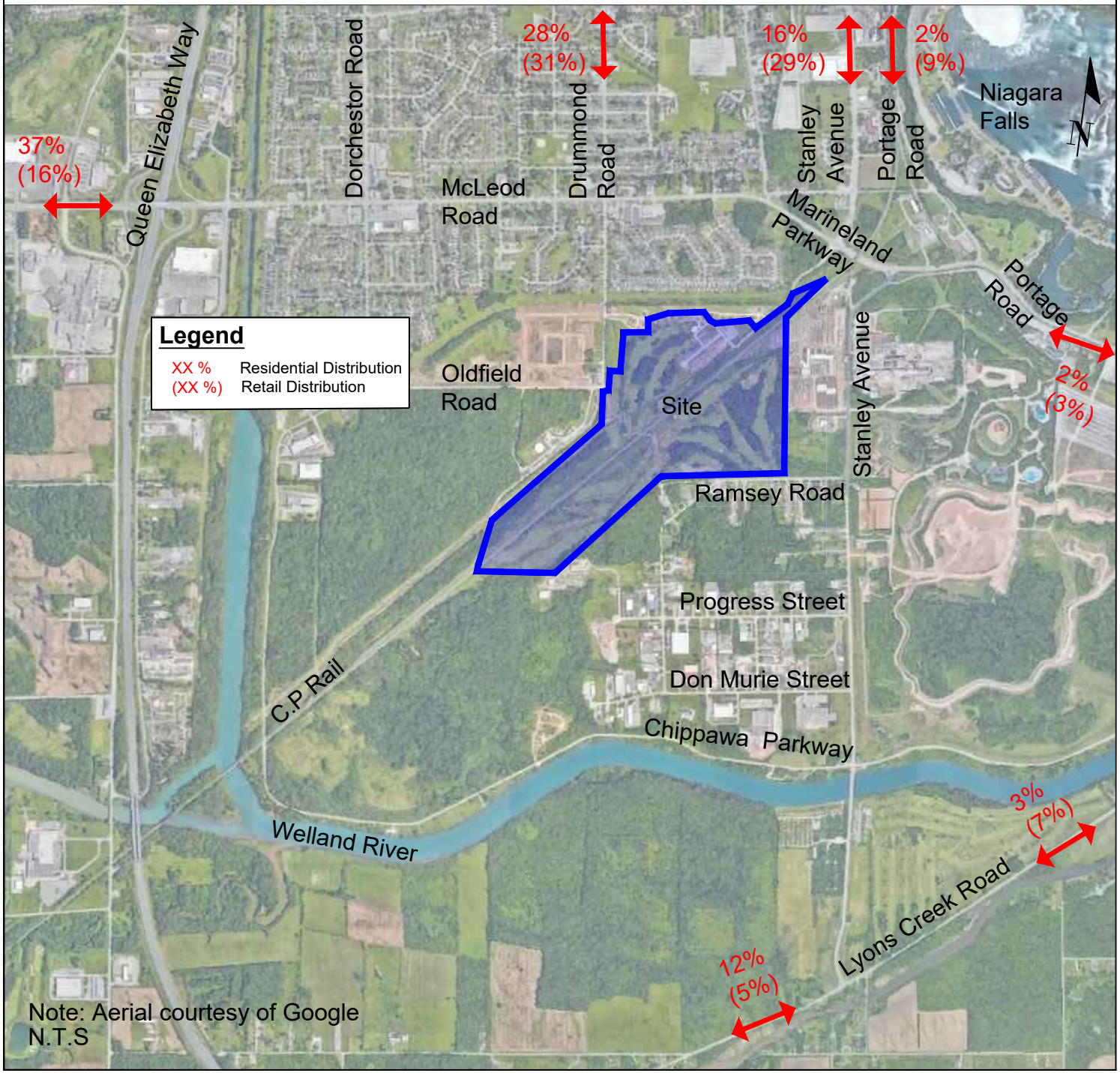
Figure 1 : Existing Travel Patterns



Detailed Residential Trip Distribution

PD / Ward	2016 TTS Trips (see Raw TTS)	% Attraction	Adjusted Trips	% routing East		West		North			Total	Trips East		West		North			Total
				Portage/ Marineland	Lyons Creek Rd	McLeod (QEW Access)	Lyons Creek (QEW Access)	Drummond	Stanley	Portage		Portage/ Marineland	Lyons Creek Rd	McLeod (QEW Access)	Lyons Creek (QEW Access)	Drummond	Stanley	Portage	
External (PD excluding Niagara Falls)																			
PD 1 of Toronto	31	100%	31			100%					100%	0	0	31	0	0	0	0	31
PD 2 of Toronto	16	100%	16			100%					100%	0	0	16	0	0	0	0	16
PD 9 of Toronto	31	100%	31			100%					100%	0	0	31	0	0	0	0	31
Mississauga	106	100%	106			100%					100%	0	0	106	0	0	0	0	106
Oakville	60	100%	60			100%					100%	0	0	60	0	0	0	0	60
Burlington	107	100%	107			100%					100%	0	0	107	0	0	0	0	107
Stoney Creek	27	100%	27			100%					100%	0	0	27	0	0	0	0	27
Hamilton	485	100%	485			100%					100%	0	0	485	0	0	0	0	485
Grimsby	158	100%	158			100%					100%	0	0	158	0	0	0	0	158
Lincoln	91	100%	91			100%					100%	0	0	91	0	0	0	0	91
Pelham	107	100%	107			25%	10%	55%	10%		100%	0	0	27	11	59	11	0	108
Niagara-on-the-Lake	1287	100%	1287			35%		45%	15%	5%	100%	0	0	450	0	579	193	64	1286
St. Catharines	2480	100%	2480			30%		40%	30%		100%	0	0	744	0	992	744	0	2480
Thorold	590	100%	590			20%		45%	30%	5%	100%	0	0	118	0	266	177	30	591
Niagara Falls	7193	0%	0								0%	0	0	0	0	0	0	0	0
Welland	671	100%	671			10%	85%	5%			100%	0	0	67	570	34	0	0	671
Port Colborne	15	100%	15			20%	80%				100%	0	0	3	12	0	0	0	15
Fort Erie	494	100%	494	20%	40%	10%	30%				100%	99	198	49	148	0	0	0	494
Haldimand-Norfolk	107	100%	107	0%	20%	20%	45%	15%			100%	0	21	21	48	16	0	0	106
Other	163	100%	163	15%	15%	15%	15%	15%	15%	10%	100%	24	24	24	24	24	24	16	160
External Total	**7026**										**Total**	123	243	2615	813	1970	1149	110	7023
											TTS %	2%	3%	37%	*12%*	*28%*	*16%*	*2%*	*100%*

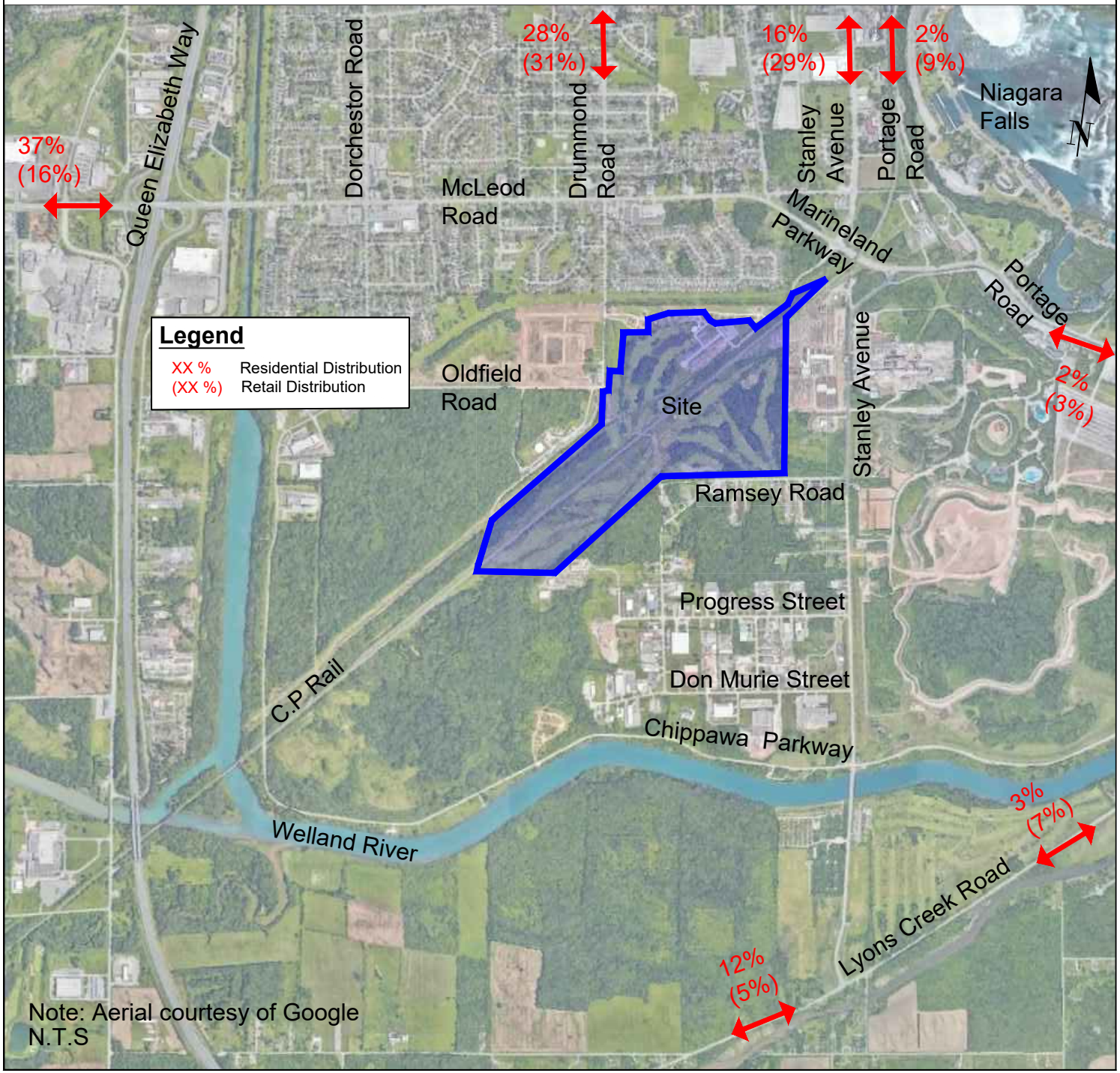
Figure 2 : Distribution based on 2016 TTS and Retail Catchment Area



Detailed Retail Trip Distribution

				% routing								Trips							
				East		West		North				East		West		North			
PD / Ward	2016 TTS Trips (see Raw TTS)	% Attraction	Adjusted Trips	Portage/ Marineland	Lyons Creek Rd	McLeod (QEW Access)	Lyons Creek (QEW Access)	Drummond	Stanley	Portage	Total	Portage/ Marineland	Lyons Creek Rd	McLeod (QEW Access)	Lyons Creek (QEW Access)	Drummond	Stanley	Portage	Total
External (PD excluding Niagara Falls)																			
200	3187	10%	319		40%	10%	50%				100%	0	128	32	160	0	0	0	320
201	5068	25%	1267	30%	70%						100%	380	887	0	0	0	0	0	1267
202	1137	100%	1137			60%	40%				100%	0	0	682	455	0	0	0	1137
203.01	5282	100%	5282			10%		40%	35%	15%	100%	0	0	528	0	2113	1849	792	5282
203.02	3549	70%	2484			5%		40%	45%	10%	100%	0	0	124	0	994	1118	248	2484
204	6780	20%	1356			15%		40%	35%	10%	100%	0	0	203	0	542	475	136	1356
205	1545	10%	155						60%	40%	100%	0	0	0	0	0	93	62	155
206	4983	0%	0								0%	0	0	0	0	0	0	0	0
207	5806	0%	0								0%	0	0	0	0	0	0	0	0
208	5803	0%	0								0%	0	0	0	0	0	0	0	0
209.03	5306	20%	1061			45%		35%	20%		100%	0	0	477	0	371	212	0	1060
209.04	3509	15%	526			25%		45%	30%		100%	0	0	132	0	237	158	0	527
209.05	6396	0%	0								0%	0	0	0	0	0	0	0	0
209.06	2973	0%	0								0%	0	0	0	0	0	0	0	0
210	8777	0%	0								0%	0	0	0	0	0	0	0	0
211	4261	0%	0								0%	0	0	0	0	0	0	0	0
212	1916	0%	0								0%	0	0	0	0	0	0	0	0
213	2980	0%	0								0%	0	0	0	0	0	0	0	0
214	4539	0%	0								0%	0	0	0	0	0	0	0	0
215	4274	0%	0								0%	0	0	0	0	0	0	0	0
External Total	**79294**										**Total**	380	1015	2178	615	4257	3905	1238	13588
											TTS %	3%	7%	16%	*5%*	*31%*	*29%*	*9%*	*100%*

Figure 2 : Distribution based on 2016 TTS and Retail Catchment Area



3.5 Trip Distribution and Assignment

Niagara Region provided the 2031 and 2041 auto and transit trip matrices from their recently updated travel demand model (EMME software). Since both the 2031 and 2041 matrices were similar in terms of trip distribution, the 2041 matrices were used to determine the geographic distribution of trips to and from the Riverfront Community lands.

Table 3.3 summarizes the trip distribution by cardinal direction and by roadway providing access to or within the study area. It also includes a component of the trip distribution referred to as "Internal". The "Internal" area includes the model zone that the subject site is also located within or adjacent to and would account for the percentage of trips between the development lands and nearby complementary land uses.

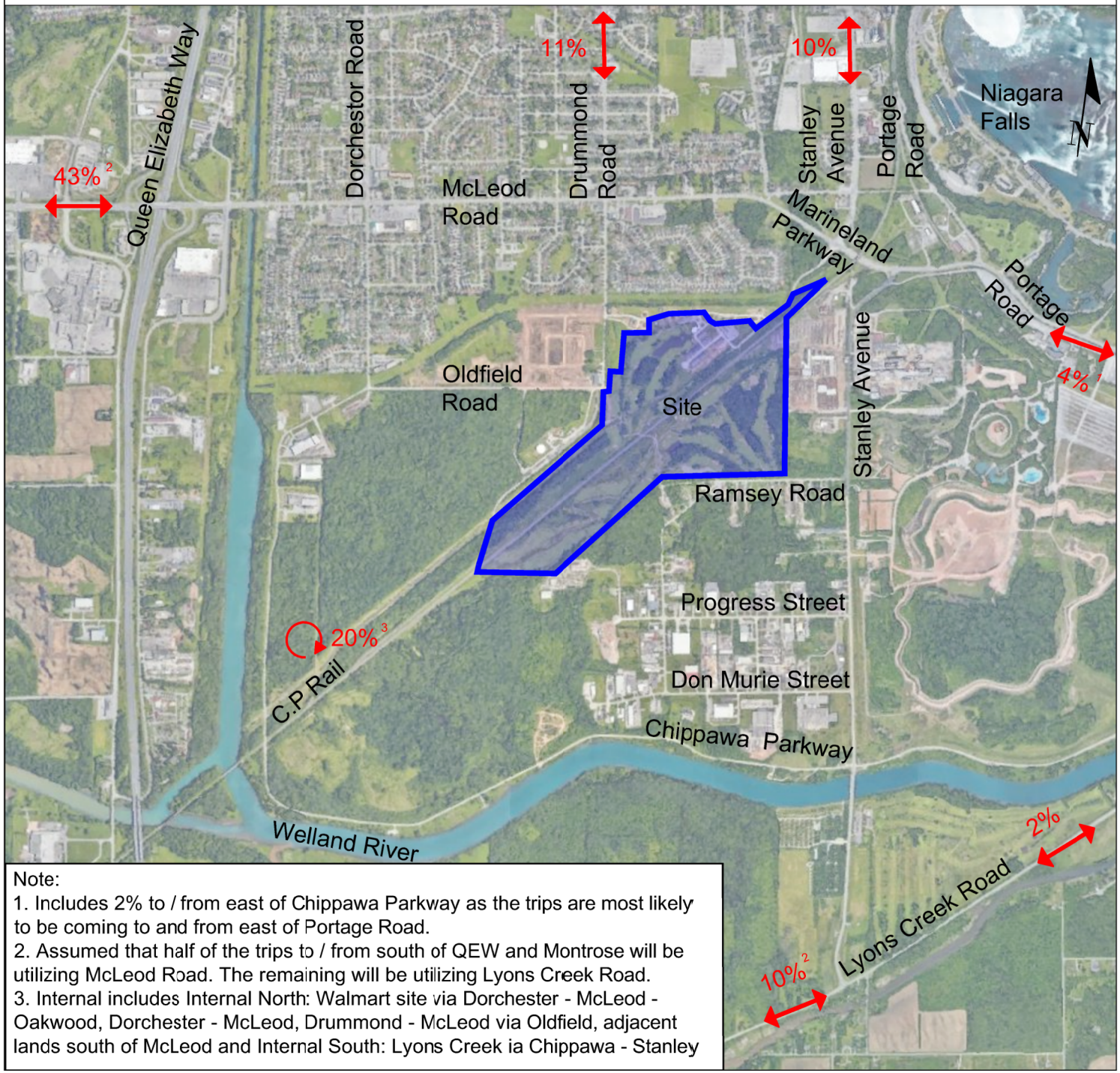
TABLE 3.3: TRIP DISTRIBUTION

Trip Distribution Zone	Distribution
West (McLeod)	4%
North (Montrose)	7%
North (QEW)	14%
North (Dorchester)	11%
North (Drummond)	11%
North (Stanley)	10%
East (Portage)	2%
East (Chippawa Parkway)	2%
East (Lyons Creek)	2%
South (QEW)	5%
South (Montrose)	8%
West (Biggar)	3%
West (Chippawa Creek)	1%
Internal North (Walmart site via Dorchester-McLeod-Oakwood)	4%
Internal North (Dorchester-McLeod)	3%
Internal North (Drummond-McLeod via Oldfield)	3%
Internal North (adjacent lands south of McLeod)	6%
Internal South (Lyons Creek via Chippawa-Stanley)	4%
Total	**100%**

The trips shown in **Table 3.2** were manually assigned to the study area road network based on the traffic distribution pattern in **Table 3.3** and using the following rationale for route selection:

- While the majority of site traffic (approximately 70-75%) would be oriented to the north, there is and will be limited capacity in the McLeod Road corridor to accommodate the site trips on the most direct routes to the north (i.e. primarily Dorchester Road);
- Consequently, site traffic was assigned approximately 50% to the arterial-collector routes accessing the McLeod Road corridor to the

Figure 3 : Background Development Riverfront Community Assumed Distribution



Note:
1. Includes 2% to / from east of Chippawa Parkway as the trips are most likely to be coming to and from east of Portage Road.
2. Assumed that half of the trips to / from south of QEW and Montrose will be utilizing McLeod Road. The remaining will be utilizing Lyons Creek Road.
3. Internal includes Internal North: Walmart site via Dorchester - McLeod - Oakwood, Dorchester - McLeod, Drummond - McLeod via Oldfield, adjacent lands south of McLeod and Internal South: Lyons Creek ia Chippawa - Stanley

3.2.3 Trip Generation

Table 3.2 summarizes the trip generation estimates for the weekday AM, PM and Saturday peak hours. These estimates consider the reductions noted above.

A total of 86 AM, 103 PM and 116 Saturday peak hour new vehicle trips are forecast to be added to the area roadways.

TABLE 3.2: TRIP GENERATION ESTIMATES

Land Use Code	Units	Trips	AM Peak Hour				PM Peak Hour				Saturday Peak Hour			
			Rate	In	Out	Total	Rate	In	Out	Total	Rate	In	Out	Total
232 - High-Rise Condominium/Townhouse (Units)	125	Total	eq.	12	53	65	eq.	36	22	58	eq.	29	38	67
		Mode Split	5%	1	3	3	5%	2	1	3	5%	1	2	3
		New	95%	11	50	62	95%	34	21	55	95%	28	36	64
230 - Condominium/Townhouse (Units)	43	Total	eq.	5	21	26	eq.	32	18	50	eq.	30	25	55
		Mode Split	5%	0	1	1	5%	2	1	3	5%	2	1	3
		New	95%	5	20	25	95%	30	17	48	95%	29	24	52
Total Trip Generation		**Total**	-	17	74	**91**	-	68	40	**108**	-	59	63	**122**
		Mode Split	-	1	4	**5**	-	3	2	**5**	-	3	3	**6**
		New	-	16	70	**86**	-	65	38	**103**	-	56	60	**116**

3.3 Development Trip Distribution and Assignment

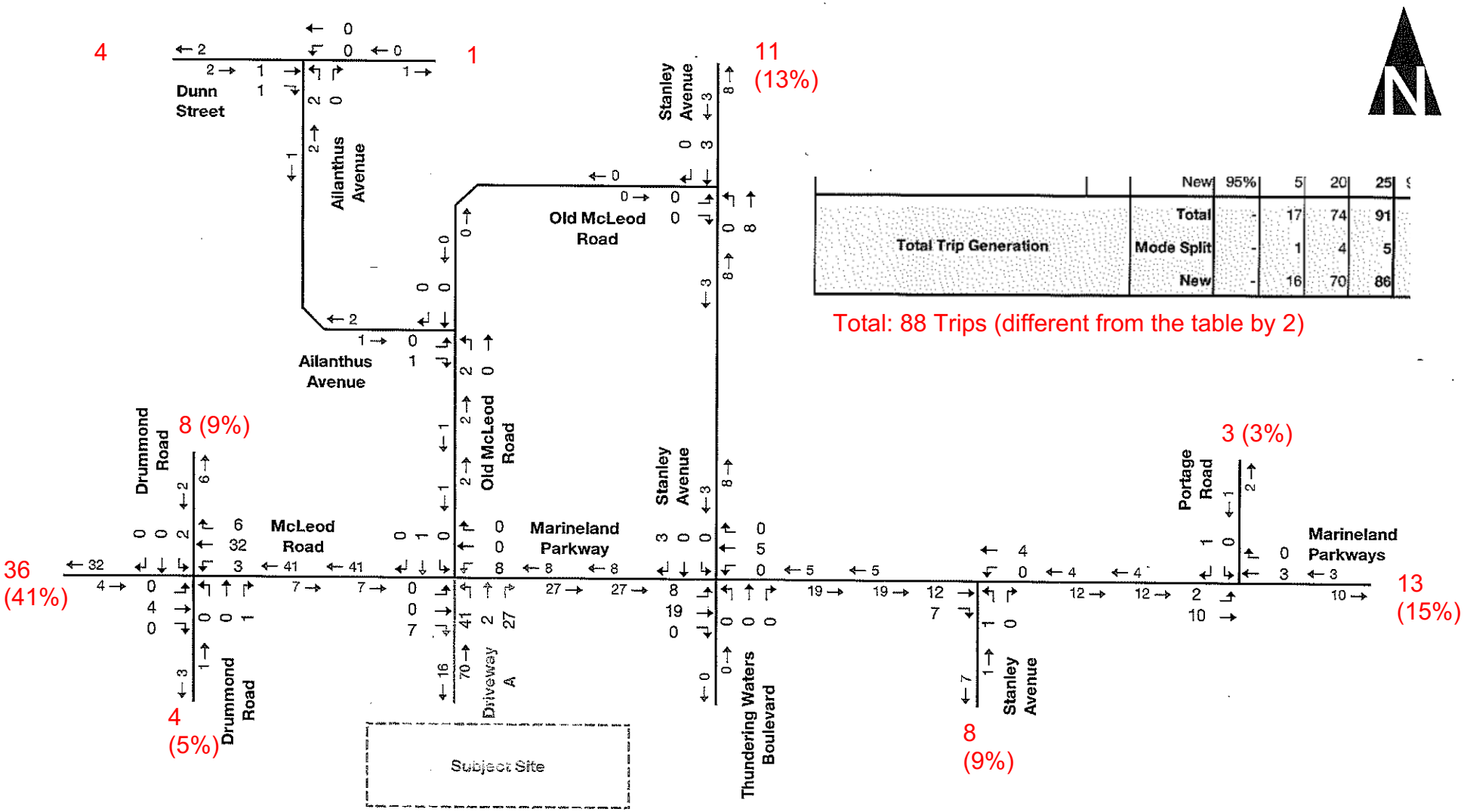
The 2011 Transportation Tomorrow Survey (TTS) data for the City of Niagara Falls was used to determine the trip distribution for the residential uses proposed. The TTS was examined for the weekday AM and PM peak hour corresponding to the weekday commuter hours that are typically used in the assessment of residential developments.

The survey data were assessed for weekday AM peak period (7:00 AM-9:00 AM) trips originating within the City of Niagara Falls when residents would be leaving home for the day. Similarly, trips destined to City of Niagara Falls were tabulated.

The weekday PM peak hour was developed utilizing the same methodology between the hours of 4:00 PM and 6:00 PM.

Table 3.3 details the estimated trip distribution for the development. The Saturday peak hour is assumed to have similar directional distribution as the weekday AM peak hour.

RJB notes in red**



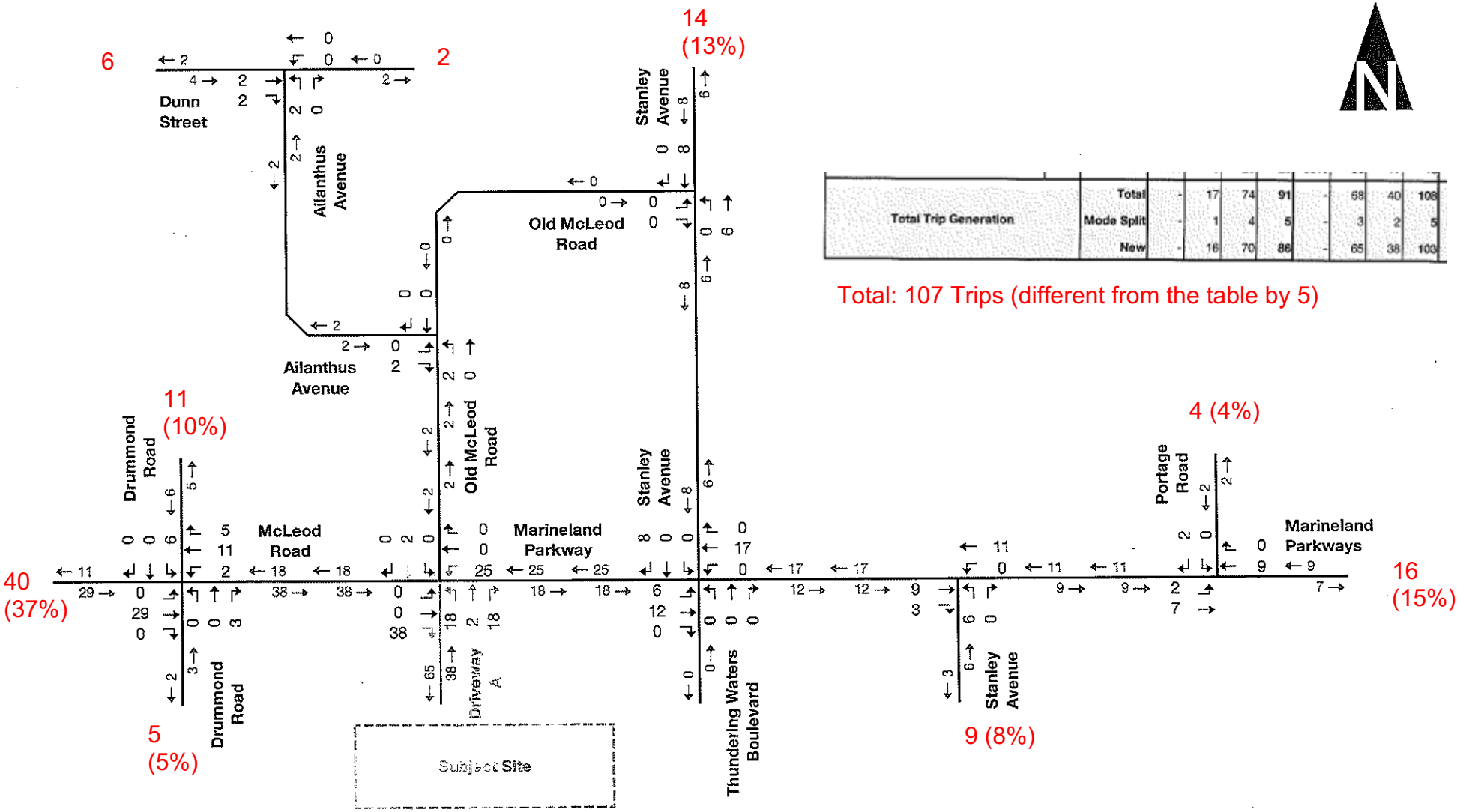
		New	95%	5	20	25
Total Trip Generation	Total	-		17	74	91
	Mode Split	-		1	4	5
	New	-		16	70	86

Total: 88 Trips (different from the table by 2)

paradigm TRANSPORTATION SOLUTIONS LIMITED

Site Generated AM Peak Hour Traffic Volumes

RJB notes in red**



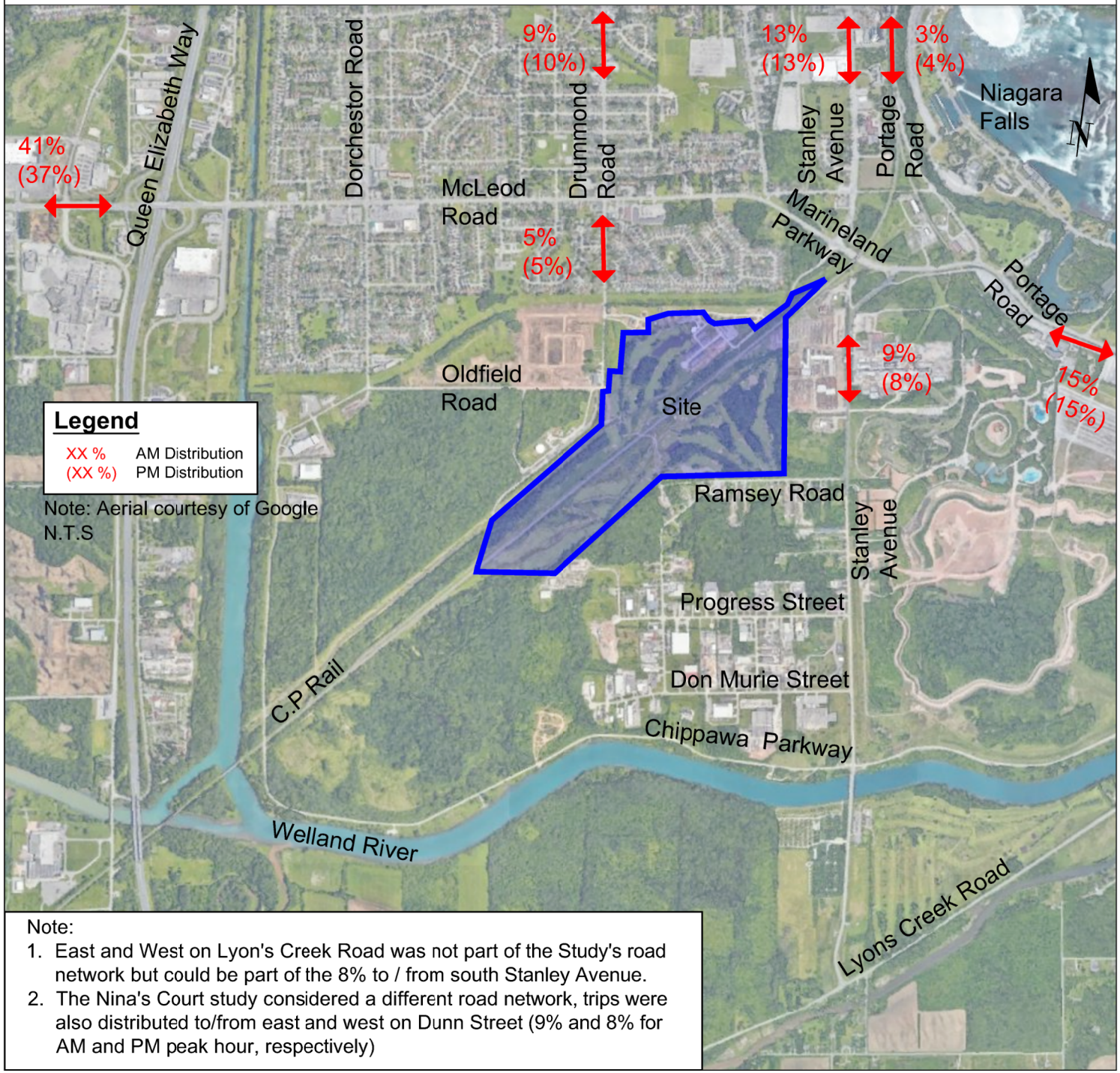
Total Trip Generation	Total	-	17	74	91	-	68	40	108
	Mode Split	-	1	4	5	-	3	2	5
	New	-	16	70	86	-	65	38	103

Total: 107 Trips (different from the table by 5)

paradigm TRANSPORTATION SOLUTIONS LIMITED

Site Generated PM Peak Hour Traffic Volumes

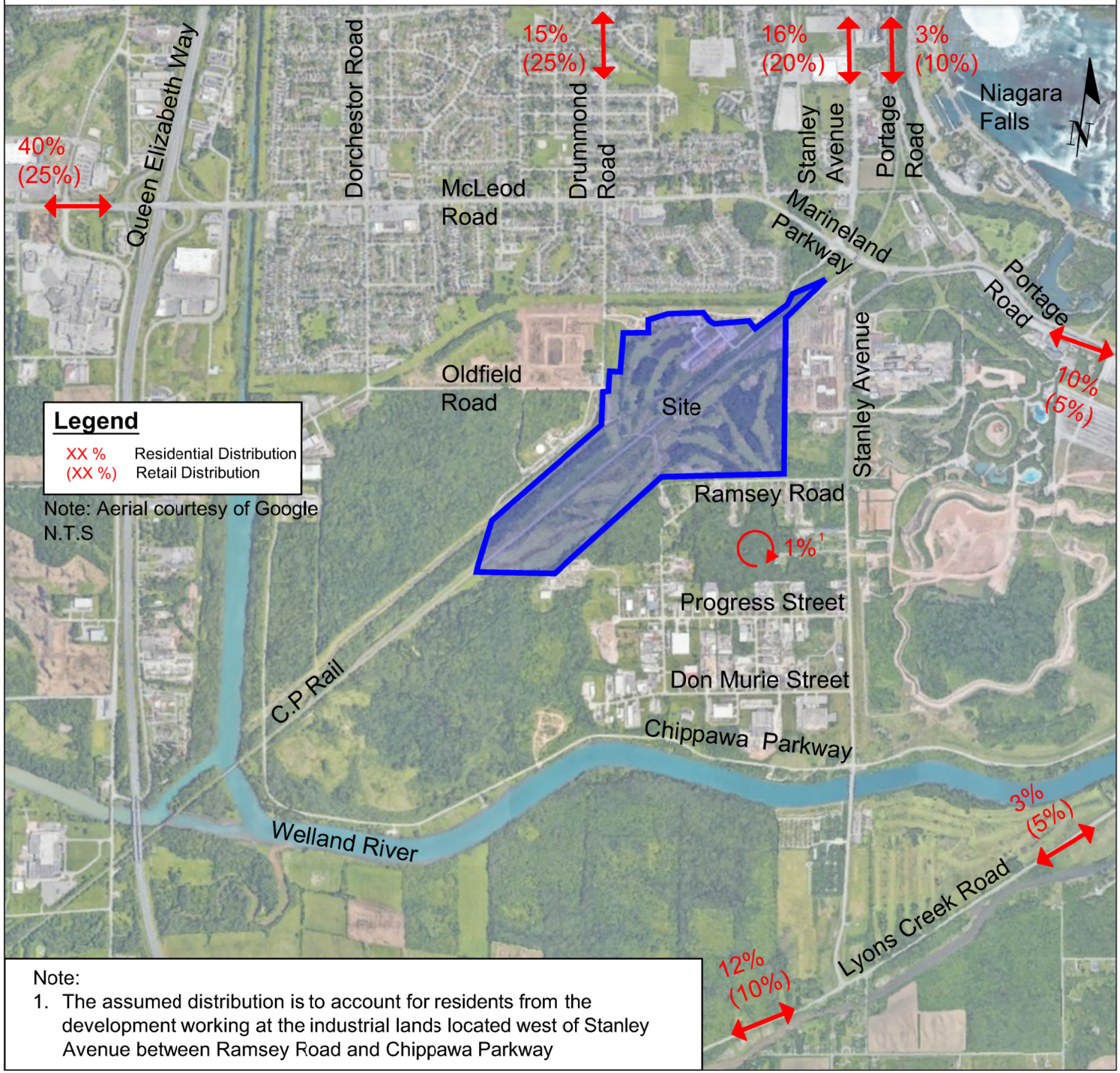
Figure 4 : Background Development Nina's Court Assumed Distribution



Note:

1. East and West on Lyon's Creek Road was not part of the Study's road network but could be part of the 8% to / from south Stanley Avenue.
2. The Nina's Court study considered a different road network, trips were also distributed to/from east and west on Dunn Street (9% and 8% for AM and PM peak hour, respectively)

Figure 5 : Proposed Distribution for Transportation Study



Note:

1. The assumed distribution is to account for residents from the development working at the industrial lands located west of Stanley Avenue between Ramsey Road and Chippawa Parkway

Appendix B

CP Rail Information

800 - 1290 Central Parkway
West
Mississauga, Ontario
Canada L5C 4R3

T 905 803 3429
E josie_tomei@cpr.ca

November 6, 2018

Via email: scicak@golder.com

Stefan Cicak
Golder Associates Ltd.
6925 Century Avenue
Suite 100
Mississauga, ON L5N 7K2

Dear Sir/Madam:

Re: Rail Traffic Volumes, CP Mileage 4.0, Montrose Subdivision, Marineland Parkway, Niagara Falls

This is in reference to your request for rail traffic data in the vicinity of Marineland Parkway in the City of Niagara Falls. The study area is located in the vicinity of mile 4.0 of our Montrose Subdivision, which is classified as an Industrial Spur line.

The information requested is as follows:

1. Number of freight trains between 0700 & 2300: 0
   Number of freight trains between 2300 & 0700: 2

2. Maximum cars per train freight: 20

3. Number of locomotives per train: 2

4. Maximum permissible train speed: 25 mph (normal speed 15 mph)

5. Grade crossings are located at Biggar Road, Grassy Brook Road and Montrose Road, however whistling is prohibited at these locations. Please note, the whistle may be sounded if deemed necessary by the train crew for safety reasons at any time.

6. The Montrose Spur services industrial facilities in the area only. There is a main track and siding with additional leads into industrial facilities all with jointed track. There is also a cross-over switch in the study area.

The information provided is based on recent rail traffic. Variations of the above may exist on a day-to-day basis. Specific measurements may also vary significantly depending on customer needs.

Yours truly,

Josie Tomei SR/WA
Specialist Real Estate Sales & Acquisitions – Ontario

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix C

Existing Traffic Counts and Signal Timing Plans

Drummond Rd @ McLeod Rd

Morning Peak Diagram

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

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

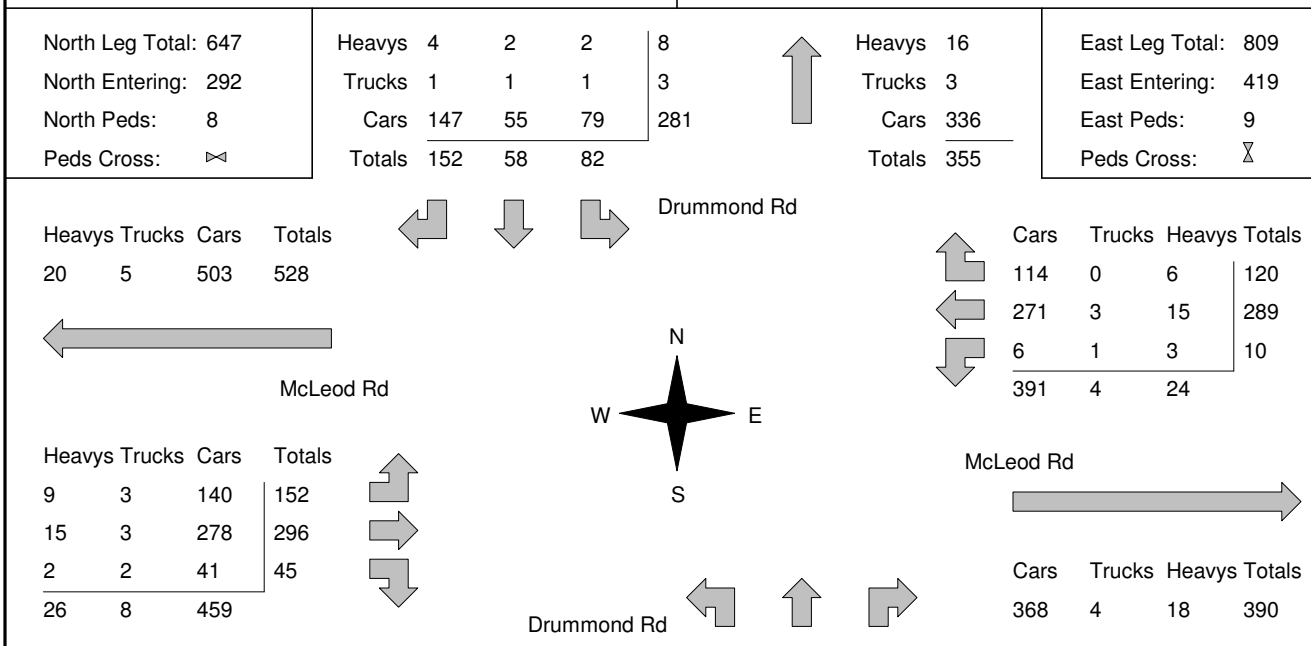
Municipality: Niagara Falls
Site #: 0000000001
Intersection: McLeod Rd & Drummond Rd
TFR File #: 1
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: McLeod Rd runs W/E



Comments

Drummond Rd @ McLeod Rd

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

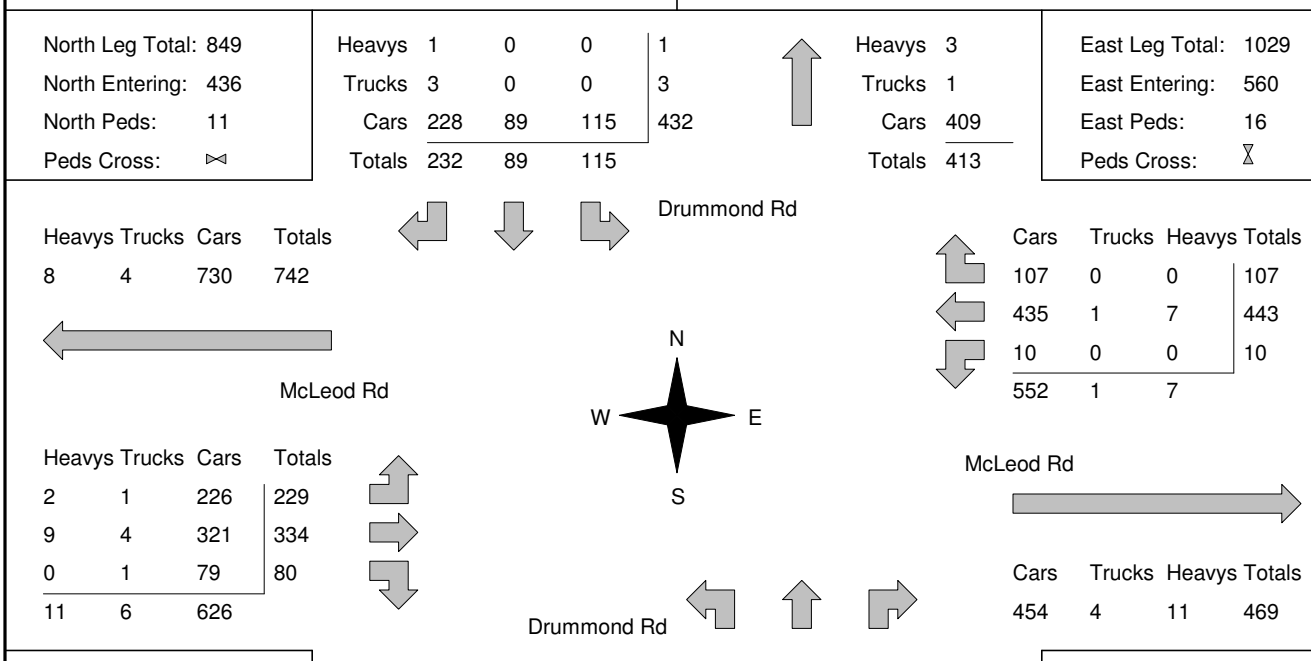
Municipality: Niagara Falls
Site #: 0000000001
Intersection: McLeod Rd & Drummond Rd
TFR File #: 1
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: McLeod Rd runs W/E



Comments

Stanley Ave @ Marineland Pkwy

Morning Peak Diagram

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

One Hour Peak
From: 7:45:00
To: 8:45:00

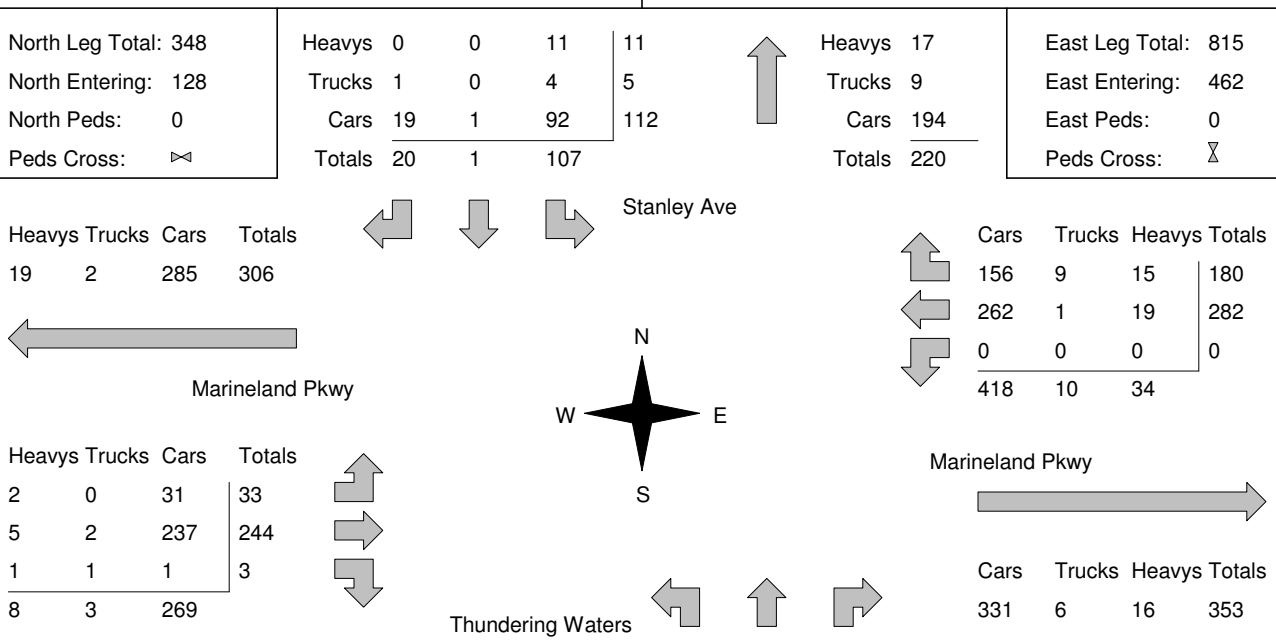
Municipality: Niagara Falls
Site #: 0000000002
Intersection: Marineland Pkwy & Stanley Ave
TFR File #: 2
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Marineland Pkwy runs W/E



Comments

Stanley Ave @ Marineland Pkwy

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

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

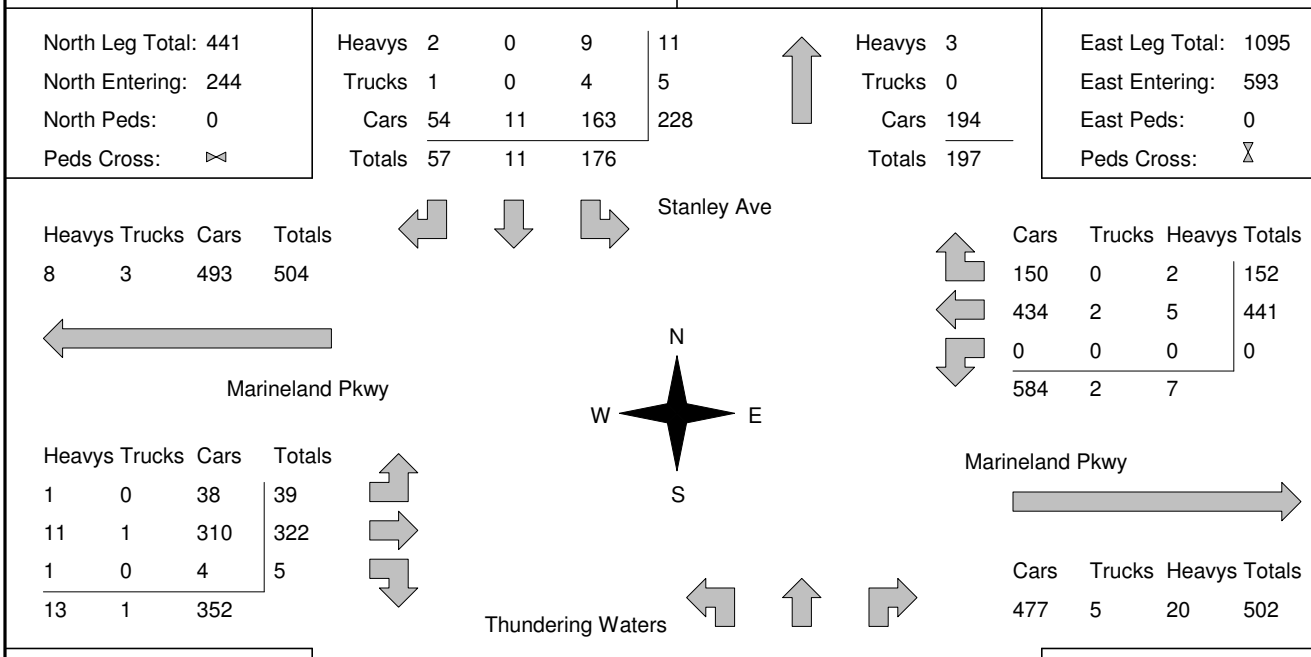
Municipality: Niagara Falls
Site #: 0000000002
Intersection: Marineland Pkwy & Stanley Ave
TFR File #: 2
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

**** Signalized Intersection ****

Major Road: Marineland Pkwy runs W/E



Comments

Stanley Ave @ Ramsey Rd

Morning Peak Diagram

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

One Hour Peak
From: 7:30:00
To: 8:30:00

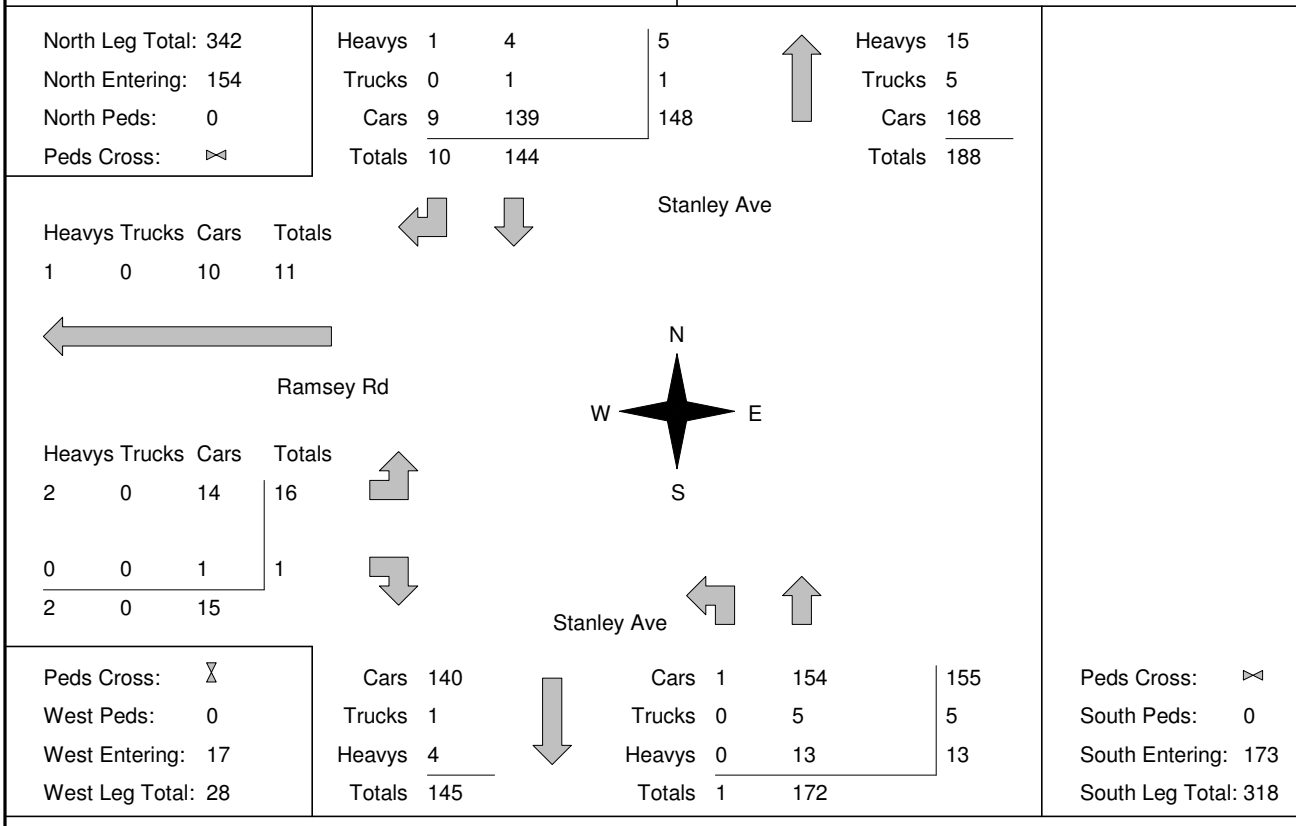
Municipality: Niagara Falls
Site #: 0000000003
Intersection: Stanley Ave & Ramsey Rd
TFR File #: 3
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

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

Major Road: Stanley Ave runs N/S



Comments

Stanley Ave @ Ramsey Rd

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

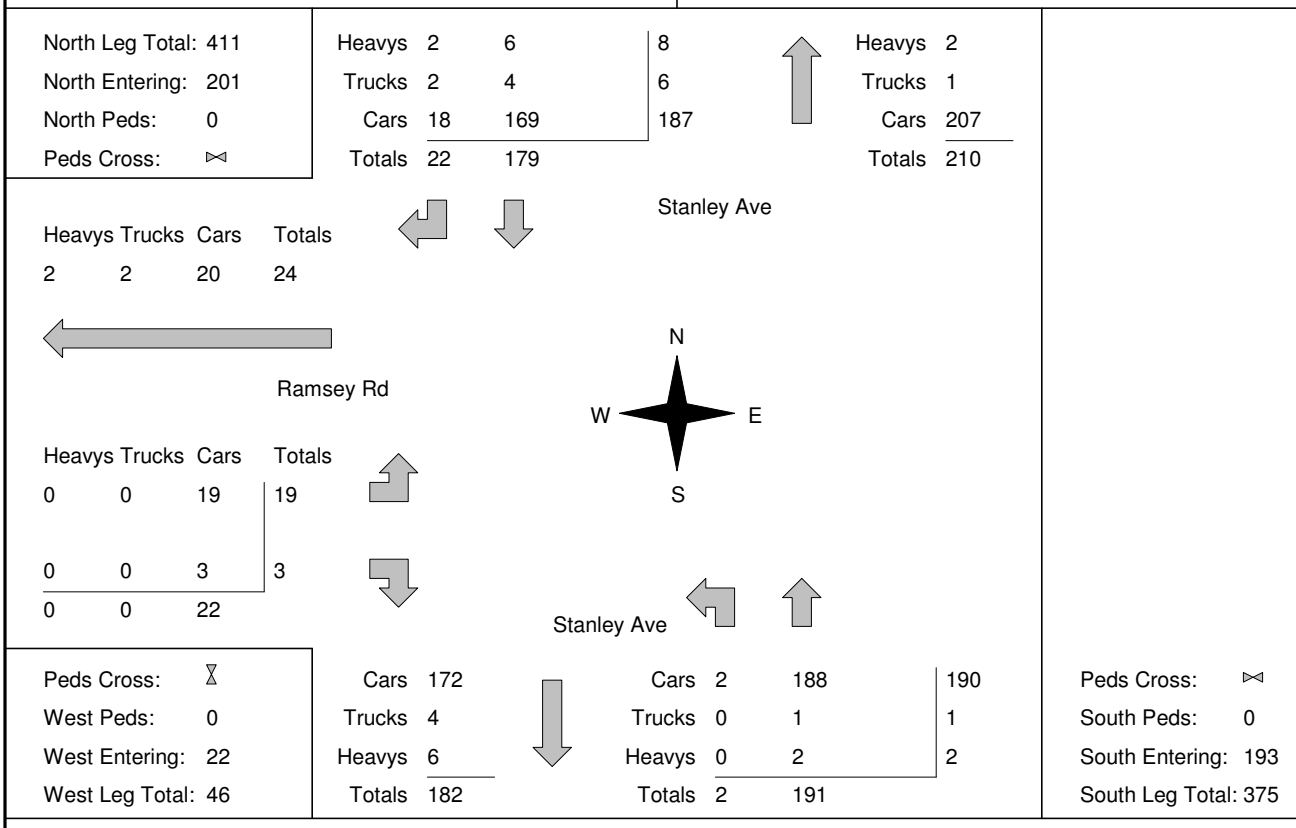
Municipality: Niagara Falls
Site #: 0000000003
Intersection: Stanley Ave & Ramsey Rd
TFR File #: 3
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

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

Major Road: Stanley Ave runs N/S



Comments

Stanley Ave @ Progress St

Morning Peak Diagram

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

One Hour Peak
From: 7:30:00
To: 8:30:00

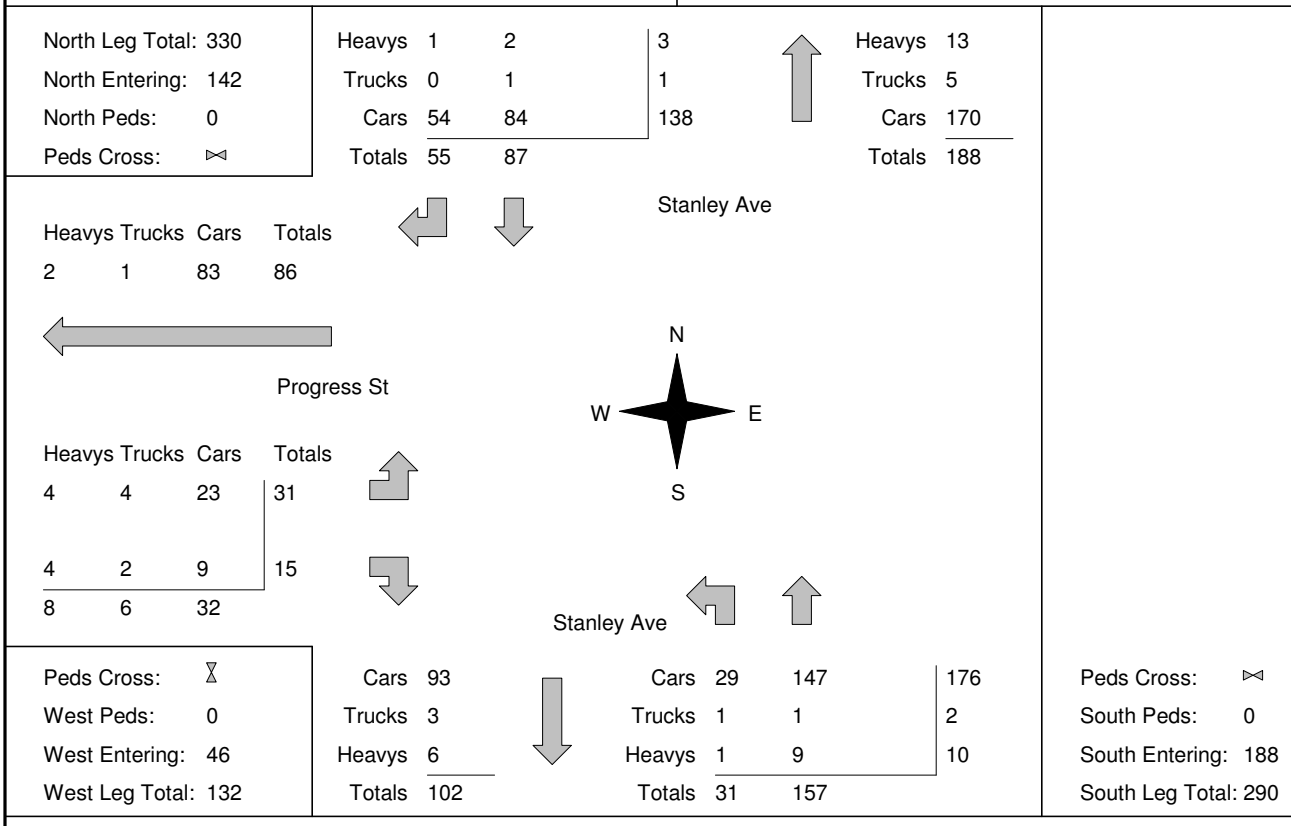
Municipality: Niagara Falls
Site #: 0000000004
Intersection: Stanley Ave & Progress St
TFR File #: 4
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

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

Major Road: Stanley Ave runs N/S



Comments

Stanley Ave @ Progress St

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

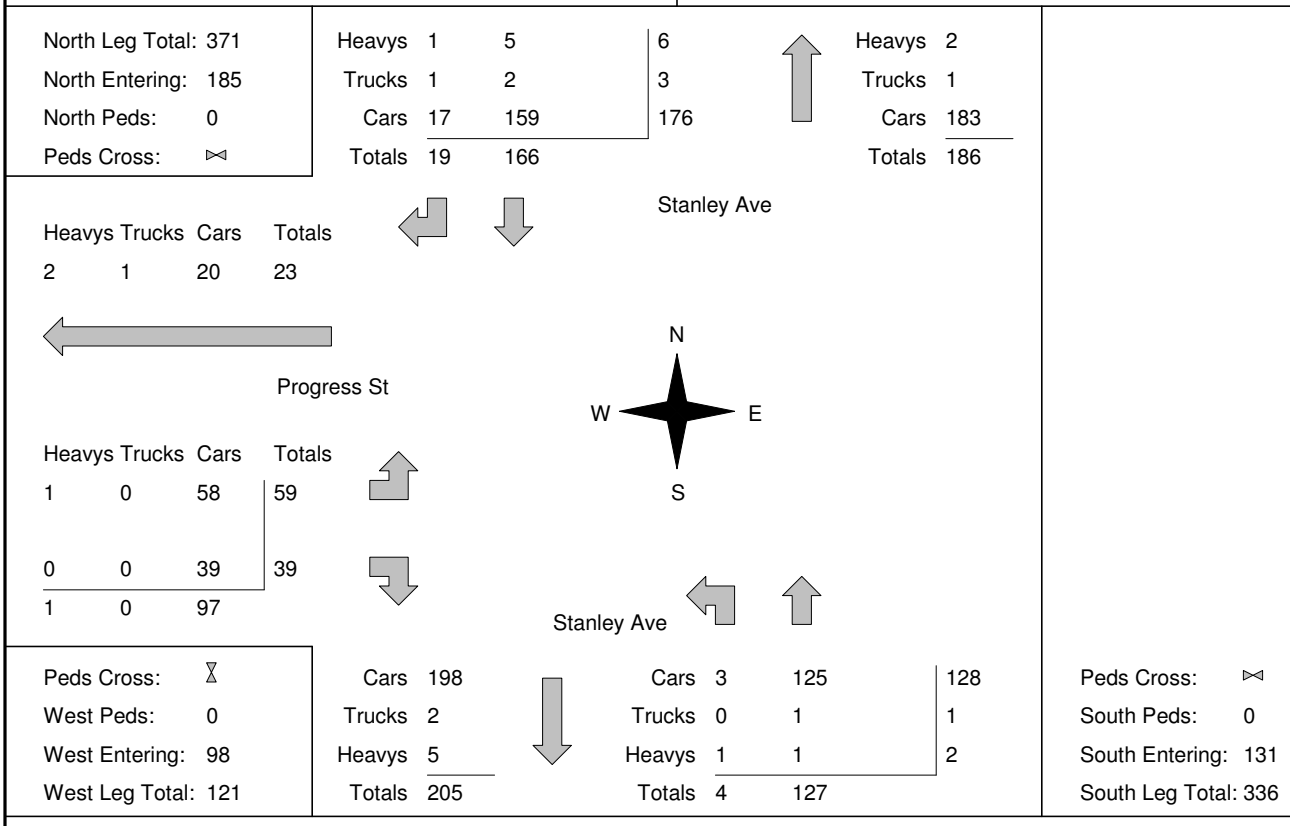
Municipality: Niagara Falls
Site #: 0000000004
Intersection: Stanley Ave & Progress St
TFR File #: 4
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

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

Major Road: Stanley Ave runs N/S



Comments

Stanley Ave @ Progress St

Total Count Diagram

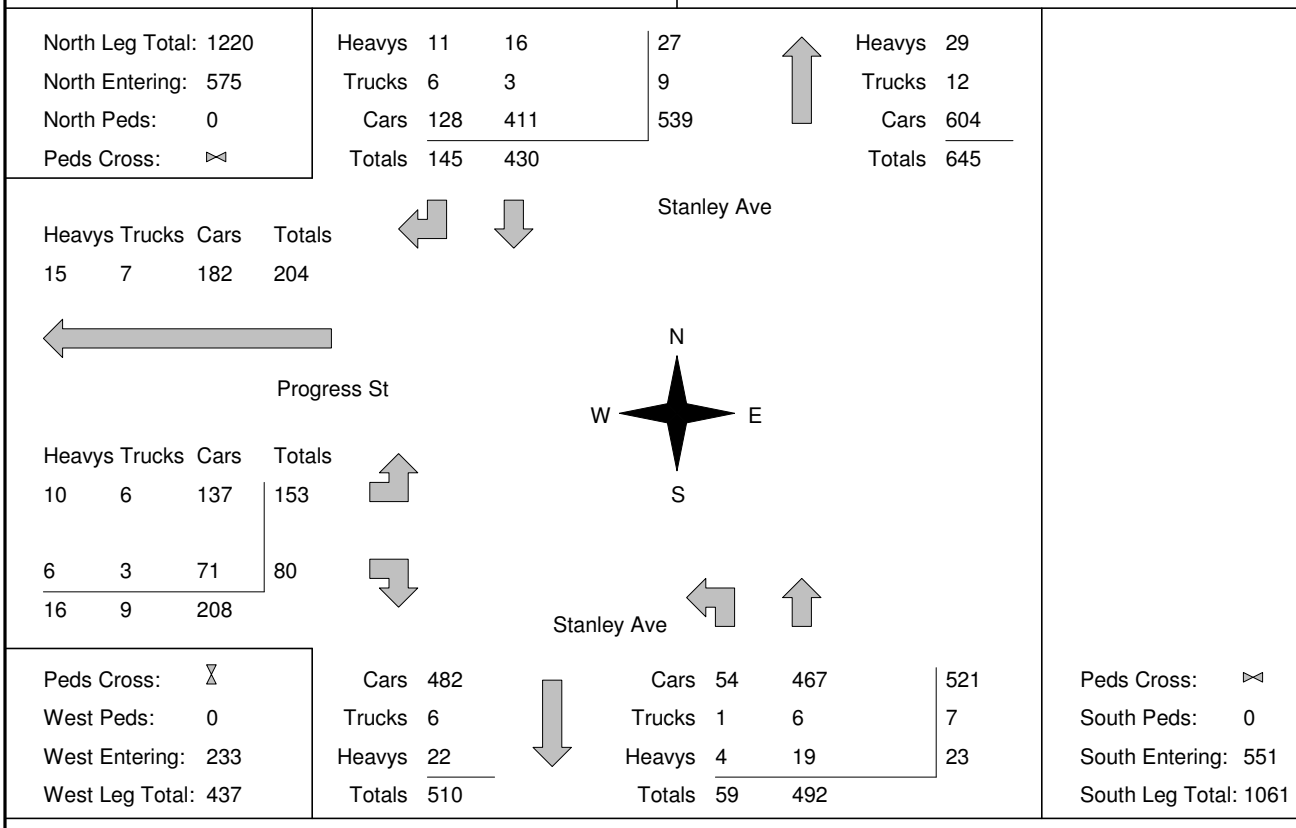
Municipality: Niagara Falls
Site #: 0000000004
Intersection: Stanley Ave & Progress St
TFR File #: 4
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

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

Major Road: Stanley Ave runs N/S



Comments

Stanley Ave @ Don Murie St

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

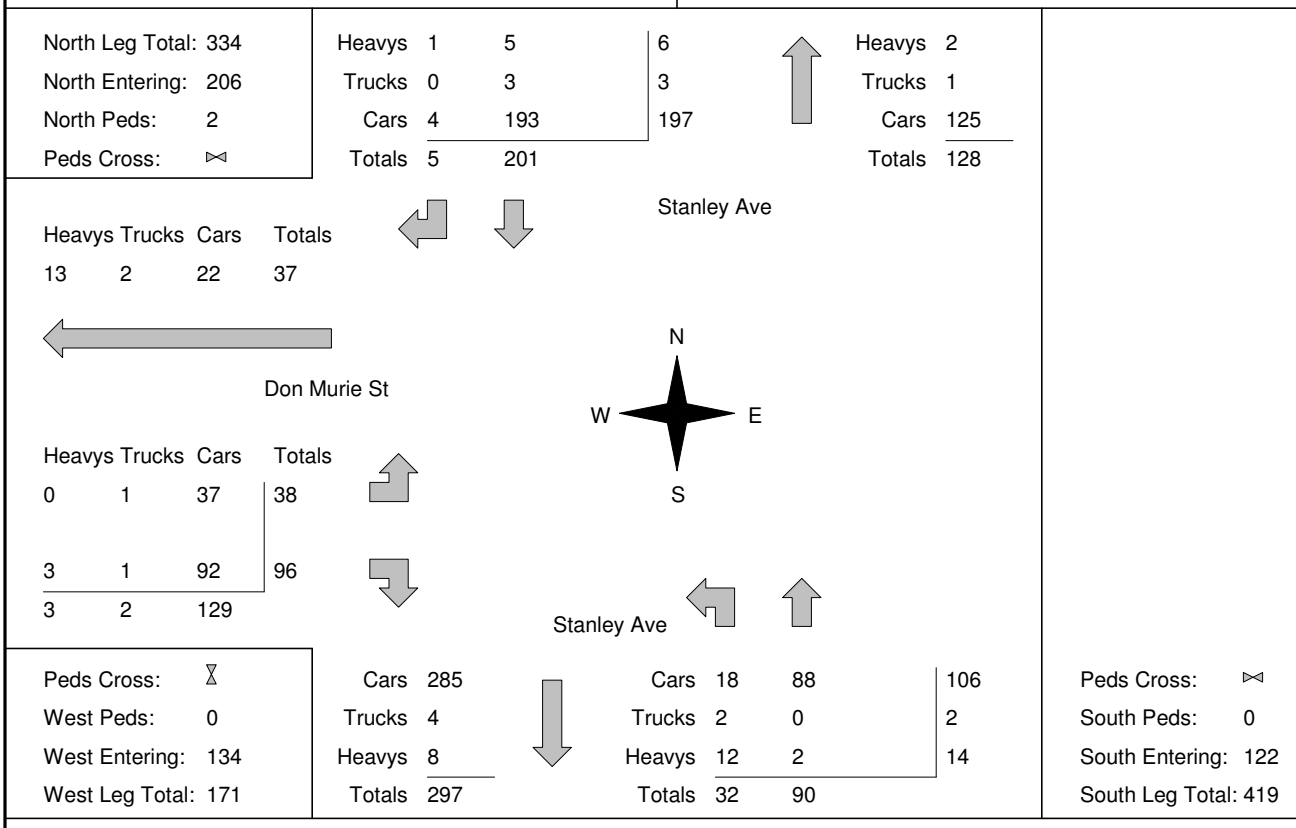
Municipality: Niagara Falls
Site #: 0000000005
Intersection: Stanley Ave & Don Murie St
TFR File #: 5
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

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

Major Road: Stanley Ave runs N/S



Comments

Stanley Ave @ Chippawa Pkwy

Morning Peak Diagram

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

One Hour Peak
From: 7:30:00
To: 8:30:00

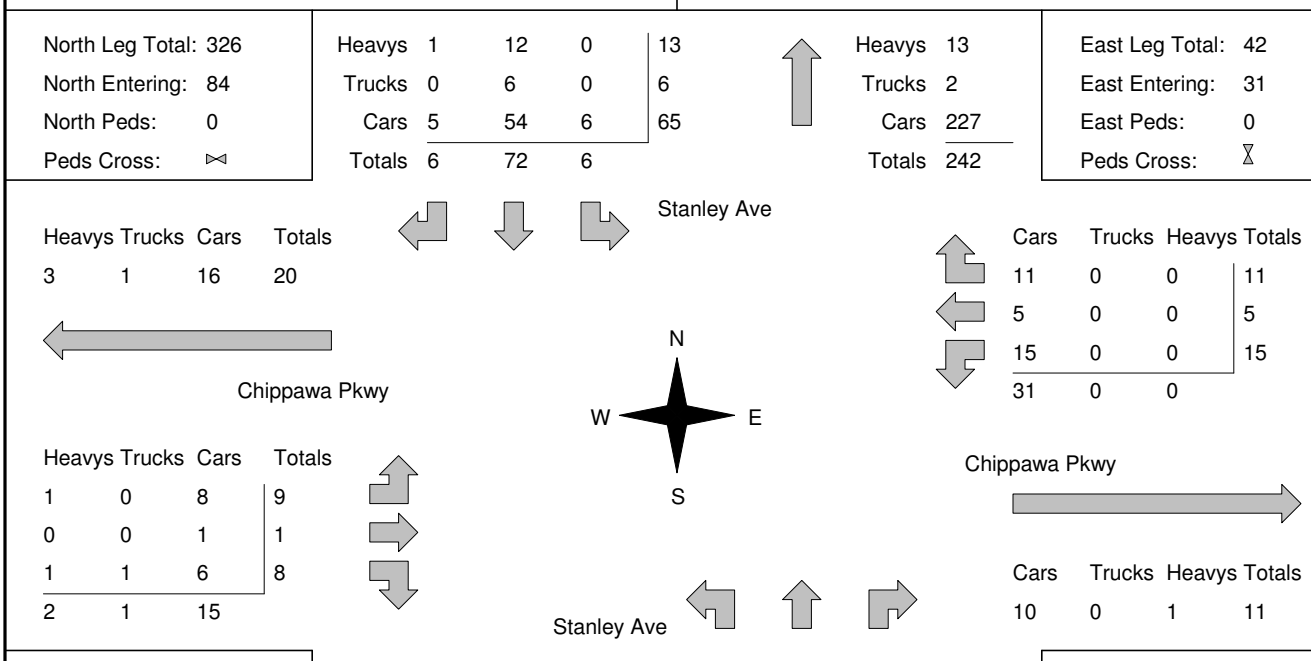
Municipality: Niagara Falls
Site #: 0000000006
Intersection: Stanley Ave & Chippawa Pkwy
TFR File #: 6
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

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

Major Road: Stanley Ave runs N/S



Comments

Stanley Ave @ Chippawa Pkwy

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

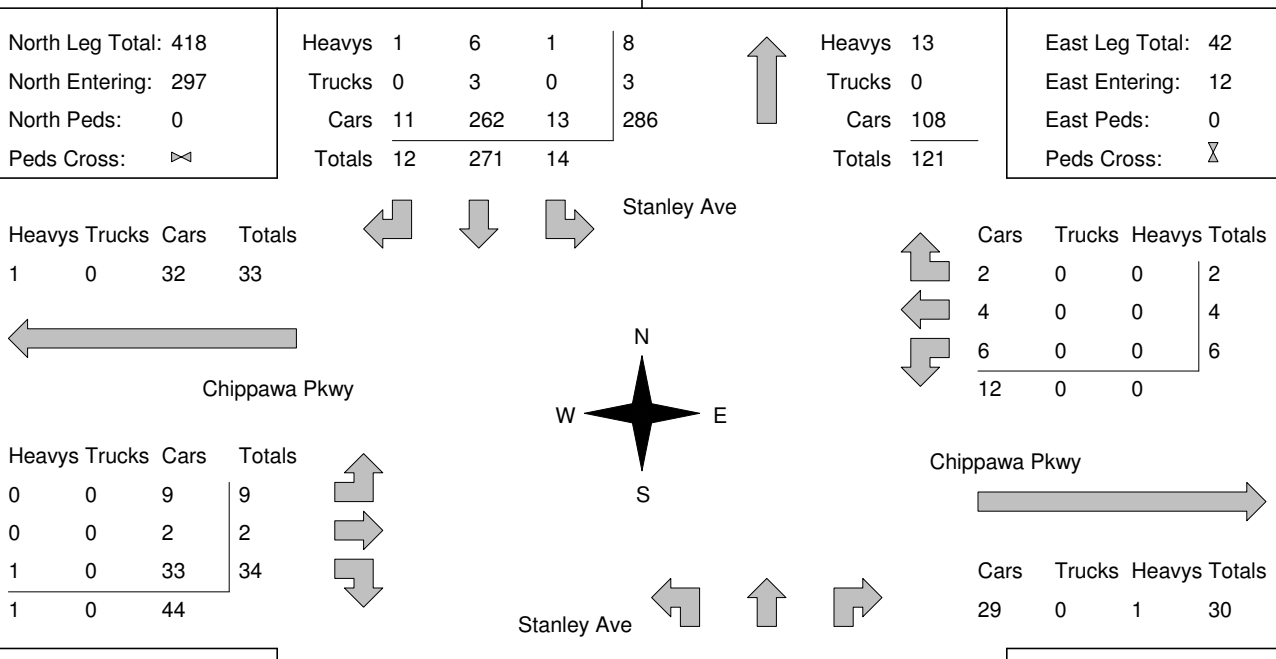
Municipality: Niagara Falls
Site #: 0000000006
Intersection: Stanley Ave & Chippawa Pkwy
TFR File #: 6
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

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

Major Road: Stanley Ave runs N/S



Comments

Stanley Ave @ Lyons Creek Rd

Morning Peak Diagram

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

One Hour Peak
From: 7:30:00
To: 8:30:00

Municipality: Niagara Falls
Site #: 0000000007
Intersection: Lyons Creek Rd & Stanley Ave
TFR File #: 7
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

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

Major Road: Lyons Creek Rd runs W/E

North Leg Total:	328		
North Entering:	95		
North Peds:	0		
Peds Cross:	⋈		
Heavys	10	1	11
Trucks	5	5	10
Cars	61	13	74
Totals	76	19	
Heavys	16		
Trucks	2		
Cars	215		
Totals	233		
East Leg Total:	399		
East Entering:	273		
East Peds:	0		
Peds Cross:	⧖		

Stanley Ave

Heavys	Trucks	Cars	Totals
16	7	278	301

	Cars	Trucks	Heavys	Totals
	42	1	5	48
	217	2	6	225
	259	3	11	

Lyons Creek Rd

N
W E
S

Heavys	Trucks	Cars	Totals
11	1	173	185
10	2	95	107
21	3	268	

Lyons Creek Rd

Cars	Trucks	Heavys	Totals
108	7	11	126

Peds Cross:	⧖
West Peds:	0
West Entering:	292
West Leg Total:	593

Comments

Stanley Ave @ Lyons Creek Rd

Afternoon Peak Diagram

Specified Period
From: 16:00:00
To: 18:00:00

One Hour Peak
From: 16:15:00
To: 17:15:00

Municipality: Niagara Falls
Site #: 0000000007
Intersection: Lyons Creek Rd & Stanley Ave
TFR File #: 7
Count date: 22-Mar-2018

Weather conditions:
Clear/Dry

Person(s) who counted:
Cam

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

Major Road: Lyons Creek Rd runs W/E

North Leg Total: 450
North Entering: 310
North Peds: 0
Peds Cross: ⋈

Heavys	7	1	8
Trucks	0	3	3
Cars	233	66	299
Totals	240	70	

Heavys	14
Trucks	1
Cars	125
Totals	140

East Leg Total: 545
East Entering: 204
East Peds: 0
Peds Cross: ⧖

Stanley Ave

Heavys	Trucks	Cars	Totals
10	2	398	410

	Cars	Trucks	Heavys	Totals
	33	1	0	34
	165	2	3	170
	198	3	3	

Lyons Creek Rd

N
W E
S

Heavys	Trucks	Cars	Totals
14	0	92	106
2	3	266	271
16	3	358	

Lyons Creek Rd

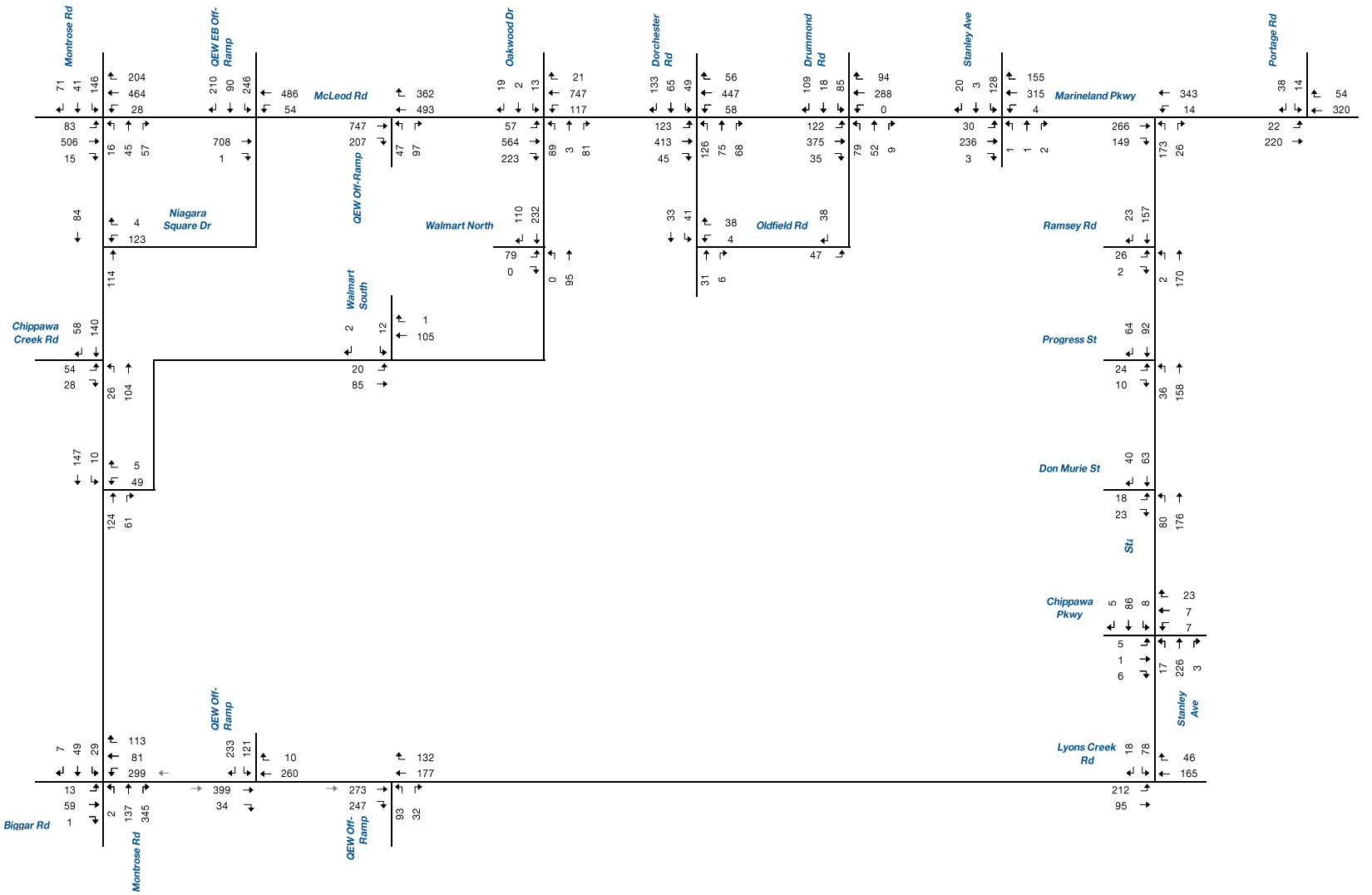
Cars	Trucks	Heavys	Totals
332	6	3	341

Peds Cross: ⧖
West Peds: 0
West Entering: 377
West Leg Total: 787

Comments

TABLE 2.1: TRAFFIC COUNT DATES

Intersection	Summer Weekday		Summer Weekend
	AM	PM	
McLeod Road & Montrose Road	2-Sep-15	2-Sep-15	5-Sep-15
McLeod Road & QEW Off-Ramp / Niagara Square Drive	2-Sep-15	2-Sep-15	29-Aug-15
McLeod Road & QEW Off-Ramp	2-Sep-15	2-Sep-15	29-Aug-15
McLeod Road & Oakwood Drive	Camera Malfunction	2-Sep-15	5-Sep-15
McLeod Road & Dorchester Road	27-Jul-15	27-Jul-15	5-Sep-15
McLeod Road & Drummond Road	29-Jul-15	29-Jul-15	5-Sep-15
Marineland Parkway & Stanley Avenue / Thundering Waters Boulevard	2-Sep-15	2-Sep-15	5-Sep-15
			5-Sep-15
			5-Sep-15
Montrose Road & Niagara Square Drive	3-Sep-15	3-Sep-15	Not Counted
Montrose Road & Chippawa Creek Road	3-Sep-15	3-Sep-15	5-Sep-15
Montrose Road & Oakwood Drive	3-Sep-15	3-Sep-15	5-Sep-15
Montrose Road & Lyons Creek Road / Biggar Road	26-Aug-15	26-Aug-15	5-Sep-15
Lyons Creek Road & QEW Off-Ramp	2-Sep-15	2-Sep-15	29-Aug-15
Lyons Creek Road & QEW Off-Ramp	2-Sep-15	2-Sep-15	29-Aug-15
Lyons Creek Road & Stanley Avenue (North Leg)	3-Sep-15	3-Sep-15	5-Sep-15
Stanley Avenue & Ramsey Road	2-Sep-15	2-Sep-15	5-Sep-15
Stanley Avenue & Progress Street	2-Sep-15	2-Sep-15	5-Sep-15
Stanley Avenue & Don Murie Street	2-Sep-15	2-Sep-15	5-Sep-15
Stanley Avenue & Dorchester Road / Chippawa Parkway	3-Sep-15	3-Sep-15	5-Sep-15
Oakwood Drive & Walmart North Driveway	2-Sep-15	2-Sep-15	5-Sep-15
Oakwood Drive & Walmart South Driveway	2-Sep-15	2-Sep-15	5-Sep-15

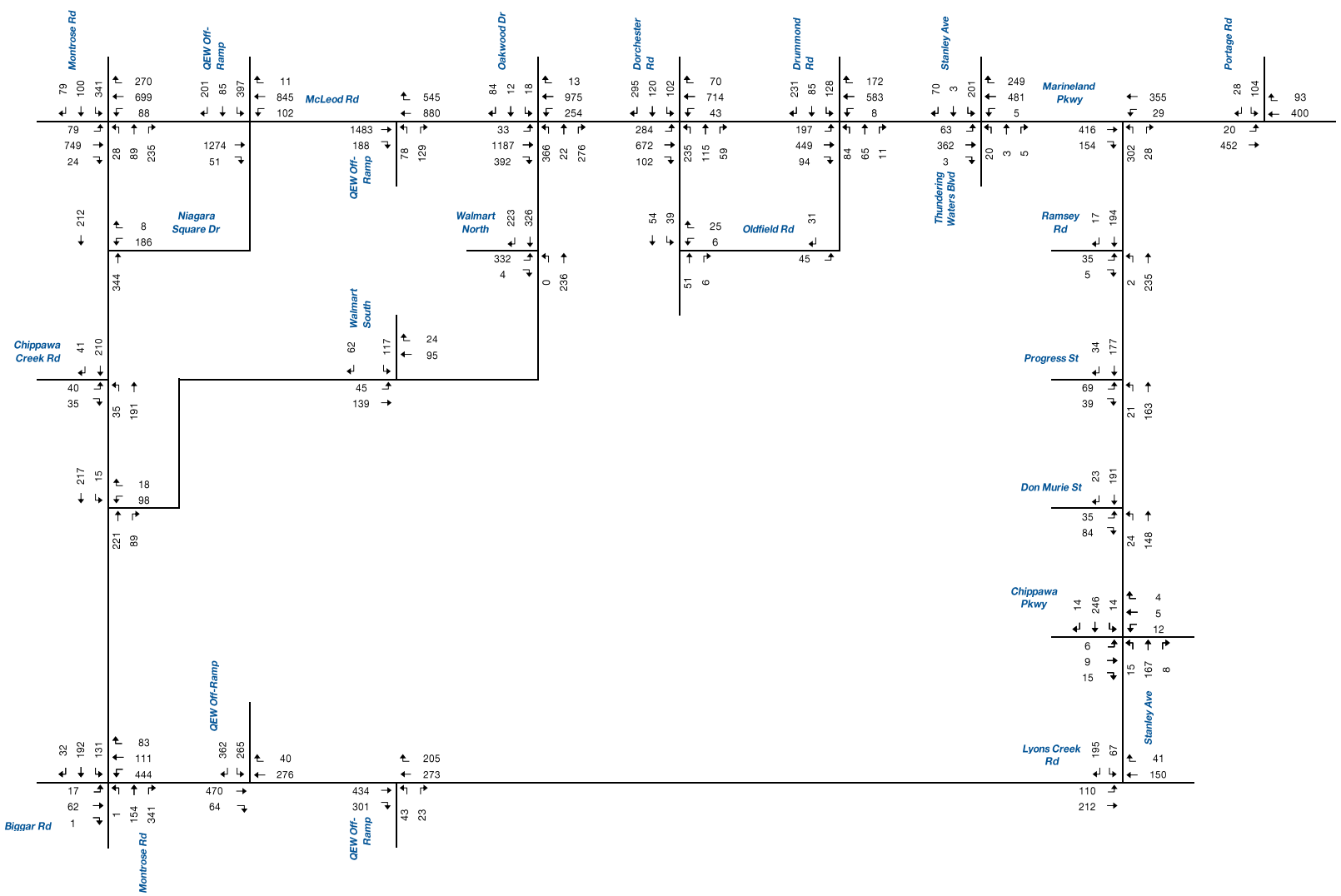


Existing Traffic Volumes (2017)

AM Peak Hour

Riverfront Community Transportation Assessment
151385

Figure 2.2



Existing Traffic Volumes (2017)

PM Peak Hour

Riverfront Community Transportation Assessment
151385

Figure 2.3

Signal Code: 049DRM						
Intersection: RR49 (McLEOD RD.) & DRUMMOND RD.						
Municipality: niagarafalls						
Owner: region						
Last Modified: 12/8/2016 8:55:24 AM						
Timing Parameters	**EBD ADV. McLEOD**	**EBD & WBD McLEOD**	**NBD & SBD DRUMMOND**	**n/a**	**n/a**	**n/a**
Min Green	**6**	**8**	**8**	**0**	**0**	**0**
Walk	**0**	**8**	**10**	**0**	**0**	**0**
Ped Clearance	**0**	**13**	**17**	**0**	**0**	**0**
Vehicle Ext.	**2.5**	**2.5**	**2.5**	**0**	**0**	**0**
Max Green	**14**	**40**	**35**	**0**	**0**	**0**
Yellow	**3**	**4.1**	**4.1**	**0**	**0**	**0**
All Red	**0**	**2**	**2**	**0**	**0**	**0**

		Offset
Minimum Cycle	**28.2**	**0**
Pedestrian Cycle	**60.2**	
Maximum Cycle	**104.2**	**0**
Operation	**FA**	

Installed On:
10/14/2011
Count Date:
7/17/2008

FA = Fully Actuated **SA = Semi Actuated** **FT = Fixed Time**

***Note: you need to change the paper orientation from Portriat to Landscape**

Signal Code: 49E102						
Intersection: RR49(Marineland Pkwy) & RR102(Stanley Ave. E.)						
Municipality: niagarafalls						
Owner: Region						
Last Modified: 5/15/2018 1:05:14 PM						
Timing Parameters	**EBD & WBD THRU MARINELAND PKWY**	**NBD THRU STANLEY AVE.**	**n/a**	**n/a**	**n/a**	**n/a**
Min Green	**10**	**8**	**0**	**0**	**0**	**0**
Walk	**0**	**12**	**0**	**0**	**0**	**0**
Ped Clearance	**0**	**20**	**0**	**0**	**0**	**0**
Vehicle Ext.	**2.9**	**2.8**	**0**	**0**	**0**	**0**
Max Green	**35**	**30**	**0**	**0**	**0**	**0**
Yellow	**4.5**	**4.1**	**0**	**0**	**0**	**0**
All Red	**3**	**2.4**	**0**	**0**	**0**	**0**

		Offset
Minimum Cycle	**32**	**0**
Pedestrian Cycle	**38.5**	
Maximum Cycle	**79**	**0**
Operation	**FA**	

Installed On:
10/19/2010
Count Date:
9/9/2015

FA = Fully Actuated **SA = Semi Actuated** **FT = Fixed Time**

***Note: you need to change the paper orientation from Portriat to Landscape**

Signal Code: 49W102						
Intersection: RR49 (Marineland Pkwy) & RR102 (Stanley Ave. W.)						
Municipality: niagarafalls						
Owner: Region						
Last Modified: 12/10/2013 9:45:41 AM						
Timing Parameters	**EBD ADVANCE MARINELAND PKWY**	**EBD & WBD THRU MARINELAND PKWY**	**NBD THRU THUNDERING WATERS ENT.**	**SBD THRU STANLEY AVE.**	**n/a**	**n/a**
Min Green	**6**	**8**	**8**	**8**	**0**	**0**
Walk	**0**	**12**	**11**	**11**	**0**	**0**
Ped Clearance	**0**	**20**	**19**	**19**	**0**	**0**
Vehicle Ext.	**2.3**	**2.5**	**4**	**4**	**0**	**0**
Max Green	**12**	**35**	**20**	**30**	**0**	**0**
Yellow	**3**	**4.1**	**4.1**	**4.1**	**0**	**0**
All Red	**0**	**2**	**2**	**2**	**0**	**0**

		Offset
Minimum Cycle	28.2	0
Pedestrian Cycle	74.2	
Maximum Cycle	118.3	0
Operation	FA	

Installed On:
8/6/2009
Count Date:
7/24/2013

FA = Fully Actuated **SA = Semi Actuated** **FT = Fixed Time**

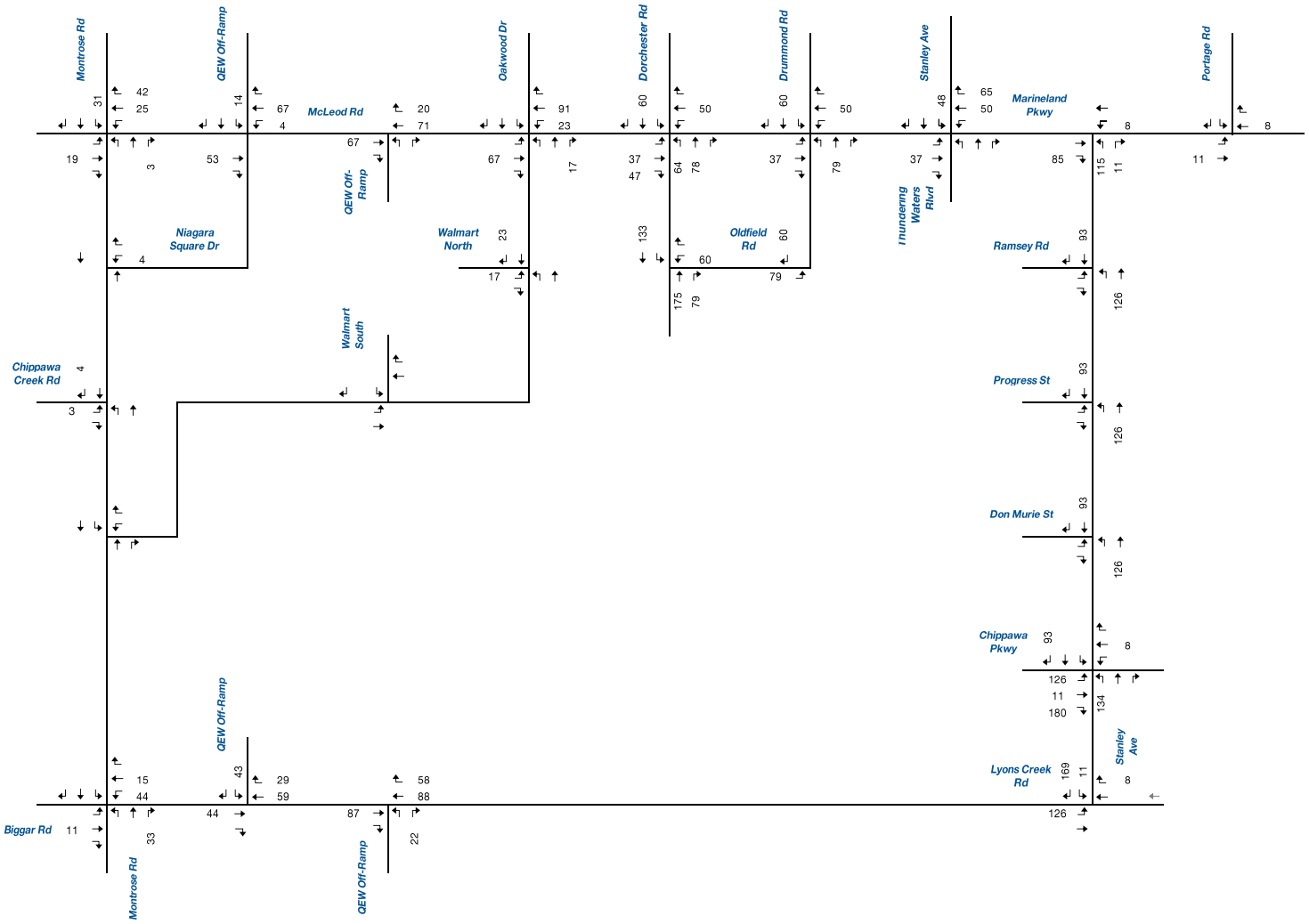
***Note: you need to change the paper orientation from Portriat to Landscape**

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix D

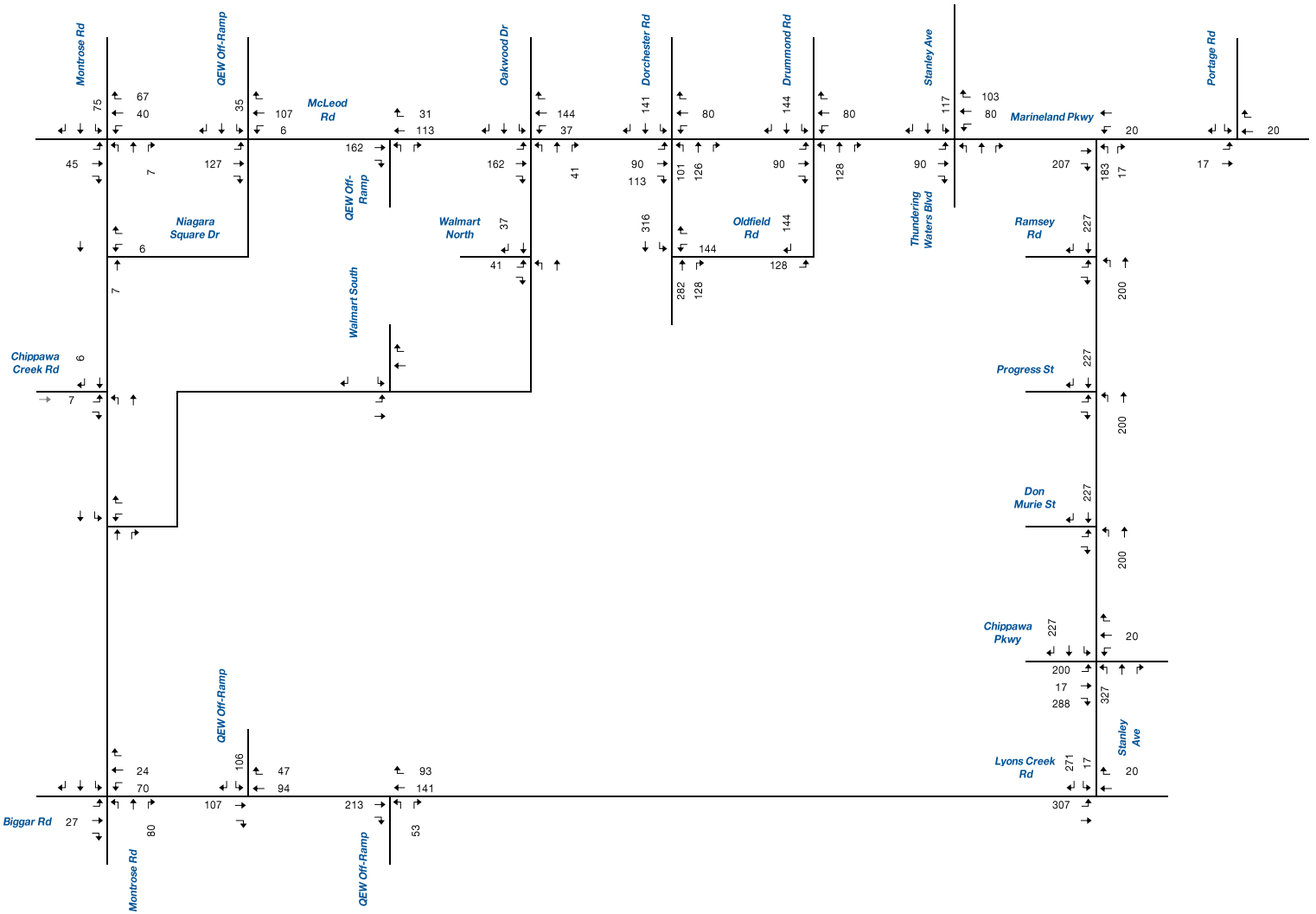
Background Development Site Traffic



Development Generated Traffic Volumes

AM Peak Hour

Figure 3.11

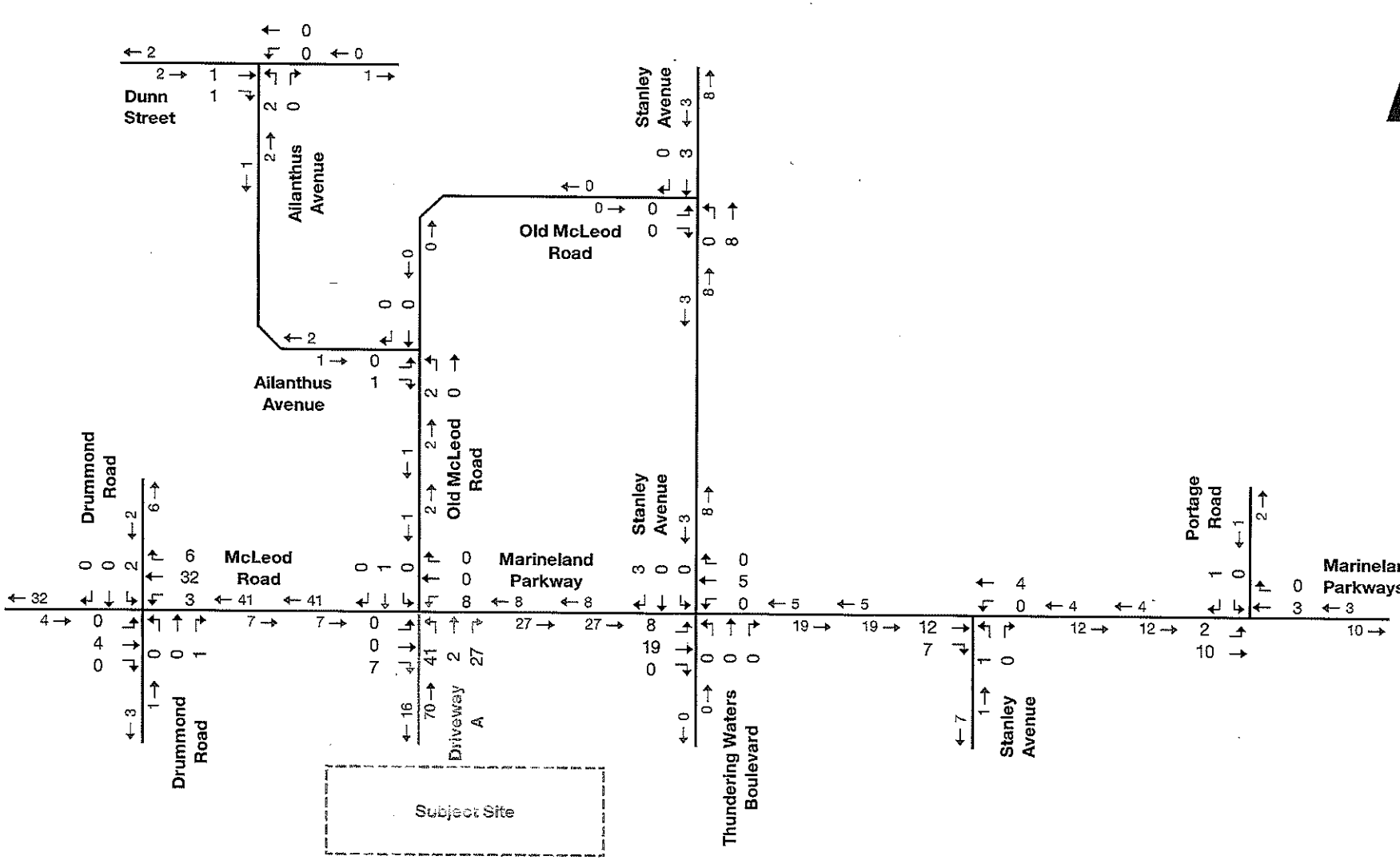


Development Generated Traffic Volumes

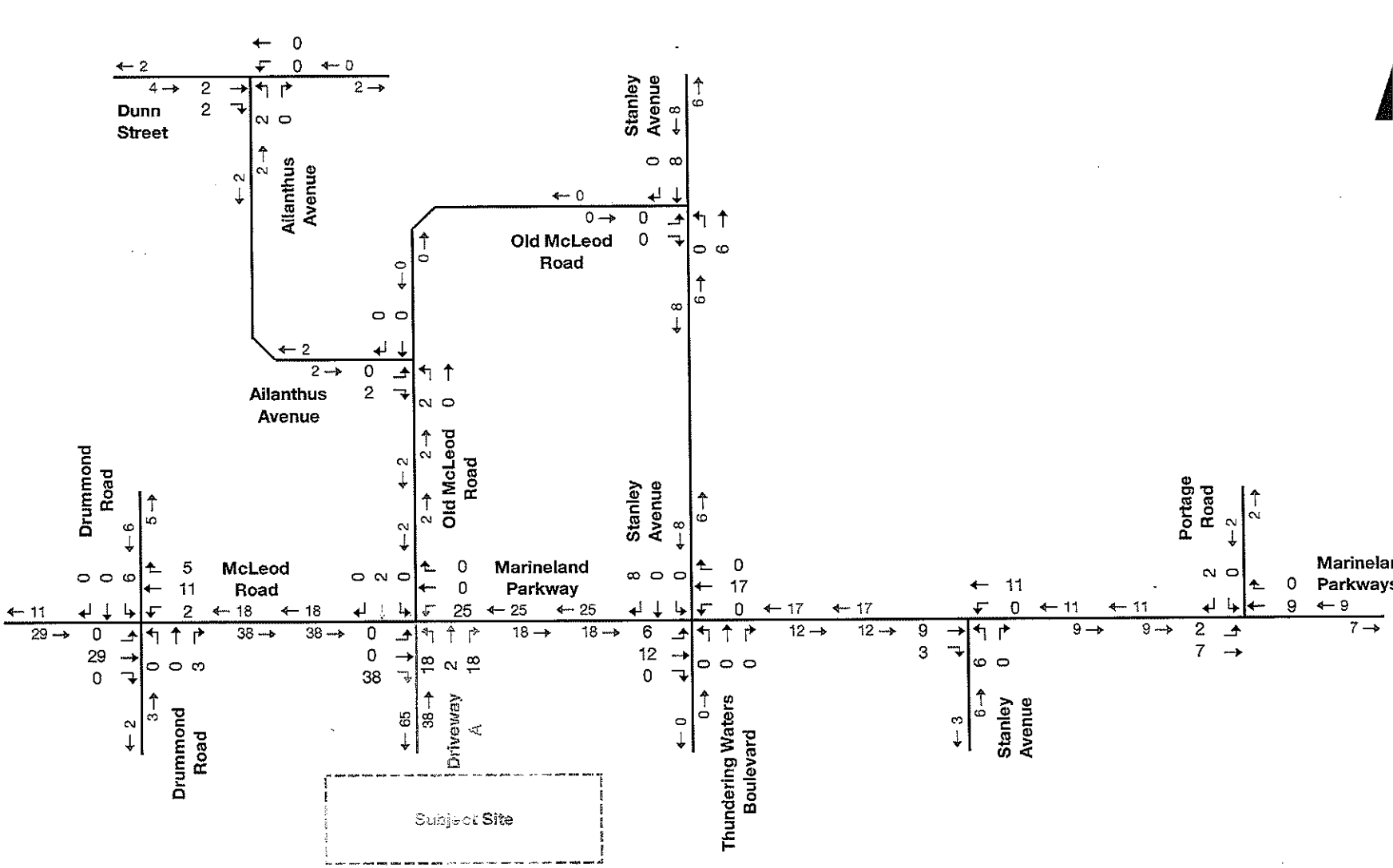
PM Peak Hour

Riverfront Community Transportation Assessment
151385

Figure 3.12



Site Generated AM Peak Hour Traffic Volumes



Site Generated PM Peak Hour Traffic Volumes

Nina's Court on Marineland, Niagara Falls Transportation Impact Study
162630

Figure 3.2B

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix E

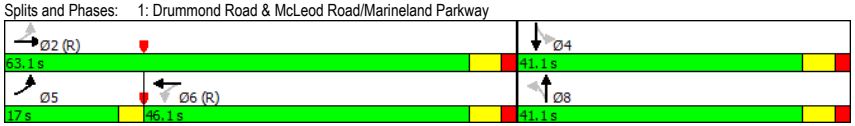
Existing Traffic Operations

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	152	296	10	289	87	83	82	58
Future Volume (vph)	152	296	10	289	87	83	82	58
Lane Group Flow (vph)	0	541	0	461	0	200	90	231
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1
Total Split (s)	17.0	63.1	46.1	46.1	41.1	41.1	41.1	41.1
Total Split (%)	16.3%	60.6%	44.2%	44.2%	39.4%	39.4%	39.4%	39.4%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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
Total Lost Time (s)		6.1		6.1		6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio		0.43		0.27		0.48	0.24	0.36
Control Delay		14.8		11.1		31.4	27.1	12.6
Queue Delay		0.0		0.0		0.0	0.0	0.0
Total Delay		14.8		11.1		31.4	27.1	12.6
Queue Length 50th (m)		31.4		20.7		31.1	13.0	13.5
Queue Length 95th (m)		44.0		29.9		52.7	25.6	32.2
Internal Link Dist (m)		299.5		1002.2		718.1		408.3
Turn Bay Length (m)							20.0	
Base Capacity (vph)		1255		1697		421	381	639
Starvation Cap Reductn		0		0		0	0	0
Spillback Cap Reductn		0		0		0	0	0
Storage Cap Reductn		0		0		0	0	0
Reduced v/c Ratio		0.43		0.27		0.48	0.24	0.36

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 58.1 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	152	296	45	10	289	120	87	83	12	82	58	152
Future Volume (vph)	152	296	45	10	289	120	87	83	12	82	58	152
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			6.1			6.1		6.1	6.1	
Lane Util. Factor		0.95			0.95			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		0.99			0.96			0.99		1.00	0.89	
Flt Protected		0.98			1.00			0.98		0.95	1.00	
Satd. Flow (prot)		3299			3238			1820		1743	1636	
Flt Permitted		0.68			0.94			0.67		0.62	1.00	
Satd. Flow (perm)		2282			3046			1247		1135	1636	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	167	325	49	11	318	132	96	91	13	90	64	167
RTOR Reduction (vph)	0	7	0	0	30	0	0	3	0	0	90	0
Lane Group Flow (vph)	0	534	0	0	431	0	0	197	0	90	141	0
Confl. Peds. (#/hr)	8		2	2		8	3		9	9		3
Heavy Vehicles (%)	8%	6%	9%	40%	6%	5%	2%	1%	8%	4%	5%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		57.0			57.0			35.0		35.0	35.0	
Effective Green, g (s)		57.0			57.0			35.0		35.0	35.0	
Actuated g/C Ratio		0.55			0.55			0.34		0.34	0.34	
Clearance Time (s)		6.1			6.1			6.1		6.1	6.1	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		1248			1666			418		381	549	
v/s Ratio Prot											0.09	
v/s Ratio Perm		c0.23			0.14			c0.16		0.08		
v/c Ratio		0.43			0.26			0.47		0.24	0.26	
Uniform Delay, d1		14.0			12.5			27.3		25.0	25.1	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.2			0.4			3.8		1.5	1.1	
Delay (s)		14.2			12.8			31.1		26.4	26.3	
Level of Service		B			B			C		C	C	
Approach Delay (s)		14.2			12.8			31.1			26.3	
Approach LOS		B			B			C			C	

Intersection Summary

HCM 2000 Control Delay	18.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2
Intersection Capacity Utilization	100.3%	ICU Level of Service	G
Analysis Period (min)	15		

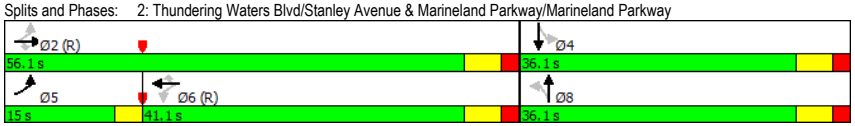
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	33	290	3	318	203	4	7	127	1
Future Volume (vph)	33	290	3	318	203	4	7	127	1
Lane Group Flow (vph)	35	309	3	338	216	4	9	135	22
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		2		6	8		4	
Detector Phase	5	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.1	38.1	38.1	38.1	36.1	36.1	36.1	36.1
Total Split (s)	15.0	56.1	56.1	41.1	41.1	36.1	36.1	36.1	36.1
Total Split (%)	16.3%	60.8%	60.8%	44.6%	44.6%	39.2%	39.2%	39.2%	39.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead			Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	None	None
v/c Ratio	0.06	0.16	0.01	0.21	0.27	0.01	0.01	0.33	0.04
Control Delay	8.8	10.9	0.0	15.3	3.3	21.2	19.2	26.3	9.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.8	10.9	0.0	15.3	3.3	21.2	19.2	26.3	9.7
Queue Length 50th (m)	2.5	13.6	0.0	19.0	0.0	0.5	0.8	18.0	0.1
Queue Length 95th (m)	6.3	20.2	0.0	28.5	12.2	2.8	4.1	33.2	5.1
Internal Link Dist (m)		1002.2		127.7			119.7		189.9
Turn Bay Length (m)	56.0		30.0		50.0	17.0			
Base Capacity (vph)	637	1921	547	1632	804	464	605	412	525
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.05	0.16	0.01	0.21	0.27	0.01	0.01	0.33	0.04

Intersection Summary

Cycle Length: 92.2
Actuated Cycle Length: 92.2
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 2: Thundering Waters Blvd/Stanley Avenue & Marineland Parkway/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	33	290	3	0	318	203	4	7	2	127	1	20
Future Volume (vph)	33	290	3	0	318	203	4	7	2	127	1	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.86	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1722	3544	978		3411	1445	1825	1857		1601	1571	
Flt Permitted	0.51	1.00	1.00		1.00	1.00	0.74	1.00		0.75	1.00	
Satd. Flow (perm)	929	3544	978		3411	1445	1427	1857		1267	1571	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	35	309	3	0	338	216	4	7	2	135	1	21
RTOR Reduction (vph)	0	0	1	0	0	115	0	1	0	0	14	0
Lane Group Flow (vph)	35	309	2	0	338	101	4	8	0	135	8	0
Heavy Vehicles (%)	6%	3%	67%	0%	7%	13%	0%	0%	0%	14%	0%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	50.0	50.0	50.0		42.9	42.9	30.0	30.0		30.0	30.0	
Effective Green, g (s)	50.0	50.0	50.0		42.9	42.9	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.54	0.54	0.54		0.47	0.47	0.33	0.33		0.33	0.33	
Clearance Time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	539	1921	530		1587	672	464	604		412	511	
v/s Ratio Prot	0.00	c0.09			c0.10			0.00			0.00	
v/s Ratio Perm	0.03		0.00			0.07	0.00			c0.11		
v/c Ratio	0.06	0.16	0.00		0.21	0.15	0.01	0.01		0.33	0.02	
Uniform Delay, d1	9.9	10.6	9.7		14.6	14.2	21.0	21.1		23.5	21.1	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.2	0.0		0.3	0.5	0.0	0.0		0.5	0.0	
Delay (s)	10.0	10.8	9.7		14.9	14.6	21.1	21.1		24.0	21.1	
Level of Service	A	B	A		B	B	C	C		C	C	
Approach Delay (s)		10.7			14.8			21.1			23.6	
Approach LOS		B			B			C			C	

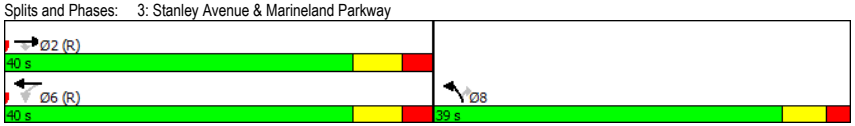
Intersection Summary

HCM 2000 Control Delay	14.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.26			
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	15.2	
Intersection Capacity Utilization	41.1%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	269	150	14	346	175	26
Future Volume (vph)	269	150	14	346	175	26
Lane Group Flow (vph)	292	163	15	376	190	28
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	6	6	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	8.0	8.0
Minimum Split (s)	25.5	25.5	25.5	25.5	38.5	38.5
Total Split (s)	40.0	40.0	40.0	40.0	39.0	39.0
Total Split (%)	50.6%	50.6%	50.6%	50.6%	49.4%	49.4%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.1	4.1
All-Red Time (s)	3.0	3.0	3.0	3.0	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.21	0.23	0.04	0.27	0.15	0.04
Control Delay	15.5	3.5	14.4	16.0	15.0	5.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.5	3.5	14.4	16.0	15.0	5.9
Queue Length 50th (m)	14.3	0.0	1.3	19.0	8.9	0.0
Queue Length 95th (m)	22.3	10.4	4.7	28.3	15.1	4.4
Internal Link Dist (m)	100.3			324.3	152.7	
Turn Bay Length (m)		33.0	29.0		140.0	32.0
Base Capacity (vph)	1403	712	397	1403	1255	662
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.21	0.23	0.04	0.27	0.15	0.04

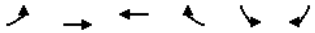
Intersection Summary
Cycle Length: 79
Actuated Cycle Length: 79
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 3: Stanley Avenue & Marineland Parkway



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	269	150	14	346	175	26
Future Volume (vph)	269	150	14	346	175	26
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3411	1498	1601	3411	3052	1570
Flt Permitted	1.00	1.00	0.57	1.00	0.95	1.00
Satd. Flow (perm)	3411	1498	966	3411	3052	1570
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	292	163	15	376	190	28
RTOR Reduction (vph)	0	96	0	0	0	16
Lane Group Flow (vph)	292	67	15	376	190	12
Heavy Vehicles (%)	7%	9%	14%	7%	16%	4%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1403	616	397	1403	1255	645
v/s Ratio Prot	0.09			c0.11	c0.06	
v/s Ratio Perm		0.04	0.02			0.01
v/c Ratio	0.21	0.11	0.04	0.27	0.15	0.02
Uniform Delay, d1	15.0	14.3	13.9	15.4	14.6	13.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.3	0.4	0.2	0.5	0.3	0.1
Delay (s)	15.3	14.7	14.1	15.8	14.8	13.8
Level of Service	B	B	B	B	B	B
Approach Delay (s)	15.1			15.8	14.7	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	15.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.21		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	27	268	323	58	14	38
Future Volume (Veh/h)	27	268	323	58	14	38
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	29	291	351	63	15	41
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		348				
pX, platoon unblocked						
vC, conflicting volume	351				554	176
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	351				554	176
tC, single (s)	4.4				6.9	7.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	97				97	95
cM capacity (veh/h)	1123				443	801

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	126	194	176	176	63	15	41
Volume Left	29	0	0	0	0	15	0
Volume Right	0	0	0	0	63	0	41
cSH	1123	1700	1700	1700	1700	443	801
Volume to Capacity	0.03	0.11	0.10	0.10	0.04	0.03	0.05
Queue Length 95th (m)	0.6	0.0	0.0	0.0	0.0	0.8	1.2
Control Delay (s)	2.1	0.0	0.0	0.0	0.0	13.4	9.7
Lane LOS	A					B	A
Approach Delay (s)	0.8		0.0			10.7	
Approach LOS						B	

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	30.5%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	16	1	1	172	144	10
Future Volume (Veh/h)	16	1	1	172	144	10
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	22	1	1	236	197	14
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	442	204	211			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	442	204	211			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	96	100	100			
cM capacity (veh/h)	552	842	1372			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	23	237	211
Volume Left	22	1	0
Volume Right	1	0	14
cSH	561	1372	1700
Volume to Capacity	0.04	0.00	0.12
Queue Length 95th (m)	1.0	0.0	0.0
Control Delay (s)	11.7	0.0	0.0
Lane LOS	B	A	
Approach Delay (s)	11.7	0.0	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	19.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	15	31	157	87	55
Future Volume (Veh/h)	31	15	31	157	87	55
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	40	19	40	201	112	71
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	428	148	183			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	428	148	183			
tC, single (s)	6.7	6.6	4.2			
tC, 2 stage (s)						
tF (s)	3.7	3.7	2.3			
p0 queue free %	92	98	97			
cM capacity (veh/h)	525	808	1368			

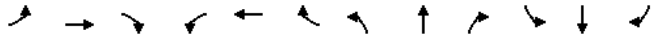
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	59	241	183
Volume Left	40	40	0
Volume Right	19	0	71
cSH	592	1368	1700
Volume to Capacity	0.10	0.03	0.11
Queue Length 95th (m)	2.5	0.7	0.0
Control Delay (s)	11.8	1.5	0.0
Lane LOS	B	A	
Approach Delay (s)	11.8	1.5	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.2		
Intersection Capacity Utilization	31.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	10	28	66	185	53	40
Future Volume (Veh/h)	10	28	66	185	53	40
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	14	40	94	264	76	57
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	556	104	133			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	556	104	133			
tC, single (s)	6.5	6.5	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.6	2.3			
p0 queue free %	97	95	93			
cM capacity (veh/h)	447	874	1427			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	54	358	133
Volume Left	14	94	0
Volume Right	40	0	57
cSH	701	1427	1700
Volume to Capacity	0.08	0.07	0.08
Queue Length 95th (m)	1.9	1.6	0.0
Control Delay (s)	10.6	2.5	0.0
Lane LOS	B	A	
Approach Delay (s)	10.6	2.5	0.0
Approach LOS	B		

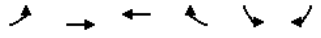
Intersection Summary			
Average Delay	2.7		
Intersection Capacity Utilization	30.1%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	1	8	15	5	11	9	222	4	6	72	6
Future Volume (Veh/h)	9	1	8	15	5	11	9	222	4	6	72	6
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	11	1	10	18	6	13	11	264	5	7	86	7
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	408	394	90	402	396	266	93			269		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	408	394	90	402	396	266	93			269		
tC, single (s)	7.2	6.5	6.5	7.1	6.5	6.2	4.4			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.5	3.5	4.0	3.3	2.5			2.2		
p0 queue free %	98	100	99	97	99	98	99			99		
cM capacity (veh/h)	519	538	909	549	537	777	1328			1306		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	22	37	280	100
Volume Left	11	18	11	7
Volume Right	10	13	5	7
cSH	646	610	1328	1306
Volume to Capacity	0.03	0.06	0.01	0.01
Queue Length 95th (m)	0.8	1.5	0.2	0.1
Control Delay (s)	10.8	11.3	0.4	0.6
Lane LOS	B	B	A	A
Approach Delay (s)	10.8	11.3	0.4	0.6
Approach LOS	B	B		

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	24.3%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	185	107	225	48	19	76
Future Volume (Veh/h)	185	107	225	48	19	76
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	199	115	242	52	20	82
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	294				781	268
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	294				781	268
tC, single (s)	4.2				6.7	6.4
tC, 2 stage (s)						
tF (s)	2.3				3.8	3.5
p0 queue free %	84				93	89
cM capacity (veh/h)	1245				273	729

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	199	115	294	20	82
Volume Left	199	0	0	20	0
Volume Right	0	0	52	0	82
cSH	1245	1700	1700	273	729
Volume to Capacity	0.16	0.07	0.17	0.07	0.11
Queue Length 95th (m)	4.3	0.0	0.0	1.8	2.9
Control Delay (s)	8.4	0.0	0.0	19.3	10.6
Lane LOS	A			C	B
Approach Delay (s)	5.3		0.0	12.3	
Approach LOS				B	

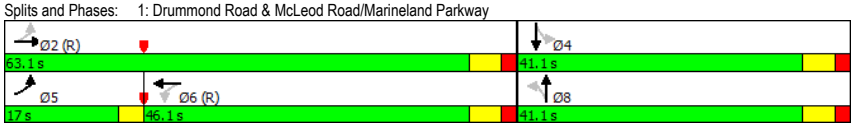
Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	38.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	229	334	10	443	67	77	115	89
Future Volume (vph)	229	334	10	443	67	77	115	89
Lane Group Flow (vph)	0	684	0	596	0	174	122	342
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1
Total Split (s)	17.0	63.1	46.1	46.1	41.1	41.1	41.1	41.1
Total Split (%)	16.3%	60.6%	44.2%	44.2%	39.4%	39.4%	39.4%	39.4%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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
Total Lost Time (s)		6.1		6.1		6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio		0.58		0.33		0.47	0.30	0.53
Control Delay		17.5		12.9		31.1	28.1	19.8
Queue Delay		0.0		0.0		0.0	0.0	0.0
Total Delay		17.5		12.9		31.1	28.1	19.8
Queue Length 50th (m)		44.2		31.4		26.4	18.1	32.7
Queue Length 95th (m)		61.7		42.3		46.9	33.2	59.8
Internal Link Dist (m)		299.5		1002.2		715.1		408.3
Turn Bay Length (m)							20.0	
Base Capacity (vph)		1177		1792		373	405	648
Starvation Cap Reductn		0		0		0	0	0
Spillback Cap Reductn		0		0		0	0	0
Storage Cap Reductn		0		0		0	0	0
Reduced v/c Ratio		0.58		0.33		0.47	0.30	0.53

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 58.1 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	229	334	80	10	443	107	67	77	20	115	89	232
Future Volume (vph)	229	334	80	10	443	107	67	77	20	115	89	232
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			6.1			6.1		6.1	6.1	
Lane Util. Factor		0.95			0.95			1.00		1.00	1.00	
Frpb, ped/bikes		0.99			0.99			1.00		1.00	0.98	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		0.98			0.97			0.98		1.00	0.89	
Flt Protected		0.98			1.00			0.98		0.95	1.00	
Satd. Flow (prot)		3401			3455			1811		1801	1663	
Flt Permitted		0.62			0.94			0.59		0.64	1.00	
Satd. Flow (perm)		2131			3250			1098		1206	1663	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	244	355	85	11	471	114	71	82	21	122	95	247
RTOR Reduction (vph)	0	11	0	0	14	0	0	5	0	0	90	0
Lane Group Flow (vph)	0	673	0	0	582	0	0	169	0	122	252	0
Confl. Peds. (#/hr)	11		9	9		11	8		16	16		8
Heavy Vehicles (%)	1%	4%	1%	0%	2%	0%	0%	1%	10%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		57.0			57.0			35.0		35.0	35.0	
Effective Green, g (s)		57.0			57.0			35.0		35.0	35.0	
Actuated g/C Ratio		0.55			0.55			0.34		0.34	0.34	
Clearance Time (s)		6.1			6.1			6.1		6.1	6.1	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		1165			1777			368		405	558	
v/s Ratio Prot											0.15	
v/s Ratio Perm		c0.32			0.18			c0.15		0.10		
v/c Ratio		0.58			0.33			0.46		0.30	0.45	
Uniform Delay, d1		15.6			13.0			27.2		25.6	27.1	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.7			0.5			4.1		1.9	2.6	
Delay (s)		16.3			13.5			31.3		27.5	29.7	
Level of Service		B			B			C		C	C	
Approach Delay (s)		16.3			13.5			31.3			29.1	
Approach LOS		B			B			C			C	

Intersection Summary

HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.55		
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2
Intersection Capacity Utilization	101.4%	ICU Level of Service	G
Analysis Period (min)	15		

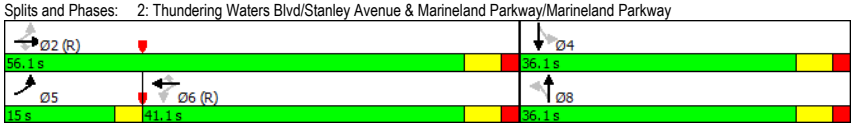
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	39	388	5	524	181	6	6	211	11
Future Volume (vph)	39	388	5	524	181	6	6	211	11
Lane Group Flow (vph)	41	404	5	546	189	6	10	220	70
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		2		6	8		4	
Detector Phase	5	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.1	38.1	38.1	38.1	36.1	36.1	36.1	36.1
Total Split (s)	15.0	56.1	56.1	41.1	41.1	36.1	36.1	36.1	36.1
Total Split (%)	16.3%	60.8%	60.8%	44.6%	44.6%	39.2%	39.2%	39.2%	39.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead			Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	None	None
v/c Ratio	0.08	0.21	0.01	0.32	0.22	0.02	0.02	0.50	0.12
Control Delay	8.9	11.3	0.0	16.4	3.2	21.3	17.4	29.9	8.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.9	11.3	0.0	16.4	3.2	21.3	17.4	29.9	8.4
Queue Length 50th (m)	3.0	18.3	0.0	32.6	0.0	0.7	0.7	31.2	1.3
Queue Length 95th (m)	7.1	26.2	0.0	45.8	11.4	3.4	4.2	52.9	10.1
Internal Link Dist (m)		1002.2		87.3			119.7		189.9
Turn Bay Length (m)	56.0		30.0		50.0	17.0			
Base Capacity (vph)	552	1903	755	1708	870	379	590	438	563
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.21	0.01	0.32	0.22	0.02	0.02	0.50	0.12

Intersection Summary

Cycle Length: 92.2
Actuated Cycle Length: 92.2
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 2: Thundering Waters Blvd/Stanley Avenue & Marineland Parkway/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	39	388	5	0	524	181	6	6	4	211	11	57
Future Volume (vph)	39	388	5	0	524	181	6	6	4	211	11	57
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.94		1.00	0.87	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	3510	1361		3579	1617	1560	1806		1706	1610	
Flt Permitted	0.39	1.00	1.00		1.00	1.00	0.71	1.00		0.75	1.00	
Satd. Flow (perm)	721	3510	1361		3579	1617	1168	1806		1349	1610	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	41	404	5	0	546	189	6	6	4	220	11	59
RTOR Reduction (vph)	0	0	2	0	0	101	0	3	0	0	40	0
Lane Group Flow (vph)	41	404	3	0	546	88	6	7	0	220	30	0
Heavy Vehicles (%)	3%	4%	20%	0%	2%	1%	17%	0%	0%	7%	0%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	50.0	50.0	50.0		42.8	42.8	30.0	30.0		30.0	30.0	
Effective Green, g (s)	50.0	50.0	50.0		42.8	42.8	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.54	0.54	0.54		0.46	0.46	0.33	0.33		0.33	0.33	
Clearance Time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	438	1903	738		1661	750	380	587		438	523	
v/s Ratio Prot	0.00	c0.12			c0.15			0.00			0.02	
v/s Ratio Perm	0.05		0.00			0.05	0.01			c0.16		
v/c Ratio	0.09	0.21	0.00		0.33	0.12	0.02	0.01		0.50	0.06	
Uniform Delay, d1	10.1	10.9	9.7		15.6	14.0	21.1	21.1		25.1	21.4	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.3	0.0		0.5	0.3	0.1	0.0		0.9	0.0	
Delay (s)	10.2	11.2	9.7		16.1	14.3	21.2	21.1		26.0	21.4	
Level of Service	B	B	A		B	B	C	C		C	C	
Approach Delay (s)		11.1			15.7			21.1			24.9	
Approach LOS		B			B			C			C	

Intersection Summary

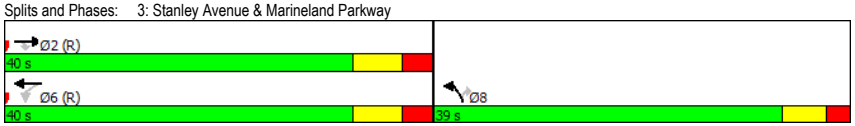
HCM 2000 Control Delay	16.1	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.39				
Actuated Cycle Length (s)	92.2	Sum of lost time (s)		15.2	
Intersection Capacity Utilization	50.5%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	447	156	32	400	305	30
Future Volume (vph)	447	156	32	400	305	30
Lane Group Flow (vph)	486	170	35	435	332	33
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	6	6	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	8.0	8.0
Minimum Split (s)	22.5	22.5	22.5	22.5	38.5	38.5
Total Split (s)	40.0	40.0	40.0	40.0	39.0	39.0
Total Split (%)	50.6%	50.6%	50.6%	50.6%	49.4%	49.4%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.1	4.1
All-Red Time (s)	3.0	3.0	3.0	3.0	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.34	0.24	0.11	0.30	0.24	0.05
Control Delay	16.8	3.6	15.6	16.4	15.8	5.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.8	3.6	15.6	16.4	15.8	5.5
Queue Length 50th (m)	25.4	0.0	3.2	22.4	16.2	0.0
Queue Length 95th (m)	36.5	10.6	8.8	32.6	24.8	4.8
Internal Link Dist (m)	155.5			318.1	148.8	
Turn Bay Length (m)		33.0	29.0		140.0	32.0
Base Capacity (vph)	1416	694	315	1430	1361	691
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.34	0.24	0.11	0.30	0.24	0.05

Intersection Summary

Cycle Length: 79
Actuated Cycle Length: 79
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 3: Stanley Avenue & Marineland Parkway

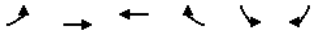


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	447	156	32	400	305	30
Future Volume (vph)	447	156	32	400	305	30
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3444	1445	1547	3476	3309	1633
Flt Permitted	1.00	1.00	0.47	1.00	0.95	1.00
Satd. Flow (perm)	3444	1445	769	3476	3309	1633
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	486	170	35	435	332	33
RTOR Reduction (vph)	0	100	0	0	0	19
Lane Group Flow (vph)	486	70	35	435	332	14
Heavy Vehicles (%)	6%	13%	18%	5%	7%	0%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1416	594	316	1430	1361	671
v/s Ratio Prot	c0.14			0.13	c0.10	
v/s Ratio Perm		0.05	0.05			0.01
v/c Ratio	0.34	0.12	0.11	0.30	0.24	0.02
Uniform Delay, d1	15.9	14.4	14.3	15.6	15.2	13.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.4	0.7	0.5	0.4	0.1
Delay (s)	16.6	14.8	15.0	16.2	15.6	13.9
Level of Service	B	B	B	B	B	B
Approach Delay (s)	16.1			16.1	15.5	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	16.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.29		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	47.0%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	20	457	404	94	105	28
Future Volume (Veh/h)	20	457	404	94	105	28
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	22	497	439	102	114	30
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		342				
pX, platoon unblocked					0.96	
vC, conflicting volume	439				732	220
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	439				643	220
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				70	96
cM capacity (veh/h)	1117				383	785

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	188	331	220	220	102	114	30
Volume Left	22	0	0	0	0	114	0
Volume Right	0	0	0	0	102	0	30
cSH	1117	1700	1700	1700	1700	383	785
Volume to Capacity	0.02	0.19	0.13	0.13	0.06	0.30	0.04
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0	9.3	0.9
Control Delay (s)	1.1	0.0	0.0	0.0	0.0	18.3	9.8
Lane LOS	A					C	A
Approach Delay (s)	0.4		0.0			16.5	
Approach LOS						C	

Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	39.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	19	3	2	191	179	22
Future Volume (Veh/h)	19	3	2	191	179	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	24	4	3	242	227	28
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	489	241	255			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	489	241	255			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	96	100	100			
cM capacity (veh/h)	541	803	1322			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	28	245	255
Volume Left	24	3	0
Volume Right	4	0	28
cSH	567	1322	1700
Volume to Capacity	0.05	0.00	0.15
Queue Length 95th (m)	1.2	0.1	0.0
Control Delay (s)	11.7	0.1	0.0
Lane LOS	B	A	
Approach Delay (s)	11.7	0.1	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	0.7			
Intersection Capacity Utilization	21.6%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	59	39	4	127	166	19
Future Volume (Veh/h)	59	39	4	127	166	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	78	51	5	167	218	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	408	230	243			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	408	230	243			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	87	94	100			
cM capacity (veh/h)	597	814	1200			

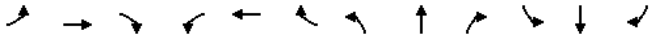
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	129	172	243
Volume Left	78	5	0
Volume Right	51	0	25
cSH	667	1200	1700
Volume to Capacity	0.19	0.00	0.14
Queue Length 95th (m)	5.4	0.1	0.0
Control Delay (s)	11.7	0.3	0.0
Lane LOS	B	A	
Approach Delay (s)	11.7	0.3	0.0
Approach LOS	B		

Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	22.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	38	96	32	90	201	5
Future Volume (Veh/h)	38	96	32	90	201	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	51	130	43	122	272	7
Pedestrians					2	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	486	276	279			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	486	276	279			
tC, single (s)	6.4	6.2	4.5			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.6			
p0 queue free %	90	83	96			
cM capacity (veh/h)	516	758	1077			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	181	165	279
Volume Left	51	43	0
Volume Right	130	0	7
cSH	670	1077	1700
Volume to Capacity	0.27	0.04	0.16
Queue Length 95th (m)	8.3	0.9	0.0
Control Delay (s)	12.4	2.5	0.0
Lane LOS	B	A	
Approach Delay (s)	12.4	2.5	0.0
Approach LOS	B		

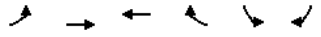
Intersection Summary			
Average Delay	4.2		
Intersection Capacity Utilization	35.4%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	9	2	34	6	4	2	17	110	14	14	271	12
Future Volume (Veh/h)	9	2	34	6	4	2	17	110	14	14	271	12
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	12	3	44	8	5	3	22	141	18	18	347	15
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	590	594	354	630	592	150	362			159		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	590	594	354	630	592	150	362			159		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	97	99	94	98	99	100	98			99		
cM capacity (veh/h)	407	408	687	361	409	902	1208			1390		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	59	16	181	380
Volume Left	12	8	22	18
Volume Right	44	3	18	15
cSH	585	424	1208	1390
Volume to Capacity	0.10	0.04	0.02	0.01
Queue Length 95th (m)	2.5	0.9	0.4	0.3
Control Delay (s)	11.8	13.8	1.1	0.5
Lane LOS	B	B	A	A
Approach Delay (s)	11.8	13.8	1.1	0.5
Approach LOS	B	B		

Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	27.6%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	106	271	170	34	70	240
Future Volume (Veh/h)	106	271	170	34	70	240
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	126	323	202	40	83	286
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	242				797	222
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	242				797	222
tC, single (s)	4.2				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.3
p0 queue free %	90				74	65
cM capacity (veh/h)	1263				315	815

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	126	323	242	83	286
Volume Left	126	0	0	83	0
Volume Right	0	0	40	0	286
cSH	1263	1700	1700	315	815
Volume to Capacity	0.10	0.19	0.14	0.26	0.35
Queue Length 95th (m)	2.5	0.0	0.0	7.9	12.0
Control Delay (s)	8.2	0.0	0.0	20.5	11.8
Lane LOS	A			C	B
Approach Delay (s)	2.3		0.0	13.7	
Approach LOS				B	

Intersection Summary				
Average Delay	5.8			
Intersection Capacity Utilization	32.5%	ICU Level of Service	A	
Analysis Period (min)	15			

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix F

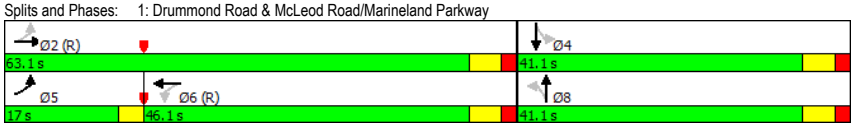
Background 2026 Traffic Operations

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	158	349	13	383	91	165	87	120
Future Volume (vph)	158	349	13	383	91	165	87	120
Lane Group Flow (vph)	0	610	0	579	0	295	96	306
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1
Total Split (s)	17.0	63.1	46.1	46.1	41.1	41.1	41.1	41.1
Total Split (%)	16.3%	60.6%	44.2%	44.2%	39.4%	39.4%	39.4%	39.4%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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
Total Lost Time (s)		6.1		6.1		6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio		0.51		0.34		0.77	0.30	0.50
Control Delay		16.3		12.6		46.4	28.7	24.4
Queue Delay		0.0		0.0		0.0	0.0	0.0
Total Delay		16.3		12.6		46.4	28.7	24.4
Queue Length 50th (m)		37.7		29.4		52.7	14.3	37.6
Queue Length 95th (m)		52.8		40.5		#94.7	28.0	63.2
Internal Link Dist (m)		299.5		1002.2		718.1		408.3
Turn Bay Length (m)							20.0	
Base Capacity (vph)		1193		1692		381	322	609
Starvation Cap Reductn		0		0		0	0	0
Spillback Cap Reductn		0		0		0	0	0
Storage Cap Reductn		0		0		0	0	0
Reduced v/c Ratio		0.51		0.34		0.77	0.30	0.50

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 58.1 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	349	47	13	383	131	91	165	13	87	120	158
Future Volume (vph)	158	349	47	13	383	131	91	165	13	87	120	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			6.1			6.1		6.1	6.1	
Lane Util. Factor		0.95			0.95			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		0.99			0.96			0.99		1.00	0.91	
Flt Protected		0.99			1.00			0.98		0.95	1.00	
Satd. Flow (prot)		3311			3261			1843		1745	1677	
Flt Permitted		0.65			0.94			0.60		0.52	1.00	
Satd. Flow (perm)		2170			3053			1130		959	1677	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	174	384	52	14	421	144	100	181	14	96	132	174
RTOR Reduction (vph)	0	7	0	0	23	0	0	2	0	0	46	0
Lane Group Flow (vph)	0	603	0	0	556	0	0	293	0	96	260	0
Confl. Peds. (#/hr)	8		2	2		8	3		9	9		3
Heavy Vehicles (%)	8%	6%	9%	40%	6%	5%	2%	1%	8%	4%	5%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		57.0			57.0			35.0		35.0	35.0	
Effective Green, g (s)		57.0			57.0			35.0		35.0	35.0	
Actuated g/C Ratio		0.55			0.55			0.34		0.34	0.34	
Clearance Time (s)		6.1			6.1			6.1		6.1	6.1	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		1187			1670			379		322	563	
v/s Ratio Prot											0.16	
v/s Ratio Perm		c0.28			0.18			c0.26		0.10		
v/c Ratio		0.51			0.33			0.77		0.30	0.46	
Uniform Delay, d1		14.8			13.1			31.0		25.5	27.2	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.3			0.5			14.2		2.4	2.7	
Delay (s)		15.2			13.6			45.2		27.9	29.9	
Level of Service		B			B			D		C	C	
Approach Delay (s)		15.2			13.6			45.2			29.4	
Approach LOS		B			B			D			C	

Intersection Summary

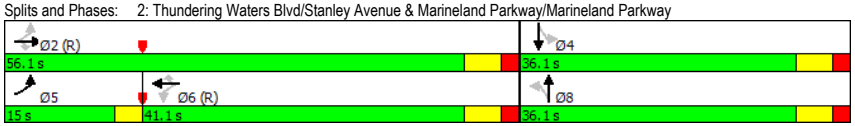
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.63		
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2
Intersection Capacity Utilization	100.3%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	42	358	3	386	276	4	7	180	1
Future Volume (vph)	42	358	3	386	276	4	7	180	1
Lane Group Flow (vph)	45	381	3	411	294	4	9	191	27
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		2		6	8		4	
Detector Phase	5	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.1	38.1	38.1	38.1	36.1	36.1	36.1	36.1
Total Split (s)	15.0	56.1	56.1	41.1	41.1	36.1	36.1	36.1	36.1
Total Split (%)	16.3%	60.8%	60.8%	44.6%	44.6%	39.2%	39.2%	39.2%	39.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead			Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	None	None
v/c Ratio	0.08	0.20	0.01	0.25	0.35	0.01	0.01	0.46	0.05
Control Delay	8.9	11.2	0.0	15.8	3.3	21.2	19.2	29.2	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	8.9	11.2	0.0	15.8	3.3	21.2	19.2	29.2	9.0
Queue Length 50th (m)	3.2	17.1	0.0	23.7	0.0	0.5	0.8	26.7	0.1
Queue Length 95th (m)	7.7	24.7	0.0	34.7	14.1	2.8	4.1	46.7	5.6
Internal Link Dist (m)		1002.2		127.7			119.7		189.9
Turn Bay Length (m)	56.0		30.0		50.0	17.0			
Base Capacity (vph)	603	1921	547	1625	842	462	605	412	528
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.07	0.20	0.01	0.25	0.35	0.01	0.01	0.46	0.05

Intersection Summary
Cycle Length: 92.2
Actuated Cycle Length: 92.2
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 2: Thundering Waters Blvd/Stanley Avenue & Marineland Parkway/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	42	358	3	0	386	276	4	7	2	180	1	24
Future Volume (vph)	42	358	3	0	386	276	4	7	2	180	1	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.86	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1722	3544	978		3411	1445	1825	1857		1601	1568	
Flt Permitted	0.47	1.00	1.00		1.00	1.00	0.74	1.00		0.75	1.00	
Satd. Flow (perm)	852	3544	978		3411	1445	1421	1857		1267	1568	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	45	381	3	0	411	294	4	7	2	191	1	26
RTOR Reduction (vph)	0	0	1	0	0	158	0	1	0	0	18	0
Lane Group Flow (vph)	45	381	2	0	411	136	4	8	0	191	9	0
Heavy Vehicles (%)	6%	3%	67%	0%	7%	13%	0%	0%	0%	14%	0%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	50.0	50.0	50.0		42.7	42.7	30.0	30.0		30.0	30.0	
Effective Green, g (s)	50.0	50.0	50.0		42.7	42.7	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.54	0.54	0.54		0.46	0.46	0.33	0.33		0.33	0.33	
Clearance Time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	502	1921	530		1579	669	462	604		412	510	
v/s Ratio Prot	0.00	c0.11			c0.12			0.00			0.01	
v/s Ratio Perm	0.04		0.00			0.09	0.00			c0.15		
v/c Ratio	0.09	0.20	0.00		0.26	0.20	0.01	0.01		0.46	0.02	
Uniform Delay, d1	10.0	10.8	9.7		15.1	14.7	21.0	21.1		24.7	21.1	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.2	0.0		0.4	0.7	0.0	0.0		0.8	0.0	
Delay (s)	10.1	11.1	9.7		15.5	15.4	21.1	21.1		25.5	21.1	
Level of Service	B	B	A		B	B	C	C		C	C	
Approach Delay (s)		10.9			15.4			21.1			25.0	
Approach LOS		B			B			C			C	

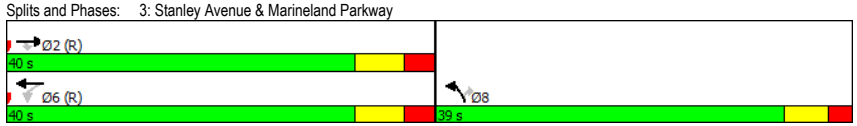
Intersection Summary					
HCM 2000 Control Delay	15.6	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.34				
Actuated Cycle Length (s)	92.2	Sum of lost time (s)		15.2	
Intersection Capacity Utilization	46.0%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	292	248	23	364	298	38
Future Volume (vph)	292	248	23	364	298	38
Lane Group Flow (vph)	317	270	25	396	324	41
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	6	6	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	8.0	8.0
Minimum Split (s)	25.5	25.5	25.5	25.5	38.5	38.5
Total Split (s)	40.0	40.0	40.0	40.0	39.0	39.0
Total Split (%)	50.6%	50.6%	50.6%	50.6%	49.4%	49.4%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.1	4.1
All-Red Time (s)	3.0	3.0	3.0	3.0	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.23	0.35	0.06	0.28	0.26	0.06
Control Delay	15.6	3.5	14.8	16.2	16.0	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.6	3.5	14.8	16.2	16.0	5.2
Queue Length 50th (m)	15.7	0.0	2.2	20.1	15.9	0.0
Queue Length 95th (m)	24.2	12.9	6.8	29.8	24.6	5.3
Internal Link Dist (m)	100.3			324.3	152.7	
Turn Bay Length (m)		33.0	29.0		140.0	32.0
Base Capacity (vph)	1403	775	388	1403	1255	670
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.35	0.06	0.28	0.26	0.06

Intersection Summary

Cycle Length: 79
Actuated Cycle Length: 79
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

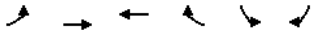
Splits and Phases: 3: Stanley Avenue & Marineland Parkway



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	292	248	23	364	298	38
Future Volume (vph)	292	248	23	364	298	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3411	1498	1601	3411	3052	1570
Flt Permitted	1.00	1.00	0.56	1.00	0.95	1.00
Satd. Flow (perm)	3411	1498	943	3411	3052	1570
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	317	270	25	396	324	41
RTOR Reduction (vph)	0	159	0	0	0	24
Lane Group Flow (vph)	317	111	25	396	324	17
Heavy Vehicles (%)	7%	9%	14%	7%	16%	4%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1403	616	387	1403	1255	645
v/s Ratio Prot	0.09			c0.12	c0.11	
v/s Ratio Perm		0.07	0.03			0.01
v/c Ratio	0.23	0.18	0.06	0.28	0.26	0.03
Uniform Delay, d1	15.1	14.8	14.1	15.5	15.3	13.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.6	0.3	0.5	0.5	0.1
Delay (s)	15.5	15.4	14.4	16.0	15.8	13.9
Level of Service	B	B	B	B	B	B
Approach Delay (s)	15.4			15.9	15.6	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	15.6	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.27		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	30	300	347	60	15	41
Future Volume (Veh/h)	30	300	347	60	15	41
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	33	326	377	65	16	45
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		348				
pX, platoon unblocked						
vC, conflicting volume	377				606	188
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	377				606	188
tC, single (s)	4.4				6.9	7.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	97				96	94
cM capacity (veh/h)	1097				409	785

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	142	217	188	188	65	16	45
Volume Left	33	0	0	0	0	16	0
Volume Right	0	0	0	0	65	0	45
cSH	1097	1700	1700	1700	1700	409	785
Volume to Capacity	0.03	0.13	0.11	0.11	0.04	0.04	0.06
Queue Length 95th (m)	0.7	0.0	0.0	0.0	0.0	0.9	1.4
Control Delay (s)	2.2	0.0	0.0	0.0	0.0	14.2	9.9
Lane LOS	A					B	A
Approach Delay (s)	0.9		0.0			11.0	
Approach LOS						B	

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	32.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	1	1	313	256	11
Future Volume (Veh/h)	17	1	1	313	256	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	23	1	1	429	351	15
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	790	358	366			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	790	358	366			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	93	100	100			
cM capacity (veh/h)	344	690	1204			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	24	430	366
Volume Left	23	1	0
Volume Right	1	0	15
cSH	351	1204	1700
Volume to Capacity	0.07	0.00	0.22
Queue Length 95th (m)	1.7	0.0	0.0
Control Delay (s)	16.0	0.0	0.0
Lane LOS	C	A	
Approach Delay (s)	16.0	0.0	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	27.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	16	34	297	194	60
Future Volume (Veh/h)	34	16	34	297	194	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	44	21	44	381	249	77
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	756	288	326			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	756	288	326			
tC, single (s)	6.7	6.6	4.2			
tC, 2 stage (s)						
tF (s)	3.7	3.7	2.3			
p0 queue free %	87	97	96			
cM capacity (veh/h)	331	670	1211			

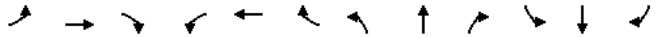
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	65	425	326
Volume Left	44	44	0
Volume Right	21	0	77
cSH	395	1211	1700
Volume to Capacity	0.16	0.04	0.19
Queue Length 95th (m)	4.4	0.9	0.0
Control Delay (s)	15.9	1.2	0.0
Lane LOS	C	A	
Approach Delay (s)	15.9	1.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	44.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	30	71	327	157	43
Future Volume (Veh/h)	11	30	71	327	157	43
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	16	43	101	467	224	61
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	924	254	285			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	924	254	285			
tC, single (s)	6.5	6.5	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.6	2.3			
p0 queue free %	94	94	92			
cM capacity (veh/h)	266	716	1255			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	59	568	285
Volume Left	16	101	0
Volume Right	43	0	61
cSH	491	1255	1700
Volume to Capacity	0.12	0.08	0.17
Queue Length 95th (m)	3.1	2.0	0.0
Control Delay (s)	13.3	2.2	0.0
Lane LOS	B	A	
Approach Delay (s)	13.3	2.2	0.0
Approach LOS	B		

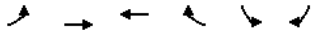
Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	45.3%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	136	12	189	16	13	12	144	241	4	6	85	99
Future Volume (Veh/h)	136	12	189	16	13	12	144	241	4	6	85	99
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	162	14	225	19	15	14	171	287	5	7	101	118
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	827	808	160	1038	864	290	219			292		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	827	808	160	1038	864	290	219			292		
tC, single (s)	7.2	6.5	6.5	7.1	6.5	6.2	4.4			4.1		
tC, 2 stage (s)												
tF (s)	3.6	4.0	3.5	3.5	4.0	3.3	2.5			2.2		
p0 queue free %	30	95	73	85	94	98	86			99		
cM capacity (veh/h)	233	270	828	131	250	754	1187			1281		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	401	48	463	226
Volume Left	162	19	171	7
Volume Right	225	14	5	118
cSH	394	215	1187	1281
Volume to Capacity	1.02	0.22	0.14	0.01
Queue Length 95th (m)	96.8	6.3	3.8	0.1
Control Delay (s)	83.2	26.5	4.1	0.3
Lane LOS	F	D	A	A
Approach Delay (s)	83.2	26.5	4.1	0.3
Approach LOS	F	D		

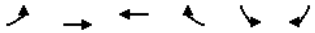
Intersection Summary				
Average Delay	32.2			
Intersection Capacity Utilization	67.7%	ICU Level of Service	C	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	327	116	244	60	33	257
Future Volume (Veh/h)	327	116	244	60	33	257
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93
Hourly flow rate (vph)	352	125	262	65	35	276
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	327				1124	294
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	327				1124	294
tC, single (s)	4.2				6.7	6.4
tC, 2 stage (s)						
tF (s)	2.3				3.8	3.5
p0 queue free %	71				75	61
cM capacity (veh/h)	1210				141	704

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	352	125	327	35	276
Volume Left	352	0	0	35	0
Volume Right	0	0	65	0	276
cSH	1210	1700	1700	141	704
Volume to Capacity	0.29	0.07	0.19	0.25	0.39
Queue Length 95th (m)	9.2	0.0	0.0	7.0	14.2
Control Delay (s)	9.2	0.0	0.0	38.7	13.4
Lane LOS	A			E	B
Approach Delay (s)	6.8		0.0	16.2	
Approach LOS				C	

Intersection Summary				
Average Delay	7.4			
Intersection Capacity Utilization	47.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	131	0	0	0	0	104
Future Volume (vph)	131	0	0	0	0	104
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	142	0	0	0	0	113

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	142	0	113
Volume Left (vph)	142	0	0
Volume Right (vph)	0	0	113
Hadj (s)	0.20	0.00	-0.60
Departure Headway (s)	4.3	4.3	3.6
Degree Utilization, x	0.17	0.00	0.11
Capacity (veh/h)	811	820	948
Control Delay (s)	8.2	7.3	7.1
Approach Delay (s)	8.2	0.0	7.1
Approach LOS	A	A	A

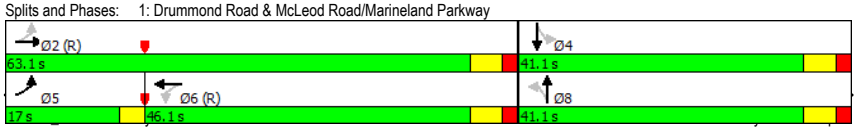
Intersection Summary			
Delay	7.7		
Level of Service	A		
Intersection Capacity Utilization	20.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	238	467	12	552	70	208	126	237
Future Volume (vph)	238	467	12	552	70	208	126	237
Lane Group Flow (vph)	0	838	0	723	0	321	134	508
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1
Total Split (s)	17.0	63.1	46.1	46.1	41.1	41.1	41.1	41.1
Total Split (%)	16.3%	60.6%	44.2%	44.2%	39.4%	39.4%	39.4%	39.4%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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
Total Lost Time (s)		6.1		6.1		6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio		0.74		0.41		1.33	0.44	0.82
Control Delay		22.4		14.0		205.6	32.5	40.9
Queue Delay		0.0		0.0		0.0	0.0	0.0
Total Delay		22.4		14.0		205.6	32.5	40.9
Queue Length 50th (m)		62.9		40.7		~84.7	21.0	84.9
Queue Length 95th (m)		88.0		53.7		#138.2	38.9	#137.9
Internal Link Dist (m)		299.5		1002.2		714.4		408.3
Turn Bay Length (m)							20.0	
Base Capacity (vph)		1137		1785		241	306	619
Starvation Cap Reductn		0		0		0	0	0
Spillback Cap Reductn		0		0		0	0	0
Storage Cap Reductn		0		0		0	0	0
Reduced v/c Ratio		0.74		0.41		1.33	0.44	0.82

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 58.1 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
~ 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.

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	467	83	12	552	116	70	208	24	126	237	241
Future Volume (vph)	238	467	83	12	552	116	70	208	24	126	237	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			6.1			6.1		6.1	6.1	
Lane Util. Factor		0.95			0.95			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		0.98			0.97			0.99		1.00	0.92	
Flt Protected		0.99			1.00			0.99		0.95	1.00	
Satd. Flow (prot)		3420			3469			1845		1808	1739	
Flt Permitted		0.59			0.93			0.38		0.48	1.00	
Satd. Flow (perm)		2061			3244			708		911	1739	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	253	497	88	13	587	123	74	221	26	134	252	256
RTOR Reduction (vph)	0	9	0	0	12	0	0	3	0	0	35	0
Lane Group Flow (vph)	0	829	0	0	711	0	0	318	0	134	473	0
Confl. Peds. (#/hr)	11		9	9		11	8		16	16		8
Heavy Vehicles (%)	1%	4%	1%	0%	2%	0%	0%	1%	10%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		57.0			57.0			35.0		35.0	35.0	
Effective Green, g (s)		57.0			57.0			35.0		35.0	35.0	
Actuated g/C Ratio		0.55			0.55			0.34		0.34	0.34	
Clearance Time (s)		6.1			6.1			6.1		6.1	6.1	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		1127			1774			237		305	584	
v/s Ratio Prot											0.27	
v/s Ratio Perm		c0.40			0.22			c0.45		0.15		
v/c Ratio		0.74			0.40			1.34		0.44	0.81	
Uniform Delay, d1		17.9			13.7			34.6		27.0	31.6	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		2.5			0.7			178.8		4.5	11.5	
Delay (s)		20.4			14.4			213.4		31.5	43.1	
Level of Service		C			B			F		C	D	
Approach Delay (s)		20.4			14.4			213.4			40.7	
Approach LOS		C			B			F			D	

Intersection Summary

HCM 2000 Control Delay	48.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.00		
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2
Intersection Capacity Utilization	112.5%	ICU Level of Service	H
Analysis Period (min)	15		

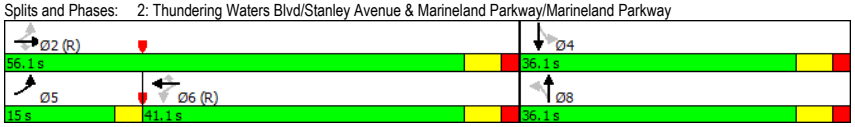
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	47	506	5	642	291	6	6	337	11
Future Volume (vph)	47	506	5	642	291	6	6	337	11
Lane Group Flow (vph)	49	527	5	669	303	6	10	351	81
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		2		6	8		4	
Detector Phase	5	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.1	38.1	38.1	38.1	36.1	36.1	36.1	36.1
Total Split (s)	15.0	56.1	56.1	41.1	41.1	36.1	36.1	36.1	36.1
Total Split (%)	16.3%	60.8%	60.8%	44.6%	44.6%	39.2%	39.2%	39.2%	39.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead			Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	None	None
v/c Ratio	0.11	0.28	0.01	0.39	0.33	0.02	0.02	0.80	0.14
Control Delay	9.2	11.9	0.0	17.3	3.1	21.3	17.4	44.2	7.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.2	11.9	0.0	17.3	3.1	21.3	17.4	44.2	7.8
Queue Length 50th (m)	3.5	25.0	0.0	41.8	0.0	0.7	0.7	56.3	1.3
Queue Length 95th (m)	8.1	34.4	0.0	57.6	14.2	3.4	4.2	#100.9	10.9
Internal Link Dist (m)		1002.2		87.3			119.7		189.9
Turn Bay Length (m)	56.0		30.0		50.0	17.0			
Base Capacity (vph)	496	1903	755	1703	928	376	590	438	568
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	0.10	0.28	0.01	0.39	0.33	0.02	0.02	0.80	0.14

Intersection Summary

Cycle Length: 92.2
Actuated Cycle Length: 92.2
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Thundering Waters Blvd/Stanley Avenue & Marineland Parkway/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	47	506	5	0	642	291	6	6	4	337	11	67
Future Volume (vph)	47	506	5	0	642	291	6	6	4	337	11	67
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.94		1.00	0.87	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	3510	1361		3579	1617	1560	1806		1706	1603	
Flt Permitted	0.32	1.00	1.00		1.00	1.00	0.70	1.00		0.75	1.00	
Satd. Flow (perm)	596	3510	1361		3579	1617	1157	1806		1349	1603	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	49	527	5	0	669	303	6	6	4	351	11	70
RTOR Reduction (vph)	0	0	2	0	0	163	0	3	0	0	47	0
Lane Group Flow (vph)	49	527	3	0	669	140	6	7	0	351	34	0
Heavy Vehicles (%)	3%	4%	20%	0%	2%	1%	17%	0%	0%	7%	0%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	50.0	50.0	50.0		42.7	42.7	30.0	30.0		30.0	30.0	
Effective Green, g (s)	50.0	50.0	50.0		42.7	42.7	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.54	0.54	0.54		0.46	0.46	0.33	0.33		0.33	0.33	
Clearance Time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	378	1903	738		1657	748	376	587		438	521	
v/s Ratio Prot	0.01	c0.15			c0.19			0.00			0.02	
v/s Ratio Perm	0.06		0.00			0.09	0.01			c0.26		
v/c Ratio	0.13	0.28	0.00		0.40	0.19	0.02	0.01		0.80	0.06	
Uniform Delay, d1	10.4	11.4	9.7		16.3	14.6	21.1	21.1		28.4	21.4	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.4	0.0		0.7	0.6	0.1	0.0		10.1	0.1	
Delay (s)	10.6	11.7	9.7		17.1	15.1	21.2	21.1		38.5	21.5	
Level of Service	B	B	A		B	B	C	C		D	C	
Approach Delay (s)		11.6			16.5			21.1			35.3	
Approach LOS		B			B			C			D	

Intersection Summary

HCM 2000 Control Delay	19.2	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.55			
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	15.2	
Intersection Capacity Utilization	60.8%	ICU Level of Service	B	
Analysis Period (min)	15			

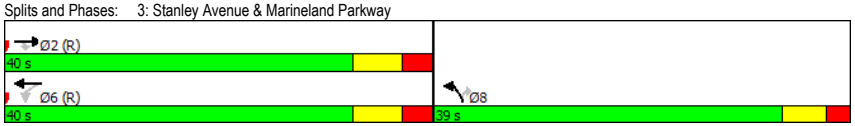
c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	474	372	53	427	506	48
Future Volume (vph)	474	372	53	427	506	48
Lane Group Flow (vph)	515	404	58	464	550	52
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	6	6	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	8.0	8.0
Minimum Split (s)	22.5	22.5	22.5	22.5	38.5	38.5
Total Split (s)	40.0	40.0	40.0	40.0	39.0	39.0
Total Split (%)	50.6%	50.6%	50.6%	50.6%	49.4%	49.4%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.1	4.1
All-Red Time (s)	3.0	3.0	3.0	3.0	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.36	0.49	0.19	0.32	0.40	0.07
Control Delay	17.0	4.0	17.0	16.6	17.5	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.0	4.0	17.0	16.6	17.5	4.8
Queue Length 50th (m)	27.2	0.0	5.4	24.1	29.0	0.0
Queue Length 95th (m)	38.8	15.4	13.4	34.8	41.2	6.0
Internal Link Dist (m)	155.5			318.1	148.8	
Turn Bay Length (m)		33.0	29.0		140.0	32.0
Base Capacity (vph)	1416	832	301	1430	1361	702
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.36	0.49	0.19	0.32	0.40	0.07

Intersection Summary

Cycle Length: 79
Actuated Cycle Length: 79
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 3: Stanley Avenue & Marineland Parkway

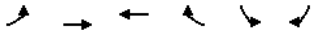


Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	474	372	53	427	506	48
Future Volume (vph)	474	372	53	427	506	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3444	1445	1547	3476	3309	1633
Flt Permitted	1.00	1.00	0.45	1.00	0.95	1.00
Satd. Flow (perm)	3444	1445	735	3476	3309	1633
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	515	404	58	464	550	52
RTOR Reduction (vph)	0	238	0	0	0	31
Lane Group Flow (vph)	515	166	58	464	550	21
Heavy Vehicles (%)	6%	13%	18%	5%	7%	0%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1416	594	302	1430	1361	671
v/s Ratio Prot	c0.15			0.13	c0.17	
v/s Ratio Perm		0.12	0.08			0.01
v/c Ratio	0.36	0.28	0.19	0.32	0.40	0.03
Uniform Delay, d1	16.1	15.5	14.9	15.8	16.4	13.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	1.2	1.4	0.6	0.9	0.1
Delay (s)	16.8	16.6	16.3	16.4	17.3	14.0
Level of Service	B	B	B	B	B	B
Approach Delay (s)	16.7			16.4	17.0	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.38		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	53.8%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	500	449	98	109	31
Future Volume (Veh/h)	23	500	449	98	109	31
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	543	488	107	118	34
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		342				
pX, platoon unblocked					0.95	
vC, conflicting volume	488				810	244
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	488				698	244
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				66	96
cM capacity (veh/h)	1071				348	757

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	206	362	244	244	107	118	34
Volume Left	25	0	0	0	0	118	0
Volume Right	0	0	0	0	107	0	34
cSH	1071	1700	1700	1700	1700	348	757
Volume to Capacity	0.02	0.21	0.14	0.14	0.06	0.34	0.04
Queue Length 95th (m)	0.5	0.0	0.0	0.0	0.0	11.1	1.1
Control Delay (s)	1.2	0.0	0.0	0.0	0.0	20.5	10.0
Lane LOS	A					C	A
Approach Delay (s)	0.4		0.0			18.2	
Approach LOS						C	

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	42.9%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	3	2	413	424	24
Future Volume (Veh/h)	21	3	2	413	424	24
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	27	4	3	523	537	30
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	1081	552	567			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1081	552	567			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	89	99	100			
cM capacity (veh/h)	243	537	1015			

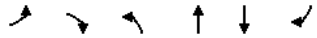
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	31	526	567
Volume Left	27	3	0
Volume Right	4	0	30
cSH	261	1015	1700
Volume to Capacity	0.12	0.00	0.33
Queue Length 95th (m)	3.0	0.1	0.0
Control Delay (s)	20.6	0.1	0.0
Lane LOS	C	A	
Approach Delay (s)	20.6	0.1	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	33.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	64	42	4	344	410	21
Future Volume (Veh/h)	64	42	4	344	410	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	84	55	5	453	539	28
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	1016	553	567			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1016	553	567			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	68	90	99			
cM capacity (veh/h)	262	537	900			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	139	458	567
Volume Left	84	5	0
Volume Right	55	0	28
cSH	329	900	1700
Volume to Capacity	0.42	0.01	0.33
Queue Length 95th (m)	15.4	0.1	0.0
Control Delay (s)	23.7	0.2	0.0
Lane LOS	C	A	
Approach Delay (s)	23.7	0.2	0.0
Approach LOS	C		

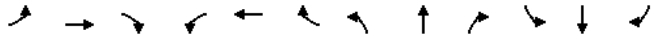
Intersection Summary			
Average Delay	2.9		
Intersection Capacity Utilization	35.6%	ICU Level of Service	A
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	41	104	35	303	448	5
Future Volume (Veh/h)	41	104	35	303	448	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	55	141	47	409	605	7
Pedestrians					2	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1114	608	612			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1114	608	612			
tC, single (s)	6.4	6.2	4.5			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.6			
p0 queue free %	74	71	94			
cM capacity (veh/h)	215	492	793			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	196	456	612
Volume Left	55	47	0
Volume Right	141	0	7
cSH	362	793	1700
Volume to Capacity	0.54	0.06	0.36
Queue Length 95th (m)	23.5	1.4	0.0
Control Delay (s)	26.1	1.7	0.0
Lane LOS	D	A	
Approach Delay (s)	26.1	1.7	0.0
Approach LOS	D		

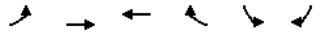
Intersection Summary			
Average Delay	4.7		
Intersection Capacity Utilization	60.4%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	210	19	325	6	12	2	345	125	15	15	296	240
Future Volume (Veh/h)	210	19	325	6	12	2	345	125	15	15	296	240
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	269	24	417	8	15	3	442	160	19	19	379	308
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	1635	1634	533	2054	1778	170	687			179		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1635	1634	533	2054	1778	170	687			179		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.2		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.3		
p0 queue free %	0	54	23	0	65	100	52			99		
cM capacity (veh/h)	37	52	545	4	42	880	916			1367		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	710	26	621	706
Volume Left	269	8	442	19
Volume Right	417	3	19	308
cSH	84	11	916	1367
Volume to Capacity	8.40	2.37	0.48	0.01
Queue Length 95th (m)	Err	31.9	20.3	0.3
Control Delay (s)	Err	1305.9	10.9	0.4
Lane LOS	F	F	B	A
Approach Delay (s)	Err	1305.9	10.9	0.4
Approach LOS	F	F		

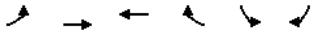
Intersection Summary				
Average Delay	3461.1			
Intersection Capacity Utilization	106.9%	ICU Level of Service	G	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	422	293	184	63	96	531
Future Volume (Veh/h)	422	293	184	63	96	531
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.84	0.84	0.84	0.84	0.84	0.84
Hourly flow rate (vph)	502	349	219	75	114	632
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	294				1610	256
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	294				1610	256
tC, single (s)	4.2				6.5	6.2
tC, 2 stage (s)						
tF (s)	2.3				3.6	3.3
p0 queue free %	58				0	19
cM capacity (veh/h)	1207				66	780

Direction, Lane #	EB 1	EB 2	WB 1	SB 1	SB 2
Volume Total	502	349	294	114	632
Volume Left	502	0	0	114	0
Volume Right	0	0	75	0	632
cSH	1207	1700	1700	66	780
Volume to Capacity	0.42	0.21	0.17	1.73	0.81
Queue Length 95th (m)	15.9	0.0	0.0	77.6	66.3
Control Delay (s)	10.1	0.0	0.0	489.0	26.2
Lane LOS	B			F	D
Approach Delay (s)	6.0		0.0	96.9	
Approach LOS				F	

Intersection Summary				
Average Delay	40.9			
Intersection Capacity Utilization	53.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Sign Control		Stop	Stop		Stop	
Traffic Volume (vph)	180	0	0	0	0	180
Future Volume (vph)	180	0	0	0	0	180
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	196	0	0	0	0	196

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total (vph)	196	0	196
Volume Left (vph)	196	0	0
Volume Right (vph)	0	0	196
Hadj (s)	0.23	0.00	-0.57
Departure Headway (s)	4.5	4.5	3.8
Degree Utilization, x	0.25	0.00	0.21
Capacity (veh/h)	765	762	899
Control Delay (s)	9.0	7.5	7.8
Approach Delay (s)	9.0	0.0	7.8
Approach LOS	A	A	A

Intersection Summary			
Delay		8.4	
Level of Service		A	
Intersection Capacity Utilization		27.8%	ICU Level of Service A
Analysis Period (min)		15	

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix G

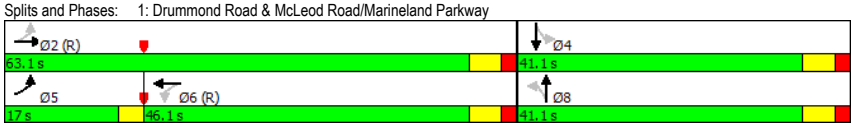
Background 2031 Traffic Operations

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	162	357	14	390	93	168	89	122	162
Future Volume (vph)	162	357	14	390	93	168	89	122	162
Lane Group Flow (vph)	178	445	15	576	102	200	98	134	178
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	5	2		6		8		4	
Permitted Phases	2		6		8		4		
Detector Phase	5	2	6	6	8	8	4	4	
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1	
Total Split (s)	17.0	63.1	46.1	46.1	41.1	41.1	41.1	41.1	
Total Split (%)	16.3%	60.6%	44.2%	44.2%	39.4%	39.4%	39.4%	39.4%	
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	
All-Red Time (s)	0.0	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	
Total Lost Time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max	
v/c Ratio	0.38	0.24	0.05	0.41	0.24	0.32	0.27	0.22	1.00
Control Delay	13.0	12.1	20.3	20.8	26.9	26.9	27.9	26.0	77.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.0	12.1	20.3	20.8	26.9	26.9	27.9	26.0	77.0
Queue Length 50th (m)	16.0	22.1	1.8	38.2	14.8	29.2	14.4	19.3	0.0
Queue Length 95th (m)	26.5	31.0	6.2	55.5	28.0	47.6	27.9	33.6	#41.5
Internal Link Dist (m)		299.5		1002.2		718.1		408.3	
Turn Bay Length (m)	95.0		25.0		25.0		15.0		50.0
Base Capacity (vph)	499	1847	280	1396	423	630	360	614	178
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	0.36	0.24	0.05	0.41	0.24	0.32	0.27	0.22	1.00

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 58.1 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	162	357	48	14	390	134	93	168	14	89	122	162
Future Volume (vph)	162	357	48	14	390	134	93	168	14	89	122	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1		6.1	6.1		6.1	6.1		6.1	6.1	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	1.00		1.00	0.99		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.96		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1686	3361		1300	3286		1784	1868		1742	1830	1585
Flt Permitted	0.35	1.00		0.49	1.00		0.67	1.00		0.59	1.00	1.00
Satd. Flow (perm)	618	3361		677	3286		1261	1868		1075	1830	1585
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	178	392	53	15	429	147	102	185	15	98	134	178
RTOR Reduction (vph)	0	10	0	0	31	0	0	3	0	0	0	178
Lane Group Flow (vph)	178	435	0	15	545	0	102	197	0	98	134	0
Confl. Peds. (#/hr)	8		2	2		8	3		9	9		3
Heavy Vehicles (%)	8%	6%	9%	40%	6%	5%	2%	1%	8%	4%	5%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	NA
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	57.0	57.0		43.3	43.3		35.0	35.0		35.0	35.0	0.0
Effective Green, g (s)	57.0	57.0		43.3	43.3		35.0	35.0		35.0	35.0	0.0
Actuated g/C Ratio	0.55	0.55		0.42	0.42		0.34	0.34		0.34	0.34	0.00
Clearance Time (s)	3.0	6.1		6.1	6.1		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	447	1838		281	1365		423	627		361	614	0
v/s Ratio Prot	c0.04	0.13			0.17			c0.11			0.07	
v/s Ratio Perm	c0.18			0.02			0.08			0.09		
v/c Ratio	0.40	0.24		0.05	0.40		0.24	0.31		0.27	0.22	0.00
Uniform Delay, d1	12.5	12.3		18.2	21.3		25.0	25.7		25.3	24.8	52.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	0.6	0.3		0.4	0.9		1.3	1.3		1.8	0.8	0.0
Delay (s)	13.1	12.6		18.6	22.2		26.4	27.0		27.1	25.6	52.1
Level of Service	B	B		B	C		C	C		C	C	D
Approach Delay (s)		12.7			22.1			26.8			37.5	
Approach LOS		B			C			C			D	

Intersection Summary

HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.38			
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2	
Intersection Capacity Utilization	72.7%	ICU Level of Service	C	
Analysis Period (min)	15			

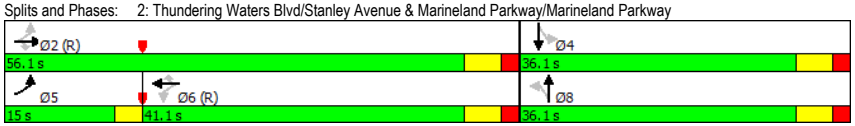
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	43	365	3	394	282	4	7	184	1
Future Volume (vph)	43	365	3	394	282	4	7	184	1
Lane Group Flow (vph)	46	388	3	419	300	4	9	196	27
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		2		6	8		4	
Detector Phase	5	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.1	38.1	38.1	38.1	36.1	36.1	36.1	36.1
Total Split (s)	15.0	56.1	56.1	41.1	41.1	36.1	36.1	36.1	36.1
Total Split (%)	16.3%	60.8%	60.8%	44.6%	44.6%	39.2%	39.2%	39.2%	39.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead			Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	None	None
v/c Ratio	0.08	0.20	0.01	0.26	0.36	0.01	0.01	0.48	0.05
Control Delay	9.0	11.2	0.0	15.9	3.4	21.2	19.2	29.5	9.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.0	11.2	0.0	15.9	3.4	21.2	19.2	29.5	9.0
Queue Length 50th (m)	3.3	17.5	0.0	24.2	0.0	0.5	0.8	27.5	0.1
Queue Length 95th (m)	7.7	25.1	0.0	35.5	14.2	2.8	4.1	47.9	5.6
Internal Link Dist (m)		1002.2		127.7			119.7		189.9
Turn Bay Length (m)	56.0		30.0		50.0	17.0			
Base Capacity (vph)	599	1921	547	1624	844	462	605	412	528
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	0.08	0.20	0.01	0.26	0.36	0.01	0.01	0.48	0.05

Intersection Summary

Cycle Length: 92.2
Actuated Cycle Length: 92.2
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 2: Thundering Waters Blvd/Stanley Avenue & Marineland Parkway/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	43	365	3	0	394	282	4	7	2	184	1	24
Future Volume (vph)	43	365	3	0	394	282	4	7	2	184	1	24
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.86	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1722	3544	978		3411	1445	1825	1857		1601	1568	
Flt Permitted	0.46	1.00	1.00		1.00	1.00	0.74	1.00		0.75	1.00	
Satd. Flow (perm)	842	3544	978		3411	1445	1421	1857		1267	1568	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	46	388	3	0	419	300	4	7	2	196	1	26
RTOR Reduction (vph)	0	0	1	0	0	161	0	1	0	0	18	0
Lane Group Flow (vph)	46	388	2	0	419	139	4	8	0	196	9	0
Heavy Vehicles (%)	6%	3%	67%	0%	7%	13%	0%	0%	0%	14%	0%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	50.0	50.0	50.0		42.7	42.7	30.0	30.0		30.0	30.0	
Effective Green, g (s)	50.0	50.0	50.0		42.7	42.7	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.54	0.54	0.54		0.46	0.46	0.33	0.33		0.33	0.33	
Clearance Time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	497	1921	530		1579	669	462	604		412	510	
v/s Ratio Prot	0.00	c0.11			c0.12			0.00			0.01	
v/s Ratio Perm	0.05		0.00			0.10	0.00			c0.15		
v/c Ratio	0.09	0.20	0.00		0.27	0.21	0.01	0.01		0.48	0.02	
Uniform Delay, d1	10.0	10.8	9.7		15.1	14.7	21.0	21.1		24.8	21.1	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	0.2	0.0		0.4	0.7	0.0	0.0		0.9	0.0	
Delay (s)	10.1	11.1	9.7		15.6	15.4	21.1	21.1		25.7	21.1	
Level of Service	B	B	A		B	B	C	C		C	C	
Approach Delay (s)		11.0			15.5			21.1			25.1	
Approach LOS		B			B			C			C	

Intersection Summary

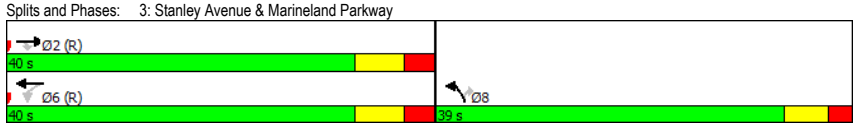
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.34			
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	15.2	
Intersection Capacity Utilization	46.4%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	299	252	23	373	303	39
Future Volume (vph)	299	252	23	373	303	39
Lane Group Flow (vph)	325	274	25	405	329	42
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	6	6	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	8.0	8.0
Minimum Split (s)	25.5	25.5	25.5	25.5	38.5	38.5
Total Split (s)	40.0	40.0	40.0	40.0	39.0	39.0
Total Split (%)	50.6%	50.6%	50.6%	50.6%	49.4%	49.4%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.1	4.1
All-Red Time (s)	3.0	3.0	3.0	3.0	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.23	0.35	0.07	0.29	0.26	0.06
Control Delay	15.7	3.5	14.8	16.2	16.1	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	3.5	14.8	16.2	16.1	5.2
Queue Length 50th (m)	16.1	0.0	2.2	20.6	16.2	0.0
Queue Length 95th (m)	24.7	13.0	6.8	30.4	24.9	5.4
Internal Link Dist (m)	100.3			324.3	152.7	
Turn Bay Length (m)		33.0	29.0		140.0	32.0
Base Capacity (vph)	1403	777	384	1403	1255	670
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.35	0.07	0.29	0.26	0.06

Intersection Summary

Cycle Length: 79
Actuated Cycle Length: 79
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 3: Stanley Avenue & Marineland Parkway



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	299	252	23	373	303	39
Future Volume (vph)	299	252	23	373	303	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3411	1498	1601	3411	3052	1570
Flt Permitted	1.00	1.00	0.56	1.00	0.95	1.00
Satd. Flow (perm)	3411	1498	936	3411	3052	1570
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	325	274	25	405	329	42
RTOR Reduction (vph)	0	161	0	0	0	25
Lane Group Flow (vph)	325	113	25	405	329	17
Heavy Vehicles (%)	7%	9%	14%	7%	16%	4%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1403	616	385	1403	1255	645
v/s Ratio Prot	0.10			c0.12	c0.11	
v/s Ratio Perm		0.08	0.03			0.01
v/c Ratio	0.23	0.18	0.06	0.29	0.26	0.03
Uniform Delay, d1	15.1	14.8	14.1	15.5	15.3	13.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.4	0.7	0.3	0.5	0.5	0.1
Delay (s)	15.5	15.5	14.4	16.0	15.8	13.9
Level of Service	B	B	B	B	B	B
Approach Delay (s)	15.5			16.0	15.6	
Approach LOS	B			B	B	

Intersection Summary

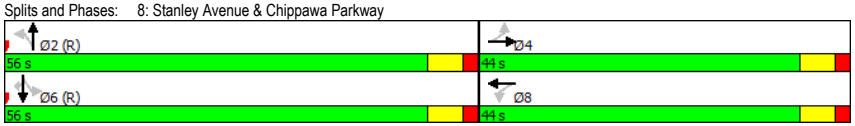
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	136	12	17	14	144	254	7	89	100
Future Volume (vph)	136	12	17	14	144	254	7	89	100
Lane Group Flow (vph)	162	239	20	32	171	308	8	106	119
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
Total Split (s)	44.0	44.0	44.0	44.0	56.0	56.0	56.0	56.0	56.0
Total Split (%)	44.0%	44.0%	44.0%	44.0%	56.0%	56.0%	56.0%	56.0%	56.0%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.70	0.56	0.14	0.09	0.25	0.25	0.01	0.10	0.12
Control Delay	52.7	10.7	33.4	20.1	3.5	3.1	6.7	6.5	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	10.7	33.4	20.1	3.5	3.1	6.7	6.5	1.7
Queue Length 50th (m)	29.7	2.3	3.3	2.7	3.6	6.5	0.4	5.9	0.0
Queue Length 95th (m)	42.4	16.0	8.3	8.7	5.8	9.2	2.2	13.8	5.3
Internal Link Dist (m)		207.0		145.4		1041.9		321.5	
Turn Bay Length (m)	30.0		30.0		30.0		30.0		30.0
Base Capacity (vph)	482	646	289	686	690	1251	761	1067	1005
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	0.34	0.37	0.07	0.05	0.25	0.25	0.01	0.10	0.12

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 8: Stanley Avenue & Chippawa Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	12	189	17	14	13	144	254	5	7	89	100
Future Volume (vph)	136	12	189	17	14	13	144	254	5	7	89	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		6.1	6.1		6.1	6.1		6.1	6.1	6.1
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.86		1.00	0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1644	1336		1825	1786		1372	1801		1825	1537	1396
Flt Permitted	0.74	1.00		0.40	1.00		0.69	1.00		0.57	1.00	1.00
Satd. Flow (perm)	1274	1336		765	1786		995	1801		1097	1537	1396
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	162	14	225	20	17	15	171	302	6	8	106	119
RTOR Reduction (vph)	0	184	0	0	12	0	0	0	0	0	0	36
Lane Group Flow (vph)	162	55	0	20	20	0	171	308	0	8	106	83
Heavy Vehicles (%)	11%	0%	25%	0%	0%	0%	33%	6%	25%	0%	25%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	18.4	18.4		18.4	18.4		69.4	69.4		69.4	69.4	69.4
Effective Green, g (s)	18.4	18.4		18.4	18.4		69.4	69.4		69.4	69.4	69.4
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.69	0.69		0.69	0.69	0.69
Clearance Time (s)	6.1	6.1		6.1	6.1		6.1	6.1		6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	234	245		140	328		690	1249		761	1066	968
v/s Ratio Prot		0.04			0.01			0.17			0.07	
v/s Ratio Perm	c0.13			0.03			c0.17			0.01		0.06
v/c Ratio	0.69	0.23		0.14	0.06		0.25	0.25		0.01	0.10	0.09
Uniform Delay, d1	38.2	34.7		34.2	33.7		5.7	5.6		4.7	5.0	5.0
Progression Factor	1.00	1.00		1.00	1.00		0.39	0.40		1.00	1.00	1.00
Incremental Delay, d2	8.5	0.5		0.5	0.1		0.7	0.4		0.0	0.2	0.2
Delay (s)	46.7	35.2		34.7	33.7		3.0	2.7		4.7	5.2	5.1
Level of Service	D	D		C	C		A	A		A	A	A
Approach Delay (s)		39.8			34.1			2.8			5.2	
Approach LOS		D			C			A			A	

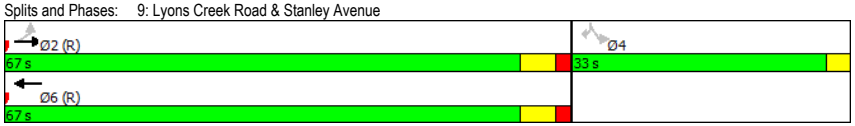
Intersection Summary

HCM 2000 Control Delay	17.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.34			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.2	
Intersection Capacity Utilization	39.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	338	122	256	34	261
Future Volume (vph)	338	122	256	34	261
Lane Group Flow (vph)	363	131	343	37	281
Turn Type	Perm	NA	NA	Perm	Perm
Protected Phases		2	6		
Permitted Phases	2			4	4
Detector Phase	2	2	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.1	24.1	24.1	22.5	22.5
Total Split (s)	67.0	67.0	67.0	33.0	33.0
Total Split (%)	67.0%	67.0%	67.0%	33.0%	33.0%
Yellow Time (s)	4.1	4.1	4.1	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	3.0	3.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.63	0.12	0.32	0.09	0.46
Control Delay	18.4	8.7	9.7	24.5	6.3
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	8.7	9.7	24.5	6.3
Queue Length 50th (m)	41.0	9.9	27.4	5.0	0.0
Queue Length 95th (m)	72.3	17.6	42.5	10.5	10.2
Internal Link Dist (m)		337.8	364.0	1041.9	
Turn Bay Length (m)	44.0			25.0	
Base Capacity (vph)	580	1054	1085	414	605
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.63	0.12	0.32	0.09	0.46

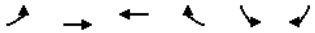
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 33 (33%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 9: Lyons Creek Road & Stanley Avenue



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	338	122	256	63	34	261
Future Volume (vph)	338	122	256	63	34	261
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	6.1		3.0	3.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1722	1731	1767		1383	1361
Flt Permitted	0.53	1.00	1.00		0.95	1.00
Satd. Flow (perm)	954	1731	1767		1383	1361
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	363	131	275	68	37	281
RTOR Reduction (vph)	0	0	9	0	0	197
Lane Group Flow (vph)	363	131	334	0	37	84
Heavy Vehicles (%)	6%	11%	4%	13%	32%	20%
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		2	6			
Permitted Phases	2				4	4
Actuated Green, G (s)	60.9	60.9	60.9		30.0	30.0
Effective Green, g (s)	60.9	60.9	60.9		30.0	30.0
Actuated g/C Ratio	0.61	0.61	0.61		0.30	0.30
Clearance Time (s)	6.1	6.1	6.1		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	580	1054	1076		414	408
v/s Ratio Prot		0.08	0.19			
v/s Ratio Perm	c0.38				0.03	c0.06
v/c Ratio	0.63	0.12	0.31		0.09	0.21
Uniform Delay, d1	12.4	8.3	9.4		25.2	26.1
Progression Factor	1.00	1.00	1.00		0.94	1.07
Incremental Delay, d2	5.0	0.2	0.8		0.4	1.1
Delay (s)	17.4	8.5	10.2		24.1	29.0
Level of Service	B	A	B		C	C
Approach Delay (s)		15.0	10.2		28.4	
Approach LOS		B	B		C	

Intersection Summary			
HCM 2000 Control Delay	17.3	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.49		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.1
Intersection Capacity Utilization	53.7%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	31	307	356	62	15	42
Future Volume (Veh/h)	31	307	356	62	15	42
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	34	334	387	67	16	46
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		348				
pX, platoon unblocked						
vC, conflicting volume	387				622	194
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	387				622	194
tC, single (s)	4.4				6.9	7.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	97				96	94
cM capacity (veh/h)	1087				399	779

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	34	167	167	194	194	67	16	46
Volume Left	34	0	0	0	0	0	16	0
Volume Right	0	0	0	0	0	67	0	46
cSH	1087	1700	1700	1700	1700	1700	399	779
Volume to Capacity	0.03	0.10	0.10	0.11	0.11	0.04	0.04	0.06
Queue Length 95th (m)	0.7	0.0	0.0	0.0	0.0	0.0	1.0	1.4
Control Delay (s)	8.4	0.0	0.0	0.0	0.0	0.0	14.4	9.9
Lane LOS	A						B	A
Approach Delay (s)	0.8			0.0			11.1	
Approach LOS							B	

Intersection Summary				
Average Delay	1.1			
Intersection Capacity Utilization	26.5%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	1	1	323	264	11
Future Volume (Veh/h)	18	1	1	323	264	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	25	1	1	442	362	15
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	814	370	377			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	814	370	377			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	92	100	100			
cM capacity (veh/h)	333	681	1193			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	26	443	377
Volume Left	25	1	0
Volume Right	1	0	15
cSH	339	1193	1700
Volume to Capacity	0.08	0.00	0.22
Queue Length 95th (m)	1.9	0.0	0.0
Control Delay (s)	16.5	0.0	0.0
Lane LOS	C	A	
Approach Delay (s)	16.5	0.0	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	27.8%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	17	35	306	199	63
Future Volume (Veh/h)	35	17	35	306	199	63
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	45	22	45	392	255	81
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	778	296	336			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	778	296	336			
tC, single (s)	6.7	6.6	4.2			
tC, 2 stage (s)						
tF (s)	3.7	3.7	2.3			
p0 queue free %	86	97	96			
cM capacity (veh/h)	321	662	1201			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	67	437	336
Volume Left	45	45	0
Volume Right	22	0	81
cSH	386	1201	1700
Volume to Capacity	0.17	0.04	0.20
Queue Length 95th (m)	4.7	0.9	0.0
Control Delay (s)	16.3	1.2	0.0
Lane LOS	C	A	
Approach Delay (s)	16.3	1.2	0.0
Approach LOS	C		

Intersection Summary			
Average Delay	1.9		
Intersection Capacity Utilization	45.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	32	75	338	160	46
Future Volume (Veh/h)	11	32	75	338	160	46
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	16	46	107	483	229	66
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				346		
pX, platoon unblocked	0.94					
vC, conflicting volume	959	262	295			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	922	262	295			
tC, single (s)	6.5	6.5	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.6	2.3			
p0 queue free %	94	94	91			
cM capacity (veh/h)	248	709	1244			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	62	590	295
Volume Left	16	107	0
Volume Right	46	0	66
cSH	480	1244	1700
Volume to Capacity	0.13	0.09	0.17
Queue Length 95th (m)	3.4	2.1	0.0
Control Delay (s)	13.6	2.3	0.0
Lane LOS	B	A	
Approach Delay (s)	13.6	2.3	0.0
Approach LOS	B		

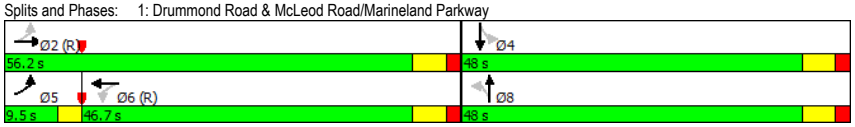
Intersection Summary			
Average Delay	2.3		
Intersection Capacity Utilization	46.5%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	244	475	13	564	71	210	129	239	248
Future Volume (vph)	244	475	13	564	71	210	129	239	248
Lane Group Flow (vph)	260	595	14	727	76	249	137	254	264
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	NA
Protected Phases	5	2		6		8		4	
Permitted Phases	2		6		8		4		
Detector Phase	5	2	6	6	8	8	4	4	
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1	
Total Split (s)	9.5	56.2	46.7	46.7	48.0	48.0	48.0	48.0	
Total Split (%)	9.1%	53.9%	44.8%	44.8%	46.1%	46.1%	46.1%	46.1%	
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	
All-Red Time (s)	0.0	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	
Total Lost Time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max	
v/c Ratio	0.80	0.36	0.04	0.53	0.18	0.33	0.33	0.33	1.00
Control Delay	36.4	16.9	20.5	25.2	21.7	22.4	24.2	23.0	63.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	36.4	16.9	20.5	25.2	21.7	22.4	24.2	23.0	63.2
Queue Length 50th (m)	28.9	36.5	1.7	56.3	9.7	33.2	18.8	34.8	0.0
Queue Length 95th (m)	#56.2	49.1	5.8	73.9	19.9	52.4	34.1	54.0	#48.7
Internal Link Dist (m)		299.5		1002.2		717.3		408.3	
Turn Bay Length (m)	95.0		25.0		25.0		15.0		50.0
Base Capacity (vph)	327	1659	316	1368	416	747	418	772	264
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	0.80	0.36	0.04	0.53	0.18	0.33	0.33	0.33	1.00

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 58.1 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	244	475	85	13	564	119	71	210	24	129	239	248
Future Volume (vph)	244	475	85	13	564	119	71	210	24	129	239	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1		6.1	6.1		6.1	6.1		6.1	6.1	4.0
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	1.00		1.00	1.00	1.00
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	0.98		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1804	3423		1807	3468		1814	1849		1803	1921	1601
Flt Permitted	0.25	1.00		0.43	1.00		0.54	1.00		0.55	1.00	1.00
Satd. Flow (perm)	483	3423		813	3468		1036	1849		1040	1921	1601
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	260	505	90	14	600	127	76	223	26	137	254	264
RTOR Reduction (vph)	0	14	0	0	17	0	0	4	0	0	0	264
Lane Group Flow (vph)	260	581	0	14	710	0	76	245	0	137	254	0
Confl. Peds. (#/hr)	11		9	9		11	8		16	16		8
Heavy Vehicles (%)	1%	4%	1%	0%	2%	0%	0%	1%	10%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	NA
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	50.1	50.1		40.6	40.6		41.9	41.9		41.9	41.9	0.0
Effective Green, g (s)	50.1	50.1		40.6	40.6		41.9	41.9		41.9	41.9	0.0
Actuated g/C Ratio	0.48	0.48		0.39	0.39		0.40	0.40		0.40	0.40	0.00
Clearance Time (s)	3.0	6.1		6.1	6.1		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	314	1645		316	1351		416	743		418	772	0
v/s Ratio Prot	c0.05	0.17			0.20			c0.13			0.13	
v/s Ratio Perm	c0.35			0.02			0.07			0.13		
v/c Ratio	0.83	0.35		0.04	0.53		0.18	0.33		0.33	0.33	0.00
Uniform Delay, d1	21.7	16.9		19.8	24.4		20.1	21.5		21.5	21.5	52.1
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	16.2	0.6		0.3	1.5		1.0	1.2		2.1	1.1	0.0
Delay (s)	37.9	17.5		20.0	25.9		21.1	22.7		23.5	22.6	52.1
Level of Service	D	B		C	C		C	C		C	C	D
Approach Delay (s)		23.7			25.8			22.3			34.7	
Approach LOS		C			C			C			C	

Intersection Summary

HCM 2000 Control Delay	26.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.62			
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2	
Intersection Capacity Utilization	81.3%	ICU Level of Service	D	
Analysis Period (min)	15			

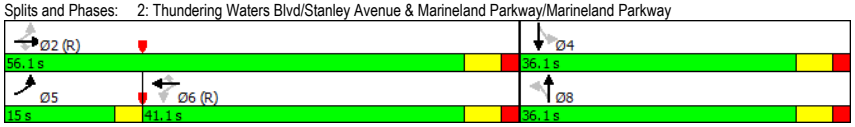
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	48	516	5	656	296	6	6	342	12
Future Volume (vph)	48	516	5	656	296	6	6	342	12
Lane Group Flow (vph)	50	538	5	683	308	6	10	356	85
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		2		6	8		4	
Detector Phase	5	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.1	38.1	38.1	38.1	36.1	36.1	36.1	36.1
Total Split (s)	15.0	56.1	56.1	41.1	41.1	36.1	36.1	36.1	36.1
Total Split (%)	16.3%	60.8%	60.8%	44.6%	44.6%	39.2%	39.2%	39.2%	39.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead			Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	None	None
v/c Ratio	0.12	0.28	0.01	0.40	0.33	0.02	0.02	0.81	0.15
Control Delay	9.2	11.9	0.0	17.5	3.1	21.3	17.4	45.2	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.2	11.9	0.0	17.5	3.1	21.3	17.4	45.2	7.9
Queue Length 50th (m)	3.6	25.5	0.0	43.0	0.0	0.7	0.7	57.5	1.6
Queue Length 95th (m)	8.3	35.0	0.0	59.1	14.2	3.4	4.2	#102.7	11.3
Internal Link Dist (m)		1002.2		87.3			119.7		189.9
Turn Bay Length (m)	56.0		30.0		50.0	17.0			
Base Capacity (vph)	490	1903	755	1702	930	375	590	438	572
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	0.10	0.28	0.01	0.40	0.33	0.02	0.02	0.81	0.15

Intersection Summary

Cycle Length: 92.2
Actuated Cycle Length: 92.2
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Thundering Waters Blvd/Stanley Avenue & Marineland Parkway/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	48	516	5	0	656	296	6	6	4	342	12	69
Future Volume (vph)	48	516	5	0	656	296	6	6	4	342	12	69
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.94		1.00	0.87	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	3510	1361		3579	1617	1560	1806		1706	1609	
Flt Permitted	0.31	1.00	1.00		1.00	1.00	0.70	1.00		0.75	1.00	
Satd. Flow (perm)	583	3510	1361		3579	1617	1152	1806		1349	1609	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	50	538	5	0	683	308	6	6	4	356	12	72
RTOR Reduction (vph)	0	0	2	0	0	165	0	3	0	0	49	0
Lane Group Flow (vph)	50	538	3	0	683	143	6	7	0	356	36	0
Heavy Vehicles (%)	3%	4%	20%	0%	2%	1%	17%	0%	0%	7%	0%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	50.0	50.0	50.0		42.7	42.7	30.0	30.0		30.0	30.0	
Effective Green, g (s)	50.0	50.0	50.0		42.7	42.7	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.54	0.54	0.54		0.46	0.46	0.33	0.33		0.33	0.33	
Clearance Time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	371	1903	738		1657	748	374	587		438	523	
v/s Ratio Prot	0.01	c0.15			c0.19			0.00			0.02	
v/s Ratio Perm	0.07		0.00			0.09	0.01			c0.26		
v/c Ratio	0.13	0.28	0.00		0.41	0.19	0.02	0.01		0.81	0.07	
Uniform Delay, d1	10.4	11.4	9.7		16.4	14.6	21.1	21.1		28.5	21.5	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.4	0.0		0.8	0.6	0.1	0.0		11.0	0.1	
Delay (s)	10.6	11.8	9.7		17.2	15.1	21.2	21.1		39.5	21.5	
Level of Service	B	B	A		B	B	C	C		D	C	
Approach Delay (s)		11.7			16.5			21.1			36.0	
Approach LOS		B			B			C			D	

Intersection Summary

HCM 2000 Control Delay	19.4	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.56			
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	15.2	
Intersection Capacity Utilization	61.4%	ICU Level of Service	B	
Analysis Period (min)	15			

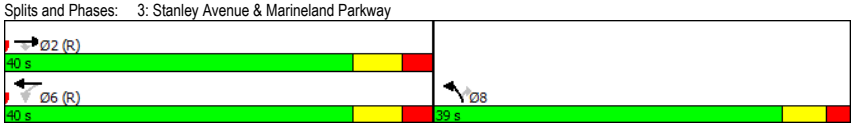
c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	486	376	54	438	514	49
Future Volume (vph)	486	376	54	438	514	49
Lane Group Flow (vph)	528	409	59	476	559	53
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	6	6	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	8.0	8.0
Minimum Split (s)	22.5	22.5	22.5	22.5	38.5	38.5
Total Split (s)	40.0	40.0	40.0	40.0	39.0	39.0
Total Split (%)	50.6%	50.6%	50.6%	50.6%	49.4%	49.4%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.1	4.1
All-Red Time (s)	3.0	3.0	3.0	3.0	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.37	0.49	0.20	0.33	0.41	0.08
Control Delay	17.1	4.0	17.2	16.7	17.6	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	4.0	17.2	16.7	17.6	4.8
Queue Length 50th (m)	28.0	0.0	5.5	24.8	29.6	0.0
Queue Length 95th (m)	39.8	15.6	13.6	35.7	42.0	6.1
Internal Link Dist (m)	155.5			318.1	148.8	
Turn Bay Length (m)		33.0	29.0		140.0	32.0
Base Capacity (vph)	1416	835	296	1430	1361	703
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.37	0.49	0.20	0.33	0.41	0.08

Intersection Summary

Cycle Length: 79
Actuated Cycle Length: 79
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 3: Stanley Avenue & Marineland Parkway



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	486	376	54	438	514	49
Future Volume (vph)	486	376	54	438	514	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3444	1445	1547	3476	3309	1633
Flt Permitted	1.00	1.00	0.44	1.00	0.95	1.00
Satd. Flow (perm)	3444	1445	720	3476	3309	1633
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	528	409	59	476	559	53
RTOR Reduction (vph)	0	241	0	0	0	31
Lane Group Flow (vph)	528	168	59	476	559	22
Heavy Vehicles (%)	6%	13%	18%	5%	7%	0%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1416	594	296	1430	1361	671
v/s Ratio Prot	c0.15			0.14	c0.17	
v/s Ratio Perm		0.12	0.08			0.01
v/c Ratio	0.37	0.28	0.20	0.33	0.41	0.03
Uniform Delay, d1	16.2	15.5	14.9	15.9	16.5	13.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	1.2	1.5	0.6	0.9	0.1
Delay (s)	16.9	16.7	16.4	16.5	17.4	14.0
Level of Service	B	B	B	B	B	B
Approach Delay (s)	16.8			16.5	17.1	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	16.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.39		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	54.3%	ICU Level of Service	A
Analysis Period (min)	15		

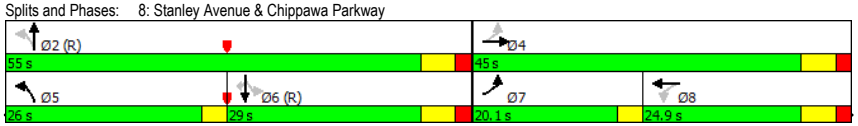
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	210	19	7	13	346	131	16	311	241
Future Volume (vph)	210	19	7	13	346	131	16	311	241
Lane Group Flow (vph)	269	443	9	20	444	189	21	399	309
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	NA	Perm
Protected Phases	7	4		8	5	2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	7	4	8	8	5	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.1	24.1	24.1	9.5	24.1	24.1	24.1	24.1
Total Split (s)	20.1	45.0	24.9	24.9	26.0	55.0	29.0	29.0	29.0
Total Split (%)	20.1%	45.0%	24.9%	24.9%	26.0%	55.0%	29.0%	29.0%	29.0%
Yellow Time (s)	3.0	4.1	4.1	4.1	3.0	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	2.0	0.0	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)	3.0	6.1	6.1	6.1	3.0	6.1	6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.71	0.66	0.08	0.16	0.62	0.17	0.04	0.52	0.43
Control Delay	42.7	9.0	44.3	41.4	18.0	9.8	26.6	30.6	14.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	9.0	44.3	41.4	18.0	9.8	26.6	30.6	14.1
Queue Length 50th (m)	42.9	3.5	1.7	3.2	42.9	14.8	2.7	64.2	18.0
Queue Length 95th (m)	54.0	13.0	5.5	8.7	54.3	m24.6	7.9	#98.6	35.9
Internal Link Dist (m)		207.0		145.4		1041.4		321.9	
Turn Bay Length (m)	30.0		30.0		30.0		30.0		30.0
Base Capacity (vph)	395	879	321	355	762	1136	469	762	724
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	0.68	0.50	0.03	0.06	0.58	0.17	0.04	0.52	0.43

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Stanley Avenue & Chippawa Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	19	327	7	13	2	346	131	16	16	311	241
Future Volume (vph)	210	19	327	7	13	2	346	131	16	16	311	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1		6.1	6.1		3.0	6.1		6.1	6.1	6.1
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.86		1.00	0.98		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1825	1603		1825	1878		1825	1707		1706	1865	1512
Flt Permitted	0.53	1.00		0.89	1.00		0.34	1.00		0.64	1.00	1.00
Satd. Flow (perm)	1025	1603		1708	1878		661	1707		1146	1865	1512
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	269	24	419	9	17	3	444	168	21	21	399	309
RTOR Reduction (vph)	0	319	0	0	3	0	0	3	0	0	0	110
Lane Group Flow (vph)	269	124	0	9	17	0	444	186	0	21	399	199
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	0%	12%	0%	7%	3%	8%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	23.8	23.8		4.5	4.5		64.0	64.0		38.5	38.5	38.5
Effective Green, g (s)	23.8	23.8		4.5	4.5		64.0	64.0		38.5	38.5	38.5
Actuated g/C Ratio	0.24	0.24		0.04	0.04		0.64	0.64		0.38	0.38	0.38
Clearance Time (s)	3.0	6.1		6.1	6.1		3.0	6.1		6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	374	381		76	84		684	1092		441	718	582
v/s Ratio Prot	c0.12	0.08			0.01		c0.15	0.11			0.21	
v/s Ratio Perm	c0.05			0.01			c0.27			0.02		0.13
v/c Ratio	0.72	0.32		0.12	0.20		0.65	0.17		0.05	0.56	0.34
Uniform Delay, d1	34.1	31.5		45.8	46.0		10.4	7.3		19.3	24.1	21.8
Progression Factor	1.00	1.00		1.00	1.00		1.99	1.28		1.00	1.00	1.00
Incremental Delay, d2	6.5	0.5		0.7	1.2		1.6	0.2		0.2	3.1	1.6
Delay (s)	40.6	32.0		46.5	47.2		22.3	9.5		19.5	27.1	23.4
Level of Service	D	C		D	D		C	A		B	C	C
Approach Delay (s)		35.2			47.0			18.5			25.3	
Approach LOS		D			D			B			C	

Intersection Summary

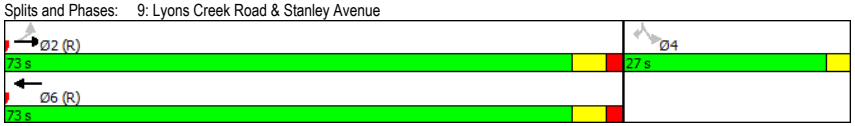
HCM 2000 Control Delay	26.9	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.71				
Actuated Cycle Length (s)	100.0	Sum of lost time (s)		18.2	
Intersection Capacity Utilization	70.3%	ICU Level of Service		C	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	428	308	193	100	544
Future Volume (vph)	428	308	193	100	544
Lane Group Flow (vph)	510	367	307	119	648
Turn Type	Perm	NA	NA	Perm	Perm
Protected Phases		2	6		
Permitted Phases	2			4	4
Detector Phase	2	2	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.1	24.1	24.1	22.5	22.5
Total Split (s)	73.0	73.0	73.0	27.0	27.0
Total Split (%)	73.0%	73.0%	73.0%	27.0%	27.0%
Yellow Time (s)	4.1	4.1	4.1	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	3.0	3.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.79	0.29	0.25	0.29	0.74
Control Delay	23.1	7.5	6.3	33.8	17.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	23.1	7.5	6.3	33.8	17.8
Queue Length 50th (m)	62.0	26.2	18.3	21.9	57.3
Queue Length 95th (m)	97.7	35.5	26.5	35.1	91.1
Internal Link Dist (m)		337.8	364.0	1041.4	
Turn Bay Length (m)	44.0			25.0	
Base Capacity (vph)	644	1259	1217	413	872
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.79	0.29	0.25	0.29	0.74

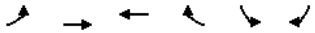
Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 75
Control Type: Actuated-Coordinated

Splits and Phases: 9: Lyons Creek Road & Stanley Avenue



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	428	308	193	65	100	544
Future Volume (vph)	428	308	193	65	100	544
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	6.1		3.0	3.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1615	1883	1802		1722	1585
Flt Permitted	0.57	1.00	1.00		0.95	1.00
Satd. Flow (perm)	964	1883	1802		1722	1585
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	510	367	230	77	119	648
RTOR Reduction (vph)	0	0	12	0	0	492
Lane Group Flow (vph)	510	367	295	0	119	156
Heavy Vehicles (%)	13%	2%	3%	3%	6%	3%
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		2	6			
Permitted Phases	2				4	4
Actuated Green, G (s)	66.9	66.9	66.9		24.0	24.0
Effective Green, g (s)	66.9	66.9	66.9		24.0	24.0
Actuated g/C Ratio	0.67	0.67	0.67		0.24	0.24
Clearance Time (s)	6.1	6.1	6.1		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	644	1259	1205		413	380
v/s Ratio Prot		0.19	0.16			
v/s Ratio Perm	c0.53				0.07	c0.10
v/c Ratio	0.79	0.29	0.24		0.29	0.41
Uniform Delay, d1	11.7	6.8	6.6		31.0	32.0
Progression Factor	1.00	1.00	1.00		1.02	4.30
Incremental Delay, d2	9.6	0.6	0.5		1.5	2.8
Delay (s)	21.3	7.4	7.0		33.2	140.5
Level of Service	C	A	A		C	F
Approach Delay (s)		15.5	7.0		123.9	
Approach LOS		B	A		F	

Intersection Summary				
HCM 2000 Control Delay	56.8	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	0.69		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.1
Intersection Capacity Utilization	56.9%	ICU Level of Service	B
Analysis Period (min)	15		
c Critical Lane Group			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	23	512	460	100	112	32
Future Volume (Veh/h)	23	512	460	100	112	32
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	25	557	500	109	122	35
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		342				
pX, platoon unblocked					0.96	
vC, conflicting volume	500				828	250
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	500				732	250
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	98				63	95
cM capacity (veh/h)	1060				333	750

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	25	278	278	250	250	109	122	35
Volume Left	25	0	0	0	0	0	122	0
Volume Right	0	0	0	0	0	109	0	35
cSH	1060	1700	1700	1700	1700	1700	333	750
Volume to Capacity	0.02	0.16	0.16	0.15	0.15	0.06	0.37	0.05
Queue Length 95th (m)	0.6	0.0	0.0	0.0	0.0	0.0	12.4	1.1
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	0.0	21.9	10.0
Lane LOS	A						C	B
Approach Delay (s)	0.4			0.0			19.3	
Approach LOS							C	

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	32.0%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	3	2	423	434	25
Future Volume (Veh/h)	22	3	2	423	434	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	28	4	3	535	549	32
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	1106	565	581			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1106	565	581			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	88	99	100			
cM capacity (veh/h)	234	528	1003			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	32	538	581
Volume Left	28	3	0
Volume Right	4	0	32
cSH	252	1003	1700
Volume to Capacity	0.13	0.00	0.34
Queue Length 95th (m)	3.3	0.1	0.0
Control Delay (s)	21.4	0.1	0.0
Lane LOS	C	A	
Approach Delay (s)	21.4	0.1	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	34.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	67	44	5	351	419	22
Future Volume (Veh/h)	67	44	5	351	419	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	88	58	7	462	551	29
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	1042	566	580			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1042	566	580			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	65	89	99			
cM capacity (veh/h)	253	528	890			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	146	469	580
Volume Left	88	7	0
Volume Right	58	0	29
cSH	319	890	1700
Volume to Capacity	0.46	0.01	0.34
Queue Length 95th (m)	17.4	0.2	0.0
Control Delay (s)	25.5	0.2	0.0
Lane LOS	D	A	
Approach Delay (s)	25.5	0.2	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	3.2		
Intersection Capacity Utilization	36.5%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	43	109	36	308	459	6
Future Volume (Veh/h)	43	109	36	308	459	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	58	147	49	416	620	8
Pedestrians					2	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				346		
pX, platoon unblocked	0.88					
vC, conflicting volume	1140	624	628			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1092	624	628			
tC, single (s)	6.4	6.2	4.5			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.6			
p0 queue free %	70	69	94			
cM capacity (veh/h)	195	482	781			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	205	465	628
Volume Left	58	49	0
Volume Right	147	0	8
cSH	340	781	1700
Volume to Capacity	0.60	0.06	0.37
Queue Length 95th (m)	28.3	1.5	0.0
Control Delay (s)	30.4	1.8	0.0
Lane LOS	D	A	
Approach Delay (s)	30.4	1.8	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	61.8%	ICU Level of Service	B
Analysis Period (min)	15		

BURNSIDE

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Appendix H

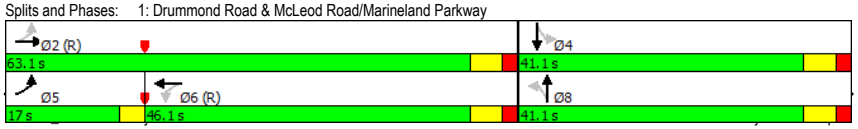
Total 2026 Traffic Operations

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	158	349	55	383	246	224	87	143
Future Volume (vph)	158	349	55	383	246	224	87	143
Lane Group Flow (vph)	0	671	0	625	0	656	96	331
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1
Total Split (s)	17.0	63.1	46.1	46.1	41.1	41.1	41.1	41.1
Total Split (%)	16.3%	60.6%	44.2%	44.2%	39.4%	39.4%	39.4%	39.4%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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
Total Lost Time (s)		6.1		6.1		6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio		0.57		0.43		2.01	0.38	0.55
Control Delay		17.0		14.0		486.7	31.7	26.9
Queue Delay		0.0		0.0		0.0	0.0	0.0
Total Delay		17.0		14.0		486.7	31.7	26.9
Queue Length 50th (m)		42.1		34.6		~209.2	14.7	44.5
Queue Length 95th (m)		59.3		47.7		#277.4	29.7	71.8
Internal Link Dist (m)		299.5		1002.2		718.1		408.3
Turn Bay Length (m)							20.0	
Base Capacity (vph)		1175		1446		327	255	605
Starvation Cap Reductn		0		0		0	0	0
Spillback Cap Reductn		0		0		0	0	0
Storage Cap Reductn		0		0		0	0	0
Reduced v/c Ratio		0.57		0.43		2.01	0.38	0.55

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 58.1 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
~ 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.

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	349	103	55	383	131	246	224	127	87	143	158
Future Volume (vph)	158	349	103	55	383	131	246	224	127	87	143	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			6.1			6.1		6.1	6.1	
Lane Util. Factor		0.95			0.95			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00			1.00		1.00	1.00	
Frt		0.97			0.97			0.97		1.00	0.92	
Flt Protected		0.99			1.00			0.98		0.95	1.00	
Satd. Flow (prot)		3262			3187			1767		1751	1689	
Flt Permitted		0.64			0.82			0.53		0.41	1.00	
Satd. Flow (perm)		2117			2611			947		762	1689	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	174	384	113	60	421	144	270	246	140	96	157	174
RTOR Reduction (vph)	0	16	0	0	20	0	0	9	0	0	39	0
Lane Group Flow (vph)	0	655	0	0	605	0	0	647	0	96	292	0
Confl. Peds. (#/hr)	8		2	2		8	3		9	9		3
Heavy Vehicles (%)	8%	6%	9%	40%	6%	5%	2%	1%	8%	4%	5%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		57.0			57.0			35.0		35.0	35.0	
Effective Green, g (s)		57.0			57.0			35.0		35.0	35.0	
Actuated g/C Ratio		0.55			0.55			0.34		0.34	0.34	
Clearance Time (s)		6.1			6.1			6.1		6.1	6.1	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		1158			1428			318		255	567	
v/s Ratio Prot											0.17	
v/s Ratio Perm		c0.31			0.23			c0.68		0.13		
v/c Ratio		0.57			0.42			2.03		0.38	0.52	
Uniform Delay, d1		15.5			13.9			34.6		26.3	27.8	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		0.6			0.9			476.0		4.2	3.3	
Delay (s)		16.1			14.8			510.6		30.5	31.1	
Level of Service		B			B			F		C	C	
Approach Delay (s)		16.1			14.8			510.6			31.0	
Approach LOS		B			B			F			C	

Intersection Summary

HCM 2000 Control Delay	154.8	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.16		
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2
Intersection Capacity Utilization	111.2%	ICU Level of Service	H
Analysis Period (min)	15		

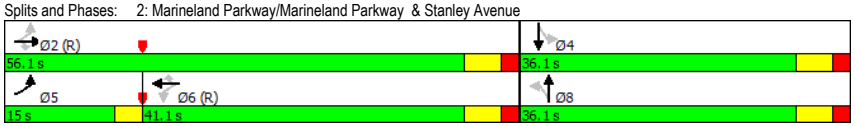
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	104	410	3	403	276	4	7	180	1
Future Volume (vph)	104	410	3	403	276	4	7	180	1
Lane Group Flow (vph)	111	436	3	429	294	4	10	191	53
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		2		6	8		4	
Detector Phase	5	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.1	38.1	38.1	38.1	36.1	36.1	36.1	36.1
Total Split (s)	15.0	56.1	56.1	41.1	41.1	36.1	36.1	36.1	36.1
Total Split (%)	16.3%	60.8%	60.8%	44.6%	44.6%	39.2%	39.2%	39.2%	39.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead			Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	None	None
v/c Ratio	0.20	0.23	0.00	0.29	0.37	0.01	0.02	0.46	0.10
Control Delay	9.8	11.4	0.0	18.1	3.7	21.2	19.3	29.3	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.8	11.4	0.0	18.1	3.7	21.2	19.3	29.3	7.2
Queue Length 50th (m)	8.3	20.0	0.0	25.8	0.0	0.5	1.0	26.7	0.1
Queue Length 95th (m)	15.6	28.2	0.0	38.3	14.9	2.8	4.5	46.7	7.8
Internal Link Dist (m)		1002.2		127.7			103.0		189.9
Turn Bay Length (m)	56.0		30.0		50.0	17.0			
Base Capacity (vph)	588	1921	885	1502	801	442	595	411	543
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	0.19	0.23	0.00	0.29	0.37	0.01	0.02	0.46	0.10

Intersection Summary

Cycle Length: 92.2
Actuated Cycle Length: 92.2
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 2: Marineland Parkway/Marineland Parkway & Stanley Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	104	410	3	0	403	276	4	7	2	180	1	49
Future Volume (vph)	104	410	3	0	403	276	4	7	2	180	1	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1722	3544	1601		3411	1445	1789	1827		1601	1561	
Flt Permitted	0.45	1.00	1.00		1.00	1.00	0.72	1.00		0.75	1.00	
Satd. Flow (perm)	817	3544	1601		3411	1445	1361	1827		1266	1561	
Peak-hour factor, PHF	0.94	0.94	0.92	0.92	0.94	0.94	0.92	0.92	0.92	0.94	0.92	0.94
Adj. Flow (vph)	111	436	3	0	429	294	4	8	2	191	1	52
RTOR Reduction (vph)	0	0	1	0	0	166	0	1	0	0	35	0
Lane Group Flow (vph)	111	436	2	0	429	128	4	9	0	191	18	0
Heavy Vehicles (%)	6%	3%	2%	2%	7%	13%	2%	2%	2%	14%	2%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	50.0	50.0	50.0		40.0	40.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	50.0	50.0	50.0		40.0	40.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.54	0.54	0.54		0.43	0.43	0.33	0.33		0.33	0.33	
Clearance Time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	511	1921	868		1479	626	442	594		411	507	
v/s Ratio Prot	0.02	c0.12			c0.13			0.00			0.01	
v/s Ratio Perm	0.10		0.00			0.09	0.00			c0.15		
v/c Ratio	0.22	0.23	0.00		0.29	0.20	0.01	0.01		0.46	0.04	
Uniform Delay, d1	10.4	11.0	9.7		16.9	16.2	21.0	21.1		24.7	21.2	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0		0.5	0.7	0.0	0.0		0.8	0.0	
Delay (s)	10.7	11.3	9.7		17.4	16.9	21.1	21.1		25.6	21.3	
Level of Service	B	B	A		B	B	C	C		C	C	
Approach Delay (s)		11.2			17.2			21.1			24.6	
Approach LOS		B			B			C			C	

Intersection Summary

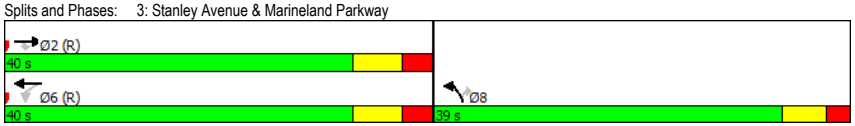
HCM 2000 Control Delay	16.3	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.35				
Actuated Cycle Length (s)	92.2	Sum of lost time (s)		15.2	
Intersection Capacity Utilization	47.4%	ICU Level of Service		A	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	344	248	23	381	298	38
Future Volume (vph)	344	248	23	381	298	38
Lane Group Flow (vph)	374	270	25	414	324	41
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	6	6	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	8.0	8.0
Minimum Split (s)	25.5	25.5	25.5	25.5	38.5	38.5
Total Split (s)	40.0	40.0	40.0	40.0	39.0	39.0
Total Split (%)	50.6%	50.6%	50.6%	50.6%	49.4%	49.4%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.1	4.1
All-Red Time (s)	3.0	3.0	3.0	3.0	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.27	0.35	0.07	0.30	0.26	0.06
Control Delay	16.0	3.5	14.9	16.3	16.0	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.0	3.5	14.9	16.3	16.0	5.2
Queue Length 50th (m)	18.9	0.0	2.2	21.2	15.9	0.0
Queue Length 95th (m)	28.2	12.9	6.8	31.2	24.6	5.3
Internal Link Dist (m)	100.3			324.3	152.7	
Turn Bay Length (m)		33.0	29.0		140.0	32.0
Base Capacity (vph)	1403	775	367	1403	1255	670
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.35	0.07	0.30	0.26	0.06

Intersection Summary

Cycle Length: 79
Actuated Cycle Length: 79
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 3: Stanley Avenue & Marineland Parkway



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	344	248	23	381	298	38
Future Volume (vph)	344	248	23	381	298	38
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3411	1498	1601	3411	3052	1570
Flt Permitted	1.00	1.00	0.53	1.00	0.95	1.00
Satd. Flow (perm)	3411	1498	892	3411	3052	1570
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	374	270	25	414	324	41
RTOR Reduction (vph)	0	159	0	0	0	24
Lane Group Flow (vph)	374	111	25	414	324	17
Heavy Vehicles (%)	7%	9%	14%	7%	16%	4%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1403	616	366	1403	1255	645
v/s Ratio Prot	0.11			c0.12	c0.11	
v/s Ratio Perm		0.07	0.03			0.01
v/c Ratio	0.27	0.18	0.07	0.30	0.26	0.03
Uniform Delay, d1	15.4	14.8	14.1	15.6	15.3	13.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.6	0.4	0.5	0.5	0.1
Delay (s)	15.8	15.4	14.4	16.1	15.8	13.9
Level of Service	B	B	B	B	B	B
Approach Delay (s)	15.7			16.0	15.6	
Approach LOS	B			B	B	

Intersection Summary

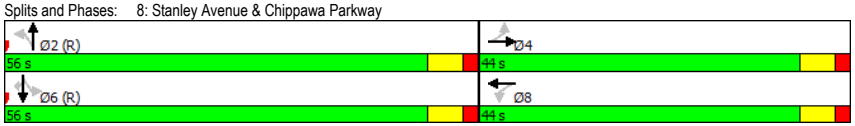
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	39.3%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	136	12	16	13	144	265	6	145	99
Future Volume (vph)	136	12	16	13	144	265	6	145	99
Lane Group Flow (vph)	162	239	19	29	171	320	7	173	118
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
Total Split (s)	44.0	44.0	44.0	44.0	56.0	56.0	56.0	56.0	56.0
Total Split (%)	44.0%	44.0%	44.0%	44.0%	56.0%	56.0%	56.0%	56.0%	56.0%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.69	0.56	0.14	0.09	0.26	0.26	0.01	0.16	0.12
Control Delay	52.5	10.7	33.1	20.0	3.6	3.1	6.7	6.8	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.5	10.7	33.1	20.0	3.6	3.1	6.7	6.8	1.7
Queue Length 50th (m)	29.7	2.3	3.1	2.4	3.6	6.7	0.4	10.1	0.0
Queue Length 95th (m)	42.4	16.0	7.9	8.1	5.8	9.6	2.0	21.3	5.2
Internal Link Dist (m)		207.0		145.4		1041.9		321.5	
Turn Bay Length (m)	30.0		30.0		30.0		30.0		30.0
Base Capacity (vph)	483	646	289	684	649	1252	749	1067	1005
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	0.34	0.37	0.07	0.04	0.26	0.26	0.01	0.16	0.12

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 8: Stanley Avenue & Chippawa Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	12	189	16	13	12	144	265	4	6	145	99
Future Volume (vph)	136	12	189	16	13	12	144	265	4	6	145	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		6.1	6.1		6.1	6.1		6.1	6.1	6.1
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.86		1.00	0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1644	1336		1825	1782		1372	1803		1825	1537	1396
Flt Permitted	0.74	1.00		0.40	1.00		0.65	1.00		0.56	1.00	1.00
Satd. Flow (perm)	1278	1336		765	1782		936	1803		1080	1537	1396
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	162	14	225	19	15	14	171	315	5	7	173	118
RTOR Reduction (vph)	0	184	0	0	11	0	0	0	0	0	0	36
Lane Group Flow (vph)	162	55	0	19	18	0	171	320	0	7	173	82
Heavy Vehicles (%)	11%	0%	25%	0%	0%	0%	33%	6%	25%	0%	25%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	18.4	18.4		18.4	18.4		69.4	69.4		69.4	69.4	69.4
Effective Green, g (s)	18.4	18.4		18.4	18.4		69.4	69.4		69.4	69.4	69.4
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.69	0.69		0.69	0.69	0.69
Clearance Time (s)	6.1	6.1		6.1	6.1		6.1	6.1		6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	235	245		140	327		649	1251		749	1066	968
v/s Ratio Prot		0.04			0.01			0.18			0.11	
v/s Ratio Perm	c0.13			0.02			c0.18			0.01		0.06
v/c Ratio	0.69	0.23		0.14	0.05		0.26	0.26		0.01	0.16	0.08
Uniform Delay, d1	38.1	34.7		34.1	33.6		5.7	5.7		4.7	5.3	5.0
Progression Factor	1.00	1.00		1.00	1.00		0.39	0.40		1.00	1.00	1.00
Incremental Delay, d2	8.2	0.5		0.4	0.1		0.9	0.4		0.0	0.3	0.2
Delay (s)	46.3	35.2		34.6	33.7		3.1	2.7		4.7	5.6	5.1
Level of Service	D	D		C	C		A	A		A	A	A
Approach Delay (s)		39.7			34.0			2.8			5.4	
Approach LOS		D			C			A			A	

Intersection Summary

HCM 2000 Control Delay	16.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.35			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.2	
Intersection Capacity Utilization	47.8%	ICU Level of Service	A	
Analysis Period (min)	15			

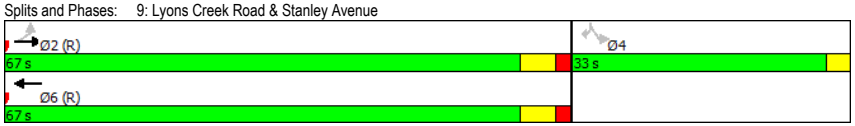
c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	345	116	244	46	304
Future Volume (vph)	345	116	244	46	304
Lane Group Flow (vph)	371	125	333	49	327
Turn Type	Perm	NA	NA	Perm	Perm
Protected Phases		2	6		
Permitted Phases	2			4	4
Detector Phase	2	2	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.1	24.1	24.1	22.5	22.5
Total Split (s)	67.0	67.0	67.0	33.0	33.0
Total Split (%)	67.0%	67.0%	67.0%	33.0%	33.0%
Yellow Time (s)	4.1	4.1	4.1	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	3.0	3.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.63	0.12	0.31	0.12	0.51
Control Delay	18.4	8.6	9.5	26.1	8.5
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	8.6	9.5	26.1	8.5
Queue Length 50th (m)	42.0	9.4	26.2	7.1	0.0
Queue Length 95th (m)	73.8	16.9	41.0	14.0	17.3
Internal Link Dist (m)		337.8	364.0	1041.9	
Turn Bay Length (m)	44.0			25.0	
Base Capacity (vph)	589	1054	1082	414	637
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.63	0.12	0.31	0.12	0.51

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 33 (33%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 9: Lyons Creek Road & Stanley Avenue

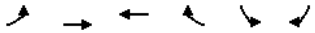


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	345	116	244	66	46	304
Future Volume (vph)	345	116	244	66	46	304
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	6.1		3.0	3.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1722	1731	1762		1383	1361
Flt Permitted	0.53	1.00	1.00		0.95	1.00
Satd. Flow (perm)	968	1731	1762		1383	1361
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	371	125	262	71	49	327
RTOR Reduction (vph)	0	0	10	0	0	229
Lane Group Flow (vph)	371	125	323	0	49	98
Heavy Vehicles (%)	6%	11%	4%	13%	32%	20%
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		2	6			
Permitted Phases	2				4	4
Actuated Green, G (s)	60.9	60.9	60.9		30.0	30.0
Effective Green, g (s)	60.9	60.9	60.9		30.0	30.0
Actuated g/C Ratio	0.61	0.61	0.61		0.30	0.30
Clearance Time (s)	6.1	6.1	6.1		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	589	1054	1073		414	408
v/s Ratio Prot		0.07	0.18			
v/s Ratio Perm	c0.38				0.04	c0.07
v/c Ratio	0.63	0.12	0.30		0.12	0.24
Uniform Delay, d1	12.4	8.2	9.4		25.4	26.4
Progression Factor	1.00	1.00	1.00		0.99	1.70
Incremental Delay, d2	5.0	0.2	0.7		0.6	1.4
Delay (s)	17.4	8.5	10.1		25.6	46.2
Level of Service	B	A	B		C	D
Approach Delay (s)		15.2	10.1		43.5	
Approach LOS		B	B		D	

Intersection Summary

HCM 2000 Control Delay	22.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.50		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.1
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	42	340	360	60	15	45
Future Volume (Veh/h)	42	340	360	60	15	45
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	46	370	391	65	16	49
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		348				
pX, platoon unblocked						
vC, conflicting volume	391				668	196
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	391				668	196
tC, single (s)	4.4				6.9	7.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	96				96	94
cM capacity (veh/h)	1083				368	777

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	169	247	196	196	65	16	49
Volume Left	46	0	0	0	0	16	0
Volume Right	0	0	0	0	65	0	49
cSH	1083	1700	1700	1700	1700	368	777
Volume to Capacity	0.04	0.15	0.12	0.12	0.04	0.04	0.06
Queue Length 95th (m)	1.0	0.0	0.0	0.0	0.0	1.0	1.5
Control Delay (s)	2.6	0.0	0.0	0.0	0.0	15.2	9.9
Lane LOS	A					C	A
Approach Delay (s)	1.1		0.0			11.2	
Approach LOS						B	

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	33.9%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	17	61	25	313	256	11
Future Volume (Veh/h)	17	61	25	313	256	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	23	84	34	429	351	15
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	856	358	366			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	856	358	366			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	92	88	97			
cM capacity (veh/h)	305	690	1204			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	107	463	366
Volume Left	23	34	0
Volume Right	84	0	15
cSH	543	1204	1700
Volume to Capacity	0.20	0.03	0.22
Queue Length 95th (m)	5.5	0.7	0.0
Control Delay (s)	13.2	0.9	0.0
Lane LOS	B	A	
Approach Delay (s)	13.2	0.9	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	46.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	16	34	321	254	60
Future Volume (Veh/h)	34	16	34	321	254	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	44	21	44	412	326	77
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	864	364	403			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	864	364	403			
tC, single (s)	6.7	6.6	4.2			
tC, 2 stage (s)						
tF (s)	3.7	3.7	2.3			
p0 queue free %	84	97	96			
cM capacity (veh/h)	284	603	1134			

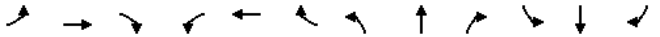
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	65	456	403
Volume Left	44	44	0
Volume Right	21	0	77
cSH	342	1134	1700
Volume to Capacity	0.19	0.04	0.24
Queue Length 95th (m)	5.2	0.9	0.0
Control Delay (s)	18.0	1.2	0.0
Lane LOS	C	A	
Approach Delay (s)	18.0	1.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	49.1%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	30	71	351	217	43
Future Volume (Veh/h)	11	30	71	351	217	43
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	16	43	101	501	310	61
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				346		
pX, platoon unblocked	0.93					
vC, conflicting volume	1044	340	371			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1009	340	371			
tC, single (s)	6.5	6.5	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.6	2.3			
p0 queue free %	93	93	91			
cM capacity (veh/h)	218	639	1166			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	59	602	371
Volume Left	16	101	0
Volume Right	43	0	61
cSH	420	1166	1700
Volume to Capacity	0.14	0.09	0.22
Queue Length 95th (m)	3.7	2.2	0.0
Control Delay (s)	15.0	2.3	0.0
Lane LOS	B	A	
Approach Delay (s)	15.0	2.3	0.0
Approach LOS	B		

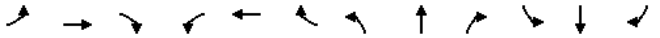
Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	49.8%	ICU Level of Service		A
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	126	0	0	4	0	110	3	207	1	38	83	95
Future Volume (vph)	126	0	0	4	0	110	3	207	1	38	83	95
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	137	0	0	4	0	120	3	225	1	41	90	103

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	137	124	229	131	103
Volume Left (vph)	137	4	3	41	0
Volume Right (vph)	0	120	1	0	103
Hadj (s)	0.20	-0.57	0.03	0.18	-0.70
Departure Headway (s)	5.4	4.7	5.0	5.6	4.7
Degree Utilization, x	0.21	0.16	0.32	0.20	0.14
Capacity (veh/h)	607	689	679	605	714
Control Delay (s)	9.8	8.6	10.4	8.9	7.3
Approach Delay (s)	9.8	8.6	10.4	8.2	
Approach LOS	A	A	B	A	

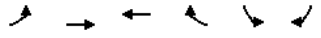
Intersection Summary				
Delay	9.2			
Level of Service	A			
Intersection Capacity Utilization	41.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	0	19	5	0	57	7	6	1	22	15	38
Future Volume (Veh/h)	106	0	19	5	0	57	7	6	1	22	15	38
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	115	0	21	5	0	62	8	7	1	24	16	41
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	170	108	36	129	128	8	57			8		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	170	108	36	129	128	8	57			8		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	100	98	99	100	94	99			99		
cM capacity (veh/h)	736	766	1036	814	747	1075	1547			1612		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	136	67	16	81
Volume Left	115	5	8	24
Volume Right	21	62	1	41
cSH	771	1050	1547	1612
Volume to Capacity	0.18	0.06	0.01	0.01
Queue Length 95th (m)	4.8	1.6	0.1	0.3
Control Delay (s)	10.7	8.7	3.7	2.2
Lane LOS	B	A	A	A
Approach Delay (s)	10.7	8.7	3.7	2.2
Approach LOS	B	A		

Intersection Summary				
Average Delay	7.6			
Intersection Capacity Utilization	25.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	57	26	10	21	0
Future Volume (Veh/h)	0	57	26	10	21	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	62	28	11	23	0
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	39				96	34
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	39				96	34
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	100
cM capacity (veh/h)	1571				904	1040

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	62	39	23
Volume Left	0	0	23
Volume Right	0	11	0
cSH	1571	1700	904
Volume to Capacity	0.00	0.02	0.03
Queue Length 95th (m)	0.0	0.0	0.6
Control Delay (s)	0.0	0.0	9.1
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.1
Approach LOS			A

Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	13.3%	ICU Level of Service	A
Analysis Period (min)	15		

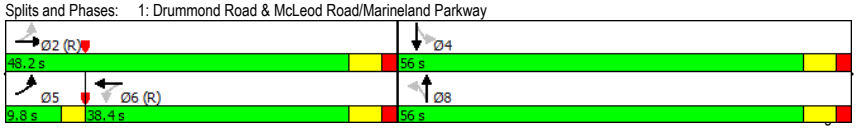
Timings — Total 2026 PM Peak Hour
1: Drummond Road & McLeod Road/Marineland Parkway

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	238	467	136	552	174	250	126	303
Future Volume (vph)	238	467	136	552	174	250	126	303
Lane Group Flow (vph)	0	1013	0	855	0	565	134	578
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1
Total Split (s)	9.8	48.2	38.4	38.4	56.0	56.0	56.0	56.0
Total Split (%)	9.4%	46.3%	36.9%	36.9%	53.7%	53.7%	53.7%	53.7%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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
Total Lost Time (s)		6.1		6.1		6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio		1.30		1.16dl		1.56	0.35	0.66
Control Delay		172.9		106.3		288.0	20.3	23.2
Queue Delay		0.0		0.0		0.0	0.0	0.0
Total Delay		172.9		106.3		288.0	20.3	23.2
Queue Length 50th (m)		~136.1		~105.5		~161.9	16.4	78.7
Queue Length 95th (m)		#176.1		#144.0		#227.1	31.1	116.5
Internal Link Dist (m)		299.5		1002.2		717.3		408.3
Turn Bay Length (m)							20.0	
Base Capacity (vph)		778		754		363	385	871
Starvation Cap Reductn		0		0		0	0	0
Spillback Cap Reductn		0		0		0	0	0
Storage Cap Reductn		0		0		0	0	0
Reduced v/c Ratio		1.30		1.13		1.56	0.35	0.66

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 58.1 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 150
Control Type: Actuated-Coordinated
~ 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.
dl Defacto Left Lane. Recode with 1 though lane as a left lane.

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



HCM Signalized Intersection Capacity Analysis — Total 2026 PM Peak Hour
1: Drummond Road & McLeod Road/Marineland Parkway

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	467	247	136	552	116	174	250	107	126	303	241
Future Volume (vph)	238	467	247	136	552	116	174	250	107	126	303	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			6.1			6.1		6.1	6.1	
Lane Util. Factor		0.95			0.95			1.00		1.00	1.00	
Frpb, ped/bikes		0.99			0.99			0.99		1.00	0.99	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		0.96			0.98			0.97		1.00	0.93	
Flt Protected		0.99			0.99			0.98		0.95	1.00	
Satd. Flow (prot)		3340			3468			1782		1814	1761	
Flt Permitted		0.54			0.53			0.41		0.42	1.00	
Satd. Flow (perm)		1843			1841			741		804	1761	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	253	497	263	145	587	123	185	266	114	134	322	256
RTOR Reduction (vph)	0	33	0	0	11	0	0	9	0	0	28	0
Lane Group Flow (vph)	0	980	0	0	844	0	0	556	0	134	550	0
Confl. Peds. (#/hr)	11		9	9		11	8		16	16		8
Heavy Vehicles (%)	1%	4%	1%	0%	2%	0%	0%	1%	10%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		42.1			42.1			49.9		49.9	49.9	
Effective Green, g (s)		42.1			42.1			49.9		49.9	49.9	
Actuated g/C Ratio		0.40			0.40			0.48		0.48	0.48	
Clearance Time (s)		6.1			6.1			6.1		6.1	6.1	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		744			743			354		385	843	
v/s Ratio Prot											0.31	
v/s Ratio Perm		c0.53			0.46			c0.75		0.17		
v/c Ratio		1.32			1.16dl			1.57		0.35	0.65	
Uniform Delay, d1		31.1			31.1			27.2		17.0	20.6	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		151.9			77.0			270.3		2.5	3.9	
Delay (s)		183.0			108.1			297.4		19.5	24.5	
Level of Service		F			F			F		B	C	
Approach Delay (s)		183.0			108.1			297.4			23.6	
Approach LOS		F			F			F			C	

Intersection Summary

HCM 2000 Control Delay	147.1	HCM 2000 Level of Service	F
HCM 2000 Volume to Capacity ratio	1.50		
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2
Intersection Capacity Utilization	132.0%	ICU Level of Service	H
Analysis Period (min)	15		

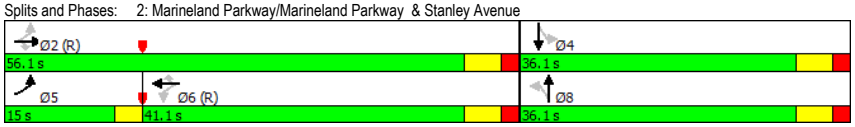
dl Defacto Left Lane. Recode with 1 though lane as a left lane.
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	91	545	5	698	291	6	6	337	11
Future Volume (vph)	91	545	5	698	291	6	6	337	11
Lane Group Flow (vph)	95	568	5	727	303	6	10	351	152
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		2		6	8		4	
Detector Phase	5	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.1	38.1	38.1	38.1	36.1	36.1	36.1	36.1
Total Split (s)	15.0	56.1	56.1	41.1	41.1	36.1	36.1	36.1	36.1
Total Split (%)	16.3%	60.8%	60.8%	44.6%	44.6%	39.2%	39.2%	39.2%	39.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead			Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	None	None
v/c Ratio	0.23	0.30	0.01	0.46	0.34	0.02	0.02	0.80	0.25
Control Delay	10.3	12.1	0.0	19.8	3.3	21.5	17.4	44.2	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	12.1	0.0	19.8	3.3	21.5	17.4	44.2	6.0
Queue Length 50th (m)	7.0	27.3	0.0	47.5	0.0	0.7	0.7	56.3	1.3
Queue Length 95th (m)	13.7	37.2	0.0	65.7	14.7	3.4	4.2	#100.9	14.0
Internal Link Dist (m)		1002.2		87.3			75.7		189.9
Turn Bay Length (m)	56.0		30.0		50.0	17.0			
Base Capacity (vph)	464	1903	885	1592	887	352	590	438	609
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	0.20	0.30	0.01	0.46	0.34	0.02	0.02	0.80	0.25

Intersection Summary

Cycle Length: 92.2
Actuated Cycle Length: 92.2
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Marineland Parkway/Marineland Parkway & Stanley Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	91	545	5	0	698	291	6	6	4	337	11	135
Future Volume (vph)	91	545	5	0	698	291	6	6	4	337	11	135
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.94		1.00	0.86	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	3510	1601		3579	1617	1560	1806		1706	1580	
Flt Permitted	0.28	1.00	1.00		1.00	1.00	0.66	1.00		0.75	1.00	
Satd. Flow (perm)	525	3510	1601		3579	1617	1084	1806		1349	1580	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	95	568	5	0	727	303	6	6	4	351	11	141
RTOR Reduction (vph)	0	0	2	0	0	170	0	3	0	0	95	0
Lane Group Flow (vph)	95	568	3	0	727	133	6	7	0	351	57	0
Heavy Vehicles (%)	3%	4%	2%	2%	2%	1%	17%	0%	0%	7%	0%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	50.0	50.0	50.0		40.4	40.4	30.0	30.0		30.0	30.0	
Effective Green, g (s)	50.0	50.0	50.0		40.4	40.4	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.54	0.54	0.54		0.44	0.44	0.33	0.33		0.33	0.33	
Clearance Time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	373	1903	868		1568	708	352	587		438	514	
v/s Ratio Prot	0.02	c0.16			c0.20			0.00			0.04	
v/s Ratio Perm	0.12		0.00			0.08	0.01			c0.26		
v/c Ratio	0.25	0.30	0.00		0.46	0.19	0.02	0.01		0.80	0.11	
Uniform Delay, d1	10.9	11.5	9.7		18.3	15.9	21.1	21.1		28.4	21.8	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.4	0.0		1.0	0.6	0.1	0.0		10.1	0.1	
Delay (s)	11.3	11.9	9.7		19.2	16.4	21.2	21.1		38.5	21.9	
Level of Service	B	B	A		B	B	C	C		D	C	
Approach Delay (s)		11.8			18.4			21.1			33.5	
Approach LOS		B			B			C			C	

Intersection Summary

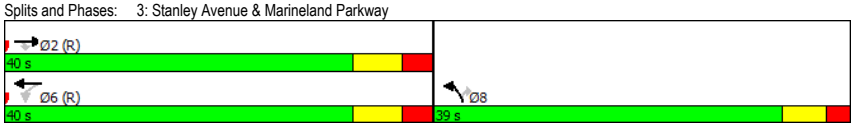
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.58				
Actuated Cycle Length (s)	92.2	Sum of lost time (s)		15.2	
Intersection Capacity Utilization	63.2%	ICU Level of Service		B	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	513	372	53	483	506	48
Future Volume (vph)	513	372	53	483	506	48
Lane Group Flow (vph)	558	404	58	525	550	52
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	6	6	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	8.0	8.0
Minimum Split (s)	22.5	22.5	22.5	22.5	38.5	38.5
Total Split (s)	40.0	40.0	40.0	40.0	39.0	39.0
Total Split (%)	50.6%	50.6%	50.6%	50.6%	49.4%	49.4%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.1	4.1
All-Red Time (s)	3.0	3.0	3.0	3.0	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.39	0.49	0.21	0.37	0.40	0.07
Control Delay	17.4	4.0	17.4	17.1	17.5	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	4.0	17.4	17.1	17.5	4.8
Queue Length 50th (m)	30.0	0.0	5.4	27.8	29.0	0.0
Queue Length 95th (m)	42.2	15.4	13.6	39.5	41.2	6.0
Internal Link Dist (m)	155.5			318.1	148.8	
Turn Bay Length (m)		33.0	29.0		140.0	32.0
Base Capacity (vph)	1416	832	282	1430	1361	702
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.39	0.49	0.21	0.37	0.40	0.07

Intersection Summary

Cycle Length: 79
Actuated Cycle Length: 79
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 3: Stanley Avenue & Marineland Parkway



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	513	372	53	483	506	48
Future Volume (vph)	513	372	53	483	506	48
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3444	1445	1547	3476	3309	1633
Flt Permitted	1.00	1.00	0.42	1.00	0.95	1.00
Satd. Flow (perm)	3444	1445	686	3476	3309	1633
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	558	404	58	525	550	52
RTOR Reduction (vph)	0	238	0	0	0	31
Lane Group Flow (vph)	558	166	58	525	550	21
Heavy Vehicles (%)	6%	13%	18%	5%	7%	0%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1416	594	282	1430	1361	671
v/s Ratio Prot	c0.16			0.15	c0.17	
v/s Ratio Perm		0.12	0.08			0.01
v/c Ratio	0.39	0.28	0.21	0.37	0.40	0.03
Uniform Delay, d1	16.3	15.5	15.0	16.1	16.4	13.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.8	1.2	1.6	0.7	0.9	0.1
Delay (s)	17.2	16.6	16.6	16.8	17.3	14.0
Level of Service	B	B	B	B	B	B
Approach Delay (s)	16.9			16.8	17.0	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	16.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.40		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	54.9%	ICU Level of Service	A
Analysis Period (min)	15		

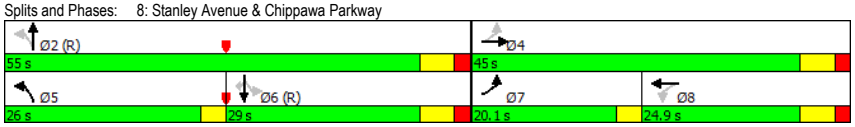
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	210	19	6	12	345	191	15	336	240
Future Volume (vph)	210	19	6	12	345	191	15	336	240
Lane Group Flow (vph)	269	441	8	18	442	264	19	431	308
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	NA	Perm
Protected Phases	7	4		8	5	2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	7	4	8	8	5	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.1	24.1	24.1	9.5	24.1	24.1	24.1	24.1
Total Split (s)	20.1	45.0	24.9	24.9	26.0	55.0	29.0	29.0	29.0
Total Split (%)	20.1%	45.0%	24.9%	24.9%	26.0%	55.0%	29.0%	29.0%	29.0%
Yellow Time (s)	3.0	4.1	4.1	4.1	3.0	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	2.0	0.0	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)	3.0	6.1	6.1	6.1	3.0	6.1	6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.71	0.66	0.07	0.14	0.64	0.23	0.04	0.56	0.43
Control Delay	42.8	9.1	44.3	40.9	12.0	8.4	26.5	31.2	15.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	9.1	44.3	40.9	12.0	8.4	26.5	31.2	15.0
Queue Length 50th (m)	43.1	3.5	1.5	2.8	36.3	20.9	2.4	70.4	19.9
Queue Length 95th (m)	54.2	12.9	5.2	8.1	47.0	29.7	7.4	#109.3	38.4
Internal Link Dist (m)		207.0		145.4		1041.4		321.9	
Turn Bay Length (m)	30.0		30.0		30.0		30.0		30.0
Base Capacity (vph)	395	878	328	354	735	1139	441	769	720
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	0.68	0.50	0.02	0.05	0.60	0.23	0.04	0.56	0.43

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Stanley Avenue & Chippawa Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	19	325	6	12	2	345	191	15	15	336	240
Future Volume (vph)	210	19	325	6	12	2	345	191	15	15	336	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1		6.1	6.1		3.0	6.1		6.1	6.1	6.1
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.86		1.00	0.97		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1825	1603		1825	1873		1825	1710		1706	1865	1512
Flt Permitted	0.54	1.00		0.91	1.00		0.31	1.00		0.60	1.00	1.00
Satd. Flow (perm)	1038	1603		1746	1873		603	1710		1071	1865	1512
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	269	24	417	8	15	3	442	245	19	19	431	308
RTOR Reduction (vph)	0	318	0	0	3	0	0	2	0	0	0	101
Lane Group Flow (vph)	269	123	0	8	15	0	442	262	0	19	431	207
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	0%	12%	0%	7%	3%	8%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	23.7	23.7		4.4	4.4		64.1	64.1		38.8	38.8	38.8
Effective Green, g (s)	23.7	23.7		4.4	4.4		64.1	64.1		38.8	38.8	38.8
Actuated g/C Ratio	0.24	0.24		0.04	0.04		0.64	0.64		0.39	0.39	0.39
Clearance Time (s)	3.0	6.1		6.1	6.1		3.0	6.1		6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	374	379		76	82		659	1096		415	723	586
v/s Ratio Prot	c0.12	0.08			0.01		c0.15	0.15			0.23	
v/s Ratio Perm	c0.05			0.00			c0.28			0.02		0.14
v/c Ratio	0.72	0.32		0.11	0.18		0.67	0.24		0.05	0.60	0.35
Uniform Delay, d1	34.2	31.5		45.9	46.1		10.9	7.6		19.1	24.4	21.7
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.5	0.5		0.6	1.1		2.7	0.5		0.2	3.6	1.7
Delay (s)	40.7	32.0		46.5	47.2		13.6	8.1		19.3	28.0	23.4
Level of Service	D	C		D	D		B	A		B	C	C
Approach Delay (s)		35.3			47.0			11.5			25.9	
Approach LOS		D			D			B			C	

Intersection Summary

HCM 2000 Control Delay	24.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.73			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.2	
Intersection Capacity Utilization	71.4%	ICU Level of Service	C	
Analysis Period (min)	15			

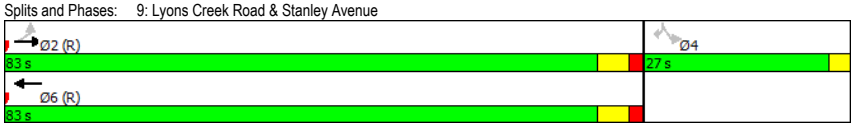
c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	474	293	184	105	562
Future Volume (vph)	474	293	184	105	562
Lane Group Flow (vph)	564	349	311	125	669
Turn Type	Perm	NA	NA	Perm	Perm
Protected Phases		2	6		
Permitted Phases	2			4	4
Detector Phase	2	2	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.1	24.1	24.1	22.5	22.5
Total Split (s)	83.0	83.0	83.0	27.0	27.0
Total Split (%)	75.5%	75.5%	75.5%	24.5%	24.5%
Yellow Time (s)	4.1	4.1	4.1	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	3.0	3.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.84	0.27	0.25	0.33	0.77
Control Delay	26.1	6.7	5.6	39.2	9.8
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	26.1	6.7	5.6	39.2	9.8
Queue Length 50th (m)	78.3	24.6	17.8	22.8	0.0
Queue Length 95th (m)	121.3	33.0	25.5	36.7	17.5
Internal Link Dist (m)		337.8	364.0	1041.4	
Turn Bay Length (m)	44.0			25.0	
Base Capacity (vph)	671	1316	1265	375	868
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.84	0.27	0.25	0.33	0.77

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated

Splits and Phases: 9: Lyons Creek Road & Stanley Avenue

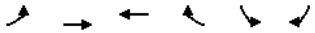


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	474	293	184	77	105	562
Future Volume (vph)	474	293	184	77	105	562
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	6.1		3.0	3.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.96		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1615	1883	1791		1722	1585
Flt Permitted	0.57	1.00	1.00		0.95	1.00
Satd. Flow (perm)	961	1883	1791		1722	1585
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	564	349	219	92	125	669
RTOR Reduction (vph)	0	0	14	0	0	523
Lane Group Flow (vph)	564	349	297	0	125	146
Heavy Vehicles (%)	13%	2%	3%	3%	6%	3%
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		2	6			
Permitted Phases	2				4	4
Actuated Green, G (s)	76.9	76.9	76.9		24.0	24.0
Effective Green, g (s)	76.9	76.9	76.9		24.0	24.0
Actuated g/C Ratio	0.70	0.70	0.70		0.22	0.22
Clearance Time (s)	6.1	6.1	6.1		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	671	1316	1252		375	345
v/s Ratio Prot		0.19	0.17			
v/s Ratio Perm	c0.59				0.07	c0.09
v/c Ratio	0.84	0.27	0.24		0.33	0.42
Uniform Delay, d1	12.1	6.1	6.0		36.3	37.0
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	12.1	0.5	0.4		2.4	3.8
Delay (s)	24.2	6.6	6.4		38.6	40.8
Level of Service	C	A	A		D	D
Approach Delay (s)		17.5	6.4		40.5	
Approach LOS		B	A		D	

Intersection Summary

HCM 2000 Control Delay	24.8	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.74		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.1
Intersection Capacity Utilization	60.0%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	36	526	492	98	109	44
Future Volume (Veh/h)	36	526	492	98	109	44
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	572	535	107	118	48
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		342				
pX, platoon unblocked					0.94	
vC, conflicting volume	535				899	268
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	535				753	268
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				62	93
cM capacity (veh/h)	1029				311	731

Direction, Lane #	EB 1	EB 2	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	230	381	268	268	107	118	48
Volume Left	39	0	0	0	0	118	0
Volume Right	0	0	0	0	107	0	48
cSH	1029	1700	1700	1700	1700	311	731
Volume to Capacity	0.04	0.22	0.16	0.16	0.06	0.38	0.07
Queue Length 95th (m)	0.9	0.0	0.0	0.0	0.0	13.0	1.6
Control Delay (s)	1.8	0.0	0.0	0.0	0.0	23.5	10.3
Lane LOS	A					C	B
Approach Delay (s)	0.7		0.0			19.7	
Approach LOS						C	

Intersection Summary				
Average Delay	2.6			
Intersection Capacity Utilization	45.2%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	21	43	68	413	424	24
Future Volume (Veh/h)	21	43	68	413	424	24
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	27	54	86	523	537	30
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	1247	552	567			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1247	552	567			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	85	90	92			
cM capacity (veh/h)	177	537	1015			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	81	609	567
Volume Left	27	86	0
Volume Right	54	0	30
cSH	320	1015	1700
Volume to Capacity	0.25	0.08	0.33
Queue Length 95th (m)	7.5	2.1	0.0
Control Delay (s)	20.0	2.2	0.0
Lane LOS	C	A	
Approach Delay (s)	20.0	2.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	63.1%	ICU Level of Service		B
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	64	42	4	410	450	21
Future Volume (Veh/h)	64	42	4	410	450	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	84	55	5	539	592	28
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	1155	606	620			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1155	606	620			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	61	89	99			
cM capacity (veh/h)	216	501	859			

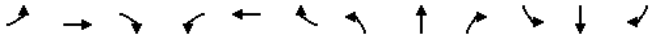
Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	139	544	620
Volume Left	84	5	0
Volume Right	55	0	28
cSH	279	859	1700
Volume to Capacity	0.50	0.01	0.36
Queue Length 95th (m)	19.7	0.1	0.0
Control Delay (s)	30.0	0.2	0.0
Lane LOS	D	A	
Approach Delay (s)	30.0	0.2	0.0
Approach LOS	D		

Intersection Summary			
Average Delay	3.3		
Intersection Capacity Utilization	37.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	41	104	35	369	488	5
Future Volume (Veh/h)	41	104	35	369	488	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	55	141	47	499	659	7
Pedestrians					2	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				346		
pX, platoon unblocked	0.88					
vC, conflicting volume	1258	662	666			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1224	662	666			
tC, single (s)	6.4	6.2	4.5			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.6			
p0 queue free %	66	69	94			
cM capacity (veh/h)	162	458	754			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	196	546	666
Volume Left	55	47	0
Volume Right	141	0	7
cSH	303	754	1700
Volume to Capacity	0.65	0.06	0.39
Queue Length 95th (m)	31.9	1.5	0.0
Control Delay (s)	36.4	1.7	0.0
Lane LOS	E	A	
Approach Delay (s)	36.4	1.7	0.0
Approach LOS	E		

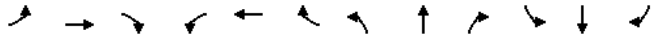
Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	63.8%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	176	0	0	9	0	73	18	151	5	114	248	159
Future Volume (vph)	176	0	0	9	0	73	18	151	5	114	248	159
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	191	0	0	10	0	79	20	164	5	124	270	173

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	191	89	189	394	173
Volume Left (vph)	191	10	20	124	0
Volume Right (vph)	0	79	5	0	173
Hadj (s)	0.20	-0.51	0.04	0.18	-0.70
Departure Headway (s)	6.1	5.7	5.7	5.8	4.9
Degree Utilization, x	0.32	0.14	0.30	0.64	0.24
Capacity (veh/h)	545	556	596	604	709
Control Delay (s)	12.0	9.6	11.1	17.2	8.2
Approach Delay (s)	12.0	9.6	11.1	14.5	
Approach LOS	B	A	B	B	

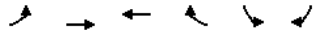
Intersection Summary				
Delay	13.0			
Level of Service	B			
Intersection Capacity Utilization	55.0%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	0	12	3	0	43	20	16	4	69	10	120
Future Volume (Veh/h)	75	0	12	3	0	43	20	16	4	69	10	120
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	0	13	3	0	47	22	17	4	75	11	130
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	336	291	76	302	354	19	141			21		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	336	291	76	302	354	19	141			21		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	100	99	100	100	96	98			95		
cM capacity (veh/h)	562	581	985	612	536	1059	1442			1595		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	95	50	43	216
Volume Left	82	3	22	75
Volume Right	13	47	4	130
cSH	598	1015	1442	1595
Volume to Capacity	0.16	0.05	0.02	0.05
Queue Length 95th (m)	4.3	1.2	0.4	1.1
Control Delay (s)	12.2	8.7	3.9	2.8
Lane LOS	B	A	A	A
Approach Delay (s)	12.2	8.7	3.9	2.8
Approach LOS	B	A		

Intersection Summary				
Average Delay			5.9	
Intersection Capacity Utilization			31.4%	ICU Level of Service
Analysis Period (min)			15	



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	49	66	26	15	0
Future Volume (Veh/h)	0	49	66	26	15	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	53	72	28	16	0
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	100				139	86
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	100				139	86
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1493				854	973

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	53	100	16
Volume Left	0	0	16
Volume Right	0	28	0
cSH	1493	1700	854
Volume to Capacity	0.00	0.06	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.0	9.3
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.3
Approach LOS			A

Intersection Summary				
Average Delay			0.9	
Intersection Capacity Utilization			15.1%	ICU Level of Service
Analysis Period (min)			15	

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix I

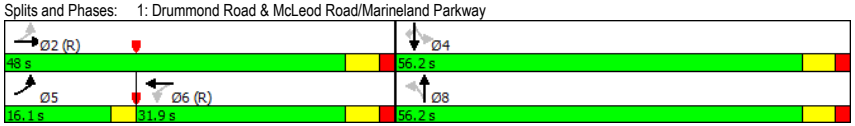
Total 2031 Traffic Operations

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	162	357	56	390	248	227	89	145	162
Future Volume (vph)	162	357	56	390	248	227	89	145	162
Lane Group Flow (vph)	178	506	62	576	273	390	98	159	178
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		6		8		4	
Permitted Phases	2		6		8		4		4
Detector Phase	5	2	6	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1	33.1
Total Split (s)	16.1	48.0	31.9	31.9	56.2	56.2	56.2	56.2	56.2
Total Split (%)	15.5%	46.1%	30.6%	30.6%	53.9%	53.9%	53.9%	53.9%	53.9%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max
v/c Ratio	0.54	0.38	0.37	0.64	0.46	0.46	0.25	0.18	0.21
Control Delay	25.2	20.9	40.2	35.7	21.3	18.2	18.3	16.1	3.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	20.9	40.2	35.7	21.3	18.2	18.3	16.1	3.0
Queue Length 50th (m)	22.3	33.8	10.4	51.1	35.7	45.4	11.3	17.7	0.0
Queue Length 95th (m)	37.1	47.0	23.5	70.2	57.9	69.7	22.7	29.8	10.6
Internal Link Dist (m)		299.5		1002.2		718.1		408.3	
Turn Bay Length (m)	95.0		25.0		25.0		15.0		50.0
Base Capacity (vph)	351	1347	167	895	592	856	386	879	842
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	0.51	0.38	0.37	0.64	0.46	0.46	0.25	0.18	0.21

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 58.1 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	162	357	104	56	390	134	248	227	128	89	145	162
Future Volume (vph)	162	357	104	56	390	134	248	227	128	89	145	162
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1		6.1	6.1		6.1	6.1		6.1	6.1	6.1
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	1.00
Frt	1.00	0.97		1.00	0.96		1.00	0.95		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1688	3288		1300	3286		1784	1741		1746	1830	1561
Flt Permitted	0.26	1.00		0.47	1.00		0.66	1.00		0.44	1.00	1.00
Satd. Flow (perm)	456	3288		638	3286		1233	1741		804	1830	1561
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	178	392	114	62	429	147	273	249	141	98	159	178
RTOR Reduction (vph)	0	26	0	0	32	0	0	20	0	0	0	92
Lane Group Flow (vph)	178	480	0	62	544	0	273	370	0	98	159	86
Confl. Peds. (#/hr)	8		2	2		8	3		9	9		3
Heavy Vehicles (%)	8%	6%	9%	40%	6%	5%	2%	1%	8%	4%	5%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	41.9	41.9		27.4	27.4		50.1	50.1		50.1	50.1	50.1
Effective Green, g (s)	41.9	41.9		27.4	27.4		50.1	50.1		50.1	50.1	50.1
Actuated g/C Ratio	0.40	0.40		0.26	0.26		0.48	0.48		0.48	0.48	0.48
Clearance Time (s)	3.0	6.1		6.1	6.1		6.1	6.1		6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	319	1322		167	864		592	837		386	879	750
v/s Ratio Prot	c0.06	0.15			c0.17			0.21			0.09	
v/s Ratio Perm	0.16			0.10			c0.22			0.12		0.05
v/c Ratio	0.56	0.36		0.37	0.63		0.46	0.44		0.25	0.18	0.11
Uniform Delay, d1	21.8	21.8		31.4	33.9		18.0	17.8		16.0	15.4	14.9
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	2.1	0.8		6.2	3.5		2.6	1.7		1.6	0.5	0.3
Delay (s)	23.9	22.6		37.6	37.4		20.6	19.5		17.6	15.8	15.2
Level of Service	C	C		D	D		C	B		B	B	B
Approach Delay (s)		22.9			37.4			20.0			16.0	
Approach LOS		C			D			B			B	

Intersection Summary

HCM 2000 Control Delay	24.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.53			
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2	
Intersection Capacity Utilization	81.3%	ICU Level of Service	D	
Analysis Period (min)	15			

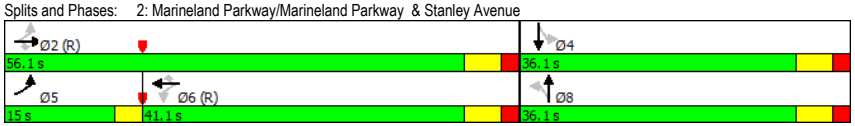
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	105	417	3	411	282	4	7	184	1
Future Volume (vph)	105	417	3	411	282	4	7	184	1
Lane Group Flow (vph)	112	444	3	437	300	4	9	196	53
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		2		6	8		4	
Detector Phase	5	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.1	38.1	38.1	38.1	36.1	36.1	36.1	36.1
Total Split (s)	15.0	56.1	56.1	41.1	41.1	36.1	36.1	36.1	36.1
Total Split (%)	16.3%	60.8%	60.8%	44.6%	44.6%	39.2%	39.2%	39.2%	39.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead			Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	None	None
v/c Ratio	0.21	0.23	0.00	0.29	0.37	0.01	0.01	0.48	0.10
Control Delay	9.9	11.4	0.0	18.1	3.7	21.2	19.2	29.5	7.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	9.9	11.4	0.0	18.1	3.7	21.2	19.2	29.5	7.2
Queue Length 50th (m)	8.4	20.4	0.0	26.3	0.0	0.5	0.8	27.5	0.1
Queue Length 95th (m)	15.7	28.7	0.0	39.1	15.0	2.8	4.1	47.9	7.8
Internal Link Dist (m)		1002.2		127.7			59.4		189.9
Turn Bay Length (m)	56.0		30.0		50.0	17.0			
Base Capacity (vph)	584	1921	885	1501	803	451	605	412	543
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	0.19	0.23	0.00	0.29	0.37	0.01	0.01	0.48	0.10

Intersection Summary

Cycle Length: 92.2
Actuated Cycle Length: 92.2
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated

Splits and Phases: 2: Marineland Parkway/Marineland Parkway & Stanley Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	105	417	3	0	411	282	4	7	2	184	1	49
Future Volume (vph)	105	417	3	0	411	282	4	7	2	184	1	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.97		1.00	0.85	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1722	3544	1601		3411	1445	1825	1857		1601	1562	
Flt Permitted	0.45	1.00	1.00		1.00	1.00	0.72	1.00		0.75	1.00	
Satd. Flow (perm)	807	3544	1601		3411	1445	1388	1857		1267	1562	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	112	444	3	0	437	300	4	7	2	196	1	52
RTOR Reduction (vph)	0	0	1	0	0	170	0	1	0	0	35	0
Lane Group Flow (vph)	112	444	2	0	437	130	4	8	0	196	18	0
Heavy Vehicles (%)	6%	3%	2%	2%	7%	13%	0%	0%	0%	14%	0%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	50.0	50.0	50.0		40.0	40.0	30.0	30.0		30.0	30.0	
Effective Green, g (s)	50.0	50.0	50.0		40.0	40.0	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.54	0.54	0.54		0.43	0.43	0.33	0.33		0.33	0.33	
Clearance Time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	507	1921	868		1479	626	451	604		412	508	
v/s Ratio Prot	0.02	c0.13			c0.13			0.00			0.01	
v/s Ratio Perm	0.10		0.00			0.09	0.00			c0.15		
v/c Ratio	0.22	0.23	0.00		0.30	0.21	0.01	0.01		0.48	0.04	
Uniform Delay, d1	10.5	11.0	9.7		16.9	16.2	21.0	21.1		24.8	21.2	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.3	0.0		0.5	0.8	0.0	0.0		0.9	0.0	
Delay (s)	10.7	11.3	9.7		17.5	17.0	21.1	21.1		25.7	21.3	
Level of Service	B	B	A		B	B	C	C		C	C	
Approach Delay (s)		11.2			17.3			21.1			24.7	
Approach LOS		B			B			C			C	

Intersection Summary

HCM 2000 Control Delay	16.3	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	92.2	Sum of lost time (s)	15.2	
Intersection Capacity Utilization	47.8%	ICU Level of Service	A	
Analysis Period (min)	15			

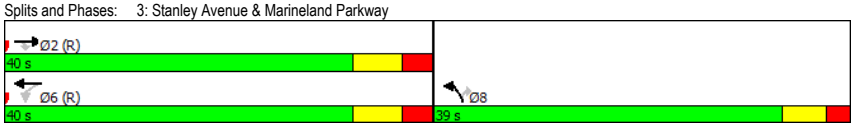
c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	351	252	23	390	303	39
Future Volume (vph)	351	252	23	390	303	39
Lane Group Flow (vph)	382	274	25	424	329	42
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	6	6	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	8.0	8.0
Minimum Split (s)	25.5	25.5	25.5	25.5	38.5	38.5
Total Split (s)	40.0	40.0	40.0	40.0	39.0	39.0
Total Split (%)	50.6%	50.6%	50.6%	50.6%	49.4%	49.4%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.1	4.1
All-Red Time (s)	3.0	3.0	3.0	3.0	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.27	0.35	0.07	0.30	0.26	0.06
Control Delay	16.1	3.5	14.9	16.4	16.1	5.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.1	3.5	14.9	16.4	16.1	5.2
Queue Length 50th (m)	19.3	0.0	2.2	21.7	16.2	0.0
Queue Length 95th (m)	28.8	13.0	6.8	32.0	24.9	5.4
Internal Link Dist (m)	100.3			324.3	152.7	
Turn Bay Length (m)		33.0	29.0		140.0	32.0
Base Capacity (vph)	1403	777	364	1403	1255	670
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.27	0.35	0.07	0.30	0.26	0.06

Intersection Summary

Cycle Length: 79
Actuated Cycle Length: 79
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 3: Stanley Avenue & Marineland Parkway



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	351	252	23	390	303	39
Future Volume (vph)	351	252	23	390	303	39
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3411	1498	1601	3411	3052	1570
Flt Permitted	1.00	1.00	0.53	1.00	0.95	1.00
Satd. Flow (perm)	3411	1498	886	3411	3052	1570
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	382	274	25	424	329	42
RTOR Reduction (vph)	0	161	0	0	0	25
Lane Group Flow (vph)	382	113	25	424	329	17
Heavy Vehicles (%)	7%	9%	14%	7%	16%	4%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1403	616	364	1403	1255	645
v/s Ratio Prot	0.11			c0.12	c0.11	
v/s Ratio Perm		0.08	0.03			0.01
v/c Ratio	0.27	0.18	0.07	0.30	0.26	0.03
Uniform Delay, d1	15.4	14.8	14.1	15.6	15.3	13.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.5	0.7	0.4	0.6	0.5	0.1
Delay (s)	15.9	15.5	14.4	16.2	15.8	13.9
Level of Service	B	B	B	B	B	B
Approach Delay (s)	15.7			16.1	15.6	
Approach LOS	B			B	B	

Intersection Summary

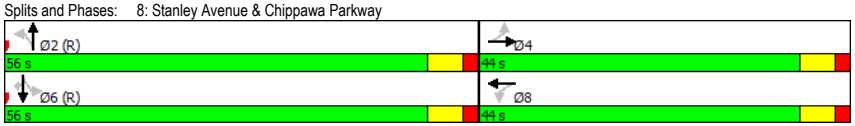
HCM 2000 Control Delay	15.8	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.28		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	39.4%	ICU Level of Service	A
Analysis Period (min)	15		
c Critical Lane Group			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	136	12	17	14	144	278	7	149	100
Future Volume (vph)	136	12	17	14	144	278	7	149	100
Lane Group Flow (vph)	162	239	20	32	171	337	8	177	119
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
Total Split (s)	44.0	44.0	44.0	44.0	56.0	56.0	56.0	56.0	56.0
Total Split (%)	44.0%	44.0%	44.0%	44.0%	56.0%	56.0%	56.0%	56.0%	56.0%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.70	0.56	0.14	0.09	0.26	0.27	0.01	0.17	0.12
Control Delay	52.7	10.7	33.4	20.1	3.6	3.1	6.7	6.8	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.7	10.7	33.4	20.1	3.6	3.1	6.7	6.8	1.7
Queue Length 50th (m)	29.7	2.3	3.3	2.7	3.6	7.1	0.4	10.3	0.0
Queue Length 95th (m)	42.4	16.0	8.3	8.7	5.9	10.1	2.2	21.7	5.3
Internal Link Dist (m)		207.0		145.4		1041.9		321.5	
Turn Bay Length (m)	30.0		30.0		30.0		30.0		30.0
Base Capacity (vph)	482	646	289	686	648	1251	733	1067	1005
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	0.34	0.37	0.07	0.05	0.26	0.27	0.01	0.17	0.12

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 8: Stanley Avenue & Chippawa Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	12	189	17	14	13	144	278	5	7	149	100
Future Volume (vph)	136	12	189	17	14	13	144	278	5	7	149	100
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		6.1	6.1		6.1	6.1		6.1	6.1	6.1
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.86		1.00	0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1644	1336		1825	1786		1372	1802		1825	1537	1396
Flt Permitted	0.74	1.00		0.40	1.00		0.65	1.00		0.55	1.00	1.00
Satd. Flow (perm)	1274	1336		765	1786		932	1802		1057	1537	1396
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	162	14	225	20	17	15	171	331	6	8	177	119
RTOR Reduction (vph)	0	184	0	0	12	0	0	0	0	0	0	36
Lane Group Flow (vph)	162	55	0	20	20	0	171	337	0	8	177	83
Heavy Vehicles (%)	11%	0%	25%	0%	0%	0%	33%	6%	25%	0%	25%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	18.4	18.4		18.4	18.4		69.4	69.4		69.4	69.4	69.4
Effective Green, g (s)	18.4	18.4		18.4	18.4		69.4	69.4		69.4	69.4	69.4
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.69	0.69		0.69	0.69	0.69
Clearance Time (s)	6.1	6.1		6.1	6.1		6.1	6.1		6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	234	245		140	328		646	1250		733	1066	968
v/s Ratio Prot		0.04			0.01			c0.19			0.12	
v/s Ratio Perm	c0.13			0.03			0.18			0.01		0.06
v/c Ratio	0.69	0.23		0.14	0.06		0.26	0.27		0.01	0.17	0.09
Uniform Delay, d1	38.2	34.7		34.2	33.7		5.7	5.8		4.7	5.3	5.0
Progression Factor	1.00	1.00		1.00	1.00		0.39	0.40		1.00	1.00	1.00
Incremental Delay, d2	8.5	0.5		0.5	0.1		0.8	0.4		0.0	0.3	0.2
Delay (s)	46.7	35.2		34.7	33.7		3.1	2.7		4.7	5.6	5.1
Level of Service	D	D		C	C		A	A		A	A	A
Approach Delay (s)		39.8			34.1			2.8			5.4	
Approach LOS		D			C			A			A	

Intersection Summary

HCM 2000 Control Delay	16.5	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.36			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.2	
Intersection Capacity Utilization	48.6%	ICU Level of Service	A	
Analysis Period (min)	15			

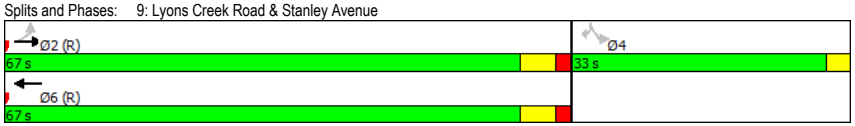
c Critical Lane Group

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	356	122	256	47	308
Future Volume (vph)	356	122	256	47	308
Lane Group Flow (vph)	383	131	349	51	331
Turn Type	Perm	NA	NA	Perm	Perm
Protected Phases		2	6		
Permitted Phases	2			4	4
Detector Phase	2	2	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.1	24.1	24.1	22.5	22.5
Total Split (s)	67.0	67.0	67.0	33.0	33.0
Total Split (%)	67.0%	67.0%	67.0%	33.0%	33.0%
Yellow Time (s)	4.1	4.1	4.1	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	3.0	3.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.66	0.12	0.32	0.12	0.52
Control Delay	19.9	8.7	9.7	26.3	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	19.9	8.7	9.7	26.3	8.6
Queue Length 50th (m)	45.0	9.9	27.8	7.5	0.0
Queue Length 95th (m)	80.1	17.6	43.3	14.5	17.8
Internal Link Dist (m)		337.8	364.0	1041.9	
Turn Bay Length (m)	44.0			25.0	
Base Capacity (vph)	576	1054	1082	414	640
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.66	0.12	0.32	0.12	0.52

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 33 (33%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 9: Lyons Creek Road & Stanley Avenue

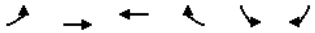


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	356	122	256	69	47	308
Future Volume (vph)	356	122	256	69	47	308
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	6.1		3.0	3.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1722	1731	1762		1383	1361
Flt Permitted	0.52	1.00	1.00		0.95	1.00
Satd. Flow (perm)	946	1731	1762		1383	1361
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	383	131	275	74	51	331
RTOR Reduction (vph)	0	0	10	0	0	232
Lane Group Flow (vph)	383	131	339	0	51	99
Heavy Vehicles (%)	6%	11%	4%	13%	32%	20%
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		2	6			
Permitted Phases	2				4	4
Actuated Green, G (s)	60.9	60.9	60.9		30.0	30.0
Effective Green, g (s)	60.9	60.9	60.9		30.0	30.0
Actuated g/C Ratio	0.61	0.61	0.61		0.30	0.30
Clearance Time (s)	6.1	6.1	6.1		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	576	1054	1073		414	408
v/s Ratio Prot		0.08	0.19			
v/s Ratio Perm	c0.41				0.04	c0.07
v/c Ratio	0.66	0.12	0.32		0.12	0.24
Uniform Delay, d1	12.8	8.3	9.5		25.4	26.4
Progression Factor	1.00	1.00	1.00		0.99	1.72
Incremental Delay, d2	6.0	0.2	0.8		0.6	1.4
Delay (s)	18.8	8.5	10.2		25.8	46.9
Level of Service	B	A	B		C	D
Approach Delay (s)		16.2	10.2		44.1	
Approach LOS		B	B		D	

Intersection Summary

HCM 2000 Control Delay	23.1	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.53		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.1
Intersection Capacity Utilization	55.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	43	347	369	62	15	46
Future Volume (Veh/h)	43	347	369	62	15	46
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	47	377	401	67	16	50
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		348				
pX, platoon unblocked						
vC, conflicting volume	401				684	200
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	401				684	200
tC, single (s)	4.4				6.9	7.2
tC, 2 stage (s)						
tF (s)	2.3				3.5	3.4
p0 queue free %	96				96	94
cM capacity (veh/h)	1073				360	771

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	47	188	188	200	200	67	16	50
Volume Left	47	0	0	0	0	0	16	0
Volume Right	0	0	0	0	0	67	0	50
cSH	1073	1700	1700	1700	1700	1700	360	771
Volume to Capacity	0.04	0.11	0.11	0.12	0.12	0.04	0.04	0.06
Queue Length 95th (m)	1.0	0.0	0.0	0.0	0.0	0.0	1.1	1.6
Control Delay (s)	8.5	0.0	0.0	0.0	0.0	0.0	15.5	10.0
Lane LOS	A						C	A
Approach Delay (s)	0.9			0.0			11.3	
Approach LOS							B	

Intersection Summary				
Average Delay	1.2			
Intersection Capacity Utilization	26.9%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	18	61	25	323	264	11
Future Volume (Veh/h)	18	61	25	323	264	11
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.73	0.73	0.73	0.73	0.73	0.73
Hourly flow rate (vph)	25	84	34	442	362	15
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	880	370	377			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	880	370	377			
tC, single (s)	6.5	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.6	3.3	2.2			
p0 queue free %	92	88	97			
cM capacity (veh/h)	295	681	1193			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	109	476	377
Volume Left	25	34	0
Volume Right	84	0	15
cSH	524	1193	1700
Volume to Capacity	0.21	0.03	0.22
Queue Length 95th (m)	5.9	0.7	0.0
Control Delay (s)	13.7	0.9	0.0
Lane LOS	B	A	
Approach Delay (s)	13.7	0.9	0.0
Approach LOS	B		

Intersection Summary				
Average Delay	2.0			
Intersection Capacity Utilization	47.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	17	35	330	259	63
Future Volume (Veh/h)	35	17	35	330	259	63
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	45	22	45	423	332	81
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	886	372	413			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	886	372	413			
tC, single (s)	6.7	6.6	4.2			
tC, 2 stage (s)						
tF (s)	3.7	3.7	2.3			
p0 queue free %	84	96	96			
cM capacity (veh/h)	275	597	1125			

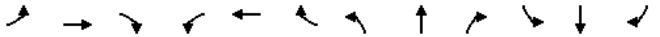
Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	45	22	468	413
Volume Left	45	0	45	0
Volume Right	0	22	0	81
cSH	275	597	1125	1700
Volume to Capacity	0.16	0.04	0.04	0.24
Queue Length 95th (m)	4.4	0.9	0.9	0.0
Control Delay (s)	20.6	11.3	1.2	0.0
Lane LOS	C	B	A	
Approach Delay (s)	17.6		1.2	0.0
Approach LOS	C			

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	50.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	32	75	362	220	46
Future Volume (Veh/h)	11	32	75	362	220	46
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	16	46	107	517	314	66
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				346		
pX, platoon unblocked	0.92					
vC, conflicting volume	1078	347	380			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1043	347	380			
tC, single (s)	6.5	6.5	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.6	2.3			
p0 queue free %	92	93	91			
cM capacity (veh/h)	206	633	1157			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	16	46	624	380
Volume Left	16	0	107	0
Volume Right	0	46	0	66
cSH	206	633	1157	1700
Volume to Capacity	0.08	0.07	0.09	0.22
Queue Length 95th (m)	1.9	1.8	2.3	0.0
Control Delay (s)	24.0	11.1	2.4	0.0
Lane LOS	C	B	A	
Approach Delay (s)	14.4		2.4	0.0
Approach LOS	B			

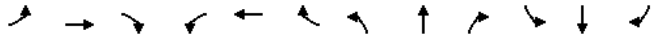
Intersection Summary				
Average Delay	2.2			
Intersection Capacity Utilization	50.9%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	126	0	0	4	0	110	3	207	1	38	83	95
Future Volume (vph)	126	0	0	4	0	110	3	207	1	38	83	95
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	137	0	0	4	0	120	3	225	1	41	90	103

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	137	124	229	131	103
Volume Left (vph)	137	4	3	41	0
Volume Right (vph)	0	120	1	0	103
Hadj (s)	0.20	-0.57	0.03	0.18	-0.70
Departure Headway (s)	5.4	4.7	5.0	5.6	4.7
Degree Utilization, x	0.21	0.16	0.32	0.20	0.14
Capacity (veh/h)	607	689	679	605	714
Control Delay (s)	9.8	8.6	10.4	8.9	7.3
Approach Delay (s)	9.8	8.6	10.4	8.2	
Approach LOS	A	A	B	A	

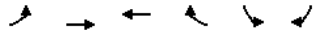
Intersection Summary				
Delay	9.2			
Level of Service	A			
Intersection Capacity Utilization	41.2%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	106	0	19	5	0	57	7	6	1	22	15	38
Future Volume (Veh/h)	106	0	19	5	0	57	7	6	1	22	15	38
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	115	0	21	5	0	62	8	7	1	24	16	41
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	170	108	36	129	128	8	57			8		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	170	108	36	129	128	8	57			8		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	84	100	98	99	100	94	99			99		
cM capacity (veh/h)	736	766	1036	814	747	1075	1547			1612		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	136	67	16	81
Volume Left	115	5	8	24
Volume Right	21	62	1	41
cSH	771	1050	1547	1612
Volume to Capacity	0.18	0.06	0.01	0.01
Queue Length 95th (m)	4.8	1.6	0.1	0.3
Control Delay (s)	10.7	8.7	3.7	2.2
Lane LOS	B	A	A	A
Approach Delay (s)	10.7	8.7	3.7	2.2
Approach LOS	B	A		

Intersection Summary				
Average Delay	7.6			
Intersection Capacity Utilization	25.1%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	58	26	10	21	0
Future Volume (Veh/h)	0	58	26	10	21	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	63	28	11	23	0
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	39				96	34
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	39				96	34
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				97	100
cM capacity (veh/h)	1571				903	1040

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	63	39	23
Volume Left	0	0	23
Volume Right	0	11	0
cSH	1571	1700	903
Volume to Capacity	0.00	0.02	0.03
Queue Length 95th (m)	0.0	0.0	0.6
Control Delay (s)	0.0	0.0	9.1
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.1
Approach LOS			A

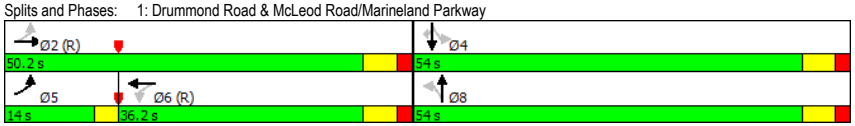
Intersection Summary				
Average Delay	1.7			
Intersection Capacity Utilization	13.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	244	475	137	564	175	252	129	305	248
Future Volume (vph)	244	475	137	564	175	252	129	305	248
Lane Group Flow (vph)	260	770	146	727	186	382	137	324	264
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases	5	2		6		8		4	
Permitted Phases	2		6		8		4		4
Detector Phase	5	2	6	6	8	8	4	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1	33.1
Total Split (s)	14.0	50.2	36.2	36.2	54.0	54.0	54.0	54.0	54.0
Total Split (%)	13.4%	48.2%	34.7%	34.7%	51.8%	51.8%	51.8%	51.8%	51.8%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag					
Lead-Lag Optimize?	Yes		Yes	Yes					
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max	Max
v/c Ratio	0.84	0.53	0.74	0.71	0.43	0.47	0.36	0.37	0.31
Control Delay	43.4	20.2	57.4	36.7	22.9	20.1	21.7	19.8	3.1
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.4	20.2	57.4	36.7	22.9	20.1	21.7	19.8	3.1
Queue Length 50th (m)	32.7	50.5	26.7	67.0	24.6	47.8	17.4	41.4	0.0
Queue Length 95th (m)	#66.3	67.7	#58.4	87.8	43.7	72.7	32.9	62.1	13.2
Internal Link Dist (m)		299.5		1002.2		717.3		408.3	
Turn Bay Length (m)	95.0		25.0		25.0		15.0		50.0
Base Capacity (vph)	311	1466	198	1019	431	820	379	883	862
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	0.84	0.53	0.74	0.71	0.43	0.47	0.36	0.37	0.31

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 91.2 (88%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	244	475	249	137	564	119	175	252	107	129	305	248
Future Volume (vph)	244	475	249	137	564	119	175	252	107	129	305	248
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1		6.1	6.1		6.1	6.1		6.1	6.1	6.1
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00		0.99	1.00		0.99	1.00		0.99	1.00	1.00
Frt	1.00	0.95		1.00	0.97		1.00	0.96		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1805	3313		1811	3468		1816	1754		1809	1921	1567
Flt Permitted	0.18	1.00		0.36	1.00		0.49	1.00		0.43	1.00	1.00
Satd. Flow (perm)	349	3313		686	3468		938	1754		826	1921	1567
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	260	505	265	146	600	127	186	268	114	137	324	264
RTOR Reduction (vph)	0	65	0	0	17	0	0	15	0	0	0	143
Lane Group Flow (vph)	260	705	0	146	710	0	186	367	0	137	324	121
Confl. Peds. (#/hr)	11		9	9		11	8		16	16		8
Heavy Vehicles (%)	1%	4%	1%	0%	2%	0%	0%	1%	10%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		4
Actuated Green, G (s)	44.1	44.1		30.1	30.1		47.9	47.9		47.9	47.9	47.9
Effective Green, g (s)	44.1	44.1		30.1	30.1		47.9	47.9		47.9	47.9	47.9
Actuated g/C Ratio	0.42	0.42		0.29	0.29		0.46	0.46		0.46	0.46	0.46
Clearance Time (s)	3.0	6.1		6.1	6.1		6.1	6.1		6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	301	1402		198	1001		431	806		379	883	720
v/s Ratio Prot	c0.09	0.21			0.20			c0.21			0.17	
v/s Ratio Perm	c0.27			0.21			0.20			0.17		0.08
v/c Ratio	0.86	0.50		0.74	0.71		0.43	0.46		0.36	0.37	0.17
Uniform Delay, d1	22.4	22.0		33.5	33.1		19.0	19.2		18.2	18.3	16.5
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	21.7	1.3		21.6	4.2		3.1	1.9		2.7	1.2	0.5
Delay (s)	44.1	23.3		55.1	37.4		22.1	21.1		20.9	19.5	17.0
Level of Service	D	C		E	D		C	C		C	B	B
Approach Delay (s)		28.6			40.3			21.4			18.8	
Approach LOS		C			D			C			B	

Intersection Summary

HCM 2000 Control Delay	28.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2
Intersection Capacity Utilization	83.9%	ICU Level of Service	E
Analysis Period (min)	15		

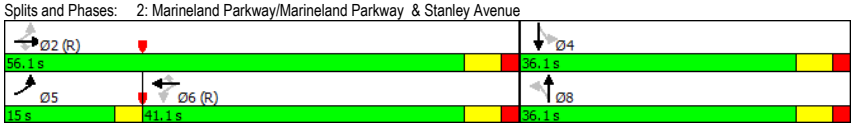
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBT	WBR	NBL	NBT	SBL	SBT
Lane Configurations									
Traffic Volume (vph)	92	555	5	712	296	6	6	342	11
Future Volume (vph)	92	555	5	712	296	6	6	342	11
Lane Group Flow (vph)	96	578	5	742	308	6	10	356	154
Turn Type	pm+pt	NA	Perm	NA	Perm	Perm	NA	Perm	NA
Protected Phases	5	2		6			8		4
Permitted Phases	2		2		6	8		4	
Detector Phase	5	2	2	6	6	8	8	4	4
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	38.1	38.1	38.1	38.1	36.1	36.1	36.1	36.1
Total Split (s)	15.0	56.1	56.1	41.1	41.1	36.1	36.1	36.1	36.1
Total Split (%)	16.3%	60.8%	60.8%	44.6%	44.6%	39.2%	39.2%	39.2%	39.2%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead			Lag	Lag				
Lead-Lag Optimize?	Yes			Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	C-Max	Max	Max	None	None
v/c Ratio	0.24	0.30	0.01	0.47	0.35	0.02	0.02	0.81	0.25
Control Delay	10.3	12.1	0.0	19.9	3.4	21.5	17.4	45.2	6.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	10.3	12.1	0.0	19.9	3.4	21.5	17.4	45.2	6.0
Queue Length 50th (m)	7.1	27.8	0.0	48.7	0.0	0.7	0.7	57.5	1.3
Queue Length 95th (m)	13.8	37.9	0.0	67.2	14.7	3.4	4.2	#102.7	14.2
Internal Link Dist (m)		1002.2		131.9			66.0		189.9
Turn Bay Length (m)	56.0		30.0		50.0	17.0			
Base Capacity (vph)	458	1903	885	1592	890	352	590	438	610
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	0.21	0.30	0.01	0.47	0.35	0.02	0.02	0.81	0.25

Intersection Summary

Cycle Length: 92.2
Actuated Cycle Length: 92.2
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 85
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 2: Marineland Parkway/Marineland Parkway & Stanley Avenue



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	92	555	5	0	712	296	6	6	4	342	11	137
Future Volume (vph)	92	555	5	0	712	296	6	6	4	342	11	137
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95	1.00		0.95	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00	0.85		1.00	0.85	1.00	0.94		1.00	0.86	
Flt Protected	0.95	1.00	1.00		1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1772	3510	1601		3579	1617	1560	1806		1706	1580	
Flt Permitted	0.27	1.00	1.00		1.00	1.00	0.66	1.00		0.75	1.00	
Satd. Flow (perm)	511	3510	1601		3579	1617	1082	1806		1349	1580	
Peak-hour factor, PHF	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96	0.96
Adj. Flow (vph)	96	578	5	0	742	308	6	6	4	356	11	143
RTOR Reduction (vph)	0	0	2	0	0	173	0	3	0	0	96	0
Lane Group Flow (vph)	96	578	3	0	742	135	6	7	0	356	58	0
Heavy Vehicles (%)	3%	4%	2%	0%	2%	1%	17%	0%	0%	7%	0%	5%
Turn Type	pm+pt	NA	Perm	Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2		2	6		6	8			4		
Actuated Green, G (s)	50.0	50.0	50.0		40.4	40.4	30.0	30.0		30.0	30.0	
Effective Green, g (s)	50.0	50.0	50.0		40.4	40.4	30.0	30.0		30.0	30.0	
Actuated g/C Ratio	0.54	0.54	0.54		0.44	0.44	0.33	0.33		0.33	0.33	
Clearance Time (s)	3.0	6.1	6.1		6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	367	1903	868		1568	708	352	587		438	514	
v/s Ratio Prot	0.02	c0.16			c0.21			0.00			0.04	
v/s Ratio Perm	0.12		0.00			0.08	0.01			c0.26		
v/c Ratio	0.26	0.30	0.00		0.47	0.19	0.02	0.01		0.81	0.11	
Uniform Delay, d1	11.0	11.6	9.7		18.4	15.9	21.1	21.1		28.5	21.8	
Progression Factor	1.00	1.00	1.00		1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.4	0.4	0.0		1.0	0.6	0.1	0.0		11.0	0.1	
Delay (s)	11.4	12.0	9.7		19.4	16.5	21.2	21.1		39.5	21.9	
Level of Service	B	B	A		B	B	C	C		D	C	
Approach Delay (s)		11.9			18.5			21.1			34.2	
Approach LOS		B			B			C			C	

Intersection Summary

HCM 2000 Control Delay	20.1	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.59				
Actuated Cycle Length (s)	92.2	Sum of lost time (s)		15.2	
Intersection Capacity Utilization	63.9%	ICU Level of Service		B	
Analysis Period (min)	15				

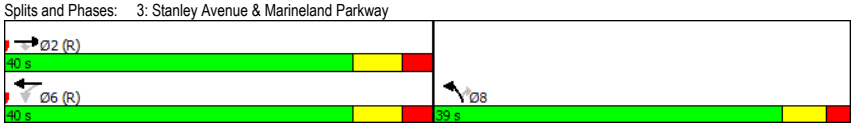
c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	525	376	54	494	514	49
Future Volume (vph)	525	376	54	494	514	49
Lane Group Flow (vph)	571	409	59	537	559	53
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Detector Phase	2	2	6	6	8	8
Switch Phase						
Minimum Initial (s)	10.0	10.0	10.0	10.0	8.0	8.0
Minimum Split (s)	22.5	22.5	22.5	22.5	38.5	38.5
Total Split (s)	40.0	40.0	40.0	40.0	39.0	39.0
Total Split (%)	50.6%	50.6%	50.6%	50.6%	49.4%	49.4%
Yellow Time (s)	4.5	4.5	4.5	4.5	4.1	4.1
All-Red Time (s)	3.0	3.0	3.0	3.0	2.4	2.4
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lead/Lag						
Lead-Lag Optimize?						
Recall Mode	C-Max	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.40	0.49	0.21	0.38	0.41	0.08
Control Delay	17.5	4.0	17.6	17.2	17.6	4.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.5	4.0	17.6	17.2	17.6	4.8
Queue Length 50th (m)	30.7	0.0	5.5	28.5	29.6	0.0
Queue Length 95th (m)	43.3	15.6	13.8	40.5	42.0	6.1
Internal Link Dist (m)	106.2			318.1	148.8	
Turn Bay Length (m)		33.0	29.0		140.0	32.0
Base Capacity (vph)	1416	835	276	1430	1361	703
Starvation Cap Reductn	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0
Reduced v/c Ratio	0.40	0.49	0.21	0.38	0.41	0.08

Intersection Summary

Cycle Length: 79
Actuated Cycle Length: 79
Offset: 0 (0%), Referenced to phase 2:EBT and 6:WBTL, Start of Green
Natural Cycle: 65
Control Type: Actuated-Coordinated

Splits and Phases: 3: Stanley Avenue & Marineland Parkway



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	525	376	54	494	514	49
Future Volume (vph)	525	376	54	494	514	49
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Lane Util. Factor	0.95	1.00	1.00	0.95	0.97	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	1.00	1.00	0.95	1.00	0.95	1.00
Satd. Flow (prot)	3444	1445	1547	3476	3309	1633
Flt Permitted	1.00	1.00	0.41	1.00	0.95	1.00
Satd. Flow (perm)	3444	1445	672	3476	3309	1633
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	571	409	59	537	559	53
RTOR Reduction (vph)	0	241	0	0	0	31
Lane Group Flow (vph)	571	168	59	537	559	22
Heavy Vehicles (%)	6%	13%	18%	5%	7%	0%
Turn Type	NA	Perm	Perm	NA	Prot	Perm
Protected Phases	2			6	8	
Permitted Phases		2	6			8
Actuated Green, G (s)	32.5	32.5	32.5	32.5	32.5	32.5
Effective Green, g (s)	32.5	32.5	32.5	32.5	32.5	32.5
Actuated g/C Ratio	0.41	0.41	0.41	0.41	0.41	0.41
Clearance Time (s)	7.5	7.5	7.5	7.5	6.5	6.5
Vehicle Extension (s)	3.0	3.0	3.0	3.0	3.0	3.0
Lane Grp Cap (vph)	1416	594	276	1430	1361	671
v/s Ratio Prot	c0.17			0.15	c0.17	
v/s Ratio Perm		0.12	0.09			0.01
v/c Ratio	0.40	0.28	0.21	0.38	0.41	0.03
Uniform Delay, d1	16.4	15.5	15.0	16.2	16.5	13.9
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.9	1.2	1.8	0.8	0.9	0.1
Delay (s)	17.3	16.7	16.8	16.9	17.4	14.0
Level of Service	B	B	B	B	B	B
Approach Delay (s)	17.0			16.9	17.1	
Approach LOS	B			B	B	

Intersection Summary

HCM 2000 Control Delay	17.0	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.41		
Actuated Cycle Length (s)	79.0	Sum of lost time (s)	14.0
Intersection Capacity Utilization	55.4%	ICU Level of Service	B
Analysis Period (min)	15		

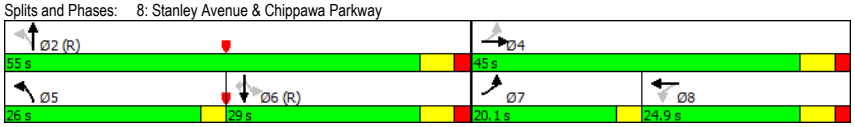
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	210	19	7	13	346	197	16	351	241
Future Volume (vph)	210	19	7	13	346	197	16	351	241
Lane Group Flow (vph)	269	443	9	20	444	274	21	450	309
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	NA	Perm
Protected Phases	7	4		8	5	2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	7	4	8	8	5	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.1	24.1	24.1	9.5	24.1	24.1	24.1	24.1
Total Split (s)	20.1	45.0	24.9	24.9	26.0	55.0	29.0	29.0	29.0
Total Split (%)	20.1%	45.0%	24.9%	24.9%	26.0%	55.0%	29.0%	29.0%	29.0%
Yellow Time (s)	3.0	4.1	4.1	4.1	3.0	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	2.0	0.0	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)	3.0	6.1	6.1	6.1	3.0	6.1	6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.71	0.66	0.08	0.16	0.66	0.24	0.05	0.59	0.43
Control Delay	42.7	9.0	44.3	41.4	13.0	8.5	26.7	32.2	15.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.7	9.0	44.3	41.4	13.0	8.5	26.7	32.2	15.7
Queue Length 50th (m)	42.9	3.5	1.7	3.2	36.7	22.0	2.7	75.0	21.4
Queue Length 95th (m)	54.0	13.0	5.5	8.7	47.6	30.8	8.0	#118.5	40.1
Internal Link Dist (m)		207.0		145.4		1041.4		321.9	
Turn Bay Length (m)	30.0		30.0		30.0		30.0		30.0
Base Capacity (vph)	395	879	321	355	719	1138	434	762	712
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	0.68	0.50	0.03	0.06	0.62	0.24	0.05	0.59	0.43

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 8: Stanley Avenue & Chippawa Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	19	327	7	13	2	346	197	16	16	351	241
Future Volume (vph)	210	19	327	7	13	2	346	197	16	16	351	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1		6.1	6.1		3.0	6.1		6.1	6.1	6.1
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.86		1.00	0.98		1.00	0.99		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1825	1603		1825	1878		1825	1710		1706	1865	1512
Flt Permitted	0.53	1.00		0.89	1.00		0.29	1.00		0.59	1.00	1.00
Satd. Flow (perm)	1025	1603		1708	1878		561	1710		1061	1865	1512
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	269	24	419	9	17	3	444	253	21	21	450	309
RTOR Reduction (vph)	0	319	0	0	3	0	0	2	0	0	0	98
Lane Group Flow (vph)	269	124	0	9	17	0	444	272	0	21	450	211
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	0%	12%	0%	7%	3%	8%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	23.8	23.8		4.5	4.5		64.0	64.0		38.5	38.5	38.5
Effective Green, g (s)	23.8	23.8		4.5	4.5		64.0	64.0		38.5	38.5	38.5
Actuated g/C Ratio	0.24	0.24		0.04	0.04		0.64	0.64		0.38	0.38	0.38
Clearance Time (s)	3.0	6.1		6.1	6.1		3.0	6.1		6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	374	381		76	84		643	1094		408	718	582
v/s Ratio Prot	c0.12	0.08			0.01		c0.16	0.16			0.24	
v/s Ratio Perm	c0.05			0.01			c0.29			0.02		0.14
v/c Ratio	0.72	0.32		0.12	0.20		0.69	0.25		0.05	0.63	0.36
Uniform Delay, d1	34.1	31.5		45.8	46.0		11.4	7.7		19.3	24.9	22.0
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Incremental Delay, d2	6.5	0.5		0.7	1.2		3.2	0.5		0.2	4.1	1.8
Delay (s)	40.6	32.0		46.5	47.2		14.6	8.2		19.5	29.0	23.7
Level of Service	D	C		D	D		B	A		B	C	C
Approach Delay (s)		35.2			47.0			12.2			26.7	
Approach LOS		D			D			B			C	

Intersection Summary

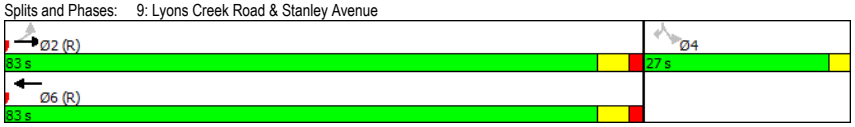
HCM 2000 Control Delay	25.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.74			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.2	
Intersection Capacity Utilization	72.4%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	480	308	193	109	575
Future Volume (vph)	480	308	193	109	575
Lane Group Flow (vph)	571	367	324	130	685
Turn Type	Perm	NA	NA	Perm	Perm
Protected Phases		2	6		
Permitted Phases	2			4	4
Detector Phase	2	2	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.1	24.1	24.1	22.5	22.5
Total Split (s)	83.0	83.0	83.0	27.0	27.0
Total Split (%)	75.5%	75.5%	75.5%	24.5%	24.5%
Yellow Time (s)	4.1	4.1	4.1	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	3.0	3.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.87	0.28	0.26	0.35	0.78
Control Delay	28.9	6.8	5.7	39.5	9.9
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	28.9	6.8	5.7	39.5	9.9
Queue Length 50th (m)	82.8	26.2	19.0	23.8	0.0
Queue Length 95th (m)	#137.1	34.7	26.8	38.0	17.5
Internal Link Dist (m)		337.8	364.0	1041.4	
Turn Bay Length (m)	44.0			25.0	
Base Capacity (vph)	660	1316	1266	375	881
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.87	0.28	0.26	0.35	0.78

Intersection Summary

Cycle Length: 110
Actuated Cycle Length: 110
Offset: 0 (0%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 90
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 9: Lyons Creek Road & Stanley Avenue

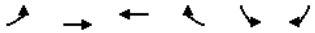


Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	480	308	193	79	109	575
Future Volume (vph)	480	308	193	79	109	575
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	6.1		3.0	3.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.96		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1615	1883	1792		1722	1585
Flt Permitted	0.56	1.00	1.00		0.95	1.00
Satd. Flow (perm)	945	1883	1792		1722	1585
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	571	367	230	94	130	685
RTOR Reduction (vph)	0	0	13	0	0	536
Lane Group Flow (vph)	571	367	311	0	130	149
Heavy Vehicles (%)	13%	2%	3%	3%	6%	3%
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		2	6			
Permitted Phases	2				4	4
Actuated Green, G (s)	76.9	76.9	76.9		24.0	24.0
Effective Green, g (s)	76.9	76.9	76.9		24.0	24.0
Actuated g/C Ratio	0.70	0.70	0.70		0.22	0.22
Clearance Time (s)	6.1	6.1	6.1		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	660	1316	1252		375	345
v/s Ratio Prot		0.19	0.17			
v/s Ratio Perm	c0.60				0.08	c0.09
v/c Ratio	0.87	0.28	0.25		0.35	0.43
Uniform Delay, d1	12.6	6.2	6.0		36.4	37.1
Progression Factor	1.00	1.00	1.00		1.00	1.00
Incremental Delay, d2	14.2	0.5	0.5		2.5	3.9
Delay (s)	26.8	6.7	6.5		38.9	41.1
Level of Service	C	A	A		D	D
Approach Delay (s)		18.9	6.5		40.7	
Approach LOS		B	A		D	

Intersection Summary

HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	110.0	Sum of lost time (s)	9.1
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	36	538	503	100	112	45
Future Volume (Veh/h)	36	538	503	100	112	45
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	39	585	547	109	122	49
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type		None	None			
Median storage veh)						
Upstream signal (m)		342				
pX, platoon unblocked					0.95	
vC, conflicting volume	547				918	274
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	547				800	274
tC, single (s)	4.1				6.8	6.9
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	96				58	93
cM capacity (veh/h)	1018				294	724

Direction, Lane #	EB 1	EB 2	EB 3	WB 1	WB 2	WB 3	SB 1	SB 2
Volume Total	39	292	292	274	274	109	122	49
Volume Left	39	0	0	0	0	0	122	0
Volume Right	0	0	0	0	0	109	0	49
cSH	1018	1700	1700	1700	1700	1700	294	724
Volume to Capacity	0.04	0.17	0.17	0.16	0.16	0.06	0.42	0.07
Queue Length 95th (m)	0.9	0.0	0.0	0.0	0.0	0.0	14.9	1.7
Control Delay (s)	8.7	0.0	0.0	0.0	0.0	0.0	25.7	10.3
Lane LOS	A						D	B
Approach Delay (s)	0.5			0.0			21.3	
Approach LOS							C	

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	33.4%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	22	43	68	423	434	25
Future Volume (Veh/h)	22	43	68	423	434	25
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.79	0.79	0.79	0.79	0.79	0.79
Hourly flow rate (vph)	28	54	86	535	549	32
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	1272	565	581			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1272	565	581			
tC, single (s)	6.4	6.2	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	84	90	91			
cM capacity (veh/h)	171	528	1003			

Direction, Lane #	EB 1	NB 1	SB 1
Volume Total	82	621	581
Volume Left	28	86	0
Volume Right	54	0	32
cSH	308	1003	1700
Volume to Capacity	0.27	0.09	0.34
Queue Length 95th (m)	8.0	2.1	0.0
Control Delay (s)	20.9	2.2	0.0
Lane LOS	C	A	
Approach Delay (s)	20.9	2.2	0.0
Approach LOS	C		

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	64.2%	ICU Level of Service		C
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	67	44	5	417	459	22
Future Volume (Veh/h)	67	44	5	417	459	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	88	58	7	549	604	29
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	1182	618	633			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1182	618	633			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	58	88	99			
cM capacity (veh/h)	208	493	849			

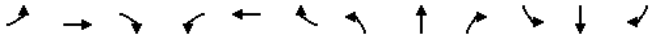
Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	88	58	556	633
Volume Left	88	0	7	0
Volume Right	0	58	0	29
cSH	208	493	849	1700
Volume to Capacity	0.42	0.12	0.01	0.37
Queue Length 95th (m)	14.8	3.0	0.2	0.0
Control Delay (s)	34.4	13.3	0.2	0.0
Lane LOS	D	B	A	
Approach Delay (s)	26.0		0.2	0.0
Approach LOS	D			

Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	36.3%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	43	109	36	374	499	6
Future Volume (Veh/h)	43	109	36	374	499	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	58	147	49	505	674	8
Pedestrians					2	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				346		
pX, platoon unblocked	0.87					
vC, conflicting volume	1283	678	682			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1252	678	682			
tC, single (s)	6.4	6.2	4.5			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.6			
p0 queue free %	62	67	93			
cM capacity (veh/h)	154	449	743			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	58	147	554	682
Volume Left	58	0	49	0
Volume Right	0	147	0	8
cSH	154	449	743	1700
Volume to Capacity	0.38	0.33	0.07	0.40
Queue Length 95th (m)	12.1	10.7	1.6	0.0
Control Delay (s)	41.7	16.9	1.8	0.0
Lane LOS	E	C	A	
Approach Delay (s)	23.9		1.8	0.0
Approach LOS	C			

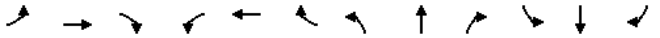
Intersection Summary				
Average Delay	4.1			
Intersection Capacity Utilization	59.6%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Sign Control		Stop			Stop			Stop			Stop	
Traffic Volume (vph)	176	0	0	9	0	73	18	151	5	114	248	159
Future Volume (vph)	176	0	0	9	0	73	18	151	5	114	248	159
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	191	0	0	10	0	79	20	164	5	124	270	173

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total (vph)	191	89	189	394	173
Volume Left (vph)	191	10	20	124	0
Volume Right (vph)	0	79	5	0	173
Hadj (s)	0.20	-0.51	0.04	0.18	-0.70
Departure Headway (s)	6.1	5.7	5.7	5.8	4.9
Degree Utilization, x	0.32	0.14	0.30	0.64	0.24
Capacity (veh/h)	545	556	596	604	709
Control Delay (s)	12.0	9.6	11.1	17.2	8.2
Approach Delay (s)	12.0	9.6	11.1	14.5	
Approach LOS	B	A	B	B	

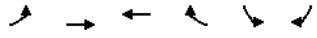
Intersection Summary				
Delay	13.0			
Level of Service	B			
Intersection Capacity Utilization	55.0%	ICU Level of Service	B	
Analysis Period (min)	15			



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	75	0	12	3	0	43	20	16	4	69	10	120
Future Volume (Veh/h)	75	0	12	3	0	43	20	16	4	69	10	120
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	82	0	13	3	0	47	22	17	4	75	11	130
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	336	291	76	302	354	19	141			21		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	336	291	76	302	354	19	141			21		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	85	100	99	100	100	96	98			95		
cM capacity (veh/h)	562	581	985	612	536	1059	1442			1595		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	95	50	43	216
Volume Left	82	3	22	75
Volume Right	13	47	4	130
cSH	598	1015	1442	1595
Volume to Capacity	0.16	0.05	0.02	0.05
Queue Length 95th (m)	4.3	1.2	0.4	1.1
Control Delay (s)	12.2	8.7	3.9	2.8
Lane LOS	B	A	A	A
Approach Delay (s)	12.2	8.7	3.9	2.8
Approach LOS	B	A		

Intersection Summary				
Average Delay	5.9			
Intersection Capacity Utilization	31.4%	ICU Level of Service	A	
Analysis Period (min)	15			



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	50	67	26	15	0
Future Volume (Veh/h)	0	50	67	26	15	0
Sign Control		Free	Free		Stop	
Grade		0%	0%		0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	54	73	28	16	0
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	101				141	87
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	101				141	87
tC, single (s)	4.1				6.4	6.2
tC, 2 stage (s)						
tF (s)	2.2				3.5	3.3
p0 queue free %	100				98	100
cM capacity (veh/h)	1491				852	971

Direction, Lane #	EB 1	WB 1	SB 1
Volume Total	54	101	16
Volume Left	0	0	16
Volume Right	0	28	0
cSH	1491	1700	852
Volume to Capacity	0.00	0.06	0.02
Queue Length 95th (m)	0.0	0.0	0.4
Control Delay (s)	0.0	0.0	9.3
Lane LOS			A
Approach Delay (s)	0.0	0.0	9.3
Approach LOS			A

Intersection Summary				
Average Delay	0.9			
Intersection Capacity Utilization	15.1%	ICU Level of Service	A	
Analysis Period (min)	15			

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix J

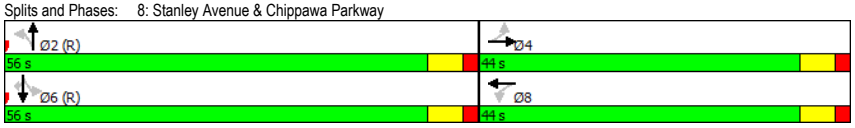
Background Traffic Operations with Improvements

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	136	12	16	13	144	241	6	85	99
Future Volume (vph)	136	12	16	13	144	241	6	85	99
Lane Group Flow (vph)	162	239	19	29	171	292	7	101	118
Turn Type	Perm	NA	Perm	NA	Perm	NA	Perm	NA	Perm
Protected Phases		4		8		2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	4	4	8	8	2	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1	24.1
Total Split (s)	44.0	44.0	44.0	44.0	56.0	56.0	56.0	56.0	56.0
Total Split (%)	44.0%	44.0%	44.0%	44.0%	56.0%	56.0%	56.0%	56.0%	56.0%
Yellow Time (s)	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag									
Lead-Lag Optimize?									
Recall Mode	None	None	None	None	C-Max	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.69	0.56	0.14	0.09	0.25	0.23	0.01	0.09	0.12
Control Delay	52.5	10.7	33.1	20.0	3.5	3.1	6.7	6.5	1.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	52.5	10.7	33.1	20.0	3.5	3.1	6.7	6.5	1.7
Queue Length 50th (m)	29.7	2.3	3.1	2.4	3.6	6.1	0.4	5.6	0.0
Queue Length 95th (m)	42.4	16.0	7.9	8.1	5.8	8.8	2.0	13.2	5.2
Internal Link Dist (m)		207.0		145.4		1041.9		321.5	
Turn Bay Length (m)	30.0		30.0		30.0		30.0		30.0
Base Capacity (vph)	483	646	289	684	694	1251	774	1067	1005
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	0.34	0.37	0.07	0.04	0.25	0.23	0.01	0.09	0.12

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 50
Control Type: Actuated-Coordinated

Splits and Phases: 8: Stanley Avenue & Chippawa Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	136	12	189	16	13	12	144	241	4	6	85	99
Future Volume (vph)	136	12	189	16	13	12	144	241	4	6	85	99
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		6.1	6.1		6.1	6.1		6.1	6.1	6.1
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.86		1.00	0.93		1.00	1.00		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1644	1336		1825	1782		1372	1802		1825	1537	1396
Flt Permitted	0.74	1.00		0.40	1.00		0.69	1.00		0.58	1.00	1.00
Satd. Flow (perm)	1278	1336		765	1782		999	1802		1117	1537	1396
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	162	14	225	19	15	14	171	287	5	7	101	118
RTOR Reduction (vph)	0	184	0	0	11	0	0	0	0	0	0	36
Lane Group Flow (vph)	162	55	0	19	18	0	171	292	0	7	101	82
Heavy Vehicles (%)	11%	0%	25%	0%	0%	0%	33%	6%	25%	0%	25%	17%
Turn Type	Perm	NA		Perm	NA		Perm	NA		Perm	NA	Perm
Protected Phases		4			8			2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	18.4	18.4		18.4	18.4		69.4	69.4		69.4	69.4	69.4
Effective Green, g (s)	18.4	18.4		18.4	18.4		69.4	69.4		69.4	69.4	69.4
Actuated g/C Ratio	0.18	0.18		0.18	0.18		0.69	0.69		0.69	0.69	0.69
Clearance Time (s)	6.1	6.1		6.1	6.1		6.1	6.1		6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	235	245		140	327		693	1250		775	1066	968
v/s Ratio Prot		0.04			0.01			0.16			0.07	
v/s Ratio Perm	c0.13			0.02			c0.17			0.01		0.06
v/c Ratio	0.69	0.23		0.14	0.05		0.25	0.23		0.01	0.09	0.08
Uniform Delay, d1	38.1	34.7		34.1	33.6		5.6	5.6		4.7	5.0	5.0
Progression Factor	1.00	1.00		1.00	1.00		0.39	0.41		1.00	1.00	1.00
Incremental Delay, d2	8.2	0.5		0.4	0.1		0.8	0.4		0.0	0.2	0.2
Delay (s)	46.3	35.2		34.6	33.7		3.0	2.7		4.7	5.2	5.1
Level of Service	D	D		C	C		A	A		A	A	A
Approach Delay (s)		39.7			34.0			2.8			5.2	
Approach LOS		D			C			A			A	

Intersection Summary

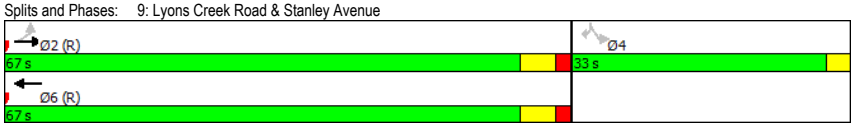
HCM 2000 Control Delay	17.6	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.34			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	12.2	
Intersection Capacity Utilization	39.0%	ICU Level of Service	A	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	327	116	244	33	257
Future Volume (vph)	327	116	244	33	257
Lane Group Flow (vph)	352	125	327	35	276
Turn Type	Perm	NA	NA	Perm	Perm
Protected Phases		2	6		
Permitted Phases	2			4	4
Detector Phase	2	2	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.1	24.1	24.1	22.5	22.5
Total Split (s)	67.0	67.0	67.0	33.0	33.0
Total Split (%)	67.0%	67.0%	67.0%	33.0%	33.0%
Yellow Time (s)	4.1	4.1	4.1	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	3.0	3.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.59	0.12	0.30	0.08	0.46
Control Delay	17.1	8.6	9.5	24.4	6.1
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	17.1	8.6	9.5	24.4	6.1
Queue Length 50th (m)	38.5	9.4	25.7	4.9	0.0
Queue Length 95th (m)	66.8	16.9	40.2	10.3	10.0
Internal Link Dist (m)		337.8	364.0	1041.9	
Turn Bay Length (m)	44.0			25.0	
Base Capacity (vph)	594	1054	1085	414	601
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.59	0.12	0.30	0.08	0.46

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 33 (33%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 60
Control Type: Actuated-Coordinated

Splits and Phases: 9: Lyons Creek Road & Stanley Avenue



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	327	116	244	60	33	257
Future Volume (vph)	327	116	244	60	33	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	6.1		3.0	3.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1722	1731	1767		1383	1361
Flt Permitted	0.54	1.00	1.00		0.95	1.00
Satd. Flow (perm)	977	1731	1767		1383	1361
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	352	125	262	65	35	276
RTOR Reduction (vph)	0	0	9	0	0	193
Lane Group Flow (vph)	352	125	318	0	35	83
Heavy Vehicles (%)	6%	11%	4%	13%	32%	20%
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		2	6			
Permitted Phases	2				4	4
Actuated Green, G (s)	60.9	60.9	60.9		30.0	30.0
Effective Green, g (s)	60.9	60.9	60.9		30.0	30.0
Actuated g/C Ratio	0.61	0.61	0.61		0.30	0.30
Clearance Time (s)	6.1	6.1	6.1		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	594	1054	1076		414	408
v/s Ratio Prot		0.07	0.18			
v/s Ratio Perm	c0.36				0.03	c0.06
v/c Ratio	0.59	0.12	0.30		0.08	0.20
Uniform Delay, d1	12.0	8.2	9.3		25.1	26.1
Progression Factor	1.00	1.00	1.00		0.94	1.03
Incremental Delay, d2	4.3	0.2	0.7		0.4	1.1
Delay (s)	16.3	8.5	10.0		24.0	27.9
Level of Service	B	A	B		C	C
Approach Delay (s)		14.2	10.0		27.4	
Approach LOS		B	B		C	

Intersection Summary

HCM 2000 Control Delay	16.7	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.46		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.1
Intersection Capacity Utilization	52.3%	ICU Level of Service	A
Analysis Period (min)	15		

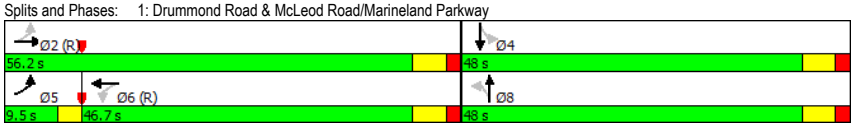
c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	238	467	12	552	70	208	126	237
Future Volume (vph)	238	467	12	552	70	208	126	237
Lane Group Flow (vph)	0	838	0	723	0	321	134	508
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1
Total Split (s)	9.5	56.2	46.7	46.7	48.0	48.0	48.0	48.0
Total Split (%)	9.1%	53.9%	44.8%	44.8%	46.1%	46.1%	46.1%	46.1%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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
Total Lost Time (s)		6.1		6.1		6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio		0.85		0.46		0.80	0.34	0.69
Control Delay		33.5		18.5		43.6	24.8	28.5
Queue Delay		0.0		0.0		0.0	0.0	0.0
Total Delay		33.5		18.5		43.6	24.8	28.5
Queue Length 50th (m)		74.6		47.6		55.4	18.5	74.4
Queue Length 95th (m)		#113.5		62.9		#102.7	34.0	111.8
Internal Link Dist (m)		299.5		1002.2		717.3		408.3
Turn Bay Length (m)							20.0	
Base Capacity (vph)		983		1572		403	390	734
Starvation Cap Reductn		0		0		0	0	0
Spillback Cap Reductn		0		0		0	0	0
Storage Cap Reductn		0		0		0	0	0
Reduced v/c Ratio		0.85		0.46		0.80	0.34	0.69

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 58.1 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	467	83	12	552	116	70	208	24	126	237	241
Future Volume (vph)	238	467	83	12	552	116	70	208	24	126	237	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)		6.1			6.1			6.1		6.1	6.1	
Lane Util. Factor		0.95			0.95			1.00		1.00	1.00	
Frpb, ped/bikes		1.00			0.99			1.00		1.00	0.99	
Flpb, ped/bikes		1.00			1.00			1.00		0.99	1.00	
Frt		0.98			0.97			0.99		1.00	0.92	
Flt Protected		0.99			1.00			0.99		0.95	1.00	
Satd. Flow (prot)		3420			3469			1845		1807	1739	
Flt Permitted		0.58			0.93			0.53		0.51	1.00	
Satd. Flow (perm)		2028			3242			997		971	1739	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	253	497	88	13	587	123	74	221	26	134	252	256
RTOR Reduction (vph)	0	9	0	0	14	0	0	3	0	0	35	0
Lane Group Flow (vph)	0	829	0	0	709	0	0	318	0	134	473	0
Confl. Peds. (#/hr)	11		9	9		11	8		16	16		8
Heavy Vehicles (%)	1%	4%	1%	0%	2%	0%	0%	1%	10%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)		50.1			50.1			41.9		41.9	41.9	
Effective Green, g (s)		50.1			50.1			41.9		41.9	41.9	
Actuated g/C Ratio		0.48			0.48			0.40		0.40	0.40	
Clearance Time (s)		6.1			6.1			6.1		6.1	6.1	
Vehicle Extension (s)		3.0			3.0			3.0		3.0	3.0	
Lane Grp Cap (vph)		975			1558			400		390	699	
v/s Ratio Prot											0.27	
v/s Ratio Perm		c0.41			0.22			c0.32		0.14		
v/c Ratio		0.85			0.46			0.80		0.34	0.68	
Uniform Delay, d1		23.8			18.0			27.4		21.6	25.6	
Progression Factor		1.00			1.00			1.00		1.00	1.00	
Incremental Delay, d2		7.2			1.0			15.0		2.4	5.2	
Delay (s)		31.0			18.9			42.4		24.0	30.8	
Level of Service		C			B			D		C	C	
Approach Delay (s)		31.0			18.9			42.4			29.4	
Approach LOS		C			B			D			C	

Intersection Summary

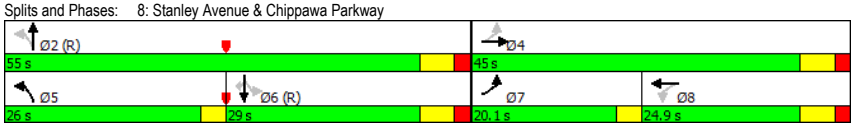
HCM 2000 Control Delay	28.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.85		
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2
Intersection Capacity Utilization	112.5%	ICU Level of Service	H
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT	SBR
Lane Configurations									
Traffic Volume (vph)	210	19	6	12	345	125	15	296	240
Future Volume (vph)	210	19	6	12	345	125	15	296	240
Lane Group Flow (vph)	269	441	8	18	442	179	19	379	308
Turn Type	pm+pt	NA	Perm	NA	pm+pt	NA	Perm	NA	Perm
Protected Phases	7	4		8	5	2		6	
Permitted Phases	4		8		2		6		6
Detector Phase	7	4	8	8	5	2	6	6	6
Switch Phase									
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	24.1	24.1	24.1	9.5	24.1	24.1	24.1	24.1
Total Split (s)	20.1	45.0	24.9	24.9	26.0	55.0	29.0	29.0	29.0
Total Split (%)	20.1%	45.0%	24.9%	24.9%	26.0%	55.0%	29.0%	29.0%	29.0%
Yellow Time (s)	3.0	4.1	4.1	4.1	3.0	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	2.0	2.0	2.0	0.0	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)	3.0	6.1	6.1	6.1	3.0	6.1	6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag	Lead		Lag	Lag	Lag
Lead-Lag Optimize?	Yes		Yes	Yes	Yes		Yes	Yes	Yes
Recall Mode	None	None	None	None	None	C-Max	C-Max	C-Max	C-Max
v/c Ratio	0.71	0.66	0.07	0.14	0.60	0.16	0.04	0.48	0.41
Control Delay	42.8	9.1	44.3	40.9	15.8	9.6	25.5	28.3	12.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.8	9.1	44.3	40.9	15.8	9.6	25.5	28.3	12.7
Queue Length 50th (m)	43.1	3.5	1.5	2.8	37.9	13.5	2.4	58.0	15.9
Queue Length 95th (m)	54.2	12.9	5.2	8.1	50.4	m23.8	7.3	85.0	33.0
Internal Link Dist (m)		207.0		145.4		1041.4		321.9	
Turn Bay Length (m)	30.0		30.0		30.0		30.0		30.0
Base Capacity (vph)	395	878	328	354	781	1138	491	793	751
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	0.68	0.50	0.02	0.05	0.57	0.16	0.04	0.48	0.41

Intersection Summary
Cycle Length: 100
Actuated Cycle Length: 100
Offset: 0 (0%), Referenced to phase 2:NBTL and 6:SBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
m Volume for 95th percentile queue is metered by upstream signal.

Splits and Phases: 8: Stanley Avenue & Chippawa Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	210	19	325	6	12	2	345	125	15	15	296	240
Future Volume (vph)	210	19	325	6	12	2	345	125	15	15	296	240
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1		6.1	6.1		3.0	6.1		6.1	6.1	6.1
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	1.00
Frt	1.00	0.86		1.00	0.97		1.00	0.98		1.00	1.00	0.85
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	1.00
Satd. Flow (prot)	1825	1603		1825	1873		1825	1707		1706	1865	1512
Flt Permitted	0.54	1.00		0.91	1.00		0.38	1.00		0.64	1.00	1.00
Satd. Flow (perm)	1038	1603		1746	1873		723	1707		1157	1865	1512
Peak-hour factor, PHF	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78	0.78
Adj. Flow (vph)	269	24	417	8	15	3	442	160	19	19	379	308
RTOR Reduction (vph)	0	318	0	0	3	0	0	3	0	0	0	113
Lane Group Flow (vph)	269	123	0	8	15	0	442	176	0	19	379	195
Heavy Vehicles (%)	0%	0%	3%	0%	0%	0%	0%	12%	0%	7%	3%	8%
Turn Type	pm+pt	NA		Perm	NA		pm+pt	NA		Perm	NA	Perm
Protected Phases	7	4			8		5	2			6	
Permitted Phases	4			8			2			6		6
Actuated Green, G (s)	23.7	23.7		4.4	4.4		64.1	64.1		40.1	40.1	40.1
Effective Green, g (s)	23.7	23.7		4.4	4.4		64.1	64.1		40.1	40.1	40.1
Actuated g/C Ratio	0.24	0.24		0.04	0.04		0.64	0.64		0.40	0.40	0.40
Clearance Time (s)	3.0	6.1		6.1	6.1		3.0	6.1		6.1	6.1	6.1
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	3.0
Lane Grp Cap (vph)	374	379		76	82		694	1094		463	747	606
v/s Ratio Prot	c0.12	0.08			0.01		c0.13	0.10			0.20	
v/s Ratio Perm	c0.05			0.00			c0.27			0.02		0.13
v/c Ratio	0.72	0.32		0.11	0.18		0.64	0.16		0.04	0.51	0.32
Uniform Delay, d1	34.2	31.5		45.9	46.1		10.0	7.2		18.2	22.5	20.6
Progression Factor	1.00	1.00		1.00	1.00		1.74	1.26		1.00	1.00	1.00
Incremental Delay, d2	6.5	0.5		0.6	1.1		1.5	0.2		0.2	2.5	1.4
Delay (s)	40.7	32.0		46.5	47.2		18.8	9.3		18.4	25.0	22.0
Level of Service	D	C		D	D		B	A		B	C	C
Approach Delay (s)		35.3			47.0			16.0			23.5	
Approach LOS		D			D			B			C	

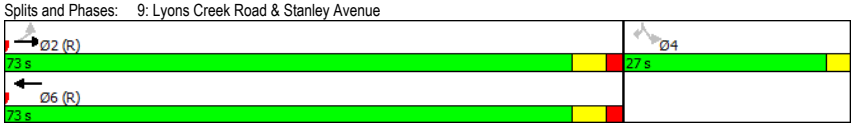
Intersection Summary				
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	18.2	
Intersection Capacity Utilization	69.3%	ICU Level of Service	C	
Analysis Period (min)	15			
c Critical Lane Group				

Lane Group	EBL	EBT	WBT	SBL	SBR
Lane Configurations					
Traffic Volume (vph)	422	293	184	96	531
Future Volume (vph)	422	293	184	96	531
Lane Group Flow (vph)	502	349	294	114	632
Turn Type	Perm	NA	NA	Perm	Perm
Protected Phases		2	6		
Permitted Phases	2			4	4
Detector Phase	2	2	6	4	4
Switch Phase					
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	24.1	24.1	24.1	22.5	22.5
Total Split (s)	73.0	73.0	73.0	27.0	27.0
Total Split (%)	73.0%	73.0%	73.0%	27.0%	27.0%
Yellow Time (s)	4.1	4.1	4.1	3.0	3.0
All-Red Time (s)	2.0	2.0	2.0	0.0	0.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.1	6.1	6.1	3.0	3.0
Lead/Lag					
Lead-Lag Optimize?					
Recall Mode	C-Max	C-Max	C-Max	Max	Max
v/c Ratio	0.77	0.28	0.24	0.28	0.73
Control Delay	21.0	7.4	6.2	34.3	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0
Total Delay	21.0	7.4	6.2	34.3	17.4
Queue Length 50th (m)	58.9	24.6	17.2	21.0	51.9
Queue Length 95th (m)	91.3	33.6	25.1	33.9	87.1
Internal Link Dist (m)		337.8	364.0	1041.4	
Turn Bay Length (m)	44.0			25.0	
Base Capacity (vph)	656	1259	1217	413	860
Starvation Cap Reductn	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0
Reduced v/c Ratio	0.77	0.28	0.24	0.28	0.73

Intersection Summary

Cycle Length: 100
Actuated Cycle Length: 100
Offset: 27 (27%), Referenced to phase 2:EBTL and 6:WBT, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 9: Lyons Creek Road & Stanley Avenue



Movement	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	422	293	184	63	96	531
Future Volume (vph)	422	293	184	63	96	531
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1	6.1		3.0	3.0
Lane Util. Factor	1.00	1.00	1.00		1.00	1.00
Frt	1.00	1.00	0.97		1.00	0.85
Flt Protected	0.95	1.00	1.00		0.95	1.00
Satd. Flow (prot)	1615	1883	1801		1722	1585
Flt Permitted	0.58	1.00	1.00		0.95	1.00
Satd. Flow (perm)	981	1883	1801		1722	1585
Peak-hour factor, PHF	0.84	0.84	0.84	0.84	0.84	0.84
Adj. Flow (vph)	502	349	219	75	114	632
RTOR Reduction (vph)	0	0	12	0	0	480
Lane Group Flow (vph)	502	349	282	0	114	152
Heavy Vehicles (%)	13%	2%	3%	3%	6%	3%
Turn Type	Perm	NA	NA		Perm	Perm
Protected Phases		2	6			
Permitted Phases	2				4	4
Actuated Green, G (s)	66.9	66.9	66.9		24.0	24.0
Effective Green, g (s)	66.9	66.9	66.9		24.0	24.0
Actuated g/C Ratio	0.67	0.67	0.67		0.24	0.24
Clearance Time (s)	6.1	6.1	6.1		3.0	3.0
Vehicle Extension (s)	3.0	3.0	3.0		3.0	3.0
Lane Grp Cap (vph)	656	1259	1204		413	380
v/s Ratio Prot		0.19	0.16			
v/s Ratio Perm	c0.51				0.07	c0.10
v/c Ratio	0.77	0.28	0.23		0.28	0.40
Uniform Delay, d1	11.2	6.7	6.5		30.9	31.9
Progression Factor	1.00	1.00	1.00		1.04	4.16
Incremental Delay, d2	8.3	0.5	0.5		1.5	2.8
Delay (s)	19.5	7.3	7.0		33.7	135.6
Level of Service	B	A	A		C	F
Approach Delay (s)		14.5	7.0		120.0	
Approach LOS		B	A		F	

Intersection Summary

HCM 2000 Control Delay	54.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.67		
Actuated Cycle Length (s)	100.0	Sum of lost time (s)	9.1
Intersection Capacity Utilization	55.7%	ICU Level of Service	B
Analysis Period (min)	15		

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	35	17	35	306	199	63
Future Volume (Veh/h)	35	17	35	306	199	63
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	45	22	45	392	255	81
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	778	296	336			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	778	296	336			
tC, single (s)	6.7	6.6	4.2			
tC, 2 stage (s)						
tF (s)	3.7	3.7	2.3			
p0 queue free %	86	97	96			
cM capacity (veh/h)	321	662	1201			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	45	22	437	336
Volume Left	45	0	45	0
Volume Right	0	22	0	81
cSH	321	662	1201	1700
Volume to Capacity	0.14	0.03	0.04	0.20
Queue Length 95th (m)	3.7	0.8	0.9	0.0
Control Delay (s)	18.0	10.6	1.2	0.0
Lane LOS	C	B	A	
Approach Delay (s)	15.6		1.2	0.0
Approach LOS	C			

Intersection Summary				
Average Delay	1.9			
Intersection Capacity Utilization	45.7%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	32	75	338	160	46
Future Volume (Veh/h)	11	32	75	338	160	46
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	16	46	107	483	229	66
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				346		
pX, platoon unblocked	0.94					
vC, conflicting volume	959	262	295			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	922	262	295			
tC, single (s)	6.5	6.5	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.6	2.3			
p0 queue free %	94	94	91			
cM capacity (veh/h)	248	709	1244			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	16	46	590	295
Volume Left	16	0	107	0
Volume Right	0	46	0	66
cSH	248	709	1244	1700
Volume to Capacity	0.06	0.06	0.09	0.17
Queue Length 95th (m)	1.6	1.6	2.1	0.0
Control Delay (s)	20.5	10.4	2.3	0.0
Lane LOS	C	B	A	
Approach Delay (s)	13.0		2.3	0.0
Approach LOS	B			

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	46.5%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	67	44	5	351	419	22
Future Volume (Veh/h)	67	44	5	351	419	22
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	88	58	7	462	551	29
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	1042	566	580			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1042	566	580			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	65	89	99			
cM capacity (veh/h)	253	528	890			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	88	58	469	580
Volume Left	88	0	7	0
Volume Right	0	58	0	29
cSH	253	528	890	1700
Volume to Capacity	0.35	0.11	0.01	0.34
Queue Length 95th (m)	11.4	2.8	0.2	0.0
Control Delay (s)	26.7	12.7	0.2	0.0
Lane LOS	D	B	A	
Approach Delay (s)	21.1		0.2	0.0
Approach LOS	C			

Intersection Summary				
Average Delay		2.7		
Intersection Capacity Utilization		33.8%	ICU Level of Service	A
Analysis Period (min)		15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	43	109	36	308	459	6
Future Volume (Veh/h)	43	109	36	308	459	6
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	58	147	49	416	620	8
Pedestrians					2	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				346		
pX, platoon unblocked	0.88					
vC, conflicting volume	1140	624	628			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1092	624	628			
tC, single (s)	6.4	6.2	4.5			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.6			
p0 queue free %	70	69	94			
cM capacity (veh/h)	195	482	781			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	58	147	465	628
Volume Left	58	0	49	0
Volume Right	0	147	0	8
cSH	195	482	781	1700
Volume to Capacity	0.30	0.31	0.06	0.37
Queue Length 95th (m)	9.0	9.7	1.5	0.0
Control Delay (s)	31.1	15.7	1.8	0.0
Lane LOS	D	C	A	
Approach Delay (s)	20.1		1.8	0.0
Approach LOS	C			

Intersection Summary				
Average Delay		3.8		
Intersection Capacity Utilization		56.1%	ICU Level of Service	B
Analysis Period (min)		15		

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix K

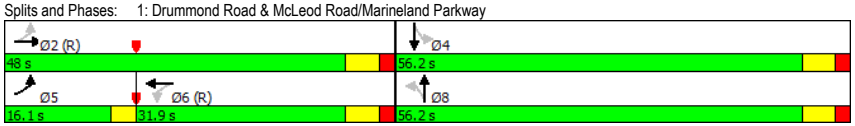
Total Traffic Operations with Improvements

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	158	349	55	383	246	224	87	143
Future Volume (vph)	158	349	55	383	246	224	87	143
Lane Group Flow (vph)	174	497	60	565	270	386	96	331
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1
Total Split (s)	16.1	48.0	31.9	31.9	56.2	56.2	56.2	56.2
Total Split (%)	15.5%	46.1%	30.6%	30.6%	53.9%	53.9%	53.9%	53.9%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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
Total Lost Time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.52	0.37	0.36	0.63	0.61	0.45	0.25	0.39
Control Delay	24.7	20.7	39.5	35.2	27.0	18.1	18.1	14.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.7	20.7	39.5	35.2	27.0	18.1	18.1	14.7
Queue Length 50th (m)	21.8	33.0	10.0	49.7	38.7	44.8	11.1	31.3
Queue Length 95th (m)	36.4	46.1	23.0	68.8	67.1	68.8	22.2	51.9
Internal Link Dist (m)		299.5		1002.2		718.1		408.3
Turn Bay Length (m)	95.0		25.0		25.0		15.0	
Base Capacity (vph)	356	1347	169	898	445	856	389	850
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.49	0.37	0.36	0.63	0.61	0.45	0.25	0.39

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 58.1 (56%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 70
Control Type: Actuated-Coordinated

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	158	349	103	55	383	131	246	224	127	87	143	158
Future Volume (vph)	158	349	103	55	383	131	246	224	127	87	143	158
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1		6.1	6.1		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.95		1.00	0.92	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1687	3286		1300	3286		1786	1740		1746	1689	
Flt Permitted	0.27	1.00		0.47	1.00		0.49	1.00		0.44	1.00	
Satd. Flow (perm)	472	3286		643	3286		926	1740		811	1689	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	174	384	113	60	421	144	270	246	140	96	157	174
RTOR Reduction (vph)	0	26	0	0	32	0	0	20	0	0	38	0
Lane Group Flow (vph)	174	471	0	60	533	0	270	366	0	96	293	0
Confl. Peds. (#/hr)	8		2	2		8	3		9	9		3
Heavy Vehicles (%)	8%	6%	9%	40%	6%	5%	2%	1%	8%	4%	5%	3%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	41.9	41.9		27.5	27.5		50.1	50.1		50.1	50.1	
Effective Green, g (s)	41.9	41.9		27.5	27.5		50.1	50.1		50.1	50.1	
Actuated g/C Ratio	0.40	0.40		0.26	0.26		0.48	0.48		0.48	0.48	
Clearance Time (s)	3.0	6.1		6.1	6.1		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	322	1321		169	867		445	836		389	812	
v/s Ratio Prot	c0.06	0.14			c0.16			0.21			0.17	
v/s Ratio Perm	0.16			0.09			c0.29			0.12		
v/c Ratio	0.54	0.36		0.36	0.62		0.61	0.44		0.25	0.36	
Uniform Delay, d1	21.7	21.7		31.1	33.7		19.8	17.8		15.9	17.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.8	0.8		5.7	3.3		6.0	1.7		1.5	1.2	
Delay (s)	23.5	22.5		36.9	37.0		25.9	19.5		17.4	18.2	
Level of Service	C	C		D	D		C	B		B	B	
Approach Delay (s)		22.8			37.0			22.1			18.1	
Approach LOS		C			D			C			B	

Intersection Summary

HCM 2000 Control Delay	25.5	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.60			
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2	
Intersection Capacity Utilization	81.0%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	34	16	34	321	254	60
Future Volume (Veh/h)	34	16	34	321	254	60
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.78	0.78	0.78	0.78	0.78	0.78
Hourly flow rate (vph)	44	21	44	412	326	77
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	864	364	403			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	864	364	403			
tC, single (s)	6.7	6.6	4.2			
tC, 2 stage (s)						
tF (s)	3.7	3.7	2.3			
p0 queue free %	84	97	96			
cM capacity (veh/h)	284	603	1134			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	44	21	456	403
Volume Left	44	0	44	0
Volume Right	0	21	0	77
cSH	284	603	1134	1700
Volume to Capacity	0.16	0.03	0.04	0.24
Queue Length 95th (m)	4.1	0.8	0.9	0.0
Control Delay (s)	20.0	11.2	1.2	0.0
Lane LOS	C	B	A	
Approach Delay (s)	17.2		1.2	0.0
Approach LOS	C			

Intersection Summary				
Average Delay	1.8			
Intersection Capacity Utilization	49.1%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	11	30	71	351	217	43
Future Volume (Veh/h)	11	30	71	351	217	43
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.70	0.70	0.70	0.70	0.70	0.70
Hourly flow rate (vph)	16	43	101	501	310	61
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				346		
pX, platoon unblocked	0.93					
vC, conflicting volume	1044	340	371			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1009	340	371			
tC, single (s)	6.5	6.5	4.2			
tC, 2 stage (s)						
tF (s)	3.6	3.6	2.3			
p0 queue free %	93	93	91			
cM capacity (veh/h)	218	639	1166			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	16	43	602	371
Volume Left	16	0	101	0
Volume Right	0	43	0	61
cSH	218	639	1166	1700
Volume to Capacity	0.07	0.07	0.09	0.22
Queue Length 95th (m)	1.8	1.6	2.2	0.0
Control Delay (s)	22.8	11.0	2.3	0.0
Lane LOS	C	B	A	
Approach Delay (s)	14.2		2.3	0.0
Approach LOS	B			

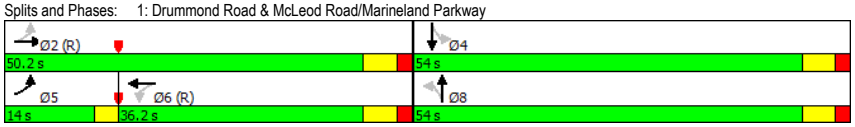
Intersection Summary				
Average Delay	2.1			
Intersection Capacity Utilization	49.8%	ICU Level of Service	A	
Analysis Period (min)	15			

Lane Group	EBL	EBT	WBL	WBT	NBL	NBT	SBL	SBT
Lane Configurations								
Traffic Volume (vph)	238	467	136	552	174	250	126	303
Future Volume (vph)	238	467	136	552	174	250	126	303
Lane Group Flow (vph)	253	760	145	710	185	380	134	578
Turn Type	pm+pt	NA	Perm	NA	Perm	NA	Perm	NA
Protected Phases	5	2		6		8		4
Permitted Phases	2		6		8		4	
Detector Phase	5	2	6	6	8	8	4	4
Switch Phase								
Minimum Initial (s)	5.0	5.0	5.0	5.0	5.0	5.0	5.0	5.0
Minimum Split (s)	9.5	27.1	27.1	27.1	33.1	33.1	33.1	33.1
Total Split (s)	14.0	50.2	36.2	36.2	54.0	54.0	54.0	54.0
Total Split (%)	13.4%	48.2%	34.7%	34.7%	51.8%	51.8%	51.8%	51.8%
Yellow Time (s)	3.0	4.1	4.1	4.1	4.1	4.1	4.1	4.1
All-Red Time (s)	0.0	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
Total Lost Time (s)	3.0	6.1	6.1	6.1	6.1	6.1	6.1	6.1
Lead/Lag	Lead		Lag	Lag				
Lead-Lag Optimize?	Yes		Yes	Yes				
Recall Mode	None	C-Max	C-Max	C-Max	Max	Max	Max	Max
v/c Ratio	0.80	0.52	0.73	0.70	0.83	0.46	0.35	0.69
Control Delay	38.8	20.0	56.2	36.1	55.8	20.1	21.5	25.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.8	20.0	56.2	36.1	55.8	20.1	21.5	25.4
Queue Length 50th (m)	31.7	49.2	26.4	65.1	31.6	47.5	17.0	82.4
Queue Length 95th (m)	#59.3	66.4	#57.2	85.3	#73.1	72.2	32.0	121.8
Internal Link Dist (m)		299.5		1002.2		717.3		408.3
Turn Bay Length (m)	95.0		25.0		25.0		15.0	
Base Capacity (vph)	318	1468	199	1020	224	820	381	837
Starvation Cap Reductn	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.80	0.52	0.73	0.70	0.83	0.46	0.35	0.69

Intersection Summary

Cycle Length: 104.2
Actuated Cycle Length: 104.2
Offset: 91.2 (88%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle: 80
Control Type: Actuated-Coordinated
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Splits and Phases: 1: Drummond Road & McLeod Road/Marineland Parkway



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	238	467	247	136	552	116	174	250	107	126	303	241
Future Volume (vph)	238	467	247	136	552	116	174	250	107	126	303	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.1		6.1	6.1		6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	0.99		1.00	0.99		1.00	0.99		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		0.99	1.00		1.00	1.00		0.99	1.00	
Frt	1.00	0.95		1.00	0.97		1.00	0.95		1.00	0.93	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3312		1811	3469		1820	1753		1808	1761	
Flt Permitted	0.19	1.00		0.36	1.00		0.26	1.00		0.44	1.00	
Satd. Flow (perm)	368	3312		693	3469		489	1753		830	1761	
Peak-hour factor, PHF	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94	0.94
Adj. Flow (vph)	253	497	263	145	587	123	185	266	114	134	322	256
RTOR Reduction (vph)	0	66	0	0	17	0	0	15	0	0	28	0
Lane Group Flow (vph)	253	694	0	145	693	0	185	365	0	134	550	0
Confl. Peds. (#/hr)	11		9	9		11	8		16	16		8
Heavy Vehicles (%)	1%	4%	1%	0%	2%	0%	0%	1%	10%	0%	0%	2%
Turn Type	pm+pt	NA		Perm	NA		Perm	NA		Perm	NA	
Protected Phases	5	2			6			8			4	
Permitted Phases	2			6			8			4		
Actuated Green, G (s)	44.1	44.1		30.1	30.1		47.9	47.9		47.9	47.9	
Effective Green, g (s)	44.1	44.1		30.1	30.1		47.9	47.9		47.9	47.9	
Actuated g/C Ratio	0.42	0.42		0.29	0.29		0.46	0.46		0.46	0.46	
Clearance Time (s)	3.0	6.1		6.1	6.1		6.1	6.1		6.1	6.1	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	307	1401		200	1002		224	805		381	809	
v/s Ratio Prot	c0.09	0.21			0.20			0.21			0.31	
v/s Ratio Perm	c0.26			0.21			c0.38			0.16		
v/c Ratio	0.82	0.50		0.72	0.69		0.83	0.45		0.35	0.68	
Uniform Delay, d1	22.1	21.9		33.3	32.9		24.5	19.2		18.1	22.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	16.2	1.3		20.4	3.9		28.1	1.8		2.5	4.6	
Delay (s)	38.3	23.2		53.7	36.8		52.6	21.1		20.7	26.7	
Level of Service	D	C		D	D		D	C		C	C	
Approach Delay (s)		27.0			39.7			31.4			25.6	
Approach LOS		C			D			C			C	

Intersection Summary

HCM 2000 Control Delay	30.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	104.2	Sum of lost time (s)	15.2	
Intersection Capacity Utilization	91.6%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	64	42	4	410	450	21
Future Volume (Veh/h)	64	42	4	410	450	21
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.76	0.76	0.76	0.76	0.76	0.76
Hourly flow rate (vph)	84	55	5	539	592	28
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	1155	606	620			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1155	606	620			
tC, single (s)	6.4	6.2	4.3			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.4			
p0 queue free %	61	89	99			
cM capacity (veh/h)	216	501	859			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	84	55	544	620
Volume Left	84	0	5	0
Volume Right	0	55	0	28
cSH	216	501	859	1700
Volume to Capacity	0.39	0.11	0.01	0.36
Queue Length 95th (m)	13.1	2.8	0.1	0.0
Control Delay (s)	31.8	13.1	0.2	0.0
Lane LOS	D	B	A	
Approach Delay (s)	24.4		0.2	0.0
Approach LOS	C			

Intersection Summary				
Average Delay	2.7			
Intersection Capacity Utilization	35.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	41	104	35	369	488	5
Future Volume (Veh/h)	41	104	35	369	488	5
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	0.74	0.74	0.74	0.74	0.74	0.74
Hourly flow rate (vph)	55	141	47	499	659	7
Pedestrians					2	
Lane Width (m)					3.7	
Walking Speed (m/s)					1.1	
Percent Blockage					0	
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				346		
pX, platoon unblocked	0.88					
vC, conflicting volume	1258	662	666			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1224	662	666			
tC, single (s)	6.4	6.2	4.5			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.6			
p0 queue free %	66	69	94			
cM capacity (veh/h)	162	458	754			

Direction, Lane #	EB 1	EB 2	NB 1	SB 1
Volume Total	55	141	546	666
Volume Left	55	0	47	0
Volume Right	0	141	0	7
cSH	162	458	754	1700
Volume to Capacity	0.34	0.31	0.06	0.39
Queue Length 95th (m)	10.6	9.8	1.5	0.0
Control Delay (s)	38.3	16.3	1.7	0.0
Lane LOS	E	C	A	
Approach Delay (s)	22.5		1.7	0.0
Approach LOS	C			

Intersection Summary				
Average Delay	3.8			
Intersection Capacity Utilization	58.5%	ICU Level of Service	B	
Analysis Period (min)	15			

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Appendix L

Signal Warrant Analysis

Input Sheet

Main Road	Stanley Avenue
Minor Road	Chippawa Parkway
Direction of Main Road	North / South
Date:	Background 2026 T
No. of Lanes on Main	1
T-Intersection	No
Operating Environment	Urban
Scenario	Forecasted Traffic Volumes (Existing Intersection)

Analysis Sheet

Justification 1: Minimum Vehicle Volumes

Justification	Guidance Approach Lanes				Total	Section Percent
	1 Lanes		2 or More Lanes			
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW		
1A (All Approach Lanes)	480	720	600	900		
		x				
	COMPLIANCE %				642	89%
1B (Minor Street Both Approaches)	120	170	120	170		
		x				
	COMPLIANCE %				238	140%
Signal Justification 1:						

Justification 2: Delay to Cross Traffic

Justification	Guidance Approach Lanes				Total	Section Percent
	1 lanes		2 or More lanes			
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW		
2A (Major Street Both Approaches)	480	720	600	900		
		x				
	COMPLIANCE %				404	56%
2B (Traffic Crossing Major Street)	50	75	50	75		
		x				
	COMPLIANCE %				100	133%
Signal Justification 2:						

Justification 3: Combination (Justification 1 and 2)

Justification Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume
Justification 2	Delay Cross Traffic

Results Sheet

Justification		Compliance	Minimum Target	Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A. Total Volume	89%	120%		NO
	B. Crossing Volume	140%			
2. Delay to Cross Traffic	A. Main Road	56%	120%		NO
	B. Crossing Road	133%			
3. Combination	A. Justificaton 1	89%	120%		NO
	B. Justification 2	56%			

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Input Sheet

Main Road	Stanley Avenue
Minor Road	Lyons Creek Road
Direction of Main Road	East / West
Date:	Background 2026 T
No. of Lanes on Main	1
T-Intersection	No
Operating Environment	Urban
Scenario	Forecasted Traffic Volumes (Existing Intersection)

Analysis Sheet

Justification 1: Minimum Vehicle Volumes

Justification	Guidance Approach Lanes				Total	Section Percent
	1 Lanes		2 or More Lanes			
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW		
1A (All Approach Lanes)	480	720	600	900		
		x				
	COMPLIANCE %				657	91%
1B (Minor Street Both Approaches)	120	170	120	170		
		x				
	COMPLIANCE %				229	135%
Signal Justification 1:						

Justification 2: Delay to Cross Traffic

Justification	Guidance Approach Lanes				Total	Section Percent
	1 lanes		2 or More lanes			
Flow Condition	FREE FLOW	RESTR. FLOW	FREE FLOW	RESTR. FLOW		
2A (Major Street Both Approaches)	480	720	600	900		
		x				
	COMPLIANCE %				427	59%
2B (Traffic Crossing Major Street)	50	75	50	75		
		x				
	COMPLIANCE %				32	43%
Signal Justification 2:						

Justification 3: Combination (Justification 1 and 2)

Justification Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume
Justification 2	Delay Cross Traffic

Results Sheet

Justification		Compliance	Minimum Target	Signal Justified?	
				YES	NO
1. Minimum Vehicular Volume	A. Total Volume	91%	120%		NO
	B. Crossing Volume	135%			
2. Delay to Cross Traffic	A. Main Road	59%	120%		NO
	B. Crossing Road	43%			
3. Combination	A. Justificaton 1	91%	120%		NO
	B. Justification 2	43%			

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