THE CORPORATION OF THE TOWNSHIP OF PUSLINCH
March 6, 2019 COUNCIL MEETING

A G E N D A

DATE: Wednesday, March 6, 2019
REGULAR MEETING: 1:00 P.M.

≠ Denotes resolution prepared

1. Call the Meeting to Order

2. Disclosure of Pecuniary Interest & the General Nature Thereof.

3. **CLOSED ITEMS ≠**

4. Adoption and Receipt of Minutes of the Previous Meeting.≠

   (a) Asset Management Public Meeting- February 5, 2019
   (b) Budget Public Meeting- February 5, 2019
   (c) Council Meeting – February 20, 2019
   (d) Closed Council Meeting – February 20, 2019

5. Business Arising Out of the Minutes.

6. **PUBLIC MEETINGS**

7. **COMMUNICATIONS**

   1. Jet fuel spill cleanup efforts.
      (a) Correspondence from the Ministry of the Environment, Conservation and Parks dated February 14, 2019.

   2. Notice of submission of design and construction report, Highway 401 Interchange & Highway Improvements from Hespeler Road to Townline Road, City of Cambridge
      (a) Correspondence from Stantec dated February 26, 2019

   3. CBM Neubauer Pit, License No. 625284, Proposed Trigger Level Thresholds.
      (a) Correspondence from Groundwater Science Corp. dated February 1, 2019.
      (b) Neubauer Groundwater Threshold Review dated February 25, 2019.

   4. **Intergovernmental Affairs≠**

      (a) Various correspondence for review.

8. DELEGATIONS / PRESENTATIONS ≠

1:05 p.m. – Sarah Wilhelm and Jameson Pickard, Wellington County with respect to the mapping of a Natural Heritage System in the County of Wellington.

1:30 p.m. – Martin Keller, Source Protection Program Manager, Grand River Conservation Authority with respect to the Guelph/Guelph-Eramosa water quantity policy development study- Draft Water Quantity Policy Approaches.

9. REPORTS ≠

1. **Puslinch Fire and Rescue Services**

   None

2. **Finance Department**
   (a) FIN-2019-011 Ontario Trillium Foundation – Execution of Grant Contract
   (b) FIN-2019-013 Ontario Regulation 284/09 – 2019 Budget

3. **Administration Department**

   (a) ADM-2019-007 Council-Staff Relations Policy
   (b) ADM-2019-009 Pregnancy and Parental Leave of Members of Council Policy
   (c) ADM-2019-010 Tree Canopy and Natural Vegetation Protection and Enhancement Policy
   (d) ADM-2019-011 Source Protection Annual Reports - 2018

4. **Planning and Building**

   (a) BLDG-2019-002 Building Department Monthly Update- January 2019
   (b) 855 and 927 Victoria Road S Rezoning, Traffic Impact Study
   (c) PD-2019-001 To accept conveyance of a road widening designated as Part 2 on Reference Plan 61R-21503 as part of the Township of Puslinch public highway system and dedicate as part of Gilmour Road.
   (d) PD-2019-002 To lift and assume the 0.3m Reserve, Block 22 on Registered Plan 61M-16 as part of the Township of Puslinch's public highway system on Boreham Drive.

5. **Roads & Parks Department**

   None

6. **Recreation Department**

   (a) REC-2019-001 Puslinch Community Centre Park – Back Soccer Fields - Update

7. **Mayor's Updates**

   None

10. **NOTICES OF MOTION**

    None

11. **COMMITTEE MINUTES**

    (a) Heritage Committee December 3, 2018
    (b) Planning and Development Advisory Committee January 8, 2019
    (c) Committee of Adjustment January 8, 2019
    (d) Heritage Committee January 22, 2019

12. **MUNICIPAL ANNOUNCEMENTS**

13. **UNFINISHED BUSINESS**

14. **BY-LAWS ≠**

    (a) Being a by-law to repeal By-law 12/10 and to enact a new Fire Department Establishing and Regulating By-law for the Corporation of the Township of Puslinch.
    (b) Being a By-law to provide for the appointment of several Municipal Law Enforcement Officers for the Corporation of the Township of Puslinch.
    (c) Being a by-law to lift and assume the 0.3 Metre reserve as part of the Township of Puslinch public highway system, designated as Block 22, Registered Plan 61M-16, Township of Puslinch.
    (d) Being a by-law to acquire and dedicate Part 2 on Reference Plan 61R-21503 as part of the Township of Puslinch Public Highway System, to be known as and to form part of Gilmour Road.

(e) Being a by-law to authorize the entering into a Grant Contract with the Ontario Trillium Foundation for the building of a lit soccer field at the Puslinch Community Centre Park

15. **CONFIRMING BY-LAW ≠**

(a) By-law to confirm the proceedings of Council for the Corporation of the Township of Puslinch.

16. **ADJOURNMENT ≠**

THE CORPORATION OF THE TOWNSHIP OF PUSLINCH

PUBLIC INFORMATION MEETING MINUTES

DATE:	**Tuesday, February 5, 2019**
TIME:	**6:00 p.m.**
PLACE:	**Council Chambers, 7404 Wellington Road 34**
FILE:	**Public Meeting – Asset Management Plan**
MEMBERS:	**Mayor James Seeley – Chair** **Councillor Matthew Bulmer** **Councillor Jessica Goyda** **Councillor John Sepulis**

The Public Information Meeting was called to order at 6:00 p.m.

Presentations:

Wayne Wood – Senior Consulting Engineer & Project Manager, Urban and Environmental Management Inc. (UEM) and John Murphy - Municipal Finance Specialist, DFA Infrastructure International Inc. (DFA) provided an overview of the following:

- What is asset management?
- Creation of an Asset Registry
- Asset Classes in Puslinch
- Service level policies for: Bridges and Culverts; Buildings and Facilities; Fire Equipment; Fire Reservoirs; Fleet- Works, Building Department, Parks & Fire Department; Gravel Roads; Hard Surface Roads; Regulatory Signs/Warning Signs; Sidewalks; Storm Water Management Ponds; Storm Water Management Systems; Street Trees; Street Lights and Poles.
- 10 Year Capital Needs to support Existing Infrastructure.
- Financial Strategy, and recommended financial strategy option.

Mayor Seeley then invited members of the public to provide comments.

Comments:

Nicole Fitz. Henry inquired whether a facility condition index was completed when assets were reviewed for the asset management plan development, and whether there is agreement on an acceptable facility condition index.

Andrew Grandison from UEM indicated that the 2015 Building Condition Index report was utilized to determine the capital program for Township facilities.

Wayne Wood from UEM advised that a Bridge and Culvert inspection report, Roads Needs Study, and other assessments were utilized when developing the capital program and asset registry. UEM also completed a condition assessment with a one to five rating scale for Parks and Recreation assets.

Joe Hutter inquired whether Condition assessments of assets were used to create the Asset Management Plan?

Wayne Wood clarified that for some assets, condition assessments were utilized while for other assets, UEM determined a condition based on the likelihood of the asset's failure.

Cameron Tuck inquired about whether all Township assets were included when the Plan was established.

Wayne Wood advised that all of the assets included in listings provided to UEM are included. Also, certain assets are included based on discussions with staff.

Gregg Allan expressed concern regarding the overstating of the condition of gravel roads as the Township does not have a formal policy for documenting gravel road conditions. Gregg also inquired what the current service level is for gravel roads, what the acquisition date is for a gravel road and why his road has a Level 4 Condition.

Andrew Grandison indicated that the service level for gravel roads is not formally documented and that there are recommendations in the report that all gravel roads are assumed to be at a condition of 90 unless deteriorated by grading activities.

Wayne Wood indicated that the service level policy proposed for gravel roads indicates that other alternatives should be considered such as surface treatment including asphalt and/or reconstruction if all of the criteria in the service level policy are met.

Cameron Tuck inquired whether the Morriston ball diamond was assessed.

Andrew Grandison indicated that Old Morriston Ball Diamond is identified in the asset registry.

Nicole Fitz. Henry recommended that Operating Costs should be included in the Asset Management Plan as operating costs decrease as a result of efficiency improvements to assets. Nicole also inquired whether climate change impacts were addressed in the Plan.

John Murphy from DFA indicated that additional funding for operating maintenance of assets was not included over the program's life.

Wayne Wood indicated that climate change was addressed in the report and that future asset condition assessments/studies include climate change impacts as a section in the report. There is limited documentation and studies that qualify the impact of weather conditions on infrastructure.

Marion Hunter commented on the poor state of gravel roads and inquired about what the starting point would be to begin fixing the roads.

Mayor Seeley advised that there is a gravel roads study in the 2019 Capital Budget that will address the state of gravel roads.

Gregg Allan inquired as to why the average daily traffic volume exceeding 400 vehicles was utilized as a criteria in the proposed service level policy for gravel roads.

Wayne Wood advised that UEM reviewed published data from various organizations including Ontario Good Roads Association, however, there is a limited amount of information available in Canada for traffic count criteria for gravel roads. Some of the published information is from areas in the United States where there is heavy frost.

Jason Ganning inquired what the risks are with the Old Morriston Ball Park and inquired what the projected costs are to rehabilitate the park.

Wayne Wood advised that UEM has identified a capital expenditure of $10,000 for bleachers and $1,000 for benches.

Mayor Seeley clarified that he believes the question relates to the ball diamond lights.

Karen Landry advised that the ball diamond lights are identified in the asset registry as a known asset but not incorporated in the capital plan based on a previous Council decision. Council would be required to pass a Council Resolution in order to incorporate in the capital plan.

Kathy White inquired how the increases in some Township fees (ie. building permit fees) were factored into the plan.

John Murphy advised that currently the Township has a number of reserves that are utilized for asset management purposes. The Capital Plan includes these reserves, capital tax levy, and amounts from other sources such as County grant funding, aggregate revenue, development charges, provincial grants, etc. for funding the asset management capital program. John Murphy advised that user fees and charges are funding operating costs and not capital costs. The Asset Management Program is a living document that will evolve over time. The tax levy is the largest portion for funding the program. DFA is recommending an increase to the levy in order for total funds available to pay for asset management activities be sufficient to fund the capital program and the servicing of long-term debt.

Karen Landry advised that building permit fees cannot fund non-building activities.

Frank Cane inquired whether it can be interpreted that the Morriston Ball Diamond will not have any repairs.

Karen Landry advised that all assets are identified in the asset registry. As of present, Council's decision on the matter is that the ball diamond lights are not to be included in the capital forecast. If that decision is to be changed, then the decision needs to be changed by Council. If there are residents that are interested in making delegations to Council regarding this matter, a request to delegate to Council can be made.

Adjournment:

The meeting adjourned at 6:51 p.m.

THE CORPORATION OF THE TOWNSHIP OF PUSLINCH
PUBLIC INFORMATION MEETING MINUTES

DATE:	**Tuesday, February 5, 2019**
TIME:	**7:00 p.m.**
PLACE:	**Council Chambers, 7404 Wellington Road 34**
FILE:	**Public Meeting – 2019 Budget**
MEMBERS:	**Mayor James Seeley – Chair** **Councillor Matthew Bulmer** **Councillor Jessica Goyda** **Councillor John Sepulis**

The Public Information Meeting was called to order at 7:00 p.m.

Presentation:

Mary Hasan, Director of Finance/Treasurer provided an overview of the proposed 2019 budget, including:

- Where we are in the budget process
- Property tax allocations
- Services provided by the Township
- Proposed budget tax levy
- Overview of the 2019 proposed operating and capital budgets
- Discretionary and restricted reserves

Mayor Seeley then invited members of the public to provide comments.

Comments:

Joe Hutter inquired about the storm water management ponds on Carriage Lane. In addition, Joe inquired about the Township's economic development program.

Staff from the Wellington County's Economic Development Department will attend an upcoming Council Meeting to provide an overview of the Economic Development Department as it relates to Puslinch.

Adjournment:

The meeting adjourned at 7:20 p.m.

MINUTES

DATE: Wednesday, February 20, 2019
CLOSED MEETING: 5:30 P.M.
REGULAR MEETING: 7:00 P.M.

The February 20, 2019 Regular Council Meeting was held on the above date and called to order at 5:30 p.m. in the Council Chambers, Aberfoyle.

1. **ATTENDANCE:**

Mayor James Seeley
Councillor Matthew Bulmer
Councillor Jessica Goyda
Councillor Ken Roth
Councillor John Sepulis

STAFF IN ATTENDANCE:

1. Karen Landry, CAO/Clerk
2. Mary Hasan, Director of Finance/Treasurer
3. Don Creed, Director of Public Works and Parks
4. Nina Lecic, Deputy Clerk

OTHERS IN ATTENDANCE

1. Doug Smith
2. Kathy White

2. **DISCLOSURE OF PECUNIARY INTEREST & THE GENERAL NATURE THEREOF:**

None

3. **CLOSED MEETING**

Council was in closed session from 6:00 p.m. to 6:29 p.m.
Council recessed from 6:29 p.m. to 7:00 p.m.

Resolution No. 2019-076: Moved by Councillor Goyda and Seconded by Councillor Sepulis

That Council shall go into closed session under Section 239 of the Municipal Act for the purpose of:

(a) Confidential Verbal Report from Karen Landry, CAO/Clerk regarding litigation or potential litigation, including matters before administrative tribunals, affecting the municipality or local board and advice that is subject to solicitor-client privilege, including communications necessary for that purpose with respect to an application for judicial review- Swastika Trail.

(b) Confidential Report ADM-2019-008 from Nina Lecic, Deputy Clerk, regarding personal matters about an identifiable individual including municipal or local board employees – Citizen Appointments to Advisory Committees.

CARRIED

Resolution No. 2019-077: Moved by Councillor Sepulis and Seconded by Councillor Goyda

THAT Council moves into open session.

CARRIED

Resolution No. 2019-078: Moved by Councillor Goyda and
Seconded by Councillor Sepulis

That Council receives the:

(a) Confidential Verbal Report from Karen Landry, CAO/Clerk regarding litigation or potential litigation, including matters before administrative tribunals, affecting the municipality or local board and advice that is subject to solicitor-client privilege, including communications necessary for that purpose with respect to an application for judicial review- Swastika Trail;

And that staff proceeds as directed;

(b) Confidential Report ADM-2019-008 from Nina Lecic, Deputy Clerk, regarding personal matters about an identifiable individual including municipal or local board employees – Citizen Appointments to Advisory Committees;

And That the following Committee appointments be made for the 2018-2022 Term of Council, or until successors are appointed:

Heritage Committee
Mary Tivy
John Arnold
John Levak
Barb Jefferson
Recreation Committee
June Williams
Vince Klimkosz
Bruce Joy
Daina Makinson
Planning and Development Advisory Committee (Committee of Adjustment)
Dennis O'Connor
John Dan Kennedy
Paul Sadhra
Deep Basi

CARRIED

4. **ADOPTION OF THE MINUTES:**

(a) Budget Meeting- January 30, 2019
(b) Closed Budget Meeting- January 30, 2019
(c) Council Meeting – February 6, 2019
(d) Closed Council Meeting – February 6, 2019

Resolution No. 2019-079: Moved by Councillor Sepulis and
Seconded by Councillor Goyda

That the minutes of the following meetings be adopted as written and distributed:

(a) Budget Meeting- January 30, 2019
(b) Closed Budget Meeting- January 30, 2019
(c) Council Meeting – February 6, 2019
(d) Closed Council Meeting – February 6, 2019

CARRIED

5. **BUSINESS ARISING OUT OF THE MINUTES:**

6. **PUBLIC MEETINGS:**

7. **COMMUNICATIONS:**

1. Invitation from the Puslinch Historical Society to visit archives.
   a. Correspondence dated February 1, 2019.

2. Update on the Clair-Maltby project.
   a. Correspondence from the City of Guelph dated February 8, 2019.

3. Monthly Monitoring Report, Mill Creek Pit, License #5738.
   a. Correspondence from Dufferin Aggregates dated February 11, 2019.

   Council directed staff to obtain an explanation with respect to the changing threshold values between this Report and January's report.

7. Intergovernmental Affairs

Resolution No. 2019-080: Moved by Councillor Goyda and
Seconded by Councillor Sepulis

That the Intergovernmental Affairs correspondence items listed on the Council Agenda for the February 20, 2019 Council meeting be received.

CARRIED

8. DELEGATIONS/PRESENTATIONS

9. REPORTS:

1. **Puslinch Fire and Rescue Services**

(a) FIR-2019-001 Establishing and Regulating Bylaw for Puslinch Fire and Rescue Services

Resolution No. 2019-081: Moved by Councillor Sepulis and
Seconded by Councillor Goyda

That Report FIR-2019-001 with respect to Establishing and Regulating Bylaw for Puslinch Fire and Rescue Services be received for information; and

That Council passes a by-law to repeal the previous Establishing and Regulating Bylaw for Puslinch Fire and Rescue Services bylaw #12/10 and replace it with the By-law attached as Schedule A to Report FIR-2019-001.

CARRIED

2. **Finance Department**

(a) FIN-2019-008 - 2018 Completed Capital Projects

Resolution No. 2019-082: Moved by Councillor Goyda and
Seconded by Councillor Sepulis

That Report FIN-2019-008 regarding the 2018 Completed Capital Projects be received.

CARRIED

(b) FIN-2019-009 - Balances in Discretionary and Restricted Reserves

Resolution No. 2019-083: Moved by Councillor Sepulis and
Seconded by Councillor Goyda

That Report FIN-2019-009 regarding the Balances in Discretionary and Restricted Reserves be received; and

That the Capital Carry-forward Balance of $52,669 related to the 2014 Information Technology Software Upgrade projects be transferred to the Corporate Information Technology Software Discretionary Reserve to be utilized in future budget years as required; and

That the Capital Carry-forward Balance of $7,500 related to the Logo and Branding Project be transferred to the Operating Carry-forward Discretionary Reserve to fund any future Community Improvement Plan Grant Applications; and

That the surplus allocations to discretionary reserves in accordance with the policy adopted by Council through Council Resolution No. 2013-284 be reviewed and updated based on the recommendations in the Asset Management Program; and

That the budget allocations to discretionary reserves for the specific budget year and forecast period be reviewed and updated based on the recommendations in the Asset Management Program. **CARRIED**

(c) FIN-2019-010 - 2019 Budget – Final

Resolution No. 2019-084: Moved by Councillor Roth and
Seconded by Councillor Bulmer

That Report FIN-2019-010 regarding the 2019 Budget – Final be received; and

That the excess funds of $557,627 related to the OMERS Omission Period be reallocated from the Legal Contingency Discretionary Reserve to the Asset Management Discretionary Reserve in order to address the recommendations from the Asset Management Plan; and

That Council enact a by-law to adopt the Budget for the Corporation of the Township of Puslinch for the year 2019, as amended. **CARRIED**

3. **Administration Department**

(a) ADM-2019-006 Lina Gourgees – Traffic Safety Concerns – Old Ruby Lane

Resolution No. 2019-085: Moved by Councillor Sepulis and
Seconded by Councillor Goyda

THAT staff be directed to enter into discussions with the Township's insurance provider to determine the risk on the Township when the speed of a road is higher than the recommended speed by the Transportation Association of Canada (TAC);

And that, as part of the 2020 budget, staff consider a program to review and change road speed based on TAC results;

And that staff report back on the most cost efficient method to implement the program.
CARRIED

Resolution No. 2019-086: Moved by Councillor Bulmer and
Seconded by Councillor Roth

That Report ADM-2019-006 regarding request by Lina Gourgees – Traffic Safety Concerns – Old Ruby Lane be received; and

That staff request the OPP to deploy the speed spy for a period of time on Victoria Road and Old Ruby Lane and report back on the results. **CARRIED**

4. **Planning and Building Department**

(a) Wellington County Report- Amendment 1 to the Growth Plan, 2017

Resolution No. 2019-087: Moved by Councillor Sepulis and
Seconded by Councillor Goyda

That Council gives authority to the Chief Administrative Officer and Mayor to review Wellington County's submissions with respect to the Amendment to the Growth Plan, and to provide comments. **CARRIED**

Resolution No. 2019-088: Moved by Councillor Roth and
Seconded by Councillor Bulmer

THAT the Wellington County Report ' Amendment 1 to the Growth Plan, 2017' be received for information;

And that Council supports the changes as outlined in the report.

CARRIED

5. **Roads & Parks Department**

(a) Verbal update from Don Creed, Director of Public Works and Parks with respect to vehicle maintenance

Don Creed, Director of Parks and Public Works, provided an update with respect to the higher than anticipated costs in vehicle maintenance due to the weather.

6. **Recreation Department**

None

7. **Mayor's Updates**

Mayor Seeley provided Council an update with respect to the fuel spill updates that are posted on the Township website.

10. NOTICE OF MOTION:

(a) Mayor Seeley with respect to a tree cutting program

Councillor Goyda assumed the role of Chair.

Resolution No. 2019-089: Moved by Mayor Seeley and
Seconded by Councillor Bulmer

WHEREAS it is desirable for the Operating Budget to include an amount for the commencement of a tree cutting program;

THEREFORE BE IT RESOLVED that $20, 000, as a separate cost centre, be added to the 2019 Operating Budget, as a base budget increase which will result in a 3.32% Township tax impact and a 1.73% blended tax impact, for the commencement of the tree maintenance program in an area to be identified by staff;

And that staff report back on a tree maintenance program.

CARRIED

Mayor Seeley resumed the Chair Position.

11. COMMITTEE MINUTES

None

12. MUNICIPAL ANNOUNCEMENTS

(a) Councillor Goyda updated Council with respect to the family day winter classic, and provided an update on the last Friends of Mill Creek meeting.

13. UNFINISHED BUSINESS

14. BY-LAWS:

(a) A by-law to adopt the Budget for the Corporation of the Township of Puslinch for the year 2019.

Resolution No. 2019-090: Moved by Councillor Bulmer and
Seconded by Councillor Roth

That the following By-law be taken as read three times and finally passed in open Council:

(a) **A by-law to adopt the Budget for the Corporation of the Township of Puslinch for the year 2019.**

CARRIED

15. CONFIRMING BY-LAW

(a) By-Law to confirm the proceedings of Council for the Corporation of the Township of Puslinch

Resolution No. 2019-091: Moved by Councillor Roth and
Seconded by Councillor Bulmer

That the following By-law be taken as read three times and finally passed in open Council:

By-Law 011-2019 being a by-law to confirm the proceedings of Council for the Corporation of the Township of Puslinch at its meeting held on the 20th day of February 2019.

CARRIED

16. ADJOURNMENT:

Resolution No. 2019-092: Moved by Councillor Bulmer and
Seconded by Councillor Roth

That Council hereby adjourns at 9:09 p.m.

CARRIED

_____
James Seeley, Mayor

_____
Karen Landry, CAO/Clerk

Ministry of the Environment,
Conservation and Parks
Drinking Water and Environmental
Compliance Division
West Central Region
Guelph District Office

1 Stone Road West
4th Floor
Guelph, Ontario N1G 4Y2
Tel.: 519 826-4255
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Ministère de l'Environnement
de la Protection de la nature et des Parcs
Division de la conformité en matière d'eau
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Direction régionale du Centre-Ouest
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Ontario

Township pf Puslinch
7404 Wellington Rd. 34
Puslinch, ON
N0B2J0

February 14, 2019

Ms. Landry,

I am in receipt of your letter dated February 13, 2019 regarding the January 13, 2019 jet fuel spill cleanup efforts.

I appreciate your keen interest in the planning and outcome of the spill cleanup. The Ministry of the Environment, Conservation and Parks (ministry) will continue to provide updates to all relevant stakeholders, including the Township of Puslinch on a weekly basis or more frequently for any significant updates. The ministry is hoping to be able to provide a more detailed update with respect to impacts and next steps to all interested stakeholders in the coming weeks.

I can assure you that the ministry takes all spills to the environment seriously. Under subsection 93(1) of the *Environmental Protection Act*, "The owner of a pollutant and the person having control of a pollutant that is spilled and that causes or is likely to cause an adverse effect shall forthwith do everything practicable to prevent, eliminate and ameliorate the adverse effect and to restore the natural environment." The ministry, as the regulator is ensuring that those with legal responsibility for the spill carry out their duty to contain the spilled pollutants, clean-up the spill and restore the natural environment. Our staff has been working closely with the consultants since the spill occurred to ensure that appropriate steps are taken to minimize or mitigate the impacts from the spill in an expedited fashion.

As you mentioned, work is currently being carried out via a contractor hired by the insurance company of the spiller. The consultant is in the process of finalizing a delineation report and a remedial action plan for the ministry to review. The ministry is not able to share reports and other documentation prepared for and paid for by a third party. We have reached out to Browns Fuels directly to request they consider the sharing of all available

reports with the Township, as an interested party. The ministry is just putting together a summary of its own analytical sampling results and will share that with the Township and the GRCA sometime next week.

I can confirm that the Ministry`s technical staff are evaluating the draft delineation report and the incoming sampling data as it is received. Once that review is complete, the ministry will be in a better position to provide a detailed summary of next steps to all interested stakeholders.

If you have any further questions or concerns, please don't hesitate to contact me.

Regards,

Amy Shaw
District Manager
519-826-4258

Cc: Clarissa Whitelaw, Area Supervisor (MECP)
Lynnette Armour, Senior Environmental Officer (MECP)
Joe Farwell, GRCA
Mayor James Seeley

Stantec Consulting Ltd.
600-171 Queens Avenue, London ON N6A 5J7

February 26, 2019
File: 165000897

Dear Sir/Madam,

Reference: NOTICE OF SUBMISSION OF DESIGN AND CONSTRUCTION REPORT
Highway 401 Interchange & Highway Improvements from Hespeler Road to Townline Road, City of Cambridge – Phase II (GWP 3222-15-00)

The Ontario Ministry of Transportation (MTO) in partnership with Stantec Consulting Ltd. is undertaking the Detailed Design and Class Environmental Assessment study for improvements on Highway 401 from Hespeler Road to Townline Road in the City of Cambridge, Region of Waterloo. The project includes the expansion of Highway 401 to ten lanes, including Managed Lanes (previously known as High Occupancy Vehicle lanes). The project has been divided into two phases to support construction staging. Phase I construction, GWP 3125-07-00, was completed in 2018 and included the replacement of the Franklin Boulevard bridge, some interchange work, and replacement of guiderail and municipal illumination on Franklin Boulevard. Phase II of the project is tentatively scheduled for construction in fall 2019, subject to completion of the study, funding and approvals.

The *Preliminary Design and Class EA Study for Highway 401 from Hespeler Road easterly to the Wellington County/Halton Region Boundary Study* was documented in a Transportation Environmental Study Report (TESR) in 2012, and received Environmental Assessment clearance in November 2013.

The purpose of this letter is to inform you that the **Design and Construction Report (DCR) documenting Phase II (GWP 3222-15-00)** has been prepared under the Ministry of Transportation's *Class Environmental Assessment for Provincial Transportation Facilities, 2000*. This Phase II DCR is available for a 30-day review period from **Tuesday, March 12, 2019 to Wednesday, April 10, 2019**, during regular business hours only, at the following three review locations, and on the project website (www.highway401-hespeler-townline.ca):

City of Cambridge City Hall
Clerk's Office, 2nd Floor
50 Dickson Street
Cambridge, ON

Ministry of Transportation
West Region, Front Lobby
659 Exeter Road
London, ON

Cambridge Public Library
Idea Exchange - Hespeler Branch
5 Tannery Street East
Cambridge, ON

Reference: NOTICE OF SUBMISSION OF DESIGN AND CONSTRUCTION REPORT
Highway 401 Interchange & Highway Improvements from Hespeler Road to Townline Road, City of Cambridge – Phase II (GWP 3222-15-00)

The enclosed *Ontario Government Notice* (OGN) provides additional details for your reference. Current information is available on the project website, www.highway401-hespeler-townline.ca.

Regards,

STANTEC CONSULTING LTD.

Paula Burnard, MScPl, MCIP, RPP
Senior Environmental Planner
Phone: 519-675-6666
Fax: 519-645-6575
paula.burnard@stantec.com

Attachment: Ontario Government Notice of Submission of Design and Construction Report

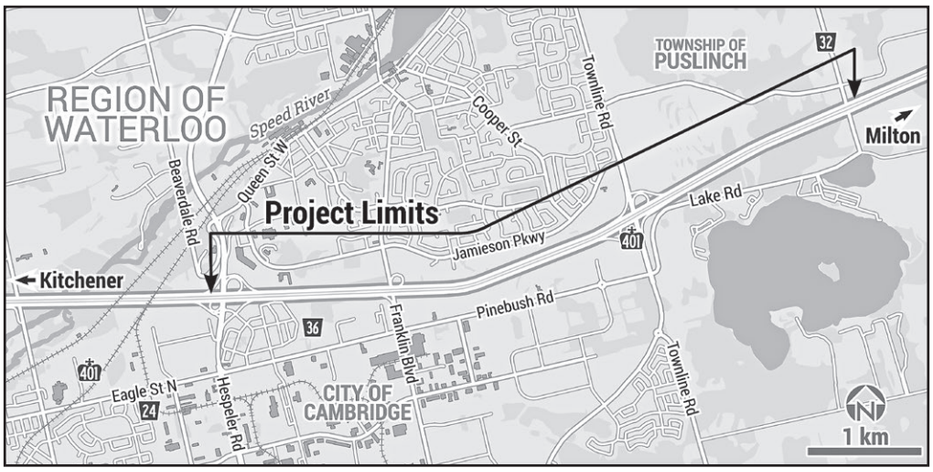
c. S. Howard, Senior Project Manager, MTO West Region
K. Houston, Senior Environmental Planner, MTO West Region
K. Welker, Consultant Project Manager, Stantec Consulting Ltd.
D. Emery, Consultant Project Director, Stantec Consulting Ltd.

NOTICE OF SUBMISSION - DESIGN AND CONSTRUCTION REPORT

Highway 401 Interchange & Highway Improvements from Hespeler Road to Townline Road, City of Cambridge - Phase II (GWP 3222-15-00) Detailed Design and Class Environmental Assessment Study

THE STUDY

The **Ontario Ministry of Transportation (MTO)** has retained **Stantec Consulting Ltd.** to complete the Detailed Design and Class Environmental Assessment (Class EA) study for improvements on Highway 401 from Hespeler Road to Townline Road in the City of Cambridge, Region of Waterloo as shown on the key plan below. Since the issuance of the Notice of Study Commencement in May 2014 (formerly GWP 3060-11-00), the project has been divided into two phases to support construction staging. Phase I construction, GWP 3125-07-00, was completed in 2018 and included the replacement of the Franklin Boulevard bridge, some interchange work, and replacement of guiderail and municipal illumination on Franklin Boulevard.



Phase II, GWP 3222-15-00, includes:

- Widening of Highway 401 to ten lanes, including Managed Lanes (previously named High Occupancy Vehicle lanes)
- Reconstruction of the Highway 401 interchange at Hespeler Road
- Replacement of the Hespeler Road bridge (with provision for pedestrian/cyclist travel across Highway 401, in accordance with the active transportation goals of the Region of Waterloo and the City of Cambridge)
- Reconstruction of ramp tie-ins at Franklin Boulevard and Townline Road interchanges
- Retaining walls as needed
- Expansion of the commuter parking lot at the Townline Road interchange
- Drainage improvements, illumination, overhead signs and traffic signals
- A section of new noise wall constructed along the south side of Highway 401, west of Franklin Boulevard
- Rehabilitation of the Wellington Road 32 Underpass

Phase II construction will start in the fall 2019 to 2022, subject to completion of the Study, funding and approvals.

PROCESS

This project was approved in November 2013 following the preparation and filing of a Transportation Environmental Study Report (TESR) in November 2012 (GWP 8-00-00).

This Phase II Design and Construction Report was prepared under the Ministry of Transportation's *Class Environmental Assessment (EA) for Provincial Transportation Facilities,* 2000 as a Group 'B' project. The Phase II DCR is available for a 30-day review period from **Tuesday, March 12, 2019 to Wednesday, April 10, 2019,** during regular business hours only, at the following three review locations, and on the project website (**www.highway401-hespeler-townline.ca**):

City of Cambridge City Hall
Clerk's Office, 2nd Floor
50 Dickson Street, Cambridge, ON

Ontario Ministry of Transportation
West Region, Front Lobby
659 Exeter Road, London, ON

Cambridge Public Library
Idea Exchange - Hespeler Branch
5 Tannery Street East, Cambridge, ON

The Notice of Submission of Design and Construction Report documenting Phase I of the project (GWP 3125-07-00) was issued in November 2017.

COMMENTS

Comments during the review period may be submitted via the project website **(www.highway401-hespeler-townline.ca**) or by contacting one of the following individuals:

Mr. Kevin Welker, P.Eng., ENV SP
Consultant Project Manager
Stantec Consulting Ltd.
600-171 Queens Avenue, London, ON N6A 5J7
tel: 519-675-6652 (+0 collect)
e-mail: kevin.welker@stantec.com

Mr. Scott Howard
Senior Project Manager
Ministry of Transportation
659 Exeter Road, 3rd Floor, London, ON N6E 1L3
tel: 1-800-265-6072, ext. 519-873-4568
e-mail: scott.howard@ontario.ca

If you have any accessibility requirements in order to participate in the project, please contact one of the Project Team members listed above.

Information collected will be used in accordance with the *Freedom of Information and Protection of Privacy Act.* With the exception of personal information, all comments will become part of the public record.

Ontario

Groundwater Science Corp.

Unit 2, 465 Kingscourt Drive,
Waterloo, ON N2K 3R5
Phone: (519) 746-6916
groundwaterscience.ca

February 1, 2019

Colin Evans
Lands Manager,
St. Marys Cement Inc. (Canada)
CBM Aggregates – Aberfoyle
55 Industrial Street
Toronto, ON
M4G 3W9

Dear Mr. Evans:

RE: Proposed Trigger Level Thresholds,
CBM Neubauer Pit, Licence No. 625284
Part Lot 27, Concession 1, Puslinch Township

This letter provides a set of proposed pond level thresholds for the reference property in order to satisfy conditions of below water extraction. The pit Licence was issued in December 2011. Above water table extraction began in early 2017. Below water extraction is scheduled to start in the summer of 2019. Site details and monitoring well locations are shown on **Figure 1** (attached).

1.0 Threshold Requirements

The Licence conditions as listed on the Site Plan include the following (in addition to other monitoring and reporting requirements):

7. *Trigger Levels, considering existing cross-site hydraulic gradients, shall be developed to the satisfaction of MNR, in consultation with GRCA and the Township of Puslinch as needed, prior to below water table extraction.*
8. *The following Mitigation and Contingency Plan shall be adopted:*
    - ***Initial Trigger Level*** *exceeded – the Township, GRCA and MNR shall be notified immediately and daily monitoring shall be undertaken.*
    - ***Intermediate Trigger Level*** *exceeded for seven (7) consecutive days – the Township, GRCA and MNR shall be notified immediately and extraction below the water table shall be reduced 50% until the Neubauer Pond surface water elevation is greater than the* ***Intermediate Trigger Level*** *for seven (7) consecutive days.*
    - ***Final Trigger Level*** *exceeded – the Township, GRCA and MNR shall be notified immediately and extraction below the water table shall cease until the Neubauer Pond surface water elevation is greater than the* ***Intermediate Trigger Level*** *for seven (7) consecutive days.*

2.0 Threshold Development

The CBM Neubauer site is located adjacent to the CBM Puslinch Pit site. Below water extraction has occurred at the Puslinch Pit site, and two ponds have been developed, referenced as the North Pond and South Pond (see **Figure 1**). The South Pond is relatively large and can be expected to exert some control on local groundwater flow conditions. Other large ponds in the overall area, including the McNally, McNally East and Lanci ponds will also exert some control on groundwater flow.

A comparison of long-term monitoring results at the Neubauer Pit (including McNally East Pit HH1) and select locations at the Puslinch Pit are shown in hydrograph format on **Figure 2**. The data appears to fall into two "groups". We note that water levels at HH1 and the North Pond appear to have a similar range and fluctuation. Monitors BH1, BH4, South Pond and MP3 appear to also have a similar range and fluctuation, and are generally lower than HH1/North Pond. Groundwater flow in this area is generally east/northeast to west/southwest.

The South Pond has occupied most of the southern portion of the Puslinch Pit since late 2012 or early 2013. The established threshold for the South Pond is 305.34 mASL (as per July 2007 survey). Additional groundwater level thresholds of 305.27 mASL have been established for Puslinch Pit monitoring MP3 and MP4. Unlike the Neubauer Pit requirements, thresholds established for the Puslinch Pit represent an level at which agencies are notified, additional monitoring is initiated (as needed) and the reasons for the threshold exceedance is investigated. Specific actions are not prescribed when a threshold is exceeded at the Puslinch Pit, however may be recommended as a result of the investigation.

The predicted final average level of the Neubauer Pond (as shown on the Site Plan), is approximately 306.75 mASL. This predicted level appears reasonable given the monitoring record to date (see **Figure 2**). Long term monitors located at the perimeter of the Neubauer Pit are BH1 and BH4. Note that BH2 and BH3 are located within the extraction area and will be removed. Location BH5 is located further south of the site.

Table 1 summarizes minimum, maximum and average pond and groundwater levels based on the monitoring record since 2013.

Monitor	Water Level Elevations (mASL)		
	Average	Maximum	Minimum
HH1	307.1	307.6	306.6
BH1	306.2	306.7	305.6
BH4	306.5	307.2	305.9
South Pond	306.5	306.9	305.8
MP3	306.3	307.5	305.7
mASL = metres above sea level			

Table 1: Monitoring Record Summary

The minimum water levels at BH1, BH4 and the South Pond are all within a relatively small (30 cm) range. This represents the lowest water table condition in this area since 2013. The water table fluctuation observed at HH1, BH1, BH4 and the South Pond is very consistent at about 1.1 m.

The concern addressed by the trigger threshold requirements is that below water extraction, and pond development, may lower water table elevations and reduce gradients, beyond "natural" conditions. By maintaining water levels above historical low levels at the site, features upgradient of the site are

"protected" from impacts related to extraction. In addition, the overall flow system toward Mill Creek is maintained.

We note that no threshold exceedance, and no significant water table "impact", has occurred at the Puslinch Pit over 18+ years of operation. Therefore the likelihood of impact related to the Neubauer Pit operations is also considered low.

Trigger level thresholds for the Neubauer Pit are recommended for the extraction pond, BH1 and BH4, based on the historical monitoring record and considering existing cross-site hydraulic gradients. The trigger level thresholds are summarized in **Table 2**.

Monitor	Water Level Trigger Threshold Elevations (mASL)		
	Initial	Intermediate	Final
Pond	305.7	305.6	305.2
BH1	305.5	305.4	305.0
BH4	305.7	305.6	305.2
mASL = metres above sea level			

Table 2: Proposed Trigger Thresholds

The predicted final average Neubauer Pond is approximately 25 cm higher than the measured South Pond average level. This also corresponds well with the 20 to 30 cm measured difference (gradient) in low water table elevations between the Neubauer site and the South Pond. The South Pond has an established notification/investigation trigger threshold of 305.34 mASL. In order to maintain the gradient from pond to pond, the Neubauer Pond Initial trigger level threshold is recommended to be 305.7 mASL. Similar to other operations in the area, the Intermediate trigger threshold level is 10 cm lower, and the Final trigger threshold is 50 cm lower.

Similar thresholds are recommended for BH1 and BH4, related to historical water level elevations at both locations, which will ensure that appropriate mitigation measures are implemented if water table conditions and/or hydraulic gradients decline below historically observed levels in this area.

3.0 Recommendations

The proposed Neubauer Trigger Thresholds be reviewed by MNRF for approval.

If you have any questions or require further assistance please do not hesitate to contact me.

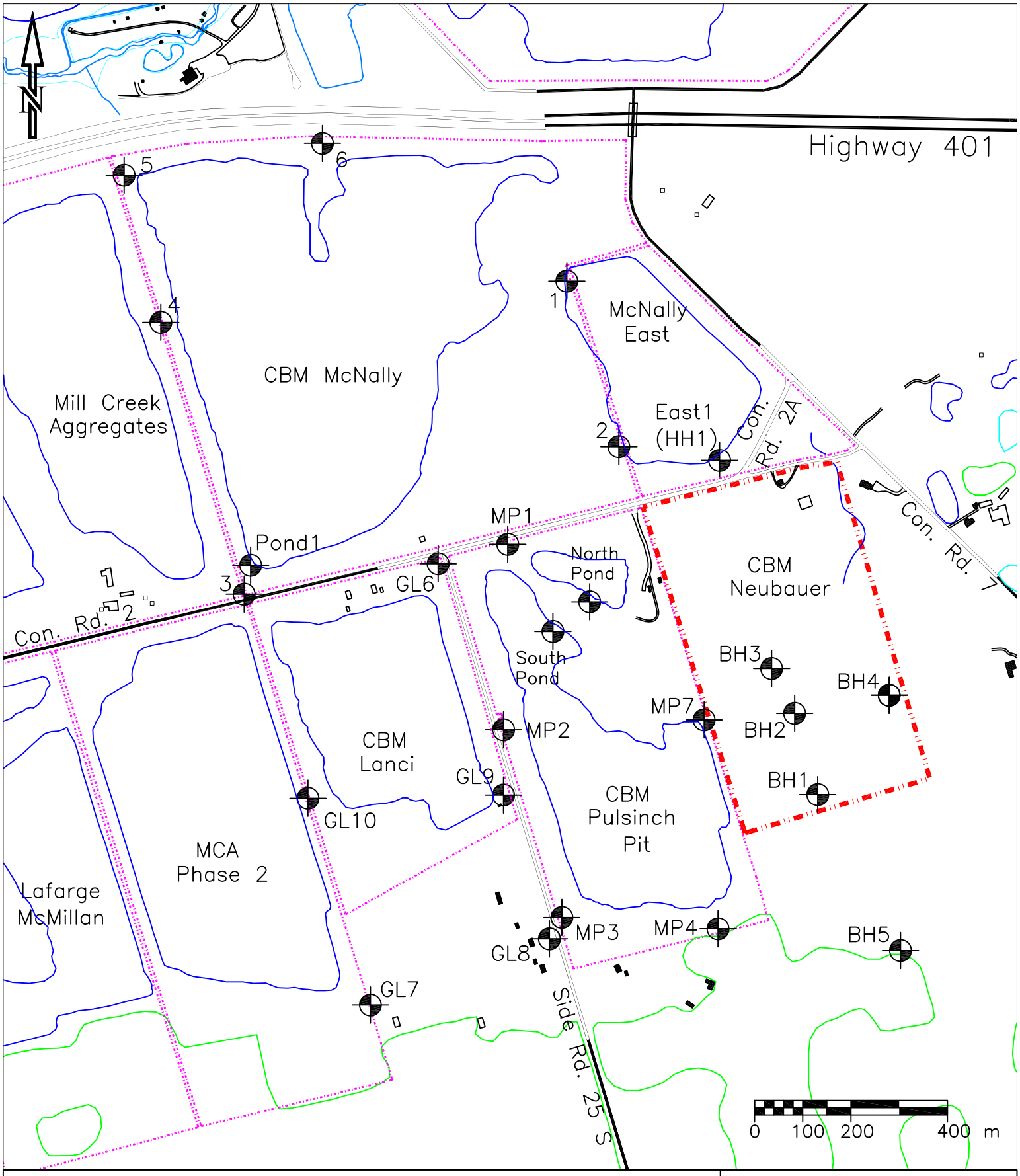
Sincerely,

Andrew Pentney, P.Geo.
Hydrogeologist

PROFESSIONAL GEOSCIENTIST
ANDREW H. PENTNEY
PRACTISING MEMBER
0652
ONTARIO

Cc: Bernie Janssen, Harrington McAvan Ltd.

Attached: Figure 1: Monitoring Locations
Figure 2: Water Level Elevation Summary Hydrograph



CBM Neubauer Pit Licence Boundary (approximate)

existing Licence boundaries (approximate)

surface water: pond (approximate), creek or swale

wetland (OBM mapping)

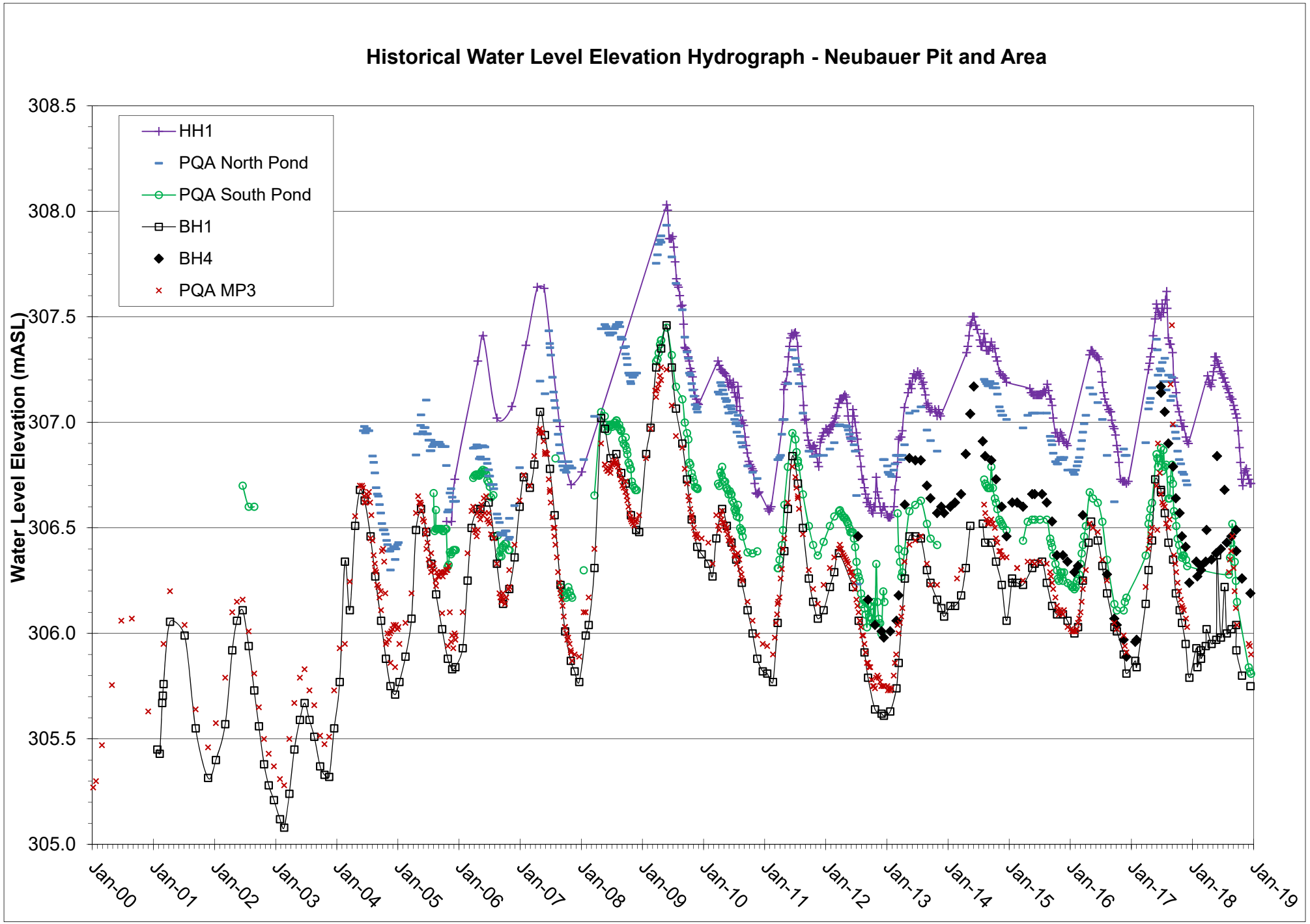
modified from :
1) OBM mapping UNDER LICENSE, WITHOUT PREJUDICE OR ENDORSEMENT, FROM THE QUEEN'S PRINTER OF ONTARIO
2) Site Plans, Harrington and Hoyle Ltd.
3) 2017 Air Photo (Google Earth)

Figure 1: Local Monitoring Locations

CBM Neubauer Pit
Groundwater Monitoring Program
Annual Report

Goundwater Science Corp.

Scale: as shown
Date: April 2018


Historical Water Level Elevation Hydrograph - Neubauer Pit and Area
Water Level Elevation (mASL)
308.5
308.0
307.5
307.0
306.5
306.0
305.5
305.0
HH1
PQA North Pond
PQA South Pond
BH1
BH4
PQA MP3
Jan-00
Jan-01
Jan-02
Jan-03
Jan-04
Jan-05
Jan-06
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Jan-17
Jan-18
Jan-19

Harden Environmental Services Ltd.
4622 Nassagaweya-Puslinch Townline Road
R.R. 1, Moffat, Ontario, L0P 1J0
Phone: (519) 826-0099 Fax: (519) 826-9099

Groundwater Studies
Geochemistry
Phase I / II
Regional Flow Studies
Contaminant Investigations
OMB Hearings
Water Quality Sampling
Monitoring
Groundwater Protection Studies
Groundwater Modelling
Groundwater Mapping

File: Neubauer

February 25, 2019

Township of Puslinch
7404 Wellington Road 34
Puslinch, Ontario, N0B 2J0

Attention: Karen Landry, CAO

Dear Ms. Landry;

Re: Neubauer Groundwater Threshold Review

We have reviewed the proposed groundwater elevation thresholds presented by Groundwater Science Corporation presented in their letter of February 1, 2019. The purpose of the threshold values is to ensure that groundwater flow is maintained within the Mill Creek Subwatershed. The thresholds presented address east to west groundwater flow within the Mill Creek Subwatershed, that is from the Neubauer Property to the CBM Puslinch property. However, no threshold values were determined to address the potential for north to south movement of groundwater from the Mill Creek Subwatershed to the Fletcher Creek Subwatershed. We make recommendations in this letter to redress this omission.

The groundwater monitoring wells on the McNally East, Neubauer and Puslinch Pits, all owned and operated by CBM Aggregates Ltd are used to determine groundwater flow conditions within and around the existing site. Below-water-table extraction is not presently taking place at the Neubauer site. The groundwater flow is presently north to south from the McNally East site to the Neubauer site and from east to west from the Neubauer site to the Puslinch Pit site. There is a pair of monitoring wells (BH1 and BH5) that confirm that north to south movement of groundwater is presently not occurring from the Neubauer site. Therefore, the existing condition is that groundwater flow through the Neubauer Pit and local environs remains within the Mill Creek Subwatershed.

The threshold values presented by Groundwater Science Corporation are reasonable for BH1, BH4 and the Pit Pond. These thresholds include initial, intermediate and final threshold values that dictate action to be taken should water levels fall below the stated threshold. Actions include reduction in below-water-table extraction rates and cessation of all below-water-table extraction should conditions continue to worsen.

Presently, a south to north groundwater flow condition is indicated by the monitoring pair BH1 and BH5. This shows that groundwater is flowing from the highland area (Galt Moraine) south of the pit into the Mill Creek environment. The expansion of the pit pond on the Neubauer Property is expected to raise water levels at the south end of the site and thereby potentially reverse the hydraulic gradient. It is our recommendation that, should a north to south gradient occur, the pit owner must evaluate the magnitude of groundwater flow. In addition to the thresholds stated in the Groundwater Science Corp. letter, we recommend the following threshold be added;

Should groundwater elevations in BH1 exceed those measured in BH5, the owner will undertake an evaluation to estimate the magnitude of groundwater flux between Mill Creek Subwatershed and Fletcher Creek Subwatershed. Mitigation of the groundwater flux may be necessary should the Ministry of Natural Resources and Forestry or the Grand River Conservation Authority deem the volume of flux to be significant.

Sincerely,
Harden Environmental Services Ltd.

Stan Denhoed, P.Eng., M.Sc.
Senior Hydrogeologist

Conservation Halton

905.336.1158
Fax: 905.336.7014
2596 Britannia Road West
Burlington, Ontario L7P 0G3
conservationhalton.ca

Protecting the Natural Environment from Lake to Escarpment

February 13, 2019

Mayor Seeley and Members of Council
c/o Karen Landry, CAO/Clerk
Township of Puslinch
7404 Wellington Road 34
Puslinch ON N0B 2J0

Dear Mayor Seeley and Members of Council:

Re: 2019 Budget Municipal Funding Apportionment

Municipal funding in the 2019 Budget of $9,977,998 was approved by the Conservation Halton Board of Directors on November 22, 2018.

The total municipal funding has been apportioned to municipalities as follows:

Municipality:	2019 Apportionment %	2019 Municipal Funding - Operating	2019 Municipal Funding - Capital	2019 Total Municipal Funding
Region of Halton	87.6577%	$ 8,179,327	$ 567,157	$ 8,746,484
City of Hamilton	7.2456%	$ 676,086	$ 46,880	$ 722,966
Region of Peel	4.8745%	$ 454,839	$ 31,539	$ 486,378
Township of Puslinch	0.2222%	$ 20,732	$ 1,438	$ 22,170
Total	**100.0000%**	**$ 9,330,984**	**$ 647,014**	**$ 9,977,998**

The apportioned amounts are being levied in accordance with Sections 26 and 27 of the Conservation Authorities Act.

Please contact me for further information regarding the apportionment of the municipal funding in the Conservation Halton 2019 Budget.

Yours truly,

Hassaan Basit,
CAO/Secretary-Treasurer

cc Marnie Piggot, Director, Finance; Conservation Halton
Mary Hasan, Director of Finance/Treasurer; Township of Puslinch

From:	Karen Landry
To:	Nina Lecic
Subject:	FW: Township of South Stormont Council Resolution - Provincial Review of OMPF
Date:	Wednesday, February 27, 2019 9:28:55 AM
Attachments:	image002.png

From: Ashley Sloan <ashley@southstormont.ca>
Sent: Tuesday, February 26, 2019 2:25 PM
To: clerks@pickering.ca; clerks@sarnia.ca; clerks@stcatharines.ca; clerks@clarington.net; gdombroski@madawaskavalley.ca; clerk@addingtonhighlands.ca; info@adelaidemetcalfe.on.ca; lkeenan@townshipadjtos.on.ca; info@admastonbromley.com; alberton@jam21.net; mdaigneault@alfred-plantagenet.com; info@algonquinhighlands.ca; alnhald@alnwickhaldimand.ca; township@amaranth-eastgary.ca; info@armourtownship.ca; reynaldrivard@nt.net; arnprior@arnprior.ca; clerk@acwtownship.ca; bbonisteel@asphodelnorwood.com; jrody@assiginack.ca; athens@ripnet.com; info@atikokan.ca; pmercier@augusta.ca; bayham@bayham.on.ca; khallahan@twp.beckwith.on.ca; billingsadmin@billingstwp.ca; reception@blackriver-matheson.com; generalmail@blandfordblenheim.ca; katie.scott@blindriver.ca; bluewater@town.bluewater.on.ca; clerk@ebonfield.org; admin@eganville.com; lmcdonald@bracebridge.ca; brant@brant.ca; brethour@parolink.net; info@brockton.ca; info@brookealvinston.com; brucemines@bellnet.ca; blrtownship@xplornet.com; clerk@burksfalls.ca; burpeemills@vianet.ca; info@caledon.ca; administration@calvintownship.ca; info@carletonplace.ca; cao@carlingtownship.ca; clerk@carlowmayo.ca; harlytwp@parolink.net; info@casselman.ca; services@cavanmonaghan.net; dleitch@centralelgin.org; township@centralfrontenac.com; info@centralhuron.com; centralm@amtelecom.net; kokane@centrewellington.ca; info@champlain.ca; apellow@chapleau.ca; chapple@tbaytel.net; dthibeault@charltonanddack.com; office@chatsworth.ca; info@chisholm.ca; mouellet@clarence-rockland.com; pfettes@clearview.ca; cobalt@ntl.sympatico.ca; alice.mercier@cochraneontario.com; brentstdenis@gmail.com; toc@ontera.net; townhall@collingwood.ca; conmee@tbaytel.net; clerk@cramahetownship.ca; clerk@dawneuphemia.on.ca; dawsontwp@tbaytel.net; gmaracle@deseronto.ca; office@doriontownship.ca; info@dourodummer.on.ca; admin@dnetownship.ca; scasey@dubreuilville.ca; cao@duttondunwich.on.ca; info@dysartetal.ca; eftownship@ear-falls.com; municipality@eastferris.ca; township@amaranth-eastgary.ca; lrozon@easthawkesbury.ca; ezt@ezt.ca; mail@twpec.ca; mail@elizabethtown-kitley.on.ca; info@city.elliotlake.on.ca; township@emo.ca; englehrt@ntl.sympatico.ca; dmctavish@enniskillen.ca; connie.cox@erin.ca; info@essatownship.on.ca; cbondy@essex.ca; evantureladmin@parolink.net; office@faraday.ca; info@fauquierstrickland.com; town@fort-frances.com; mbouffard@frenchriver.ca; admin@frontofyonge.com; dplumley@kos.net; diannesayer3@hotmail.com; sboonstra@gbtownship.ca; office@georgianbluffs.on.ca; gillies@tbaytel.net; townhall@goderich.ca; adminoffice@gordonbarrieisland.ca; aclarke@gorebay.ca; mail@townofgrandvalley.ca; cthwaites@gravenhurst.ca; admin@greatermadawaska.com; info@greaternapanee.com; administration@greenstone.ca; info@greyhighlands.ca; general@get.on.ca; info@haldimandcounty.on.ca; info@hamiltontownship.ca; harlytwp@parolink.net; harris@ntl.sympatico.ca; info@hastingshighlands.ca; havbelmet@hbmtwp.ca; cgroulx@hawkesbury.ca; townofhearst@hearst.ca; info@highlandseast.ca; twphill@parolink.net; admin@hiltontownship.ca; info@hiltonbeach.com; clerk@town.howick.on.ca; harlytwp@parolink.net;

tanya.calleja@huntsville.ca; info@huronkinloss.com; bknight@huroneast.com; email@huronshores.ca; deputyclerk@tbaytel.net; clerks@ingersoll.ca; klauzon@iroquoisfalls.com; elklake@ntl.sympatico.ca; johnsontwp@bellnet.ca; office@townshipofjoly.com; general@kapuskasing.ca; info@city.kawarthalakes.on.ca; info@townofkearney.com; harlytwp@parolink.net; info@khrtownship.ca; clerk@kincardine.net; joann.ducharme@tkl.ca; lavalley@nwonet.net; lairdtwp@soonet.ca; m.percival@lakeofbays.on.ca; lakeofthewoodstwp@tbaytel.net; webmaster@lakeshore.ca; administration@county-lambton.on.ca; dwightmctaggart@larderlake.ca; jallen@latchford.ca; info@laurentianhills.ca; info@lvtownship.ca; info@leamington.ca; vanessa@townshipleeds.on.ca; clerk@township.limerick.on.ca; info@loyalist.ca; ldeboer@lucanbiddulph.on.ca; twpmacd@onlink.net; admin@vianet.ca; clerktreasurer@visitmachin.com; info@madawaskavalley.ca; clerk@madoc.ca; info@magnetawan.com; malahide@malahide.ca; reception@town.mapleton.on.ca; clerk@marathon.ca; info@markstay-warren.ca; township@ntl.sympatico.ca; info@mattawa.ca; mattawan@xplornet.ca; csenior@oxfordcounty.ca; mattice@ntl.sympatico.ca; lwest@mcdougall.ca; clerk@township.mckellar.on.ca; clerk@mcmurrichmonteith.com; info@mcnabbraeside.com; info@meaford.ca; info@melancthontownship.ca; deputyclerk@merrickville-wolford.ca; smibert@middlesexcentre.on.ca; admin@mindenhills.ca; bwhite@town.minto.on.ca; town@mississippimills.ca; mono@townofmono.com; info@township.montague.on.ca; moonbeam@moonbeam.ca; townshipofmorley@gmail.com; nmichie@morristurnberry.ca; info@mulmurtownship.ca; cmortimer@muskokalakes.ca; nairncentre@personainternet.com; neebing@neebing.org; clerk@newtecumseth.ca; office@newbury.ca; info@nipigon.net; admin@nipissingtownship.com; inquiries@norfolkcounty.ca; naw@nalgonawil.com; info@northdundas.com; info@northfrontenac.ca; liselavigne@northglengarry.ca; general@northgrenville.on.ca; info@northhuron.ca; c.parent@northkawartha.on.ca; admin@northmiddlesex.on.ca; clerk@northstormont.ca; info@townofnemi.on.ca; marylynn.nbp@amtelecom.net; karmstrong@twp.norwich.on.ca; twpoconn@tbaytel.net; oilsprings@ciaccess.com; twpopas@persona.ca; corporate@orillia.ca; info@oro-medonte.ca; admin@papineaucameron.ca; jboggs@townofparrysound.com; info@pelee.ca; tlapierre@pembroke.ca; hbryce@penetanguishene.ca; info@townshipofperry.ca; lwalton@perth.ca; gschwendinger@pertheast.ca; lscott@perthsouth.ca; email@petawawa.ca; petrolia@town.petrolia.on.ca; picklelake@picklelake.org; plumtwsp@onlink.net; info@plympton-wyoming.ca; jburns@villageofpointedward.com; admin@porthope.ca; info@powassan.net; info@prescott.ca; Clerks@pecounty.on.ca; Karen Landry <KLandry@puslinch.ca>; kevinh@quintewest.ca; rainyriver@tbaytel.net; ramara@ramara.ca; municipality@redlake.ca; cao@shawbiz.ca; kbulmer@town.renfrew.on.ca; info@twprideaulakes.on.ca; clerk.greffe@russell.ca; admin@ryersontownship.ca; inquiries@sables-spanish.ca; clerk@schreiber.ca; info@seguin.ca; twpsel@nexicom.net; hsander@townshipofsevern.com; shuniah@shuniah.org; admin@siouxlookout.ca; info@livethelakelife.ca; cao@swox.org; clerk@town.southbruce.on.ca; sbpen@bmts.com; mail@southdundas.com; admin@township.southfrontenac.on.ca; info@southglengarry.com; info@southhuron.ca; info@southriverontario.com; South Stormont Info <info@southstormont.ca>; info@southgate.ca; info@southwestmiddlesex.ca; southwold@southwold.ca; info@springwater.ca; webmaster@twp.stclair.on.ca; stjoeadmin@bellnet.ca; lheinbuch@town.stmarys.on.ca; caoclerk@stonemills.com; clerk@strongtownship.com; villageoffice@sundridge.ca;

tarbutttownship@bellnet.ca; agray@tay.ca; clerk@tayvalleytwp.ca; info@tecumseh.ca; twptehk@amtelecom.net; visit@temagami.ca; municipality@temiskamingshores.ca; info@terracebay.ca; inquiries@thamescentre.on.ca; mweaver@thearchipelago.on.ca; info@thebluemountains.ca; bgreen@ontera.net; townthess@bellnet.ca; reynaldrivard@nt.net; clerks@tillsonburg.ca; dluker@tiny.ca; info@trenthills.ca; loneill@trentlakes.ca; clerk@tudorandcashel.com; info@twp.tweed.on.ca; info@tyendinagatownship.com; administration@valharty.ca; info@warwicktownship.ca; clerk@wasagabeach.com; ccyr@wawa.cc; township@wellington-north.com; westelgin@westelgin.net; info@westperth.com; westport@rideau.net; info@whitestone.ca; info@whitewaterregion.ca; wollaston@bellnet.ca; zorra@zorra.on.ca; cityclerk@portcolborne.ca; clerk@southalgonquin.ca; bwatson@brighton.ca; jbouthillette@stcharlesontario.ca; pberfelz@northperth.ca; deputyclerk@ebonfield.org; clerksoffice@centrehastings.com; jaremy.hpayne@bellnet.ca; cao@lanarkhighlands.ca; kingsvilleworks@kingsville.ca; treasurer@ntl.sympatico.ca; admin@manitouwadge.ca; service@kenora.ca; peggy@baldwin.ca; info@whiteriver.ca; cbrooks@cramahetownship.ca; calvin.rodgers@chamberlaintownship.com; info@townofspanish.com; t.bennett@marmoraandlake.ca; asimonian@augusta.ca; regionalclerk@regionofwaterloo.ca; MCadieux@prescott-russell.on.ca; townclerk@milton.ca
Cc: Loriann Harbers <loriann@southstormont.ca>
Subject: Township of South Stormont Council Resolution - Provincial Review of OMPF

Good afternoon,

In light of the review of the Ontario Municipal Partnership Fund (OMPF) announced by the Provincial government, the Council of the Township of South Stormont passed the following resolution at its meeting of February 20, 2019:

Resolution Number: 047/2019
Moved by: Deputy Mayor Smith Seconded by: Councillor Guindon

Whereas the Provincial government announced it was conducting a review of the Ontario Municipal Partnership Fund (OMPF), which provides annual funding allotments to municipal governments to help offset operating and capital costs;

And whereas Municipalities were further advised that the overall spending envelope for the program would decrease having a significant impact on future budgets and how funds are raised by Municipalities as funding will be reduced by an unspecified amount;

And whereas if allocations to municipalities are reduced, Councils will need to compensate with property tax increases or local service reductions;

And whereas, the 2018 South Stormont allocation was **$821,700**, which is equivalent to **14%** of the Township's municipal property tax revenue;

And whereas, a 14% increase in the municipal property tax rate would increase the municipal component of property taxes paid for an average household by **$129 per year**;

And whereas the Township of South Stormont prides itself on efficient and value for money practices every day;

Now therefore be it resolved that although an interim payment has been received, Council of the Township of South Stormont expresses grave concern with the potential reduction and/or loss of the OMPF allotment in future years;

And further, Council petitions the Provincial government to complete the OMPF review in an expeditious manner as future financial consideration ensures municipal sustainability;

And furthermore, that this resolution be circulated to the Premier, Ministers of Finance, Municipal Affairs and Housing, our local MPP and all Ontario municipalities for their endorsement and support.
CARRIED

Your endorsement and support of this resolution would be appreciated.

Sincerely,

Ashley Sloan
Clerk's Assistant
Marriage Officiant

Come see for yourself!
Township of South Stormont
2 Mille Roches Rd., P.O. Box 84
Long Sault, ON K0C 1P0
Email: ashley@southstormont.ca
Office: 613-534-8889 ext. 204
Fax: 613-534-2280

Like Us On Facebook

Mayor Dan Mathieson & Stratford City Council

In co-operation with the

Stratford Festival

Are pleased to invite Municipal Staff, Elected Officials, their friends and families to join us for

Civic Night

Tuesday, June 18th, 2019

"Billy Elliott"

Festival Theatre - 55 Queen Street, Stratford
Performance: 8:00 p.m.

A Show to Make Your Spirit Shine

Dreams don't come easy in the hardscrabble mining town, riven by a bitter national strike, where eleven-year-old Billy lives with his bereaved family. But Billy's discovery of his talent for dance awakens in him a passion that will transform his life and win the hearts of his whole community. With its inspirational story, breathtaking dance numbers and music by pop legend Elton John, this fresh new take on the smash-hit show – reimagined for Stratford – will appeal to all.

Please join us prior to the performance in the Paul D. Fleck Marquee for a Reception beginning at 6:30 pm

For this performance, the Stratford Festival is offering 2 tickets for the price of one, however, tickets can be purchased individually at half price. Tickets will sell out quickly for this performance, so please purchase your tickets early. The Festival is also offering discounted tickets for youth 18 years of age and under, so please feel free to bring them along.

Tickets can be purchased by contacting the Box Office at 1-800-567-1600 or on-line at www.stratfordfestival.ca and providing the ***Promotion Code 85151****. Additional information regarding this performance is available through the Stratford Festival's website.*

If you should have any questions or require additional information, please do not hesitate to contact Pat Shantz, Administrative Assistant to the Mayor, at 519-271-0250, ext. 236 or by email pshantz@stratford.ca. We look forward to seeing you on June 18th!

OAKVILLE

February 15, 2019

Ontario Growth Secretariat
Ministry of Municipal Affairs and Housing
777 Bay Street
23rd Floor, Suite 2304
Toronto ON M5G 2E5

growthplanning@ontario.ca

Dear Secretariat:

Subject: Information Report - Province of Ontario, Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe

At its meeting on February 11, 2019, Oakville Town Council approved the following resolution with respect to the subject item noted above:

1. *That Planning Services report "Information Report - Province of Ontario, Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe", be received and endorsed.*

2. *That Planning Services report "Information Report - Province of Ontario, Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe" dated February 5, 2019 be submitted to the Ministry of Municipal Affairs and Housing by the commenting deadline of February 28, 2019.*

3. *That Planning Services report "Information Report - Province of Ontario, Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe" dated February 5, 2019, be forwarded to the Region of Halton, City of Burlington, Town of Halton Hills, Town of Milton, Halton MPPs, Association of Municipalities of Ontario, Large Urban Mayor's Caucus of Ontario, and the Mayors and Regional Chairs of Ontario for information.*

The staff report is attached, and may be viewed on the town website at the following link (see Item 9): Planning and Development Council Addendum.

Should you have any questions regarding this matter or should you require additional information, please contact Kirk Biggar, Senior Planner, Town of Oakville, at 905-845-6601, extension 3968, or email kirk.biggar@oakville.ca.

Subject: Information Report - Province of Ontario, Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe

Yours truly,

Kathy Patrick
Acting Town Clerk

c. Graham Milne, Regional Clerk, Region of Halton
Angela Morgan, City Clerk, City of Burlington
Suzanne Jones, Town Clerk, Town of Halton Hills
Troy McHarg, Town Clerk, Town of Milton
The Honourable Ted Arnott, MPP Wellington – Halton Hills
Stephen Crawford, MPP, Oakville
Jane McKenna, MPP, Burlington
Association of Municipalities of Ontario
Large Urban Mayor's Caucus of Ontario

email: Mayors and Regional Chairs of Ontario
Jane Clohecy, Commissioner of Community Development
Mark Simeoni, Director of Planning Services
Diane Childs, Manager of Policy Planning and Heritage
Kirk Biggar, Senior Planner, Policy Planning
Franca Piazza, Legislative Coordinator, Planning Services

Attach.

OAKVILLE

REPORT

PLANNING AND DEVELOPMENT COUNCIL MEETING

MEETING DATE: FEBRUARY 11, 2019

FROM: Planning Services Department

DATE: February 5, 2019

SUBJECT: **Information Report - Province of Ontario, Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe**

LOCATION: Town wide
WARD: Multiple Wards:

RECOMMENDATION:

1. That Planning Services report "Information Report - Province of Ontario, Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe", be received.

2. That Planning Services report "Information Report - Province of Ontario, Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe" dated February 5, 2019 be submitted to the Ministry of Municipal Affairs and Housing by the commenting deadline of February 28, 2019.

3. That Planning Services report "Information Report - Province of Ontario, Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe" dated February 5, 2019, be forwarded to the Region of Halton, City of Burlington, Town of Halton Hills and the Town of Milton for information.

KEY FACTS:

The following are key points for consideration with respect to this report:

- On January 15, 2019, the Minister of Municipal Affairs and Housing proposed changes to the Growth Plan for the Greater Golden Horseshoe.

- The proposed changes are posted to the Environmental Registry of Ontario and the province is seeking feedback until February 28, 2019.

- The proposed changes to the Growth Plan would apply across six broad categories:

- Employment Planning
- Settlement Area Boundary Expansions
- Small Rural Settlements
- Natural Heritage and Agricultural Systems
- Intensification and Density Targets
- Major Transit Station Areas

- Three additional proposals accompany the proposed Growth Plan changes:

  - Proposed Framework for Provincially Significant Employment Zones

  - Proposed modifications to the transition regulation (O. Reg. 311/06, Transitional Matters - Growth Plans) and the exemptions regulation (O. Reg. 525/97, Exemption from Approval – Official Plan Amendments)

- This report presents a summary and discussion on the proposed changes with a focus on the Growth Plan and the Provincially Significant Employment Zones.

- Highlights of the provincial engagement process and the proposed modifications to the regulations are also provided.

- The purpose of this report is to recommend comments that could be provided to the province regarding the proposed changes to the Growth Plan.

BACKGROUND:

On January 15, 2019, the Ministry of Municipal Affairs and Housing released proposed changes to the provincial Growth Plan for the Greater Golden Horseshoe, 2017 (Growth Plan) on the Environmental Registry of Ontario under ERO Number 013-4504 and searchable on-line at https://ero.ontario.ca/

The province has posted the draft amended Growth Plan at: http://www.mah.gov.on.ca/Page20924.aspx#_Toc481588422

The proposed changes to the Growth Plan were accompanied by three additional proposals:

1. Proposed Modifications to O. Reg. 311/06 (Transitional Matters - Growth Plans) made under the Places to Grow Act, 2005 to implement the Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe, 2017 (ERO 013-4505)

2. Proposed Modifications to O. Reg. 525/97 (Exemption from Approval – Official Plan Amendments) made under the *Planning Act* to implement the Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe, 2017 (ERO 013-4507)

3. Proposed Framework for Provincially Significant Employment Zones (ERO 013-4506)

The province has stated that the changes are intended to:

> *"Address implementation challenges with the Plan that were identified by the municipal and development sectors and other stakeholders, and*
>
> *To provide greater flexibility and address barriers to building homes, creating jobs, attracting investments and putting in place the right infrastructure while protecting the environment."*

The province is seeking feedback on these proposals with a commenting deadline of February 28, 2019. Comments may be submitted online through the Environmental Registry online form, by email at growthplanning@ontario.ca or by mail to:

Ontario Growth Secretariat
Ministry of Municipal Affairs and Housing
777 Bay Street
23rd Floor, Suite 2304
Toronto, ON M5G 2E5

Questions about the proposed changes, the consultation process and consultation documents may be directed to growthplanning@ontario.ca.

COMMENT/OPTIONS:

The purpose of this report is to recommend comments that could be provided to the province regarding the proposed changes to the Growth Plan. The report presents a summary and discussion on the proposed changes with a focus on the Growth Plan and the Provincially Significant Employment Zones. Highlights of the provincial engagement process and the proposed modifications to the regulations are also provided.

Provincial Engagement Process

The Ministry of Municipal Affairs and Housing received input from key stakeholders at a stakeholder forum and a series of implementation working sessions regarding the Growth Plan held in the fall of 2018. The sessions were organized around the following topics:

- Planning for Employment
- Agricultural and Natural Heritage Systems Mapping
- Planning for Major Transit Station Areas
- Intensification and Density Targets
- Settlement Area Boundary Expansions

The purpose of each session was to discuss specific, practical, workable solutions to challenges with implementing Growth Plan policies within the topic. Each session consisted of a presentation brief from ministry staff, small group facilitated discussions and report back plenary sessions intended to highlight solutions.

Working Group participants included lower-tier and upper-tier municipal staff with detailed, technical knowledge about Growth Plan policies as well a counterparts from the conservation authorities. Participants also included representatives from the development industry and Non-Governmental sectors.

Town staff participated in each session with as many as 4 representatives depending on the topic. The results of these sessions were to be considered by the Minister of Municipal Affairs and Housing to help inform changes to the policy framework.

Overview and Purpose of the Proposed Changes to the Growth Plan

The proposed changes to the Growth Plan would apply across six broad categories:

- Employment Planning
- Settlement Area Boundary Expansions
- Small Rural Settlements
- Natural Heritage and Agricultural Systems
- Intensification and Density Targets
- Major Transit Station Areas

As stated by the province, the purpose of the proposed changes is as follows:

> *"The overall goal of the proposed changes is to streamline growth management planning in the Greater Golden Horseshoe to achieve the following outcomes:*
>
> *More Streamlined Process - Provide greater flexibility so that municipalities will be able to move forward faster on the implementation of the Plan and meet the deadline to update their official plan to conform with the Plan by July 1, 2022.*
>
> *More Land for Housing - Respect the ability of local governments to make decisions about when and where to add new land for housing, to ensure that there is enough housing supply to meet demand.*
>
> *More Housing and Jobs Near Transit - A more flexible framework for focusing investments around transit infrastructure will enable municipalities to plan to increase the supply of housing and jobs near transit faster and more effectively.*
>
> *Greater Local Autonomy and Flexibility for Municipalities - Ensuring that municipalities will have the ability to implement the Plan in a manner that better reflects their local context while protecting the Greenbelt."*

Discussion on the Proposed Changes to the Growth Plan

The following sections discuss the broad changes contained in the proposed amendment to the Growth Plan with the exception of "Small Rural Settlements" which do not directly affect Oakville.

The proposed changes for "Settlement Area Boundary Expansions" do not directly impact the Town of Oakville but there are implications for the Region of Halton in terms of:

- Providing cost effective servicing through the servicing allocation programs, and
- Comprehensive study work underway through the region's ongoing Official Plan Review and their Integrated Growth Management Strategy (IGMS).

Market Demand and Housing Supply

A key change proposed for the Growth Plan is the introduction of language related to housing and market demand. It is a theme that emerges throughout the amendment. For example in Section 1.2, the vision statement "the GGH will offer a wide variety of choices for living" is replaced with "the GGH will have sufficient

housing supply that reflects market demand and what is needed in local communities."

The market is not typically a land use planning matter and the meaning of "market demand" is not clear since the amendment does not include a definition of the term. As a new theme emerging in the Growth Plan, it is unclear how this is meant to inform other parts of the amendment.

Recommendation
Town of Oakville staff recommends that as a new theme in the Growth Plan, additional background, tools and guidance to assist Planning authorities to determine market demand should be developed. To date, an integral analysis of the various factors defining and impacting market demand, housing supply and community needs is missing.

Intensification Strategy in the Delineated Built-up Area
Another change proposed to the Growth Plan is in Section 2 – Where and How to Grow. Subsection 2.2.2.3 (formerly 2.2.2.4) requires municipalities to develop a strategy to manage growth within the delineated built-up area, which must address a number of criteria that currently includes clause (a) "encourage intensification generally to achieve the desired urban structure." A proposed change would delete and replace this reference with a new clause (c) "encourage intensification generally throughout the delineated built-up area."

The rationale for this proposed change is unclear. Staff notes that while the Growth Plan does not use the term "urban structure" elsewhere, various other policies of the Growth Plan mandate the organization of planning and development around an urban structure, which is fundamental to the practice of good planning for complete communities in Ontario. For instance, the Growth Plan requires:

- Focusing growth within settlement areas to the built-up area and to strategic growth areas, to locations of existing and planned transit and to areas with existing and planned public service facilities (2.2.1 Managing Growth)

- Identifying strategic growth areas and applying minimum intensification and density targets (2.2.2 Delineated Built-up Area)

- Identifying nodes and corridors including urban growth centres, major transit station areas, priority transit corridors and areas of existing and future planned transit and planning for these areas to accommodate intensification through minimum density targets (2.2.3 Urban growth Centres, 2.2.4 Transit Corridors and Station Areas).

A municipality's urban structure provides the framework for managing growth and is the basis for the timely and efficient provision of infrastructure to support growth, as well as aligning transportation with land use. An urban structure establishes the basis for official plan policy and for making good planning decisions to support and achieve provincial objectives.

While this is not a fundamental change to the policy, Town staff is of the opinion that the reference to urban structure is appropriate.

Recommendation
Town of Oakville staff recommends that the reference to urban structure be maintained in policy 2.2.2.3(a). If the proposed change is made, Town staff recommends that it would be helpful to add language such as “at appropriate locations,” or “where it can reasonably be accommodated” consistent with the direction provided in other policies that recognize not all locations may be appropriate for intensification, and the level of intensification that may be appropriate at any location will depend on various considerations.

Achieving Complete Communities
Under Managing Growth, Section 2.2.1.4, there is direction to support the achievement of complete communities, a fundamental concept of the Growth Plan and Ontario’s land use planning framework. The proposed amendment would remove references to “ensure development of high quality” environments and “site design and urban design standards.”

This change, if approved, suggests a shift away from achieving the provincial interests expressed in Section 2(r) of the *Planning Act* which includes “the promotion of built form that (i) is well-designed, (ii) encourages a sense of place, and (iii) provides for public spaces that are of high quality, safe, accessible, attractive and vibrant”

Recommendation
Town of Oakville staff recommends that this change not be carried through in the amendment. The province is encouraged to implement changes that promote harmonization and alignment within its own land use planning framework.

The message that the province should be achieving plan coordination and policy alignment has been delivered consistently by the Town of Oakville and the Halton Area Planning Partnership (HAPP) Joint Submissions. HAPP is comprised of Halton Region and the local municipalities of City of Burlington, the Town of Halton Hills, the Town of Milton, and the Town of Oakville.

The tools of plan coordination and policy alignment, along with clarity and certainty are key ingredients to managing growth, delivering development and building infrastructure in a timely and cost-effective manner. These tools are already available to the province and could be used more effectively, for example, to address recent provincial concerns expressed around housing supply.

Intensification and Density Targets

The proposed changes to the Growth Plan would revise the policies that establish minimum intensification and density targets for municipalities. For Oakville, within Halton, the following targets would take effect:

- At the next municipal comprehensive review (MCR), a minimum of 50% of all residential development occurring annually within Halton will be within the delineated built-up area. This is a reduction from 60% in the current policies.

- The Region of Halton will plan to achieve a minimum density target that is not less than 50 residents and jobs combined per hectare. This is a reduction from the current policies which require a minimum density of 60 residents and jobs per hectare across the designated greenfield area in the Region's current urban area boundary, and 80 residents and jobs per hectare across any lands added to the Region's urban area boundary through a future MCR.

During previous provincial engagements on the Growth Plan, including the 2015 Coordinated Plan Review and the 2016 Proposed Growth Plan, the town and HAPP were generally supportive of increased density and intensification targets.

Transit Oriented Development

The proposed amendments would allow upper- and single-tier municipalities to delineate and plan for Major Transit Station Areas (MTSAs) in advance of an MCR provided *Planning Act* requirements regarding official plan policies are met.

In addition, the proposed amendments would expand the radius of MTSAs from 500 metres around existing or planned stations/stops to a range of 500 to 800 metres.

However, at the same time, the proposed changes would allow the Minister to approve a lower minimum density target for an MTSA, according to criteria that reflect local conditions.

In Oakville, the Bronte GO station is identified as an MTSA in the Growth Plan and is required to be planned for 160 residents and jobs combined per hectare. As part of the town's ongoing Official Plan Review, staff has initiated the Bronte GO Major Transit Station Area Study and the town has contracted a multi-disciplinary team consulting team to complete an area specific plan for the area.

Employment Planning

The proposed changes to the Growth Plan for employment planning would allow municipalities a one-time window to convert employment lands to non-employment uses in designated employment areas in advance of an MCR provided there is a need, and where it will maintain a significant number of jobs on the lands.

The current Growth Plan requires employment land conversions to be considered only through an MCR which occurs typically at five-year intervals and must be undertaken by the Region. This timing is viewed as a potential delay to advancing development on certain lands.

The proposed changes to the Growth Plan for employment planning also include the introduction of Provincially Significant Employment Zones (PSEZ). At the same time, the proposed Growth Plan changes would delete the Prime Employment Area designation along with the requirement for upper-and single-tier municipalities to develop an employment strategy.

The PSEZ consultation document, selection criteria and proposed mapping for Oakville is attached in Appendix A and is discussed in the following sections.

The Ministry of Municipal Affairs and Housing is seeking feedback on the proposed PSEZs, criteria for selection, proposed mapping, need for additional zones and/or changes to the boundaries. The ministry is also seeking input on whether:

- The identified provincially significant employment zones have adequately identified employment areas that would support commercial and industrial activities and the needs of the emerging economy; and

- Employment areas that overlap with major transit station areas should be included in the provincially significant employment zones at this time.

Once identified as a PSEZ, the process and tests for converting to non-employment uses would follow the same required MCR process and criteria that are set out in the current Growth Plan.

Provincially Significant Employment Zones

The proposed changes to the Growth Plan are intended to identify provincially significant employment zones (PSEZ) that would receive enhanced protection for employment uses. The PSEZ would apply to employment areas that:

- Are designated employment areas and are inside existing settlement area boundaries (i.e., no Greenbelt lands are included in provincially significant employment zones);

- May be vulnerable to conversion pressures (e.g. to residential conversion);

- May be facing encroachment by sensitive land uses that could threaten the existing employment uses; or

- Are needed in the region to attract new investment and retain existing industries.

The Town of Oakville is supportive of protecting employment lands of provincial significance. However, staff is of the opinion that introducing another layer of mapping and policy related to planning for employment, in addition to those contained in the local and regional official plans, may have the opposite effect from what the province is trying to achieve in terms of being open for business.

A third layer of employment land mapping and policy, in some locations, might frustrate the establishment of new employment uses that would generate new jobs by introducing additional red tape

If the province continues with the proposed approach, clear and direct guidance would be required to interpret and streamline implementation of the province's policy framework, to the upper- and single-tier municipalities, to the local municipalities.

The Town of Oakville appreciates the opportunity to respond to the Minister's request for feedback on the proposed PSEZ criteria and mapping for Oakville as shown in Appendix A.

Appendix B contains mapping of areas within the Town of Oakville that staff is recommending not be included in the proposed PSEZ. The following key facts provide additional context to the town response and recommendations.

The Town of Oakville has two official plans in effect:

1) The Livable Oakville Plan, which applies to the lands south of Dundas Street and to the lands north of Highway 407 which came into effect in May 2011; and

2) The 2006 Official Plan, which applies to the lands north of Dundas Street up to Highway 407. Two secondary plans known as the North Oakville East Secondary Plan and the North Oakville West Secondary Plan remain as amendments to the 2006 Official Plan.

The Town of Oakville initiated its Official Plan Review in May 2015 with a Special Public Meeting seeking Council and public input to the process.

To date the following studies have been completed that impact employment planning and have resulted in amendments to the Official Plan:

- A town-wide Urban Structure Review was completed in 2017.

  On September 26, 2017, Town Council adopted Official Plan Amendments (OPAs 15, 317 and 318) for a revised Urban Structure section introduced into the Town of Oakville's Official Plan – the Livable Oakville Plan.

  The adopted amendments also provide for revisions to the North Oakville East and West Secondary Plans to align them with the changes to the Livable Oakville Plan.

  On April 26, 2018, the Region of Halton approved OPAs 15, 317 and 318 with modifications, to establish a town-wide urban structure. At the time of approval, the town-wide urban structure was deemed to be consistent with the Provincial Policy Statement, 2014, to conform to the Regional Official Plan, 2009 and the Growth Plan, 2017.

  Subsequent to the Region's approval, OPA 15 was appealed to the Local Planning and Appeal Tribunal (LPAT) by one appellant. Those matters are ongoing with the LPAT.

- A town-wide Employment and Commercial Review was completed in 2017 and was a comprehensive assessment of the lands designated to accommodate the town's long-term employment and commercial needs.

  The review identified Oakville as a strong attractor for knowledge-based sectors and showed a distribution of employment on employment land that was highly concentrated in the office sector.

  The review also identified a healthy supply of employment land to meet the town's long term demand for employment well beyond 2041.

- The Speers Road Corridor Study was completed in 2017 and provided a detailed analysis to confirm long-term land uses and suitable opportunities for intensification in the context of its continued function as an employment area.

- On April 16, 2018, Town Council adopted:

  - OPA 26 to update commercial- and employment-related policies in the Livable Oakville Official Plan, and

- OPA 27 to introduce specific policies to the Livable Oakville Plan for the employment lands pertaining to the Speers Road Corridor.

- As of the date of this report, OPA 26 and 27 are awaiting approval from the Region of Halton.

Bronte GO Major Transit Station Area

The Bronte GO Station is located between Speers Road and Wyecroft Road, west of Third Line. This is along the Lakeshore West GO line which is identified as a provincial Priority Transit Corridor in the Growth Plan. The Bronte GO Station is also identified as a Major Transit Station Area (MTSA) in the Growth Plan and is required to be planned to accommodate 160 residents and jobs combined per hectare.

As part of the town's ongoing Official Plan Review and to implement the Growth Plan, staff initiated the Bronte GO Major Transit Station Area Study in June 2018. The approximate study area is identified in Appendix B, Area A.

The town has contracted a multi-disciplinary team consulting team to complete an area specific plan for this MTSA. This study is examining, among other matters, the opportunities to accommodate new growth, intensification and a mix of uses, including non-employment uses, in conjunction with service improvements under the Lakeshore West GO Expansion.

Under the proposed changes to the Growth Plan and the proposed PSEZ mapping, the Bronte GO MTSA is identified within the Oakville (QEW), PSEZ Number 19 (Appendix A).

Recommendation

In order to continue to implement the Growth Plan and to support faster development around MTSAs on priority transit lines to support increasing housing supply, Town of Oakville staff is of the opinion that it is not appropriate to include the Bronte GO MTSA in the proposed PSEZ.

Town of Oakville staff recommends that the lands identified around the Bronte GO MTSA be removed from the proposed PSEZ in accordance with town mapping in Appendix B, Area A.

North Oakville Urban Core Areas

The town's Urban Structure identifies the North Oakville Urban Core Areas as "Nodes and Corridors" and "Nodes and Corridors for Further Study". Generally, Nodes and Corridors are key areas of the Town identified as the focus for mixed use development and intensification and comprise the town's Strategic Growth Areas as that term is defined in the Growth Plan.

The North Oakville Urban Core Areas are located in a part of Oakville where land use is governed by the North Oakville East Secondary Plan. The plan identifies urban core areas as areas intended to accommodate mixed-use, transit supportive development which is the densest in North Oakville. Current land use designations and policies for these lands permit a range of uses beyond pure employment.

Under the proposed changes to the Growth Plan and the proposed PSEZ mapping, portions of the Trafalgar Urban Core Area (at Trafalgar Road and Burnhamthorpe Road East) and portions of the Neyagawa Urban Core Area (at Neyagawa Boulevard and Burnhamthorpe Road West) identified within the 401 407 (Meadowvale), PSEZ Number 18 (Appendix A).

Recommendation
In order to continue to implement the town's Urban Structure and the North Oakville East Secondary Plan, along with key provincial plans including the Growth Plan and the 2041 RTP, Town of Oakville staff is of the opinion that it is not appropriate to include any portion of the North Oakville Urban Core Areas in the proposed PSEZ.

Town of Oakville staff recommends that the lands identified as Trafalgar Urban Core (Area B-1) and Neyagawa Urban Core (Area B-2) be removed from the proposed PSEZ in accordance with town mapping in Appendix B, Area B.

Speers Road Corridor
The town's Urban Structure identifies the Speers Road Corridor as an Employment Mixed Use Corridor. The recently completed Speers Road Corridor Study (OPA 27), in conjunction with the Employment Commercial Review (OPA 26), recommended changes to the land use designations and policies that recognize the corridor's primary function as an Employment Area and that support the existing cluster of business and economic activities. These activities include manufacturing, warehousing, offices, and associated retail and ancillary facilities. The OPAs also recommended changing the Office Employment designation within the corridor to Business Employment.

At a higher level, the Speers Road corridor is also identified:

- In the province's 2041 RTP as part of the Frequent Rapid Transit Network, Project # 58 Harvester / Speers / Cornwall, and
- In the Region of Halton Mobility Management Strategy (completed 2017) as a Regional Transit Priority Corridor.

Under the proposed changes to the Growth Plan and the proposed PSEZ mapping, the Speers Road Corridor is identified within the Oakville (QEW), PSEZ Number 19 (Appendix A).

Recommendation
In order to continue to implement the town's Urban Structure, the findings of recent town studies and implementing OPAs, as well as key provincial and regional plans including the Growth Plan, the 2041 RTP, the Region of Halton's Mobility Management Strategy, Town of Oakville staff is of the opinion that it is not appropriate to include the Speers Road Corridor in the proposed PSEZ.

Town of Oakville staff recommends that the lands identified as the Speers Road Corridor be removed from the proposed PSEZ in accordance with town mapping in Appendix B, Area C.

Supporting Areas of Business and Economic Activity
Appendix B, Area D identifies three edge locations proposed to be included within the Oakville (QEW), PSEZ Number 19 (Appendix A). These areas support the nearby traditional employment areas:

- Area D-1, currently developed in Business Commercial uses and status confirmed through the Employment Commercial Review (OPA 26),

- Area D-2, currently designated Core Commercial and developed in commercial land uses and activities, and

- Area D-3, currently developed in smaller scale local business uses.

Recommendation
In order to continue to implement the town's Urban Structure, the findings of recent town studies and implementing OPAs, Town of Oakville staff is of the opinion that it is not appropriate to include the town identified Supporting Areas of Business and Economic Activity in the proposed PSEZ.

Town of Oakville staff recommends that the lands identified as the Supporting Areas of Business and Economic Activity be removed from the proposed PSEZ in accordance with town mapping in Appendix B, Area D.

Winston Park - Core Commercial
Appendix B, Area E identifies two locations proposed to be included within the 401 407 (Meadowvale), PSEZ Number 18 (Appendix A). The towns Urban Structure identifies these lands as Major Commercial Areas which are intended to provide concentrations of commercial facilities serving a broader area within the region.

In terms of land use, these areas are within a traditional employment area called Winston Park but represent long-standing areas designated Core Commercial and currently developed in commercial land uses and activities.

Recommendation
In order to continue to implement the town's Urban Structure, Town of Oakville staff is of the opinion that it is not appropriate to include the Winston Park - Core Commercial lands in the proposed PSEZ.

Town of Oakville staff recommends that the lands identified as Winston Park - Core Commercial be removed from the proposed PSEZ in accordance with town mapping in Appendix B, Area E.

North Oakville – Transitional Area
Appendix B, Area F identifies locations proposed to be included within the 401 407 (Meadowvale), PSEZ Number 18 (Appendix A). The towns Urban Structure identifies these lands as Residential Areas which are intended to include housing as well as a range of compatible facilities such as schools, places of worship, recreational and commercial uses that serve the residents.

The North Oakville East Secondary Plan intends for the Transitional Area to provide for an interface and buffer between the more intensive concentration of employment uses in the north and the adjacent residential uses in the south.

Recommendation
In order to continue to implement the town's Urban Structure, Town of Oakville staff is of the opinion that it is not appropriate to include the Transitional Area in the proposed PSEZ.

Town of Oakville staff recommends that the lands identified as Transitional Area be removed from the proposed PSEZ in accordance with town mapping in Appendix B, Area F.

Natural Area and Parkway Belt West Plan
Appendix B, Area G identifies Natural Area and Parkway Belt West Plan locations proposed to be included within the Oakville (Oakville East), PSEZ Number 17 (Appendix A).

The towns Urban Structure identifies these lands as Parkway Belt and Natural Heritage System which are intended to be protected from development or where development would be limited by provincial policy.

The Livable Oakville Plan provides similar protection and permissions for limited development through the Natural Area and Parkway Belt Designations.

Recommendation
In order to continue to implement the town's Urban Structure, and to be consistent with existing levels of protection and provincial permissions for limited development, Town of Oakville staff is of the opinion that it is not appropriate to include the Transitional Area in the proposed PSEZ.

Town of Oakville staff recommends that the lands identified as Natural Area and Parkway Belt West Plan be removed from the proposed PSEZ in accordance with town mapping in Appendix B, Area G.

Natural Heritage and Agricultural Systems
Previously released provincial mapping of Natural Heritage and Agricultural Systems does not apply until it has been implemented in upper- and single-tier official plans. These municipalities may refine the provincial mapping before incorporating it into their official plan. Until that process is complete, existing official plan mapping applies. For upper-tier municipalities, the initial implementation of provincial mapping may be done separately for each lower-tier municipality. Any subsequent changes to the mapping may only occur through a municipal comprehensive review.

Proposed Modifications to Regulations

This section summarizes proposed modifications to the regulations based on information posted to the Environmental Registry of Ontario. As of the date of this report, staff was continuing to review the proposed modifications. Additional input to the province arising from this review will be submitted to the Province by the commenting deadline of February 28, 2019.

Proposed Modifications to O. Reg. 311/06 (Transitional Matters - Growth Plans) made under the Places to Grow Act, 2005 to implement the Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe, 2017

This modification proposes to align the transition regulation with the Growth Plan amendment, if approved:

- Change references to "the Growth Plan for the Greater Golden Horseshoe, 2017" to "the Growth Plan for the Greater Golden Horseshoe, 2017 as amended by Amendment 1";

- Delete provisions that had been added to the regulation on June 28, 2017 to support implementation of a phased-in designated greenfield area density target; and

- Delete the provisions that had been added to the regulation on May 4, 2018 to support implementation of a standard method to calculate the amount of land needed for development to the horizon of the Growth Plan, known as a land needs assessment.

The province is also seeking input on whether any specific planning matters (or types of matters) in process that should be addressed through the transition regulation. This could include, for example, official plans or official plan amendments that have been adopted and are currently under appeal.

Prescribing such matters or types of matters in the regulation could allow them to be approved in conformity with an earlier version of the Growth Plan and/or provide for an exemption from some policies in the Growth Plan for the Greater Golden Horseshoe, 2017 as amended by Amendment 1, if approved.

Proposed Modifications to O. Reg. 525/97 (Exemption from Approval – Official Plan Amendments) made under the Planning Act to implement the Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe, 2017

The purpose of the regulation is to facilitate the proposed amendments to the Growth Plan that would allow municipalities the flexibility to make changes to their official plan to implement the Agricultural System for the Greater Golden Horseshoe mapping or the Natural Heritage System for the Growth Plan mapping before their next municipal comprehensive review, while ensuring that the Minister's approval would be required for these changes.

This topic was covered previously in this report under the sub-heading "Natural Heritage and Agricultural Systems". The flexibility in the modification is aimed to address the mapping of the systems that was imposed on municipalities in February 2018 that did not allow for a transition period from existing mapping and ignored work that had been done at the local level.

NEXT STEPS:

Town of Oakville staff welcomes the opportunity to recommend comments to the province regarding the proposed changes to the Growth Plan. If further information is required, town staff is available to clarify and assist.

CONSIDERATIONS:

(A) PUBLIC
There are no public impacts from this report and no notice requirements.

(B) FINANCIAL
There are no financial implications from this report.

(C) IMPACT ON OTHER DEPARTMENTS & USERS
There are no effects on other departments and users from this report.

(D) CORPORATE AND/OR DEPARTMENT STRATEGIC GOALS
This report addresses the corporate strategic goal to:
• be the most livable town in Canada

(E) COMMUNITY SUSTAINABILITY
Consideration of the sustainability goals and objectives of the Livable Oakville Plan are part of all town reviews of provincial initiatives.

APPENDICES:

Appendix A – Proposed Provincially Significant Employment Zones
Appendix B – Town Response to Provincially Significant Employment Zones

Prepared by:
Kirk Biggar, MCIP, RPP
Senior Planner, Policy Planning

Recommended by:
Diane Childs, MCIP, RPP
Manager, Policy Planning and Heritage

Submitted by:
Mark H. Simeoni, MCIP, RPP
Director, Planning Services

PROPOSED PROVINCIALLY SIGNIFICANT EMPLOYMENT ZONES

Proposed Amendment 1 to the Growth Plan for the Greater Golden Horseshoe 2017 (2019)

January 2019

Ontario

Provincially Significant Employment Zones

This map book is part of the Ministry of Municipal Affairs and Housing's proposal to identify provincially significant employment zones that would receive enhanced protection for employment uses, under the Proposed Amendment 1 to the Growth Plan for the Greater Golden Horseshoe, 2017.

This proposal is currently listed on the Environmental Registry of Ontario and Ontario's Regulatory Registry.

The consultation period closes on February 28, 2019.

It works with the following other proposals that are also currently listed on the Environmental Registry of Ontario and Ontario's Regulatory Registry:

1. Proposed Amendment 1 to the Growth Plan for the Greater Golden Horseshoe, 2017.
2. Proposed Modifications to O. Reg. 311/06 (Transitional Matters - Growth Plans) made under the *Places to Grow Act, 2005* to implement the Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe, 2017
3. Proposed Modifications to O. Reg. 525/97 (Exemption from Approval – Official Plan Amendments) made under the *Planning Act* to implement the Proposed Amendment to the Growth Plan for the Greater Golden Horseshoe, 2017

The proposed policy framework for protecting employment areas would change by allowing employment area conversions to be approved ahead of the next municipal comprehensive review. This proposed amendment would provide flexibility to municipalities who wish to support mixed use development, while maintaining employment area protections where needed. However to ensure employment areas that are crucial to province's economy are not converted without a more comprehensive assessment of employment land need, the ministry is proposing to identify provincially significant employment zones that would not be eligible for conversion during the proposed transitional period.

The proposed provincially significant employment zones are shown in this mapbook and apply to employment areas that:

- Are designated employment areas and are inside existing settlement area boundaries (i.e., no Greenbelt lands are included in provincially significant employment zones);
- May be vulnerable to conversion pressures (e.g. to residential conversion);
- May be facing encroachment by sensitive land uses that could threaten the existing employment uses; or

- Are needed in the region to attract new investment and retain existing industries.

Additional criteria related to site use may include:

- Located near highways, railways, intermodal facilities, transit and/or other major transportation infrastructure to support the movement of people and goods;
- High concentration of employment and/or economic output, and play an economically strategic role to the region;
- Support industrial uses, which are sensitive to encroachment; or
- Contiguous zones and contain large continuous developable, constraint-free lands (e.g. >10 acres).

In identifying these zones, the province reviewed and included the agri-food support network and mapped important employment hubs identified by the Ontario Ministry of Agriculture, Food and Rural Affairs. The mapping also takes into account the Greenbelt and specialty crop areas to ensure they are excluded from provincially significant employment zones.

The Ministry of Municipal Affairs and Housing is seeking feedback on the proposed zones and criteria for selecting them including the need for additional zones and/or changes to the boundaries for any of the proposed zones. The ministry is also seeking input on whether:

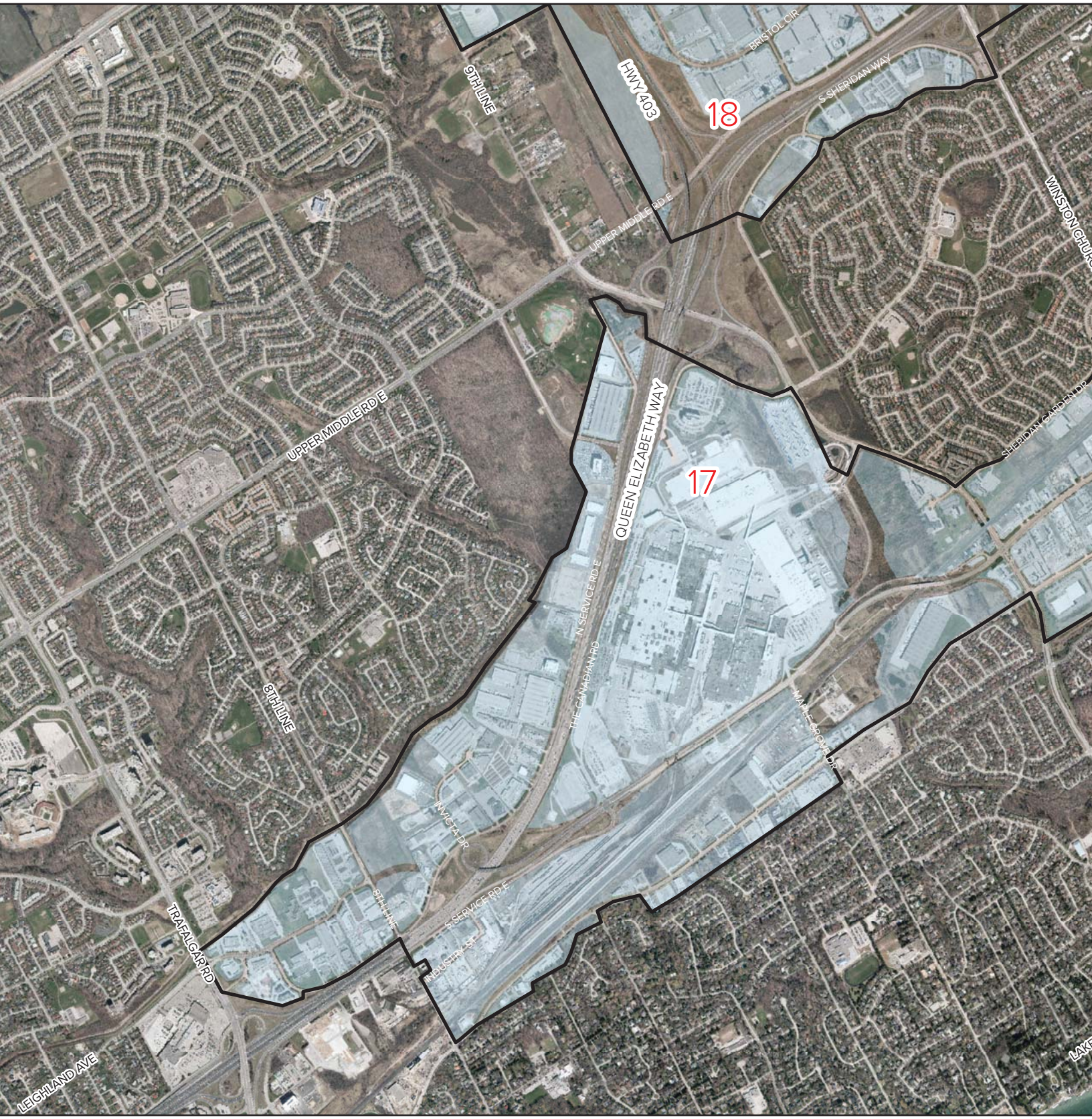
- the identified provincially significant employment zones have adequately identified employment areas that would support commercial and industrial activities and the needs of the emerging economy; and
- employment areas that overlap with major transit station areas should be included in the provincially significant employment zones.

If you have any questions or comments regarding this map book please contact Charles O’Hara at 416-325-5794 or by email at Charles.OHara@ontario.ca

To request an alternate format of the content found on this page, please contact us: growthplanning@ontario.ca

Proposed Provincially Significant Employme

Proposed Amendment 1 to the Growth Plan for the Greater G



Proposed PSEZ

Municipally Designated Employment Area (2013)

Municipal Boundary

Data Sources: Ministry of Municipal Affairs and Housing, Ministry of Natural Resources and Forestry.

Zone Name: Oakvi

Zone Nu

Upper- or Single-Tier M

Proposed Provincially Significant Employmer

Proposed Amendment 1 to the Growth Plan for the Greater G

Proposed PSEZ

Municipally Designated Employment Area (2013)

Municipal Boundary

Data Sources: Ministry of Municipal Affairs and Housing, Ministry of Natural Resources and Forestry.

Zone Name: 401 4

Zone Nu

Upper- or Single-Tier M

Proposed Provincially Significant Employmer

Proposed Amendment 1 to the Growth Plan for the Greater G

Proposed PSEZ

Municipally Designated Employment Area (2013)

Municipal Boundary

Data Sources: Ministry of Municipal Affairs and Housing, Ministry of Natural Resources and Forestry.

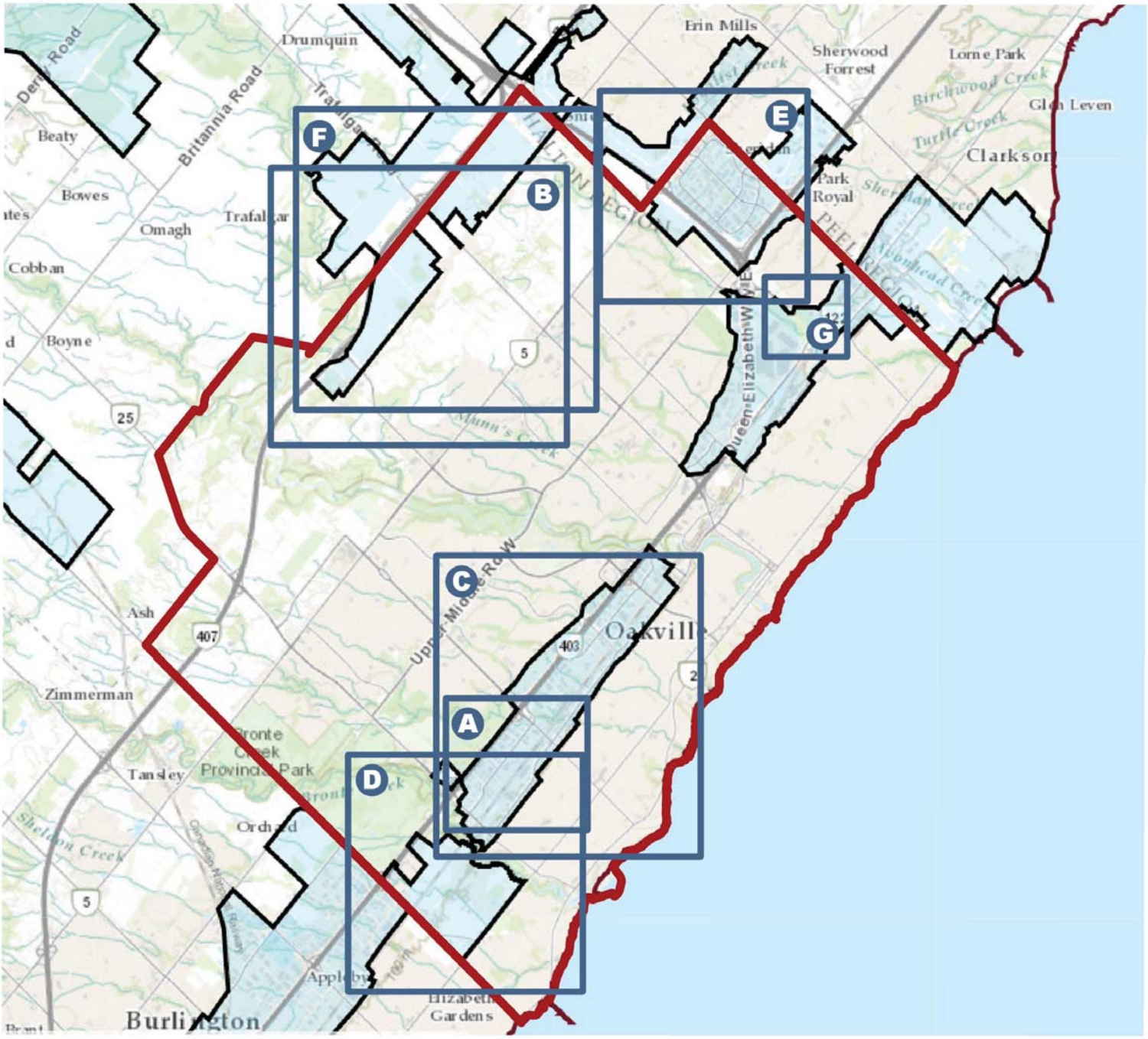
Zone Name: O

Zone Nu

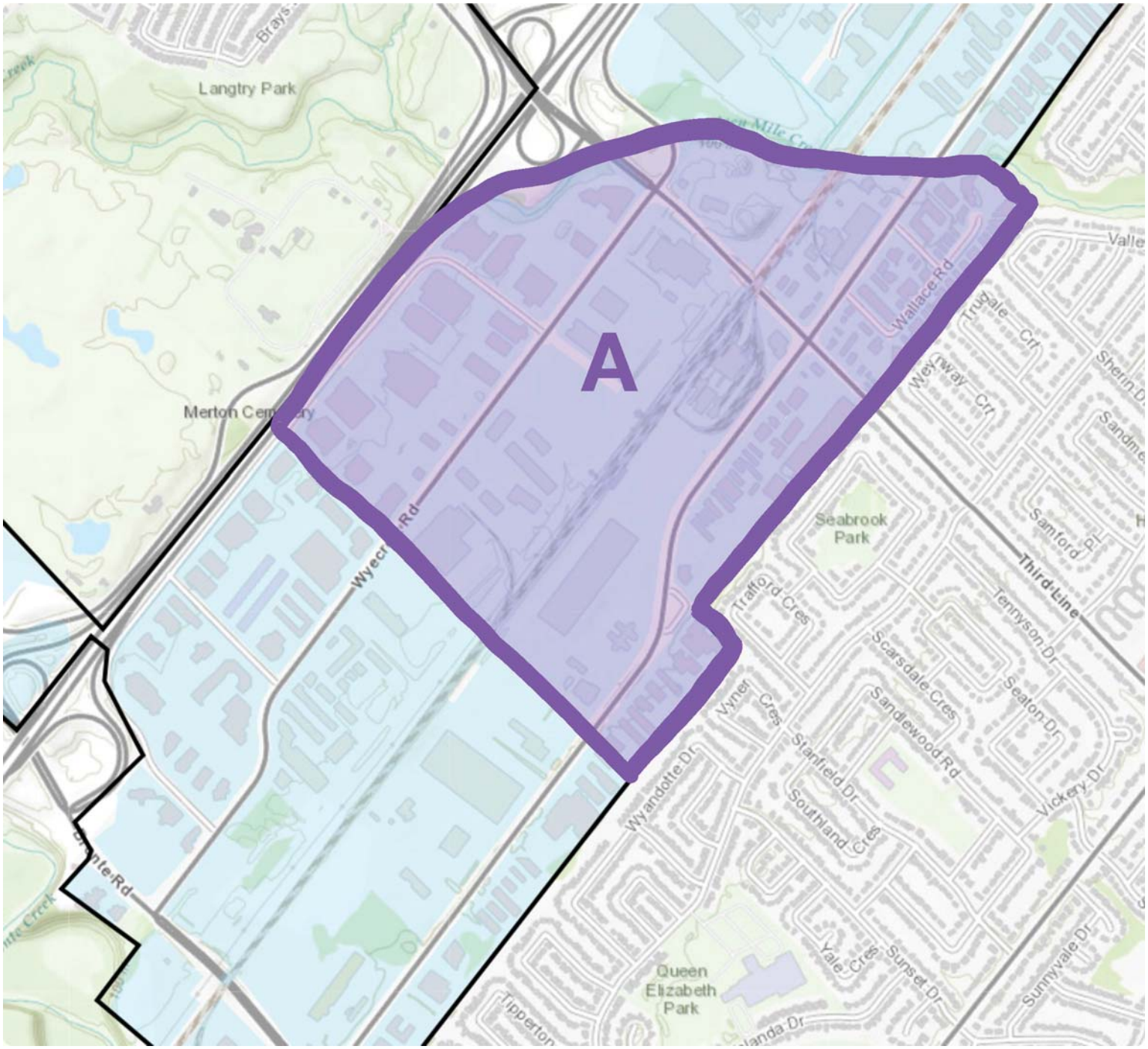
Upper- or Single-Tier M

Appendix B
Town Response to Provincially Significant Employment Zones

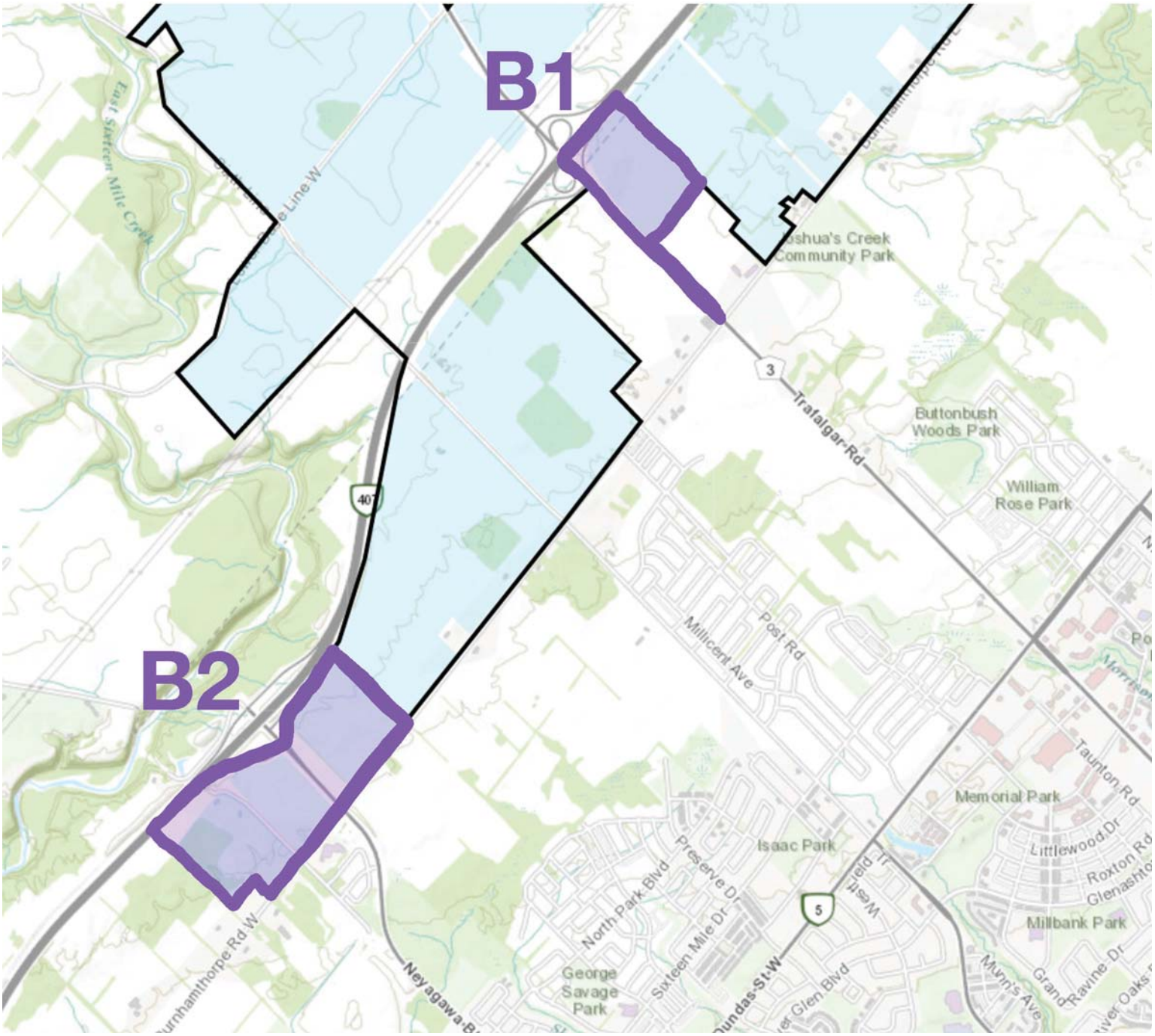
KEY MAP



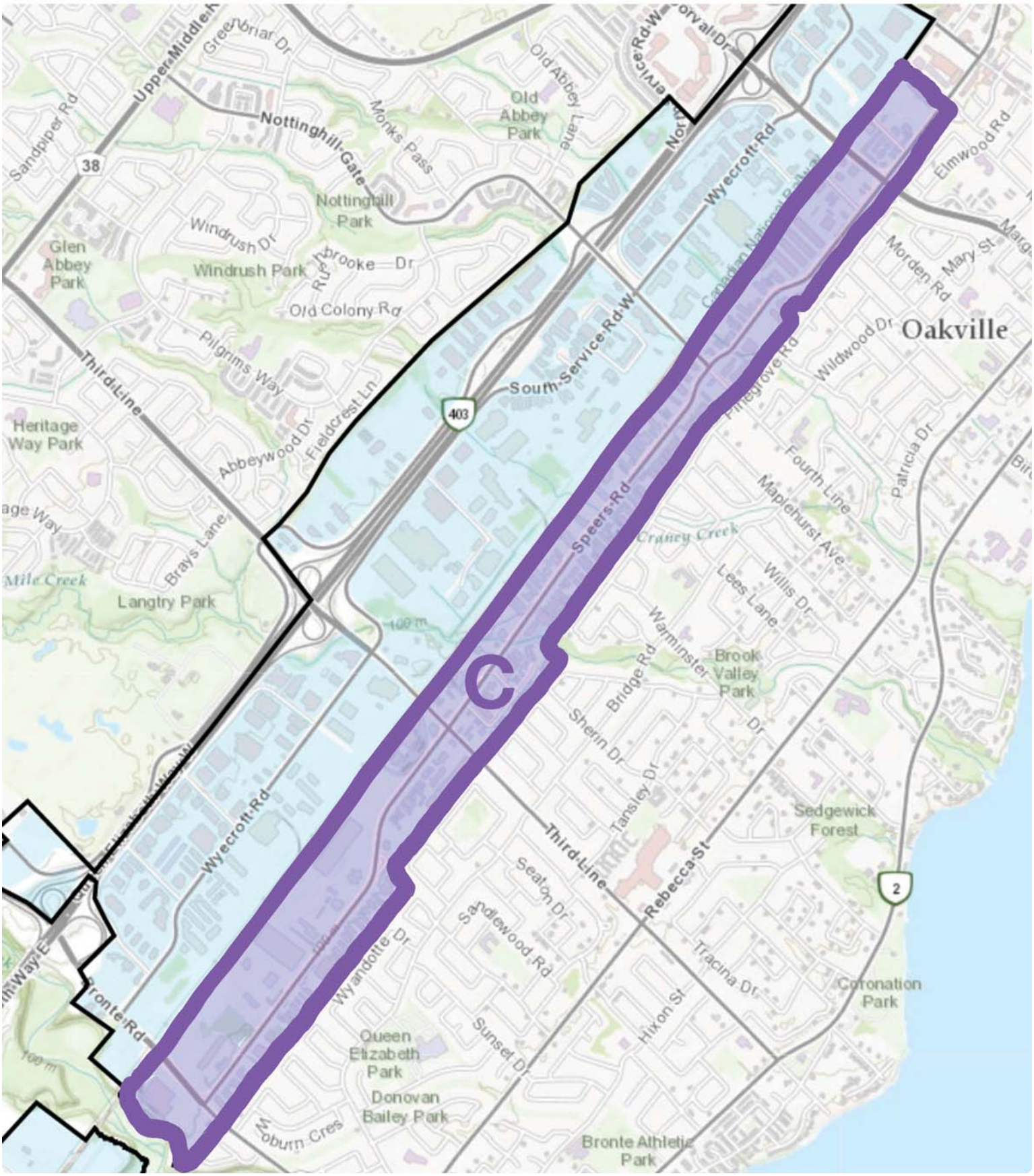
Area A
Bronte GO Major Transit Station Area (MTSA)



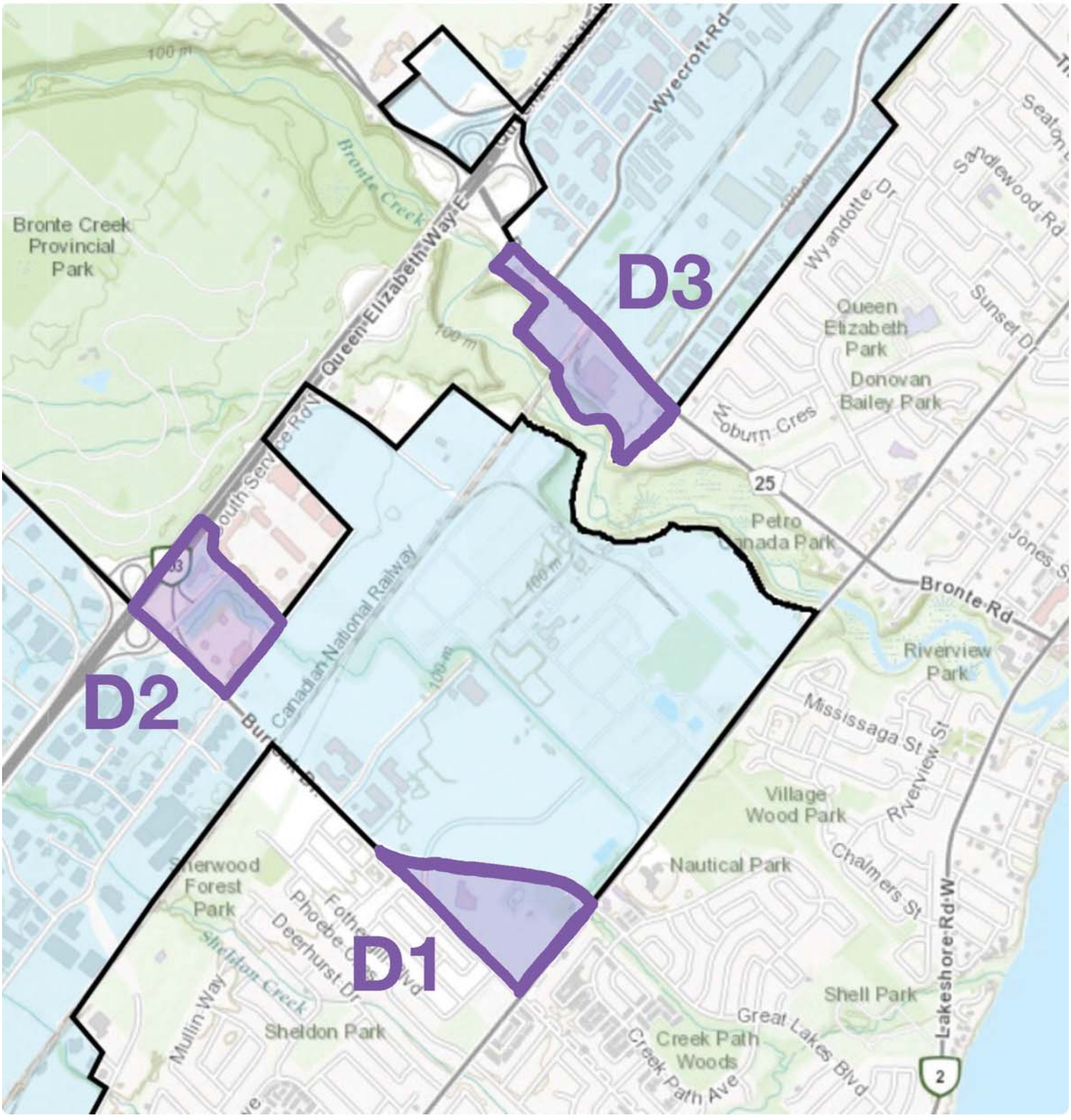
Area B
North Oakville — Urban Core Areas



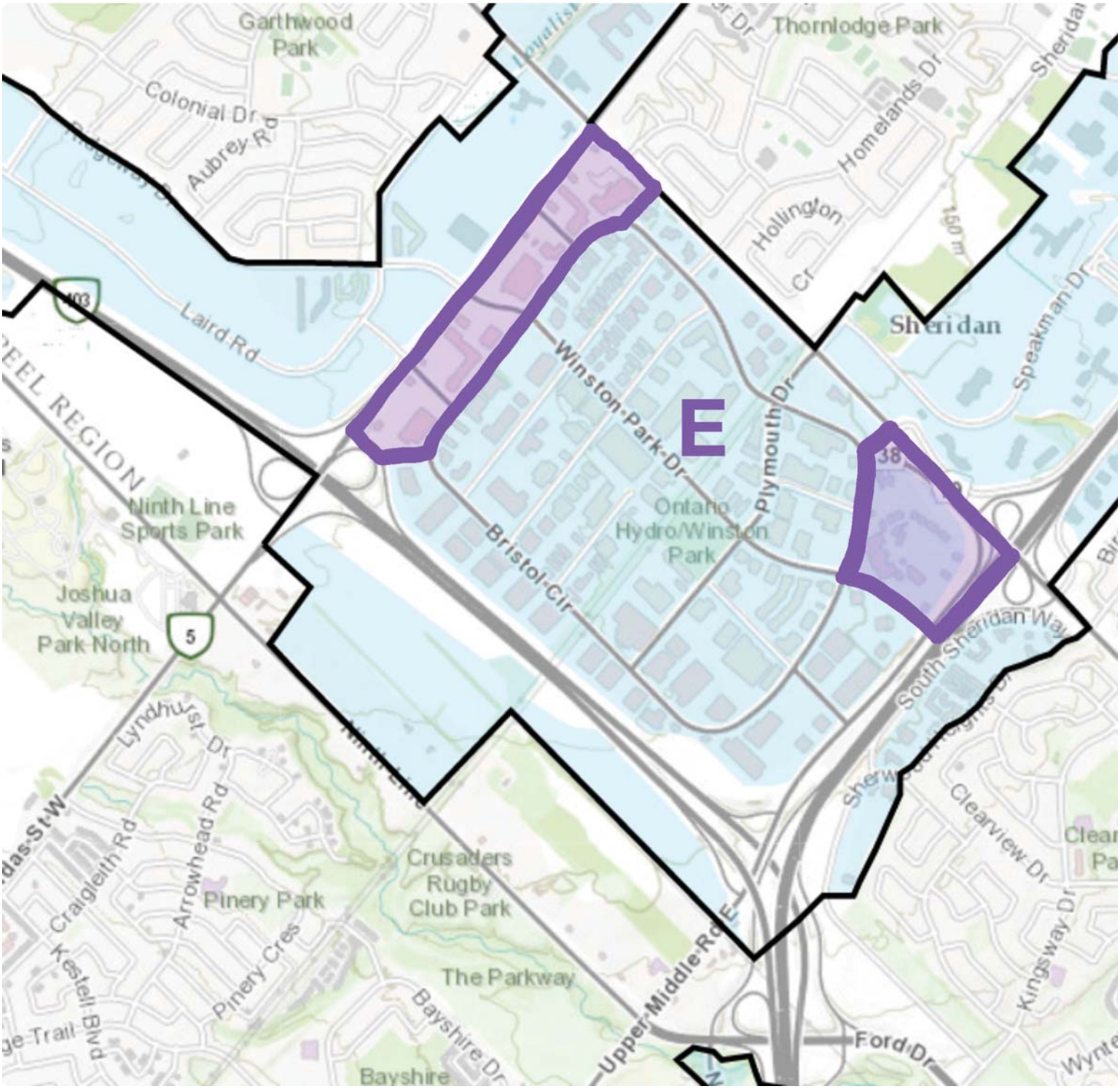
Area C
Speers Road Corridor



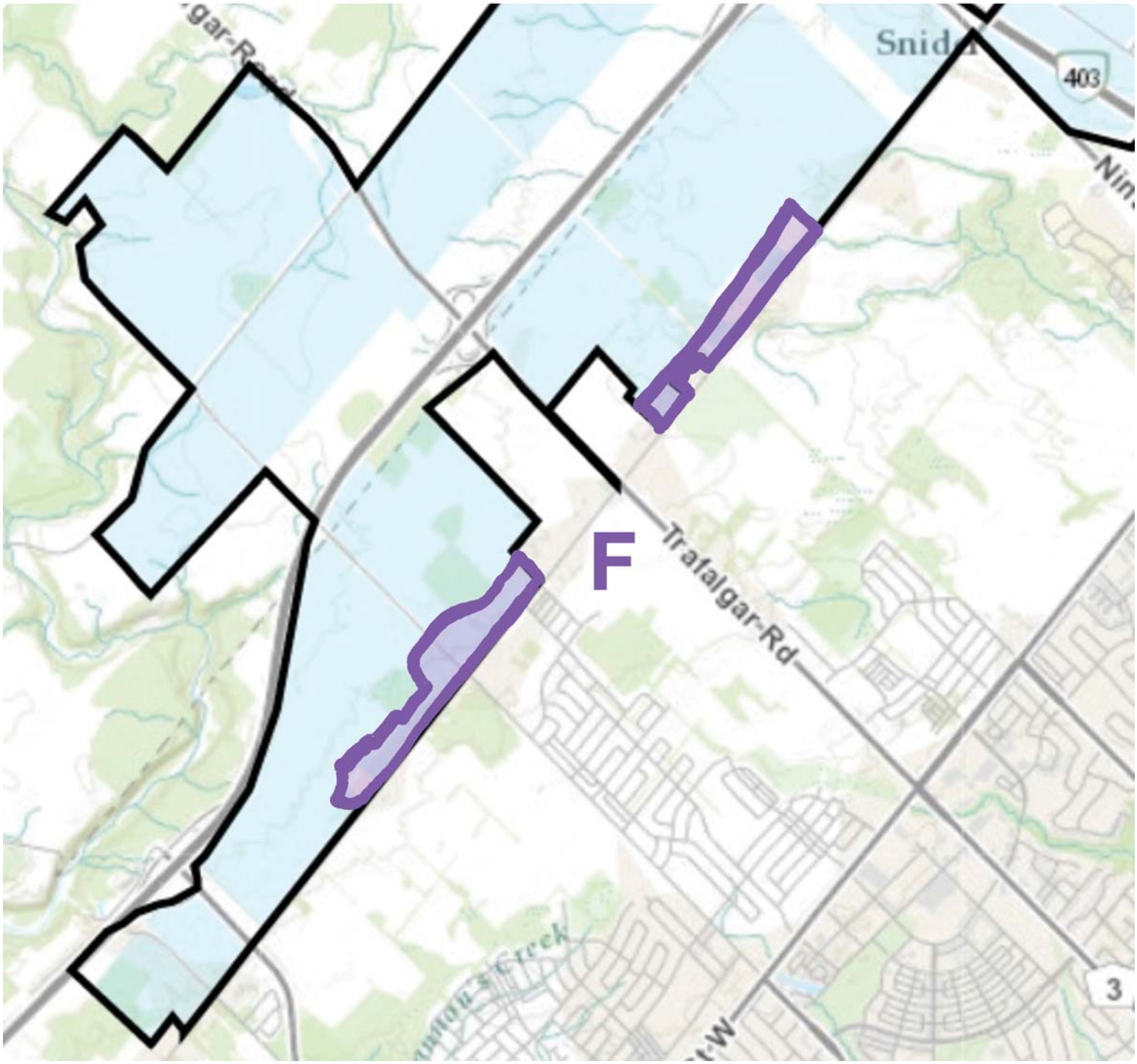
Area D
D1 — Rebecca Street / Burloak Drive
D2 — QEW / Burloak Drive
D3 — QEW / west of Bronte Road



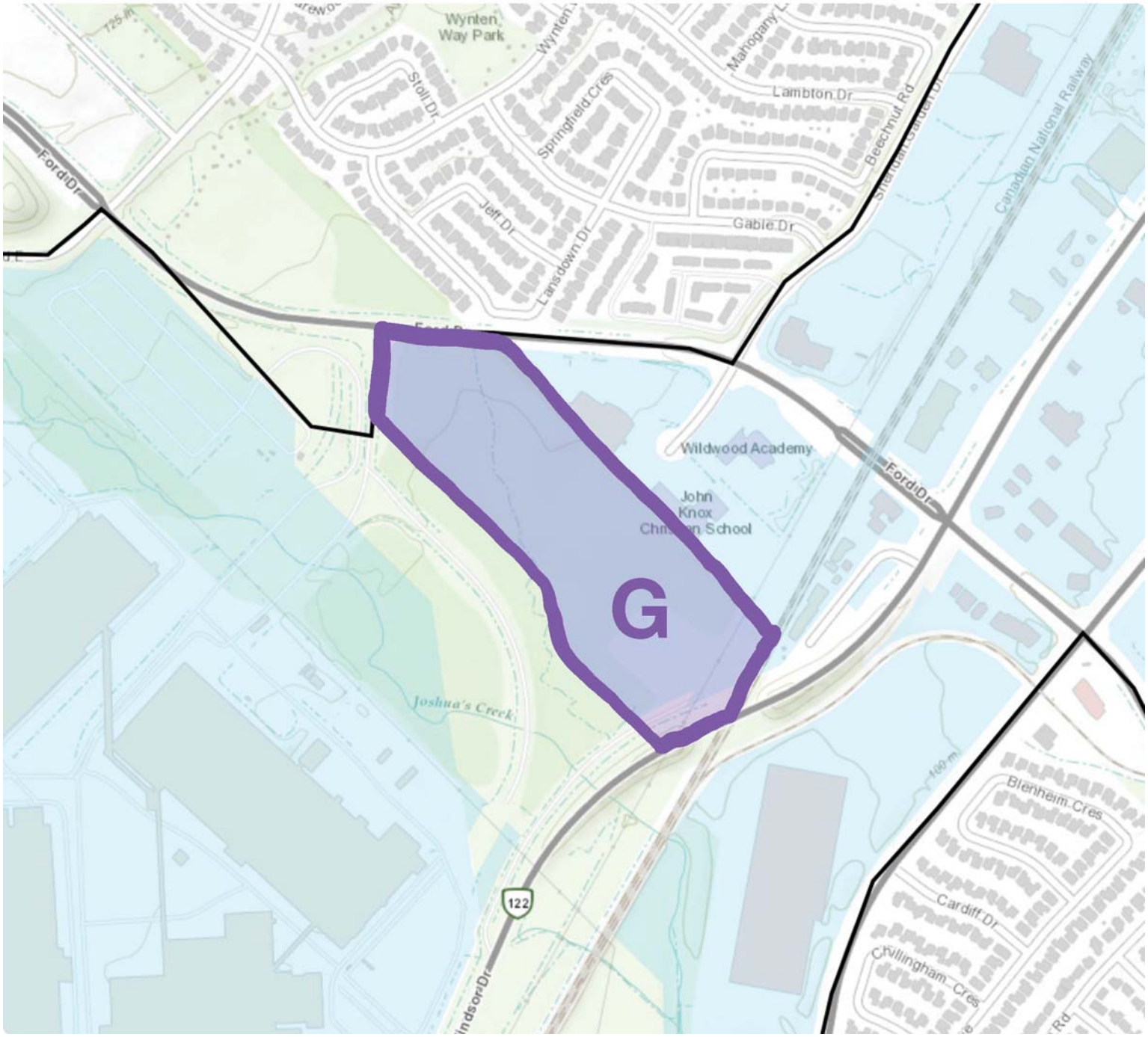
Area E
Winston Park — Core Commercial



Area F
North Oakville — Transitional Area



Area G
Natural Area and Parkway Belt West Plan



Ministry of Economic Development, Job Creation and Trade

Office of the Minister

18th Floor
777 Bay Street
Toronto ON M7A 1S5
Tel.: 416-326-8475

Ministère du Développement économique, de la Création d'emplois et du Commerce

Bureau du ministre

18e étage
777, rue Bay
Toronto ON M7A 1S5
Tél.: 416-326-8475

Ontario

February 20, 2019

Dear Head of Council:

This week our government was pleased to announce our first step in supporting Ontario's automotive industry – Driving Prosperity: The Future of Ontario's Automotive Sector.

As you know, one of the biggest barriers automakers face if they want to build or expand an auto assembly plant is the availability of large-scale sites for manufacturing. The auto sector is generally concentrated in densely populated parts of Ontario where it isn't easy to find the right site.

Automakers have told us they are looking for sites with access to servicing, skilled labour and transportation — and that aren't situated on sensitive lands. In response to this, our plan includes a *Job Site Challenge* which will give municipalities, that wish to participate, the opportunity to propose sites of 500 to 1,500 acres for industrial expansion.

Our goal is to help proponents create competitive shovel-ready sites where an automaker can build a plant and bring thousands of good-paying jobs to the community. Lands that are located in the Green Belt, Oak Ridges Moraine, Ground Water Protection Zones or other sensitive lands are specifically excluded from eligibility.

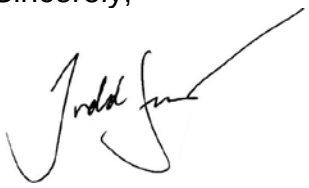
The Job Site Challenge is modelled on successful U.S. projects that have played a major role in attracting auto assembly plants to several southern states. These new plants, along with their extensive supply chains, have created thousands of new jobs.

We look forward to working with municipalities on this. We will partner with the successful proponents to make sure that development opportunities are competitive. This will of course include streamlining the approvals processes for planning, environmental and servicing.

This is an opportunity for us to work together to bring high-quality jobs to your community, helping to drive one of Ontario's key economic sectors forward in the coming decades.

Please feel free to contact either of us with any questions.

Sincerely,



Todd Smith
Minister of Economic Development,
Job Creation and Trade

Steve Clark
Minister of Municipal Affairs
and Housing

TORONTO

Ulli S. Watkiss
City Clerk

City Clerk's Office

Secretariat
Marilyn Toft
Council Secretariat Support
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100 Queen Street West
Toronto, Ontario M5H 2N2

Tel: 416-392-7032
Fax: 416-392-2980
e-mail: Marilyn.Toft@toronto.ca
web: www.toronto.ca

In reply please quote:
Ref.: 19-MM2.10

February 11, 2019

GREATER GOLDEN HORSESHOE MUNICIPALITIES:

Subject: **Member Motion 2.10**
Protecting the City of Toronto against potential impacts of the Government of Ontario's Bill 66

City Council on January 30 and 31, 2019, adopted this Item, and in so doing, has:

1. expressed its opposition to Schedule 3 of Bill 66;

2. expressed its opposition to Schedule 5 of Bill 66;

3. expressed its opposition to Schedule 9 of Bill 66; and

4. expressed its opposition to Schedule 10 of Bill 66 or any similar successor sections or schedules within Bill 66.

for City Clerk

M. Toft/sb

Attachment

Sent to: Premier, Province of Ontario
Leader, New Democratic Party of Ontario, Province of Ontario
Leader, Green Party of Ontario, Province of Ontario
Interim Leader, Ontario Liberal Party, Province of Ontario
Minister of Municipal Affairs and Housing, Province of Ontario
Minister of the Environment, Conservation and Parks, Province of Ontario
Minister of Labour, Province of Ontario
Minister of Education, Province of Ontario
Greater Golden Horseshoe Municipalities,
Executive Director, Association of Municipalities of Ontario

c. City Manager

TORONTO Decisions

City Council

Member Motions - Meeting 2

MM2.10	ACTION	Adopted		Ward: All

Protecting the City of Toronto against potential impacts of the Government of Ontario's Bill 66 - by Councillor Mike Layton, seconded by Councillor Ana Bailão

City Council Decision

City Council on January 30 and 31, 2019, adopted the following:

1. City Council express its opposition to Schedule 3 of Bill 66.

2. City Council express its opposition to Schedule 5 of Bill 66.

3. City Council express its opposition to Schedule 9 of Bill 66.

4. City Council express its opposition to Schedule 10 of Bill 66 or any similar successor sections or schedules within Bill 66.

5. City Council request that, following the adoption of Bill 66 by the Province, the City Manager report back to City Council on the impacts of the legislation on the City of Toronto.

6. City Council direct the City Clerk to distribute City Council's decision in opposition to Schedules 3, 5, 9 and 10 of Bill 66 to the leaders of all parties represented in the Ontario Legislature, the Minister of Municipal Affairs and Housing, the Minister of the Environment, Conservation and Parks, the Minister of Labour, the Minister of Education, all Greater Golden Horseshoe municipalities, and the Association of Municipalities of Ontario.

Summary

The Government of Ontario has introduced Bill 66, an Act amending or repealing various other Acts that could have lasting impact on City of Toronto residents, the planning process, the natural environment, food security, workers, and child welfare.

Schedule 3 of the Bill could put at risk young children in the care of home child care providers. Through changes to the Child Care and Early Years Act and the Education Act, the legislation would allow an increase in the number of very young children in the care of each home childcare provider, which could compromise the quality of care and increase the risk of accidental injury or death.

Schedule 5 repeals the Toxics Reduction Act, 2009, and associated regulations that require Ontario companies to publicly report on their use and release of toxic substances and develop

feasible reduction plans. Taking away the responsibility to inform the public and reduce harmful chemicals found in our workplaces, consumer products and local communities puts human health and the environment at risk.

Schedule 9 amends the Labour Relations Act, 1995, to deem municipalities and certain local boards, school boards, hospitals, colleges, universities and public bodies to be non-construction employers. That would mean that any collective agreement binding the employer and the trade union ceases to apply in so far as it applies to the construction industry.

This would mean not only a lowering of quality of jobs in the City, but there could be potential risks to the public if unqualified and untrained workers were to be responsible for projects related to construction and other infrastructure projects in the City.

Schedule 10 of the proposed legislation would amend the Planning Act to allow municipalities to pass by-laws without public notice that could override important drinking water, agricultural and environmental protections contained in the Clean Water Act, 2006, Oak Ridges Moraine Conservation Act, 2001, the Greenbelt Act, 2005, the Places to Grow Act, 2005, and other provincial legislation.

The Greenbelt is an integral component of land use planning that complements the Growth Plan for the Greater Golden Horseshoe to encourage smart regional planning and sustainable communities, reduce urban sprawl, and protect natural and hydrological features and agricultural lands. Furthermore, protections like those included in the Clean Water Act are critical to the health of residents of Toronto.

Background Information (City Council)

Member Motion MM2.10
(http://www.toronto.ca/legdocs/mmis/2019/mm/bgrd/backgroundfile-123945.pdf)

GUELPH-GUELPH/ERAMOSA WATER QUANTITY POLICY DEVELOPMENT STUDY

Draft Water Quantity Policy Approaches

Township of Puslinch Council

March 6, 2019

DRINKING WATER SOURCE PROTECTION Our Actions Matter

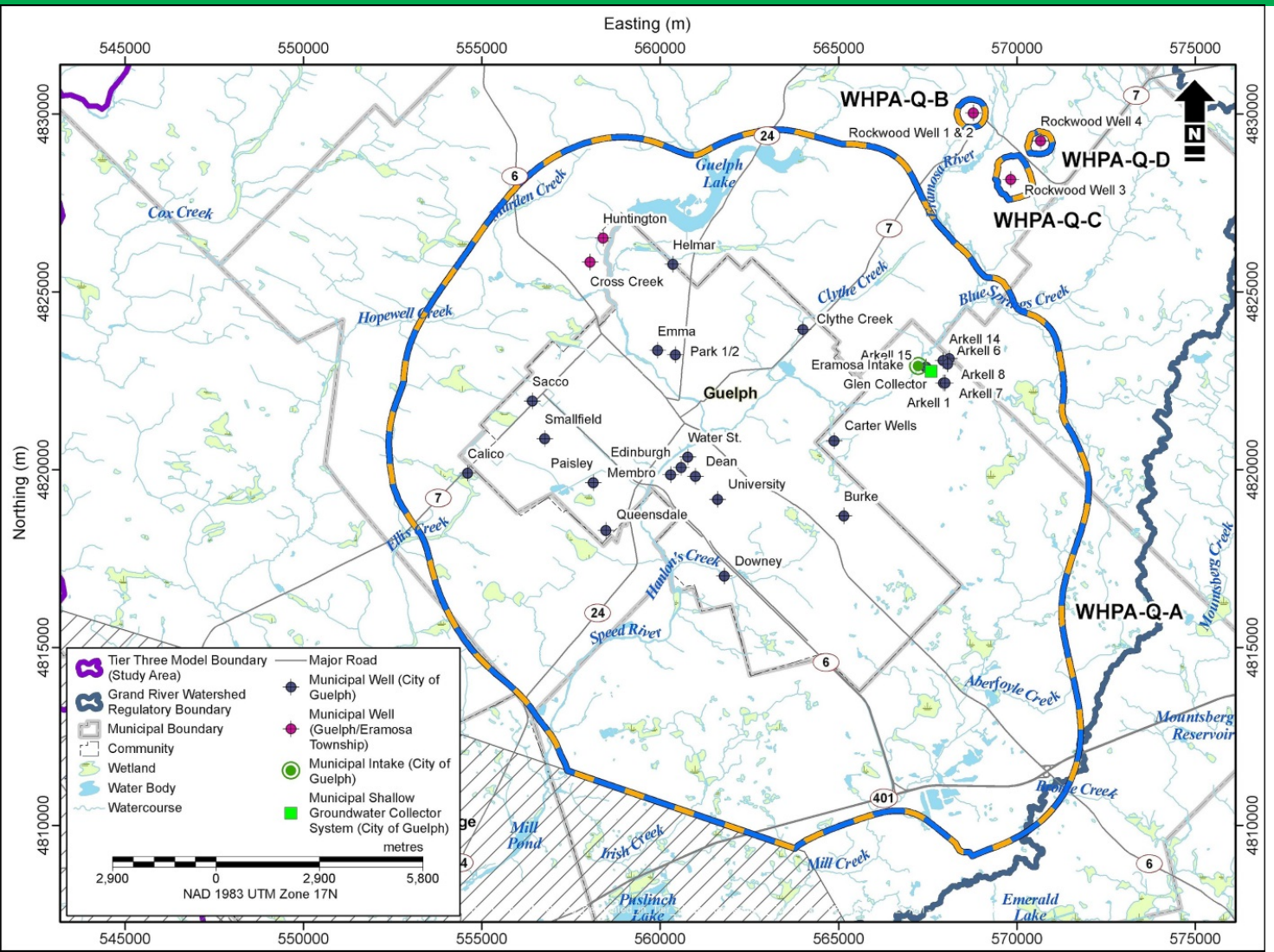
LAKE ERIE SOURCE PROTECTION REGION

OVERVIEW

- Provide brief background of Guelph-Guelph/Eramosa (GGET) Tier 3 Water Budget and Risk Assessment
- Provide status update on Guelph-Guelph/Eramosa (GGET) water quantity policy development study
- Present draft policy approaches for addressing significant water quantity threats
  - Consumptive water taking
  - Recharge reduction

GGET TIER 3 STUDY

Wellhead Protection Area Quantity (WHPA-Q)

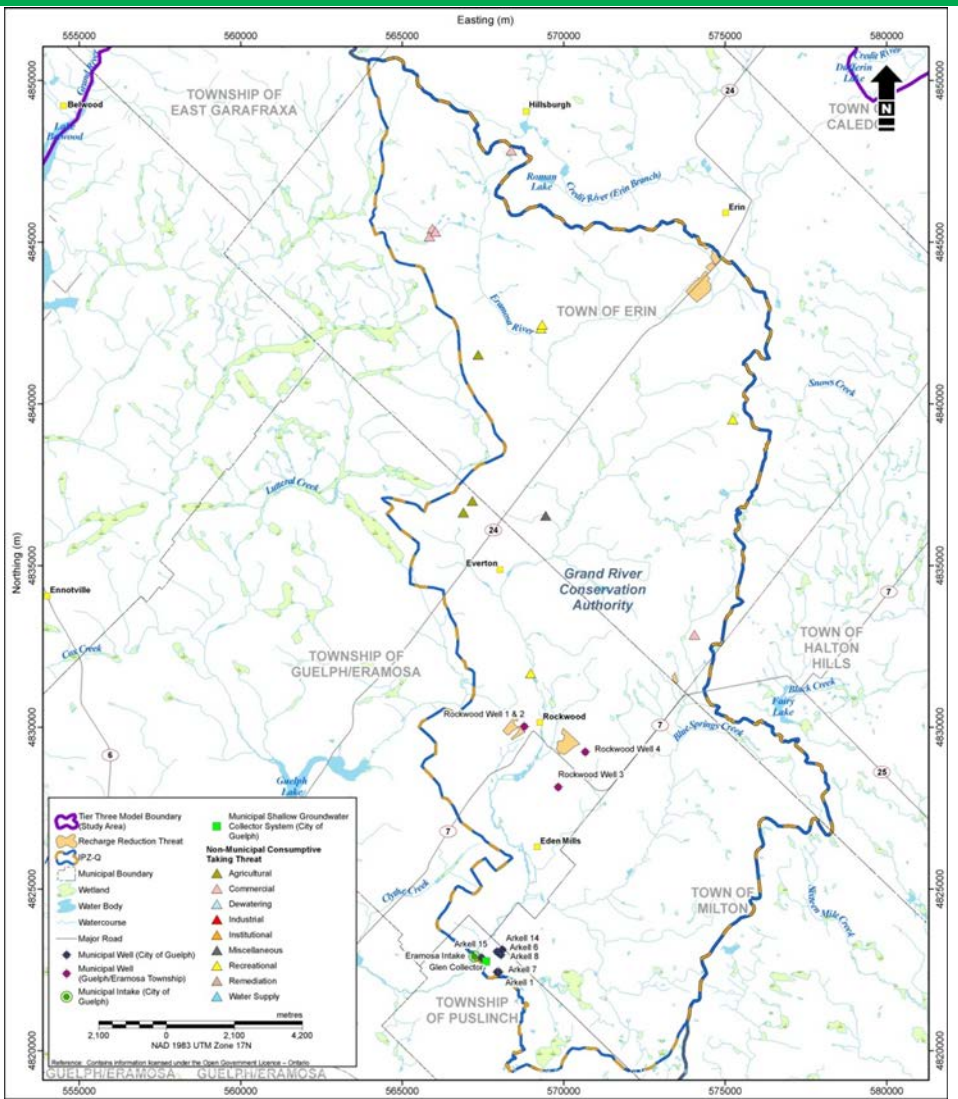


- Defined four WHPA-Qs within study area
- Considered current and future water takings under future land use and drought conditions
- GGET WHPA-Q - **Significant** Risk Level
- GET WHPA-Q around Rockwood Wells – **Low** Risk Level

DRINKING WATER SOURCE PROTECTION Our Actions Matter
LAKE ERIE SOURCE PROTECTION REGION

GGET TIER 3 STUDY

Intake Protection Zone Quantity (IPZ-Q)

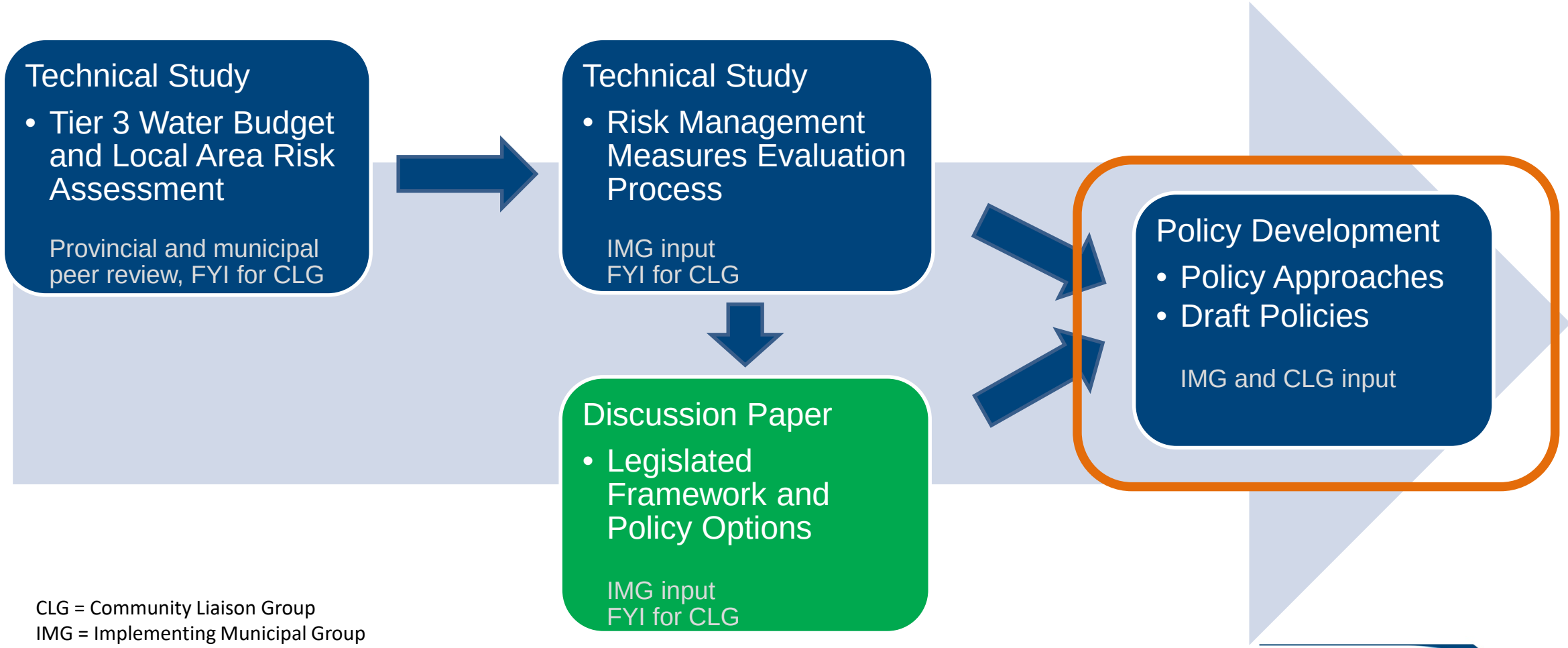


- IPZ-Q = area upstream of the surface water intake on the Eramosa River
- Assigned **Significant** risk level, adopted from WHPA-Q because of interconnection through Arkell System
- Significant risk levels for GGET WHPA-Q and IPZ-Q a result of model prediction that City of Guelph municipal wells (Queensdale, Arkell 1) may not be able to continue pumping in the future (2031) under future land use and drought conditions

DRINKING WATER SOURCE PROTECTION Our Actions Matter
LAKE ERIE SOURCE PROTECTION REGION

POLICY DEVELOPMENT

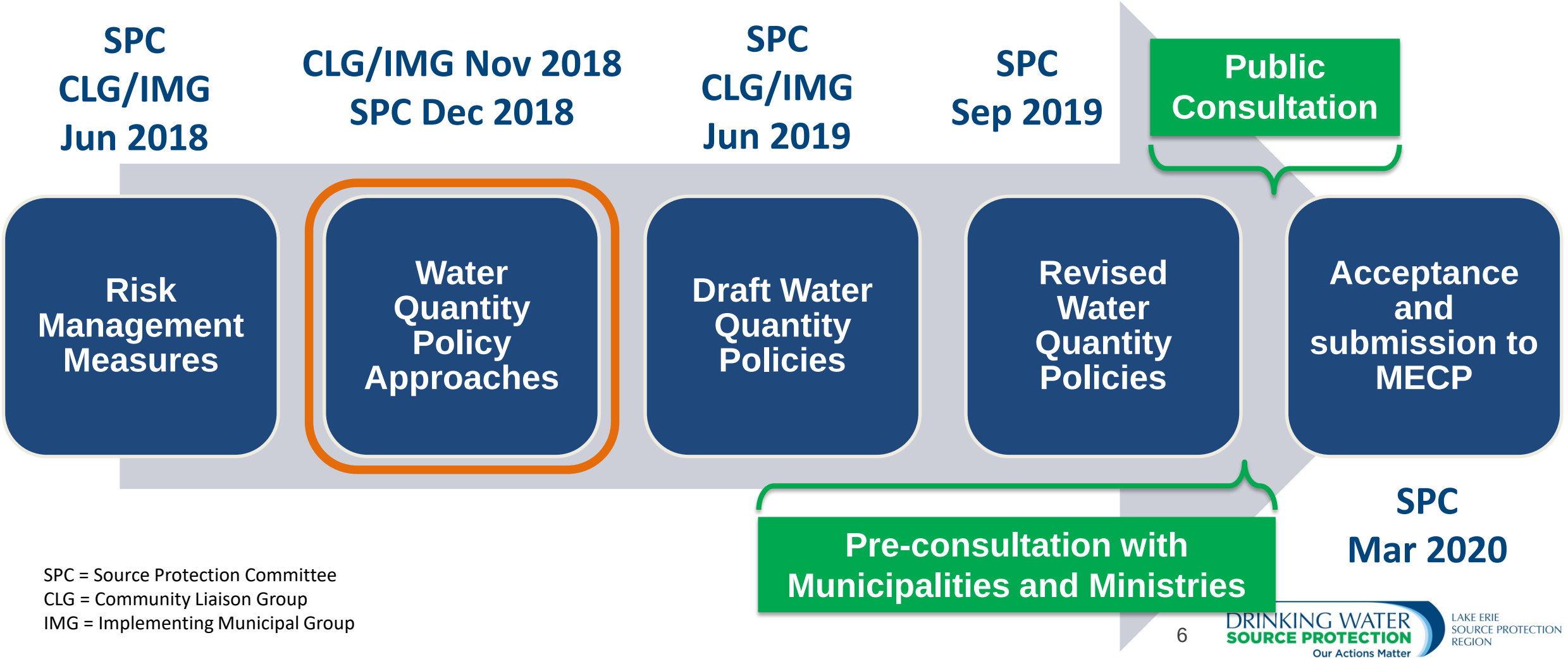
Guelph-Guelph/Eramosa Water Quantity Policy Development Study



CLG = Community Liaison Group
IMG = Implementing Municipal Group

POLICY DEVELOPMENT

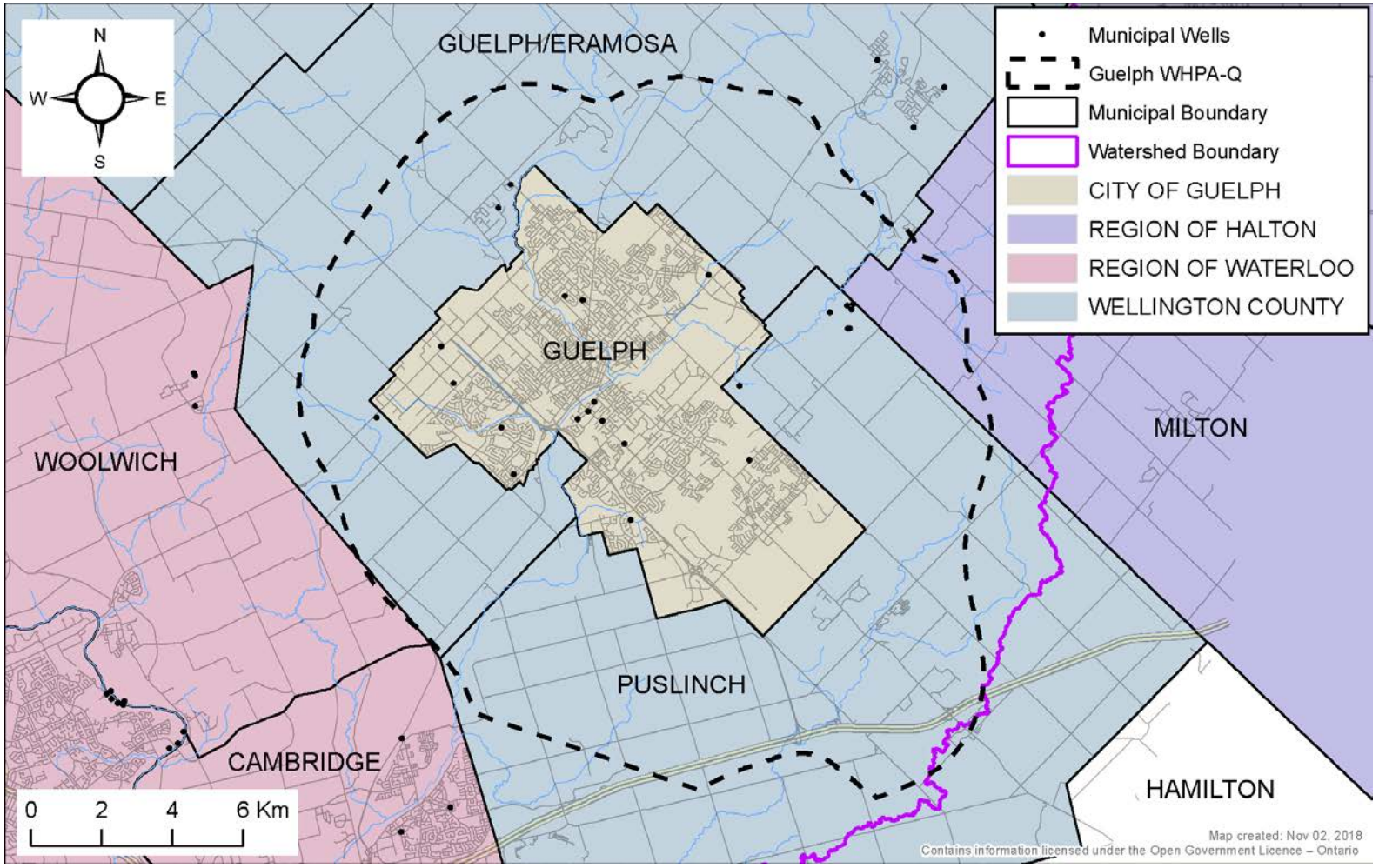
Process and Timeline



SPC = Source Protection Committee
CLG = Community Liaison Group
IMG = Implementing Municipal Group

POLICY APPLICABILITY

Wellhead Protection Area Quantity (WHPA-Q)



- Policies will apply within WHPA-Q (Guelph-Guelph/Eramosa Hamilton Drive)
- Policies do not apply outside WHPA-Q
- Policies do not apply in WHPA-Q (Guelph/Eramosa Rockwood)
- Policies to be incorporated into different municipal chapters

POLICY DEVELOPMENT

Context

- *Clean Water Act (2006)* protects source of municipal drinking water supplies through prevention, developing collaborative, watershed-based source protection plans
- Source protection plan policies protect current and future drinking water supplies from contamination (quality) and overuse (quantity) activities
- Policy objectives:
  - Ensure activity never becomes significant drinking water threat
  - Ensure activity ceases to be significant drinking water threat
- Policy approaches are high-level, draft, and subject to change. Additional approaches may be considered
- Approaches inform the development of detailed policy texts
- Policy texts will be more specific and may differ among municipalities

POLICY FRAMEWORK

Threats Management Strategy (TMS) and Policy Discussion Paper provide Risk Management Measures (RMMs) that inform water quantity policy development:

Optimization of Municipal Water Supply Systems (Wells)

Water Conservation and Efficiency

Addition of New Municipal Supply

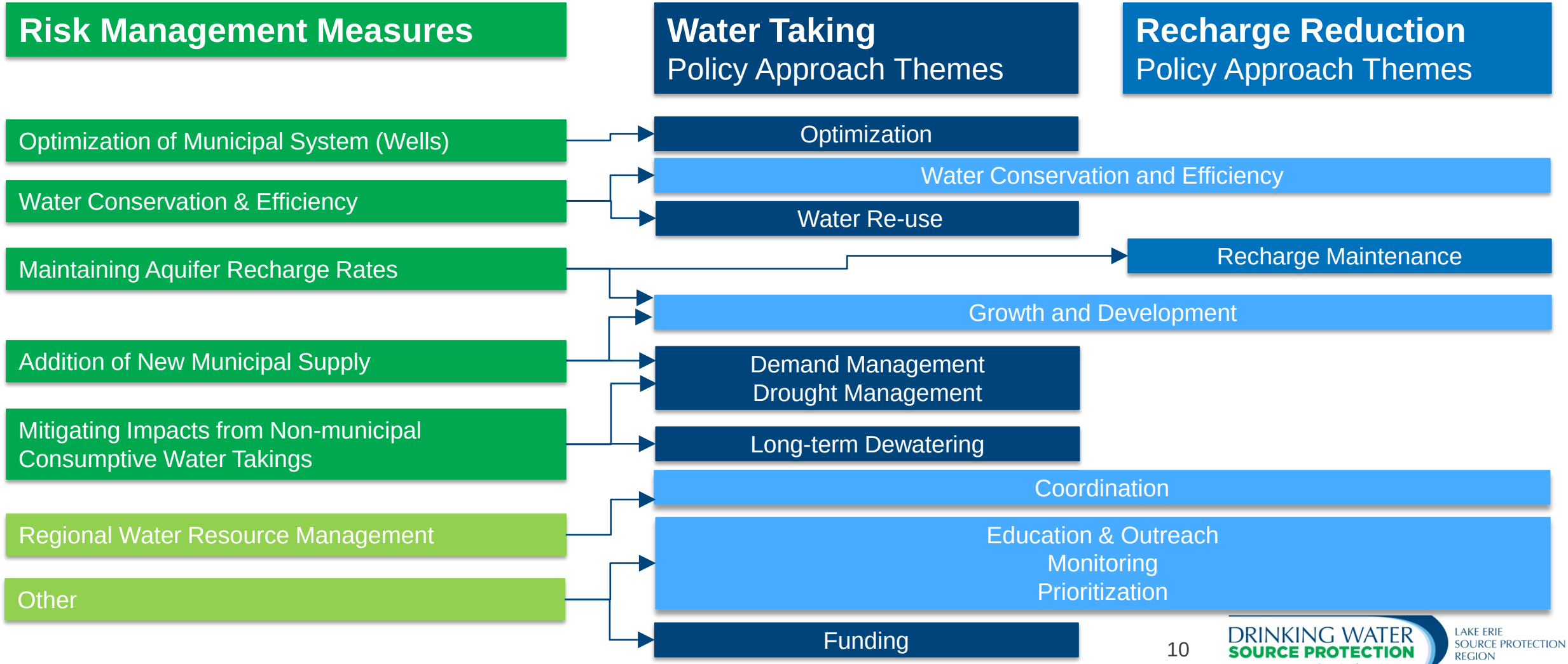
Maintaining Aquifer Recharge Rates

Mitigating Impacts from Non-municipal Consumptive Water Takings

Regional Water Resource Management

Other

POLICY FRAMEWORK



DRINKING WATER SOURCE PROTECTION Our Actions Matter
LAKE ERIE SOURCE PROTECTION REGION

POLICY APPROACHES

Water Taking

Themes	Policy Approach
Optimization	• Optimization programs for municipal water supply systems
Water Conservation and Efficiency	• Incentive programs for water conservation and efficiency
Water Re-use	• Guidelines for water re-use systems and technologies
Growth and Development	• Growth targets under Places to Grow Plan • Update of subwatershed studies • Demand management for new drinking water supply sources • Conditions as part of development approvals • Water takings in areas of municipal servicing
Coordination	• Water Resource Technical Working Group
Demand Management	• Permits To Take Water (PTTW) review • Water takings in areas of municipal servicing

POLICY APPROACHES

Water Taking

Themes	Policy Approach
Drought Management	• City of Guelph drought response plan
Education and Outreach	• Education and outreach initiatives • Web-based resources as part of EnviroGuide platform
Monitoring	• Subwatershed monitoring program • Collection of water usage data for water takers exempted from PTTW requirements • Long-term monitoring of shallow groundwater and surface water systems* **under discussion*
Prioritization	• Prioritization of municipal water use • Prioritization of inspection and abatement
Funding	• Tier 3 water budget model maintenance • Climate change assessment model
Long-term Dewatering	• *Under discussion*

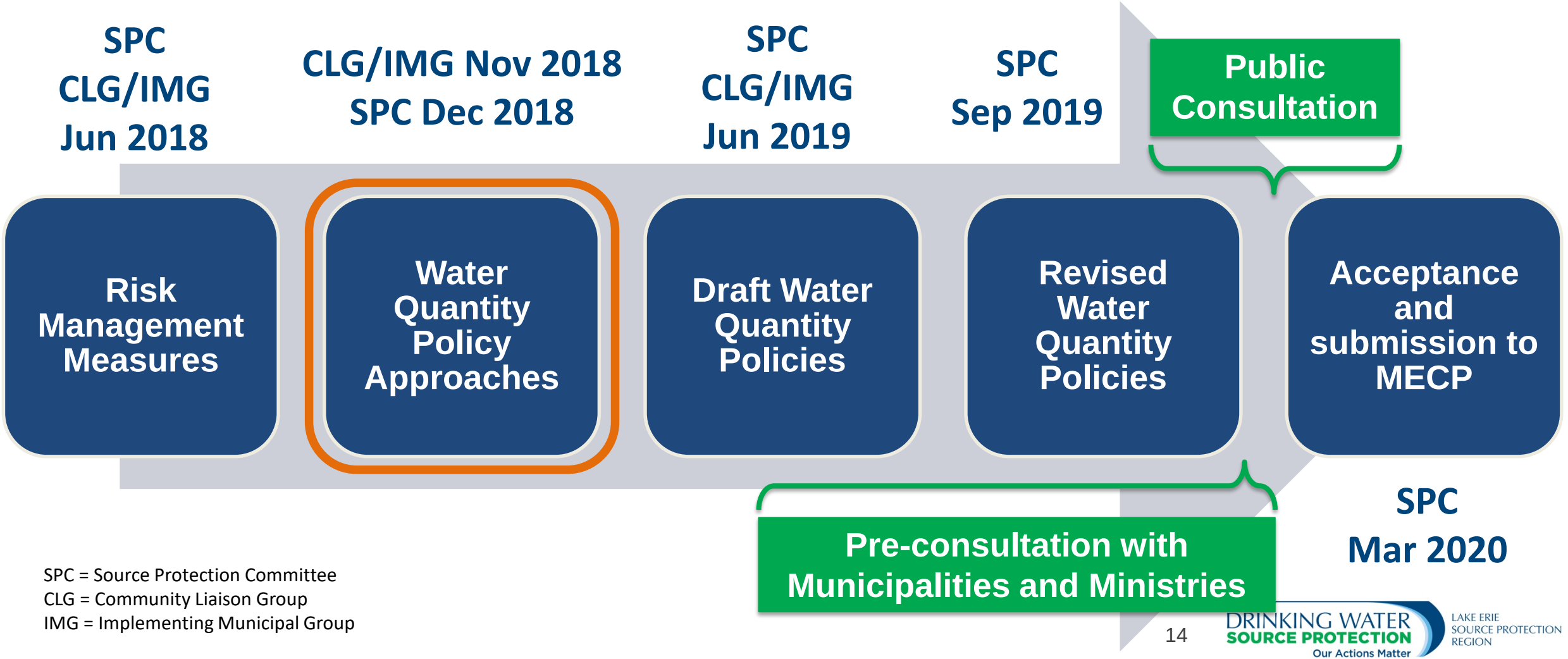
POLICY APPROACHES

Recharge Reduction

Themes	Policy Approach
Water Conservation and Efficiency	• Incentive programs for recharge
Recharge Maintenance	• Guidelines for groundwater recharge maintenance • Groundwater recharge maintenance where appropriate • Environmental Compliance Approval (ECA) review for stormwater management facilities with LID systems
Growth and Development	• Update of subwatershed studies
Coordination	• Water Resource Technical Working Group
Education and Outreach	• Education and outreach initiatives • Web-based resources as part of EnviroGuide platform
Monitoring	• Long-term monitoring program of shallow groundwater and surface water systems* **under discussion*
Prioritization	• Prioritization of ECA review and inspection for stormwater management facilities with LID systems

POLICY DEVELOPMENT

Process and Timeline



SPC = Source Protection Committee
CLG = Community Liaison Group
IMG = Implementing Municipal Group

NEXT STEPS

- Lake Erie Region committed to collaborative process for policy development through municipal and stakeholder engagement with Project Team, IMG, and CLG
- Further discussion with ministry staff required for outstanding policy approaches
- Policy framework and approaches brought to the Lake Erie Region Source Protection Committee (SPC) on **December 6, 2018**
- Work to develop policy text ongoing with aim to present to SPC on **June 20, 2019**
- Draft policy text presented to the CLG/IMG for feedback on **late June 2019**
- Revised policy text to be brought to the SPC on **September 5, 2019**
- Submission to MECP anticipated by **March 2020** following pre-consultation and public consultation process

Mapping of a Natural Heritage System in the County of Wellington

Final Report

September 2018

Prepared for:
The County of Wellington

Prepared by:
Grand River Conservation Authority
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Table of Contents

List of Figures

List of Tables

1.0 Background and Context

1.1 A Systems Approach to Conservation

Approaches to the conservation of nature in Ontario have evolved significantly over the past few decades in response to advances in conservation biology and landscape ecology. Prior to the 1960's, conservation lands such as parks and reserves were identified primarily for the purposes of managing natural resource uses (e.g., forests for logging, reservoirs for flood control) and recreational activities (Environment Canada, 2005).

The conservation of lands were successful in achieving the protection of many important natural areas, however there became an increasing awareness through the 1980's that the health of species and communities within these protected areas were being impacted by surrounding human land uses (Harris, 1984). Population declines were occurring in some protected areas due to their spatial isolation.

Connectivity between natural features on the landscape was being lost. Increasingly land-use changes resulted in the conversion of large, unbroken swaths of natural land into smaller, often isolated natural areas. The separation or fragmentation of the natural landscape into smaller parcels is referred to as landscape fragmentation and it can disrupt seasonal movements of wildlife, decrease wildlife access to resources and mates, and increase the presence of nuisance wildlife in rural and urban lands, among other negative effects.

Biogeographers and conservation biologists called for a re-evaluation of the existing "Natural Areas" approach to conservation (Noss & Harris, 1986). It is now recognized that the ecological integrity of our natural heritage can best be maintained with a "Systems" approach to conservation, where natural areas are connected to one another via corridors and linkages, forming an interconnected web of natural habitat.

Today, natural areas are being managed by a variety of groups, both government and non-government, with a much broader set of objectives, including the conservation of ecological, hydrological and geological interconnected values (Gray et al. 2009; Margules & Pressey, 2000). Connected Natural Heritage Systems (NHSs) provide many ecosystem services such as pollination, clean water, and soil erosion control which support healthy communities. NHSs also provide many ecological functions (e.g. endangered species habitat, movement corridors for wildlife, biodiversity maintenance) which contribute to ecological sustainability and resiliency of the local, regional and global landscape.

What is a Natural Heritage System?

The Provincial Policy Statement (2014), under the Planning Act, defines a Natural Heritage System (NHS) as:

"..a system made up of natural heritage features and areas, and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. These systems can include natural heritage features and areas, federal and provincial parks and conservation reserves, other natural heritage features, lands that have been restored or have the potential to be restored to a natural state, areas that support hydrologic functions, and working landscapes that enable ecological functions to continue."

1.2 The Relationship of the Wellington County NHS to the Growth Plan NHS

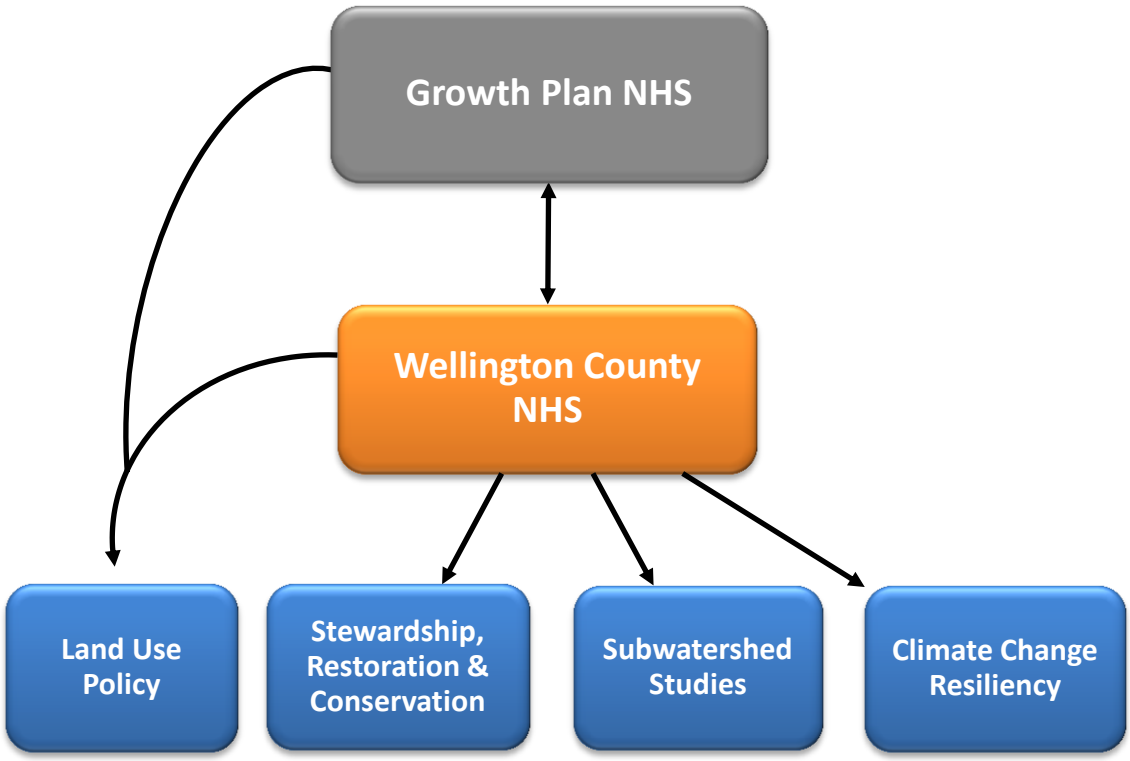
On February 9, 2018 the province released a regional-scale NHS in accordance with updated policies in the 2017 Growth Plan for the Greater Golden Horseshoe (the Growth Plan NHS). The Growth Plan for the Greater Golden Horseshoe requires that member municipalities, including Wellington County, incorporate the Growth Plan NHS mapping through an official plan review.

From a landscape perspective, NHSs should be identified at various scales because the ecological importance of certain features may not be easily discernable at a single spatial scale. For example, a habitat may be considered significant wildlife habitat (SWH) after field assessments that can only be done at a local scale. Conversely, the hydrological or terrestrial connectivity within valleylands or between woodlands can only be discerned at broader spatial scales.

The province identified the Growth Plan NHS at a mapping scale of roughly 1:50,000. The Wellington County NHS presented in this report identifies a connected NHS at a mapping scale of roughly 1:10:000.

The Wellington County NHS may help the County conform to provincial planning requirements by providing a scientific basis for refinements to the Growth Plan NHS before it is incorporated into the County's official plan (figure 1). It can also be a resource for existing stewardship programs and strategies to help prioritize conservation actions (figure 1). Furthermore, the Wellington County NHS can be a foundational tool that will support watershed and subwatershed planning, as well as climate change strategies (figure 1).

Figure 1 The hierarchical relationships between Growth Plan NHS, the Wellington County NHS, County land use policy, and stewardship initiatives within the County. A Wellington County NHS has a number of potential uses (in blue).



2.0 Overview of Wellington County Natural Heritage

The following describes the current physical and ecological characteristics of the landscape in Wellington County, all of which contribute to the development and ecological function of features in the Wellington County NHS.

2.1 Physical Characteristics

2.1.1 Climate

The Wellington County climate is characterized by a humid continental climate with large seasonal differences of warm and humid summers to cold or very cold winters. Climate averaged data was obtained from Environment Canada's weather station at Belwood Shand Dam for a 30 year period between 1981-2010.

Summer days typically reach highs in the mid to low-20s °C but may also include several days where temperatures exceed 30 °C. During the winter, daytime highs are normally a few degrees below 0 °C, but can also be much warmer or colder. Overall the average annual daily temperature is 6.7 °C (table 1).

The average annual precipitation in the area is 945.7 mm (table 1). The County typically receives more precipitation in the spring and summer months than in the fall and winter. Snowfall accounts for approximately 16% of the annual precipitation.

Table 1. Climate Average Data for the years 1981-2010. Environment Canada Shand Dam Weather Station

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Daily Mean Temperature (°C)	-7.4	-6.3	-1.9	5.7	12.2	17.5	20.0	19.0	14.9	8.3	2.1	-3.9	6.7
Precipitation (mm)	67.9	55.9	59.6	74.1	86.9	83.9	89.2	96.6	93.1	77.2	93.0	68.6	945.7

2.1.2 Bedrock and Surficial Geology

Underlying Wellington County are strata (layers) of bedrock, characterized by the geological time scale of their formation (i.e. Period, Era, and Eon) and by the type of rock. The County is situated on bedrock formed during the Silurian Period (OGS, 2011). The Silurian bedrock of Wellington County has four major strata (figure 2). The Amabel

formation (the lowest strata) and the Guelph formation (the second lowest strata) consist of sandstone, shale, dolostone, siltstone rock types (Hoffman at el., 1963). The Salina formation (the third lowest strata) and the Bass Islands formation (the top strata) consist of limestone, dolostone, shale, sandstone, gypsum and salt. In the westernmost sides of Minto and Mapleton, Selurian bedrock is overlain with younger bedrock from the Devonian Period, consisting of sandstone, dolostone and limestone (Hoffman at el., 1963).

Repeated glaciation events in Southern Ontario deposited varying thicknesses and types of sediment on top of the underlying geology (Hoffman et al., 1963). In Wellington County, sediment was mostly deposited directly by glacier ice (i.e. glacial deposits, or till) or by streams flowing away from those glaciers (i.e. glaciofluvial deposits, or outwash; Chapman & Putnam, 2007). The mode in which sediments were deposited determined the type of materials present in surficial deposits, their thickness, and whether the materials were organized (stratified) or mixed (Stephenson et al., 1988).

The most prevalent material present in Wellington County is till, a poorly sorted and poorly stratified surficial deposit (figure 3; OGS, 2010). Glaciofluvial deposits account for the majority of other types of material present in the County, mainly in Minto, Erin, Centre Wellington, Guelph/Eramosa and Puslinch. In Erin, glaciofluvial deposits are composed of mainly sand and gravel, in Puslinch, gravel was deposited, and in Centre Wellington and Guelph/Eramosa, sand, gravel, and combinations of sand and gravel were deposited (figure 3; OGS, 2010). In Minto, glaciofluvial deposits of sand, sand and gravel, or sand, silt and gravel predominate in the northern half of the municipality (figure 3; OGS, 2010).

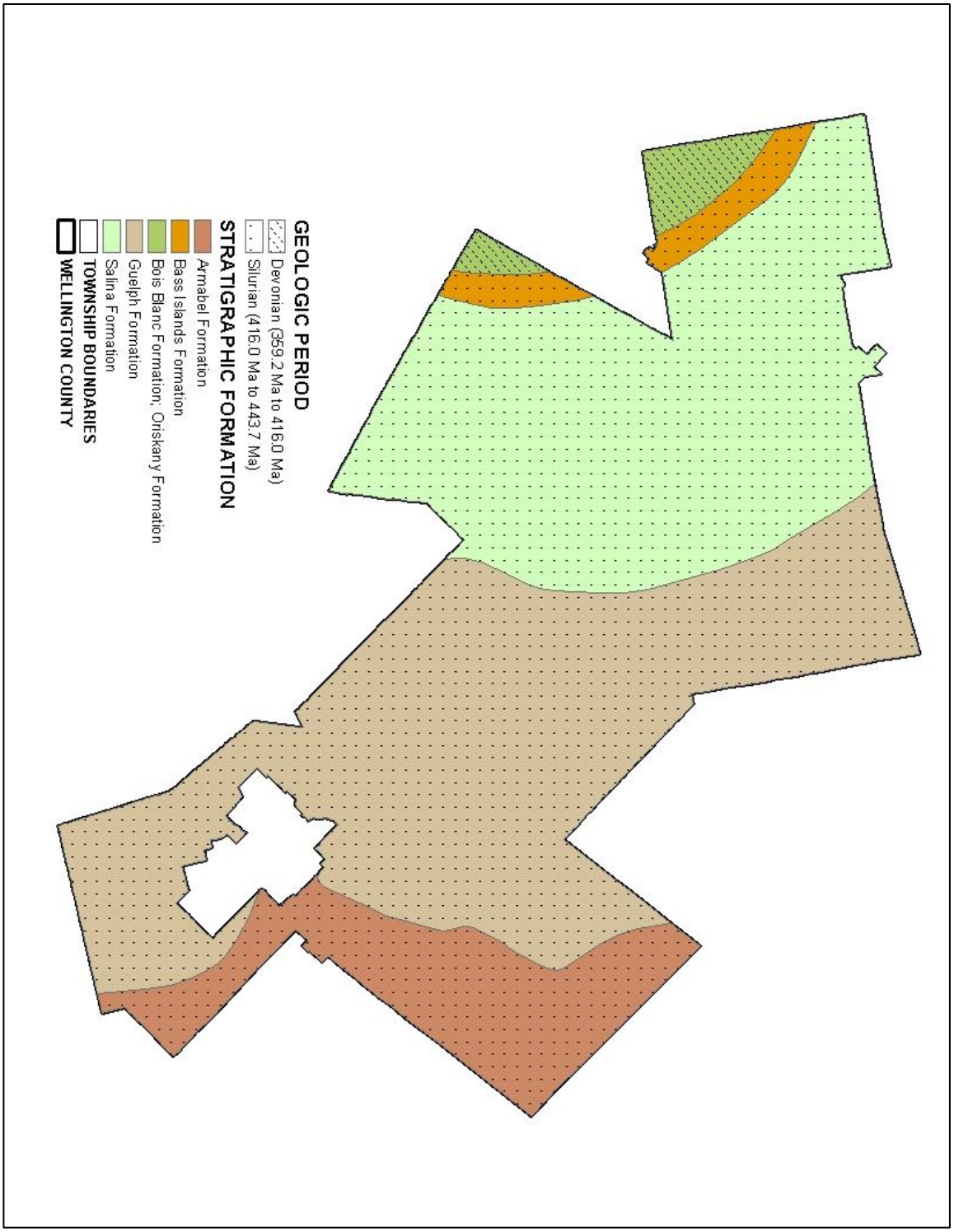


Figure 2. Bedrock Geology in Wellington County

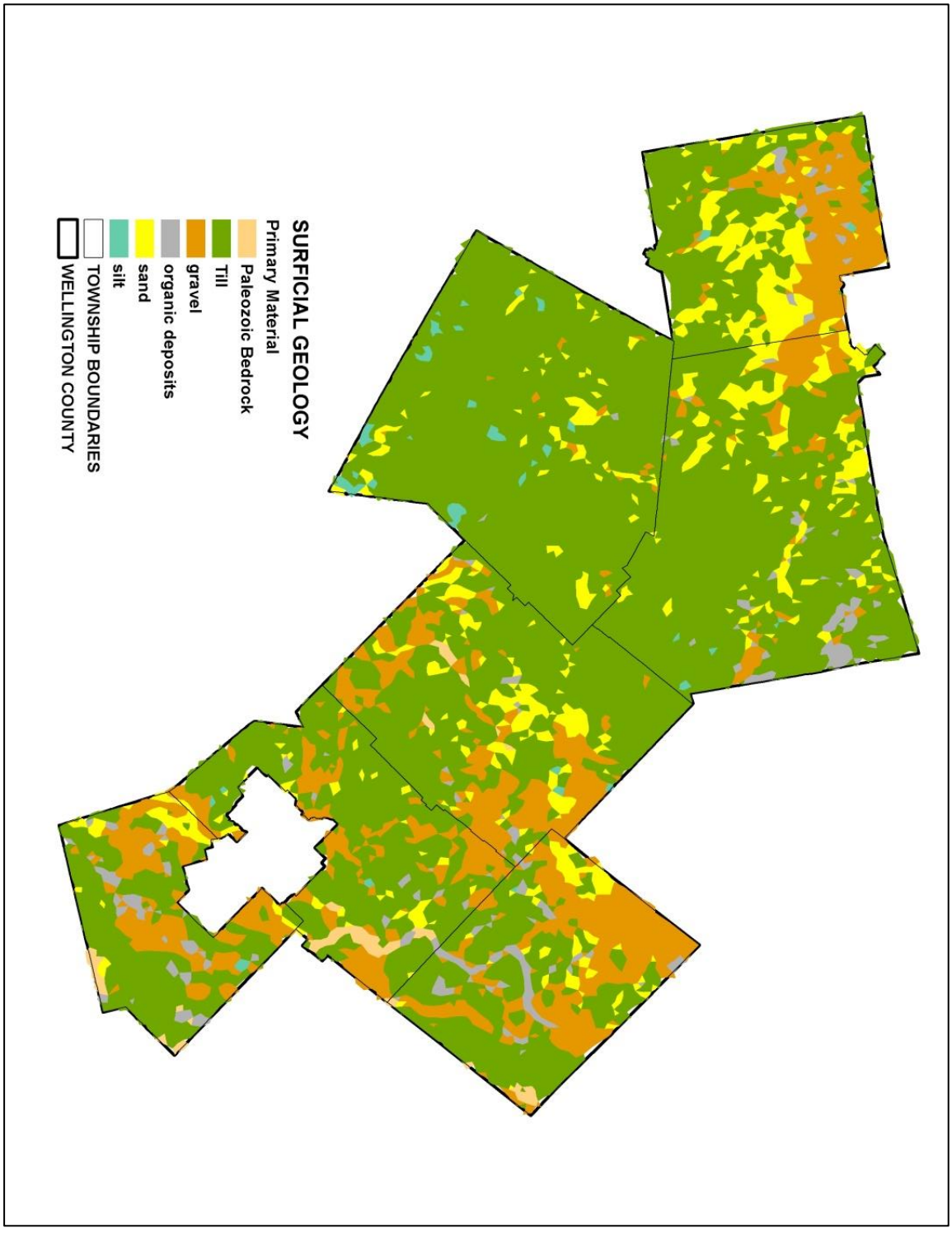


Figure 3. Surficial Geology in Wellington County

2.1.3 Physiography and Soils

Physiography and soils affect hydrological connectivity directly and other ecosystem functions indirectly by influencing the growth and species composition of vegetation communities.

Wellington County contains eight physiographic regions (figure 4), each one distinct based on topographic features, surficial geology, and soils (Chapman & Putnam, 2007). The dominant soil types in the county (figure 5) are loamy soils which are ideal for agriculture as they tend to contain more nutrients than other soil types and have ideal water permeability.

The Townships of Centre Wellington and Guelph Eramosa are mostly situated within the Guelph Drumlin Field, which is characterized by a high density of drumlins (low and broad oval hills), glacial spillways, and loam or fine sandy loam soils (figures 4 and 5; Chapman & Putnam, 2007).

The Townships of Mapleton and Wellington North comprise the relatively flat terrain of the Dundalk Till Plain and Stratford Till Plain regions (figure 4). Soil types in both of these regions are dominated by loam in the southern parts of the region and silty loam in the northern parts, with clay loam soils predominating in the Luther Marsh area of Wellington North Township (figure 5). Agricultural land use is greatest in Mapleton and Wellington North than all other lower-tier municipalities in Wellington County, probably in part due to the combination of flat topography and loam soils.

The Paris-Galt Moraine (i.e. the Horseshoe Moraine) is a large till moraine making up much of the physiography in Puslinch Township (figure 4). The Paris-Galt Moraine is a significant groundwater recharge area consisting of well drained sandy loam soils and glacial rock deposits.

Finally, the sandy kame moraines in the northern part of Minto and the silty loam kame moraines in eastern Centre Wellington and northern portions of Erin Township are also well drained and areas important for groundwater recharge (figures 4 and 5).

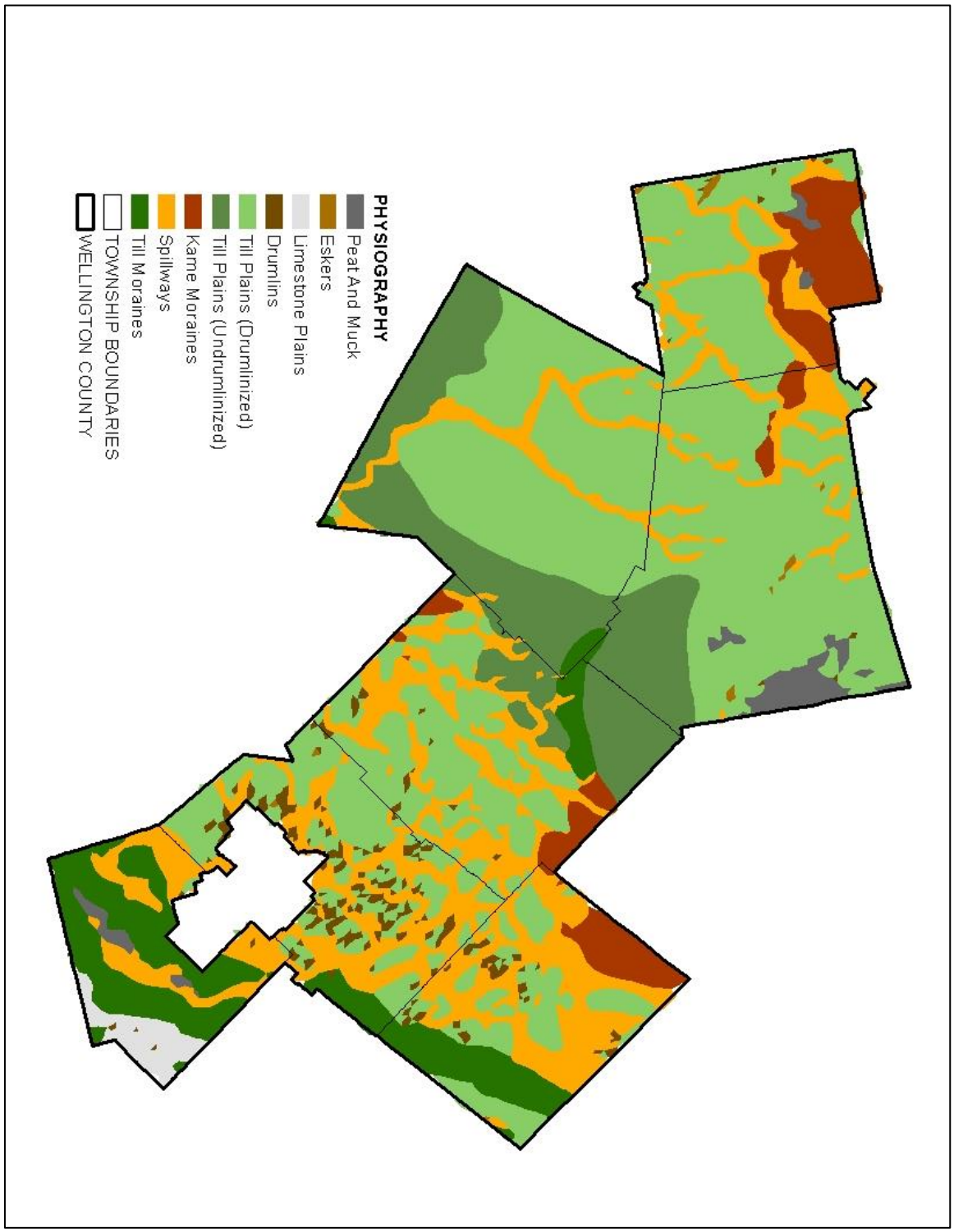


Figure 4. Physiography in Wellington County

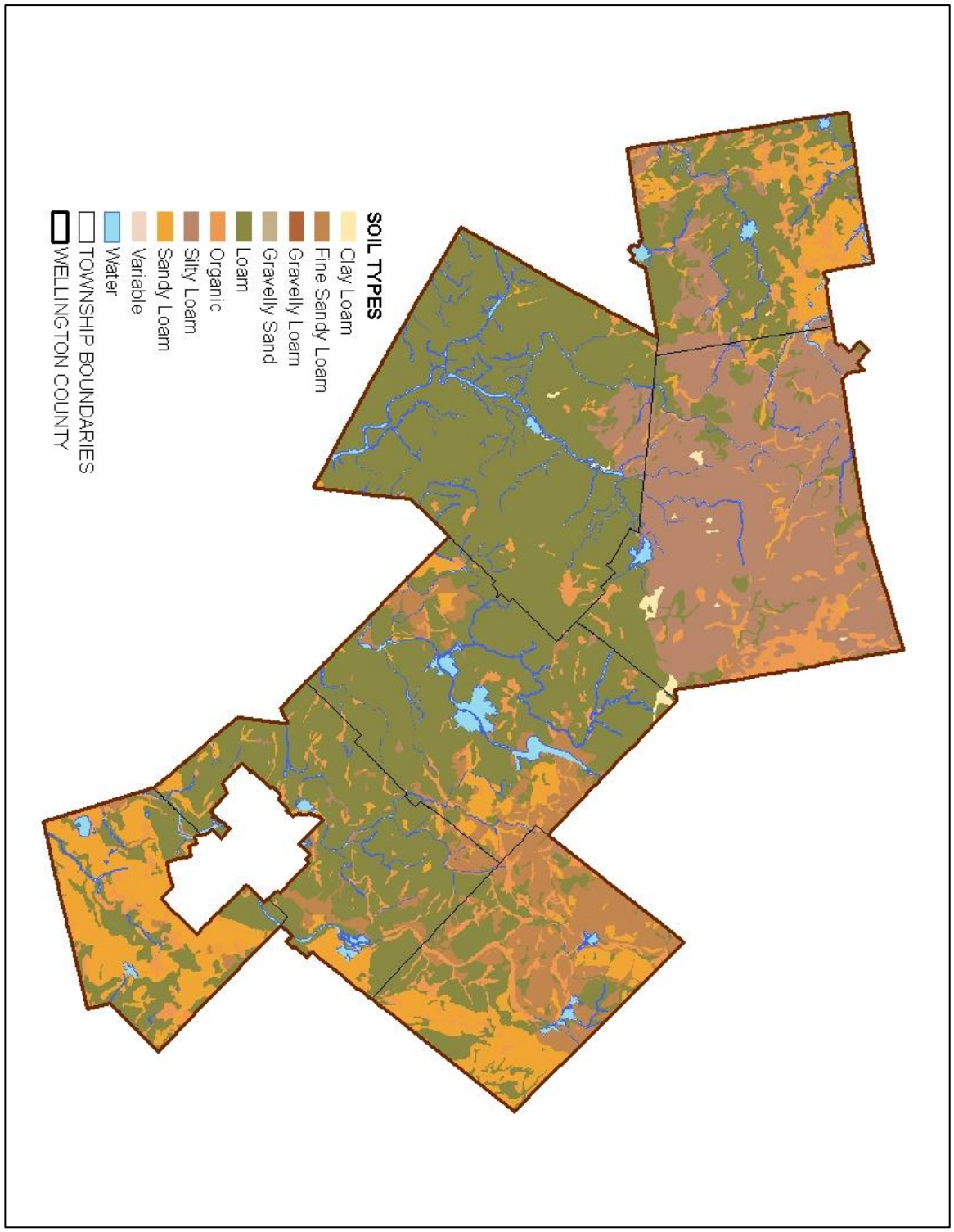


Figure 5. Soil Types in Wellington County

2.1.4 Groundwater Hydrology

Modelled estimates of groundwater recharge have been produced by conservation authorities as part of the Drinking Water Source Protection Program in accordance with Ontario's Clean Water Act (figure 6). While modelled estimates of groundwater recharge have been compiled across the County, not all data is similar for comparison purposes in figure 6 (e.g. areas mapped white).

In Wellington, areas of high recharge are concentrated on the Paris-Galt Moraines in Puslinch and the Moraines of the Hillsburgh Sandhills in Erin, ranging mostly between 295-579 mm/yr. Recharge to the groundwater system is lowest in the Dundalk Till Plain and Stratford Till Plain regions, generally recharging at 65 mm/yr or less.

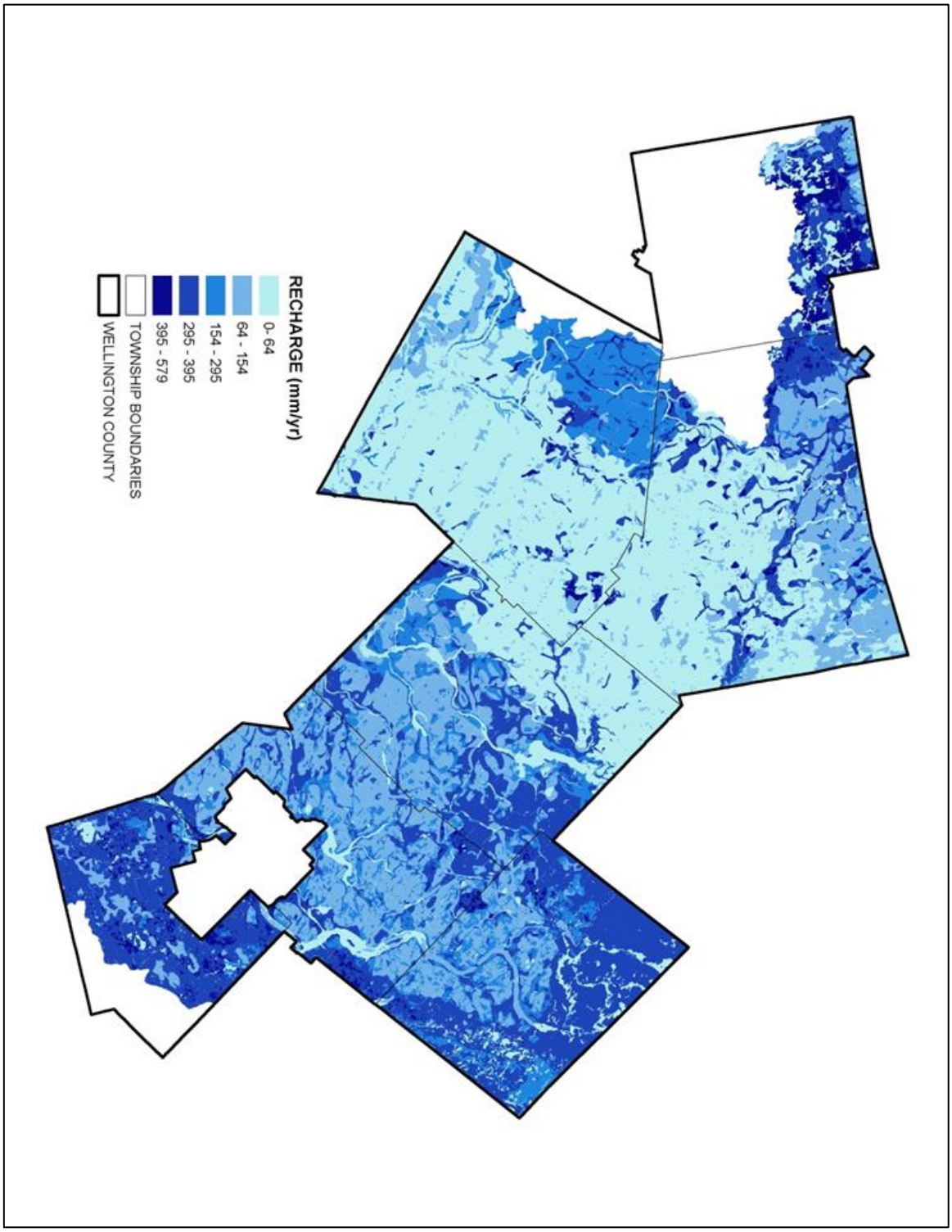


Figure 6. Modelled Groundwater Recharge Areas in Wellington County

2.2 Aquatic and Wetland Ecology

2.2.1 Watercourses

Fifty-six percent of the watercourses in the county have been classified by the Ontario Ministry of Natural Resources and Forestry (OMNRF) based on assessments of the temperature regime and the composition of the fish community within specific reaches. The remaining 44% have an unassigned classification or are not classified. Of the currently assessed watercourses, a majority are classified as warmwater fish habitat (figure 7, table 2).

Table 2. Lengths of Classified Watercourses in Wellington County

Lengths of Mapped Watercourses				
Total Length of Watercourses (km)			Classified Watercourses (km)	Not Classified Watercourses (km)
3,512			2,573	939
Lengths of Classified Watercourses				
Total (km)	**Cold (km)**	**Cool (km)**	**Warm (km)**	**Unknown (km)**
2,573	667	540	766	600

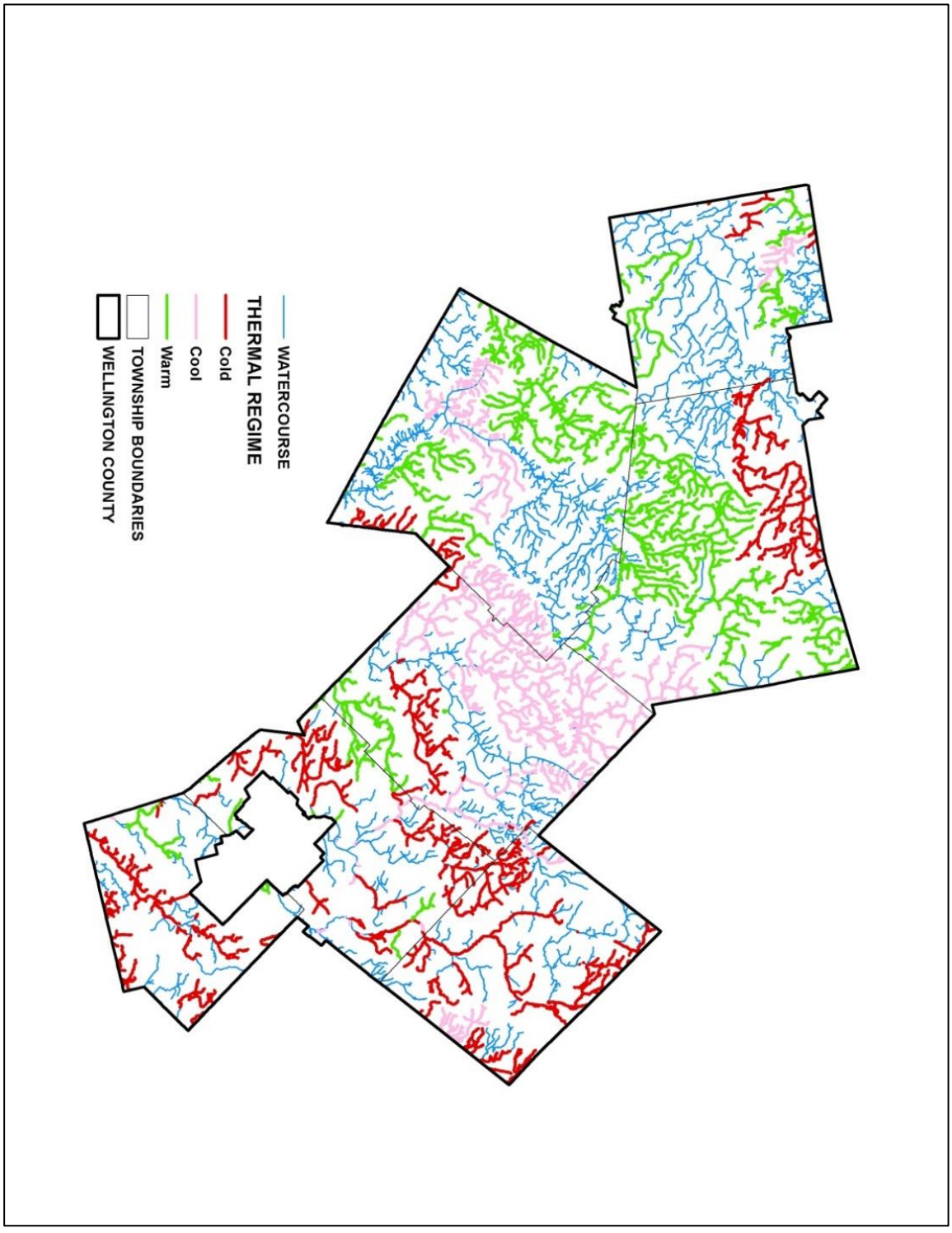


Figure 7. Thermal Regimes of Watercourses in Wellington County

2.2.2 Wetlands

Wetlands are lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the ground surface. In either case the presence of abundant water has caused the formation of hydric soils and has favored the dominance of either hydrophytic plants or water tolerant plants. Periodically soaked or wet lands being used for agricultural purposes, which no longer exhibit wetland characteristics, are not considered to be wetlands.

Many wetlands have been evaluated and mapped by the Ontario Ministry of Natural Resources and Forestry using Ontario's Wetland Evaluation System (OMNR, 2014). Wetland evaluations consider biological, hydrological, socio-economic factors as well as special features of a wetland or wetland complex. Wetlands that meet certain criteria through the Ontario Wetland Evaluation System (OWES) are designated as Provincially Significant and afforded protection under Ontario's Planning Act. This analysis considered both evaluated (PSWs and non-PSWs) and unevaluated wetlands.

Wetlands can also be mapped by local planning authorities such as conservation authorities and municipalities. These agencies may have local wetland protection policies that consider certain wetlands identified through OWES as non-provincially significant to be locally significant wetlands on the landscape. All wetlands are afforded protection in accordance with conservation authority policies.

Wetlands cover 30,267 hectares, or about 12% of the county. Wetland cover in the county is above the federal subwatershed and watershed targets (6% and 10% percent, respectively per Environment Canada, 2013). A vast majority of the mapped wetlands in the county have been evaluated in accordance with provincial standards, and most of these wetlands (91% of the total evaluated wetland area) are considered to be provincially significant (table 3). Of the 90 wetlands that have been evaluated, 46 are considered to be provincially significant whereas 44 are considered locally significant (table 3).

Table 3. Total Wetland Cover and Evaluated Wetland Cover in Wellington County

Wellington County Area	260,982 ha			
Total Wetland Cover	30,267 ha			
	No. Wetland Complexes	**Area (ha)**	**% of County**	**% of Total Wetland in County**
Total Evaluated Wetlands	90	27,424	10.5	90.6
Provincially Significant Wetland (PSW)	46	24,943	9.6	82.4
Non-Provincially (Locally) Significant Wetland	44	2,481	0.9	8.2
Percentage PSW (of total evaluated wetland area)	91%			

The geographic extent of evaluated and unevaluated wetlands within the county is illustrated in figure 8. Although a high percentage of the wetlands within the county have been evaluated, these field assessments have not occurred evenly across the landscape. For instance, whereas most wetlands in Minto, Guelph/Eramosa, and Puslinch Townships have been evaluated, several wetlands in Mapleton and Wellington North Townships have not been evaluated. Although many wetlands throughout this and other townships have not been evaluated in accordance with provincial standards or are considered to be locally significant only, all wetlands in the county are considered valuable to a natural heritage system and support a number of functions including:

- providing habitat for a variety of plants and animals, including species at risk and other species of conservation concern,
- controlling flooding and erosion,
- attenuating nutrients, and
- providing educational, recreational, and research opportunities.

Many of the wetlands found within Wellington County are part of much larger wetland complexes which in many cases extend beyond the municipal boundary. Some of the largest (>1000 total hectares) and diverse wetlands complexes partially or wholly represented in the county include the following:

Speed-Lutteral-Swan Creek Wetland, a 5,683 ha complex of deciduous and coniferous swamp (95% of the complex) and marsh (5%) communities located within glacial meltwater channels associated with the Guelph Drumlin Field. The wetland complex covers portions of Eramosa, Erin, Nichol, and West Garafraxa Townships in Wellington County. Considerable portions of the wetland (60% of complex area) is underlain by organic soils, where carbon storage is expected to be proportionately high, and is sustained by and/or contributes groundwater to local watercourses known to contain Brook Trout.

Luther Marsh Wetland Complex, a 4,029 ha complex of deciduous and coniferous swamp, marsh, fen and bog communities. Luther Marsh is a large and diverse headwater wetland that drains toward the upper Grand River. Wylde Lake Bog is one of the more significant biological features and one of the largest peatlands within the district. Luther Lake is known to harbor large concentrations of waterfowl during fall migration and is a known breeding area for species at risk, including Least Bittern, Black Tern, and Bald Eagle. The wetland continues to support a breeding colony of Great Blue Heron and several Osprey nests. During the fall, large numbers of Great Egret and Sandhill Crane roost in the marsh areas.

Eramosa-Blue Springs Wetland, a 3,089 ha complex of deciduous and coniferous swamp (95%) and a marsh (5%) communities. Much of the wetland complex occurs along the riparian zones or meltwater channels and as such have a permanent or intermittent surface water connection with other nearby wetlands and/or watercourses that feed Blue Springs Creek and the Eramosa River. Much of the wetland (95%) is underlain by organic soils, where carbon storage is expected to be proportionately high, and is sustained by and contributes groundwater to local watercourses known to contain Brook Trout.

Mill Creek Wetland, a 1,804 ha complex of deciduous and coniferous swamp (95%) and a marsh (5%) communities closely associated with Aberfoyle Creek and Mill Creek in Puslinch Township. Upper portions of the wetland complex located on the Galt-Paris Moraine are sustained by high rates of groundwater discharge, which also sustains a diverse cold water fish community dominated by Brook Trout and Brown Trout.

A complete list of evaluated wetlands can be found in Appendix II: Evaluated Wetlands in Wellington County.

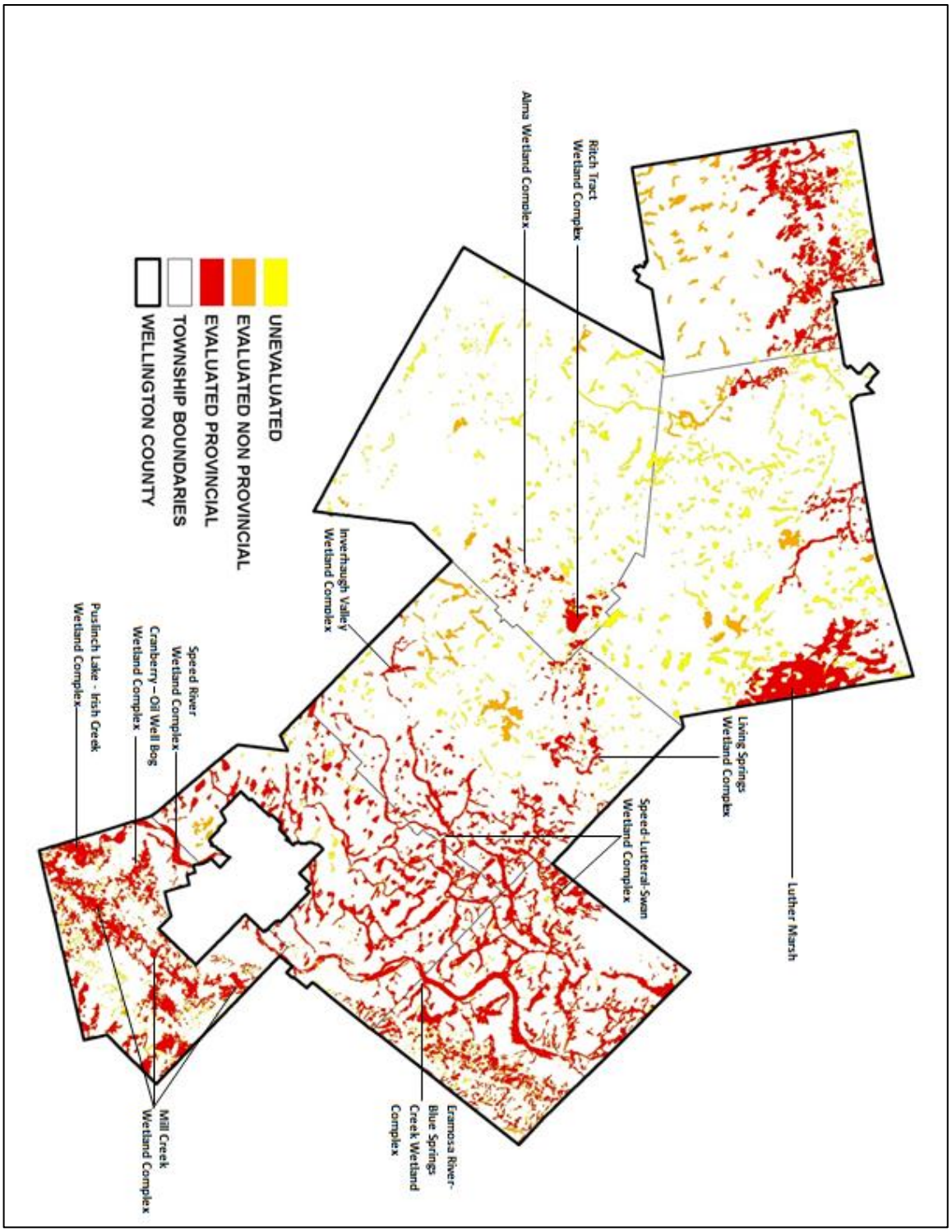


Figure 8. Evaluated and Unevaluated Wetlands in Wellington County

2.3 Terrestrial Ecology

2.3.1 Valleylands

Valleylands are natural areas that occur in a valley or other landform depression that has water flowing through or standing for some period of the year (OMMAH, 2014). Valleylands form across the landscape, from their origins in headwater areas to their outlets in aquatic features such as wetlands and lakes. Although the physical boundaries of valleylands can be determined, some valleylands are more well-defined than others. For example, vallelyands with flows occurring overland through streams and rivers are more well-defined than valleylands where flows originate from springs, seepage areas or surface run-off (OMNR, 2010). Well-defined valleylands can be delineated by the stable top-of-bank, and less well-defined valleylands can be delineated using a combination of proxy boundaries such as riparian zones, flood hazard limits, the meander belt of the watercourse or the highest general level of seasonal inundation (OMNR, 2010). For much of the county valleylands have not yet been identified by planning authorities – the exception being valleyland mapping, and an associated methodology, developed by Credit Valley Conservation as part of the Credit River Watershed NHS.

2.3.2 Woodlands

Woodlands are areas with trees greater than 2 m in height and 60% canopy coverage, with a minimum mapping unit of 0.25 ha where mapped from orthophotography and 0.5 ha where mapped from Infrared Satellite imagery, as identified and mapped by the province. Woodlands generally include forests, woodlots, plantations, and swamps. Woodlands are also defined in accordance with the Ecological Land Classification System for Southern Ontario (Lee et al., 1998). Accordingly, a forest is a terrestrial vegetation community with at least 60% tree cover whereas a woodland is a treed community with 35 to 60% cover of coniferous or deciduous trees. Interior forests are defined as those portions of the woodland in excess of 100 m from the edge of the feature.

Woodlands cover 45,556 ha or 17.4% of Wellington County (figure 9). Woodland cover is unevenly distributed across Wellington County, ranging from approximately 10% in the Township of Mapleton to 33% in the Township of Puslinch (figure 10).

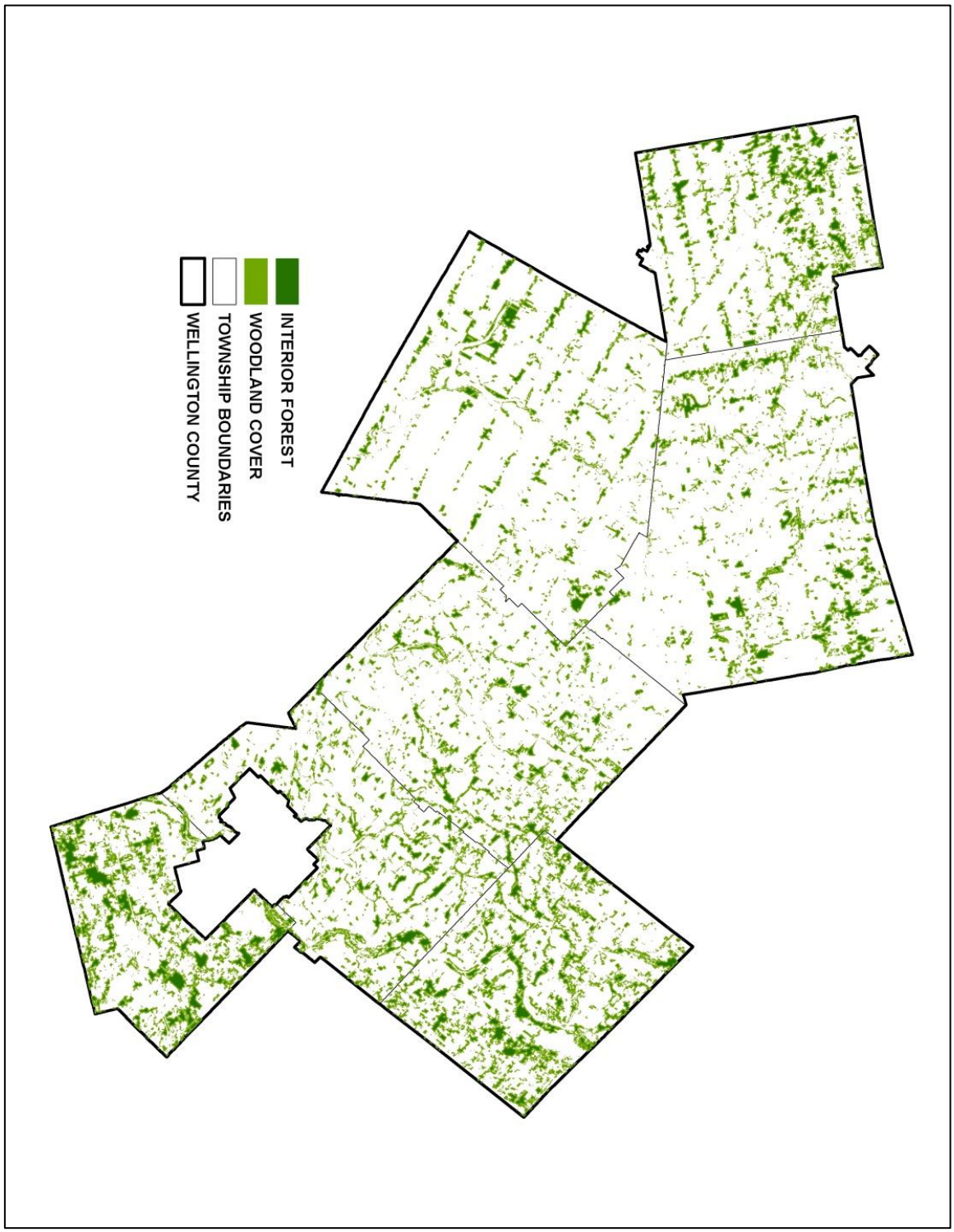
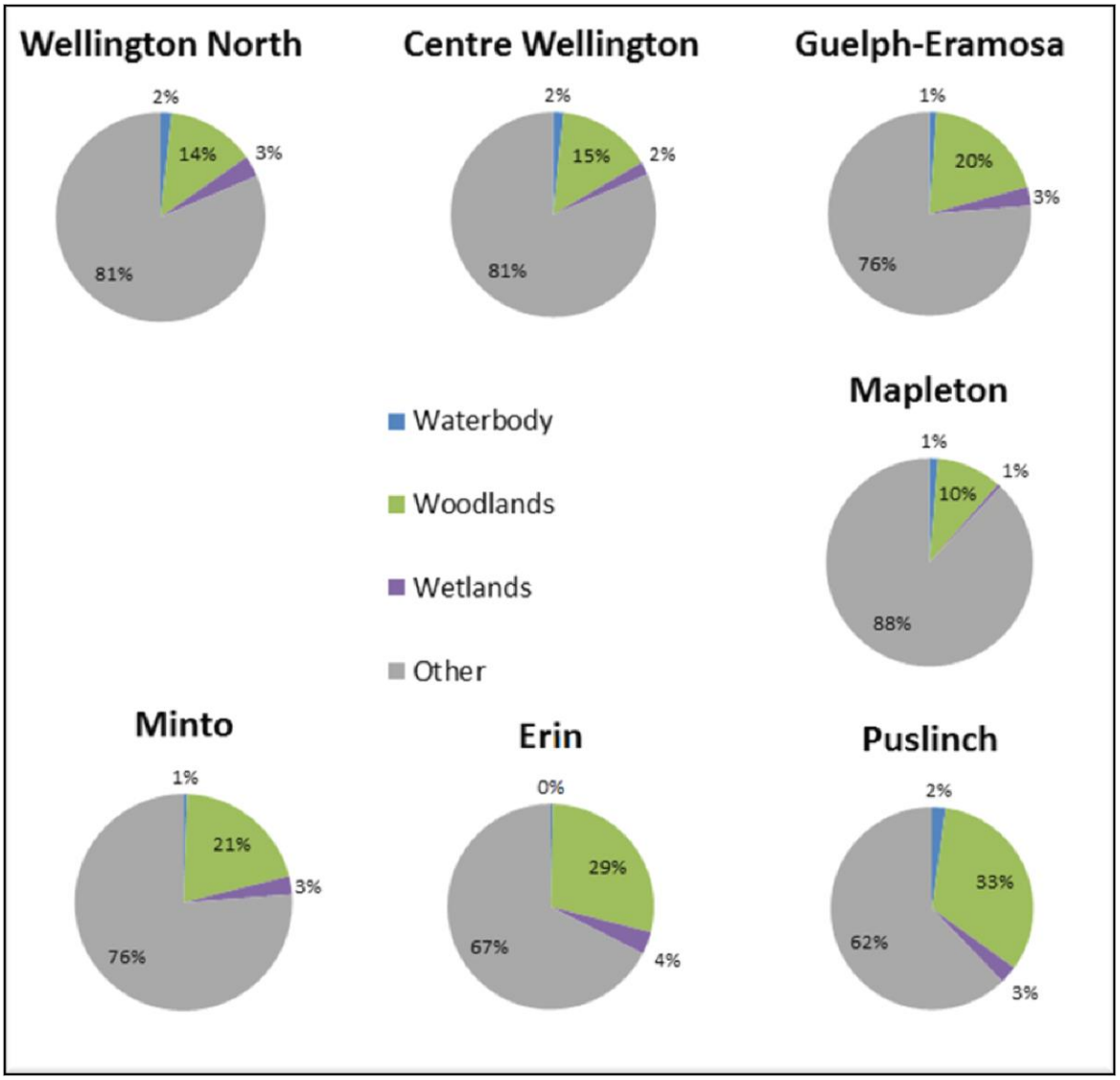


Figure 9. Woodland Cover and Interior Forest in Wellington County

Figure 10. Percent of Land Cover in Wellington County's Member Municipalities



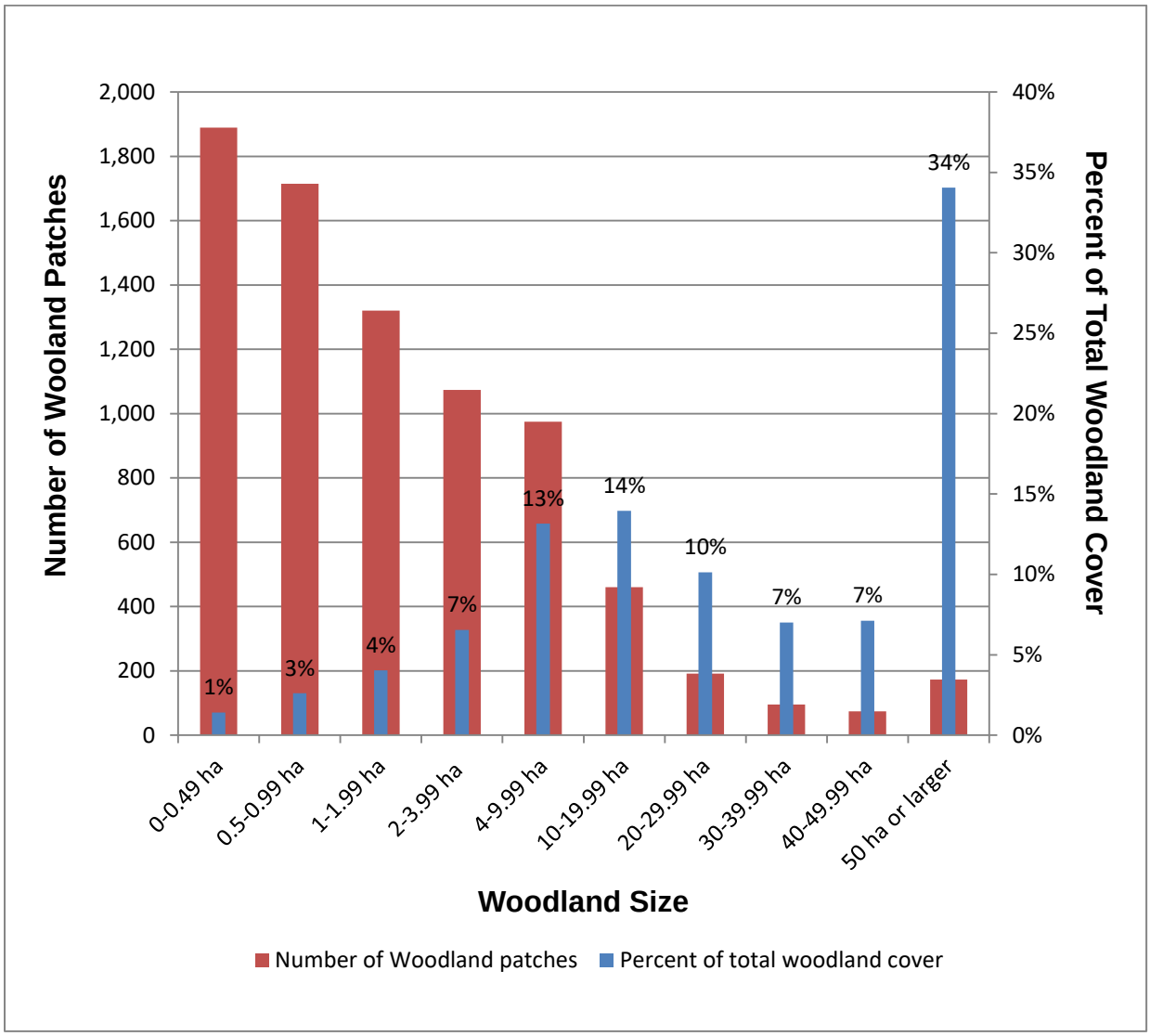
Approximately 6,460 ha, or 14% of the county's forested area, is considered interior forest (table 4).

Table 4. Total Woodland Cover and Interior Woodland Cover in Wellington County

Total Woodland Cover	45,556 ha (17.4% of Wellington County)
Interior Forest Cover (100 meters from edge)	6,460 ha (14% of total woodland cover and 2.4% of Wellington County)

Woodlands in the county are generally fragmented (figure 9) and woodland patch sizes vary considerably (figure 11). Forty-one percent of woodland patches in the county are over 40 ha in size, 31% between 10 and 40 ha in size, and 28% are less than 10 ha (figure 11).

Figure 11. Number and Percent Cover of Woodland Patches by Size in Wellington County



Woodlands tend to be larger and appear to be more connected in portions of Guelph/Eramosa, Puslinch, and Minto Townships whereas woodlands are smaller and more isolated within portions of Wellington North and Mapleton Townships. Some of the forested areas are located on areas characterized by a high groundwater table and moist soils, and are also mapped as wetlands. Many woodlands in the county are contiguous with or overlap with large wetland complexes such as Luther Marsh. Many

woodlands are confined to river and creek valleys and provide buffer and linkage functions. Some of the larger valleys, most notably the Speed River, Eramosa River, and Mill Creek valleys, are buffered by wooded swamps.

2.3.3 Areas of Natural and Scientific Interest

Areas of Natural and Scientific Interest (ANSIs) are defined by the province as “an area of land and water containing natural landscapes or features that have been identified as having life science or earth science values related to protection, scientific study or education” (MNR, 1983; Hilts et al., 1986; OMMAH, 2014). Life Science ANSIs target lands and water with representative terrestrial and aquatic natural heritage features whereas Earth Science ANSIs target lands and waters with representative geologic features. The best representative sites outside of national parks, provincial parks, or conservation reserves are considered to be provincially significant ANSIs. Other sites that are considered to be the next best examples of a representative ecological or geological unit, landform, or community are identified as regionally significant or locally significant (OMNR, 2010). These natural areas tend to comprise or are contiguous with locally significant woodlands and PSWs.

Fifty-three (53) ANSIs designated by the OMNRF are wholly or partially represented within Wellington County, including 31 Earth Science ANSIs and 22 Life Science ANSIs (figure 12). Twenty ANSIs are considered significant at a provincial scale whereas the remaining ANSIs are considered regionally significant.

In terms of area represented in the county, the top 5 Life Science ANSIs include Luther Marsh and the Eramosa River Valley, which are considered provincially significant and Galt Creek and Forests, Brisbane Woods, and Oil Well Bog-Little Tract, which are considered regionally significant.

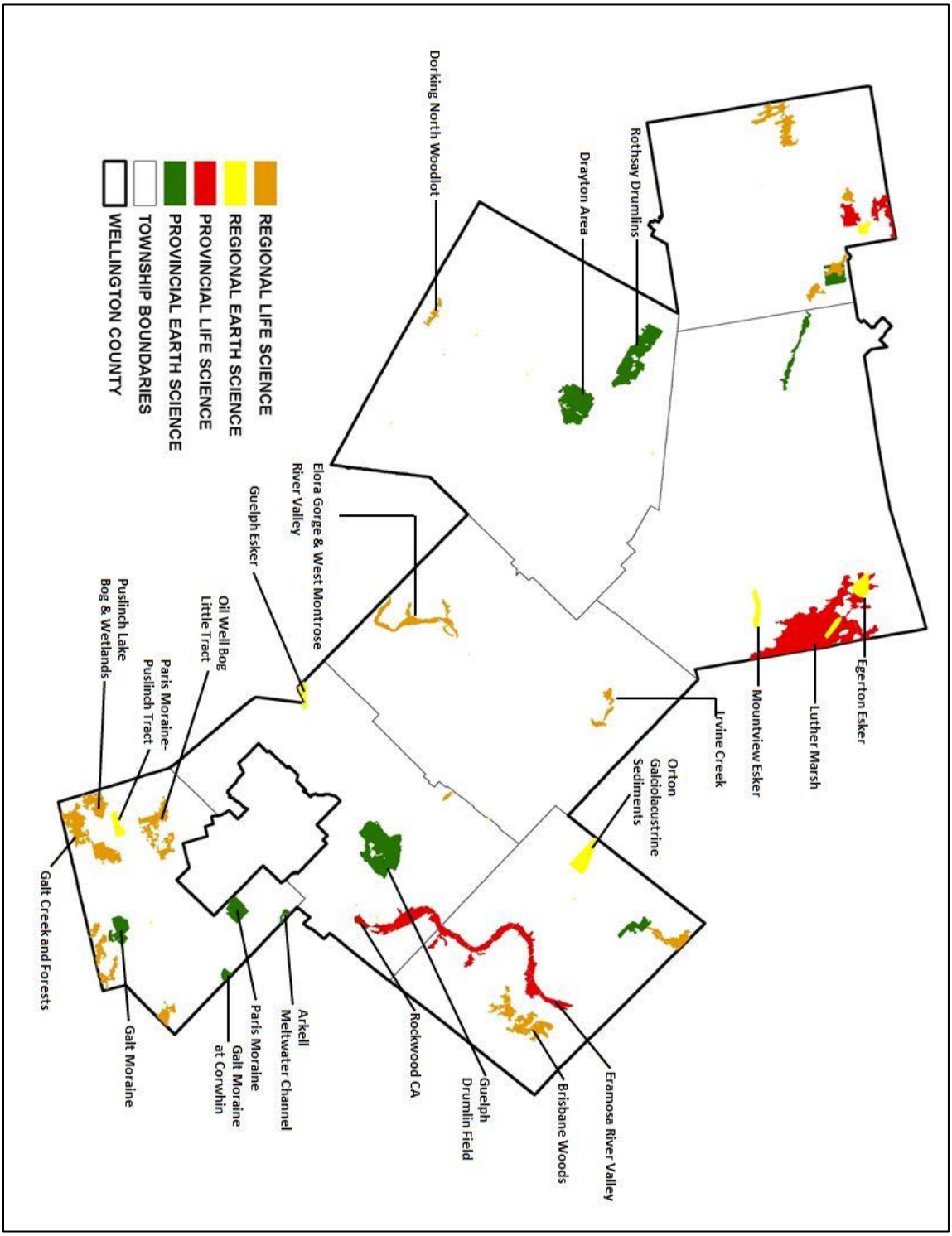


Figure 12. Areas of Natural and Scientific Interest (ANSIs) in Wellington County

2.3.4 Rare Species and Species at Risk

A total of 73 provincially significant species tracked by the Natural Heritage Information Center have been recorded in the county (see Appendix III: Provincially Significant Species Documented Within Wellington County), including 26 plants, 24 birds, 7 reptiles, 6 insects, 4 fishes, 4 mammals, 1 amphibian, and 1 mussel. The list of significant species includes 43 species at risk that have been assessed at the provincial and/or federal levels. Provincially-listed species at risk and their habitat are afforded protection in accordance with the provincial Endangered Species Act, which is administered by the Ontario Ministry of Natural Resources and Forestry. Federally-listed species at risk and their habitat are afforded protection in accordance with the Species at Risk Act, which is administered jointly by Environment and Climate Change Canada and Fisheries and Oceans Canada. Only threatened and endangered species are currently afforded legal protection. Species of special concern and their habitat generally receive protection in accordance with the Provincial Policy Statement (PPS) issued under the Planning Act.

2.3.5 Significant Wildlife Habitat

Significant Wildlife Habitat (SWH) has been identified by the province as a natural heritage area for the purposes of implementing Section 2.1 of the PPS (OMMAH, 2014). The Natural Heritage Reference Manual (OMNR, 2010) and the Significant Wildlife Habitat Technical Guide (OMNR, 2000) were prepared by the Ontario Ministry of Natural Resources and Forestry to assist planning authorities and others involved in land use planning in the protection of NHSs in the province. According to the Significant Wildlife Habitat Technical Guide (SWHTG), wildlife is described as “all wild mammals, birds, reptiles, amphibians, fishes, invertebrates, plants, fungi, algae, bacteria and other wild organisms” (Ontario Wildlife Working Group, 1991).

What is Significant Wildlife Habitat?

The Provincial Policy Statement (2014), under the Planning Act, identifies wildlife habitat as:

"areas where plants, animals, and other organisms live, and find adequate amounts of food, water, shelter, and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle, and areas which are important to migratory or non-migratory species."

Wildlife habitat is considered significant where it is:

"ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System. Criteria for determining significance may be recommended by the province but municipal approaches that achieve or exceed the same objective may also be used."

More recently, the OMNRF issued additional technical criteria to facilitate the identification of SWH in the province (OMNRF, 2015). Schedule 6E lists the recommended criteria for identifying SWH within Ecoregion 6E, which includes Wellington County. The 4 general categories of SWH are summarized in table 5 and are outlined and defined in greater detail in the SWHTG and Ecoregion Schedule 6E. The schedules include a description of wildlife habitat, wildlife species, and the criteria that must be met to identify SWH. Candidate SWH is described using the Ecological Land Classification (ELC) for Southern Ontario (Lee et al., 1998).

The identification of core natural heritage features such as significant wetlands, ANSIs, and other locally significant woodlands has facilitated the identification of SWH in the county. In addition, areas that are known to contain provincially significant species would also be considered SWH. A full and detailed assessment of SWH is beyond the scope of this report.

Table 5. Significant Wildlife Habitat Categories and their Definitions. Specific Criteria for Sub-categories are Outlined in the Significant Wildlife Habitat Technical Guide and Ecoregion Schedule 6E (OMNRF, 2000; 2015).

Category	Definition
Seasonal Concentration Areas Waterfowl Stopover and Staging Areas Shorebird Migratory Stopover Areas Raptor Wintering Areas Bat Hibernacula Bat Maternity Colonies Turtle Wintering Areas Reptile Hibernacula Colonial Nesting Bird Habitats Deer Winter Congregation Areas	These areas contain large numbers or concentrations of 1 or more wildlife species annually and usually at certain times of the year, sometimes within relatively small areas. Examples include deer wintering areas, breeding bird colonies, and hibernation sites for reptiles, amphibians, and bats.
Rare Vegetation Communities Cliff and Talus Slopes Alvars Old Growth Forests Savannah Tallgrass Prairie or Specialized Habitat for Wildlife Waterfowl Nesting Areas Bald Eagle and Osprey Nesting, Foraging and Perching Habitat Woodland Raptor Nesting Habitat Turtle Nesting Areas Seeps and Springs Amphibian Breeding Habitat Area-sensitive Bird Breeding Habitat	Rare vegetation communities often contain rare species, particularly plants and small invertebrates, which depend on such habitats for their survival and cannot readily move to or find alternative habitats. Rare vegetation species and communities are identified by the Natural Heritage Information Centre using a ranking procedure developed by The Nature Conservancy. Some wildlife species require large areas of suitable wintering and breeding habitat for their long-term survival. Wildlife populations also tend to decline when habitat becomes fragmented and reduced in size. The more wildlife species a habitat contains, the more significant the habitat becomes to the planning area. The largest and least fragmented habitats within a planning area will support the most significant populations of wildlife.

Category	Definition
Habitat for Species of Conservation Concern (Not including Endangered or Threatened Species) Marsh Breeding Bird Habitat Open Country Bird Breeding Habitat Shrub/Early Successional Bird Breeding Habitat Terrestrial Crayfish	This habitat includes wildlife species that are listed as Special Concern, are ranked as being rare, that are declining, or are featured species. Such habitats do not include habitats of Endangered or Threatened species as identified by the Endangered Species Act 2007.
Animal Movement Corridors Amphibian Movement Corridors Deer Movement Corridors	These areas tend to be elongated areas used by wildlife to move from one habitat to another. They are important to ensure genetic diversity within populations, to allow seasonal migration of animals (e.g. deer moving from summer to winter range), and to allow animals to move throughout their home range from feeding areas to cover areas. Animal movement corridors function at different scales often related to the size and home range of the animal. For example, short, narrow areas of natural habitat may function as a corridor between amphibian breeding areas and their summer range, while wider, longer corridors are needed to allow deer to travel from their winter habitat to their summer habitat. Identifying the most important corridors that provide connectivity across the landscape is challenging because of a lack of specific information on animal movements. There is also some uncertainty about the optimum width and mortality risks of corridors. Furthermore, a corridor may be beneficial for some species but detrimental to others. For example, narrow linear corridors may allow increased access for raccoons, cats, and other predators. Also, narrow corridors dominated by edge habitat may encourage invasion by weedy generalist plants and opportunistic species of birds and mammals. Corridors often consist of naturally vegetated areas that run through more open or developed landscapes. However, sparsely vegetated areas can also function as corridors. For example, many species move freely through agricultural land to reach natural areas.

3.0 The Framework for Developing a Wellington County NHS

In October of 2017, the Grand River Conservation Authority (GRCA) was retained by Wellington County to map a Natural Heritage System (NHS) for the county. The project was to include a broad natural heritage characterization, and recommendations for a scientifically defensible methodology for identifying a NHS within Wellington County.

3.1 Project Governance

The GRCA managed and executed all aspects of NHS development and Wellington County managed and executed communications and consultations with the public.

A Project Steering Committee (SC) was formed to oversee the project. The SC was comprised of county staff and representatives from the six conservation authorities whose jurisdiction overlap county borders. Their role in this project was to provide expertise to help inform decision making and to facilitate access to relevant data and resources from their respective jurisdictions.

3.2 Project Scope

3.2.1 Guiding Principles

The following principles, as outlined in the Terms of Reference for this project, have guided the development of the Wellington County NHS:

- ✓ The process for identifying regionally significant natural features and areas in Wellington County should not be constrained by provincial guidance and policies (i.e. the PPS 2014 and Growth Plan NHS).
- ✓ A science-based approach (including either empirical evidence, conservation principles or expert opinion) should be used to guide the criteria measures and methodology, with consideration of economic, cultural and social values.
- ✓ The NHS is to focus on identifying local scale core areas and linkages within a landscape context.
- ✓ Data inputs will come from existing datasets (whether baseline or derived), will be of a reasonably recent vintage, and will be as consistent and complete as possible across the study area.
- ✓ The final methodology, criteria measures, analytical limitations, results and implications will be well-documented and clearly explained in the final report.
- ✓ Connection of the project NHS mapping to existing NHS mapping (of like-scale) in adjacent areas is to be made as much as reasonably possible.
- ✓ Defendable and repeatable methodology is to be used (i.e., the same map would result from someone else using the same criteria and methods).

3.2.2 Project Goals

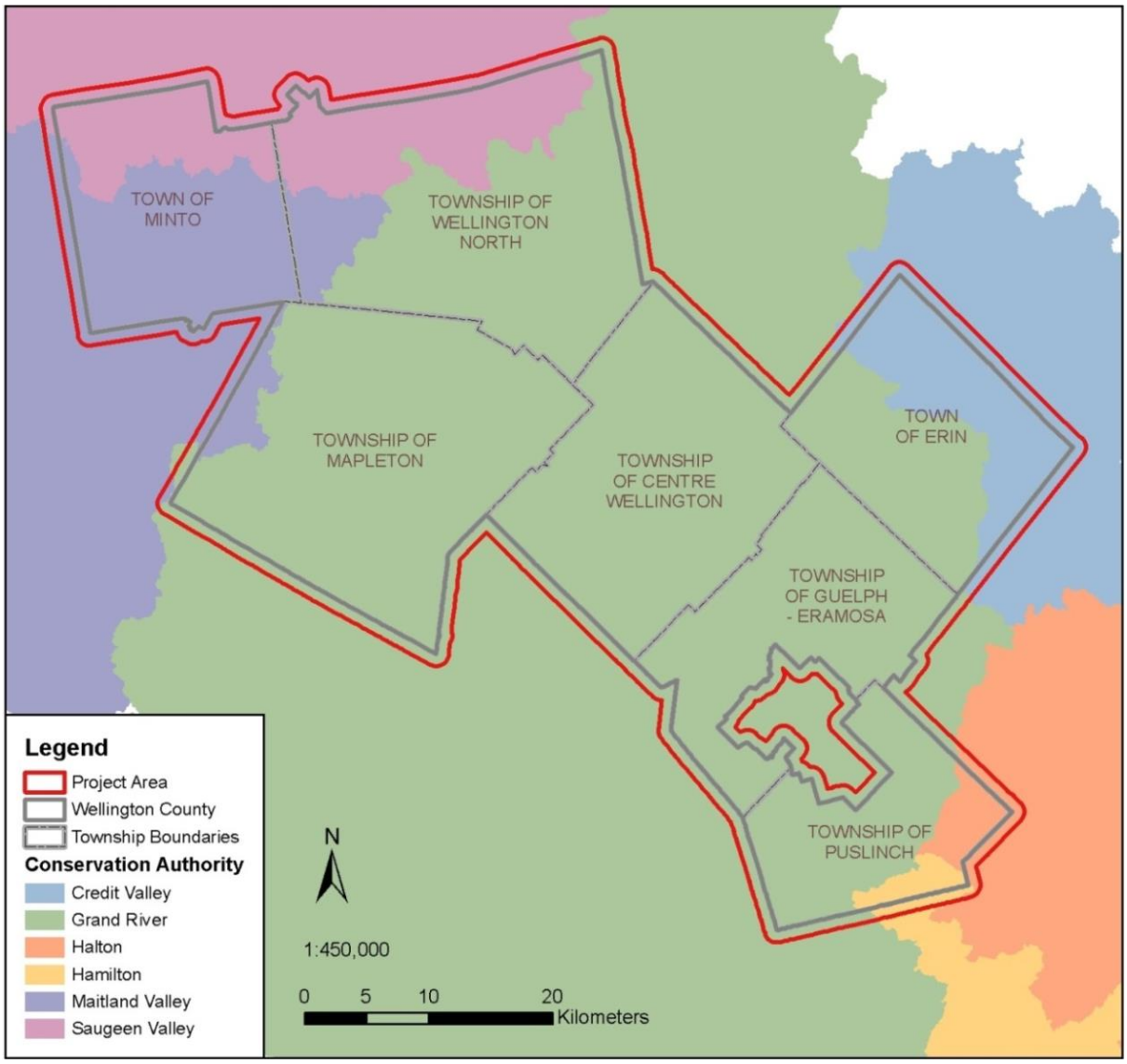
The project goals are to develop, through the engagement and agreement of stakeholders, a Wellington County NHS that will:

- ✓ Maintain and/or improve local and regional biodiversity
- ✓ Recognize local-scale linkage between and among natural heritage features and areas
- ✓ Provide a strategic direction for land and water restoration, stewardship activities, conservation land acquisition and securement, priorities for inventory programs, and amendments to the County Official Plan
- ✓ Inform resource-management decision-making
- ✓ Support sustainable economic opportunities
- ✓ Support sustainable recreational use

3.2.3 Study Area

The project area is defined as the County of Wellington, plus a 1 kilometer buffer to acknowledge connectivity beyond the municipal boundary (figure 13). This represents an area of 2,976 km^2 (297,568 ha).

Figure 13. Wellington County Natural Heritage System Project Area



3.3 Project Phases

Development of the Wellington County NHS occurred over six general phases:

Phase 1 – A Terms of Reference, detailing the project plan and scope, was formed between Wellington County and the GRCA. A Steering Committee (SC) was established and an initial meeting was held on November 20, 2017 with SC members to kick off the project.

Phase 2 – A review was conducted of scientific and grey literature related to NHSs, their supporting methodologies and models, as well as relevant landscape ecology

concepts and research. Existing spatial data resources were identified, obtained and reviewed.

Phase 3 – A full-day technical workshop was held on December 12, 2017 to review potential options for NHS methodologies and criteria. Workshop attendees included members of the SC as well as expertise in planning, Geographic Information Systems (GIS) analysis and landscape ecology from neighboring municipal offices and conservation authorities. Over several group discussions, methodology and criteria options were evaluated with consideration of the project's timeline and of Wellington's unique landscape. All methodology and criteria options were weighed in terms of their data requirements, whether they were appropriate for the degree of landscape fragmentation in the county, and how well they aligned with the goals and guiding principles of this project.

Phase 4 – The technical workshop informed the development of a methodology and criteria for identifying a Wellington County NHS. The spatial data layers acquired in phase 2 were prepared and processed in a GIS to create mapping that represents the Wellington County NHS. Mapping outputs were validated throughout the mapping process with quality assurance and quality control measures.

Phase 5 – Draft mapping was presented to the SC and workshop participants on March 20, 2018 for review and feedback. An open house was held on April 3, 2018 to present draft mapping to the general public (see section 6.0). Beginning April 3rd, comments from the public were welcomed and those received by May 7, 2018 were considered for incorporation in final mapping revisions.

Phase 6 – a final report (this document) was produced to summarize the development of the Wellington County NHS. It includes a description of the project, a general natural heritage characterization of the project area, a general description of the methodology and criteria used to identify the Wellington County NHS, an overview of the natural features captured by the Wellington County NHS mapping, a comparison of the Wellington County NHS to the Growth Plan NHS, recommendations for future work and several reference appendices. A technical report entitled "Mapping of a Natural Heritage System in the County of Wellington. Technical Report" was also produced to accompany the final report. The technical report outlines the step-by-step workflow followed to produce the NHS mapping. The information provided in the technical report is intended to provide sufficient enough detail to replicate or update the NHS mapping.

4.0 The Recommended Natural Heritage System for Wellington County

4.1 General Description of the Wellington County NHS

The Natural Heritage System (NHS) recommended for Wellington County was designed within the context of the County's landscape; a mosaic of diverse land uses and natural cover types, with rural land uses being dominant. It captures natural features, areas and linkages with an approach that considers both broad-scale and local-scale ecological functions. The aquatic components of the NHS form the main linkages in the NHS, and enhancement linkages have been identified in areas where voluntary stewardship activities can improve local linkages. The Wellington County NHS contains primarily natural land cover but also contains some non-natural cover in areas that provide ecological and/or hydrological function (e.g., valleylands).

4.2 Overview of the Wellington County NHS Components

The Wellington County NHS is comprised of two main component types (table 6):

1) ***Natural Heritage Components*** consist of natural features and areas such as woodlands, wetlands, valleylands, aquatic habitat, significant wildlife habitat, habitat of endangered and threatened species, and Life Science ANSIs. These are natural features and areas with important ecological and hydrological functions that are already on the landscape. They are the building blocks of the Wellington County NHS.

2) ***Stewardship Components*** consist of Enhancement Linkages and Enhancement Woodlands. These components have the potential to connect and enhance the overall ecological and hydrological functions of the Wellington County NHS.

Table 6. The Components of the Wellington County NHS with Definitions

Component Type	Definition
Natural Heritage Components	
Wetlands	Wetlands are lands that are seasonally or permanently covered by shallow water, as well as lands where the water table is close to or at the ground surface. Wetlands have hydric soils that support predominantly hydrophytic plants or water tolerant plants.
Woodlands	Woodlands are areas where trees provide 60 percent canopy coverage. Woodlands include forests, woodlots, plantations, and swamps.
Valleylands	Valleylands are depressional landforms whose formation was or is currently influenced by the flow regime of watercourses. Valleylands are dynamic features, changing both gradually through slow erosion and deposition processes, and also abruptly through rapid erosion processes such as floods.
Aquatic Habitat	Aquatic habitat refers to all watercourses and waterbodies, including those which are natural as well as those which have been altered or constructed.
Significant Wildlife Habitat	The PPS (2014) identifies wildlife habitat as: "areas where plants, animals, and other organisms live, and find adequate amounts of food, water, shelter, and space needed to sustain their populations. Specific wildlife habitats of concern may include areas where species concentrate at a vulnerable point in their annual or life cycle, and areas which are important to migratory or non-migratory species."

Component Type	Definition
Natural Heritage Components	
	Wildlife habitat is considered significant where it is: "ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or NHS. Criteria for determining significance may be recommended by the province but municipal approaches that achieve or exceed the same objective may also be used."
Habitat of Endangered and Threatened Species	The PPS (2014) identifies habitat of endangered and threatened species as: "a) with respect to…endangered or threatened species for which a regulation is made under …the Endangered Species Act, 2007, the area prescribed by that regulation as the habitat of the species; or b) with respect to any other endangered or threatened species, an area on which the species depends, directly or indirectly, to carry on its life processes, including life processes such as reproduction, rearing, hibernation, migration or feeding, as approved by the Ontario Ministry of Natural Resources; and…that are used by members of the species as dens, nests, hibernacula or other residences."
Life Science ANSIs	Life Science ANSIs are areas of significant representative segments of Ontario's biodiversity and natural landscapes including specific types of forests, valleys, prairies and wetlands, their native plants and animals and their supportive environments. They contain

Component Type	Definition
Natural Heritage Components	
	relatively undisturbed vegetation and landforms and their associated species and communities.
Stewardship Components	**Definition**
Enhancement Linkages	Enhancement Linkages are potential connections between Natural Heritage Components. Enhancement Linkages should be thought of as approximate and flexible.
Enhancement Woodlands	Enhancement Woodlands are smaller woodlands in the Townships of Wellington County that have less than 29% overall woodland cover (Minto, Wellington North, Centre Wellington, Mapleton, and Guelph/Eramosa). Enhancement Woodlands are woodlands that, if enhanced, would improve the broad-scale ecological and hydrological functions of the NHS.

4.3 General Description of Mapping Methodology

The Wellington County NHS was mapped in two stages:

Stage 1: Mapping Natural Heritage Components

The best available existing spatial data of natural features and areas from Conservation Authorities and the province were used to map the Natural Heritage Components of the Wellington County NHS. Features mapped by these sources were included within the NHS if they fulfilled the ecological criteria listed in table 8. Ecological criteria classes and thresholds were used to select those natural heritage features and areas that are important for preserving ecological functions in the system (see section 4.4). These were based on a review of the current scientific and grey literature, of existing guidance documents, of effective and practical application of criteria in other Southern Ontario jurisdictions, and on the professional judgement of technical experts at the workshop. Natural Heritage Components were mapped using a Geographic Information System (GIS) called ArcGIS (See the companion to this final report “Mapping of a Natural

Heritage System in the County of Wellington. Technical Report" for a detailed workflow of technical steps in ArcGIS).

Stage 2: Mapping Stewardship Components

Stewardship Components were mapped using the Natural Heritage Components as building blocks.

Enhancement linkages were mapped as dotted lines between unconnected Natural Heritage Components to represent potential linkages (figure 14). Enhancement Linkages were identified with connectivity analysis using a toolbox for ArcGIS called Linkage Mapper (Version 1.1. Seattle, WA: The Nature Conservancy). This objective and automated process uses a combination of least-cost path analysis (LCP) and Euclidian distance calculations to identify the most ideal path, or "path of least resistance", between unconnected patches of Natural Heritage Components (figure 14). In the context of NHS design, the "cost" in a least-cost path analysis refers to factors that reduce the viability of linkages, such as land use types that limit the distribution and migration of flora and fauna. In the example shown in figure 14, feature A is isolated, so it will be connected via the "path of least resistance" to either feature B or feature C. The "path of least resistance" identified by Linkage Mapper occurs between feature A and feature B, rather than feature C, because this connection follows a natural watercourse and does not require a road crossing. We used data related to land cover characteristics to determine the relative "cost" of various land cover types. These relative "cost" values, a data input in Linkage Mapper, are shown in table 7.

Enhancement Woodlands were selected based on ecological criteria classes and thresholds. Enhancement Woodlands are smaller woodlands in parts of the county that, if grown in size through voluntary restoration actions, would increase the overall woodland cover in townships where there is currently less than 29% woodland cover.

Figure 14. An Example of how Enhancement Linkages were Mapped along the "Path of Least Resistance" using the Software Linkage Mapper

Feature A is isolated from the other natural features on the landscape. The "path of least resistance" occurs between feature A and feature B rather than feature C because this linkage follows a watercourse and does not require a road crossing.

Table 7. The Relative "Cost" Values Assigned to Land Cover Types to Map Enhancement Linkages

Land cover	Relative "cost" Value
Streams with adjacent natural cover	5
Natural cover not adjacent to a stream	10
Streams without adjacent natural cover	50
Pervious built-up areas, tilled farmland, undifferentiated lands, and slower-moving medium-impact roads	100
Impervious built-up areas, extraction sites, faster-moving medium-impact roads	1000
High-impact roads (All Freeways and any roads with speed limits ≥90km/hr and ≥4 lanes)	No data (no connections can made in this land cover type)

4.4 Criteria and Thresholds used to Identify Wellington County NHS Components

Broad concepts in the field of landscape ecology were established in the 1990's (Forman, 1995; Riley & Mohr, 1994) and continue to be refined by emerging hypotheses and research. Generally, these concepts recognize the heterogeneity of landscapes, and identify the various factors related to spatial-scale and spatial-pattern that influence the structure and function of ecosystems (Noss & Cooperrider, 1994; Riley & Mohr, 1994). They form the basis for Wellington County's selection criteria: size, representation, rarity, habitat quality, matrix influence, and hydrological importance (table 8).

These six criteria and their thresholds (table 8) are grounded in empirical evidence, guidelines produced by government or non-government science agencies, and the expertise of Conservation Authority and Municipal staff provided at a technical workshop held on November 20, 2017. In the following subsections we provide a brief elaboration of the scientific rationale behind each of these criteria.

Table 8. The Components of the Wellington County NHS with Criteria Thresholds

Natural Heritage Components		
Component	**Criteria class**	**Criteria Threshold**
Woodlands	Size	✓ Woodlands in Urban Centers: ≥ 1 ha and ≥30 m wide
		✓ Woodlands in Rural Areas: ≥4ha and ≥30m wide
	Matrix influence	✓ Woodlands of any size that is contained by or is within 30m of a natural heritage component meeting a criteria threshold
	Rarity	✓ Woodlands containing a vegetation community and/or species with a provincial ranking of S1, S2 or S3 (as ranked by the NHIC) or a global ranking of G1, G2 or G3 (as ranked by the NatureServe Network) (text criterion)
		✓ Woodlands containing 10 or more trees/ha greater than 100 years old (text criterion)
		✓ Woodlands containing 10 or more trees/ha that are ≥50 cm in diameter (text criterion)
Wetlands	Hydrological importance	✓ Evaluated non-Provincially Significant Wetlands and all Provincially Significant Wetlands
		✓ Unevaluated wetlands mapped by the MNRF or Conservation Authorities
Valleylands	Hydrological importance	✓ Valleylands associated with watercourses, waterbodies and wetlands
	Representation	✓ Valleylands representing distinctive landforms such as oxbows, bottomlands, terraces, deltas, etc. (text criterion)
Aquatic Habitat	Habitat Quality	✓ All watercourses
		✓ Waterbodies connected to a watercourse
		✓ All headwaters (text criterion)
	Matrix influence	✓ Waterbodies within 30 m of a natural heritage component meeting a criteria threshold

Natural Heritage Components		
Component	**Criteria class**	**Criteria Threshold**
Significant Wildlife Habitat (SWH)	Habitat Quality	✓ All identified SWH (text criterion)
Habitat of Endangered and Threated Species	Rarity	✓ All identified habitat of Endangered and Threatened Species (text criterion)
Areas of Natural and Scientific Interest (ANSI)	Representation	✓ Life Science ANSIs
Stewardship Components		
Components	**Criteria class**	**Criteria Threshold**
Enhancement Woodlands	Size	In lower-tier municipalities with <30% woodland cover: ✓ Woodlands in Rural Areas: 1-4 ha in size and ≥30m wide
Enhancement Linkages	Size	✓ Flexible connections between Natural Heritage Components. The exact location and the appropriate width of the linkage should be determined at the site-level and should accommodate the dispersal needs of the species at the site.

4.4.1 Size

Generally, larger habitat patches have more intact ecological functions than smaller habitat patches for a variety of reasons. Larger habitat patches tend to have greater structural diversity and are more likely to supports the habitat requirements of a greater number of species, particularly “area-sensitive” species which breed only in larger habitat patches (Environment Canada, 2013; Herkert et al., 2003).

With respect to woodlands specifically, there is strong evidence indicating that species diversity, abundance and breeding success in woodland patches can be at least partially attributed to patch size (Lee et al., 2002; Villard et al., 1999; Austen et al., 2001; Nol et al., 2005; Burke & Nol, 2000; Bayne & Hobson, 2002). Larger woodland patches are more likely to contain different successional stages, which translates to more structural diversity, providing different habitat types for a greater variety of

species. Some forest species can only be found in large patches because they are sensitive to “edge effects”, meaning they can only survive in the interior of a forest patch, far away from the patch’s edge (Forman, 1995; Burke & Nol, 2000). Larger patches also support more stable species populations as they have more space and more resources which enable larger population capacities (Connor et al., 2000; Andrén, 1994; Freemark & Merriam, 1986; MacArthur & Wilson, 1967). Larger patches are also more resilient to stressors tied to climate change. For example, large forests can better sustain the effects of blowdown and erosion caused by extreme weather, and their ecological equilibriums are more stable making them less susceptible to disease, insect infestations and exotic species invasions (Pearce, 1992).

Patch size has long been emphasized as a vitally influential, but current research has shown that landscape-level characteristics also have an important effect on the ecosystem functions at the scale of woodland patches (Driscoll et al., 2013; Ewers & Didham, 2006). In particular, research and guidance documents have stressed that patch size be considered in conjunction with the overall amount of woodland cover in an area (Fahrig, 2013; Federation of Ontario Naturalists, 2004; Environment Canada, 2013). As woodland patches become more fragmented and overall woodland cover decreases, preserving smaller woodlands becomes increasingly important (Andrén, 1994). Although the most cited value of small woodland patches is their social value to urban communities, they also provide ecosystem functions such as airborne pollution uptake, stepping stone habitat in lieu of connected movement corridors for migratory species (Forman, 1995; Leidner & Haddad, 2011; Lloyd & Marsden, 2011), and redirecting pressure for recreational opportunities away from the now fewer and more sensitive remaining large woodland patches.

The province and Ontario Nature have provided guidelines putting minimum woodland patch sizes in the context of overall woodland cover. They both suggest size thresholds for a variety of woodland cover scenarios (table 9). In a landscape with 30% woodland cover Ontario Nature suggests a more conservative size threshold of 15 ha, and the province suggests a size threshold of 20 ha. In a landscape with 10% woodland cover Ontario Nature suggests a size threshold of 2 ha, and the province suggests a size threshold of 4 ha.

Table 9. Minimum Woodland Patch Size Thresholds Recommended by the Province and Ontario Nature

Percent Woodland Cover	Minimum woodland patch size (OMNR 2010)	Percent Woodland Cover	Minimum woodland patch size (ON 2004)
<5 %	2 ha	<5 %	All woodlands
5-15%	4 ha	5-10%	2 ha
15-30%	20 ha	11-15%	4 ha
30-60%	50 ha	16-20%	10 ha
-	-	21-30%	15 ha
-	-	31-50%	25 ha

As discussed in subsection 2.3.2, woodland cover is unevenly distributed across Wellington County, ranging from approximately 10% in the Township of Mapleton to 33% in the Township of Puslinch (figure 10). Given this, a conservative approach for Wellington County would be to apply the 2 ha or 4 ha threshold to the entire county. At this threshold, the vast majority of interior woodland habitat in Wellington would be included by default. The county's overall woodland cover and interior woodland could also be increased by targeting small woodland patches for voluntary stewardship action in the Townships of Wellington North, Centre Wellington, Mapleton, Minto, and Guelph/Eramosa.

4.4.2 Matrix influence

Matrix influence refers to the effect of surrounding lands (known as the 'matrix') on the ecosystem services and ecological function of a patch. Some human land uses adjacent to a patch can have direct negative impacts (e.g., mortality) or indirect negative impacts (e.g., increased predation) on the populations of species (Ries et al., 2004; Ewers & Didham, 2006). Conversely, the ecological function of a habitat patch can be increased if it is adjacent to another natural habitat patch (e.g., riparian vegetation along a watercourse improves fish habitat), or, to a lesser degree, fallow fields and low-intensity agricultural lands (Perfecto & Vandermeer, 2002; Cook et al., 2002).

The fragmentation of woodland cover in a landscape results in patches of woodlands that are disconnected and sometimes isolated from other woodland patches by large gaps. A matrix of primarily urban land uses between woodland patches can impede the

distribution and migration of flora and fauna. Disruptions in the dispersal of species can threaten the health of populations (Ewers & Didham, 2006; Noss & Harris, 1986). Where patches of other natural cover exist in the matrix, functional connections are likely to persist if those patches are in relative close proximity; however there is limited science indicating specific distances at which certain functions are maintained. A study in Southern Ontario found that the movements of forest birds in fragmented landscapes are generally constrained by forest margins, but that most birds were more likely to cross a gap of up to 25 m if an existing detour under forest cover was considerably longer (Belisle & Desrochers, 2002). In a review of the functions provided by woodlands, Gartner-Lee (2002) reports that woodlands influence thermoregulation, sediment filtration, nutrient flow and habitat quality of riparian and aquatic habitat from distances of 4 – 300 m away. Given the limited guidance available, we recommend the inclusion of woodlands (of any size) in the landscape matrix within 30 m of any other NHS component.

Similarly, the matrix surrounding off-line waterbodies has a strong influence over their functional connectivity to the NHS. Off-line waterbodies (those which are not well connected to a watercourse) are generally formed naturally though geomorphic processes or artificially for aggregate extraction, stormwater management, irrigation or aesthetic purposes. Their lack of hydrological connectivity increases the potential to accumulate sediment, contaminants and nutrients to toxic levels (Tixier et al., 2011; Nurnberg et al., 2003). However, off-line ponds in urban areas can and do provide habitat for terrestrial and aquatic wildlife, (Helfield & Diamond, 1997; Scher & Thiery, 2005; Adams et al., 1985) presumably more so when in close proximity to other natural habitat patches.

4.4.3 Rarity

Rarity refers to uncommon characteristics. As with all concepts in landscape ecology, rarity must be considered in the context of spatial and temporal scale. For example, a species occurring over a broad geographic range is rare if its overall population densities are low relative to historical densities. Conversely, a locally common species may still be considered rare if its global range is very small, or if an individual is observed outside of its global range. Rarity applies not only to species, but also to vegetation communities and ecosystems, and all can be considered rare at one or multiple spatial scales.

Globally rare species and vegetation communities are identified and tracked by the NatureServe Network using a standardized conservation status ranking system (Master et al., 2012). In this system, globally rare species are ranked as G1 (critically imperilled species or communities), G2 (imperilled species or communities) or G3 (vulnerable species or communities; Rainer et al. 2017). NatureServe has also established methodology for assessments at the national and subnational level. In Ontario, the Natural Heritage Information Centre (NHIC) identifies and tracks species using the

subnational (Srank) system. Rare species are ranked as S1 (extremely rare species or communities – usually less than 5 occurrences), S2 (very rare species or communities – usually between 5-20 occurrences), or S3 (rare to uncommon species or communities – usually between 20-100 occurrences). It is necessary to protect the habitat of rare species in order to protect the species themselves from further rarity. NatureServe rankings, and the assessments that support them, are one of many resources used by the federal and provincial government in their designation of species at risk under the federal Species at Risk Act or the provincial Endangered Species Act. However, not all rare species end up listed, and only the habitats of species listed as endangered or threatened are protected by these pieces of legislation.

Although there is a reasonable amount of woodland cover in parts of southern Ontario, old-growth forests are rare. Mature and old-growth forests are sometimes considered "legacy features" because they take a significant amount of time to establish, and will only do so with minimal human and natural disturbance. Evidence suggests that forest composition (i.e. measures such as tree density, structural diversity, tree species diversity and tree age diversity) has a positive influence on the overall diversity and abundance of both flora and fauna (Austen & Bradstreet, 1996; Jacquemyn et al., 2003; Weber et al., 2008).

4.4.4 Habitat Quality

Habitat quality refers to the degree to which the habitat requirements (i.e. resources, mates, space etc.) of a species are met. High quality habitats are critical to the long-term sustainability of local and/or regional species populations (OMNR, 2000), and thus also critical for maintaining Wellington's biodiversity. Habitat quality is a species-specific concept as all species have different ideal habitat conditions (Hall et al., 1997), yet, the habitats of different species can and do overlap within the same natural feature.

Habitat quality is generally evaluated based on existing knowledge of the ideal physical, chemical and biologic conditions for each life history stage of a species' life cycle. The Significant Wildlife Habitat Technical Guide (OMNR, 2000), and its accompanying Criteria Schedule for Ecoregion 6E (OMNRF, 2015) is the most comprehensive system in Wellington County for identifying high quality habitats of birds, reptiles, amphibians, mammals, vascular plants, and butterflies. Although some significant wildlife habitats (SWH) have been identified by Conservation Authorities in Wellington County, exhaustive watershed-wide searches have not been performed. Nevertheless, natural features containing SWH, whether or not their existence is known, should be considered high quality habitat.

Identifying the locations of high quality fish habitat is a more complex task. The GRCA and Credit Valley Conservation (CVC) have both estimated the fish communities present in their respective watersheds in fisheries management plans (OMNR & GRCA, 2005; OMNR & CVC, 2002). Fish community estimates were produced using a

combination of predictive modeling of potential fish habitat based on geomorphology, and site-level fish and habitat analysis. Although the habitat needs and life cycles of the fish in these communities are known, the specific locations of high quality fish habitat is subject to rapid change due to highly dynamic hydrologic processes (Junk et al., 1989). Therefore, river systems and their on-line waterbodies should be thought of as mosaics of ever-changing habitat patches (Allan, 2004; Fausch et al., 2002; Ward et al., 2002). Evidence suggests that variability and variety in aquatic habitats supports greater biodiversity (Townsend, 1989; Hildrew & Giller, 1994; Robinson et al., 2002).

4.4.5 Representation

Representation refers to the full range of variation in species, communities and ecosystems within a landscape, whether common or rare (Smith & Theberge, 1986). Ecologists have a very limited understanding of the relative significance of species, communities and ecosystems. Therefore, the most effective way to preserve biodiversity is to ensure that the full range of ecological variation is represented in natural heritage systems (Margules & Pressey, 2000).

Representation is a concept that is relevant and significant at all spatial scales (Kukkala & Moilanen, 2013). The full range of species, communities and ecosystems in Wellington County is narrower than the full range in the province, and the provincial range is narrower the National and Global range of ecological variation, but all are significant at their respective scales.

Many of Ontario's designated parks and protected natural areas are identified on the basis of representation (Gray et al., 2009). Areas of Natural and Scientific Interest (ANSIs) are publicly or privately owned areas that are recognized for their representative earth science or life science diversity. There are over 1,000 ANSIs in Ontario (Gray et al., 2009). The ANSI designation was implemented in the 1980's to complement Provincial Parks system, as resource limitations do not allow for the acquisition of all representative areas into the Parks system. Life Science ANSIs target lands and water with terrestrial and aquatic natural heritage features that are provincially, regionally or locally representative.

Representation is an important concept with respect to Valleylands. The action of flowing water causes frequent disturbance and change to the landforms within Valleylands (Swanson et al., 1988; Tockner & Stanford, 2002). These landform changes over space and time provide a high diversity of riparian habitat types that support biodiversity, as well as ecological functions such as stream flow regulation (Décamps & Naiman, 1990; Tockner & Stanford, 2002).

4.4.6 Hydrological Importance

Hydrological importance refers to a feature's physical, biological and chemical connection to the aquatic system and/or its influence on the hydrological cycle.

Hydrological importance is a measure that pertains to waterbodies, wetlands, watercourses, headwaters, groundwater recharge areas and groundwater discharge areas.

Features with a connection to the aquatic system maintain the hydrological balance of a landscape. They help sustain water quantity by attenuating surface water runoff and controlling groundwater recharge and discharge. These features can be disproportionately more valuable in urbanizing areas where landscape changes interfere with the hydrological balance by replacing pervious land cover types (e.g. agricultural land) with impervious surfaces (Schueler et al., 2009; Bolund & Hunhammer, 1999; Diamond et al., 2002). Features with a connection to the aquatic system also maintain the quality of water. Contaminants, sediment and excess nutrients are degraded or stored, improving water quality downstream (USEPA, 2015; Meyer et al., 2003; Cappiella & Fraley-McNeal, 2007).

All wetlands are an integral part of the hydrologic cycle, including small and/or isolated wetlands such as headwater wetlands (Mitsch & Gosselink, 2007; OMNR, 2010). As of 2002, Wellington County has lost 49.3% of its historical wetland cover (DUC, 2010). Currently, wetlands represent 12% of Wellington's total area. Watersheds with less than 10% wetland cover are susceptible to declines in wetland functions, particularly hydrological functions such as flood abatement and water quality functions such as sediment trapping (Johnston et al., 1990). These key functions, as well as biodiversity, have also been shown to decline in watersheds that have lost approximately 60% of historical wetland area (Zedler, 2003). Based on these studies, Environment Canada (2013) has suggested a 'no net loss' approach, combined with maintenance of at least 40% of historical wetland cover.

Valleylands are the backbone of the aquatic system as they contain the drainage network of a watershed from their headwaters down to their ultimate drainage into lakes. Vegetated riparian zones in valleylands reduce the intensity and volume of surface water runoff, which helps to reduce shoreline erosion, while also buffering the aquatic system from contaminants originating in agricultural and urban lands (Strayer et al., 2003; Allan, 2004; Opperman et al., 2010). The floodplains in valleylands moderate inflows and outflows during a flood by providing storage areas where floodwaters can be temporarily retained until water levels decrease in streams (Tockner & Stanford, 2002).

5.0 Outcome of the Wellington County NHS

5.1 Wellington County NHS Summary

As discussed in detail in chapter 4, The Wellington County NHS is comprised of two main component types: 1) Natural heritage components, which consist of natural features and areas, and 2) Stewardship components, which consist of enhancement linkages and enhancement woodlands (table 6). Maps of the Wellington County NHS are shown in Appendix I: Maps. Some of the components of the Wellington County NHS are provided as text only (table 8) because mapped information is either sensitive, incomplete or unavailable.

The Wellington County NHS (excluding enhancement linkages) is 59,343 ha, or 23%, of Wellington's total area. A breakdown by feature is provided in table 10.

Table 10. Quantities of Natural Features in the County that are Captured in the Wellington County NHS as Natural Heritage Components

Feature	Area in County (ha or km)	Area expressed as a percent of Wellington's total area (%)	Amount of area captured in Wellington County NHS (ha or km)	Amount of feature captured in Wellington County NHS expressed as a percent
Wetlands	*30,267 ha	11.5%	30,267 ha	100%
Woodlands	*45,556 ha	17.4%	44,864 ha	98.5%
Valleylands	*29,859 ha	11.4%	29,859 ha	100%
Waterbodies	*5,056 ha	1.9%	4,736 ha	93.7%
Watercourses	*3,512 km	N/A	3,512 km	100%
Life Science ANSIs	*8,482 ha	3.2%	8,482 ha	100%

*These feature types are not mutually exclusive. For example, Life Science ANSIs and valleylands are comprised of a combination of features, and some woodland types (e.g., swamps) are both woodland and wetland. Summing these area values will not provide an accurate total area of features.

A total of 1,171 enhancement woodlands were identified in Mapleton, Wellington North, Minto, Centre Wellington and Guelph/Eramosa (table 11). Not surprising due to their size difference, Wellington North identifies the most enhancement woodlands and Minto the least. A total of 13,931 enhancement linkages were identified across the county, with a total length of 2,646 km. The longest enhancement linkage was identified in Centre Wellington at 5.6 km.

Table 11. Quantities of Natural Features in the County that are Captured in the Wellington County NHS as Stewardship Components

Stewardship Component	Lower Tier Municipality							Entire County
	Mapleton	Wellington North	Minto	Centre Wellington	Guelph-Eramosa	Erin	Puslinch	
Enhancement Woodlands								
Number (#)	242	358	157	241	173	0	0	1,171
Area (ha)	554.29	744.10	304.61	516.09	364.41	0	0	2,483.5
Enhancement Linkages								
Number (#)	5,703	1,333	950	1,616	1,070	1,460	1,799	13,931
Total Length (km)	985.42	334.96	249.60	390.40	247.08	200.96	237.64	2,646
Minimum Length (m)	14.99	14.99	14.99	14.99	14.99	14.99	14.99	14.99
Maximum Length (m)	3,118	2,333	3,975	5,632	3,411	1,538	3,813	5,632

5.2 Comparison of the Wellington County NHS to the Growth Plan NHS

The provincial and county NHSs were developed at different scales and with different by complimentary objectives. The province identified the Growth Plan NHS at a mapping scale of roughly 1:50,000. The Wellington County NHS presented in this report identifies a connected NHS at a mapping scale of roughly 1:10,000.

The province's Growth Plan for the Greater Golden Horseshoe maps 78,519 ha, or 30%, of Wellington's total area as part of the Growth Plan NHS. When overlaid with the Wellington County NHS, there are 40,442 ha captured similarly by both the Growth Plan NHS and the Wellington County NHS (see Appendix I: Maps – *Comparison of the Wellington County NHS to the Growth Plan NHS*).

The Growth Plan NHS includes more area than the Wellington County NHS because the methodology applied resulted in the inclusion of more non-natural land cover (i.e.

lands classified by the Southern Ontario Land Resource Information System (SOLRIS) Version 2.1 and Version 3 as Built-up areas, Extraction, Tilled, Transportation, or Undifferentiated). The Growth Plan NHS is 46% non-natural cover whereas the Wellington County NHS is 8% non-natural cover. Furthermore, The Growth Plan NHS includes less of the county's wetlands (76%), woodlands (68%), valleylands (64%), waterbodies (31%) and watercourses (44%) compared to the Wellington County NHS (table 12).

Table 12. Quantities of Natural Features in the County Captured by the Wellington County NHS and the Growth Plan NHS

Feature	Amount in County (ha or km)	Amount captured in Wellington County NHS (ha or km)	Amount captured in Wellington County NHS expressed as a percent	Amount captured in Growth Plan NHS (ha or km)	Amount captured in Growth Plan NHS expressed as a percent
Wetlands	30,267 ha	30,267 ha	100%	22,852 ha	76%
Woodlands	45,556 ha	44,864 ha	99%	31,160 ha	68%
Valleylands	29,859 ha	29,859 ha	100%	19,169 ha	64%
Waterbodies	5,056 ha	4,736 ha	94%	1,547 ha	31%
Watercourses	3,512 km	3,512 km	100%	1,549 km	44%
Life Science ANSIs	8,482 ha	8,482 ha	100%	8,372 ha	99%

6.0 Public Consultation

6.1 Public Open House and Stakeholder Engagement

As a component of the Wellington County NHS mapping project, the County of Wellington undertook several public consultation activities to communicate project information and gather input including the following:

- A Public Drop-In Open House on April 3, 2018 held in the Aboyne Hall at Wellington Place (figure 15)
- A dedicated page on the county's website with key project information and Frequently Asked Questions & Answers
- An interactive online mapping tool for the public to view the proposed NHS
- Social media posts on Facebook and Twitter

The proposed Wellington County NHS was posted on the county's website for a 35-day review period from April 3 to May 7, 2018.

Copies of stakeholder engagement material can be found in Appendix IV: Stakeholder Engagement.

Open House Attendees

6.2 Presentation to the Wellington Federation of Agriculture

A significant portion of Wellington County's landscape is characterized by agricultural lands therefore it is important that any NHS developed for Wellington County respects the role agriculture offers to the conservation and stewardship of the environment.

On April 3, 2018 the County of Wellington and the Grand River Conservation Authority (GRCA) presented the proposed Wellington County NHS to the Wellington Federation of Agriculture(WFA) Board of Directors. The presentation provided an overview of the project, an overview of the proposed Wellington County NHS methodology and mapping, answered questions about the mapping and sought feedback.

Through an email on April 5, 2018 the County of Wellington provided links to key project information, FAQs and the Public Comment Form that could be forwarded to WFA members.

A copy of the presentation given to the WFA can be found in Appendix V: Presentation to Wellington Federation of Agriculture.

6.3 Stakeholder Input on the Wellington County NHS

Notice of the Public Open House was advertised in the Wellington Advertiser for 2 weeks prior to the event. Additional notice was emailed to stakeholder contacts that were considered to have a potential interest in the Wellington County NHS project. A total of 21 members of the public signed into the Public Open House held April 3, 2018. No written comments were submitted at the Public Open House.

Some members of the WFA Board of Directors raised concerns with the project during the presentation given by County of Wellington and GRCA staff. There were also concerns about the potential impact on farm properties of the province's Growth Plan NHS. Members of the agricultural community were encouraged to review the draft mapping and provide feedback.

Public consultation on the proposed Wellington County NHS was provided for 35 days, from April 3 to May 7, 2018. As a result of the public consultation, the County of Wellington received a total of 3 written comment submissions: 2 submissions were received online and 1 comment submission was received through email.

A copy of all written submissions can be found in Appendix VI: Comments Received on the Wellington County Natural Heritage System

6.4 Outcome of Stakeholder Input to the Wellington County NHS

The intent of the public consultation was to present information on the proposed Wellington County NHS mapping and provide an opportunity for stakeholders to offer feedback. Overall public comments were generally supportive of the county's initiative to

identify a NHS that balances the conservation and stewardship of natural areas with the importance of agriculture on the landscape.

As a result of consultation and feedback received, the County removed Environmentally Sensitive Areas (ESAs) as a mapped component of the Wellington County NHS.

As a result of consultation and feedback received, the inclusion of floodplains was reviewed and determined to be an appropriate surrogate for significant valleylands until such time valleylands in Wellington County can be identified or an alternate surrogate considered.

Comments from the public received after May 7th, 2018 will be kept on file with the County of Wellington for consideration in future initiatives. The county remains open to input on planning matters of interest to the public. At the time of submission of this final report no additional comments have been received.

7.0 Concluding Remarks

7.1 Statement of Limitations

We use ecological principles and science-based criteria (see section 4.4) to include all important ecological features into the Wellington County NHS. This project was not scoped to derive custom spatial data layers through interpretation of aerial photographs or satellite imagery, nor was natural heritage information collected though field reconnaissance activities such as Ecological Land Classification (ELC) and wildlife surveys. We used best available existing mapped natural heritage data from Conservation Authorities and from the province to perform the analysis and map the components of the NHS. We relied on the vetting done by the source of the data and have not modified the delineations of any features. NHS Components that could not be mapped due to insufficient data were included in the Wellington County NHS as text. This mapping is intended for use at a mapping scale of 1:10,000. For use at finer scales, we recommend site-level refinement.

7.2 Recommendations for Future Work

7.2.1 Identification of Enhancement Areas

Federal guidelines suggest that an adequately healthy NHS should contain at least 30 percent forest cover and 10 percent wetland cover at the watershed scale, which will only support approximately half of its potential species-richness. If targeted for voluntary stewardship action, enhancement woodlands can help to increase Wellington County's overall natural cover, thereby increasing the resiliency of the system. However to reach

these federal targets, it is recommended that enhancement areas are also identified. Enhancement areas should be:

a) areas that would connect functionally to the Wellington County NHS if restored
b) areas that are currently pervious (i.e. lands that are currently unpaved and allow water to reach the soil).

7.2.2 Assessment of Connectivity to Neighbouring Municipal Natural Heritage Systems

Within the Wellington County NHS, natural heritage components such as aquatic habitat and valleylands provide the majority of existing hydrological and terrestrial connectivity in the system, and enhancement linkages identify opportunities to improve overall connectivity. Ecological processes such as species dispersion and stream flow fluctuations do not halt at geographic boundaries, so an assessment of hydrological and terrestrial connectivity at Wellington County's jurisdictional boundary should be done to ensure system connectivity with neighbouring municipalities.

8.0 Acronyms

ANSI	Areas of Natural and Scientific Interest
CVC	Credit Valley Conservation
ELC	Ecological Land Classification System
ESA	Environmentally Sensitive Areas
GRCA	Grand River Conservation Authority
GIS	Geographic Information System
NHIC	Natural Heritage Information Centre
NHS	Natural Heritage System
OGS	Ontario Geological Survey
OMMAH	Ontario Ministry of Municipal Affairs and Housing
OMNRF	Ontario Ministry of Natural Resources and Forestry
PPS	Provincial Policy Statement
PSW	Provincially Significant Wetland
SC	Steering Committee
SWH	Significant Wildlife Habitat
SWHTG	Significant Wildlife Habitat Technical Guide
WFA	Wellington Federation of Agriculture

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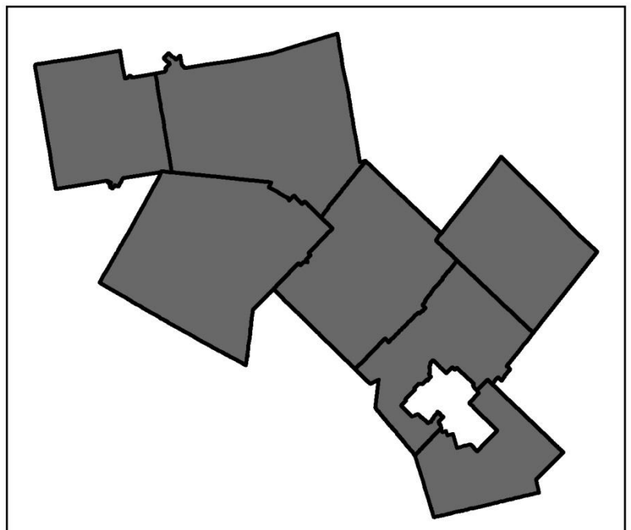
Appendix I: Maps

Wellington County
Natural Heritage System

Legend

- Existing Natural Heritage Components
- Enhancement Woodlands
- Enhancement Linkages

Wellington County



NAD 1983 UTM Zone 17N

Wellington County
Natural Heritage System

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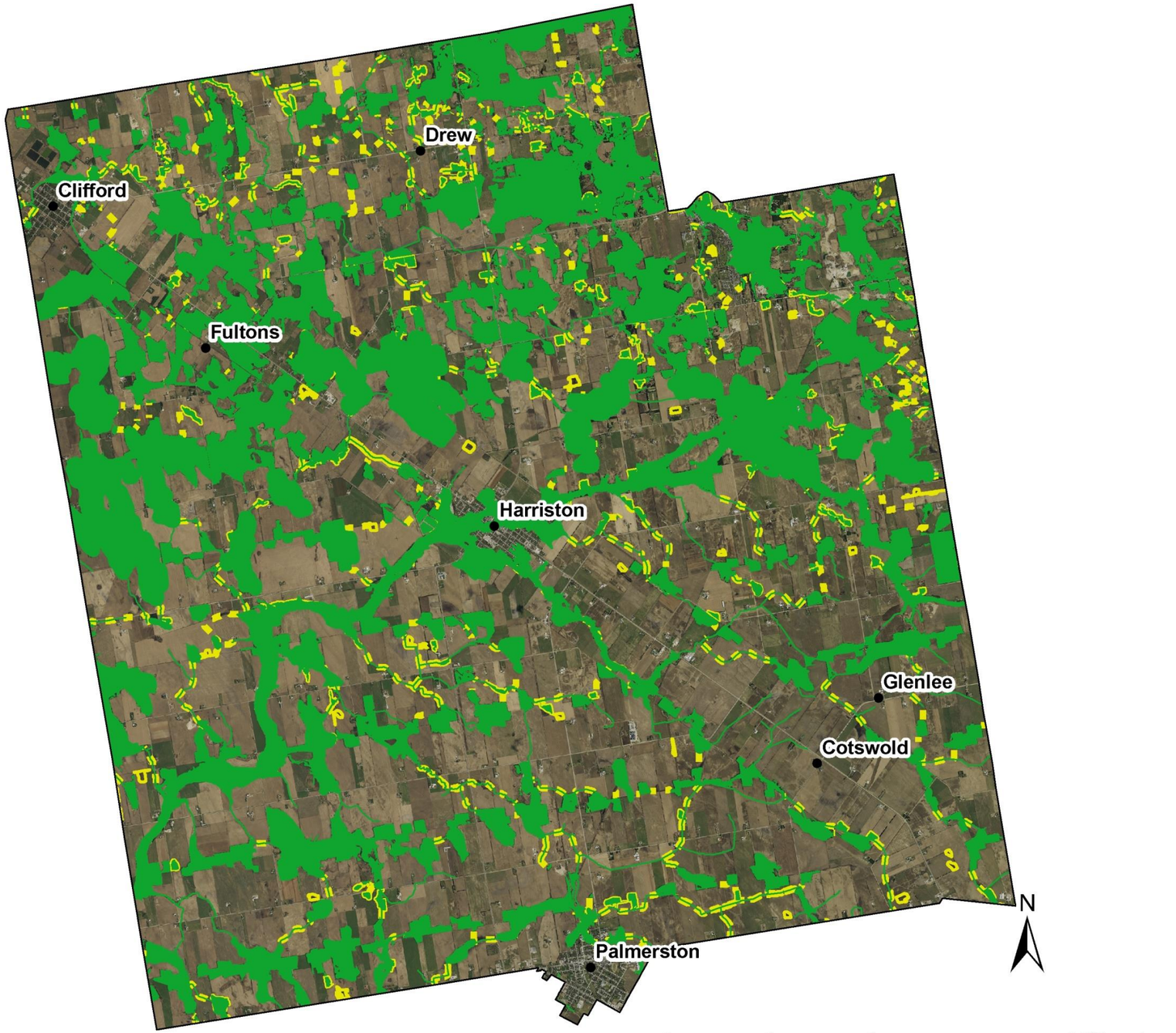
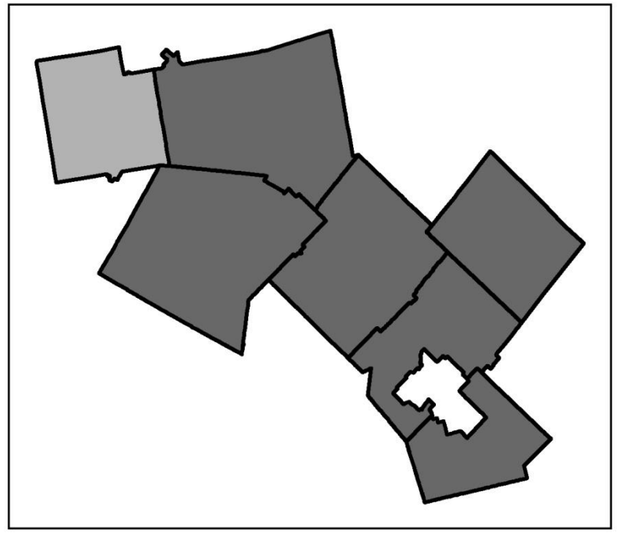


Legend

- Existing Natural Heritage Components
- Enhancement Woodlands
- Enhancement Linkages

Wellington County



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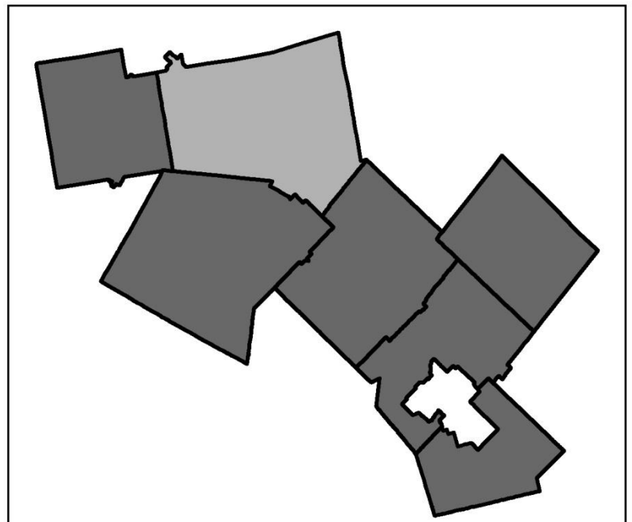
Wellington County
Natural Heritage System

Township of Wellington North

Legend

- Existing Natural Heritage Components
- Enhancement Woodlands
- Enhancement Linkages

Wellington County



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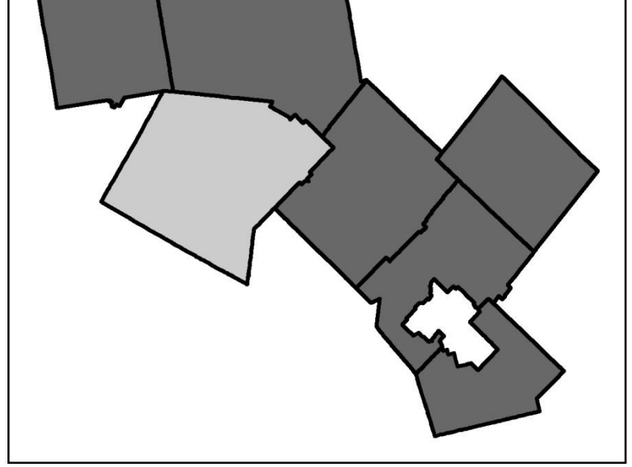
Wellington County Natural Heritage System

Township of Mapleton

Legend

- Existing Natural Heritage Components
- Enhancement Woodlands
- Enhancement Linkages

Wellington County



NAD 1983 UTM Zone 17N

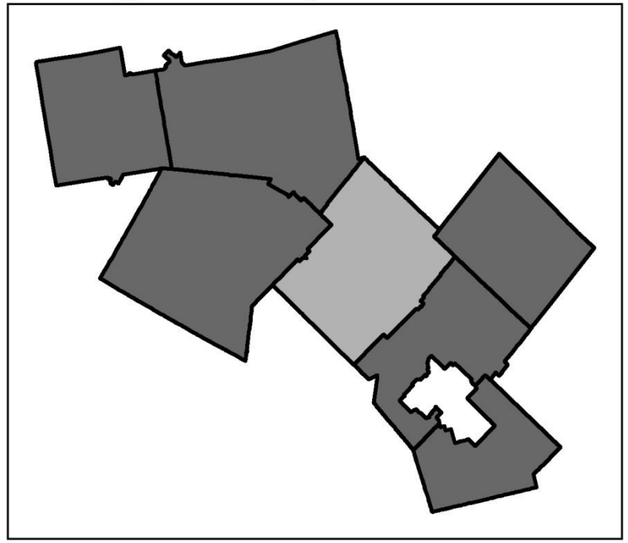
Wellington County Natural Heritage System

Township of Centre Wellington

Legend

- Existing Natural Heritage Components
- Enhancement Woodlands
- Enhancement Linkages

Wellington County



NAD 1983 UTM Zone 17N

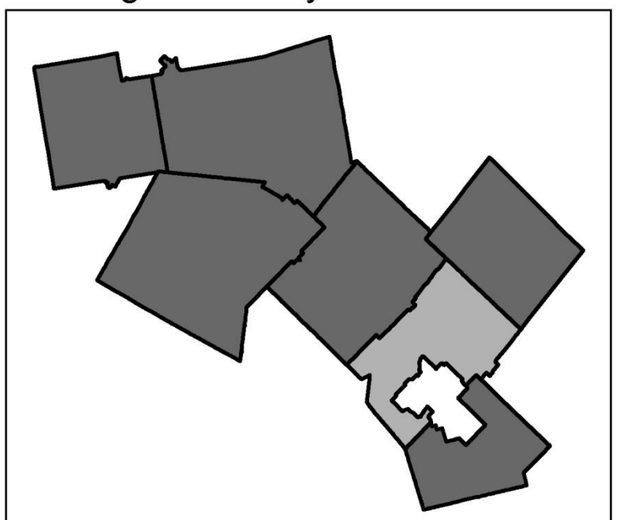
Wellington County
Natural Heritage System

Township of Guelph Eramosa

Legend

- Existing Natural Heritage Components
- Enhancement Woodlands
- Enhancement Linkages

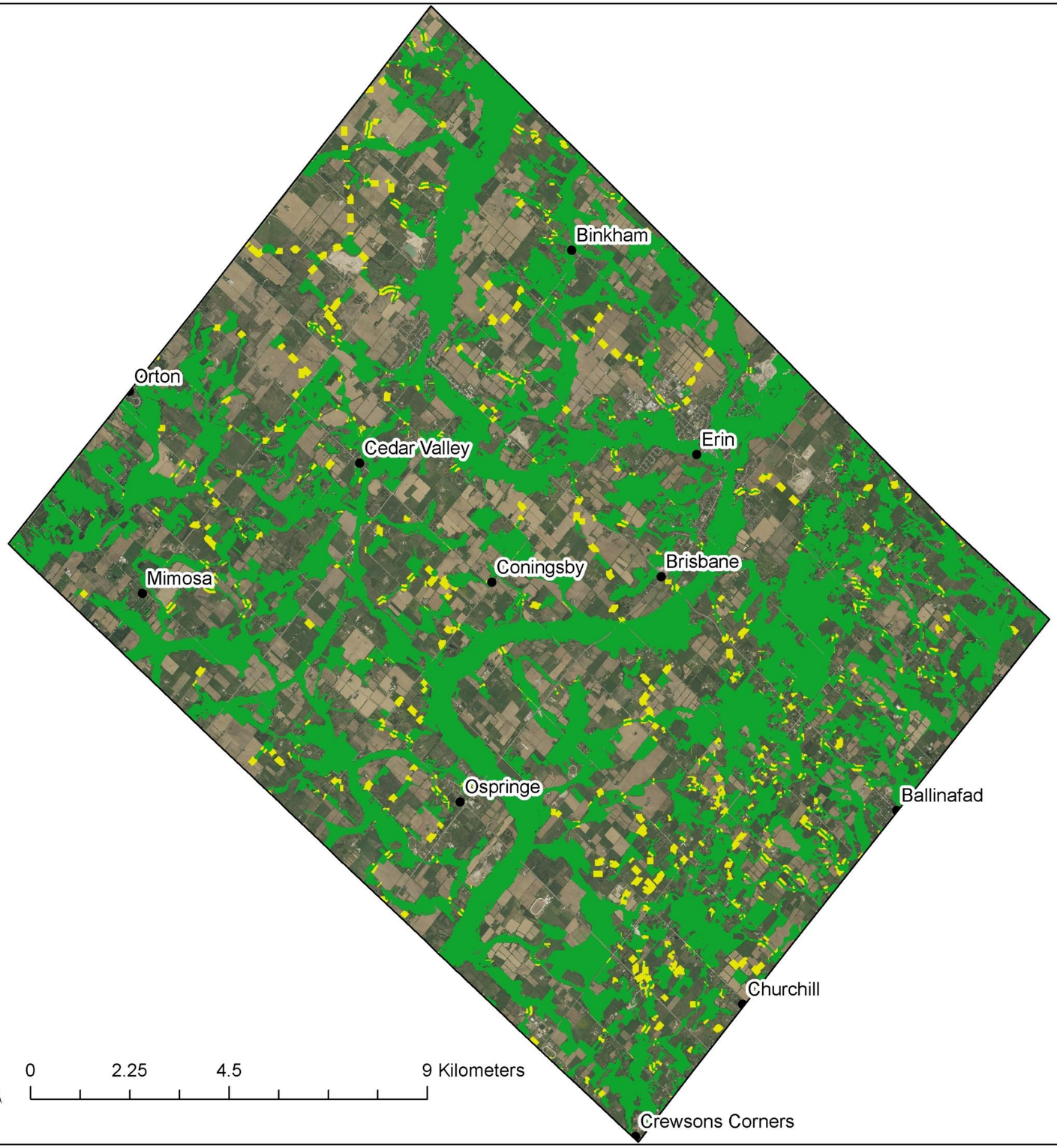
Wellington County



NAD 1983 UTM Zone 17N

Wellington County Natural Heritage System

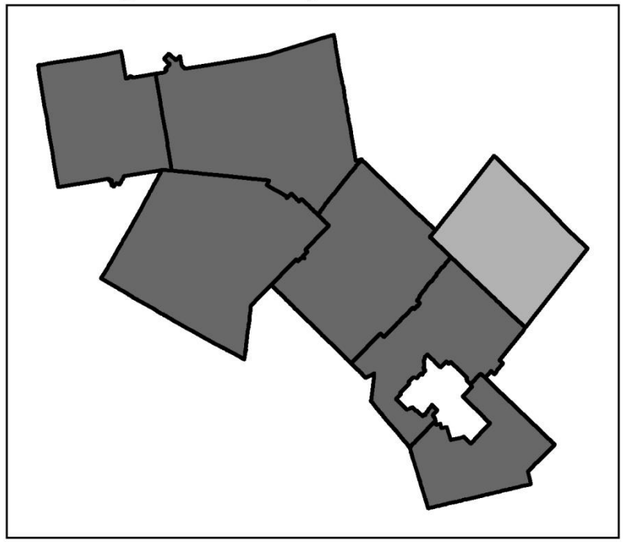
Town of Erin



Legend

- Existing Natural Heritage Components
- Enhancement Woodlands
- Enhancement Linkages

Wellington County



NAD 1983 UTM Zone 17N

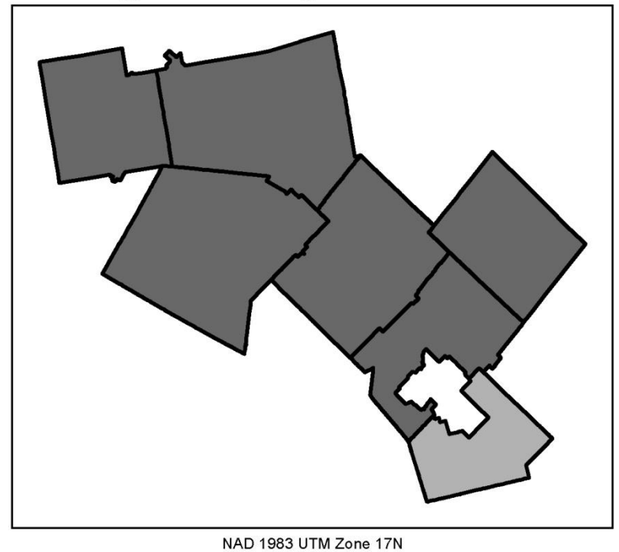
Wellington County
Natural Heritage System

Township of Puslinch

Legend

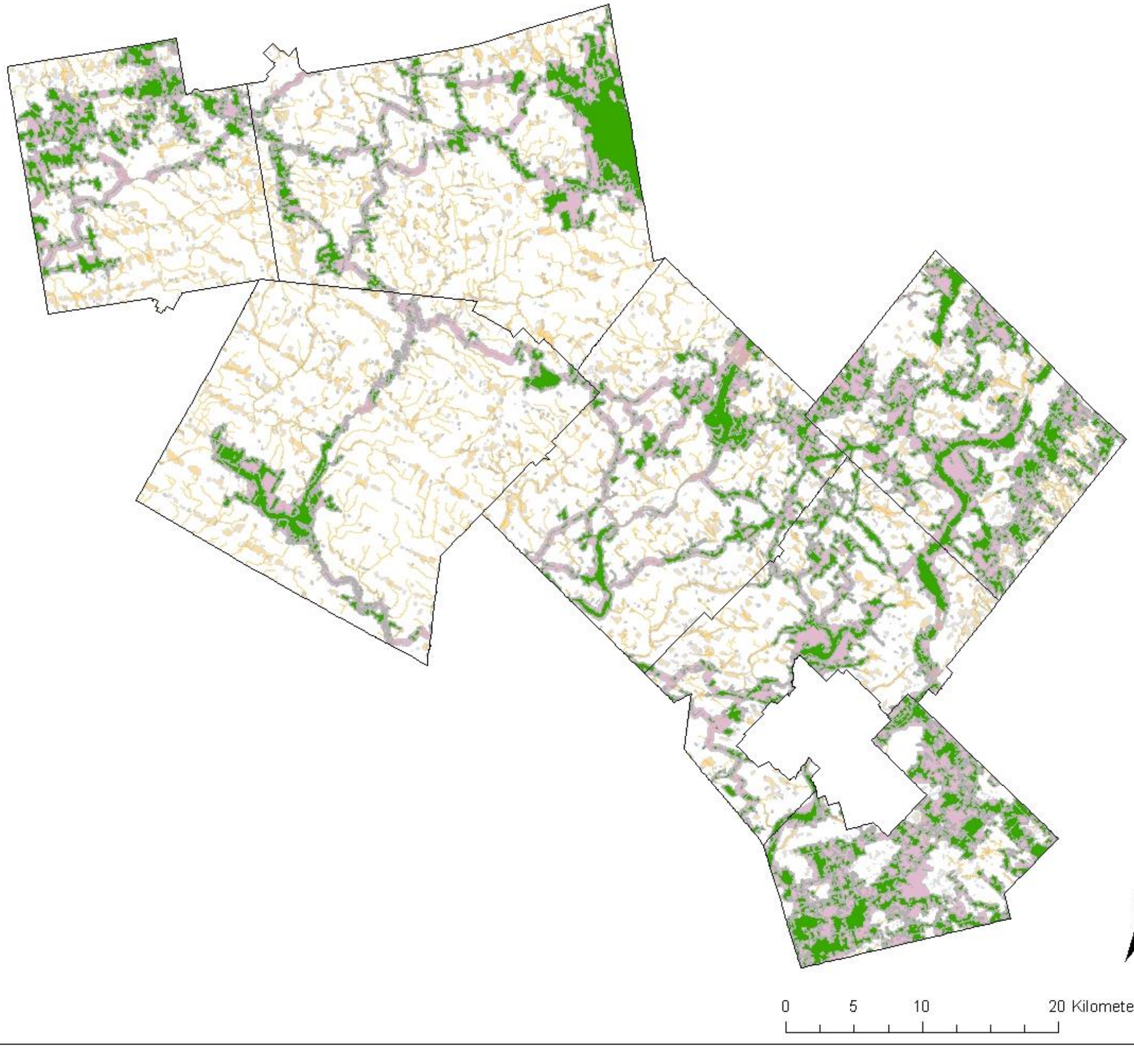
- Existing Natural Heritage Components
- Enhancement Woodlands
- Enhancement Linkages

Wellington County



NAD 1983 UTM Zone 17N

Growth Plan Natural Heritage System and Wellington County Natural Heritage System



Legend

- Wellington County Townships
- Both Growth Plan NHS and County NHS
- Growth Plan Natural Heritage System
- Wellington County Natural Heritage System

NAD 1983 UTM Zone 17N

Appendix II: Evaluated Wetlands in Wellington County

Wetland Complex Name	Total Complex Area (Ha)	Overall Wetland Score
Acton Silver Creek Wetland Complex	170.79	720
Alma Wetland Complex	230.41	708
Alton Hillsburgh Wetland Complex	290.11	700
Arkell Bog Wetland Complex	44.42	630
Arkell Corwhin Wetland Complex	188.80	723
Badenoch Moffat Wetland Complex	479.74	792
Beverly Swamp Wetland Complex	2759.76	776
Brotherston Wetland Complex	136.46	436
Caledon Mountain Wetland Complex	266.93	845
Central Carroll Creek Wetland Complex	47.57	464
Clare Creek Wetland Complex	490.23	706
Clifford-Harriston Complex	54.75	Null
Clifford Harriston Wetland Complex	2805.59	789
Clythe Creek Wetland Complex	124.58	604
Conn Swamp	153.99	Null
Cotswold East Wetland Complex	25.61	391
Cotswold Wetland Complex	21.35	367
Cranberry Oil Well Bog Wetland Complex	372.57	854
Creek Bank Valley Wetland	238.07	551

Wetland Complex Name	Total Complex Area (Ha)	Overall Wetland Score
Damascus Southeast Wetland Complex	211.54	483
Derrynane Swamp	151.17	440
East Morriston Swamp	12.48	337
Ellis Creek Wetland Complex	524.84	772
Elmira Wetland	55.88	433
Eramosa River - Blue Springs Creek Wetland Complex	3444.71	776*
Erin Town Line Woods Swamp	19.71	268
Fairchild Creek Headwaters Wetland Complex	294.84	772
Farewell Swamp	199.00	746
Fletcher Creek Swamp	563.13	781
Glenchristie Wetland Complex	53.65	643
Glenlee Wetland Complex	26.82	409
Goldstone South Swamp	44.97	334
Guelph Junction Wetland Complex	485.43	782
Guelph Northeast Wetland Complex	285.23	620
Guelph Southwest Wetland Complex	90.76	467
Hanlon Creek Swamp	233.18	632
Harriston South Wetland Complex	74.21	441
Harriston West Wetland Complex	17.57	285
Harriston Wetland Complex	12.79	359

Wetland Complex Name	Total Complex Area (Ha)	Overall Wetland Score
Hopewell Creek Riparian Wetland	147.83	484
Howick Minto Wetland Complex	217.27	556
Inverhaugh Valley Wetland Complex	137.90	712
Irvine Creek Wetland Complex	286.13	523
Keldon Swamp	920.68	Null
Living Springs Wetland Complex	363.32	693*
Lower Cox Creek Wetland Complex	333.95	619
Lower Mountsberg Creek Wetland Complex	365.79	667
Luther Marsh	4033.07	874
Marden South Wetland Complex	757.81	669
Melgund Wetland Complex	24.30	341
Mill Creek Puslinch Wetland Complex	1804.10	788
Minto 1 Wetland	13.39	336
Minto 10 Wetland	9.97	254
Minto 11 Wetland	8.66	289
Minto 12 Wetland	12.72	258
Minto 13 Wetland	27.95	333
Minto 14 Wetland	2.04	326
Minto 2 Wetland	66.50	361
Minto 3 Wetland	54.41	421
Minto 4 Wetland	15.08	282

Wetland Complex Name	Total Complex Area (Ha)	Overall Wetland Score
Minto 5 Wetland	18.54	287
Minto 6 Wetland	17.35	385
Minto 7 Wetland	8.28	232
Minto 8 Wetland	14.25	360
Minto 9 Wetland	10.29	241
Minto Wallace 1 Wetland Complex	65.99	425
Minto Wallace 2 Wetland Complex	61.90	404
Moffat Creek Swamp	238.69	707
Morriston Marsh	4.63	253
Mountsberg Reservoir Marsh	230.81	701
North Cumnock Wetland Complex	254.20	619
North Woolwich Swamp	249.58	603
Palmerston Northwest Wetland Complex	36.04	312
Portuguese Swamp	60.68	654
Puslinch Lake Irish Creek Wetland Complex	485.11	763
Ritch Tract Swamp	328.50	563
Salem South Wetland Complex	151.14	565
South Saugeen River Wetland Complex	113.82	Null
Speed-Lutteral-Swan Creek Wetland Complex	5853.16	798*
Speed River Wetland Complex	661.58	808
Stirton South Swamp	43.27	276

Wetland Complex Name	Total Complex Area (Ha)	Overall Wetland Score
Torrence Creek Swamp	141.55	692
Trecastle Swamp	72.65	350
Valens Wetland Complex	290.46	774
Wagram Wetland Complex	216.89	585
Waterloo Guelph Townline Wetland	81.08	591
Wellington Huron Wetland	25.75	391
West Credit River Wetland Complex	907.76	785

*Where more than one overall score is listed for the complex, the most recent overall score is shown (data source - Ontario Ministry of Natural Resources and Forestry. Dataset Name: Wetland. Ontario: Queen's Printer of Ontario, 2017.)

Appendix III: Provincially Significant Species Documented Within Wellington County

Common Name	Scientific Name	Provincial Rank[1]	Provincial Status[2]	Federal Status[3]	Source	Last Known Observation	Habitat present
Plants							
American Chestnut	*Castanea dentata*	S1S2	ENDANGERED	ENDANGERED	NHIC 2015	1983	Yes
American Gromwell	*Lithospermum latifolium*	S3	No Status	No Status	NHIC 2015	1941	Yes
Beaked Spiked Rush	*Eleocharis rostellata*	S3	No Status	No Status	NHIC 2015	1909	Yes
Burning Bush	*Eonymus atropureus*	S3	No Status	No Status	NHIC 2015	1902	Yes
Butternut	*Juglans cinerea*	S2?	ENDANGERED	ENDANGERED	NHIC 2015	2009	Yes
Canadian Black-snakeroot	*Sanicula canadensis var. grandis*	S2	No Status	No Status	NHIC 2015	1904	?
Carey's Sedge	*Carex careyana*	S2	No Status	No Status	NHIC 2015	1997	Yes
Carolina Vetch	*Vicia caroliniana*	S2	No Status	No Status	NHIC 2015	1948	Yes
Downy False Foxglove	*Aureolaria virginica*	S1	No Status	No Status	NHIC 2015	1990	Yes
False Hop Sedge	*Carex lupuliformis*	S1	ENDANGERED	ENDANGERED	NHIC 2015	1902	?
Harbinger-of-Spring	*Eriginea bulbosa*	S3	No Status	No Status	NHIC 2015	1942	Yes
Hill's Pond Weed	*Potamogeton hillii*	S2	SPECIAL CONCERN	SPECIAL CONCERN	NHIC 2015	?	?
Large Roundleaf Orchid	*Platanthera macrophylla*	S2	No Status	No Status	NHIC 2015	?	?
Moss Flox	*Phlox subulata*	S1?	No Status	No Status	NHIC 2015	1974	?
Northern Hawthorn	*Craetagus dissona*	S3	No Status	No Status	NHIC 2015	1942	Yes
Pignut Hickory	*Carya glabra*	S3	No Status	No Status	NHIC 2015	1980	Yes
Ram's Head Lady's Slipper	*Cypripedium arietinum*	S3	No Status	No Status	NHIC 2015	1986	?
Rugulose Grapefern	*Botrychium rugulosum*	S2	No Status	No Status	NHIC 2015	1979	?
Scarlet Beebalm	*Monarda didyma*	S3	No Status	No Status	NHIC 2015	1892	?
Sharp-fruited Rush	*Juncus acuminatus*	S3	No Status	No Status	NHIC 2015	1902	Yes
Shrubby St. John's Wart	*Hypericum prolificum*	S2	No Status	No Status	NHIC 2015	?	Yes
Slender Stubble Moss	*Gyroweisia tenuis*	S1	No Status	No Status	NHIC 2015	?	?
Slim-flowered Muhly	*Muhlenbergia tenuiflora*	S2	No Status	No Status	NHIC 2015	1989	?
Smith's Bulrush	*Schoenoplectus smithii*	S3	No Status	No Status	NHIC 2015	1902	Yes
Soft-Hairy False Gromwell	*Onosmodium molle ssp. hispidissimum*	S2	No Status	No Status	NHIC 2015	?	?

Woodland Flax	*Linum virginianum*	S2	No Status	No Status	NHIC 2015	?	Yes
Birds							
Acadian Flycatcher	*Empidonax virescens*	S2S3B	ENDANGERED	ENDANGERED	eBird 2018	1988	?
Bank Swallow	*Riparia riparia*	S4B	THREATENED	THREATENED	eBird 2018	2017	Yes
Bald Eagle	*Haliaeetus leucocephalus*	S4B S2N	SPECIAL CONCERN	Not At Risk	eBird 2018	2017	Yes
Barn Swallow	*Hirundo rustica*	S4B	THREATENED	THREATENED	eBird 2018	2017	Yes
Black Tern	*Chlidonia niger*	S3B	SPECIAL CONCERN	Not At Risk	eBird 2018	2007	Yes
Bobolink	*Dolichonyx oryzivorus*	S4B	THREATENED	THREATENED	eBird 2018	2017	Yes
Canada Warbler	*Wilsonia canadensis*	S4B	SPECIAL CONCERN	THREATENED	eBird 2018	2017	Yes
Cerulean Warbler	*Dendroica cerulea*	S3B	THREATENED	ENDANGERED	eBird 2018	2005	?
Chimney Swift	*Chaetura pelagica*	S4B	THREATENED	THREATENED	eBird 2018	2017	Yes
Common Nighthawk	*Chordeiles minor*	S4B	SPECIAL CONCERN	THREATENED	eBird 2018	2017	Yes
Eastern Meadowlark	*Sturnella magna*	S4B	THREATENED	THREATENED	eBird 2018	2017	Yes
Eastern Whip-poor-will	*Caprimulgus vociferus*	S4B	THREATENED	THREATENED	eBird 2018	2017	Yes
Golden Eagle	*Aquila chrysaetos*	S2B	ENDANGERED	NOT AT RISK	eBird 2018	2017	No
Golden-winged Warbler	*Vermivora chrysoptera*	S4B	SPECIAL CONCERN	THREATENED	eBird 2018	2000	Yes
Horned Grebe	*Podiceps auritus*	S1B	SPECIAL CONCERN	SPECIAL CONCERN	eBird 2018	2018	Yes
Henslow's Sparrow	*Ammodramus henslowii*	SHB	ENDANGERED	ENDANGERED	NHIC 2015	1988	?
Least Bittern	*Ixobrychus exilis*	S4B	THREATENED	THREATENED	eBird 2018	2017	Yes
Loggerhead Shrike	*Lanius ludovicianus*	S2B	ENDANGERED	ENDANGERED	NHIC 2015	1982	?
Olive-sided Flycatcher	*Contopus cooperi*	S4B	SPECIAL CONCERN	THREATENED	eBird 2018	2016	Yes
Peregrine Falcon	*Falco peregrinus*	S3B	SPECIAL CONCERN	SPECIAL CONCERN	eBird 2018	2017	Yes
Prairie Warbler	*Dendroica discolor*	S3B	Not At Risk	Not At Risk	eBird 2016	2016	Yes
Red-headed Woodpecker	*Melanerpes erythrocephalus*	S4B	SPECIAL CONCERN	THREATENED	eBird 2018	2016	Yes
Short-eared Owl	*Asio flammeus*	S4B S2N	SPECIAL CONCERN	SPECIAL CONCERN	eBird 2018	2017	Yes
Yellow-breasted Chat	*Icteria virens*	S2B	SPECIAL CONCERN	SPECIAL CONCERN	eBird 2018	June 14, 2017	Yes
Mammals							
Eastern Small-footed Myotis	*Myotis lebii*	S2	ENDANGERED				Yes

Little Brown Myotis	*Myotis lucifugus*	S4	ENDANGERED	ENDANGERED			Yes
Northern Myotis	*Myotis septentrionalis*	S3	ENDANGERED	ENDANGERED			Yes
Tricolored Bat	*Pipistrellus subflavus*	S3?	No Status	No Status			Yes
Herpetofauna							
Blanding's Turtle	*Emydoidea blandingii*	S3	THREATENED	THREATENED	NHIC 2015	1988	Yes
Butler's Gartersnake	*Thamnophis butleri*	S2	ENDANGERED	ENDANGERED	NHIC	2009	Yes
Eastern Massassauga	*Sistrurus catenatus*	S3	THREATENED	THREATENED	NHIC 2015	1962	Yes
Eastern Ribbonsnake	*Thamnophis sauritus*	S3	SPECIAL CONCERN	SPECIAL CONCERN	NHIC 2015	1990	Yes
Jefferson Salamander	*Ambystoma jeffersonianum*	S2	ENDANGERED	THREATENED	NHIC 2015	1985	?
Jefferson X Blue-spotted Salamander	*Ambystoma hybrid pop. 1*	S2	No Status	No Status	NHIC 2015	1990	Yes
Milksnake	*Lampropeltis triangulum*	S3	SPECIAL CONCERN	SPECIAL CONCERN	NHIC 2015	1990	Yes
Northern Map Turtle	*Graptemys geographica*	S3	SPECIAL CONCERN	SPECIAL CONCERN	NHIC 2015	1924	?
Snapping Turtle	*Chelydra serpentine*	S3	SPECIAL CONCERN	SPECIAL CONCERN	GRCA 2017	2017	Yes
Fishes							
Black Redhorse	*Moxostoma duquesnei*	S2	THREATENED	THREATENED	NHIC 2015	1982	Yes
Greater Redhorse	*Moxostoma valenciennesi*	S3	No Status	No Status	NHIC 2015	1997	Yes
Redside Dace	*Clinostomus elongatus*	S2	ENDANGERED	ENDANGERED	NHIC 2015	2001	Yes
Silver Shiner	*Notropis photogenis*	S2S3	THREATENED	SPECIAL CONCERN	NHIC 2015	1981	Yes
Mussels							
Rainbow Mussel	*Villosa iris*	S2S3	ENDANGERED	THREATENED	NHIC 2015		
Insects							
A Mayfly	*Ameletus walleyi*	SH	No Status	No Status	NHIC 2015	1969	?
Giant Lacewing	*Polystoechotes punctatus*	SH	No Status	No Status	NHIC 2015	?	?
Clam-tipped Emerald	*Somatochlora tenebrosa*	S2S3	No Status	No Status	NHIC 2015		
Mottled Darner	*Aeshna clepsydra*	S3	No Status	No Status	NHIC 2015	1995	?
Rusy-patched Bumblebee	*Bombus affinis*	S1	ENDANGERED	ENDANGERED	NHIC 2018	1980	
Tawny Emperor	*Asterocampa clyton*	S2S3	No Status	No Status	NHIC 2015	1997	?

Appendix IV: Stakeholder Engagement

Open House Notice

COUNTY OF WELLINGTON

NOTICE OF OPEN HOUSE

Wellington County Natural Heritage System

Tuesday April 3, 2018
4:00 pm - 8:00 pm

at the Aboyne Hall
Wellington County Museum and Archives
0536 Wellington Road 18, Fergus

Wellington County retained the Grand River Conservation Authority (GRCA) to develop a Natural Heritage System across the County. The project was designed to identify a natural heritage system with a 'made in Wellington' approach that reflects the diversity of natural heritage resources on the County landscape and respects the balance between natural systems and the importance of farming and other land uses.

You are invited to this drop-in format Open House to view the draft mapping, ask project team members questions about the project, and learn about stewardship opportunities for landowners.

This Open House marks the beginning of public consultation so if you are unable to attend, please feel free to phone or email the address below to provide your input or ask questions.

For more information, please feel free to contact the County Planning Department at:

519.837.2600 x2040 | countynhs@wellington.ca

or visit our website at:

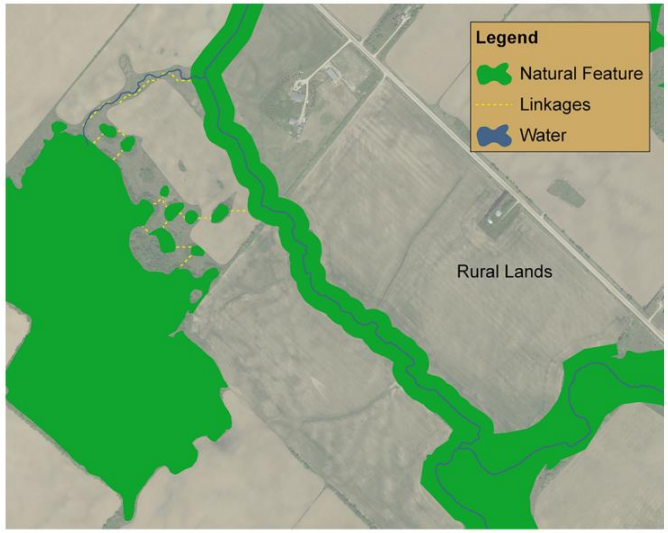
https://www.wellington.ca/en/resident-services/pl-majorprojects.aspx

ALTERNATE FORMATS OF THIS NOTICE ARE AVAILABLE UPON REQUEST

Wellington County Natural Heritage System

What is a Natural Heritage System?

A natural heritage system is a network of interconnected natural features and areas such as wetlands, woodlands, valleylands, lakes and rivers.



Natural Heritage Systems are identified to help conserve biological diversity, maintain ecological functions (e.g. movement corridors for wildlife, endangered species habitat) and sustain ecosystem services that we all depend on (e.g. pollination, clean water, flood damage reduction).

Biological Diversity

The Henslow's Sparrow and the Spotted Turtle are two species at risk found in Wellington County

Ecological Functions

An aerial photograph showing the importance of corridors within a rural landscape

Ecosystem Services

Bees and other pollinators are crucial for the pollination of fruit, vegetable, oil, seed, and nut crops

Open House Story Boards

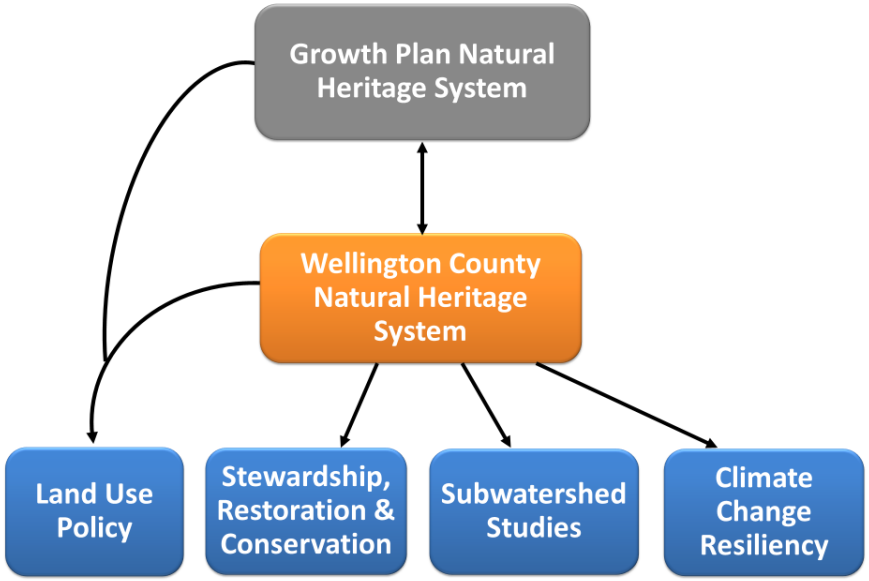
Wellington County Natural Heritage System

The relationship to the Growth Plan Natural Heritage System

The County recognizes that the regional scale Natural Heritage System in the Growth Plan for the Greater Golden Horseshoe (Growth Plan NHS) was recently issued and that decisions on planning matters must conform with the policies related to that system.

At the same time, the County feels that it needs a more detailed and locally developed Natural Heritage System as a scientific basis for:

- ✓ Refinements to the Growth Plan NHS when we amend the County Official Plan to conform with the Growth Plan and consider possible future policy amendments
- ✓ Stewardship programs and strategies
- ✓ Watershed and subwatershed planning
- ✓ Developing climate change strategies



Wellington County Natural Heritage System

What is the goal of this project?

The goals of this project are to identify, through the engagement of stakeholders, a Natural Heritage System that will:

- ✓ Maintain and/or improve local and regional biodiversity
- ✓ Recognize local-scale linkage between and among natural heritage features and areas
- ✓ Provide a scientific basis for land and water stewardship activities, conservation land acquisition, priorities for Inventory Programs, and possible future amendments to the County Official Plan
- ✓ Inform resource-management decision-making
- ✓ Support sustainable economic opportunities
- ✓ Support sustainable recreational use

Wellington County Natural Heritage System

What is included in Wellington's Natural Heritage System Mapping?

Existing Natural Heritage Components	
Components	**Criteria**
Wetlands	✓ Any evaluated non-Provincially Significant wetlands and Provincially Significant wetlands
	✓ Any unevaluated wetlands mapped by the MNRF or Conservation Authorities
Woodlands	✓ Woodlands in Urban Centers: ≥ 1 ha and ≥ 30 m wide
	✓ Woodlands in Rural Areas: ≥ 4ha and ≥ 30m wide
	✓ Woodlands of any size that is contained by or is within 30m of an existing natural heritage component meeting a criteria threshold
	✓ Woodlands containing a vegetation community with a provincial ranking of S1, S2 or S3 (as ranked by the NHIC) or a global ranking of G1, G2 or G3 (as ranked by the NatureServe Network) (text criterion)
	✓ Woodlands containing 10 or more trees/ha greater than 100 years old (text criterion)
	✓ Woodlands containing 10 or more trees/ha that are ≥ 50 cm in diameter (text criterion)
Valleylands	✓ Valleylands associated with watercourses, waterbodies and wetlands
	✓ Valleylands representing distinctive landforms such as oxbows, bottomlands, terraces, deltas, etc. (text criterion)
Aquatic Habitat	✓ All watercourses
	✓ Waterbodies connected to a watercourse
	✓ All headwaters (text criterion)
	✓ Waterbodies within 30 m of an existing natural heritage component meeting a criteria threshold
Significant Wildlife Habitat (SWH)	✓ All identified SWH (text criterion)
Habitat of Endangered and Threated Species	✓ All identified habitat of Endangered and Threatened Species (text criterion)
Areas of Natural and Scientific Importance(ANSI)	✓ All Life Science ANSIs
Environmentally Sensitive Areas (ESA)	✓ All ESAs

Stewardship Components	
Components	**Criteria**
Enhancement Woodlands	In lower-tier municipalities with ≤30% woodland cover: ✓ Woodlands in Rural Areas: 1-4 ha in size and ≥ 30m wide
Enhancement Linkages	✓ Flexible connections between Existing Natural Heritage Components

Wellington County Natural Heritage System

Methods used to map Wellington County's draft Natural Heritage System

Step 1: Identification of Existing Natural Heritage Components

- The best available data from Conservation Authorities and the Province were used to map natural features.
- Existing Natural Heritage Components of the draft Natural Heritage System were selected using science-based criteria.
- Ecologically important components that could not be mapped due to insufficient data were included in the draft Natural Heritage System as text.

Step 2: Identification of Stewardship Components

- Enhancement Linkages were mapped using an objective, automated software tool (Linkage Mapper*) in a Geographic Information Systems (GIS).
- Enhancement Woodlands were selected using science-based criteria. If enhanced through voluntary stewardship action these woodlands could increase the overall woodland cover in Wellington County.

We want to hear from YOU!
Please leave your comments and suggestions on a comment form!

* McRae, B.H., and D.M. Kavanagh. 2014. Linkage Mapper connectivity analysis software. The Nature Conservancy, Seattle, WA. [Available at: http://www.circuitscape.org/linkagemapper].

Wellington County Natural Heritage System

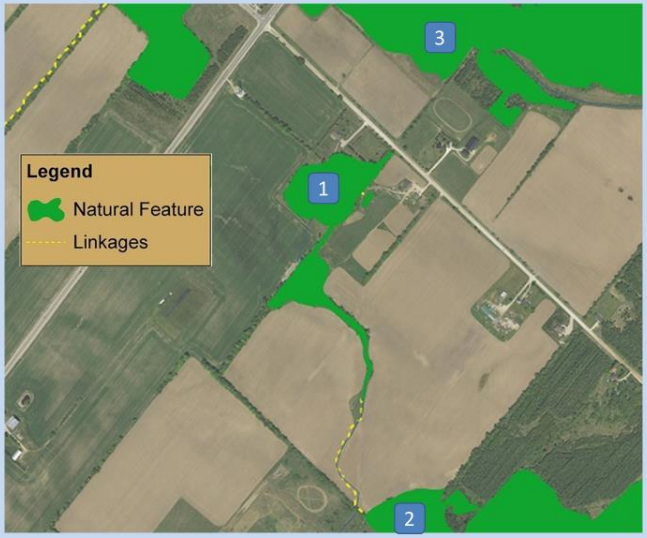
What are Enhancement Linkages?

Enhancement Linkages aim to improve or create connections between Existing Natural Enhancement Components in the Natural Heritage System.

Enhancement linkages were mapped by identifying the "path of least resistance" between Existing Natural Heritage Components.

Enhancement Linkages should be thought of as ***approximate*** and ***flexible*** locations.

An example of the "Path of Least Resistance"



Feature 1 is isolated from the other natural features on the landscape. The "path of least resistance" occurs between feature 1 and feature 2 , rather than feature 3 , because this linkage follows a watercourse and does not require a road crossing.

Wellington County Natural Heritage System

What programs and funding are available to landowners?

Wellington County and its Stewardship Partners have a long history of working with residents to protect and improve natural heritage in the County through voluntary stewardship programs such as:

- The Green Legacy Programme
- Trees for Mapleton
- Trees for Minto
- Wellington Rural Water Quality Program
- CVC Landowner Action Fund
- Halton Watershed Stewardship program
- Reforestation and Tree Planting Programs offered by your local Conservation Authority
- …and more!

Wellington County Natural Heritage System Q and A

County Natural Heritage System Questions and Answers

This project is striving to identify a natural heritage system that best reflects the County of Wellington's natural heritage with a 'made in Wellington' approach that respects the balance between natural systems and the importance of agriculture and other land uses on the County landscape.

What will the Grand River Conservation Authority (GRCA) produce for the County at the end of this project?

The GRCA will provide:

- Digital mapping of the County Natural Heritage System;
- An analysis of the Natural Heritage System for the Growth Plan for the Greater Golden Horseshoe (Growth Plan NHS);
- A final report that includes a general description of how the mapping was done as well as appendices with technical information; and
- The GRCA will present the final report to the County Planning Committee.

The County will post copies of the above products on its web site.

What support is available for landowners who want to do stewardship?

Stewardship projects are voluntary.

Landowners who are planning or considering stewardship projects on their lands can begin using the County Natural Heritage System to see where there may be opportunities. For advice to identify the best locations, landowners can contact their Conservation Authority stewardship or landowner outreach service.
Green Legacy staff can also connect you with planting advice and services that may be available in your area.

There are a number of funding programs available to assist landowners undertaking stewardship projects on their property. This includes the Wellington Rural Water Quality Program and the Green Legacy Program, in addition to a number of provincial initiatives. Each program has its own goals, grant rates and eligibility criteria. Your local Conservation Authority stewardship staff can help to connect you with potential funding opportunities for your project.

What is the difference between this County Natural Heritage System and the Greenlands System that is in the County Official Plan?

The County Official Plan Greenlands System relates to policies in the Provincial Policy Statement about protecting natural heritage features from development and protecting people and property from lands that are subject to flooding, erosion or unstable slopes. The Greenlands and Core Greenlands designations show the boundaries of the features that were included. As a result, many of the features in the Official Plan Greenlands System are also in the County Natural Heritage System. The main difference is that the County Natural Heritage System identifies linkages between the features and potential areas for enhancement.

Will the County Natural Heritage System add to the Conservation Authority Regulated Area?

Conservation Authority Regulations are focused on natural hazards such as floodplains, watercourses, slopes, wetlands, etc. Changes to Conservation Authority regulated area mapping will focus on these features and the lands adjacent to them. The Conservation Authority regulation for natural hazards does not include linkages so linkages will not be added to the Regulated Area mapping.

Since the Province has issued a Natural Heritage System for the Growth Plan that includes Wellington, why is the County developing a Natural Heritage System?

The County recognizes that planning decisions made under the Planning Act must conform with the policies for the Growth Plan Natural Heritage System (Growth Plan NHS). The County will be required to add the Growth Plan NHS as an overlay to the County Official Plan. This change will be part of a larger Official Plan Amendment to conform with the Growth Plan that we need to complete by 2022 (conformity OPA). When we draft the conformity OPA, we will have an opportunity to refine the Growth Plan Natural Heritage System to make it more precise. In order to have a scientific basis for the Growth Plan NHS refinement process, possible future policy amendments, and mapping to support stewardship efforts, the County needs a more detailed and locally developed natural heritage system.

How do I provide feedback and when is the deadline for input?

The mapping presented at this time is Draft. You can provide comments in a number of ways:

- Fill in the comment form on our web site at: **www.wellington.ca/naturalheritagesystem**
- Send an email to us at **countynhc@wellington.ca**
- Write to:

  Aldo Salis, Director of Planning
  County of Wellington, 74 Woolwich Street, Guelph, ON N1H 3T9

We would appreciate getting your comments by May 7th. Comments received after May 7th will be kept on file for consideration in future initiatives and the County is always open to input on planning matters of interest to the public. You are also welcome to provide feedback on the comment form on the next page.

ALTERNATE FORMATS AVAILABLE UPON REQUEST.

Comment Form

The mapping presented at this time is Draft. You can provide comments in a number of ways:

- Fill in the comment form on our web site at: **www.wellington.ca/naturalheritagesystem**
- Send an email to us at **countynhc@wellington.ca**
- Write to: **Aldo Salis, Director of Planning**
  County of Wellington, 74 Woolwich Street, Guelph, ON N1H 3T9

1. **Do you think we selected the right features to include in the system?**

2. **Do we show the features correctly on the draft mapping? If not, what changes would you recommend?**

3. **Do you agree with showing the enhancement linkages with arrow symbols?If not, how would you recommend showing the linkages?**

4. **What other feedback would you like the County to consider?**

First Name: _____ Last Name: _____
Telephone: _____ Email: _____
Address: _____

I hereby request the County of Wellington Planning Department to keep me informed of all further public meetings in relation to this matter. Disclosure of this information is governed by the Municipal Freedom of Information and Protection of Privacy Act, R.S.S 1990. Questions about this collection and disclosure should be directed to Mark Paoli, Senior Planner, County of Wellington.

ALTERNATE FORMATS AVAILABLE UPON REQUEST.

Appendix V: Presentation to Wellington Federation of Agriculture

Draft Mapping of a Natural Heritage System in the County of Wellington

Presentation to the Wellington Federation of Agriculture

April 3rd, 2018

Grand River Conservation Authority

Natural Heritage Systems & Agriculture

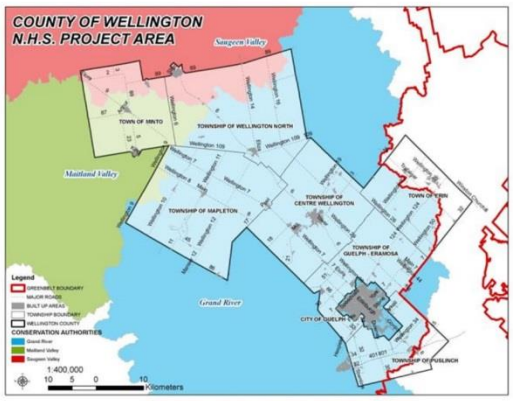
- Agricultural lands are not only economically beneficial to Wellington County but can also produce ecosystem services
- Agricultural lands can support ecological function of nearby natural cover
- Agricultural lands can support hydrological connectivity
- The benefits of agricultural lands to human health and the environment are a source of pride for many farmers and the County

What happens next for this project

- Today kicks off a one month commenting period
- In May, the County and GRCA will review and consider the input received
- In June, the GRCA will present a report to the County Planning Committee

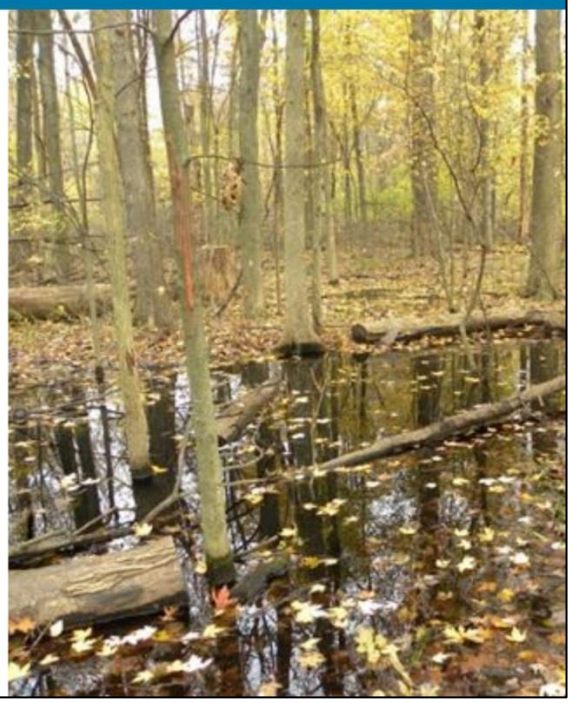
Initiating a Wellington NHS

In the fall of 2016, County Council passed a recommendation requesting GRCA provide a proposal to develop a natural heritage system for the County.



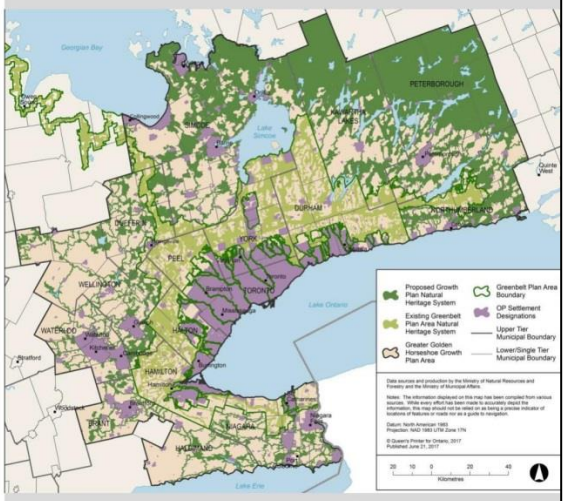
Grand River NHS Framework

GRCA's Strategic Plan identifies the development of a Natural Heritage Systems Framework for the Grand River watershed as a priority.

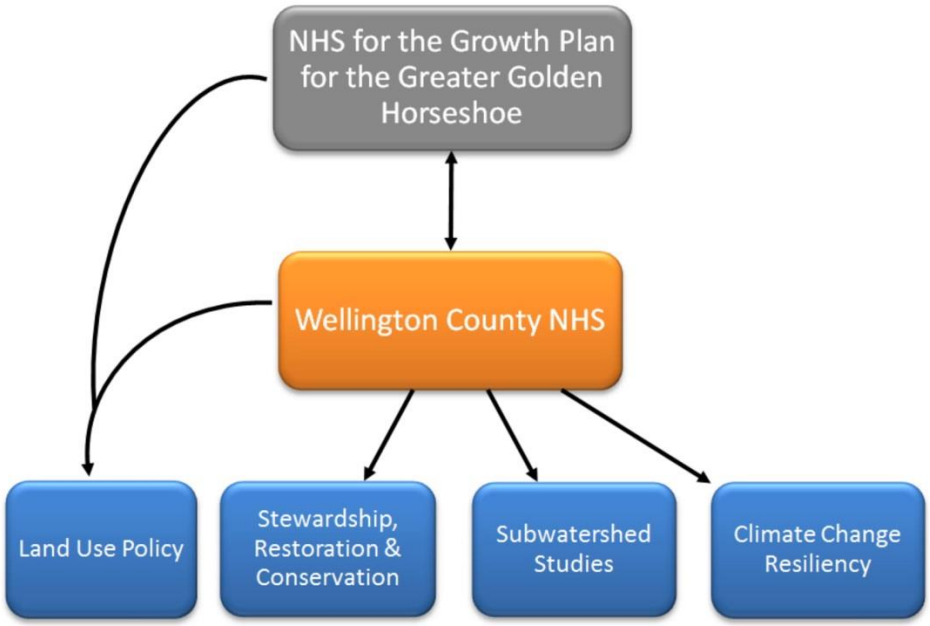


Proposed NHS for the GPGGH

In the Summer of 2017, the Province released the proposed regional NHS for the Growth Plan for the Greater Golden Horseshoe region.



A multi-purpose NHS



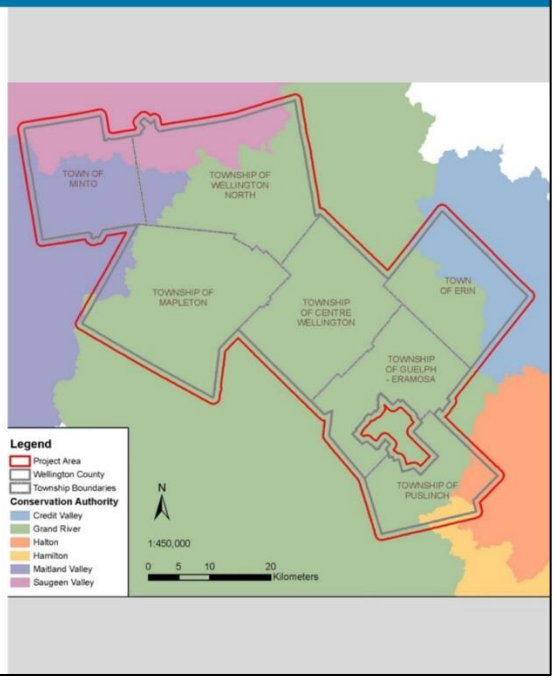
Overall Goal

This project is striving to identify a natural heritage system that best reflects the County of Wellington's natural heritage with a 'made in Wellington' approach that respects the balance between natural systems and the importance of agriculture and other land uses on the County landscape.

Project Area & Committee

County of Wellington including Greenbelt areas + 1km buffer.

Coordination of project by GRCA with County staff & other CA reps to provide strategic direction.



The system was built in two steps

Step 1: Identification of Existing Natural Heritage Components

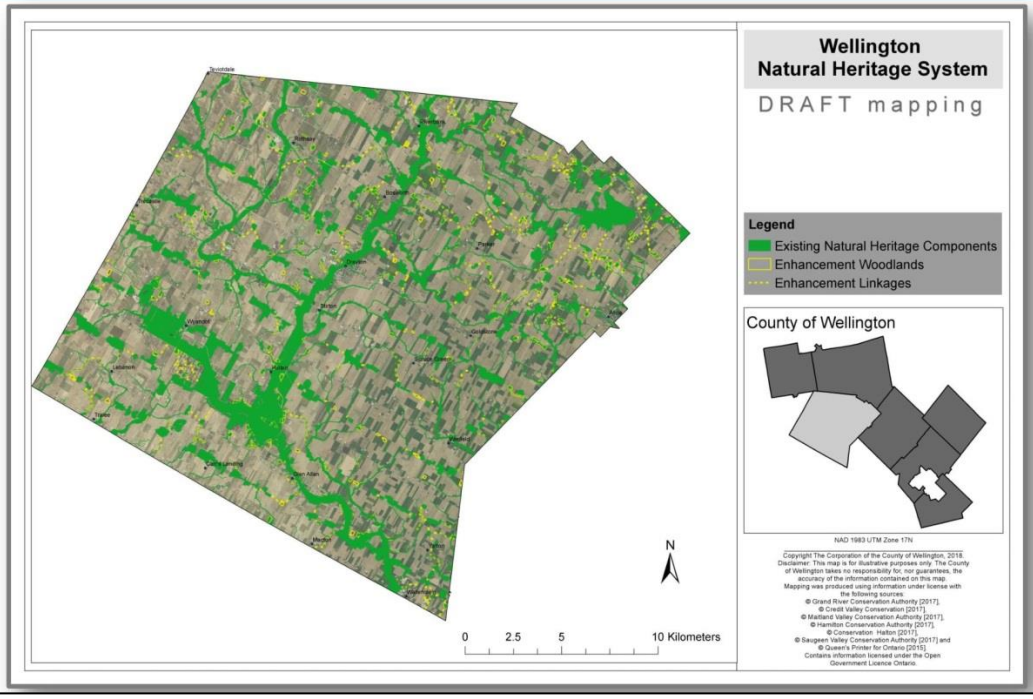
- Existing Natural Heritage Components for the draft Natural Heritage System were selected using science-based criteria.
- The best available data from Conservation Authorities and the Province were used to map natural features.
- Ecologically important components that could not be mapped due to insufficient data were included in the draft Natural Heritage System as text.

The system was built in two steps

Step 2: Identification of Stewardship Components

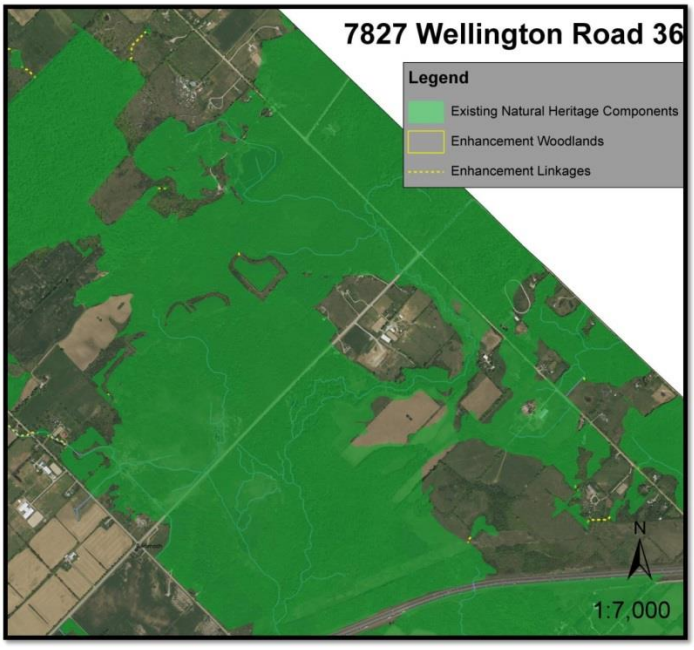
- **Enhancement Linkages** were mapped using an objective, automated software tool (Linkage Mapper*) in a Geographic Information System (GIS).
- **Enhancement Woodlands** were selected using science-based criteria. If enhanced through voluntary stewardship action these woodlands could increase the overall woodland cover in Wellington County.

Natural Heritage System

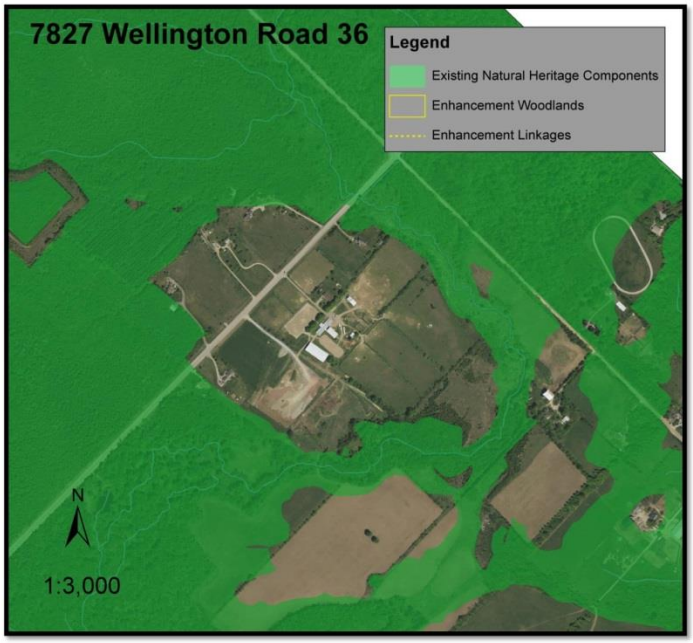


Natural Heritage System

Agricultural Property (Puslinch)



Agricultural Property (Puslinch)



Agricultural Property (Puslinch)

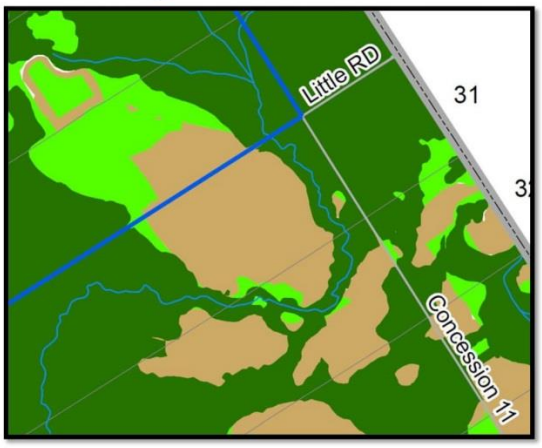
Valleylands Floodplain Component

Wetlands Component

Agricultural Property (Puslinch)

Wellington NHS

Wellington Greenlands



A Tool for Stewardship

Wellington County and its Stewardship Partners have a long history of working with residents to protect and improve natural heritage in the County through voluntary stewardship programs such as:

- ✓ The Green Legacy Programme
- ✓ Trees for Mapleton
- ✓ Trees for Minto
- ✓ Wellington Rural Water Quality Program
- ✓ CVC Landowner Action Fund
- ✓ Halton Watershed Stewardship Program
- ✓ Reforestation and Tree Planting Programs offered by your local Conservation Authority

…and more!

Photo: Grand River Conservation Authority/Shari Lovell

Paris and Galt Moraine Policy Area Policies

- Agriculture is a major activity on the moraines and is an accepted and supported use of land. The County will encourage best practices for agriculture by developing and supporting stewardship programs.
- Large scale development proposals will be required to demonstrate that ground and surface water functions will be maintained, and where possible, enhanced.
- Small scale developments that do not rely on significant site alterations will not normally be required to demonstrate protection of the moraines. Where planning approvals for small scale developments are needed, best practices for site alteration will be required to reduce or eliminate cut and fill activities that would fill in land surface depressions.

Appendix VI: Comments Received on the Wellington County Natural Heritage System

Summary of Public Comments on the County of Wellington Natural Heritage System		
Submission	Comment	Response
#1	A) Mapping is at such a large scale it is hard to make sense of the mapping. There are areas where there should be dark green and there are not. There are enhanced linkage areas shown in yellow, which is unnecessary as the stream corridor is completely vegetated on both sides. B) There are areas marked Natural Heritage Components in green on the County Map that are absolutely devoid of any natural features whatever, other than a ditch, drain or stream. C) The Software used by the GRCA, the same used by the province, I understand, apparently does not include decommissioned railway right of way as a medium for enhanced linkage purposes. If so, this is something that you will need to attend to manually. In my view, these abandoned rail corridors can potentially be as effective as a stream corridor. In the case of the Elora Cataract Trail way, owned by the GRCA, and CVC, it links two watersheds, the Grand and Credit, three major parks spaces, Forks of the Credit Provincial Park, Belwood Conservation Area, and the Elora Gorge Conservation Area, a variety of landscapes, rural and urban communities. Further, there are many initiatives along the way to create further linkages to local park space. Among others elsewhere in the County, we have in the Township of Centre Wellington alone, the CNR. ROW from Fergus to Alma, the CNR ROW from Elora to Guelph, the CNR ROW, now owned by the County and converted to the Trestle Bridge Trail and associated linkages to Grand River, the museum and nursing home complexes, and soon to be hospital lands. Even those ROW that been conveyed to adjacent landowners remain as effective, vegetated linkages.	• The scale of the online mapping is adjustable allowing the user to zoom out for a broader landscape perspective or to zoom in and view neighbourhood/community connectivity. • The scope of the study used existing data sets that could be applied across Wellington County. The accuracy and representation of the NHS is a result of the best data available. Updated datasets will inform future updates to the NHS mapping. • Decommissioned railway corridors were not selected as a dataset, nor available, as a component of the Wellington County Natural System. • Enhancement linkages were identified through the use of an automated program – the application of manual adjustments was beyond the scope of the study. The intent of displaying enhancement linkages is to demonstrate potential connections or corridors between existing natural heritage components however the linkage may be flexible in its route to connect features.
#2	It is important to preserve and protect our waterways as vital community assets and now appreciating the aesthetics of our County. Connecting on foot as well.	• Comment noted.
#3	I like the overall concept of what the county is trying to do. I like the idea of showing the dashed where a connection could be made but most of them were not practical as they cut across a farm at an angle. It would be good if the County could look at other models like the ALUS Canada and identify and target areas where more environmental restoration needed to be done. The county has a good model of promoting environmental initiatives like green legacy but maybe a component could be added on to rural water quality program to help encourage better stewardship practices and provide the corridors for animals to co exist with us in the farming community. I see increases in windbreaks but also see other fence lines coming down. With increased flooding, climate change and a lack of awareness of how our practices on farm can affect the climate, wildlife , soil erosion , etc much work will be needed to be done to get us in the farming community on side. There is no ag extension really any more and younger farmers get information in different ways. We need to be re engaged. (somehow). At the recent farm show in Drayton I was encouraged by the number of younger farmers that were interested in doing more, There is a good article in the most recent Ontario Grain Farmer on page 6 on Alternative Land use. I believe some monetary compensation will be needed, some case studies that show a benefit to society and to the farmer, some taxation changes on properties that are currently bush but not under a land conservation program to keep them bush and in wetlands, some restrictions maybe on when we can take out another fence row, etc.	• Linkages shown in the Natural Heritage System represent a connection between core areas exists, not necessarily the connection between the Core areas. It is our thought that linkages in most cases will form in areas outside of cultivated fields. • The County and GRCA researched other models for the Natural Heritage system and reviewed available options with the working group at the technical workshop. It was determined that a hybrid approach was appropriate for the County using the Feature Composite method and the Core Areas and Linkages method. • The Wellington County Natural Heritage System will be utilized as a resource to guide restoration and enhancement projects that are undertaken. These may include projects through the Green Legacy program, Rural Water Quality Program or initiatives by local Conservation Authorities. • The Wellington Federation of Agriculture (WFA) was consulted throughout this project.

	I commend the county on the work done so far but please engage, dialogue with the farm community and get us on side. I think in general all of us need to think longer term and I believe this project is attempting to do that.	

REPORT FIN-2019-011

TO:	Mayor and Members of Council
FROM:	Mary Hasan, Director of Finance/Treasurer
MEETING DATE:	March 6, 2019
SUBJECT:	Ontario Trillium Foundation – Execution of Grant Contract File No. L04 ONT

RECOMMENDATIONS

That Report FIN-2019-011 regarding the Ontario Trillium Foundation – Execution of Grant Contract be received; and

That Council enact a By-law authorizing the entering into a Grant Contract with the Ontario Trillium Foundation for the building of a lit soccer field at the Puslinch Community Centre Park.

DISCUSSION

Purpose

The purpose of this report is to recommend that Council enact a By-law authorizing the entering into a Grant Contract with the Ontario Trillium Foundation (OTF) for the building of a lit soccer field at the Puslinch Community Centre Park.

Background

Council at its meeting held on July 18, 2018 directed staff to apply to the OTF – Capital Grants program for the Puslinch Community Centre Park – Back Soccer Fields.

The OTF is an agency of the Government of Ontario, and one of Canada's leading granting foundations. OTF awarded more than $120 million to some 700 projects last year to build healthy and vibrant communities in Ontario.

Funding Allocation

The funding from OTF is for the delivering of improved infrastructure with a $150,000 grant over 12 months for the construction costs associated with building a lit soccer field at the Puslinch Community Centre.

The first payment of $135,000 is released one day following the construction start date. Township Council at its meeting held on January 30, 2019 directed staff to communicate a construction start date of May 1, 2020 to OTF in order to provide sufficient time to seek funding opportunities from third party sources.

The final 10% grant holdback of $15,000 will be released after the Township has submitted the final report and OTF has verified the satisfactory completion of the grant.

Public Recognition of OTF Funding

The Township is required to publicly recognize the OTF grant. Grant recipients are required to do the following activities:

- Recognize funding publicly through recognition events, press conferences, photo opportunities, social media and news releases
- Give OTF and their local Member of Provincial Parliament (MPP) a minimum of three weeks' notice of a recognition event
- Acknowledge the funding in media releases, media interviews, annual reports, newsletters, social media activities, videos and promotional materials, both online and in print
- Use the OTF logo and name according to guidelines and communications toolkit provided to the grantees
- Display any promotional material received from OTF in a public area
- Report on all recognition activities and media coverage in their Progress and Final Reports

FINANCIAL IMPLICATIONS

Report REC-2019-001 includes the financial implications associated with the Puslinch Community Centre Park – Back Soccer Fields.

APPLICABLE LEGISLATION AND REQUIREMENTS

Municipal Act, 2001

ATTACHMENTS

None

REPORT FIN-2019-013

TO:	Mayor and Members of Council
FROM:	Mary Hasan, Director of Finance/Treasurer
MEETING DATE:	March 6, 2019
SUBJECT:	Ontario Regulation 284/09 – 2019 Budget File No. F05 BUD

RECOMMENDATIONS

That Report FIN-2019-013 regarding Ontario Regulation 284/09 – 2019 Budget be received; and

That Council adopts Report FIN-2019-013 which meets the requirements of Ontario Regulation 284/09 and outlines the preparation of the 2019 Operating and Capital budgets to a Public Sector Accounting Board compliant format.

DISCUSSION

Purpose

Ontario Regulation 284/09 requires municipalities that have excluded expenses in their budgets to prepare a report about those excluded expenses and adopt the report by Council Resolution before approving the Township's budget. Township staff upon approval of this Report will implement the approved 2019 budget.

Background

In 2009, accounting standards and financial reporting requirements changed significantly, with the most notable change being that of the requirement to report on tangible capital assets (TCA). However, these new accounting standards do not require budgets to be prepared on the same basis.

The Township, like many municipalities, continues to prepare budgets on the traditional cash basis. These budgets do not include the Public Sector Accounting Board (PSAB) requirements of accrual accounting and accounting for non-financial assets such as TCA.

Ontario Regulation 284/09

Allowable excluded expenses as per Ontario Regulation 284/09 can be all or a portion of the following:

a) Amortization expenses
b) Post-employment benefit expenses
c) Solid waste landfill closure and post-closure expenses

The Township excludes amortization expense from its cash based budget. Post-employment benefit expenses (ie. premiums paid for retirees who qualify) are included in the operating budget, therefore no adjustment is required. The Township does not have any landfill expenses and as such, they are not applicable.

The regulation requires the report to contain at a minimum:

a) An estimate of the change in the accumulated surplus (revenues less expenditures) of the municipality to the end of the year resulting from the exclusion of expenses
b) An analysis of the estimated impact of the exclusion of expenses on future TCA funding requirements

In addition to these excluded expenses, the cash based budgets prepared by the Township include certain types of transactions that need to be excluded for PSAB reporting purposes. These are not covered in Ontario Regulation 284/09.

a) Debenture principal repayments (ie. Carroll Pond debenture)
b) Transfers to discretionary reserves
c) Contributions from discretionary reserves
d) Funds from debenture issuances (no new debentures issued for the Township in the 2019 budget)
e) Fixed Asset/TCA expenditures

Comments

Table 1 below outlines the changes made to convert the balanced 2019 budget prepared under the cash basis of accounting to increase the Township's accumulated surplus in the amount of $530,804.

Table 1	
2019 Budget – Cash Based	
2019 Operating Budget Tax Levy	$2,851,360
2019 Operating Budget Other Revenues	$1,917,228
2019 Operating Budget Net Withdrawals from Discretionary Reserves	$178,447
2019 Operating Budget Expenditures	-($4,947,035)
Surplus/(Deficit)	**$0**
2019 Capital Budget Funded	$2,689,118
2019 Capital Budget Expenditures	-($2,689,118)
Surplus/(Deficit)	**$0**
Add Expenditures Excluded from Cash Based Budget	
Amortization Expense	-($1,603,571)
Exclusion Impact on Accumulated Surplus/ (Deficit)	-($1,603,571)
Remove Non PSAB Items from Cash Based Budget	
Debenture Principal Repayments	$0
Transfers to Discretionary Reserves (Capital Budget)	$271,000
Transfers to Discretionary Reserves (Operating Budget)	$88,750
Contribution from Discretionary Reserves (Capital Budget)	-($301,530)
Contribution from Discretionary Reserves (Operating Budget)	-($267,197)
Funds from Debenture Issuances	$0
Budgeted Tangible Capital Asset Acquisitions	$2,343,352
Total Non PSAB Items Removed from Cash Based Budget	*$2,134,375*
Total Impact on 2019 Accumulated Surplus/(Deficit)	$530,804

Amortization expense of $1,603,571 listed in Table 1 above was the amortization expense recorded in the 2017 audited financial statements. Amortization expense has a major impact on the 2019 accumulated surplus amount. The amortization expense reduces the surplus amount and also reduces the net book value of the TCA reported on the audited statement of financial position.

Fixed asset purchases of $2,343,352 listed in Table 1 above is higher than the amortization expense of $1,603,571. The Township's Asset Management Program will enable the Township to plan effectively for the replacement of current infrastructure based on the replacement costs noted in the asset registry and the ten-year plan.

The Township's projected accumulated surplus at the end of 2019 is as follows:

December 31, 2017 Audited Accumulated Surplus	$22,784,339
Projected Impact of 2018 Budget	-($53,334)
Projected Impact of 2019 Budget	$530,804
2019 Estimated Ending Accumulated Surplus	$23,261,809

FINANCIAL IMPLICATIONS

There are no direct financial implications associated with this report. The intent is to describe the conversion of the cash based operating and capital budgets to a PSAB budget compliant format.

APPLICABLE LEGISLATION AND REQUIREMENTS

Ontario Regulation 284/09 of the Municipal Act, 2001

ATTACHMENTS

None

REPORT ADM-2019-007

TO: Mayor and Members of Council

FROM: Nina Lecic, Deputy Clerk

MEETING DATE: March 6, 2019

SUBJECT: Council-Staff Relations Policy
File: A09

RECOMMENDATIONS

THAT Staff Report ADM-2019-007 regarding the Council-Staff Relations Policy be received for information;

And that Council adopts the Council-Staff Relations Policy attached to this report.

Background

Effective March 1, 2019, the *Municipal Act* (the Act) will be amended to require Council to adopt and maintain a policy with respect to the relationship between Members of Council and the officers and employees of the corporation.

The Council-Staff Relations Policy outlines the legislation, policies, procedures and practices that the Township complies with in order to promote a respectful relationship between Members of Council and the employees of the Township of Puslinch.

Purpose

The purpose of this report is to provide Council with the Council-Staff Relations Policy, as required by the Act.

Financial Implications

There are no financial implications associated with this report.

Applicable Legislation and Requirements

Municipal Act, 2001, S.O. 2001, c. 25

Attachments

Council-Staff Relations Policy

Policy No. 2019-xxx

Corporate Policy

Department: Administration

Date: March 2019

Subject: Council Staff Relations Policy

1. POLICY STATEMENT:

The Township of Puslinch will promote a respectful, tolerant and harassment-free relationship and workplace between Members of Council and the officers and employees of the corporation, guided by the Code of Conduct for Members of Council, the Employee Code of the Conduct, the Violence in the Workplace Policy, the Harassment in the Workplace Policy and the Procedure By-law.

2. PURPOSE:

This policy provides guidance on how the Township of Puslinch ensures a respectful, tolerant and harassment-free relationship and workplace between Members of Council and the officers and employees of the corporation.

3. SCOPE:

In accordance with Section 270 of the Municipal Act, 2001, this policy applies to all members of Council and the officers and employees of the Corporation.

4. POLICY:

The relationship between Members of Council and the officers and employees of the corporation is guided by the following:

4.1 Code of Conduct for Members of Council

The Code of Conduct for Members of Council establishes the ethical behavior expected of Council Members.

Section 3 of the Code of Conduct states the following:

3.2 Members shall be respectful of the role of staff to provide advice based on political neutrality and objectivity and without undue influence from an individual **Member** or group of **Members**.

3.3. A Member shall not attempt to influence or to interfere, either directly or indirectly, with an employee, officer or other individual exercising functions under the Provincial Offences Act.

3.4. A Member shall not use or attempt to use the office or influence for the purpose of intimidating, threatening, coercing, commanding or influencing any staff member with the intent of interfering in the staff member's duties.

4.2 Employee Code of Conduct

The Employee Code of Conduct provides an understanding of the fundamental rights, privileges and obligations of Municipal Staff.

<u>The Staff/Council Relations section notes the following:</u>

1. Employees shall deal with all members of Council in an objective and impartial manner at all times.
2. Employees must recognize that elected officials are responsible for the establishment of policy and employees are responsible for implementation of the directive originating from Council.

4.3 Violence and Harassment in the Workplace Policy

The harassment and violence in the workplace policy is committed to providing and maintaining a work environment that is based on respect for the dignity and rights of everyone in the corporation. The policy applies to all Employees of the Township, which includes Members of Council.

It states that: The Township will not tolerate or condone discrimination, harassment or violence in the workplace.
Furthermore: An employee must do his/her part by ensuring that his/her behavior does not violate this policy. Respect in the workplace and fostering a work environment that is based on respect and is free of harassment, violence and discrimination is everyone's responsibility.

4.4 Procedure By-law

The Township's Procedural By-law states the following with respect to the Conduct of Council Members:

No Members stall:

a) use offensive words or unparliamentary language in or against the Council, any Member of Council, or any officer or employee of the Township, or any person acting in an official capacity or otherwise noted;

5. RESPONSIBILITIES

Members of Council and Township staff are responsible for adhering to the parameters of this policy and its governing provisions, including the Code of Conduct for Members of Council, the Employee Code of Conduct, the Violence and Harassment in the Workplace Policy, and the Township's Procedural By-law, and any amendments to these policies.

6. COMPLIANCE

The Township Clerk shall be responsible for receiving complaints and/or concerns related to this policy. Upon receipt of a complaint and/or concern, the Clerk shall notify:

1. The Supervisor responsible for the employee;
2. In the case of Council, the Integrity Commissioner;
3. In the case of a Violence and Harassment in the Workplace complaint, an Investigator.

Where there is a discrepancy between the Council-Staff Relations Policy and the Code of Conduct for Members of Council or the Employee Code of Conduct, the language in the Code prevails.

Where there is a discrepancy between the Council-Staff Relations Policy and the Violence and Harassment in the Workplace Policy, the Occupational Health and Safety Act prevails.

REPORT ADM-2019-009

TO: Mayor and Members of Council

FROM: Nina Lecic, Deputy Clerk

MEETING DATE: March 6, 2019

SUBJECT: Pregnancy and Parental Leave of Members of Council Policy

File: A09

RECOMMENDATIONS

THAT Staff Report ADM-2018-009 regarding the Pregnancy and Parental Leave of Members of Council Policy be received for information;

And that the Policy attached as Appendix A to this report be approved.

Background

Effective March 1, 2019, the *Municipal Act* (the Act) will be amended to require Municipalities to adopt and maintain a policy with respect to the Pregnancy and Parental Leave of Members of Council.

Purpose

The purpose of this report is to adopt a policy with respect to the Pregnancy and Parental Leave for Members of Council, as required by Section 270 of the Act. The Act allows an absence of up to 20 weeks for pregnancy and parental leave, without vacating the office of a Council Member, which is what this policy proposes. The policy was drafted to ensure flexibility for members of Council, recognizing their unique representative role.

Of particular note is that:

- A member reserves the right to participate as an active Member of Council at any time during his or her leave.
- A member shall continue to receive all remuneration, reimbursements and benefits afforded to all Members of Council.

Staff are recommending that the member's pay be continued because Council members do not pay EI premiums and are therefore not eligible to collect those benefits.

Staff have canvassed other Wellington County member Municipalities and heard from the following ones which confirmed the same approach to the remuneration aspect of the policy: Minto, Centre Wellington and Wellington North.

Financial Implications

There are no financial implications associated with this report.

Applicable Legislation and Requirements

Municipal Act, 2001, S.O. 2001, c. 25

Attachments

Pregnancy and Parental Leave of Members of Council Policy

Policy No. 2019-xxx

Corporate Policy

Department: Administration

Date: March 2019

Subject: Pregnancy and Parental Leave of Members of Council Policy

1. POLICY STATEMENT:

The Township of Puslinch recognizes a member of Council's right to take leave for the member's pregnancy, the birth of the member's child or the adoption of a child by the member as required by and in accordance with section 270 of the Municipal Act, 2001.

2. PURPOSE:

The purpose of the policy it to establish the procedure for declaring a pregnancy and parental leave for a member of Council.

3. DEFINITIONS:

Pregnancy and Parental Leave means an absence of 20 consecutive weeks or less as a result of a member's pregnancy, the birth of a member's child or the adoption of a child by the member in accordance with Section 259(1.1) of the Municipal Act, 2001.

4. SCOPE:

In accordance with Section 270 of the Municipal Act, 2001, this policy applies to members of Council.

5. POLICY:

Township Council supports a member of Council's right to pregnancy and/or parental leave in keeping with the following principles:

5.1 A member is elected to represent his or her constituents.
5.2 A member's pregnancy and/or parental leave does not require Council approval and his or her office cannot be declared vacant as a result of the leave.
5.3 A member will continue to receive communication from the Township as if the member were not on leave.
5.4 A member reserves the right to participate as an active member of Council at any time during his or her leave.

5.5 A member shall continue to receive all remuneration, reimbursements and benefits afforded to all members of Council.

5.6 Council may make temporary appointments an interim Member to Committee and Board to replace the Member on Leave, unless the Member has first given notice to the Clerk that they wish to continue to attend the meeting of the Committee and Boards to which they were appointed.

5.7 Notwithstanding, at any point in time during a member's pregnancy or parental leave, the member may provide written notice to the Clerk of their intent to lift any of the temporary appointments to exercise their statutory role. The member shall provide written notice to the Clerk of any changes to their return date.

5.8 Members of Council on pregnancy or paternity leave shall participate in events, conferences, committee meetings, constituent meetings or respond to communications at the level they determine, utilizing an out of office email feature to identify they are on leave, the level of service offered and an alternate contact, if required.

6. RESPONSIBILITIES

Members of Council and Township staff are responsible for adhering to the parameters of this policy.

Where a member of Council will be absent due to a pregnancy and/or parental leave, the member shall provide written notice to the Clerk indicating expected start and end dates.

7. COMPLIANCE

In cases of policy violation, the Integrity Commissioner may investigate and determine appropriate corrective action.

REPORT ADM-2019-010

TO: Mayor and Members of Council

FROM: Karen M. Landry, CAO/Clerk

MEETING DATE: March 6, 2019

SUBJECT: Tree Canopy and Natural Vegetation Protection and Enhancement Policy
File: A09TRE

RECOMMENDATIONS

THAT Staff Report ADM-2019-010 regarding a Tree Canopy and Natural Vegetation Protection and Enhancement Policy be received; and

THAT Council adopt the Tree Canopy and Natural Vegetation Protection and Enhancement Policy attached as Schedule A to Report ADM-2019-010.

Background

Effective March 1, 2019, the *Municipal Act* (the Act) requires Council to adopt and maintain a policy with respect to the manner in which the municipality will protect and enhance the tree canopy and natural vegetation in the municipality.

The County of Wellington considered and adopted a report prepared by Jameson Pickard, Planner regarding a Tree Canopy and Natural Vegetation and Enhancement Policy attached as part of Schedule C.

Purpose

The purpose of this report is to have Council adopt a Tree Canopy and Natural Vegetation Protection and Enhancement policy.

The Township protects trees and natural vegetation through existing policies and by working with other government organizations to support these objectives.

The proposed Tree Canopy and Natural Vegetation Protection and Enhancement Policy establishes that the Township will continue through identified existing policies and programs to protect trees and natural vegetation. The existing policies and programs include:

- The Township's current and proposed Development Standards provides for the planting of trees to protect and enhance the quality of natural heritage features found on and adjacent to proposed development sites – attached as Schedule B

- The County of Wellington Official Plan, approved May 6, 1999 (Consolidated June 1, 2018) – Part 5, policies 8.9, 10.13 g) and h) and 10.2, as amended – attached as Schedule C

  The Township utilizes the County's Official Plan.

- The County of Wellington Conservation and Sustainable Use of Woodlands By-law 5115-09, as amended – attached as Schedule D

  This By-law applies throughout the County of Wellington.

- The County of Wellington Natural Heritage System, established in 2018

  County staff on behalf of the Township use the County of Wellington Natural Heritage System as an enhancement and restoration tool.

- The County's Rural Water Quality Program, established in 1999 – accessible through the following link https://www.wellington.ca/en/resident-services/ruralwaterquality.aspx

  This program is available to eligible residents.

- The County Green Legacy Program

  The Township annually participates in this program.

- The Warden's Annual Tree Planting, established in 2006

  Township Council and staff are invited to participate in the annual tree planting event.

Financial Implications

There are no financial implications associated with this report.

Applicable Legislation and Requirements

Municipal Act, 2001, S.O. 2001, c. 25

Attachments

Schedule A	Tree Canopy and Natural Vegetation Protection and Enhancement Draft Policy
Schedule B	Township's Current Development Standards Current – Section and Township's Proposed Development Standards – Section
Schedule C	County of Wellington Committee Report by Jameson Pickard dated February 14, 2019 and excerpts of County of Wellington Official Plan, Approved May 6, 1999 (Consolidated June 1, 2018) – Part 5, policies 8.9, 10.1.3 g) and h) and 10.2
Schedule D	County of Wellington Conservation and Sustainable Use of Woodlands By-law 5115-09

Corporate Policy

Department: Administration

Date: March 2019

Subject: Tree Canopy and Natural Vegetation Protection and Enhancement

Policy Statement

The Township is committed to protecting trees and natural vegetation and working with other organizations that support these objectives.

Scope

This policy applies to the entire Township.

General

The Township will comply with and support the following policies and programs as part of its Tree Canopy and Natural Vegetation Protection and Enhancement Policy:

1. The Township's Development Standards, as amended
2. The County of Wellington Official Plan, approved May 6, 1999 (Consolidated June 1, 2018) – Part 5, policies 8.9, 10.13 g) and h) and 10.2, as amended
3. The County of Wellington Conservation and Sustainable Use of Woodlands By-law 5115-09, as amended
4. The County of Wellington Natural Heritage System, established in 2018, as amended
5. The County's Rural Water Quality Program through participation by eligible residents
6. The County Green Legacy Program through participation in the annual tree distribution program
7. The Warden's Annual Tree Planting, established in 2006 through participation in the annual tree planting event as resources permit

Reference and Related Documents

Township's Development Standards, as amended
County of Wellington Official Plan, as amended
County of Wellington Conservation and Sustainable Use of Woodlands By-law 5115-09, as amended
County of Wellington Natural Heritage System, as amended

EXCERPTS

Current Development Standards

4.5.1 Trees

Trees are to be provided by the Developer and placed every 35 metres along both sides of the road allowance. The type and location shall be reviewed with the Township of Puslinch during the design of the services. In general the trees will be at least 2.5 metres in height and a minimum trunk caliper of 75 mm measured 0.3 metres above the ground level. All trees shall be of top grade nursery grown stock free of all insect pests and diseases.

If the trees will interfere with the utilities to be provided, alternative spacing, grouping or location of the trees will be considered.

The following list of tree species will be accepted but consideration must be given to soil type and moisture conditions and other tree species will be considered.

Norway Maple	Blue Spruce
Honey Locust	Austrian Pine
Red Oak	Sugar Maple
White Ash	

Proposed Development Standards

9.2 Plant Materials

- Native trees and shrubs should mostly be used in landscape plantings, particularly where development is proposed in close proximity to woodlands and wetlands. However, in urban areas and on other sites where planting conditions are difficult some non-native species that are not considered invasive may be utilized.
- Along all-weather roads an average of one tree is to be planted for every 10 meters of road frontage. Street trees are not to be planted within the road allowance but are to be provided on private property close to the road allowance.
- Trees are also to be planted in and/or around parking areas and along the perimeter of development properties in locations that enhance the appearance and functions of buildings and structures.

List of Recommended Trees

DECIDUOUS TREES

Red Maple (Acer rubrum)
Silver Maple (Acer saccharium)
Sugar Maple (Acer saccharum)
Downy Serviceberry (Amelanchier arborea) Allegheny Serviceberry (Amelanchier laevis)
White Birch (Betula papyrifera)
Blue Beech (Carpinus caroliniana) Bitternut Hickory (Carya cordiformis) Shagbark Hickory (Carya ovata)
Hackberry (Celtis occidentalis)
Black Walnut (Juglans nigra)
American Hophornbeam (Ostrya virginiana) London Planetree (Plantanus x acerifolia)*
Sycamore (Plantanus occidentalis) Largetooth Aspen (Populus grandidentata) Pin Cherry (Prunus pensylvanica)
Black Cherry (Prunus serotina)
Bur Oak (Quercus macrocarpa)
Red Oak (Quercus rubra)
American Mountain Ash (Sorbus Americana) Showy Mountain Ash (Sorbus decora)
Basswood (Tilia Americana)
*Non-invasive introduced species

Coniferous Trees

Balsam Fir (Abies balsamea)
Red Cedar (Juniperous virginiana)
European Larch (Larix decidua)*
Tamarack (Larix laricina)
Norway Spruce (Picea abies)*
White Spruce (Picea glauca)
Colorado Blue Spruce (Picea pungens ‘Glauca”)*
Red Pine (Pinus resinosa)
White Pine (Pinus strobus)
White Cedar (Thuja occidentalis)
Eastern Hemlock (Tsuga canadensis)
*Non-invasive introduced species

- For ecological restoration and/or enhancement projects bare root tree seedlings that are 15 to 60cm in height may be utilized.

Shrubs and Ground Covers

- Use shrubs and ground covers in large masses for lower maintenance and seasonal planting. Place special emphasis on early spring and fall colours.
- Use shrubs to define and control pedestrian circulation and to screen undesirable views.

DECIDUOUS SHRUBS

Alternate-leaved Dogwood (Cornus alternifolia)
Grey Dogwood (Cornus racemosa)
Red-osier Dogwood (Cornus sericea)
Winterberry (Ilex verticillata)
Ninebark (Physocarpus opulifolius) Chokecherry (Prunus virginiana)
Fragrant Sumac (Rhus aromatica)
Staghorn Sumac (Rhus typhina)
Smooth Wild Rose (Rosa blanda)
Pussy Willow (Salix discolor)
American Elderberry (Sambucus canadensis) Red Elderberry (Sambucus pubens)
Meadowsweet (Spiraea alba)
Narrow-leaved meadowsweet (Spiraea alba) Nannyberry (Viburnum lentago)
American Highbush Cranberry (Viburnum trilobum)

EVERGREEN SHRUBS

Junipers (Juniperus sp.)
Mugo Pine (Pinus mugo)*
Ground Hemlock (Taxus canadensis)

PERENNIALS

New England Aster (Aster novae-angliae)
Purple Cone Flower (Echinacea purpurea)
Canada Wild Rye (Elymus Canadensis)

Creeping Red Fescue (Festuca rubra)
Daylily (Hemerocallis sp.)*
Perennial Ryegrass (Lolium perenne)*
Wild Bergamot (Monarda fistulosa)
Kentucky Bluegrass (Poa pratensis)*
Black-Eyed Susan (Rudbeckia hirta)
Autumn Joy Sedum (Sedum sp.)*
Little Bluestem (Schizachyrium scoparium)
Indian Grass (Sorghastrum nutans)

*Non-invasive introduced species

- Minimum acceptable sizes for shrubs are 60 to 100cm in height
- For ecological restoration and/or enhancement projects bare root shrub seedlings 20 to 60cm in height may be

Landscape Buffers

- Buffers may be needed to screen undesirable views along roads or property boundaries. Buffers may consist of architectural screening, landscaping, berming or a combination of these materials.
- Where landscaping is used to create the buffer, planting is to consist of trees and/or shrubs, with a minimum of 50% coniferous (evergreen) plant material. Site-specific circumstances may warrant dense, continuous coniferous planting.
- Where berming is used to create the buffer, the berm must be a minimum of one meter high and have maximum side slopes of 3:1. It must be seeded with an appropriate native groundcover and planted with a mixture of shrubs and coniferous trees.

COUNTY OF WELLINGTON

KIM COURTS
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74 WOOLWICH STREET
GUELPH, ONTARIO
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February 15, 2019

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Dear Member Municipality Clerks,

At its meeting held February 14, 2019 the following recommendation and report was presented to the Planning Committee:

> **That the report on Tree Canopy and Natural Vegetation Protection and Enhancement be received and endorsed as the County's fulfillment of the requirement of section 270(1)7 of the Municipal Act 2001, as amended; and**
>
> **That the Tree Canopy and Natural Vegetation Protection and Enhancement report be circulated to our member municipalities for their information and consideration.**

Please note that municipalities have until March 1, 2019 to develop and implement policies that will achieve this requirement.

Enclosed is the Tree Canopy and Natural Vegetation Protection and Enhancement Report.

Should you have any questions please contact Jameson Pickard, Planner at jamesonp@wellington.ca or 519.837.2600 x 2300.

Respectfully,

Courts

Kim Courts
Deputy Clerk

COUNTY OF WELLINGTON

COMMITTEE REPORT

To: Chair and Members of the Planning Committee
From: Jameson Pickard, Planner
Date: Thursday, February 14, 2019
Subject: **Tree Canopy and Natural Vegetation Protection and Enhancement**

1.0 Background

On May 30, 2017, *Bill 68 – Modernizing Municipal Legislation Act, 2017* received Royal Assent in the Ontario Legislature. This legislation made changes to a number of existing pieces of legislation which apply to municipal operations. This report focuses on one change made to section 270 (1) of the *Municipal Act*, *2001*, which states:

"*A municipality shall adopt and maintain policies with respect to the following matters:*

7. *The manner in which the municipality will protect and enhance the tree canopy and natural vegetation in the municipality."*

Municipalities have until March 1st, 2019 to develop and implement policies that will achieve this requirement.

2.0 County of Wellington Existing Policies and Programs

The County of Wellington has a long history of protecting trees and natural vegetation and working with other organizations that support these objectives. The County of Wellington's existing policies and programmes which protect and enhance tree canopy and natural vegetation include*:*

- The County of Wellington Official Plan, Approved May 6, 1999 (Consolidated June 1, 2018) – Part 5, policies 8.9, 10.1.3 g) & h) and 10.2 (see Appendix 1);
- The County's Rural Water Quality Programme, established in 1999;
- The County's Green Legacy Programme, established in 2004;
- The Warden's Annual Tree Planting, established in 2006
- The County of Wellington Conservation and Sustainable Use of Woodlands By-law (5115-09), established in 2009; and
- The County's Natural Heritage System, established in 2018

3.0 Conclusion

The legislation does not provide clear direction on what constitutes an adequate policy to fulfil this requirement of the Municipal Act. However, on December 4, 2018, staff did receive an

email with some clarity from the Ministry of Municipal Affairs advising that the policy is intended to give municipalities the flexibility to determine what is included in the policy to address local need and circumstances.

Based on the above information, staff believe that the intent of the policy requirement under section 270(1)7 of the *Municipal Act, 2001*, is already achieved through the County's existing policies and programmes related to tree and vegetation protection and enhancement.

We note that these policies and programmes apply to the entire County of Wellington, and our member municipalities may wish to rely on them in order to address their requirement under the *Municipal Act, 2001.*

4.0 Recommendation

THAT the report on 'Tree Canopy and Natural Vegetation Protection and Enhancement' be received and endorsed as the County's fulfillment of the requirement of section 270(1)7 of the Municipal Act, 2001, as amended.

AND

THAT the report 'Tree Canopy and Natural Vegetation Protection and Enhancement' be circulated to our member municipalities for their information and consideration.

Respectfully submitted,

Jameson Pickard, B.URPL
Planner

Appendix 1

(County of Wellington Official Plan Excerpts)

PART 5
THE GREENLANDS SYSTEM

5.1 DEFINED

The Greenlands System is intended to include those features and areas which are part of Wellington's natural heritage or areas in which natural or human-made conditions may pose a threat to public safety. These often inter-related areas include:

- wetlands
- environmentally sensitive areas
- streams and valley lands
- ponds, lakes and reservoirs
- areas of natural and scientific interest
- woodlands
- fish and wildlife habitat
- flood plains and hazardous lands
- threatened or endangered species

Our natural heritage will be protected and enhanced.

5.2 PURPOSE

The Greenlands System set out in the Plan contains landscapes, resources and ecological systems that are essential to environmental and public health in Wellington. The Greenlands System will ensure that natural features and areas and their natural beauty will be retained for future generations.

The County recognizes the many important and inter-related functions of our natural environment. The careful conservation of our land, animal, plant, water and air resources is necessary to provide healthy, prosperous and enjoyable communities.

Certain parts of the County contain land subject to natural hazards including flooding hazards, erosion hazards and areas of unstable soils or bedrock. These hazards may pose a danger to public health and safety, including risks to life and property. The County recognizes the public interest in reducing exposure to unsafe conditions.

The Greenlands System also has a spiritual value providing visual pleasure, tranquility, recreation and renewal essential to human health and well being.

Finally, the Greenlands System has an economic value related to tourism, forestry, recreation, fishing and other resource products which is sustainable if properly managed.

5.3 PLANNING APPROACH

The Greenlands System is designated on Schedule "A" to this Plan and is a composite of many natural heritage features, flood prone areas and hazardous lands. The boundaries of many natural heritage features overlap and inter-relationships frequently exist between these areas. The system is divided into two broad categories: Core Greenlands and Greenlands.

The Greenlands System will be maintained or enhanced. Activities which diminish or degrade the essential functions of the Greenlands System will be prohibited. Activities which maintain, restore or, where possible, enhance the health of the Greenlands System will be encouraged where reasonable.

While the Greenlands System designated on Schedule 'A' is based on those features that have been mapped at a municipal scale, the diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems, should be maintained, restored or, where possible, improved, recognizing linkage between and among natural heritage features and areas,

surface water features and ground water features.

5.4 CORE GREENLANDS

Within the Greenlands System certain areas have greater sensitivity or significance. These areas will be identified in policy and protected. These areas have been included in the "Core" Greenlands designations and include:

- provincially significant wetlands
- all other wetlands;
- habitat of endangered or threatened species and fish habitat; and
- hazardous lands.

Development is not allowed in provincially significant wetlands or the habitat of endangered or threatened species.

5.4.1 Wetlands

All wetlands in the County of Wellington are included in the Core Greenlands. Development and site alteration will not be permitted in wetlands which are considered provincially significant. Provincially significant wetlands are shown in Appendix 3 of this Plan. All other wetlands will be protected in large measure and development that would seriously impair their future ecological functions will not be permitted. The appropriate Conservation Authority should be contacted when development is proposed in or adjacent to a wetland.

5.4.2 Habitat of Endangered or Threatened Species and Fish Habitat

Development and site alteration will not be allowed in significant habitat of endangered or threatened species except in accordance with provincial and federal requirements. Development or site alteration adjacent to significant habitat of endangered or threatened species shall require a satisfactory Environmental Impact Assessment that demonstrates there will be no negative impact on the significant habitat of endangered or threatened species or its ecological function. Proponents will be directed to the federal or provincial agency that has jurisdiction over the species or habitat to be protected.

Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.

5.4.3 Hazardous Lands

The Core Greenlands designation includes areas subject to flooding hazards and erosion hazards and hazardous sites that could be unsafe for development or site alteration due to naturally occurring hazards like organic soils or unstable bedrock conditions. Generally development shall be directed away from areas in which conditions exist which would pose risks to public health and safety or property caused by natural hazards.

Development shall not be permitted to locate in hazardous lands where the use is:

- An institutional use associated with hospitals, nursing homes, pre-school, school nurseries, day care and schools where there is a threat to safe evacuation during an emergency as a result of flooding, failure of floodproofing measures and/or protection works, or erosion;

- An essential emergency service such as that provided by fire, police, and ambulance stations and electrical substations, which would be impaired during an emergency as a result of flooding, failure of floodproofing measures and/or protection works, or erosion;

- Associated with the disposal, manufacture, treatment or storage of hazardous substances.

Development and site alteration will not be permitted in the floodway of a river or stream unless a Special Policy Area has been approved or it is permitted elsewhere in this Plan. In most parts of the County, a one-zone flood plain management concept applies and the floodway encompasses the entire floodplain.

Development and site alterations will only be permitted in the flood-fringe portion of the floodplain (where a two-zone concept applies), in Special Policy Areas and in areas susceptible to other natural hazards if:

a) the hazards can be safely addressed, and the development and site alteration is carried out in accordance with established standards and procedures;

b) new hazards are not created and existing hazards are not aggravated;

c) no adverse environmental impacts will result;

d) essential emergency services have a way of safely entering and exiting the area during times of flooding, erosion and other emergencies;

e) the development does not include institutional uses or essential emergency services or the disposal, manufacturing, treatment or storage of hazardous substances;

f) no reasonable alternative is available.

Development must avoid areas which pose a threat to public health or safety.

5.5 GREENLANDS

Other significant natural heritage features including habitat, areas of natural and scientific interest, streams and valleylands, woodlands, environmentally sensitive areas, ponds, lakes and reservoirs and natural links are also intended to be afforded protection from development or site alteration which would have negative impacts.

These areas are often found within Core Greenlands. Where they are outside Core Greenlands they are identified as Greenlands.

5.5.1 Habitat

Fish and wildlife habitat are included in the Greenlands System, often as part of other defined natural heritage features.

Development and site alteration shall not be allowed in significant wildlife habitat unless it has been demonstrated that there will be no negative impacts on the habitat or its ecological functions.

Development and site alteration shall not be allowed in fish habitat except in accordance with provincial and federal requirements.

5.5.2 Natural and Scientific Interest

Areas of Natural and Scientific Interest (ANSI's) are included in the Greenlands system where they have been determined by the Province to be provincially significant or regionally significant. Both provincially and regionally significant Areas of Life Science or Earth Science Natural and Scientific Interest will be protected from development or site alteration which would

have a negative impact on the natural feature or its ecological function.

5.5.3 Streams and Valleylands

Streams and valleylands are included in the Greenlands system. All streams and valleylands will be protected from development or site alterations which would negatively impact on the stream or valley-land or their ecological functions.

5.5.4 Woodlands

In the Rural System, woodlands over 4 hectares and plantations over 10 hectares are considered to be significant by the County, and are included in the Greenlands system. Woodlands of this size are important due to their contribution to the amount of forest cover on the County landscape. Exceptions may include a plantation established and continuously managed for the sole purpose of complete removal at rotation without a reforestation objective, as demonstrated with documentation acceptable to the County.

In the Urban System, woodlands over 1 hectare are considered to be significant by the County and are included in the Greenlands System. Woodlands of this size are important due to their economic, visual and environmental contributions to the urban landscape.

Detailed studies such as environmental impact assessments may be used to identify, delineate and evaluate the significance of woodlands based on other criteria such as: proximity to watercourses, wetlands, or other woodlands; linkage functions; age of the stand or individual trees; presence of endangered or threatened species; or overall species composition.

Significant woodlands will be protected from development or site alterations which would negatively impact the woodlands or their ecological functions. Good forestry practices will be encouraged and tree removal shall be subject to the Wellington County *Forest Conservation By-law*.

Smaller woodlands may also have local significance and, where practical, these smaller woodlands should be protected.

5.5.5 Environmentally Sensitive Areas (ESA's)

Environmentally sensitive areas as determined by the County from previous studies are included in the Greenlands system. The areas will be protected from development or site alterations which would negatively impact them or their ecological functions.

5.5.6 Ponds, Lakes and Reservoirs

Ponds, lakes and reservoirs are included in the Greenlands system where the County determines they require protection. These areas will be protected from development or site alterations which would negatively impact them or their ecological functions.

5.6 DEVELOPMENT CONTROL

5.6.1 Permitted Uses

Within the Core Greenlands designation, development and site alteration shall not be permitted within Provincially Significant Wetlands or in significant habitat of threatened or endangered species, except in accordance with provincial and federal requirements.

In other Core Greenlands areas, and in Greenlands areas, permitted uses and activities may include:

a) agriculture;
b) existing uses;
c) conservation;
d) forestry;
e) aggregate extraction within Mineral Aggregate Areas subject to appropriate rezoning, licensing and the policies of this Plan;
f) open space; and
g) passive recreation.

Other uses permitted in the applicable adjacent or underlying designations may be permitted.

5.6.2 Development Impacts

The above uses for both, the Core Greenlands and Greenlands designations, as well as accessory buildings and structures, shall only be permitted if:

- there are no negative impacts on significant features and functions and no significant negative impacts on other greenland features and functions;
- the hazardous lands policies of Section 5.4.3 are met;
- the development conforms to policies of the applicable adjacent or underlying designation.

Where development is proposed in the Greenland system or on adjacent lands, the County or local municipality shall require the developer to:

a) identify the nature of the features potentially impacted by the development;

b) prepare, where required, an environmental impact assessment to ensure that the requirements of this Plan will be met, and consider enhancement of the natural area where appropriate and reasonable.

c) address any other relevant requirements set out in Section 4.6.3 Environmental Impact Assessment.

No development will be approved unless the County is satisfied that the Greenland and Environmental Impact Assessment policies are met.

Natural Heritage Systems

The County will encourage the restoration or enhancement of the natural heritage system in accordance with the following:

- In areas undergoing significant development, particularly in urban areas, an assessment of opportunities to link or connect natural features may be required to demonstrate how the development will maintain, restore or, where possible, improve linkages and connectivity;
- In areas not undergoing significant development, particularly agricultural and rural areas, stewardship initiatives will be the main means to maintain, restore or, where possible, improve linkages and connectivity.

5.6.3 Adjacent Lands

For the purposes of this section of the Plan, adjacent lands are considered to be:

a) lands within 120 metres of provincially significant wetlands, provincially significant Life Science Areas of Natural and Scientific Interest, significant habitat of endangered and threatened species, fish habitat, significant wildlife habitat, significant valleylands, and significant woodlands.

b) lands within 50 metres of provincially significant Earth Science Areas of Natural and Scientific Interest;

c) lands within 30 metres of all other Core Greenlands and Greenland areas.

5.6.4 Zoning

Core Greenland areas shall be placed in a restrictive zone which prohibits buildings, structures and site alterations except as may be necessary for the management or maintenance of the natural environment.

Other greenlands may also be given a restrictive zoning by a municipal council.

Zoning by-laws may also recognize existing land uses in core greenlands and, where appropriate, provide for reasonable expansions or alterations. Zoning by-laws may also establish setbacks from Core Greenland areas in which no buildings or structures shall be permitted.

5.6.5 Agriculture

The Greenlands System policies will not limit the ability of agricultural uses to continue.

5.6.6 Mineral Aggregate Areas

Areas of high potential for mineral aggregate area shown on Schedule 'C' as an overlay over the Greenland System.

Existing licensed mineral aggregate operations are permitted and will be protected.

In the Greenbelt, mineral aggregate operations are subject to the policies of Section 9.9.10.2.

5.6.7 Greenlands Mapping

The mapping identifying Core Greenlands and Greenlands on various schedules to this Plan may need to be refined by more detailed mapping on individual sites. Where more detailed mapping is available, minor adjustments may be made without an amendment to this Plan and the land use policies of the adjacent designation will apply as determined by Council.

5.6.8 Conservation Authority Regulations

Some lands within and adjacent to the Greenland System may be subject to an Ontario Regulation issued under the Conservation Authorities Act. Where development or site alteration is proposed within a regulated area, as shown on Conservation Authority schedules and/or described in the text of the applicable Conservation Authority regulation, the Conservation Authority should be consulted before development (including construction, conversion, grading, filling, or excavating).

5.7 RESTORATION AND ENHANCEMENT

While the majority of the County policy framework is focused on protecting natural heritage features from development and site alteration, the County also supports restoration and enhancement of the natural heritage system. The development control process can provide a means to identify opportunities for restoration and enhancement where development activities are taking place.

The Rural System is by far the largest land area of the County and this area is not normally undergoing development. The County believes that the most effective way to restore and enhance the natural heritage system in these areas lies in stewardship initiatives. These initiatives normally involve partnerships with willing landowners to identify and make improvements.

The County has developed a Rural Water Quality Program with Conservation Authorities to encourage farm stewardship initiatives to improve water quality. The County also has a Green Legacy Program that supports community and private planting activities which include an educational and advisory component. Both programs are stewardship initiatives that restore and enhance the County's natural heritage. Examples include projects to: restore streambeds; fence livestock from streams which have become naturalized linkages over time; tree planting to prevent or reduce water and wind erosion or to restore fragile lands.

5.8 GREENBELT PLAN

Lands within the Greenbelt are subject to the policies of Section 9.9.

Recreation Master Plan may be included by amendment to the Official Plan.

8.9 GREENLANDS SYSTEM

8.9.1 Overview

The GREENLAND areas designated within Urban Centres consist mainly of Core Greenlands, as illustrated on Schedule "A" of the Plan. The primary purpose is to identify hazardous areas which pose a threat to property or human life or have inherent limitations to development.

The main greenland features identified are rivers, their adjacent flood prone land and valley slopes. Also included are wetlands, significant woodlands, smaller watercourses and other areas with physical constraints such as poor drainage, steep or unstable slopes. These areas serve as plant and animal habitat, forest areas and fishery resource areas in urban centres.

8.9.2 Objectives

The objectives for the greenland areas are as follows:

a) to provide protection to those aspects of the natural environment which can be harmed by urban development;

b) to protect the community from those aspects of the natural environment which can pose a threat to public health and safety;

c) to ensure that natural areas are protected and their natural beauty retained for future generations;

d) to improve public access to natural areas where appropriate; and

e) to encourage stewardship and enhancement of the local natural environment.

Urban greenlands will be protected and, where practical, enhanced.

8.9.3 Permitted Land Use

Within the Core Greenlands and Greenlands designations on Schedule "A", permitted uses and policies outlined in the Greenland System of this Plan shall apply.

8.9.4 Hazardous Lands and Sites

a) lands which may be hazardous because of unstable slopes or other hazards will be identified in the implementing Zoning By-law, in consultation with the Conservation Authority;

b) the reconstruction or minor alteration of existing uses may occur subject to the approval of Council and any required Conservation Authority permits.

8.9.5 Flood Plain Lands

Many urban centres were settled along the banks of a major water course. A significant portion of many urban centres in Wellington lie within a flood plain. The following policies shall apply to land designated GREENLANDS within a flood plain.

a) this Plan prescribes a "one-zone" approach to flood plain management, meaning that development is restricted below the Regulatory Floodplain (i.e. flood plain area), as shown on Schedule "A");

b) no buildings or structures shall be erected and no placement, movement or removal of fill may occur within the flood plain without the prior approval of the Conservation Authority;

c) outdoor industrial storage or the storage of hazardous or toxic

substances including sewage disposal or collection shall not be permitted;

d) the reconstruction or minor alteration of existing uses may occur subject to the approval of Council and any required Conservation Authority permits;

e) the creation of lots which extend into flood susceptible areas may only be permitted, in consultation with the Conservation Authority, where no public agency is willing to assume ownership of the flood plain lands and that sufficient buildable area exists outside the flood plain;

f) amendments to this Plan will not be required for minor revisions to flood plain boundaries.

8.9.6 Special Policy Areas – Flooding

A **Special Policy Area** may be applied within a community that has historically existed in the floodplain and where site specific policies approved in consultation with the Conservation Authority, Ministry of Natural Resources and the Ministry of Municipal Affairs are intended to address the significant social and economic hardships that would result from strict adherence to provincial policies.

For the purposes of the Plan, the communities of Drayton and Harriston identify a Special Policy Area for floodplain management. In addition, Harriston, utilizes a two zone concept to manage portions of the floodplain outside of the Special Policy Area. Notwithstanding the above, the urban centre of Rockwood utilizes both a one zone and a two zone concept to floodplain management. Also, the hamlet of Damascus which contains a portion of the Four Mile Creek is subject to flooding during a Regional Storm. A two zone concept has been applied to Damascus and the Zoning By-law will establish permitted uses and regulations to implement this approach to floodplain management.

Specific floodplain management policies for Drayton, Harriston, Eden Mills and Rockwood are contained in Part 9, Local Planning Policy.

8.10 FUTURE DEVELOPMENT

8.10.1 Overview

There are certain areas within urban centres, where it is not possible to pre-designate for the future intended uses. Such lands may not be required over the planning period for development purposes or the specific nature of the intended land uses is not known at this time.

8.10.2 Objectives

The objectives for areas designated FUTURE DEVELOPMENT are as follows:

a) to provide for the orderly future development of the unbuilt areas of the Urban Centre;

b) to limit development of such lands until an Official Plan Amendment including a proper site plan or concept plan for future uses has been submitted and approved;

c) to prohibit any major development of these lands until the necessary municipal services can be made available to such areas.

8.10.3 Permitted Uses

The permitted uses within areas designated FUTURE DEVELOPMENT as illustrated on Schedule "A" of the Plan shall be limited to existing uses and the growing of crops including nursery and horticultural crops but does not include greenhouses.

Consideration may be given to the creation of a new lot by consent provided such development is in accordance with the policies of this Plan.

PART 10
CREATING NEW LOTS

10.1 GENERAL POLICIES

10.1.1 All New Lots

The creation of new lots is the responsibility of the County of Wellington through sub-divisions, consents and part lot control. In approving new lots by any means, the County will ensure that the policies of this Plan and local planning regulations will be met. The County will strive to ensure that:

- the natural environment is protected
- natural resources are protected
- public services are used efficiently
- good community design is promoted
- health and safety issues are addressed

10.1.2 Subdivision Required

Plans of subdivision will normally be required when:

a) four or more lots (including the retained) are being created, or

b) a new road or a substantial extension to an existing road is required, or

c) where special concerns or issues exist which would best be dealt with through a plan of subdivision.

Where the policies of this Plan refer to "plan of subdivision" or "subdivision", the words "plan of condominium " or "condominium" can be substituted where applicable.

10.1.3 Matters for Consideration

The County will consider the following when considering new lot creation by subdivision, consent or part lot control:

a) that any new lots will be consistent with official plan policies and zoning regulations;

b) that all lots can be adequately serviced with water, sewage disposal, stormwater management or drainage, fire protection, roads, utilities, solid waste disposal to accepted municipal standards and without undue financial burden on the municipality;

c) that sufficient reserve water and sewage plant capacity will be available when lots are created in areas to be serviced by central water and sewage systems;

d) that all lots will have safe driveway access to an all-season maintained public road and that access to a local road will be preferred over county and provincial roads, where practical;

e) e) that public streets, spaces and facilities will be safe, meet the needs of pedestrians, and facilitate pedestrian and non-motorized movement, including, but not limited to, walking and cycling.

f) that the topography, soils and drainage of the site are satisfactory for the lot sizes and uses proposed;

g) that tree loss related to anticipated development be kept to a minimum and, wherever reasonable, be compensated for by new tree planting;

h) that natural heritage features are not affected negatively;

i) that lots are not created in areas which would pose a threat to public health or safety;

j) that natural resources such as agricultural lands and mineral aggregates would not be affected adversely;

k) that the size and shape of proposed lots is suitable, including frontage, area and the proportion of frontage to depth;

l) that the proposed lots and uses are compatible with and designed to minimize adverse impacts on surrounding uses;

m) that all new lots shall have logical lot lines given existing lot patterns in the area, natural and human-made features and other appropriate considerations;

n) that residential lots will have adequate access to community facilities such as schools, libraries and parks based on reasonable standards for the area;

o) that the creation of any lot is necessary, timely and in the public interest;

p) that provincial legislation and policies are met, including the Greenbelt Plan policies set out in Section 9.9 of this Plan.

10.1.4 Studies

In considering the creation of new lots and in particular lots created by plan of subdivision, the County may require studies to ensure that the policies of this Plan are appropriately addressed.

Plans of subdivision will be accompanied by:

- planning impact assessments
- environmental impact assessments
- preliminary storm water management plans

Where a plan of subdivision is proposed to be developed on individual on-site or private communal water or sewage services, the following studies will also be required:

- a Servicing Options Assessment
- a hydrogeological study

Other studies may be required depending on individual circumstances.

Lots created by consent may also require studies to evaluate merit. In particular, lots created in or adjacent to the Greenland system may require an environmental impact assessment.

10.1.5 Conditions of Approval

In approving new lots, the County will impose conditions which are necessary to ensure that a plan of subdivision or consent is developed in an orderly manner and that the public interest is protected.

10.1.6 Part-Lot Control

Where a plan of subdivision is approved, a part-lot control by-law may be passed to allow the further division of a lot or block if the objectives of this plan and the regulations of the zoning by-law are met.

10.2 GREENLAND SYSTEM

10.2.1 New Lots Restricted

New lots will not be allowed within the Greenlands System unless:

a) the lot has sufficient area outside the Core Greenland System for all its intended functions including suitable buffering and includes core greenland areas only to provide for logical boundaries;

b) the lot provides a minor boundary adjustment or correction of title and does not require any activity which would impair greenland features or functions;

c) the lot is for conservation purposes which provide an overall benefit to the environment;

d) there will be no negative impacts on natural features or their ecological functions.

10.2.2 Environmental Impact Studies

Where the County is concerned that a proposed lot in or adjacent to the Greenlands System could negatively impact a natural feature or function, the County may require an environmental impact study to assess potential impacts and means of mitigation.

10.3 PRIME AGRICULTURAL LAND

10.3.1 New Lots

Lot creation in prime agricultural areas will be restricted to the following:

a) agricultural uses
b) agriculture-related uses
c) a residence surplus to a farming operation.
d) lot line adjustments
e) community service facilities

10.3.2 Agricultural Uses

New lots for agricultural operations shall be of a size appropriate for the type of agricultural use(s) common in the area and sufficiently large to maintain flexibility for future changes in the type or size of agricultural operations. New agricultural lots will normally be a minimum of 35 hectares in size. Smaller lots may only be considered where there is clear evidence that the farmer intends to conduct an agricultural pursuit which can be successful on a smaller property.

Where practical, the creation of agricultural lots along the original lots in the Township survey is encouraged even if somewhat smaller than normal lots result.

New agricultural lots may include lands in the Greenlands System where necessary to provide logical lot lines, provided that suitable building envelopes and new access routes are available outside of, and a suitable distance from, Core Greenlands and Greenlands features.

10.3.3 Agriculture-Related Uses

New lots for agricultural-related uses should be kept to a minimum size necessary for the use and appropriate water and sewage systems.

10.3.4 Residence Surplus to a Farming Operation

A severance may be considered for an existing residence that is surplus to a farming operation as a result of farm consolidation, provided that:

a) the remaining vacant farmland is large enough to function as a significant part of the overall farm unit; and

b) the result of removing the surplus dwelling from the farm does not render the remaining farmlands difficult or inefficient to farm; and

c) the amount of good farmland retained with the surplus house is kept to a minimum size needed for residential purposes, taking into consideration environmental and topographic features; and

d) the surplus residence is habitable and is not expected to be demolished by a future owner; and

e) the Minimum Distance Separation formula will be met, and

f) the vacant parcel of farmland is rezoned to prohibit a residential use.

The intention of this policy is to allow farmers to reduce their costs of acquiring

THE CORPORATION OF THE COUNTY OF WELLINGTON

BY-LAW NUMBER 5115-09

A by-law respecting the Conservation and Sustainable Use of Woodlands and to repeal by-law number 5090-09.

WHEREAS subsection 135(2) of the *Municipal Act, 2001*, S.O. 2001, c. 25, as amended, ("the Act") provides that The Corporation of the County of Wellington ("the County of Wellington") may prohibit or regulate the destruction or injuring of trees in woodlands designated in the by-law;

AND WHEREAS the County of Wellington may require that a Permit to injure or destroy trees in woodlands designated in the by-law and impose conditions on a permit, including conditions relating to the manner in which destruction occurs and the qualifications of persons authorized to injure or destroy trees;

AND WHEREAS the County of Wellington has determined that it is desirable to enact such a by-law for the purpose of achieving the objectives of the County Official Plan by sustaining a healthy natural environment and by promoting good forestry practices;

NOW THEREFORE, the Council of The Corporation of the County of Wellington hereby enacts as follows:

SECTION 1. DEFINITIONS

In this by-law:

(a) "basal area" means the sum of the basal areas of the individual trees of a dbh greater than 10 cm (3.94 in) which comprise woodlands (expressed in square metres per hectare or square feet per acre). The basal area of an individual tree is the cross-sectional area of the tree stem or trunk taken at the point of measurement of dbh. For purposes of enforcing this by-law, basal area shall be determined by using a 4% strip cruise (where trees are measured on 2-metre (6.56 foot- wide parallel strips) regularly spaced across the woodlands;

(b) "building permit" means a building permit as issued under the *Building Code Act*, 1992, S.O. 1992, c. 23, or any successor thereof;

(c) "bush cord" means a measure of stacked wood measuring 4 by 4 by 8 ft or 128 cubic feet (123 by 123 by 246 cm or 3.7 cubic metres) of wood and air;

(d) "business days" means any day falling on or between Monday and Friday of each week but does not include New Year's Day, Family Day, Good Friday, Easter Monday, Victoria Day, Canada Day, Civic Holiday, Labour Day, Thanksgiving Day, Remembrance Day, Christmas Day and Boxing Day;

(e) "Calendar Year" means January 1 through December 31 of a year;

(f) "Certified Tree Marker" means an individual who has completed all requirements to be certified by the Ontario Ministry of Natural Resources to mark trees according to a silvicultural prescription;

(g) "Christmas Tree Plantation" is an area planted with appropriate tree species and managed for the production of Christmas trees. This means that the trees and area is regularly tended to produce trees to be sold as Christmas trees. A Christmas tree plantation must have been tended for the production of Christmas trees within the last five (5) years. If the area has not been tended as a Christmas tree plantation within five years and meets the stocking requirements of Section 1(ai) it is considered woodlands;

(h) "circumference" means the measurement of the outer boundary of the stem or trunk of a tree, including the bark;

(i) "Clerk" means the Clerk of the County of Wellington or his or her designate;

(j) "Council" means the Council of the County of Wellington;

(k) "County" means the County of Wellington;

(l) "County Staff" means employees of the County of Wellington and contract parties authorized to act on behalf of the County of Wellington;

(m) "dbh" (diameter breast height) means the diameter of the stem or trunk of a tree measured at a point of measurement that is 1.37 metres (4.5 feet) above the highest point of the ground at the base of the stem or trunk of the tree;

(n) "destroy" means any action which causes or results in the irreversible injury or death of a tree;

(o) "diameter" means a (length of) straight line from side to side through the centre of a stem or trunk of a tree, including the bark;

(p) "drip line" means a line running directly beneath the outermost branches of the trees forming the perimeter of woodlands;

(q) "excess damage" is disturbance to the forest floor or waterways and/or damage to trees not specified for cutting or other vegetation in excess of prescribed levels;

(r) "Forester" is a Registered Professional Forester or Associate Member in good standing with the Ontario Professional Forester's Association who is authorized to prepare silvicultural prescriptions that apply to the County and subject woodlands;

(s) "forest stand" means that part of woodlands that is a contiguous group of trees sufficiently uniform in species composition, arrangement of age classes and condition to be a homogeneous and distinguishable unit for forestry management purposes;

(t) "good forestry practices" means the proper implementation of harvest, renewal and maintenance activities known to be appropriate for the forest and environmental conditions under which they are being applied and that minimize detriments to forest values including significant ecosystems, important fish and wildlife habitat, soil and water quality and quantity, forest productivity and health and the aesthetics and recreational opportunities of the landscape;

(u) "hazardous condition" is where a tree, due to damage, health problems or structural weakness, is in a condition that presents a significant risk of injuring persons or property;

(v) "injury" means lasting damage to a tree which has the effect of inhibiting or terminating its growth, but does not include pruning or removing branches for maintenance purposes;

(w) "officer" means an individual appointed by the County by by-law, for the administration and enforcement of this by-law and such individuals as hereby designated as provincial offences officer.

(x) "own use" means use that does not include a sale, exchange or other disposition of trees destroyed or injured;

(y) "owner" means a person having any right, title, interest or equity in land;

(z) "permit" means a permit to injure or destroy trees issued under Sections 4 & 5 of this by-law and "permit holder" means an applicant who has been issued a permit;

(aa) "person" means an individual or a corporation and their respective heirs, executors, administrators or other duly appointed representatives;

(ab) "point of measurement" means the point on the stem or trunk of the tree measured above the highest point of the ground in an undisturbed state. In the case of coppice or clump growth where the point of fusion occurs at or above the point of measurement for dbh, the coppice or clump growth shall be deemed a single tree and "point of measurement" shall mean the point on the stem or trunk measured above the highest point of the ground in an undisturbed state. In the case of coppice or clump growth where the point of fusion occurs below the point of measurement for dbh, each stem or trunk in the coppice or clump growth shall be deemed a separate tree and "point of measurement" shall mean the point on each tree stem or trunk measured from the point of fusion;

(ac) "prescribed species" means the species of trees as listed in Parts I, II and III of Schedule "A" of this by-law, titled "Protected Tree Species";

(ad) "silvicultural prescription" means a site specific operational plan, approved by a forester that describes the existing forest conditions, the forest management objectives for an area, and prescribes the methods for marking, harvesting and regenerating the subject forest in a manner that accommodates other resource values as identified;

(ae) "tree" means any species of woody perennial plant, including its root system, which has reached or can reach a height of at least 4.5 metres (15 ft) at physiological maturity, provided that where multiple stems grow from the same root system, the number of trees shall be the number of stems with discrete, apical tips;

(af) "tree marker" means any person who has marked trees for cutting. This includes landowners, timber buyers, Certified Tree Markers or Foresters. Certified Tree Marker is defined in Section 1 (f);

(ag) "unforested corridor" means a break in the forest cover or forest canopy, which includes but is not limited to, highways and roads, railway rights-of-way, drains, lanes, paths, golf course fairways, utility lines or natural open spaces;

(ah) "watercourse" means a natural or man-made waterway containing flowing water at least part of the year;

(ai) "woodlands" means land, one hectare (2.47 acres) or more in area measured to the drip line, and includes any unforested corridors within the area that are equal to or less than 30 metres (98.4 feet) in width, with at least:

(i) 1,000 trees, of any size, per hectare (405 trees, of any size, per acre);

(ii) 750 trees, measuring over 5 centimetres in diameter, per hectare (304 trees, measuring over 2 inches in diameter, per acre);

(iii) 500 trees, measuring over 12 centimetres in diameter, per hectare (202 trees, measuring over 4.7 inches in diameter, per acre); or

(iv) 250 trees, measuring over 20 centimetres in diameter, per hectare (101 trees, measuring over 7.9 inches in diameter, per acre).

but does not include a cultivated fruit orchard, nut orchard or a plantation established for the purpose of producing Christmas trees. For the purpose of the definition of woodlands, all measurements of the trees are to be taken at 1.37 metres (4.5 feet) from the ground.

SECTION 2. PROHIBITION

2.1 No person shall cause or permit the injuring or destruction of a tree growing in a woodlands:
(a) unless exempted by Section 3 of this by-law; or
(b) except in accordance with a permit issued under Sections 4 and 5 of this by-law.

2.2 No person shall:
(a) contravene the terms or conditions of a permit issued under this by-law; or
(b) cause or permit the contravention of the terms or conditions of a permit issued under this by-law.

2.3 No person shall operate a vehicle, machinery or equipment or conduct operations in a manner or at a time that:
(a) results in the leaving of any part of a tree in a watercourse including any trees that have not been cut, but have been pushed, knocked over or otherwise ended up in a watercourse; or
(b) results in excess damage to trees that have not been marked in accordance with Sections 4.2.3 or 4.3.3, the forest floor or soil as determined using procedures that may be prescribed by the County.

2.4 No person shall operate a vehicle, machinery or equipment or conduct operations in a manner or at a time that:
(a) destroys or injures any tree that is below the minimum required circumference in woodlands for which no valid silvicultural prescription has been filed;
(b) destroys or injures any tree so that the basal area of the woodlands is reduced below the minimum requirement in woodlands for which no valid silvicultural prescription has been filed;
(c) destroys any tree so as to reduce the number of trees per hectare below the minimum number of trees per hectare required to constitute woodlands; or
(d) destroys any tree so as to reduce the number of trees per hectare below 12.5 trees, which have reached or exceeded the minimum diameter or circumference specified in Part 1, Schedule A.

2.5 No person shall fail to comply with an order to discontinue activity (i.e. Stop Work Order) issued under this by-law or remove or deface any order that has been posted pursuant to this by-law.

SECTION 3. EXEMPTIONS

3.1 Despite Section 2 of this by-law, this by-law does not apply to :

(a) activities or matters undertaken by a municipality or a local board of a municipalilty;

(b) activities or matters undertaken under a licence issued under the *Crown Forest Sustainability Act, 1994;*

(c) the injuring or destruction of trees by a person licensed under the *Surveyors Act* to engage in the practice of cadastral surveying, or his or her agent, while making a survey;

(d) the injuring or destruction of trees imposed after December 31, 2002 as a condition to the approval of a site plan, a plan of subdivision or a consent under Section 41, 51 or 53, respectively, of the *Planning Act* or as a requirement of a site plan agreement or subdivison agreement entered into under those sections;

(e) the injuring or destruction of trees imposed after December 31, 2002 as a condition to a development permit authorized by regulation made under Section 70.2 of the *Planning Act* or as a requirement of an agreement entered into under the regulation;

(f) the injuring or destruction of trees by a transmitter or distributor, as those terms are defined in Section 2 of the *Electricity Act, 1998*, for the purpose of constructing and maintaining a transmission system or a distribution system, as those terms are defined in that section;

(g) the injuring or destruction of trees undertaken on land described in a licence for a pit or quarry or a permit for a wayside pit or wayside quarry issued under the *Aggregate Resources Act;*

(h) the injuring or destruction of trees undertaken on land in order to lawfully establish and operate or enlarge any pit or quarry on land:

(i) that has not been designated under the *Aggregate Resources Act* or a predecessor of that Act; and

(ii) on which a pit or quarry is a permitted land use under a by-law passed under Section 34 of the *Planning Act;*

(i) the injuring or destruction of trees required in order to erect a building or structure or to construct a septic system (including weeping tile bed), in respect of which a building permit has been issued, provided that the total area within which trees are injured or destroyed is within 15 metres of the outer edge of the building, structure or septic system or proposed building, structure or septic system;

(j) the injuring or destruction of trees that is reasonably required in order to install and provide utilities to the construction or use of a building or structure in respect of which a building permit has been issued, including the installation of a primary septic bed;

(k) the injuring or destruction of trees that is reasonably required in order to install a single lane driveway for vehicular access to a building or structure in respect of which a building permit has been issued;

(l) the injuring or destruction of trees provided that no more than 20 trees, or up to the equivalent of 15 cubic metres of wood (six (6) bush cords or 3,000 board feet) plus associated fuel wood from the tops of the aforementioned trees, are injured or destroyed in a calendar year from an owner's land, provided that the injury or destruction of trees does not reduce the density of the trees such that the area does not meet the definition of woodlands, and that the injuring or destruction of trees is consistent with good forestry practices;

(m) the injuring or destruction of Eastern White Cedar trees provided that no more than the equivalent of three (3) bush cords of wood are injured or destroyed in a calendar year from an owner's land, and that the injuring or destruction of trees is in accordance with good forestry practices;

(n) the injuring or destruction of trees that are in a hazardous condition;

(o) land previously cleared and used for agricultural purposes, which has become overgrown with young (less than 10 years old) early-successional tree species (e.g. Sumac, Hawthorne, Apple, Scots Pine, Poplar, White Birch, Ash) and the land is intended to be used again as part of an agricultural operation (defined as land eligible for a Farm Business Registration Number);

(p) woodlands affected by the creation of new Municipal Drains. However, it is expected that in determining the route of such a new drain, every reasonable effort will be made to avoid woodlands and that the Officer be consulted where woodlands are involved. Routine maintenance of such works, involving the removal of tree regrowth, shall also be exempt from this by-law, provided clearing does not exceed the original corridor width or that specified in the Engineer's Report; or

(q) a linear windbreak or hedgerow or a bona fide tree nursery that is being actively managed and harvested for the purposes for which it was planted.

SECTION 4. PERMITS

4.1 Permits and Delegation to Officer

4.1.1 Upon application by an owner, the County may issue the following permits:

(a) Good Forestry Practices Permits;
(b) Circumference Permits; and
(c) Clearing Permits.

4.1.2 The County hereby delegates to an Officer the power to issue a permit under Subsections 4.2, 4.3 and 4.4 of this by-law and to impose conditions to such permits.

4.2 **Good Forestry Practices Permits**

4.2.1 The County may issue a Good Forestry Practices Permit to permit the injuring or destruction of trees provided that the injuring or destruction of trees is conducted in accordance with good forestry practices as prescribed in a silvicultural prescription prepared and stamped by a Forester, and provided further that the trees to be injured or destroyed are marked, in accordance with the prescription, by a Forester or Certified Tree Marker as specified in Section 4.2.3.

4.2.2 Despite Subsection 4.3 of this by-law, the County may issue a Good Forestry Practices Permit to an owner who has marked trees on their own land, provided that an Officer is satisfied that the injuring or destruction of trees is consistent with good forestry practices and the trees are marked as specified in Sections 4.2.3.

4.2.3 Before a Good Forestry Practice Permit Application is submitted, the trees to be injured or destroyed must be marked with paint at approximately 4.5 feet (1.3 metres) above ground on at least two sides to the Officer's satisfaction. A vertical paint line shall be placed at the tree base below the saw line and extending to the ground to the Officer's satisfaction.

4.2.4 The applicant shall erect and display a public notice sign regarding the Good Forestry Practices Permit at the entrance to woodlands in a position that ensures that it is clear and visible to all persons, and the notice shall be in the prescribed form.

4.3 **Circumference Permits**

4.3.1 The County may issue a Circumference Permit to permit the injuring or destruction of trees provided that:

(a) the trees are of a species listed in Schedule "A";

(b) the trees have attained the diameter or circumference measurement applicable to such tree species as set out in Schedule "A", measured at the highest point of measurement available on the tree/stump, provided in Schedule "A" or at the stump;

(c) the trees or area of trees to be injured or destroyed are marked with paint as specified in Sections 4.3.3;

(d) for the portion of the forest stand or woodlands where trees are marked for cutting, the injuring or destruction of trees shall not have the effect of:

(i) reducing the basal area of trees measuring at least 24.5 centimetres (9.5 inches) dbh to below 15 square metres per hectare (65 sq. ft per acre);
(ii) reducing the number of trees in woodlands below the number of trees necessary to constitute woodlands; or
(iii) reducing below 12.5 trees per hectare (5 trees per acre) in woodlands the number of trees in Part 1 of Schedule "A" which have reached or exceeded the minimum diameter or circumference measurement, measured at 137 centimetres from the ground, as set out in Schedule "A";

4.3.2 Notwithstanding Section 4.3.1 (a), the County may issue a permit to injure or destroy tree species not listed in Schedule "A", provided that an Officer is satisfied that the injuring or destruction of trees is consistent with good forestry practices and the trees are marked as specified in Section 4.2.3.

4.3.3 Before a Circumference Permit Application is submitted, the trees to be injured or destroyed must be marked with paint at approximately 4.5 feet (1.3 metres) above ground on at least two sides to the Officer's satisfaction. A vertical paint line shall be placed at the tree base below the saw line and extending to the ground to the Officer's satisfaction.

4.3.4 The applicant shall erect and display a public notice sign regarding the Circumference Permit at the entrance to woodlands in a position that ensures that it is clear and visible to all persons, and the notice shall be in the prescribed form.

4.4 **Clearing Permits**

4.4.1 Where a person intends to injure or destroy trees and the proposed activity does not meet the requirements set out in Subsections 4.2 and 4.3 of this by-law, an application may be made for a Clearing Permit.

4.4.2 The County may issue a Clearing Permit to permit the injuring or destruction of trees provided that Council or County Staff is satisfied that the injuring or destruction of trees will be in compliance with agricultural and natural environment policies adopted by County Council from time to time.

4.4.3 An Officer may issue a Clearing Permit to permit the injuring or destruction of trees provided that the total area of tree removal does not exceed 0.5 hectare (1.24 acres), and provided that the Officer is satisfied that the injuring or destruction of trees will be in compliance with agricultural and natural environment policies adopted by County Council from time to time.

4.4.4 Before a Clearing Permit Application is submitted, the boundaries of the area specified in the application or the trees to be removed, must be marked with paint to the Officer's satisfaction.

4.4.5 The applicant shall erect and display a public notice regarding the Clearing Permit at the entrance to woodlands in a position that ensures that it is clear and visible to all persons, and the notice shall be in the prescribed form.

4.4.6 Where an application to clear involves an area that is wetland, the County shall consult with the Conservation Authority and other agencies, prior to issuing a permit.

SECTION 5. APPLICATION PROCESS

5.1 Every person, who intends to injure or destroy a tree where a permit to do so is required under this by-law, shall first complete and submit an application for a permit in the prescribed form.

5.2 An application for a permit shall:

(a) be accompanied by the applicable fee as prescribed in Schedule "B"; and
(b) contain a description of the proposed activity.

5.3 An application for a permit shall be deemed incomplete, and no permit shall be issued if:

(a) the application has not been completed in full;
(b) the owner of the woodlands has not signed the application;
(c) the party who will be undertaking or responsible for the injuring or destruction of trees has not signed the application; or
(d) the applicable fee has not been paid.

5.4 In addition to the requirements set out in Subsections 5.1, 5.2 and 5.3 of this by-law, an application for a Good Forestry Practices Permit shall include a silvicultural prescription prepared in accordance with Subsection 4.2 of this by-law and the name of the Forester or Certified Tree Marker who marked the trees in accordance with the prescription; or unless otherwise directed by an Officer under Section 4.2.2 of this by-law.

5.5 In addition to the requirements set out in Subsections 5.1, 5.2 and 5.3 of this by-law, an application for a Circumference Permit shall include the name of the individual who marked the trees to be injured or destroyed in accordance with Subsection 4.3 of this by-law.

5.6 In addition to the requirements set out in Subsections 5.1, 5.2 and 5.3 of this by-law, an application for a Clearing Permit shall include:

(a) an explanation of the necessity for the proposed activity and the rationale for selecting the area; and
(b) an environmental impact study if required by the County to satisfy the requirements determined by the County.

5.7 Upon receipt by the County of an application for a permit, the owner shall permit an Officer to enter upon his or her land and undertake such site inspections as may be required to consider the application. An Officer may undertake a site inspection prior to, during and after the proposed activity.

5.8 The County may issue a permit subject to those conditions that are deemed necessary, including but not limited to:

(a) the manner and timing in which the injuring or destruction of trees is to be carried out;
(b) the qualifications of persons authorized to injure or destroy trees;
(c) the species, size, number and location of replacement trees to be planted; and
(d) measures to be implemented to mitigate the direct and indirect effects of the injuring or destruction of trees on the natural environment.

5.9 A decision regarding an application for a permit shall not be made by the County until such time as all the required documents have been filed, the applicable fee has been paid and any required inspections have been undertaken.

5.10 A permit issued pursuant to this by-law shall expire one year after the date of issuance, except that an Officer may, upon request, renew the permit for a further period(s) of one year and such permit is not transferable unless authorized by the County.

5.11 Failure to comply with any provisio or condition of a permit or an order issued under this by-law or any other provisions of this by-law may result in the revocation of the permit by the County, in addition to any other enforcement proceedings against the permit holder.

5.12 The County may revoke a permit at any time if it was issued because of mistake, or if the permit holder provided false or incorrect information.

5.13 Where a permit has been revoked, the permit holder shall immediately cease or ensure the immediate cessation of all activities for which the permit was issued.

5.14 An application for a permit shall not be deemed to be received by the County until such time as all requirements of this by-law have been fulfilled by the applicant.

SECTION 6. ORDERS TO DISCONTINUE ACTIVITY

6.1 Where an Officer is satisfied that a contravention of this by-law has occurred, the Officer may make an order requiring the person who contravened the by-law or who caused or permitted the injuring or destruction of trees in contravention of the by-law to stop the injuring or destruction of trees (i.e. Stop Work Order). This includes the immediate stoppage of all work, including the movement or disposal of wood, soil or other material, and the removal, destruction, burning or burying of logs, stumps or logging debris.

6.2 An order issued under this section may be served personally, or served by sending it by mail to the last known address of:

(a) the owner of the woodlands; and
(b) the corporation, company, person or persons identified as injuring or destroying a tree or trees.

6.3 Where service of an order is made by mail, service shall be deemed to have been effected on the fifth day after the order is mailed.

6.4 Where service cannot be carried out under Subsection 6.2 of this by-law, the Officer shall place a placard containing the terms of the order in a conspicuous place on the owner's land, and the placing of the placard shall be deemed to be sufficient service of the order on the person or persons to whom the order is directed.

SECTION 7. APPEALS TO COUNCIL OF THE COUNTY OF WELLINGTON

7.1 An applicant for a permit under Section 4 may appeal to the Council of the County of Wellington:

(a) if the County refuses to issue a permit, within 30 days after the refusal;
(b) if the County fails to make a decision on the application, within 45 days after the application is received by the County; or
(c) if the applicant objects to a condition in the permit, within 30 days after the issuance of the permit.

7.2 Where an order has been served, the owner or the person to whom the order is being served may appeal the order to Council within 30 days of being served the order.

7.3 The decision of the Council of The Corporation of the County of Wellington shall be final.

SECTION 8. ENFORCEMENT

8.1 The provisions of this by-law may be enforced by a By-law Officer appointed by the County of Wellington for the administration and enforcement of this by-law.

8.2 An Officer or any person authorized by an Officer may enter on land at any reasonable time for the purpose of carrying out an inspection to determine whether or not the following are being complied with:

(a) the provisions of this by-law;
(b) an order issued under this by-law; and
(c) a condition of a permit issued under this by-law

8.3 For the purpose of determining compliance with this by-law, the points of measurement listed in Schedule "A" shall be used to determine whether a tree which has been injured or destroyed would have attained the minimum measurement required by this by-law.

8.4 For purpose of determining compliance with this by-law, tree density as set out in the definition of "woodlands" in Section 1 ai (i) to (iv) shall be determined by using a 4% strip cruise (where trees are measured on 2-metre (6.56 foot)-wide parallel strips) regularly spaced across the woodlands.

8.5 Any person who obstructs an Officer, or any person or agent authorized by an Officer, in discharge of his or her duties under this by-law, shall be considered in violation of this by-law.

SECTION 9. PENALTIES

9.1 Any person who contravenes any provision of this by-law, the conditions of a permit, or an order issued under this by-law is guilty of an offence.

9.2 Any Officer or Director of a Corporation who knowingly concurs in the contravention of any provision of this by-law, the conditions of a permit or an order issued under this by-law is guilty of an offence.

9.3 Every person who is guilty of an offence under this by-law shall be subject to the following penalties:

(a) on the first conviction, to a fine of not more than $10,000 or $1,000 per tree, whichever is greater; and

(b) on any subsequent conviction, to a fine of not more than $25,000 or $2,500 per tree, whichever is greater.

9.4 Despite subsection 9.3 of this by-law, where the person convicted is a Corporation:

(a) the maximum fines in Subsection 9.3 (a) are $50,000 or $5,000 per tree, whichever is greater;

(b) the maximum fines in Subsection 9.3 (b) are $100,000 or $10,000 per tree, whichever is greater.

9.5 In addition to any other remedy or penalty provided by law, the court in which the conviction has been entered, or any other court of competent jurisdiction may make an order requiring the person to rehabilitate the land or to plant or replant trees in such manner and within such time period as the court considers appropriate, including any silvicultural treatment necessary to reestablish the trees;

SECTION 10. GENERAL

10.1 Schedules "A" and "B" shall form part of this by-law.

10.2 The short title of this by-law is the "Forest Conservation By-law".

10.3 Tree by-law No. 5090-09 of the County of Wellington is hereby repealed.

10.4 Despite Subsection 10.3 of this by-law, Tree By-law No. 3961-94 of the County of Wellington shall continue to apply to proceedings in respect of matters that were initiated prior to its repeal.

10.5 This by-law shall come into force and effect on the final passing thereof.

10.6 Words importing the singular shall include the plural, and the converse of the foregoing applies, unless the context of the by-law requires otherwise.

10.7 If any section or sections of this by-law or parts thereof are found by any Court to be illegal or beyond the power of the Council to enact, such section or sections or parts thereof shall be deemed to be severable and all other sections or parts of this by-law shall be deemed to be separate and independent there from and continue in full force and effect unless and until similarly found illegal.

10.8 If there is a conflict between this by-law and a by-law passed under the *Forestry Act* or the *Municipal Act*, the provision that is the most restrictive regarding the injury or destruction of trees shall prevail.

10.9 Nothing in this by-law shall exempt any person from complying with the requirements of any other by-law in force, or obtaining any licence, permission, permit, authority or approval required under any other by-law or legislation.

READ A FIRST, SECOND AND THIRD TIME AND PASSED THIS 24TH, DAY OF SEPTEMBER, 2009

JOANNE ROSS-ZUJ –WARDEN

DONNA VAN WYCK - CLERK

SCHEDULE "A"
PROTECTED TREE SPECIES

PART I

1. Prescribed species:

Ash	White (*Fraxinus americana*),
	Red (*Fraxinus pennsylvanica*),
	Green (Fraxinus pennsylvanica var. subintegerrima)
Walnut	(*Juglans nigra*)
Cherry	Black (*Prserotina)*
Hickory	Bitternut (*Carya cordiformis*),
Elm	White,
	American (*Ulmus americana*),
	Slippery, Red (*Ulmus rubra*)
	Rock (*Ulmus thomasii*)
Basswood	(*Tilia americana*),
Beech	(*Fagus* grandifolia),
Butternut *	(*Juglans Cinerea*)
Oak	White, (*Quercus alba*),
	Red, (*Quercus ruba*),
	Bur (*Quercus macrocarpa*),
Maple	Sugar (*Acer saccharum*),
	Black (*Acer nigrum*),
	Silver (*Acer saccharinum*),
	Red (*Acer rubrum*),
Pine	White (*Pinus strobus*),
	Red (*Pinus resinosa*),

* Note that Butternut is an Endangered Species. A permit for the injuring or destruction of Butternut trees may only be issued by the County if there is prior written authorization from a Butternut Health Assessor.

2. Prescribed circumference or diameter for the species listed in PART 1 of this Schedule:

Column 1 **Point of Measurement**	Column 2 **Circumference**	Column 3 **Diameter**
137 cm. (4.5 ft.)	145 cm. (57 in.)	46 cm. (18 in.)
46 cm. (18 in.)	160 cm. (63 in.)	51 cm. (20 in.)
31 cm. (12 in.)	176 cm. (69 in.)	56 cm. (22 in.)
20 cm. (8 in.)	200 cm. (79 in.)	63 cm. (25 in.)
10 cm. (4 in.)	223 cm. (88 in.)	71 cm. (28 in.)
2.5 cm.(1 in.)	249 cm. (98 in.)	79 cm. (31 in.)

PART II

3. Prescribed species:

Hemlock	*(Tsuga canadensis),*
Spruce	White (*Picea glauca*),
	Black (*Picea mariana*)
	Norway Spruce (*Picea abies*)
Pine	Scots pine (*Pinus sylvestris*)
Tamarack	Eastern larch, (*Larix laricina*)
Ash	Black (*Fraxinus nigra*)
Birch	Yellow (*Betula alleghaniensis*)
Willow	Black (*Salix nigra*) and exotic species

4. Prescribed circumference or diameter for the species listed in PART 2 of this Schedule:

Column 1 **Point of Measurement**	Column 2 **Circumference**	Column 3 **Diameter**
137 cm. (4.5 ft.)	94 cm. (57 in.)	31 cm. (12 in.)
46 cm. (18 in.)	112 cm. (44 in.)	36 cm. (14 in.)
31 cm. (12 in.)	127 cm. (50 in.)	41 cm. (16 in.)
20 cm. (8 in.)	145 cm. (57 in.)	46 cm. (18 in.)
10 cm. (4 in.)	175 cm. (69 in.)	56 cm. (22 in.)
2.5 cm (1 in.)	207 cm. (82 in.)	66 cm. (26 in.)

PART III

5. Prescribed species:

Poplar	Trembling Aspen (*Populus tremuloides*), Large-toothed (*Populus grandidentata*), Balsam (*Populus balsamifera*), Eastern Cottonwood (*Populus deltoides*)
Cedar	White (*Thuja occidentalis*), Red (Juniperus virginiana)
Birch	White (*Betula papyrifera*)
Beech	Blue (*Carpinus caroliniana*)
Ironwood	(*Ostrya virginiana*)
Fir	Balsam (*Abies balsamea*)
Cherry	Pin (*Prunus pensylvanica*), Choke (*Prunus virginiana*)
Larch	European Larch (*Larix deciduas*)

6. Prescribed circumference or diameter for the species listed in PART 3 of this Schedule:

Column 1 **Point of Measurement**	Column 2 **Circumference**	Column 3 **Diameter**
137 cm. (4.5 ft.)	53 cm.(19 in.)	17 cm. (6 in.)
46 cm. (18 in.)	64 cm. (25 in.)	20 cm. (8 in.)
31 cm. (12 in.)	79 cm. (31 in.)	25 cm. (10 in.)
20 cm. (8 in.)	94 cm. (57 in.)	31 cm. (12 in.)
10 cm. (4 in.)	127 cm. (50 in.)	41 cm. (16 in.)
2.5cm.(1 in.)	152 cm. (60 in.)	49 cm. (19 in.)

SCHEDULE "B"
PRESCRIBED FEES

PART I

1. Good Forestry Practices Permit - $0
2. Circumference Permit - $0
3. Clearing Permit (minor) - $0
4. Clearing Permit (significant) - $0

REPORT ADM-2019-011

TO: Mayor and Members of Council

FROM: Kyle Davis, Risk Management Official

MEETING DATE: March 6, 2019

SUBJECT: Source Protection Annual Reports - 2018

RECOMMENDATION

That Report ADM-2019-011 regarding Source Protection Annual Reports for 2018 be received for information.

Background

For reporting purposes, the Township of Puslinch is subject to two Source Protection Plans (based on watershed or Conservation Authority boundaries): Grand River Plan and the Halton-Hamilton Plan. In 2018, all Source Protection Plans were in effect.

Under Section 81 of the Clean Water Act and Section 65 of O. Reg. 287/07, an annual report must be prepared by a Risk Management Official and submitted to the appropriate Source Protection Authority (Conservation Authority) by February 1st of each year. Under Section 45 of the *Clean Water Act*, a public body, including a municipality, must comply with monitoring and reporting policies designated by a Source Protection Plan. This includes the submittal of an annual municipal report by February 1st of each year. Risk Management staff submitted both reports, as required, by the statutory deadline for the Township. Although the Township does not operate its own municipal drinking water systems, it is responsible for the protection of municipal wellhead protection areas and intake protection zones from neighbouring municipalities including the City of Guelph, Region of Waterloo and City of Hamilton.

The Wellington County municipalities continue to implement source protection under the Wellington Source Water Protection partnership, www.wellingtonwater.ca

Purpose

In 2018, progress continued in the implementation of source protection in the municipality:

1. Screening and review of development applications continued in 2018, with the majority being screened out from requiring further review by Risk Management staff. There were 49 reviews, including notices, of development applications by Risk Management staff in 2018.

2. As part of the comprehensive zoning by-law project, the Township's zoning by-law was updated to conform to the Grand River and Halton-Hamilton Source Protection Plans.

3. Analysis continued on the threat verification data collected in previous years on agricultural, industrial, commercial and institutional properties identified as potential significant drinking water threats in the approved Assessment Reports. Staff currently estimate approximately 58% of threat activities (83 of 142) in the municipality still require action to either remove or confirm / mitigate the threat activities while 42% have been either removed or confirmed and mitigated. The majority of the remaining threat activities are related to agricultural properties. One Risk Management Plan is in the process of negotiation for the municipality and one inspection was competed in 2018 within the Township.

4. In 2018, staff were involved in reviewing, authoring and / or participating in a significant number of Source Protection Plan amendments and / or work plans for 4 of the 5 applicable Source Protection Plans in the County. The amendments were primarily focused on policy updates and / or technical updates. This includes Tier 3 (water quantity) studies discussed below and new vulnerable areas from the Region of Waterloo extending into the Township. In 2018, staff received new wellhead delineations and issues contributing areas for Region of Waterloo wells that extend into the municipality. It is anticipated that existing threat activities numbers will change with the delineation of new wellhead protection areas and issues contributing areas. This will be reported to Council at a later date in 2019.

5. Tier 3 (water quantity) technical studies continue for the City of Guelph, Guelph / Eramosa Township, Township of Puslinch and Town of Erin. Staff and consultants continued to participate in meetings and review for these studies in 2018. This project is led by the Grand River Source Protection Authority (GRCA) and funded by the Ontario Ministry of the Environment and Climate Change. Staff from the Townships, Town and County participate on the project team along with other affected municipalities, the Source Protection Authority staff and the Province. The study area includes the City of Guelph, as well as parts of the Townships of Guelph/Eramosa and Puslinch, and parts of the Towns of Erin, Halton Hills and Milton.

   The 2018 technical work involved closely reviewing the identified significant drinking water threat activities and using the hydrogeological model to assist in determining the most appropriate risk management measure to manage categories of threat activities. Threat activities for water quantity include water taking and activities that reduce groundwater recharge such as the creation of impervious surfaces. This work was finalized in 2018 in the Threats Management Strategy report. Concurrently, a climate change assessment was completed for the entire study area and included the threats ranking for the intake protection zone. Results from both studies are being used in the

development of policy approaches and policy text. A third technical study still in progress in 2018 was the screening tool. This project was evaluating potential methods to assist screening water taking applications within the WHPA-Q.

In 2018, significant staff and consultant time was spent on developing and finalizing policy approaches and drafting policy text for the Tier 3 study in Guelph, Guelph / Eramosa, Puslinch and Erin. Negotiations and discussions are still ongoing between Wellington County municipalities, City of Guelph, Region of Waterloo, Region of Halton, Grand River Conservation Authority and the Province on policy text and this is expected to continue through 2019. Consultation with municipalities within the study area and public consultation continued in 2018. Municipal consultation is occurring, at a staff level, through Implementing Municipal workshops organized by the GRCA. Municipal and Community Liaison Group workshops occurred in 2018 on topics including the completed technical studies and policy approaches. The Community Liaison Group is comprised of members of stakeholder groups including public, environmental groups, industry and agriculture.

6. Attached for reference is the cover letter submitted to the applicable Source Protection Authorities with the submittal of the annual reports. Also attached is a summary table of source protection implementation for all municipalities in Wellington County. The annual reports are not attached as the reports are formatted for data management purposes and are lengthy when converted to pdf format. They are available at Council's request.

Financial Implications
Current staffing and resources

Applicable Legislation and Requirements
Clean Water Act
Grand River Source Protection Plan
Halton-Hamilton Source Protection Plan

Attachments
1/ 2018 Risk Management Official and Municipal Annual Report Cover letter dated February 1, 2019
2/ Source Protection Annual Reporting Summary Table for 2018 – Wellington County municipalities

February 1, 2019

Martin Keller, Source Protection Program Manager
Grand River Source Protection Authority
mkeller@grandriver.ca

Diane L. Bloomfield, Manager, Source Water Protection
Halton-Hamilton Source Protection Authority
dbloomfield@hrca.on.ca

Via E-mail Only

Subject: Township of Puslinch 2018 Risk Management Official and Municipal Annual Reports

For reporting purposes, the Township of Puslinch is subject to two Source Protection Plans (based on watershed or Conservation Authority boundaries): Grand River Plan and the Halton-Hamilton Plan). In 2018, all Source Protection Plans were in effect.

Under Section 81 of the Clean Water Act and Section 65 of O. Reg. 287/07, an annual report must be prepared by a Risk Management Official and submitted to the appropriate Source Protection Authority (Conservation Authority) by February 1st of each year. Under Section 45 of the *Clean Water Act*, a public body, including a municipality, must comply with monitoring and reporting policies designated by a Source Protection Plan. The attached annual municipal reports are provided in accordance with above sections of the *Clean Water Act* and the monitoring policies outlined in the effective Source Protection Plans for this municipality. These attached reports have been provided electronically as the report templates are formatted for data management purposes. The Wellington County municipalities continue to implement source protection under the Wellington Source Water Protection partnership, www.wellingtonwater.ca

In 2018, progress continued in the implementation of source protection in the municipality.
A summary of key aspects of the Risk Management Official Report and Municipal Report are provided below.

In 2018, there were 2 development review notices issued per Section 59 of the Clean Water Act within the municipality. Additionally, Risk Management staff comments were provided on an additional 47 applications that did not require development review notices, for a total of 49 development applications (notices and comments) reviewed in the municipality. There were 95 Section 59 notices issued County wide and Risk Management staff comments on 256 additional

development applications, County wide, for a total of 351 development applications (notices and comments) reviewed County wide in 2018. This represents an increase in the total number of development applications (notices and comments) reviewed County wide from 2016 (137) and 2017 (269).

For the municipality, there has been a decrease in the number of development notices issued but an increase in comments from previous years (4 notices and 3 comments in 2016, 14 notices and 27 comments in 2017). These differences may, in part, be attributable to increased familiarity of staff with the source protection screening process and in determining when a notice is actually required. This trend is expected to stabilize over the coming years in terms of notice and overall numbers. In addition to the notices and comments provided, other applications were screened out by building or planning staff following Risk Management Official Written Direction provided by Wellington Source Water Protection. In 2018, risk management staff conducted quality control and assurance analysis on the screened out applications to ensure that the screening out process was accurate. The analysis was conducted on building permit data from January to November 2018 and was conducted County wide. The analysis revealed that, County wide, 93% of the applications were screened correctly. Of the 7% County wide that were screened incorrectly, the causes have been identified and remedied and Section 59 notices issued where applicable.

The County Official Plan was amended in 2016 to conform to the five Source Protection Plans in the County and in 2018, the conformity exercise for the Township's zoning by-law was completed as part of a comprehensive zoning by-law update. The zoning by-law is currently under appeal. Notice was sent to the Source Protection Authority as required. County wide, two training sessions were run for municipal, building and planning staff. Overall, feedback from the training sessions were positive and we are planning more training sessions in 2019.

In 2018, the source protection staffing complement stayed constant, County wide, at 2.3 full time equivalents with administrative support provided by the Township of Centre Wellington. All municipalities have, at a minimum, two staff members appointed as Risk Management Officials and Inspectors. These staff are well supported by the internal Wellington Source Protection Working Group which is comprised of other departmental staff from all eight Wellington municipalities including building officials, planners, water compliance staff, public works staff and Chief Administrative Officers. Also in 2018, one co-op student and one short term contract staff member assisted source protection staff with a variety of tasks in the summer and fall.

Analysis continued on the threat verification data collected in previous years on residential, agricultural, industrial, commercial and institutional activities identified as potential significant drinking water threats in the approved Assessment Reports. Staff complete a variety of tasks to

remove or confirm and then mitigate activities identified as potential significant drinking water threats in the approved Assessment Reports. These threat activities are existing and the analysis can involve desk top interpretation of air photos or GIS data, phone calls, review of municipal records, windshield surveys, site inspections by Risk Management staff and if confirmed, then mitigation through septic inspection, prohibition and / or negotiation of risk management plans. As a result of this analysis, staff currently estimate approximately 58% of threat activities (83 of 142) in the municipality still require action to either remove or confirm / mitigate the threat activities while 42% have been either removed or confirmed and mitigated.

To support this threats analysis, 1 inspection was conducted for threat verification purposes in the Township in 2018. County wide, 113 inspections were conducted in 2018 with 84% of inspections (95) conducted for threat activity verification purposes and 16% (18) of inspections were compliance inspections. To date, the focus for threat verification analysis and inspections has been industrial, commercial and institutional threat activities, residential septic systems, fuel oil use or agricultural activities within 100 metres of municipal wells. In 2019 and beyond, it is anticipated that threat verification activities will include more agricultural activities. The remaining threat activities in the municipality are primarily agricultural or related to issues contributing areas for chloride.

One Risk Management Plan, at a commercial property, is in the process of negotiation for the municipality. Cumulatively, there are 11 Risk Management Plans complete County wide. County wide, the number of Risk Management Plans in progress increased from 23 in 2017 to 73 in 2018, however, the number of complete Risk Managements stayed relatively constant from 2017 to 2018. There will be a more of a focus in 2019 on negotiating risk management plans. It should be noted, however, there a number of factors that could delay Risk Management Plan completion including other time sensitive projects such as Source Protection Plan amendments, Tier 3 studies or development reviews and review time and / or reluctance from property owners, tenants or contractors.

In 2018, County wide, staff continued the implementation of the source protection education and outreach program as required by the applicable Source Protection Plans. Four newspaper ads were run during the year on topics related to salt, water conservation, fertilizer and who protects our water. During inspections, education material was provided directly to the proponents generally regarding the threats present, the process (RMP, prohibition etc.) and property specific mapping. This material was generally well received and found to be useful by the proponents. Similarly, material is provided to every applicant that receives a Section 59 notice, this includes fact sheets and property specific mapping. Wellington Source Water Protection continues to maintain and update a website (www.wellingtonwater.ca), ten fact sheets on specific topics and other print media (i.e. post cards to direct applicants to mapping). Staff participate and Wellington Source Water Protection is a sponsor for the Waterloo-

Wellington Children's Groundwater Festival. Staff participate on the organizing committee as well as during the Festival to deliver presentations. The Children's Groundwater Festival is an excellent way to reach Grade 2 to 5 and high school children (and their parents) and deliver water protection messages including source protection. The Festival attracts 5,000 elementary children and 500 high school / adult volunteers. Approximately 600 children attend from the County of Wellington as well as participation from a County high school and companies / municipalities as volunteers.

In 2018, staff participated on two provincial working groups consulting on potential provincial changes to guidance documents and / or legislation. These groups included: Dense Non-aqueous phase liquids and Water Quantity. The water quantity working group is related to the science and policy review of the Provincial water management framework and the moratorium on water bottling permits to take water.

In 2018, staff were involved in reviewing, authoring and / or participating in a significant number of Source Protection Plan amendments and / or work plans for 4 of the 5 applicable Source Protection Plans in the County. The amendments were primarily focused on policy updates and / or technical updates. Additionally, there was staff review and participation in technical studies to delineate new wellhead protection areas for quality within Centre Wellington and Guelph / Eramosa and new issues contributing areas in Centre Wellington. Staff have also received new wellhead delineations and issues contributing areas for Region of Waterloo wells that extend into the municipality. It is anticipated that existing threat activities numbers will change with the delineation of new wellhead protection areas and issues contributing areas. Further detail is provided in attachment #1.

Tier 3 (water quantity) technical studies continue for the City of Guelph, Guelph / Eramosa Township, Township of Puslinch and Town of Erin. Staff and consultants continued to participate in meetings and review for these studies in 2018. This project is led by the Grand River Source Protection Authority (GRCA) and funded by the Ontario Ministry of the Environment and Climate Change. Staff from the Townships, Town and County participate on the project team along with other affected municipalities, the Source Protection Authority staff and the Province. The study area includes the City of Guelph, as well as parts of the Townships of Guelph/Eramosa and Puslinch, and parts of the Towns of Erin, Halton Hills and Milton.

The 2018 technical work involved closely reviewing the identified significant drinking water threat activities and using the hydrogeological model to assist in determining the most appropriate risk management measure to manage categories of threat activities. Threat activities for water quantity include water taking and activities that reduce groundwater recharge such as the creation of impervious surfaces. This work was finalized in 2018 in the Threats Management Strategy report. Concurrently, a climate change assessment was

completed for the entire study area and included the threats ranking for the intake protection zone. Results from both studies are being used in the development of policy approaches and policy text. A third technical study still in progress in 2018 was the screening tool. This project was evaluating potential methods to assist screening water taking applications within the WHPA-Q.

In 2018, significant staff and consultant time was spent on developing and finalizing policy approaches and drafting policy text for the Tier 3 study in Guelph, Guelph / Eramosa, Puslinch and Erin. Negotiations and discussions are still ongoing between Wellington County municipalities, City of Guelph, Region of Waterloo, Region of Halton, Grand River Conservation Authority and the Province on policy text and this is expected to continue through 2019. Consultation with municipalities within the study area and public consultation continued in 2018. Municipal consultation is occurring, at a staff level, through Implementing Municipal workshops organized by the GRCA. Municipal and Community Liaison Group workshops occurred in 2018 on topics including the completed technical studies and policy approaches. The Community Liaison Group is comprised of members of stakeholder groups including public, environmental groups, industry and agriculture.

All required septic system inspections, in this municipality, for the 2015 to 2020 inspection period are complete. The next septic system inspection program will commence in 2020. If a septic system is present within well head protection area with a vulnerability score of 10 or within an issues contributing area for nitrates, a septic inspection is required every 5 years.

Attached for your reference is summary table of source protection implementation for all municipalities in Wellington County (the County and seven, local municipalities). Further detail can also be found in the County of Wellington municipal reports submitted separately. For further information on the attached reports, please contact the undersigned at 519-846-9691 ext 362.

Respectfully submitted,

Kyle Davis
Risk Management Official

C.C.

Karen Landry, Township of Puslinch
Ilona Feldmann, Source Protection Program Assistant, Grand River Source Protection Authority
Emily Vandermeulen, Wellington Source Water Protection

Attachments (electronically)

1. Source Protection Annual Reporting Summary 2018 – Wellington County municipalities
2. Lake Erie RMO Template
3. Lake Erie Municipal Template attached and also submitted electronically through online database - EARS
4. HH RMO and Municipal Template

WELLINGTON
Source Water
PROTECTION
wellingtonwater.ca

Source Protection Annual Reporting Summary 2018 - Wellington County municipalities

Reportables		Centre Wellington	Guelph/Eramosa	Mapleton	Puslinch	Wellington North	Erin	Minto	County of Wellington	Total
Septic Inspection Program (Cumulative)	Completed	24	415	N/A	54	9	127	6	N/A	635
	Outstanding	0	6	N/A	0	0	0	0	N/A	6
	Major Remedial Action	5	27	N/A	1	1	8	0	N/A	42
	Minor Remedial Action	4	79	N/A	12	1	14	1	N/A	111
	Septic Socials	1	3	N/A	2	1	1	1	N/A	9
S59 Notices Issued for Reporting Year		5	8	1	2	7	10	62	N/A	95
Comments on Development reviews (in addition to notices) for Reporting Year		47	43	41	47	15	26	37	N/A	256
Total Inspections for the Reporting Year (Section 62)		6	93	2	1	3	7	1	N/A	113
Inspections for Section 57 Prohibition for Reporting Year		3	4	2	0	3	5	1	N/A	18
Inspections for Section 58 Risk Management Plans for Reporting Year		3	89	0	1	0	2	0	N/A	95
Contraventions during Inspections for Reporting Year		0	1	0	0	0	0	0	N/A	1
RMPs	Cumulative Completed since SPP Effective Date	5	3	0	0	1	0	2	N/A	11
	Completed in Reporting Year	1	1	0	0	1	0	0	N/A	3
	In Progress	20	9	1	1	18	7	17	N/A	73
Chemical Management Plan (Official Plan Section 4.9.5)	Cumulative Completed	0	3	0	0	1	1	1	N/A	6
	Completed in Reporting Year	0	0	0	0	0	0	0	N/A	0
	In Progress	0	0	0	0	0	0	0	N/A	0
RMP, Development Review Templates and Business Process / Database		Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	Ongoing	N/A
RMO / RMI Appointment		Complete	Complete	Complete	Complete	Complete	Complete	Complete	N/A	N/A
Education and Outreach		The following is a summary of the E and O results, County wide, for 2018. Two training sessions were run for municipal staff and consultants (engineers, surveyors, planners). Overall, feedback from the training sessions were positive and we are planning more training sessions in 2019. Four newspaper ads were run during the year on topics related to salt, water conservation, fertilizer and who protects our water. During inspections, education material was provided directly to the proponents generally regarding the threats present, the process (RMP, prohibition etc.) and property specific mapping. This material was generally well received and found to be useful by the proponents. Similarly, material is provided to every applicant that receives a Section 59 notice, this includes fact sheets and property specific mapping. Wellington Source Water Protection continues to maintain and update a website (www.wellingtonwater.ca), ten fact sheets on specific topics and other print media (i.e. post cards to direct applicants to mapping). Staff participate and Wellington Source Water Protection is a sponsor for the Waterloo-Wellington Children's Groundwater Festival. Staff participate on the organizing committee as well as during the Festival to deliver presentations. The Children's Groundwater Festival is an excellent way to reach Grade 2 to 5 and high school children (and their parents) and deliver water protection messages including source protection. The Festival attracts 5,000 elementary children and 500 high school / adult volunteers. Approximately 600 children attend from the County of Wellington as well as participation from a County high school and companies / municipalities as volunteers.								
Road Signs (not including provincially installed signs)		0	0	0	0	11	0	15	N/A	26
Emergency Management Plan		Complete	Complete	Complete	Complete	Complete	Complete	Complete	Complete	1
Official Plan Update		County Complete, Local not required	Complete	Complete	Complete	Complete	County Complete, Local to be completed	Complete	Complete	1
ZBL Update		Complete	Complete	Complete	Complete (under appeal)	Complete	Ongoing	Complete	N/A	6

WELLINGTON Source Water PROTECTION wellingtonwater.ca

Source Protection Annual Reporting Summary 2018 - Wellington County municipalities

Reportables	Centre Wellington	Guelph/Eramosa	Mapleton	Puslinch	Wellington North	Erin	Minto	County of Wellington	Total
Municipal By-laws Required (Sewer Use, Connection)	N/A	N/A	N/A	N/A	Complete	N/A	Complete	N/A	3
Tier 3 - Water Quantity Studies	Physical Characterization Report complete, Model Development and Calibration report drafted, public consultation through Community Liaison Group and with stakeholders	Threats Management Strategy complete, Climate Change Assessment complete including threats ranking for intake protection zone, Screening tool in progress, Policy approaches drafted, public and municipal consultation through Community Liaison Group and Implementing Municipal Group, Policy text drafted	N/A	Threats Management Strategy complete, Climate Change Assessment complete including threats ranking for intake protection zone, Screening tool in progress, Policy approaches drafted, public and municipal consultation through Community Liaison Group and Implementing Municipal Group, Policy text drafted	N/A	Threats Management Strategy complete, Climate Change Assessment complete including threats ranking for intake protection zone, Screening tool in progress, Policy approaches drafted, public and municipal consultation through Community Liaison Group and Implementing Municipal Group, Policy text drafted	N/A	See summaries for local municipalities.	2
Provincial Working Groups	Staff participated on two provincial working groups consulting on potential provincial changes to guidance documents and / or legislation. These groups included: Dense Non-aqueous phase liquids and Water Quantity. The water quantity working group is related to the science and policy review of the Provincial water management framework and the moratorium on water bottling permits to take water.								
Source Protection Plan Amendments and Related Technical Projects	New Issues Contributing Areas (ICA) for Chloride and TCE delineated. New WHPAs for quality delineated. Policy approaches and text drafted for the chloride ICA. Grand River Section 34 update for policy and technical work.	New WHPAs for quality delineated. Grand River Section 34 update for policy and technical work.	Grand River Section 34 update for policy and technical work.	Halton-Hamilton Section 34 submission and Section 36 work plan. Region of Waterloo new WHPAs for quality delineated. Grand River Section 34 update for policy and technical work.	Grand River Section 34 update for policy and technical work.	CTC Section 34 submission and Section 36 work plan. Grand River Section 34 update for policy and technical work.	Maitland Section 34 submission and Section 36 work plan.	See summaries for local municipalities.	11
Provincial Reporting (Annual Reports and Grant reports)	4	4	4	6	6	6	6	7	43

Note:

a) 84% of Inspections (94) were conducted for verification purposes and not for purposes of determining compliance or contraventions. 16% (18) of inspections were compliance inspections.

b) To date, the focus for RMPs has primarily been on industrial, commercial and institutional properties. Agricultural property verification and RMPs are planned to begin in 2019.

c) The total number of Section 59 notices in Erin were 10 for 2018, however, two notices were for a property located in both the Credit and Grand watersheds. Therefore, those two notices are reported in both the CTC and Grand annual reports, resulting in 9 notices in the CTC and 3 notices in the Grand being reported.

d) Section 34 and Section 36 of the Clean Water Act outline amendment processes for the Source Protection Plans. Section 34 updates, generally, are focused updates related to updated technical work (i.e. new WHPAs) or updates to policies where there have been implementation challenges. Section 36 updates, generally, are broader updates related to changed provincial guidance, policy updates, updated technical work not already covered by a Section 34 updates. Timelines for Section 36 updates vary, however, are generally every 5 years and are preceded by development of a work plan outlining the tasks. Section 34 updates are completed as required.

REPORT BLDG-2019-002

TO: Mayor and Members of Council

FROM: Gerald Moore, Chief Building Official

MEETING DATE: February 19, 2019

SUBJECT: Building Department Monthly Update- January 2019

RECOMMENDATION

That Report BLDG-2019-002 with respect to the Building Department Monthly Update- January 2019 be received for information.

DISCUSSION

Purpose

The purpose of this report is to provide Council with an update of the activities in the Building Department for January 2019.

Background

The purpose of this report is to provide Council with a summary of the Building Department's activities for the month of January 2019.

Financial Implications

The Building Code Act requires that the total amount of building permit fees meets the total costs for the municipality to administer and enforce the Building Code Act and Regulations. Building permit fees were established to fully recover the Township's cost of providing building permit services, including an allocation of administrative overhead/indirect costs. Any surplus revenue from building permit fees is transferred to a restricted reserve, to be drawn upon in years of declining building activity.

APPLICABLE LEGISLATION AND REQUIREMENTS

Building Code Act, 1992, S.O. 1992, c. 23

ATTACHMENTS

Schedule A – January 2019 Monthly report

Permit Comparison Summary

Issued For Period JAN 1,2019 To JAN 31,2019

	Previous Year			Current Year		
	Permit Count	Fees	Value	Permit Count	Fees	Value
Commercial/Industrial						
Commercial - No Occupancy Required	0	0.00	0.00	2	4,584.79	695,000.00
Demolition						
Demolition Permit	2	312.00	12,000.00	1	156.00	43,000.00
New Residence						
Residential - Occupancy Required	0	0.00	0.00	2	31,366.72	2,450,000.00
Other						
Solar Permit	1	416.00	25,000.00	0	0.00	0.00
Other Residential						
Accessory/Farm Buildings	2	1,079.34	98,000.00	1	4,552.20	1,100,000.00
Deck Permit	2	312.00	19,000.00	1	156.00	7,000.00
Detached Garage	0	0.00	0.00	1	2,172.30	100,000.00
Residential - No Occupancy Required	2	1,052.48	110,000.00	3	2,003.84	186,500.00
Septic						
Sewage Disposal System Permit	2	1,248.00	50,000.00	4	2,496.00	75,000.00
Signs						
Sign Permit	2	520.00	20,000.00	0	0.00	0.00

	Previous Year	Current Year
Total Permits Issued	13	15
Total Dwelling Units Created	0	3
Total Permit Value	334,000.00	4,656,500.00
Total Permit Fees	4,939.82	47,487.85
Total Compliance Letters Issued	2	3
Total Compliance Letter Fees	150.00	225.00

Inspection Summary

Ward	Permit Inspections	Other Roll Inspections
000	198	1
Total	198	1

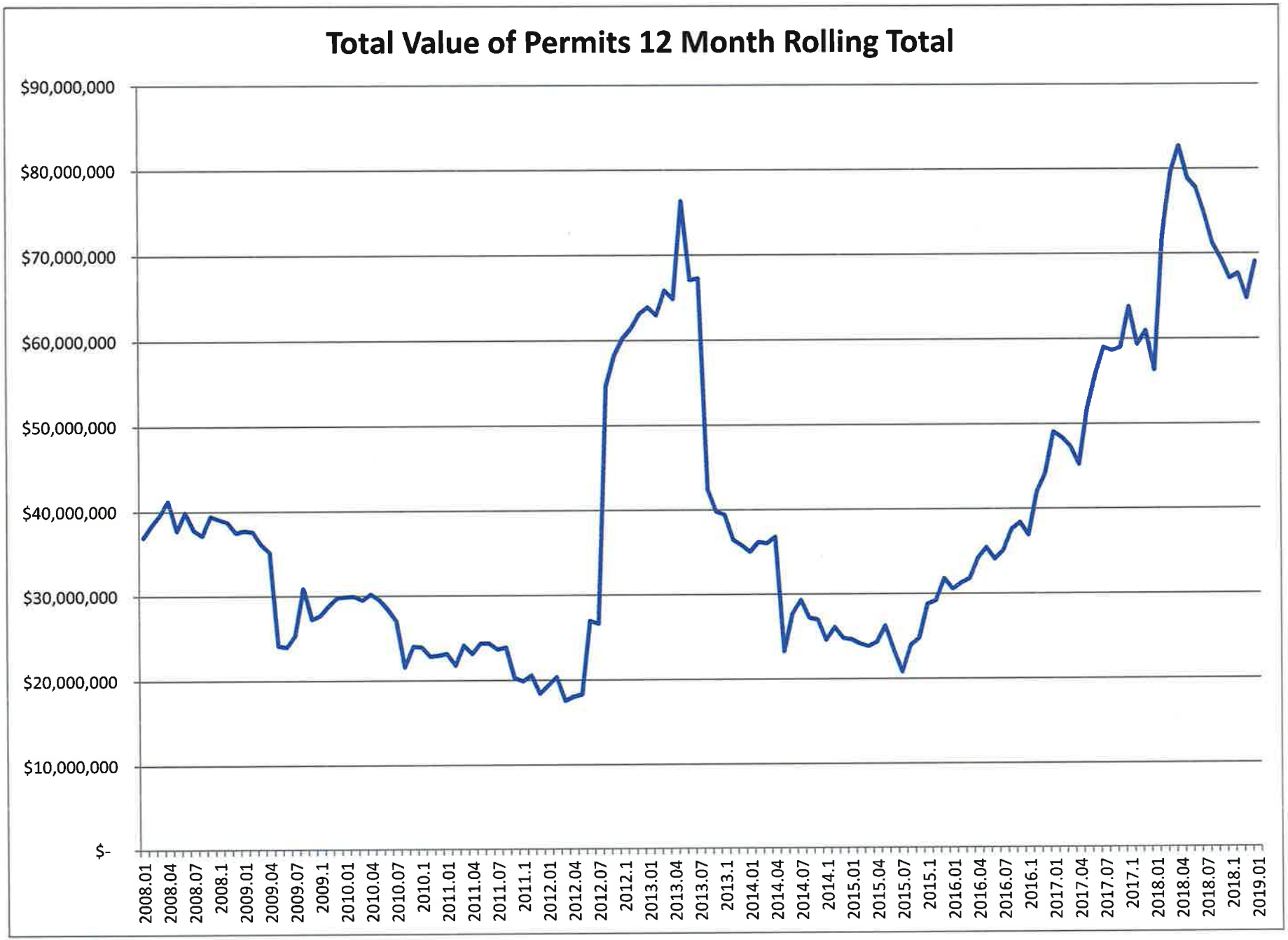
Permit Charge	Amount
Accessory/Farm Buildings	4,552.20
Commercial - No Occupancy Req	4,584.79
Deck Permit	156.00
Demolition Permit	156.00
Detached Garage	2,172.30
Residential - No Occupancy Req	2,003.84
Residential - Occupancy Requir	31,366.72
Sewage Disposal System Permit	2,496.00

Permit Comparison Summary

Issued For Period JAN 1,2019 To JAN 31,2019

Total	47,487.85

Note: The Graphs Below only Include Septic Permits in 2012 and beyond



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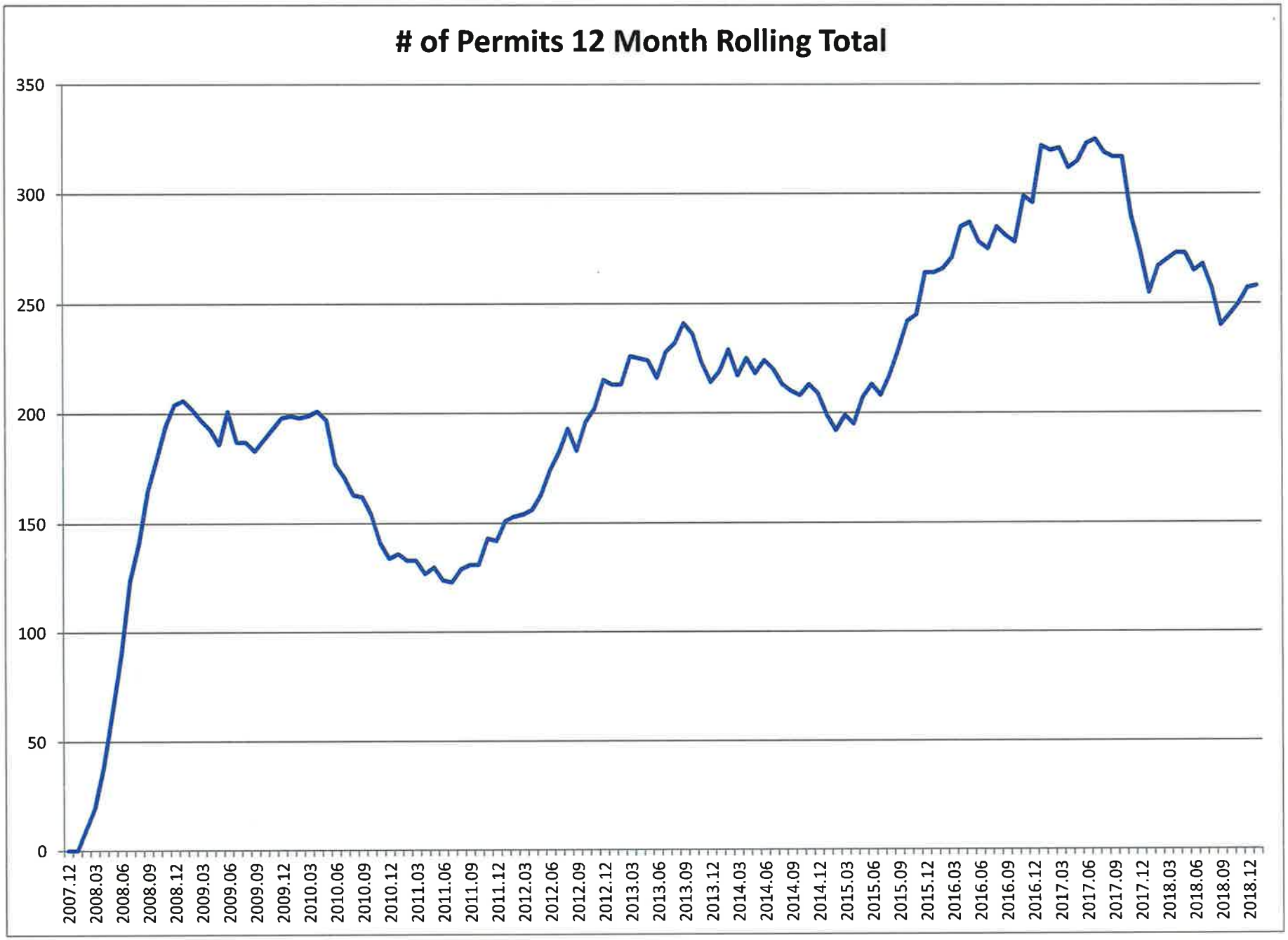

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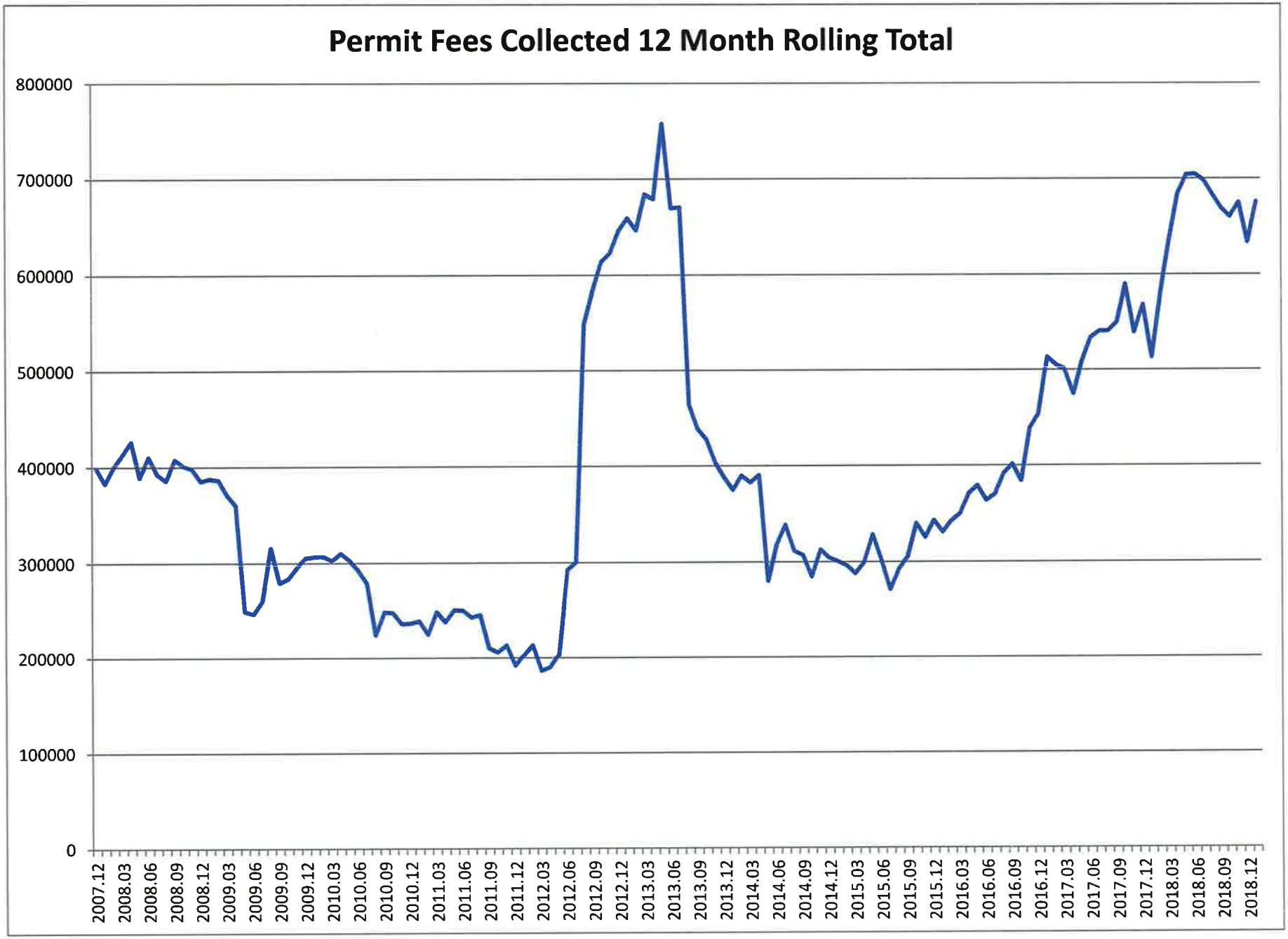

February 17, 2019
Our File: 119006-3

Township of Puslinch
7404 Wellington Road 34
Guelph, ON N1H 6H9

Attention: Ms. Karen Landry

Re: 855 and 927 Victoria Road S Rezoning (OZS18-007), Traffic Impact Study

Dear Ms. Landry:

As requested in the email dated January 22, 2019 from Sarah Wilhelm of Wellington County Planning Department, we have reviewed the Transportation Impact Study (TIS) by Paradigm Transportation Solutions (June 2018) for Victoria Road and MacAlister Boulevard. The focus of our review was related to potential impacts or the proposed new apartment development proposed for the northwest corner of Victoria Road South and MacAllister Boulevard to the enclave of Puslinch residents located on the east side of Victoria Road South.

It is noted that all existing intersections in this vicinity are currently signalized including:

- Victoria Road South and MacAlister Boulevard
- Victoria Road South and Stone Road
- Victoria Road South and Arkell Road

The report assesses Level of Service (LOS), Volume to Capacity ratio (V/C) and 95th percentile lane queue length for both the background traffic operations (i.e. without apartment development) and total traffic operations (i.e. with the proposed development). Optimized signal timing was assessed for the 2030 total traffic operations.

The highest possible LOS rating is LOS A, and remedial improvements are typically assessed for LOS of E or F. A V/C ratio of less than 0.85 for through movements and less than 0.90 for turning movements is preferred, and the available queue length should exceed the predicted 95th percentile queue length.

Results for Victoria Road South northbound, at MacAlister Boulevard, are summarized in the following table.

Year	With/Without Apartment Development	Traffic Movement	LOS	V/C	95th percentile Queue Length	Available Queue Length
Existing	without	Left Turn	A	0.18	19	120
		Through	A	0.64	83	N/A
2020	without	Left Turn	B	0.66	33	120
		Through	B	0.70	84	N/A
	with	Left Turn	E	0.98**	41	120
		Through	B	0.71	74	N/A
2025	without	Left Turn	C	0.77	31	120
		Through	B	0.78	81	N/A

	with	Left Turn	F**	1.06**	41	120
		Through	B	0.77	80	N/A
2030	without	Left Turn	C	0.81	32	120
		Through	C	0.86	87	N/A
	with	Left Turn	F**	1.09**	37	120
		Through	C	0.86	83	N/A
2030 *(with optimized signal timing)*	with	Left Turn	D	0.82	62	120
		Through	B	0.69	84	N/A

** Exceeds acceptable level. Remedial improvements required.

The traffic assessment indicates that with optimized signal timing, traffic movements in the vicinity of the Puslinch Residential enclave are projected to operate within acceptable levels of service with the proposed apartment development. It is also noted that the need to widen Victoria Road South to four lanes between York Road and Clair Road is also being considered as part of Transportation Master Plan which is currently being updated.

It is understood that there are concerns regarding the lack connectivity for pedestrians crossing from the east side of Victoria Road South (Puslinch enclave) as well as difficulties backing out of driveways of homes at this location.

If the above remains a concern, it is recommended that Puslinch Township formally requesting that the City of Guelph conduct a review of the area and examine the need for pedestrian traffic improvements in this area (such as sidewalk, refuge island, crosswalk, etc).

If you have any questions or require additional information, please do not hesitate to contact us.

Yours truly,

GM BLUEPLAN ENGINEERING
Per:

Amanda Pepping, P. Eng.

paradigm
TRANSPORTATION SOLUTIONS LIMITED

Victoria Road & MacAlister Boulevard, Guelph Transportation Impact Study

Paradigm Transportation Solutions Limited

June 2018

Project Summary

Project Number
170044

June 2018

Client
Fusion Homes
500 Hanlon Creek Blvd
Guelph, ON N1C 0A1

Client Contact
Ben Jones

Consultant Project Team
Stewart Elkins, B.E.S., MITE
W. Andrew Evans, M.Sc.

Victoria Road & MacAlister Boulevard, Guelph Transportation Impact Study

Signatures and Seals

Signature

Engineer's Seal

Disclaimer

This document has been prepared for the titled project or named part thereof and should not be relied upon or used for any other project without an independent check being carried out as to its suitability and prior written authorization of Paradigm Transportation Solutions Limited being obtained. Paradigm Transportation Solutions Limited accepts no responsibility or liability for the consequence of this document being used for a purpose other than the purposes for which it was commissioned. Any person using or relying on the document for such other purpose agrees, and will by such use or reliance be taken to confirm their agreement to indemnify Paradigm Transportation Solutions Limited for all loss or damage resulting there from. Paradigm Transportation Solutions Limited accepts no responsibility or liability for this document to any party other than the person by whom it was commissioned.

To the extent that this report is based on information supplied by other parties, Paradigm Transportation Solutions Limited accepts no liability for any loss or damage suffered by the client, whether through contract or tort, stemming from any conclusions based on data supplied by parties other than Paradigm Transportation Solutions Limited and used by Paradigm Transportation Solutions Limited in preparing this report.

Paradigm Transportation Solutions Limited
22 King Street South Suite 300
Waterloo ON N2J 1N8
p: 519.896.3163
www.ptsl.com

Executive Summary

Content

Paradigm Transportation Solutions Limited (Paradigm) was retained by 2506780 Ontario Inc and Gamma Developers Limited to undertake a transportation impact study for their proposed residential development at Victoria Road South and MacAlister Boulevard in the City of Guelph, Ontario. Two different plans of the developed have been prepared with the higher density version being presented in this report as the "worst case" scenario. The proposed higher density development consists of four (4) apartment buildings with 333 residential units and 108 townhomes units. Vehicular access to the subject site is proposed a full moves access to MacAlister Boulevard and a right-in/right-out only driveway to Victoria Road South.

Conclusions

Based on the analyses contained in this brief, it is concluded that:

- **Existing Traffic Operations:** The study area intersections are currently operating at acceptable overall levels of service during the AM and PM peak hours.

  At the intersection of Victoria Road South and Arkell Road, the eastbound left-turn movement is operating at LOS E with v/c ratio 0.98 during the AM peak hour which can be mitigated by optimizing the signal timings.

- **Development Generated Traffic:** The proposed development is forecast to generate approximately 165 trips during the weekday AM peak hour and 204 trips during the weekday PM peak hour
- **2020 Background Traffic Operations:** The study area intersections are forecast to continue operating acceptable overall levels of service during the AM and PM peak hours.
- **2020 Total Traffic Operations:** The study area intersections are forecast to operate similar to 2020 background traffic operations. Inclusion of the site-generated traffic does not significantly impact the study area intersections.

  The southbound left-through-right turn movement at the intersection of MacAlister Boulevard and the Site Driveway is forecast to operate at LOS F with a v/c ratio of 0.62 during the AM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on MacAlister Boulevard which limits the number of available gaps for side street traffic.

- **2025 Background Traffic Operations:** The study area intersections are forecast to experience congestion and delay but will continue

operating at acceptable overall levels of service during the AM and PM peak hours.

The eastbound left-turn movement at the intersection of Victoria Road South and Arkell Road is forecast to operate at LOS F with a v/c ratio of 1.05 during the AM peak hour. The northbound through-right turn movement is forecast to operate at LOS E with a v/c ratio of 1.04, and the southbound through-right turn movement is forecast to operate at LOS D with v/c ratio of 0.97 during the PM peak hour.

- **2025 Total Traffic Operations:** The study area intersections are forecast to operate similar to 2025 background traffic operations. Inclusion of the site-generated traffic does not significantly impact the operations of the study area intersections during the AM and PM peak hours.

  The southbound shared left-through-right turn movement at the intersection of MacAlister Boulevard and the Site Driveway is forecast to operate at LOS F with a v/c ratio of 0.71 during the AM peak hour.

- **2030 Background Traffic Operations:** The study area intersections are forecast to experience congestion and during the AM and PM peak hours.

  The northbound left-turn movement at the intersection of Victoria Road South and Store Road is forecast to operate at LOS F with v/c ratio of 1.09 during the AM peak hour.

  The northbound left turn movement is forecast to operate at LOS E with v/c 1.0 and the northbound through movement is forecast to operate at LOS E with v/c ratio of 1.04 during the AM peak hour at the intersection of Victoria Road South and MacAlister Boulevard.

  The eastbound left-turn movement at the intersection of Victoria Road South and Arkell Road is forecast to operate at LOS F with a v/c ratio of 1.19 during the AM peak hour, the northbound through-right turn movement is forecast to operate at LOS F with a v/c ratio of 1.15 and the southbound through-right turn movement is forecast to operate at LOS E with v/c ratio of 1.08 during the PM peak hour.

- **2025 Total Traffic Operations:** The study area intersections are forecast to operate similar to 2030 background traffic operations. Inclusion of the site-generated traffic does not significantly impact the operations of the study area intersections during the AM and PM peak hours.

  The southbound shared left-through-right turn movement at the intersection of MacAlister Boulevard and the Site Driveway is forecast to operate at LOS F with a v/c ratio of 0.77 during the AM peak hour.

- **Future Total Operations with Improvements:** With optimized signal timings, the study area intersections will operate with acceptable levels of services during the AM and PM peak hours. The southbound left-turn/through/right-turn movement is forecast to operate at LOS F with v/c ratio of 0.77 at the intersection of MacAlister Boulevard and the site driveway during the AM peak hour.

Recommendations

Based on the findings of this study, the following is recommended:

- A southbound left-turn lane be included on the MacAlister Boulevard driveway.
- The City of Guelph should monitor the intersections of Victoria Road at Stone Road, Victoria Road at MacAlister Boulevard and Victoria Road at Arkell Road under future traffic conditions to determine the delay and adjust the signal timings accordingly.
- The City of Guelph monitor the traffic volumes on Victoria Road South and assess the need for widening when traffic volumes reach the forecast levels identified in this study.
- The developer implements the following Travel Demand Management measures to reduce the private automobile impact:
  - Mark site driveway with a ladder crosswalk to further emphasize the presence of this east-west pedestrian crossing;
  - Provide residents and visitor bicycle parking spaces on-site; as well as general education of all travel mode options that identify benefits and how residents can best utilize these modes. New residents should be provided with a welcome package that outlines proximity to transit, cycling facilities and the proximity to local activity centres.

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Contents

Appendices

Figures

Tables

1 Introduction

1.1 Overview

Paradigm Transportation Solutions Limited (Paradigm) was retained by 2506780 Ontario Inc and Gamma Developers Limited to undertake a transportation impact study for their proposed residential development at Victoria Road South and MacAlister Boulevard in the City of Guelph, Ontario. Two different plans of the developed have been prepared with the higher density version being presented in this report as the "worst case" scenario. The proposed higher density development consists of four (4) apartment buildings with 333 residential units and 108 townhomes units.

The location of the subject site is shown in **Figure 1.1**.

1.2 Purpose and Scope

The purpose of this study is to assess the impact of the subject site on the adjacent road network and to determine the improvements required (if any) to accommodate the increase in traffic attributed to the proposed development. The scope of this study includes determination of the current traffic conditions in the vicinity of the development, the additional traffic that may be generated by the development, analyses of the impact of the traffic, and recommendations on the measures required in order to accommodate the traffic needs in a satisfactory manner. Travel Demand Management measures will also be provided to reduce the impact of private automobile usage.

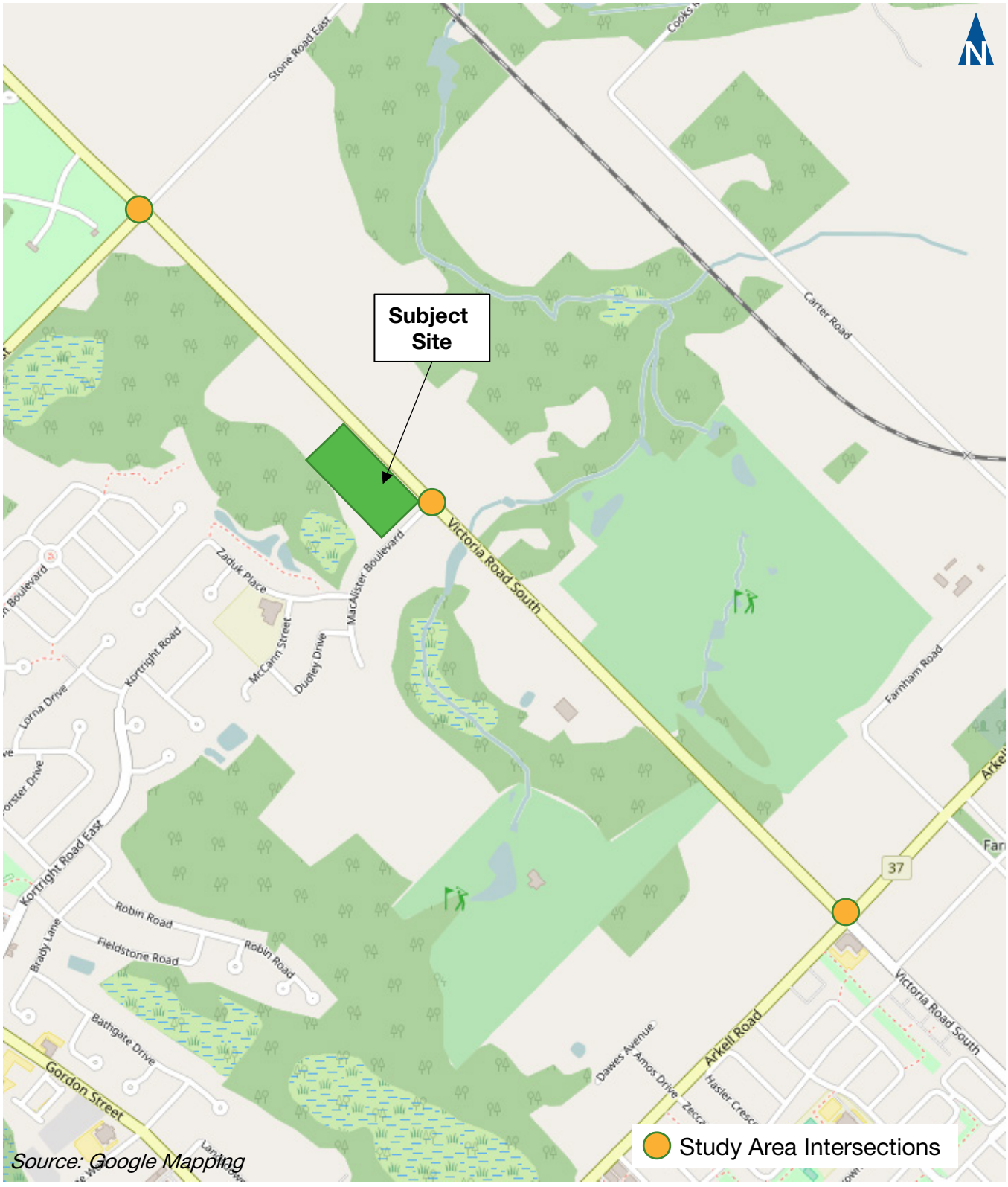
The horizon years assessed in the study is 2020, which is the anticipated build-out of the development, five years beyond the full buildout (2025) and ten-years beyond the full buildout (2030). This study have been conducted in accordance to the guidelines set out in the City of Guelph Traffic Impact Study Guidelines[1].

The following intersections were investigated to assess the impact of additional traffic due to the proposed development:

- Victoria Road South and MacAlister Boulevard (signalized);
- Victoria Road South and Stone Road (signalized);
- Victoria Road South and Arkell Road (signalized); and
- The proposed driveway connections from the subject site to MacAlister Boulevard and Victoria Road South (unsignalized).

Through discussions with staff from the City of Guelph, the weekday AM and PM peak hour were determined to be the key peak hours for analysis.

[1] Traffic Impact Study Guidelines, City of Guelph, November 2011



Source: Google Mapping

Study Area and Development Location

Victoria Road & MacAlister Boulevard, Guelph TIS
170044

Figure 1.1

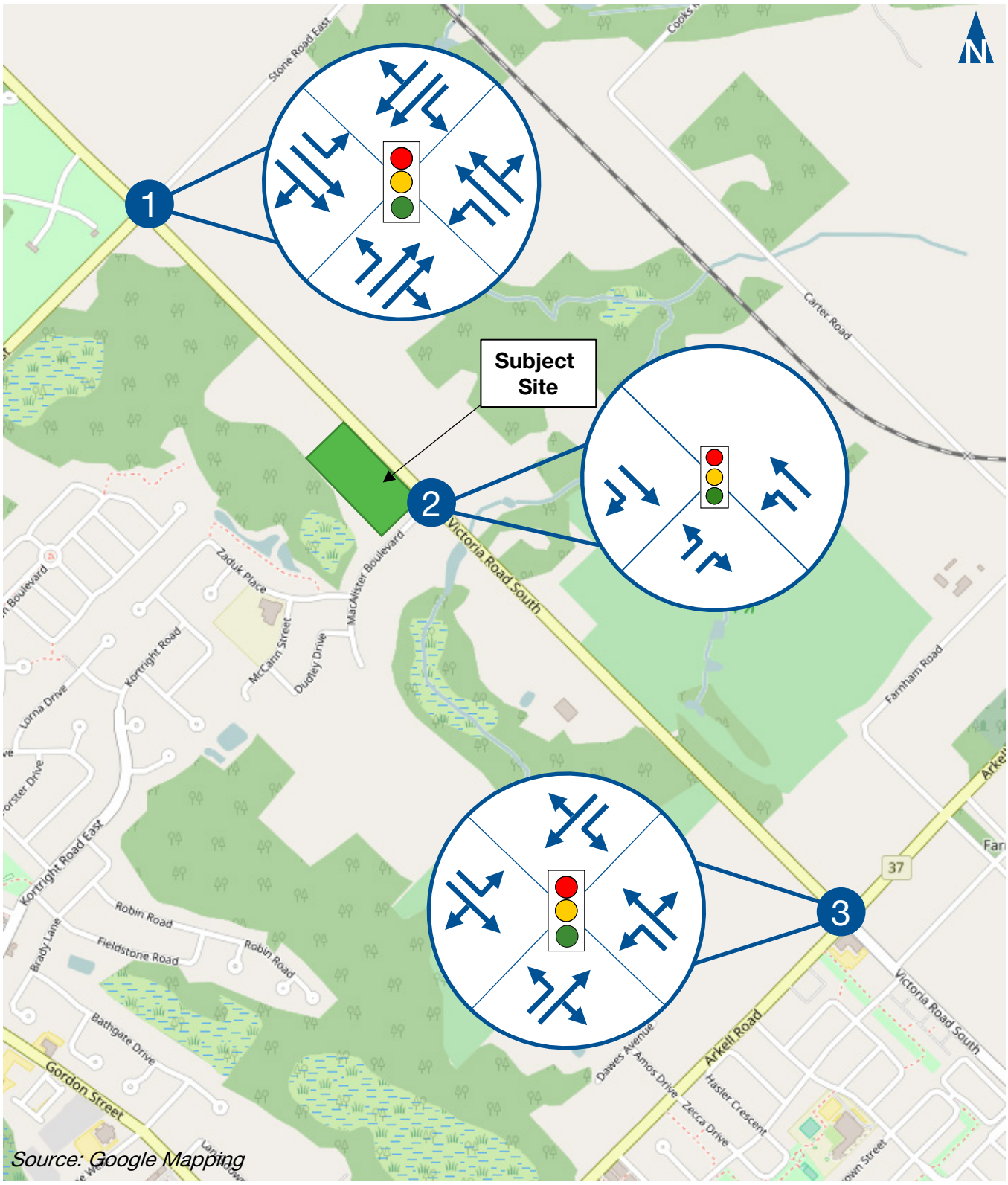
2 Existing Conditions

2.1 Existing Road Characteristics

Victoria Road South and MacAlister Boulevard are the roadways in the study area that will be most impacted by the proposed development. The roadways are described generally as follows:

- **Victoria Road South** is a north-south arterial road with an urban cross-section. Through the study area, Victoria Road South has a three-lane cross-section with a posted speed limit of 70 kilometres per hour. North of MacAlister Boulevard there are two southbound lanes and one northbound lane. The curbside southbound lane turns into the southbound right turn lane at its intersection with MacAlister Boulevard. The south leg of the intersection has an exclusive northbound left-turn lane and a through lane. A sidewalk is provided on the west side of Victoria Road South. There are on-street bike lanes on both sides of Victoria Road South.
- **MacAlister Boulevard** is an east-west local road with an urban cross-section. It has a one travel lane in each direction but has the pavement width to accommodate two lanes per direction (currently no lanes are painted due to the recent construction of MacAlister Boulevard). For the purpose of this study, MacAlister Boulevard is assumed to operate with one-lane per direction. There is a raised centre median that is broken where the proposed driveway to the subject site is located. At its signalized intersection with Victoria Road, the pavement width can accommodate separate left and right turns. Therefore, a separate right turn lane has been analyzed in the study. As there are no posted speed limit signs on MacAlister Boulevard, the assumed speed limit is 50 kilometers per hour. There are currently no sidewalks on either side of MacAlister Boulevard in the study area. However, this area is currently under development and sidewalks will likely be provided upon full buildout of the area.
- **Stone Road** is an east-west arterial road with an urban cross-section. It has two travel lanes in each direction west from Victoria Road South. There are on-street cycles lanes and sidewalks on both sides of the road from Victoria Road South to Gordon Street.
- **Arkell Road** is an east-west arterial road with an urban cross-section. It has one travel lane in each direction. There are on-street cycle lanes on both sides of the road. A sidewalk is provided on the south side of the road from Victoria Road South to Gordon Street.

The existing lane configurations and traffic control are shown in **Figure 2.1**.



Source: Google Mapping

Existing Lane Configuration and Traffic Control

Victoria Road & MacAlister Boulevard, Guelph TIS
170044

Figure 2.1

2.2 Existing Cycling Network

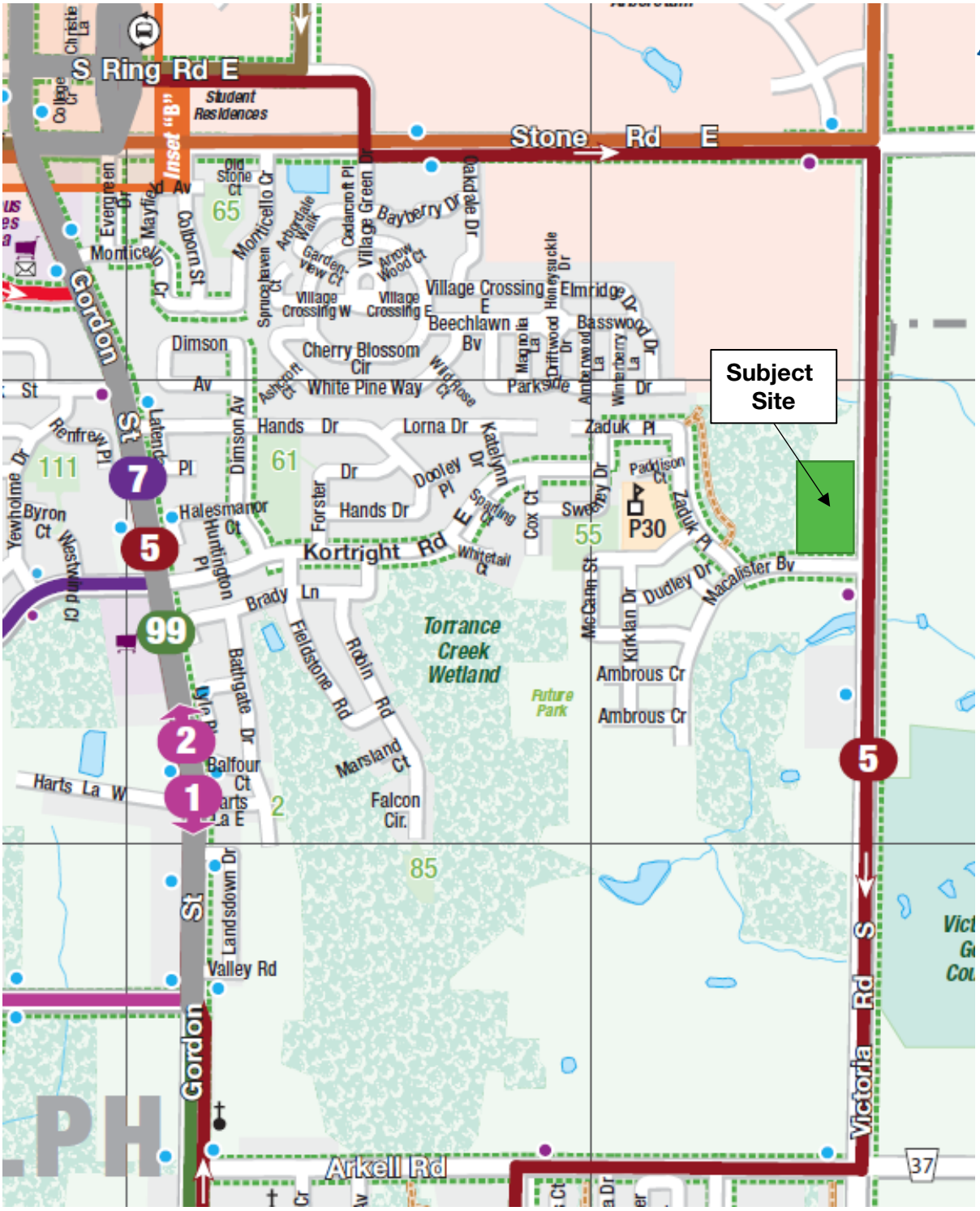
On-street cycling lanes are provided on both sides of Victoria Road South, Stone Road, and Arkell Road in the study area.

2.3 Existing Transit Network

Guelph Transit operates one transit route within the study area: Route 5 (Goodwin). Route 5 provides a clockwise circular service connecting the University lands with the Clairfields East residential areas to the southeast via Stone Road, Victoria Road, Summerfield Drive, Goodwin Drive and Gordon Street. Service is provided seven days per week as follows:

- Weekday service operates from approximately 6:00 AM to 12:30 AM with headways generally in the order of 20 to 30 minutes;
- Saturday service operates from approximately 6:00 AM to 12:30 AM with headways of generally 30 minutes; and
- Sunday service operates from approximately 9:30 AM to 7:00 PM with headways of generally 30 minutes.

The closet bus stop to the proposed site is located in the southwest corner of the Victoria Road and MacAlister Boulevard intersection. This stop is located approximately 275 metres from the centre of the site. The maximum typical walking distance to a bus stop is usually 400 to 500 metres. This bus stop is within the maximum recommended walking distance for most of development. The existing bus route in the study area is shown in **Figure 2.2**.



ce: Guelph Transit

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Existing Transit Network

2.4 Existing Traffic Volumes

Weekday AM and PM peak period traffic counts were conducted by Paradigm on Thursday April 12, 2018 for the study area intersections. The count information is provided in **Appendix A**.

The balanced existing weekday AM and PM peak hour traffic volumes are shown in **Figure 2.3.**

2.5 Existing Traffic Operations

Intersection level of service (LOS) is a recognized method of quantifying the delay experienced by drivers at intersections. The term "Level of Service" denotes how well a traffic movement operates under given traffic demands, lane arrangements and traffic controls. Each level is determined by the average amount of control delay per vehicle. Control delay is the total delay associated with stopping for a signal or stop sign and includes four components: deceleration delay, stopped delay, time spent in queue and final acceleration delay.

The highest possible rating is LOS A, under which the average total delay is equal or less than 10.0 seconds per vehicle. When the average delay exceeds 80 seconds for signalized intersections, 50 seconds for unsignalized intersections or when the volume to capacity ratio is greater than 1.0, the movement is classed as LOS F and remedial measures are usually implemented, if they are feasible. LOS E is usually used as a guideline for the determination of road improvement needs on through lanes, while LOS F may be acceptable for left-turn movements at peak times, depending on delays.

The operations of intersections in the study area were evaluated with the existing turning movement volumes using Synchro / SimTraffic 9.

The intersection analysis considered the following separate measures of performance:

- The volume to capacity ratio for each intersection;
- The LOS for each turning movement. LOS is based on the average control delay per vehicle; and
- The estimated 95th percentile queue length using SimTraffic (based on 5 iterations of 15-minute seeding time and 60-minute evaluation time).

The City of Guelph Traffic Impact Study guidelines indicate the following thresholds for identifying critical movements:

- Signalized intersections:

- v/c ratios for overall intersection operations, through movements or shared/turning movements increased to 0.85 or above;
- v/c ratios for exclusive turning movements increased to 0.90 or above; or
- queues for an individual movement are projected to exceed available turning lane storage.

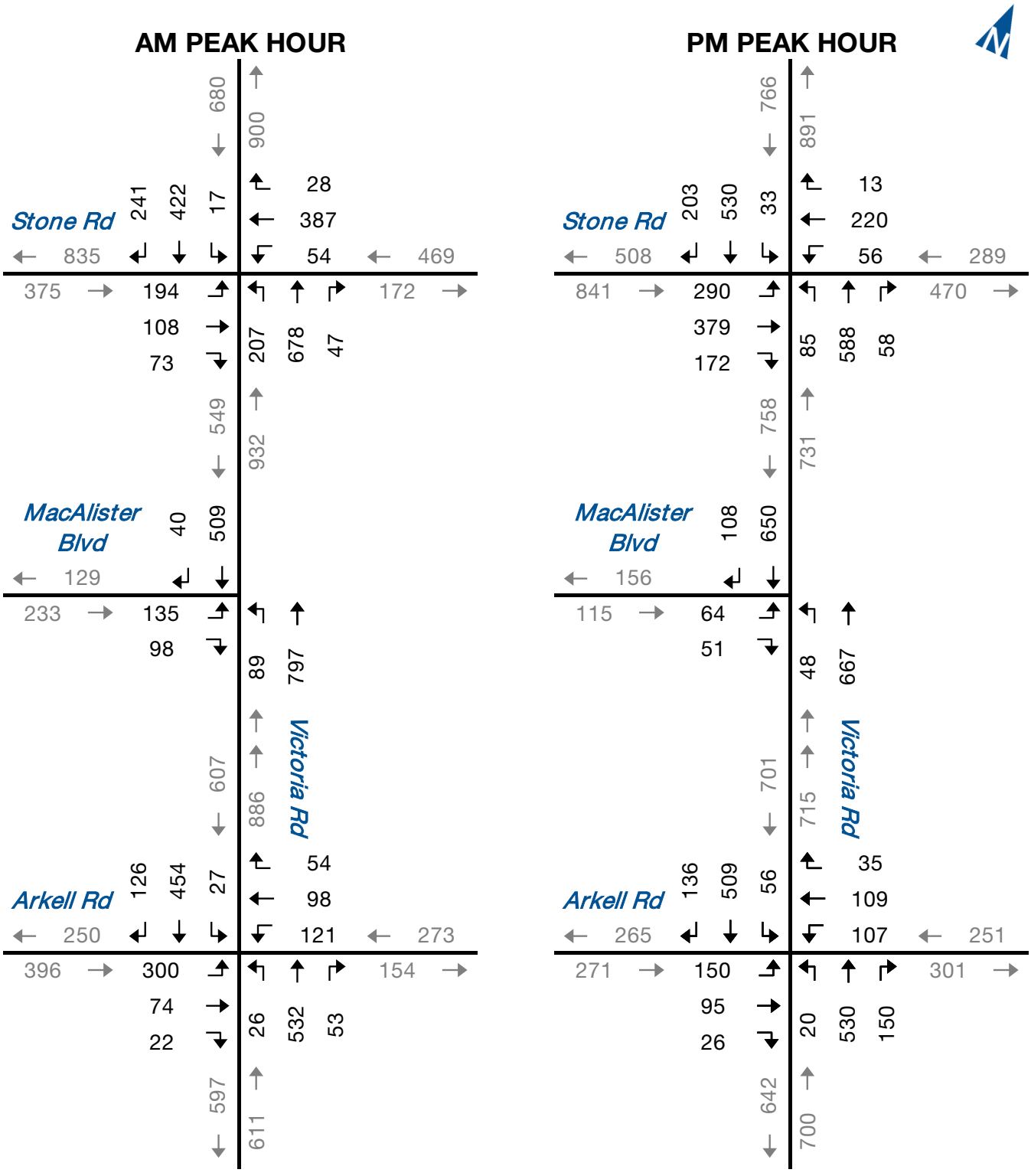
- Unsignalized intersections:
  - Level of service based on average delay per vehicles, on individual movements exceeds LOS E; or
  - The estimated 95th percentile queue length for an individual movement exceeds the available queue storage.

The existing intersection operations are summarized in **Table 2.1** indicating the existing levels of service (LOS), volume to capacity ratios (V/C) and 95th percentile queues experienced within the study area, for the AM and PM peak hours. The Detailed Synchro reports are provided in **Appendix B**.

The following is noted from the analysis:

- Victoria Road South at Arkell Road:
  - The eastbound left-turn movement currently operates at LOS E with a v/c ratio of 0.98 during the AM peak hour; and
  - The northbound and southbound shared through/right-turn movements are forecast to operate at LOS D with v/c ratios of 0.93 (northbound) and 0.98 (southbound) during the PM peak hour.

These critical movements can be mitigated by optimizing the signal timings (**Table 2.2)** with the detailed Synchro reports provided in Appendix B.



Existing Traffic Volumes

Victoria Road & MacAlister Boulevard, Guelph TIS
170044

Figure 2.3

TABLE 2.1: EXISTING TRAFFIC OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	C 20 0.64 42	B 18 0.18 32		**B** **19**	B 16 0.18 23	C 22 0.57 44		**C** **21**	C 25 0.76 57	C 20 0.71 89		**C** **21**	B 12 0.08 14	B 18 0.59 52		**B** **18**	**B** **20**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	B 20 0.35 34 60 26		B 18 0.07 22	**B** **19**					A 8 0.30 38 120 83	B 17 0.84 126		**B** **16**		B 14 0.65 84 220 136	A 9 0.03 12	**B** **14**	**B** **16**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	E 69 0.98 91	C 28 0.31 131		**E** **59**	C 25 0.39 32	C 32 0.54 38		**C** **29**	B 13 0.14 18	C 22 0.78 95		**C** **21**	B 11 0.11 45	C 30 0.89 152		**C** **29**	**C** **33**
PM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	D 40 0.89 56	C 22 0.62 61		**C** **28**	B 17 0.37 27	B 20 0.36 35		**B** **19**	B 14 0.40 35	B 19 0.65 76		**B** **18**	B 12 0.20 15	C 20 0.70 58		**B** **20**	**C** **22**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	C 21 0.20 19 60 41		B 20 0.03 18	**C** **20**					A 7 0.18 19 120 101	A 8 0.64 83		**A** **8**		B 14 0.73 118 220 102	A 7 0.05 15	**B** **13**	**B** **11**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	C 26 0.61 37	C 26 0.48 30		**C** **26**	C 22 0.38 28	C 27 0.55 35		**C** **25**	B 13 0.15 45	D 36 0.93 196		**D** **35**	B 12 0.26 66	D 45 0.98 188		**D** **43**	**D** **35**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
RBT - Roundabout

TABLE 2.2: EXISTING TRAFFIC OPERATIONS WITH IMPROVEMENTS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	D 51 0.90 96	C 29 0.27 167		**D** **45**	C 27 0.40 36	C 35 0.56 47		**C** **31**	B 14 0.14 32	C 23 0.77 98		**C** **22**	B 12 0.11 38	C 31 0.88 135		**C** **30**	**C** **31**
PM Peak Hour	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	C 26 0.55 37	C 28 0.42 30		**C** **27**	C 24 0.38 28	C 29 0.50 35		**C** **27**	B 10 0.08 45	C 25 0.86 196		**C** **25**	B 12 0.25 66	C 22 0.81 188		**C** **21**	**C** **24**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
RBT - Roundabout

3 Development Concept

The subject site is in the north-west quadrant of the intersection of Victoria Road South and MacAlister Boulevard. Two different plans of the developed have been prepared with the higher density version being presented in this report as the "worst case" scenario. The proposed higher density development consists of four (4) apartment buildings with 333 residential units and 108 townhomes units. For reference, the lower demister version has two apartment building with 211 residential units and 156 townhome units.

Vehicular access to the subject site is proposed via one access to MacAlister Boulevard and one access to Victoria Road South. Based on discussions with the City of Guelph prior to commencing the study, the City advised that the Victoria Road access would be a right-in / right-only driveway with a raised centre median prohibiting left turns. The City also advised that the MacAlister Boulevard driveway should be located opposite the existing driveway at 385 MacAlister Boulevard to limit the number of offset intersections. This study assumes the recommendations of the City for the driveway configurations.

A total of 545 parking spaces are to be provided on-site in accordance to City bylaws. A total of 567 parking spaces is being proposed with 273 surface parking spaces (of which 110 are designated for visitor parking spaces), 198 underground parking spaces, and 96 driveways.

The proposed site-plan is shown in **Figure 3.1**.

3.1 Development Trip Generation

The Institute of Transportation Engineers (ITE) Trip Generation Manual, 10th Edition[2] was used to estimate the peak hour traffic volumes that will be generated by the components of this development. The following land use codes were used:

- **LUC 220 (Multifamily Housing [Low-Rise])**: includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units, and that have one or two levels (floors).; and
- **LUC 221 (Multifamily Housing [Mid-Rise])**: includes apartments, townhouses, and condominiums located within the same building with at least three other dwelling units and that have between three and 10 levels (floors).

To be conservative, no trip reductions to reflect increased pedestrian / cycling activity were included in the calculation. The estimated total trip

[2] Trip Generation Manual, 10th Edition, Institute of Transportation Engineers, September 2017

generation for the development displayed in **Table 3.1** indicates that a net total of 165 trips will be generated during the AM peak hour and 204 trips will be generated during the PM peak.

TABLE 3.1: DEVELOPMENT TRIP GENERATION

Land Use Code	Number of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
220 - Multifamily Housing (Low-Rise)	108	Equation[1]	12	42	**54**	Equation[3]	40	23	**63**
221 - Multifamily Housing (Mid-Rise)	333	Equation[2]	29	82	**111**	Equation[4]	86	55	**141**
Total Trip Generation	**441**		**41**	**124**	**165**		**126**	**78**	**204**

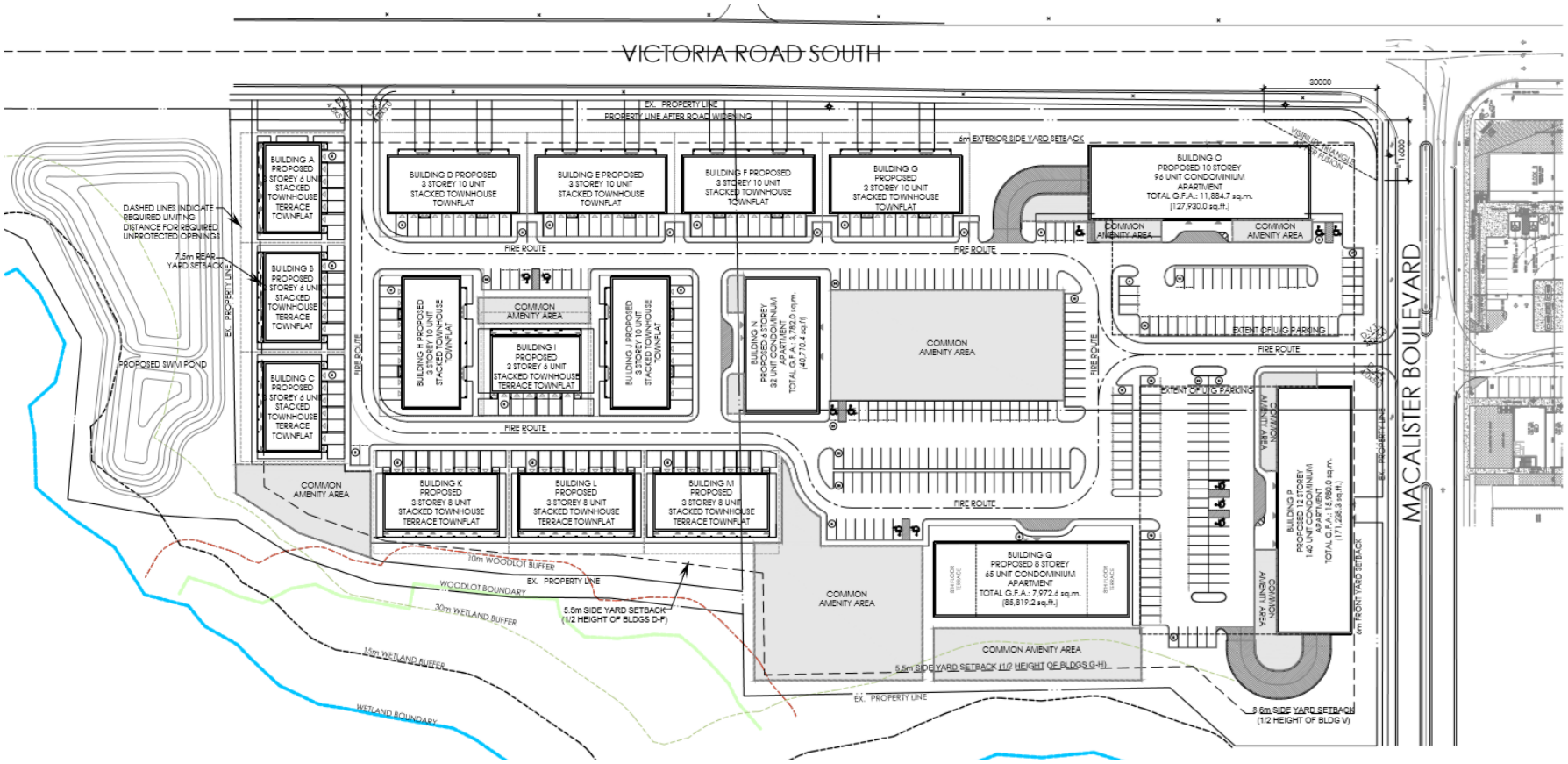
[1] Ln(T) = 0.92 Ln(X) - 0.51
[2] Ln(T) = 0.98 Ln(X) - 0.52
[3] Ln(T) = 0.98 Ln(X) - 0.98
[4] Ln(T) = 0.96 Ln(X) - 0.63

3.2 Development Trip Distribution and Assignment

Table 3.2 summarizes the trip distribution which based on existing traffic patterns and was approved with staff from the City of Guelph. The site-generated trips were assigned to the study area road network using this distribution and are summarized in **Figure 3.2**.

TABLE 3.2: TRIP DISTRIBUTION

Road	Direction	Distribution
Victoria Road	North	46%
	South	45%
MacAlister Boulevard	West	9%
	Total	**100%**



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Site Plan

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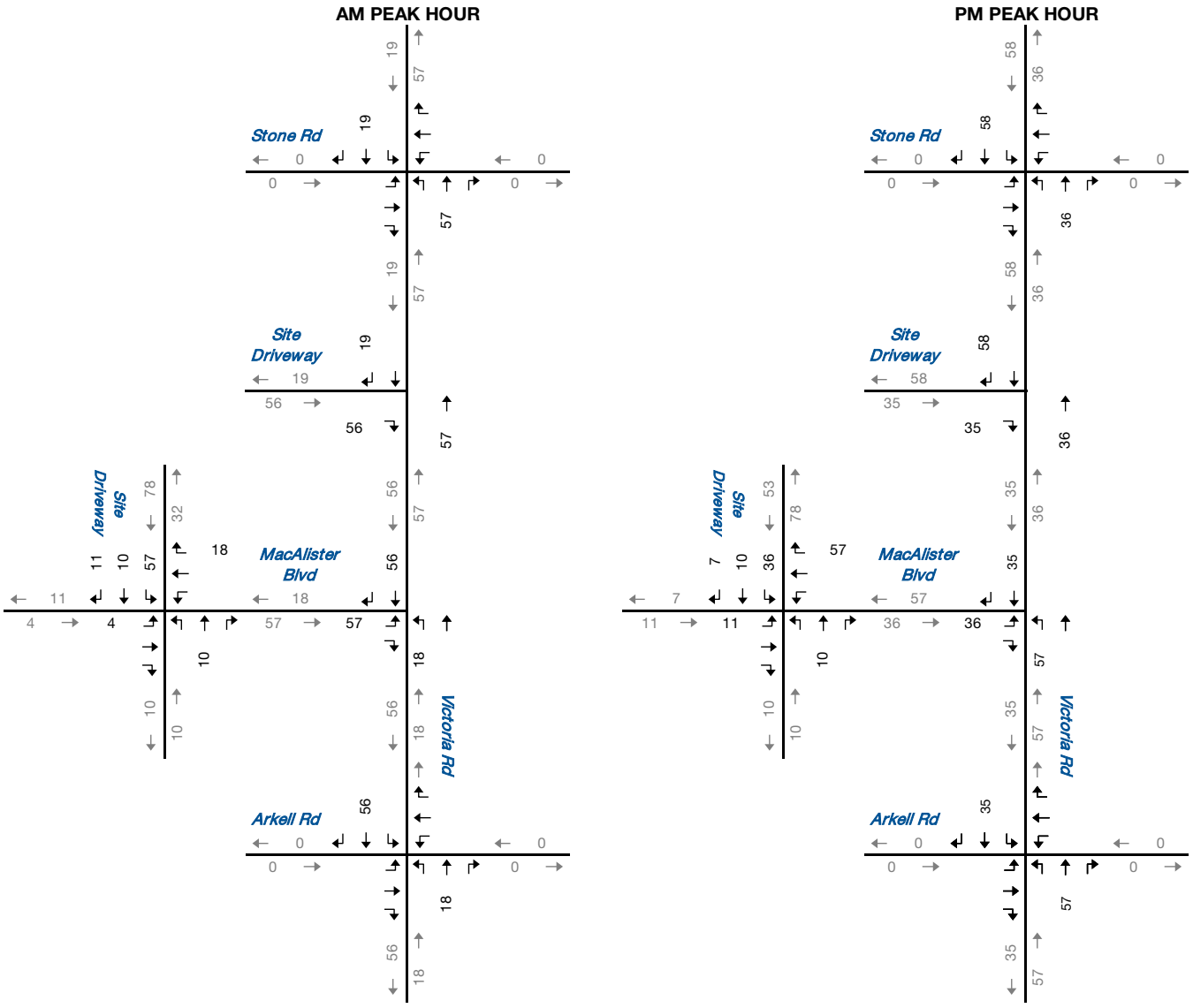
Figure 3.1



Development Generated Traffic Forecasts

Victoria Road & MacAlister Boulevard, Guelph TIS
170044

Figure 3.2

4 Evaluation of Future Traffic Conditions

The assessment of future traffic conditions contained in this section includes estimates of future background and total traffic and analysis for the opening year (2020), five-year horizon (2025), and ten-year horizon (2030). The likely future traffic volumes in the vicinity of the development will consist of increased non-site traffic volumes (background traffic), the traffic generated by other expected developments in the vicinity and traffic generated by the proposed development.

4.1 2020 Background Traffic

4.1.1 2020 Background Traffic Growth

To derive the future background traffic volumes, an annual average growth rate of 2.0% compounded for two years (total growth of 4%) was applied to the existing traffic on the study area road network. The growth rate was provided to Paradigm by the City of Guelph. **Figure 4.1** shows the weekday AM and PM peak hours background traffic growth for the 2020 horizon year.

4.1.2 Kortright East Background Development

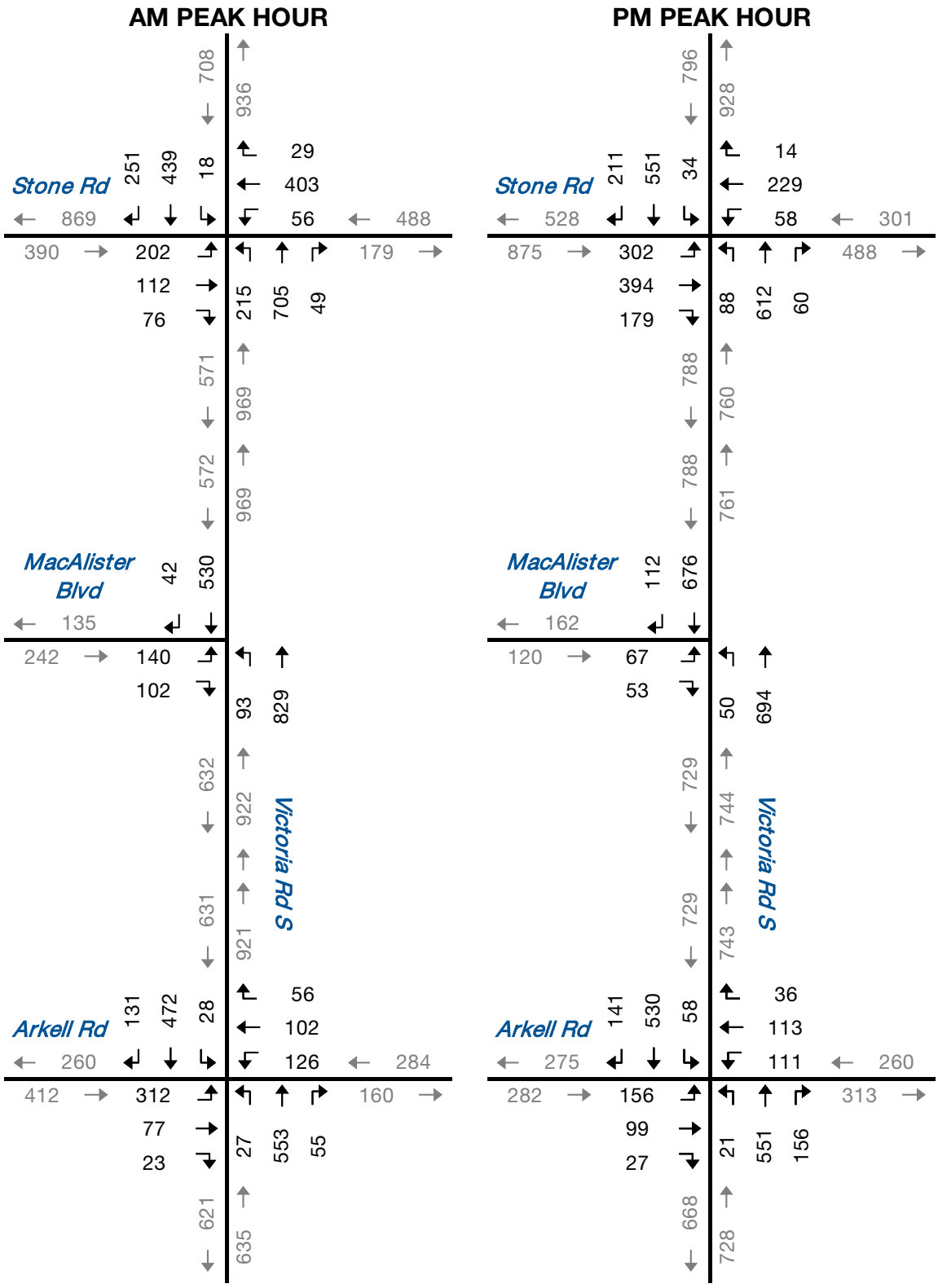
In addition to the general background growth, the remaining residential development of the Kortright East area of the City of Guelph has been included in the forecast background traffic. Through information provided by staff from the City, it is expected that a total of 353 single family residential units are still to be developed.

The estimated trip generation for the remaining residential units are shown in **Table 4.1** and are forecast to generate approximately 257 trips during the AM peak hour and 197 trips during the PM peak hour. Approximately 55% of the trips are expected to travel through the study area intersections based on the distribution of the existing traffic and the distribution from the Kortright East Traffic Study.

TABLE 4.1: KORTRIGHT EAST BACKGROUND DEVELOPMENT TRIP GENERATION

Land Use Code	Number of Units	AM Peak Hour				PM Peak Hour			
		Equation Rate	In	Out	Total	Equation Rate	In	Out	Total
210 - Single-Family Detached	353	T=0.70(X)+9.74	64	193	257	Ln(T) = 0.9 Ln(X) +0.51	124	73	**197**
Total Generation			**64**	**193**	**257**		**124**	**73**	**197**

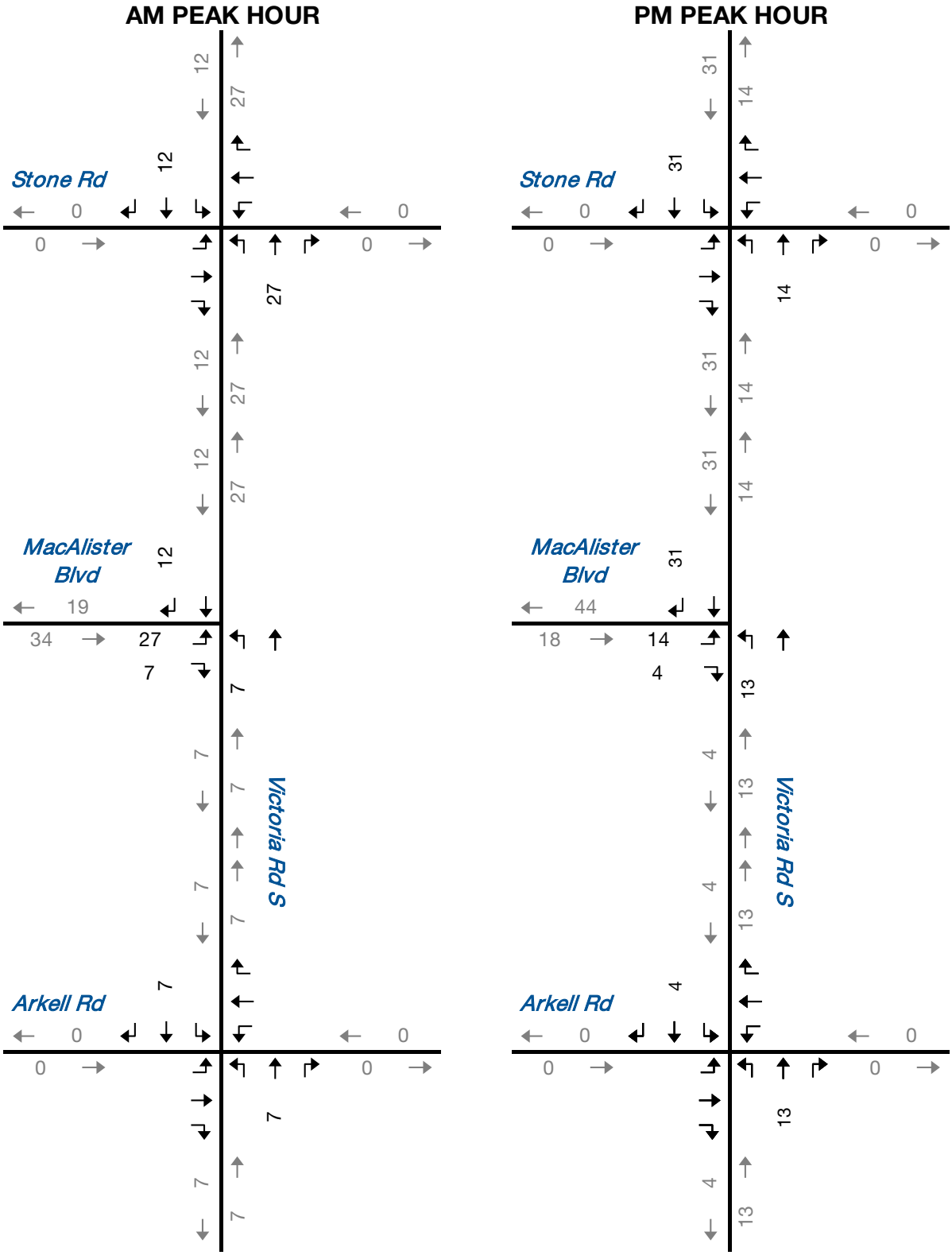
As the timing of the remaining of the residential development is unknown, approximately 38% of the trips were applied to the 2020 background forecast, and the remaining trips applied to 2025 and 2030 background horizon years. This is to account for continued construction of the background developments while the subject site is being constructed. **Figure 4.2** shows the Kortright East background development traffic for the 2020 horizon year.



2020 Background Growth

Victoria Road & MacAlister Boulevard, Guelph TIS
170044

Figure 4.1



2020 Kortright East Background Traffic Volumes

Victoria Road & MacAlister Boulevard, Guelph TIS
170044

Figure 4.2

4.1.3 385 MacAlister Boulevard

The parcel of land on the south side of MacAlister Boulevard known as municipal address 385 is proposed as a mixed-use. The development is proposed to include coffee/donut restaurant with drive-thru window, a gas-station with convenience market and one commercial building with residential apartments on the second storey. The traffic generated by this background development was included from the 2020 horizon forecast.

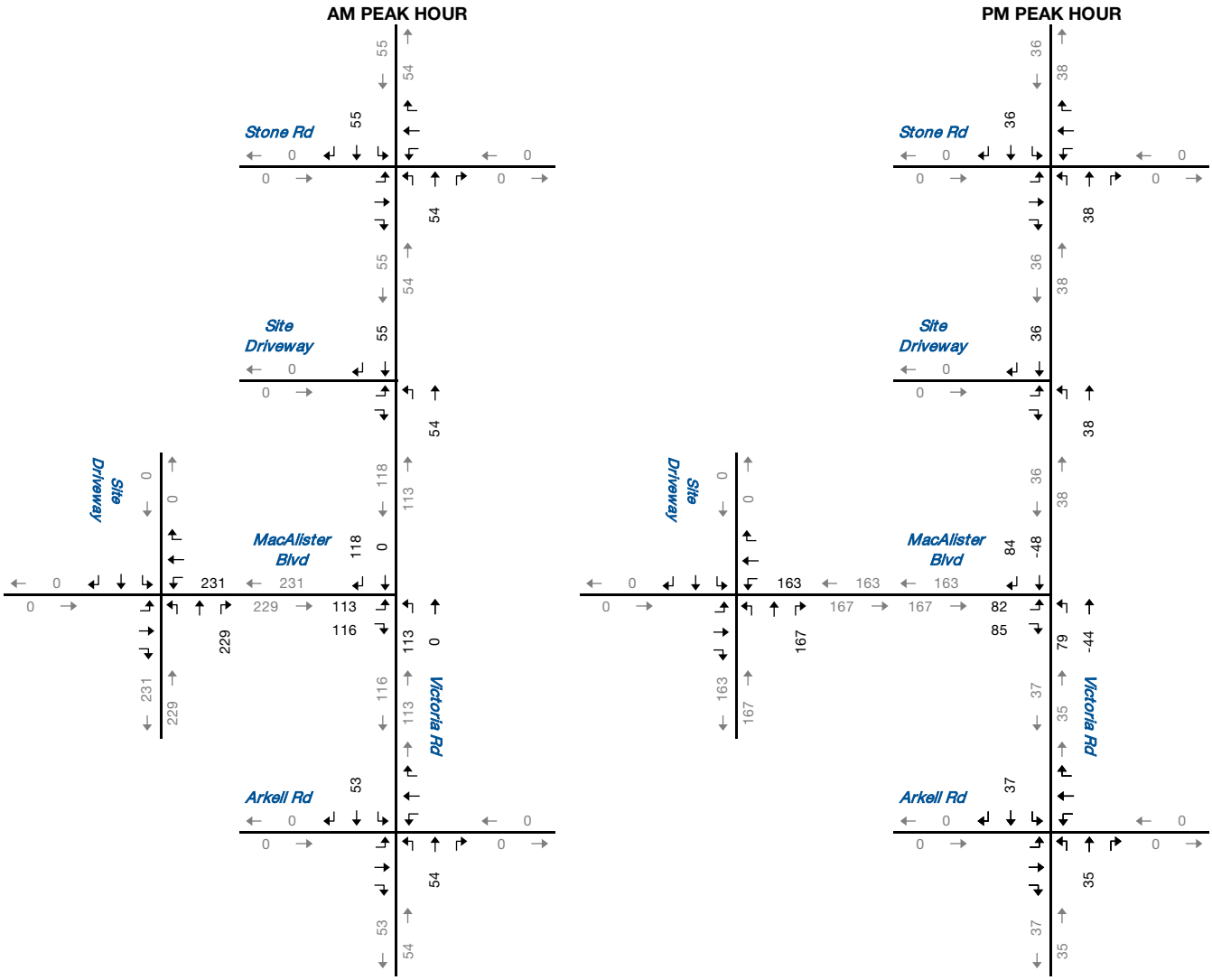
The estimated trip generation for the 385 MacAlister Boulevard is shown in **Table 4.2** and is forecast to generate approximately 236 trips during the AM peak hour and 160 trips during the PM peak hour.

TABLE 4.2: 385 MACALISTER BOULEVARD TRIP GENERATION

ITE Land Use Code	Number of Units	AM Peak Hour				PM Peak Hour			
		Rate	In	Out	Total	Rate	In	Out	Total
Observed Tim Hortons Weekday AM and PM Trip Generation			186	185	371		98	104	202
937 - Coffee/Donut Shop with Drive-Through Window (GFA/1000ft^2)	2.42	--	--	--	--	--	--	--	--
945 - Gasoline / Service Station with Convenience Market (GFA / 1000ft^2)	8	12.47	51	49	100	13.99	56	56	112
220 - Multifamily Housing (Low-Rise) (Units)	5	0.46	0	2	2	0.56	2	1	3
820 - Shopping Center (GFA / 1000ft^2)	7.15	0.94	4	3	7	3.81	14	13	27
Total Trip Generation			**241**	**239**	**480**		**170**	**174**	**344**
Pass-By Trips Coffe/Donut Shop*		49%	90	90	180	50%	50	50	99.99
Pass-By Trips Gasoline/Service Station with Convenience Market		63%	32	32	64	66%	37	37	74
Pass-By Trips Shopping Center		--	--	--	--	34%	5	5	10
Net Generation			**119**	**117**	**236**		**78**	**82**	**160**

* - Average pass-by percentage for Fast Food Restaurant with Drive-Through Window used as no Pass-By percentage available for Coffee/Donut Shop
Saturday peak hour pass-by percentage based on average of AM and PM peak hours

Figure 4.3 shows background development weekday AM and PM peak hour traffic volumes.



385 MacAlister Boulevard Background Traffic Volumes

Victoria Road & MacAlister Boulevard, Guelph TIS
170044

Figure 4.3

4.1.4 2020 Background Traffic Volumes

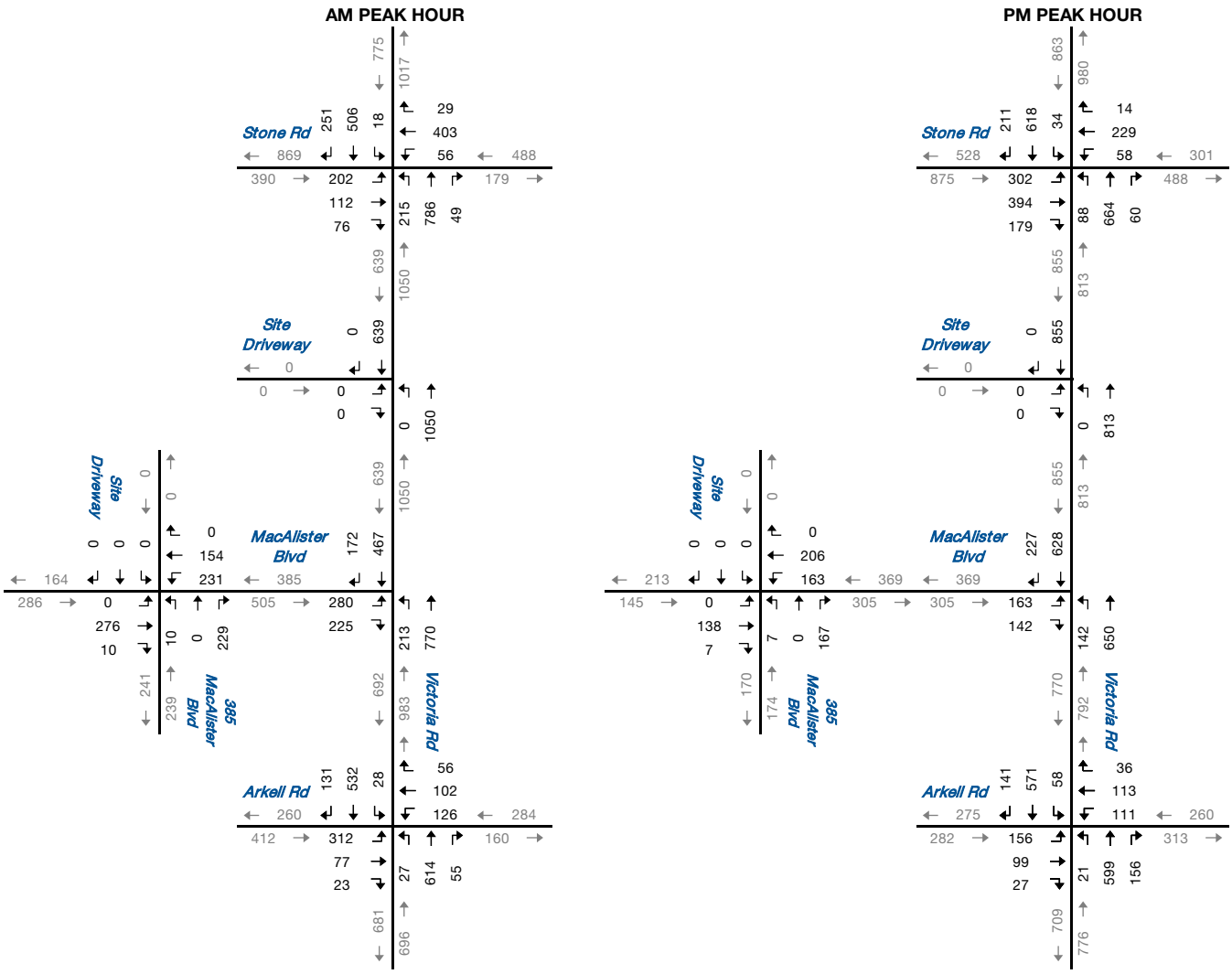
Figure 4.4 shows the 2020 total background AM and PM peak hour volumes which are obtained from the general background traffic growth (Figure 4.1) and the 2020 traffic generated by the Kortright East residential development (Figure 4.2) and 385 MacAlister Boulevard (Figure 4.3).

4.2 2020 Background Traffic Operations

The operations of the study area intersections were evaluated under background traffic volumes using the same methodology and assumptions as for the existing traffic volumes. The 2020 background AM and PM peak hour intersection operations are summarized in **Table 4.3** indicating the future LOS, v/c ratios and 95th percentile back of queue estimates within the study area. The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours with the following exceptions:

- Victoria Road South at MacAlister Boulevard:
  - The northbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio 0.90 and the eastbound left-turn movement is forecast to have a 95th percentile queue reach of 70m during the AM peak hour.
- Victoria Road South at Arkell Road:
  - The northbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio of 0.86 and the southbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio of 0.86 during the AM peak hour.
  - The northbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio of 0.93 and the southbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio of 0.87 during the AM peak hour.

Detailed Synchro reports are provided in **Appendix C**.



2020 Background Traffic Volumes

TABLE 4.3: 2020 BACKGROUND OPERATIONS SUMMARY

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	C 20 0.62 45	B 19 0.18 29		**B** **20**	B 17 0.17 24	C 23 0.57 46		**C** **22**	C 23 0.74 90	B 20 0.72 123		**C** **21**	B 11 0.08 16	B 18 0.61 58		**B** **18**	**B** **20**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	B 17 0.48 70 60 -10		B 15 0.26 2	**B** **16**					C 24 0.75 64 120 56	C 27 0.90 114		**C** **26**		C 20 0.71 87 220 133	B 13 0.11 24	**B** **19**	**C** **21**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	D 44 0.87 87	C 26 0.29 178		**D** **40**	C 23 0.36 31	C 29 0.51 46		**C** **26**	B 12 0.12 51	C 28 0.86 142		**C** **28**	B 12 0.12 39	C 27 0.86 142		**C** **27**	**C** **30**
	MacAlister Boulevard & 385 MacAlister Boulevard	TWSC	LOS Delay V/C Q		A 0 0.16 15		**A** **0**		A 6 0.18 31		**A** **6**	B 13 0.33 39			**B** **13**					**6**
PM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	C 25 0.75 62	C 22 0.61 63		**C** **23**	B 16 0.25 25	B 20 0.31 38		**B** **19**	B 13 0.35 36	B 18 0.63 86		**B** **18**	B 12 0.12 16	B 20 0.71 63		**B** **20**	**C** **20**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	B 17 0.30 49 60 12		B 16 0.09 20	**B** **17**					B 19 0.66 33 120 87	B 15 0.70 84		**B** **15**		C 25 0.83 110 220 110	B 12 0.14 28	**C** **21**	**B** **18**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	C 24 0.53 41	C 26 0.40 33		**C** **25**	C 22 0.36 29	C 27 0.48 37		**C** **25**	B 11 0.09 69	C 33 0.93 269		**C** **33**	B 12 0.26 66	C 27 0.87 150		**C** **26**	**C** **28**
	MacAlister Boulevard & 385 MacAlister Boulevard	TWSC	LOS Delay V/C Q		A 0 0.09 2		**A** **0**		A 4 0.11 20		**A** **4**	B 10 0.20 22			**B** **10**					**5**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout

4.3 2020 Future Total Traffic Volumes

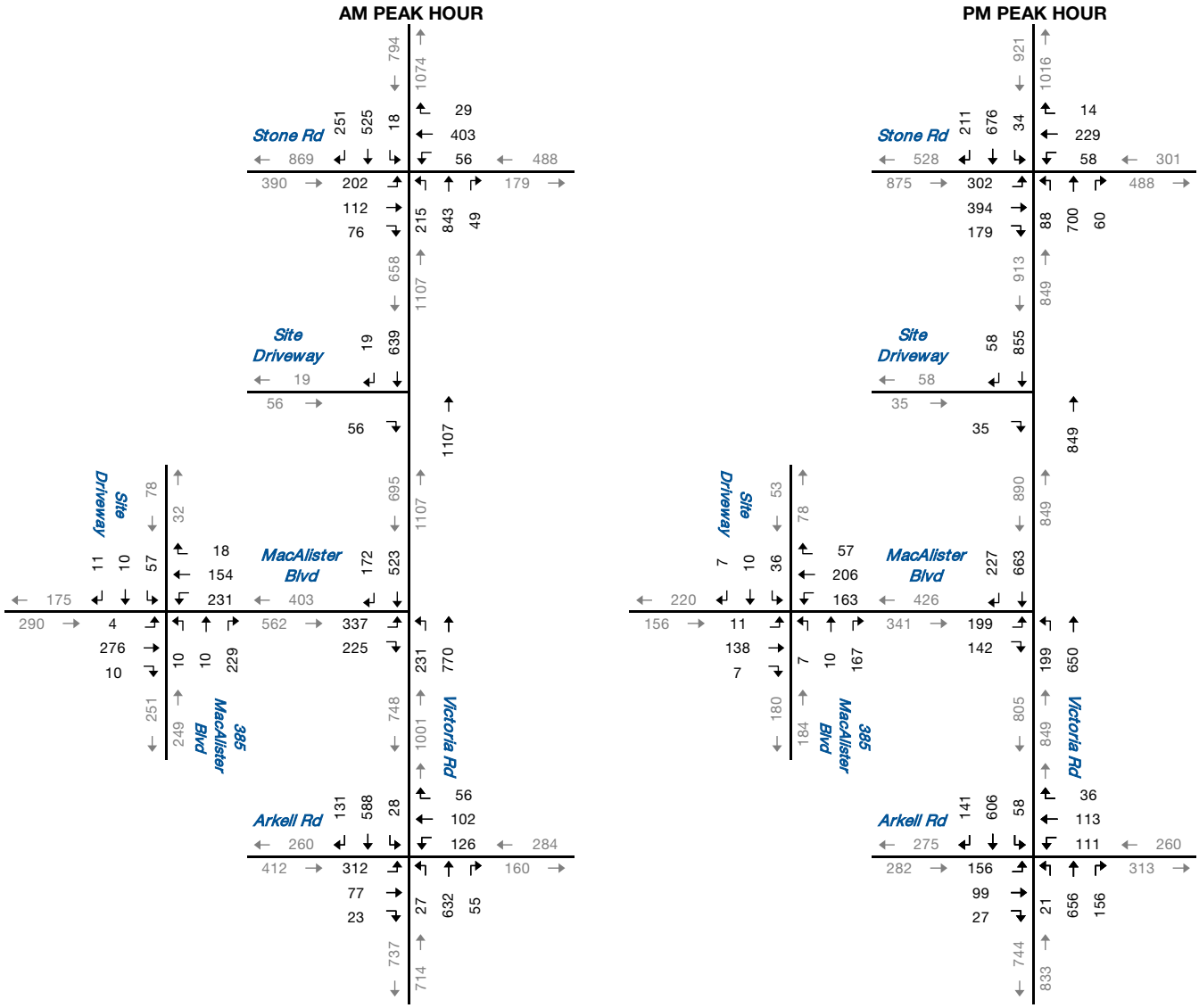
The site-generated traffic was added to the background traffic to produce the 2020 future total traffic volumes. **Figure 4.5** shows the 2020 future total weekday AM and PM peak hour volumes.

4.4 2020 Future Total Traffic Operations

The operations of the study area intersections were evaluated under future total traffic volumes using the same methodology and assumptions as for the 2020 background traffic volumes. The future total AM and PM peak hour intersection operations are summarized in **Table 4.4** indicating the future LOS, v/c ratios and 95th percentile back of queue estimates within the study area. Detailed Synchro report are provided in **Appendix D**. The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours with the following exceptions:

- Victoria Road South at MacAlister Boulevard:
  - The northbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio 0.90 and the eastbound left-turn movement is forecast to have a 95th percentile queue reach of 73m during the AM peak hour.
  - The northbound left-turn movement is forecast to operate at LOS E with v/c ratio of 0.98 and the southbound through movement at LOS C with v/c ratio of 0.92 during the PM peak hour.
- Victoria Road South at Arkell Road:
  - The eastbound left-turn movement is forecast to operate at LOS D with v/c ratio of .91, and the southbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio of 0.88 during the AM peak hour.
  - The northbound shared through/right-turn movement is forecast to operate at LOS D with v/c ratio of 1.00 and the southbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio of 0.91 during the AM peak hour.
- MacAlister Boulevard at Site Driveway / Commercial Driveway:
  - The southbound shared left-turn/through/right-turn movement is forecast to operate at LOS F with a v/c ratio of 0.62 during the AM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on MacAlister Boulevard which limits the number of available gaps for side street traffic.

The addition of the site-generated trips does not overly impact the study area intersections with increases to overall intersection delays by 1 second or less during the AM and PM peak hours.



2020 Total Traffic Volumes

Victoria Road & MacAlister Boulevard, Guelph TIS
170044

Figure 4.5

TABLE 4.4: 2020 TOTAL TRAFFIC INTERSECTION OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	C 21 0.63 48	B 19 0.18 33		**C 20**	B 17 0.17 27	C 23 0.57 49		**C 22**	C 23 0.74 115	C 21 0.75 208		**C 21**	B 12 0.08 11	B 18 0.62 66		**B 18**	**C 20**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	B 16 0.48 73 60 -13		B 15 0.26 21	**B 16**					C 24 0.75 47 120 73	C 27 0.90 105		**C 26**		C 20 0.71 79 220 141	B 13 0.11 22	**B 19**	**C 21**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	D 53 0.91 93	C 28 0.30 117		**D 47**	C 24 0.37 35	C 31 0.52 42		**C 28**	B 12 0.13 35	C 26 0.84 167		**C 25**	B 12 0.12 61	C 29 0.88 239		**C 29**	**C 31**
	Victoria Road South & Site Driveway	TWSC	LOS Delay V/C Q			B 11 0.08 15	**B 11**						A 0 0.65 0		**A 0**		A 0 0.25 0		**A 0**	**0**
	MacAlister Boulevard & Site Driveway	TWSC	LOS Delay V/C Q		A 0 0.01 11		**A 0**		A 6 0.18 33		**A 6**		B 15 0.40 44		**B 15**		F 71 0.62 23		**F 71**	**11**
PM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	C 26 0.76 58	C 23 0.62 66		**C 24**	B 17 0.25 26	C 20 0.31 35		**B 20**	B 13 0.37 42	B 18 0.64 86		**B 18**	B 12 0.12 15	C 21 0.74 71		**C 20**	**C 21**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	B 17 0.36 50 60 10		B 16 0.11 20	**B 17**					E 72 0.98 41 120 80	B 15 0.71 74		**C 28**		C 35 0.92 154 220 66	B 13 0.14 66	**C 29**	**C 27**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	C 24 0.53 37	C 26 0.40 34		**C 25**	C 22 0.36 30	C 27 0.48 36		**C 25**	B 11 0.09 57	D 49 1.00 268		**D 48**	B 13 0.26 92	C 32 0.91 262		**C 30**	**D 36**
	Victoria Road South & Site Driveway	TWSC	LOS Delay V/C Q			B 12 0.06 15	**B 12**						A 0 0.50 0		**A 0**		A 0 0.34 17		**A 0**	**0**
	MacAlister Boulevard & Site Driveway	TWSC	LOS Delay V/C Q		A 1 0.01 6		**A 1**		A 4 0.11 21		**A 4**		B 11 0.24 22		**B 11**		D 26 0.23 17		**D 26**	**6**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout

4.5 2025 Background Traffic

4.5.1 2025 Background Growth

To derive the future background traffic volumes, an annual average growth rate of 2.0% compounded for seven years (total growth of 14%) was applied to the existing traffic on the study area road network. **Figure 4.6** shows the weekday AM and PM peak hours background traffic growth for the 2025 horizon year.

4.5.2 Kortright East Background Traffic Volumes

Figure 4.7 shows the remaining Kortright East background development traffic for the 2025 horizon year.

4.5.3 385 MacAlister Boulevard Traffic Volumes

The traffic generated from the development at 385 MacAlister Boulevard used in the 2025 background traffic volumes are shown in Figure 4.3.

4.5.4 2025 Background Traffic Volumes

Figure 4.8 shows the 2025 total background AM and PM peak hour volumes which are obtained from the general background traffic growth and the 2025 traffic generated by the Kortright East residential development and 385 MacAlister Boulevard.

4.6 2025 Background Traffic Operations

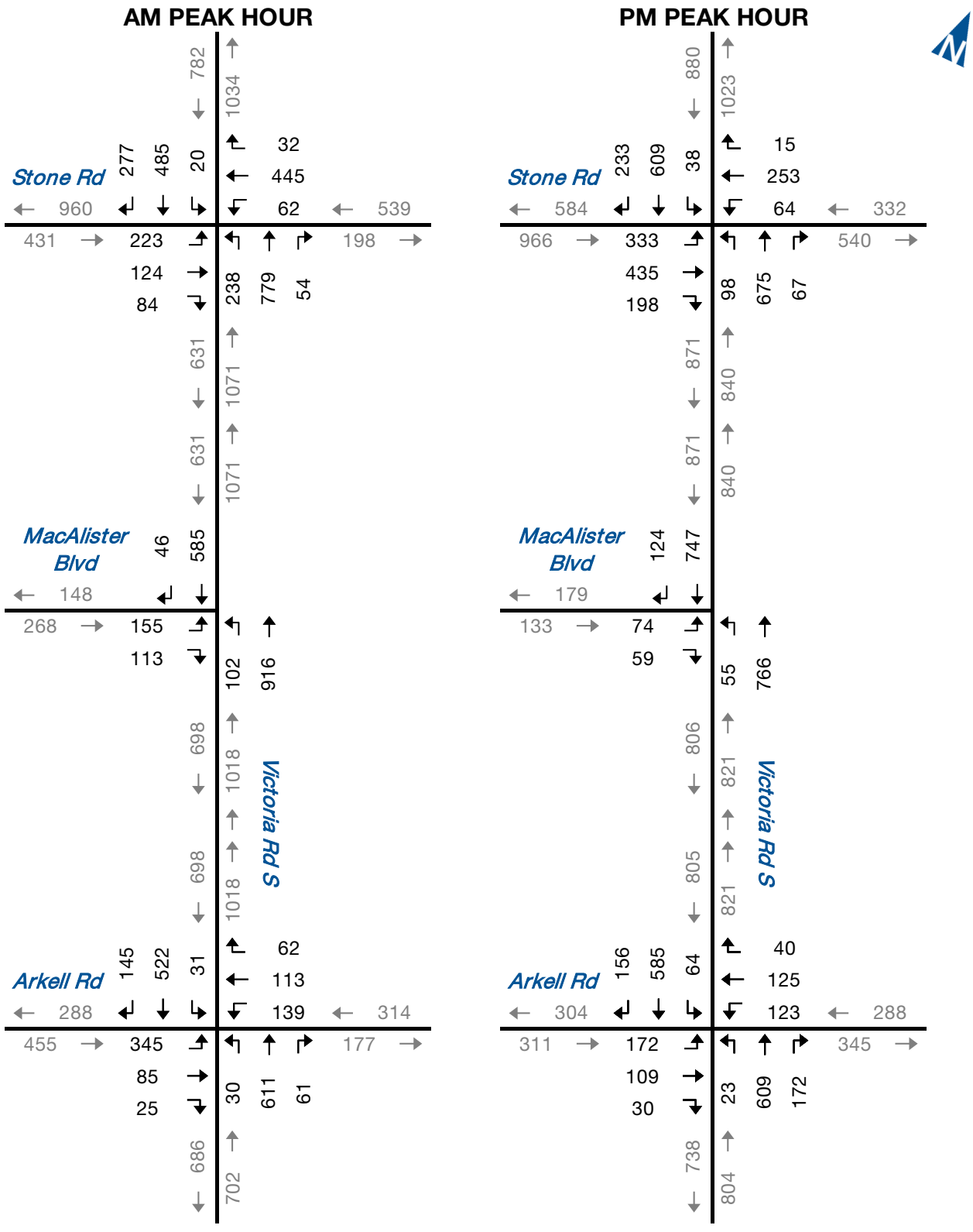
The operations of the study area intersections were evaluated under 2025 background traffic volumes using the same methodology and assumptions as for the 2020 background and total traffic volumes. The 2025 background AM and PM peak hour intersection operations are summarized in **Table 4.5** indicating the future LOS, v/c ratios and 95th percentile back of queue estimates within the study area. The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours with the following exceptions:

- Victoria Road South at MacAlister Boulevard:
  - The northbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio 0.95 and the eastbound left-turn movement is forecast to have a 95th percentile queue reach of 80m during the AM peak hour.
- Victoria Road South at Arkell Road:
  - The eastbound left-turn movement is forecast to operate at LOS F with v/c ratio of 1.05, the northbound shared left-turn/through movement at LOS C with v/c ratio of 0.89, and

the southbound shared left-turn/through movement at LOS C with v/c ratio 0.89 during the AM peak hour.

- The northbound shared through/right-turn movement is forecast to operate at LOS E with v/c ratio of 1.04 and the southbound shared through-right turn movement at LOS D with v/c ratio of 0.97 during the PM peak hour.

Detailed Synchro reports are provided in **Appendix E**.



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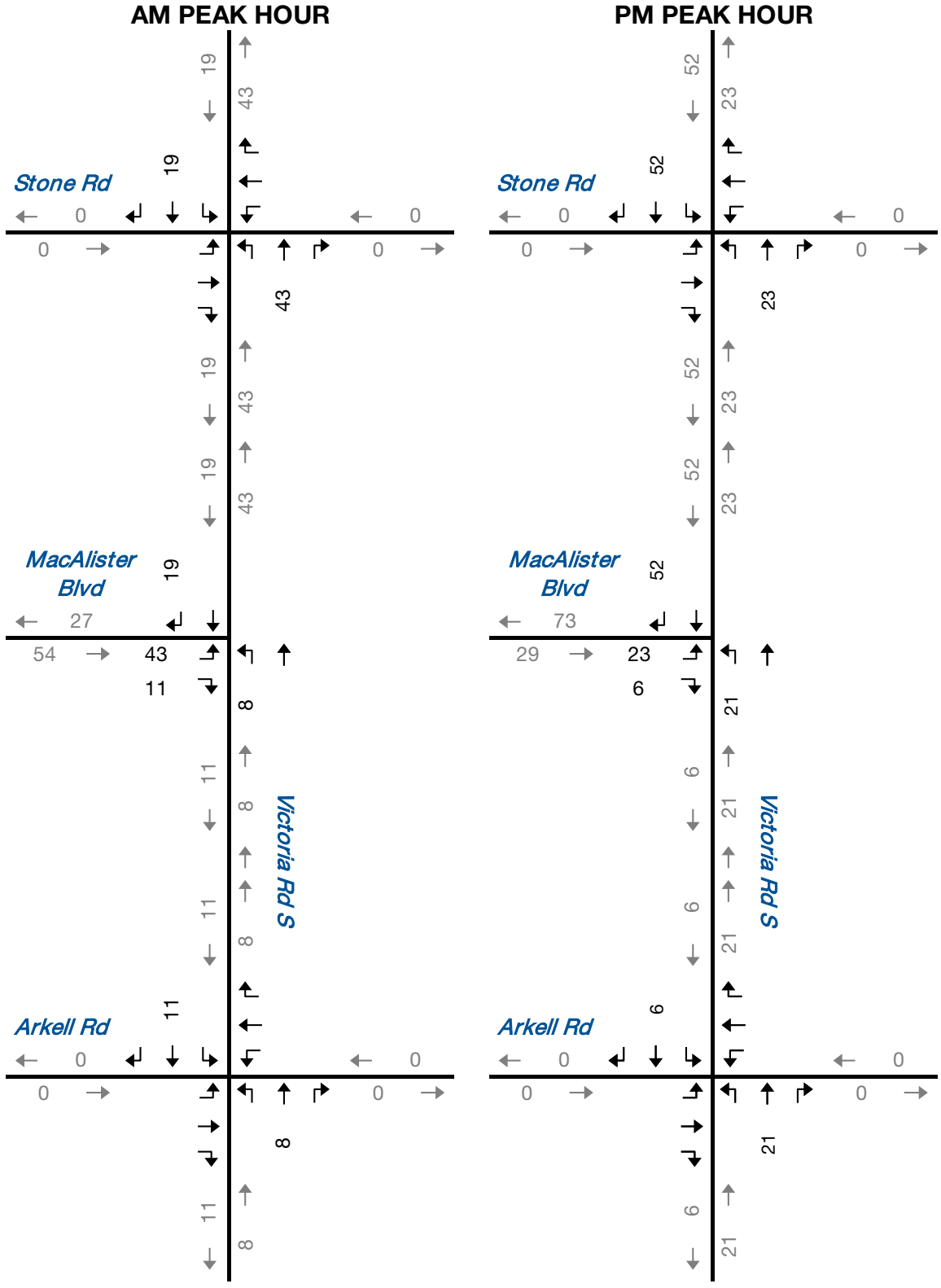
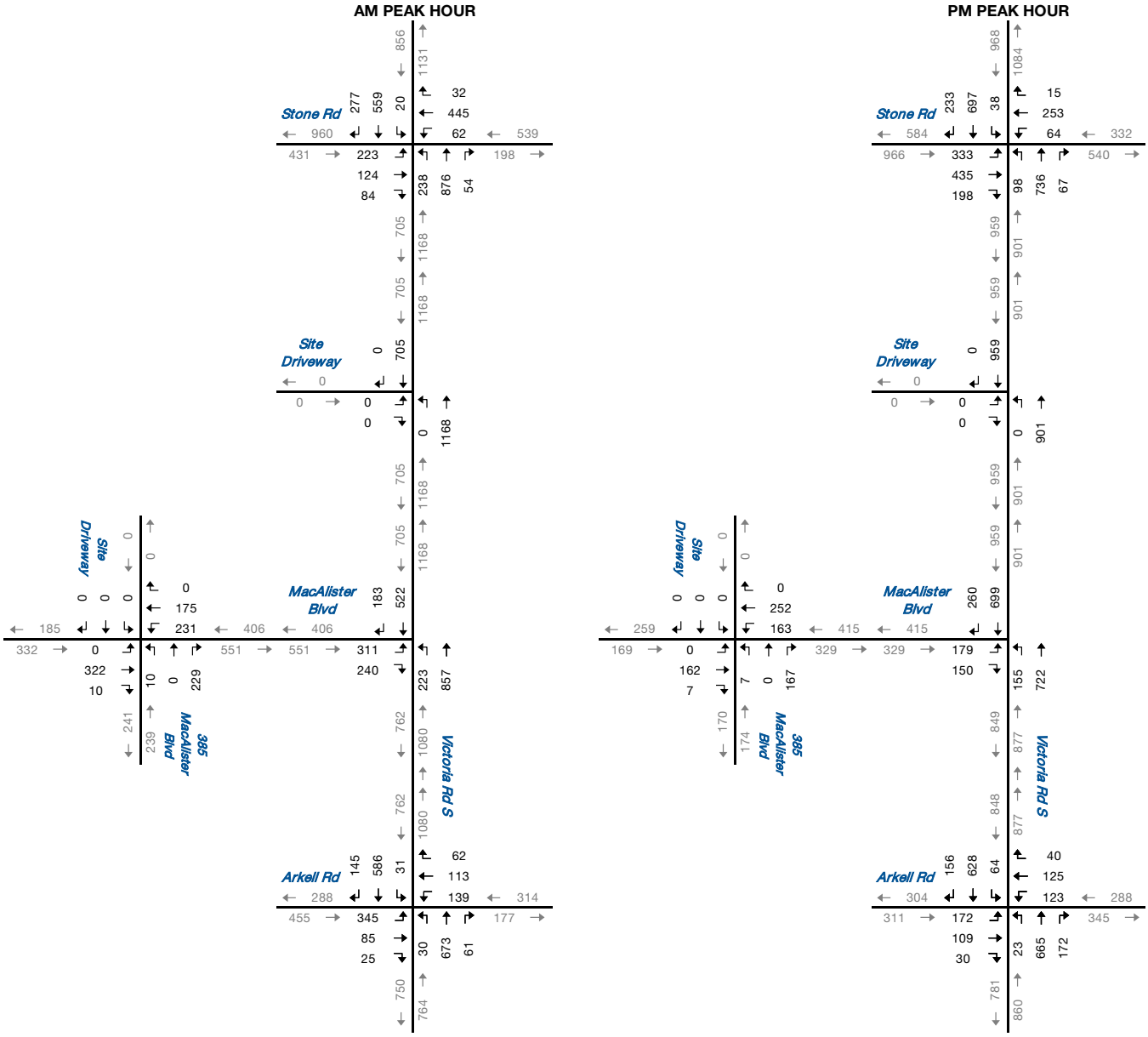
2025 Background Growth



2025 & 2030 Kortright East Background Traffic Volumes

Victoria Road & MacAlister Boulevard, Guelph TIS
170044

Figure 4.7



2025 Background Traffic Volumes

Victoria Road & MacAlister Boulevard, Guelph TIS
170044

Figure 4.8

TABLE 4.5: 2025 BACKGROUND INTERSECTION OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																
				Eastbound				Westbound				Northbound				Southbound				Overall
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	C 28 0.75 65	C 20 0.20 54		**C** **24**	B 18 0.19 27	C 24 0.61 50		**C** **24**	D 43 0.88 125	C 21 0.76 212		**C** **26**	B 12 0.10 17	B 19 0.65 72		**B** **18**	**C** **23**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	B 19 0.56 80 60 -20		B 17 0.31 21	**B** **18**					C 34 0.83 55 120 65	C 34 0.95 122		**C** **34**		C 21 0.74 104 220 116	B 13 0.12 29	**B** **19**	**C** **26**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	F 89 1.05 99	C 28 0.32 347		**E** **74**	C 25 0.41 38	C 32 0.56 47		**C** **29**	B 13 0.15 56	C 31 0.89 198		**C** **30**	B 13 0.15 64	C 31 0.89 346		**C** **30**	**D** **39**
	MacAlister Boulevard & 385 MacAlister Boulevard	TWSC	LOS Delay V/C Q		A 0 0.20 24		**A** **0**		A 6 0.19 33		**A** **6**	B 14 0.36 54			**B** **14**					**6**
PM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	C 32 0.83 74	C 24 0.65 82		**C** **26**	B 18 0.30 30	C 21 0.32 36		**C** **20**	B 14 0.42 44	B 20 0.67 97		**B** **19**	B 12 0.15 22	C 22 0.77 78		**C** **22**	**C** **22**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	B 17 0.33 47 60 13		B 16 0.09 21	**B** **17**					C 29 0.77 31 120 89	B 17 0.78 81		**B** **19**		D 40 0.95 199 220 21	B 13 0.16 138	**C** **33**	**C** **25**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	C 25 0.57 43	C 26 0.43 33		**C** **25**	C 22 0.39 33	C 27 0.51 39		**C** **25**	B 12 0.10 64	E 60 1.04 246		**E** **59**	B 14 0.28 93	D 43 0.97 243		**D** **40**	**D** **43**
	MacAlister Boulevard & 385 MacAlister Boulevard	TWSC	LOS Delay V/C Q		A 0 0.10 0		**A** **0**		A 4 0.12 22		**A** **4**	B 11 0.21 22			**B** **11**					**5**

MOE - Measure of Effectiveness
LOS - Level of Service
Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
RBT - Roundabout

4.7 2025 Future Total Traffic Volumes

The site-generated traffic was added to the background traffic to produce the 2025 future total traffic volumes. **Figure 4.9** shows the 2025 future total AM and PM peak hour volumes.

4.8 2025 Future Total Traffic Operations

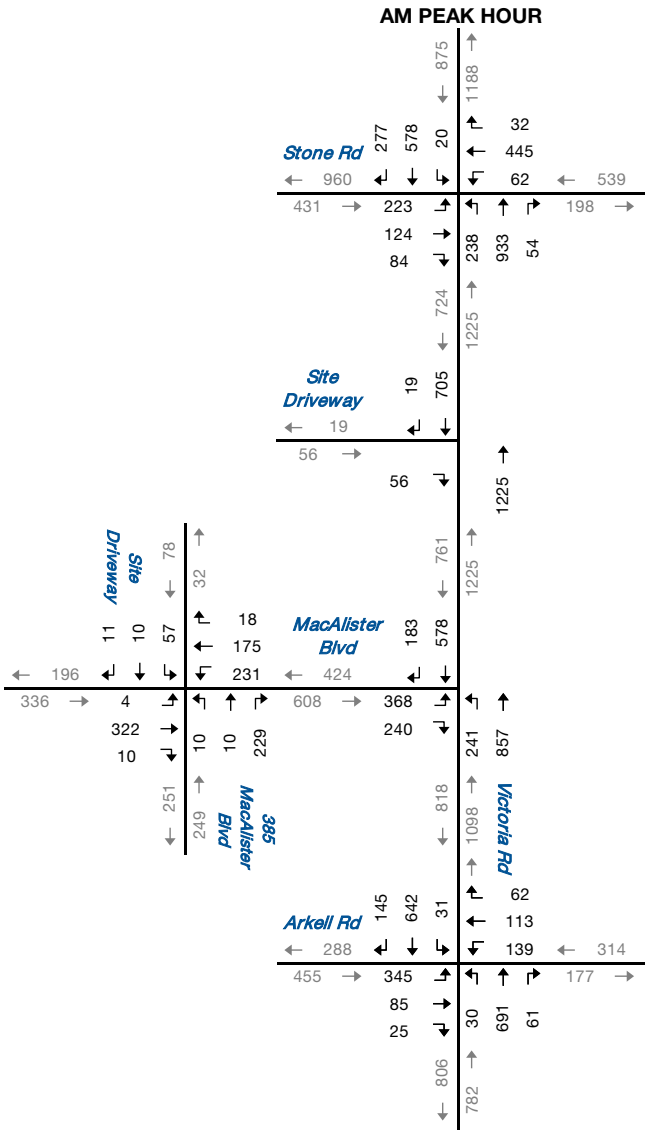
The operations of the study area intersections were evaluated under 2025 future total traffic volumes using the same methodology and assumptions as for the 2025 background traffic volumes. The future total AM and PM peak hour intersection operations are summarized in **Table 4.6** indicating the future LOS, v/c ratios and 95th percentile back of queue estimates within the study area. The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours with the following exceptions:

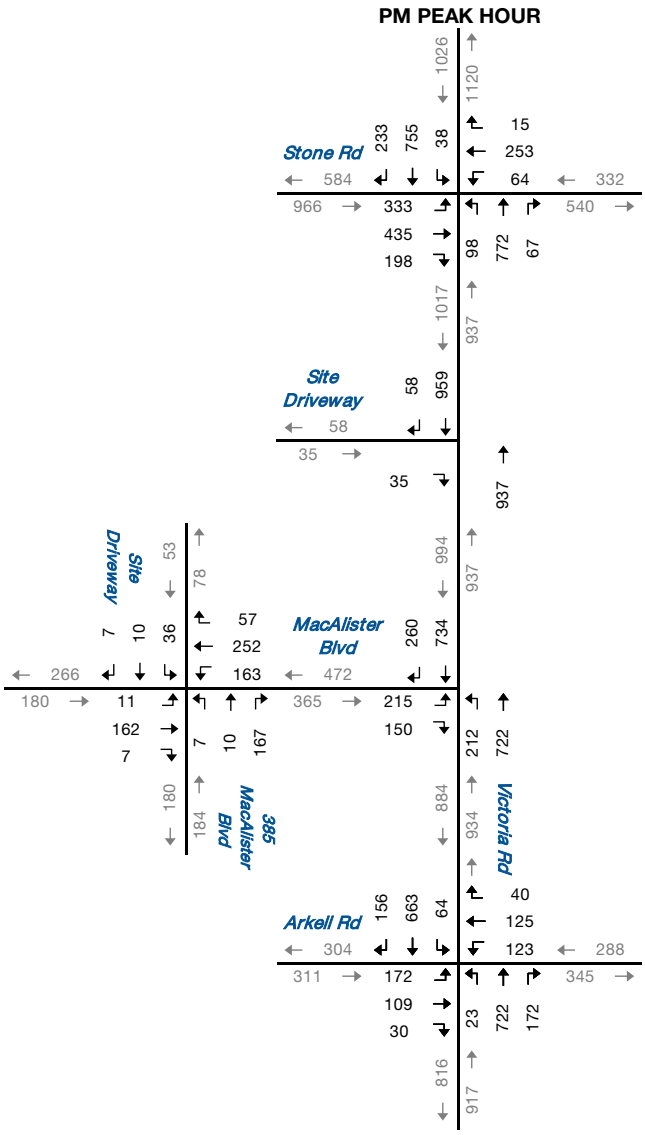
- Victoria Road at MacAlister Boulevard:
  - The northbound left-turn movement is forecast to operate at LOS F with v/c ratio of 1.06, the northbound through movement is forecast to operate at LOS C with v/c ratio of 0.95, and the eastbound left-turn movement is forecast to have a 95th percentile queue length of 75 metres during the AM Peak hour.
  - The northbound left-turn movement is forecast to operate at LOS F with v/c ratio of 1.06, and the southbound through movement is forecast to operate at LOS D with v/c ratio of 0.99 during the PM peak hour.
- Victoria Road South at Arkell Road:
  - The eastbound left-turn movement is forecast to operate at LOS F with v/c ratio of 1.06, the northbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio of 0.90, and the southbound shared through/right-turn movement is forecast to operate at LOS D with v/c ratio of 0.94 during the AM peak hour.
  - The northbound shared through/right turn movement is forecast to operate at LOS F with v/c ratio of 1.11 and the southbound shared through/right-turn movement is forecast to operate at LOS D with v/c ratio of 1.01 during the PM peak hour.
- MacAlister Boulevard at Site Driveway / Commercial Driveway:
  - The southbound shared left-through-right turn movement is forecast to operate at LOS F with a v/c ratio of 0.71 during the AM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on

MacAlister Boulevard which limits the number of available gaps for side street traffic.

The addition of the site-generated trips does not overly impact the study area intersections with increases to overall intersection delays by 6 seconds or less during the AM and PM peak hours.

Detailed Synchro report are provided in **Appendix F**.





2025 Total Traffic Volumes

Victoria Road & MacAlister Boulevard, Guelph TIS
170044

Figure 4.9

TABLE 4.6: 2025 TOTAL TRAFFIC INTERSECTION OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	C 31 0.63 56	C 21 0.18 41		**C** **26**	B 19 0.17 30	C 25 0.57 57		**C** **24**	D 44 0.74 116	C 22 0.75 415		**C** **26**	B 12 0.08 14	B 18 0.62 70		**B** **18**	**C** **23**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	C 21 0.66 75 60 -15		B 17 0.34 21	**B** **19**					F 93 1.06 77 120 43	C 34 0.95 137		**D** **47**		C 25 0.81 148 220 72	B 13 0.12 72	**C** **22**	**C** **32**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	F 96 1.06 82	C 29 0.32 337		**E** **80**	C 25 0.41 38	C 33 0.57 48		**C** **30**	B 14 0.18 57	C 32 0.90 230		**C** **31**	B 13 0.16 73	D 39 0.94 505		**D** **38**	**D** **43**
	Victoria Road South & Site Driveway	TWSC	LOS Delay V/C Q			B 11 0.09 14	**B** **11**						A 0 0.72 0		**A** **0**		A 0 0.28 3		**A** **0**	**0**
	MacAlister Boulevard & Site Driveway	TWSC	LOS Delay V/C Q		A 0 0.01 39		**A** **0**		A 6 0.19 39		**A** **6**		C 16 0.43 110		**C** **16**		F 93 0.71 41		**F** **93**	**13**
PM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	D 35 0.85 78	C 25 0.66 86		**C** **28**	B 18 0.31 28	C 22 0.32 35		**C** **21**	B 15 0.45 58	B 19 0.66 104		**B** **19**	B 12 0.15 31	C 22 0.78 91		**C** **22**	**C** **23**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	B 18 0.40 55 60 5		B 16 0.13 22	**B** **17**					F 98 1.06 41 120 80	B 17 0.77 80		**D** **35**		D 48 0.99 207 220 13	B 13 0.16 222	**D** **39**	**C** **34**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	C 25 0.57 41	C 26 0.43 34		**C** **25**	C 22 0.39 33	C 27 0.51 39		**C** **25**	B 13 0.10 67	F 84 1.11 236		**F** **82**	B 14 0.28 105	D 54 1.01 635		**D** **51**	**E** **56**
	Victoria Road South & Site Driveway	TWSC	LOS Delay V/C Q			B 13 0.07 37	**B** **13**						A 0 0.55 0		**A** **0**		A 0 0.38		**A** **0**	**0**
	MacAlister Boulevard & Site Driveway	TWSC	LOS Delay V/C Q		A 1 0.01 9		**A** **1**		A 4 0.12 21		**A** **4**		B 12 0.25 23		**B** **12**		D 29 0.26 18		**D** **29**	**6**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds
Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)
TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control
RBT - Roundabout

4.9 2030 Background Traffic

4.9.1 2030 Background Growth

To derive the 2030 future background traffic volumes, an annual average growth rate of 2.0% compounded for 12 years (total growth of 24%) was applied to the existing traffic on the study area road network. **Figure 4.10** shows the weekday AM and PM peak hours background traffic growth for the 2030 horizon year.

4.9.2 Kortright East Background Traffic Volumes

The traffic generated from Kortright East development used in the 2030 background traffic volumes are shown in Figure 4.7.

4.9.3 385 MacAlister Boulevard Traffic Volumes

The traffic generated from the development at 385 MacAlister Boulevard used in the 230 background traffic volumes are shown in Figure 4.3.

4.9.4 2025 Background Traffic Volumes

Figure 4.11 shows the 2030 total background AM and PM peak hour volumes which are obtained from the general background traffic growth and the 2025 traffic generated by the Kortright East residential development and 385 MacAlister Boulevard.

4.10 2030 Background Traffic Operations

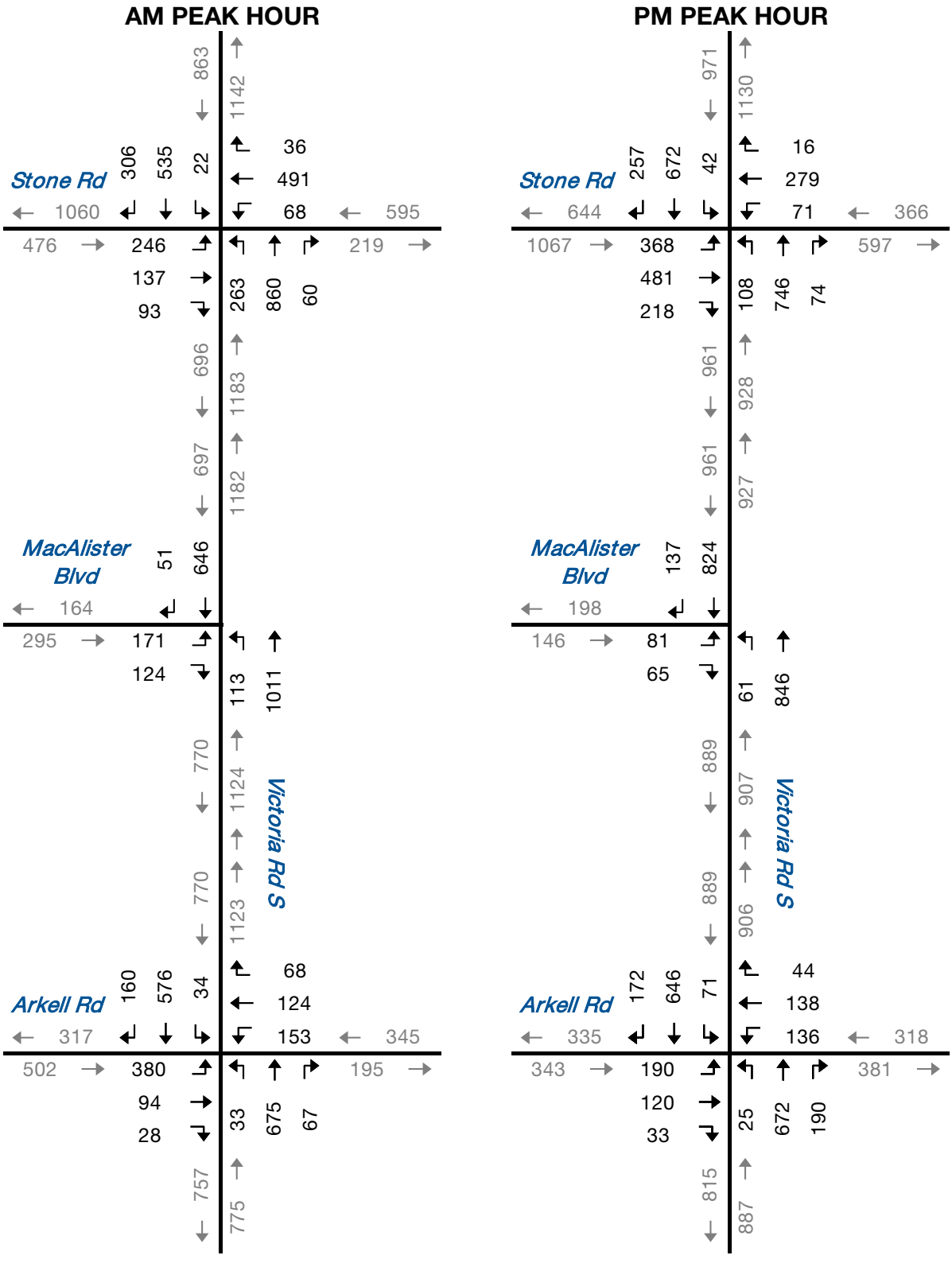
The operations of the study area intersections were evaluated under 2030 background traffic volumes using the same methodology and assumptions as for the 2025 background and total traffic volumes. The 2030 background AM and PM peak hour intersection operations are summarized in **Table 4.7** indicating the future LOS, v/c ratios and 95th percentile back of queue estimates within the study area. The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours with the following exceptions:

- Victoria Road South at Stone Road:
  - The northbound left turn is forecast to operate at LOS F with v/c ratio of 1.09 during the AM peak hour.
- Victoria Road South at MacAlister Boulevard:
  - The northbound left-turn movement is forecast to operate at LOS E with v/c ratio of 1.00, the northbound through movement is forecast to operate at LOS E with v/c ratio of 1.04, and the eastbound left-turn movement is forecast to have a 95th percentile queue reach of 84 metres during the AM peak hour.

- The northbound through movement is forecast to operate at LOS C with v/c ratio of 0.86, and the southbound through movement is forecast to operate at LOS E with v/c ratio of 1.04 during the PM peak hour.

- Victoria Road South at Arkell Road:
  - The eastbound left-turn movement is forecast to operate at LOS F with v/c ratio of 1.19, the northbound shared through/right-turn movement is forecast to operate at LOS D with v/c ratio of 0.97, and the southbound shared through/right-turn movement is forecast to operate at LOS D with v/c ratio of 0.97 during the AM peak hour.
  - The northbound shared through/right-turn movement is forecast to operate at LOS F with v/c ratio of 1.15 and the southbound shared through/right-turn movement is forecast to operate at LOS E with v/c ratio of 1.08 during the PM peak hour.

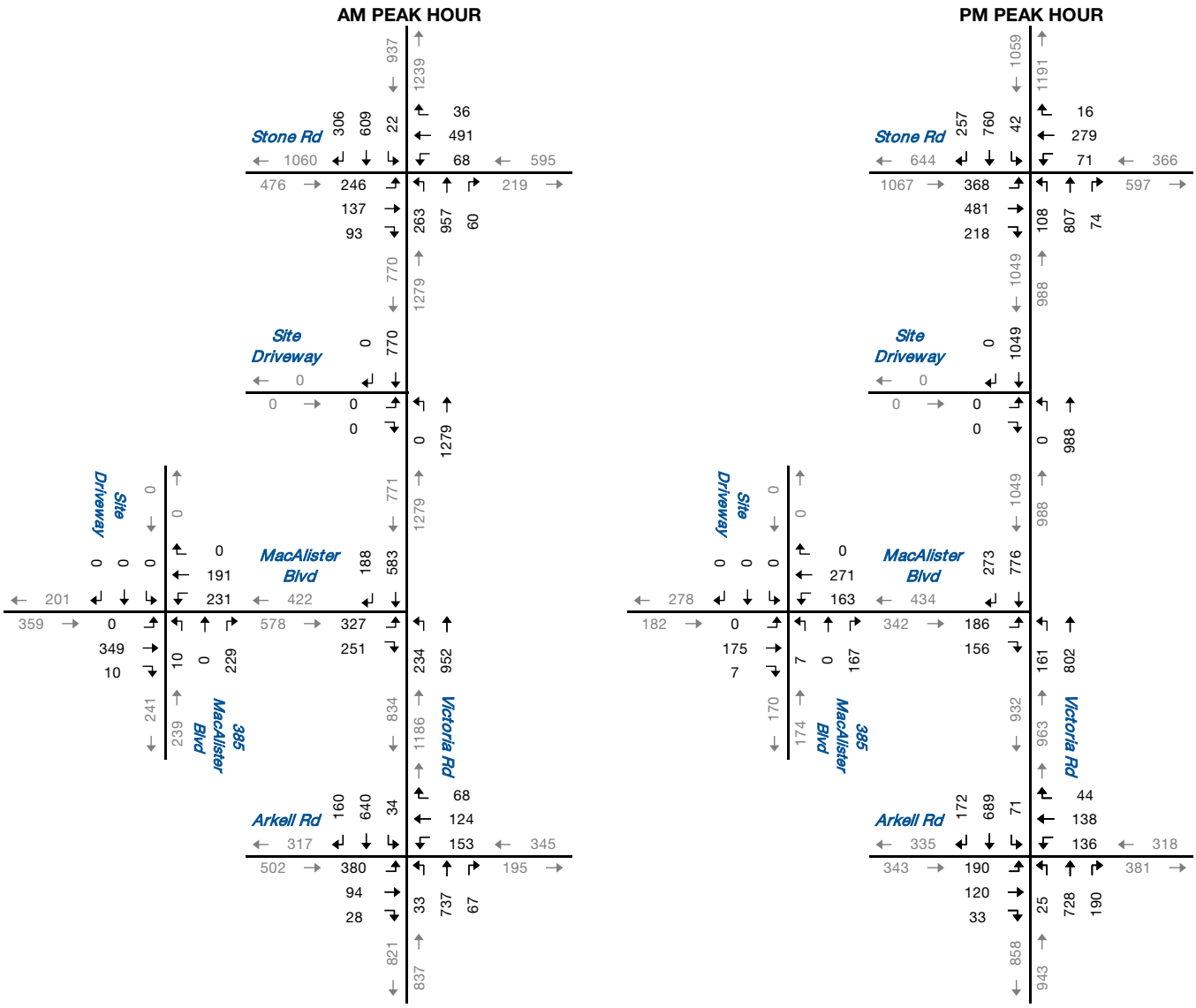
Detailed Synchro reports are provided in **Appendix G**.



2030 Background Growth

Victoria Road & MacAlister Boulevard, Guelph TIS
170044

Figure 4.10



2030 Background Traffic Volumes

Figure 4.11

TABLE 4.7: 2030 BACKGROUND INTERSECTIONS OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	D 49 0.89 92	C 21 0.21 128		**D** **36**	B 19 0.22 34	C 26 0.65 65		**C** **25**	F 101 1.09 108	C 23 0.80 487		**D** **39**	B 13 0.12 20	B 20 0.69 82		**B** **20**	**C** **30**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	C 20 0.60 84 60 -24		B 18 0.34 20	**B** **19**					E 75 1.00 102 120 18	E 56 1.04 160		**E** **60**		C 23 0.80 125 220 95	B 12 0.12 24	**C** **21**	**D** **38**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	F 141 1.19 84	C 29 0.35 313		**F** **113**	C 26 0.45 39	C 34 0.60 51		**C** **30**	B 15 0.19 57	D 46 0.97 278		**D** **44**	B 15 0.19 78	D 45 0.97 622		**D** **44**	**E** **56**
	MacAlister Boulevard & 385 MacAlister Boulevard	TWSC	LOS Delay V/C Q		A 0 0.20 35		**A** **0**		A 6 0.19 36		**A** **6**	B 14 0.38 71			**B** **14**					**6**
PM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	D 47 0.92 91	C 26 0.70 127		**C** **33**	B 19 0.37 28	C 22 0.33 39		**C** **21**	B 16 0.51 93	C 21 0.70 153		**C** **20**	B 13 0.18 17	C 24 0.80 97		**C** **24**	**C** **25**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	B 18 0.35 51 60 9		B 16 0.11 21	**B** **17**					C 34 0.81 32 120 88	C 22 0.86 87		**C** **24**		E 64 1.04 212 220 8	B 13 0.17 249	**D** **51**	**C** **35**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	C 26 0.62 48	C 26 0.45 36		**C** **26**	C 22 0.42 35	C 27 0.54 43		**C** **25**	B 14 0.11 68	F 101 1.15 227		**F** **99**	B 14 0.32 104	E 74 1.08 787		**E** **69**	**E** **69**
	MacAlister Boulevard & 385 MacAlister Boulevard	TWSC	LOS Delay V/C Q		A 0 0.11 0		**A** **0**		A 4 0.12 67		**A** **4**	B 11 0.21 63			**B** **11**					**5**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout

4.11 2030 Future Total Traffic Volumes

The site-generated traffic was added to the background traffic to produce the 2030 future total traffic volumes. **Figure 4.12** shows the 2030 future total AM and PM peak hour volumes.

4.12 2030 Future Total Traffic Operations

The operations of the study area intersections were evaluated under 2030 future total traffic volumes using the same methodology and assumptions as for the background traffic volumes. The future total AM and PM peak hour intersection operations are summarized in **Table 4.8** indicating the future LOS, v/c ratios and 95th percentile back of queue estimates within the study area. The results indicate that the study area intersections are forecast to operate at acceptable levels of service during the AM and PM peak hours with the following exceptions:

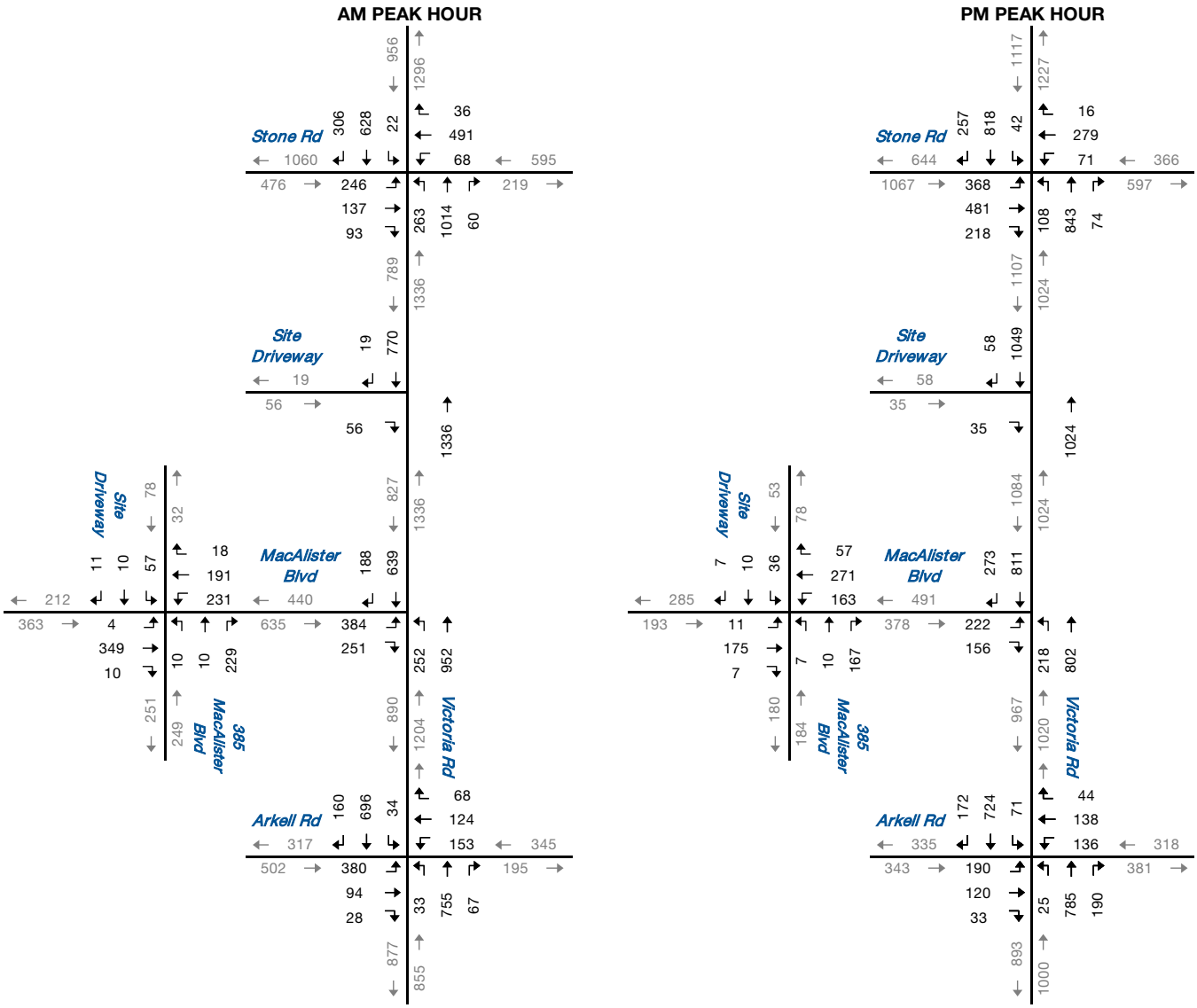
- Victoria Road South at Stone Road:
  - The eastbound left-turn movement is forecast to operate at LOS E with v/c ratio of 0.92 and the northbound left-turn movement is forecast to operate at LOS F with v/c ratio of 1.09 during the AM peak hour.
  - The eastbound left-turn movement is forecast to operate at LOS D with v/c ratio of 0.93 during the PM peak hour.
- Victoria Road at MacAlister Boulevard:
  - The northbound left-turn is forecast to operate at LOS F with v/c ratio of 1.29, the northbound through movement is forecast to operate at LOS E with v/c ratio of 1.04, and the eastbound left-turn movement is forecast to have a 95th percentile queue reach of 76 metres during the AM peak hour.
  - The northbound left-turn movement is forecast to operate at LOS F with v/c ratio of 1.09, the northbound through movement is forecast to operate at LOS C with v/c ratio of 0.86, and the southbound through movement is forecast to operate at LOS E with v/c ratio of 1.09 during the PM peak hour.
- Victoria Road South at Arkell Road:
  - The eastbound left-turn movement is forecast to operate at LOS F with v/c ratio of 1.19, the northbound shared through/right-turn movement is forecast to operate at LOS D with v/c ratio of 1.00, and the southbound shared through/right-turn movement is forecast to operate at LOS E with v/c ratio of 1.04 during the AM peak hour.
  - The northbound shared through/right-turn movement is forecast to operate at LOS F with v/c ratio of 1.22, and the

southbound shared through/right-turn movement is forecast to operate at LOS F with v/c ratio of 1.12 during the PM peak hour.

- MacAlister Boulevard at Site Driveway / Commercial Driveway:
  - The southbound shared left-through-right turn movement is forecast to operate at LOS F with a v/c ratio of 0.77 during the AM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on MacAlister Boulevard which limits the number of available gaps for side street traffic.

The addition of the site-generated trips does not overly impact the study area intersections with increases to overall intersection delays by 12 seconds or less during the AM and PM peak hours.

Detailed Synchro report are provided in **Appendix H**.



2030 Total Traffic Volumes

Figure 4.12

TABLE 4.8: 2030 TOTAL TRAFFIC INTERSECTION OPERATIONS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	E 57 0.92 82	C 21 0.21 73		**D** **40**	B 19 0.22 29	C 27 0.66 58		**C** **26**	F 101 1.09 110	C 23 0.82 560		**D** **39**	B 13 0.12 18	B 19 0.68 88		**B** **18**	**C** **23**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	C 23 0.70 76 60 -16		B 18 0.37 20	**C** **21**					F 181 1.29 108 120 12	E 56 1.04 165		**F** **82**		C 29 0.88 176 220 44	B 12 0.12 94	**C** **26**	**D** **50**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	F 141 1.19 83	C 29 0.35 312		**F** **113**	C 26 0.45 43	C 34 0.60 52		**C** **30**	B 17 0.19 66	D 51 1.00 277		**D** **50**	B 16 0.19 70	E 63 1.04 1083		**E** **61**	**E** **63**
	Victoria Road South & Site Driveway	TWSC	LOS Delay V/C Q			B 12 0.09 15	**B** **12**						A 0 0.79 0		**A** **0**		A 0 0.30 27		**A** **0**	**0**
	MacAlister Boulevard & Site Driveway	TWSC	LOS Delay V/C Q		A 0 0.01 41		**A** **0**		A 6 0.19 37		**A** **6**		C 17 0.44 104		**C** **17**		F 112 0.77 34		**F** **112**	**14**
PM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	D 50 0.93 80	C 26 0.70 106		**C** **34**	B 20 0.38 29	C 22 0.33 37		**C** **22**	B 17 0.52 88	C 21 0.71 141		**C** **21**	B 13 0.18 45	C 25 0.83 126		**C** **25**	**C** **26**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	B 18 0.41 57 60 3		B 16 0.14 21	**B** **17**					F 108 1.09 37 120 83	C 22 0.86 83		**D** **40**		E 79 1.09 177 220 43	B 13 0.17 239	**E** **62**	**D** **46**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	C 26 0.62 42	C 26 0.45 36		**C** **26**	C 22 0.42 32	C 27 0.54 43		**C** **25**	B 14 0.11 69	F 130 1.22 229		**F** **127**	B 14 0.32 105	F 89 1.12 940		**F** **84**	**F** **86**
	Victoria Road South & Site Driveway	TWSC	LOS Delay V/C Q			B 13 0.07 37	**B** **13**						A 0 0.60 0		**A** **0**		A 0 0.41 591		**A** **0**	**0**
	MacAlister Boulevard & Site Driveway	TWSC	LOS Delay V/C Q		A 1 0.01 8		**A** **1**		A 4 0.12 26		**A** **4**		B 12 0.26 25		**B** **12**		D 31 0.28 16		**D** **31**	**6**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout

4.13 Traffic Control Signal Warrants

The intersection of MacAlister Boulevard and the Site Driveway is forecast to have movements operating at LOS E or worse. The need for traffic control signals at this intersection to potentially improve operations was assessed in accordance with the traffic signal justifications outlined in the Ontario Traffic Manual Book 12: Traffic Signals[3]. The intersection was assessed starting at the 2030 future total horizon, which represents the "worst case" scenario.

The signal warrant is in **Appendix I**. The warrant indicate that traffic control signals are not warranted at the intersection based on the 2030 future total traffic volumes.

4.14 Future Total Traffic Operations – with Improvements

The operations analyses indicate that several movements at the study area intersections will operate with poor levels of service and over-capacity in the 2020, 2025, and 2030 future background and total traffic horizons.

The study area intersections were evaluated under 2030 future total traffic horizon, which represents the "worst case" scenario with optimized signal timings. The results of the analyses are summarized in **Table 4.9** indicating the LOS, v/c ratios and 95th percentile back of queue estimates. The results indicate that the intersection is forecast to operate at acceptable levels of service during the AM and PM peak hours with the following exceptions:

- Victoria Road South at MacAlister Boulevard:
  - The northbound through movement is forecast to operate at LOS C with v/c ratio of 0.89, and the southbound through movement is forecast to operate at LOS C with v/c ratio of 0.92 during the AM peak hour.
  - The southbound through movement is forecast to operate at LOS C with v/c ratio of 0.91 during the PM peak hour.
- Victoria Road South at Arkell Road:
  - The eastbound left-turn movement is forecast to operate at LOS D with v/c ratio of 0.94, the northbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio of 0.89, and the southbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio of 0.92 during the AM peak hour.
  - The northbound shared through/right-turn movement is forecast to operate at LOS D with v/c ratio of 0.99, and the southbound shared through/right-turn movement is forecast to operate at LOS C with v/c ratio of 0.91 during the PM peak hour.

[3] Ontario Traffic Manual, Book 12: Traffic Signals, March 2012

It is noted that through volumes on Victoria Road South are forecast to operate near capacity even with the optimized signal timings. The City of Guelph is currently updating their Transportation Master Plan; however, the Guelph-Wellington Transportation Study[4] identified the need to widen Victoria Road South from York Road to Clair Road to four lanes. The City of Guelph should consider the need of widening Victoria Road South to four (4)-lanes when the traffic volumes reach the forecast levels identified herein.

As the intersection of MacAlister Boulevard at the Site Driveway was not warranted for traffic signalizes. It was analyzed with a second exit lane to reduce the delay. With an exclusive southbound left-turn lane, the shared southbound through/right-turn movement is forecast to operate at LOS C with only the southbound left-turn movement forecast to operate at LOS F.

The need for improvements is not driven by site traffic as the addition of the site-generated trips does not overly impact the study area intersections with increases to overall intersection delays by 12 seconds or less during the AM and PM peak hours.

Detailed Synchro reports are provided in **Appendix J**.

[4] Guelph-Wellington Transportation Study, July 2005 Final Report

TABLE 4.9: 2030 TOTAL TRAFFIC INTERSECTION OPERATIONS WITH IMPROVMENTS

Analysis Period	Intersection	Control Type	MOE	Direction / Movement / Approach																Overall
				Eastbound				Westbound				Northbound				Southbound				
				Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	Left	Through	Right	Approach	
AM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	D 36 0.81 93	C 24 0.19 137		**C** **30**	C 25 0.24 40	C 34 0.70 75		**C** **33**	C 25 0.75 114	C 24 0.76 702		**C** **24**	B 18 0.13 17	C 33 0.84 93		**C** **33**	**C** **29**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	D 36 0.81 75 60 -15		C 24 0.49 52	**C** **31**					C 29 0.83 90 120 30	C 26 0.91 127		**C** **27**		C 27 0.82 140 220 80	B 14 0.12 24	**C** **24**	**C** **27**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	D 55 0.94 89	C 31 0.32 356		**D** **49**	C 28 0.41 45	D 40 0.63 58		**C** **34**	B 15 0.36 84	C 29 0.89 245		**C** **28**	B 13 0.29 68	C 34 0.92 329		**C** **33**	**C** **35**
	Victoria Road South & Site Driveway	TWSC	LOS Delay V/C Q			B 12 0.09 16	**B** **12**						A 0 0.79 0		**A** **0**		A 0 0.30 3		**A** **0**	**0**
	MacAlister Boulevard & Site Driveway	TWSC	LOS Delay V/C Q		A 0 0.01 29		**A** **0**		A 6 0.19 33		**A** **6**		C 17 0.44 65		**C** **17**	F 120 0.71 27	C 17 0.07 2		**F** **92**	**12**
PM Peak Hour	Victoria Road South & Stone Road	TCS	LOS Delay V/C Q	C 33 0.83 8	C 28 0.71 118		**C** **30**	B 20 0.33 31	C 25 0.36 39		**C** **24**	B 19 0.56 127	C 22 0.71 255		**C** **22**	B 14 0.19 31	C 27 0.84 127		**C** **26**	**C** **26**
	Victoria Road South & MacAlister Boulevard	TCS	LOS Delay V/C Q Ex Avail.	C 30 0.54 57 60 3		C 26 0.10 34	**C** **28**					D 38 0.82 62 120 58	B 13 0.69 84		**B** **18**		C 33 0.91 133 220 87	B 13 0.17 30	**C** **28**	**C** **24**
	Victoria Road South & Arkell Road	TCS	LOS Delay V/C Q	D 41 0.70 71	D 39 0.53 78		**D** **40**	C 34 0.50 43	D 43 0.64 54		**D** **39**	B 16 0.14 54	D 47 0.99 226		**D** **46**	C 22 0.45 91	C 31 0.91 514		**C** **31**	**D** **39**
	Victoria Road South & Site Driveway	TWSC	LOS Delay V/C Q			B 13 0.07 16	**B** **13**						A 0 0.60 0		**A** **0**		A 0 0.41 0		**A** **0**	**0**
	MacAlister Boulevard & Site Driveway	TWSC	LOS Delay V/C Q		A 1 0.01 8		**A** **1**		A 3 0.12 24		**A** **3**		B 12 0.26 25		**B** **12**	D 35 0.23 7	C 15 0.05 1		**D** **28**	**6**

MOE - Measure of Effectiveness
LOS - Level of Service
Delay - Average Delay per Vehicle in Seconds

Q - 95th Percentile Queue Length (m)
Ex. - Existing Available Storage (m)
Avail. - Available Storage (m)

TCS - Traffic Control Signal
TWSC - Two-Way Stop Control
AWSC - All-Way Stop Control

RBT - Roundabout

5 Transportation Demand Management

Transportation Demand Management (TDM) refers to ways of making the capacity of our roads more efficient by reducing vehicle demands. TDM approaches consider how people's choices of travel mode are affected by land use patterns, development design, parking availability, parking cost, and the relative cost, convenience and availability of alternative modes of travel. Various TDM strategies are used to influence those factors so that the alternatives are more competitive with driving alone and potentially reduce the reliance on motor vehicles.

TDM strategies at a development can be divided into two basic categories:

- Pre-occupancy: things that need to be done while a development is being designed and built; and
- Post-occupancy: things that can be done once people are occupying the development.

The pre-occupancy actions are critical as they are most likely to determine how attractive, convenient and safe alternative travel will be once the site is occupied. Before a site is occupied, it can be designed to be convenient and safe for pedestrians and cyclists, and vehicle parking can be provided to meet but not exceed demand. After the development is built, incentives can be offered, but those incentives will not work as well if the site and its surroundings are oriented to cars.

The following section outlines existing facilities and TDM measures that can be implemented into the development site design.

Cycling Infrastructure

On-street cycle lanes are currently provided on both sides of Victoria Road South. These cycle lanes provide connections to key areas of the City such as the Downtown core, the University of Guelph, and Stone Road Mall. As residents of the townhomes will have access to a garage for each unit, bicycle parking for these residents is not a concern. Safe and secure bicycle parking spaces should be provided. In addition to resident bicycle parking, visitor bicycle parking spaces should be provided near the main entrances of the apartment buildings.

Walking Infrastructure

A site visit confirmed that sidewalks are provided along the west side of Victoria Road South, both sides of MacAlister Boulevard west of the subject site, as well as throughout the existing residential subdivision to the west. The developer should ensure that well marked, safe pedestrian routes are provided on site that connect to the existing sidewalks. The walkways and sidewalks should be illuminated either through light standards and/or wall mounted lights along the building frontage

The developments driveway connections at Victoria Road South and MacAlister Boulevard should be marked with a ladder crossing or hardscaped using a different material or pattern to further emphasize the presence of the pedestrian crossing.

Transit Infrastructure

Currently the development is serviced by Route 5 along Victoria Road South with the nearest stop located at the Victoria Road South and MacAlister Boulevard intersections. The following are recommended on-site improvements:

- Provision of transit information on-site to direct residents to appropriate adjacent transit stops/stations for Route 5 as well as the wider Guelph Transit network.
- Guelph Transit should monitor ridership levels on Route 5 to ensure appropriate amenities are in place at local transit stops including weather-protected waiting areas when ridership levels warrant the need for improved amenities.

Parking

A parking management plan recognizes the need to provide adequate parking, but values strategies which result in more efficient use of parking resources and reduces the amount of parking needed at a location.

Rather than establish generous parking requirements to satisfy the maximum potential demand that may occur, parking management allows contingency-based planning, which means that various solutions are identified which can be deployed if needed.

Reducing parking spaces should not exacerbate any current parking issues; however, reducing the number of parking spaces should be explored to further encourage residents to utilize other modes of travel.

Rather than automatically including a certain amount of parking with building space, parking costs can be borne directly by users by “unbundling,” which means that parking is rented or sold separately. This is more equitable and efficient, since occupants are not forced to pay for parking they do not need and allows consumers to adjust their parking supply to reflect their needs. The applicant will charge for parking at a separate cost to occupants. If it is found that not all car parking spaces are utilized, then the vacant spaces can be converted to bicycle storage.

If visitor or resident parking is seldom used, some of these spaces could be converted to car share / bike share spaces or even allocated to more outdoor amenity space such as patio space or community garden. However, this would need to be explored later through the condominium corporation and further supported by the residents of the development once the it has become more established.

Carshare/Bikeshare

Car sharing refers to automobile rental services intended to substitute for private vehicle ownership. It makes occasional use of a vehicle affordable, even for low-income households, while providing an incentive to minimize driving and rely on alternative travel options as much as possible.

Where car sharing services are available, some households reduce their vehicle ownership, either shifting from two to one vehicle, or from one to zero vehicles. The use of car share benefits employees as well as nearby residents and businesses in suitable environments.

By providing this type of mode share on site, lower automobile ownership rates and parking requirements may be further obtained. Residents of the building could choose to use walking, transit or cycling as their primary mode of travel and utilize the car share as secondary mode of travel.

There are currently two car share providers in the City of Guelph:

- **Community Car Share** operates in the City of Guelph with locations situated around the downtown core and the University. There are currently no locations in the study area. More information on Community Car Share can be found on the internet at *communitycarshare.ca*; and
- **Student Car Share** is a car share service for students and is available on or around campuses across Canada. More information on Student Car Share can be found on the internet at *studentcarshare.ca*; however, a password and school information will be required to access this website.

Bike share operates in a similar way as car share. Bike Share is the fastest growing transportation mode in the world, complementing existing public transit and providing first and last mile connectivity by filling in transit gaps. At present, there is no bike share operators in the City of Guelph.

Discussions with local car share and bike share providers should be considered if enough interest from residents and local area residents is expressed for these services.

Wayfinding/Travel Planning

The following measures should be implemented to facilitate with wayfinding and resident travel route planning:

- Travel planning resources for residents (individualized marketing, active transportation maps, community resources), and wayfinding.

Education/Promotion, Incentives

Provision of transit and active transportation maps should be provided to each unit to inform residents of existing transit and active transportation opportunities.

Integrating the above noted TDM measures into a comprehensive site plan will assist in mitigating the site's impact on the adjacent road network, promote a strong and vibrant economy, and create a livable community that has a balanced transportation network that accommodates all modes of transportation into the future. To further assist in developing a site that caters to all modes of transportation, these TDM measures should be considered and/or implemented during the site plan approval stage.

6 Conclusions and Recommendations

6.1 Conclusions

Based on the analyses contained in this brief, it is concluded that:

- **Existing Traffic Operations:** The study area intersections are currently operating at acceptable overall levels of service during the AM and PM peak hours.

  At the intersection of Victoria Road South and Arkell Road, the eastbound left-turn movement is operating at LOS E with v/c ratio 0.98 during the AM peak hour which can be mitigated by optimizing the signal timings.

- **Development Generated Traffic:** The proposed development is forecast to generate approximately 165 trips during the weekday AM peak hour and 204 trips during the weekday PM peak hour
- **2020 Background Traffic Operations:** The study area intersections are forecast to continue operating acceptable overall levels of service during the AM and PM peak hours.
- **2020 Total Traffic Operations:** The study area intersections are forecast to operate similar to 2020 background traffic operations. Inclusion of the site-generated traffic does not significantly impact the study area intersections.

  The southbound left-through-right turn movement at the intersection of MacAlister Boulevard and the Site Driveway is forecast to operate at LOS F with a v/c ratio of 0.62 during the AM peak hour. The moderate v/c ratio indicates the delay is likely due to the high volume of through traffic on MacAlister Boulevard which limits the number of available gaps for side street traffic.

- **2025 Background Traffic Operations:** The study area intersections are forecast to experience congestion and delay but will continue operating at acceptable overall levels of service during the AM and PM peak hours.

  The eastbound left-turn movement at the intersection of Victoria Road South and Arkell Road is forecast to operate at LOS F with a v/c ratio of 1.05 during the AM peak hour. The northbound through-right turn movement is forecast to operate at LOS E with a v/c ratio of 1.04, and the southbound through-right turn movement is forecast to operate at LOS D with v/c ratio of 0.97 during the PM peak hour.

- **2025 Total Traffic Operations:** The study area intersections are forecast to operate similar to 2025 background traffic operations. Inclusion of the site-generated traffic does not significantly impact the operations of the study area intersections during the AM and PM peak hours.

The southbound shared left-through-right turn movement at the intersection of MacAlister Boulevard and the Site Driveway is forecast to operate at LOS F with a v/c ratio of 0.71 during the AM peak hour.

- **2030 Background Traffic Operations:** The study area intersections are forecast to experience congestion and during the AM and PM peak hours.

  The northbound left-turn movement at the intersection of Victoria Road South and Store Road is forecast to operate at LOS F with v/c ratio of 1.09 during the AM peak hour.

  The northbound left turn movement is forecast to operate at LOS E with v/c 1.0 and the northbound through movement is forecast to operate at LOS E with v/c ratio of 1.04 during the AM peak hour at the intersection of Victoria Road South and MacAlister Boulevard.

  The eastbound left-turn movement at the intersection of Victoria Road South and Arkell Road is forecast to operate at LOS F with a v/c ratio of 1.19 during the AM peak hour, the northbound through-right turn movement is forecast to operate at LOS F with a v/c ratio of 1.15 and the southbound through-right turn movement is forecast to operate at LOS E with v/c ratio of 1.08 during the PM peak hour.

- **2025 Total Traffic Operations:** The study area intersections are forecast to operate similar to 2030 background traffic operations. Inclusion of the site-generated traffic does not significantly impact the operations of the study area intersections during the AM and PM peak hours.

  The southbound shared left-through-right turn movement at the intersection of MacAlister Boulevard and the Site Driveway is forecast to operate at LOS F with a v/c ratio of 0.77 during the AM peak hour.

- **Future Total Operations with Improvements:** With optimized signal timings, the study area intersections will operate with acceptable levels of services during the AM and PM peak hours. The southbound left-turn/through/right-turn movement which is forecast to operate at LOS F with v/c ratio of 0.77 at the intersection of MacAlister Boulevard and the site driveway during the AM peak hour.

6.2 Recommendations

Based on the findings of this study, the following is recommended:

- A southbound left-turn lane be included on the MacAlister Boulevard driveway.

- The City of Guelph should monitor the intersections of Victoria Road at Stone Road, Victoria Road at MacAlister Boulevard and Victoria Road at Arkell Road under future traffic conditions to determine the delay and adjust the signal timings accordingly.
- The City of Guelph monitor the traffic volumes on Victoria Road South and assess the need for widening when traffic volumes reach the forecast levels identified in this study.
- The developer implements the following Travel Demand Management measures to reduce the private automobile impact:
    - Mark site driveway with a ladder crosswalk to further emphasize the presence of this east-west pedestrian crossing;
    - Provide residents and visitor bicycle parking spaces on-site; as well as general education of all travel mode options that identify benefits and how residents can best utilize these modes. New residents should be provided with a welcome package that outlines proximity to transit, cycling facilities and the proximity to local activity centres.

Appendix A

Existing Traffic Volumes

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & Stone Road - Weekday
Site Code:
Start Date: 04/12/2018

Turning Movement Data

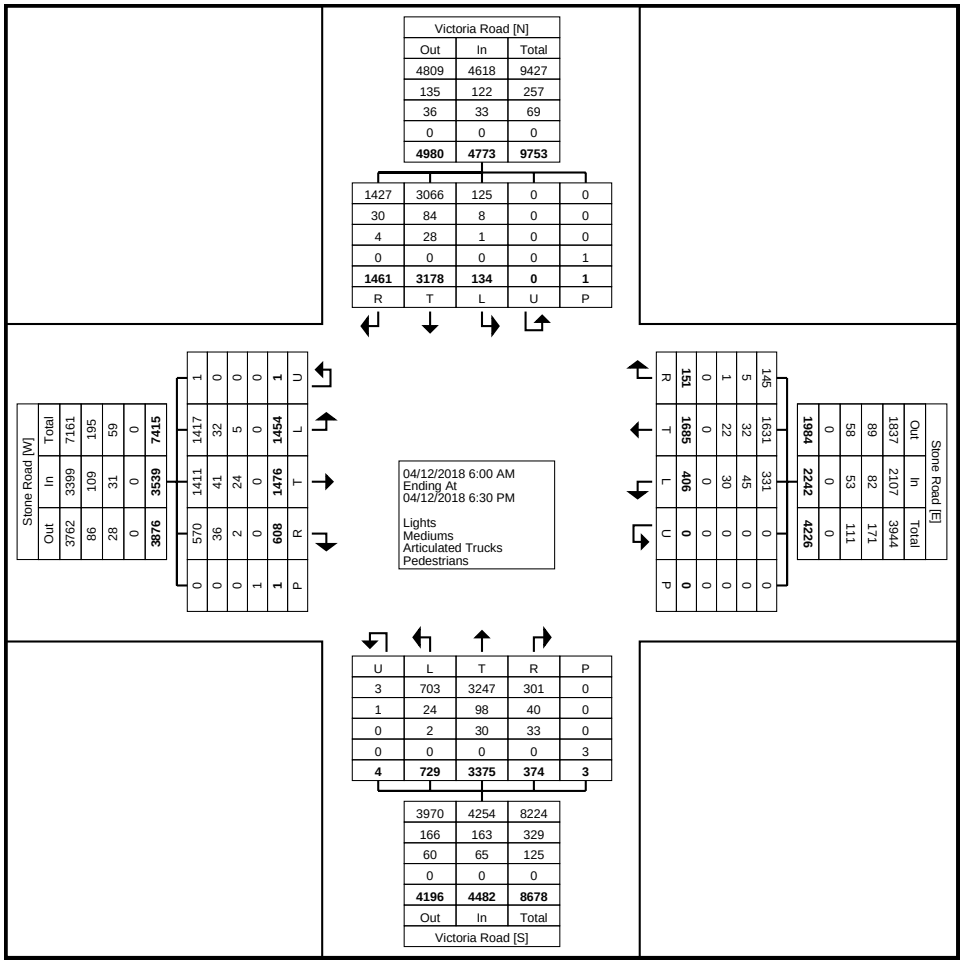
Start Time	Stone Road Eastbound						Stone Road Westbound						Victoria Road Northbound						Victoria Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
6:00 AM	4	34	1	0	0	39	9	11	0	0	0	20	4	15	4	0	0	23	3	61	6	0	0	70	152
6:15 AM	6	25	4	0	0	35	3	4	2	0	0	9	9	25	10	0	0	44	1	65	18	0	0	84	172
6:30 AM	12	27	5	0	0	44	7	16	0	0	0	23	12	45	8	0	0	65	2	94	18	0	0	114	246
6:45 AM	17	27	7	0	0	51	9	29	0	0	0	38	12	54	7	0	0	73	3	81	28	0	0	112	274
Hourly Total	39	113	17	0	0	169	28	60	2	0	0	90	37	139	29	0	0	205	9	301	70	0	0	380	844
7:00 AM	12	18	11	0	0	41	13	25	4	0	0	42	10	55	6	0	0	71	1	78	12	0	0	91	245
7:15 AM	17	24	8	0	0	49	7	32	3	0	0	42	9	80	5	0	0	94	0	87	26	0	0	113	298
7:30 AM	22	34	2	0	0	58	13	51	3	0	0	67	19	77	13	0	0	109	3	114	35	0	0	152	386
7:45 AM	30	33	8	0	0	71	13	78	7	0	0	98	47	108	11	0	0	166	2	116	35	0	0	153	488
Hourly Total	81	109	29	0	0	219	46	186	17	0	0	249	85	320	35	0	0	440	6	395	108	0	0	509	1417
8:00 AM	37	33	19	0	1	89	12	95	8	0	0	115	51	134	14	1	0	200	7	96	47	0	1	150	554
8:15 AM	71	20	20	0	0	111	11	106	9	0	0	126	57	172	13	0	0	242	6	111	73	0	0	190	669
8:30 AM	48	27	15	0	0	90	10	96	6	0	0	112	49	161	7	0	0	217	1	103	62	0	0	166	585
8:45 AM	38	28	19	0	0	85	21	90	5	0	0	116	50	149	13	2	0	214	3	112	59	0	0	174	589
Hourly Total	194	108	73	0	1	375	54	387	28	0	0	469	207	616	47	3	0	873	17	422	241	0	1	680	2397
9:00 AM	35	21	10	0	0	66	13	56	2	0	0	71	28	100	12	0	0	140	4	100	67	0	0	171	448
9:15 AM	41	19	13	0	0	73	15	58	10	0	0	83	26	76	6	0	0	108	1	60	51	0	0	112	376
9:30 AM	37	22	7	0	0	66	7	47	4	0	0	58	18	68	4	0	0	90	3	66	39	0	0	108	322
9:45 AM	36	23	14	0	0	73	8	40	5	0	0	53	18	53	6	0	0	77	3	67	53	0	0	123	326
Hourly Total	149	85	44	0	0	278	43	201	21	0	0	265	90	297	28	0	0	415	11	293	210	0	0	514	1472
10:00 AM	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	2
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	1	0	0	0	1	0	0	0	0	0	0	0	0	1	0	0	1	2
2:30 PM	47	52	23	0	0	122	15	49	5	0	0	69	15	101	14	0	0	130	3	95	40	0	0	138	459
2:45 PM	50	40	20	0	0	110	17	58	3	0	0	78	10	99	18	0	0	127	3	84	51	0	0	138	453
Hourly Total	97	92	43	0	0	232	32	107	8	0	0	147	25	200	32	0	0	257	6	179	91	0	0	276	912
3:00 PM	55	55	20	0	0	130	18	43	3	0	0	64	21	95	15	0	0	131	2	76	46	0	0	124	449
3:15 PM	49	51	14	1	0	115	16	45	7	0	0	68	19	164	17	0	0	200	3	107	45	0	0	155	538
3:30 PM	57	58	12	0	0	127	17	40	4	0	0	61	14	109	13	0	1	136	10	110	57	0	0	177	501
3:45 PM	49	44	19	0	0	112	13	48	8	0	0	69	18	143	18	0	1	179	6	102	52	0	0	160	520
Hourly Total	210	208	65	1	0	484	64	176	22	0	0	262	72	511	63	0	2	646	21	395	200	0	0	616	2008
4:00 PM	75	63	44	0	0	182	24	69	10	0	0	103	18	96	15	0	0	129	4	114	61	0	0	179	593
4:15 PM	63	67	33	0	0	163	16	72	9	0	0	97	25	154	24	0	0	203	7	111	49	0	0	167	630
4:30 PM	82	97	35	0	0	214	12	50	2	0	0	64	16	126	10	0	0	152	6	133	49	0	0	188	618
4:45 PM	69	93	54	0	0	216	12	53	2	0	0	67	26	139	20	0	0	185	10	129	61	0	0	200	668
Hourly Total	289	320	166	0	0	775	64	244	23	0	0	331	85	515	69	0	0	669	27	487	220	0	0	734	2509
5:00 PM	66	100	47	0	0	213	13	61	3	0	0	77	26	144	15	0	0	185	7	112	48	0	0	167	642

5:15 PM	73	89	36	0	0	198	19	56	6	0	0	81	17	150	13	0	0	180	10	139	45	0	0	194	653
5:30 PM	65	81	22	0	0	168	12	52	6	0	0	70	17	127	15	0	0	159	9	120	48	0	0	177	574
5:45 PM	68	66	24	0	0	158	11	39	5	0	0	55	27	132	8	0	0	167	6	123	58	0	0	187	567
Hourly Total	272	336	129	0	0	737	55	208	20	0	0	283	87	553	51	0	0	691	32	494	199	0	0	725	2436
6:00 PM	68	64	18	0	0	150	12	52	8	0	0	72	17	97	6	1	0	121	3	91	50	0	0	144	487
6:15 PM	55	41	24	0	0	120	8	63	2	0	0	73	24	127	14	0	1	165	2	121	71	0	0	194	552
Grand Total	1454	1476	608	1	1	3539	406	1685	151	0	0	2242	729	3375	374	4	3	4482	134	3178	1461	0	1	4773	15036
Approach %	41.1	41.7	17.2	0.0	-	-	18.1	75.2	6.7	0.0	-	-	16.3	75.3	8.3	0.1	-	-	2.8	66.6	30.6	0.0	-	-	-
Total %	9.7	9.8	4.0	0.0	-	23.5	2.7	11.2	1.0	0.0	-	14.9	4.8	22.4	2.5	0.0	-	29.8	0.9	21.1	9.7	0.0	-	31.7	-
Lights	1417	1411	570	1	-	3399	331	1631	145	0	-	2107	703	3247	301	3	-	4254	125	3066	1427	0	-	4618	14378
% Lights	97.5	95.6	93.8	100.0	-	96.0	81.5	96.8	96.0	-	-	94.0	96.4	96.2	80.5	75.0	-	94.9	93.3	96.5	97.7	-	-	96.8	95.6
Mediums	32	41	36	0	-	109	45	32	5	0	-	82	24	98	40	1	-	163	8	84	30	0	-	122	476
% Mediums	2.2	2.8	5.9	0.0	-	3.1	11.1	1.9	3.3	-	-	3.7	3.3	2.9	10.7	25.0	-	3.6	6.0	2.6	2.1	-	-	2.6	3.2
Articulated Trucks	5	24	2	0	-	31	30	22	1	0	-	53	2	30	33	0	-	65	1	28	4	0	-	33	182
% Articulated Trucks	0.3	1.6	0.3	0.0	-	0.9	7.4	1.3	0.7	-	-	2.4	0.3	0.9	8.8	0.0	-	1.5	0.7	0.9	0.3	-	-	0.7	1.2
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	3	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & Stone Road - Weekday
Site Code:
Start Date: 04/12/2018



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & Stone Road - Weekday
Site Code:
Start Date: 04/12/2018

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Stone Road Eastbound						Stone Road Westbound						Victoria Road Northbound						Victoria Road Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:00 AM	37	33	19	0	1	89	12	95	8	0	0	115	51	134	14	1	0	200	7	96	47	0	1	150	554
8:15 AM	71	20	20	0	0	111	11	106	9	0	0	126	57	172	13	0	0	242	6	111	73	0	0	190	669
8:30 AM	48	27	15	0	0	90	10	96	6	0	0	112	49	161	7	0	0	217	1	103	62	0	0	166	585
8:45 AM	38	28	19	0	0	85	21	90	5	0	0	116	50	149	13	2	0	214	3	112	59	0	0	174	589
Total	194	108	73	0	1	375	54	387	28	0	0	469	207	616	47	3	0	873	17	422	241	0	1	680	2397
Approach %	51.7	28.8	19.5	0.0	-	-	11.5	82.5	6.0	0.0	-	-	23.7	70.6	5.4	0.3	-	-	2.5	62.1	35.4	0.0	-	-	-
Total %	8.1	4.5	3.0	0.0	-	15.6	2.3	16.1	1.2	0.0	-	19.6	8.6	25.7	2.0	0.1	-	36.4	0.7	17.6	10.1	0.0	-	28.4	-
PHF	0.683	0.818	0.913	0.000	-	0.845	0.643	0.913	0.778	0.000	-	0.931	0.908	0.895	0.839	0.375	-	0.902	0.607	0.942	0.825	0.000	-	0.895	0.896
Lights	187	98	67	0	-	352	45	380	27	0	-	452	204	587	31	2	-	824	14	403	234	0	-	651	2279
% Lights	96.4	90.7	91.8	-	-	93.9	83.3	98.2	96.4	-	-	96.4	98.6	95.3	66.0	66.7	-	94.4	82.4	95.5	97.1	-	-	95.7	95.1
Mediums	6	6	6	0	-	18	4	3	1	0	-	8	1	22	10	1	-	34	2	17	6	0	-	25	85
% Mediums	3.1	5.6	8.2	-	-	4.8	7.4	0.8	3.6	-	-	1.7	0.5	3.6	21.3	33.3	-	3.9	11.8	4.0	2.5	-	-	3.7	3.5
Articulated Trucks	1	4	0	0	-	5	5	4	0	0	-	9	2	7	6	0	-	15	1	2	1	0	-	4	33
% Articulated Trucks	0.5	3.7	0.0	-	-	1.3	9.3	1.0	0.0	-	-	1.9	1.0	1.1	12.8	0.0	-	1.7	5.9	0.5	0.4	-	-	0.6	1.4
Pedestrians	-	-	-	-	1	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-

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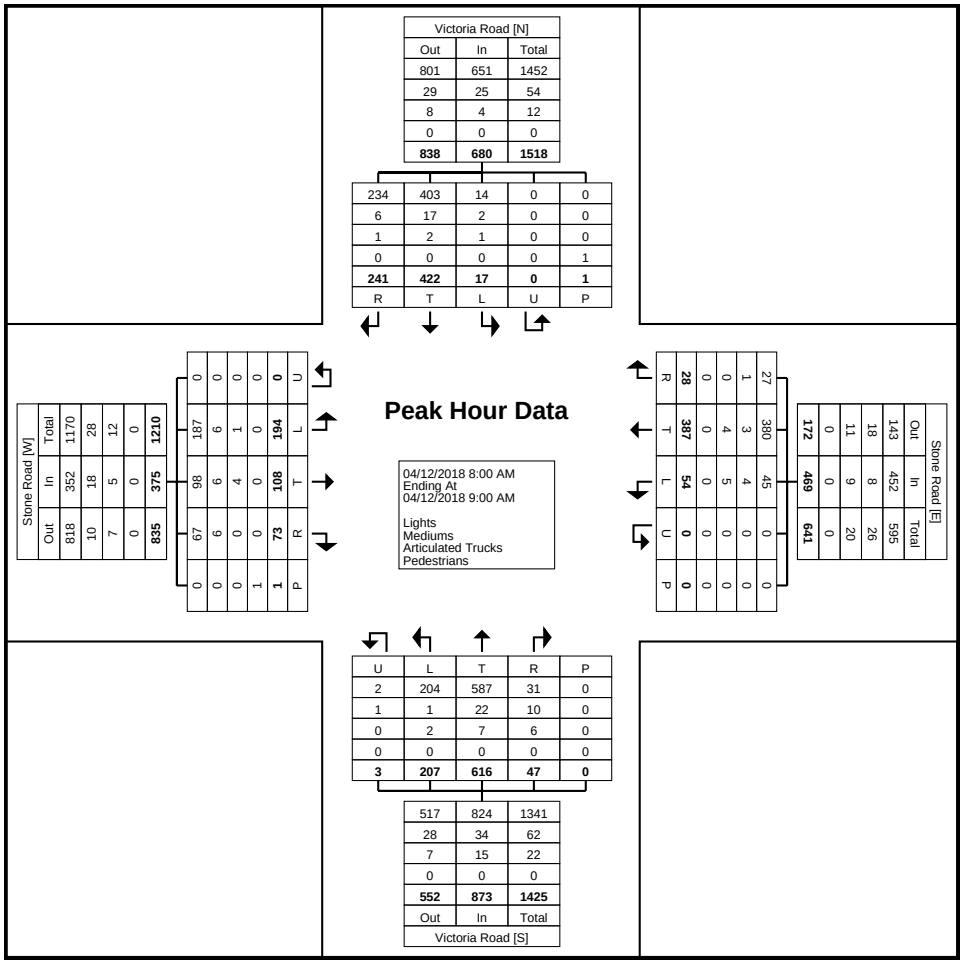
Count Name: Victoria Road & Stone Road - Weekday
Site Code:
Start Date: 04/12/2018



Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & Stone Road - Weekday
Site Code:
Start Date: 04/12/2018

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Stone Road Eastbound						Stone Road Westbound						Victoria Road Northbound						Victoria Road Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	82	97	35	0	0	214	12	50	2	0	0	64	16	126	10	0	0	152	6	133	49	0	0	188	618
4:45 PM	69	93	54	0	0	216	12	53	2	0	0	67	26	139	20	0	0	185	10	129	61	0	0	200	668
5:00 PM	66	100	47	0	0	213	13	61	3	0	0	77	26	144	15	0	0	185	7	112	48	0	0	167	642
5:15 PM	73	89	36	0	0	198	19	56	6	0	0	81	17	150	13	0	0	180	10	139	45	0	0	194	653
Total	290	379	172	0	0	841	56	220	13	0	0	289	85	559	58	0	0	702	33	513	203	0	0	749	2581
Approach %	34.5	45.1	20.5	0.0	-	-	19.4	76.1	4.5	0.0	-	-	12.1	79.6	8.3	0.0	-	-	4.4	68.5	27.1	0.0	-	-	-
Total %	11.2	14.7	6.7	0.0	-	32.6	2.2	8.5	0.5	0.0	-	11.2	3.3	21.7	2.2	0.0	-	27.2	1.3	19.9	7.9	0.0	-	29.0	-
PHF	0.884	0.948	0.796	0.000	-	0.973	0.737	0.902	0.542	0.000	-	0.892	0.817	0.932	0.725	0.000	-	0.949	0.825	0.923	0.832	0.000	-	0.936	0.966
Lights	288	375	168	0	-	831	46	214	12	0	-	272	83	550	54	0	-	687	32	503	201	0	-	736	2526
% Lights	99.3	98.9	97.7	-	-	98.8	82.1	97.3	92.3	-	-	94.1	97.6	98.4	93.1	-	-	97.9	97.0	98.1	99.0	-	-	98.3	97.9
Mediums	2	2	4	0	-	8	4	4	0	0	-	8	2	6	1	0	-	9	1	9	2	0	-	12	37
% Mediums	0.7	0.5	2.3	-	-	1.0	7.1	1.8	0.0	-	-	2.8	2.4	1.1	1.7	-	-	1.3	3.0	1.8	1.0	-	-	1.6	1.4
Articulated Trucks	0	2	0	0	-	2	6	2	1	0	-	9	0	3	3	0	-	6	0	1	0	0	-	1	18
% Articulated Trucks	0.0	0.5	0.0	-	-	0.2	10.7	0.9	7.7	-	-	3.1	0.0	0.5	5.2	-	-	0.9	0.0	0.2	0.0	-	-	0.1	0.7
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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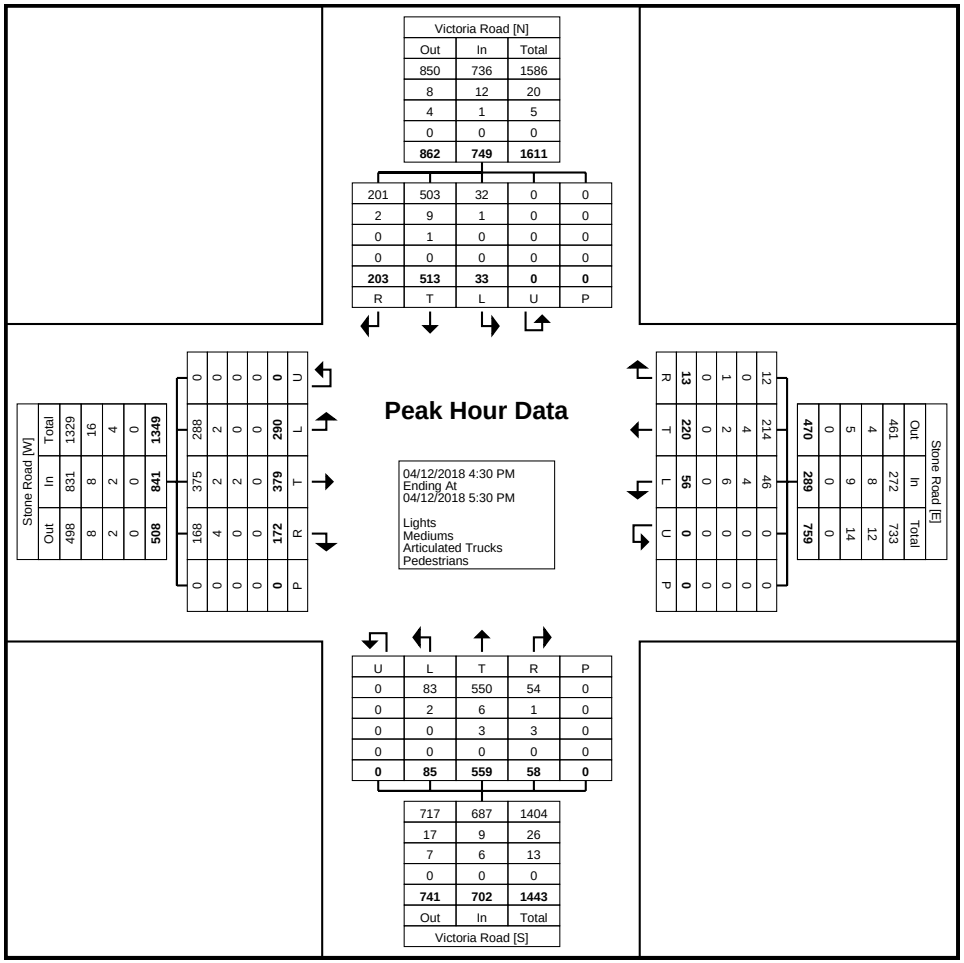

Turning Movement Peak Hour Data Plot (4:30 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & Stone Road - Weekday
Site Code:
Start Date: 04/12/2018

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & MacAlister Blvd - Weekday
Site Code:
Start Date: 04/12/2018

Turning Movement Data

Start Time	Victoria Road Eastbound					MacAlister Blvd Northbound					Victoria Road Southbound					Int. Total
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	
6:00 AM	2	4	0	0	6	1	25	0	0	26	71	3	0	0	74	106
6:15 AM	4	2	0	0	6	1	39	0	0	40	67	2	0	0	69	115
6:30 AM	8	4	0	0	12	4	62	0	0	66	100	2	0	0	102	180
6:45 AM	4	4	0	0	8	6	67	0	0	73	82	9	0	0	91	172
Hourly Total	18	14	0	0	32	12	193	0	0	205	320	16	0	0	336	573
7:00 AM	7	8	0	0	15	6	70	0	0	76	99	2	0	0	101	192
7:15 AM	9	9	0	0	18	6	97	0	0	103	95	4	0	0	99	220
7:30 AM	11	12	0	0	23	6	106	0	0	112	125	13	0	0	138	273
7:45 AM	19	9	0	0	28	9	157	0	0	166	126	8	0	0	134	328
Hourly Total	46	38	0	0	84	27	430	0	0	457	445	27	0	0	472	1013
8:00 AM	35	23	0	0	58	31	186	0	0	217	123	9	0	0	132	407
8:15 AM	51	44	0	0	95	41	181	0	0	222	130	10	0	0	140	457
8:30 AM	26	16	0	0	42	8	193	0	0	201	118	9	0	0	127	370
8:45 AM	23	15	0	0	38	9	195	0	0	204	124	12	0	0	136	378
Hourly Total	135	98	0	0	233	89	755	0	0	844	495	40	0	0	535	1612
9:00 AM	19	10	0	0	29	4	113	0	0	117	105	13	0	0	118	264
9:15 AM	16	5	0	3	21	4	89	0	0	93	82	6	0	0	88	202
9:30 AM	11	6	0	0	17	4	75	0	0	79	69	9	0	0	78	174
9:45 AM	9	7	0	0	16	5	69	0	0	74	80	5	0	0	85	175
Hourly Total	55	28	0	3	83	17	346	0	0	363	336	33	0	0	369	815
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2:30 PM	12	7	0	0	19	19	111	0	0	130	115	20	0	0	135	284
2:45 PM	14	19	0	0	33	10	111	0	0	121	107	18	0	0	125	279
Hourly Total	26	26	0	0	52	29	222	0	0	251	222	38	0	0	260	563
3:00 PM	15	18	0	0	33	9	117	0	0	126	109	6	0	0	115	274
3:15 PM	13	10	0	0	23	11	171	0	0	182	120	15	0	0	135	340
3:30 PM	13	8	0	0	21	1	133	0	0	134	125	15	0	0	140	295
3:45 PM	15	9	0	0	24	5	155	0	0	160	120	19	0	0	139	323
Hourly Total	56	45	0	0	101	26	576	0	0	602	474	55	0	0	529	1232
4:00 PM	9	16	0	0	25	12	138	0	1	150	155	14	0	0	169	344
4:15 PM	15	9	0	0	24	8	171	0	0	179	155	17	0	0	172	375
4:30 PM	17	11	0	0	28	11	153	0	0	164	156	24	0	0	180	372
4:45 PM	15	10	0	0	25	13	165	0	0	178	159	30	0	0	189	392
Hourly Total	56	46	0	0	102	44	627	0	1	671	625	85	0	0	710	1483
5:00 PM	21	16	0	0	37	13	164	0	0	177	159	25	0	0	184	398
5:15 PM	11	14	0	0	25	11	165	0	0	176	176	29	0	0	205	406

5:30 PM	15	10	0	0	25	16	146	0	0	162	146	10	0	0	156	343
5:45 PM	12	14	0	1	26	12	156	0	0	168	143	20	0	0	163	357
Hourly Total	59	54	0	1	113	52	631	0	0	683	624	84	0	0	708	1504
6:00 PM	12	5	0	3	17	13	124	0	0	137	113	13	0	0	126	280
6:15 PM	13	11	0	1	24	14	133	0	0	147	124	19	0	0	143	314
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	476	365	0	8	841	323	4037	0	1	4360	3778	410	0	0	4188	9389
Approach %	56.6	43.4	0.0	-	-	7.4	92.6	0.0	-	-	90.2	9.8	0.0	-	-	-
Total %	5.1	3.9	0.0	-	9.0	3.4	43.0	0.0	-	46.4	40.2	4.4	0.0	-	44.6	-
Lights	466	343	0	-	809	310	3860	0	-	4170	3578	398	0	-	3976	8955
% Lights	97.9	94.0	-	-	96.2	96.0	95.6	-	-	95.6	94.7	97.1	-	-	94.9	95.4
Mediums	10	22	0	-	32	13	114	0	-	127	139	12	0	-	151	310
% Mediums	2.1	6.0	-	-	3.8	4.0	2.8	-	-	2.9	3.7	2.9	-	-	3.6	3.3
Articulated Trucks	0	0	0	-	0	0	63	0	-	63	61	0	0	-	61	124
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	1.6	-	-	1.4	1.6	0.0	-	-	1.5	1.3
Pedestrians	-	-	-	8	-	-	-	-	1	-	-	-	-	0	-	-
% Pedestrians	-	-	-	100.0	-	-	-	-	100.0	-	-	-	-	-	-	-

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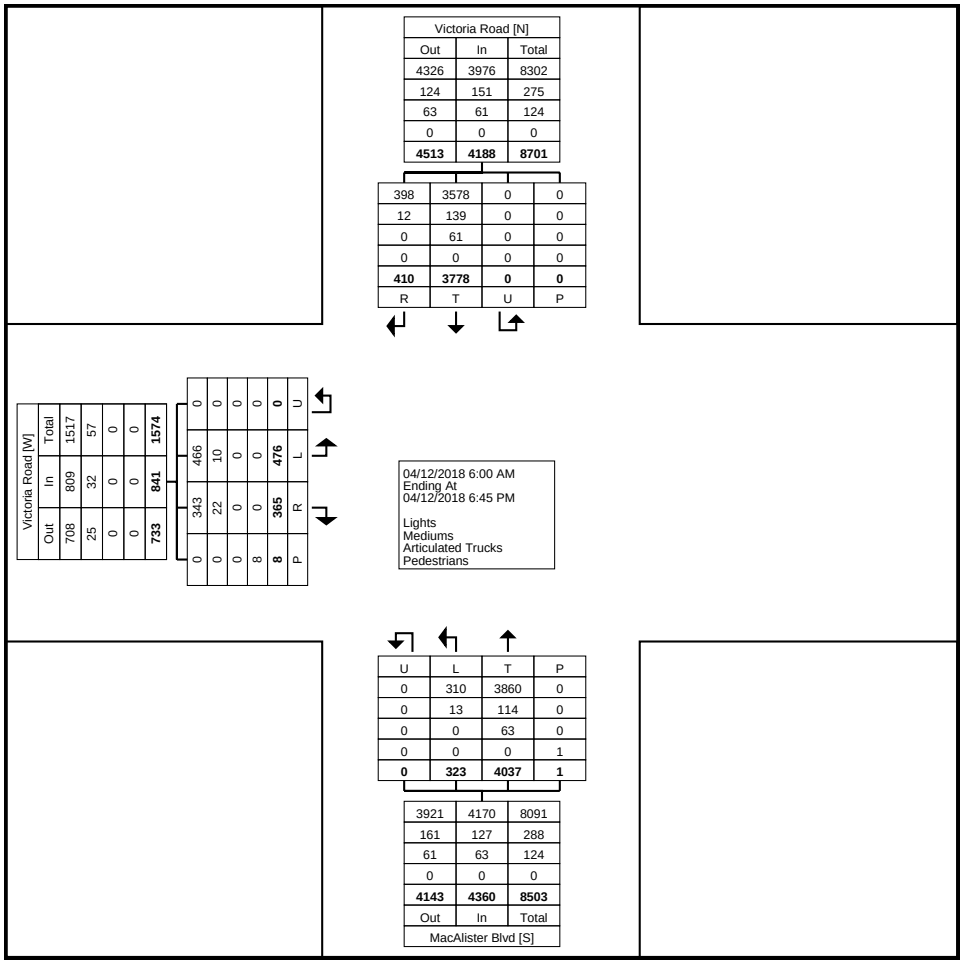
Count Name: Victoria Road & MacAlister Blvd - Weekday
Site Code:
Start Date: 04/12/2018



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & MacAlister Blvd - Weekday
Site Code:
Start Date: 04/12/2018

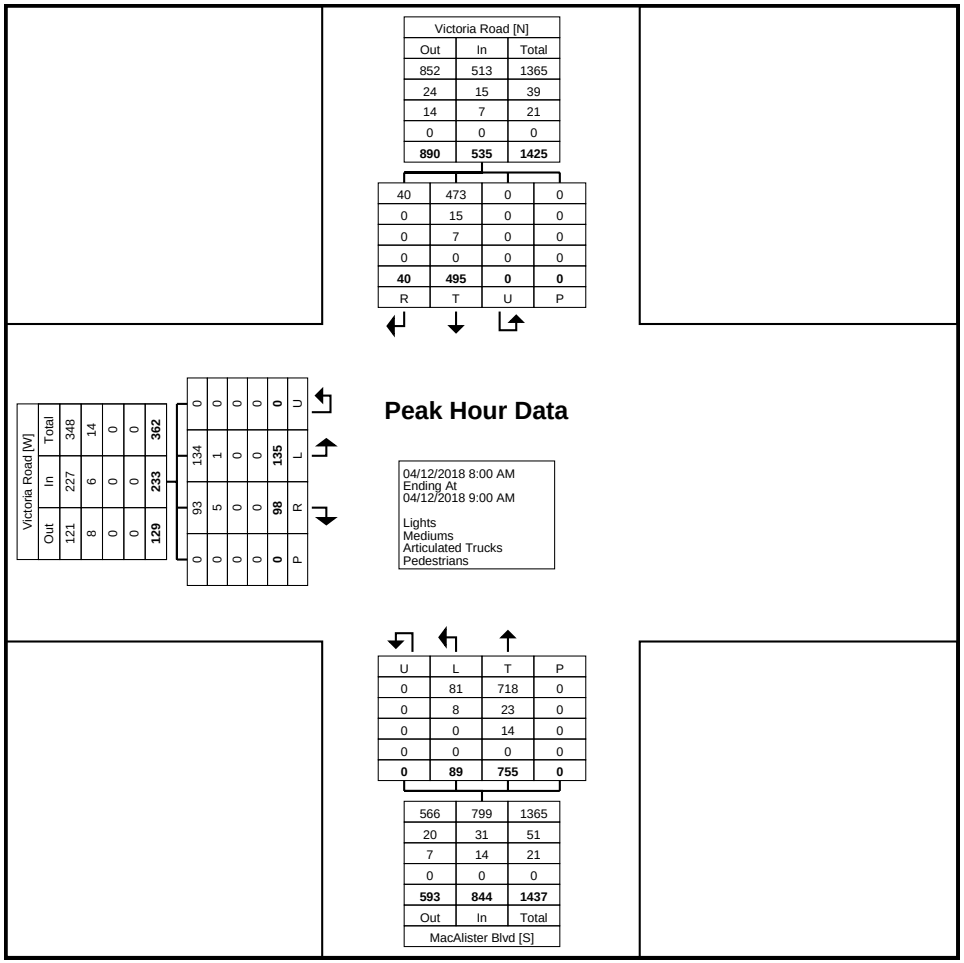
Turning Movement Peak Hour Data (8:00 AM)

Start Time	Victoria Road Eastbound					MacAlister Blvd Northbound					Victoria Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:00 AM	35	23	0	0	58	31	186	0	0	217	123	9	0	0	132	407
8:15 AM	51	44	0	0	95	41	181	0	0	222	130	10	0	0	140	457
8:30 AM	26	16	0	0	42	8	193	0	0	201	118	9	0	0	127	370
8:45 AM	23	15	0	0	38	9	195	0	0	204	124	12	0	0	136	378
Total	135	98	0	0	233	89	755	0	0	844	495	40	0	0	535	1612
Approach %	57.9	42.1	0.0	-	-	10.5	89.5	0.0	-	-	92.5	7.5	0.0	-	-	-
Total %	8.4	6.1	0.0	-	14.5	5.5	46.8	0.0	-	52.4	30.7	2.5	0.0	-	33.2	-
PHF	0.662	0.557	0.000	-	0.613	0.543	0.968	0.000	-	0.950	0.952	0.833	0.000	-	0.955	0.882
Lights	134	93	0	-	227	81	718	0	-	799	473	40	0	-	513	1539
% Lights	99.3	94.9	-	-	97.4	91.0	95.1	-	-	94.7	95.6	100.0	-	-	95.9	95.5
Mediums	1	5	0	-	6	8	23	0	-	31	15	0	0	-	15	52
% Mediums	0.7	5.1	-	-	2.6	9.0	3.0	-	-	3.7	3.0	0.0	-	-	2.8	3.2
Articulated Trucks	0	0	0	-	0	0	14	0	-	14	7	0	0	-	7	21
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	1.9	-	-	1.7	1.4	0.0	-	-	1.3	1.3
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & MacAlister Blvd - Weekday
Site Code:
Start Date: 04/12/2018



Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & MacAlister Blvd - Weekday
Site Code:
Start Date: 04/12/2018

Turning Movement Peak Hour Data (4:30 PM)

Start Time	Victoria Road Eastbound					MacAlister Blvd Northbound					Victoria Road Southbound					
	Left	Right	U-Turn	Peds	App. Total	Left	Thru	U-Turn	Peds	App. Total	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	17	11	0	0	28	11	153	0	0	164	156	24	0	0	180	372
4:45 PM	15	10	0	0	25	13	165	0	0	178	159	30	0	0	189	392
5:00 PM	21	16	0	0	37	13	164	0	0	177	159	25	0	0	184	398
5:15 PM	11	14	0	0	25	11	165	0	0	176	176	29	0	0	205	406
Total	64	51	0	0	115	48	647	0	0	695	650	108	0	0	758	1568
Approach %	55.7	44.3	0.0	-	-	6.9	93.1	0.0	-	-	85.8	14.2	0.0	-	-	-
Total %	4.1	3.3	0.0	-	7.3	3.1	41.3	0.0	-	44.3	41.5	6.9	0.0	-	48.3	-
PHF	0.762	0.797	0.000	-	0.777	0.923	0.980	0.000	-	0.976	0.923	0.900	0.000	-	0.924	0.966
Lights	62	51	0	-	113	48	625	0	-	673	636	108	0	-	744	1530
% Lights	96.9	100.0	-	-	98.3	100.0	96.6	-	-	96.8	97.8	100.0	-	-	98.2	97.6
Mediums	2	0	0	-	2	0	16	0	-	16	7	0	0	-	7	25
% Mediums	3.1	0.0	-	-	1.7	0.0	2.5	-	-	2.3	1.1	0.0	-	-	0.9	1.6
Articulated Trucks	0	0	0	-	0	0	6	0	-	6	7	0	0	-	7	13
% Articulated Trucks	0.0	0.0	-	-	0.0	0.0	0.9	-	-	0.9	1.1	0.0	-	-	0.9	0.8
Pedestrians	-	-	-	0	-	-	-	-	0	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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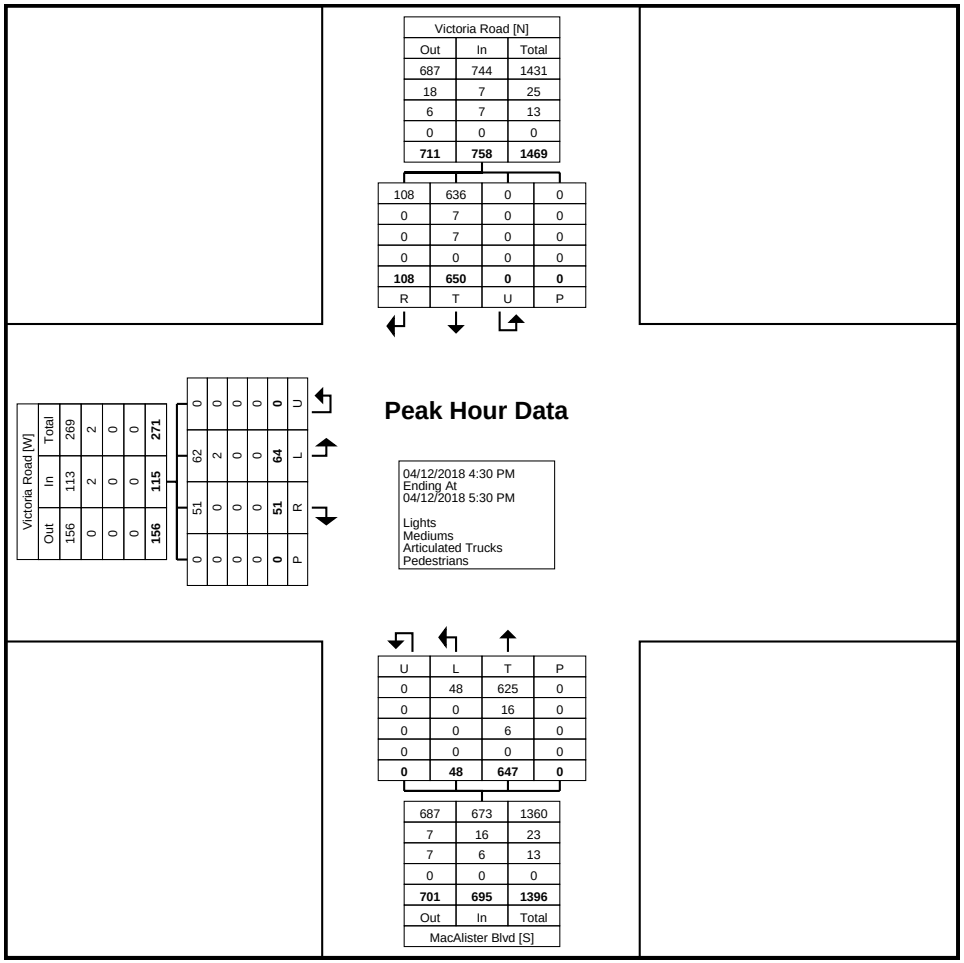
Count Name: Victoria Road & MacAlister Blvd - Weekday
Site Code:
Start Date: 04/12/2018



Turning Movement Peak Hour Data Plot (4:30 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & MacAlister Blvd - Weekday
Site Code:
Start Date: 04/12/2018

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & Arkell Road - Weekda
Site Code:
Start Date: 04/12/2018

Turning Movement Data

Start Time	Arkell Road Eastbound						Arkell Road Westbound						Victoria Road Northbound						Victoria Road Southbound						Int. Total
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	
6:00 AM	7	7	3	0	0	17	14	0	0	0	0	14	1	21	7	0	0	29	4	68	8	0	0	80	140
6:15 AM	7	11	0	0	0	18	13	3	4	0	0	20	0	33	6	0	0	39	5	68	3	0	0	76	153
6:30 AM	15	9	1	0	0	25	12	4	3	0	0	19	2	50	6	0	0	58	3	99	4	0	0	106	208
6:45 AM	12	9	0	0	0	21	21	4	4	0	0	29	2	40	6	0	0	48	8	72	3	0	0	83	181
Hourly Total	41	36	4	0	0	81	60	11	11	0	0	82	5	144	25	0	0	174	20	307	18	0	0	345	682
7:00 AM	16	18	1	0	0	35	15	2	5	0	0	22	2	56	8	0	0	66	10	90	9	0	0	109	232
7:15 AM	28	18	6	0	0	52	11	7	5	0	0	23	1	58	10	0	0	69	10	93	12	0	0	115	259
7:30 AM	33	26	6	0	0	65	39	16	5	0	0	60	4	88	10	0	0	102	6	111	17	0	0	134	361
7:45 AM	53	30	7	0	2	90	48	23	11	0	0	82	3	102	15	0	0	120	5	114	21	0	0	140	432
Hourly Total	130	92	20	0	2	242	113	48	26	0	0	187	10	304	43	0	0	357	31	408	59	0	0	498	1284
8:00 AM	87	22	4	0	0	113	22	17	11	0	0	50	5	132	9	0	0	146	10	99	30	0	0	139	448
8:15 AM	83	17	2	0	0	102	25	31	18	0	0	74	2	140	15	0	0	157	8	105	39	0	0	152	485
8:30 AM	72	25	8	0	0	105	38	30	9	0	0	77	15	121	17	0	0	153	7	111	24	0	0	142	477
8:45 AM	58	10	8	0	0	76	36	20	12	0	0	68	4	139	12	0	0	155	2	100	33	0	0	135	434
Hourly Total	300	74	22	0	0	396	121	98	50	0	0	269	26	532	53	0	0	611	27	415	126	0	0	568	1844
9:00 AM	33	17	5	0	0	55	22	19	4	0	0	45	7	73	12	0	0	92	4	79	19	0	0	102	294
9:15 AM	22	10	2	0	0	34	14	14	4	0	0	32	8	61	10	0	0	79	4	76	9	0	0	89	234
9:30 AM	15	15	3	0	2	33	12	13	7	0	0	32	5	52	9	0	0	66	6	47	20	0	0	73	204
9:45 AM	15	20	5	0	0	40	5	12	7	0	0	24	2	53	14	0	0	69	6	68	17	0	0	91	224
Hourly Total	85	62	15	0	2	162	53	58	22	0	0	133	22	239	45	0	0	306	20	270	65	0	0	355	956
10:00 AM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
*** BREAK ***	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Hourly Total	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	1	1
2:30 PM	26	10	4	0	0	40	21	17	6	0	0	44	5	109	13	0	0	127	9	87	27	0	0	123	334
2:45 PM	28	14	3	0	0	45	27	19	9	0	0	55	6	69	20	0	0	95	2	94	24	0	0	120	315
Hourly Total	54	24	7	0	0	85	48	36	15	0	0	99	11	178	33	0	0	222	11	181	51	0	0	243	649
3:00 PM	24	25	4	0	0	53	22	10	5	0	0	37	4	106	20	0	0	130	4	99	25	0	0	128	348
3:15 PM	45	20	8	0	3	73	22	20	11	0	0	53	5	138	24	0	0	167	4	102	20	0	0	126	419
3:30 PM	33	25	6	0	0	64	18	18	5	0	0	41	2	95	19	0	0	116	6	87	31	0	0	124	345
3:45 PM	32	16	11	0	2	59	16	20	2	0	0	38	8	110	25	0	0	143	4	96	31	0	0	131	371
Hourly Total	134	86	29	0	5	249	78	68	23	0	0	169	19	449	88	0	0	556	18	384	107	0	0	509	1483
4:00 PM	31	29	10	0	1	70	25	23	11	0	0	59	6	118	28	0	0	152	7	111	34	0	0	152	433
4:15 PM	31	28	10	0	0	69	19	24	8	0	0	51	7	125	38	0	0	170	13	116	39	0	0	168	458
4:30 PM	41	28	9	0	0	78	31	19	13	0	0	63	6	129	36	0	0	171	8	124	31	0	0	163	475
4:45 PM	31	28	4	0	0	63	23	32	11	0	0	66	2	129	40	0	0	171	10	121	41	0	0	172	472
Hourly Total	134	113	33	0	1	280	98	98	43	0	0	239	21	501	142	0	0	664	38	472	145	0	0	655	1838
5:00 PM	41	25	6	0	1	72	20	25	7	0	0	52	7	136	36	0	0	179	15	125	26	0	0	166	469

5:15 PM	37	14	7	0	1	58	33	33	4	0	0	70	5	136	38	0	0	179	13	131	38	0	0	182	489
5:30 PM	29	26	8	0	1	63	22	27	10	0	0	59	6	125	27	0	1	158	11	109	39	0	0	159	439
5:45 PM	42	30	8	0	0	80	27	23	6	0	0	56	6	103	21	0	0	130	4	109	44	0	1	157	423
Hourly Total	149	95	29	0	3	273	102	108	27	0	0	237	24	500	122	0	1	646	43	474	147	0	1	664	1820
6:00 PM	28	9	10	0	2	47	16	23	9	0	0	48	3	101	18	0	0	122	11	80	21	0	0	112	329
6:15 PM	44	18	13	0	1	75	26	19	7	0	0	52	4	104	20	0	0	128	7	86	43	0	0	136	391
6:30 PM	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Grand Total	1099	609	182	0	16	1890	715	567	233	0	0	1515	145	3052	589	0	1	3786	226	3077	783	0	1	4086	11277
Approach %	58.1	32.2	9.6	0.0	-	-	47.2	37.4	15.4	0.0	-	-	3.8	80.6	15.6	0.0	-	-	5.5	75.3	19.2	0.0	-	-	-
Total %	9.7	5.4	1.6	0.0	-	16.8	6.3	5.0	2.1	0.0	-	13.4	1.3	27.1	5.2	0.0	-	33.6	2.0	27.3	6.9	0.0	-	36.2	-
Lights	1067	595	180	0	-	1842	705	557	220	0	-	1482	140	2907	573	0	-	3620	215	2921	729	0	-	3865	10809
% Lights	97.1	97.7	98.9	-	-	97.5	98.6	98.2	94.4	-	-	97.8	96.6	95.2	97.3	-	-	95.6	95.1	94.9	93.1	-	-	94.6	95.8
Mediums	31	13	2	0	-	46	9	10	13	0	-	32	5	82	15	0	-	102	11	94	54	0	-	159	339
% Mediums	2.8	2.1	1.1	-	-	2.4	1.3	1.8	5.6	-	-	2.1	3.4	2.7	2.5	-	-	2.7	4.9	3.1	6.9	-	-	3.9	3.0
Articulated Trucks	1	1	0	0	-	2	1	0	0	0	-	1	0	63	1	0	-	64	0	62	0	0	-	62	129
% Articulated Trucks	0.1	0.2	0.0	-	-	0.1	0.1	0.0	0.0	-	-	0.1	0.0	2.1	0.2	-	-	1.7	0.0	2.0	0.0	-	-	1.5	1.1
Pedestrians	-	-	-	-	16	-	-	-	-	-	0	-	-	-	-	-	1	-	-	-	-	-	1	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	100.0	-	-	-	-	-	100.0	-	-

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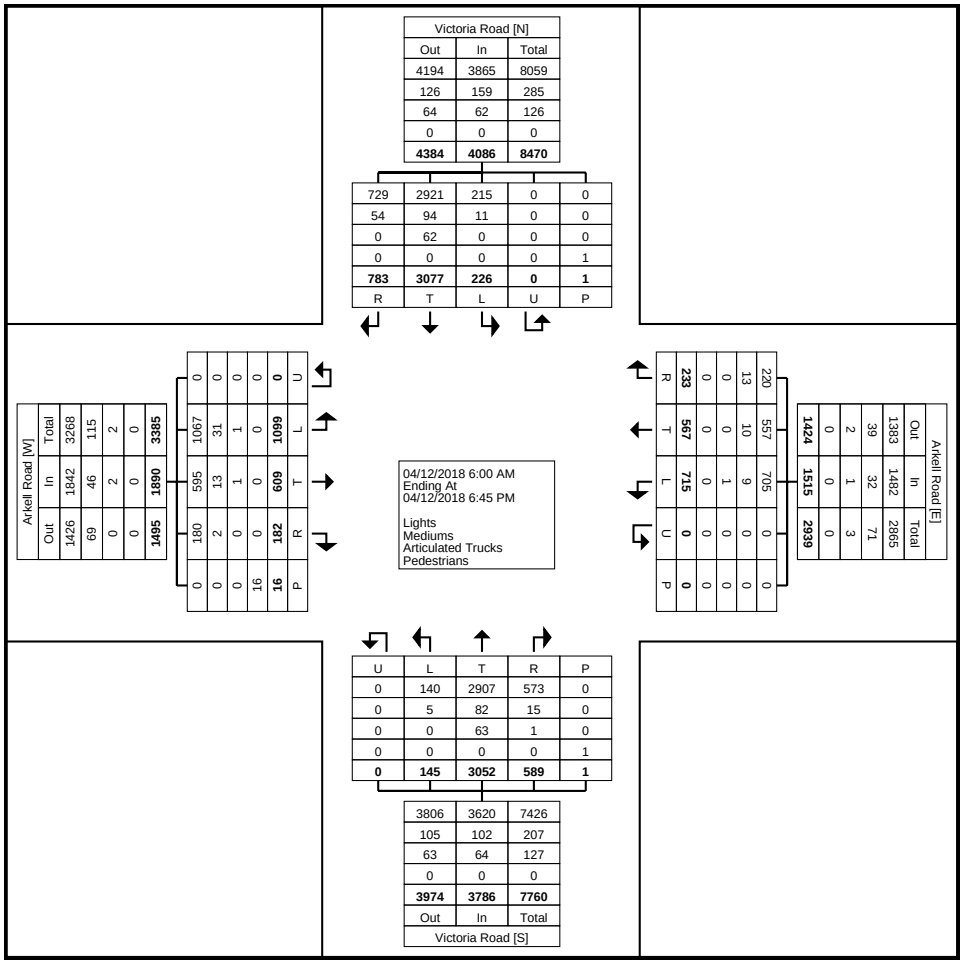
Count Name: Victoria Road & Arkell Road - Weekda
Site Code:
Start Date: 04/12/2018



Turning Movement Data Plot

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & Arkell Road - Weekda
Site Code:
Start Date: 04/12/2018

Turning Movement Peak Hour Data (8:00 AM)

Start Time	Arkell Road Eastbound						Arkell Road Westbound						Victoria Road Northbound						Victoria Road Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
8:00 AM	87	22	4	0	0	113	22	17	11	0	0	50	5	132	9	0	0	146	10	99	30	0	0	139	448
8:15 AM	83	17	2	0	0	102	25	31	18	0	0	74	2	140	15	0	0	157	8	105	39	0	0	152	485
8:30 AM	72	25	8	0	0	105	38	30	9	0	0	77	15	121	17	0	0	153	7	111	24	0	0	142	477
8:45 AM	58	10	8	0	0	76	36	20	12	0	0	68	4	139	12	0	0	155	2	100	33	0	0	135	434
Total	300	74	22	0	0	396	121	98	50	0	0	269	26	532	53	0	0	611	27	415	126	0	0	568	1844
Approach %	75.8	18.7	5.6	0.0	-	-	45.0	36.4	18.6	0.0	-	-	4.3	87.1	8.7	0.0	-	-	4.8	73.1	22.2	0.0	-	-	-
Total %	16.3	4.0	1.2	0.0	-	21.5	6.6	5.3	2.7	0.0	-	14.6	1.4	28.9	2.9	0.0	-	33.1	1.5	22.5	6.8	0.0	-	30.8	-
PHF	0.862	0.740	0.688	0.000	-	0.876	0.796	0.790	0.694	0.000	-	0.873	0.433	0.950	0.779	0.000	-	0.973	0.675	0.935	0.808	0.000	-	0.934	0.951
Lights	287	71	22	0	-	380	119	93	48	0	-	260	23	502	50	0	-	575	25	398	117	0	-	540	1755
% Lights	95.7	95.9	100.0	-	-	96.0	98.3	94.9	96.0	-	-	96.7	88.5	94.4	94.3	-	-	94.1	92.6	95.9	92.9	-	-	95.1	95.2
Mediums	12	2	0	0	-	14	2	5	2	0	-	9	3	16	3	0	-	22	2	8	9	0	-	19	64
% Mediums	4.0	2.7	0.0	-	-	3.5	1.7	5.1	4.0	-	-	3.3	11.5	3.0	5.7	-	-	3.6	7.4	1.9	7.1	-	-	3.3	3.5
Articulated Trucks	1	1	0	0	-	2	0	0	0	0	-	0	0	14	0	0	-	14	0	9	0	0	-	9	25
% Articulated Trucks	0.3	1.4	0.0	-	-	0.5	0.0	0.0	0.0	-	-	0.0	0.0	2.6	0.0	-	-	2.3	0.0	2.2	0.0	-	-	1.6	1.4
Pedestrians	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

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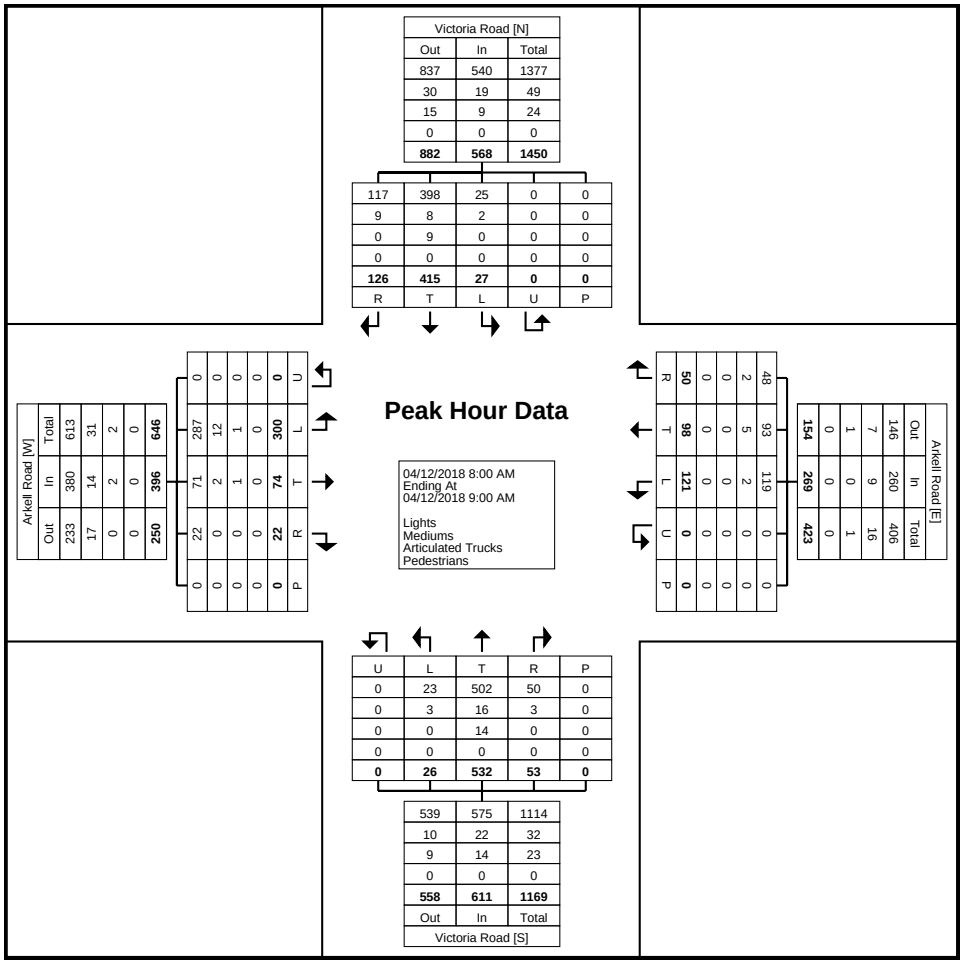

Turning Movement Peak Hour Data Plot (8:00 AM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
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Count Name: Victoria Road & Arkell Road - Weekda
Site Code:
Start Date: 04/12/2018

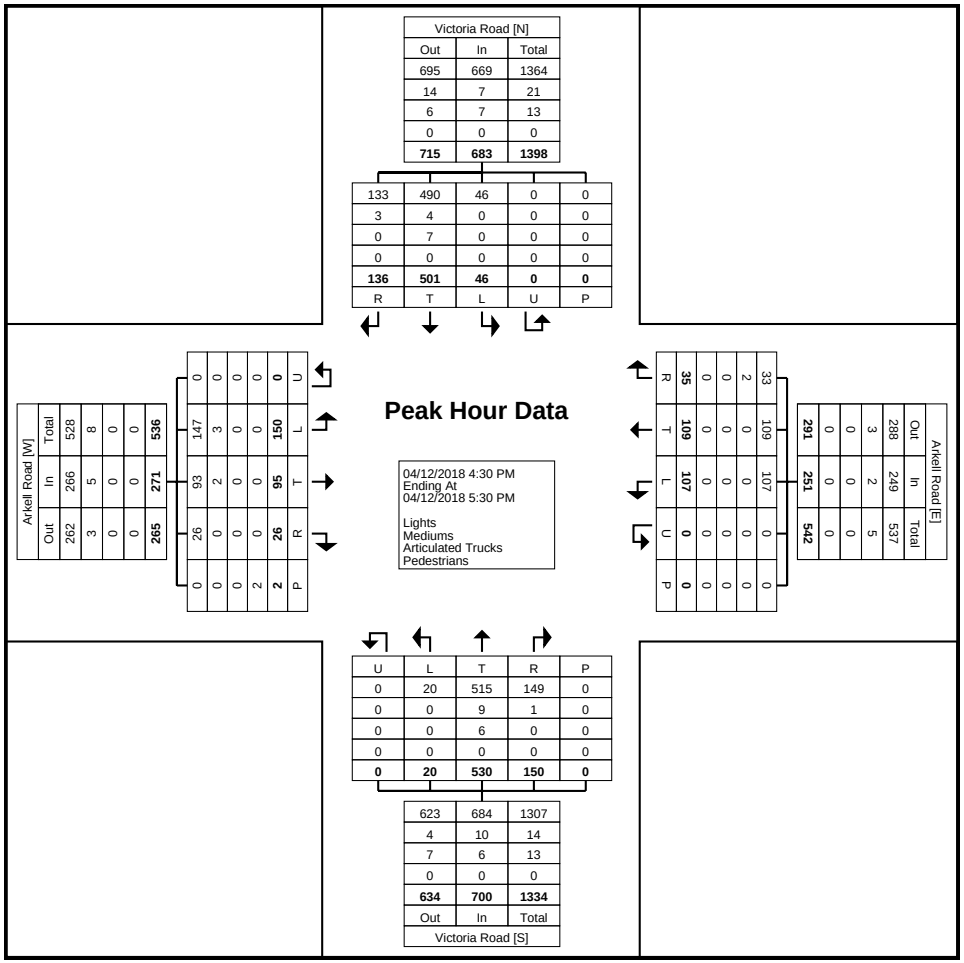
Turning Movement Peak Hour Data (4:30 PM)

Start Time	Arkell Road Eastbound						Arkell Road Westbound						Victoria Road Northbound						Victoria Road Southbound						
	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Left	Thru	Right	U-Turn	Peds	App. Total	Int. Total
4:30 PM	41	28	9	0	0	78	31	19	13	0	0	63	6	129	36	0	0	171	8	124	31	0	0	163	475
4:45 PM	31	28	4	0	0	63	23	32	11	0	0	66	2	129	40	0	0	171	10	121	41	0	0	172	472
5:00 PM	41	25	6	0	1	72	20	25	7	0	0	52	7	136	36	0	0	179	15	125	26	0	0	166	469
5:15 PM	37	14	7	0	1	58	33	33	4	0	0	70	5	136	38	0	0	179	13	131	38	0	0	182	489
Total	150	95	26	0	2	271	107	109	35	0	0	251	20	530	150	0	0	700	46	501	136	0	0	683	1905
Approach %	55.4	35.1	9.6	0.0	-	-	42.6	43.4	13.9	0.0	-	-	2.9	75.7	21.4	0.0	-	-	6.7	73.4	19.9	0.0	-	-	-
Total %	7.9	5.0	1.4	0.0	-	14.2	5.6	5.7	1.8	0.0	-	13.2	1.0	27.8	7.9	0.0	-	36.7	2.4	26.3	7.1	0.0	-	35.9	-
PHF	0.915	0.848	0.722	0.000	-	0.869	0.811	0.826	0.673	0.000	-	0.896	0.714	0.974	0.938	0.000	-	0.978	0.767	0.956	0.829	0.000	-	0.938	0.974
Lights	147	93	26	0	-	266	107	109	33	0	-	249	20	515	149	0	-	684	46	490	133	0	-	669	1868
% Lights	98.0	97.9	100.0	-	-	98.2	100.0	100.0	94.3	-	-	99.2	100.0	97.2	99.3	-	-	97.7	100.0	97.8	97.8	-	-	98.0	98.1
Mediums	3	2	0	0	-	5	0	0	2	0	-	2	0	9	1	0	-	10	0	4	3	0	-	7	24
% Mediums	2.0	2.1	0.0	-	-	1.8	0.0	0.0	5.7	-	-	0.8	0.0	1.7	0.7	-	-	1.4	0.0	0.8	2.2	-	-	1.0	1.3
Articulated Trucks	0	0	0	0	-	0	0	0	0	0	-	0	0	6	0	0	-	6	0	7	0	0	-	7	13
% Articulated Trucks	0.0	0.0	0.0	-	-	0.0	0.0	0.0	0.0	-	-	0.0	0.0	1.1	0.0	-	-	0.9	0.0	1.4	0.0	-	-	1.0	0.7
Pedestrians	-	-	-	-	2	-	-	-	-	-	0	-	-	-	-	-	0	-	-	-	-	-	0	-	-
% Pedestrians	-	-	-	-	100.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & Arkell Road - Weekda
Site Code:
Start Date: 04/12/2018



Turning Movement Peak Hour Data Plot (4:30 PM)

Paradigm Transportation Solutions Limited
22 King Street South, Suite 300

Waterloo, Ontario, Canada N2J 1N8
519-896-3163 cbowness@ptsl.com

Count Name: Victoria Road & Arkell Road - Weekda
Site Code:
Start Date: 04/12/2018

Appendix B

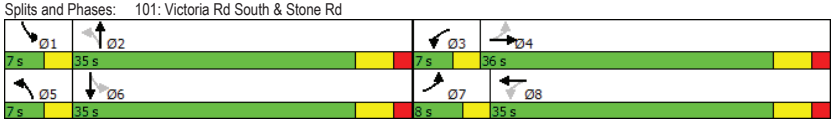
Existing Traffic Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	108	73	54	387	28	207	678	47	17	422	241
Future Volume (vph)	194	108	73	54	387	28	207	678	47	17	422	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.940			0.990			0.990			0.945	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3125	0	1543	3499	0	1787	3344	0	1530	3252	0
Flt Permitted	0.418			0.629			0.285			0.244		
Satd. Flow (perm)	764	3125	0	1021	3499	0	535	3344	0	393	3252	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		79			9			9			144	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							5					5
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
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Adj. Flow (vph)	211	117	79	59	421	30	225	737	51	18	459	262
Shared Lane Traffic (%)												
Lane Group Flow (vph)	211	196	0	59	451	0	225	788	0	18	721	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	22.5	14.4		20.5	13.3		27.0	19.9		27.0	19.9	
Actuated g/C Ratio	0.37	0.24		0.34	0.22		0.44	0.33		0.44	0.33	
v/c Ratio	0.58	0.25		0.16	0.58		0.70	0.72		0.07	0.62	
Control Delay	21.6	13.1		13.7	24.7		24.9	21.9		9.0	16.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.6	13.1		13.7	24.7		24.9	21.9		9.0	16.2	
LOS	C	B		B	C		C	C		A	B	
Approach Delay		17.5			23.4			22.6			16.0	
Approach LOS		B			C			C			B	

Intersection Summary		
Area Type:	Other	
Cycle Length: 85		
Actuated Cycle Length: 60.7		
Natural Cycle: 85		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.72		
Intersection Signal Delay: 20.1		Intersection LOS: C
Intersection Capacity Utilization 70.8%		ICU Level of Service C
Analysis Period (min) 15		

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	194	108	73	54	387	28	207	678	47	17	422	241
Future Volume (vph)	194	108	73	54	387	28	207	678	47	17	422	241
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3123		1543	3499		1787	3345		1530	3255	
Flt Permitted	0.42	1.00		0.63	1.00		0.29	1.00		0.24	1.00	
Satd. Flow (perm)	765	3123		1021	3499		536	3345		392	3255	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	211	117	79	59	421	30	225	737	51	18	459	262
RTOR Reduction (vph)	0	60	0	0	7	0	0	6	0	0	97	0
Lane Group Flow (vph)	211	136	0	59	444	0	225	782	0	18	624	0
Confl. Peds. (#/hr)							5					5
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.5	14.4		17.5	13.4		23.9	19.8		23.9	19.8	
Effective Green, g (s)	19.5	14.4		17.5	13.4		23.9	19.8		23.9	19.8	
Actuated g/C Ratio	0.32	0.24		0.29	0.22		0.40	0.33		0.40	0.33	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	328	744		331	776		297	1096		232	1067	
v/s Ratio Prot	c0.05	0.04		0.01	0.13		c0.05	0.23		0.01	0.19	
v/s Ratio Perm	c0.15			0.04			c0.25			0.03		
v/c Ratio	0.64	0.18		0.18	0.57		0.76	0.71		0.08	0.59	
Uniform Delay, d1	16.0	18.3		15.8	20.9		14.0	17.8		11.5	16.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.3	0.1		0.3	1.0		10.5	2.2		0.1	0.8	
Delay (s)	20.3	18.4		16.1	22.0		24.6	20.0		11.6	17.7	
Level of Service	C	B		B	C		C	C		B	B	
Approach Delay (s)		19.4			21.3			21.0			17.6	
Approach LOS		B			C			C			B	

Intersection Summary				
HCM 2000 Control Delay	19.9	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	60.4	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	70.8%	ICU Level of Service	C	
Analysis Period (min)	15			

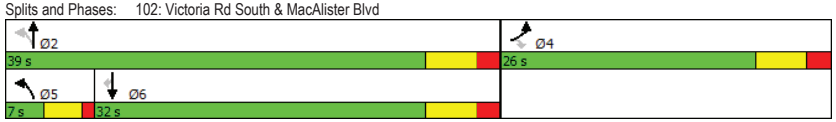
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	135	95	89	797	509	40
Future Volume (vph)	135	95	89	797	509	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1787	1538	1656	1810	1827	1615
Flt Permitted	0.950		0.283			
Satd. Flow (perm)	1787	1505	493	1810	1827	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		103				43
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			174.1	186.7	
Travel Time (s)	6.3			9.0	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Adj. Flow (vph)	147	103	97	866	553	43
Shared Lane Traffic (%)						
Lane Group Flow (vph)	147	103	97	866	553	43
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	21.0	21.0	36.3	36.1	30.9	30.9
Actuated g/C Ratio	0.35	0.35	0.61	0.61	0.52	0.52
v/c Ratio	0.23	0.17	0.27	0.79	0.58	0.05
Control Delay	18.4	5.1	9.4	22.3	19.3	4.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.4	5.1	9.4	22.3	19.3	4.7
LOS	B	A	A	C	B	A
Approach Delay	12.9			21.0	18.3	
Approach LOS	B			C	B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 59.5			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 19.0		Intersection LOS: B	
Intersection Capacity Utilization 68.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	135	95	89	797	509	40
Future Volume (vph)	135	95	89	797	509	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1505	1656	1810	1827	1581
Flt Permitted	0.95	1.00	0.28	1.00	1.00	1.00
Satd. Flow (perm)	1787	1505	494	1810	1827	1581
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	147	103	97	866	553	43
RTOR Reduction (vph)	0	79	0	0	0	23
Lane Group Flow (vph)	147	24	97	866	553	20
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	14.6	14.6	35.2	35.2	29.0	29.0
Effective Green, g (s)	14.6	14.6	35.2	35.2	29.0	29.0
Actuated g/C Ratio	0.24	0.24	0.57	0.57	0.47	0.47
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	422	355	322	1030	857	741
v/s Ratio Prot	c0.08		0.01	c0.48	0.30	
v/s Ratio Perm		0.02	0.16			0.01
v/c Ratio	0.35	0.07	0.30	0.84	0.65	0.03
Uniform Delay, d1	19.6	18.3	7.5	11.0	12.5	8.8
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.0	0.2	6.3	1.7	0.0
Delay (s)	19.8	18.4	7.7	17.3	14.2	8.8
Level of Service	B	B	A	B	B	A
Approach Delay (s)	19.2			16.3	13.8	
Approach LOS	B			B	B	

Intersection Summary			
HCM 2000 Control Delay	15.9	HCM 2000 Level of Service	B
HCM 2000 Volume to Capacity ratio	0.76		
Actuated Cycle Length (s)	61.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	68.6%	ICU Level of Service	C
Analysis Period (min)	15		

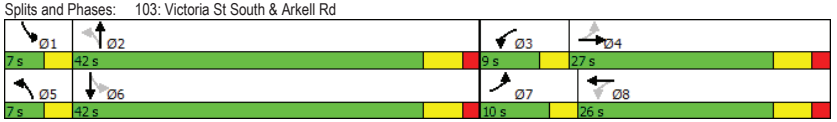
c Critical Lane Group

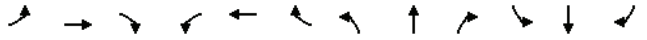
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	74	22	121	98	54	26	532	53	27	545	126
Future Volume (vph)	300	74	22	121	98	54	26	532	53	27	545	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.99		1.00				1.00	
Frt		0.965			0.947			0.986			0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1779	0	1770	1706	0	1612	1767	0	1687	1758	0
Flt Permitted	0.575			0.690			0.147			0.227		
Satd. Flow (perm)	1049	1779	0	1285	1706	0	249	1767	0	403	1758	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			31			7			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1319.4	
Travel Time (s)		19.8			17.0			16.1			95.0	
Confl. Peds. (#/hr)	1					1	3					3
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
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Adj. Flow (vph)	326	80	24	132	107	59	28	578	58	29	592	137
Shared Lane Traffic (%)												
Lane Group Flow (vph)	326	104	0	132	166	0	28	636	0	29	729	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	10.0	27.0		9.0	26.0		7.0	42.0		7.0	42.0	
Total Split (%)	11.8%	31.8%		10.6%	30.6%		8.2%	49.4%		8.2%	49.4%	
Maximum Green (s)	7.0	21.0		6.0	20.0		4.0	36.0		4.0	36.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	22.4	12.3		20.4	11.3		41.6	34.6		41.6	34.6	
Actuated g/C Ratio	0.30	0.16		0.27	0.15		0.55	0.46		0.55	0.46	
v/c Ratio	0.86	0.34		0.34	0.59		0.13	0.78		0.10	0.89	
Control Delay	47.1	26.9		21.7	33.0		8.7	25.9		8.0	34.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	47.1	26.9		21.7	33.0		8.7	25.9		8.0	34.5	
LOS	D	C		C	C		A	C		A	C	
Approach Delay		42.2			28.0			25.2			33.5	
Approach LOS		D			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 75.1			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 31.9		Intersection LOS: C	
Intersection Capacity Utilization 75.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd





Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	74	22	121	98	54	26	532	53	27	545	126
Future Volume (vph)	300	74	22	121	98	54	26	532	53	27	545	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	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	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1734	1779		1770	1706		1611	1768		1687	1758	
Flt Permitted	0.58	1.00		0.69	1.00		0.15	1.00		0.23	1.00	
Satd. Flow (perm)	1050	1779		1285	1706		250	1768		403	1758	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	326	80	24	132	107	59	28	578	58	29	592	137
RTOR Reduction (vph)	0	14	0	0	26	0	0	4	0	0	9	0
Lane Group Flow (vph)	326	90	0	132	140	0	28	632	0	29	720	0
Confl. Peds. (#/hr)	1					1	3					3
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.3	12.3		17.3	11.3		38.5	34.5		38.5	34.5	
Effective Green, g (s)	19.3	12.3		17.3	11.3		38.5	34.5		38.5	34.5	
Actuated g/C Ratio	0.26	0.16		0.23	0.15		0.51	0.46		0.51	0.46	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	334	292		336	257		201	815		276	810	
v/s Ratio Prot	c0.09	0.05		0.03	0.08		c0.01	0.36		0.01	c0.41	
v/s Ratio Perm	c0.16			0.06			0.06			0.05		
v/c Ratio	0.98	0.31		0.39	0.54		0.14	0.78		0.11	0.89	
Uniform Delay, d1	26.7	27.5		23.9	29.4		12.2	16.9		10.7	18.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	42.4	0.6		0.8	2.3		0.3	4.7		0.2	11.6	
Delay (s)	69.1	28.1		24.6	31.7		12.5	21.6		10.9	30.0	
Level of Service	E	C		C	C		B	C		B	C	
Approach Delay (s)		59.2			28.6			21.2			29.3	
Approach LOS		E			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	32.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	74.8	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	75.1%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	48.8	38.2	29.4	33.3	44.6	48.9	79.2	100.6	89.3	20.7	57.8	63.6
Average Queue (m)	26.2	16.6	11.4	9.1	29.9	25.4	27.4	57.7	38.8	4.2	28.5	30.5
95th Queue (m)	42.1	31.7	22.6	22.9	43.8	41.9	56.9	89.2	70.3	14.0	46.0	51.9
Link Distance (m)		260.6	260.6		101.6	101.6		800.1	800.1		137.0	137.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)							0	1			0	
Queuing Penalty (veh)							0	2			0	

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	B5	SB	SB
Directions Served	L	R	L	T	T	T	R
Maximum Queue (m)	43.5	19.3	55.3	139.7	15.0	101.0	15.6
Average Queue (m)	18.3	12.7	15.3	73.9	1.2	44.7	4.6
95th Queue (m)	34.4	21.6	37.5	126.4	15.7	84.0	12.1
Link Distance (m)	65.2			155.2	1300.7	168.0	168.0
Upstream Blk Time (%)			0	1			
Queuing Penalty (veh)			0	9			
Storage Bay Dist (m)		10.0	100.0				
Storage Blk Time (%)	16	7		4			
Queuing Penalty (veh)	15	9		3			

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	82.1	133.8	38.0	46.1	22.2	108.3	82.3	185.0
Average Queue (m)	56.3	43.0	17.5	23.0	6.1	58.8	10.5	89.1
95th Queue (m)	90.8	131.0	32.4	38.3	17.8	95.1	44.6	152.2
Link Distance (m)		264.8		226.2		213.2		1300.7
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)	19	0				3		15
Queuing Penalty (veh)	18	0				1		4

Zone Summary

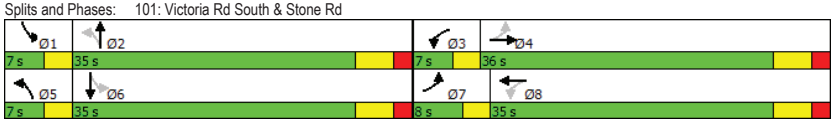
Zone wide Queuing Penalty: 61

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	379	172	56	220	13	85	588	58	33	530	203
Future Volume (vph)	290	379	172	56	220	13	85	588	58	33	530	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							0.99				0.99	
Frt		0.953			0.992			0.987			0.958	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3396	0	1530	3468	0	1770	3478	0	1752	3371	0
Flt Permitted	0.556			0.347			0.230			0.290		
Satd. Flow (perm)	1046	3396	0	559	3468	0	426	3478	0	535	3371	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		96			8			13			72	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							22					22
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
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Adj. Flow (vph)	315	412	187	61	239	14	92	639	63	36	576	221
Shared Lane Traffic (%)												
Lane Group Flow (vph)	315	599	0	61	253	0	92	702	0	36	797	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	23.4	15.2		21.3	14.1		26.2	19.1		26.2	19.1	
Actuated g/C Ratio	0.38	0.25		0.35	0.23		0.43	0.31		0.43	0.31	
v/c Ratio	0.68	0.65		0.23	0.31		0.34	0.64		0.12	0.72	
Control Delay	23.7	21.2		14.5	20.4		12.9	20.7		10.1	21.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.7	21.2		14.5	20.4		12.9	20.7		10.1	21.1	
LOS	C	C		B	C		B	C		B	C	
Approach Delay		22.1			19.2			19.8			20.7	
Approach LOS		C			B			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 60.9			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.72			
Intersection Signal Delay: 20.7		Intersection LOS: C	
Intersection Capacity Utilization 66.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	290	379	172	56	220	13	85	588	58	33	530	203
Future Volume (vph)	290	379	172	56	220	13	85	588	58	33	530	203
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3396		1530	3466		1768	3476		1752	3377	
Flt Permitted	0.56	1.00		0.35	1.00		0.23	1.00		0.29	1.00	
Satd. Flow (perm)	1045	3396		559	3466		427	3476		535	3377	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	315	412	187	61	239	14	92	639	63	36	576	221
RTOR Reduction (vph)	0	72	0	0	6	0	0	9	0	0	49	0
Lane Group Flow (vph)	315	527	0	61	247	0	92	693	0	36	748	0
Confl. Peds. (#/hr)							22					22
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.2	15.1		18.2	14.1		23.1	19.0		23.1	19.0	
Effective Green, g (s)	20.2	15.1		18.2	14.1		23.1	19.0		23.1	19.0	
Actuated g/C Ratio	0.33	0.25		0.30	0.23		0.38	0.32		0.38	0.32	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	412	850		234	810		254	1095		287	1064	
v/s Ratio Prot	c0.06	0.16		0.02	0.07		c0.02	0.20		0.01	c0.22	
v/s Ratio Perm	c0.19			0.06			0.11			0.04		
v/c Ratio	0.76	0.62		0.26	0.30		0.36	0.63		0.13	0.70	
Uniform Delay, d1	17.0	20.1		15.4	19.1		12.5	17.7		11.9	18.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.2	1.4		0.6	0.2		0.9	1.2		0.2	2.1	
Delay (s)	25.2	21.5		16.0	19.3		13.4	18.9		12.1	20.3	
Level of Service	C	C		B	B		B	B		B	C	
Approach Delay (s)		22.7			18.6			18.2			19.9	
Approach LOS		C			B			B			B	

Intersection Summary				
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	60.3	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	66.9%	ICU Level of Service	C	
Analysis Period (min)	15			

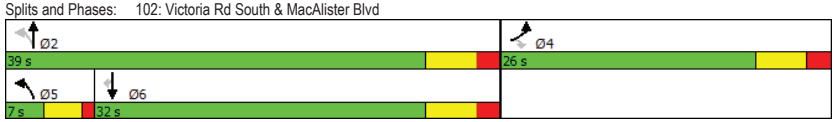
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	64	51	48	667	650	108
Future Volume (vph)	64	51	48	667	650	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1752	1615	1805	1845	1863	1615
Flt Permitted	0.950		0.186			
Satd. Flow (perm)	1752	1581	353	1845	1863	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		55				117
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			133.8	186.7	
Travel Time (s)	6.3			6.9	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Adj. Flow (vph)	70	55	52	725	707	117
Shared Lane Traffic (%)						
Lane Group Flow (vph)	70	55	52	725	707	117
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	21.4	21.4	37.5	37.4	33.5	33.5
Actuated g/C Ratio	0.35	0.35	0.62	0.62	0.55	0.55
v/c Ratio	0.11	0.09	0.18	0.64	0.69	0.13
Control Delay	17.4	5.8	8.5	15.5	22.6	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	17.4	5.8	8.5	15.5	22.6	3.4
LOS	B	A	A	B	C	A
Approach Delay	12.3			15.1	19.9	
Approach LOS	B			B	B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 60.6			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.69			
Intersection Signal Delay: 17.2		Intersection LOS: B	
Intersection Capacity Utilization 66.6%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	64	51	48	667	650	108
Future Volume (vph)	64	51	48	667	650	108
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1580	1805	1845	1863	1581
Flt Permitted	0.95	1.00	0.19	1.00	1.00	1.00
Satd. Flow (perm)	1752	1580	353	1845	1863	1581
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	70	55	52	725	707	117
RTOR Reduction (vph)	0	42	0	0	0	59
Lane Group Flow (vph)	70	13	52	725	707	58
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	14.5	14.5	37.1	37.1	31.4	31.4
Effective Green, g (s)	14.5	14.5	37.1	37.1	31.4	31.4
Actuated g/C Ratio	0.23	0.23	0.58	0.58	0.49	0.49
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	399	360	244	1076	919	780
v/s Ratio Prot	c0.04		0.01	c0.39	c0.38	
v/s Ratio Perm		0.01	0.12			0.04
v/c Ratio	0.18	0.03	0.21	0.67	0.77	0.07
Uniform Delay, d1	19.7	19.1	8.7	9.1	13.1	8.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0	0.2	1.7	3.9	0.0
Delay (s)	19.8	19.1	8.8	10.8	17.1	8.5
Level of Service	B	B	A	B	B	A
Approach Delay (s)	19.5			10.6	15.9	
Approach LOS	B			B	B	

Intersection Summary				
HCM 2000 Control Delay	13.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.61			
Actuated Cycle Length (s)	63.6	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	66.6%	ICU Level of Service	C	
Analysis Period (min)	15			

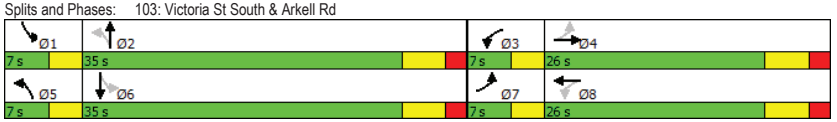
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	95	26	107	109	35	20	530	150	56	509	136
Future Volume (vph)	150	95	26	107	109	35	20	530	150	56	509	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt		0.968			0.963			0.967			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1803	0	1805	1791	0	1805	1793	0
Flt Permitted	0.658			0.673			0.164			0.137		
Satd. Flow (perm)	1226	1811	0	1279	1803	0	311	1791	0	260	1793	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			21			22			21	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1359.6	
Travel Time (s)		19.8			17.0			16.1			97.9	
Confl. Peds. (#/hr)							6					6
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
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Adj. Flow (vph)	163	103	28	116	118	38	22	576	163	61	553	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	131	0	116	156	0	22	739	0	61	701	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	7.0	26.0		7.0	26.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.3%	34.7%		9.3%	34.7%		9.3%	46.7%		9.3%	46.7%	
Maximum Green (s)	4.0	20.0		4.0	20.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	17.2	10.2		17.2	10.2		36.1	29.1		36.1	29.1	
Actuated g/C Ratio	0.26	0.16		0.26	0.16		0.55	0.45		0.55	0.45	
v/c Ratio	0.46	0.44		0.31	0.52		0.08	0.91		0.26	0.87	
Control Delay	22.4	26.0		19.2	28.1		7.0	36.3		9.1	30.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.4	26.0		19.2	28.1		7.0	36.3		9.1	30.7	
LOS	C	C		B	C		A	D		A	C	
Approach Delay		24.0			24.3			35.5			29.0	
Approach LOS		C			C			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 65.3			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 30.0		Intersection LOS: C	
Intersection Capacity Utilization 73.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	95	26	107	109	35	20	530	150	56	509	136
Future Volume (vph)	150	95	26	107	109	35	20	530	150	56	509	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1811		1805	1804		1805	1791		1805	1794	
Flt Permitted	0.66	1.00		0.67	1.00		0.16	1.00		0.14	1.00	
Satd. Flow (perm)	1226	1811		1279	1804		312	1791		261	1794	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	103	28	116	118	38	22	576	163	61	553	148
RTOR Reduction (vph)	0	15	0	0	18	0	0	12	0	0	12	0
Lane Group Flow (vph)	163	116	0	116	138	0	22	727	0	61	689	0
Confl. Peds. (#/hr)							6					6
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.2	10.2		14.2	10.2		33.1	29.1		33.1	29.1	
Effective Green, g (s)	14.2	10.2		14.2	10.2		33.1	29.1		33.1	29.1	
Actuated g/C Ratio	0.22	0.16		0.22	0.16		0.51	0.45		0.51	0.45	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	299	282		310	281		249	798		226	799	
v/s Ratio Prot	c0.03	0.06		0.02	0.08		0.01	c0.41		c0.02	0.38	
v/s Ratio Perm	c0.08			0.06			0.04			0.12		
v/c Ratio	0.55	0.41		0.37	0.49		0.09	0.91		0.27	0.86	
Uniform Delay, d1	22.1	24.8		21.4	25.2		10.3	16.9		11.3	16.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.0	1.0		0.8	1.4		0.2	14.5		0.6	9.5	
Delay (s)	24.1	25.8		22.1	26.5		10.5	31.4		11.9	25.8	
Level of Service	C	C		C	C		B	C		B	C	
Approach Delay (s)		24.9			24.7			30.8			24.7	
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	0.75			
Actuated Cycle Length (s)	65.3	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	73.2%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	64.2	70.9	60.9	32.9	45.2	33.7	57.9	85.5	69.6	17.9	61.9	66.3
Average Queue (m)	35.4	41.4	28.1	12.0	21.3	13.7	14.7	50.0	35.1	5.9	36.3	36.2
95th Queue (m)	56.5	61.0	52.1	26.7	34.9	27.7	34.8	76.1	60.9	15.0	56.7	58.3
Link Distance (m)		260.6	260.6		101.6	101.6		800.1	800.1		137.0	137.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	0	0						0				
Queuing Penalty (veh)	0	0						0				

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	SB	SB	B7
Directions Served	L	R	L	T	T	R	T
Maximum Queue (m)	27.2	17.2	23.1	90.5	146.5	16.0	3.8
Average Queue (m)	8.7	8.3	8.8	50.2	59.1	6.9	0.1
95th Queue (m)	19.0	17.7	18.5	82.6	117.6	14.7	2.7
Link Distance (m)	65.2			115.1	168.0	168.0	800.1
Upstream Blk Time (%)					0		
Queuing Penalty (veh)					1		
Storage Bay Dist (m)		10.0	100.0				
Storage Blk Time (%)	4	3		0			
Queuing Penalty (veh)	2	2		0			

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	43.1	37.4	33.8	43.7	81.6	181.4	82.3	209.2
Average Queue (m)	21.7	16.8	16.2	19.6	9.4	101.5	20.4	96.4
95th Queue (m)	37.2	29.5	27.8	35.2	45.1	196.2	65.7	188.3
Link Distance (m)		264.8		226.2		213.2		1340.8
Upstream Blk Time (%)						4		
Queuing Penalty (veh)						0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)					0	21	0	18
Queuing Penalty (veh)					0	4	0	10

Zone Summary

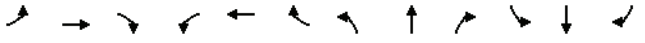
Zone wide Queuing Penalty: 20

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	74	22	121	98	54	26	532	53	27	545	126
Future Volume (vph)	300	74	22	121	98	54	26	532	53	27	545	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.99						1.00	
Frt		0.965			0.947			0.986			0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1779	0	1770	1706	0	1612	1767	0	1687	1758	0
Flt Permitted	0.481			0.690			0.145			0.224		
Satd. Flow (perm)	877	1779	0	1285	1706	0	246	1767	0	398	1758	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			25			7			16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1319.4	
Travel Time (s)		19.8			17.0			16.1			95.0	
Confl. Peds. (#/hr)	1					1	3					3
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
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Adj. Flow (vph)	326	80	24	132	107	59	28	578	58	29	592	137
Shared Lane Traffic (%)												
Lane Group Flow (vph)	326	104	0	132	166	0	28	636	0	29	729	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	12.0	29.0		9.0	26.0		7.0	55.0		7.0	55.0	
Total Split (%)	12.0%	29.0%		9.0%	26.0%		7.0%	55.0%		7.0%	55.0%	
Maximum Green (s)	9.0	23.0		6.0	20.0		4.0	49.0		4.0	49.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	28.0	15.6		21.8	12.5		45.3	38.1		45.3	38.1	
Actuated g/C Ratio	0.34	0.19		0.26	0.15		0.55	0.46		0.55	0.46	
v/c Ratio	0.83	0.30		0.35	0.59		0.14	0.78		0.10	0.89	
Control Delay	45.4	29.8		25.7	38.6		9.2	26.0		8.5	34.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	45.4	29.8		25.7	38.6		9.2	26.0		8.5	34.4	
LOS	D	C		C	D		A	C		A	C	
Approach Delay		41.6			32.9			25.3			33.4	
Approach LOS		D			C			C			C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 82.6		
Natural Cycle: 90		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.89		
Intersection Signal Delay: 32.5		Intersection LOS: C
Intersection Capacity Utilization 75.1%		ICU Level of Service D
Analysis Period (min) 15		

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	300	74	22	121	98	54	26	532	53	27	545	126
Future Volume (vph)	300	74	22	121	98	54	26	532	53	27	545	126
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	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	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1734	1779		1770	1705		1611	1768		1687	1758	
Flt Permitted	0.48	1.00		0.69	1.00		0.14	1.00		0.22	1.00	
Satd. Flow (perm)	879	1779		1285	1705		246	1768		397	1758	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	326	80	24	132	107	59	28	578	58	29	592	137
RTOR Reduction (vph)	0	11	0	0	21	0	0	4	0	0	9	0
Lane Group Flow (vph)	326	93	0	132	145	0	28	632	0	29	720	0
Confl. Peds. (#/hr)	1					1	3					3
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	24.8	15.6		18.7	12.5		42.2	38.1		42.2	38.1	
Effective Green, g (s)	24.8	15.6		18.7	12.5		42.2	38.1		42.2	38.1	
Actuated g/C Ratio	0.30	0.19		0.23	0.15		0.51	0.46		0.51	0.46	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	362	338		329	259		194	821		268	816	
v/s Ratio Prot	c0.10	0.05		0.03	0.08		c0.01	0.36		0.01	c0.41	
v/s Ratio Perm	c0.17			0.06			0.07			0.05		
v/c Ratio	0.90	0.27		0.40	0.56		0.14	0.77		0.11	0.88	
Uniform Delay, d1	26.1	28.4		26.4	32.2		13.5	18.3		11.9	19.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	24.5	0.4		0.8	2.6		0.3	4.5		0.2	11.1	
Delay (s)	50.6	28.8		27.2	34.8		13.8	22.8		12.1	31.0	
Level of Service	D	C		C	C		B	C		B	C	
Approach Delay (s)		45.3			31.4			22.4			30.3	
Approach LOS		D			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	82.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	75.1%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Intersection: 103: Victoria St South & Arkell Rd

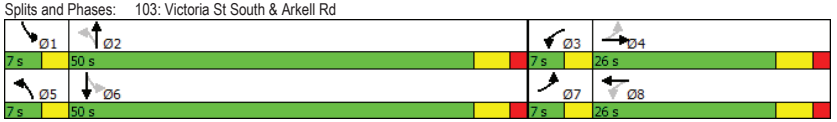
Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	82.3	180.5	42.3	52.0	57.6	118.7	82.1	152.6
Average Queue (m)	64.2	60.4	20.7	26.4	8.9	60.1	8.6	79.9
95th Queue (m)	95.8	167.3	36.0	46.8	31.8	97.8	38.4	134.5
Link Distance (m)		264.8		226.2		213.2		1300.7
Upstream Blk Time (%)		0						
Queuing Penalty (veh)		0						
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)	28	0				3		10
Queuing Penalty (veh)	27	0				1		3

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	95	26	107	109	35	20	530	150	56	509	136
Future Volume (vph)	150	95	26	107	109	35	20	530	150	56	509	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt		0.968			0.963			0.967			0.968	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1803	0	1805	1791	0	1805	1792	0
Flt Permitted	0.658			0.673			0.187			0.156		
Satd. Flow (perm)	1226	1811	0	1279	1803	0	355	1791	0	296	1792	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			17			22			21	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1359.6	
Travel Time (s)		19.8			17.0			16.1			97.9	
Confl. Peds. (#/hr)							6					6
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
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Adj. Flow (vph)	163	103	28	116	118	38	22	576	163	61	553	148
Shared Lane Traffic (%)												
Lane Group Flow (vph)	163	131	0	116	156	0	22	739	0	61	701	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	7.0	26.0		7.0	26.0		7.0	50.0		7.0	50.0	
Total Split (%)	7.8%	28.9%		7.8%	28.9%		7.8%	55.6%		7.8%	55.6%	
Maximum Green (s)	4.0	20.0		4.0	20.0		4.0	44.0		4.0	44.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	18.4	11.2		18.4	11.2		40.9	33.7		40.9	33.7	
Actuated g/C Ratio	0.26	0.16		0.26	0.16		0.57	0.47		0.57	0.47	
v/c Ratio	0.47	0.45		0.32	0.53		0.08	0.87		0.24	0.82	
Control Delay	27.9	31.7		24.7	33.5		6.4	28.7		8.2	25.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	27.9	31.7		24.7	33.5		6.4	28.7		8.2	25.2	
LOS	C	C		C	C		A	C		A	C	
Approach Delay		29.6			29.8			28.1			23.8	
Approach LOS		C			C			C			C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 90		
Actuated Cycle Length: 71.7		
Natural Cycle: 80		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.87		
Intersection Signal Delay: 27.0		Intersection LOS: C
Intersection Capacity Utilization 73.2%		ICU Level of Service D
Analysis Period (min) 15		

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	150	95	26	107	109	35	20	530	150	56	509	136
Future Volume (vph)	150	95	26	107	109	35	20	530	150	56	509	136
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1811		1805	1804		1804	1791		1805	1793	
Flt Permitted	0.66	1.00		0.67	1.00		0.19	1.00		0.16	1.00	
Satd. Flow (perm)	1226	1811		1279	1804		356	1791		296	1793	
Peak-hour factor, PHF	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	163	103	28	116	118	38	22	576	163	61	553	148
RTOR Reduction (vph)	0	12	0	0	14	0	0	12	0	0	11	0
Lane Group Flow (vph)	163	119	0	116	142	0	22	727	0	61	690	0
Confl. Peds. (#/hr)							6					6
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.3	11.2		15.3	11.2		37.8	33.7		37.8	33.7	
Effective Green, g (s)	15.3	11.2		15.3	11.2		37.8	33.7		37.8	33.7	
Actuated g/C Ratio	0.22	0.16		0.22	0.16		0.53	0.47		0.53	0.47	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	295	285		305	284		272	848		244	849	
v/s Ratio Prot	c0.03	0.07		0.02	0.08		0.00	c0.41		c0.01	0.38	
v/s Ratio Perm	c0.09			0.06			0.04			0.12		
v/c Ratio	0.55	0.42		0.38	0.50		0.08	0.86		0.25	0.81	
Uniform Delay, d1	24.2	27.0		23.4	27.4		10.2	16.6		11.2	16.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.2	1.0		0.8	1.4		0.1	8.6		0.5	6.0	
Delay (s)	26.4	28.0		24.2	28.8		10.3	25.2		11.7	22.0	
Level of Service	C	C		C	C		B	C		B	C	
Approach Delay (s)		27.1			26.8			24.7			21.2	
Approach LOS		C			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	24.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	71.1	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	73.2%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	55.6	45.5	30.2	45.8	42.3	120.4	58.2	149.8
Average Queue (m)	25.1	19.6	16.2	22.1	5.4	65.3	11.3	64.8
95th Queue (m)	43.2	35.3	26.6	38.6	24.9	106.0	32.9	112.9
Link Distance (m)		264.8		226.2		213.2		1340.8
Upstream Blk Time (%)								
Queuing Penalty (veh)								
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)	0					5		5
Queuing Penalty (veh)	0					1		3

Appendix C

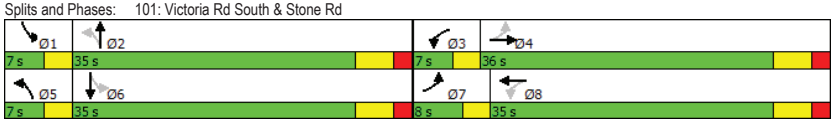
2020 Background Traffic Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	202	112	76	56	403	29	215	786	49	18	506	251
Future Volume (vph)	202	112	76	56	403	29	215	786	49	18	506	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.939			0.990			0.991			0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3121	0	1543	3499	0	1787	3353	0	1530	3269	0
Flt Permitted	0.431			0.633			0.269			0.224		
Satd. Flow (perm)	787	3121	0	1028	3499	0	505	3353	0	361	3269	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		76			9			8			110	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							5					5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Adj. Flow (vph)	202	112	76	56	403	29	215	786	49	18	506	251
Shared Lane Traffic (%)												
Lane Group Flow (vph)	202	188	0	56	432	0	215	835	0	18	757	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	22.2	14.1		20.2	13.1		28.0	20.9		28.0	20.9	
Actuated g/C Ratio	0.36	0.23		0.33	0.21		0.46	0.34		0.46	0.34	
v/c Ratio	0.56	0.24		0.15	0.58		0.68	0.73		0.07	0.64	
Control Delay	21.5	13.5		14.3	25.2		23.7	21.9		8.8	17.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	21.5	13.5		14.3	25.2		23.7	21.9		8.8	17.2	
LOS	C	B		B	C		C	C		A	B	
Approach Delay		17.6			24.0			22.3			17.0	
Approach LOS		B			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 61.4			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 20.4		Intersection LOS: C	
Intersection Capacity Utilization 74.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	202	112	76	56	403	29	215	786	49	18	506	251
Future Volume (vph)	202	112	76	56	403	29	215	786	49	18	506	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3123		1543	3499		1787	3353		1530	3271	
Flt Permitted	0.43	1.00		0.63	1.00		0.27	1.00		0.22	1.00	
Satd. Flow (perm)	788	3123		1029	3499		507	3353		361	3271	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	202	112	76	56	403	29	215	786	49	18	506	251
RTOR Reduction (vph)	0	58	0	0	7	0	0	5	0	0	72	0
Lane Group Flow (vph)	202	130	0	56	425	0	215	830	0	18	685	0
Confl. Peds. (#/hr)							5					5
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.2	14.1		17.2	13.1		25.0	20.9		25.0	20.9	
Effective Green, g (s)	19.2	14.1		17.2	13.1		25.0	20.9		25.0	20.9	
Actuated g/C Ratio	0.31	0.23		0.28	0.21		0.41	0.34		0.41	0.34	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	326	719		323	748		292	1145		225	1117	
v/s Ratio Prot	c0.05	0.04		0.01	0.12		c0.05	0.25		0.01	0.21	
v/s Ratio Perm	c0.14			0.04			c0.25			0.03		
v/c Ratio	0.62	0.18		0.17	0.57		0.74	0.72		0.08	0.61	
Uniform Delay, d1	16.5	18.9		16.4	21.5		13.4	17.6		11.2	16.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.5	0.1		0.3	1.0		9.3	2.3		0.2	1.0	
Delay (s)	20.0	19.0		16.7	22.5		22.7	19.9		11.4	17.8	
Level of Service	B	B		B	C		C	B		B	B	
Approach Delay (s)		19.5			21.8			20.5			17.6	
Approach LOS		B			C			C			B	

Intersection Summary				
HCM 2000 Control Delay	19.8	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.70			
Actuated Cycle Length (s)	61.2	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	74.3%	ICU Level of Service	D	
Analysis Period (min)	15			

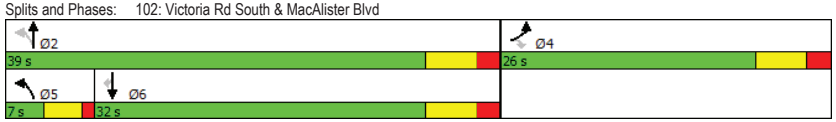
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	280	225	213	770	467	172
Future Volume (vph)	280	225	213	770	467	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1787	1538	1656	1810	1827	1615
Flt Permitted	0.950		0.272			
Satd. Flow (perm)	1787	1505	474	1810	1827	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		145				172
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			174.1	186.7	
Travel Time (s)	6.3			9.0	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Adj. Flow (vph)	280	225	213	770	467	172
Shared Lane Traffic (%)						
Lane Group Flow (vph)	280	225	213	770	467	172
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.2	20.2	31.1	29.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.51	0.47	0.36	0.36
v/c Ratio	0.48	0.38	0.71	0.90	0.71	0.25
Control Delay	20.9	9.2	25.8	30.2	23.5	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	9.2	25.8	30.2	23.5	3.5
LOS	C	A	C	C	C	A
Approach Delay	15.7			29.2	18.1	
Approach LOS	B			C	B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 61.3			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 22.7		Intersection LOS: C	
Intersection Capacity Utilization 67.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	280	225	213	770	467	172
Future Volume (vph)	280	225	213	770	467	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1506	1656	1810	1827	1581
Flt Permitted	0.95	1.00	0.27	1.00	1.00	1.00
Satd. Flow (perm)	1787	1506	475	1810	1827	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	280	225	213	770	467	172
RTOR Reduction (vph)	0	97	0	0	0	110
Lane Group Flow (vph)	280	128	213	770	467	62
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.1	20.1	29.0	29.0	22.0	22.0
Effective Green, g (s)	20.1	20.1	29.0	29.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.47	0.47	0.36	0.36
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	587	495	283	859	657	569
v/s Ratio Prot	c0.16		0.04	c0.43	0.26	
v/s Ratio Perm		0.08	0.32			0.04
v/c Ratio	0.48	0.26	0.75	0.90	0.71	0.11
Uniform Delay, d1	16.3	15.0	14.4	14.7	16.8	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	9.6	11.9	3.6	0.1
Delay (s)	16.5	15.1	24.0	26.6	20.4	13.1
Level of Service	B	B	C	C	C	B
Approach Delay (s)	15.9			26.0	18.5	
Approach LOS	B			C	B	

Intersection Summary				
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	67.2%	ICU Level of Service	C	
Analysis Period (min)	15			

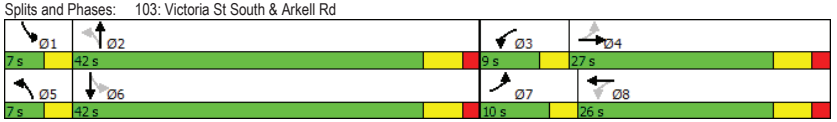
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	312	77	23	126	102	56	27	615	55	28	532	131
Future Volume (vph)	312	77	23	126	102	56	27	615	55	28	532	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.99		1.00				1.00	
Frt		0.965			0.947			0.988			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1779	0	1770	1706	0	1612	1771	0	1687	1754	0
Flt Permitted	0.602			0.692			0.181			0.174		
Satd. Flow (perm)	1098	1779	0	1289	1706	0	307	1771	0	309	1754	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			30			7			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1319.4	
Travel Time (s)		19.8			17.0			16.1			95.0	
Confl. Peds. (#/hr)	1					1	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Adj. Flow (vph)	312	77	23	126	102	56	27	615	55	28	532	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	312	100	0	126	158	0	27	670	0	28	663	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	10.0	27.0		9.0	26.0		7.0	42.0		7.0	42.0	
Total Split (%)	11.8%	31.8%		10.6%	30.6%		8.2%	49.4%		8.2%	49.4%	
Maximum Green (s)	7.0	21.0		6.0	20.0		4.0	36.0		4.0	36.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	22.0	11.9		20.0	10.8		38.1	30.9		38.1	30.9	
Actuated g/C Ratio	0.31	0.17		0.28	0.15		0.53	0.43		0.53	0.43	
v/c Ratio	0.77	0.32		0.31	0.55		0.11	0.87		0.12	0.86	
Control Delay	36.4	26.4		20.7	31.3		8.3	32.2		8.2	31.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.4	26.4		20.7	31.3		8.3	32.2		8.2	31.2	
LOS	D	C		C	C		A	C		A	C	
Approach Delay		34.0			26.6			31.3			30.3	
Approach LOS		C			C			C			C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 85		
Actuated Cycle Length: 71.3		
Natural Cycle: 80		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.87		
Intersection Signal Delay: 30.9		Intersection LOS: C
Intersection Capacity Utilization 75.7%		ICU Level of Service D
Analysis Period (min) 15		

Splits and Phases: 103: Victoria St South & Arkell Rd



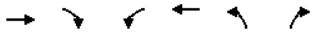
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	312	77	23	126	102	56	27	615	55	28	532	131
Future Volume (vph)	312	77	23	126	102	56	27	615	55	28	532	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	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	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1734	1780		1770	1706		1611	1770		1687	1754	
Flt Permitted	0.60	1.00		0.69	1.00		0.18	1.00		0.17	1.00	
Satd. Flow (perm)	1098	1780		1290	1706		306	1770		309	1754	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	312	77	23	126	102	56	27	615	55	28	532	131
RTOR Reduction (vph)	0	14	0	0	25	0	0	4	0	0	10	0
Lane Group Flow (vph)	312	86	0	126	133	0	27	666	0	28	653	0
Confl. Peds. (#/hr)	1					1	3					3
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.0	11.9		17.0	10.9		35.0	30.9		35.0	30.9	
Effective Green, g (s)	19.0	11.9		17.0	10.9		35.0	30.9		35.0	30.9	
Actuated g/C Ratio	0.27	0.17		0.24	0.15		0.49	0.44		0.49	0.44	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	357	298		350	261		226	770		231	763	
v/s Ratio Prot	c0.09	0.05		0.03	0.08		0.01	c0.38		c0.01	0.37	
v/s Ratio Perm	c0.15			0.06			0.05			0.05		
v/c Ratio	0.87	0.29		0.36	0.51		0.12	0.86		0.12	0.86	
Uniform Delay, d1	24.0	25.8		22.1	27.6		11.5	18.2		11.6	18.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	20.4	0.5		0.6	1.6		0.2	10.0		0.2	9.3	
Delay (s)	44.3	26.4		22.7	29.1		11.7	28.1		11.8	27.3	
Level of Service	D	C		C	C		B	C		B	C	
Approach Delay (s)		40.0			26.3			27.5			26.7	
Approach LOS		D			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	29.5	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.83		
Actuated Cycle Length (s)	71.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.7%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	256	10	231	154	10	229
Future Volume (vph)	256	10	231	154	10	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995				0.871	
Flt Protected				0.971	0.998	
Satd. Flow (prot)	1853	0	0	1809	1619	0
Flt Permitted				0.971	0.998	
Satd. Flow (perm)	1853	0	0	1809	1619	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	137.8			87.8	86.3	
Travel Time (s)	9.9			6.3	6.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	256	10	231	154	10	229
Shared Lane Traffic (%)						
Lane Group Flow (vph)	266	0	0	385	239	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	256	10	231	154	10	229
Future Volume (Veh/h)	256	10	231	154	10	229
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	256	10	231	154	10	229
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				88		
pX, platoon unblocked						
vC, conflicting volume			266		877	261
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			266		877	261
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			82		96	71
cM capacity (veh/h)			1298		262	778

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	266	385	239
Volume Left	0	231	10
Volume Right	10	0	229
cSH	1700	1298	719
Volume to Capacity	0.16	0.18	0.33
Queue Length 95th (m)	0.0	5.2	11.7
Control Delay (s)	0.0	5.7	12.5
Lane LOS		A	B
Approach Delay (s)	0.0	5.7	12.5
Approach LOS			B

Intersection Summary			
Average Delay	5.8		
Intersection Capacity Utilization	59.7%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	56.3	32.0	23.4	28.3	48.8	45.7	95.4	142.7	113.1	21.2	66.1	62.0
Average Queue (m)	26.4	16.2	9.6	11.5	32.1	27.3	41.8	77.8	60.7	5.2	34.1	35.7
95th Queue (m)	45.4	29.2	19.4	24.1	46.4	42.4	89.5	123.2	101.0	15.8	55.4	57.7
Link Distance (m)		260.6	260.6		101.6	101.6		800.1	800.1		137.0	137.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)							0	7				
Queuing Penalty (veh)							0	15				

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	R
Maximum Queue (m)	70.5	20.0	102.5	134.2	98.9	30.5
Average Queue (m)	43.8	16.8	30.2	71.8	49.6	12.7
95th Queue (m)	69.9	20.0	63.7	113.9	87.4	23.9
Link Distance (m)	66.9			155.2	168.0	168.0
Upstream Blk Time (%)	2		0	0		
Queuing Penalty (veh)	12		0	2		
Storage Bay Dist (m)		10.0	100.0			
Storage Blk Time (%)	37	14		2		
Queuing Penalty (veh)	84	40		4		

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	82.4	184.6	35.7	53.1	82.3	159.6	82.0	161.4
Average Queue (m)	69.9	72.6	17.5	26.0	13.8	81.8	9.3	83.3
95th Queue (m)	97.2	177.9	31.2	46.2	51.0	141.5	39.0	141.6
Link Distance (m)		264.8		226.2		213.2		1300.7
Upstream Blk Time (%)		0						
Queuing Penalty (veh)		0						
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)	41	1			0	12	0	12
Queuing Penalty (veh)	41	2			0	3	0	3

Intersection: 201: Commercial Driveway & MacAlister Blvd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	24.3	43.5	43.8
Average Queue (m)	2.2	14.1	18.2
95th Queue (m)	14.6	30.5	39.3
Link Distance (m)	127.7	66.9	77.8
Upstream Blk Time (%)		0	2
Queuing Penalty (veh)		0	0
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

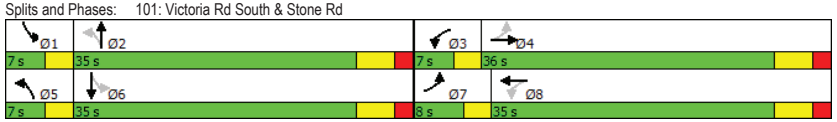
Zone wide Queuing Penalty: 206

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	302	394	179	58	229	14	88	664	60	34	618	211
Future Volume (vph)	302	394	179	58	229	14	88	664	60	34	618	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.953			0.991			0.988			0.962	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3396	0	1530	3464	0	1770	3483	0	1752	3386	0
Flt Permitted	0.560			0.363			0.219			0.283		
Satd. Flow (perm)	1053	3396	0	584	3464	0	406	3483	0	522	3386	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			8			12			60	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							22					22
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Adj. Flow (vph)	302	394	179	58	229	14	88	664	60	34	618	211
Shared Lane Traffic (%)												
Lane Group Flow (vph)	302	573	0	58	243	0	88	724	0	34	829	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	22.8	14.6		20.7	13.6		27.1	19.9		27.1	19.9	
Actuated g/C Ratio	0.37	0.24		0.34	0.22		0.44	0.33		0.44	0.33	
v/c Ratio	0.67	0.65		0.22	0.31		0.32	0.63		0.11	0.73	
Control Delay	23.6	21.6		14.8	20.9		12.3	20.1		9.6	21.1	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	23.6	21.6		14.8	20.9		12.3	20.1		9.6	21.1	
LOS	C	C		B	C		B	C		A	C	
Approach Delay		22.3			19.8			19.3			20.6	
Approach LOS		C			B			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 61.1			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.73			
Intersection Signal Delay: 20.7		Intersection LOS: C	
Intersection Capacity Utilization 69.4%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	302	394	179	58	229	14	88	664	60	34	618	211
Future Volume (vph)	302	394	179	58	229	14	88	664	60	34	618	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3396		1530	3465		1768	3481		1752	3390	
Flt Permitted	0.56	1.00		0.36	1.00		0.22	1.00		0.28	1.00	
Satd. Flow (perm)	1053	3396		585	3465		408	3481		522	3390	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	302	394	179	58	229	14	88	664	60	34	618	211
RTOR Reduction (vph)	0	72	0	0	6	0	0	8	0	0	40	0
Lane Group Flow (vph)	302	501	0	58	237	0	88	716	0	34	789	0
Confl. Peds. (#/hr)							22					22
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.7	14.6		17.7	13.6		24.0	19.9		24.0	19.9	
Effective Green, g (s)	19.7	14.6		17.7	13.6		24.0	19.9		24.0	19.9	
Actuated g/C Ratio	0.32	0.24		0.29	0.22		0.40	0.33		0.40	0.33	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	403	816		234	776		253	1141		289	1111	
v/s Ratio Prot	c0.06	0.15		0.02	0.07		c0.02	0.21		0.01	c0.23	
v/s Ratio Perm	c0.18			0.06			0.11			0.04		
v/c Ratio	0.75	0.61		0.25	0.31		0.35	0.63		0.12	0.71	
Uniform Delay, d1	17.4	20.5		15.9	19.6		12.2	17.3		11.5	17.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	7.5	1.4		0.6	0.2		0.8	1.1		0.2	2.1	
Delay (s)	24.8	21.9		16.4	19.8		13.0	18.4		11.7	20.0	
Level of Service	C	C		B	B		B	B		B	B	
Approach Delay (s)		22.9			19.2			17.8			19.7	
Approach LOS		C			B			B			B	

Intersection Summary					
HCM 2000 Control Delay	20.1	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.71				
Actuated Cycle Length (s)	60.7	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	69.4%	ICU Level of Service	C		
Analysis Period (min)	15				

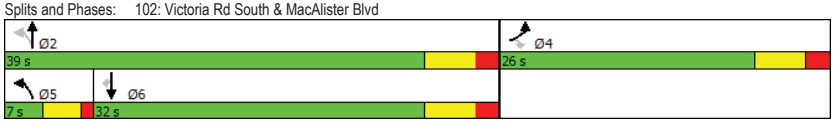
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	163	142	142	650	628	227
Future Volume (vph)	163	142	142	650	628	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1752	1615	1805	1845	1863	1615
Flt Permitted	0.950		0.166			
Satd. Flow (perm)	1752	1581	315	1845	1863	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		142				227
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			133.8	186.7	
Travel Time (s)	6.3			6.9	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Adj. Flow (vph)	163	142	142	650	628	227
Shared Lane Traffic (%)						
Lane Group Flow (vph)	163	142	142	650	628	227
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.0	20.0	34.0	32.0	26.4	26.4
Actuated g/C Ratio	0.31	0.31	0.53	0.50	0.41	0.41
v/c Ratio	0.30	0.24	0.60	0.71	0.82	0.29
Control Delay	18.8	4.7	20.7	17.5	28.5	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	18.8	4.7	20.7	17.5	28.5	3.2
LOS	B	A	C	B	C	A
Approach Delay	12.3			18.1	21.8	
Approach LOS	B			B	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 64			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.82			
Intersection Signal Delay: 18.8		Intersection LOS: B	
Intersection Capacity Utilization 70.9%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	163	142	142	650	628	227
Future Volume (vph)	163	142	142	650	628	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1581	1805	1845	1863	1581
Flt Permitted	0.95	1.00	0.17	1.00	1.00	1.00
Satd. Flow (perm)	1752	1581	315	1845	1863	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	163	142	142	650	628	227
RTOR Reduction (vph)	0	98	0	0	0	135
Lane Group Flow (vph)	163	44	142	650	628	92
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.0	20.0	32.8	32.8	26.4	26.4
Effective Green, g (s)	20.0	20.0	32.8	32.8	26.4	26.4
Actuated g/C Ratio	0.31	0.31	0.51	0.51	0.41	0.41
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	540	487	214	933	759	644
v/s Ratio Prot	c0.09		0.02	c0.35	c0.34	
v/s Ratio Perm		0.03	0.31			0.06
v/c Ratio	0.30	0.09	0.66	0.70	0.83	0.14
Uniform Delay, d1	17.1	15.9	13.2	12.2	17.2	12.1
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0	5.9	2.3	7.4	0.1
Delay (s)	17.2	16.0	19.0	14.5	24.6	12.2
Level of Service	B	B	B	B	C	B
Approach Delay (s)	16.6			15.3	21.3	
Approach LOS	B			B	C	

Intersection Summary				
HCM 2000 Control Delay	18.1	HCM 2000 Level of Service	B	
HCM 2000 Volume to Capacity ratio	0.63			
Actuated Cycle Length (s)	64.8	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	70.9%	ICU Level of Service	C	
Analysis Period (min)	15			

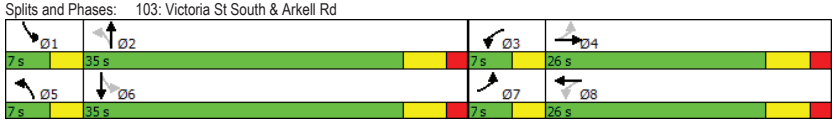
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	99	27	111	113	36	21	599	156	58	571	141
Future Volume (vph)	156	99	27	111	113	36	21	599	156	58	571	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt		0.968			0.964			0.969			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1805	0	1805	1795	0	1805	1797	0
Flt Permitted	0.662			0.676			0.157			0.137		
Satd. Flow (perm)	1233	1811	0	1284	1805	0	298	1795	0	260	1797	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			21			20			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1359.6	
Travel Time (s)		19.8			17.0			16.1			97.9	
Confl. Peds. (#/hr)							6					6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Adj. Flow (vph)	156	99	27	111	113	36	21	599	156	58	571	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	126	0	111	149	0	21	755	0	58	712	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	7.0	26.0		7.0	26.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.3%	34.7%		9.3%	34.7%		9.3%	46.7%		9.3%	46.7%	
Maximum Green (s)	4.0	20.0		4.0	20.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	16.9	9.9		16.9	9.9		36.1	29.0		36.1	29.0	
Actuated g/C Ratio	0.26	0.15		0.26	0.15		0.56	0.45		0.56	0.45	
v/c Ratio	0.44	0.43		0.30	0.51		0.08	0.93		0.24	0.88	
Control Delay	22.0	25.9		19.1	27.8		6.9	38.4		8.7	31.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.0	25.9		19.1	27.8		6.9	38.4		8.7	31.6	
LOS	C	C		B	C		A	D		A	C	
Approach Delay		23.8			24.1			37.5			29.8	
Approach LOS		C			C			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 65			
Natural Cycle: 80			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 31.2		Intersection LOS: C	
Intersection Capacity Utilization 77.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	99	27	111	113	36	21	599	156	58	571	141
Future Volume (vph)	156	99	27	111	113	36	21	599	156	58	571	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1810		1805	1805		1805	1795		1805	1798	
Flt Permitted	0.66	1.00		0.68	1.00		0.16	1.00		0.14	1.00	
Satd. Flow (perm)	1234	1810		1285	1805		299	1795		261	1798	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	156	99	27	111	113	36	21	599	156	58	571	141
RTOR Reduction (vph)	0	15	0	0	18	0	0	11	0	0	10	0
Lane Group Flow (vph)	156	111	0	111	131	0	21	744	0	58	702	0
Confl. Peds. (#/hr)							6					6
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.9	9.9		13.9	9.9		33.1	29.1		33.1	29.1	
Effective Green, g (s)	13.9	9.9		13.9	9.9		33.1	29.1		33.1	29.1	
Actuated g/C Ratio	0.21	0.15		0.21	0.15		0.51	0.45		0.51	0.45	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	296	275		306	274		244	803		227	804	
v/s Ratio Prot	c0.03	0.06		0.02	0.07		0.01	c0.41		c0.02	0.39	
v/s Ratio Perm	c0.08			0.06			0.04			0.11		
v/c Ratio	0.53	0.40		0.36	0.48		0.09	0.93		0.26	0.87	
Uniform Delay, d1	22.1	24.9		21.4	25.2		10.3	16.9		11.4	16.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	1.0		0.7	1.3		0.2	16.4		0.6	10.3	
Delay (s)	23.8	25.8		22.1	26.5		10.5	33.4		12.0	26.6	
Level of Service	C	C		C	C		B	C		B	C	
Approach Delay (s)		24.7			24.6			32.8			25.5	
Approach LOS		C			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	28.0	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.75				
Actuated Cycle Length (s)	65.0	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	77.8%	ICU Level of Service		D	
Analysis Period (min)	15				

c Critical Lane Group

Intersection: 13: Bend

Movement	NW
Directions Served	T
Maximum Queue (m)	32.6
Average Queue (m)	2.1
95th Queue (m)	32.2
Link Distance (m)	137.0
Upstream Blk Time (%)	0
Queuing Penalty (veh)	0
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	72.6	70.9	64.7	34.0	43.6	36.6	68.3	100.0	85.3	20.1	69.1	68.0
Average Queue (m)	36.7	43.3	26.1	10.8	22.5	15.1	14.7	57.5	43.7	6.4	37.4	40.5
95th Queue (m)	61.5	63.3	50.6	24.7	37.5	30.6	36.2	85.8	74.7	15.9	56.5	63.1
Link Distance (m)		260.6	260.6		101.6	101.6		800.1	800.1		137.0	137.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	1	0						1				
Queuing Penalty (veh)	1	0						1				

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	R
Maximum Queue (m)	58.9	17.5	38.9	89.9	118.8	36.5
Average Queue (m)	24.7	14.7	19.5	50.8	66.5	15.3
95th Queue (m)	48.5	20.0	32.3	84.2	109.5	27.9
Link Distance (m)	66.6			115.1	168.0	168.0
Upstream Blk Time (%)	0					
Queuing Penalty (veh)	0					
Storage Bay Dist (m)		10.0	100.0			
Storage Blk Time (%)	20	9		0		
Queuing Penalty (veh)	28	15		0		

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	47.2	38.4	34.6	39.9	82.3	225.9	82.4	139.8
Average Queue (m)	23.3	18.7	16.6	21.2	18.2	175.7	21.2	86.3
95th Queue (m)	41.3	32.8	28.8	36.5	69.2	269.2	65.9	150.3
Link Distance (m)		264.8		226.2		213.2		1340.8
Upstream Blk Time (%)						34		
Queuing Penalty (veh)						0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)					0	50	0	17
Queuing Penalty (veh)					0	11	0	10

Intersection: 201: Commercial Driveway & MacAlister Blvd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	3.1	27.0	27.8
Average Queue (m)	0.1	7.4	13.3
95th Queue (m)	2.2	20.1	21.7
Link Distance (m)	127.8	66.6	63.1
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Network Summary

Network wide Queuing Penalty: 66

Appendix D

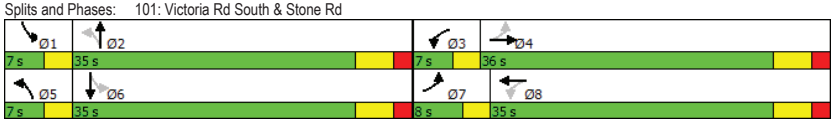
2020 Total Traffic Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	202	112	76	56	403	29	215	843	49	18	525	251
Future Volume (vph)	202	112	76	56	403	29	215	843	49	18	525	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.939			0.990			0.992			0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3121	0	1543	3499	0	1787	3360	0	1530	3273	0
Flt Permitted	0.427			0.633			0.262			0.198		
Satd. Flow (perm)	780	3121	0	1028	3499	0	492	3360	0	319	3273	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		76			9			8			103	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							5					5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Adj. Flow (vph)	202	112	76	56	403	29	215	843	49	18	525	251
Shared Lane Traffic (%)												
Lane Group Flow (vph)	202	188	0	56	432	0	215	892	0	18	776	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	22.3	14.2		20.3	13.2		29.0	21.9		29.0	21.9	
Actuated g/C Ratio	0.36	0.23		0.32	0.21		0.46	0.35		0.46	0.35	
v/c Ratio	0.57	0.25		0.15	0.58		0.69	0.76		0.08	0.64	
Control Delay	22.3	13.7		14.7	25.8		24.2	22.5		8.8	17.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.3	13.7		14.7	25.8		24.2	22.5		8.8	17.3	
LOS	C	B		B	C		C	C		A	B	
Approach Delay		18.2			24.5			22.9			17.1	
Approach LOS		B			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 62.5			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 20.8		Intersection LOS: C	
Intersection Capacity Utilization 74.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	202	112	76	56	403	29	215	843	49	18	525	251
Future Volume (vph)	202	112	76	56	403	29	215	843	49	18	525	251
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	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		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3123		1543	3499		1787	3359		1530	3275	
Flt Permitted	0.43	1.00		0.63	1.00		0.26	1.00		0.20	1.00	
Satd. Flow (perm)	780	3123		1029	3499		492	3359		319	3275	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	202	112	76	56	403	29	215	843	49	18	525	251
RTOR Reduction (vph)	0	59	0	0	7	0	0	5	0	0	67	0
Lane Group Flow (vph)	202	129	0	56	425	0	215	887	0	18	709	0
Confl. Peds. (#/hr)							5					5
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.3	14.2		17.3	13.2		25.9	21.8		25.9	21.8	
Effective Green, g (s)	19.3	14.2		17.3	13.2		25.9	21.8		25.9	21.8	
Actuated g/C Ratio	0.31	0.23		0.28	0.21		0.42	0.35		0.42	0.35	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	320	712		320	742		290	1177		212	1147	
v/s Ratio Prot	c0.05	0.04		0.01	0.12		c0.05	c0.26		0.01	0.22	
v/s Ratio Perm	c0.14			0.04			0.26			0.03		
v/c Ratio	0.63	0.18		0.17	0.57		0.74	0.75		0.08	0.62	
Uniform Delay, d1	17.0	19.3		16.8	22.0		13.4	17.8		11.3	16.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	4.0	0.1		0.3	1.1		9.8	2.8		0.2	1.0	
Delay (s)	21.0	19.4		17.1	23.0		23.2	20.6		11.5	17.7	
Level of Service	C	B		B	C		C	C		B	B	
Approach Delay (s)		20.3			22.4			21.1			17.6	
Approach LOS		C			C			C			B	

Intersection Summary				
HCM 2000 Control Delay	20.2	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.72			
Actuated Cycle Length (s)	62.2	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	74.8%	ICU Level of Service	D	
Analysis Period (min)	15			

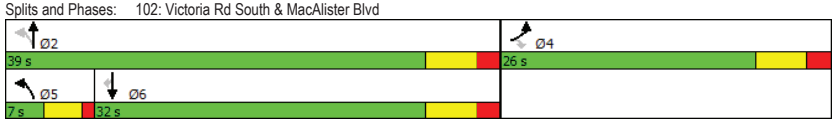
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	280	225	213	770	467	172
Future Volume (vph)	280	225	213	770	467	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1787	1538	1656	1810	1827	1615
Flt Permitted	0.950		0.272			
Satd. Flow (perm)	1787	1505	474	1810	1827	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		145				172
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			174.1	186.7	
Travel Time (s)	6.3			9.0	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Adj. Flow (vph)	280	225	213	770	467	172
Shared Lane Traffic (%)						
Lane Group Flow (vph)	280	225	213	770	467	172
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.2	20.2	31.1	29.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.51	0.47	0.36	0.36
v/c Ratio	0.48	0.38	0.71	0.90	0.71	0.25
Control Delay	20.9	9.2	25.8	30.2	23.5	3.5
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.9	9.2	25.8	30.2	23.5	3.5
LOS	C	A	C	C	C	A
Approach Delay	15.7			29.2	18.1	
Approach LOS	B			C	B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 61.3			
Natural Cycle: 60			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.90			
Intersection Signal Delay: 22.7		Intersection LOS: C	
Intersection Capacity Utilization 67.2%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	280	225	213	770	467	172
Future Volume (vph)	280	225	213	770	467	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1506	1656	1810	1827	1581
Flt Permitted	0.95	1.00	0.27	1.00	1.00	1.00
Satd. Flow (perm)	1787	1506	475	1810	1827	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	280	225	213	770	467	172
RTOR Reduction (vph)	0	97	0	0	0	110
Lane Group Flow (vph)	280	128	213	770	467	62
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.1	20.1	29.0	29.0	22.0	22.0
Effective Green, g (s)	20.1	20.1	29.0	29.0	22.0	22.0
Actuated g/C Ratio	0.33	0.33	0.47	0.47	0.36	0.36
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	587	495	283	859	657	569
v/s Ratio Prot	c0.16		0.04	c0.43	0.26	
v/s Ratio Perm		0.08	0.32			0.04
v/c Ratio	0.48	0.26	0.75	0.90	0.71	0.11
Uniform Delay, d1	16.3	15.0	14.4	14.7	16.8	13.0
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.1	9.6	11.9	3.6	0.1
Delay (s)	16.5	15.1	24.0	26.6	20.4	13.1
Level of Service	B	B	C	C	C	B
Approach Delay (s)	15.9			26.0	18.5	
Approach LOS	B			C	B	

Intersection Summary			
HCM 2000 Control Delay	21.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	61.1	Sum of lost time (s)	16.0
Intersection Capacity Utilization	67.2%	ICU Level of Service	C
Analysis Period (min)	15		

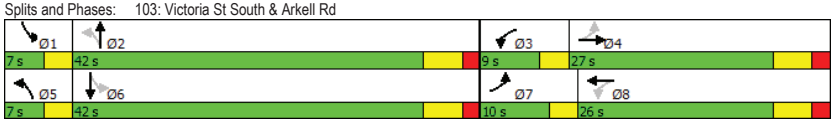
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	312	77	23	126	102	56	27	632	55	28	588	131
Future Volume (vph)	312	77	23	126	102	56	27	632	55	28	588	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.99		1.00				1.00	
Frt		0.965			0.947			0.988			0.973	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1779	0	1770	1706	0	1612	1771	0	1687	1760	0
Flt Permitted	0.598			0.692			0.154			0.181		
Satd. Flow (perm)	1091	1779	0	1289	1706	0	261	1771	0	321	1760	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			30			6			16	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1319.4	
Travel Time (s)		19.8			17.0			16.1			95.0	
Confl. Peds. (#/hr)	1					1	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Adj. Flow (vph)	312	77	23	126	102	56	27	632	55	28	588	131
Shared Lane Traffic (%)												
Lane Group Flow (vph)	312	100	0	126	158	0	27	687	0	28	719	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	10.0	27.0		9.0	26.0		7.0	42.0		7.0	42.0	
Total Split (%)	11.8%	31.8%		10.6%	30.6%		8.2%	49.4%		8.2%	49.4%	
Maximum Green (s)	7.0	21.0		6.0	20.0		4.0	36.0		4.0	36.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	22.0	12.0		20.0	11.0		41.1	34.0		41.1	34.0	
Actuated g/C Ratio	0.30	0.16		0.27	0.15		0.55	0.46		0.55	0.46	
v/c Ratio	0.81	0.33		0.33	0.57		0.12	0.84		0.11	0.88	
Control Delay	40.6	26.9		21.5	32.5		8.4	30.0		8.1	33.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	40.6	26.9		21.5	32.5		8.4	30.0		8.1	33.3	
LOS	D	C		C	C		A	C		A	C	
Approach Delay		37.3			27.6			29.2			32.3	
Approach LOS		D			C			C			C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 85		
Actuated Cycle Length: 74.2		
Natural Cycle: 90		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 0.88		
Intersection Signal Delay: 31.6		Intersection LOS: C
Intersection Capacity Utilization 78.7%		ICU Level of Service D
Analysis Period (min) 15		

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	312	77	23	126	102	56	27	632	55	28	588	131
Future Volume (vph)	312	77	23	126	102	56	27	632	55	28	588	131
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	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	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1734	1780		1770	1706		1611	1771		1687	1760	
Flt Permitted	0.60	1.00		0.69	1.00		0.15	1.00		0.18	1.00	
Satd. Flow (perm)	1092	1780		1290	1706		261	1771		322	1760	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	312	77	23	126	102	56	27	632	55	28	588	131
RTOR Reduction (vph)	0	14	0	0	26	0	0	3	0	0	9	0
Lane Group Flow (vph)	312	86	0	126	132	0	27	684	0	28	710	0
Confl. Peds. (#/hr)	1					1	3					3
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.1	12.0		17.1	11.0		38.0	34.0		38.0	34.0	
Effective Green, g (s)	19.1	12.0		17.1	11.0		38.0	34.0		38.0	34.0	
Actuated g/C Ratio	0.26	0.16		0.23	0.15		0.51	0.46		0.51	0.46	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	342	288		337	253		206	812		238	807	
v/s Ratio Prot	c0.09	0.05		0.03	0.08		c0.01	0.39		0.01	c0.40	
v/s Ratio Perm	c0.15			0.06			0.06			0.05		
v/c Ratio	0.91	0.30		0.37	0.52		0.13	0.84		0.12	0.88	
Uniform Delay, d1	25.8	27.3		23.6	29.1		11.9	17.7		11.4	18.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.6	0.6		0.7	2.0		0.3	7.9		0.2	11.0	
Delay (s)	53.4	27.9		24.3	31.1		12.2	25.6		11.6	29.2	
Level of Service	D	C		C	C		B	C		B	C	
Approach Delay (s)		47.2			28.1			25.1			28.5	
Approach LOS		D			C			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)	74.1	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	78.7%	ICU Level of Service	D	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	276	10	231	154	18	10	10	229	57	10	11
Future Volume (vph)	4	276	10	231	154	18	10	10	229	57	10	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.994			0.876			0.981	
Flt Protected		0.999			0.972			0.998			0.965	
Satd. Flow (prot)	0	1852	0	0	1800	0	0	1629	0	0	1763	0
Flt Permitted		0.999			0.972			0.998			0.965	
Satd. Flow (perm)	0	1852	0	0	1800	0	0	1629	0	0	1763	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		137.8			87.8			86.3			71.2	
Travel Time (s)		9.9			6.3			6.2			5.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	276	10	231	154	18	10	10	229	57	10	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	290	0	0	403	0	0	249	0	0	78	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 70.3%		ICU Level of Service C	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	276	10	231	154	18	10	10	229	57	10	11
Future Volume (Veh/h)	4	276	10	231	154	18	10	10	229	57	10	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	276	10	231	154	18	10	10	229	57	10	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					88							
pX, platoon unblocked												
vC, conflicting volume	172			286			930	923	281	1148	919	163
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	172			286			930	923	281	1148	919	163
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			82			95	95	70	44	95	99
cM capacity (veh/h)	1405			1276			203	220	758	102	221	882

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	290	403	249	78
Volume Left	4	231	10	57
Volume Right	10	18	229	11
cSH	1405	1276	628	126
Volume to Capacity	0.00	0.18	0.40	0.62
Queue Length 95th (m)	0.1	5.3	15.2	25.4
Control Delay (s)	0.1	5.6	14.5	71.2
Lane LOS	A	A	B	F
Approach Delay (s)	0.1	5.6	14.5	71.2
Approach LOS			B	F

Intersection Summary				
Average Delay			11.2	
Intersection Capacity Utilization			70.3%	ICU Level of Service C
Analysis Period (min)			15	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	56	0	1107	639	19
Future Volume (vph)	0	56	0	1107	639	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.996	
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	3525	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	3525	0
Link Speed (k/h)	50			50	70	
Link Distance (m)	72.9			186.7	822.5	
Travel Time (s)	5.2			13.4	42.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	56	0	1107	639	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	56	0	1107	658	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 61.6%		ICU Level of Service B	
Analysis Period (min) 15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	56	0	1107	639	19
Future Volume (Veh/h)	0	56	0	1107	639	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	56	0	1107	639	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				187		
pX, platoon unblocked	0.57					
vC, conflicting volume	1756	329	658			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1945	329	658			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	92	100			
cM capacity (veh/h)	33	667	926			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	56	1107	426	232
Volume Left	0	0	0	0
Volume Right	56	0	0	19
cSH	667	1700	1700	1700
Volume to Capacity	0.08	0.65	0.25	0.14
Queue Length 95th (m)	2.2	0.0	0.0	0.0
Control Delay (s)	10.9	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	10.9	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	61.6%	ICU Level of Service	B
Analysis Period (min)	15		

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	57.2	37.1	29.1	33.9	59.6	57.9	95.4	209.2	187.2	15.9	64.2	76.3
Average Queue (m)	27.9	17.2	10.4	11.9	31.9	27.7	58.1	114.6	94.1	3.6	34.9	39.2
95th Queue (m)	48.0	32.8	21.8	27.2	48.5	46.4	114.9	207.8	181.0	11.6	54.0	65.8
Link Distance (m)		260.6	260.6		101.6	101.6		800.0	800.0		137.0	137.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	0				0		0	28				
Queuing Penalty (veh)	0				0		0	60				

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	R
Maximum Queue (m)	69.3	20.5	55.9	114.9	87.7	25.2
Average Queue (m)	46.2	16.9	27.2	67.5	47.8	12.3
95th Queue (m)	73.3	20.6	46.6	105.4	79.0	21.9
Link Distance (m)	65.2			155.2	167.7	167.7
Upstream Blk Time (%)	2					
Queuing Penalty (veh)	14					
Storage Bay Dist (m)		10.0	100.0			
Storage Blk Time (%)	38	17		2		
Queuing Penalty (veh)	86	49		4		

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	82.3	129.6	38.4	48.7	69.1	170.4	82.3	223.0
Average Queue (m)	61.9	41.4	20.3	25.5	8.5	90.6	16.3	127.9
95th Queue (m)	93.3	116.9	34.7	42.3	34.9	167.4	60.9	239.1
Link Distance (m)		264.8		226.2		213.2		1300.7
Upstream Blk Time (%)						1		
Queuing Penalty (veh)						0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)	20	0			0	13	0	30
Queuing Penalty (veh)	20	0			0	4	0	8

Intersection: 201: Commercial Driveway/Site Driveway & MacAlister Blvd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	24.2	44.0	64.3	32.2
Average Queue (m)	2.2	15.7	22.2	11.9
95th Queue (m)	11.7	33.0	43.9	22.8
Link Distance (m)	129.2	65.2	77.9	62.6
Upstream Blk Time (%)			0	
Queuing Penalty (veh)			0	
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 202: Victoria Rd South & Site Driveway

Movement	EB
Directions Served	R
Maximum Queue (m)	17.5
Average Queue (m)	7.7
95th Queue (m)	15.3
Link Distance (m)	58.9
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

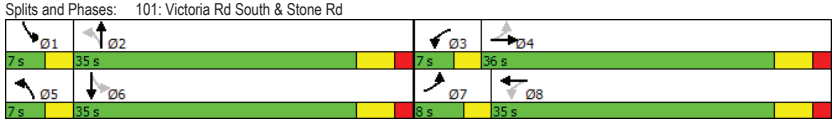
Zone wide Queuing Penalty: 244

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	302	394	179	58	229	14	88	700	60	34	676	211
Future Volume (vph)	302	394	179	58	229	14	88	700	60	34	676	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.953			0.991			0.988			0.964	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3396	0	1530	3464	0	1770	3483	0	1752	3395	0
Flt Permitted	0.560			0.357			0.194			0.265		
Satd. Flow (perm)	1053	3396	0	575	3464	0	360	3483	0	489	3395	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			8			11			53	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							22					22
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Adj. Flow (vph)	302	394	179	58	229	14	88	700	60	34	676	211
Shared Lane Traffic (%)												
Lane Group Flow (vph)	302	573	0	58	243	0	88	760	0	34	887	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	23.0	14.8		20.9	13.8		28.3	21.1		28.3	21.1	
Actuated g/C Ratio	0.37	0.24		0.33	0.22		0.45	0.34		0.45	0.34	
v/c Ratio	0.68	0.65		0.23	0.32		0.35	0.64		0.11	0.75	
Control Delay	24.7	22.1		15.3	21.5		12.7	20.2		9.6	21.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.7	22.1		15.3	21.5		12.7	20.2		9.6	21.9	
LOS	C	C		B	C		B	C		A	C	
Approach Delay		23.0			20.3			19.4			21.5	
Approach LOS		C			C			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 62.5			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.75			
Intersection Signal Delay: 21.2		Intersection LOS: C	
Intersection Capacity Utilization 71.0%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	302	394	179	58	229	14	88	700	60	34	676	211
Future Volume (vph)	302	394	179	58	229	14	88	700	60	34	676	211
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3396		1530	3465		1769	3484		1752	3400	
Flt Permitted	0.56	1.00		0.36	1.00		0.19	1.00		0.26	1.00	
Satd. Flow (perm)	1054	3396		574	3465		360	3484		489	3400	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	302	394	179	58	229	14	88	700	60	34	676	211
RTOR Reduction (vph)	0	72	0	0	6	0	0	7	0	0	35	0
Lane Group Flow (vph)	302	501	0	58	237	0	88	753	0	34	852	0
Confl. Peds. (#/hr)							22					22
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.9	14.8		17.9	13.8		25.2	21.1		25.2	21.1	
Effective Green, g (s)	19.9	14.8		17.9	13.8		25.2	21.1		25.2	21.1	
Actuated g/C Ratio	0.32	0.24		0.29	0.22		0.41	0.34		0.41	0.34	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	397	809		228	770		239	1183		281	1155	
v/s Ratio Prot	c0.06	0.15		0.02	0.07		c0.02	0.22		0.01	c0.25	
v/s Ratio Perm	c0.18			0.06			0.12			0.04		
v/c Ratio	0.76	0.62		0.25	0.31		0.37	0.64		0.12	0.74	
Uniform Delay, d1	18.0	21.1		16.4	20.2		12.2	17.3		11.5	18.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.3	1.4		0.6	0.2		1.0	1.1		0.2	2.5	
Delay (s)	26.4	22.5		17.0	20.4		13.2	18.4		11.7	20.6	
Level of Service	C	C		B	C		B	B		B	C	
Approach Delay (s)		23.9			19.7			17.9			20.2	
Approach LOS		C			B			B			C	

Intersection Summary					
HCM 2000 Control Delay	20.6	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.73				
Actuated Cycle Length (s)	62.1	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	71.0%	ICU Level of Service	C		
Analysis Period (min)	15				

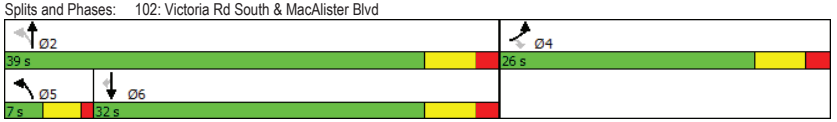
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	199	142	199	650	663	227
Future Volume (vph)	199	142	199	650	663	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1752	1615	1805	1845	1863	1615
Flt Permitted	0.950		0.139			
Satd. Flow (perm)	1752	1581	264	1845	1863	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		128				227
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			133.8	186.7	
Travel Time (s)	6.3			6.9	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Adj. Flow (vph)	199	142	199	650	663	227
Shared Lane Traffic (%)						
Lane Group Flow (vph)	199	142	199	650	663	227
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.0	20.0	33.8	31.8	24.8	24.8
Actuated g/C Ratio	0.31	0.31	0.53	0.50	0.39	0.39
v/c Ratio	0.36	0.24	0.94	0.71	0.92	0.30
Control Delay	19.8	5.8	64.9	17.6	39.0	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.8	5.8	64.9	17.6	39.0	3.3
LOS	B	A	E	B	D	A
Approach Delay	14.0			28.7	29.9	
Approach LOS	B			C	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 63.8			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.94			
Intersection Signal Delay: 26.8		Intersection LOS: C	
Intersection Capacity Utilization 75.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	199	142	199	650	663	227
Future Volume (vph)	199	142	199	650	663	227
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1581	1805	1845	1863	1581
Flt Permitted	0.95	1.00	0.14	1.00	1.00	1.00
Satd. Flow (perm)	1752	1581	264	1845	1863	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	199	142	199	650	663	227
RTOR Reduction (vph)	0	88	0	0	0	139
Lane Group Flow (vph)	199	54	199	650	663	88
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.0	20.0	31.8	31.8	24.8	24.8
Effective Green, g (s)	20.0	20.0	31.8	31.8	24.8	24.8
Actuated g/C Ratio	0.31	0.31	0.50	0.50	0.39	0.39
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	549	495	204	919	724	614
v/s Ratio Prot	c0.11		0.05	c0.35	0.36	
v/s Ratio Perm		0.03	c0.44			0.06
v/c Ratio	0.36	0.11	0.98	0.71	0.92	0.14
Uniform Delay, d1	17.0	15.6	16.6	12.4	18.5	12.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0	55.3	2.5	16.2	0.1
Delay (s)	17.1	15.6	71.8	14.9	34.7	12.7
Level of Service	B	B	E	B	C	B
Approach Delay (s)	16.5			28.2	29.1	
Approach LOS	B			C	C	

Intersection Summary				
HCM 2000 Control Delay	26.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.78			
Actuated Cycle Length (s)	63.8	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	75.9%	ICU Level of Service	D	
Analysis Period (min)	15			

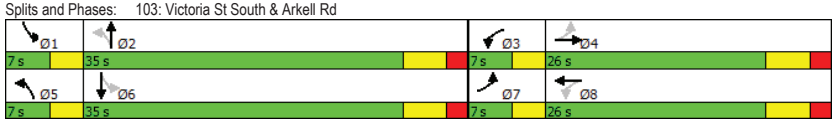
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	99	27	111	113	36	21	656	156	58	606	141
Future Volume (vph)	156	99	27	111	113	36	21	656	156	58	606	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor							1.00				0.99	
Frt		0.968			0.964			0.971			0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1805	0	1805	1798	0	1805	1801	0
Flt Permitted	0.662			0.676			0.137			0.137		
Satd. Flow (perm)	1233	1811	0	1284	1805	0	260	1798	0	260	1801	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			21			19			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1359.6	
Travel Time (s)		19.8			17.0			16.1			97.9	
Confl. Peds. (#/hr)							6					6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Adj. Flow (vph)	156	99	27	111	113	36	21	656	156	58	606	141
Shared Lane Traffic (%)												
Lane Group Flow (vph)	156	126	0	111	149	0	21	812	0	58	747	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	7.0	26.0		7.0	26.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.3%	34.7%		9.3%	34.7%		9.3%	46.7%		9.3%	46.7%	
Maximum Green (s)	4.0	20.0		4.0	20.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	16.9	9.9		16.9	9.9		36.1	29.0		36.1	29.0	
Actuated g/C Ratio	0.26	0.15		0.26	0.15		0.56	0.45		0.56	0.45	
v/c Ratio	0.44	0.43		0.30	0.51		0.09	1.00		0.24	0.92	
Control Delay	22.0	25.9		19.1	27.8		7.0	52.5		8.7	36.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.0	25.9		19.1	27.8		7.0	52.5		8.7	36.7	
LOS	C	C		B	C		A	D		A	D	
Approach Delay		23.8			24.1			51.4			34.6	
Approach LOS		C			C			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 65			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.00			
Intersection Signal Delay: 38.4		Intersection LOS: D	
Intersection Capacity Utilization 78.3%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	156	99	27	111	113	36	21	656	156	58	606	141
Future Volume (vph)	156	99	27	111	113	36	21	656	156	58	606	141
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1810		1805	1805		1805	1798		1805	1801	
Flt Permitted	0.66	1.00		0.68	1.00		0.14	1.00		0.14	1.00	
Satd. Flow (perm)	1234	1810		1285	1805		261	1798		261	1801	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	156	99	27	111	113	36	21	656	156	58	606	141
RTOR Reduction (vph)	0	15	0	0	18	0	0	10	0	0	10	0
Lane Group Flow (vph)	156	111	0	111	131	0	21	802	0	58	737	0
Confl. Peds. (#/hr)							6					6
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	13.9	9.9		13.9	9.9		33.1	29.1		33.1	29.1	
Effective Green, g (s)	13.9	9.9		13.9	9.9		33.1	29.1		33.1	29.1	
Actuated g/C Ratio	0.21	0.15		0.21	0.15		0.51	0.45		0.51	0.45	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	296	275		306	274		227	804		227	806	
v/s Ratio Prot	c0.03	0.06		0.02	0.07		0.01	c0.45		c0.02	0.41	
v/s Ratio Perm	c0.08			0.06			0.04			0.11		
v/c Ratio	0.53	0.40		0.36	0.48		0.09	1.00		0.26	0.91	
Uniform Delay, d1	22.1	24.9		21.4	25.2		10.9	17.9		12.5	16.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.7	1.0		0.7	1.3		0.2	30.7		0.6	14.8	
Delay (s)	23.8	25.8		22.1	26.5		11.1	48.7		13.1	31.6	
Level of Service	C	C		C	C		B	D		B	C	
Approach Delay (s)		24.7			24.6			47.7			30.2	
Approach LOS		C			C			D			C	

Intersection Summary			
HCM 2000 Control Delay	35.5	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	78.3%	ICU Level of Service	D
Analysis Period (min)	15		

c Critical Lane Group

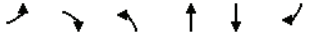
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	138	7	163	206	57	7	10	167	36	10	7
Future Volume (vph)	11	138	7	163	206	57	7	10	167	36	10	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.994			0.982			0.877			0.982	
Flt Protected		0.996			0.981			0.998			0.967	
Satd. Flow (prot)	0	1844	0	0	1794	0	0	1630	0	0	1769	0
Flt Permitted		0.996			0.981			0.998			0.967	
Satd. Flow (perm)	0	1844	0	0	1794	0	0	1630	0	0	1769	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		137.8			87.8			71.9			55.7	
Travel Time (s)		9.9			6.3			5.2			4.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	11	138	7	163	206	57	7	10	167	36	10	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	156	0	0	426	0	0	184	0	0	53	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	59.5%	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)	11	138	7	163	206	57	7	10	167	36	10	7
Future Volume (Veh/h)	11	138	7	163	206	57	7	10	167	36	10	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	138	7	163	206	57	7	10	167	36	10	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)					88							
pX, platoon unblocked												
vC, conflicting volume	263			145			736	752	142	896	728	234
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	263			145			736	752	142	896	728	234
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			89			98	97	82	81	97	99
cM capacity (veh/h)	1301			1437			294	298	906	188	308	805

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	156	426	184	53
Volume Left	11	163	7	36
Volume Right	7	57	167	7
cSH	1301	1437	761	228
Volume to Capacity	0.01	0.11	0.24	0.23
Queue Length 95th (m)	0.2	3.1	7.5	7.0
Control Delay (s)	0.6	3.6	11.2	25.5
Lane LOS	A	A	B	D
Approach Delay (s)	0.6	3.6	11.2	25.5
Approach LOS			B	D

Intersection Summary				
Average Delay	6.2			
Intersection Capacity Utilization	59.5%	ICU Level of Service		B
Analysis Period (min)	15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	35	0	849	855	58
Future Volume (vph)	0	35	0	849	855	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.990	
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	3504	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	3504	0
Link Speed (k/h)	50			50	70	
Link Distance (m)	60.3			186.7	822.5	
Travel Time (s)	4.3			13.4	42.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	35	0	849	855	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	35	0	849	913	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	48.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	35	0	849	855	58
Future Volume (Veh/h)	0	35	0	849	855	58
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	35	0	849	855	58
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				187		
pX, platoon unblocked	0.70					
vC, conflicting volume	1733	456	913			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1833	456	913			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	94	100			
cM capacity (veh/h)	47	551	742			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	35	849	570	343
Volume Left	0	0	0	0
Volume Right	35	0	0	58
cSH	551	1700	1700	1700
Volume to Capacity	0.06	0.50	0.34	0.20
Queue Length 95th (m)	1.6	0.0	0.0	0.0
Control Delay (s)	12.0	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	12.0	0.0	0.0	
Approach LOS	B			

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		48.0%	ICU Level of Service	A
Analysis Period (min)		15		

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	70.4	72.9	68.3	32.4	38.8	31.8	83.3	97.8	89.3	17.7	68.1	82.8
Average Queue (m)	35.8	43.1	30.1	12.1	21.7	14.1	16.5	58.2	42.4	5.9	41.8	46.2
95th Queue (m)	58.4	66.2	58.9	26.4	35.4	28.6	42.3	85.8	71.9	14.7	61.6	71.1
Link Distance (m)		260.6	260.6		101.6	101.6		799.5	799.5		137.0	137.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	0	0					0	0			0	
Queuing Penalty (veh)	0	1					0	0			0	

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	R
Maximum Queue (m)	61.2	17.5	50.8	82.0	169.9	112.6
Average Queue (m)	27.9	15.1	25.1	45.7	90.7	20.2
95th Queue (m)	50.3	20.4	40.5	73.5	153.6	66.2
Link Distance (m)	65.0			115.1	168.2	168.2
Upstream Blk Time (%)	0				1	0
Queuing Penalty (veh)	0				4	0
Storage Bay Dist (m)		10.0	100.0			
Storage Blk Time (%)	25	10				
Queuing Penalty (veh)	36	19				

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	42.0	41.6	34.3	43.1	82.4	230.3	82.3	259.2
Average Queue (m)	23.3	18.4	16.6	20.2	13.7	200.7	34.8	146.2
95th Queue (m)	36.5	34.0	30.3	35.5	57.4	268.1	92.3	262.1
Link Distance (m)		264.8		226.2		213.2		1340.8
Upstream Blk Time (%)						57		
Queuing Penalty (veh)						0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)					0	58	0	39
Queuing Penalty (veh)					0	12	0	23

Intersection: 201: Commercial Driveway/Site Driveway & MacAlister Blvd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	10.0	31.5	28.2	23.0
Average Queue (m)	1.0	7.1	13.5	9.0
95th Queue (m)	5.6	20.7	21.8	17.1
Link Distance (m)	128.6	65.0	63.4	46.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 202: Victoria Rd South & Site Driveway

Movement	EB	SB	SB
Directions Served	R	T	TR
Maximum Queue (m)	18.3	22.2	11.2
Average Queue (m)	6.7	1.6	0.6
95th Queue (m)	15.0	17.4	8.9
Link Distance (m)	46.1	799.5	799.5
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 96

Appendix E

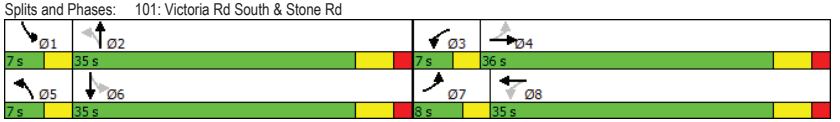
2025 Background Traffic Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	124	84	62	445	32	238	876	54	20	559	277
Future Volume (vph)	223	124	84	62	445	32	238	876	54	20	559	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.939			0.990			0.991			0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3121	0	1543	3499	0	1787	3353	0	1530	3269	0
Flt Permitted	0.378			0.621			0.231			0.183		
Satd. Flow (perm)	691	3121	0	1008	3499	0	434	3353	0	295	3269	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		84			9			8			109	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							5					5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Adj. Flow (vph)	223	124	84	62	445	32	238	876	54	20	559	277
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	208	0	62	477	0	238	930	0	20	836	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	23.4	15.3		21.4	14.2		30.7	23.6		30.7	23.6	
Actuated g/C Ratio	0.36	0.23		0.33	0.22		0.47	0.36		0.47	0.36	
v/c Ratio	0.68	0.26		0.17	0.62		0.83	0.76		0.09	0.67	
Control Delay	28.7	13.8		15.2	26.9		38.6	23.2		9.3	18.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.7	13.8		15.2	26.9		38.6	23.2		9.3	18.2	
LOS	C	B		B	C		D	C		A	B	
Approach Delay		21.5			25.6			26.3			18.0	
Approach LOS		C			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 65.2			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 23.1		Intersection LOS: C	
Intersection Capacity Utilization 80.0%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	124	84	62	445	32	238	876	54	20	559	277
Future Volume (vph)	223	124	84	62	445	32	238	876	54	20	559	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3123		1543	3499		1787	3354		1530	3271	
Flt Permitted	0.38	1.00		0.62	1.00		0.23	1.00		0.18	1.00	
Satd. Flow (perm)	691	3123		1009	3499		434	3354		295	3271	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	223	124	84	62	445	32	238	876	54	20	559	277
RTOR Reduction (vph)	0	64	0	0	7	0	0	5	0	0	70	0
Lane Group Flow (vph)	223	144	0	62	470	0	238	925	0	20	766	0
Confl. Peds. (#/hr)							5					5
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.4	15.3		18.4	14.3		27.6	23.5		27.6	23.5	
Effective Green, g (s)	20.4	15.3		18.4	14.3		27.6	23.5		27.6	23.5	
Actuated g/C Ratio	0.31	0.24		0.28	0.22		0.42	0.36		0.42	0.36	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	298	735		319	769		269	1212		203	1182	
v/s Ratio Prot	c0.06	0.05		0.01	0.13		c0.06	0.28		0.01	0.23	
v/s Ratio Perm	c0.18			0.04			c0.32			0.04		
v/c Ratio	0.75	0.20		0.19	0.61		0.88	0.76		0.10	0.65	
Uniform Delay, d1	18.5	19.9		17.4	22.8		15.4	18.3		11.6	17.3	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.8	0.1		0.3	1.4		27.2	2.9		0.2	1.2	
Delay (s)	28.3	20.0		17.7	24.3		42.7	21.2		11.8	18.5	
Level of Service	C	C		B	C		D	C		B	B	
Approach Delay (s)		24.3			23.5			25.6			18.4	
Approach LOS		C			C			C			B	

Intersection Summary				
HCM 2000 Control Delay	23.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.84			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	80.0%	ICU Level of Service	D	
Analysis Period (min)	15			

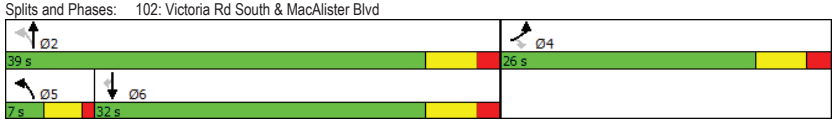
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	311	240	223	857	522	183
Future Volume (vph)	311	240	223	857	522	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1787	1538	1656	1810	1827	1615
Flt Permitted	0.950		0.243			
Satd. Flow (perm)	1787	1505	424	1810	1827	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		139				183
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			174.1	186.7	
Travel Time (s)	6.3			9.0	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Adj. Flow (vph)	311	240	223	857	522	183
Shared Lane Traffic (%)						
Lane Group Flow (vph)	311	240	223	857	522	183
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.0	20.0	33.8	31.8	24.8	24.8
Actuated g/C Ratio	0.31	0.31	0.53	0.50	0.39	0.39
v/c Ratio	0.56	0.42	0.79	0.95	0.74	0.25
Control Delay	23.2	10.6	33.6	38.0	24.1	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	23.2	10.6	33.6	38.0	24.1	3.4
LOS	C	B	C	D	C	A
Approach Delay	17.7			37.1	18.7	
Approach LOS	B			D	B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 63.8			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 27.0		Intersection LOS: C	
Intersection Capacity Utilization 72.3%		ICU Level of Service C	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	311	240	223	857	522	183
Future Volume (vph)	311	240	223	857	522	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1506	1656	1810	1827	1581
Flt Permitted	0.95	1.00	0.24	1.00	1.00	1.00
Satd. Flow (perm)	1787	1506	423	1810	1827	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	311	240	223	857	522	183
RTOR Reduction (vph)	0	95	0	0	0	112
Lane Group Flow (vph)	311	145	223	857	522	71
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.0	20.0	31.8	31.8	24.8	24.8
Effective Green, g (s)	20.0	20.0	31.8	31.8	24.8	24.8
Actuated g/C Ratio	0.31	0.31	0.50	0.50	0.39	0.39
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	560	472	268	902	710	614
v/s Ratio Prot	c0.17		0.04	c0.47	0.29	
v/s Ratio Perm		0.10	0.37			0.04
v/c Ratio	0.56	0.31	0.83	0.95	0.74	0.12
Uniform Delay, d1	18.2	16.6	15.5	15.2	16.7	12.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.1	18.5	19.0	4.0	0.1
Delay (s)	18.9	16.8	34.0	34.2	20.7	12.6
Level of Service	B	B	C	C	C	B
Approach Delay (s)	18.0			34.2	18.6	
Approach LOS	B			C	B	

Intersection Summary			
HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.86		
Actuated Cycle Length (s)	63.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	72.3%	ICU Level of Service	C
Analysis Period (min)	15		

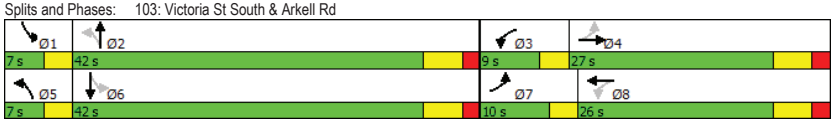
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	345	85	25	139	113	62	30	673	61	31	586	145
Future Volume (vph)	345	85	25	139	113	62	30	673	61	31	586	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.99		1.00				1.00	
Frt		0.966			0.947			0.988			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1780	0	1770	1706	0	1612	1771	0	1687	1753	0
Flt Permitted	0.552			0.686			0.144			0.142		
Satd. Flow (perm)	1007	1780	0	1278	1706	0	244	1771	0	252	1753	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			30			7			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1319.4	
Travel Time (s)		19.8			17.0			16.1			95.0	
Confl. Peds. (#/hr)	1					1	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Adj. Flow (vph)	345	85	25	139	113	62	30	673	61	31	586	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	345	110	0	139	175	0	30	734	0	31	731	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	10.0	27.0		9.0	26.0		7.0	42.0		7.0	42.0	
Total Split (%)	11.8%	31.8%		10.6%	30.6%		8.2%	49.4%		8.2%	49.4%	
Maximum Green (s)	7.0	21.0		6.0	20.0		4.0	36.0		4.0	36.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	22.9	12.8		20.9	11.8		42.0	34.9		42.0	34.9	
Actuated g/C Ratio	0.30	0.17		0.28	0.16		0.55	0.46		0.55	0.46	
v/c Ratio	0.93	0.35		0.36	0.60		0.14	0.90		0.14	0.90	
Control Delay	58.0	26.9		21.9	33.7		9.1	35.8		9.0	35.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	58.0	26.9		21.9	33.7		9.1	35.8		9.0	35.3	
LOS	E	C		C	C		A	D		A	D	
Approach Delay		50.5			28.5			34.7			34.3	
Approach LOS		D			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 75.9			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 36.8		Intersection LOS: D	
Intersection Capacity Utilization 82.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd



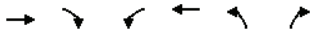
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	345	85	25	139	113	62	30	673	61	31	586	145
Future Volume (vph)	345	85	25	139	113	62	30	673	61	31	586	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	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	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1734	1780		1770	1706		1611	1770		1687	1754	
Flt Permitted	0.55	1.00		0.69	1.00		0.14	1.00		0.14	1.00	
Satd. Flow (perm)	1007	1780		1278	1706		245	1770		252	1754	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	345	85	25	139	113	62	30	673	61	31	586	145
RTOR Reduction (vph)	0	14	0	0	25	0	0	4	0	0	10	0
Lane Group Flow (vph)	345	96	0	139	150	0	30	730	0	31	721	0
Confl. Peds. (#/hr)	1					1	3					3
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.8	12.8		17.8	11.8		38.9	34.9		38.9	34.9	
Effective Green, g (s)	19.8	12.8		17.8	11.8		38.9	34.9		38.9	34.9	
Actuated g/C Ratio	0.26	0.17		0.24	0.16		0.51	0.46		0.51	0.46	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	330	300		339	265		198	816		205	808	
v/s Ratio Prot	c0.10	0.05		0.03	0.09		c0.01	c0.41		0.01	0.41	
v/s Ratio Perm	c0.18			0.06			0.07			0.07		
v/c Ratio	1.05	0.32		0.41	0.56		0.15	0.89		0.15	0.89	
Uniform Delay, d1	27.1	27.6		24.0	29.6		12.4	18.7		12.5	18.7	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	61.9	0.6		0.8	2.7		0.4	12.3		0.3	12.2	
Delay (s)	89.0	28.2		24.8	32.3		12.8	31.0		12.8	30.9	
Level of Service	F	C		C	C		B	C		B	C	
Approach Delay (s)		74.3			29.0			30.3			30.1	
Approach LOS		E			C			C			C	

Intersection Summary			
HCM 2000 Control Delay	38.8	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.91		
Actuated Cycle Length (s)	75.7	Sum of lost time (s)	18.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	322	10	231	175	10	229
Future Volume (vph)	322	10	231	175	10	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996				0.871	
Flt Protected				0.972	0.998	
Satd. Flow (prot)	1855	0	0	1811	1619	0
Flt Permitted				0.972	0.998	
Satd. Flow (perm)	1855	0	0	1811	1619	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	137.8			87.8	86.3	
Travel Time (s)	9.9			6.3	6.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	322	10	231	175	10	229
Shared Lane Traffic (%)						
Lane Group Flow (vph)	332	0	0	406	239	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	322	10	231	175	10	229
Future Volume (Veh/h)	322	10	231	175	10	229
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	322	10	231	175	10	229
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				88		
pX, platoon unblocked						
vC, conflicting volume			332		964	327
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			332		964	327
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			81		96	68
cM capacity (veh/h)			1227		230	714

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	332	406	239
Volume Left	0	231	10
Volume Right	10	0	229
cSH	1700	1227	656
Volume to Capacity	0.20	0.19	0.36
Queue Length 95th (m)	0.0	5.5	13.3
Control Delay (s)	0.0	5.7	13.6
Lane LOS		A	B
Approach Delay (s)	0.0	5.7	13.6
Approach LOS			B

Intersection Summary			
Average Delay	5.7		
Intersection Capacity Utilization	64.3%	ICU Level of Service	C
Analysis Period (min)	15		

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	73.6	53.8	45.5	30.8	57.0	56.0	95.4	201.9	189.2	25.5	67.6	81.1
Average Queue (m)	36.1	22.2	12.8	11.5	33.8	30.9	76.8	132.1	111.7	5.2	39.0	45.7
95th Queue (m)	65.2	53.9	34.9	26.2	49.5	48.0	124.5	211.7	188.5	17.2	61.1	72.3
Link Distance (m)		260.6	260.6		101.6	101.6		800.1	800.1		137.0	137.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	3				0		0	41			0	
Queuing Penalty (veh)	2				0		0	98			0	

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	R
Maximum Queue (m)	71.8	20.3	67.1	134.5	129.9	42.0
Average Queue (m)	53.9	16.9	31.8	79.7	58.9	13.3
95th Queue (m)	79.5	20.8	54.7	122.3	104.3	28.9
Link Distance (m)	66.9			155.2	168.0	168.0
Upstream Blk Time (%)	7				0	
Queuing Penalty (veh)	39				0	
Storage Bay Dist (m)		10.0	100.0			
Storage Blk Time (%)	45	20		3		
Queuing Penalty (veh)	107	63		8		

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	82.5	258.5	42.7	58.5	82.3	200.3	82.3	294.4
Average Queue (m)	78.2	205.9	21.0	28.5	14.9	113.8	18.8	159.9
95th Queue (m)	99.1	347.3	37.8	47.3	55.8	197.7	64.0	346.4
Link Distance (m)		264.8		226.2		213.2		1300.7
Upstream Blk Time (%)		41				2		
Queuing Penalty (veh)		0				0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)	85	1			0	25	0	34
Queuing Penalty (veh)	93	3			0	8	0	10

Intersection: 201: Commercial Driveway & MacAlister Blvd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	36.6	42.8	67.6
Average Queue (m)	6.0	17.6	25.5
95th Queue (m)	23.8	33.2	53.8
Link Distance (m)	127.7	66.9	77.8
Upstream Blk Time (%)			1
Queuing Penalty (veh)			0
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

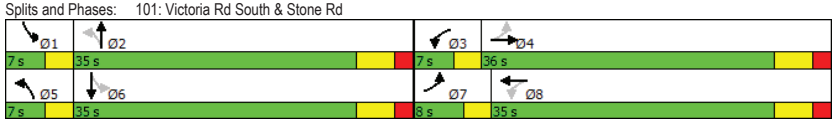
Zone wide Queuing Penalty: 432

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	333	435	198	64	253	15	96	736	67	38	697	233
Future Volume (vph)	333	435	198	64	253	15	96	736	67	38	697	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.953			0.992			0.987			0.962	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3396	0	1530	3467	0	1770	3479	0	1752	3387	0
Flt Permitted	0.551			0.305			0.179			0.237		
Satd. Flow (perm)	1037	3396	0	491	3467	0	332	3479	0	437	3387	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		96			8			12			59	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							22					22
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Adj. Flow (vph)	333	435	198	64	253	15	96	736	67	38	697	233
Shared Lane Traffic (%)												
Lane Group Flow (vph)	333	633	0	64	268	0	96	803	0	38	930	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	24.7	16.5		22.6	15.5		29.5	22.3		29.5	22.3	
Actuated g/C Ratio	0.38	0.25		0.35	0.24		0.45	0.34		0.45	0.34	
v/c Ratio	0.74	0.68		0.27	0.32		0.40	0.67		0.14	0.78	
Control Delay	28.5	23.1		16.4	21.6		14.9	21.5		10.5	23.5	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	28.5	23.1		16.4	21.6		14.9	21.5		10.5	23.5	
LOS	C	C		B	C		B	C		B	C	
Approach Delay		25.0			20.6			20.8			23.0	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 65.4			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.78			
Intersection Signal Delay: 22.7		Intersection LOS: C	
Intersection Capacity Utilization 75.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	333	435	198	64	253	15	96	736	67	38	697	233
Future Volume (vph)	333	435	198	64	253	15	96	736	67	38	697	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3396		1530	3466		1769	3481		1752	3392	
Flt Permitted	0.55	1.00		0.30	1.00		0.18	1.00		0.24	1.00	
Satd. Flow (perm)	1037	3396		491	3466		334	3481		438	3392	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	333	435	198	64	253	15	96	736	67	38	697	233
RTOR Reduction (vph)	0	72	0	0	6	0	0	8	0	0	39	0
Lane Group Flow (vph)	333	561	0	64	262	0	96	795	0	38	891	0
Confl. Peds. (#/hr)							22					22
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.6	16.5		19.6	15.5		26.4	22.3		26.4	22.3	
Effective Green, g (s)	21.6	16.5		19.6	15.5		26.4	22.3		26.4	22.3	
Actuated g/C Ratio	0.33	0.25		0.30	0.24		0.41	0.34		0.41	0.34	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	403	862		213	826		226	1194		260	1163	
v/s Ratio Prot	c0.06	0.17		0.02	0.08		c0.03	0.23		0.01	c0.26	
v/s Ratio Perm	c0.21			0.07			0.15			0.05		
v/c Ratio	0.83	0.65		0.30	0.32		0.42	0.67		0.15	0.77	
Uniform Delay, d1	19.0	21.7		16.7	20.4		13.0	18.2		12.1	19.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	13.0	1.8		0.8	0.2		1.3	1.4		0.3	3.1	
Delay (s)	32.0	23.5		17.5	20.6		14.3	19.6		12.4	22.1	
Level of Service	C	C		B	C		B	B		B	C	
Approach Delay (s)		26.4			20.0			19.0			21.7	
Approach LOS		C			C			B			C	

Intersection Summary			
HCM 2000 Control Delay	22.2	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.78		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	18.0
Intersection Capacity Utilization	75.1%	ICU Level of Service	D
Analysis Period (min)	15		

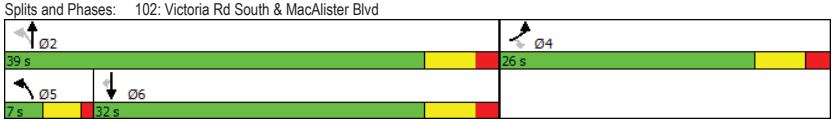
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	179	150	155	722	699	260
Future Volume (vph)	179	150	155	722	699	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1752	1615	1805	1845	1863	1615
Flt Permitted	0.950		0.136			
Satd. Flow (perm)	1752	1581	258	1845	1863	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		150				260
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			133.8	186.7	
Travel Time (s)	6.3			6.9	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Adj. Flow (vph)	179	150	155	722	699	260
Shared Lane Traffic (%)						
Lane Group Flow (vph)	179	150	155	722	699	260
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.0	20.0	34.5	32.5	25.5	25.5
Actuated g/C Ratio	0.31	0.31	0.53	0.50	0.40	0.40
v/c Ratio	0.33	0.25	0.74	0.78	0.95	0.33
Control Delay	19.4	4.7	33.5	20.5	44.5	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.4	4.7	33.5	20.5	44.5	3.3
LOS	B	A	C	C	D	A
Approach Delay	12.7			22.8	33.3	
Approach LOS	B			C	C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 65		
Actuated Cycle Length: 64.5		
Natural Cycle: 65		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.95		
Intersection Signal Delay: 25.9		Intersection LOS: C
Intersection Capacity Utilization 75.4%		ICU Level of Service D
Analysis Period (min) 15		

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	179	150	155	722	699	260
Future Volume (vph)	179	150	155	722	699	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1581	1805	1845	1863	1581
Flt Permitted	0.95	1.00	0.14	1.00	1.00	1.00
Satd. Flow (perm)	1752	1581	258	1845	1863	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	179	150	155	722	699	260
RTOR Reduction (vph)	0	103	0	0	0	157
Lane Group Flow (vph)	179	47	155	722	699	103
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.0	20.0	32.5	32.5	25.5	25.5
Effective Green, g (s)	20.0	20.0	32.5	32.5	25.5	25.5
Actuated g/C Ratio	0.31	0.31	0.50	0.50	0.40	0.40
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	543	490	201	929	736	625
v/s Ratio Prot	c0.10		0.04	c0.39	c0.38	
v/s Ratio Perm		0.03	0.35			0.07
v/c Ratio	0.33	0.09	0.77	0.78	0.95	0.16
Uniform Delay, d1	17.1	15.8	13.4	13.0	18.9	12.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0	15.2	4.1	21.4	0.1
Delay (s)	17.2	15.8	28.6	17.2	40.3	12.7
Level of Service	B	B	C	B	D	B
Approach Delay (s)	16.6			19.2	32.8	
Approach LOS	B			B	C	

Intersection Summary				
HCM 2000 Control Delay	24.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.71			
Actuated Cycle Length (s)	64.5	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	75.4%	ICU Level of Service	D	
Analysis Period (min)	15			

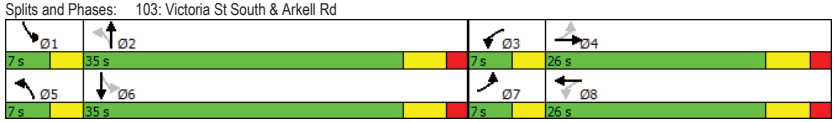
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	109	30	123	125	40	23	665	172	64	628	156
Future Volume (vph)	172	109	30	123	125	40	23	665	172	64	628	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor											0.99	
Frt		0.968			0.964			0.969			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1805	0	1805	1795	0	1805	1797	0
Flt Permitted	0.653			0.668			0.137			0.137		
Satd. Flow (perm)	1216	1811	0	1269	1805	0	260	1795	0	260	1797	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			21			20			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1359.6	
Travel Time (s)		19.8			17.0			16.1			97.9	
Confl. Peds. (#/hr)							6					6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Adj. Flow (vph)	172	109	30	123	125	40	23	665	172	64	628	156
Shared Lane Traffic (%)												
Lane Group Flow (vph)	172	139	0	123	165	0	23	837	0	64	784	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	7.0	26.0		7.0	26.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.3%	34.7%		9.3%	34.7%		9.3%	46.7%		9.3%	46.7%	
Maximum Green (s)	4.0	20.0		4.0	20.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	17.5	10.5		17.5	10.5		36.1	29.0		36.1	29.0	
Actuated g/C Ratio	0.27	0.16		0.27	0.16		0.55	0.44		0.55	0.44	
v/c Ratio	0.48	0.46		0.33	0.54		0.10	1.04		0.27	0.97	
Control Delay	22.8	26.3		19.5	28.5		7.4	64.2		9.4	47.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.8	26.3		19.5	28.5		7.4	64.2		9.4	47.0	
LOS	C	C		B	C		A	E		A	D	
Approach Delay		24.4			24.7			62.7			44.1	
Approach LOS		C			C			E			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 65.6			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 46.0		Intersection LOS: D	
Intersection Capacity Utilization 84.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	109	30	123	125	40	23	665	172	64	628	156
Future Volume (vph)	172	109	30	123	125	40	23	665	172	64	628	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1810		1805	1805		1805	1795		1805	1797	
Flt Permitted	0.65	1.00		0.67	1.00		0.14	1.00		0.14	1.00	
Satd. Flow (perm)	1216	1810		1270	1805		261	1795		261	1797	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	172	109	30	123	125	40	23	665	172	64	628	156
RTOR Reduction (vph)	0	15	0	0	18	0	0	11	0	0	11	0
Lane Group Flow (vph)	172	124	0	123	147	0	23	826	0	64	773	0
Confl. Peds. (#/hr)							6					6
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.5	10.5		14.5	10.5		33.1	29.1		33.1	29.1	
Effective Green, g (s)	14.5	10.5		14.5	10.5		33.1	29.1		33.1	29.1	
Actuated g/C Ratio	0.22	0.16		0.22	0.16		0.50	0.44		0.50	0.44	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	302	289		313	288		225	796		225	797	
v/s Ratio Prot	c0.03	0.07		0.02	0.08		0.01	c0.46		c0.02	0.43	
v/s Ratio Perm	c0.09			0.06			0.05			0.13		
v/c Ratio	0.57	0.43		0.39	0.51		0.10	1.04		0.28	0.97	
Uniform Delay, d1	22.1	24.8		21.4	25.2		12.0	18.2		13.3	17.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	1.0		0.8	1.5		0.2	42.0		0.7	24.7	
Delay (s)	24.6	25.9		22.2	26.7		12.2	60.3		14.0	42.5	
Level of Service	C	C		C	C		B	E		B	D	
Approach Delay (s)		25.2			24.8			59.0			40.4	
Approach LOS		C			C			E			D	

Intersection Summary					
HCM 2000 Control Delay	43.3	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.83				
Actuated Cycle Length (s)	65.6	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	84.2%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	162	7	163	252	7	167
Future Volume (vph)	162	7	163	252	7	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.994				0.870	
Flt Protected				0.981	0.998	
Satd. Flow (prot)	1852	0	0	1827	1617	0
Flt Permitted				0.981	0.998	
Satd. Flow (perm)	1852	0	0	1827	1617	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	137.8			87.8	71.9	
Travel Time (s)	9.9			6.3	5.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	162	7	163	252	7	167
Shared Lane Traffic (%)						
Lane Group Flow (vph)	169	0	0	415	174	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	162	7	163	252	7	167
Future Volume (Veh/h)	162	7	163	252	7	167
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	162	7	163	252	7	167
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				88		
pX, platoon unblocked						
vC, conflicting volume			169		744	166
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			169		744	166
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		98	81
cM capacity (veh/h)			1409		338	879

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	169	415	174
Volume Left	0	163	7
Volume Right	7	0	167
cSH	1700	1409	826
Volume to Capacity	0.10	0.12	0.21
Queue Length 95th (m)	0.0	3.1	6.3
Control Delay (s)	0.0	3.7	10.5
Lane LOS		A	B
Approach Delay (s)	0.0	3.7	10.5
Approach LOS			B

Intersection Summary			
Average Delay	4.5		
Intersection Capacity Utilization	51.9%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	79.7	103.9	83.5	36.2	40.7	38.4	80.2	110.2	89.5	31.8	73.9	83.7
Average Queue (m)	43.8	50.6	34.9	14.1	22.3	16.2	17.0	64.6	47.8	7.8	47.5	52.0
95th Queue (m)	74.3	82.4	66.8	29.7	35.6	30.9	43.8	97.0	80.2	21.8	68.8	78.4
Link Distance (m)		260.6	260.6		101.6	101.6		800.1	800.1		137.0	137.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	3	0					0	2			0	
Queuing Penalty (veh)	6	1					0	2			0	

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	SB	SB	B7	B7
Directions Served	L	R	L	T	T	R	T	T
Maximum Queue (m)	57.9	17.5	34.9	90.5	194.3	173.3	58.5	56.0
Average Queue (m)	25.8	15.2	18.7	48.9	114.4	43.9	9.5	6.3
95th Queue (m)	47.4	21.0	31.2	80.5	198.9	137.6	50.3	41.4
Link Distance (m)	66.6			115.1	168.0	168.0	800.1	800.1
Upstream Blk Time (%)	0				13	2		
Queuing Penalty (veh)	0				61	9		
Storage Bay Dist (m)		10.0	100.0					
Storage Blk Time (%)	24	12		0				
Queuing Penalty (veh)	36	21		0				

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	49.7	35.3	40.4	45.8	82.3	230.4	82.4	247.2
Average Queue (m)	25.2	18.9	19.2	23.9	15.7	216.1	36.3	137.1
95th Queue (m)	42.9	32.6	32.8	39.4	64.0	245.8	92.9	242.6
Link Distance (m)		264.8		226.2		213.2		1340.8
Upstream Blk Time (%)						76		
Queuing Penalty (veh)						0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)					0	62	0	35
Queuing Penalty (veh)					0	14	0	23

Intersection: 201: Commercial Driveway & MacAlister Blvd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	28.8	26.6
Average Queue (m)	8.5	12.8
95th Queue (m)	21.6	22.2
Link Distance (m)	66.6	63.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 173

Appendix F

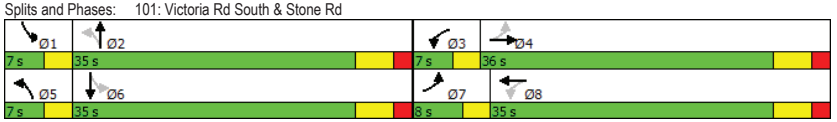
2025 Total Traffic Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	124	84	62	445	32	238	933	54	20	578	277
Future Volume (vph)	223	124	84	62	445	32	238	933	54	20	578	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.939			0.990			0.992			0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3121	0	1543	3499	0	1787	3360	0	1530	3273	0
Flt Permitted	0.370			0.621			0.227			0.164		
Satd. Flow (perm)	676	3121	0	1008	3499	0	427	3360	0	264	3273	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		84			9			7			103	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							5					5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Adj. Flow (vph)	223	124	84	62	445	32	238	933	54	20	578	277
Shared Lane Traffic (%)												
Lane Group Flow (vph)	223	208	0	62	477	0	238	987	0	20	855	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	23.5	15.4		21.4	14.3		31.9	24.8		31.9	24.8	
Actuated g/C Ratio	0.35	0.23		0.32	0.22		0.48	0.37		0.48	0.37	
v/c Ratio	0.70	0.26		0.17	0.63		0.83	0.78		0.10	0.66	
Control Delay	30.7	14.0		15.6	27.6		38.8	23.7		9.3	18.2	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	30.7	14.0		15.6	27.6		38.8	23.7		9.3	18.2	
LOS	C	B		B	C		D	C		A	B	
Approach Delay		22.6			26.3			26.6			18.0	
Approach LOS		C			C			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 66.5			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 23.5		Intersection LOS: C	
Intersection Capacity Utilization 80.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	223	124	84	62	445	32	238	933	54	20	578	277
Future Volume (vph)	223	124	84	62	445	32	238	933	54	20	578	277
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	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		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3123		1543	3499		1787	3359		1530	3275	
Flt Permitted	0.37	1.00		0.62	1.00		0.23	1.00		0.16	1.00	
Satd. Flow (perm)	676	3123		1009	3499		427	3359		264	3275	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	223	124	84	62	445	32	238	933	54	20	578	277
RTOR Reduction (vph)	0	64	0	0	7	0	0	4	0	0	64	0
Lane Group Flow (vph)	223	144	0	62	470	0	238	983	0	20	791	0
Confl. Peds. (#/hr)							5					5
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.5	15.4		18.3	14.3		28.8	24.8		28.8	24.8	
Effective Green, g (s)	20.5	15.4		18.3	14.3		28.8	24.8		28.8	24.8	
Actuated g/C Ratio	0.31	0.23		0.28	0.22		0.44	0.37		0.44	0.37	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	290	726		311	755		267	1258		191	1226	
v/s Ratio Prot	c0.06	0.05		0.01	0.13		c0.05	0.29		0.01	0.24	
v/s Ratio Perm	c0.18			0.04			c0.33			0.04		
v/c Ratio	0.77	0.20		0.20	0.62		0.89	0.78		0.10	0.64	
Uniform Delay, d1	19.2	20.4		18.1	23.5		15.6	18.3		11.6	17.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	11.6	0.1		0.3	1.6		28.7	3.2		0.2	1.2	
Delay (s)	30.8	20.6		18.4	25.1		44.3	21.5		11.9	18.2	
Level of Service	C	C		B	C		D	C		B	B	
Approach Delay (s)		25.9			24.3			25.9			18.1	
Approach LOS		C			C			C			B	

Intersection Summary				
HCM 2000 Control Delay	23.4	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.86			
Actuated Cycle Length (s)	66.2	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	80.5%	ICU Level of Service	D	
Analysis Period (min)	15			

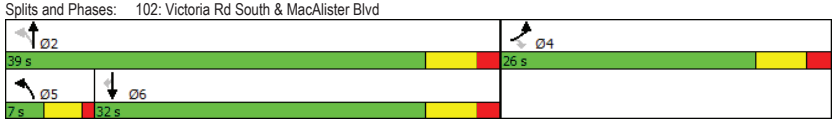
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	368	240	241	857	578	183
Future Volume (vph)	368	240	241	857	578	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1787	1538	1656	1810	1827	1615
Flt Permitted	0.950		0.192			
Satd. Flow (perm)	1787	1505	335	1810	1827	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		117				183
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			174.1	186.7	
Travel Time (s)	6.3			9.0	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Adj. Flow (vph)	368	240	241	857	578	183
Shared Lane Traffic (%)						
Lane Group Flow (vph)	368	240	241	857	578	183
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.0	20.0	33.8	31.8	24.8	24.8
Actuated g/C Ratio	0.31	0.31	0.53	0.50	0.39	0.39
v/c Ratio	0.66	0.43	1.01	0.95	0.82	0.25
Control Delay	26.0	12.2	78.8	38.0	28.8	3.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.0	12.2	78.8	38.0	28.8	3.4
LOS	C	B	E	D	C	A
Approach Delay	20.6			46.9	22.7	
Approach LOS	C			D	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 63.8			
Natural Cycle: 65			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.01			
Intersection Signal Delay: 33.0		Intersection LOS: C	
Intersection Capacity Utilization 77.5%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	368	240	241	857	578	183
Future Volume (vph)	368	240	241	857	578	183
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1506	1656	1810	1827	1581
Flt Permitted	0.95	1.00	0.19	1.00	1.00	1.00
Satd. Flow (perm)	1787	1506	334	1810	1827	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	368	240	241	857	578	183
RTOR Reduction (vph)	0	80	0	0	0	112
Lane Group Flow (vph)	368	160	241	857	578	71
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.0	20.0	31.8	31.8	24.8	24.8
Effective Green, g (s)	20.0	20.0	31.8	31.8	24.8	24.8
Actuated g/C Ratio	0.31	0.31	0.50	0.50	0.39	0.39
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	560	472	228	902	710	614
v/s Ratio Prot	c0.21		0.05	c0.47	0.32	
v/s Ratio Perm		0.11	c0.48			0.04
v/c Ratio	0.66	0.34	1.06	0.95	0.81	0.12
Uniform Delay, d1	18.9	16.8	17.5	15.2	17.4	12.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	2.1	0.2	75.4	19.0	7.1	0.1
Delay (s)	21.1	17.0	92.9	34.2	24.6	12.6
Level of Service	C	B	F	C	C	B
Approach Delay (s)	19.4			47.1	21.7	
Approach LOS	B			D	C	

Intersection Summary			
HCM 2000 Control Delay	32.4	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.97		
Actuated Cycle Length (s)	63.8	Sum of lost time (s)	16.0
Intersection Capacity Utilization	77.5%	ICU Level of Service	D
Analysis Period (min)	15		

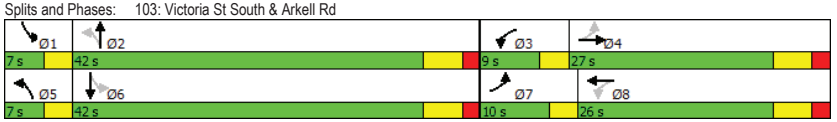
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	345	85	25	139	113	62	30	691	61	31	642	145
Future Volume (vph)	345	85	25	139	113	62	30	691	61	31	642	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.99						1.00	
Frt		0.966			0.947			0.988			0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1780	0	1770	1706	0	1612	1771	0	1687	1758	0
Flt Permitted	0.546			0.686			0.111			0.134		
Satd. Flow (perm)	996	1780	0	1278	1706	0	188	1771	0	238	1758	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			30			6			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1319.4	
Travel Time (s)		19.8			17.0			16.1			95.0	
Confl. Peds. (#/hr)	1					1	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Adj. Flow (vph)	345	85	25	139	113	62	30	691	61	31	642	145
Shared Lane Traffic (%)												
Lane Group Flow (vph)	345	110	0	139	175	0	30	752	0	31	787	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	10.0	27.0		9.0	26.0		7.0	42.0		7.0	42.0	
Total Split (%)	11.8%	31.8%		10.6%	30.6%		8.2%	49.4%		8.2%	49.4%	
Maximum Green (s)	7.0	21.0		6.0	20.0		4.0	36.0		4.0	36.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	22.9	12.9		20.9	11.9		43.1	36.1		43.1	36.1	
Actuated g/C Ratio	0.30	0.17		0.27	0.15		0.56	0.47		0.56	0.47	
v/c Ratio	0.95	0.35		0.36	0.61		0.17	0.90		0.15	0.95	
Control Delay	62.4	26.8		22.1	34.1		9.6	36.6		9.1	42.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	62.4	26.8		22.1	34.1		9.6	36.6		9.1	42.6	
LOS	E	C		C	C		A	D		A	D	
Approach Delay		53.8			28.8			35.5			41.3	
Approach LOS		D			C			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 77			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.95			
Intersection Signal Delay: 40.2		Intersection LOS: D	
Intersection Capacity Utilization 85.1%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	345	85	25	139	113	62	30	691	61	31	642	145
Future Volume (vph)	345	85	25	139	113	62	30	691	61	31	642	145
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	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	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1734	1780		1770	1706		1612	1771		1687	1759	
Flt Permitted	0.55	1.00		0.69	1.00		0.11	1.00		0.13	1.00	
Satd. Flow (perm)	997	1780		1278	1706		188	1771		238	1759	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	345	85	25	139	113	62	30	691	61	31	642	145
RTOR Reduction (vph)	0	14	0	0	25	0	0	3	0	0	9	0
Lane Group Flow (vph)	345	96	0	139	150	0	30	749	0	31	778	0
Confl. Peds. (#/hr)	1					1	3					3
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	19.9	12.9		17.9	11.9		40.1	36.1		40.1	36.1	
Effective Green, g (s)	19.9	12.9		17.9	11.9		40.1	36.1		40.1	36.1	
Actuated g/C Ratio	0.26	0.17		0.23	0.15		0.52	0.47		0.52	0.47	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	324	298		335	263		171	830		199	824	
v/s Ratio Prot	c0.10	0.05		0.03	0.09		c0.01	0.42		0.01	c0.44	
v/s Ratio Perm	c0.18			0.06			0.08			0.07		
v/c Ratio	1.06	0.32		0.41	0.57		0.18	0.90		0.16	0.94	
Uniform Delay, d1	27.7	28.2		24.6	30.2		13.5	18.8		12.7	19.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	68.2	0.6		0.8	2.8		0.5	13.0		0.4	19.0	
Delay (s)	95.9	28.8		25.4	33.0		14.0	31.8		13.1	38.5	
Level of Service	F	C		C	C		B	C		B	D	
Approach Delay (s)		79.7			29.7			31.1			37.5	
Approach LOS		E			C			C			D	

Intersection Summary				
HCM 2000 Control Delay	42.5	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.95			
Actuated Cycle Length (s)	77.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	85.1%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	322	10	231	175	18	10	10	229	57	10	11
Future Volume (vph)	4	322	10	231	175	18	10	10	229	57	10	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.994			0.876			0.981	
Flt Protected		0.999			0.973			0.998			0.965	
Satd. Flow (prot)	0	1853	0	0	1802	0	0	1629	0	0	1763	0
Flt Permitted		0.999			0.973			0.998			0.965	
Satd. Flow (perm)	0	1853	0	0	1802	0	0	1629	0	0	1763	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		137.8			87.8			86.3			71.2	
Travel Time (s)		9.9			6.3			6.2			5.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	322	10	231	175	18	10	10	229	57	10	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	336	0	0	424	0	0	249	0	0	78	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 73.8%		ICU Level of Service D	
Analysis Period (min) 15			

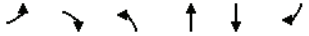
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	322	10	231	175	18	10	10	229	57	10	11
Future Volume (Veh/h)	4	322	10	231	175	18	10	10	229	57	10	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	322	10	231	175	18	10	10	229	57	10	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					88							
pX, platoon unblocked												
vC, conflicting volume	193			332			997	990	327	1215	986	184
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	193			332			997	990	327	1215	986	184
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			81			94	95	68	35	95	99
cM capacity (veh/h)	1380			1227			181	199	714	88	201	858

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	336	424	249	78
Volume Left	4	231	10	57
Volume Right	10	18	229	11
cSH	1380	1227	584	110
Volume to Capacity	0.00	0.19	0.43	0.71
Queue Length 95th (m)	0.1	5.5	17.0	30.1
Control Delay (s)	0.1	5.5	15.7	93.4
Lane LOS	A	A	C	F
Approach Delay (s)	0.1	5.5	15.7	93.4
Approach LOS			C	F

Intersection Summary					
Average Delay			12.5		
Intersection Capacity Utilization			73.8%	ICU Level of Service	D
Analysis Period (min)			15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	56	0	1225	705	19
Future Volume (vph)	0	56	0	1225	705	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.996	
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	3525	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	3525	0
Link Speed (k/h)	50			50	70	
Link Distance (m)	72.9			186.7	822.5	
Travel Time (s)	5.2			13.4	42.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	56	0	1225	705	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	56	0	1225	724	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 67.8%		ICU Level of Service C	
Analysis Period (min) 15			



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	56	0	1225	705	19
Future Volume (Veh/h)	0	56	0	1225	705	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	56	0	1225	705	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				187		
pX, platoon unblocked	0.54					
vC, conflicting volume	1940	362	724			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2321	362	724			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	100			
cM capacity (veh/h)	17	635	874			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	56	1225	470	254
Volume Left	0	0	0	0
Volume Right	56	0	0	19
cSH	635	1700	1700	1700
Volume to Capacity	0.09	0.72	0.28	0.15
Queue Length 95th (m)	2.3	0.0	0.0	0.0
Control Delay (s)	11.2	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	11.2	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay		0.3	
Intersection Capacity Utilization		67.8%	ICU Level of Service	C
Analysis Period (min)		15	

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	66.2	54.0	24.9	44.2	71.1	69.1	95.5	389.1	366.9	19.8	69.2	80.8
Average Queue (m)	31.4	19.8	11.0	12.1	36.6	33.3	91.5	241.3	224.5	4.5	40.4	44.6
95th Queue (m)	56.0	41.1	20.3	30.3	56.6	56.2	116.0	414.5	406.6	14.2	62.7	70.2
Link Distance (m)		260.6	260.6		101.6	101.6		800.0	800.0		137.0	137.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	1			0	0		1	68				
Queuing Penalty (veh)	1			0	0		4	163				

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	B5	SB	SB
Directions Served	L	R	L	T	T	T	R
Maximum Queue (m)	70.1	20.8	92.3	141.9	6.1	154.5	79.2
Average Queue (m)	64.5	16.9	36.7	83.6	0.4	81.8	20.5
95th Queue (m)	74.7	20.7	76.6	137.3	6.0	147.7	71.6
Link Distance (m)	65.2			155.2	1300.7	167.7	167.7
Upstream Blk Time (%)	22		0	0		2	0
Queuing Penalty (veh)	133		0	5		8	0
Storage Bay Dist (m)		10.0	100.0				
Storage Blk Time (%)	57	19	0	6			
Queuing Penalty (veh)	138	72	0	14			

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	82.4	283.4	41.2	56.0	82.2	209.8	82.3	390.2
Average Queue (m)	82.3	252.8	21.5	29.4	15.8	129.8	21.7	242.6
95th Queue (m)	82.3	336.7	38.1	47.7	56.5	230.1	73.2	504.9
Link Distance (m)		264.8		226.2		213.2		1300.7
Upstream Blk Time (%)		75				9		
Queuing Penalty (veh)		0				0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)	93	2		0	0	29	0	46
Queuing Penalty (veh)	102	8		0	0	9	0	14

Intersection: 201: Commercial Driveway/Site Driveway & MacAlister Blvd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	48.7	55.1	89.5	47.8
Average Queue (m)	16.3	18.7	65.0	19.8
95th Queue (m)	39.4	39.3	109.9	41.4
Link Distance (m)	129.2	65.2	77.9	62.6
Upstream Blk Time (%)		0	59	0
Queuing Penalty (veh)		0	0	0
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 202: Victoria Rd South & Site Driveway

Movement	EB	SB	SB
Directions Served	R	T	TR
Maximum Queue (m)	13.3	21.6	3.3
Average Queue (m)	8.3	2.5	0.2
95th Queue (m)	13.7	23.7	3.1
Link Distance (m)	58.9	800.0	800.0
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

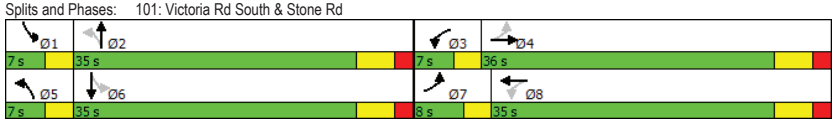
Zone wide Queuing Penalty: 671

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	333	435	198	64	253	15	98	772	67	38	755	233
Future Volume (vph)	333	435	198	64	253	15	98	772	67	38	755	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.953			0.992			0.988			0.965	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3396	0	1530	3467	0	1770	3483	0	1752	3398	0
Flt Permitted	0.551			0.296			0.166			0.225		
Satd. Flow (perm)	1037	3396	0	477	3467	0	308	3483	0	415	3398	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		96			8			11			52	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							22					22
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Adj. Flow (vph)	333	435	198	64	253	15	98	772	67	38	755	233
Shared Lane Traffic (%)												
Lane Group Flow (vph)	333	633	0	64	268	0	98	839	0	38	988	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	24.8	16.7		22.8	15.7		31.3	24.1		31.3	24.1	
Actuated g/C Ratio	0.37	0.25		0.34	0.23		0.47	0.36		0.47	0.36	
v/c Ratio	0.76	0.69		0.28	0.33		0.42	0.67		0.14	0.79	
Control Delay	30.6	24.0		17.2	22.3		15.5	21.3		10.4	23.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	30.6	24.0		17.2	22.3		15.5	21.3		10.4	23.9	
LOS	C	C		B	C		B	C		B	C	
Approach Delay		26.3			21.3			20.7			23.4	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 67.3			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.79			
Intersection Signal Delay: 23.3		Intersection LOS: C	
Intersection Capacity Utilization 76.8%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	333	435	198	64	253	15	98	772	67	38	755	233
Future Volume (vph)	333	435	198	64	253	15	98	772	67	38	755	233
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3396		1530	3466		1769	3483		1752	3400	
Flt Permitted	0.55	1.00		0.30	1.00		0.17	1.00		0.23	1.00	
Satd. Flow (perm)	1037	3396		476	3466		309	3483		416	3400	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	333	435	198	64	253	15	98	772	67	38	755	233
RTOR Reduction (vph)	0	72	0	0	6	0	0	7	0	0	33	0
Lane Group Flow (vph)	333	561	0	64	262	0	98	832	0	38	955	0
Confl. Peds. (#/hr)							22					22
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.8	16.7		19.8	15.7		28.2	24.1		28.2	24.1	
Effective Green, g (s)	21.8	16.7		19.8	15.7		28.2	24.1		28.2	24.1	
Actuated g/C Ratio	0.33	0.25		0.30	0.23		0.42	0.36		0.42	0.36	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	394	846		205	812		219	1252		256	1222	
v/s Ratio Prot	c0.06	0.17		0.02	0.08		c0.03	0.24		0.01	c0.28	
v/s Ratio Perm	c0.21			0.07			0.16			0.05		
v/c Ratio	0.85	0.66		0.31	0.32		0.45	0.66		0.15	0.78	
Uniform Delay, d1	20.0	22.6		17.5	21.2		13.1	18.0		12.0	19.1	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.2	2.0		0.9	0.2		1.5	1.3		0.3	3.3	
Delay (s)	35.3	24.6		18.4	21.5		14.5	19.4		12.3	22.4	
Level of Service	D	C		B	C		B	B		B	C	
Approach Delay (s)		28.3			20.9			18.9			22.0	
Approach LOS		C			C			B			C	

Intersection Summary					
HCM 2000 Control Delay	22.9	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.80				
Actuated Cycle Length (s)	67.0	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	76.8%	ICU Level of Service	D		
Analysis Period (min)	15				

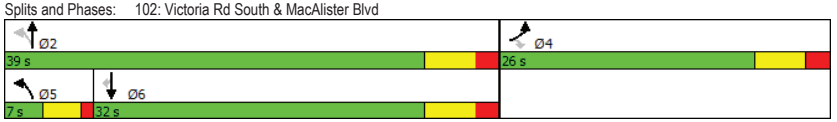
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	215	150	212	722	734	260
Future Volume (vph)	215	150	212	722	734	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1752	1615	1805	1845	1863	1615
Flt Permitted	0.950		0.133			
Satd. Flow (perm)	1752	1581	253	1845	1863	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		126				260
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			133.8	186.7	
Travel Time (s)	6.3			6.9	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Adj. Flow (vph)	215	150	212	722	734	260
Shared Lane Traffic (%)						
Lane Group Flow (vph)	215	150	212	722	734	260
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.0	20.0	35.0	33.0	26.0	26.0
Actuated g/C Ratio	0.31	0.31	0.54	0.51	0.40	0.40
v/c Ratio	0.40	0.26	1.02	0.77	0.99	0.33
Control Delay	20.5	6.4	87.6	20.2	52.0	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.5	6.4	87.6	20.2	52.0	3.3
LOS	C	A	F	C	D	A
Approach Delay	14.7			35.5	39.2	
Approach LOS	B			D	D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 33.8		Intersection LOS: C	
Intersection Capacity Utilization 80.4%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	215	150	212	722	734	260
Future Volume (vph)	215	150	212	722	734	260
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1581	1805	1845	1863	1581
Flt Permitted	0.95	1.00	0.13	1.00	1.00	1.00
Satd. Flow (perm)	1752	1581	253	1845	1863	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	215	150	212	722	734	260
RTOR Reduction (vph)	0	87	0	0	0	156
Lane Group Flow (vph)	215	63	212	722	734	104
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.0	20.0	33.0	33.0	26.0	26.0
Effective Green, g (s)	20.0	20.0	33.0	33.0	26.0	26.0
Actuated g/C Ratio	0.31	0.31	0.51	0.51	0.40	0.40
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	539	486	200	936	745	632
v/s Ratio Prot	c0.12		0.05	c0.39	0.39	
v/s Ratio Perm		0.04	c0.49			0.07
v/c Ratio	0.40	0.13	1.06	0.77	0.99	0.16
Uniform Delay, d1	17.8	16.2	17.9	12.9	19.3	12.5
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.0	80.4	4.0	29.0	0.1
Delay (s)	17.9	16.3	98.3	16.9	48.4	12.6
Level of Service	B	B	F	B	D	B
Approach Delay (s)	17.2			35.4	39.0	
Approach LOS	B			D	D	

Intersection Summary				
HCM 2000 Control Delay	34.1	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.85			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	80.4%	ICU Level of Service	D	
Analysis Period (min)	15			

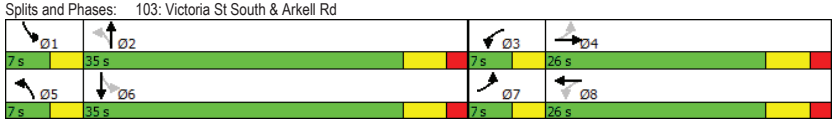
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	109	30	123	125	40	23	722	172	64	663	156
Future Volume (vph)	172	109	30	123	125	40	23	722	172	64	663	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor											0.99	
Frt		0.968			0.964			0.971			0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1805	0	1805	1798	0	1805	1799	0
Flt Permitted	0.653			0.668			0.137			0.137		
Satd. Flow (perm)	1216	1811	0	1269	1805	0	260	1798	0	260	1799	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			21			19			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1359.6	
Travel Time (s)		19.8			17.0			16.1			97.9	
Confl. Peds. (#/hr)							6					6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Adj. Flow (vph)	172	109	30	123	125	40	23	722	172	64	663	156
Shared Lane Traffic (%)												
Lane Group Flow (vph)	172	139	0	123	165	0	23	894	0	64	819	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	7.0	26.0		7.0	26.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.3%	34.7%		9.3%	34.7%		9.3%	46.7%		9.3%	46.7%	
Maximum Green (s)	4.0	20.0		4.0	20.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	17.5	10.5		17.5	10.5		36.1	29.0		36.1	29.0	
Actuated g/C Ratio	0.27	0.16		0.27	0.16		0.55	0.44		0.55	0.44	
v/c Ratio	0.48	0.46		0.33	0.54		0.10	1.11		0.27	1.02	
Control Delay	22.8	26.3		19.5	28.5		7.4	87.8		9.4	57.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	22.8	26.3		19.5	28.5		7.4	87.8		9.4	57.6	
LOS	C	C		B	C		A	F		A	E	
Approach Delay		24.4			24.7			85.8			54.1	
Approach LOS		C			C			F			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 65.6			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.11			
Intersection Signal Delay: 58.8		Intersection LOS: E	
Intersection Capacity Utilization 85.1%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	172	109	30	123	125	40	23	722	172	64	663	156
Future Volume (vph)	172	109	30	123	125	40	23	722	172	64	663	156
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1810		1805	1805		1805	1798		1805	1800	
Flt Permitted	0.65	1.00		0.67	1.00		0.14	1.00		0.14	1.00	
Satd. Flow (perm)	1216	1810		1270	1805		261	1798		261	1800	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	172	109	30	123	125	40	23	722	172	64	663	156
RTOR Reduction (vph)	0	15	0	0	18	0	0	11	0	0	10	0
Lane Group Flow (vph)	172	124	0	123	147	0	23	883	0	64	809	0
Confl. Peds. (#/hr)							6					6
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	14.5	10.5		14.5	10.5		33.1	29.1		33.1	29.1	
Effective Green, g (s)	14.5	10.5		14.5	10.5		33.1	29.1		33.1	29.1	
Actuated g/C Ratio	0.22	0.16		0.22	0.16		0.50	0.44		0.50	0.44	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	302	289		313	288		225	797		225	798	
v/s Ratio Prot	c0.03	0.07		0.02	0.08		0.01	c0.49		c0.02	0.45	
v/s Ratio Perm	c0.09			0.06			0.05			0.13		
v/c Ratio	0.57	0.43		0.39	0.51		0.10	1.11		0.28	1.01	
Uniform Delay, d1	22.1	24.8		21.4	25.2		12.8	18.2		13.3	18.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.5	1.0		0.8	1.5		0.2	65.9		0.7	35.3	
Delay (s)	24.6	25.9		22.2	26.7		13.0	84.1		14.0	53.6	
Level of Service	C	C		C	C		B	F		B	D	
Approach Delay (s)		25.2			24.8			82.4			50.7	
Approach LOS		C			C			F			D	

Intersection Summary					
HCM 2000 Control Delay	56.4	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	0.87				
Actuated Cycle Length (s)	65.6	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	85.1%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

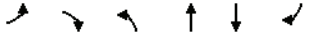
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	162	7	163	252	57	7	10	167	36	10	7
Future Volume (vph)	11	162	7	163	252	57	7	10	167	36	10	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.984			0.877			0.982	
Flt Protected		0.997			0.983			0.998			0.967	
Satd. Flow (prot)	0	1848	0	0	1802	0	0	1630	0	0	1769	0
Flt Permitted		0.997			0.983			0.998			0.967	
Satd. Flow (perm)	0	1848	0	0	1802	0	0	1630	0	0	1769	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		137.8			87.8			71.9			55.7	
Travel Time (s)		9.9			6.3			5.2			4.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	11	162	7	163	252	57	7	10	167	36	10	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	180	0	0	472	0	0	184	0	0	53	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	63.2%	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)	11	162	7	163	252	57	7	10	167	36	10	7
Future Volume (Veh/h)	11	162	7	163	252	57	7	10	167	36	10	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	162	7	163	252	57	7	10	167	36	10	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)					88							
pX, platoon unblocked												
vC, conflicting volume	309			169			806	822	166	966	798	280
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	309			169			806	822	166	966	798	280
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			88			97	96	81	78	96	99
cM capacity (veh/h)	1252			1409			262	271	879	167	280	758

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	180	472	184	53
Volume Left	11	163	7	36
Volume Right	7	57	167	7
cSH	1252	1409	725	203
Volume to Capacity	0.01	0.12	0.25	0.26
Queue Length 95th (m)	0.2	3.1	8.0	8.0
Control Delay (s)	0.6	3.5	11.6	28.8
Lane LOS	A	A	B	D
Approach Delay (s)	0.6	3.5	11.6	28.8
Approach LOS			B	D

Intersection Summary				
Average Delay		6.1		
Intersection Capacity Utilization		63.2%	ICU Level of Service	B
Analysis Period (min)		15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	35	0	937	959	58
Future Volume (vph)	0	35	0	937	959	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.991	
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	3507	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	3507	0
Link Speed (k/h)	50			50	70	
Link Distance (m)	60.3			186.7	822.5	
Travel Time (s)	4.3			13.4	42.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	35	0	937	959	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	35	0	937	1017	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	35	0	937	959	58
Future Volume (Veh/h)	0	35	0	937	959	58
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	35	0	937	959	58
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				187		
pX, platoon unblocked	0.65					
vC, conflicting volume	1925	508	1017			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2157	508	1017			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	100			
cM capacity (veh/h)	26	510	678			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	35	937	639	378
Volume Left	0	0	0	0
Volume Right	35	0	0	58
cSH	510	1700	1700	1700
Volume to Capacity	0.07	0.55	0.38	0.22
Queue Length 95th (m)	1.8	0.0	0.0	0.0
Control Delay (s)	12.6	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	12.6	0.0	0.0	
Approach LOS	B			

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		52.6%	ICU Level of Service	A
Analysis Period (min)		15		

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	79.2	103.6	90.1	34.6	39.4	35.8	68.9	115.4	100.0	33.2	96.5	93.9
Average Queue (m)	46.6	51.4	37.0	13.2	21.7	17.2	20.7	68.4	53.5	8.9	55.6	58.1
95th Queue (m)	77.9	86.0	71.8	27.7	34.8	33.3	58.3	104.1	89.5	30.6	85.2	91.1
Link Distance (m)		260.6	260.6		101.6	101.6		799.5	799.5		137.0	137.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	4	1					0	4			1	
Queuing Penalty (veh)	8	2					0	3			1	

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	R
Maximum Queue (m)	65.3	17.5	48.4	94.7	178.2	179.7
Average Queue (m)	32.2	14.8	24.0	48.1	152.7	98.2
95th Queue (m)	55.2	21.7	40.5	79.9	206.9	221.5
Link Distance (m)	65.0			115.1	168.2	168.2
Upstream Blk Time (%)	0				28	6
Queuing Penalty (veh)	1				140	27
Storage Bay Dist (m)		10.0	100.0			
Storage Blk Time (%)	30	11		0		
Queuing Penalty (veh)	45	25		0		

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	47.7	43.6	41.7	47.3	82.3	231.1	82.4	561.2
Average Queue (m)	24.9	19.3	18.4	22.9	17.4	220.0	45.3	368.7
95th Queue (m)	41.3	34.0	33.0	38.7	66.9	236.4	105.2	634.6
Link Distance (m)		264.8		226.2		213.2		1340.8
Upstream Blk Time (%)						78		
Queuing Penalty (veh)						0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)					0	62	0	59
Queuing Penalty (veh)					0	14	0	38

Intersection: 201: Commercial Driveway/Site Driveway & MacAlister Blvd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	16.0	26.0	27.2	23.4
Average Queue (m)	1.8	8.5	14.2	9.0
95th Queue (m)	8.9	21.3	23.1	18.3
Link Distance (m)	128.6	65.0	63.4	46.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 202: Victoria Rd South & Site Driveway

Movement	EB	SB	SB
Directions Served	R	T	TR
Maximum Queue (m)	36.6	264.6	268.6
Average Queue (m)	13.8	140.8	133.3
95th Queue (m)	36.6	373.5	366.2
Link Distance (m)	46.1	799.5	799.5
Upstream Blk Time (%)	11		
Queuing Penalty (veh)	0		
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 305

Appendix G

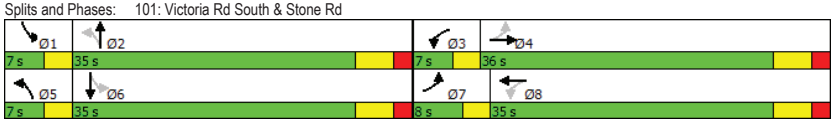
2030 Background Traffic Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	246	137	93	68	491	36	263	957	60	22	609	306
Future Volume (vph)	246	137	93	68	491	36	263	957	60	22	609	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.939			0.990			0.991			0.950	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3121	0	1543	3499	0	1787	3353	0	1530	3269	0
Flt Permitted	0.328			0.608			0.195			0.155		
Satd. Flow (perm)	599	3121	0	987	3499	0	366	3353	0	250	3269	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		93			10			8			112	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							5					5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Adj. Flow (vph)	246	137	93	68	491	36	263	957	60	22	609	306
Shared Lane Traffic (%)												
Lane Group Flow (vph)	246	230	0	68	527	0	263	1017	0	22	915	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	24.8	16.7		22.8	15.7		32.9	25.8		32.9	25.8	
Actuated g/C Ratio	0.36	0.24		0.33	0.23		0.48	0.38		0.48	0.38	
v/c Ratio	0.82	0.28		0.19	0.65		1.02	0.81		0.11	0.71	
Control Delay	42.5	13.7		15.7	28.1		81.2	25.5		10.2	19.7	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	42.5	13.7		15.7	28.1		81.2	25.5		10.2	19.7	
LOS	D	B		B	C		F	C		B	B	
Approach Delay		28.6			26.7			36.9			19.4	
Approach LOS		C			C			D			B	

Intersection Summary		
Area Type:	Other	
Cycle Length: 85		
Actuated Cycle Length: 68.8		
Natural Cycle: 85		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 1.02		
Intersection Signal Delay: 28.9		Intersection LOS: C
Intersection Capacity Utilization 86.4%		ICU Level of Service E
Analysis Period (min) 15		

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	246	137	93	68	491	36	263	957	60	22	609	306
Future Volume (vph)	246	137	93	68	491	36	263	957	60	22	609	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3123		1543	3498		1787	3353		1530	3270	
Flt Permitted	0.33	1.00		0.61	1.00		0.20	1.00		0.16	1.00	
Satd. Flow (perm)	599	3123		988	3498		368	3353		250	3270	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	246	137	93	68	491	36	263	957	60	22	609	306
RTOR Reduction (vph)	0	70	0	0	8	0	0	5	0	0	70	0
Lane Group Flow (vph)	246	160	0	68	519	0	263	1012	0	22	845	0
Confl. Peds. (#/hr)							5					5
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.9	16.8		19.7	15.7		29.8	25.8		29.8	25.8	
Effective Green, g (s)	21.9	16.8		19.7	15.7		29.8	25.8		29.8	25.8	
Actuated g/C Ratio	0.32	0.24		0.29	0.23		0.43	0.38		0.43	0.38	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	275	764		316	800		242	1261		183	1229	
v/s Ratio Prot	c0.07	0.05		0.01	0.15		c0.06	0.30		0.01	0.26	
v/s Ratio Perm	c0.22			0.05			c0.41			0.05		
v/c Ratio	0.89	0.21		0.22	0.65		1.09	0.80		0.12	0.69	
Uniform Delay, d1	20.8	20.6		18.2	24.0		17.7	19.1		12.3	18.0	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.6	0.1		0.3	1.8		82.9	3.8		0.3	1.6	
Delay (s)	49.3	20.7		18.6	25.8		100.6	22.9		12.6	19.6	
Level of Service	D	C		B	C		F	C		B	B	
Approach Delay (s)		35.5			25.0			38.9			19.5	
Approach LOS		D			C			D			B	

Intersection Summary				
HCM 2000 Control Delay	30.3	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	1.02			
Actuated Cycle Length (s)	68.6	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	86.4%	ICU Level of Service	E	
Analysis Period (min)	15			

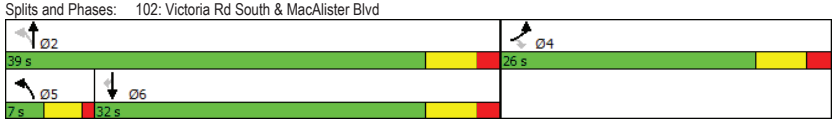
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	327	251	234	952	583	188
Future Volume (vph)	327	251	234	952	583	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1787	1538	1656	1810	1827	1615
Flt Permitted	0.950		0.197			
Satd. Flow (perm)	1787	1505	343	1810	1827	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		138				188
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			174.1	186.7	
Travel Time (s)	6.3			9.0	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Adj. Flow (vph)	327	251	234	952	583	188
Shared Lane Traffic (%)						
Lane Group Flow (vph)	327	251	234	952	583	188
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.0	20.0	35.0	33.0	26.0	26.0
Actuated g/C Ratio	0.31	0.31	0.54	0.51	0.40	0.40
v/c Ratio	0.60	0.45	0.96	1.04	0.80	0.25
Control Delay	24.4	11.3	64.8	59.0	27.7	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	24.4	11.3	64.8	59.0	27.7	3.3
LOS	C	B	E	E	C	A
Approach Delay	18.8			60.1	21.7	
Approach LOS	B			E	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.04			
Intersection Signal Delay: 39.0		Intersection LOS: D	
Intersection Capacity Utilization 78.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	327	251	234	952	583	188
Future Volume (vph)	327	251	234	952	583	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1505	1656	1810	1827	1581
Flt Permitted	0.95	1.00	0.20	1.00	1.00	1.00
Satd. Flow (perm)	1787	1505	344	1810	1827	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	327	251	234	952	583	188
RTOR Reduction (vph)	0	96	0	0	0	113
Lane Group Flow (vph)	327	155	234	952	583	75
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.0	20.0	33.0	33.0	26.0	26.0
Effective Green, g (s)	20.0	20.0	33.0	33.0	26.0	26.0
Actuated g/C Ratio	0.31	0.31	0.51	0.51	0.40	0.40
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	549	463	235	918	730	632
v/s Ratio Prot	c0.18		0.05	c0.53	0.32	
v/s Ratio Perm		0.10	0.46			0.05
v/c Ratio	0.60	0.34	1.00	1.04	0.80	0.12
Uniform Delay, d1	19.1	17.4	17.7	16.0	17.2	12.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	1.2	0.2	57.1	39.7	6.1	0.1
Delay (s)	20.2	17.5	74.8	55.7	23.3	12.4
Level of Service	C	B	E	E	C	B
Approach Delay (s)	19.1			59.5	20.6	
Approach LOS	B			E	C	

Intersection Summary			
HCM 2000 Control Delay	38.4	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	0.94		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	78.2%	ICU Level of Service	D
Analysis Period (min)	15		

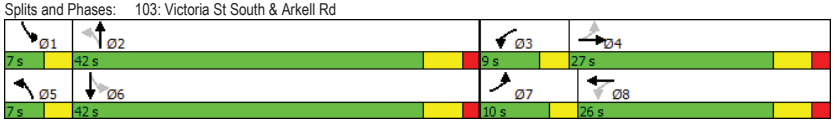
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	380	94	28	153	124	68	33	737	67	34	640	160
Future Volume (vph)	380	94	28	153	124	68	33	737	67	34	640	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.99						1.00	
Frt		0.966			0.947			0.987			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1781	0	1770	1706	0	1612	1769	0	1687	1753	0
Flt Permitted	0.508			0.679			0.111			0.111		
Satd. Flow (perm)	927	1781	0	1265	1706	0	188	1769	0	197	1753	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			30			7			18	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1319.4	
Travel Time (s)		19.8			17.0			16.1			95.0	
Confl. Peds. (#/hr)	1					1	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Adj. Flow (vph)	380	94	28	153	124	68	33	737	67	34	640	160
Shared Lane Traffic (%)												
Lane Group Flow (vph)	380	122	0	153	192	0	33	804	0	34	800	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	10.0	27.0		9.0	26.0		7.0	42.0		7.0	42.0	
Total Split (%)	11.8%	31.8%		10.6%	30.6%		8.2%	49.4%		8.2%	49.4%	
Maximum Green (s)	7.0	21.0		6.0	20.0		4.0	36.0		4.0	36.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	23.8	13.7		21.8	12.7		43.1	36.1		43.1	36.1	
Actuated g/C Ratio	0.31	0.18		0.28	0.16		0.55	0.46		0.55	0.46	
v/c Ratio	1.07	0.37		0.39	0.63		0.19	0.98		0.18	0.97	
Control Delay	94.4	27.1		22.5	35.0		10.3	49.7		10.1	48.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	94.4	27.1		22.5	35.0		10.3	49.7		10.1	48.9	
LOS	F	C		C	D		B	D		B	D	
Approach Delay		78.0			29.4			48.1			47.3	
Approach LOS		E			C			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 77.9			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.07			
Intersection Signal Delay: 51.3		Intersection LOS: D	
Intersection Capacity Utilization 88.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd



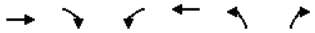
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	380	94	28	153	124	68	33	737	67	34	640	160
Future Volume (vph)	380	94	28	153	124	68	33	737	67	34	640	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	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	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1734	1780		1770	1706		1612	1770		1687	1753	
Flt Permitted	0.51	1.00		0.68	1.00		0.11	1.00		0.11	1.00	
Satd. Flow (perm)	927	1780		1264	1706		188	1770		197	1753	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	380	94	28	153	124	68	33	737	67	34	640	160
RTOR Reduction (vph)	0	14	0	0	25	0	0	4	0	0	10	0
Lane Group Flow (vph)	380	108	0	153	167	0	33	800	0	34	790	0
Confl. Peds. (#/hr)	1					1	3					3
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.7	13.7		18.7	12.7		40.1	36.1		40.1	36.1	
Effective Green, g (s)	20.7	13.7		18.7	12.7		40.1	36.1		40.1	36.1	
Actuated g/C Ratio	0.27	0.18		0.24	0.16		0.52	0.46		0.52	0.46	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	319	313		342	278		170	821		178	813	
v/s Ratio Prot	c0.11	0.06		0.03	0.10		c0.01	c0.45		0.01	0.45	
v/s Ratio Perm	c0.21			0.07			0.09			0.09		
v/c Ratio	1.19	0.35		0.45	0.60		0.19	0.97		0.19	0.97	
Uniform Delay, d1	27.7	28.1		24.6	30.2		14.3	20.4		14.4	20.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	112.9	0.7		0.9	3.6		0.6	25.1		0.5	24.7	
Delay (s)	140.5	28.8		25.5	33.8		14.9	45.5		15.0	45.1	
Level of Service	F	C		C	C		B	D		B	D	
Approach Delay (s)		113.4			30.1			44.3			43.9	
Approach LOS		F			C			D			D	

Intersection Summary			
HCM 2000 Control Delay	56.0	HCM 2000 Level of Service	E
HCM 2000 Volume to Capacity ratio	1.01		
Actuated Cycle Length (s)	77.8	Sum of lost time (s)	18.0
Intersection Capacity Utilization	88.8%	ICU Level of Service	E
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	349	10	231	191	10	229
Future Volume (vph)	349	10	231	191	10	229
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.996				0.871	
Flt Protected				0.973	0.998	
Satd. Flow (prot)	1855	0	0	1812	1619	0
Flt Permitted				0.973	0.998	
Satd. Flow (perm)	1855	0	0	1812	1619	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	137.8			87.8	86.3	
Travel Time (s)	9.9			6.3	6.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	349	10	231	191	10	229
Shared Lane Traffic (%)						
Lane Group Flow (vph)	359	0	0	422	239	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	66.5%	ICU Level of Service	C
Analysis Period (min)	15		



Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	349	10	231	191	10	229
Future Volume (Veh/h)	349	10	231	191	10	229
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	349	10	231	191	10	229
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				88		
pX, platoon unblocked						
vC, conflicting volume			359		1007	354
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			359		1007	354
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			81		95	67
cM capacity (veh/h)			1200		216	690

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	359	422	239
Volume Left	0	231	10
Volume Right	10	0	229
cSH	1700	1200	632
Volume to Capacity	0.21	0.19	0.38
Queue Length 95th (m)	0.0	5.7	14.1
Control Delay (s)	0.0	5.6	14.1
Lane LOS		A	B
Approach Delay (s)	0.0	5.6	14.1
Approach LOS			B

Intersection Summary			
Average Delay		5.6	
Intersection Capacity Utilization		66.5%	ICU Level of Service
Analysis Period (min)		15	

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	82.2	136.4	112.2	57.6	87.2	82.0	95.5	450.8	444.3	29.0	71.7	93.4
Average Queue (m)	54.6	47.2	28.5	12.9	38.9	36.2	93.4	273.4	255.2	6.9	44.7	52.8
95th Queue (m)	91.8	127.9	97.9	33.7	64.5	62.1	108.8	487.3	475.0	20.3	66.3	82.4
Link Distance (m)		260.6	260.6		101.6	101.6		800.1	800.1		137.0	137.0
Upstream Blk Time (%)					0	0						
Queuing Penalty (veh)					0	0						
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	19	0		0	1		7	67			0	
Queuing Penalty (veh)	13	1		0	1		33	177			0	

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	B5	SB	SB
Directions Served	L	R	L	T	T	T	R
Maximum Queue (m)	71.8	20.3	134.7	166.1	37.2	143.8	31.4
Average Queue (m)	61.1	17.0	41.1	100.5	5.3	69.5	13.1
95th Queue (m)	83.5	19.5	102.2	160.4	47.2	124.7	24.3
Link Distance (m)	66.9			155.2	1300.7	168.0	168.0
Upstream Blk Time (%)	13		0	3		0	
Queuing Penalty (veh)	77		0	30		1	
Storage Bay Dist (m)		10.0	100.0				
Storage Blk Time (%)	51	21	1	12			
Queuing Penalty (veh)	127	70	6	28			

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	82.4	282.7	47.7	62.5	82.3	229.2	82.3	538.6
Average Queue (m)	82.3	266.4	22.4	30.8	15.8	187.2	24.3	317.6
95th Queue (m)	84.1	313.1	38.7	51.1	57.4	278.4	78.4	622.4
Link Distance (m)		264.8		226.2		213.2		1300.7
Upstream Blk Time (%)		90				38		
Queuing Penalty (veh)		0				0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)	96	1		0	0	47	0	51
Queuing Penalty (veh)	117	4		0	0	16	0	17

Intersection: 201: Commercial Driveway & MacAlister Blvd

Movement	EB	WB	NB
Directions Served	TR	LT	LR
Maximum Queue (m)	47.8	46.3	74.1
Average Queue (m)	11.4	17.7	32.9
95th Queue (m)	35.4	36.2	70.8
Link Distance (m)	127.7	66.9	77.8
Upstream Blk Time (%)			5
Queuing Penalty (veh)			0
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

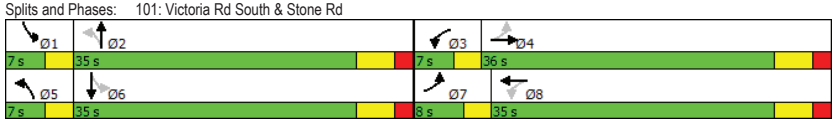
Zone wide Queuing Penalty: 719

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	369	481	218	71	279	16	108	807	74	42	760	257
Future Volume (vph)	369	481	218	71	279	16	108	807	74	42	760	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.953			0.992			0.987			0.962	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3396	0	1530	3468	0	1770	3479	0	1752	3386	0
Flt Permitted	0.541			0.250			0.159			0.200		
Satd. Flow (perm)	1018	3396	0	403	3468	0	295	3479	0	369	3386	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			7			12			59	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							22					22
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Adj. Flow (vph)	369	481	218	71	279	16	108	807	74	42	760	257
Shared Lane Traffic (%)												
Lane Group Flow (vph)	369	699	0	71	295	0	108	881	0	42	1017	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	26.7	18.6		24.7	17.6		32.2	25.1		32.2	25.1	
Actuated g/C Ratio	0.38	0.27		0.35	0.25		0.46	0.36		0.46	0.36	
v/c Ratio	0.83	0.72		0.34	0.34		0.49	0.70		0.17	0.81	
Control Delay	36.7	25.0		18.5	22.3		18.9	23.0		11.6	25.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	36.7	25.0		18.5	22.3		18.9	23.0		11.6	25.9	
LOS	D	C		B	C		B	C		B	C	
Approach Delay		29.0			21.6			22.6			25.3	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 70.1			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.83			
Intersection Signal Delay: 25.3		Intersection LOS: C	
Intersection Capacity Utilization 81.1%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	369	481	218	71	279	16	108	807	74	42	760	257
Future Volume (vph)	369	481	218	71	279	16	108	807	74	42	760	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3397		1530	3467		1769	3480		1752	3390	
Flt Permitted	0.54	1.00		0.25	1.00		0.16	1.00		0.20	1.00	
Satd. Flow (perm)	1017	3397		403	3467		297	3480		369	3390	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	369	481	218	71	279	16	108	807	74	42	760	257
RTOR Reduction (vph)	0	70	0	0	5	0	0	8	0	0	38	0
Lane Group Flow (vph)	369	629	0	71	290	0	108	873	0	42	979	0
Confl. Peds. (#/hr)							22					22
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.7	18.6		21.7	17.6		29.2	25.1		29.2	25.1	
Effective Green, g (s)	23.7	18.6		21.7	17.6		29.2	25.1		29.2	25.1	
Actuated g/C Ratio	0.34	0.27		0.31	0.25		0.42	0.36		0.42	0.36	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	401	903		191	872		210	1249		235	1217	
v/s Ratio Prot	c0.07	0.19		0.02	0.08		c0.03	0.25		0.01	c0.29	
v/s Ratio Perm	c0.24			0.09			0.18			0.06		
v/c Ratio	0.92	0.70		0.37	0.33		0.51	0.70		0.18	0.80	
Uniform Delay, d1	21.2	23.1		17.7	21.4		14.1	19.2		12.8	20.2	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.1	2.4		1.2	0.2		2.1	1.7		0.4	4.0	
Delay (s)	47.3	25.5		19.0	21.6		16.2	20.9		13.2	24.2	
Level of Service	D	C		B	C		B	C		B	C	
Approach Delay (s)		33.0			21.1			20.4			23.7	
Approach LOS		C			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	25.3	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.85				
Actuated Cycle Length (s)	69.9	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	81.1%	ICU Level of Service	D		
Analysis Period (min)	15				

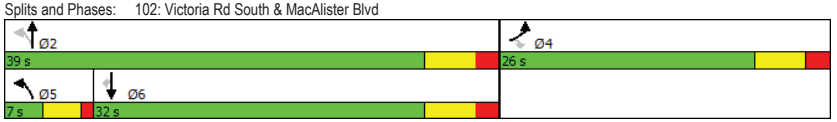
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	186	156	161	802	776	273
Future Volume (vph)	186	156	161	802	776	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1752	1615	1805	1845	1863	1615
Flt Permitted	0.950		0.133			
Satd. Flow (perm)	1752	1581	253	1845	1863	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		151				273
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			133.8	186.7	
Travel Time (s)	6.3			6.9	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Adj. Flow (vph)	186	156	161	802	776	273
Shared Lane Traffic (%)						
Lane Group Flow (vph)	186	156	161	802	776	273
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	Min	Min	Min	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.0	20.0	35.0	33.0	26.0	26.0
Actuated g/C Ratio	0.31	0.31	0.54	0.51	0.40	0.40
v/c Ratio	0.35	0.26	0.78	0.86	1.04	0.34
Control Delay	19.7	5.0	38.1	25.7	67.0	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	19.7	5.0	38.1	25.7	67.0	3.3
LOS	B	A	D	C	E	A
Approach Delay	13.0			27.8	50.5	
Approach LOS	B			C	D	

Intersection Summary		
Area Type:	Other	
Cycle Length: 65		
Actuated Cycle Length: 65		
Natural Cycle: 75		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 1.04		
Intersection Signal Delay: 35.7		Intersection LOS: D
Intersection Capacity Utilization 79.8%		ICU Level of Service D
Analysis Period (min) 15		

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	186	156	161	802	776	273
Future Volume (vph)	186	156	161	802	776	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1581	1805	1845	1863	1581
Flt Permitted	0.95	1.00	0.13	1.00	1.00	1.00
Satd. Flow (perm)	1752	1581	253	1845	1863	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	186	156	161	802	776	273
RTOR Reduction (vph)	0	105	0	0	0	164
Lane Group Flow (vph)	186	51	161	802	776	109
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.0	20.0	33.0	33.0	26.0	26.0
Effective Green, g (s)	20.0	20.0	33.0	33.0	26.0	26.0
Actuated g/C Ratio	0.31	0.31	0.51	0.51	0.40	0.40
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	539	486	200	936	745	632
v/s Ratio Prot	c0.11		0.04	c0.43	c0.42	
v/s Ratio Perm		0.03	0.37			0.07
v/c Ratio	0.35	0.11	0.81	0.86	1.04	0.17
Uniform Delay, d1	17.4	16.1	14.9	13.9	19.5	12.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.1	0.0	19.5	7.8	44.3	0.1
Delay (s)	17.6	16.1	34.4	21.7	63.8	12.7
Level of Service	B	B	C	C	E	B
Approach Delay (s)	16.9			23.9	50.5	
Approach LOS	B			C	D	

Intersection Summary				
HCM 2000 Control Delay	34.7	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.77			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	79.8%	ICU Level of Service	D	
Analysis Period (min)	15			

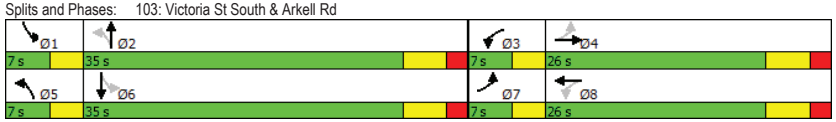
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	120	33	136	138	44	25	728	190	71	689	172
Future Volume (vph)	190	120	33	136	138	44	25	728	190	71	689	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor											0.99	
Frt		0.968			0.964			0.969			0.970	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1805	0	1805	1795	0	1805	1797	0
Flt Permitted	0.631			0.660			0.137			0.137		
Satd. Flow (perm)	1175	1811	0	1254	1805	0	260	1795	0	260	1797	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			21			20			20	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1359.6	
Travel Time (s)		19.8			17.0			16.1			97.9	
Confl. Peds. (#/hr)							6					6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Adj. Flow (vph)	190	120	33	136	138	44	25	728	190	71	689	172
Shared Lane Traffic (%)												
Lane Group Flow (vph)	190	153	0	136	182	0	25	918	0	71	861	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	7.0	26.0		7.0	26.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.3%	34.7%		9.3%	34.7%		9.3%	46.7%		9.3%	46.7%	
Maximum Green (s)	4.0	20.0		4.0	20.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	18.2	11.2		18.2	11.2		36.1	29.1		36.1	29.1	
Actuated g/C Ratio	0.27	0.17		0.27	0.17		0.54	0.44		0.54	0.44	
v/c Ratio	0.53	0.48		0.36	0.57		0.11	1.15		0.30	1.08	
Control Delay	24.1	26.8		19.8	29.3		7.8	104.4		10.2	77.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.1	26.8		19.8	29.3		7.8	104.4		10.2	77.3	
LOS	C	C		B	C		A	F		B	E	
Approach Delay		25.3			25.2			101.8			72.2	
Approach LOS		C			C			F			E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 66.3			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.15			
Intersection Signal Delay: 71.0		Intersection LOS: E	
Intersection Capacity Utilization 90.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	120	33	136	138	44	25	728	190	71	689	172
Future Volume (vph)	190	120	33	136	138	44	25	728	190	71	689	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1810		1805	1805		1805	1795		1805	1797	
Flt Permitted	0.63	1.00		0.66	1.00		0.14	1.00		0.14	1.00	
Satd. Flow (perm)	1176	1810		1254	1805		261	1795		261	1797	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	190	120	33	136	138	44	25	728	190	71	689	172
RTOR Reduction (vph)	0	15	0	0	17	0	0	11	0	0	11	0
Lane Group Flow (vph)	190	138	0	136	165	0	25	907	0	71	850	0
Confl. Peds. (#/hr)							6					6
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.2	11.2		15.2	11.2		33.1	29.1		33.1	29.1	
Effective Green, g (s)	15.2	11.2		15.2	11.2		33.1	29.1		33.1	29.1	
Actuated g/C Ratio	0.23	0.17		0.23	0.17		0.50	0.44		0.50	0.44	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	305	305		320	304		223	787		223	788	
v/s Ratio Prot	c0.04	0.08		0.03	0.09		0.01	c0.51		c0.02	0.47	
v/s Ratio Perm	c0.11			0.07			0.05			0.14		
v/c Ratio	0.62	0.45		0.42	0.54		0.11	1.15		0.32	1.08	
Uniform Delay, d1	22.3	24.8		21.3	25.2		13.2	18.6		13.6	18.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	1.1		0.9	2.0		0.2	82.8		0.8	55.3	
Delay (s)	26.2	25.9		22.2	27.2		13.5	101.4		14.4	73.9	
Level of Service	C	C		C	C		B	F		B	E	
Approach Delay (s)		26.1			25.0			99.1			69.4	
Approach LOS		C			C			F			E	

Intersection Summary					
HCM 2000 Control Delay	69.0	HCM 2000 Level of Service		E	
HCM 2000 Volume to Capacity ratio	0.92				
Actuated Cycle Length (s)	66.3	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	90.9%	ICU Level of Service		E	
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (vph)	175	7	163	271	7	167
Future Volume (vph)	175	7	163	271	7	167
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt	0.995				0.870	
Flt Protected				0.982	0.998	
Satd. Flow (prot)	1853	0	0	1829	1617	0
Flt Permitted				0.982	0.998	
Satd. Flow (perm)	1853	0	0	1829	1617	0
Link Speed (k/h)	50			50	50	
Link Distance (m)	137.8			87.8	71.9	
Travel Time (s)	9.9			6.3	5.2	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	175	7	163	271	7	167
Shared Lane Traffic (%)						
Lane Group Flow (vph)	182	0	0	434	174	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			0.0	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)		15	25		25	15
Sign Control	Free			Free	Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBT	EBR	WBL	WBT	NBL	NBR
Lane Configurations						
Traffic Volume (veh/h)	175	7	163	271	7	167
Future Volume (Veh/h)	175	7	163	271	7	167
Sign Control	Free			Free	Stop	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	175	7	163	271	7	167
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type	None			None		
Median storage veh)						
Upstream signal (m)				88		
pX, platoon unblocked						
vC, conflicting volume			182		776	178
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol			182		776	178
tC, single (s)			4.1		6.4	6.2
tC, 2 stage (s)						
tF (s)			2.2		3.5	3.3
p0 queue free %			88		98	81
cM capacity (veh/h)			1393		323	864

Direction, Lane #	EB 1	WB 1	NB 1
Volume Total	182	434	174
Volume Left	0	163	7
Volume Right	7	0	167
cSH	1700	1393	810
Volume to Capacity	0.11	0.12	0.21
Queue Length 95th (m)	0.0	3.2	6.5
Control Delay (s)	0.0	3.7	10.7
Lane LOS		A	B
Approach Delay (s)	0.0	3.7	10.7
Approach LOS			B

Intersection Summary			
Average Delay	4.4		
Intersection Capacity Utilization	53.6%	ICU Level of Service	A
Analysis Period (min)	15		

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	82.4	158.1	149.6	35.6	47.0	41.9	95.3	157.3	138.5	22.2	100.0	104.8
Average Queue (m)	56.5	67.6	51.6	14.6	24.2	19.4	36.0	88.6	71.9	7.9	58.5	65.0
95th Queue (m)	90.7	127.3	112.3	28.4	39.2	35.8	92.7	153.2	135.6	17.4	89.2	96.6
Link Distance (m)		260.6	260.6		101.6	101.6		800.1	800.1		137.0	137.0
Upstream Blk Time (%)												
Queuing Penalty (veh)												
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	8	4					0	16			1	
Queuing Penalty (veh)	20	14					0	17			0	

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	SB	SB	B7	B7
Directions Served	L	R	L	T	T	R	T	T
Maximum Queue (m)	58.0	17.5	38.4	97.9	200.6	192.3	371.4	360.3
Average Queue (m)	28.9	15.1	18.2	51.9	187.0	148.7	174.8	162.6
95th Queue (m)	50.9	21.1	31.8	86.6	212.2	249.0	400.5	394.0
Link Distance (m)	66.6			115.1	168.0	168.0	800.1	800.1
Upstream Blk Time (%)	0			0	74	15		
Queuing Penalty (veh)	1			1	389	80		
Storage Bay Dist (m)		10.0	100.0					
Storage Blk Time (%)	26	12		0				
Queuing Penalty (veh)	41	22		0				

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	60.4	40.9	41.5	50.5	82.3	231.1	82.4	614.6
Average Queue (m)	27.3	21.8	20.0	25.3	17.9	220.3	43.7	456.3
95th Queue (m)	47.7	36.2	34.7	43.1	67.9	227.1	103.7	787.3
Link Distance (m)		264.8		226.2		213.2		1340.8
Upstream Blk Time (%)						79		
Queuing Penalty (veh)						0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)	0				0	62	0	58
Queuing Penalty (veh)	0				0	16	0	41

Intersection: 201: Commercial Driveway & MacAlister Blvd

Movement	WB	NB
Directions Served	LT	LR
Maximum Queue (m)	28.2	29.8
Average Queue (m)	8.2	14.0
95th Queue (m)	22.2	23.4
Link Distance (m)	66.6	63.1
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

Zone wide Queuing Penalty: 643

Appendix H

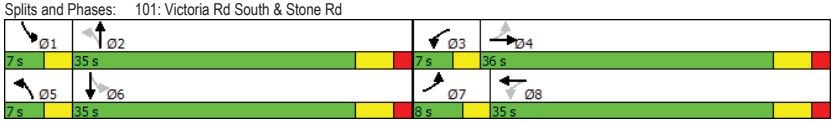
2030 Total Traffic Operations Reports

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	246	137	93	68	491	36	263	1014	60	22	628	306
Future Volume (vph)	246	137	93	68	491	36	263	1014	60	22	628	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.939			0.990			0.992			0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3121	0	1543	3499	0	1787	3359	0	1530	3273	0
Flt Permitted	0.324			0.608			0.193			0.147		
Satd. Flow (perm)	592	3121	0	987	3499	0	363	3359	0	237	3273	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		93			10			8			106	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							5					5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Adj. Flow (vph)	246	137	93	68	491	36	263	1014	60	22	628	306
Shared Lane Traffic (%)												
Lane Group Flow (vph)	246	230	0	68	527	0	263	1074	0	22	934	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	24.9	16.8		22.8	15.8		34.3	27.2		34.3	27.2	
Actuated g/C Ratio	0.35	0.24		0.32	0.23		0.49	0.39		0.49	0.39	
v/c Ratio	0.85	0.28		0.19	0.66		1.02	0.82		0.12	0.70	
Control Delay	46.0	13.9		16.0	28.9		80.3	26.3		10.2	19.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	46.0	13.9		16.0	28.9		80.3	26.3		10.2	19.6	
LOS	D	B		B	C		F	C		B	B	
Approach Delay		30.5			27.4			36.9			19.4	
Approach LOS		C			C			D			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 70.2			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 29.3		Intersection LOS: C	
Intersection Capacity Utilization 86.9%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	246	137	93	68	491	36	263	1014	60	22	628	306
Future Volume (vph)	246	137	93	68	491	36	263	1014	60	22	628	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3123		1543	3498		1787	3357		1530	3273	
Flt Permitted	0.32	1.00		0.61	1.00		0.19	1.00		0.15	1.00	
Satd. Flow (perm)	592	3123		988	3498		362	3357		237	3273	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	246	137	93	68	491	36	263	1014	60	22	628	306
RTOR Reduction (vph)	0	71	0	0	8	0	0	5	0	0	65	0
Lane Group Flow (vph)	246	159	0	68	519	0	263	1069	0	22	869	0
Confl. Peds. (#/hr)							5					5
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.8	16.8		19.8	15.8		31.2	27.2		31.2	27.2	
Effective Green, g (s)	21.8	16.8		19.8	15.8		31.2	27.2		31.2	27.2	
Actuated g/C Ratio	0.31	0.24		0.28	0.23		0.45	0.39		0.45	0.39	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	266	749		311	789		242	1304		179	1271	
v/s Ratio Prot	c0.07	0.05		0.01	0.15		c0.06	0.32		0.01	0.27	
v/s Ratio Perm	c0.22			0.05			c0.42			0.05		
v/c Ratio	0.92	0.21		0.22	0.66		1.09	0.82		0.12	0.68	
Uniform Delay, d1	21.9	21.3		18.8	24.6		17.7	19.2		12.3	17.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	35.4	0.1		0.4	2.0		82.9	4.2		0.3	1.5	
Delay (s)	57.4	21.4		19.2	26.6		100.6	23.4		12.6	19.4	
Level of Service	E	C		B	C		F	C		B	B	
Approach Delay (s)		40.0			25.8			38.6			19.2	
Approach LOS		D			C			D			B	

Intersection Summary				
HCM 2000 Control Delay	31.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	1.04			
Actuated Cycle Length (s)	70.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	86.9%	ICU Level of Service	E	
Analysis Period (min)	15			

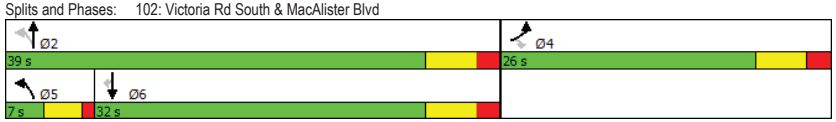
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	384	251	252	952	639	188
Future Volume (vph)	384	251	252	952	639	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1787	1538	1656	1810	1827	1615
Flt Permitted	0.950		0.148			
Satd. Flow (perm)	1787	1505	258	1810	1827	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		118				188
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			174.1	186.7	
Travel Time (s)	6.3			9.0	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Adj. Flow (vph)	384	251	252	952	639	188
Shared Lane Traffic (%)						
Lane Group Flow (vph)	384	251	252	952	639	188
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.0	20.0	35.0	33.0	26.0	26.0
Actuated g/C Ratio	0.31	0.31	0.54	0.51	0.40	0.40
v/c Ratio	0.70	0.46	1.24	1.04	0.88	0.25
Control Delay	28.2	12.8	162.4	59.0	34.0	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	28.2	12.8	162.4	59.0	34.0	3.3
LOS	C	B	F	E	C	A
Approach Delay	22.1			80.6	27.0	
Approach LOS	C			F	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.24			
Intersection Signal Delay: 50.1		Intersection LOS: D	
Intersection Capacity Utilization 82.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	384	251	252	952	639	188
Future Volume (vph)	384	251	252	952	639	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1505	1656	1810	1827	1581
Flt Permitted	0.95	1.00	0.15	1.00	1.00	1.00
Satd. Flow (perm)	1787	1505	258	1810	1827	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	384	251	252	952	639	188
RTOR Reduction (vph)	0	82	0	0	0	113
Lane Group Flow (vph)	384	169	252	952	639	75
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.0	20.0	33.0	33.0	26.0	26.0
Effective Green, g (s)	20.0	20.0	33.0	33.0	26.0	26.0
Actuated g/C Ratio	0.31	0.31	0.51	0.51	0.40	0.40
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	549	463	195	918	730	632
v/s Ratio Prot	c0.21		0.06	c0.53	0.35	
v/s Ratio Perm		0.11	c0.59			0.05
v/c Ratio	0.70	0.37	1.29	1.04	0.88	0.12
Uniform Delay, d1	19.8	17.6	16.9	16.0	18.0	12.3
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	3.1	0.2	164.2	39.7	11.4	0.1
Delay (s)	23.0	17.7	181.2	55.7	29.4	12.4
Level of Service	C	B	F	E	C	B
Approach Delay (s)	20.9			82.0	25.5	
Approach LOS	C			F	C	

Intersection Summary			
HCM 2000 Control Delay	49.9	HCM 2000 Level of Service	D
HCM 2000 Volume to Capacity ratio	1.13		
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

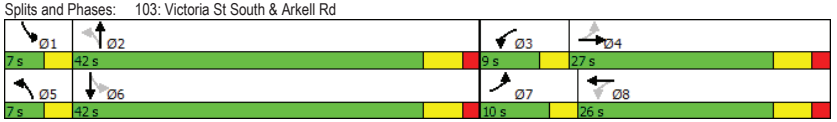
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	380	94	28	153	124	68	33	755	67	34	696	160
Future Volume (vph)	380	94	28	153	124	68	33	755	67	34	696	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.99						1.00	
Frt		0.966			0.947			0.988			0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1781	0	1770	1706	0	1612	1771	0	1687	1758	0
Flt Permitted	0.508			0.679			0.111			0.111		
Satd. Flow (perm)	927	1781	0	1265	1706	0	188	1771	0	197	1758	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		17			30			7			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1319.4	
Travel Time (s)		19.8			17.0			16.1			95.0	
Confl. Peds. (#/hr)	1					1	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Adj. Flow (vph)	380	94	28	153	124	68	33	755	67	34	696	160
Shared Lane Traffic (%)												
Lane Group Flow (vph)	380	122	0	153	192	0	33	822	0	34	856	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	10.0	27.0		9.0	26.0		7.0	42.0		7.0	42.0	
Total Split (%)	11.8%	31.8%		10.6%	30.6%		8.2%	49.4%		8.2%	49.4%	
Maximum Green (s)	7.0	21.0		6.0	20.0		4.0	36.0		4.0	36.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	23.8	13.7		21.8	12.7		43.1	36.1		43.1	36.1	
Actuated g/C Ratio	0.31	0.18		0.28	0.16		0.55	0.46		0.55	0.46	
v/c Ratio	1.07	0.37		0.39	0.63		0.19	1.00		0.18	1.04	
Control Delay	94.4	27.1		22.5	35.0		10.3	54.7		10.1	65.8	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	94.4	27.1		22.5	35.0		10.3	54.7		10.1	65.8	
LOS	F	C		C	D		B	D		B	E	
Approach Delay		78.0			29.4			53.0			63.7	
Approach LOS		E			C			D			E	

Intersection Summary		
Area Type:	Other	
Cycle Length: 85		
Actuated Cycle Length: 77.9		
Natural Cycle: 100		
Control Type: Semi Act-Uncoord		
Maximum v/c Ratio: 1.07		
Intersection Signal Delay: 58.4		Intersection LOS: E
Intersection Capacity Utilization 91.7%		ICU Level of Service F
Analysis Period (min) 15		

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	380	94	28	153	124	68	33	755	67	34	696	160
Future Volume (vph)	380	94	28	153	124	68	33	755	67	34	696	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	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	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1734	1780		1770	1706		1612	1771		1687	1758	
Flt Permitted	0.51	1.00		0.68	1.00		0.11	1.00		0.11	1.00	
Satd. Flow (perm)	927	1780		1264	1706		188	1771		197	1758	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	380	94	28	153	124	68	33	755	67	34	696	160
RTOR Reduction (vph)	0	14	0	0	25	0	0	4	0	0	9	0
Lane Group Flow (vph)	380	108	0	153	167	0	33	818	0	34	847	0
Confl. Peds. (#/hr)	1					1	3					3
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	20.7	13.7		18.7	12.7		40.1	36.1		40.1	36.1	
Effective Green, g (s)	20.7	13.7		18.7	12.7		40.1	36.1		40.1	36.1	
Actuated g/C Ratio	0.27	0.18		0.24	0.16		0.52	0.46		0.52	0.46	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	319	313		342	278		170	821		178	815	
v/s Ratio Prot	c0.11	0.06		0.03	0.10		c0.01	0.46		0.01	c0.48	
v/s Ratio Perm	c0.21			0.07			0.09			0.09		
v/c Ratio	1.19	0.35		0.45	0.60		0.19	1.00		0.19	1.04	
Uniform Delay, d1	27.7	28.1		24.6	30.2		16.0	20.8		14.9	20.8	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	112.9	0.7		0.9	3.6		0.6	30.4		0.5	42.1	
Delay (s)	140.5	28.8		25.5	33.8		16.5	51.2		15.5	63.0	
Level of Service	F	C		C	C		B	D		B	E	
Approach Delay (s)		113.4			30.1			49.8			61.2	
Approach LOS		F			C			D			E	

Intersection Summary				
HCM 2000 Control Delay	63.4	HCM 2000 Level of Service	E	
HCM 2000 Volume to Capacity ratio	1.05			
Actuated Cycle Length (s)	77.8	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	91.7%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	349	10	231	191	18	10	10	229	57	10	11
Future Volume (vph)	4	349	10	231	191	18	10	10	229	57	10	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.994			0.876			0.981	
Flt Protected		0.999			0.974			0.998			0.965	
Satd. Flow (prot)	0	1853	0	0	1803	0	0	1629	0	0	1763	0
Flt Permitted		0.999			0.974			0.998			0.965	
Satd. Flow (perm)	0	1853	0	0	1803	0	0	1629	0	0	1763	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		137.8			87.8			86.3			71.2	
Travel Time (s)		9.9			6.3			6.2			5.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	349	10	231	191	18	10	10	229	57	10	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	363	0	0	440	0	0	249	0	0	78	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization 76.0%		ICU Level of Service D	
Analysis Period (min) 15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	349	10	231	191	18	10	10	229	57	10	11
Future Volume (Veh/h)	4	349	10	231	191	18	10	10	229	57	10	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	349	10	231	191	18	10	10	229	57	10	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					88							
pX, platoon unblocked												
vC, conflicting volume	209			359			1040	1033	354	1258	1029	200
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	209			359			1040	1033	354	1258	1029	200
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			81			94	95	67	29	95	99
cM capacity (veh/h)	1362			1200			168	187	690	81	188	841

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	363	440	249	78
Volume Left	4	231	10	57
Volume Right	10	18	229	11
cSH	1362	1200	560	101
Volume to Capacity	0.00	0.19	0.44	0.77
Queue Length 95th (m)	0.1	5.7	18.2	33.3
Control Delay (s)	0.1	5.5	16.5	112.4
Lane LOS	A	A	C	F
Approach Delay (s)	0.1	5.5	16.5	112.4
Approach LOS			C	F

Intersection Summary					
Average Delay			13.6		
Intersection Capacity Utilization			76.0%	ICU Level of Service	D
Analysis Period (min)			15		

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	56	0	1336	770	19
Future Volume (vph)	0	56	0	1336	770	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.996	
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	3525	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	3525	0
Link Speed (k/h)	50			50	70	
Link Distance (m)	72.9			186.7	822.5	
Travel Time (s)	5.2			13.4	42.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	56	0	1336	770	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	56	0	1336	789	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary				
Area Type:	Other			
Control Type: Unsignalized				
Intersection Capacity Utilization	73.6%		ICU Level of Service	D
Analysis Period (min)	15			

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	56	0	1336	770	19
Future Volume (Veh/h)	0	56	0	1336	770	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	56	0	1336	770	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				187		
pX, platoon unblocked	0.51					
vC, conflicting volume	2116	394	789			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2718	394	789			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	100			
cM capacity (veh/h)	8	605	827			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	56	1336	513	276
Volume Left	0	0	0	0
Volume Right	56	0	0	19
cSH	605	1700	1700	1700
Volume to Capacity	0.09	0.79	0.30	0.16
Queue Length 95th (m)	2.4	0.0	0.0	0.0
Control Delay (s)	11.6	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	11.6	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	78.5	103.6	88.8	33.5	66.8	72.5	95.5	503.4	496.7	24.8	88.8	102.5
Average Queue (m)	47.8	27.1	16.3	13.3	37.2	34.2	93.8	339.9	327.9	6.4	44.7	54.8
95th Queue (m)	81.7	72.6	51.9	28.5	57.9	58.2	109.5	560.0	557.5	17.7	70.6	87.6
Link Distance (m)		260.6	260.6		101.6	101.6		800.0	800.0		137.0	137.0
Upstream Blk Time (%)					0	0						
Queuing Penalty (veh)					0	0						
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	9	0			0		3	72			0	
Queuing Penalty (veh)	6	0			0		17	190			0	

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	B5	SB	SB
Directions Served	L	R	L	T	T	T	R
Maximum Queue (m)	69.8	21.7	136.2	173.1	18.2	175.8	127.4
Average Queue (m)	64.5	17.5	44.4	105.2	1.4	109.0	26.7
95th Queue (m)	75.6	19.9	108.4	164.7	12.6	175.8	93.7
Link Distance (m)	65.2			155.2	1300.7	167.7	167.7
Upstream Blk Time (%)	22		0	2		3	0
Queuing Penalty (veh)	138		0	19		13	2
Storage Bay Dist (m)		10.0	100.0				
Storage Blk Time (%)	59	24	0	15			
Queuing Penalty (veh)	147	93	0	37			

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	82.4	281.4	49.5	61.0	82.3	230.3	82.3	998.5
Average Queue (m)	82.4	264.0	23.6	31.0	19.0	201.7	19.7	592.4
95th Queue (m)	82.6	312.1	43.0	52.0	65.6	277.2	69.9	1083.1
Link Distance (m)		264.8		226.2		213.2		1300.7
Upstream Blk Time (%)		86				51		
Queuing Penalty (veh)		0				0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)	97	2		0	0	52	0	57
Queuing Penalty (veh)	118	6		0	0	17	0	19

Intersection: 201: Commercial Driveway/Site Driveway & MacAlister Blvd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	49.1	47.2	89.3	42.2
Average Queue (m)	17.4	18.3	61.7	17.2
95th Queue (m)	41.4	37.3	104.3	33.5
Link Distance (m)	129.2	65.2	77.9	62.6
Upstream Blk Time (%)		0	40	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 202: Victoria Rd South & Site Driveway

Movement	EB	SB	SB
Directions Served	R	T	TR
Maximum Queue (m)	17.2	42.9	23.6
Average Queue (m)	8.2	4.3	1.5
95th Queue (m)	14.9	27.4	14.3
Link Distance (m)	58.9	800.0	800.0
Upstream Blk Time (%)			
Queuing Penalty (veh)			
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

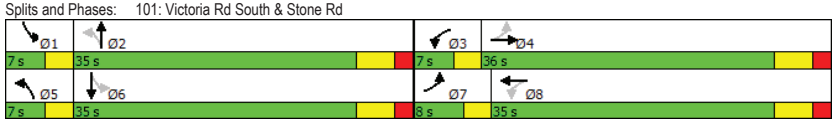
Zone wide Queuing Penalty: 823

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	368	481	218	71	279	16	108	843	74	42	818	257
Future Volume (vph)	368	481	218	71	279	16	108	843	74	42	818	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.953			0.992			0.988			0.964	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3396	0	1530	3468	0	1770	3483	0	1752	3395	0
Flt Permitted	0.541			0.245			0.152			0.187		
Satd. Flow (perm)	1018	3396	0	394	3468	0	282	3483	0	345	3395	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		95			7			12			53	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							22					22
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Adj. Flow (vph)	368	481	218	71	279	16	108	843	74	42	818	257
Shared Lane Traffic (%)												
Lane Group Flow (vph)	368	699	0	71	295	0	108	917	0	42	1075	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	8.0	36.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.4%	42.4%		8.2%	41.2%		8.2%	41.2%		8.2%	41.2%	
Maximum Green (s)	5.0	30.0		4.0	29.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	26.9	18.8		24.9	17.8		33.4	26.3		33.4	26.3	
Actuated g/C Ratio	0.38	0.26		0.35	0.25		0.47	0.37		0.47	0.37	
v/c Ratio	0.84	0.73		0.35	0.34		0.50	0.71		0.17	0.84	
Control Delay	38.1	25.5		19.1	22.7		19.5	23.1		11.7	27.3	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	38.1	25.5		19.1	22.7		19.5	23.1		11.7	27.3	
LOS	D	C		B	C		B	C		B	C	
Approach Delay		29.9			22.0			22.8			26.8	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 85			
Actuated Cycle Length: 71.5			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 26.1		Intersection LOS: C	
Intersection Capacity Utilization 82.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	368	481	218	71	279	16	108	843	74	42	818	257
Future Volume (vph)	368	481	218	71	279	16	108	843	74	42	818	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3397		1530	3467		1769	3483		1752	3397	
Flt Permitted	0.54	1.00		0.25	1.00		0.15	1.00		0.19	1.00	
Satd. Flow (perm)	1018	3397		395	3467		283	3483		345	3397	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	368	481	218	71	279	16	108	843	74	42	818	257
RTOR Reduction (vph)	0	70	0	0	5	0	0	8	0	0	33	0
Lane Group Flow (vph)	368	629	0	71	290	0	108	909	0	42	1042	0
Confl. Peds. (#/hr)							22					22
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	23.9	18.8		21.9	17.8		30.4	26.3		30.4	26.3	
Effective Green, g (s)	23.9	18.8		21.9	17.8		30.4	26.3		30.4	26.3	
Actuated g/C Ratio	0.34	0.26		0.31	0.25		0.43	0.37		0.43	0.37	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	396	895		186	865		206	1284		228	1253	
v/s Ratio Prot	c0.07	0.19		0.02	0.08		c0.03	0.26		0.01	c0.31	
v/s Ratio Perm	c0.24			0.10			0.19			0.07		
v/c Ratio	0.93	0.70		0.38	0.33		0.52	0.71		0.18	0.83	
Uniform Delay, d1	21.9	23.7		18.3	21.9		14.3	19.2		12.9	20.5	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	27.8	2.5		1.3	0.2		2.4	1.8		0.4	4.8	
Delay (s)	49.7	26.2		19.6	22.1		16.7	21.0		13.2	25.3	
Level of Service	D	C		B	C		B	C		B	C	
Approach Delay (s)		34.3			21.6			20.6			24.9	
Approach LOS		C			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	26.1	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.87				
Actuated Cycle Length (s)	71.3	Sum of lost time (s)	18.0		
Intersection Capacity Utilization	82.6%	ICU Level of Service	E		
Analysis Period (min)	15				

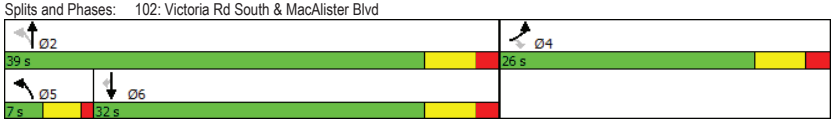
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	222	156	218	802	811	273
Future Volume (vph)	222	156	218	802	811	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	10.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1752	1615	1805	1845	1863	1615
Flt Permitted	0.950		0.133			
Satd. Flow (perm)	1752	1581	253	1845	1863	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		126				273
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			133.8	186.7	
Travel Time (s)	6.3			6.9	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Adj. Flow (vph)	222	156	218	802	811	273
Shared Lane Traffic (%)						
Lane Group Flow (vph)	222	156	218	802	811	273
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	7.0	39.0	32.0	32.0
Total Split (%)	40.0%	40.0%	10.8%	60.0%	49.2%	49.2%
Maximum Green (s)	20.0	20.0	3.0	33.0	26.0	26.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.0	20.0	35.0	33.0	26.0	26.0
Actuated g/C Ratio	0.31	0.31	0.54	0.51	0.40	0.40
v/c Ratio	0.41	0.27	1.05	0.86	1.09	0.34
Control Delay	20.7	6.8	96.0	25.7	82.4	3.3
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	20.7	6.8	96.0	25.7	82.4	3.3
LOS	C	A	F	C	F	A
Approach Delay	15.0			40.7	62.5	
Approach LOS	B			D	E	

Intersection Summary			
Area Type:	Other		
Cycle Length: 65			
Actuated Cycle Length: 65			
Natural Cycle: 80			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 1.09			
Intersection Signal Delay: 46.3		Intersection LOS: D	
Intersection Capacity Utilization 84.8%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	222	156	218	802	811	273
Future Volume (vph)	222	156	218	802	811	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1581	1805	1845	1863	1581
Flt Permitted	0.95	1.00	0.13	1.00	1.00	1.00
Satd. Flow (perm)	1752	1581	253	1845	1863	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	222	156	218	802	811	273
RTOR Reduction (vph)	0	87	0	0	0	164
Lane Group Flow (vph)	222	69	218	802	811	109
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.0	20.0	33.0	33.0	26.0	26.0
Effective Green, g (s)	20.0	20.0	33.0	33.0	26.0	26.0
Actuated g/C Ratio	0.31	0.31	0.51	0.51	0.40	0.40
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	539	486	200	936	745	632
v/s Ratio Prot	c0.13		0.05	c0.43	0.44	
v/s Ratio Perm		0.04	c0.50			0.07
v/c Ratio	0.41	0.14	1.09	0.86	1.09	0.17
Uniform Delay, d1	17.8	16.3	18.2	13.9	19.5	12.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.2	0.0	89.7	7.8	59.7	0.1
Delay (s)	18.0	16.3	107.9	21.7	79.2	12.7
Level of Service	B	B	F	C	E	B
Approach Delay (s)	17.3			40.2	62.4	
Approach LOS	B			D	E	

Intersection Summary				
HCM 2000 Control Delay	46.4	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.88			
Actuated Cycle Length (s)	65.0	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	84.8%	ICU Level of Service	E	
Analysis Period (min)	15			

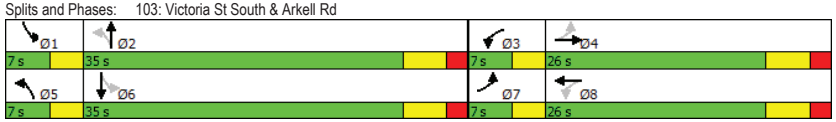
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	120	33	136	138	44	25	785	190	71	724	172
Future Volume (vph)	190	120	33	136	138	44	25	785	190	71	724	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor											0.99	
Frt		0.968			0.964			0.971			0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1805	0	1805	1798	0	1805	1799	0
Flt Permitted	0.631			0.660			0.137			0.137		
Satd. Flow (perm)	1175	1811	0	1254	1805	0	260	1798	0	260	1799	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		18			21			19			19	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1359.6	
Travel Time (s)		19.8			17.0			16.1			97.9	
Confl. Peds. (#/hr)							6					6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Adj. Flow (vph)	190	120	33	136	138	44	25	785	190	71	724	172
Shared Lane Traffic (%)												
Lane Group Flow (vph)	190	153	0	136	182	0	25	975	0	71	896	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		7.0	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	7.0	26.0		7.0	26.0		7.0	35.0		7.0	35.0	
Total Split (%)	9.3%	34.7%		9.3%	34.7%		9.3%	46.7%		9.3%	46.7%	
Maximum Green (s)	4.0	20.0		4.0	20.0		4.0	29.0		4.0	29.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	18.2	11.2		18.2	11.2		36.1	29.1		36.1	29.1	
Actuated g/C Ratio	0.27	0.17		0.27	0.17		0.54	0.44		0.54	0.44	
v/c Ratio	0.53	0.48		0.36	0.57		0.11	1.22		0.30	1.12	
Control Delay	24.1	26.8		19.8	29.3		7.8	132.8		10.2	92.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	24.1	26.8		19.8	29.3		7.8	132.8		10.2	92.9	
LOS	C	C		B	C		A	F		B	F	
Approach Delay		25.3			25.2			129.7			86.8	
Approach LOS		C			C			F			F	

Intersection Summary			
Area Type:	Other		
Cycle Length: 75			
Actuated Cycle Length: 66.3			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.22			
Intersection Signal Delay: 87.6		Intersection LOS: F	
Intersection Capacity Utilization 92.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	120	33	136	138	44	25	785	190	71	724	172
Future Volume (vph)	190	120	33	136	138	44	25	785	190	71	724	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1810		1805	1805		1805	1798		1805	1800	
Flt Permitted	0.63	1.00		0.66	1.00		0.14	1.00		0.14	1.00	
Satd. Flow (perm)	1176	1810		1254	1805		261	1798		261	1800	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	190	120	33	136	138	44	25	785	190	71	724	172
RTOR Reduction (vph)	0	15	0	0	17	0	0	11	0	0	11	0
Lane Group Flow (vph)	190	138	0	136	165	0	25	964	0	71	885	0
Confl. Peds. (#/hr)							6					6
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	15.2	11.2		15.2	11.2		33.1	29.1		33.1	29.1	
Effective Green, g (s)	15.2	11.2		15.2	11.2		33.1	29.1		33.1	29.1	
Actuated g/C Ratio	0.23	0.17		0.23	0.17		0.50	0.44		0.50	0.44	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	305	305		320	304		223	789		223	790	
v/s Ratio Prot	c0.04	0.08		0.03	0.09		0.01	c0.54		c0.02	0.49	
v/s Ratio Perm	c0.11			0.07			0.05			0.14		
v/c Ratio	0.62	0.45		0.42	0.54		0.11	1.22		0.32	1.12	
Uniform Delay, d1	22.3	24.8		21.3	25.2		13.2	18.6		13.6	18.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	3.9	1.1		0.9	2.0		0.2	111.3		0.8	70.6	
Delay (s)	26.2	25.9		22.2	27.2		13.5	129.9		14.4	89.2	
Level of Service	C	C		C	C		B	F		B	F	
Approach Delay (s)		26.1			25.0			127.0			83.7	
Approach LOS		C			C			F			F	

Intersection Summary					
HCM 2000 Control Delay	85.5	HCM 2000 Level of Service		F	
HCM 2000 Volume to Capacity ratio	0.96				
Actuated Cycle Length (s)	66.3	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	92.8%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

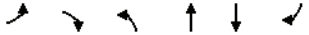
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	175	7	163	271	57	7	10	167	36	10	7
Future Volume (vph)	11	175	7	163	271	57	7	10	167	36	10	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.984			0.877			0.982	
Flt Protected		0.997			0.984			0.998			0.967	
Satd. Flow (prot)	0	1848	0	0	1804	0	0	1630	0	0	1769	0
Flt Permitted		0.997			0.984			0.998			0.967	
Satd. Flow (perm)	0	1848	0	0	1804	0	0	1630	0	0	1769	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		137.8			87.8			71.9			55.7	
Travel Time (s)		9.9			6.3			5.2			4.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	11	175	7	163	271	57	7	10	167	36	10	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	193	0	0	491	0	0	184	0	0	53	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			0.0			0.0	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	175	7	163	271	57	7	10	167	36	10	7
Future Volume (Veh/h)	11	175	7	163	271	57	7	10	167	36	10	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	175	7	163	271	57	7	10	167	36	10	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)					88							
pX, platoon unblocked												
vC, conflicting volume	328			182			838	854	178	998	830	300
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	328			182			838	854	178	998	830	300
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			88			97	96	81	77	96	99
cM capacity (veh/h)	1232			1393			249	259	864	158	268	740

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	193	491	184	53
Volume Left	11	163	7	36
Volume Right	7	57	167	7
cSH	1232	1393	708	193
Volume to Capacity	0.01	0.12	0.26	0.28
Queue Length 95th (m)	0.2	3.2	8.3	8.6
Control Delay (s)	0.5	3.4	11.9	30.6
Lane LOS	A	A	B	D
Approach Delay (s)	0.5	3.4	11.9	30.6
Approach LOS			B	D

Intersection Summary				
Average Delay		6.1		
Intersection Capacity Utilization		64.9%	ICU Level of Service	C
Analysis Period (min)		15		



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	35	0	1024	1049	58
Future Volume (vph)	0	35	0	1024	1049	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.992	
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	3511	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	3511	0
Link Speed (k/h)	50			50	70	
Link Distance (m)	60.3			186.7	822.5	
Travel Time (s)	4.3			13.4	42.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	35	0	1024	1049	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	35	0	1024	1107	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	35	0	1024	1049	58
Future Volume (Veh/h)	0	35	0	1024	1049	58
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	35	0	1024	1049	58
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				187		
pX, platoon unblocked	0.57					
vC, conflicting volume	2102	554	1107			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2560	554	1107			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	100			
cM capacity (veh/h)	12	476	626			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	35	1024	699	408
Volume Left	0	0	0	0
Volume Right	35	0	0	58
cSH	476	1700	1700	1700
Volume to Capacity	0.07	0.60	0.41	0.24
Queue Length 95th (m)	1.9	0.0	0.0	0.0
Control Delay (s)	13.2	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	13.2	0.0	0.0	
Approach LOS	B			

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		57.2%	ICU Level of Service	B
Analysis Period (min)		15		

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	81.9	133.7	101.3	35.8	42.6	38.0	85.7	155.2	122.8	64.2	120.0	132.0
Average Queue (m)	52.2	59.0	42.0	14.9	24.0	18.6	33.5	83.8	68.5	12.7	71.6	78.1
95th Queue (m)	79.9	106.0	86.0	29.4	36.7	34.3	88.3	140.9	123.8	45.2	119.8	126.2
Link Distance (m)		260.6	260.6		101.6	101.6		799.5	799.5		137.0	137.0
Upstream Blk Time (%)											2	2
Queuing Penalty (veh)											0	0
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	3	3					0	13			8	
Queuing Penalty (veh)	7	10					0	14			3	

Intersection: 101: Victoria Rd South & Stone Rd

Movement	B13
Directions Served	T
Maximum Queue (m)	24.0
Average Queue (m)	5.4
95th Queue (m)	43.6
Link Distance (m)	109.4
Upstream Blk Time (%)	2
Queuing Penalty (veh)	0
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	R
Maximum Queue (m)	64.6	17.5	41.3	98.9	179.0	182.6
Average Queue (m)	32.8	15.5	22.4	49.7	172.4	133.9
95th Queue (m)	56.7	21.2	36.6	82.9	176.8	238.6
Link Distance (m)	65.0			115.1	168.2	168.2
Upstream Blk Time (%)	1				46	9
Queuing Penalty (veh)	2				247	51
Storage Bay Dist (m)		10.0	100.0			
Storage Blk Time (%)	30	12		0		
Queuing Penalty (veh)	46	26		0		

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	49.1	43.7	38.4	50.8	82.3	231.1	82.4	883.7
Average Queue (m)	26.7	20.8	18.0	25.4	18.3	220.9	46.0	560.6
95th Queue (m)	42.3	36.2	31.5	43.1	69.0	228.5	105.3	939.8
Link Distance (m)		264.8		226.2		213.2		1340.8
Upstream Blk Time (%)						77		
Queuing Penalty (veh)						0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)					0	62	0	60
Queuing Penalty (veh)					0	16	0	43

Intersection: 201: Commercial Driveway/Site Driveway & MacAlister Blvd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	16.0	36.6	30.4	18.2
Average Queue (m)	1.3	10.1	14.9	8.6
95th Queue (m)	7.9	25.7	25.0	16.0
Link Distance (m)	128.6	65.0	63.4	46.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 202: Victoria Rd South & Site Driveway

Movement	EB	SB	SB
Directions Served	R	T	TR
Maximum Queue (m)	39.8	555.8	554.7
Average Queue (m)	13.4	328.0	318.0
95th Queue (m)	36.5	591.3	589.0
Link Distance (m)	46.1	799.5	799.5
Upstream Blk Time (%)	9		
Queuing Penalty (veh)	0		
Storage Bay Dist (m)			
Storage Blk Time (%)			
Queuing Penalty (veh)			

Zone Summary

Zone wide Queuing Penalty: 467

Appendix I

Traffic Signal Warrants

Signal Warrant Calculation (OTM Book 12)

Horizon Year: Total (2030)

Region/City/Township: Guelph, Ontario

Major Street: MacAlister Blvd
Minor Street: Site Driveway

North / South (Y/N): N

Number of Approach Lanes (1/2): 1
Tee Intersection Configuration (Y/N): N
Flow Conditions (R/F): R

Land Use North Side (I/C/R): R
Land Use South Side (I/C/R): C
PM Forecast Only (Y/N): N

Overall Warrant		
150% Satisfied:	NO	Warrant for new intersections with forecast traffic
120% Satisfied:	NO	Warrant for existing intersections with forecast traffic
100% Satisfied:	NO	Warrant for existing intersections with existing traffic

Time Period	MAJOR STREET						MINOR STREET					
	MacAlister Blvd						***Site Driveway***					
	WESTBOUND			EASTBOUND			NORTHBOUND			SOUTHBOUND		
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right
AM Peak Hour	231	191	18	4	349	10	10	10	229	57	10	11
PM Peak Hour	183	271	57	11	175	7	7	10	167	36	10	7

Average Hourly Volumes			
VOLUME	PM	SAT	AHV
1A - All	1,130	941	518
1B - Minor	327	237	141
2A - Major	803	704	377
2B - Cross	77	53	33

WARRANT 1 - MINIMUM VEHICULAR VOLUME

	APPROACH LANES	1		2 OR MORE		AVERAGE
1A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
			X			
	ALL APPROACHES	480	720	600	900	518
		% FULFILLED				72%

	APPROACH LANES	1		2 OR MORE		AVERAGE
1B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
			X			
	MINOR STREET APPROACHES	120	170	120	170	141
		% FULFILLED				83%

WARRANT 2 - DELAY TO CROSS TRAFFIC

	APPROACH LANES	1		2 OR MORE		AVERAGE
2A	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
			X			
	MAJOR STREET APPROACHES	480	720	600	900	377
		% FULFILLED				52%

	APPROACH LANES	1		2 OR MORE		AVERAGE
2B	FLOW CONDITION	FREE FLOW	REST. FLOW	FREE FLOW	REST. FLOW	HOUR PERIOD
			X			
	TRAFFIC CROSSING MAJOR STREET	50	75	50	75	33
		% FULFILLED				43%

1A - MINIMUM VEHICULAR VOLUME: Total vehicle volume on all approaches for average day
1B - MINIMUM VEHICULAR VOLUME: Total vehicle volume on minor streets
2A - DELAY TO CROSS TRAFFIC: Total vehicle volume on major street for average day
2B - DELAY TO CROSS TRAFFIC: Total vehicle and pedestrian volume crossing major street: comprising: (1) lefts from both minor street, (2) heaviest through from minor street, (3) 50% of heavier left turn from major street when following criteria met: (a)

Appendix J

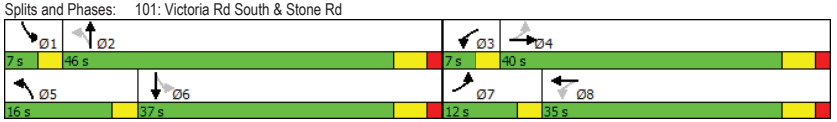
2030 Total Traffic Operations Reports with Improvements

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	246	137	93	68	491	36	263	1014	60	22	628	306
Future Volume (vph)	246	137	93	68	491	36	263	1014	60	22	628	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.939			0.990			0.992			0.951	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	3121	0	1543	3499	0	1787	3359	0	1530	3272	0
Flt Permitted	0.259			0.608			0.133			0.187		
Satd. Flow (perm)	473	3121	0	987	3499	0	250	3359	0	301	3272	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		93			8			7			86	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							5					5
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Adj. Flow (vph)	246	137	93	68	491	36	263	1014	60	22	628	306
Shared Lane Traffic (%)												
Lane Group Flow (vph)	246	230	0	68	527	0	263	1074	0	22	934	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	12.0	40.0		7.0	35.0		16.0	46.0		7.0	37.0	
Total Split (%)	12.0%	40.0%		7.0%	35.0%		16.0%	46.0%		7.0%	37.0%	
Maximum Green (s)	9.0	34.0		4.0	29.0		13.0	40.0		4.0	31.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	33.4	23.2		25.3	18.2		45.8	35.6		34.2	27.1	
Actuated g/C Ratio	0.39	0.27		0.30	0.21		0.54	0.42		0.40	0.32	
v/c Ratio	0.77	0.25		0.21	0.70		0.73	0.76		0.12	0.85	
Control Delay	38.1	15.3		20.2	36.4		29.0	25.6		12.6	33.6	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	38.1	15.3		20.2	36.4		29.0	25.6		12.6	33.6	
LOS	D	B		C	D		C	C		B	C	
Approach Delay		27.1			34.6			26.2			33.1	
Approach LOS		C			C			C			C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 85.2		
Natural Cycle: 85		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.85		
Intersection Signal Delay: 29.8		Intersection LOS: C
Intersection Capacity Utilization 86.9%		ICU Level of Service E
Analysis Period (min) 15		

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	246	137	93	68	491	36	263	1014	60	22	628	306
Future Volume (vph)	246	137	93	68	491	36	263	1014	60	22	628	306
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.94		1.00	0.99		1.00	0.99		1.00	0.95	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	3123		1543	3498		1787	3357		1530	3272	
Flt Permitted	0.26	1.00		0.61	1.00		0.13	1.00		0.19	1.00	
Satd. Flow (perm)	473	3123		988	3498		250	3357		300	3272	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	246	137	93	68	491	36	263	1014	60	22	628	306
RTOR Reduction (vph)	0	68	0	0	6	0	0	4	0	0	59	0
Lane Group Flow (vph)	246	162	0	68	521	0	263	1070	0	22	875	0
Confl. Peds. (#/hr)							5					5
Heavy Vehicles (%)	4%	9%	8%	17%	2%	4%	1%	5%	34%	18%	5%	3%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.3	23.2		22.3	18.2		42.7	35.6		31.2	27.1	
Effective Green, g (s)	30.3	23.2		22.3	18.2		42.7	35.6		31.2	27.1	
Actuated g/C Ratio	0.36	0.27		0.26	0.21		0.50	0.42		0.37	0.32	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	303	852		285	748		353	1405		169	1043	
v/s Ratio Prot	c0.09	0.05		0.01	0.15		c0.11	0.32		0.01	c0.27	
v/s Ratio Perm	c0.20			0.05			0.26			0.04		
v/c Ratio	0.81	0.19		0.24	0.70		0.75	0.76		0.13	0.84	
Uniform Delay, d1	21.2	23.7		24.2	30.8		16.6	21.1		17.7	26.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	15.1	0.1		0.4	2.8		8.3	2.5		0.4	6.1	
Delay (s)	36.3	23.8		24.6	33.7		24.9	23.6		18.0	33.0	
Level of Service	D	C		C	C		C	C		B	C	
Approach Delay (s)		30.3			32.6			23.8			32.6	
Approach LOS		C			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	28.8	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.84			
Actuated Cycle Length (s)	85.0	Sum of lost time (s)	18.0	
Intersection Capacity Utilization	86.9%	ICU Level of Service	E	
Analysis Period (min)	15			

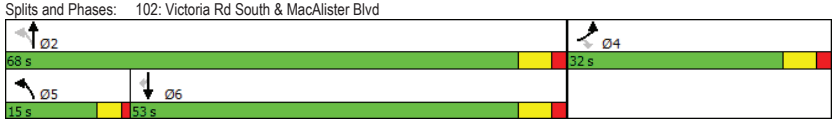
c Critical Lane Group

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	384	251	252	952	639	188
Future Volume (vph)	384	251	252	952	639	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1787	1538	1656	1810	1827	1615
Flt Permitted	0.950		0.161			
Satd. Flow (perm)	1787	1505	281	1810	1827	1581
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		251				188
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			174.1	186.7	
Travel Time (s)	6.3			9.0	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Adj. Flow (vph)	384	251	252	952	639	188
Shared Lane Traffic (%)						
Lane Group Flow (vph)	384	251	252	952	639	188
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	32.0	32.0	15.0	68.0	53.0	53.0
Total Split (%)	32.0%	32.0%	15.0%	68.0%	53.0%	53.0%
Maximum Green (s)	26.0	26.0	11.0	62.0	47.0	47.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	23.2	23.2	50.6	48.6	35.5	35.5
Actuated g/C Ratio	0.28	0.28	0.60	0.58	0.42	0.42
v/c Ratio	0.78	0.42	0.81	0.91	0.83	0.24
Control Delay	43.4	6.4	31.1	29.8	31.9	3.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	43.4	6.4	31.1	29.8	31.9	3.2
LOS	D	A	C	C	C	A
Approach Delay	28.8			30.0	25.4	
Approach LOS	C			C	C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 84.2			
Natural Cycle: 75			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.91			
Intersection Signal Delay: 28.3		Intersection LOS: C	
Intersection Capacity Utilization 82.2%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	384	251	252	952	639	188
Future Volume (vph)	384	251	252	952	639	188
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1787	1505	1656	1810	1827	1581
Flt Permitted	0.95	1.00	0.16	1.00	1.00	1.00
Satd. Flow (perm)	1787	1505	281	1810	1827	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	384	251	252	952	639	188
RTOR Reduction (vph)	0	181	0	0	0	108
Lane Group Flow (vph)	384	70	252	952	639	80
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	1%	5%	9%	5%	4%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	23.2	23.2	48.5	48.5	35.6	35.6
Effective Green, g (s)	23.2	23.2	48.5	48.5	35.6	35.6
Actuated g/C Ratio	0.28	0.28	0.58	0.58	0.43	0.43
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	495	417	309	1048	777	672
v/s Ratio Prot	c0.21		0.09	c0.53	0.35	
v/s Ratio Perm		0.05	0.39			0.05
v/c Ratio	0.78	0.17	0.82	0.91	0.82	0.12
Uniform Delay, d1	27.9	22.9	14.2	15.6	21.3	14.6
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	6.8	0.1	14.4	11.2	7.0	0.1
Delay (s)	34.7	23.0	28.6	26.9	28.3	14.6
Level of Service	C	C	C	C	C	B
Approach Delay (s)	30.1			27.2	25.2	
Approach LOS	C			C	C	

Intersection Summary			
HCM 2000 Control Delay	27.3	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.92		
Actuated Cycle Length (s)	83.7	Sum of lost time (s)	16.0
Intersection Capacity Utilization	82.2%	ICU Level of Service	E
Analysis Period (min)	15		

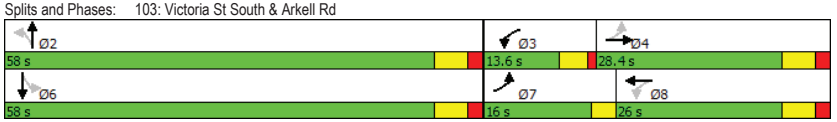
c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	380	94	28	153	124	68	33	755	67	34	696	160
Future Volume (vph)	380	94	28	153	124	68	33	755	67	34	696	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor	1.00				0.99						1.00	
Frt		0.966			0.947			0.988			0.972	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1781	0	1770	1706	0	1612	1771	0	1687	1758	0
Flt Permitted	0.417			0.679			0.103			0.128		
Satd. Flow (perm)	761	1781	0	1265	1706	0	175	1771	0	227	1758	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		14			25			7			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1319.4	
Travel Time (s)		19.8			17.0			16.1			95.0	
Confl. Peds. (#/hr)	1					1	3					3
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Adj. Flow (vph)	380	94	28	153	124	68	33	755	67	34	696	160
Shared Lane Traffic (%)												
Lane Group Flow (vph)	380	122	0	153	192	0	33	822	0	34	856	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		2	2		6	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		5.0	5.0		5.0	5.0		5.0	5.0	
Minimum Split (s)	7.0	26.0		9.5	26.0		34.0	34.0		34.0	34.0	
Total Split (s)	16.0	28.4		13.6	26.0		58.0	58.0		58.0	58.0	
Total Split (%)	16.0%	28.4%		13.6%	26.0%		58.0%	58.0%		58.0%	58.0%	
Maximum Green (s)	13.0	22.4		9.1	20.0		52.0	52.0		52.0	52.0	
Yellow Time (s)	3.0	4.0		3.5	4.0		4.0	4.0		4.0	4.0	
All-Red Time (s)	0.0	2.0		1.0	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	6.0		4.5	6.0		6.0	6.0		6.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag							
Lead-Lag Optimize?	Yes	Yes		Yes	Yes							
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0		13.0	13.0		13.0	13.0	
Flash Dont Walk (s)		13.0			13.0		15.0	15.0		15.0	15.0	
Pedestrian Calls (#/hr)		0			0		0	0		0	0	
Act Effct Green (s)	33.0	17.1		24.3	14.1		46.3	46.3		46.3	46.3	
Actuated g/C Ratio	0.37	0.19		0.27	0.16		0.52	0.52		0.52	0.52	
v/c Ratio	0.89	0.35		0.39	0.66		0.36	0.89		0.29	0.93	
Control Delay	50.0	31.9		25.0	43.1		27.4	32.7		20.8	37.4	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	50.0	31.9		25.0	43.1		27.4	32.7		20.8	37.4	
LOS	D	C		C	D		C	C		C	D	
Approach Delay		45.6			35.1			32.5			36.7	
Approach LOS		D			D			C			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100			
Actuated Cycle Length: 88.9			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.93			
Intersection Signal Delay: 36.8		Intersection LOS: D	
Intersection Capacity Utilization 91.7%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	380	94	28	153	124	68	33	755	67	34	696	160
Future Volume (vph)	380	94	28	153	124	68	33	755	67	34	696	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		4.5	6.0		6.0	6.0		6.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	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	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.95		1.00	0.99		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1735	1780		1770	1706		1612	1771		1687	1758	
Flt Permitted	0.42	1.00		0.68	1.00		0.10	1.00		0.13	1.00	
Satd. Flow (perm)	761	1780		1264	1706		175	1771		228	1758	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	380	94	28	153	124	68	33	755	67	34	696	160
RTOR Reduction (vph)	0	11	0	0	21	0	0	3	0	0	8	0
Lane Group Flow (vph)	380	111	0	153	171	0	33	819	0	34	848	0
Confl. Peds. (#/hr)	1					1	3					3
Heavy Vehicles (%)	4%	4%	0%	2%	5%	4%	12%	6%	6%	7%	4%	7%
Turn Type	pm+pt	NA		pm+pt	NA		Perm	NA		Perm	NA	
Protected Phases	7	4		3	8			2			6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	30.4	17.2		22.8	14.1		46.3	46.3		46.3	46.3	
Effective Green, g (s)	30.4	17.2		22.8	14.1		46.3	46.3		46.3	46.3	
Actuated g/C Ratio	0.34	0.19		0.26	0.16		0.52	0.52		0.52	0.52	
Clearance Time (s)	3.0	6.0		4.5	6.0		6.0	6.0		6.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	406	345		374	271		91	924		119	917	
v/s Ratio Prot	c0.14	0.06		0.04	0.10			0.46			c0.48	
v/s Ratio Perm	c0.18			0.06			0.19			0.15		
v/c Ratio	0.94	0.32		0.41	0.63		0.36	0.89		0.29	0.92	
Uniform Delay, d1	26.0	30.7		26.8	34.9		12.5	18.9		11.9	19.6	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	28.8	0.5		0.7	4.7		2.5	10.2		1.3	14.7	
Delay (s)	54.8	31.3		27.5	39.6		15.0	29.1		13.2	34.2	
Level of Service	D	C		C	D		B	C		B	C	
Approach Delay (s)		49.1			34.2			28.5			33.4	
Approach LOS		D			C			C			C	

Intersection Summary				
HCM 2000 Control Delay	35.0	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.98			
Actuated Cycle Length (s)	88.7	Sum of lost time (s)	16.5	
Intersection Capacity Utilization	91.7%	ICU Level of Service	F	
Analysis Period (min)	15			

c Critical Lane Group

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	4	349	10	231	191	18	10	10	229	57	10	11
Future Volume (vph)	4	349	10	231	191	18	10	10	229	57	10	11
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		0.0	0.0		0.0	25.0		0.0
Storage Lanes	0		0	0		0	0		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.996			0.994			0.876			0.921	
Flt Protected		0.999			0.974			0.998		0.950		
Satd. Flow (prot)	0	1853	0	0	1803	0	0	1629	0	1770	1716	0
Flt Permitted		0.999			0.974			0.998		0.950		
Satd. Flow (perm)	0	1853	0	0	1803	0	0	1629	0	1770	1716	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		137.8			87.8			86.3			71.2	
Travel Time (s)		9.9			6.3			6.2			5.1	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	4	349	10	231	191	18	10	10	229	57	10	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	363	0	0	440	0	0	249	0	57	21	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	75.0%	ICU Level of Service	D
Analysis Period (min)	15		

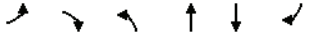
Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	4	349	10	231	191	18	10	10	229	57	10	11
Future Volume (Veh/h)	4	349	10	231	191	18	10	10	229	57	10	11
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	4	349	10	231	191	18	10	10	229	57	10	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type		None			None							
Median storage veh)												
Upstream signal (m)					88							
pX, platoon unblocked												
vC, conflicting volume	209			359			1040	1033	354	1258	1029	200
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	209			359			1040	1033	354	1258	1029	200
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	100			81			94	95	67	29	95	99
cM capacity (veh/h)	1362			1200			168	187	690	81	188	841

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	363	440	249	57	21
Volume Left	4	231	10	57	0
Volume Right	10	18	229	0	11
cSH	1362	1200	560	81	317
Volume to Capacity	0.00	0.19	0.44	0.71	0.07
Queue Length 95th (m)	0.1	5.7	18.2	27.0	1.7
Control Delay (s)	0.1	5.5	16.5	120.1	17.2
Lane LOS	A	A	C	F	C
Approach Delay (s)	0.1	5.5	16.5	92.4	
Approach LOS			C	F	

Intersection Summary					
Average Delay	12.2				
Intersection Capacity Utilization	75.0%	ICU Level of Service	D		
Analysis Period (min)	15				

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	56	0	1336	770	19
Future Volume (vph)	0	56	0	1336	770	19
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.996	
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	3525	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	3525	0
Link Speed (k/h)	50			50	70	
Link Distance (m)	72.9			186.7	822.5	
Travel Time (s)	5.2			13.4	42.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	56	0	1336	770	19
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	56	0	1336	789	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		



Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	56	0	1336	770	19
Future Volume (Veh/h)	0	56	0	1336	770	19
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	56	0	1336	770	19
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				187		
pX, platoon unblocked	0.46					
vC, conflicting volume	2116	394	789			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2847	394	789			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	91	100			
cM capacity (veh/h)	6	605	827			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	56	1336	513	276
Volume Left	0	0	0	0
Volume Right	56	0	0	19
cSH	605	1700	1700	1700
Volume to Capacity	0.09	0.79	0.30	0.16
Queue Length 95th (m)	2.4	0.0	0.0	0.0
Control Delay (s)	11.6	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	11.6	0.0	0.0	
Approach LOS	B			

Intersection Summary			
Average Delay	0.3		
Intersection Capacity Utilization	73.6%	ICU Level of Service	D
Analysis Period (min)	15		

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	B3	NB	NB	NB	SB	SB
Directions Served	L	T	TR	L	T	TR	T	L	T	TR	L	T
Maximum Queue (m)	82.4	146.8	116.6	53.3	90.1	90.5	12.6	95.5	646.3	644.0	23.6	95.4
Average Queue (m)	55.6	49.9	31.6	15.7	45.6	44.0	0.4	92.5	425.0	413.5	6.3	59.9
95th Queue (m)	93.3	136.9	105.8	40.2	75.2	75.0	8.9	113.8	696.8	701.9	16.7	88.3
Link Distance (m)		260.6	260.6		101.6	101.6	112.7		800.0	800.0		137.0
Upstream Blk Time (%)					0	1						
Queuing Penalty (veh)					0	0						
Storage Bay Dist (m)	75.0			75.0				88.0			85.0	
Storage Blk Time (%)	21	0		0	2			0	70			1
Queuing Penalty (veh)	14	1		0	1			2	183			0

Intersection: 101: Victoria Rd South & Stone Rd

Movement	SB
Directions Served	TR
Maximum Queue (m)	104.9
Average Queue (m)	65.7
95th Queue (m)	93.4
Link Distance (m)	137.0
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	B5	SB	SB
Directions Served	L	R	L	T	T	T	R
Maximum Queue (m)	69.8	57.5	110.8	141.8	12.7	151.7	29.6
Average Queue (m)	58.7	29.3	45.2	76.8	0.8	73.3	12.7
95th Queue (m)	75.4	52.1	89.6	126.5	10.8	139.5	24.2
Link Distance (m)	65.2	65.2		155.2	1300.7	167.7	167.7
Upstream Blk Time (%)	13	0	0	1		0	
Queuing Penalty (veh)	43	1	0	7		1	
Storage Bay Dist (m)			100.0				
Storage Blk Time (%)			2	2			
Queuing Penalty (veh)			24	5			

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	82.4	280.6	51.7	64.5	82.3	226.6	82.3	366.6
Average Queue (m)	81.4	231.6	26.1	34.2	36.5	152.7	22.9	186.2
95th Queue (m)	89.4	356.2	44.8	57.5	84.3	245.2	67.6	328.7
Link Distance (m)		264.8		226.2		213.2		1300.7
Upstream Blk Time (%)		60				11		
Queuing Penalty (veh)		0				0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)	80	1		0	9	30	0	37
Queuing Penalty (veh)	98	5		0	73	10	0	13

Intersection: 201: Commercial Driveway/Site Driveway & MacAlister Blvd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	45.4	39.3	66.6	26.7
Average Queue (m)	8.5	16.2	30.8	12.2
95th Queue (m)	29.3	33.2	65.4	22.5
Link Distance (m)	129.2	65.2	73.8	62.6
Upstream Blk Time (%)		0	4	
Queuing Penalty (veh)		0	0	
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 202: Victoria Rd South & Site Driveway

Movement	EB	SB
Directions Served	R	T
Maximum Queue (m)	18.2	3.1
Average Queue (m)	8.5	0.2
95th Queue (m)	15.8	2.6
Link Distance (m)	58.9	800.0
Upstream Blk Time (%)		
Queuing Penalty (veh)		
Storage Bay Dist (m)		
Storage Blk Time (%)		
Queuing Penalty (veh)		

Zone Summary

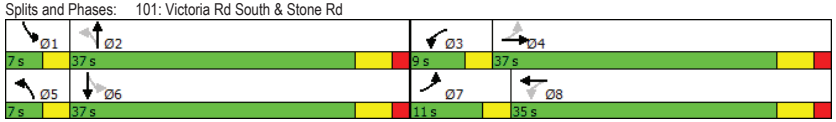
Zone wide Queuing Penalty: 480

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	368	481	218	71	279	16	108	843	74	42	818	257
Future Volume (vph)	368	481	218	71	279	16	108	843	74	42	818	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	88.0		0.0	85.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95	1.00	0.95	0.95
Ped Bike Factor							1.00				0.99	
Frt		0.953			0.992			0.988			0.964	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1787	3396	0	1530	3468	0	1770	3483	0	1752	3394	0
Flt Permitted	0.511			0.249			0.144			0.182		
Satd. Flow (perm)	961	3396	0	401	3468	0	267	3483	0	336	3394	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		89			7			11			51	
Link Speed (k/h)		50			50			50			70	
Link Distance (m)		274.5			124.3			822.5			159.7	
Travel Time (s)		19.8			8.9			59.2			8.2	
Confl. Peds. (#/hr)							22					22
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Adj. Flow (vph)	368	481	218	71	279	16	108	843	74	42	818	257
Shared Lane Traffic (%)												
Lane Group Flow (vph)	368	699	0	71	295	0	108	917	0	42	1075	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		4.0	5.0		4.0	1.0		4.0	5.0	
Minimum Split (s)	7.0	35.0		7.0	35.0		7.0	35.0		7.0	35.0	
Total Split (s)	11.0	37.0		9.0	35.0		7.0	37.0		7.0	37.0	
Total Split (%)	12.2%	41.1%		10.0%	38.9%		7.8%	41.1%		7.8%	41.1%	
Maximum Green (s)	8.0	31.0		6.0	29.0		4.0	31.0		4.0	31.0	
Yellow Time (s)	3.0	4.0		3.0	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		0.0	2.0		0.0	2.0		0.0	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	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min		Min	Min		Min	Min	
Walk Time (s)		10.0			10.0			10.0			10.0	
Flash Dont Walk (s)		19.0			19.0			19.0			19.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	31.0	19.8		26.6	17.6		34.9	27.8		34.9	27.8	
Actuated g/C Ratio	0.41	0.26		0.35	0.23		0.46	0.37		0.46	0.37	
v/c Ratio	0.77	0.74		0.31	0.36		0.53	0.71		0.18	0.84	
Control Delay	30.1	27.5		17.8	25.2		22.7	24.5		12.8	28.9	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	30.1	27.5		17.8	25.2		22.7	24.5		12.8	28.9	
LOS	C	C		B	C		C	C		B	C	
Approach Delay		28.4			23.8			24.3			28.3	
Approach LOS		C			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 90			
Actuated Cycle Length: 75.9			
Natural Cycle: 85			
Control Type: Actuated-Uncoordinated			
Maximum v/c Ratio: 0.84			
Intersection Signal Delay: 26.7		Intersection LOS: C	
Intersection Capacity Utilization 82.6%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 101: Victoria Rd South & Stone Rd



Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	368	481	218	71	279	16	108	843	74	42	818	257
Future Volume (vph)	368	481	218	71	279	16	108	843	74	42	818	257
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	0.95		1.00	0.95		1.00	0.95		1.00	0.95	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.95		1.00	0.99		1.00	0.99		1.00	0.96	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1787	3397		1530	3467		1769	3483		1752	3397	
Flt Permitted	0.51	1.00		0.25	1.00		0.14	1.00		0.18	1.00	
Satd. Flow (perm)	961	3397		402	3467		268	3483		336	3397	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	368	481	218	71	279	16	108	843	74	42	818	257
RTOR Reduction (vph)	0	66	0	0	5	0	0	7	0	0	32	0
Lane Group Flow (vph)	368	633	0	71	290	0	108	910	0	42	1043	0
Confl. Peds. (#/hr)							22					22
Heavy Vehicles (%)	1%	1%	2%	18%	3%	8%	2%	2%	7%	3%	2%	1%
Turn Type	Reserved	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	27.9	19.8		23.7	17.7		31.9	27.8		31.9	27.8	
Effective Green, g (s)	27.9	19.8		23.7	17.7		31.9	27.8		31.9	27.8	
Actuated g/C Ratio	0.37	0.26		0.31	0.23		0.42	0.37		0.42	0.37	
Clearance Time (s)	3.0	6.0		3.0	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	442	888		215	810		194	1279		218	1247	
v/s Ratio Prot	c0.09	0.19		0.03	0.08		c0.03	0.26		0.01	c0.31	
v/s Ratio Perm	c0.22			0.08			0.20			0.07		
v/c Ratio	0.83	0.71		0.33	0.36		0.56	0.71		0.19	0.84	
Uniform Delay, d1	20.2	25.4		19.0	24.2		15.5	20.5		13.9	21.9	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	12.6	2.7		0.9	0.3		3.4	1.9		0.4	5.0	
Delay (s)	32.8	28.1		19.9	24.5		19.0	22.4		14.4	26.9	
Level of Service	C	C		B	C		B	C		B	C	
Approach Delay (s)		29.7			23.6			22.0			26.4	
Approach LOS		C			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	25.9	HCM 2000 Level of Service		C	
HCM 2000 Volume to Capacity ratio	0.84				
Actuated Cycle Length (s)	75.7	Sum of lost time (s)		18.0	
Intersection Capacity Utilization	82.6%	ICU Level of Service		E	
Analysis Period (min)	15				

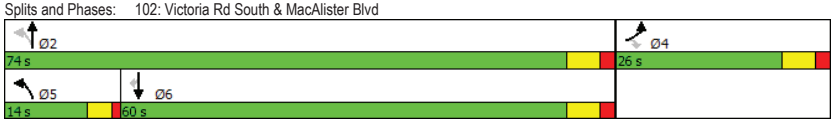
c Critical Lane Group

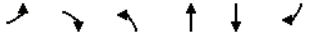
Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	222	156	218	802	811	273
Future Volume (vph)	222	156	218	802	811	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	0.0	100.0			0.0
Storage Lanes	1	1	1			1
Taper Length (m)	7.5		75.0			
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor		0.98				0.98
Frt		0.850				0.850
Flt Protected	0.950		0.950			
Satd. Flow (prot)	1752	1615	1805	1845	1863	1615
Flt Permitted	0.950		0.088			
Satd. Flow (perm)	1752	1580	167	1845	1863	1582
Right Turn on Red		Yes				Yes
Satd. Flow (RTOR)		156				273
Link Speed (k/h)	50			70	70	
Link Distance (m)	87.8			133.8	186.7	
Travel Time (s)	6.3			6.9	9.6	
Confl. Bikes (#/hr)		1				1
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Adj. Flow (vph)	222	156	218	802	811	273
Shared Lane Traffic (%)						
Lane Group Flow (vph)	222	156	218	802	811	273
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	3.6			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Number of Detectors	1	1	1	2	2	1
Detector Template	Left	Right	Left	Thru	Thru	Right
Leading Detector (m)	2.0	2.0	2.0	10.0	10.0	2.0
Trailing Detector (m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Position(m)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Size(m)	2.0	2.0	2.0	0.6	0.6	2.0
Detector 1 Type	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex
Detector 1 Channel						
Detector 1 Extend (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Queue (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 1 Delay (s)	0.0	0.0	0.0	0.0	0.0	0.0
Detector 2 Position(m)				9.4	9.4	
Detector 2 Size(m)				0.6	0.6	
Detector 2 Type				Cl+Ex	Cl+Ex	
Detector 2 Channel						
Detector 2 Extend (s)				0.0	0.0	

Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Detector Phase	4	4	5	2	6	6
Switch Phase						
Minimum Initial (s)	20.0	20.0	3.0	7.0	7.0	7.0
Minimum Split (s)	26.0	26.0	7.0	24.0	24.0	24.0
Total Split (s)	26.0	26.0	14.0	74.0	60.0	60.0
Total Split (%)	26.0%	26.0%	14.0%	74.0%	60.0%	60.0%
Maximum Green (s)	20.0	20.0	10.0	68.0	54.0	54.0
Yellow Time (s)	4.0	4.0	3.0	4.0	4.0	4.0
All-Red Time (s)	2.0	2.0	1.0	2.0	2.0	2.0
Lost Time Adjust (s)	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lead/Lag			Lead		Lag	Lag
Lead-Lag Optimize?			Yes		Yes	Yes
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Recall Mode	None	None	None	Min	Min	Min
Walk Time (s)	7.0	7.0		7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0
Act Effct Green (s)	20.4	20.4	56.3	54.3	41.6	41.6
Actuated g/C Ratio	0.23	0.23	0.65	0.62	0.48	0.48
v/c Ratio	0.54	0.32	0.81	0.70	0.91	0.30
Control Delay	38.0	7.8	40.4	14.1	35.9	2.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	38.0	7.8	40.4	14.1	35.9	2.4
LOS	D	A	D	B	D	A
Approach Delay	25.5			19.7	27.5	
Approach LOS	C			B	C	

Intersection Summary		
Area Type:	Other	
Cycle Length: 100		
Actuated Cycle Length: 86.9		
Natural Cycle: 80		
Control Type: Actuated-Uncoordinated		
Maximum v/c Ratio: 0.91		
Intersection Signal Delay: 24.0		Intersection LOS: C
Intersection Capacity Utilization 84.8%		ICU Level of Service E
Analysis Period (min) 15		

Splits and Phases: 102: Victoria Rd South & MacAlister Blvd

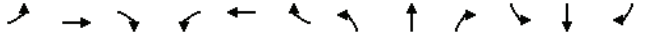




Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	222	156	218	802	811	273
Future Volume (vph)	222	156	218	802	811	273
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frpb, ped/bikes	1.00	0.98	1.00	1.00	1.00	0.98
Flpb, ped/bikes	1.00	1.00	1.00	1.00	1.00	1.00
Frt	1.00	0.85	1.00	1.00	1.00	0.85
Flt Protected	0.95	1.00	0.95	1.00	1.00	1.00
Satd. Flow (prot)	1752	1580	1805	1845	1863	1581
Flt Permitted	0.95	1.00	0.09	1.00	1.00	1.00
Satd. Flow (perm)	1752	1580	166	1845	1863	1581
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	222	156	218	802	811	273
RTOR Reduction (vph)	0	119	0	0	0	142
Lane Group Flow (vph)	222	37	218	802	811	131
Confl. Bikes (#/hr)		1				1
Heavy Vehicles (%)	3%	0%	0%	3%	2%	0%
Turn Type	Prot	Perm	pm+pt	NA	NA	Perm
Protected Phases	4		5	2	6	
Permitted Phases		4	2			6
Actuated Green, G (s)	20.4	20.4	54.3	54.3	41.7	41.7
Effective Green, g (s)	20.4	20.4	54.3	54.3	41.7	41.7
Actuated g/C Ratio	0.24	0.24	0.63	0.63	0.48	0.48
Clearance Time (s)	6.0	6.0	4.0	6.0	6.0	6.0
Vehicle Extension (s)	0.2	0.2	0.2	3.0	3.0	3.0
Lane Grp Cap (vph)	412	371	266	1155	896	760
v/s Ratio Prot	c0.13		c0.08	0.43	c0.44	
v/s Ratio Perm		0.02	0.43			0.08
v/c Ratio	0.54	0.10	0.82	0.69	0.91	0.17
Uniform Delay, d1	29.0	26.0	21.5	10.7	20.7	12.7
Progression Factor	1.00	1.00	1.00	1.00	1.00	1.00
Incremental Delay, d2	0.7	0.0	16.8	1.8	12.5	0.1
Delay (s)	29.7	26.0	38.2	12.5	33.1	12.8
Level of Service	C	C	D	B	C	B
Approach Delay (s)	28.2			18.0	28.0	
Approach LOS	C			B	C	

Intersection Summary				
HCM 2000 Control Delay	23.9	HCM 2000 Level of Service	C	
HCM 2000 Volume to Capacity ratio	0.79			
Actuated Cycle Length (s)	86.7	Sum of lost time (s)	16.0	
Intersection Capacity Utilization	84.8%	ICU Level of Service	E	
Analysis Period (min)	15			

c Critical Lane Group



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	120	33	136	138	44	25	785	190	71	724	172
Future Volume (vph)	190	120	33	136	138	44	25	785	190	71	724	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	75.0		0.0	75.0		0.0	75.0		0.0	75.0		0.0
Storage Lanes	1		0	1		0	1		0	1		0
Taper Length (m)	7.5			7.5			7.5			7.5		
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Ped Bike Factor											0.99	
Frt		0.968			0.964			0.971			0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	1811	0	1805	1805	0	1805	1798	0	1805	1798	0
Flt Permitted	0.496			0.601			0.095			0.078		
Satd. Flow (perm)	924	1811	0	1142	1805	0	180	1798	0	148	1798	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12			14			18			17	
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		275.0			236.5			223.4			1359.6	
Travel Time (s)		19.8			17.0			16.1			97.9	
Confl. Peds. (#/hr)							6					6
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Adj. Flow (vph)	190	120	33	136	138	44	25	785	190	71	724	172
Shared Lane Traffic (%)												
Lane Group Flow (vph)	190	153	0	136	182	0	25	975	0	71	896	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		3.6			3.6			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane											Yes	
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Number of Detectors	1	2		1	2		1	2		1	2	
Detector Template	Left	Thru		Left	Thru		Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0		2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6		2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Detector Phase	7	4		3	8		5	2		1	6	
Switch Phase												
Minimum Initial (s)	4.0	5.0		5.0	5.0		4.0	5.0		4.0	5.0	
Minimum Split (s)	7.0	26.0		9.5	26.0		7.0	34.0		7.0	34.0	
Total Split (s)	10.0	26.0		9.8	26.0		7.0	57.2		7.0	57.2	
Total Split (%)	10.0%	25.9%		9.8%	25.9%		7.0%	57.1%		7.0%	57.1%	
Maximum Green (s)	7.0	20.0		5.3	20.0		4.0	51.2		4.0	51.2	
Yellow Time (s)	3.0	4.0		3.5	4.0		3.0	4.0		3.0	4.0	
All-Red Time (s)	0.0	2.0		1.0	2.0		0.0	2.0		0.0	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	6.0		4.5	6.0		3.0	6.0		3.0	6.0	
Lead/Lag	Lead	Lag		Lead	Lag		Lead	Lag		Lead	Lag	
Lead-Lag Optimize?	Yes	Yes		Yes	Yes		Yes	Yes		Yes	Yes	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		None	Min		Min	Min		Min	Min	
Walk Time (s)		7.0			7.0			13.0			13.0	
Flash Dont Walk (s)		13.0			13.0			15.0			15.0	
Pedestrian Calls (#/hr)		0			0			0			0	
Act Effct Green (s)	24.2	14.2		20.8	14.0		58.3	51.3		58.3	51.3	
Actuated g/C Ratio	0.26	0.15		0.22	0.15		0.62	0.54		0.62	0.54	
v/c Ratio	0.64	0.54		0.47	0.65		0.14	0.99		0.44	0.91	
Control Delay	38.1	41.2		33.7	46.0		8.6	49.3		15.8	35.0	
Queue Delay	0.0	0.0		0.0	0.0		0.0	0.0		0.0	0.0	
Total Delay	38.1	41.2		33.7	46.0		8.6	49.3		15.8	35.0	
LOS	D	D		C	D		A	D		B	C	
Approach Delay		39.5			40.8			48.3			33.6	
Approach LOS		D			D			D			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 100.2			
Actuated Cycle Length: 94.3			
Natural Cycle: 100			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.99			
Intersection Signal Delay: 40.8		Intersection LOS: D	
Intersection Capacity Utilization 92.8%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 103: Victoria St South & Arkell Rd

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	190	120	33	136	138	44	25	785	190	71	724	172
Future Volume (vph)	190	120	33	136	138	44	25	785	190	71	724	172
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	3.0	6.0		4.5	6.0		3.0	6.0		3.0	6.0	
Lane Util. Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	0.99	
Flpb, ped/bikes	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	0.96		1.00	0.97		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00		0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	1810		1805	1805		1805	1798		1805	1799	
Flt Permitted	0.50	1.00		0.60	1.00		0.10	1.00		0.08	1.00	
Satd. Flow (perm)	925	1810		1143	1805		181	1798		148	1799	
Peak-hour factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	190	120	33	136	138	44	25	785	190	71	724	172
RTOR Reduction (vph)	0	10	0	0	12	0	0	8	0	0	8	0
Lane Group Flow (vph)	190	143	0	136	170	0	25	967	0	71	888	0
Confl. Peds. (#/hr)							6					6
Heavy Vehicles (%)	2%	2%	0%	0%	0%	6%	0%	3%	1%	0%	2%	2%
Turn Type	pm+pt	NA		pm+pt	NA		pm+pt	NA		pm+pt	NA	
Protected Phases	7	4		3	8		5	2		1	6	
Permitted Phases	4			8			2			6		
Actuated Green, G (s)	21.2	14.2		19.3	14.0		55.3	51.3		55.3	51.3	
Effective Green, g (s)	21.2	14.2		19.3	14.0		55.3	51.3		55.3	51.3	
Actuated g/C Ratio	0.22	0.15		0.20	0.15		0.59	0.54		0.59	0.54	
Clearance Time (s)	3.0	6.0		4.5	6.0		3.0	6.0		3.0	6.0	
Vehicle Extension (s)	3.0	3.0		3.0	3.0		3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	270	272		271	267		175	978		157	978	
v/s Ratio Prot	c0.05	0.08		0.03	0.09		0.01	c0.54		c0.02	0.49	
v/s Ratio Perm	c0.11			0.07			0.08			0.25		
v/c Ratio	0.70	0.53		0.50	0.64		0.14	0.99		0.45	0.91	
Uniform Delay, d1	32.5	36.9		32.4	37.8		15.6	21.2		19.7	19.4	
Progression Factor	1.00	1.00		1.00	1.00		1.00	1.00		1.00	1.00	
Incremental Delay, d2	8.1	1.8		1.5	4.9		0.4	25.7		2.1	11.9	
Delay (s)	40.6	38.8		33.9	42.7		16.0	46.9		21.8	31.3	
Level of Service	D	D		C	D		B	D		C	C	
Approach Delay (s)		39.8			38.9			46.1			30.6	
Approach LOS		D			D			D			C	

Intersection Summary					
HCM 2000 Control Delay	38.7	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	0.90				
Actuated Cycle Length (s)	94.3	Sum of lost time (s)		19.5	
Intersection Capacity Utilization	92.8%	ICU Level of Service		F	
Analysis Period (min)	15				

c Critical Lane Group

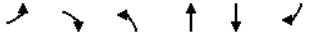
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	11	175	7	163	271	57	7	10	167	36	10	7
Future Volume (vph)	11	175	7	163	271	57	7	10	167	36	10	7
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.995			0.984			0.877			0.938	
Flt Protected		0.997			0.984			0.998		0.950		
Satd. Flow (prot)	0	1848	0	0	1804	0	0	1630	0	1770	1747	0
Flt Permitted		0.997			0.984			0.998		0.950		
Satd. Flow (perm)	0	1848	0	0	1804	0	0	1630	0	1770	1747	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		137.8			87.8			71.9			55.7	
Travel Time (s)		9.9			6.3			5.2			4.0	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	11	175	7	163	271	57	7	10	167	36	10	7
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	193	0	0	491	0	0	184	0	36	17	0
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(m)		0.0			0.0			3.6			3.6	
Link Offset(m)		0.0			0.0			0.0			0.0	
Crosswalk Width(m)		4.8			4.8			4.8			4.8	
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25		15	25		15	25		15	25		15
Sign Control		Free			Free			Stop			Stop	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	64.9%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (veh/h)	11	175	7	163	271	57	7	10	167	36	10	7
Future Volume (Veh/h)	11	175	7	163	271	57	7	10	167	36	10	7
Sign Control		Free			Free			Stop			Stop	
Grade		0%			0%			0%			0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	11	175	7	163	271	57	7	10	167	36	10	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)					88							
pX, platoon unblocked												
vC, conflicting volume	328			182			838	854	178	998	830	300
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	328			182			838	854	178	998	830	300
tC, single (s)	4.1			4.1			7.1	6.5	6.2	7.1	6.5	6.2
tC, 2 stage (s)												
tF (s)	2.2			2.2			3.5	4.0	3.3	3.5	4.0	3.3
p0 queue free %	99			88			97	96	81	77	96	99
cM capacity (veh/h)	1232			1393			249	259	864	158	268	740

Direction, Lane #	EB 1	WB 1	NB 1	SB 1	SB 2
Volume Total	193	491	184	36	17
Volume Left	11	163	7	36	0
Volume Right	7	57	167	0	7
cSH	1232	1393	708	158	363
Volume to Capacity	0.01	0.12	0.26	0.23	0.05
Queue Length 95th (m)	0.2	3.2	8.3	6.7	1.2
Control Delay (s)	0.5	3.4	11.9	34.5	15.4
Lane LOS	A	A	B	D	C
Approach Delay (s)	0.5	3.4	11.9	28.3	
Approach LOS			B	D	

Intersection Summary					
Average Delay		5.9			
Intersection Capacity Utilization		64.9%	ICU Level of Service		C
Analysis Period (min)		15			



Lane Group	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (vph)	0	35	0	1024	1049	58
Future Volume (vph)	0	35	0	1024	1049	58
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	1.00	1.00	1.00	1.00	0.95	0.95
Frt		0.865			0.992	
Flt Protected						
Satd. Flow (prot)	0	1611	0	1863	3511	0
Flt Permitted						
Satd. Flow (perm)	0	1611	0	1863	3511	0
Link Speed (k/h)	50			50	70	
Link Distance (m)	60.3			186.7	822.5	
Travel Time (s)	4.3			13.4	42.3	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Adj. Flow (vph)	0	35	0	1024	1049	58
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	35	0	1024	1107	0
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Left	Left	Right
Median Width(m)	0.0			3.6	3.6	
Link Offset(m)	0.0			0.0	0.0	
Crosswalk Width(m)	4.8			4.8	4.8	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (k/h)	25	15	25			15
Sign Control	Stop			Free	Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	57.2%	ICU Level of Service	B
Analysis Period (min)	15		

Movement	EBL	EBR	NBL	NBT	SBT	SBR
Lane Configurations						
Traffic Volume (veh/h)	0	35	0	1024	1049	58
Future Volume (Veh/h)	0	35	0	1024	1049	58
Sign Control	Stop			Free	Free	
Grade	0%			0%	0%	
Peak Hour Factor	1.00	1.00	1.00	1.00	1.00	1.00
Hourly flow rate (vph)	0	35	0	1024	1049	58
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)						
Median type				None	None	
Median storage veh)						
Upstream signal (m)				187		
pX, platoon unblocked	0.67					
vC, conflicting volume	2102	554	1107			
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	2395	554	1107			
tC, single (s)	6.8	6.9	4.1			
tC, 2 stage (s)						
tF (s)	3.5	3.3	2.2			
p0 queue free %	100	93	100			
cM capacity (veh/h)	19	476	626			

Direction, Lane #	EB 1	NB 1	SB 1	SB 2
Volume Total	35	1024	699	408
Volume Left	0	0	0	0
Volume Right	35	0	0	58
cSH	476	1700	1700	1700
Volume to Capacity	0.07	0.60	0.41	0.24
Queue Length 95th (m)	1.9	0.0	0.0	0.0
Control Delay (s)	13.2	0.0	0.0	0.0
Lane LOS	B			
Approach Delay (s)	13.2	0.0	0.0	
Approach LOS	B			

Intersection Summary				
Average Delay		0.2		
Intersection Capacity Utilization		57.2%	ICU Level of Service	B
Analysis Period (min)		15		

Intersection: 101: Victoria Rd South & Stone Rd

Movement	EB	EB	EB	WB	WB	WB	NB	NB	NB	SB	SB	SB
Directions Served	L	T	TR	L	T	TR	L	T	TR	L	T	TR
Maximum Queue (m)	82.3	158.0	147.7	39.8	43.0	41.2	95.4	208.6	199.1	62.6	142.0	143.2
Average Queue (m)	55.8	66.7	50.5	15.3	24.7	19.1	61.7	143.5	126.2	9.6	75.4	79.5
95th Queue (m)	87.0	118.2	105.7	30.9	38.7	34.7	126.8	255.4	241.8	31.4	123.4	127.3
Link Distance (m)		260.6	260.6		101.6	101.6		799.5	799.5		137.0	137.0
Upstream Blk Time (%)											1	1
Queuing Penalty (veh)											0	0
Storage Bay Dist (m)	75.0			75.0			88.0			85.0		
Storage Blk Time (%)	6	3					0	45			8	
Queuing Penalty (veh)	14	12					0	49			3	

Intersection: 101: Victoria Rd South & Stone Rd

Movement	B13
Directions Served	T
Maximum Queue (m)	23.1
Average Queue (m)	0.9
95th Queue (m)	13.1
Link Distance (m)	109.4
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Intersection: 102: Victoria Rd South & MacAlister Blvd

Movement	EB	EB	NB	NB	SB	SB
Directions Served	L	R	L	T	T	R
Maximum Queue (m)	63.3	40.2	72.0	96.4	139.4	35.8
Average Queue (m)	33.5	18.1	33.3	49.6	76.8	15.9
95th Queue (m)	57.2	34.2	62.2	84.2	133.3	30.1
Link Distance (m)	65.0	65.0		115.1	168.2	168.2
Upstream Blk Time (%)	0		0	0	0	
Queuing Penalty (veh)	0		0	1	0	
Storage Bay Dist (m)			100.0			
Storage Blk Time (%)			0	0		
Queuing Penalty (veh)			3	0		

Intersection: 103: Victoria St South & Arkell Rd

Movement	EB	EB	WB	WB	NB	NB	SB	SB
Directions Served	L	TR	L	TR	L	TR	L	TR
Maximum Queue (m)	75.0	84.8	51.3	61.4	82.3	230.4	82.4	451.0
Average Queue (m)	38.4	32.3	24.8	31.1	13.6	219.8	36.6	247.6
95th Queue (m)	70.8	77.9	43.2	53.9	53.7	226.2	90.8	513.5
Link Distance (m)		264.8		226.2		213.2		1340.8
Upstream Blk Time (%)						59		
Queuing Penalty (veh)						0		
Storage Bay Dist (m)	75.0		75.0		75.0		75.0	
Storage Blk Time (%)	5			0	0	50	0	40
Queuing Penalty (veh)	7			0	0	13	0	28

Intersection: 201: Commercial Driveway/Site Driveway & MacAlister Blvd

Movement	EB	WB	NB	SB
Directions Served	LTR	LTR	LTR	LTR
Maximum Queue (m)	16.2	38.0	31.7	23.7
Average Queue (m)	1.3	8.7	14.2	9.0
95th Queue (m)	8.0	24.1	25.3	18.3
Link Distance (m)	128.6	65.0	59.1	46.6
Upstream Blk Time (%)				
Queuing Penalty (veh)				
Storage Bay Dist (m)				
Storage Blk Time (%)				
Queuing Penalty (veh)				

Intersection: 202: Victoria Rd South & Site Driveway

Movement	EB
Directions Served	R
Maximum Queue (m)	19.3
Average Queue (m)	7.1
95th Queue (m)	15.6
Link Distance (m)	46.1
Upstream Blk Time (%)	
Queuing Penalty (veh)	
Storage Bay Dist (m)	
Storage Blk Time (%)	
Queuing Penalty (veh)	

Zone Summary

Zone wide Queuing Penalty: 130

Notice of Public Meeting
855 and 927 Victoria Road South
File: OZS18-007

January 21, 2019

Public Meeting Notice

City Council will hold a Public Meeting in accordance with the Planning Act on a Zoning By-law amendment application received from GSP Group on behalf of the owners, 2506780 Ontario Inc. and Gamma Developers Ltd. for the lands municipally known as **855 and 927 Victoria Road South**.

Meeting Date:	February 11, 2019
Location:	**Council Chambers, City Hall, 1 Carden Street**
Time:	6:30 p.m.

Subject Lands

The subject lands are comprised of two separate parcels of land located at the north-west corner of Victoria Road South and MacAlister Boulevard. The northern parcel is municipally known as 855 Victoria Road South and is approximately 2.25 hectares in size and the southern parcel is municipally known as 927 Victoria Road South and is approximately 2.58 hectares in size (see Location Map).

Purpose and Effect of Application

The intent of the application is to change the zoning from the "Agricultural" (A) Zone in the Township of Puslinch Zoning By-law 19/85 to the "Specialized Residential Cluster Townhouse" (R.3A-?) Zone, "Specialized High Density Apartment" (R.4B-?) Zone and the "Conservation Land" (P.1) Zone of the City of Guelph's Zoning By-law (1995)-14864.

Site-specific zoning regulations have been requested to the "Residential Cluster Townhouse" (R.3A) Zone and to the "High Density Apartment" (R.4B) Zone to facilitate this proposal. Further details on the site-specific zoning regulations requested can be found in the supporting documents submitted with this application and will also be listed in the Staff Report available on February 1, 2019.

The applicant is proposing to develop the lands with 367 to 400 residential dwelling units comprised of stacked townhouses and apartment units. The applicant has provided two conceptual site plans – Option A and Option B, that provide different levels of intensity for the site's development. Both options have the same general layout in terms of boundaries, access and circulation, but with variations in the residential form, intensity and configuration of the southern parcel. More specifically, the applicant is proposing:

Option A

- 367 dwelling units comprised of 156 stacked townhouse units and 211 apartment units;

- 502 parking spaces in total (including driveway and garage parking for the stacked townhouses, surface parking spaces and underground parking spaces for the apartment units); and,
- Two accesses are proposed – a right in/right out onto Victoria Road South and a full moves access onto MacAlister Boulevard.

Option B
- 400 dwelling units comprised of 108 stacked townhouse units and 292 apartment units;
- 544 parking spaces in total (including driveway and garage parking for the stacked townhouses, surface parking spaces and underground parking spaces for the apartment units); and,
- Two accesses are proposed – a right in/right out onto Victoria Road South and a full moves access onto MacAlister Boulevard.

The Conceptual Site Plans for Option A and Option B are attached.

Purpose of the Meeting
The purpose of the meeting is to provide more information about the application and is an opportunity for public input. No recommendations are provided at the Public Meeting and City Council will not be making a decision at this meeting. A recommendation report will be prepared and presented at a subsequent meeting of City Council following a full review of the application.

Other Applications
The subject lands are not subject to any other application under the Planning Act.

To speak at Council or provide written comments
Any person may attend the meeting and provide written or verbal comments and/or be notified of any future public meetings or decisions on the application.

1a. To speak to Council on the application, you may register as a delegation by contacting the City Clerk's Office, City Hall, **no later than 10:00 a.m. on Friday February 8, 2019** in any of the following ways:
- Register online at guelph.ca/delegations
- By Phone at **519-837-5603** or TTY **519-826-9771**
- By Email at clerks@guelph.ca
- In person at the ServiceGuelph Counter at City Hall, 1 Carden Street, Guelph
- By regular mail or courier to Guelph City Clerk, 1 Carden Street, Guelph ON N1H 3A1

1b. You may attend the meeting and request to speak at the meeting.

2. To submit written comments to Council on the application, you must submit them to the City Clerk's Office, City Hall, **no later than 10:00 a.m. on Friday February 8, 2019 in any of the following ways:**
   - By Email at clerks@guelph.ca
   - In person at the ServiceGuelph Counter at City Hall, 1 Carden St, Guelph
   - By regular mail or courier to Guelph City Clerk, 1 Carden Street, Guelph ON N1H 3A1

Notice of information collection: Personal information is being collected in order to gather feedback and communicate with interested parties regarding this development proposal. Information provided for or presented at a public meeting is considered a public record and may be posted to the City's website or made available to the public upon request.

Personal information, as defined by Section 2 of the Municipal Freedom of Information and Protection of Privacy Act (MFIPPA), is collected under the authority of the Municipal Act, 2001, and the Planning Act, R.S.O. 1990, c.P. 13, and in accordance with the provisions of MFIPPA. For questions regarding the collection, use, and disclosure of this information please contact the Information and Access Coordinator at 519-822-1260 extension 2349 or privacy@guelph.ca.

Appeals Information
Please note that the Ontario Municipal Board (OMB) was replaced by the Local Planning Appeal Tribunal (LPAT) on April 3, 2018. Information about the LPAT and rights of appeal can be found on their website at: http://elto.gov.on.ca/tribunals/lpat/about-lpat/.

i. If a person or public body would otherwise have an ability to appeal the decision of Guelph City Council to the Local Planning Appeal Tribunal but the person or public body does not make oral submissions at a public meeting or make written submissions to the City of Guelph before the by-law is passed, the person or public body is not entitled to appeal the decision.

ii. If a person or public body does not make oral submissions at a public meeting, or make written submissions to the City of Guelph before the by-law is passed, the person or public body may not be added as a party to the hearing of an appeal before the Local Planning Appeal Tribunal unless, in the opinion of the Tribunal, there are reasonable grounds to do so.

Requirement for Owners of Multi-tenant Buildings
Upon receiving this Notice, owners of multi-tenant buildings with seven (7) or more residential units are required under the *Planning Act* to post this Notice of Public Meeting in a location that is clearly visible to all tenants (i.e. building or community notice board). The Notice shall remain posted until the day after the Public Meeting (February 12, 2019).

Additional Information
Documents relating to the planning application are available online at **guelph.ca/development** under **855 and 927 Victoria Road South**. Printouts of

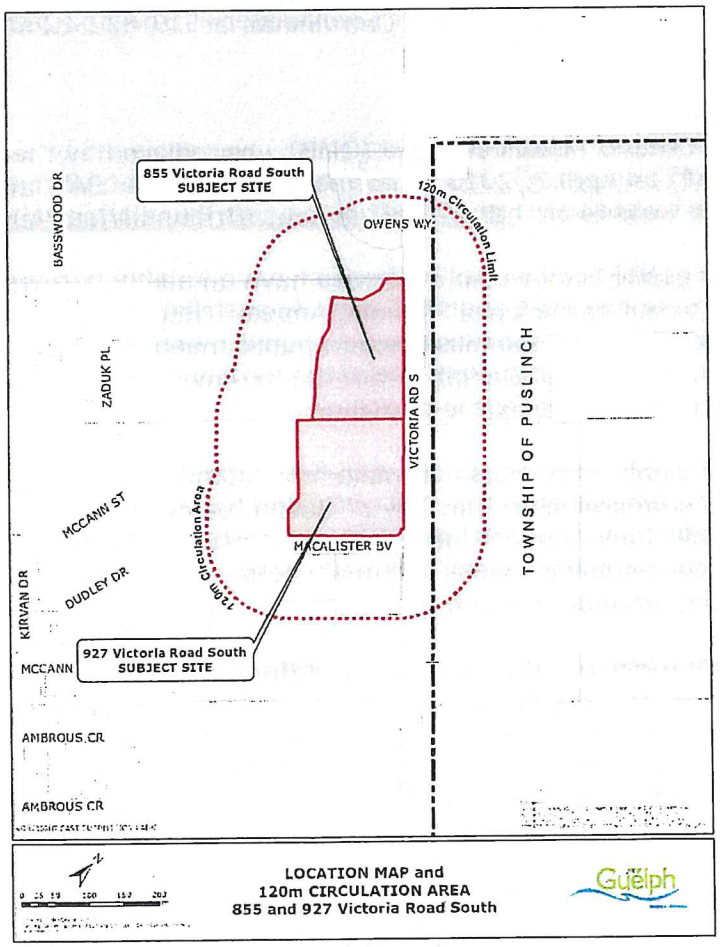
these documents are available to review by scheduling an appointment with the planner during regular office hours.

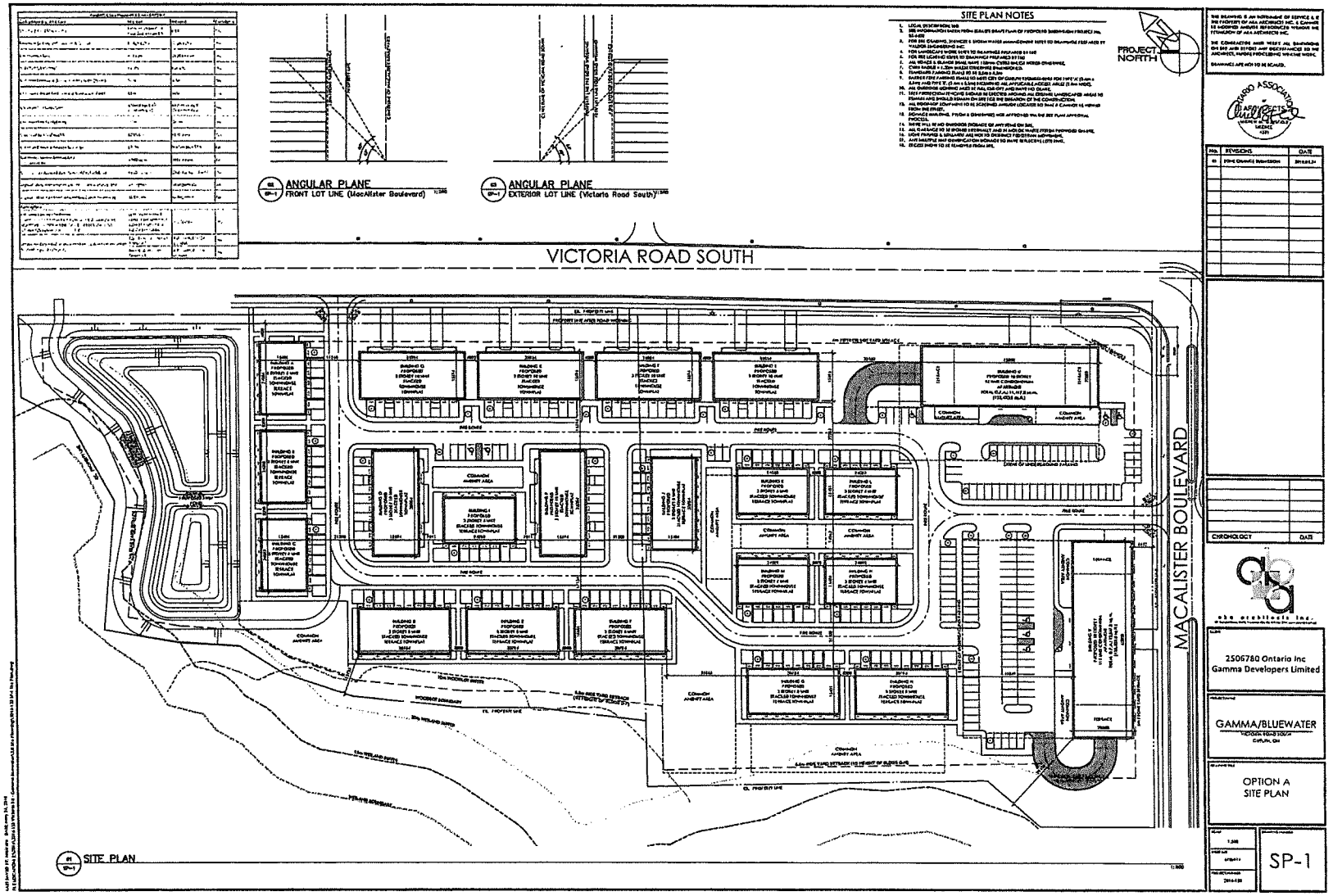
Please note that copies of the Staff Report will be available on **February 1, 2019** after 12:00 p.m. and will be posted online or may be picked up at Development Planning, 3rd floor, 1 Carden Street on, or after this date.

For additional information please contact the planner managing the file:

Lindsay Sulatycki
Senior Development Planner
Planning and Building Services
Phone: 519-837-5616, ext. 3313
Email: lindsay.sulatycki@guelph.ca

Location Map and Notice Circulation Area





No.	REVISIONS	DATE
01	FOR COUNCIL SUBMISSION	2016.03.24

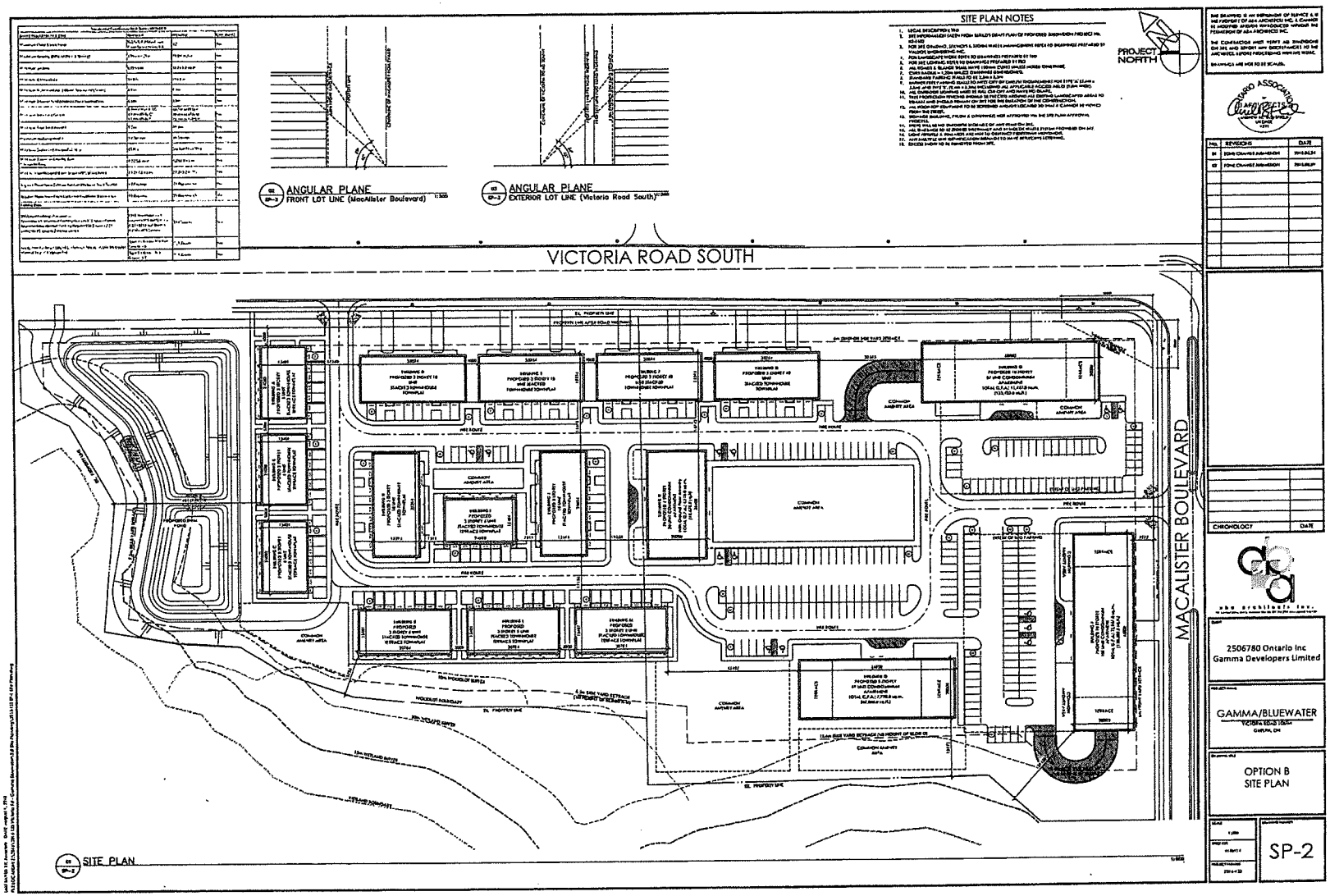
CHRONOLOGY	DATE

2506780 Ontario Inc
Gamma Developers Limited

GAMMA/BLUEWATER

OPTION A
SITE PLAN

SP-1



No.	REVISIONS	DATE
01	ZONE CHANGE SUBMISSION	2021.04.21
02	ZONE CHANGE RESUBMISSION	2021.08.27

CHRONOLOGY DATE

2506780 Ontario Inc
Gamma Developers Limited

GAMMA/BLUEWATER
VICTORIA RD S / 16TH
GUELPH, ON

OPTION B
SITE PLAN

SP-2

REPORT PD-2019-001

TO: Mayor and Members of Council

FROM: Lynne Banks, Development and Legislative Coordinator

MEETING DATE: March 6, 2019

SUBJECT: To accept conveyance of a road widening designated as Part 2 on Reference Plan 61R-21503 as part of the Township of Puslinch public highway system and dedicate as part of Gilmour Road

RECOMMENDATIONS

That Report PD-2019-001 regarding the acceptance of a conveyance of a road widening designated as Part 2 on Reference Plan 61R-21503 (the "subject lands") from the owners of the property municipally known as 77 Gilmour Road (the "Transferor") and to dedicate it as a public highway to be known as and to form part of Gilmour Road, be received; and

That Council pass a by-law to authorize the dedication of the subject lands as part of the Township's public highway system.

DISCUSSION

Purpose:

To obtain authorization from Council to acquire lands as part of Gilmour Road.

Background:

The owners of 77 Gilmour Road (the "owner's lands") applied for, and received, consent to sever their land (severance file #B152/18). A reference plan was prepared and it was noted that there was a small portion of the owner's land which has Township regulatory signs on it. The Township was approached by the owner's solicitor who advised that the owners would like to transfer the subject lands to the Township. The Township's Director of Public Works made a site visit and advised that it was his recommendation that the Township acquire the subject lands.

The transfer will be completed once the owner's solicitor registers a partial discharge of the mortgage from the subject lands to be conveyed to the Township, being Part 2 on Reference Plan 61R-21503 attached as Schedule "A" to his Report.

Once the Township is the owner of the subject lands it will be in a position to dedicate the subject lands as a public highway to be known as and to form part of Gilmour Road.

Applicable Legislation and Requirements:

Planning Act, R.S.O. 1990
Municipal Act, S.O. 2001

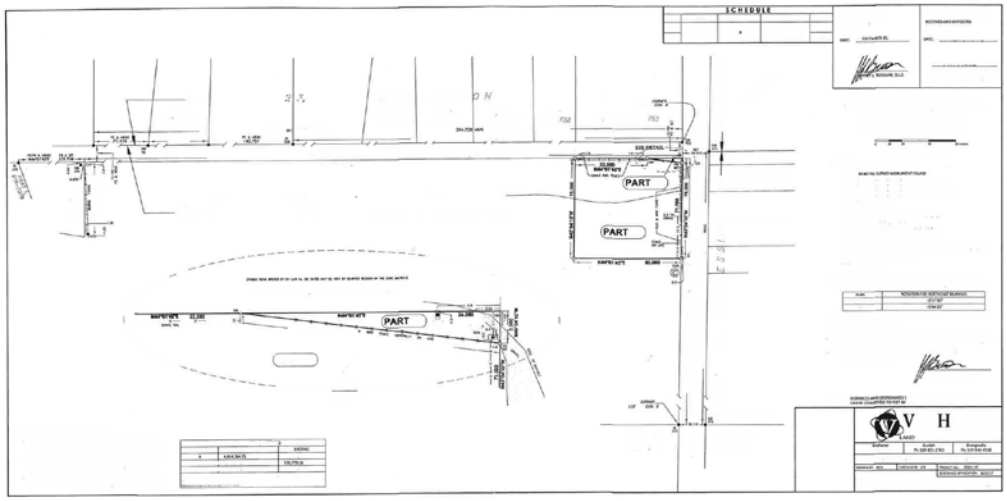
Attachment

Schedule "A" – Reference Plan 61R-21503

Location Map

ATTACHMENT "A"

Reference Plan 61R-21503



REPORT PD-2019-002

TO: Mayor and Members of Council

FROM: Lynne Banks, Development and Legislative Coordinator

MEETING DATE: March 6, 2019

SUBJECT: To lift and assume the 0.3m Reserve, Block 22 on Registered Plan 61M-16 as part of the Township of Puslinch's public highway system on Boreham Drive.

RECOMMENDATIONS

That Report PD-2019-002 be received regarding the lifting and assumption of a 0.3m reserve, being Block 22 on Registered Plan 61M-16 as part of the Township of Puslinch's public highway system on Boreham Drive and that Council pass a by-law to authorize the lifting and assumption of the one foot reserve.

DISCUSSION

Purpose:

The purpose of this Report is to obtain authorization from Council to lift and assume the 0.3 metre reserve designated as Block 22 on Registered Plan 61M-16.

Background:

In 1999, Block 22 on Registered Plan 61M-16 was transferred to the Township to satisfy a condition of a Development Agreement with Nasa Holding. Block 22 on Registered Plan 61M-16 abuts the land known municipally as 801 Watson Road South.

On June 14, 2018 the owner was granted provisional consent by the County to sever the property known municipally as 801 Watson Street South. One of the conditions of approval was that the owner transfer a 0.3 metre reserve located at the northwest corner of the property to the County. Once the transfer of the 0.3 metre reserve to the County is completed, the Township would subsequently lift Block 22 on Registered Plan 61M-16 and assume it as a public highway to facilitate obtaining a driveway entrance permit from Boreham Drive.

The owner of 801 Watson Street South is clearing the conditions of the severance of the property and will be transferring the new 0.3 metre reserve to the County in the near future.

Applicable Legislation and Requirements:

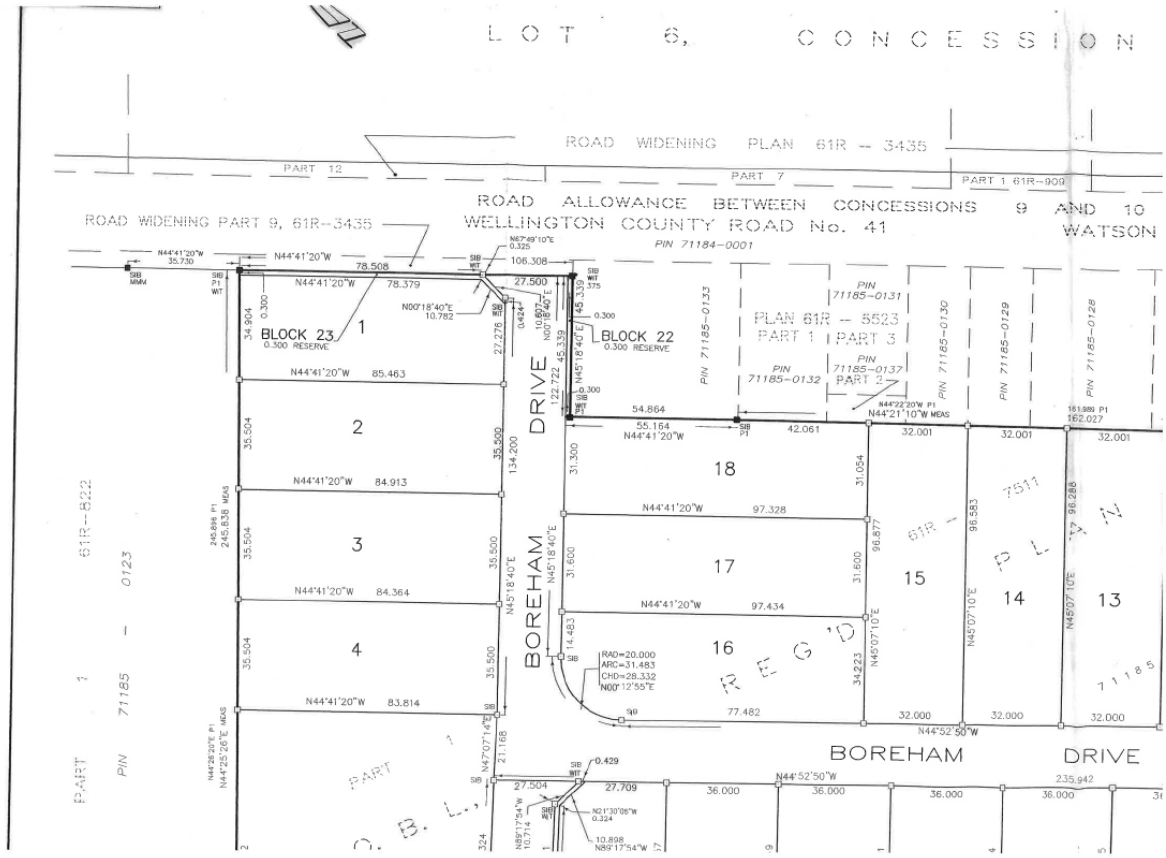
Planning Act, R.S.O. 1990
Municipal Act, S.O. 2001

Attachment "A"

Location Map

ATTACHMENT "A"

Excerpt of Registered Plan 61M-16



REPORT REC-2019-001

TO: Mayor and Members of Council

FROM: Don Creed, Director, Public Works and Parks

MEETING DATE: March 6, 2019

SUBJECT: Puslinch Community Centre Park – Back Soccer Fields - Update
File No. R04 PUS

RECOMMENDATIONS

THAT Staff Report REC-2019-001, regarding the Puslinch Community Centre Park – Back Soccer Fields – Update, be received;

AND THAT Council approves the final design, as attached as Schedule B to this report, in order to finalize the contract documents and to proceed with the issuance of the Request for Tender.

Background

Council, at its Council Workshop held on June 26, 2018, received Report REC-2018-002 regarding the Puslinch Community Centre - Back Soccer Fields. Council authorized the single source retainer of Landscape Planning Limited to coordinate the OLS Survey, Geotechnical Investigation, and other design works related to the soccer field design at an upset limit of $25,000 to be funded from the Cash in Lieu of Parkland Restricted Reserve and the Parks and Recreation Services Development Charges Restricted Reserves including (Council Resolution No. 2018-218):

- A Category 5 - School Yard Soccer Field - With Lights (lights were authorized by Council Resolution No. 2018-238 on July 18, 2018 after confirmation was received by the Grand River Conservation Authority)
- Granular Parking Lot Upgrades Without Lights
- Drainage Culvert Works at Maple Leaf Lane
- Completion of all Underground Services
- Completion of Landscaping and Grading Works for the Soccer Field

- Separate Costing for the Supply and Installation of Player's Benches and Bleachers
- Asphalt Walkway Connections - (contingent on receiving Wellington County Trail Funding as identified in Council Resolution No. 2018-238 on July 18, 2018)

At the July 18, 2018 Council Meeting, Council passed the following resolution with respect to the Back Soccer Fields at the Puslinch Community Centre:

That Report REC-2018-005 regarding the Puslinch Community Centre Park – Back Soccer Fields – Update be received; and

That Council authorizes the single source retainer of Landscape Planning Limited to complete the detailed 2018 design works related to the back soccer fields to be funded from the Cash in Lieu of Parkland Restricted Reserve and the Parks and Recreation Services Development Charges Restricted Reserve at an additional amount to an upset limit of:

- **$45, 000 for a category 5- School Yard soccer field – with lights and asphalt walkway connections (contingent on receiving Wellington County Trail funding) as identified in the area highlighted in orange in the attached image;**

That Council directs staff to apply to the following grant funding programs:

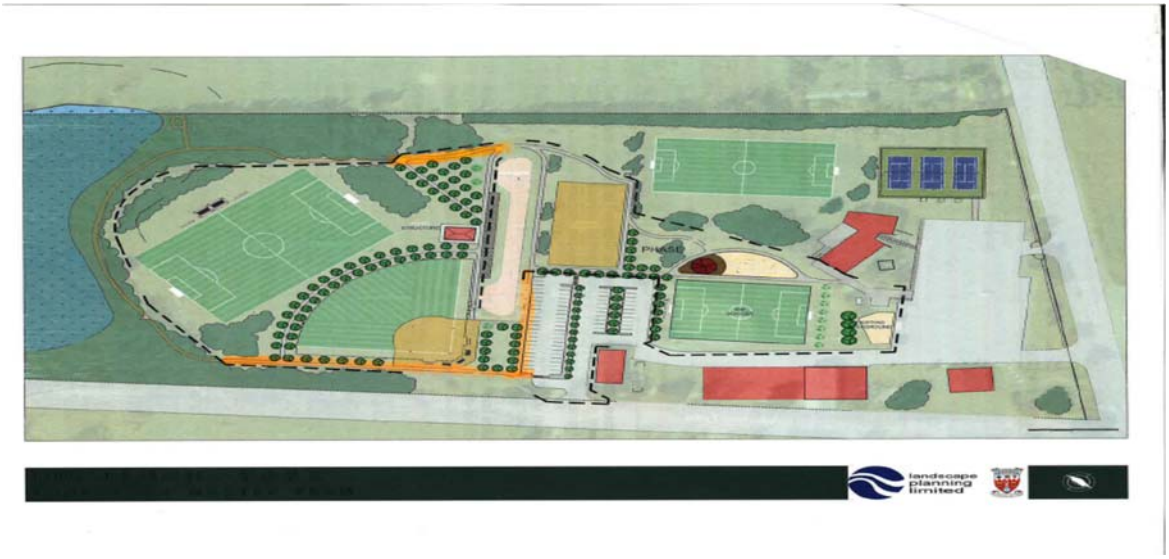
- **Canada Infrastructure Program – Phase 2; and**
- **Ontario Trillium Fund – Capital Grants; and**

That Council directs staff to provide this information to the Puslinch Minor Soccer Club; and

That the Puslinch Minor Soccer Club advise the Township by September 15, 2018 regarding:

- **Potential contributions from any organization to be made to this project in order for staff to outline funding for the selected option in the 2019 Capital Budget and to facilitate upon budget approval construction in 2019; and**
- **The timing of construction impacts and how scheduling challenges will be addressed; and**

That staff be directed to negotiate and obtain a reduced rate on the landscape architectural consulting fee.



Subsequent to that meeting, as part of the 2019 Capital Budget, the capital budget sheet for the Puslinch Community Centre Park – Back Soccer Fields is attached as Schedule A to this Report. The construction cost estimate incorporated in the 2019 Capital Budget of $602,051 is based on a cost estimate obtained from Landscape Planning Limited as of August 15, 2018.

The Township received notification of grant funding approval from the Ontario Trillium Fund for an amount of $150,000. The Ontario Trillium Fund requested a construction start date for this project. Township Council at its meeting held on January 30, 2019 directed staff to communicate a construction start date of May 1, 2020 to provide sufficient time to seek funding opportunities from third party sources.

The program details and application for the Canada Infrastructure Program - Phase 2 have not yet been announced. The Puslinch Minor Soccer Club has established a "Field Development Fund" and have contributed $5,000 to this fund.

Township staff met with the Puslinch Minor Soccer Club on February 8, 2019 to provide an update on the matter including that the Township will continue to monitor additional grant funding opportunities, however, at this time, there is a funding shortfall of approximately $400,000. The fundraising efforts of the Puslinch Minor Soccer Club are appreciated and essential to moving this project forward in accordance with the May 2020 timeline for construction commencement. The Township communicated that it is imperative for the Township to secure funding for this project in advance of its 2020 budget deliberations scheduled for September 2019.

Purpose

The purpose of this report is to obtain Council approval of the design drawings to facilitate issuing of the Request for Tender.

Attached as Schedule B to this Report is the current tender design drawings to be incorporated in the tender document. Attached as Schedule C to this Report is the current construction cost estimate as of January 18, 2019.

Financial Implications

The tender documentation will include a clause that the awarding of the project is contingent on receiving funding from third party sources.

In 2018, through Council Resolution No. 2018-218 and 2018-238, Council authorized a total amount of $70,000 for the design works. The total costs of the design works related to the tender documentation have amounted to $54,655 based on 2018 and 2019 costs incurred. It is recommended that the remaining amount of $15,344 fund the Landscape Planning Contract Administration Fee (3% of the construction estimate) as outlined in the table below.

The table below depicts the 2019 Capital Budget as compared to the January 18, 2019 construction cost estimate:

	2019 Capital Budget	January 18, 2019 Construction Cost Estimate
Estimated Construction Cost	$550,510	$587,208
Permit and Testing Allowance	$7,500	$7,500
8% Contingency	$44,041	$46,977
Total Estimated Construction Costs	**$602,051**	**$641,685**
Landscape Planning Contract Administration Fee (3% of the construction estimate)	**$15,344**	**$19,250**
Total (net of HST)	**$617,395**	**$661,115**
Add non-refundable portion of HST	**Did not include**	**$11,638**
Total Costs	**$617,395**	**$672,753**

Please note that there is a funding shortfall of $55,358 from the 2019 Capital Budget compared to the most recent cost estimate of January 18, 2019.

APPLICABLE LEGISLATION AND REQUIREMENTS

Township Purchasing and Procurement of Goods and Services and Disposal of Surplus Policy Purchasing By-law 60/08.

ATTACHMENTS

Schedule A – 2019 Capital Budget Sheet
Schedule B – Tender Design Drawings
Schedule C – Cost Estimate – January 18, 2019

TOWNSHIP OF PUSLINCH
2019 CAPITAL BUDGET

Back to Index

Department **Parks**

1 - Project Title and Type (ie. minor repairs, major repairs, replacement, new equipment, studies, policies, plans etc.)

Project Title - Puslinch Community Centre Park - Back Soccer Fields Upgrade
Project Type - Parks Improvement

2 - Purpose of Expenditure (ie. identify links to any plans, policies, legislation, studies, etc.)

2014 and 2015

The Township of Puslinch undertook, with the assistance of its consultant Monteith Brown Planning Consultants a project to research, develop and produce a fiscally responsible Master Plan document for recreation, parks, open space and trails including their respective services and facilities. The Master Plan engaged the community, municipal representatives, and other stakeholders throughout the process to gain an understanding of the broad range of leisure interest and to raise awareness for the Master Plan and the recreation and park opportunities that are available within the Township. Throughout the body of the Recreation and Parks Master Plan, recommendations were identified at the end of each subsection or topic area. The Master Plan contained 49 recommendations which have been divided into three (3) categories including:

- Service Delivery;
- Facility Needs; and
- Parks, Open Space.

The Master Plan also included an Implementation Strategy which indicated priority, timing and any considerations including potential operating and capital costs.

On May 20, 2015, Council passed Resolution No. 2015-213, stating that Council:

....adopt in principle the 2015 Township of Puslinch Recreation and Parks Master Plan prepared by Monteith Brown dated May 20, 2015 attached as Schedule “A” to report REC-2015-004; and

That Council consider any recommendations made in the 2015 Township of Puslinch Recreation and Parks Master Plan which contain budget implications during the 2016 Budget process.

On October 2015, Phase 1 of the Park Master Plan was launched (recommendation No. 32 in the Recreation and Parks Master Plan). The purpose of Phase 1 of the Puslinch Community Centre Park Master Plan was to more closely examine options for the site informed by public input.

The design of the park has changed as new features have been added over time. Designing the expansion provides an ideal opportunity to examine the functionality of the entire park, such as the potential relocation of the playground and/or the re-purposing of other uses.

The draft concept plans were presented by municipal staff to the Township's Recreation Committee on November 17, 2015 for initial review and based on comments received from the Committee, were revised prior to presentation to the public. On November 26, 2015, a public open house was held at the Optimist Recreation Centre to present the draft concept plans to interested residents and stakeholders. The concept plans and display panels were also posted on the Township's website from late November 2015 to January 31, 2016, during which comments were welcomed by the Township.

2016

The Parks Master Plan (Phase 1) was presented to Council by the Township's Consultant, Monteith Brown Planning Consultants on March 16, 2016. By Council Resolution 2016-115: Council received the presentation from Mr. Steve Langlois, Principal Planner, Monteith Brown Planning Consultants regarding the Puslinch Community Centre Park Master Plan (Phase 1).

On July 21, 2016, Council directed staff to have the consultants prepare, for their consideration, a Concept Plan and costing that:

- Includes a Lit Ball Diamond
- The addition of a 9x9 soccer field
- The addition of a 11x11 soccer field
- Accessible playground area
- Removal of the Horseshoe Pits
- Removal of the cement block building (booth)
- No splash pad
- Tennis courts remaining where they are currently located
- Horse paddock and pull track remaining where they are currently located
- Consideration for the Fall Fair requirements

2017

The new concept plan and costing was presented to Council by the Director of Public Works and Parks on February 24, 2017. By Council Resolution 2017-057: Council received the presentation from the Director of Public Works and Parks and directed staff to have the consultants prepare, for their consideration, a Phasing and Implementation Plan including all associated costs. The phasing and implementation plan including all associated costs was presented to Council at its meeting held on June 28, 2017. By Council Resolution No. 2017-234: Council received Report REC-2017-009

regarding Service Levels and Recreation and Parks Master Phasing and Implementation Plan and Costing and directed staff to report back on the funding options during the 2018 Capital Budget. The funding options for Phase 1 and Phase 2 of the Parks Master Plan was presented to Council at its 2018 Capital Budget meeting held on September 27, 2017 through Report FIN-2017-029. The funding strategy noted in the 2018 Capital Budget and Forecast included 65% of the funds required for the completion of Phase 1 and Phase 2 of the Parks Master Plan to be funded from provincial and/or federal grants and community fundraising efforts. At the September 27, 2017 Council Meeting, Council directed staff to hold the Public Meeting regarding the Parks Master Plan in 2019 and to report back during the 2019 budget deliberations on the costs to upgrade the back fields to a soccer pitch. Council at its Council Workshop held on June 26, 2018 received Report REC-2018-002 regarding the Puslinch Community Centre - Back Soccer Fields and authorized through Council Resolution No. 2018-218 the single source retainer of Landscape Planning Limited to coordinate the OLS Survey, Geotechnical Investigation, and other design works related to the soccer field including:

• A Category 5 - School Yard Soccer Field - With Lights (lights were authorized by Council Resolution No. 2018-238 on July 18, 2018 after confirmation was received by the Grand River Conservation Authority)
• Granular Parking Lot Upgrades Without Lights
• Drainage Culvert Works at Maple Leaf Lane
• Completion of all Underground Services
• Completion of Landscaping and Grading Works for the Soccer Field
• Separate Costing for the Supply and Installation of Player's Benches and Bleachers
• Asphalt Walkway Connections - (contingent on receiving Wellington County Trail Funding as identified in Council Resolution No. 2018-238 on July 18, 2018)

Council at its Council Meeting held on July 18, 2018 received Report REC-2018-005 regarding the Puslinch Community Centre Park - Back Soccer Fields - Update and authorized through Council Resolution No. 2018-238 to apply to the Canada Infrastructure Program - Phase 2 Grant Funding Program and the Ontario Trillium Fund - Capital Grants Program.

Township staff have received notification from the Ontario Trillium Fund for approval of a $150,000 grant. The program details and application for the Canada Infrastructure Program - Phase 2 have not yet been announced. The Puslinch Minor Soccer Club has established a "Field Development Fund" and have contributed $5,000 to this fund.

3 - Specific Location (ie. list facility names, stretches of Road from/to streets, etc.)

Puslinch Community Centre Park

4 - Project Description

The tender documentation will include a clause that the awarding of the project is contingent on receiving funding from third party sources. The construction cost estimate obtained from Landscape Planning Limited as of August 15, 2018 associated with this project is outlined below:

Description	Amount	Subtotal	Comments
A: Division 1 Requirements			
Bonding	$ 6,000		
Mobilization/Demolition	$ 5,000		
Site Preparations	$ 10,000	**$ 21,000**	
B: Site Servicing			
Storm Drainage Systems			
CBs/MHs/Culverts/LID	$ 20,000		
Electrical Site Servicing			
Electrical Service, Conductors and Connections	$ 45,000		Tender to include separate costing.
Supply & Install Empty Electrical Conduit	$ 20,000	**$ 85,000**	
C: Grading Works			
Rough Grade/Topsoil (Replace, Spread and Fine Grade)	$ 50,000	**$ 50,000**	
D: Paving/Hard Surfacing			
Granular Parking Lot	$ 76,875		
150 mm h.t. Concrete Curb (parking lot ends)	$ 25,875		
Concrete Bumper Blocks (parking lot)	$ 5,100		
Asphalt Walkway Connections	$ 23,460		
Concrete Bleacher Pads	$ 13,000	**$ 144,310**	Tender to include separate costing.
E: Sports Facilities Items/Fencing			
Senior Soccer Field with Lights	$ 150,000		Tender to include separate costing for lights.
Portable Bleachers (soccer field only)	$ 17,800		Tender to include separate costing.
Players Benches (21'-0") (soccer field only)	$ 2,400	**$ 170,200**	Tender to include separate costing.
F: Soft Landscape			
Edge Management Planting (naturalization)	$ 15,000		

Sod	$ 40,000		
Description	**Amount**	**Subtotal**	
Seed	$ 25,000	**$ 80,000**	
Estimated Construction Cost		**$ 550,510**	
Permit & Testing Allowance		**$ 7,500**	
8% Contingency		**$ 44,041**	
Total Estimated Construction Cost			**$ 602,051**
Consulting Fees			
Landscape Architectural - Civil and Electrical (7% of Cost Estimate excl. site furnishings)		$ 40,730	Council Resolution No.'s 2018-218 and 238
OLS Surveying Fees		$ 5,300	Council Resolution No.'s 2018-218 and 238
Geotechnical Investigation Fees		$ 6,175	Council Resolution No.'s 2018-218 and 238
			$ 52,205
Grandtotal - Construction Cost and Consulting Fees			**$ 654,255**

5 - Capital Funding for 2019 Expenditures

Tax Levy		
Capital Carryforward	25,416	Council Resolution No.'s 2018-218 and 238
Ontario Trillium Fund - Capital Grants	150,000	Approval of funding received.
Cash in Lieu of Parkland	43,404	
Canada Infrastructure Program - Phase 2	301,025	Funding application available in late 2018
Donations	89,826	
Discretionary Reserve		
Gas Tax		
Development Charges Note A		
Total Funding	**609,671**	

Additional information related to DC's

Project # and Description in DC	1. Provision for Parkland Development
Year in DC Study	2014-2023
% of DC Funding allowed in DC	90%
Service Area in DC	Parks and Recreation Services

Note A: Please indicate the service area, project description, project number, year(s), and % of DC funding allotted as outlined in the 2014 DC Study.

6 - Capital Components, Costs, and Timing

Please list proposed 2019 capital spending by quarter for cash flow purposes

	2019					Future Phases Note B			
Project Components	**JAN-MAR**	**APR-JUN**	**JUL-SEP**	**OCT-DEC**	**2019**	**2020**	**2021**	**2022**	**2023**
Consulting Fees	52,205				52,205				
Construction Costs			301,025	301,025	602,051				
Total Cost	**52,205**	**-**	**301,025**	**301,025**	**654,255**	**-**	**-**	**-**	**-**

Note B: The Future Phases section is to identify the quantum of the total project cost only. Future Phases will not be automatically approved nor funded if this project is approved.

7 - Incremental Operating Budget Impact

	2019	Annualized
Incremental Revenues		
Incremental Salary and Benefits		
Incremental Non-Salary Costs	4,375	
Total Incr. Exp./(Rev.)	**4,375**	**-**

# FT Staff	# PT Staff

Non-Incremental Operating Costs

Description	Hours/Week	No. of Weeks	Rate/Hour	Cost/Season
Equipment - Truck, Trailer, Mower	2	24	$50	$2,400
Labour & Benefits	2	24	$31.72	$1,523
Non-Incremental Costs				**$3,923**

The above costs are considered non-incremental as the Township is currently completing these services (ie. lawn mowing) for the back soccer fields.

Incremental Operating Costs

Description	Hours/Week	No. of Weeks	Rate/Hour	Cost/Season
Hydro				$2,000
Portable Toilets				$2,000
Rolling				$125
Fertilizing				$250
Incremental Costs				**$4,375**

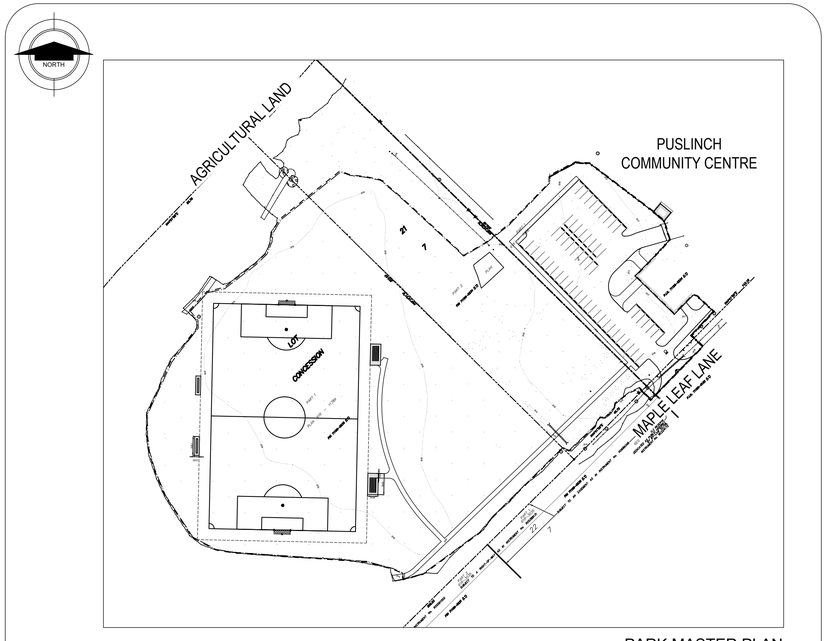
Puslinch Community Centre Soccer Field & Parking Lot

The Township of Puslinch

Contract No.: PK20-001

Pg No.	Sheet No.	Title
1.	C-1	COVER PAGE
2.	EX-1	EXISTING SITE SURVEY
3.	EX-2	EXISTING CONDITIONS / SITE PREPARATION PLAN
4.	L1	LANDSCAPE / SURFACE MATERIALS PLAN
5.	L2	LAYOUT PLAN
6.	L3	GRADING & SERVICING PLAN
		SITE ELECTRICAL
7.	E-1	ELECTRICAL/LIGHTING PLAN
8.	E-2	ELECTRICAL NOTES & DETAILS
		DETAILS
9.	D-1	DETAILS

SITE CONTEXT MAP
1:500



PARK MASTER PLAN
1:500

ISSUED FOR:
Review ☐ Tender ☒ Construction ☐

LPL No. 2018-109

TENDER DRAWINGS

CLIENT:

THE TOWNSHIP OF Puslinch

The Township of Puslinch
Parks and Open Space Development

7404 Wellington Rd 34,
Puslinch, Ontario
N0B 2J0
Tel: 519.763.1226 ext. 222
Attn: Ms. Mary Hasan, Director of Finance / Treasurer

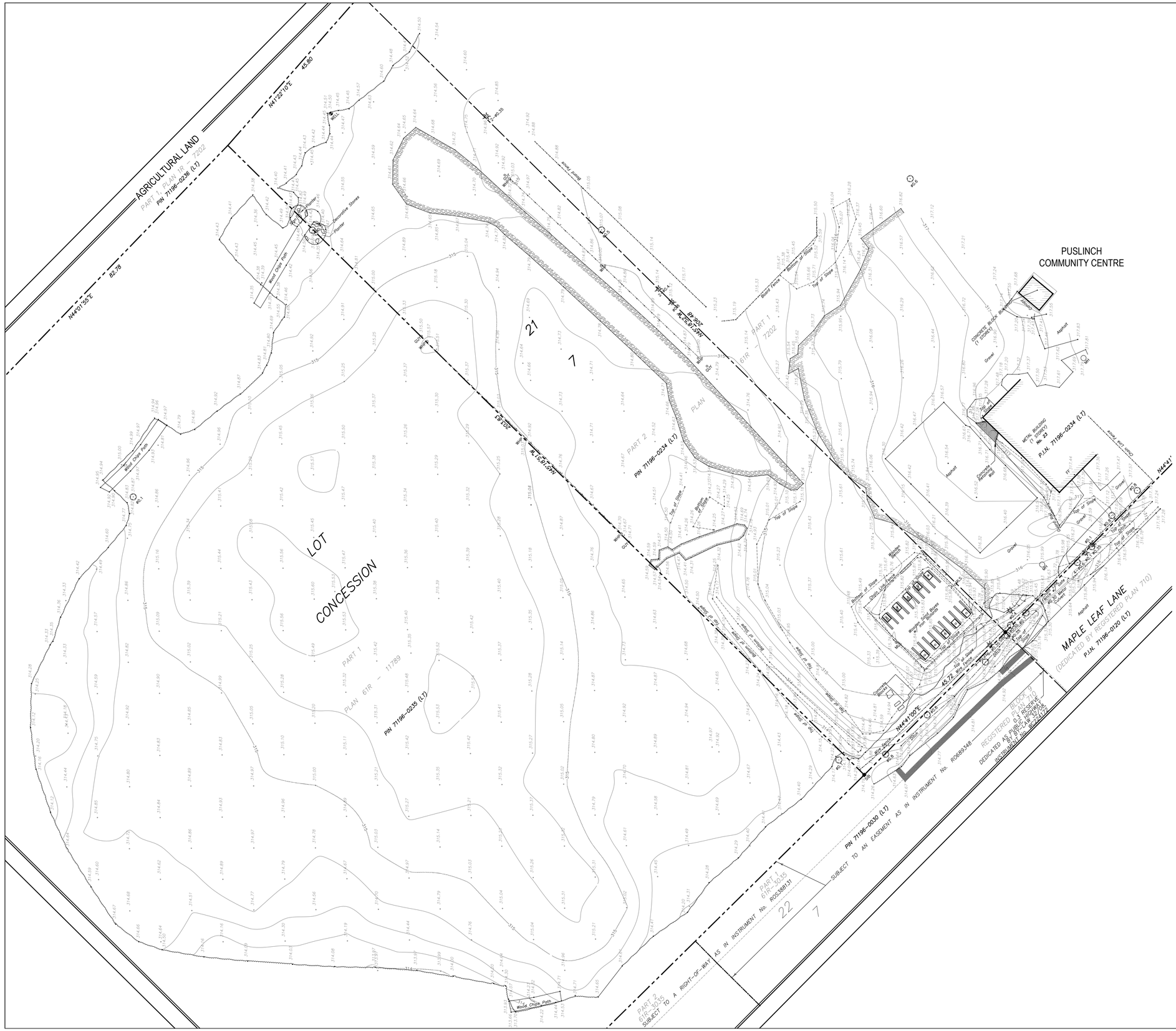
SUB-CONSULTANTS:

ELECTRICAL
MJS Consultants Inc.
420 Main Street East, Suite 473
MILTON ONTARIO
L9T 1P9
TEL: 416.402.1525

PRIME CONSULTANT:

landscape planning
LANDSCAPE ARCHITECTS

Paul Gardner, OALA, CSLA, Partner
95 Mural Street, Suite 207, Richmond Hill, ON L4B 3G2
Tel: 905.669.6838, www.landscapeplan.ca



LEGEND:

	DENOTES	
■	=	SURVEY MONUMENT FOUND
□	=	SURVEY MONUMENT PLANTED
WIT	=	WITNESS MONUMENT
SIB	=	STANDARD IRON BAR
SSIB	=	SHORT STANDARD IRON BAR
IB	=	IRON BAR
CC	=	CUT CROSS
N,S,E,W	=	NORTH, SOUTH, EAST, WEST
OU	=	ORIGIN UNKNOWN
SVNG	=	SPEIGHT, VAN NOSTRAND & GIBSON
MH	=	MANHOLE
HW	=	HAND WELL
WHP	=	WOODEN HYDRO POLE
MLS	=	METAL LIGHT STANDARD
B	=	BOLLARD
○	=	DECIDUOUS TREE
☆	=	CONIFEROUS TREE
	=	CONCRETE
	=	GRAVEL

no.	revision	date	by
R0	Issued for Tender	JAN. 06, 2020	CB

reviewed by P.G.

drawn by C.B.

date OCTOBER 2018

scale 1:400

NORTH

drawing title
SITE SURVEY

drawing number
EX-1

client
TOWNSHIP OF PUSLINCH

project title
PUSLINCH C.C. SOCCER FIELD & PARKING LOT

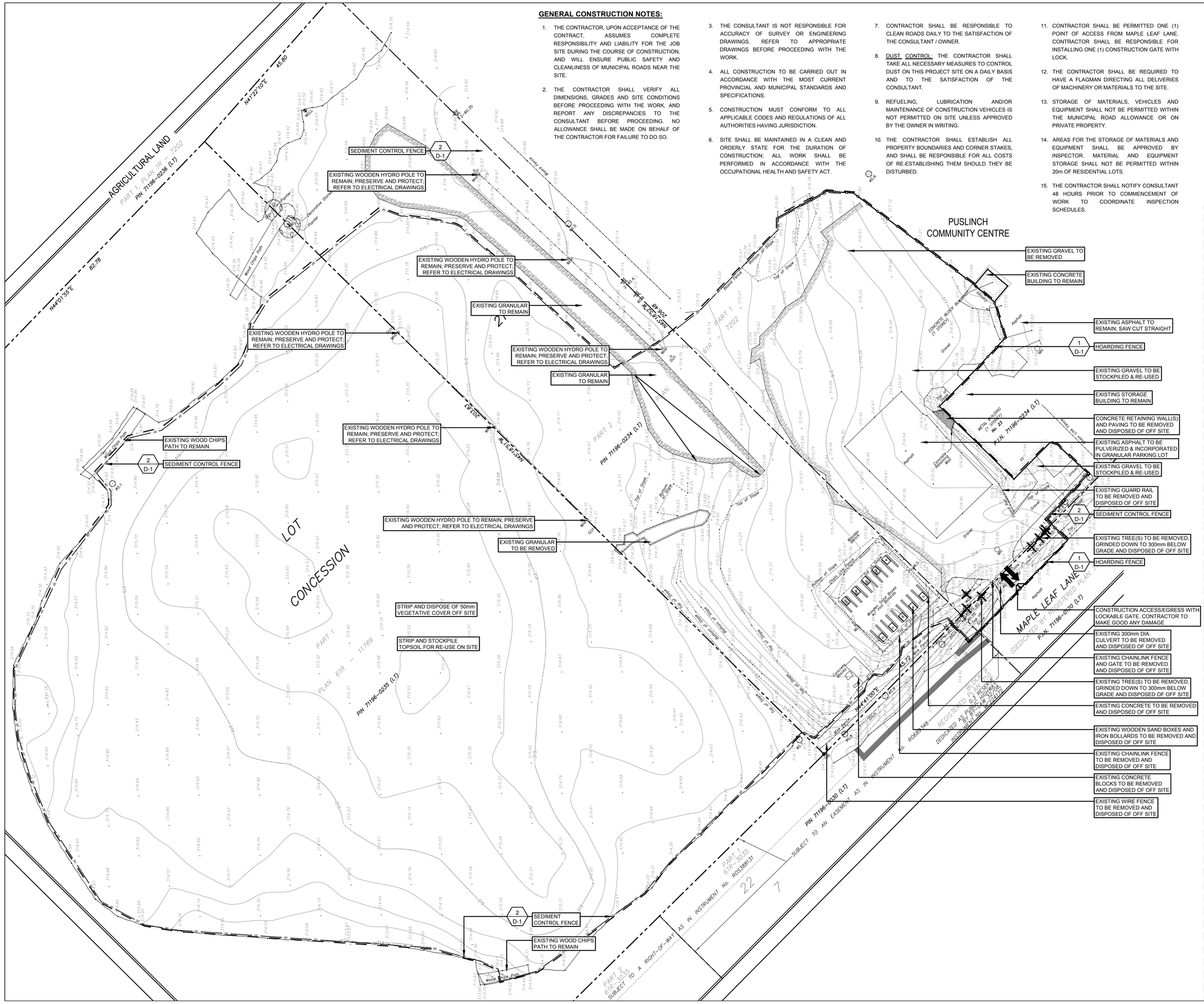
project number
2018-109

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS
OALA
JAN 06, 2020
MEMBER

landscape planning
LANDSCAPE ARCHITECTS
Suite 207, 95 Mural Street, Richmond Hill, Ontario L4B 3G2,
Tel. 905.669.6838, www.landscapeplan.ca

GENERAL CONSTRUCTION NOTES:

1. THE CONTRACTOR, UPON ACCEPTANCE OF THE CONTRACT, ASSUMES COMPLETE RESPONSIBILITY AND LIABILITY FOR THE JOB SITE DURING THE COURSE OF CONSTRUCTION, AND WILL ENSURE PUBLIC SAFETY AND CLEANLINESS OF MUNICIPAL ROADS NEAR THE SITE.
2. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS, GRADES AND SITE CONDITIONS BEFORE PROCEEDING WITH THE WORK, AND REPORT ANY DISCREPANCIES TO THE CONSULTANT BEFORE PROCEEDING. NO ALLOWANCE SHALL BE MADE ON BEHALF OF THE CONTRACTOR FOR FAILURE TO DO SO.
3. THE CONSULTANT IS NOT RESPONSIBLE FOR ACCURACY OF SURVEY OR ENGINEERING DRAWINGS. REFER TO APPROPRIATE DRAWINGS BEFORE PROCEEDING WITH THE WORK.
4. ALL CONSTRUCTION TO BE CARRIED OUT IN ACCORDANCE WITH THE MOST CURRENT PROVINCIAL AND MUNICIPAL STANDARDS AND SPECIFICATIONS.
5. CONSTRUCTION MUST CONFORM TO ALL APPLICABLE CODES AND REGULATIONS OF ALL AUTHORITIES HAVING JURISDICTION.
6. SITE SHALL BE MAINTAINED IN A CLEAN AND ORDERLY STATE FOR THE DURATION OF CONSTRUCTION; ALL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE OCCUPATIONAL HEALTH AND SAFETY ACT.
7. CONTRACTOR SHALL BE RESPONSIBLE TO CLEAN ROADS DAILY TO THE SATISFACTION OF THE CONSULTANT / OWNER.
8. DUST CONTROL: THE CONTRACTOR SHALL TAKE ALL NECESSARY MEASURES TO CONTROL DUST ON THIS PROJECT SITE ON A DAILY BASIS AND TO THE SATISFACTION OF THE CONSULTANT.
9. REFUELING, LUBRICATION AND/OR MAINTENANCE OF CONSTRUCTION VEHICLES IS NOT PERMITTED ON SITE UNLESS APPROVED BY THE OWNER IN WRITING.
10. THE CONTRACTOR SHALL ESTABLISH ALL PROPERTY BOUNDARIES AND CORNER STAKES, AND SHALL BE RESPONSIBLE FOR ALL COSTS OF RE-ESTABLISHING THEM SHOULD THEY BE DISTURBED.
11. CONTRACTOR SHALL BE PERMITTED ONE (1) POINT OF ACCESS FROM MAPLE LEAF LANE. CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING ONE (1) CONSTRUCTION GATE WITH LOCK.
12. THE CONTRACTOR SHALL BE REQUIRED TO HAVE A FLAGMAN DIRECTING ALL DELIVERIES OF MACHINERY OR MATERIALS TO THE SITE.
13. STORAGE OF MATERIALS, VEHICLES AND EQUIPMENT SHALL NOT BE PERMITTED WITHIN THE MUNICIPAL ROAD ALLOWANCE OR ON PRIVATE PROPERTY.
14. AREAS FOR THE STORAGE OF MATERIALS AND EQUIPMENT SHALL BE APPROVED BY INSPECTOR. MATERIAL AND EQUIPMENT STORAGE SHALL NOT BE PERMITTED WITHIN 20m OF RESIDENTIAL LOTS.
15. THE CONTRACTOR SHALL NOTIFY CONSULTANT 48 HOURS PRIOR TO COMMENCEMENT OF WORK TO COORDINATE INSPECTION SCHEDULES.
16. ALL EXISTING UTILITIES SHOWN ON THE DRAWINGS ARE FOR REFERENCE PURPOSES ONLY. THE CONTRACTOR SHALL CONTACT THE UTILITY COMPANIES FOR UTILITY STAKEOUT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGES CAUSED TO EXISTING UTILITIES DURING CONSTRUCTION. THE CONTRACTOR SHALL GIVE UTILITIES ADVANCE NOTICE PRIOR TO DIGGING AND SHALL ASSUME ALL LIABILITIES OF DAMAGE DURING CONSTRUCTION.
17. THE CONDITION OF CURBS, SIDEWALKS, STREET TREES AND UTILITIES LOCATED WITHIN THE MUNICIPAL R.O.W. SHALL BE REVIEWED AND DOCUMENTED BETWEEN ALL PARTIES PRIOR TO THE START OF CONSTRUCTION. THE CONTRACTOR WILL RECTIFY ANY DAMAGES, AT THEIR OWN COST, TO THE SATISFACTION OF THE OWNER / MUNICIPALITY.
18. ALL EXISTING VEGETATION AND UTILITIES SHALL BE PROTECTED BY THE CONTRACTOR FOR THE DURATION OF CONSTRUCTION. REFER TO DETAILS FOR APPROVED FENCING TYPES. ANY DAMAGES NOTED TO BE RECTIFIED AT THE COST OF THE CONTRACTOR.
19. NO MACHINE ACCESS OR GRADE CHANGES ARE PERMITTED WITHIN THE DRIP LINE OF EXISTING TREES. ANY ROOTS OR BRANCHES WHICH EXTEND BEYOND THE TREE PROTECTION HOARDING INDICATED ON THIS PLAN WHICH REQUIRE PRUNING, MUST BE DONE IN ACCORDANCE WITH GOOD ARBORICULTURAL STANDARDS. ANY EXCAVATIONS WITHIN THE DRIP LINE MUST BE HAND DUG. THE CONTRACTOR TO REMOVE AND DISPOSE HOARDING FENCING UPON CONSTRUCTION COMPLETION.
20. ALL TEMPORARY PROTECTIVE FENCING INCLUDING TREE PROTECTIVE FENCING SHALL BE MAINTAINED BY THE CONTRACTOR TO THE SATISFACTION OF THE INSPECTOR FOR THE DURATION OF CONSTRUCTION AND REMOVED FOLLOWING SUBSTANTIAL COMPLETION UPON APPROVAL BY CONSULTANT; FENCING LOCATIONS TO BE REVIEWED AND APPROVED PRIOR TO THE COMMENCEMENT OF CONSTRUCTION.
21. THE CONTRACTOR IS EXPECTED TO PROVIDE MODULAR HOARDING FENCE AROUND ALL AREAS OF ACTIVE CONSTRUCTION. THE CONTRACTOR MAY REMOVE MODULAR FENCING ONLY UPON WRITTEN APPROVAL OF THE CONSULTANT THAT ACTIVE CONSTRUCTION AREA HAS BEEN SUBSTANTIALLY COMPLETED AND SAFE FOR PUBLIC USE.
22. NO HOARDING FENCING COMPONENT, INCLUDING BRACES AND FOOT SUPPORTS, SHALL ENCUMBER THE PUBLIC SIDEWALK AT ANY TIME.
23. CONTRACTOR SHALL ENSURE THAT EXISTING RESIDENTIAL / SCHOOL FENCING IS PROTECTED AT ALL TIMES DURING CONSTRUCTION. CONTRACTOR SHALL REPAIR AT HIS COST ANY DAMAGE ARISING DURING THE PARK CONSTRUCTION.
24. ANY ACCESS FROM THE REAR YARDS OF RESIDENTIAL LOTS SHALL BE RESTRICTED BY INSTALLING WIRE ON GATES.
25. CONTRACTOR SHALL SUPPLY AND INSTALL FILTER FABRIC PROTECTION ON ALL EXISTING CATCH BASINS AND UTILITIES THAT ARE TO REMAIN AND THAT MAY BE AFFECTED BY THE CONSTRUCTION.
26. REMOVE AND DISPOSE OF ALL ITEMS NECESSARY TO PERMIT NEW CONSTRUCTION
27. REMOVAL OF ITEMS INCLUDES FULL REMOVAL OF ANY FOOTINGS.
28. REMOVE ALL SOD AND SOIL AS MAY REQUIRED TO PERMIT NEW CONSTRUCTION.
29. THE COSTS ASSOCIATED WITH THE ABOVE ITEMS 1 THROUGH 28, WHERE SUCH COSTS ARE NOT IDENTIFIED SPECIFICALLY ON THE FORM OF TENDER (BID FORM) SHALL BE DEEMED TO BE INCLUDED IN BID ITEM X.XX.
30. ALL DRAWINGS, SPECIFICATIONS AND RELATED DOCUMENTS ARE THE COPYRIGHT OF THE CONSULTANT AND MUST BE RETURNED UPON REQUEST. REPRODUCTION OF DRAWINGS, SPECIFICATIONS AND RELATED DOCUMENTS IN WHOLE OR IN PART IS FORBIDDEN WITHOUT THE CONSULTANT'S PERMISSION. DRAWINGS ARE NOT TO BE SCALED.



LEGEND:

- 1 / D-0 — DETAIL # / SHEET #
- PROPERTY LINE
- LIMIT OF CONTRACT
- POST AND PAIGE WIRE FENCE
- HOARDING FENCE
- SF — EROSION CONTROL FENCE
- TREE PRESERVATION FENCE
- SITE ACCESS / EGRESS
- EXISTING TREE TO BE REMOVED
- SITE REMOVALS
- + 246.77 — EXISTING ELEVATION
- 249.00 — EXISTING CONTOUR (0.25m INTERVAL)
- PROPERTY BAR

no.	revision	date	by
R0	Issued for Tender	JAN. 06, 2020	CB

reviewed by	drawn by
P.G.	C.B.
date	OCTOBRER 2018
scale	1:400

NORTH

drawing title
EXISTING CONDITIONS / SITE PREPARATION PLAN

drawing number
EX-2

client
TOWNSHIP OF PUSLINCH

project title
PUSLINCH C.C. SOCCER FIELD & PARKING LOT

project number
2018-109

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS
OALA JAN 06, 2020 MEMBER

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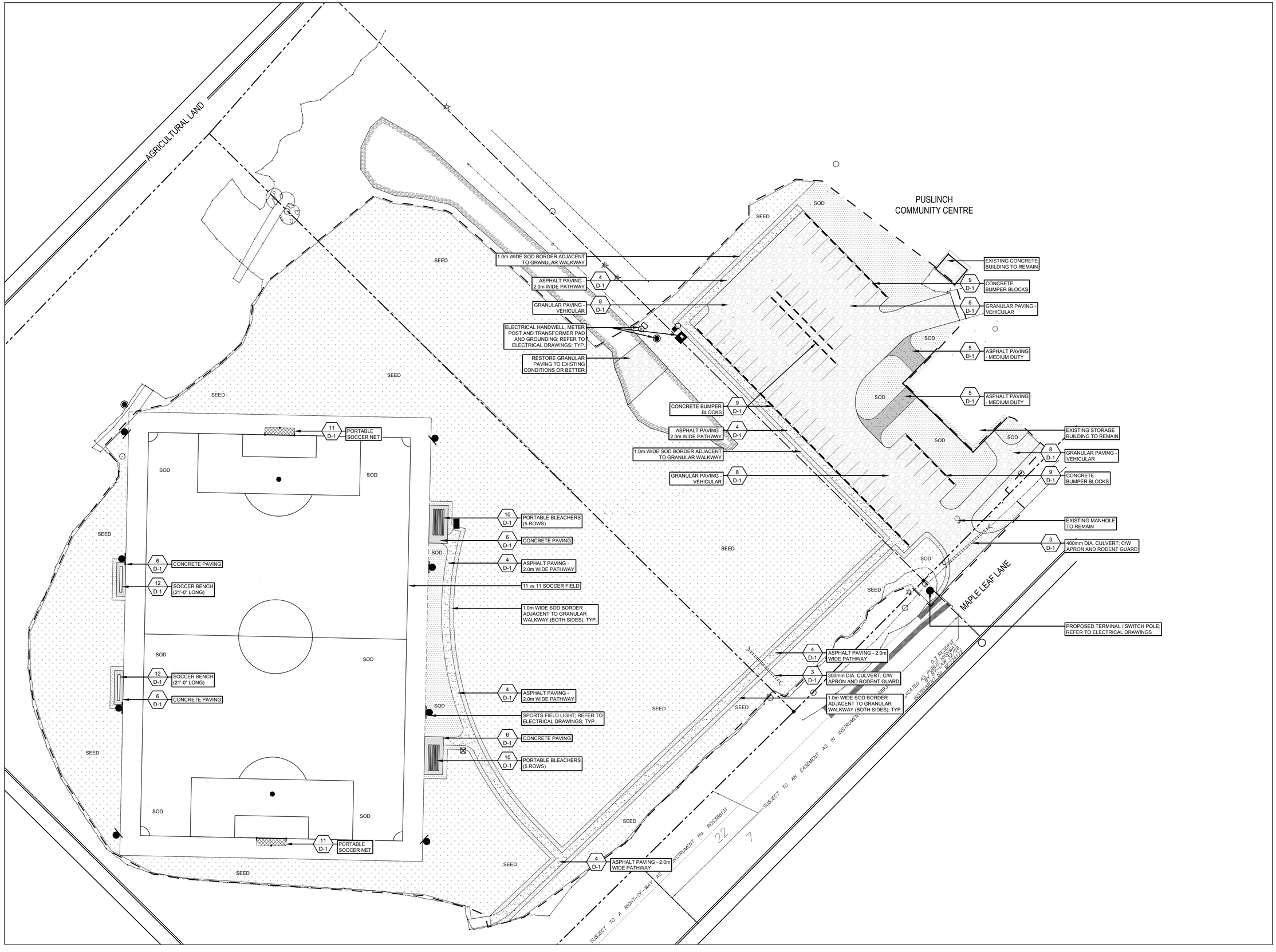

LEGEND:

- 1 / D-0 — DETAIL # / SHEET #
- PROPERTY LINE
- LIMIT OF CONTRACT
- ASPHALT PAVING - MEDIUM DUTY
- CONCRETE PAVING
- GRANULAR PAVING - VEHICULAR
- GRANULAR PAVING - LIMESTONE S
- INFILTRATION TRENCH
- SEED
- SOD

no.	revision	date	by
R0	Issued for Tender	JAN. 06, 2020	CB

reviewed by P.G. | drawn by C.B.

date OCTOBER 2018

scale 1:400

NORTH

drawing title
LANDSCAPE / SURFACE MATERIALS PLAN

drawing number
L-1

client
TOWNSHIP OF PUSLINCH

project title
PUSLINCH C.C. SOCCER FIELD & PARKING LOT

project number
2018-109

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS
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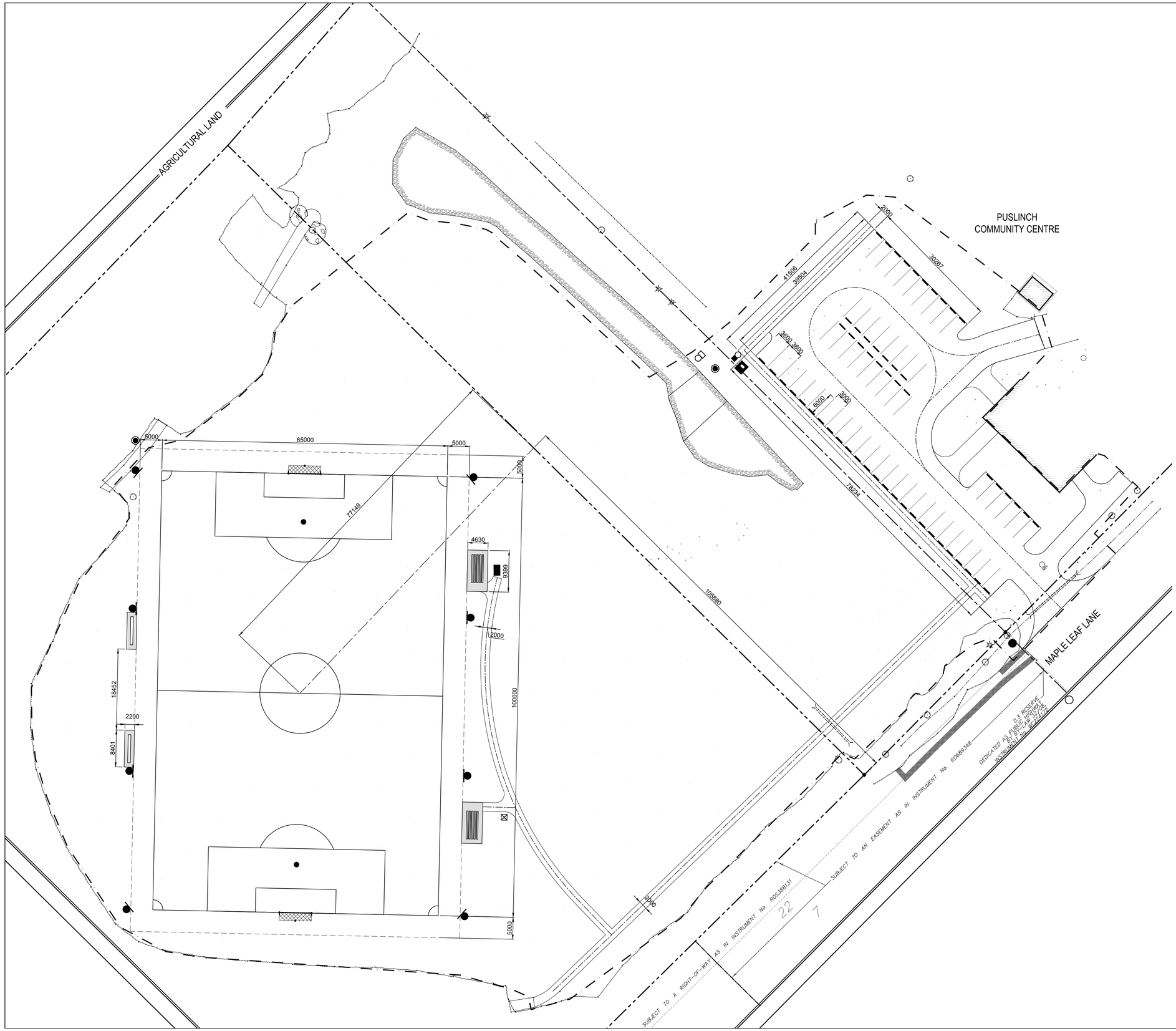

LEGEND:

1 / D-0 — DETAIL # / SHEET #

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no.	revision	date	by
R0	Issued for Tender	JAN. 06, 2020	CB

reviewed by P.G.

drawn by C.B.

date OCTOBER 2018

scale 1:400

NORTH

drawing title
LAYOUT PLAN

drawing number
L-2

client
TOWNSHIP OF PUSLINCH

project title
PUSLINCH C.C. SOCCER FIELD & PARKING LOT

project number
2018-109

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS
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JAN 06, 2020
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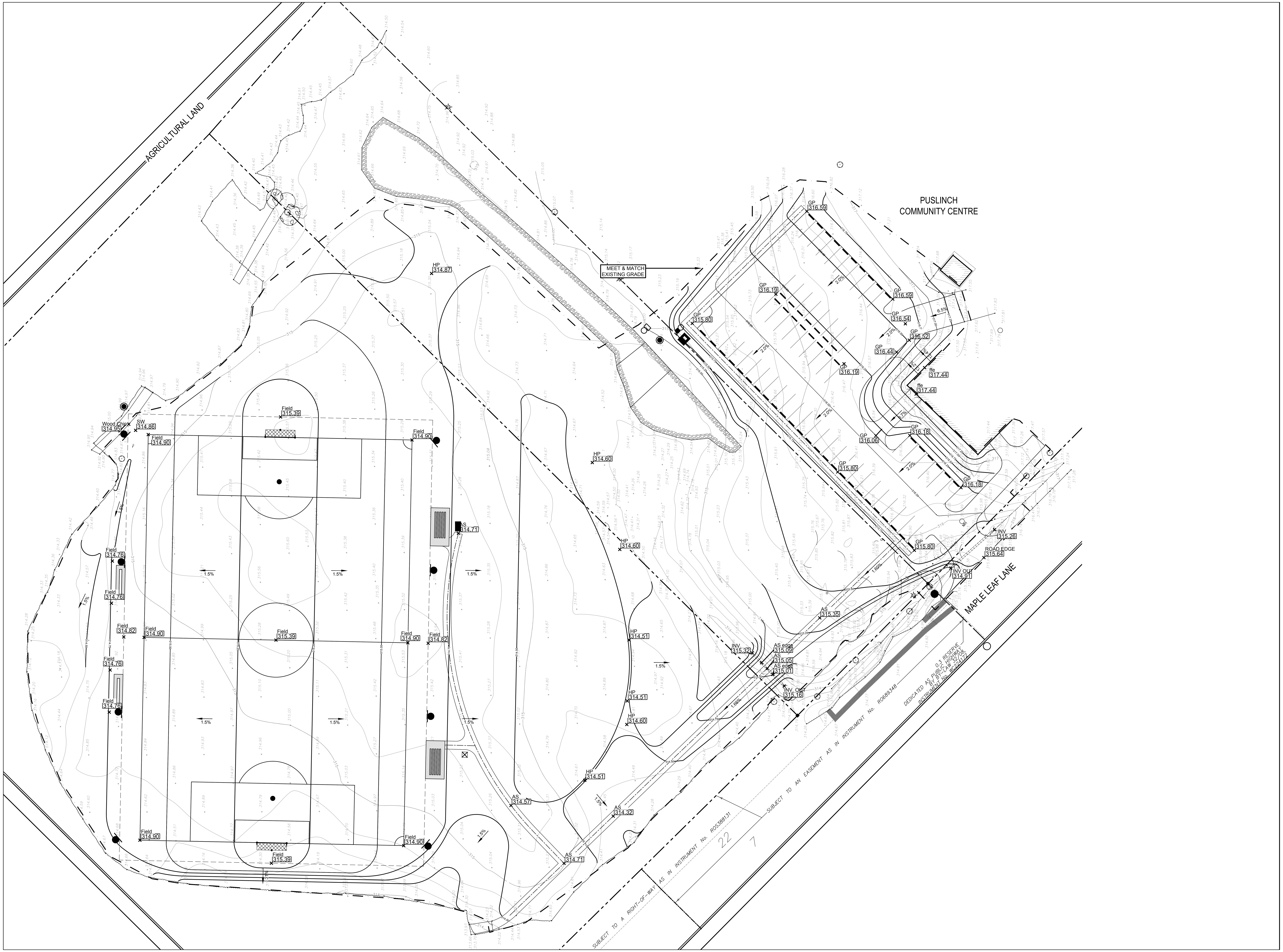

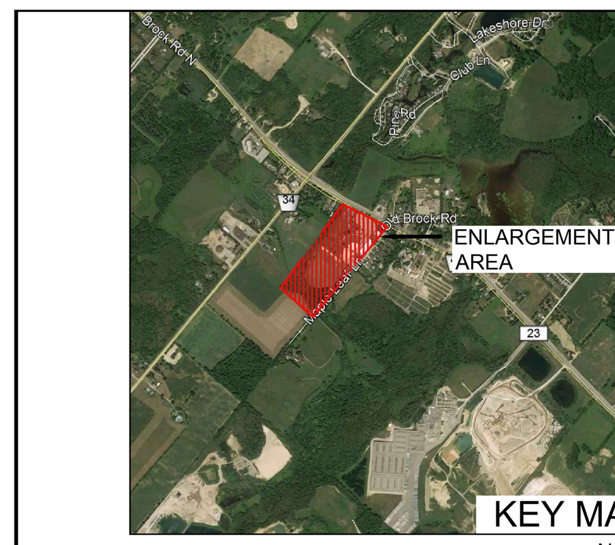

N.T.S

LEGEND:

1 / D-0	DETAIL # / SHEET #
	PROPERTY LINE
	LIMIT OF CONTRACT
249.00	EXISTING CONTOUR
	EXISTING SPOT ELEVATION
	PROPOSED SPOT ELEVATION TC - TOP OF CURB BC - BOTTOM OF CURB SW - SWALE HP - HIGH POINT AS - ASPHALT SIDEWALK GP - GRANULAR PAVING
	PROPOSED CONTOUR
2.0%	SWALE GRADIENT
	PERFORATED DRAINAGE LINE 100mm Ø
	RIGID DRAINAGE LINE 100mm Ø

no.	revision	date	by
R0	Issued for Tender	JAN. 06, 2020	CB

reviewed by P.G. — drawn by C.B.

date: OCTOBER 2018

scale: 1:400

NORTH

drawing title

GRADING & SERVICING PLAN

drawing number: L-3

client: TOWNSHIP OF PUSLINCH

project title: PUSLINCH C.C. SOCCER FIELD & PARKING LOT

project number: 2018-109

ONTARIO ASSOCIATION OF LANDSCAPE ARCHITECTS
OALA
JAN 06, 2020
MEMBER

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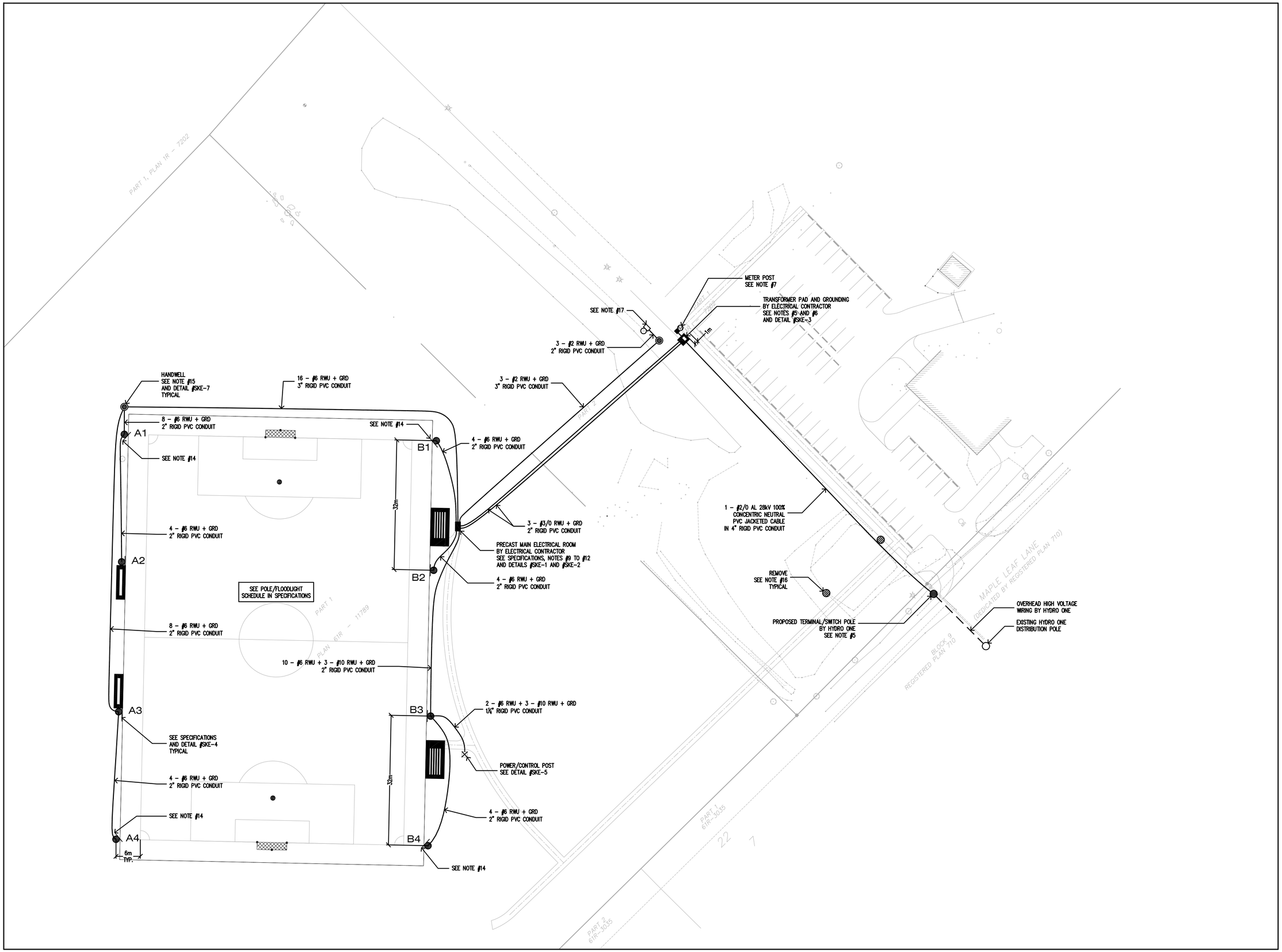


REGISTERED PROFESSIONAL ENGINEER
B.A. KRASNICHUK
PROVINCE OF ONTARIO

Electrical Consultant

MJS CONSULTANTS INC.
420 Main Street East, Suite 473
Milton, Ontario
L9T 5G3
TEL: 416-402-1525
mjscons@total.net

no.	revision	date	by
R0	Issued for Tender	JAN. 06, 2020	MJS

reviewed by: MJS - RN
drawn by: MJS - ACAD
date: JANUARY 2019
scale: 1: 400

NORTH

drawing title
ELECTRICAL/LIGHTING PLAN

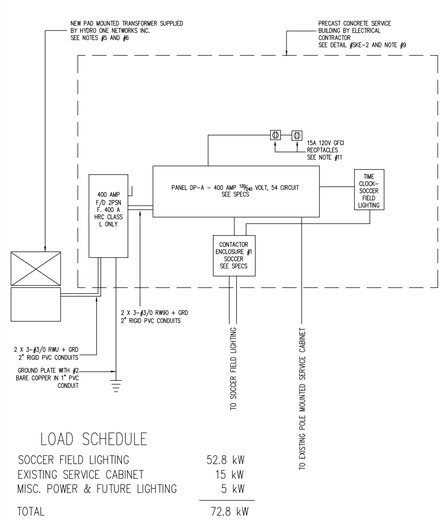
drawing number
E-1

client
TOWNSHIP OF PUSLINCH

project title
PUSLINCH C.C. SOCCER FIELD & PARKING LOT

project number
2018-109

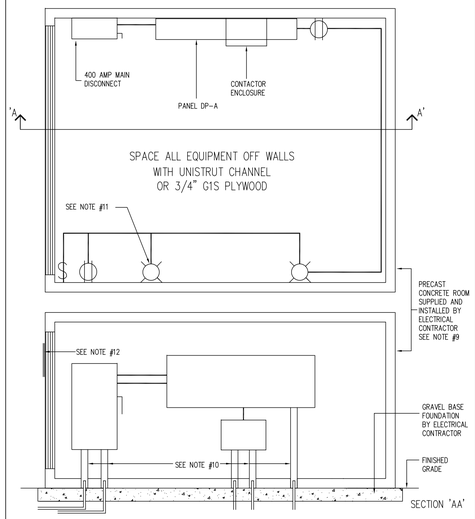
landscape planning
LANDSCAPE ARCHITECTS
Suite 207, 95 Mural Street, Richmond Hill, Ontario L4B 3G2,
Tel. 905.669.6838, www.landscapeplan.ca



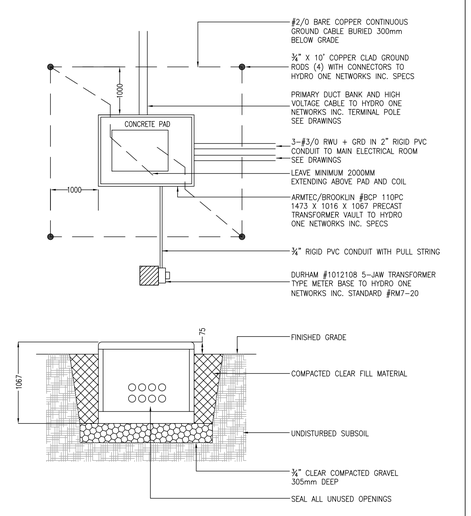
LOAD SCHEDULE

SOCCER FIELD LIGHTING	52.8 kW
EXISTING SERVICE CABINET	15 kW
MISC. POWER & FUTURE LIGHTING	5 kW
TOTAL	72.8 kW

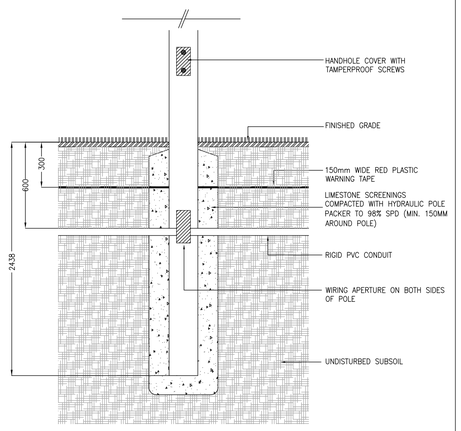
MJS CONSULTANTS INC. 420 MAIN STREET EAST, SUITE 473 MILTON, ONTARIO L9T 5G3	PUSLINCH COMMUNITY CENTRE SOCCER	SKE-1
DATE JANUARY, 2019	SINGLE LINE DISTRIBUTION	
SCALE NOT TO SCALE		



MJS CONSULTANTS INC. 420 MAIN STREET EAST, SUITE 473 MILTON, ONTARIO L9T 5G3	PUSLINCH COMMUNITY CENTRE SOCCER	SKE-2
DATE JANUARY, 2019	MAIN ELECTRICAL ROOM DETAIL	
SCALE NOT TO SCALE		



MJS CONSULTANTS INC. 420 MAIN STREET EAST, SUITE 473 MILTON, ONTARIO L9T 5G3	PUSLINCH COMMUNITY CENTRE SOCCER	SKE-3
DATE JANUARY, 2019	TRANSFORMER PAD AND GROUNDING	
SCALE NOT TO SCALE		



MJS CONSULTANTS INC. 420 MAIN STREET EAST, SUITE 473 MILTON, ONTARIO L9T 5G3	PUSLINCH COMMUNITY CENTRE SOCCER	SKE-4
DATE JANUARY, 2019	POLE BASE DETAIL	
SCALE NOT TO SCALE		

MJS CONSULTANTS INC. 420 MAIN STREET EAST, SUITE 473 MILTON, ONTARIO L9T 5G3	PUSLINCH COMMUNITY CENTRE SOCCER	SKE-5
DATE JANUARY, 2019	POWER/CONTROL POST	
SCALE NOT TO SCALE		

MJS CONSULTANTS INC. 420 MAIN STREET EAST, SUITE 473 MILTON, ONTARIO L9T 5G3	PUSLICH COMMUNITY CENTRE SOCCER	SKE-6
DATE JANUARY, 2019	LIGHTING CONTROL SCHEMATIC	
SCALE NOT TO SCALE		

MJS CONSULTANTS INC. 420 MAIN STREET EAST, SUITE 473 MILTON, ONTARIO L9T 5G3	PUSLINCH COMMUNITY CENTRE SOCCER	SKE-7
DATE JANUARY, 2019	PRE-CAST CONCRETE HANDWELL	
SCALE NOT TO SCALE		

ELECTRICAL NOTES

1. Electrical contractors quoting on this project must visit the Puslinch Community Park site located on the northwest corner of Brock Road South and Maple Leaf Lane prior to the submission of their quotation, to familiarize themselves with the existing conditions. No allowance will be made later for any expense incurred through failure to make this examination.

2. Arrange and pay for locates for all buried services before starting any work in accordance with TSSA requirements. Any damaged services, trees or other plant materials will be replaced or repaired to the satisfaction of the contract inspector. All costs for this work will be the responsibility of the electrical contractor.

3. The conduit routing indicated on the drawing is to be considered schematic only. Do not route conduits under the bases of any structures, under bleacher footings or proposed fence posts. Generally, where possible route all conduits 2000mm offset of all proposed services and the playing surfaces. Keep all of the trenches as far away as possible from the drip lines of all existing and proposed trees to avoid damaging their root systems. All costs for this work will be the responsibility of the electrical contractor.

4. The electrical contractor is responsible for the co-ordination of the new primary service and the new 400 Amp 120/240 volt single-phase, 3-wire electrical service supply to this site from an existing distribution pole located in the road allowance on the south side of Maple Leaf Lane where detailed on the drawings. Contact the Hydro One Networks Inc. Engineering Department through their website www.hydroone.com to download and file a Service Order Request for a New Service Layout to confirm the primary duct bank route, the transformer pad location and installation (grounding) requirements, the main service location and their metering requirements prior to the start of the work on site. If the electrical contractor proceeds with the work and has failed to co-ordinate with Hydro One, any servicing or location changes required by Hydro One will be at the expense of the electrical contractor. The General Contractor will pay the Hydro One service connection costs to Hydro One from the cash allowance as directed by the Landscape Architect. The electrical contractor will co-ordinate the work of Hydro One to insure that the service is connected in a timely fashion.

5. The electrical contractor will supply and install the transformer pad with foundation base, transformer pad grounding, the primary duct structure and the 2/0 AL 28kV 100% concentric neutral PVC jacketed high voltage cable from the designated terminal/switch pole located on the road allowance on the north side of Maple Leaf Lane. Terminate the duct structure approximately 1000MM from the Hydro One terminal pole as directed by Hydro One. Leave a sufficient length of high voltage cable coiled at the base of the Hydro One terminal pole for the installation and terminations on the pole by Hydro One. The electrical contractor will backfill above and below the cable with screened sand as directed by Hydro One after the cable has been installed onto the pole. Hand excavate or hydro-vac over all existing services and restore all excavations within the road allowance with 150mm of topsoil and Number 1 nursery sod. Leave 6000mm of high voltage cable in the transformer pad as directed by Hydro One. Hydro One will terminate the high voltage cable onto the primary bushings of their 75 kVA transformer. All high voltage terminations will be by Hydro One.

6. The electrical contractor will terminate the two (2) 2" rigid PVC secondary conduits inside the base of the transformer pad as directed by Hydro One. Leave 6000mm of secondary service conductor and the ground coiled within the transformer pad for termination by Hydro One. Supply Hydro One with six (6) #3/0 NEMA two-hole compression lugs to the approval of Hydro One for their termination of the secondary cables onto the transformer bushings.

7. Supply and install a Durham #1012108 5-jaw transformer type meter base on a direct buried 6'x6'x8' pressure treated wood post located where detailed on the drawing and in accordance with Hydro One Standard #RM7-20. Provide a ¾ rigid PVC conduit and pull string from the bottom of the meter base into the side of the transformer vault below grade as directed by Hydro One.

8. After all of the service locates have been completed, stake out all proposed lighting pole locations to confirm that there are no conflicts with existing or proposed services. If conflicts occur, notify the consultant, prior to excavating for the pole bases or the conduit installation.

9. The precast concrete Main Electrical Room will be supplied and installed by the electrical contractor. See the specifications and detail sheet #SKE-2. The building will be placed and levelled on a foundation base of compacted ¾" clear limestone gravel. (Approximately 3000mm long X 2000mm wide X 450mm deep)

10. Provide oversized rigid PVC conduit sleeves or expansion fittings for all conduits entering or exiting the precast concrete Main Electrical Room through the base slab. Turn all conduits up inside the larger sleeves, to a minimum of 300mm to allow for frost movement of the room. The sleeves inside the room will extend below the room concrete base slab. No conduits are to be installed on the exterior of the room. Include for core drilling of the room base slab for the conduits.

11. Supply and install two (2) wall mounted 10 watt, 120 volt, 4000K surface mount LED disk lights (NEXLEDS #NXSM4D10W or equal) in 4" sheet steel octagon boxes. Feed with 2-#12 T90 in ½" EMT from a 15 Amp 1-pole breaker located in Panel DP-A. Control the circuit with a single pole light switch located inside the door. Supply and install two (2) 15 amp 120 volt GFCI convenience receptacles in surface utility boxes with sheet steel cover plates supplied from dedicated circuits in Panel DP-A. Locate one of the receptacles beside the panel and the other 2000mm from the panel. Both receptacles are to be located 1000mm above the room floor.

12. Supply and install on the exterior face of the building door a standard metal warning sign with enamel painted letters to read "Danger High Voltage-Do Not Enter". Fasten the sign to the door with pan socket head #10 self-tapping screws or pop-rivets.

13. All conduits will be rigid, heavywall, PVC with solvent weld fittings buried with a minimum cover of 600mm. All conduits will have a TW stranded copper, green ground wire (sized in accordance with Table 16A of the OESC) installed with the conductors. All conduits will have a 150mm wide red plastic "Caution" tape buried 300 mm above the conduit, for the full length of the conduit. Polypipe, ENT and Type II PVC duct will not be acceptable. All wire will be RWU stranded copper, 600 volt, 90 degree C rated. Use red, black and white insulated wire to properly identify the phases and the neutral. The use of phasing tape will not be acceptable.

14. The crossarms on poles A1, A4, B1 and B4 are to be set at 45 degrees offset from the field play lines. All other crossarms are to be set parallel with the play lines.

15. Supply and install precast concrete handwells where located on the drawing (see detail #SKE-7). The precast concrete handwells will be Brooklin Concrete Products #BCP-2112.02 or equal with an 18" diameter cast iron cover. Cable splicing within the precast concrete handwells will be with T&B compression butt splicing sleeves insulated with T&B epoxy-filled heat shrink tubing. No other method of cable splicing will be acceptable.

16. The electrical contractor will remove and dispose of off-site two (2) existing 40 foot long, direct buried sectional steel poles each with a crossarm and two (2) HID floodlights along with their poured concrete bases where noted on the drawings. Co-ordinate with Township of Puslinch staff to locate the existing source of supply and permanently disconnect, remove and dispose of the existing underground supply conductors. All removal and disposal work will be included in the total tendered quotation. Immediately after removing the poles and concrete bases, fill the pole base holes with limestone screenings to finished grade. Compact the material to 98% SPD with a hydraulic pole packer. The ballast capacitors and the lamps must be disposed of offsite by a recycling contractor licensed by Environment Canada. The electrical contractor will be required to provide copies of the receipts with the supply of the final documentation to confirm that the materials have been properly handled and disposed of.

17. Co-ordinate with Township of Puslinch staff to locate the existing source of supply to the wood pole mounted service cabinet where shown on the drawings and permanently disconnect, remove and dispose of the existing underground supply conductors. Remove and dispose of the existing 2" rigid PVC underground supply conduit and terminate the new supply conduit from the Main Electrical Room with a rigid PVC expansion fitting into the bottom of the combination panelboard inside of the cabinet. Terminate the new supply conductors onto the line side lugs of the 100 amp main breaker. Secure the conduit to the wood pole with galvanized steel 2-hole straps fastened with 2"x #12 wood screws.

18. The electrical contractor will complete a night time site visit to verify the correct operation of the lighting system and the control sequence prior to the request for final site verification by the consultant.

19. All work must be in accordance with the Ontario Electrical Safety Code, 26TH Edition (2015). The electrical contractor will be required to submit a copy of the Electrical Safety Authority Certificate of Inspection, issued in the name of the ECRA licensed electrical contractor, at the completion of the project. Final acceptance and certification of this project by the electrical consultant will not be provided prior to the receipt of the ESA Certificate of Inspection. Provide the "As-built" drawings, warranty letter and all other required final documentation upon the completion of this project.

REGISTERED PROFESSIONAL ENGINEER
B.A. KRASNICHUK
PROVINCE OF ONTARIO

Electrical Consultant

MJS CONSULTANTS INC.
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Milton, Ontario
L9T 5G3
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mjscons@total.net

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R0	Issued for Tender	JAN. 06, 2020	MJS

reviewed by	drawn by
MJS - RN	MJS - ACAD
date	JANUARY 2019
scale	AS SHOWN

drawing title
ELECTRICAL NOTES & DETAILS

drawing number
E-2

client
TOWNSHIP OF PUSLINCH

project title
PUSLINCH C.C. SOCCER FIELD & PARKING LOT

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landscape planning
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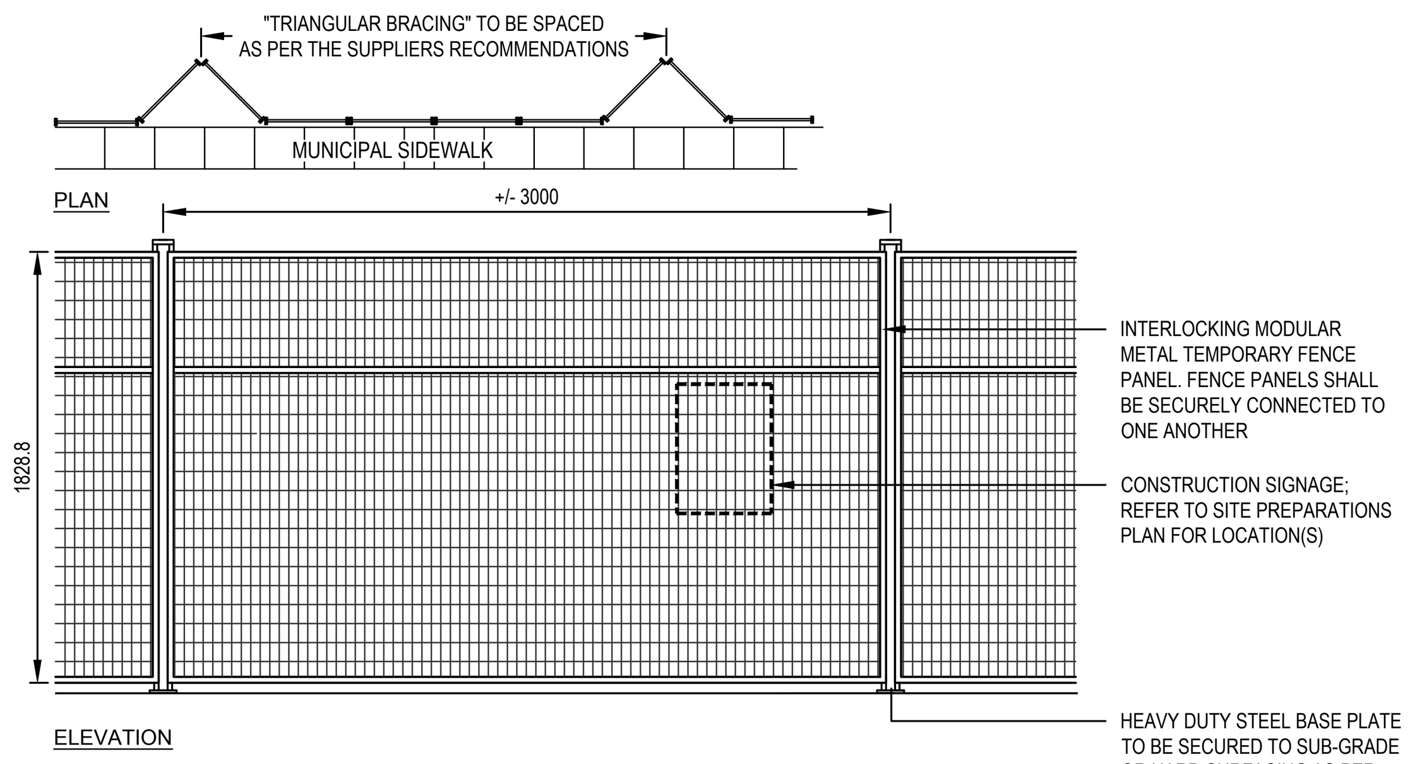
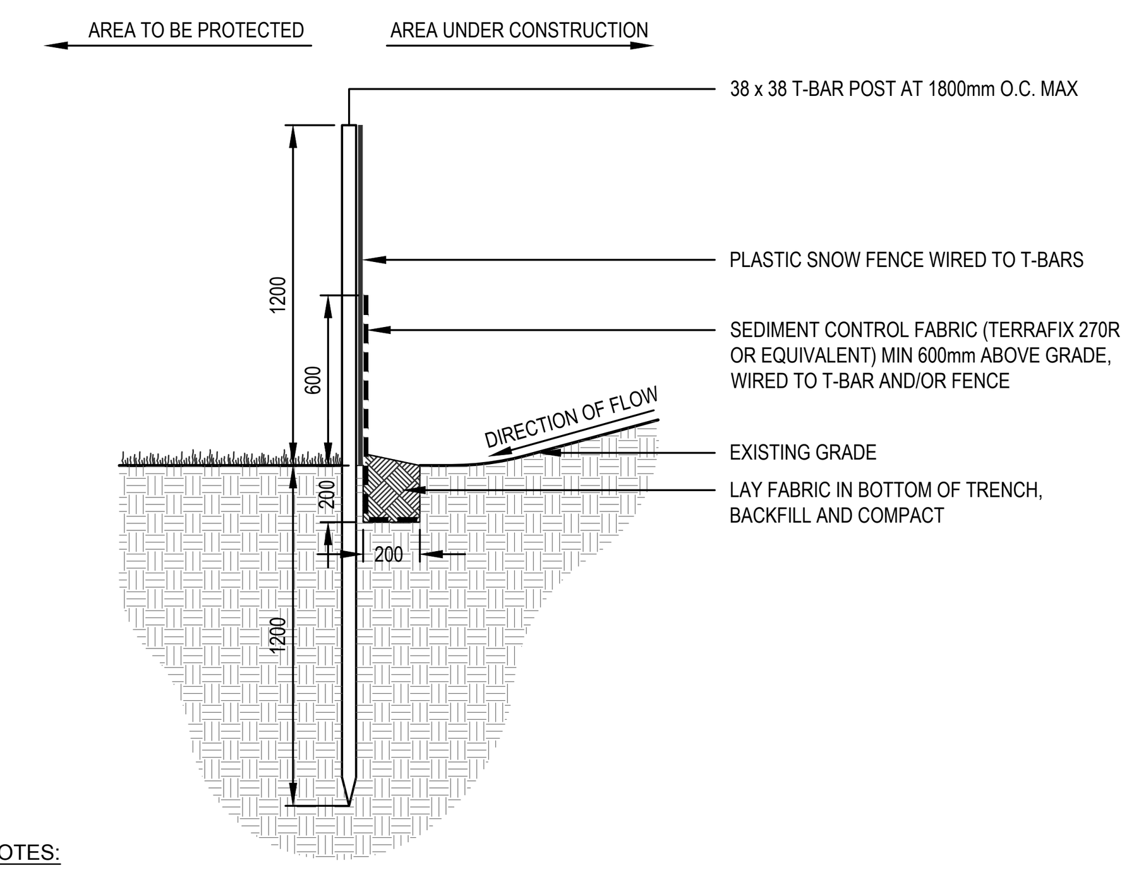


NOTES:

1. CONSULTANT TO REVIEW AND APPROVE PROPOSED TEMPORARY FENCE SYSTEM BEFORE INSTALLATION COMMENCES.
2. FENCING TO BE INSTALLED PRIOR TO START OF CONSTRUCTION AND MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
3. FENCING TO BE INSTALLED ALONG INSIDE EDGE OF CONSTRUCTION LIMIT LINE OR AS OTHERWISE DIRECTED BY CONSULTANT. **NO FENCING SHALL BE INSTALLED ON THE MUNICIPAL SIDEWALK.**
4. FENCING MAY REQUIRE RELOCATION FROM TIME TO TIME TO FACILITATE CONSTRUCTION AND CO-ORDINATION WITH ADJACENT PROPERTIES.
5. TEMPORARY FENCING TO BE INSTALLED BY THE SUPPLIER AS PER MANUFACTURER'S RECOMMENDATION AND INSTALLATION PROCEDURES. PROVIDE ALL NECESSARY HARDWARE AND ACCESSORIES FOR EXTRA SUPPORT AND STABILITY TO FENCE SYSTEM. PROVIDE FENCE SUPPLIER RECOMMENDATIONS ON "TRIANGULAR BRACING".
6. ATTACHMENT OF FENCE TO TREES IS NOT ALLOWED. ENSURE FENCE IS LOCATED BEYOND THE DRIP LINE OF TREES.
7. CONTRACTOR TO SUPPLY CONSTRUCTION SIGN UNLESS OTHERWISE DIRECTED.
8. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
9. REFER TO SITE PREPARATION AND DEMOLITION PLAN FOR HOARDING FENCE LOCATION

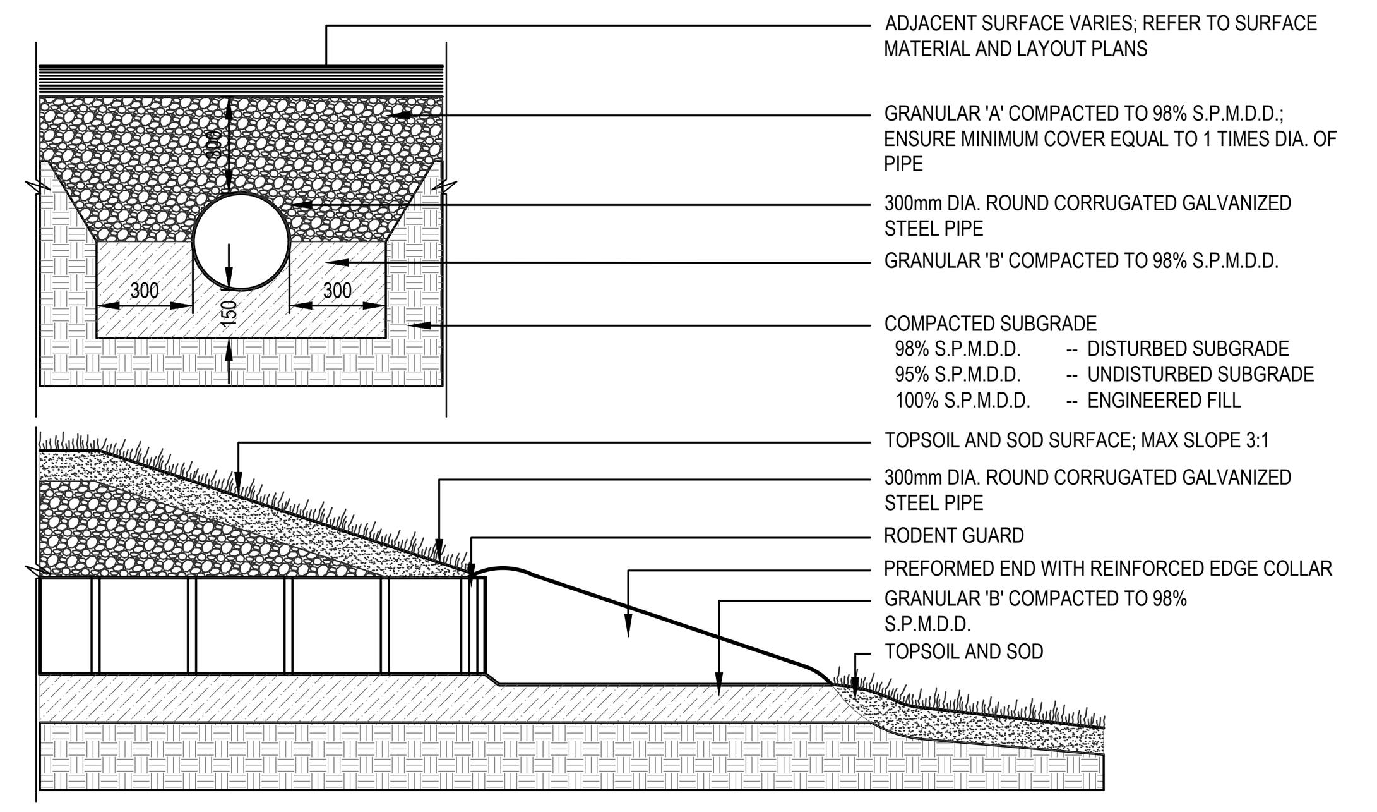
1 D-1 CONSTRUCTION HOARDING FENCE
N.T.S.



NOTES:

1. CONSULTANT TO REVIEW AND APPROVE PROPOSED TEMPORARY FENCE SYSTEM BEFORE INSTALLATION COMMENCES.
2. FENCING TO BE INSTALLED PRIOR TO START OF CONSTRUCTION AND MAINTAINED BY THE CONTRACTOR FOR THE DURATION OF CONSTRUCTION.
3. SEDIMENT CONTROL FABRIC TO HAVE HORIZONTAL OVERLAP OF 1000mm AT ALL JOINTS
4. CREATE A 1.5m x 1.5m SQUARE AROUND UTILITY STRUCTURES
5. INSTALL SEDIMENT CONTROL FABRIC INSIDE ALL CATCH BASINS
8. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
9. REFER TO SITE PREPARATION AND DEMOLITION PLAN FOR SEDIMENT CONTROL FENCE LOCATION.

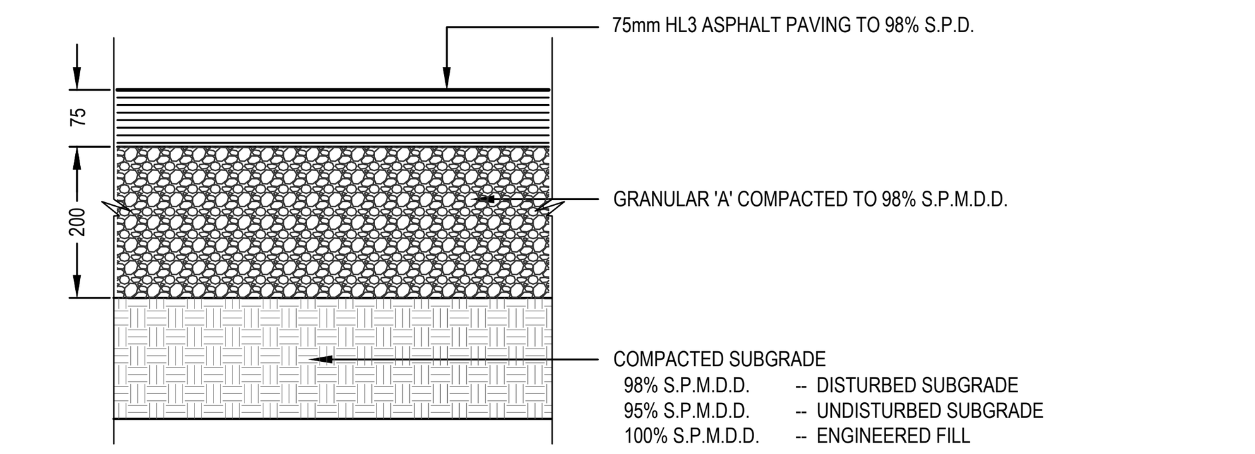
2 D-1 SEDIMENT CONTROL FENCE
N.T.S.



NOTES:

1. CORRUGATED STEEL PIPE CULVERT SHALL BE GALVANIZED, 1.6mm THICK, COMPLETE WITH PREFABRICATED GALVANIZED STEEL APRON, WITH COLLAR BOLTS BURIED BELOW GRADE.
2. APRON COLLAR BOLTS TO BE LOCATED FLUSH OR BELOW GRADE.
3. CULVERT TO BE 300mm DIA. MINIMUM SIZE OR AS SPECIFIED.
4. INVERT ELEVATIONS OF CULVERTS MUST MATCH ELEVATIONS OF SWALE CENTER.
5. 1% MINIMUM SLOPE OF CULVERT
6. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
7. REFER TO GRADING & SURFACE MATERIALS PLANS

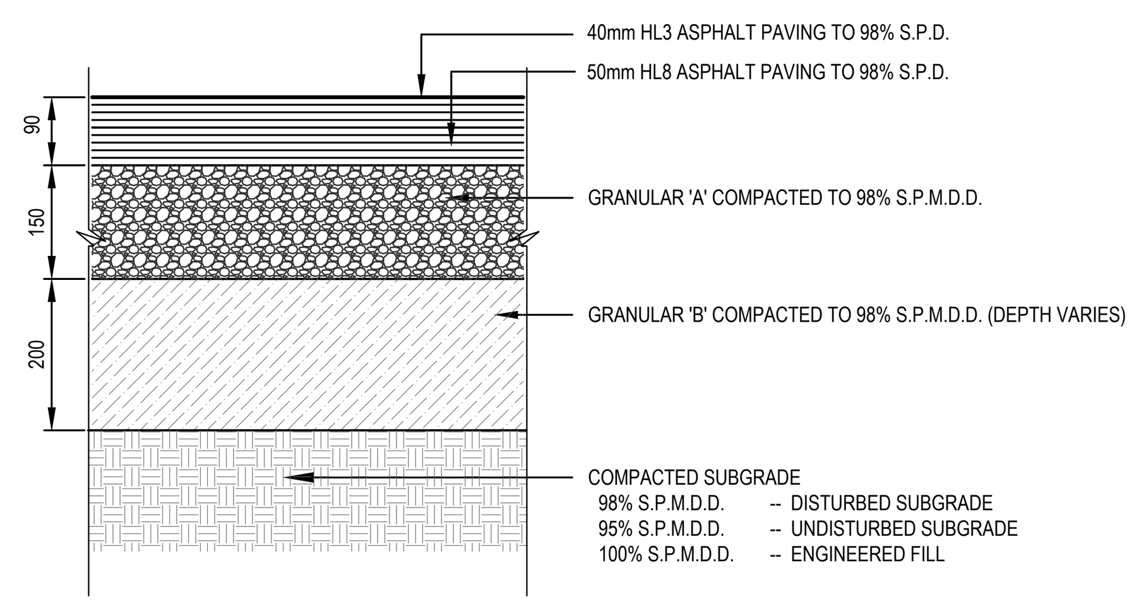
3 D-1 PATHWAY CULVERT
N.T.S.



NOTES:

1. CONTRACTOR SHALL CONTACT THE OWNER IMMEDIATELY IF UNSUITABLE OR UNSTABLE SUBGRADE IS ENCOUNTERED, SUCH AS EXCESSIVE TOPSOIL, SOFT SPOTS, &/OR ORGANIC MATTER. METHODS &/OR MATERIAL MUST BE APPROVED BY THE OWNER PRIOR TO COMMENCING WITH WORK. SUBGRADE TO BE CONSOLIDATED & TESTED TO 98% S.P.M.D.D. MIN.; ENGINEERED FILL TO BE CONSOLIDATED & TESTED TO 100% S.P.M.D.D.
2. ASPHALT EDGE TO BE 45 DEGREES, TAMPED TO FORM UNIFORMLY, SMOOTH, CLEAN EDGES, WITHOUT LATERAL DEVIATIONS.
3. GRANULAR EDGE TO EXTEND MIN. 150mm BEYOND ASPHALT.
4. SOD TO MEET & MATCH EXISTING GRADES, WITH SMOOTH TRANSITIONS AT A MAXIMUM SLOPE OF 4:1.
5. ALL SEEDED &/OR SODDED AREAS SHALL BE 25mm BELOW THE FINISH ELEVATION OF ASPHALT.
6. GRADE WALKWAY WITH A 2% CROSS-SLOPE OR AS DIRECTED ON SITE. **PONDING WATER ON ASPHALT WALKWAYS WILL NOT BE ACCEPTED.**
7. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
8. REFER TO GRADING & SURFACE MATERIALS PLANS

4 D-1 ASPHALT PAVING - 2.0m WIDE PATHWAY
N.T.S.



NOTES:

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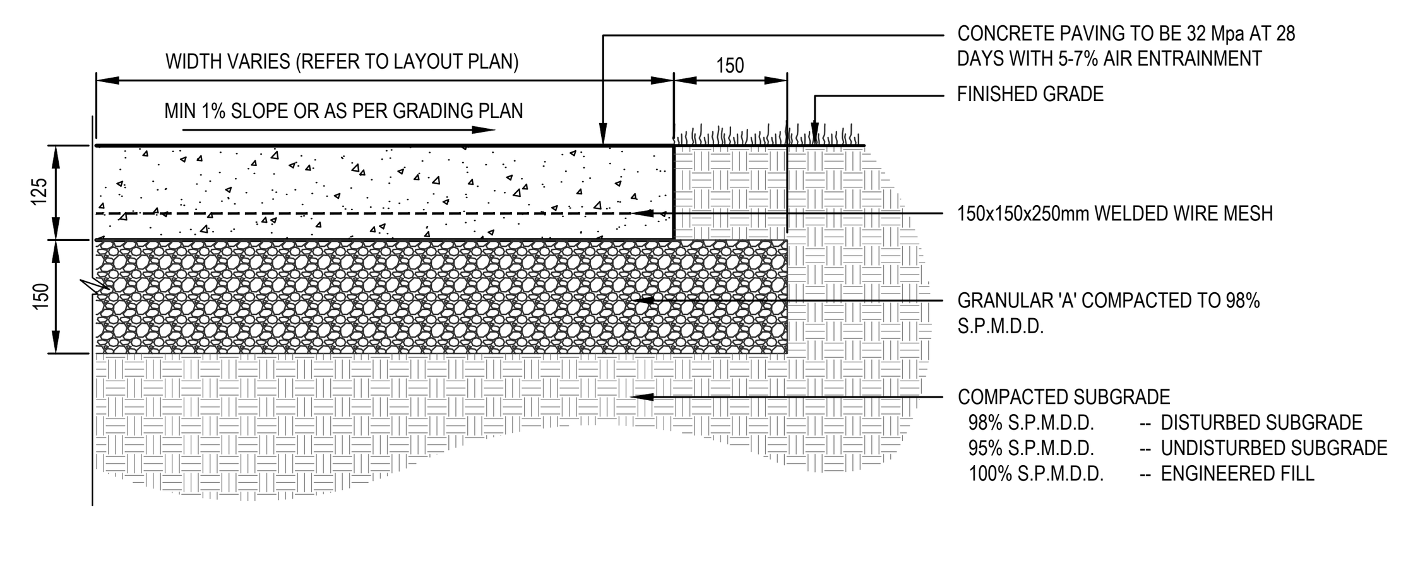
2. ASPHALT EDGE TO BE 45 DEGREES, TAMPED TO FORM UNIFORMLY, SMOOTH, CLEAN EDGES, WITHOUT LATERAL DEVIATIONS.
3. GRANULAR EDGE TO EXTEND MIN. 150mm BEYOND ASPHALT.
4. SOD TO MEET & MATCH EXISTING GRADES, WITH SMOOTH TRANSITIONS AT A MAXIMUM SLOPE OF 4:1.
5. ALL SEEDED &/OR SODDED AREAS SHALL BE 25mm BELOW THE FINISH ELEVATION OF ASPHALT.
6. GRADE WALKWAY WITH A 2% CROSS-SLOPE OR AS DIRECTED ON SITE. **PONDING WATER ON ASPHALT WALKWAYS WILL NOT BE ACCEPTED.**
7. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
8. REFER TO GRADING & SURFACE MATERIALS PLANS

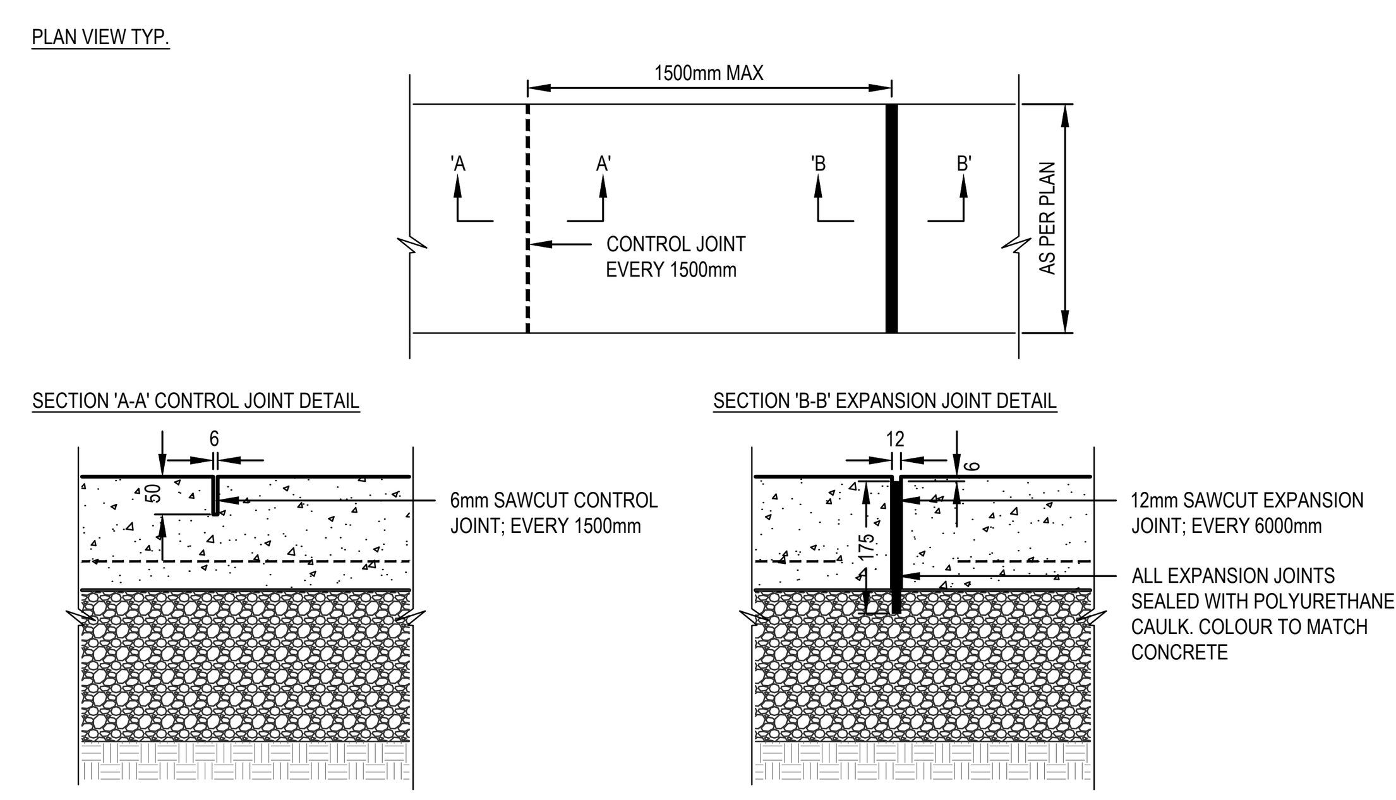
5 D-1 ASPHALT PAVING - MEDIUM DUTY
N.T.S.



NOTES:

1. CONTRACTOR SHALL CONTACT THE OWNER IMMEDIATELY IF UNSUITABLE OR UNSTABLE SUBGRADE IS ENCOUNTERED, SUCH AS EXCESSIVE TOPSOIL, SOFT SPOTS, &/OR ORGANIC MATTER. METHODS &/OR MATERIAL MUST BE APPROVED BY THE OWNER PRIOR TO COMMENCING WITH WORK. SUBGRADE TO BE CONSOLIDATED & TESTED TO 98% S.P.M.D.D. MIN.; ENGINEERED FILL TO BE CONSOLIDATED & TESTED TO 100% S.P.M.D.D.
2. CONTINUOUS BROOM FINISH ACROSS PATH OR AS OTHERWISE STATED ON PLANS
3. CONTRACTOR TO PROVIDE SAMPLES (TEST POURS) IN ACCORDANCE WITH SPECIFICATION.
4. REFER TO JOINTING DETAIL FOR CONTROL AND EXPANSION JOINTS
5. GRANULAR EDGE TO EXTEND MIN. 150mm BEYOND CONCRETE.
6. CONCRETE EDGE TO BE FORMED UNIFORMLY, SMOOTH WITH CLEAN EDGES, WITHOUT LATERAL DEVIATIONS
7. SOD TO MEET & MATCH EXISTING GRADES, WITH SMOOTH TRANSITIONS AT A MAXIMUM SLOPE OF 4:1.
8. ALL SEEDED &/OR SODDED AREAS SHALL BE 25mm BELOW THE FINISH ELEVATION OF CONCRETE.
9. GRADE WALKWAY WITH A MIN 1% CROSS-SLOPE OR AS DIRECTED ON SITE. **PONDING WATER ON CONCRETE WALKWAYS WILL NOT BE ACCEPTED.**
10. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
11. REFER TO GRADING & SURFACE MATERIALS PLANS

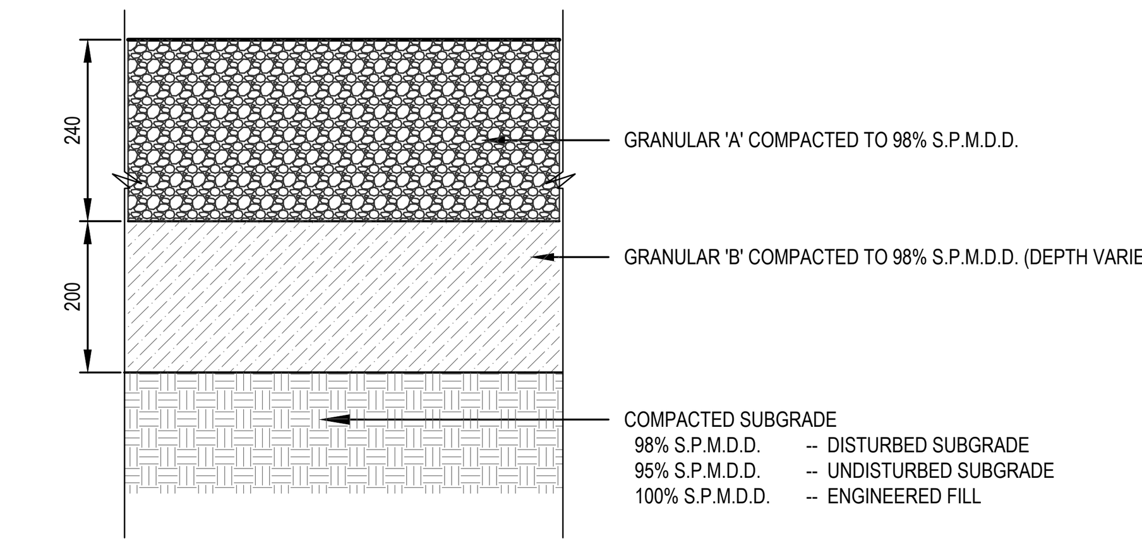
6 D-1 CONCRETE PAVING
N.T.S.



NOTES:

1. EXPANSION JOINTS:
   1.1. REQUIRED WHERE CONCRETE PAVING ABUTS STRUCTURES.
   1.2. TO BE SPACED AT 6000mm O.C. UNLESS OTHERWISE SHOWN ON DRAWINGS
   1.3. TO BE SEALED WITH POLYURETHANE CAULK. COLOUR TO MATCH CONCRETE. PROVIDE SAMPLE TO CONSULTANT FOR APPROVAL
2. CONTROL JOINTS:
   2.1. TO BE SPACED AT 1500mm O.C. UNLESS OTHERWISE SHOWN ON DRAWINGS
3. REFER TO SEPARATE DETAIL FOR CONCRETE PAVING
4. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
5. REFER TO LAYOUT PLAN

CONCRETE PAVING - JOINTING
N.T.S.



NOTES:

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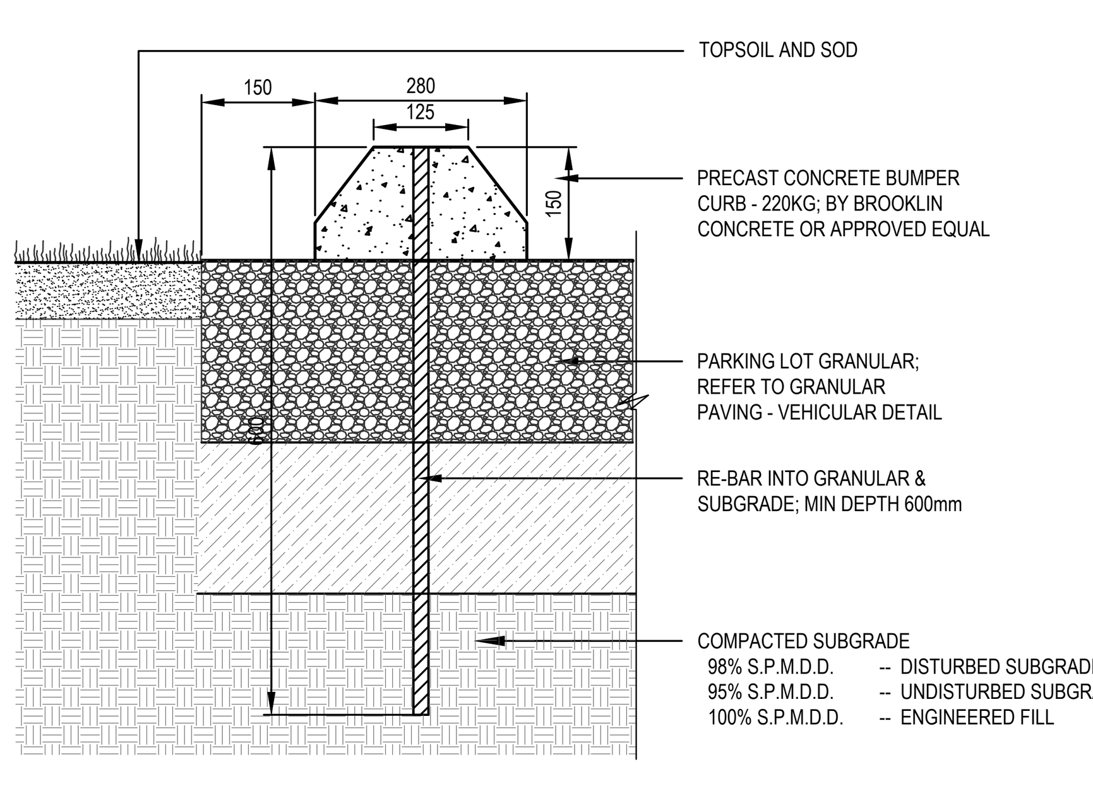
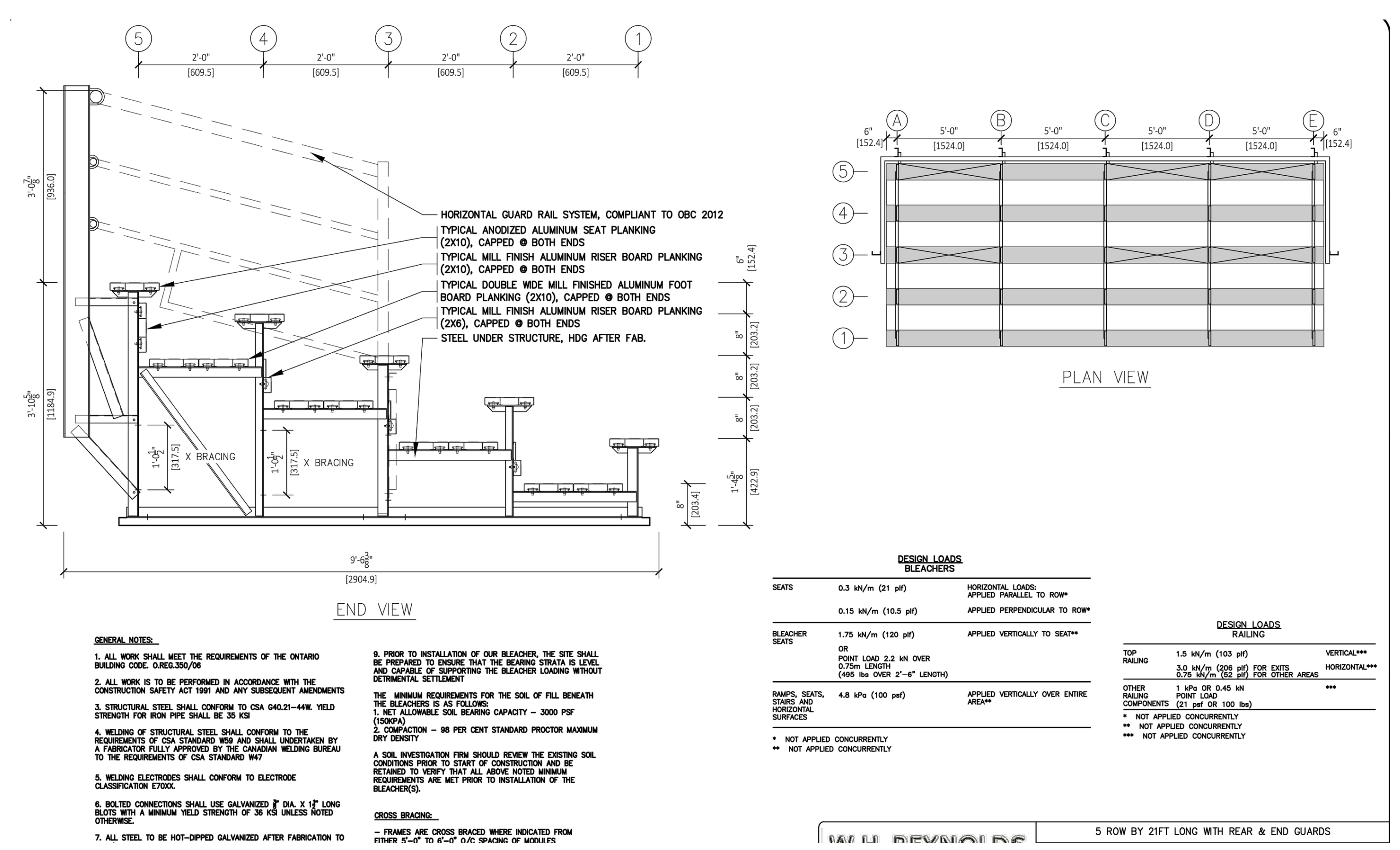
2. SOD TO MEET & MATCH EXISTING GRADES, WITH SMOOTH TRANSITIONS AT A MAXIMUM SLOPE OF 4:1.
3. ALL SEEDED &/OR SODDED AREAS SHALL BE 25mm BELOW THE FINISH ELEVATION.
4. GRADE GRANULAR WITH A 2% CROSS-SLOPE OR AS DIRECTED ON SITE.
5. ALL MEASUREMENTS ARE IN MILLIMETRES UNLESS STATED OTHERWISE.
6. REFER TO GRADING & SURFACE MATERIALS PLANS

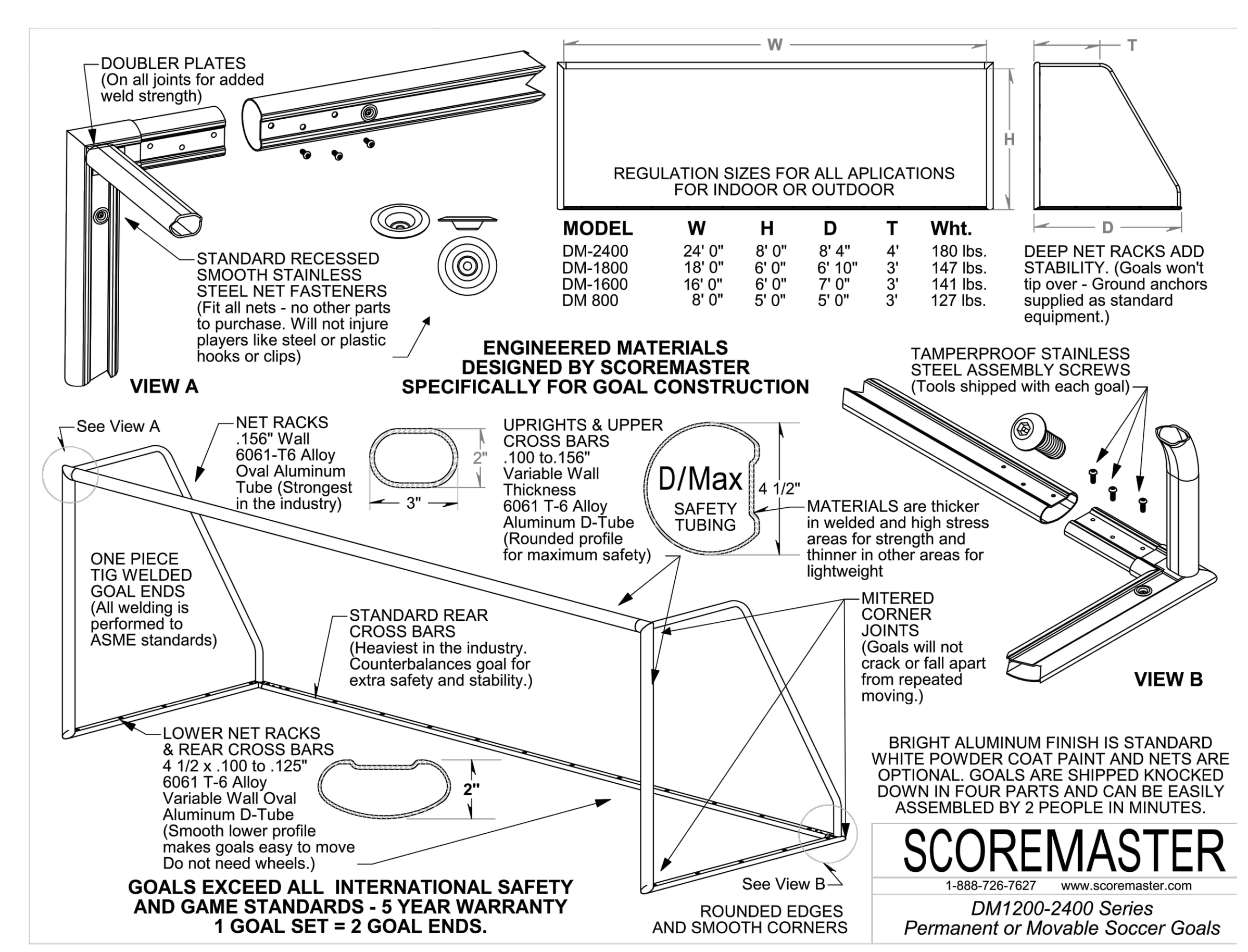
8 D-1 GRANULAR PAVING - VEHICULAR
N.T.S.



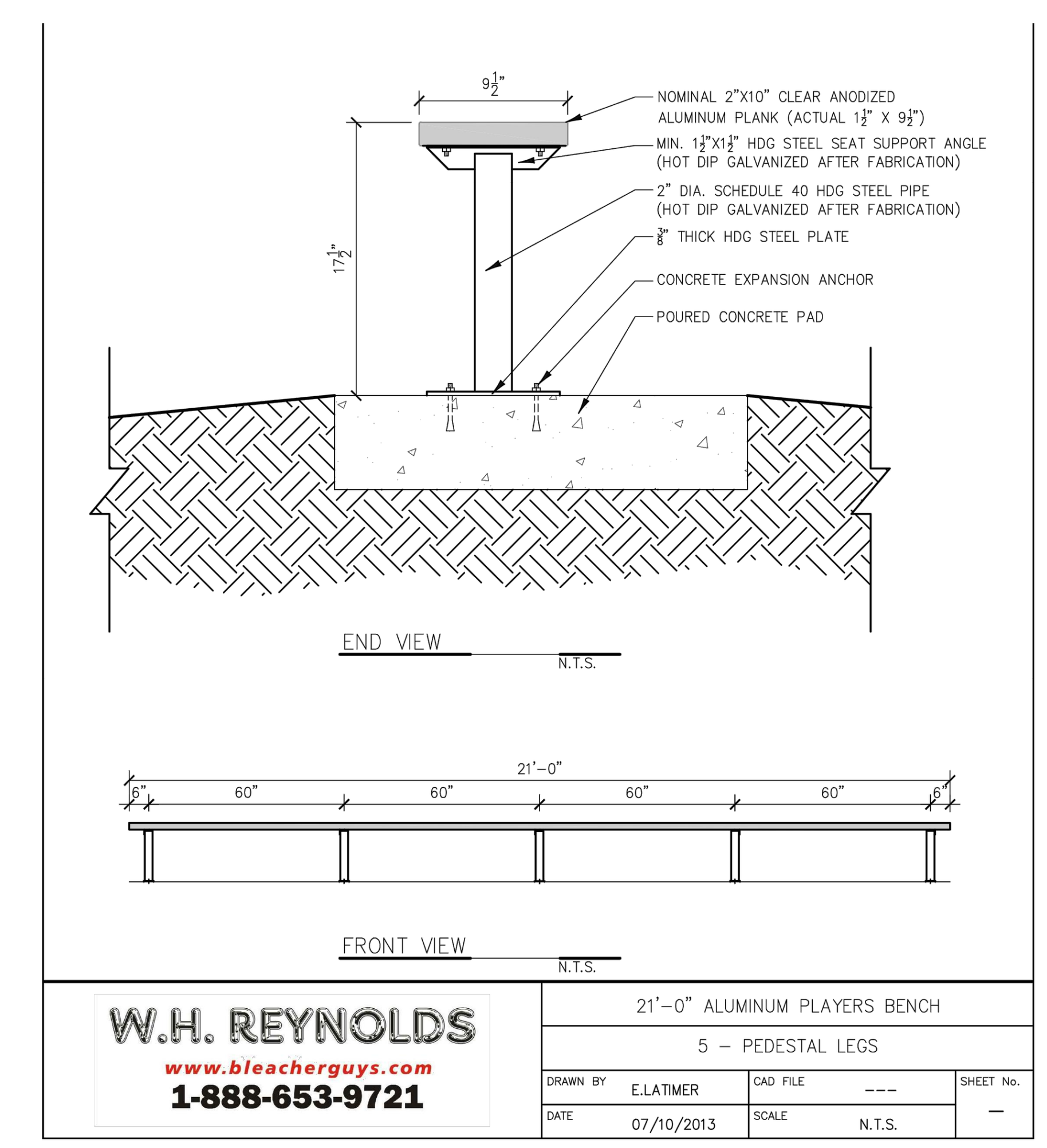
9 D-1 PRECAST CONCRETE BUMPER CURB
N.T.S.



10 D-1 SOCCER BLEACHER (5 ROWS)
N.T.S.



11 D-1 SOCCER NET
N.T.S.



12 D-1 SOCCER BENCH (21')
N.T.S.

no.	revision	date	by
R0	Issued for Tender	JAN. 06, 2020	CB

reviewed by P.G.
drawn by C.B.

date OCTOBER 2018

scale N.T.S.

drawing title
DETAILS

drawing number
D-1

client
TOWNSHIP OF PUSLINCH

project title
PUSLINCH C.C. SOCCER FIELD & PARKING LOT

project number
2018-109

landscape planning
LANDSCAPE ARCHITECTS
Suite 207, 95 Mural Street, Richmond Hill, Ontario L4B 3G2,
Tel. 905.669.6838, www.landscapeplan.ca

COST ESTIMATE: PK19-001
PUSLINCH COMMUNITY CENTRE SOCCER FIELD PARKING LOT
January 18, 2019

landscape planning
LANDSCAPE ARCHITECTS

This section MUST be completed in its entirety to be considered for contract award. In the case of no charge, a "0" (zero) must be entered.

Any items not specifically mentioned in the following descriptions but shown on the drawings and/or specified or required to complete the Work as shown on the drawings will be considered to be included in the price. Pricing shall exclude all taxes.

Quantities shown below are estimated. For items designated as lump sum (ls), the Contractor shall be paid the lump sum price unless the Township authorizes changes to the Work. For items designated as unit price, the Contractor shall be paid the sum of the products of the actual quantities that are incorporated in, or made necessary by the Work, as confirmed by the count and measurement, and the quoted Unit Price, together with any adjustments that are made in accordance with the provisions of the Contract Documents.

Item	Description	Units	Quantity	Unit Price	Sub-Total	Section Total
A	**SITE PREPARATION AND REMOVALS**					
1.0	Mobilization, Demobilization and all other works not itemized	ls	X	LUMP SUM	$ 7,000.00	
2.0	Removals & Demolition	ls	X	LUMP SUM	$ 20,000.00	
3.0	Supply & Install Modular 1.8m Construction Fence / Tree Preservation Fence	lm	155	$ 25.00	$ 3,875.00	
4.0	Supply & Install Sediment Control Fence	lm	625	$ 18.00	$ 11,250.00	
				SECTION TOTAL - ITEM A		$ 42,125.00
B	**GRADING**					
1.0	Strip, Stockpile and Screen topsoil for re-use (28695m2 x 0.15m)	m^3	4305	$ 5.00	$ 21,525.00	
2.0	Excavation, rough grading, subgrade preparation; cut to fill to meet design grade	ls	X	LUMP SUM	$ 50,000.00	
3.0	Spread and fine grading topsoil	m^2	16965	$ 1.75	$ 29,688.75	
				SECTION TOTAL - ITEM B		$ 101,213.75
C	**DRAINAGE and SITE SERVICING**					
1.0	300mm dia. CSP Culvert (includes apron, rodent guard and connections)	lm	16	$ 180.00	$ 2,880.00	
2.0	400mm dia. CSP Culvert (includes apron, rodent guard and connections)	lm	13	$ 210.00	$ 2,730.00	
				SECTION TOTAL - ITEM C		$ 5,610.00
D	**ELECTRICAL**					
1.0	Electrical: Connection - ALLOWANCE	Allow	X	ALLOWANCE	$ 20,000.00	
2.0	Supply & Install Electrical: Main Service Cabinet and Meter - New Service Required	ls	X	LUMP SUM	$ 45,000.00	
3.0	Supply & Install Electrical: Conduit and Wiring	ls	X	LUMP SUM	$ 20,000.00	
4.0	Supply & Install Electrical: Sports Field Area Lighting	ls	X	LUMP SUM	$ 120,000.00	
				SECTION TOTAL - ITEM D		$ 205,000.00
E	**PAVING / CURBS / FENCE**					
1.0	**Asphalt Paving**					
1.1	Supply & Install Asphalt Paving - Medium Duty	m^2	96	$ 52.00	$ 4,992.00	
1.2	Supply & Install Asphalt Paving - 2.0m Wide Pathway	m^2	711	$ 46.00	$ 32,706.00	
2.0	**Concrete Paving**					
2.1	Supply & Install Concrete Paving - Bleacher Pads	m^2	88	$ 100.00	$ 8,800.00	
2.2	Supply & Install Concrete Paving - Bench Pads	m^2	38	$ 100.00	$ 3,800.00	
3.0	**Granular Paving**					
3.1	Supply & Install Granular Paving - Vehicular	m^2	2555	$ 32.00	$ 81,760.00	
4.0	**Curbs and Walls**					
4.1	Supply & Install Concrete Bumper Blocks (Parking Lot) in compacted granular base	ea	56	$ 75.00	$ 4,200.00	
				SECTION TOTAL - ITEM E		$ 136,258.00

NAME OF CONTRACTOR_____

F	SPORTS AMENITIES					
1.0	Supply & Install Sod (Socer Field)	m^2	8250	$ 4.00	$ 33,000.00	
2.0	Supply & Install Portable Soccer Goals (set)	set	1	$ 7,850.00	$ 7,850.00	
3.0	Supply & Install Soccer Benches (21'-0" long, 5 leg, backless)	ea	2	$ 2,250.00	$ 4,500.00	
4.0	Supply & Install Portable Soccer Bleachers (5 rows, side and back rail, entry alley)	ea	2	$ 8,900.00	$ 17,800.00	
				SECTION TOTAL - ITEM F		$ 63,150.00

G	SOFT LANDSCAPE					
1.0	Supply and Install Sod	m^2	1850	$ 4.00	$ 7,400.00	
2.0	Supply and Install Seed	m^2	15115	$ 1.75	$ 26,451.25	
				SECTION TOTAL - ITEM G		$ 33,851.25

SUMMARY

Item	Description	Section Totals
A	SITE PREPARATION AND REMOVALS	$ 42,125.00
B	GRADING	$ 101,213.75
C	DRAINAGE and SITE SERVICING	$ 5,610.00
D	ELECTRICAL	$ 205,000.00
E	PAVING / CURBS / FENCE	$ 136,258.00
F	SPORTS AMENITIES	$ 63,150.00
G	SOFT LANDSCAPE	$ 33,851.25

TOTAL CONTRACT PRICE - Sections A through G (exclusive of all applicable taxes)	$ 587,208.00
Permit & Testing Allowance	$ 7,500.00
8% Contingency	$ 46,976.64
TOTAL ESTIMATES PARK CONSTRUCTION COST	$ 641,684.64

NAME OF CONTRACTOR_____

Heritage Committee
Monday December 3, 2018
7:00 p.m.
Council Chambers, Aberfoyle

MINUTES

MEMBERS PRESENT

Mary Tivy – Chair
John Arnold
Councillor Matthew Bulmer
Barb Jefferson
John Levak

MEMBERS ABSENT

None

TOWNSHIP STAFF

Karen Landry, CAO/Clerk
Lynne Banks – Development & Legislative Coordinator

1. CALL TO ORDER

The meeting was called to order at 7:04 p.m.

2. DISCLOSURE OF PECUNIARY INTEREST

None

3. OPENING REMARKS

The Chair made opening remarks and thanked the Committee for their hard work during their term with work done to prepare and update the Municipal Heritage Register, attending conferences and understanding their duties as a member of the Heritage Committee.

4. APPROVAL/ADOPTION OF MINUTES

That the minutes of the Heritage Committee meeting dated October 1, 2018 be adopted.

Moved by: Barb Jefferson Seconded by: John Arnold

CARRIED

5. REGULAR BUSINESS

1. 2017-2018 PUSLINCH HERITAGE COMMITTEE REPORT TO COUNCIL

- The Committee suggested that Appendices be added for site visits and conferences.
- The Committee suggested that an “Executive Summary” be added after the “Recommendation” section of the Report.
- The Committee is considering separating the report into information for new Council members and the other portion of the report to be presented at a future Council meeting.
- The Heritage Committee will prepare a draft Power Point presentation and will meet January 22, 2019 to review and finalize the Power Point presentation. All members will provide any further information for the report by January 15, 2019.
- Karen Landry suggested the presentation could be made at a Council meeting late in February or March, 2019.

- Karen Landry advised that appointments for committees will most likely be at the February 6, 2019 or February 20, 2019 Council meeting. Karen Landry also advised that the Committee will continue until successors are appointed.

2. MUNICIPAL REGISTER PROPERTY REVIEW AND FORWARD PLANNING
- Barns should only be listed if they have outstanding heritage elements.
- Karen Landry will check with the CBO whether a demolition permit is needed to demolish barns.
- A portion of the Register was reviewed by Committee members for changes/amendments to some of the listed properties.
- Several properties should be researched and added to list, e.g. William Black house, 735 Arkell Road and 6658 Forestell Road.

3. SUMMER STUDENT POSITION, 2019
- Priority would be to update and maintain the Municipal Register and would be contingent on the Township obtaining funding. The 2019 funding criteria has not been released to date.
- Karen Landry will change the base budget increase form and submit to Council.
- The updated base budge increase form will be included in the agenda for January 22, 2019 for information.

4. HERITAGE IMPACT ASSESSMENT GUIDELINES
- Waiting for confirmation from the County Planner that she will attend the February 4, 2019 meeting to discuss with the Heritage Committee.

5. PROPERTY AT 6658 FORESTALL ROAD
- Included and discussed with Item 5.2.

6. DOORS OPEN 2019
- Date to be changed to 2020.
- Mary Tivy will look at sites and a manageable route for discussion at a future meeting.

7. DOCUMENTING AND ACKNOWLEDGING ABORIGINAL SITES AND HERITAGE IN PUSLINCH
- The Heritage Committee agreed that the Aboriginal occupation should be recognized, through historical referencing.

8. OPPORTUNITIES FOR INTERPRETIVE PANELS IN THE COMMUNITY
- To be considered as part of a future budget.

9. REVIEW OF FUTURE PROPERTIES TO BE PLAQUED
- Deferred to the February 4, 2019 Heritage Committee meeting.

10. CENOTAPH ANNIVERSARY
- Councillor Bulmer will report to Council the role that the Heritage Committee will take in the celebration of the Cenotaph anniversary.
- Councillor Bulmer also noted that The Optimist may wish to be part of organizing this event.
- Councillor Bulmer also noted that the Historical Society may also wish to participate.

11. COUNCIL ORIENTATION
- Included and discussed in Item 5.1.

12. PROPOSED HERITAGE PLAQUE TO RECOGNIZE THE BLACK FAMILY CONTRIBUTIONS TO THE GROUNDS AT THE COMMUNITY CENTRE.
- Karen Landry noted that Council will be reviewing the Policy review schedule at an upcoming meeting.

13. MINOR VARIANCE FOR COMMENT

- In the future when Minor Variance and Zoning By-law Amendment Applications are circulated to the Heritage Committee for review and comment, the members will send their comments to Mary Tivy and she will forward to the Development and Legislative Coordinator.

6. ADJOURNMENT

The meeting adjourned at 9::25 p.m.

7. NEXT MEETING

January 22, 2019
February 4, 2019 @ 10:00 a.m.

Planning & Development Advisory Committee Meeting
January 8, 2019
7:00 pm
Council Chambers, Aberfoyle

MINUTES

MEMBERS PRESENT:

Councillor John Sepulis, Chair
Dan Kennedy
Dennis O'Connor
Dianne Paron

MEMBERS ABSENT:

Deep Basi

OTHERS IN ATTENDANCE:

Lynne Banks, Development and Legislative Coordinator
Jessica Rahim, County Planning
Jeff Buisman, Van Harten Surveying Inc.
John Sloot
Dave Sloot
Kathy White

1 - 5. COMMITTEE OF ADJUSTMENT

- See January 8, 2019 Committee of Adjustment minutes.

6. OPENING REMARKS

The Chair advised the gallery that the following portion of the Committee meeting will be reviewing and commenting on development planning applications.

7. DISCLOSURE OF PECUNIARY INTEREST

- John Sepulis declared a conflict of interest with respect to Item 11(c) Severance Application B132/18 (D10/REE) – Lorri Alfieri, Part Lot 21, Concession 2, 4467 Sideroad 20 North, Township of Puslinch because he is in the circulation area.

- Dennis O'Connor declared a conflict of interest with respect to Item 11(e) Lot Line Adjustment Application B129/18 (D10/REE) - Joan Reeve, Part Lot 2, Concession Gore, 6526 Gore Road, RR#2, Township of Puslinch because he is in the circulation area.

8. APPROVAL OF MINUTES

Moved by Dennis O'Connor Seconded by: Dan Kennedy

That the Minutes of the Planning & Development Advisory Committee Meeting held Tuesday, December 4, 2018, be adopted.

CARRIED

9. APPLICATION FOR SITE PLAN URBAN DESIGN REVIEW

- None

10. ZONING BY-LAW AMENDMENT

- None

11. LAND DIVISION

11(a) Severance Application B123/18 (D10/PER) – Mario and Ana Percic, Part Lot 11, Concession 3, 4605 Sideroad 10.

Proposed severance is 61 metres frontage by 73 metres for a total of 0.45 hectares, vacant land for proposed rural residential use.

Retained parcel is 73 metres frontage on Concession 4 by 73 metres on Sideroad 10 North for a total of 0.53 hectares, vacant land for proposed rural residential use.

- Jeff Buisman provided an overview of the application.
- Dan Kennedy asked where the entrance will be located.
- Jeff Buisman stated that the entrance hasn't been established yet on the property and that the plans have not yet been finalized.

Moved by Dan Kennedy Seconded by Deep Basi

The committee supports the application with no conditions imposed.

CARRIED

11(b) Severance Application B128/18 (D10/DET) – Paula and Martin Deter, Part Lot 7, Concession 4, 6669 Laird Road, Puslinch.

Proposed severance is 0.49 hectares with 29 metres frontage, existing residential use with existing storage buildings for proposed residential use and proposed dwelling.

Retained parcel is 0.44 hectares with 33 metres frontage, existing and proposed rural residential use with existing dwelling.

- Jeff Buisman provided an overview of the application and stated that the property is designated as Prime Agriculture and not Secondary Agriculture.
- John Sepulis asked what the County's position is on the application.
- Jessica Rahim advised that the County is not in support of the application because it is in Prime Agriculture and follows Prime Agriculture policies and that accessible building on lot is 18% of total lot coverage, so the building will either have to be removed or the owner will need to apply for a Zoning By-law Amendment.
- Jeff Buisman advised that it will need to be addressed.
- Dennis O'Connor inquired as to how the land is designated Prime Agricultural or Secondary Agricultural.
- Jessica Rahim advised that the designation is based on soil type and conditions.
- Dennis O'Connor asked if the soil type was on the property, was it not Prime Agriculture.
- Jessica Rahim stated that is has always been Prime Agriculture and a condition cannot be added.
- Committee stated that it is within Prime Agriculture and cannot be supported.

Moved by: Dan Kennedy Seconded by: Dianne Paron

The committee supports the application with no conditions imposed.

CARRIED

11(c) Severance Application B132/18(ALF) – Lorri Alfieri, Part Lot 21, Concession 2, 4467 Sideroad 20 North, Guelph.

Proposed severance is 43.4 metres frontage by 83.8 metres for a total of 0.36 hectares, vacant land for proposed rural residential use.

Retained parcel is 48 metres frontage by 83.8 metres for a total of 0.40 hectares, existing and proposed rural residential use with existing dwelling and pool.

- John Sepulis turned the Chair over to Dianne Paron and refrained from discussions on the matter.
- Jeff Buisman provided an overview of the application.
- Jessica Rahim advised that the application is scheduled for the County's Land Division Committee meeting in February.

Moved by Dan Kennedy Seconded by Deep Basi

The committee supports the application with the Township's Building Department comments imposed.

CARRIED

11(d) Lot Line Adjustment Application B124/18 (D10/POW) – Daniel Power, Part Lot 11, Concession 10, 4776 Nassagaweya-Puslinch Townline, Moffat.

Proposed lot line adjustment is 1.6 hectares with no frontage, vacant land to be added to abutting rural residential parcel – Frank Basso & Caryl Durst.

Retained parcel is 1.3 hectares with 54 metre frontage existing and proposed rural and residential use with existing dwelling and garage.

- Jeff Buisman provided an overview of the application.
- John Sepulis asked if the lot lines are permitted as long as they don't impede lot lines.
- Jeff Buisman advised that no, they will not impede the lot lines.

Moved by Dennis O'Connor Seconded by: Dan Kennedy

The committee supports the application with no conditions imposed.

CARRIED

11(e) Lot Line Adjustment Application B129/18 (D10/REE) - Joan Reeve, Part Lot 2, Concession Gore, 6526 Gore Road, RR#2, Puslinch.

Proposed lot line adjustment is 4.1 hectares with 42 metres frontage vacant land to be added to abutting rural residential parcel – William Reeve.

Retained parcel is 3.4 hectares with 95 metres frontage, existing and proposed rural residential use with existing dwelling and garage.

- Dennis O'Connor refrained from discussions on the matter.
- Jeff Buisman provided an overview of the application and advised that there was an error on the initial severance sketch which has since been amended. He also addressed comments from one of the abutting lands owner and advised that the GRCA was contacted and approved the application and that there are wetlands on the property. He also indicated that moving the lot line will hinder further severances on the property.
- John Sepulis asked if there was fill on the property.
- Jeff Buisman advised that in 2017 the owner built a garage but fill was not placed on the front of the property.

Moved by: Dennis O'Connor Seconded by: Dianne Paron

The committee supports the application with no conditions imposed.

CARRIED

12. OTHER MATTERS

- None

13. CLOSED MEETING

- None

14. NEXT MEETING

- Next Regular Meeting Tuesday, February 12, 2019 @ 7:00 p.m.

15. ADJOURNMENT

Moved by Dennis O'Connor Seconded by: Dianne Paron

That the Planning & Development Advisory Committee is adjourned at 8:13 p.m.

CARRIED

Planning & Development Advisory Committee Meeting
Committee of Adjustment
January 8, 2019
7:00 pm
Council Chambers, Aberfoyle

MINUTES

MEMBERS PRESENT:

Councillor John Sepulis, Chair
Dan Kennedy
Dennis O'Connor
Dianne Paron

MEMBERS ABSENT:

Deep Basi

OTHERS IN ATTENDANCE:

Lynne Banks, Development and Legislative Coordinator
Jessica Rahim, County Planning
Jeff Buisman, Van Harten Surveying
Lori Alfieri
Kathy White
Leslie Prier
Peter Prier
John Sloot
Dave Sloot
Ken Van Leeuwen

1. OPENING REMARKS

The meeting was called to order at 7:00 pm. The Chair welcomed the gallery to the Committee of Adjustment meeting and informed the gallery Township Staff would present the application, then the applicant would have the opportunity to present the purpose and details of the application and provide any further relevant information. Following this, the public can obtain clarification, ask questions and express their views on the proposal. The members of the Committee can then obtain clarification, ask questions and express their views on the proposal. All application decisions are subject to a 20 day appeal period.

2. DISCLOSURE OF PECUNIARY INTEREST

- John Sepulis declared a conflict of interest with respect to Item 4(a) Minor Variance Application D13/ALF – Lorri Alfieri – Property described as Part of Lot 21, Concession 2, 4467 Sideroad 20 North (Part 1, 61R-446), Township of Puslinch because he is within the circulation area.

3. APPROVAL OF MINUTES

Moved by: Dennis O'Connor Seconded by: Dan Kennedy

That the Minutes of the Committee of Adjustment meetings held Tuesday, December 4, 2018 be adopted.

CARRIED

4. APPLICATIONS FOR MINOR VARIANCE OR PERMISSION under section 45 of the Planning Act to be heard by the Committee this date:

4(a) Minor Variance Application D13/ALF – Lorri Alfieri – Property described as Part of Lot 21, Concession 2, 4467 Sideroad 20 North (Part 1, 61R-446, Township of Puslinch **.**

Requesting relief from provisions of Zoning By-Law #19/85, as amended, requesting a reduced lot area to be 0.35 hectares instead of 0.40 hectares as required.

- John turned the Chair over to Dianne Paron and refrained from discussions on the matter.
  - Lynne Banks outlined the application advised the notice requirements for the application had been met and that no objections were received from the circulated agencies or public. The County of Wellington Planning opinion stated that it considers the application minor and further stated that they will impose 3 conditions for the reduced lot site.
    - Jeff Buisman of Van Harten Surveyors, consultant, provided an overview of the application and advised that the location of the entrances were reviewed with Don Creed, Township Director of Public works, that both properties will have new septic systems and that there is a severance application pending with the County.
    - Dan Kennedy confirmed with Jeff Buisman that both properties will have new septic systems.
    - Dennis O'Connor inquired where the locations would be for the driveways.
    - Jeff Buisman provided an explanation of where the new driveways would be located.
    - Dianne Paron inquired why the severance application states the reduced lot area to be 0.36 hectares and the minor variance application states the reduced lot area to be .035 hectares.
    - Jeff Buisman indicated that it was rounded it down.
    - Dianne Paron inquired what happens with the results of the reports required as a result of the conditions that the County will require.
    - Jessica Rahim advised that they will be forwarded to Township staff for review with its consultant and provide comments.
  - There were no further questions or comments.

Moved by: Dan Kennedy Seconded by: Dennis O'Connor

That Application D13/ALF, providing relief from provisions of Zoning By-Law #19/85, as amended, requesting a reduced lot area to be 0.35 hectares instead of 0.40 hectares, is hereby **approved** with the following conditions:

- That a hydrogeological assessment and soil assessment be completed by a qualified professional, which demonstrates that the proposed reduced lot area will meet the technical recommendations of these studies, to the satisfaction of the Township.
- That a concept plan be submitted demonstrating that a building envelope, well and septic can be accommodated on the reduced lot area to the satisfaction of the Township.
- That the owner shall be responsible for any costs associated with the review of the hydrogeological assessment and soil assessment to the satisfaction of the Township.

Moved by: Dan Kennedy Seconded by: Dennis O'Connor

CARRIED

4(b) Minor Variance Application D13/VAN – Ken and Lynda VanLeeuwen – Property described as Part of Lot 7, Concession 3, 6644 Wellington Road 34 (Part 1, 61R-4594, Township of Puslinch **.**

Requesting relief from provisions of Zoning By-Law #19/85, as amended, requesting a reduced lot area to be 0.35 hectares instead of 0.40 hectares as required.

- Lynne Banks outlined the application, advised the notice requirements for the application had been met and outlined the comments that were received from the circulated public. The County of Wellington Planning opinion stated that it considers the application minor and further stated that they will impose 3 conditions for the reduced lot site.
  - Jeff Buisman of Van Harten Surveyors, consultant, provided an overview of the application.

- John Sloot asked for clarification as to whether or not a minimum threshold is ever set for the setback reduction limit.
- Dianne Paron stated that if there are extenuating circumstances and there is no negative impact then it will be dealt with under the consent application.

Moved by: Dianne Paron Seconded by: Dan Kennedy

That Application D13/VAN, providing relief from provisions of Zoning By-Law #19/85, as amended, requesting a reduced lot area to be 0.35 hectares instead of 0.40 hectares, is hereby **approved** with the following conditions:

- That a hydrogeological assessment and soil assessment be completed by a qualified professional, which demonstrates that the proposed reduced lot area will meet the technical recommendations of these studies, to the satisfaction of the Township.
- That a concept plan be submitted demonstrating that a building envelope, well and septic can be accommodated on the reduced lot area to the satisfaction of the Township.
- That the owner shall be responsible for any costs associated with the review of the hydrogeological assessment and soil assessment to the satisfaction of the Township.

CARRIED

4(c) Minor Variance Application D13/PRI – Leslie Prier – Property described as Part of Lot 20, Concession 4, 7000 Concession 4 (Part 1, 61R-8241, Township of Puslinch**.**

Requesting relief from provisions of Zoning By-Law #19/85, as amended, requesting a reduced MDS 1 setback from the barn at 4638 Sideroad 20 North to the severed parcel to be 345 metres instead of 420 metres as required.

- Lynne Banks outlined the application, advised the notice requirements for the application had been met and outlined the comments that were received from the circulated public.
- Jeff Buisman of Van Harten Surveyors, consultant, provided an overview of the application and outlined the 2 scenarios to determine if the MDS calculation is Type “A” or Type “B”.
- Dan Kennedy inquired if any water testing was done, or will be done, for the wells located in the area.
- Jeff Buisman advised that the MDS is only for odour.
- Dennis O’Connor raised a concern that the odour from the poultry barn located at 4638 Sideroad 20 North may cause complaints from the landowner of the severed parcel.
- John Sepulis inquired what is the requirement for Type “A” MDS to come into effect versus Type “B” MDS.
- Jeff Buisman summarized the requirements for Type “A” versus Type “B”.
- Jessica Rahim noted that the application meets the 4 test for a minor variance.
- John Sepulis advised that he supports the application because there are 3 other homes closer to the poultry barn than the applicant’s home.
- Dennis O’Connor noted that he opposes approval of the application.

Moved by: Dan Kennedy Seconded by: Dianne Paron

That Application D13/PRI, providing relief from provisions of Zoning By-Law #19/85, as amended, requesting a reduced MDS 1 setback from the barn at 4638 Sideroad 20 North to the severed parcel to be 345 metres instead of 420 metres, is hereby **approved**.

CARRIED

4(d) Minor Variance Application D13/SAI – Kamaljit Kaur Saini and Tarlochan Singh Saini c/o Gruinder Saini – Property described as Part of Lot 11, Concession 10, 9 Hume Road (Part 3, 61R-9249, Township of Puslinch **.**

Requesting relief from provisions of Zoning By-Law #19/85, as amended, requesting a reduced MDS 1 setback from the livestock facility at 4726 Watson Road South to the severed parcel to be 260 metres instead of 392 meters, as required.

- Lynne Banks outlined the application, advised the notice requirements for the application had been met and outlined the comments that were received from the circulated public.
- Jeff Buisman of Van Harten Surveyors, consultant, provided an overview of the application.
- John Sepulis asked where does the consent application that was submitted to the County stand.
- Jessica Rahim advised that it is going to the County Land Division Committee on Thursday, January 10, 2019 and that the County will be requesting a deferral of the consent application.
- John Sepulis advised the interested parties in attendance that if they have any concerns then they should attend the meeting on Thursday.
- Jeff Buisman also advised that the owner will also asking for the minor variance application to be deferred as they are working with an abutting landowner who has concerns and will come up with a new configuration of the property but need more time to finalize the plan. He also advised that he spoke with Don Creed, Director of Public Works for the Township to change the driveway entrance and that options to move both entrances to Hume Road are being examined, and then they would bring the application back to the committee.
- John Sepulis asked what will be the decision of the County Land Division Committee.
- Jeff Buisman advised that they will be providing an Environmental Impact Study and deferral of the minor variance pending resolution of the severance application.
- John Sloot commented that there needs to be more clarification for the different types of MDS setbacks and is concerned that his concerns will be dismissed.
- John Sepulis asked how many homes in the area are close to this property.
- Jessica Rahim advised that 2 homes are closer to the property.
- Jeff Buisman provided a sketch showing the locations of the properties.

Moved by: Dianne Paron Seconded by: Dan Kennedy

That Application D13/ALF, providing relief from provisions of Zoning By-Law #19/85, as amended, a reduced MDS 1 setback from the livestock facility at 4726 Watson Road South to the severed parcel to be 260 metres instead of 392 meters, as required, is hereby **deferred**.

CARRIED

There was a discussion following the meeting regarding what is the maximum lot size threshold the Township would be willing to accept.

- Dan Kennedy asked if, for example, 0.35 hectares is allowed, then would there be any later repercussions or would the committee be okay with it.
- Dennis O'Connor asked if it is logical to fit it in.
- Dianne Paron states that she is in agreement if the limit is based on the ability of the lot to accommodate the septic system, then a modest reduction would be acceptable.
- John Sepulis stated that 0.35 hectares is appropriate, anything less should be a Zoning By-law Amendment, but would the County approve it.
- Jessica Rahim stated that in 2013 the Township increased the minimum acreage to 0.40 hectares and the new By-law agrees that is appropriate for the zone.

- John Sepulis stated that until the new Zoning By-law is in effect, the committee will rely on the County to confirm that it is acceptable for the property.
- John Sepulis also stated that possibly it should be taken to Council for discussion as to whether or not a threshold should be established until the new Zoning By-law is in place.

Moved by: Dennis O'Connor Seconded by: Dan Kennedy

That a request be made to Council confirming what the minimum acreage acceptable until the new Zoning By-law is in effect.

5. ADJOURNMENT

Moved by: Dennis O'Connor Seconded by: Dan Kennedy

The Committee of Adjustment meeting adjourned at 7:45 p.m.

CARRIED

MINUTES – SPECIAL MEETING – JANUARY 22. 2019

MEMBERS PRESENT

Mary Tivy – Chair
John Arnold
Councillor Matthew Bulmer
John Levak

MEMBERS ABSENT

Barb Jefferson

TOWNSHIP STAFF

Lynne Banks – Development & Legislative Coordinator

1. CALL TO ORDER

The meeting was called to order at 7:00 p.m.

2. DISCLOSURE OF PECUNIARY INTEREST

None

3. OPENING REMARKS

The Chair advised that the meeting is to prepare an orientation package for Council and to discuss a couple of minor items.

4. CONFIRMATION OF 2019 HERITAGE COMMITTEE MEETING TIMES

- A discussion was held regarding the times for the meeting.
- Councillor Bulmer suggested that the terms of reference should have the meeting dates for the year, but if possible, that the time be floating – depending on the committee member's availability. If not, the meeting times should be 1:00 p.m. on the 1st or 3rd Monday of each month.

5. OLD SCHOOL SURVEYS/PRINT

The decision was made that the Township will keep the surveys and the print at its offices until a decision is made as to whether to make copies of them and then provide them to the Puslinch Historical Society.

6. PREPARATION OF ORIENTATION PACKAGE FOR TOWNSHIP OF PUSLINCH COUNCIL

- Discussed and prepared the orientation package to possibly be presented to Council at one of its meetings in April, 2019.
- The committee was reminded that it will need to be provided to Karen Landry 2 weeks before the council meeting, and that the presentation should be no more than 30 minutes.

7. ADJOURNMENT

The meeting adjourned at 8:23 p.m.

8. NEXT MEETING

February 4, 2019 @ 1:00 p.m.

THE CORPORATION OF THE TOWNSHIP OF PUSLINCH

BY-LAW NUMBER 012-2019

Being a by-law to repeal By-law 12/10 and to enact a new Fire Department Establishing and Regulating By-law for the Corporation of the Township of Puslinch.

WHEREAS the Fire Protection and Prevention Act, 1997, S.O. 1997, c 4, as amended, requires every municipality to establish a program in the municipality which must include public education with respect to fire safety and certain components of fire prevention and to provide such other Fire Protection Services as it determines may be necessary in accordance with its needs and circumstances;

AND WHEREAS the FPPA permits a municipality, in discharging these responsibilities, to establish a Fire Department;

AND WHEREAS the FPPA permits a Council of a municipality to establish, maintain and operate a Fire Department for all or any part of the municipality;

AND WHEREAS the FPPA requires a Fire Department to provide fire suppression services and permits the Fire Department to provide other Fire Protection Services in the municipality;

NOW THEREFORE the Council of the Corporation of The Township of Puslinch enacts as follows:

1. DEFINITIONS

In this by-law, unless the context otherwise requires;

1.1 "Approved" means approved by the Council;

1.2 "CAO" means the person appointed by Council as a Chief Administrative Officer for the Corporation;

1.3 "Confined Space" means any area not designed for human occupancy that has limited or restricted means for egress, normally having only one way in or out (e.g. tanks, silos, storage bins, hoppers, vaults, tunnels);

1.4 "Corporation" means the Corporation of the Township of Puslinch;

1.5 "Council" means the Council of the Corporation;

1.6 "Fire Chief" means the person appointed by Council as a Fire Chief for the Corporation and is ultimately responsible to Council as defined in the FPPA;

1.7 "Deputy Fire Chief" means the person appointed by Council as a Deputy Fire Chief to act on behalf of the Fire Chief in the case of an absence or a vacancy in the office of the Fire Chief;

1.8 "Division" means a Division of the Fire Department as provided for in this By-law;

1.9 "Fire Department" means the Township of Puslinch Fire Department;

1.10 "FPPA" means the Fire Protection and Prevention Act, 1997, S.O. 1997, c. 4, as may be amended from time to time, or any successor legislation, and any regulation made there under;

1.11 "Fire Protection Services" includes fire prevention, fire safety education, fire suppression, communications and training of persons involved in the provision of Fire Protection Services, rescue and emergency services and the delivery of all those services;

1.12 "High Angle" means any rescue attempt that requires rope and related equipment to safely gain access to, and remove victims from, hazardous geographical areas with limited access such as cliffs, above or below grade structures, silos by means of a rope system;

1.13 "Member" means any person employed in or appointed to Puslinch Fire and Rescue and assigned to undertake Fire Protection Services;

1.14 “NFPA” means National Fire Protection Association;

1.15 "Water Rescue" means any incident involving the rescue or removal of a victim from any body of water, moving or still such as lakes, ponds, rivers, flooding.

2. ESTABLISHMENT

2.1 The Fire Department is continued under this By-law to provide Fire Protection Services for the Corporation and the Head of the Department shall be known as the Fire Chief.

3. COMPOSITION

3.1 The Fire Department shall consist of the Fire Chief, Deputy Fire Chief(s), Captains, other officers, firefighters, administrative support staff and any other person as may be authorized or considered necessary from time to time by Council for the Fire Department to perform Fire Protection Services.

4. EMPLOYMENT

4.1 The Fire Chief appoints qualified persons as members of the Fire Department subject to the approved Puslinch Fire Department hiring process and the Corporation’s Hiring Policy.

4.2 A person is qualified to be appointed a member of the Fire Department for firefighting duties who:

- Is not less than 18 years of age;
- Resides within the Township of Puslinch or within close proximity to a Township of Puslinch Fire Station;
- Passes such aptitude tests as may be required by the Fire Chief;
- Passes such medical fitness tests as may be required by the Fire Chief;

4.3 A person appointed as a member of the Fire Department shall begin as an auxiliary firefighter or a probationary firefighter for suppression firefighting duties. A probationary firefighter shall be on probation for a period of twelve months during which he/she shall receive training and examinations as required by the Fire Chief.

4.4 Prior to the completion of the probationary period, the Fire Chief shall review their performance as a firefighter. If a probationary member appointed to provide fire protection services fails any such examinations, the Fire Chief may recommend to the CAO that their probation be extended or he/she be dismissed, in accordance with Corporation’s Policies.

5. TERMS AND CONDITIONS OF EMPLOYMENT

5.1 Subject to the FPPA, the remuneration and other terms and conditions of employment or appointment of the members and administrative support staff that comprise the Fire Department shall be in accordance with the Corporation’s polices, procedures and programs.

6. ORGANIZATION

6.1 The Fire Department shall be structured in conformance with the approved Organizational Chart (Appendix B). Any additional (new) positions to the Organizational Chart, such as those recommended in the Master Fire Plan requires the approval of Council.

6.2 The Fire Department shall be organized into Divisions such as:

- Fire Prevention;
- Fire Suppression;
- Training;
- Public Education and
- Administrative Services.

6.3 The Fire Chief, with prior approval of the CAO, may re-organize or eliminate Divisions, establish other Divisions, do all or any of these things, or any combination of them as may be required to ensure the proper administration and efficient operation of the Fire Department. The Fire Chief may assign or re-assign such members to a Division to assist in the administration and operation of the Division. The effective management of Fire Protection Services for the Corporation must maintain the Corporartion’s approved budget or as otherwise approved by Council.

7. CORE SERVICES

7.1 For the purposes of this By-law core services provided by the Fire Department will be as per Appendix "A" which forms part of this By-law.

7.2 Nothing in this By-law will restrict the Fire Department to providing only core services or limit the provisions of Fire Protection Services.

7.3 The Corporation will strive to meet the following emergency response objectives:

(a) Initial Response Staffing Performance Objective of an initial response deployment of four firefighters to all fire related emergency calls;

(b) Depth of Response Staffing Performance Objective of a depth of response deployment to all fire related emergency calls of four firefighters to low risk occupancies, 14 firefighters to moderate risk occupancies, and 24 firefighters to high risk occupancies.

7.3.1 The Corporation will strive to meet the following time performance objective:

(a) Corporate response time performance objective referenced within the NFPA 1720 Rural Area Demand Zone including a minimum of six firefighters responding within a 14 minute response time (turnout time + travel time) with a performance objective of 80%.

8. RESPONSIBILITIES AND AUTHORITY OF FIRE CHIEF

8.1 The Fire Chief is responsible to Council, through the CAO, for the:

(a) proper administration and operation of the Fire Department including the preparation of an annual budget;

(b) delivery of Fire Protection Services.

8.2 The Fire Chief is authorized to make:

(a) general orders, directives, guidelines, procedures, rules, and regulations and to take such other measures as the Fire Chief may consider necessary for the management of the Fire Department, the prevention, control and

extinguishment of fires, the protection of life and property, and the management of emergencies including:

i. the care and protection of all property belonging to the Fire Department;
ii. arranging for the provision of necessary and proper facilities, apparatus, equipment, services and supplies for the Fire Department;
iii. determining and establishing the qualifications and criteria for employment or appointment and the duties of all members and administrative support staff;
iv. utilizing members and staff of the Fire Department, to assist in the performance of his/her duties, as may be required from time to time;
v. the conduct and the discipline of members and administrative support staff;
vi. liaising with any union or association representing firefighters or staff of the Fire Department;
vii. liaising with the Office of the Fire Marshal of Ontario and any other office or organization;
viii. preparing and, upon approval by the Council, implementing and maintaining a Master Fire Service Plan and program for the Corporation;
ix. coordinating any emergency fire service plan and program, assisting in the preparation, implementation and maintenance of any emergency plans, organizations, services or measures;
x. directing any emergency plan established by the Province of Ontario or the Government of Canada;
xi. coordinating with and assisting any other public official in an emergency declared by the Mayor of the Corporation, the Premier of Ontario or the Governor in Council;
xii. reporting to the appropriate crown attorney or other prosecutor or law enforcement officer or other officer that the facts upon the evidence in any case in which there is reason to believe that a fire has been the result of criminal intent or negligence or in which there is reason to believe an offence has been committed under the FPPA;
xiii. keeping an accurate record, in convenient form for references, of all fires, rescues and emergencies responded to by the Fire Department;
xiv. keeping such other records as may be required by the Corporation and the FPPA in accordance with the Records Retention By-law;
xv. preparing and presenting the annual report of the Fire Department to Council.

8.3 The Fire Chief shall be responsible for the:

(a) administration and enforcement of this By-law; and all general orders, policies, procedures, rules, and regulations made under this By-law;

(b) enforcement of any other By-laws of the Corporation respecting Fire Protection Services;

(c) periodic review of such By-laws;

(d) periodic review, amendment or termination of any general orders, procedures, rules, and regulations made by the Fire Chief under this By-law..

8.4 The Fire Chief shall have all powers, rights and duties assigned to a Fire Chief under the FPPA including without limitations the authority to enforce compliance with the Ontario Fire Code. The FPPA also provides ‘Under Powers of the Fire Chief’ the authority to designate certain duties to others.

8.5 The Fire Chief shall report all fires to the Fire Marshal as required by the FPPA.

9. DEPUTY FIRE CHIEF

9.1 The Deputy Fire Chief shall:

(a) be the second ranking officer of the Fire Department; and

(b) be subject to and obey all orders of the Fire Chief; and

(c) perform such duties as are assigned to him or her by the Fire Chief; and

(d) act on behalf of the Fire Chief in case of absence or a vacancy in the office of the Fire Chief.

10. SUPERVISION

10.1 The Members and administrative support staff of the Fire Department while on duty shall be under the direction and control of the Fire Chief or the next ranking officer present in any place.

11. GENERAL DUTIES AND RESPONSIBILITIES

11.1 Every Member and administrative support staff person shall:

(a) conduct themselves in accordance with general orders, policies, procedures rules and regulations of the Fire Department; and

(b) give their whole and undivided attention while on duty to the efficient operation of the Fire Department; and

(c) shall perform the duties assigned to them to the best of their ability in accordance with the FPPA and any collective agreement or other written agreement that may be applicable.

12. PROPERTY

12.1 Employees must not use the Corporation's property, vehicles, equipment, supplies or services for activities not associated with the discharge of official duties.

12.2 Employees shall not use the Corporation's property, vehicles, equipment, supplies or services for personal gain.

12.3 No person shall willfully damage any apparatus, equipment or other property belonging to or used by the Fire Department.

12.4 All persons shall abide by the Corporation's Staff Code of Conduct.

13. FIRE SUPPRESSION

13.1 The Fire Department may suppress any fire, or other hazardous condition by extinguishing it or by other reasonable action and, for this purpose, may enter private property, if necessary, to do so.

13.2 The Fire Department may pull down or demolish any building or structure when considered necessary to prevent the spread of fire.

13.3 The Fire Department may request other persons present at a fire to assist in;

(a) extinguishing fires;
(b) pulling down or demolishing buildings or structures to prevent the spread of fire;
(c) crowd and traffic control; or
(d) suppression of fires or other hazardous conditions in other reasonable ways.

14. REFUSAL TO LEAVE

14.1 No person present at a fire shall refuse to leave the immediate vicinity when required to do so by a member of the Fire Department.

15. CONDUCT AT FIRES

15.1 During a fire, and during a fire investigation and until the area is safe and secure, no person, either on foot or with a vehicle of any kind, shall enter or remain upon or within;

(a) The portion of any street or lane upon which the site of the fire abuts or upon any street or lane for a distance of fifteen (15) metres on each side of the property damaged by fire; and

(b) Any other street, lane or other area or part thereof in the vicinity of the fire, as may be identified by the Fire Chief or the next ranking officer present at the fire.

15.2 The provisions of section 15.1 shall not apply to a resident of any street, lane or within an identified area or to any person authorized to enter or remain by an officer of the Fire Department or by a police officer.

16. EMERGENCY RESPONSES OUTSIDE THE LIMITS OF THE MUNICIPALITY

16.1 The Fire Department shall not respond to a call with respect to a fire or emergency outside the territorial limits of the Corporation except with respect to a fire or emergency;

(a) That, in the opinion of the Fire Chief or designate of the Fire Department:

i. threatens property in the territorial limits of the Corporation; or
ii. property situated outside the territorial limits of the Corporation that is owned or occupied by the Corporation; or
iii. on property beyond the territorial limits of the Corporation where it is determine immediate action is necessary to preserve life or property and the appropriate fire department is notified to respond and assume command or establish alternative measures, acceptable to the Fire Chief or designate.

(b) In a municipality with which an approved automatic aid or mutual aid agreement has been entered into to provide Fire Protection Services;

(c) On property with which an approved agreement has been entered into with any person or corporation to provide Fire Protection Services;

(d) At the discretion of the Fire Chief, to a municipality authorized to participate in any regional mutual aid plan established by a fire coordinator appointed by the Fire Marshal or any other similar reciprocal plan or program;

17. INTERFERENCE

17.1 No person shall impede or interfere with or hinder a member of the Fire Department in the performance of his/her duties.

18. FIRE ALARM

18.1 No person shall prevent, obstruct or interfere in any manner with the communication of a fire alarm to the Fire Department or with a member of the Fire Department responding to a fire alarm that has been activated.

19. OFFENCES

19.1 Every person who contravenes any provisions of this By-law is guilty of an offence and on conviction is liable to the penalty established by the provincial Offences Act, R.S.O.1990, c P.33, as may be amended or replaced from time to time, inclusive of costs.

20. CONFLICT

20 .1 Where this By-law may conflict with any other By-law of the Corporation, this By-law shall supersede and prevail over that other By-law to the extent of the conflict.

21. SEVERABILITY

21.1 If any or part of this By-law is found to be illegal or beyond the power of the Corporation, such section or part or item shall be deemed to be severable and all other sections or parts of this By-law shall be deemed to be separate and independent there from and to enacted as such.

22. REPEAL

22.1 That By-law 12/10 is hereby repealed.

READ A FIRST, SECOND AND THIRD TIME AND FINALLY PASSED THIS xxx DAY OF JANUARY 2019.

_____
James Seeley, Mayor

_____
Karen Landry, CAO/Clerk

APPENDIX "A"

CORE SERVICES

1. FIRE SUPPRESSION AND EMERGENCY RESPONSE

1.1 Fire suppression services shall be delivered in both an offensive and defensive mode and shall include search and rescue operations, forcible entry, ventilation, protecting exposures, salvage and overhaul as appropriate.

1.2 Emergency pre-hospital care responses and medical acts such as Defibrillation, CPR, and the Emergency Medical Responders Program or as approved by a base hospital or a medical director, shall be maintained.

1.3 Specialized technical rescue services at a NFPA Technical level shall include Vehicle Rescue and Water/Ice rescue services in accordance with available resources, NFPA Operations level services shall be provided for Confined Space, Rope Rescue and Hazardous Materials Response. All other specialized technical rescues will be at NFPA awareness level.

1.4 All training will match the response criteria and comply with Section 21 Guidelines, Puslinch Fire Department Operating Guidelines, Township Policies, applicable provincial legislation and NFPA standards.

2. FIRE PREVENTION

2.1 Enforcing the Ontario Fire Code by conducting comprehensive inspections, complaint, request, retrofit, or self initiated, of all classes of buildings and occupancies in the territorial limits of the Corporation.

2.2 Record and report all findings and issue orders to improve fire safety.

2.3 Where directed, determine the origin and cause of fires.

2.4 Responsible for Fire Safety Planning, which involves liaison with architects, consulting engineers, contractors and owners to ensure fire safety requirements are met.

2.5 Examine plans and specifications to ensure life safety requirements have been met in accordance with the Ontario Fire Code and Ontario Building Code.

2.6 Prepare reports, letters, and orders in accordance within applicable legislation requirements.

2.7 Perform other duties as assigned.

2.8 The Ontario Fire Code, Fire Protection and Prevention Act, Building Code, NFPA and other related standards, legislation and reference materials may be used as reference guides for Puslinch Fire & Rescue Fire Prevention activities as approved by the Fire Chief.

3. FIRE SAFETY EDUCATION

3.1 Distribution of fire and life safety information and public education programs shall be administered in accordance with the FPPA and guidelines of the Fire Department.

3.2 A residential home fire safety awareness program shall be ongoing.

3.3 Smoke alarms for residential occupancies shall be provided to those in need.

3.4 Fire and life safety communiqués shall be distributed to the media on a regular basis.

3.5 The Fire Department shall maintain at least one Public Fire and Life Safety Educator certified to NFPA Standard 1035.

4. EMERGENCY DISPATCHING AND COMMUNICATIONS

4.1 That Emergency Dispatching and Fire Service communications be provided by a service provider that is in compliance with the requirements of the National Fire Protection Association for dispatch times and all standards under the Fire Protection and Prevention Act.

APPENDIX "B"

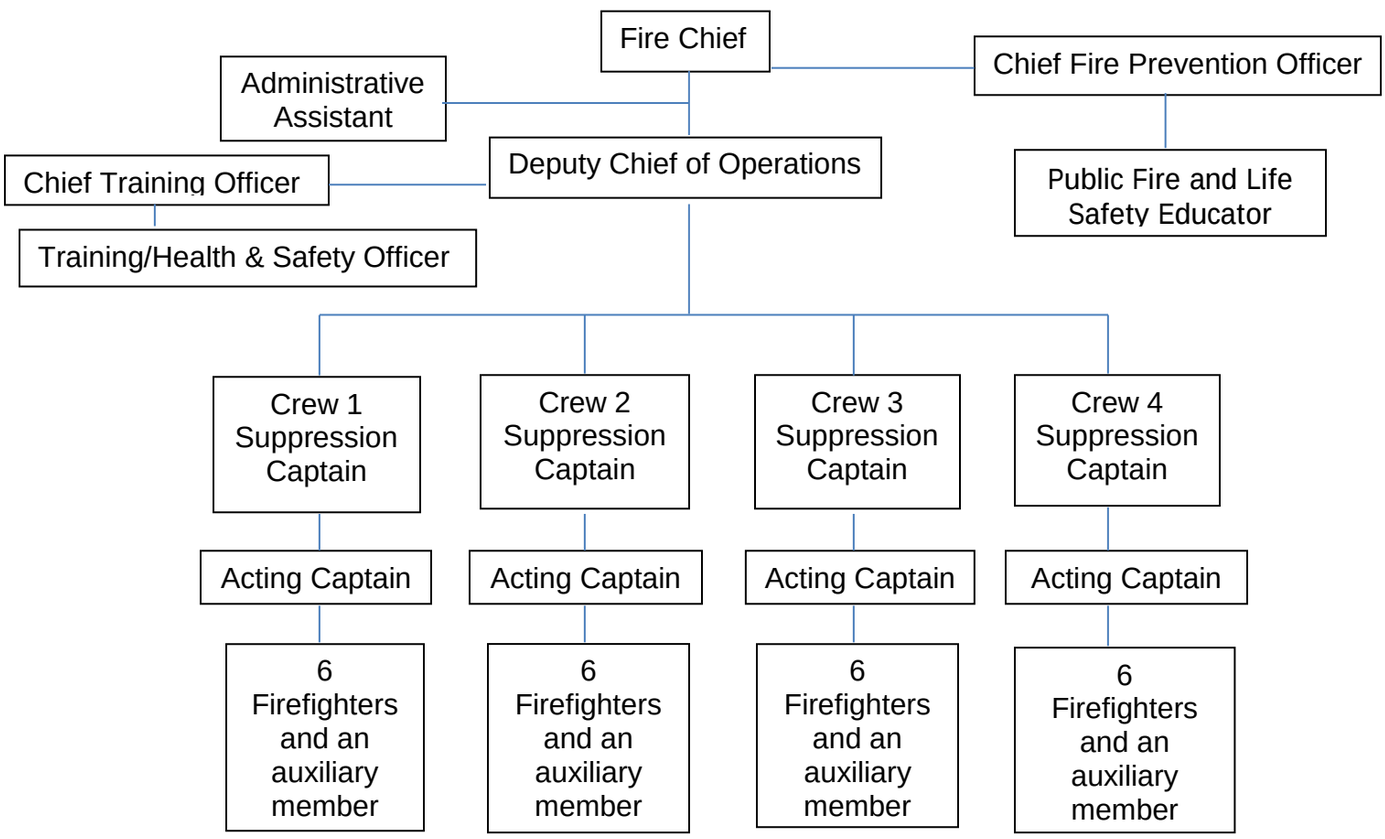
Fire Department Organizational Chart

Puslinch Fire & Rescue Services

Organizational Chart

The Puslinch community is presently served for fire protection services by its own community fire department. Puslinch Fire and Rescue Services is staffed by 43 personnel. The organizational chart is as follows:

Organizational chart:



THE CORPORATION OF THE TOWNSHIP OF PUSLINCH

BY-LAW NUMBER 013-2019

Being a By-law to provide for the appointment of several Municipal Law Enforcement Officers for the Corporation of the Township of Puslinch.

WHEREAS Section 9 of the *Municipal Act*, *2001*, S.O. 2001 c. 25, as amended, provides that a municipality has the capacity, rights, powers and privileges of a natural person for the purpose of exercising its authority;

AND WHEREAS Section 227 of the Municipal Act, S.O. 2001, c. 25, authorizes a Council to pass a by-law to appoint such officers and employees as may be necessary for the purposes of the Corporation, for carrying into effect the provisions of any by-law of Council;

AND WHEREAS Section 15 of the *Police Services Act* R.S.O. 1990, c. P.15, as amended, authorizes the appointment of Municipal Law Enforcement Officers who shall be peace officers for the purpose of enforcing the by-laws of the municipality;

NOW THEREFORE the Council of the Corporation of the Township of Puslinch hereby enacts as follows:

1. **THAT** the following individuals be appointed as a Municipal Law Enforcement Officers for the Township of Puslinch:
    a. Andrew Falcioni
    b. Tara Moran
    c. Shannon Sauve
    d. Catherine Heathfield
    e. Megan Gashgarian
2. **AND THAT** this By-law shall come into full force and effect on the day it is passed.

READ A FIRST, SECOND AND THIRD TIME AND FINALLY PASSED THIS 6th DAY OF MARCH 2019.

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James Seeley, Mayor

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Karen M. Landry, CAO/Clerk

THE CORPORATION OF THE TOWNSHIP OF PUSLINCH

BY-LAW NUMBER 014-2019

BEING A BY-LAW TO LIFT AND ASSUME THE 0.3 METRE RESERVE AS PART OF THE TOWNSHIP OF PUSLINCH PUBLIC HIGHWAY SYSTEM, DESIGNATED AS BLOCK 22, REGISTERED PLAN 61M-16, TOWNSHIP OF PUSLINCH.

WHEREAS Section 27(1) of the *Municipal Act, 2001, S.O. 2001, c. 25* authorizes a municipality to pass by-laws in respect of a highway over which it has jurisdiction;

AND WHEREAS the lands affected by this By-law were conveyed to and accepted by The Corporation of the Township of Puslinch as reserves;

AND WHEREAS The Corporation of the Township of Puslinch now wishes to dedicate the lands as part of the public highway;

AND WHEREAS it is now appropriate to dedicate the reserve as part of Boreham Drive;

NOW, THEREFORE, BE IT RESOLVED THAT THE COUNCIL OF THE CORPORATION OF THE TOWNSHIP OF PUSLINCH ENACTS AS FOLLOWS:

1. **THAT** the lands described as Block 22, Registered Plan 61M-16, Township of Puslinch are hereby dedicated as part of the public highway system known as Boreham Drive.

READ A FIRST, SECOND AND THIRD TIME AND FINALLY PASSED THIS 6th DAY OF MARCH 2019.

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James Seeley, Mayor

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Karen Landry, CAO/Clerk

THE CORPORATION OF THE TOWNSHIP OF PUSLINCH

BY-LAW NUMBER 015-2019

BEING A BY-LAW TO ACQUIRE AND DEDICATE PART 2 ON REFERENCE PLAN 61R-21503 AS PART OF THE TOWNSHIP OF PUSLINCH PUBLIC HIGHWAY SYSTEM, TO BE KNOWN AS AND TO FORM PART OF GILMOUR ROAD.

WHEREAS Section 11(2) of the Municipal Act authorizes a municipality to acquire lands for the purpose of exercising its authority;

AND WHEREAS Section 27(1) of the *Municipal Act, 2001, S.O. 2001, c. 25* authorizes a municipality to pass by-laws in respect of a highway over which it has jurisdiction;

AND WHEREAS The Corporation of the Township of Puslinch now wishes to acquire and dedicate the lands described as part 2 on Reference Plan 61R-21503 (the “lands”) as part of the public highway;

AND WHEREAS it is now appropriate to dedicate the lands shown as Part 2 on Reference Plan 61R-21503 as part of Gilmour Road;

NOW, THEREFORE, BE IT RESOLVED THAT THE COUNCIL OF THE CORPORATION OF THE TOWNSHIP OF PUSLINCH ENACTS AS FOLLOWS:

1. **THAT** the Township acquire the lands for nominal consideration ($2.00);

2. **THAT** the lands described as Part of Lot 24, Concession 8 and designated as Part 2 on Reference Plan 61R-21503, Township of Puslinch, is hereby dedicated as part of the public highway system to be known as, and to form part of Gilmour Road;

3. **THAT** the Mayor and Clerk are hereby authorized to execute on behalf of the Township such Transfer/Deeds and other documents as may be necessary to effect the conveyance of Part 2 on 61R-21503.

READ A FIRST, SECOND AND THIRD TIME AND FINALLY PASSED THIS 6th DAY OF MARCH 2019.

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James Seeley, Mayor

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Karen Landry, CAO/Clerk

THE CORPORATION OF THE TOWNSHIP OF PUSLINCH

BY-LAW NUMBER 016-2019

Being a by-law to authorize the entering into a Grant Contract with the Ontario Trillium Foundation for the building of a lit soccer field at the Puslinch Community Centre Park.

WHEREAS the *Municipal Act*, S.O. 2001, c.25 authorizes a municipality to enter into Agreements;

AND WHEREAS the *Municipal Act*, S.O. 2001, c.25 authorizes a municipality to delegate authority in accordance with the provisions in the *Municipal Act*;

AND WHEREAS the Council for the Corporation of the Township of Puslinch deems it appropriate to enter into a Grant Contract with the Ontario Trillium Foundation for the building of a lit soccer field at the Puslinch Community Centre Park;

AND WHEREAS the Council for the Corporation of the Township of Puslinch deems it expedient to delegate authority to the Director of Finance/Treasurer to execute on behalf of the Township the Grant Contract and any amendments to the Grant Contract that have no budgetary impact;

NOW THEREFORE the Corporation of the Township of Puslinch hereby enacts as follows:

1. That the Corporation of the Township of Puslinch enter into a Grant Contract with the Ontario Trillium Foundation for the building of a lit soccer field at the Puslinch Community Centre Park.

2. That the Director of Finance/Treasurer is hereby authorized to execute the Grant Contract.

3. That the Director of Finance/Treasurer be authorized to execute on behalf of the Township amendments to the Grant Contract that have no budgetary impact.

READ A FIRST, SECOND AND THIRD TIME AND FINALLY PASSED THIS 6th DAY OF MARCH 2019.

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James Seeley, Mayor

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Karen Landry, CAO/Clerk

THE CORPORATION OF THE TOWNSHIP OF PUSLINCH

BY-LAW NUMBER 017-2019

Being a by-law to confirm the proceedings of the Council of the Corporation of the Township of Puslinch at its Regular meeting held on March 6, 2019.

WHEREAS by Section 5 of the *Municipal Act, 2001, S.O. 2001, c.25* the powers of a municipal corporation are to be exercised by its Council;

AND WHEREAS by Section 5, Subsection (3) of the *Municipal Act,* a municipal power including a municipality's capacity, rights, powers and privileges under section 8, shall be exercised by by-law unless the municipality is specifically authorized to do otherwise;

AND WHEREAS it is deemed expedient that the proceedings of the Council of the Corporation of the Township of Puslinch at its Regular meeting held on March 6, 2019 be confirmed and adopted by By-law;

NOW THEREFORE the Council of the Corporation of the Township of Puslinch hereby enacts as follows:

1) The action of the Council of the Corporation of the Township of Puslinch, in respect of each recommendation contained in the reports of the Committees and each motion and resolution passed and other action taken by the Council at said meeting are hereby adopted and confirmed.

2) The Head of Council and proper official of the Corporation are hereby authorized and directed to do all things necessary to give effect to the said action of the Council.

3) The Head of Council and the Clerk are hereby authorized and directed to execute all documents required by statute to be executed by them, as may be necessary in that behalf and the Clerk authorized and directed to affix the seal of the said Corporation to all such documents.

READ A FIRST, SECOND AND THIRD TIME AND FINALLY PASSED THIS 6th DAY OF MARCH 2019.

_____
James Seeley, Mayor

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Karen Landry, C.A.O./Clerk