DILLON CONSULTING

CITY OF HAMILTON

Southcote Road (Garner Road to Golf Links Road) Environmental Study Report

FINAL

June 2019 – 18-7402

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Consultation Materials

Study Contact List

Southcote Road EA

Last Name	*First Name*	*Title*	*Job Title*	*Organization*	*Street Address*	*City and Province*	*Postal Code*	*Contact Information*
City of Hamilton Staff **TO BE SENT ELECTRONIC COPY OF MAILOUT*								
Ariyo	John	Mr.	Manager, Community Initiatives	Community & Emergency Services	28 James Street North, 5th Floor	Hamilton, ON	L8R 2K1	905-546-2424 x1564
Caterini	Rose	Ms.	City Clerk	City Managers Office	71 Main Street West, 1st Floor	Hamilton, ON	L8P 4Y5	905-546-2424 x5409
Cunliffe	Dave	Mr.	Fire Chief	Hamilton Fire Department	1227 Stone Church Road East	Hamilton, ON	L8W 2C6	905-546-2424 x3340
Dalle Vedove	Debbie	Ms.	Director of Transit	Public Works	2200 Upper James Street	Mount Hope, ON	L0R 1W0	905-546-2424 x1860
DiDomenico	Jennifer	Mr.	Manager, Policy and Programs	Public Works	77 James St. N., Suite 400	Hamilton, ON	L8R 2K3	905-546-2424 x5596
Ehrenberg	Udo	Mr.	Manager, Infrastructure Planning & Systems Design	Public Works	77 James Street North, Suite 400	Hamilton, ON	L8R 2K3	90-546-2424 x2499
Fabac	Anita	Ms.	Manager of Development Planning, Heritage & Design	Planning and Economic Development	71 Main Street West, 5th Floor	Hamilton, ON	L8P 4Y5	905-546-2424 x1258
Girt	Eric	Mr.	Commander in Charge	Hamilton Police Service				egirt@hamiltonpolice.on.ca
Parsons	Jeremy	Mr.	Heritage Planner, Rural and Suburban Teams	Planning & Economic Development	71 Main Street West, 5th Floor	Hamilton, ON	L8P 4Y5	905-546-2424 x1214
Kiddie	Melissa	Ms.	Natural Heritage Planner (Suburban)	Planning & Economic Development	71 Main Street W., 5th Floor	Hamilton, ON	L8P 4Y5	905-546-2424 x1290
Korah	Binu		Manager of Engineering Approvals Group	Planning & Economic Development	71 Main Street West Floor: 5th Floor	Hamilton, ON	L8P 4Y5	905-546-2424 x1322
Leendertse	Ken	Mr.	Director, Licensing and By-Law Enforcement	Planning & Economic Development	77 James Street North, Suite 250	Hamilton, ON	L8R 2K3	905-546-2424 ext 3059
Matthews-Malone	Betty	Ms.	Director of Operations	Public Works	77 James St. N., Suite 400	Hamilton, ON	L8R 2K3	905-546-2424 x4622
Molloy	Steve	Mr.	Acting Manager Transportation Planning	Planning and Economic Development	77 James St. N., Suite 400	Hamilton, ON	L8R 2K3	905-546-2424 x2975
Ammendolia	Carlo	Mr.	Acting Director, Development Engineering	Planning & Economic Development	71 Main Street West, 6th Floor	Hamilton, ON	L8P 4Y5	905-546-2424 x2155
Murdoch	Craig	Mr.	Director of Environmental Services	Public Works	77 James St. N., Suite 400	Hamilton, ON	L8R 2K3	905-546-2424 x4490
Newbold	Christine	Ms.	Manager	Planning and Economic Development	71 Main Street West, 6th Floor	Hamilton, ON	L8P 4Y5	905-546-2424 x1279
Paparella	Guy	Mr.	Director of Growth Planning	Planning & Economic Development	71 main St W 6th flr	Hamilton, ON	L8P 4Y5	905-546-2424 x5807
Plosz	Catherine	Ms.	Natural Heritage Planner (Rural)	Planning & Economic Development	71 Main St W 5th Flr	Hamilton, ON	L8P 4Y5	905-546-2424 x1231
Seely	Le' Ann	Ms.	Manager, Forestry and Horticulture	Public Works	77 James Street North, Suite 400	Hamilton, ON	L8R 2K3	905-546-2424 x3919
Vander Heide	Jason	Mr.	Manager of Transit Planning & Infrastructure	Transit (HSR)	2200 Upper James Street	Mount Hope, ON	L0R 1W0	905-546-2424 x7923
White	Martin	Mr.	Manager, Traffic Operations	Public Works	1375 Upper Ottawa St.	Hamilton, ON	L8W 3L5	905-546-2424 x4345
Yong-Lee	Sally	Ms.	Manager, Infrastructure Planning	Planning & Economic Development	71 Main Street West, 7th Floor	Hamilton, ON	L8P 4Y5	905-546-2424 x1428

Zegarac	Mike	Mr.	Director, Financial Planning & Policy	Corporate Services	71 Main Street West, 1st Floor	Hamilton, ON	L8P 4Y5	905-546-2424 x2739
Councillors								
Ferguson	Lloyd	Mr.	Councillor, Ward 12	City of Hamilton	71 Main Street West, 2nd Floor	Hamilton, ON	L8P 4Y5	905-546-2424 x2704
Conservation Authority								
Stone	Michael	Mr.	Manager, Watershed Planning Services	Hamilton Conservation Authority	838 Mineral Springs Road, Box 81067	Ancaster, ON	L9G 4X1	(905) 525-2181 ext 133 mstone@conservationhamilton.ca
Provinicial Authorities								
Head - Highway Engineering - Hamilton & Niagara				Ministry of Transportation	1201 Wilson Ave., Bldg. D., 3rd Floor	Downsview, ON	M4V 1L5	416-235-4540 Fax 416-235-3576
Hatcher	Laura		Team Lead - Heritage Land Use Planning	Ministry of Tourism, Culture & Sport	401 Bay Street, 17th Floor	Toronto, ON	M7A 0A7	416-314-3108 Fax 416-314-7175 laura.e.hatcher@ontario.ca
Hagman	Ian	Mr.	District Manager, Guelph District Office	Ministry of Natural Resources	1 Stone Rd. W.	Guelph, ON	N1G 4Y2	519-826-4931 Fax 519-826-4929
Slattery	Barbara	Ms.	Environmental Assessment & Planning Co-ordinator	Ministry of Environment, Conservation and Parks	119 King St. W., 12th Floor	Hamilton, ON	L8P 4Y7	905-521-7864 Fax 905-521-7806 barbara.slattery@ontario.ca
Van Room	Pauline	Ms.	Highway Engineering Hamilton	Ministry of Transportation	1201 Wilson Ave; Bldg. D. 4th Floor	Downsview, ON	M4V 1L5	
Federal Authorities								
First Nations								
			Metis Consultation Unit	Metis Nation of Ontario	500 Old St. Patrick Street Unit #3	Ottawa, ON	K1N 9G4	Tel: (613) 798-1488 Fax: (613)725-4225
General	Paul	Mr.	Lands & Resources	Six Nations Eco-Centre	1721 Chiefswood Road Iroquois Village Plaza Unit 109 PO Box 5000	Oshweken, ON	N0A 1M0	519-445-0330 pgeneral@sixnations.ca
Hill	Ava	Chief		Six Nations of the Grand River Territory	1695 Chiefswood Road P.O. Box 5000	Oshweken, ON	N0A 1M0	Chief Ava Hill Tel: (519) 445-2201 Email: arleenmaracle@sixnations.ca and lonnybomberry@sixnations.ca Fax: 519-445-4208
MacNaughton	Allen	Chief	Haudenosaunee Development Institute	Haudenosaunee Confederacy Council	2634 6th Line Road RR #2	Oshweken, ON	N0A 1M0	Email: hdi2@bellnet.ca Phone: 519-445-4222 Fax (519) 753-3449

LaForme	Stacey	Chief		Mississaugas of New Credit	2789 Mississauga Road RR #6	Hagersville, ON	N0A 1H0	Email: Stacey.LaForme@newcreditfirstnation.com Phone: 905-768-1133 ext. 240
Picard	Maxime	Ms.	Project Coordinator	Huron-Wendat Nation Council	255 Place Chef Michel-Laveau	Wendake, QC	G0A 4V0	418-843-3767 ext 2105 maxime.picard@cnhw.gc.ca
Sault	Fawn		Manager, Department of Consultation and Accommodation	Mississaugas of New Credit First Nation	2789 Mississauga Road RR #6	Hagersville, ON	N0A 1H0	Fawn.sault@newcreditfirstnation.com
Utilities								
Bolliger	Richard	Mr.		Rogers Communications				
Greco	Enzo	Mr.	Construction Project Manager	Union Gas	918 South Service Road	Stoney Creek, ON	L8E 5M4	Phone: (289) 649-2061 Cell: (905) 741-8395 Email: egreco@uniongas.com
Jakubowski	Mark	Mr.	Acting Manager of Capital Projects	Horizon Utilities Corporation	55 John St. N., 6th Floor	Hamilton, ON	L8R 3M8	
Krndija	Robert	Mr.		Hydro One				
Stratychuk	Morelle	Ms.		Bell Canada	20 Hunter St. W.	Hamilton, ON	L8N 3H2	(905) 577-6093
Transportation								
Sir/Madam				Hamilton Cycling Committee				

Indigenous Community Consultation

Southcote Road Environmental Assessment

Summary of Indigenous Community Consultation

Salutation	Surname	First Name	Title	First Nation	E-mail Address	Mailing Address	Phone Number	Email or Mail Notifications	*Notice of Commencement* Date	*Public Information Centre #1* Date	*Public Information Centre #2* Date	Follow-up
				Metis Nation of Ontario		500 Old St. Patrick Street, Unit #3 Ottawa, ON K1N 9G4	613-798-1488	Mail	10-May-18	10-May-18	29-Nov-18	13-Feb-19, left voicemail ensuring receipt of notifications and if they have any questions. Left phone number & email address.
Mr	General	Paul	Lands & Resources	Six Nations Eco-Centre	pgeneral@sixnations.ca	1721 Chiefswood Road Iroquois Village Plaza, Unit 109 PO Box 5000 Oshweken, ON N0A 1M0	519-445-0330		10-May-18	10-May-18	29-Nov-18	13-Feb-19, left voicemail ensuring receipt of notifications and if they have any questions. Left phone number & email address.
Chief	Hill	Ava		Six Nations of the Grand River Territory	arleenmaracle@sixnations.ca	1695 Chiefswood Road, PO Box 5000 Oshweken, ON N0A 1M0	519-445-2201		10-May-18	10-May-18	29-Nov-18	13-Feb-19, spoke with front desk and was advised to speak to Lonny Bomberry in Lands & Resources Department.
	Bomberry	Lonny	Lands & Resources Director	Six Nations of the Grand River Territory	lonnybomberry@sixnations.ca	2498 Chiefswood Road, PO Box 5000 Ohsweken ON, N0A 1M0	519-753-0665	Email	13-Feb-19	13-Feb-19	13-Feb-19	13-Feb-19, spoke with Lonny who asked to have the notifications and information about the project re-sent as he is not aware of it. Emailed NoC and notices of PICs.
Chief	MacNaughton	Allen	Haudenosaunee Development Institute	Haudenosaunee Confederacy Council	hdi2@bellnet.ca	2634 6th Line Road, RR #2 Oshweken, ON N0A 1M0	519-445-4222	Email	10-May-18	10-May-18	29-Nov-18	13-Feb-19, could not find notification, so has asked to resend via email. Emailed NoC and notices of PICs.
Chief	LaForme	Stacey		Mississaugas of New Credit	stacey.laforme@newcreditfirstnation.com	2789 Mississauga Road, RR #6 Hagersville, ON N0A 1H0	905-768-1133 x 240		10-May-18	10-May-18	29-Nov-18	13-Feb-19, left voicemail ensuring receipt of notifications and if they have any questions. Left phone number & email address.
Mr.	Picard	Maxime	Project Coordinator	Huron-Wendat Nation Council	maxime.picard@cnhw.qc.ca	255 Place Chef Michel-Laveau Wendake, QC G0A 4V0	418-843-3767 x 2105		10-May-18	10-May-18	29-Nov-18	13-Feb-19, left voicemail ensuring receipt of notifications and if they have any questions. Left phone number & email address.
Sault	Fawn		Manager, Department of Consultation and Accommodation	Mississaugas of New Credit	fawn.sault@newcreditfirstnation.com	2789 Mississauga Road, RR #6 Hagersville, ON N0A 1H0			10-May-18	10-May-18	29-Nov-18	13-Feb-19, emailed acknowledging letter from August 1, no new arch studies required, and will be sending natural environment assessments soon. Asked if any questions or concerns. 21-May-19, emailed PIC #2 display panels, project roll plan, and link to project website.

Notice of Study Commencement and Public Information Centre 1 Materials

PUBLIC INFORMATION CENTRE (PIC) #1

& NOTICE OF STUDY COMMENCEMENT
for
Southcote Road (Garner Road to Golf Links Road)
Municipal Class Environmental Assessment

THE STUDY

The City of Hamilton is starting a study to review and identify transportation issues along Southcote Road (Garner Road to Golf Links Road) (map below).

THE PROCESS

This project is being carried out as a Schedule C project under the Municipal Engineers Association *Municipal Class Environmental Assessment* (October 2000, as amended in 2007, 2011, and 2015).

PUBLIC INFORMATION CENTRE

The PIC will be a drop-in style session where information will be provided about the project and we will be looking for stakeholder comments on key issues and concerns:

DATE: Thursday, May 24, 2018
TIME: 6:00 p.m. – 8:00 p.m. (open house/drop in format)
LOCATION: Ancaster Town Hall, 310 Wilson Street East

PUBLIC COMMENTS INVITED

There is an opportunity at any time during this process for interested persons to review outstanding issues and bring concerns to the attention of the Project Managers. If you have any questions or comments or wish to be added to the study mailing list, please contact:

Lorissa Skrypniak, MCIP, RPP
Project Manager
Neighbourhood Traffic Management & EA's
City of Hamilton, Public Works Department
Phone: 905-546-2424 ext. 2732
Email: TrafficOps@hamilton.ca

Sabrina Stanlake-Wong, MCIP, RPP
Project Manager
Dillon Consulting
Phone: 519-438-6192
Email: sstanlake@dillon.ca

Please contact the City's Project Manager regarding disability accommodation requirements for the PIC by May 17, 2018.

Information will be collected 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.

This Notice Issued May 10 and 17, 2018.

NOTICE OF STUDY COMMENCEMENT
&
PUBLIC INFORMATION CENTRE (PIC) #1

Southcote Road (Garner Road to Golf Links Road)
Municipal Class Environmental Assessment

THE STUDY

The City of Hamilton has initiated a Municipal Class Environmental Assessment (EA), Schedule C process to develop and assess design alternatives that address and identify transportation issues along Southcote Road (Garner Road to Golf Links Road) (map below).

THE PROCESS

This project is being carried out as a Schedule C project under the Municipal Engineers Association *Municipal Class Environmental Assessment* (October 2000, as amended in 2007, 2011, and 2015).

PUBLIC INFORMATION CENTRE

A Public Information Centre (PIC) displaying information will be held to receive public input:

DATE: Thursday, May 24, 2018

TIME: 6:00 p.m. – 8:00 p.m. (open house/drop in format)

LOCATION: Ancaster Town Hall, 310 Wilson Street East

The PIC will be a drop-in style session where information will be provided about the project and we will be looking for stakeholder comments on key issues and concerns.

A second PIC will be held at a later date to present the evaluation of the alternative designs, evaluation process, and recommended design for input.

Upon completion of the study an Environmental Study Report (ESR) will be prepared and made available for public review and comment. Another advertisement will be published at that time, indicating where the report can be viewed.

PUBLIC COMMENTS INVITED

There is an opportunity at any time during this process for interested persons to review outstanding issues and bring concerns to the attention of the Project Managers. If you have any questions or comments or wish to be added to the study mailing list, please contact:

Lorissa Skrypniak, MCIP, RPP
Project Manager
Neighbourhood Traffic Management & EA's
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This Notice Issued May 10 and 17, 2018.

Hamilton

Hamilton

Southcote Road Improvements

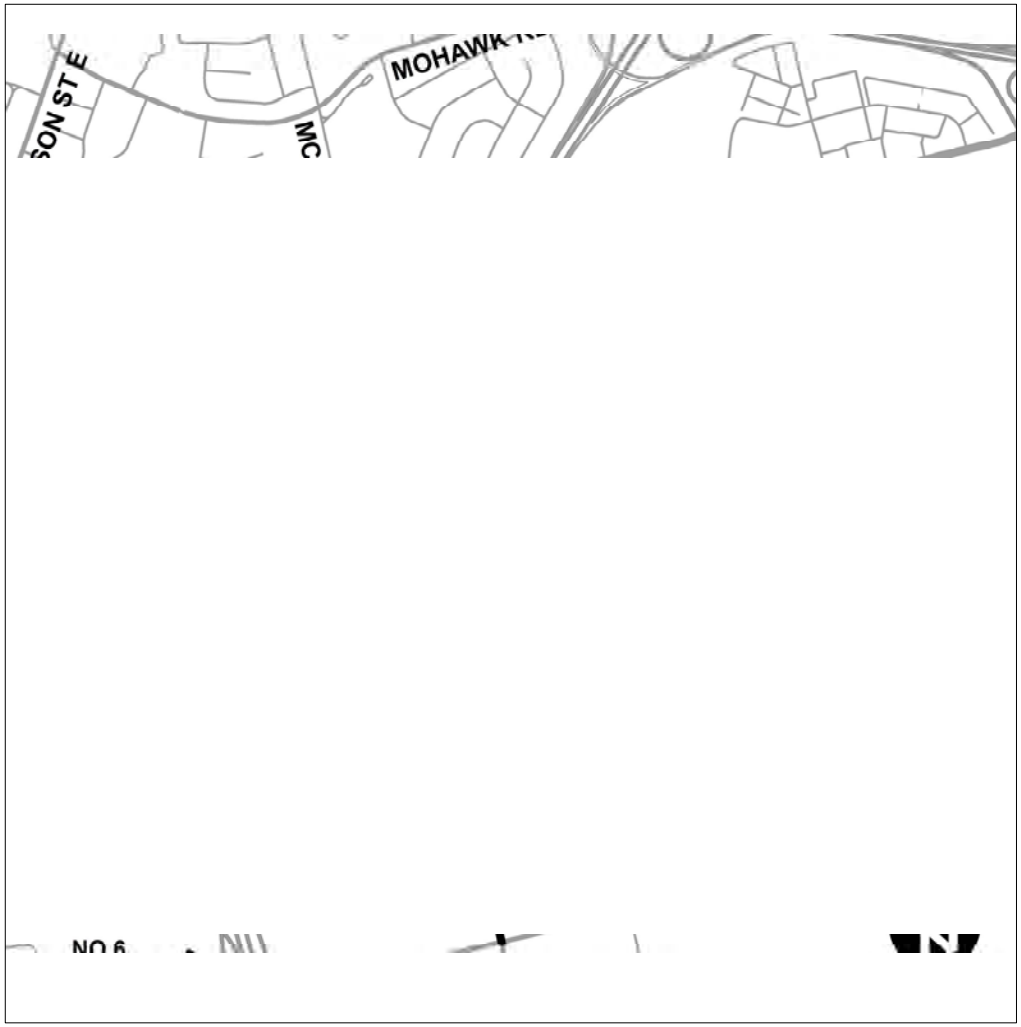
Class Environmental Assessment Study

Public Information Centre #1 | May 24, 2018

DILLON CONSULTING

Study Area

Hamilton



Ancaster Transportation Master Plan (TMP)

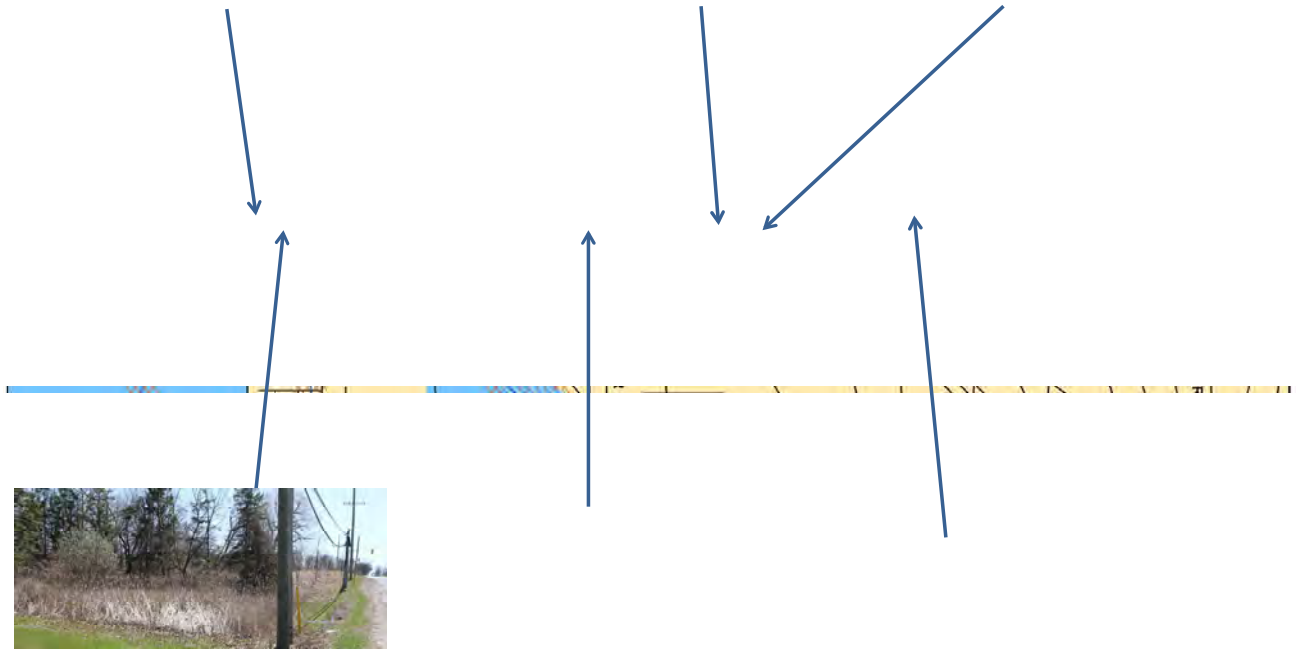
Hamilton

Relevant recommendations include:

- **Widen** Southcote Rd **to three lanes**, with a centre two-way left turn lane
- Traffic collisions are not high enough to require mitigation, however the **corridor should be further reviewed** to identify operational issues
- **Reduce speed limit to 50 km/h**
- Community members recommended **sidewalks be included along both sides of the roadway** and pedestrian crossings be considered
- Shifting Gears Cycling Master Plan (2009) recommended a **dedicated bike lane** on Southcote Rd, from Golf Links Rd to Garner Rd E

Existing Conditions

Hamilton

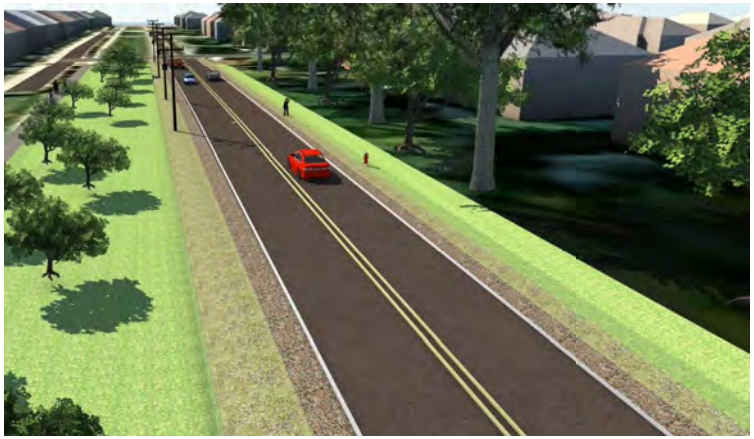


Phase 3 – Design Options

Hamilton

The following are **artistic renderings** of the current conditions & potential design options

Current Conditions



Concept 1

Phase 3 – Design Options

The following are **artist renditions** of the current conditions & potential design options

Concept 2

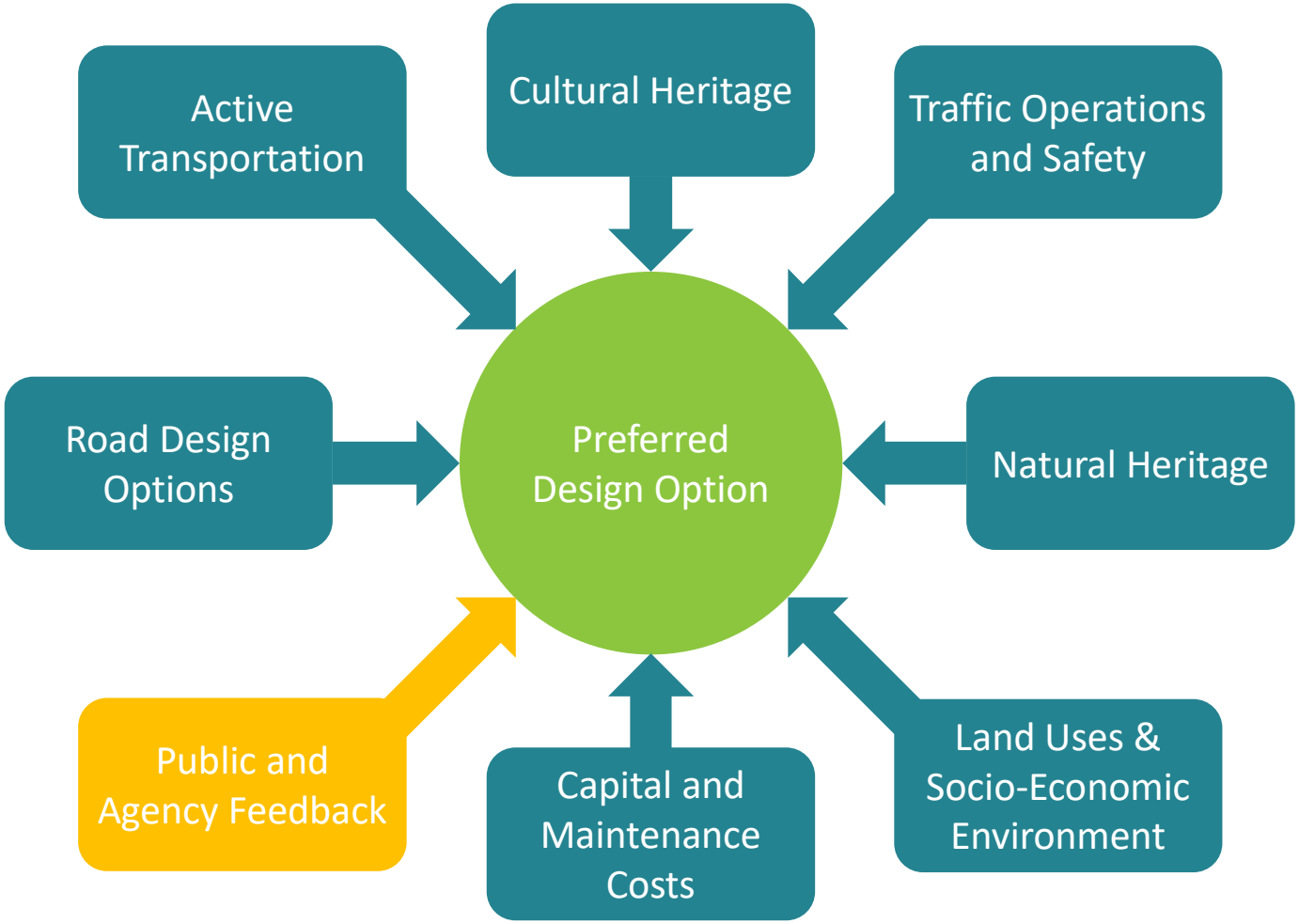
Concept 3

Phase 3 – Design Options

Hamilton

Input received today will be used to finalize and evaluate the design options.

The recommended design will be presented at Public Information Centre #2.



Next Steps

Public Information Centre #2 is anticipated to be scheduled in Fall 2018 and will:

- Present the recommended for input
- Outline the proposed construction staging and timing

Thank you for attending!

Your input is important to the outcome of this project. Please complete a comment form and return it by:

June 8, 2018

Personal information collected and recorded at the Public Information Centre or submitted in writing on this subject is collected under the authority of the Municipal Act, 2011 and will be used by members of Council and City of Hamilton staff in their review of this matter. With the exception of personal information, all comments will become part of the public record.

Ministry of the Environment and Climate Change
Drinking Water and Environmental Compliance Division
West Central Region

119 King Street West
12th Floor
Hamilton, Ontario L8P 4Y7
Tel.: 905 521-7640
Fax: 905 521-7820

Ministère de l'Environnement et de l'Action en matière de changement climatique
Division de la conformité en matière d'eau potable et d'environnement
Direction régionale du Centre-Ouest

119 rue King Ouest
12e étage
Hamilton (Ontario) L8P 4Y7
Tél. : 905 521-7640
Téléc. : 905 521-7820

May 24, 2018

Ms. Lorissa Skrypniak
Project Manager
City of Hamilton

Ms. Sabrina Stanlake-Wong
Project Manager
Dillon Consulting

Re: **Southcote Road (Garner Road to Golf Links Road) Municipal Class EA**
City of Hamilton
Response to Notice of Commencement

This letter is in response to the Notice of Commencement for the above noted project. The Ministry of the Environment and Climate Change (MOECC) acknowledges that the City of Hamilton has indicated that its study is following the Schedule "C" provisions under the MEA Class EA as it assess design alternatives to address identified transportation issues along this segment of Southcote Road.

Based on the information submitted, we have prepared a map (included with these comments) of the project area. You will note that there are a number of wells according to our data base. As part of the EA study, it would be prudent to determine which of these wells are in use and ensure that any working wells are duly considered in the identification of alternatives and design of mitigation measures.

The Ministry of the Environment and Climate Change becomes aware of streamlined environmental assessments (e.g., class environmental assessment projects, electricity projects and waste management projects) through notifications by project owners. Notifying the ministry is an important step in the streamlined environmental assessment processes.

As part of the ministry's ongoing efforts to improve processes and ensure the ministry has an opportunity to provide input on projects undergoing streamlined environmental assessments, the ministry have established dedicated email accounts in each regional office. These accounts will be used to receive notices as required in your class environmental assessment process along with a new "Project Information Form". This project notification process is in addition to the existing notification requirements in each class environmental assessment and streamlined environmental assessment process.

As of May 1, 2018, the ministry is asking proponents to use this new process. Please share the following information with your proponents and planning consultants. More information and the "Project Information Form' is available on Ontario.ca.

Process for Submitting Notices for Streamlined EAs

To submit your notice you need to do the following:

1. download and complete the Project Information Form.
2. the subject line of your email must include the project location, type of streamlined EA and project name, for example:
    - York Region, MEA Class EA, Elgin Mills Rd East (Bayview to Woodbine);
    - Durham Region, Electricity Screening Process, New Cogeneration Station;
    - City of Ottawa, Waste Management Screening Process, Landfill Expansion
3. attach a copy of your project notice in PDF format to the email
4. send your completed form and a copy of your project notice in PDF format by email to the appropriate ministry regional office:

    Central Region – eanotification.cregion@ontario.ca

    Eastern Region – eanotification.eregion@ontario.ca

    Northern Region – eanotification.nregion@ontario.ca

    South West Region – eanotification.swregion@ontario.ca

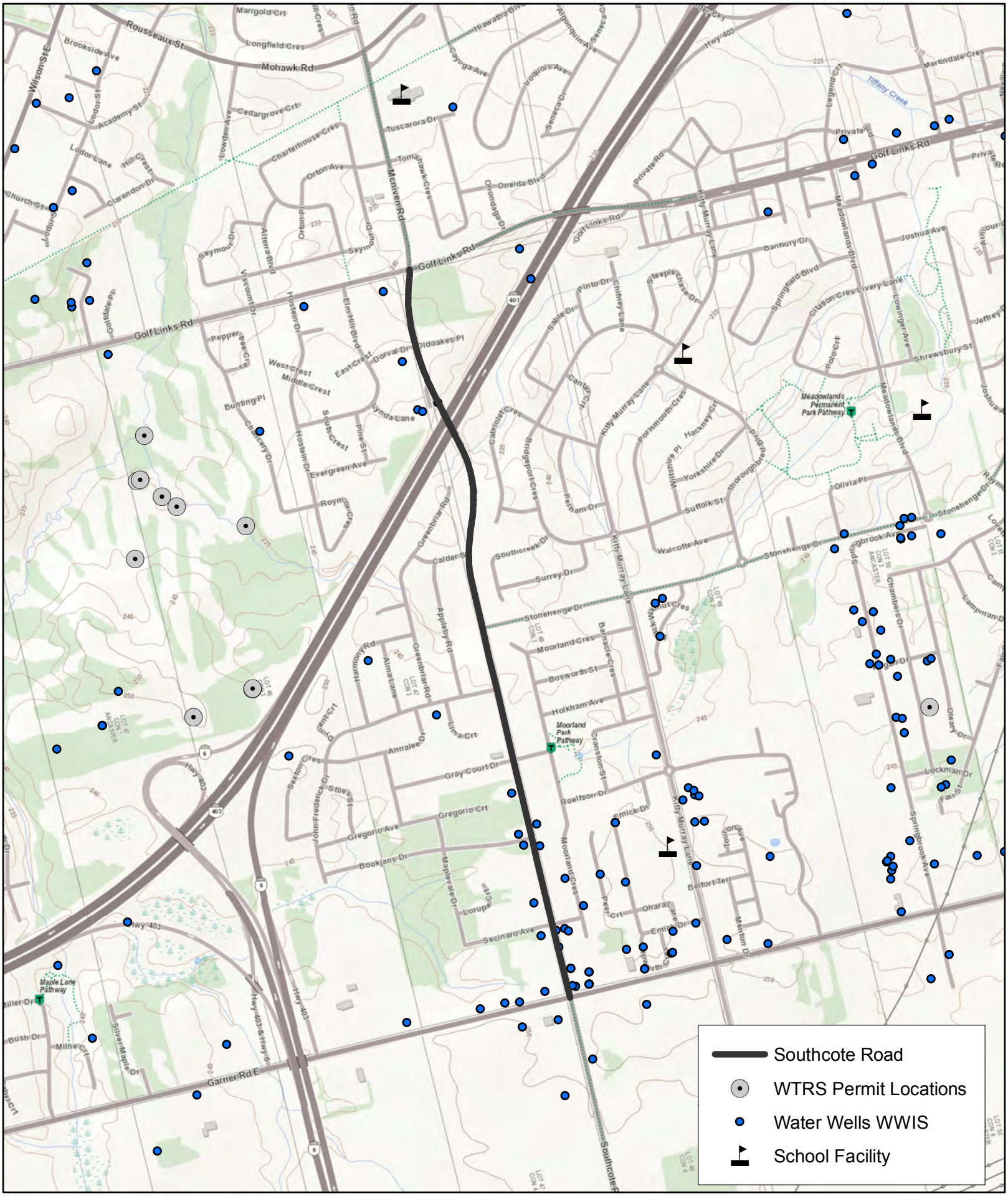
    West Central Region – eanotification.wcregion@ontario.ca

The attached map and hyperlink to the MOECC District Officer Locator website, can be used to assist with determining what ministry region your project is located.

Please continue to provide notifications as the EA continues. Should you have any questions, please contact me either by email at Barbara.slattery@ontario.ca or by phone at (905) 521-7864.

Sincerely,

EA/Planning Coordinator



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Southcote Road Environmental Assessment

Ancaster

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Meters

Information provided by:
Ministry of the Environment and Climate Change
Ministry of Natural Resources

Coordinate System: NAD 1983 UTM Zone 17N
Projection: Transverse Mercator
Datum: North American 1983

Ontario

From: **ESA Guelph (MNRF)** <ESAGUELPH@ontario.ca>
Date: Mon, Jun 11, 2018 at 12:20 PM
Subject: RE: Natural Heritage Information Request for Southcote Road, Hamilton ON.
To: "Wolosinecky, Mike" <mwolosinecky@dillon.ca>
Cc: Dayna LeClair <dleclair@dillon.ca>

Hi Mike

In response to your request for natural heritage information, please see the attached letter from the Ministry of Natural Resources & Forestry (MNRF), Guelph District Office.

Regards,

Anne Marie

Anne Marie Laurence
Management Biologist
Ministry of Natural Resources & Forestry
Guelph District
(519) 826-4132

From: Wolosinecky, Mike [mailto:mwolosinecky@dillon.ca]
Sent: April-25-18 2:15 PM
To: ESA Guelph (MNRF); nature@conservationhamilton.ca
Cc: Dayna LeClair; 187402
Subject: Natural Heritage Information Request for Southcote Road, Hamilton ON.

Dillon Consul ng Limited (Dillon) has been retained by the City of Hamilton to provide environmental services for an Environmental Assessment for proposed municipal infrastructure improvements along Southcote Road between Garner Road and Golf Links Road within the City of Hamilton.The Study Area is expected to be confined to the exis ng road right-of-way and is shown in the a ached Natural Heritage Informa on Request Form. We request further informa on regarding Species at Risk (SAR), or natural heritage informa on including Restricted Records and limits of Regulated Habitat, if available. We would also like a decision on whether there is a Low Likelihood or High Likelihood for SAR species and/or habitat to occur and be impacted.

If the Hamilton Conserva on Authority has any addi onal records concerning species, habitat or addi onal natural heritage features within the Study Area, any input would be appreciated.

I look forward to hearing the results

Mike.

--

Mike Wolosinecky
Dillon Consulting Limited
Suite 200 - 51 Breithaupt Street
Kitchener, Ontario, N2H 5G5
T - 519.571.9833 ext. 3111
F - 519.571.7424

C- 905.301.8243
MWolosinecky@dillon.ca
www.dillon.ca

Please consider the environment before printing this email

頤t ensuite d鵠uire ce message.

3 Attachments

InfoRequestRespo…

Hamilton SAR List …

Tiffany Creek Head…

Ministry of Natural Resources And Forestry

Ministère des Richesses naturelles et des Forets

Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Telephone: (519) 826-4955
Facsimile: (519) 826-4929

June 11, 2018

Mr. Mike Wolosinecky
Dillon Consulting Limited
mwolosinecky@dillon.ca

RE: SOUTHCOTE ROAD ENVIRONMENTAL ASSESSMENT
GARNER RD AND GOLFLINKS ROAD AREA, CITY OF HAMILTON

Dear Mr. Wolosinecky,

The Ministry of Natural Resources and Forestry (MNRF), Guelph District Office, has reviewed the natural heritage information available for the above-noted property and surrounding area (the "study area"), and offers the following comments:

WETLANDS

The Ministry has identified the following provincially significant wetlands (PSWs) within the study area:

- Tiffany Creek Wetland Complex

As requested, a copy of the wetland evaluation file for the **Tiffany Creek Wetland Complex** is attached. Please be advised that wetland evaluation files are considered "open" files and may be updated from time to time as new information becomes available.

AREAS OF NATURAL AND SCIENTIFIC INTEREST

The Ministry notes that there are no provincially significant Areas of Natural and Scientific Interest (ANSIs) within the study area:

FISHERIES

Restricted activity timing windows are applied to protect fish from impacts of undertakings in and around water during critical life cycle stages. The recommended timing restrictions are **April 1 to June 30** (Note: dates represent when work should be avoided).

The MNRF notes that the following fish species have been documented in the area: brook stickleback, creek chub, eastern blacknose dace, fathead minnow and goldfish.

SPECIES AT RISK

There are records in the area for the following species at risk (SAR):

- Butternut *(Juglans cinerea)* (Endangered)
- American Chestnut *(Castanea dentata)* (Endangered)
- Barn Owl *(Tyto alba)* (Endangered)
- Yellow-breasted Chat *(Icteria virens)* (Endangered)
- Bank Swallow *(Riparia riparia)* (Threatened)
- Barn Swallow *(Hirundo rustica)* (Threatened)
- Eastern Meadowlark *(Sturnella magna)* (Threatened)
- Wood Thrush *(Hylocichla mustelina)* (Special Concern)
- Snapping Turtle *(Chelydra serpentina)* (Special Concern)
- Cerulean Warbler *(Dendroica cerulea)* (Special Concern)

Threatened and Endangered Species receive both individual species and habitat protection under the *Endangered Species Act, 2007* (ESA). SAR habitat prescribed under regulation is listed in Ont. Reg. 242/08 (https://www.ontario.ca/laws/regulation/080242).

Please be advised that because the province has not been surveyed comprehensively for the presence of listed species, the absence of a record does not necessarily indicate the absence of SAR from an area. To determine the presence of SAR for a given study area, the District's recommended approach is as follows:

I. Habitat Inventory

The Ministry recommends undertaking a comprehensive botanical inventory of the entire area that may be subject to direct and indirect impacts from the proposed activity. The vegetation communities should be classified as per the "Ecological Land Classification (ELC) for Southern Ontario" system, to either the "Ecosite" or "Vegetation Type" level. For aquatic habitats in the study area, we recommend that you collect data on the physical characteristics of the waterbodies and inventory the riparian zone vegetation, so that these habitats can be classified as per the Aquatic Ecosites described in the ELC manual.

II. Potential SAR within the Study Area

A list of SAR that have the potential to occur in the area can be produced by cross-referencing the ecosites described during the habitat inventory with the habitat descriptions of SAR known to occur within the planning area. The list of SAR known to occur in the **CITY OF HAMILTON** is attached for your reference. The species-specific COSEWIC status reports (https://www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html) are a good source of information on habitat needs and will be helpful in determining the suitability of the study areas ecosites for a given species.

Please note that the Species at Risk in Ontario (SARO) List is a living document that is periodically amended as a result of species assessment and re-assessments conducted by the Committee on the Status of Species at Risk in Ontario (COSSARO). The SARO List can be accessed on the following webpage: https://www.ontario.ca/environment-and-energy/species-risk-ontario-list.

COSSARO also maintains a list of species to be assessed in the future. It is recommended that you take COSSARO's list of anticipated assessments into consideration, especially when the proposed start date of an activity is more than 6 months away, or the project will be

undertaken over a period greater than 6 months. This list can be viewed at: https://www.ontario.ca/page/how-comment-protecting-species-risk.

III. SAR Surveys

The Ministry recommends that each potential SAR identified under Step II is surveyed for, regardless of whether or not the species has been previously recorded in the area. The survey report should describe how each SAR was surveyed for, and provide a rationale for why certain species were not afforded a survey (e.g., habitat within the study area is not suitable for a specific SAR). Please note that some targeted surveys may require provincial authorizations (e.g., ESA permit or Wildlife Scientific Collector's Permit).

ADDITIONAL INFORMATION

Natural heritage features (e.g. wetlands, ANSIs) can be viewed for a given study area through the MNRF's "Make a Map" web application: https://www.ontario.ca/page/make-natural-heritage-area-map. Digital data layers can be obtained through the Land Information Ontario (LIO) geowarehouse https://www.ontario.ca/page/land-information-ontario.

Additionally, the MNRF recommends contacting the municipality and the conservation authority to determine if they have any additional information or records of interest for the study area.

Please be advised that it is your responsibility to comply with all other relevant provincial or federal legislation, municipal by-laws, other MNRF approvals or required approvals from other agencies. If your investigations reveal the presence of Threatened or Endangered species, please contact the MNRF at esa.guelph@ontario.ca for further direction.

I trust that the above information is of assistance.

Sincerely,

Anne Marie Laurence
Management Biologist

cc: Dayna LeClair, Dillon Consulting Limited, dleclair@dillon.ca

Hamilton

Date Generated: May-07-18

Amphibian	SARO	Protection	Habitat Information	Timing Windows	Survey Protocol
Jefferson Salamander *Ambystoma jeffersonianum*	END	Species Protection and Habitat Regulation	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	Active: March – October Hibernates: October – March Breeding: Late March - Mid April	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Unisexual Ambystoma - Jefferson-dominated *Ambystoma laterale - jeffersonianum*	END	Species Protection and General Habitat Protection	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	Active: March – October Hibernates: October – March Breeding: Late March - Mid April	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Bird	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
Acadian Flycatcher *Empidonax virescens*	END	Species Protection and General Habitat Protection	Generally requires large areas of mature, undisturbed forest; avoids the forest edge; often found in well wooded swamps and ravines.	Migrate South before Winter	Follow Breeding Bird Survey Protocol
Bald Eagle *Haliaeetus leucocephalus*	SC	N/A	Prefers deciduous and mixed-deciduous forest; and habitat close to water bodies such as lakes and rivers. They roost in super canopy trees such as Pine.	Breed and Nest - April or May Some Migrate South when waterbodies freeze over	Follow Breeding Bird Survey Protocol
Bank Swallow *Riparia riparia*	THR	Species Protection and General Habitat Protection	It nests in a wide variety of naturally and anthropogenically created vertical banks, which often erode and change over time including aggregate pits and the shores of large lakes and rivers.	Migrate South before Winter	Follow Breeding Bird Survey Protocol. Colony and Roost information should be recorded and submitted using Bird Studies Canada's Ontario Bank Swallow Project data forms (2010).
Barn Owl *Tyto alba*	END	Species Protection and Habitat Regulation	Generally prefer low-elevation, open country; often associated with agricultural lands, especially pasture. Nests are located in buildings, hollow trees and cavities in cliffs.	Active Year Round Some leave for the Winter	Follow Breeding Bird Survey Protocol Night surveys may be helpful as they are very vocal

Barn Swallow *Hirundo rustica*	THR	Species Protection and General Habitat Protection	Prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	Migrate South before Winter	Follow Breeding Bird Survey Protocol
Black Tern *Chlidonias niger*	SC	N/A	Generally prefer freshwater marshes and wetlands; nest either on floating material in a marsh or on the ground very close to water	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Bobolink *Dolichonyx oryzivorus*	THR	Species Protection and General Habitat Protection	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Canada Warbler *Cardellina canadensis*	SC	N/A	Generally prefers wet coniferous, decidiuous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	Arrive in Early May Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Cerulean Warbler *Setophaga cerulea*	THR	Species Protection and General Habitat Protection	Generally found in mature deciduous forests with an open understorey; also nests in older, second-growth deciduous forests.	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Chimney Swift *Chaetura pelagica*	THR	Species Protection and General Habitat Protection	Historically found in deciduous and coniferous, usually wet forest types, all with a well developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys	Nesting - Late April to Mid-May Migrate South in September or Early October	Chimney Swift Monitoring Protocol. Bird Studies Canada, March 2009

Common Nighthawk *Chordeiles minor*	SC	N/A	Generally prefer open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, logged areas, rocky outcrops, rocky barrens, grasslands, pastures, peat bogs, marshes, lakeshores, and river banks. This species also inhabits mixed and coniferous forests. Can also be found in urban areas (nest on flat roof-tops).	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Eastern Meadowlark *Sturnella magna*	THR	Species Protection and General Habitat Protection	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Eastern Whip-poor-will *Caprimlugus vociferus*	THR	Species Protection and General Habitat Protection	Generally prefer semi-open deciduous forests or patchy forests with clearings; areas with little ground cover are also preferred; In winter they occupy primarily mixed woods near open areas.	Nesting: May - July	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol
Eastern Wood-Pewee *Contopus virens*	SC	N/A	Associated with deciduous and mixed forests. Within mature and intermediate age stands it prefers areas with little understory vegetation as well as forest clearings and edges.	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Golden-winged Warbler *Vermivora chrysoptera*	SC	N/A	Generally prefer areas of early successional vegetation, found primarily on field edges, hydro or utility right-of-ways, or recently logged areas.	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Henslow's Sparrow *Ammodramus henslowii*	END	Species Protection and General Habitat Protection	Generally found in old fields, pastures and wet meadows. They prefer areas with dense, tall grasses, and thatch, or decaying plant material	Migrate South for the Winter	Follow Breeding Bird Survey Protocol

King Rail *Rallus elegans*	END	Species Protection and General Habitat Protection	Generally this species requires large marshes with open shallow water that merges with shrubby areas	Breed from Late April to mid-May Migrate South for the Winter	Follow Marsh Monitoring Protocol.
Least Bittern *Ixobrychus exilis*	THR	Species Protection and General Habitat Protection	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants	Migrate South for the Winter	Follow Marsh Monitoring Protocol; 10 day window of male calling (variable timing). Does not respond well to playback. Very difficult to detect.
Louisiana Waterthrush *Seiurus motacilla*	THR	Species Protection and General Habitat Protection	Generally inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps	Migrate South for the Winter	Follow Breeding Bird Survey Protocol or Marsh Monitoring Protocol
Peregrine Falcon *Falco peregrinus*	SC	N/A	Generally nest on tall, steep cliff ledges adjacent to large waterbodies; some birds adapt to urban environments and nest on ledges of tall buildings, even in densely populated d		

Eastern Pondmussel *Ligumia nasuta*	END	Species Protection and General Habitat Protection	Generally inhabit sheltered areas of lakes or slow streams in substrates of fine sand and mud	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008).
Lilliput *Taxolasma parvum*	END	Species Protection and General Habitat Protection	Found in a variety of habitats including small to large rivers, wetlands, shallows of lakes, ponds and reservoirs. They are common in soft substrates with over 50% of the substrate type comprised of sand and a mud/muck/silt combination. Typically occur with or near Green Sunfish, Bluegill, White Crappie, and Johnny Darter	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008): Print.
Rainbow *Villosa iris*	SC	N/A	Most abundant in shallow, welloxygenated reaches of small- to medium-sized rivers and sometimes lakes, on substrates of cobble, gravel, sand and occasionally mud.	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008): Print.
Plant	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
American Chestnut *Castanea dentata*	END	Species Protection and General Habitat Protection	Found in deciduous forest communities; this tree prefers arid forests with acid and sandy soils.	Flowers occur in Late Spring and Early Summer	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species Perform detailed floristic inventory Look for distinictive fruits on the ground
American Columbo *Frasera caroliniensis*	END	Species Protection and General Habitat Protection	Most commonly associated with open deciduous forested slopes, thickets and clearings; grows in a variety of relatively stable habitats as well as on a wide variety of soils.	Germination and development of the rosette begin in early spring Flowers open in May Fruit production continues	Walk slow

Green Dragon *Arisaema dracontium*	SC	N/A	Generally grows in damp deciduous forests and along streams.	Flowering occurs in May and June	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Hoary Mountain-mint *Pycnanthemum incanum*	END	Species Protection and General Habitat Protection	Oak savannas and prairies, dry sites.	Flowering occurs in July	Walk s

Blanding's Turtle *Emydoidea blandingii*	THR	Species Protection and General Habitat Protection	Generally occur in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams.	Eggs are laid in June, with hatchlings emerging in late September and early October.	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Eastern Hog-nosed Snake *Heterodon platirhinos*	THR	Species Protection and General Habitat Protection	Generally prefer habitats with sandy, well-drained soil and open vegetative cover, such as open woods, brushland, fields, forest edges and disturbed sites. The species is often found near water.	Mating occurs in spring and in August and early September. Eggs are laid in June. Hatching occurs in late August or early September	In early spring, look for individuals near ideal hibernation sites During egg-laying period (June), look for nesting females in sandy areas in early morning and late evening. Rest of the season, survey intensively and systematically by flipping rocks
Eastern Musk Turtle *Sternotherus odoratus*	Speci	Species Protection and General Habitat Protection	Generally prefers shallow, slow-moving water where it typically walks along the bottom rather than swimming	Nests: Late May - Early July Basks under cover of floating vegetation	Best time to survey is during the spring emergence (April - mid-May) from hibernation They stage near hibernating sites and thermoregulate Survey on warm sunny calm days During the cooler times of the year survey on the warmest time of the day
Eastern Ribbonsnake *Thamnophis sauritus*	SC	N/A	Generally occur along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting.	Hibernate: October - April Mating: Early Spring Hatching: Early Fall (September)	Contact MNRF Guelph District Management Biologist to obtain a cop

From: Fawn Sault [mailto:Fawn.Sault@mncfn.ca]
Sent: June-25-18 10:43 AM
To: PW Traffic Operations
Cc: Mark LaForme
Subject: MNCFN Response to the Notice of Study Commmencement & Public Information Centre on Southgate Road from Garner Road

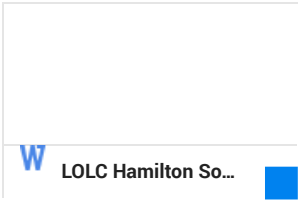
Dear Ms. Skrypniak,

Thank you for the notification sent to The Mississaugas of the New Credit First Nation (MNCFN) regarding *the Notice of Study Commencement & Public Information Centre on Southgate Road from Garner Road from Garner Road to Golf Links.* We have reviewed the document you have provided and determined that, at this time, MNCFN has a **low level** of concern about the project. *Please see the attached letter for more information.*

Respectfully, we ask that you immediately notify MNCFN if there are any changes to the project as they may impact MNCFN's interests. Additionally, MNCFN requests a copy of all associated environmental and/or archaeological reports. These can be electronic copies, if you prefer. Furthermore, MNCFN employs Field Liaison Representatives who **must** be on location whenever any fieldwork for environmental and/or archaeological assessments is undertaken. If additional work is scheduled, please notify us as soon as possible so that we may work together to discuss and arrange for MNCFN's participation.

Sincerely,

Fawn D. Sault
Consultation Manager
Department of Consultation and Accommodation
Mississaugas of the New Credit First Nation
4065Hwy 6 North
Hagersville, On.
N0A 1H0
Office - 905-768-4260
Cell – 289-527-6580



Department of
Consultation & Accommodation

August 1, 2018

Lorissa Skrypniak, MCIP, RPP
Project Manager
Neighborhood Traffic Management & EA's
City of Hamilton, Public Works Department
TrafficOps@hamilton.ca

Dear Ms Skrypniak,

We are the Mississaugas of the New Credit First Nation (MNCFN), the descendants of the Mississaugas of the River Credit. Our traditional territory extends from the Rouge River Valley in the east, across to the headwaters of the Thames River, down to Long Point on Lake Erie, and back along the shores of Lake Erie, the Niagara River, and Lake Ontario to the Rouge River Valley. It encompasses present-day London, Hamilton, and Toronto, as well as our communal lands. Our traditional territory has defined and sustained us as a First Nation for countless generations, and must continue to do so for all our generations to come.

Thank you for your notification on *the Notice of Study Commencement & Public Information Centre on Southcote Road from Garner Road to Golf Links Road* dated *May 10, 2018*. The Mississaugas of the New Credit First Nation (MNCFN) has various treaty rights across its traditional territory, including the area contemplated by your project. For further information, please see our website, http://www.newcreditfirstnation.com/. MNCFN continues to exercise treaty rights which include, but are not limited to, rights to harvest, fish, trap and gather species of plants, animals and insects for any purpose including food, social, ceremonial, trade and exchange purposes. The MNCFN also has the right to use the water and resources from the rivers, creeks and lands across the MCNFN traditional territory.

At this time, MNCFN *does not* have a high level of concern regarding the proposed project and therefore, by way of this letter, approves the continuation of this project. However, MNCFN requests that you continue to notify us about the status of the project. **In addition, we respectfully ask you to immediately notify us if there are any changes to the project as they may impact MNCFN's interests and that you please provide us with a copy of all associated**

environmental and archaeology reports. This includes, but is not limited to changes related to the scope of work and expected archaeological and environmental impacts.

Additionally, MNCFN employs Field Liaison Representatives ("FLRs") to act as official representatives of the community and who are answerable to MNCFN Chief and Council through the Department of Consultation and Accommodation. The FLRs' mandate is to ensure that MNCFN's perspectives and priorities are considered in the field and to enable MNCFN to provide timely, relevant, and meaningful comment on the Project. Therefore, **it is MNCFN policy that FLRs are on location whenever any fieldwork for environmental and/or archaeological assessments are undertaken.** It is expected that the proponent will cover the costs of this FLR participation in the fieldwork. Please also provide the contact information of the person, or consultant, in charge of organizing this work so they may facilitate the participation of the MNCFN FLRs.

Nothing in this letter shall be construed as to affect the Aboriginal or Treaty rights and hence shall not limit any consultation and accommodation owed to MNCFN by the Crown or any proponent, as recognized by section 35 of the Constitution Act, 1982, of any other First Nation.

MNCFN reserves the right in relation to any development project or decision, to decide whether it supports a project and to: comment to regulators, participate in regulatory processes and hearings, seek intervener funding or status, or to challenge and seek remedies through the courts.

MNCFN expects all proponents to act according to the following best practices:

- Engage early in the planning process, before decisions are made
- Provide information in meaningful and understandable formats.
- Convey willingness to transparently describe the project and consider any MNCFN concerns.
- Recognize the significance of cultural activities and traditional practices of the MNCFN
- Demonstrate a respect for MNCFN knowledge and uses of land and resources.
- Understand the importance of youth and elders in First Nation communities.
- Act with honour, openness, transparency and respect.
- Be prepared to listen and allow time for meaningful discussion.

Sincerely,

Fawn D. Sault

Consultation Manager
MNCFN Department of Consultation and Accommodation
cc – Mark LaForme; Director, Department of Consultation and Accommodation

Hamilton
Public Works

Southcote Road (Garner Rd to Golf Links Rd) EA

PUBLIC INFORMATION CENTRE

Thursday, May 29, 2018
Ancaster Old Town Hall – 310 Wilson Street East

COMMENT SHEET

(Please Print)

COMMENTS:

(written by Natalie Brander - Dillon)
- Comment received regarding need for pedestrian crossing to allow school children to cross west → east.

Comments and information regarding this study are being collected to assist the City of Hamilton in meeting the requirements of the *Environmental Assessment Act*. They will be maintained on file for use during the study and may be included in study documentation. With the exception of personal information, all comments will become part of the public record.

Please drop these comments in the box provided or forward them by **Friday, June 8, 2018** to either:

Lorissa Skrypniak, MCIP, RPP
Project Manager
Neighbourhood Traffic Management & EA's
City of Hamilton, Public Works Department
Phone: 905-546-2424 ext. 2732
Email: TrafficOps@hamilton.ca

Sabrina Stanlake, MCIP, RPP
Project Manager
Dillon Consulting
Phone: 519-438-6192
Email: **sstanlake@dillon.ca**

Name:

Mailing Address:

Telephone:

Property Location: (if different from mailing address):

Hamilton
Public Works

Southcote Road (Garner Rd to Golf Links Rd) EA

PUBLIC INFORMATION CENTRE

Thursday, May 29, 2018
Ancaster Old Town Hall – 310 Wilson Street East

COMMENT SHEET

(Please Print)

COMMENTS:

I own 26 Southcote Rd. Last time they improved Southcote Rd couple of catch basins were put in front of my property and all the water gets dumped in it. The land is higher on the North-East side of my property and the water from Southcote just sits in my the middle of my property with nowhere to go. By widening the road there will be more water coming off the road onto my property. I want City to keep this in mind and not dump water on private property. Or find another solution to this problem by taking water to Glenhille Road etc. Thank you in advance.

Comments and information regarding this study are being collected to assist the City of Hamilton in meeting the requirements of the *Environmental Assessment Act*. They will be maintained on file for use during the study and may be included in study documentation. With the exception of personal information, all comments will become part of the public record.

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Project Manager
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Phone: 905-546-2424 ext. 2732
Email: TrafficOps@hamilton.ca

Sabrina Stanlake, MCIP, RPP
Project Manager
Dillon Consulting
Phone: 519-438-6192
Email: **sstanlake@dillon.ca**

Name: [redacted]

Mailing Address: [redacted]

Telephone: [redacted]

Property Location: (if different from mailing address): [redacted] SOUTHCOTE ROAD ANCASTER

Visit the study website at: www.hamilton.ca/southcoteEA

Hamilton
Public Works

Southcote Road (Garner Rd to Golf Links Rd) EA

PUBLIC INFORMATION CENTRE

Thursday, May 29, 2018
Ancaster Old Town Hall – 310 Wilson Street East

COMMENT SHEET

(Please Print)

COMMENTS:

(1) DO NOT USE TRAFFIC CIRCLES.

(2) PREFER OFF ROAD BICYCLE LANES.

(3) DO NOT NEED FULL TURN LANE WHOLE LENGTH, ONLY AT INTERSECTIONS.

(4) NEED CROSSWALK SOMEWHERE ALONG ROUTE.

(5) DIP IN ROAD AT GARNER & SOUTHCOTE SHOULD BE FILLED AND BROUGHT UP LEVEL.

Comments and information regarding this study are being collected to assist the City of Hamilton in meeting the requirements of the *Environmental Assessment Act*. They will be maintained on file for use during the study and may be included in study documentation. With the exception of personal information, all comments will become part of the public record.

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Email: TrafficOps@hamilton.ca

Sabrina Stanlake, MCIP, RPP
Project Manager
Dillon Consulting
Phone: 519-438-6192
Email: **sstanlake@dillon.ca**

Name: [redacted]

Mailing Address: [redacted] SOUTHCOTE ROAD.

Telephone: [redacted]

Property Location: (if different from mailing address): AS ABOVE.

Visit the study website at: www.hamilton.ca/southcoteEA

Hamilton
Public Works

Southcote Road (Garner Rd to Golf Links Rd) EA

PUBLIC INFORMATION CENTRE

Thursday, May 29, 2018
Ancaster Old Town Hall – 310 Wilson Street East

COMMENT SHEET

(Please Print)

COMMENTS:

We approve of Plan #3
It seems to be the most reasonable with the least of major changes in the road layout.
It should make for easier & safer travel both cyclists & drivers and pedestrian
We need some pedestrian crosswalks to ~~create~~
Make it easier for pedestrians to cross the road

Comments and information regarding this study are being collected to assist the City of Hamilton in meeting the requirements of the *Environmental Assessment Act*. They will be maintained on file for use during the study and may be included in study documentation. With the exception of personal information, all comments will become part of the public record.

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City of Hamilton, Public Works Department
Phone: 905-546-2424 ext. 2732
Email: TrafficOps@hamilton.ca

Sabrina Stanlake, MCIP, RPP
Project Manager
Dillon Consulting
Phone: 519-438-6192
Email: **sstanlake@dillon.ca**

Name: [redacted]

Mailing Address: [redacted] Southcote Rob

Telephone: [redacted]

Property Location: (if different from mailing address):

Visit the study website at: www.hamilton.ca/southcoteEA

Hamilton
Public Works

Southcote Road (Garner Rd to Golf Links Rd) EA

PUBLIC INFORMATION CENTRE

Thursday, May 29, 2018
Ancaster Old Town Hall – 310 Wilson Street East

COMMENT SHEET

(Please Print)

COMMENTS:

I occasionally walk along Southcote Rd from Golf Links Rd. Considering the three Design Concepts presented, I feel they don't acknowledge the space constrictions imposed by the ditches and trees on the west side of the road. In creating a turn lane, it is very likely the shoulder on the west side of the road and some of the shoulder on the east side (from the south end of the bridge) will be needed to provide the lane. It was pointed out to me that hydro poles on the east side of the road may require relocation.

The west sidewalk - asphalt that is very old, cracked and bumpy and of varying elevations twisting around trees - will have to be removed. I only see the possibility of one multi-use path on the east side for pedestrians and cyclists to share. The path likely cannot be as wide as the one made alongside the recently opened road from Rymal Rd E. to connect with Red Hill Expressway.

In discussion with a City employee, it seems that any bike lane or sidewalk will not extend the full length of Southcote Rd. I raised the concern of what adjustments to the existing sidewalk may be required by the proposed retirement home site, on the corner of Southcote Rd & Golf Links Rd. Aside from the home operator's request for a roundabout at the intersection (seems unrealistic given that three approaches are uphill), there was the revelation that the property may also involve a future westbound access to Hwy 403. That access would have a huge impact on cyclist/pedestrian flows. There's no room for 2 on-road bike lanes and two sidewalks. Please walk down both sides by foot to see the challenges in the existing landscape.

Comments and information regarding this study are being collected to assist the City of Hamilton in meeting the requirements of the *Environmental Assessment Act*. They will be maintained on file for use during the study and may be included in study documentation. With the exception of personal information, all comments will become part of the public record.

Please drop these comments in the box provided or forward them by **Friday, June 8, 2018** to either:

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City of Hamilton, Public Works Department
Phone: 905-546-2424 ext. 2732
Email: TrafficOps@hamilton.ca

Sabrina Stanlake, MCIP, RPP
Project Manager
Dillon Consulting
Phone: 519-438-6192
Email: **sstanlake@dillon.ca**

Name: [redacted]

Mailing Address: [redacted] Hamilton Drive, Ancaster ON L9G2B1

Telephone:

Property Location: (if different from mailing address):

Visit the study website at: www.hamilton.ca/southcoteEA

From: [redacted]
Date: Sun, May 20, 2018 at 9:52 AM
Subject: Southcote Road study
To: "trafficops@hamilton.ca" <trafficops@hamilton.ca>, "sstanlake@dillon.ca" <sstanlake@dillon.ca>

Good morning.

Please include in Southcote Road study a possibility to build a sidewalk along this street.
Somemes w e have to walk on the roadside too close to passing cars.
Another idea would be to have a bike lane for safe cycling.

Best regards, [redacted], [redacted] Maplevale Drive, Ancaster.

From: **Trant, Janelle** <Janelle.Trant@hamilton.ca>
Date: Fri, Jun 8, 2018 at 12:57 PM
Subject: RE: Southcote Rd
To: [redacted]
Cc: Stanlake-Wong, Sabrina <sstanlake@dillon.ca>, Skrypniak, Lorissa <Lorissa.Skrypniak@hamilton.ca>

Thank you. Your comments have been received.

Regards,
Janelle

Janelle Trant
Project Manager, Transportaon Manag ement
Janelle.Trant@hamilton.ca | 905-546-2424 x 4101
Neighbourhood Traffic & EA's | Public Works Department | City of Hamilton
Address: 330 Wentworth Street North, Hamilton ON, L8L 5W2

From: [redacted]
Sent: June-08-18 11:42 AM
To: PW Traffic Operations; sstanlake; [redacted]
Subject: Southcote Rd

We live on the East side at [redacted] Southcote.

We are looking at the 3 design options.

NONE of these are acceptable to us.

The sidewalk on the East side should be right beside the bike lane as it is on the West side.

The sidewalk presents a danger to pedestrians due to cars entering and leaving the roadway especially at night. With the sidewalks being beside the bike path this would provide much better visibility to drivers. The is especially true for seniors and disabled.

Having the sidewalks closer to our homes takes away privacy and allow easier access to our property and vehicles. This is quite scary to us seniors. Being so close opens so many more opportunities for damage, theft, and a thus becomes a real danger and certainly will increase anxiety.

It is much more practical as drivers for us to see pedestrians before we turn into the driveway not after we have already started to turn and drive up the driveway.

Thanks

[redacted]

[redacted]

From: **Skrypniak, Lorissa** <Lorissa.Skrypniak@hamilton.ca>
Date: Fri, May 25, 2018 at 3:13 PM
Subject: Southcote EA - PIC #1 comments
To: "[redacted]
Cc: "Stanlake-Wong, Sabrina" <sstanlake@dillon.ca>

[redacted]

Thank you for your comments, we will take them into consideration in the study process.

Your third comment regarding John Frederick is outside of the study area. However, I can forward this comment on to our Traffic staff for further investigation if you would like. Did you have any specific locations in mind for stop signs along John Frederick?

For more information you can see the panels that were presented at last nights meeting on the project website.www.hamilton.ca/southcoteEA

We will also add your name to the study list.

Lorissa

From: [redacted]
Sent: May-25-18 1:00 PM
To: PW Traffic Operations; sstanlake@dillon.ca
Subject: Concern about Southcote Road improvements

Hello Lorissa Skrypniak and Sabrina Stanlake-Wong,

I was unable to attend yesterday's meeting at the Ancaster city hall regarding the development of Southcote Road. I live in that area off of John Frederick drive on Lima court.

I have two concerns:

1. Traffic lights
2. Improved sidewalks

I am glad you are updating Southcote road, it needs it. My concerns traffic lights need to be put in. Ideally, two traffic lights on Southcote, one at Stonehenge corner and one at the John Frederick Corner. There are plenty of school children who have to cross Southcote each day to attend school. It is a very dangerous road to cross during rush hour. If you are not putting in traffic lights, please consider putting in a cross walk.

Secondly, the West side of Southcote needs a better sidewalk. One of my neighbours is disabled and is in wheelchair. He has to ridiculously cross Southcote to use the east side sidewalk to move up the street, then cross back over to get back over.

Thirdly, a couple of stopsigns on John Frederick would be useful in stopping the traffic. The city for whatever reason put stopsigns all along the sidestreets off John Frederick; turning John Frederick itself into an unbroken speed way, putting our kids at risk.

Thank you for reading my concerns.

Please add me to the study mailing list.

Many Thanks,

[redacted] Lima Court
Ancaster, ON
L9G 3M8
Email: [redacted]
Phone: [redacted]

From: **Skrypniak, Lorissa** <Lorissa.Skrypniak@hamilton.ca>
Date: Mon, May 28, 2018 at 2:39 PM
Subject: Southcote Road EA - project website
To: [redacted]
Cc: "Stanlake-Wong, Sabrina" <sstanlake@dillon.ca>

[redacted]

Further to our conversation today the project website is www.hamilton.ca/southcoteEA

If you go to Public Consultation the panels that were presented can be seen here.

Your name has also been added to the project mailing list.

If you have any other questions please let me know.

Lorissa Skrypniak, MCIP, RPP Senior Project Manager
Neighbourhood Traffic Management & EA's ~ Public Works
330 Wentworth Street North, Hamilton
ph 905.546.2424 ext. 2732 ~ e-mail ~ lorissa.skrypniak@hamilton.ca

From: [redacted]
Sent: June-05-18 8:29 PM
To: PW Traffic Operations
Subject: FEEDBACK - PUBLIC INFO CENTRE NO 1 - SOUTHCOTE ROAD (GARNER ROAD TO GOLF LINKS ROAD)

Lorissa Skrypniak
Project Manager

As a Southcote Road resident, I am concerned about the speed and volume of traffic and the noise. Southcote Road is a residential street, and the heavy traffic routinely exceeds the speed limit of 50 km/hr. My suggestion would be to place a few stop signs between Golf Links and Garner to slow things down. Alternatively the roundabouts would serve a similar purpose as they do on Kitty Murray.

An even better solution - in addition to the stop signs or roundabouts - connect Golf Links with Highway 6 to reduce the number of trucks and traffic using Southcote as a route to access highway 6!

Thanks for the opportunity to provide feedback.. [redacted]

From: [redacted]
Sent: June-08-18 10:35 AM
To: Ferguson, Lloyd
Cc: Bishop, Kathy; PW Traffic Operations
Subject: PETITION: CITY OF HAMILTON EA PROCESS - SOUTHCOTE ROAD IMPROVEMENTS (GARNER ROAD TO GOLF LINKS ROAD)

I have a ached:

- covering le er
- signed peon fr om a group of 30 owners / residents of Southcote Road
- Appendix I

Peoner s are solicing the City of Hamilt on to bury underground, the electric power lines and communicaon wir es as part of the Southcote Road widening project.

I look forward to hearing from you with next steps and how we can work with you to achieve our goal.

[redacted]

Neighbourhood Lead

[redacted] Southcote Road

Ancaster, Ontario L9G 2W4

H: [redacted]

M: [redacted]

3 Attachments

Southcote Rd Lette...

Southcote Rd Petit...

Southcote Road Pe...

June 8, 2018

Lloyd Ferguson,
City Councillor, Ward 12
Hamilton City Hall
2nd floor - 71 Main Street West
Hamilton, Ontario L8P 4Y5

CITY OF HAMILTON MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA) – SCHEDULE C PROJECT SOUTHCOTE ROAD IMPROVEMENTS (GARNER ROAD TO GOLF LINKS ROAD)

I have attached a signed petition from the owners / residents of 30 Southcote Road homes, soliciting the City of Hamilton to bury underground, the power lines and communication cables as part of the above road widening project.

On May 24th, 2018, the City of Hamilton held Public Information Centre No. 1 to present design options, and to obtain stakeholder comments on key issues and concerns:

- materials presented did not address the status of hydro poles
- design option illustrations showed above ground power distribution lines

KEY OWNER / RESIDENT CONCERN

Those who signed the petition understand that by widening Southcote Road, the power lines and communication cables, if not buried underground, will be moved significantly closer to our property lines, which will only aggravate an already unsightly mess (Appendix I Fig 1.), and negatively impact our property values.

- the project provides a cost-effective opportunity to bury the lines since the street will be excavated and trenching is required for street lighting cables
- not burying the lines would be a missed opportunity to enhance the value of the project to the Southcote Road neighbourhoods and to the community

It would be extremely upsetting for residents to endure the amount of disruption associated with the road widening process, only to continue to have above ground power lines and communication cables on Southcote Road.

The City of Hamilton's requirement for feedback by June 8th did not allow sufficient time to obtain signatures from all residents of Southcote Road. In the coming weeks, more residents will be approached, and we fully expect this issue to be a top priority. As a group of concerned citizens, our goal is to submit petition signatures from all Southcote Road residents.

The City of Hamilton is planning for Public Information Centre No. 2 in the fall of 2018 to present a recommended option. At that time, the Southcote Road petitioners will expect to see a recommendation which includes underground power lines and communication cables.

I look forward to hearing from you with next steps and how we can work with you to achieve our goal.

[redacted]
Neighbourhood Lead
[redacted] Southcote Road,
Ancaster, Ontario L9G 2W4
H: [redacted]
M: [redacted]

Cc: City of Hamilton,
Lorissa Skrypniak, Project Manager, Neighbourhood Traffic Management & EA's

PETITION FROM THE SOUTHCOTE ROAD NEIGHBOURS REGARDING CITY OF HAMILTON – SOUTHCOTE ROAD – (GARNER ROAD TO GOLF LINKS ROAD) ROAD WIDENING IMPROVEMENTS – THREE LANES WITH TWO-WAY LEFT TURN LANE

We the residents of Southcote Road, Ancaster, Ontario hereby solicit the City of Hamilton to bury underground, the electric power lines and communication wires as part of the Southcote Road widening project.

- Moving already unsightly Hydro poles closer to our property lines will negatively impact our property values (see photos Appendix Fig 1)
- The project provides a cost-effective opportunity to bury the lines since the street will be excavated and trenching is required for street lighting cables
- Not burying the lines would be a missed opportunity to enhance the value of the project to the Southcote Road neighbourhoods and to the community
- Underground services will mitigate the impact of wind and ice storms on reliability of power supply and allow for more flexibility in selection of trees and landscaping options

#	STREET	PRINT NAME	SIGNATURE	DATE
[redacted]	[redacted]	[redacted]	[redacted]	June 2, 2018
	Southcote Road			June 02, 2018
	Southcote Road			June 02, 2018
	Southcote Road			June 2, 2018.
	Southcote Road			JUNE 2, 2018
	Southcote Road			June 2, 2018
	Southcote Road			Jun 2, 2018
	Southcote Road			Jun 2, 2018
	Southcote Road			June 4 2018
	Southcote Road			June 4 2018
	Southcote Road			June 4 2018
	Southcote Road			June 4, 208

PETITION FROM THE SOUTHCOTE ROAD NEIGHBOURS REGARDING CITY OF HAMILTON – SOUTHCOTE ROAD – (GARNER ROAD TO GOLF LINKS ROAD) ROAD WIDENING IMPROVEMENTS – THREE LANES WITH TWO-WAY LEFT TURN LANE

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#	STREET	PRINT NAME	SIGNATURE	DATE
[redacted]	Southcote Road	[redacted]	[redacted]	June 3, 2018
	Southcote Road			June 3, 2018
	Southcote Road			June 3, 2018
	Southcote Road			June 3, 2018
	Southcote Road			June 3, 2018
	Southcote Road			June 03 2018
	Southcote Road			June 03 2018
	Southcote Road			2018/03/06
	Southcote Road			2018/03/06
	Southcote Road			June 03/2018
	Southcote Road			June 06/2018
	Southcote Road			June 3/2018
	Southcote Road			June 6/18

SAME RES

PETITION FROM THE SOUTHCOTE ROAD NEIGHBOURS REGARDING CITY OF HAMILTON – SOUTHCOTE ROAD – (GARNER ROAD TO GOLF LINKS ROAD) ROAD WIDENING IMPROVEMENTS – THREE LANES WITH TWO-WAY LEFT TURN LANE

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- Underground services will mitigate the impact of wind and ice storms on reliability of power supply and allow for more flexibility in selection of trees and landscaping options

#	STREET	PRINT NAME	SIGNATURE	DATE
[redacted]	Southcote Road	[redacted]	[redacted]	June 4th, 2018
	Southcote Road			June 4 2018
	Southcote Road			June 5/18
	Southcote Road			June 5/18
	Southcote Road			June 5/18
	Southcote Road			June 6/18
	Southcote Road			June 7/18
	Southcote Road			
	Southcote Road			
	Southcote Road			
	Southcote Road			
	Southcote Road			

PETITION FROM THE SOUTHCOTE ROAD NEIGHBOURS REGARDING CITY OF HAMILTON – SOUTHCOTE ROAD – (GARNER ROAD TO GOLF LINKS ROAD) ROAD WIDENING IMPROVEMENTS – THREE LANES WITH TWO-WAY LEFT TURN LANE

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#	STREET	PRINT NAME	SIGNATU	DATE
[redacted]	Southcote Road	[redacted]	[redacted]	2018/06/06
	Southcote Road			
	Southcote Road			
	Southcote Road			
	Southcote Road			
	Southcote Road			
	Southcote Road			
	Southcote Road			
	Southcote Road			
	Southcote Road			
	Southcote Road			
	Southcote Road			

APPENDIX I

PETITION FROM OWNERS / RESIDENTS OF SOUTHCOTE ROAD HOMES - CITY OF HAMILTON MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA) – SCHEDULE C PROJECT – SOUTHCOTE ROAD IMPROVEMENTS (GARNER ROAD TO GOLF LINKS ROAD)

Fig 1. Southcote Road Hydro Poles are Unsightly and Heavily Loaded – May – June 2018

APPENDIX I

PETITION FROM OWNERS / RESIDENTS OF SOUTHCOTE ROAD HOMES - CITY OF HAMILTON MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT (EA) – SCHEDULE C PROJECT – SOUTHCOTE ROAD IMPROVEMENTS (GARNER ROAD TO GOLF LINKS ROAD)


POLICE
746
POLICE


MAXIMUM
50
APPD 112
CHEVROLET
focus
ATWY 025
DISCOVERY FORD


HAZMAT TEAM
1-877-ERT-SPIL
FOR SALE
John Di Liberto
RE/MAX 1575-5478

From: Jonathan Kitchen <jkitchen@dillon.ca>
Sent: June 26, 2018 10:31 AM
To: [redacted]
Cc: Sabrina Stanlake <SStanlake@dillon.ca>; 187402 <187402@dillon.ca>
Subject: Southcote Road EA - landscaping at [redacted] Southcote

Hi Jason,

You were speaking with my colleague, Sabrina, about your desire to do some landscaping closer to the roadway on the City right of way at [redacted] Southcote Road.

After discussing with the City, we would advise against doing any landscaping on City property at this time.

To give you a better sense of where the right of way is located, attached is an aerial map showing the City property and your property lines. There is concern that your new plantings could be disturbed during the construction process, so it would be best to wait until after construction is complete.

Please reach out if you do have any further questions.

Cheers,
Jonathan

Image removed by sender.

Jonathan Kitchen
Dillon Consulting Limited
51 Breithaupt Street Suite 200
Kitchener, Ontario, N2H 5G5
T - 519.571.8460 ext. 3120
F - 519.571.7424
M - 416.997.3009
JK tchen@dillon.ca
www.dillon.ca

Stanlake-Wong, Sabrina <sstanlake@dillon.ca> Tue, May 29, 1:32 PM

to Lorissa, me, 187402

I received a call from [redacted] this morning - [redacted] Southcote Road. [redacted]

He was unable to attend the PIC and was looking for an update on the project.

I provided an overview of the project timelines and explained PIC 1 was focused on gathering public input on issues and opportunities in the study area.

He noted speed is definitely a big concerns for him. He has seen and heard vehicles racing down the road.

He also mentioned there are stakes in the ground and the builder will be regrading his front lawn & replacing a portion of the driveway in the coming weeks. He was told the purpose of this is the tie in with the new road. The builder is Don Victoria.

Lorissa - are you aware of this? [redacted] thought someone in the City was involved with this work? He asked if we find out any information on this (including timing) to let us know.

Thanks,
Sabrina

Sabrina Stanlake-Wong
Associate
Dillon Consulting Limited
130 Dufferin Avenue Suite 1400
London, Ontar o, N6A 5R2
T - 519.438.1288 ext. 1235
F - 519.672.8209
M - 519.630.3849
SStanlake@dillon.ca
www.dillon.ca

Ammendolia, Carlo <Carlo.Ammendolia@hamilton.ca> Mon, Jun 4, 11:50 AM
to me, Sally, Lorissa, Sabrina, Janelle, 187402

Will do.

From: Kitchen, Jonathan [mailto:jkitchen@dillon.ca]
Sent: June 4, 2018 11:36 AM
To: Ammendolia, Carlo <Carlo.Ammendolia@hamilton.ca>
Cc: Yong-Lee, Sally <Sally.Yong-Lee@hamilton.ca>; Skrypniak, Lorissa <Lorissa.Skrypniak@hamilton.ca>; Sabrina Stanlake <SStanlake@dillon.ca>; Trant, Janelle <Janelle.Trant@hamilton.ca>; 187402 <187402@dillon.ca>
Subject: Re: FW: Southcote Road EA - [redacted] Southcote Road [redacted])

Hi Carlo,

Thank you for your response and for letting us know what is happening with the development on Southcote.

Rather than us providing the information third hand, would you mind following up with the resident that contacted us? His information is below:

[redacted]
[redacted] Southcote Road
[redacted]

Please let us know if anything further comes out of your discussion with him.

Cheers,
Jonathan

Jonathan Kitchen
Dillon Consulting Limited
51 Breithaupt Street Suite 200
Kitchener, Ontario, N2H 5G5
T - 519.571.8460 ext. 3120
F - 519.571.7424
M - 416.997.3009
JK tchen@dillon.ca
www.dillon.ca

On Mon, Jun 4, 2018 at 10:35 AM, Ammendolia, Carlo <Carlo.Ammendolia@hamilton.ca> wrote:

> Hi Jonathan,
> The majority of the properties fronting Southcote Road within this development were not graded correctly and this needs to be fixed. The grading of the front yards of these properties were intended to meet the requirements for the future cross-section of Southcote Road which will include a boulevard and sidewalk. Essentially, the grades at the property lines are too high and need to be lowered. This may involve some grading on private property in order to adequately blend in and provide a smooth transition.
> It's my understanding that the developer had circulated a letter to the residents and work would commence this week.
>
> I have calls from several of the owners that I will be following up with today.
>
> Regards,
>
> **Carlo Ammendolia** B.A., C.Tech
> Manager - Construction **| City of Hamilton**
> Planning & Economic Development Department **| Growth Management Division**
> **Phone: 905-546-2424 ext.2155**
>
>

Neighbourhood Transportation Management & EA's
Corporate Assets & Strategic Planning Division, Public Works
330 Wentworth Street North, Hamilton, ON L8L 5W2
Phone: 905.546.2424 ext. 2732

September 10, 2018

[redacted]

Southcote Road (Garner Road to Golf Links Road) Environmental Assessment
Public Information Centre No. 1 Follow-Up

Dear [redacted]:

Thank you for providing your input on the Southcote Road (Garner Road to Golf Links Road) Environmental Assessment (EA).

The first public meeting provided attendees with an overview of the project and an opportunity to provide input to the project team on existing conditions and concerns. The team is taking the feedback provided and using it to develop and evaluate the alternatives. Once the analysis is complete, the information will be presented for public input at a second information centre.

Many community members expressed similar comments at and following the meeting. This letter summarizes frequently asked comments/questions and the study team's response.

Many residents said vehicles traveling above the speed limit was the number one concern along Southcote Road. How is this being addressed through the study?
Our team is looking at opportunities to include traffic calming measures into the design. The opportunity to provide traffic calming along the corridor must be balanced with the purpose of the roadway, which is to move traffic within the community as Southcote Road is designated a minor arterial road in the City's Official Plan. Information on this issue will be presented at the next public meeting.

Will the widened roadway require the existing mature trees along Southcote Road be removed?
Based on the current right-of-way, we anticipate much of the roadway widening will be along the east side of the existing road. As part of the development and evaluation of design alternatives, we are looking at the potential impacts on the existing trees. Our aim is to balance improving the roadway, including sidewalks and cycling facilities, while minimizing the need to remove the mature trees.

Will the Highway 403 structure be widened?
The structure over Highway 403 is owned by the Ministry of Transportation (MTO) and was recently rehabilitated. At this time we are not anticipating modifications to the structure as part of the work along Southcote Road.

Is the City planning to bury the existing utility lines along Southcote Road as part of the project?
The City has reached out to the utility companies to obtain a cost estimate to burying the utilities. The cost to complete this has not been accounted for in the project budget at this time. More information will be presented on this topic at the next information centre.

When will construction start?
At this time, it is anticipated the earliest construction would begin is 2020. The current environmental assessment study will be completed in early 2019 and a detailed design phase will be completed after that.

Sincerely,

Lorissa Skrypniak, MCIP, RPP
Senior Project Manager
City of Hamilton

cc: Sabrina Stanlake-Wong, Dillon Project Manager

Our file: 18-7402

Public Information Materials

Pedestrian Crossings

Hamilton

Providing a safe location for pedestrians to cross Southcote Road within the study area was raised as an important issue to residents at Public Information Centre #1.

Traffic signals are recommended at Stonehenge Drive to improve pedestrian movements across Southcote Road.

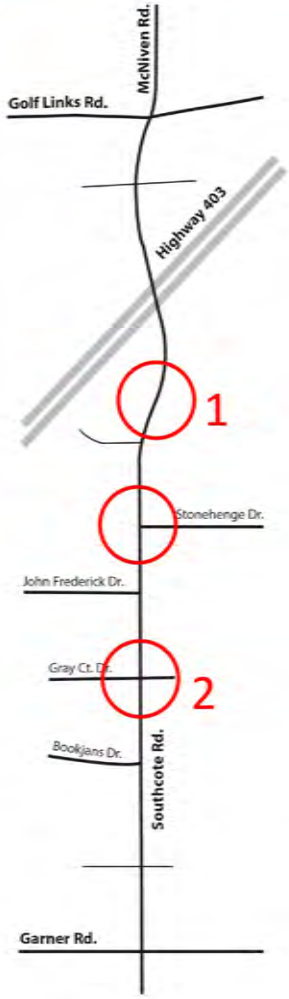
Stonehenge Drive is a collector roadway with sidewalks on both sides of the road. A path from Hackamore Court also connects to the intersection.

A pedestrian crossover (PXO) is a designated crossing area with a pedestrian right-of-way, allowing individuals to safely cross with vehicles yielding to the pedestrian. PXO's are identified with specific pavement markings and signs.

Unlike crosswalks at intersections, it is Ontario law that vehicles stopping at a PXO must wait until the individual crossing the road safely reaches the other side before proceeding.

Two possible PXO locations are:

1. **Cabriolet Crescent sidewalk path connects with Southcote Road south of the Highway 403 overpass.**
2. **Gray Court Drive.** Would provide a safe crossing to/from Moorland Park located just east of Southcote Road on Moorland Crescent.



We are looking for your input on the locations of the pedestrian crossings.

Design Considerations

Hamilton

The following key design considerations were used to develop and evaluate the options:

- Corridor will be designed to an **urban cross-section**, including curbs and gutters. A narrower, more defined roadway with a barrier curb provides some measure of traffic calming
- **Minimize impacts to the large mature trees** is a priority.
- Improvements should be completed within the **existing city-owned right-of-way** to the extent feasible
- **No improvements to the Highway 403 structure** are included with this project.
- **Narrow lanes widths** are recommended to provide a measure of traffic calming

Example of an urban residential cross-section

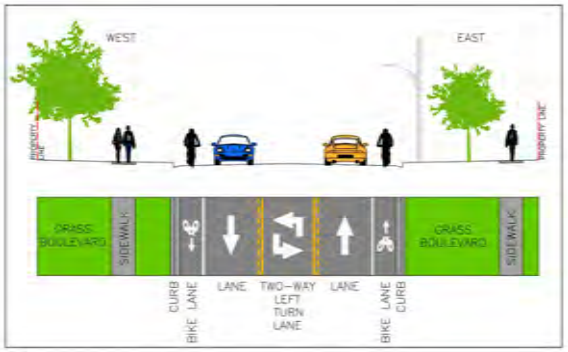
Proposed Lane Widths on Southcote Road

Description	Design Standards	Proposed Design
Through Lane	3.00m - 3.70m	3.30m
Centred Two-way Left Turn Lane	3.50m - 5.00m	3.50m
Left Turn Lane	3.00 – 3.50m	3.50m
Multi-use Pathway	3.00 - 4.00m	4.00m
Sidewalk	1.50m min.	1.50m
	2.00m min. (high pedestrian areas)	1.80m when adjacent to curb

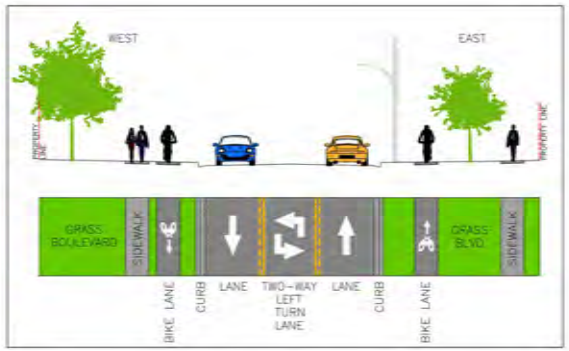
Alternative Design Concepts

Hamilton

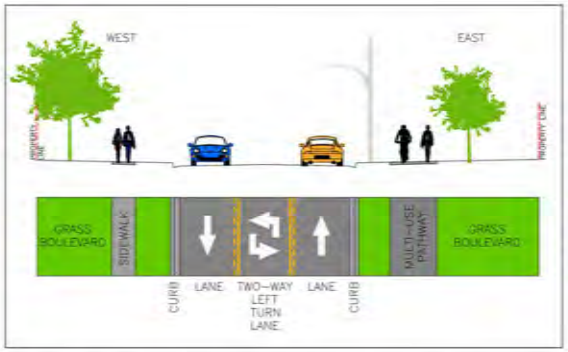
Five options were developed and evaluated for the active transportation facilities:



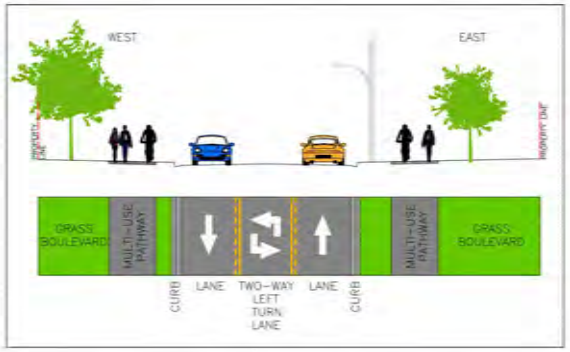
Option 1 – Continuous sidewalks and on-road bike lanes on both sides of road



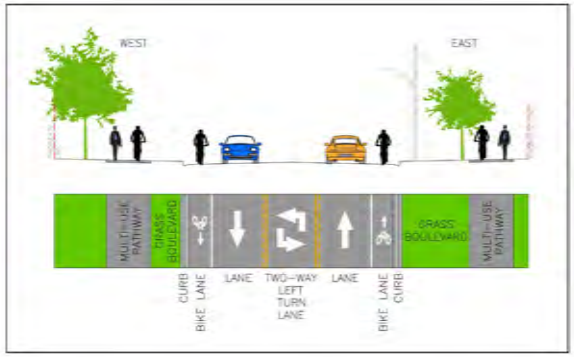
Option 2 – Continuous sidewalks and protected bike lanes on both sides of road



Option 3 – Sidewalk on one side of road and multi-use pathway (accommodating two directions of travel) on other side of road



Option 4 – Multi-use pathways on both sides of road

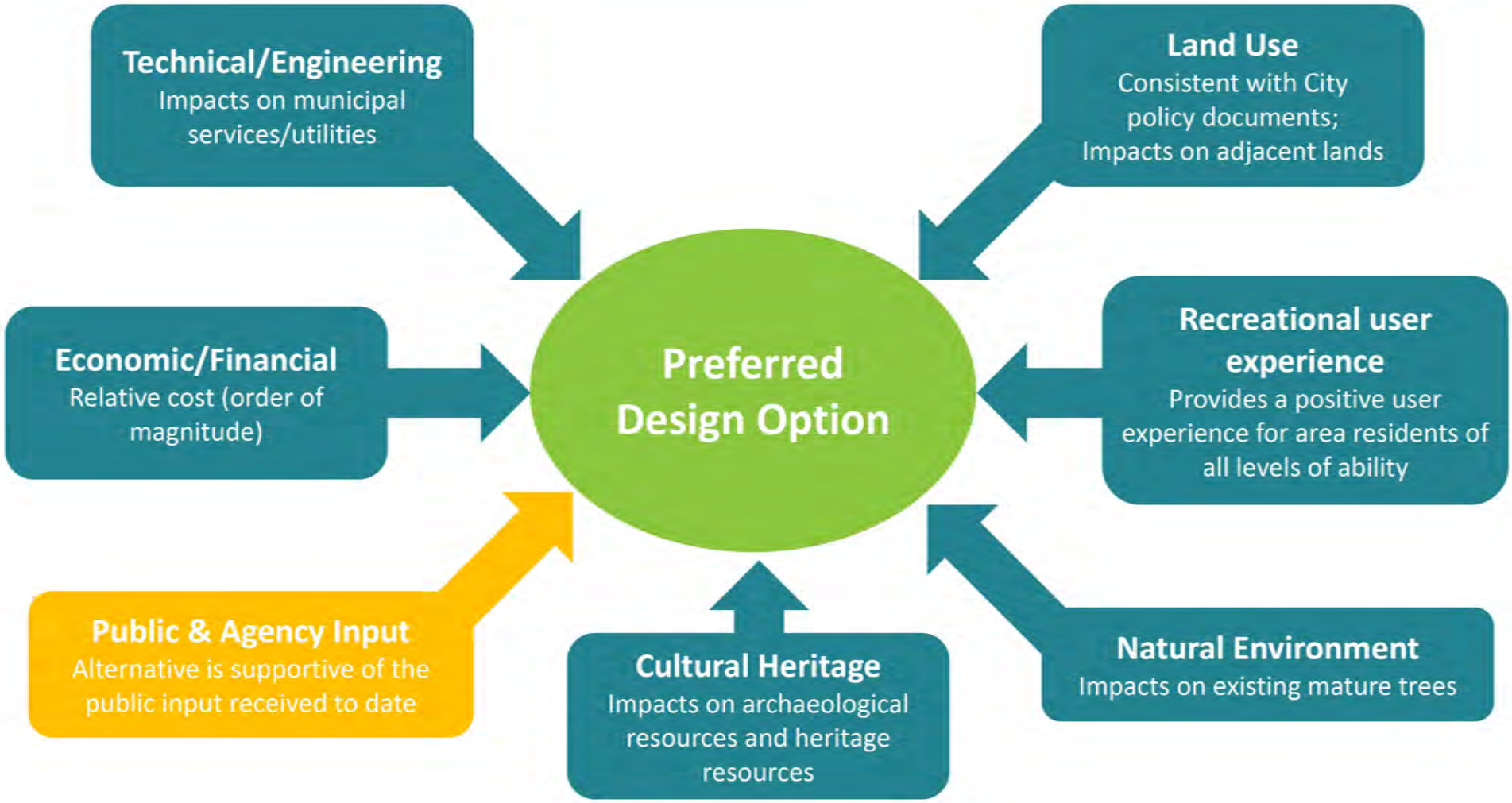


Option 5 – Multi-use pathway and on-road bike lanes on both sides of road

Discussions regarding burying the overhead utilities are currently underway and will be decided outside the scope of this study

Evaluation Criteria

Hamilton



Evaluation of Alternatives

Hamilton

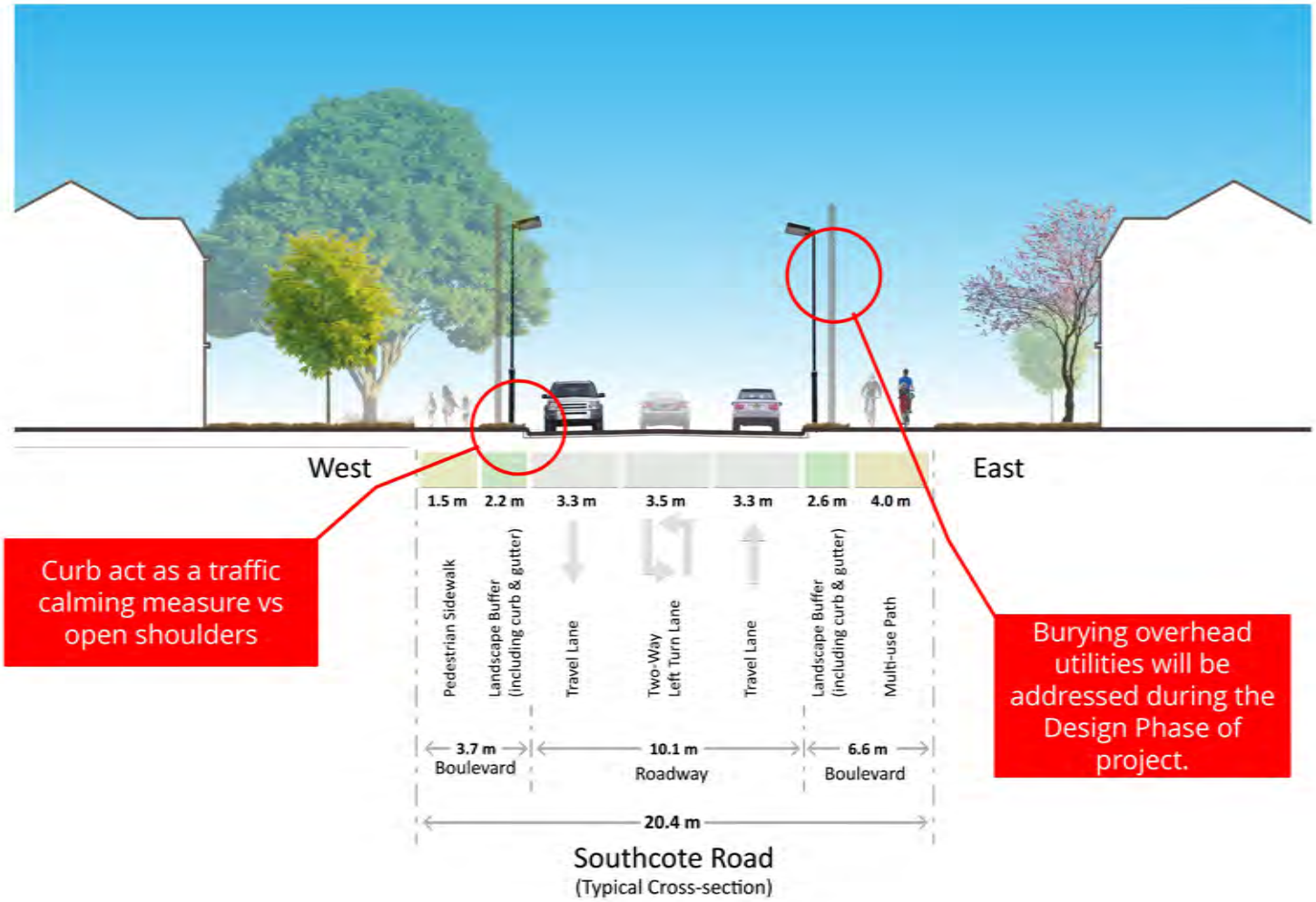
Evaluation Factors	Option 1 Continuous sidewalks and on-road bike lanes on both sides of road	Option 2 Continuous sidewalks and protected bike lanes	Option 3 Sidewalk on one side of road and multi-use pathway on other side of road	Option 4 Multi-use pathways on both sides of road	Option 5 Multi-use pathway and on-road bike lanes on both sides of road
Technical/Engineering	=	=	=	=	X
Land Use	✓	=	✓	=	=
Recreational user experience	=	=	=	=	✓
Natural Environment	=	X	✓	X	X
Supportive of public input	X	✓	✓	✓	✓
Cultural Heritage	=	=	=	=	=
Economic/Financial	=	=	=	=	X
			Preferred Alternative		

✓ Relatively Positive = Neutral X Relatively Negative

Preferred Option

Hamilton

Sidewalk on west side and multi-use pathway (accommodating two directions of travel) on east side. This option balances providing improved active transportation facilities along Southcote Road while minimizing impacts to mature trees.



Southcote Road
(Typical Cross-section)

Frontage Road Consideration

Hamilton

A frontage road was considered along the east side of Southcote Road, from Bookjans Drive to Secinaro Avenue.

- Minimize the number of entrances on Southcote Road
- Frontage road would be one-way
- May create challenges for delivery, winter maintenance, and emergency vehicles to navigate due to the minimal width available
- Reduces available parking and lawn area of the existing properties
- Reduces boulevard space between multi-use pathway and Southcote Road

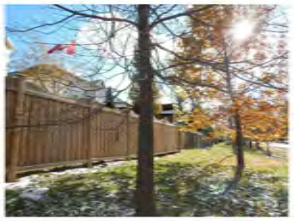
A frontage road is not recommended.

Tree Inventory

Hamilton

An inventory of all trees within 6 m of the right-of-way was completed:

- **668 trees** 10 cm or larger documented
- **59 different species/genera**, representing a mix of native species and non-native/landscape varieties
- Most abundant species were Scotch Pine (110 trees) and spruces (104 trees), many comprising fence rows
- Several smaller landscape planted trees
- Preliminary assessment was conducted for determining trees potentially requiring removal, based on tree conditions and conceptual road design
- 25 trees in poor/hazardous condition recommended for removal
- Recommended design is being reviewed to identify conflicts with trees
- A tree protection and landscape plan will be prepared



Example of Boulevard Landscape Trees

Example of Cluster of Non-native Species

Example of Hazard-Poor Condition Trees to be Removed

Example of Mature Trees Along West Side

Example of Recent Boulevard Landscape Plantings

Example of Scotch Pine Fence Rows

Next Steps

Hamilton

- Gather public input on Preferred Option
- Finalize the design and complete the impact assessment
- Prepare the Environmental Study Report (available for public review winter 2019).

Thank you for attending!

Your input is important to the outcome of this project. Please complete a comment form and return by:

January 4, 2019

Personal information collected and recorded at the Public Information Centre or submitted in writing on this subject is collected under the authority of the Municipal Act, 2011 and will be used by members of Council and City of Hamilton staff in their review of this matter. With the exception of personal information, all comments will become part of the public record.

Vince Ramelli
Manager of Real Estate, Community Partnerships and Transportation
Hamilton-Wentworth Catholic District School

To: "Vince Ramelli - HWCDSB (RamelliV@hwcdsb.ca)" <RamelliV@hwcdsb.ca>
Cc: "Scott, Kelly" <Kelly.Scott@hamilton.ca>, "'hucalm@hwcdsb.ca'" <hucalm@hwcdsb.ca>
Subject: Southcote Road EA - School Travel

Good afternoon Vince,

I'm currently working on an Environmental Assessment project for Southcote Rd between Golf Links Rd and Garner Rd E. The project involves the addition of a two-way turn lane, sidewalk infill on the west side, a multi-use path on the east side, the signalization of the Southcote/Stonehenge intersection, and a few pedestrian crossovers (PXOs). The current proposed locations for the PXOs are at the catwalk connecting Cabriolet Crescent to Southcote (unsignalized), at Stonehenge Dr. (signalized), and at Gray Court Dr. (unsignalized).

As Southcote is within the catchment area for both Immaculate Conception C.E.S. and Bishop Tonnos C.S.S, I was wondering if you would be able to provide comments on:

- Whether PXOs (signalized or unsignalized) would be beneficial in general to school travel planning

Pedestrian crossovers along Southcote Road would be very beneficial to school travel planning.

- Whether there are any school bus stops along Southcote or by Southcote that would benefit from a PXO on Southcote

There are no bus stops located along Southcote Road, where the pedestrian crossovers are proposed. The Board has several bus stops in the immediate vicinity of Secinaro Avenue/ Burbridge Way. A pedestrian crossover at this Secinaro Avenue/Burbridge Way location would act as a benefit to the bus stops in this vicinity.

- Whether the proposed locations of the PXOs are relevant and/or usable for students getting to and from school

The two pedestrian crossovers (Stonehenge location and Gray Court location) would be relevant/usable for students getting to and from Immaculate Conception CES. The most northern one at Cabriolet Crescent would not be very relevant from a school perspective.

However, if a pedestrian crossover is considered at Secinaro Avenue/Burbridge Way, that location would be very relevant as well. That location would act to provide a direct link to the school, through the Moorland Crescent walkway and Ancaster Arbour Parkette.

- Whether the sidewalk infill and creation of a multi-use path would be beneficial to school travel planning

Yes, absolutely. Sidewalks along the west side of Southcote Road and the multi-use path on the east side would be very beneficial to school travel planning and critical to support the pedestrian crossovers.

Please let me know if you would like more information, if you have any questions, or if there is someone else I should be contacting.

Thank you,

Megan Salvucci
Project Manager, Neighbourhood Traffic & EAs
Megan.Salvucci@hamilton.ca | 905-546-2424 x 4101
Roads & Traffic | Public Works Department | City of Hamilton
Address: 330 Wentworth Street North, Hamilton ON, L8L 5W3

From: Simon Goodacre [Staff] [mailto:sgoodacr@hwdsb.on.ca]
Sent: December 05 18 8 38 AM
To: Salvucci, Megan
Subject: Re outhcote Road EA chool Travel

Megan,

Here is the feedback of the parent rep on the School Travel committee:

From: Colleen Kaus [Staff]
Sent: Tuesday, December 4, 2018 11:40 AM
To: Simon Goodacre [Staff]
Subject: Re: Southcote development feedback

Good afternoon,

Anything that can be done to help facilitate a safe commute for Ancaster Meadow students is a move in the right direction. I feel that the sidewalk infill and creating of a path is crucial. Student's could safely travel to one of the PXO's when needed. The PXO's would help "connect" the two catchment sides and allow for safer travel for students. The plan doesn't address the roundabouts which will be a safety concern even with the addition of sidewalks and PXO's.

Colleen

In terms of bus stops, the Hamilton-Wentworth Student Transportation Services routes buses based on student addresses every year. Exact bus routes are always subject to change.

I hope that helps.

Thanks,
Simon

Simon Goodacre
Principal
Ancaster Meadow Elementary School
93 Kitty Murray Ln, Ancaster, ON L9K 1S3
Phone: 905.304.3255 | Fax: 905.304.3775
Twitter @sgoodacreHWDSB

From: Salvucci, Megan <Megan.Salvucci@hamilton.ca>
Sent: Friday, November 30, 2018 11:45 AM
To: Simon Goodacre [Staff]; Robert Fex [Staff]
Cc: Elio Dicienzo [Staff]; Randy Gallant [Staff]; School Travel Planning
Subject: RE: Southcote Road EA - School Travel

Hi Simon and Bob,

I really appreciate your help with this project.

Internally, we've been working with a variety of staff, including Callaway's team, to ensure that the proposal adheres to the City's best practices. To further support our efforts, we're basically looking to get statements from external organizations saying that you support the proposed changes or that you do not -so any input from the school or school board itself is very valuable.

Simon – please go ahead with sharing the questions with the School Council parent representative. Again, any external feedback, is good feedback.

Thanks,

Megan Salvucci
Project Manager, Neighbourhood Traffic & EAs
Megan.Salvucci@hamilton.ca | 905-546-2424 x 4101
Roads & Traffic | Public Works Department | City of Hamilton
Address: 330 Wentworth Street North, Hamilton ON, L8L 5W3

From: Simon Goodacre [Staff] [mailto:sgoodacr@hwdsb.on.ca]
Sent: November-30-18 10:51 AM
To: Robert Fex [Staff]; Salvucci, Megan
Cc: Elio P. DiDienzo; Randy Gallant [Staff]; School Travel Planning
Subject: Re: Southcote Road EA - School Travel

Megan and Bob,

Ancaster Meadow has been working with the City School Travel Planning program on promoting safe arrivals. Callaway Johnson is the contact.

There is also a School Council parent representative, do you mind me sharing your questions about Southcote with her? I'm sure the parents involved with the group with like an opportunity to provide input.

Thanks
Simon

Simon Goodacre
Principal
Ancaster Meadow Elementary School
93 Kitty Murray Ln, Ancaster, ON L9K 1S3
Phone: 905.304.3255 | Fax: 905.304.3775
Twitter: @sgoodacreHWDSB

From: Robert Fex [Staff]
Sent: Friday, November 30, 2018 10:06 AM
To: Megan.Salvucci@hamilton.ca
Cc: Elio Dicienzo [Staff]; Simon Goodacre [Staff]; Randy Gallant [Staff]
Subject: RE: Southcote Road EA - School Travel

Hi Megan

On behalf of Dave, I am forwarding your inquiry to the Coordinator of Transportation Services, as well as the principals of Ancaster Meadow and Ancaster High. They should be able to provide the feedback you seek. Its been a while since I dealt with crossing needs but I somewhat recall that City Parking & Bylaw staff were involved – under the division of Parking Enforcement & School Safety. Does such a division still exist?

Bob

Robert Fex BES, DSBA
Senior Planner

Planning & Accommodation
Hamilton-Wentworth District School Board

20 Education Court, P.O. Box 2558
Hamilton On, L8N 3L1
T 905.527.5092 x2380
M 289 244 2873
rfex@hwdsb.on.ca

curiosity. creativity. possibility. HWDSB

From: Salvucci, Megan <Megan.Salvucci@hamilton.ca>
Sent November 28, 2018 2 24 PM
To: David Anderson [Staff] <daanders@hwdsb.on.ca>
Cc Scott, Kelly Kelly Scott@hamilton ca ; Sue Dunlop [Staff] _jdunlop@hwd_b on ca
Subject: Southcote Road EA - School Travel

Good afternoon David,

I'm currently working on an Environmental Assessment project for Southcote Rd between Golf Links Rd and Garner Rd E. The project involve the addition of a two way turn lane, idewalk infill on the we t ide, a multi u e path on the ea t ide, the ignalization of the Southcote/Stonehenge intersection, and a few pedestrian crossovers (PXOs). The current proposed locations for the PXOs are at the catwalk connecting Cabriolet Cre cent to Southcote (un ignalized), at Stonehenge Dr (ignalized), and at Gray Court Dr (unsignalized).

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- Whether PXO (ignalized or un ignalized) would be beneficial in general to chool travel planning
- Whether there are any chool bu top along Southcote or by Southcote that would benefit from a PXO on Southcote
- Whether the propo ed location of the PXO are relevant and/or u able for tudent getting to and from chool
- Whether the idewalk infill and creation of a multi u e path would be beneficial to chool travel planning

Plea e let me know if you would like more information, if you have any que tion , or if there i omeone el e I hould be contacting

Thank you,

Megan Salvucci
Project Manager, Neighbourhood Traffic & EAs
Megan Salvucci@hamilton ca | 905 546 2424 x 4101
Roads & Traffic | Public Works Department | City of Hamilton
Address 330 Wentworth Street North Hamilton ON L8L 5W3

Salvucci, Megan 2:03 PM (7 minutes ago)
to me

From: Elio P. DiDienzo
Sent: December-04-18 10:11 AM
To: Salvucci, Megan
Subject: Re: Southcote Road EA - School Travel

Hi Megan

Hope all is well.

Our system indicates that the majority of students on the west side of Southcote receive bus service to Ancaster Meadows. Some students may be to school so any form of controlled traffic device would definitely be beneficial. At present we show two stops on Southcote closer to Garner Road f Ancaster Meadows. Students are coming from the west side of Southcote thus not crossing Southcote.

Hope this helps. Please do not hesitate to contact me if you require any further assistance.

Have a great day.

Elio P. DiCienzo
Hamilton Wentworth Student Transportation Services

From: Elio P. DiDienzo
Sent: December-04-18 10:11 AM
To: Salvucci, Megan
Subject: Re: Southcote Road EA - School Travel

Hi Megan

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Hope this helps. Please do not hesitate to contact me if you require any further assistance.

Have a great day.

Elio P. DiCienzo
Hamilton Wentworth Student Transportation Services

From: Robert Fex [Staff]
Sent: Friday, November 30, 2018 10:06 AM
To: Megan.Salvucci@hamilton.ca
Cc: Elio Dicienzo [Staff]; Simon Goodacre [Staff]; Randy Gallant [Staff]
Subject: RE: Southcote Road EA - School Travel

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Bob

Robert Fex BES, DSBA
Senior Planner

Planning & Accommodation
Hamilton-Wentworth District School Board
20 Education Court, P.O. Box 2558
Hamilton On, L8N 3L1
T 905.527.5092 x2380
M 289.244.2873
rfex@hwdsb.on.ca

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From: Salvucci, Megan <Megan.Salvucci@hamilton.ca>
Sent: November 28, 2018 2:24 PM
To: David Anderson [Staff] <daanders@hwdsb.on.ca>
Cc: Scott, Kelly <Kelly.Scott@hamilton.ca>; Sue Dunlop [Staff] <sjdunlop@hwdsb.on.ca>
Subject: Southcote Road EA - School Travel

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- Whether there are any school bus stops along Southcote or by Southcote that would benefit from a PXO on Southcote
- Whether the proposed locations of the PXOs are relevant and/or usable for students getting to and from school
- Whether the sidewalk infill and creation of a multi-use path would be beneficial to school travel planning

Please let me know if you would like more information, if you have any questions, or if there is someone else I should be contacting.

Thank you,

Megan Salvucci
Project Manager, Neighbourhood Traffic & EAs
Megan.Salvucci@hamilton.ca | 905-546-2424 x 4101
Roads & Traffic | Public Works Department | City of Hamilton
Address: 330 Wentworth Street North, Hamilton ON, L8L 5W3

6. There are no plans to put traffic lights at the intersection of Southcote Rd. and John Frederick Dr. This intersection is about 160 metres from Stonehenge Dr. which is planned to have traffic signals and we prefer not to have signals spaced less than 200 metres apart. Another complication is the presence of the "service road" on the east side running parallel to Southcote Rd.; there is only 15 metres of space between the edge of Southcote Rd. and the edge of the service road. For signalized intersections, more storage space is required for car queues. Providing the required space will not be possible at this location and, from a signal operation perspective, this is not a good situation. Additionally, the introduction of signals would make it easier for traffic to go in and out of John Frederick Dr. and onto Southcote Rd. which could lead to higher traffic volumes and an increase in speeding vehicles on John Frederick Dr. trying to catch a green light, not to mention the possibility of making it easier for cut through traffic to by-pass the traffic lights at the Southcote Rd./Garner Rd. E. intersection. To address pedestrian crossings, pedestrians will have the opportunity to safely cross the road at the signalized intersection at Stonehenge Dr. or at the Gray Crt. Dr. signed pedestrian crossover.

To take a closer look at our proposed designs and for more project information, you can check the project's webpage on the days following the PIC. I will also make sure that you are added to the mailing list.

Please let me know if you have any further questions.

Thank you,

Megan Salvucci
Project Manager, Neighbourhood Traffic & EAs
Megan Salvucci@hamilton ca | 905 546 2424 4101
Roads & Traffic | Public Works Department | City of Hamilton
Addre 330 Wentworth Street North, Hamilton ON, L8L 5W3

From: PW Traffic Operations
Sent: December-06-18 9:49 AM
To: [redacted]
Cc: Ferguson, Lloyd; PW Traffic Operations; sstanlake@dillon.ca; White, Martin; Soldo, Edward; Bender, Daryl; PW Roads South; Lazar, Myron
Subject: RE: Southcote Road (Garner Road to Golf Links Road) Municipal Class EA

Good morning [redacted]:

Thank you for your email. We have created a Customer Service Request for the 2 highlighted items in your email and assigned to the appropriate staff for their investigation

By way of forward, I have cc'd the following for their investigation for the other items

Daryl Bender Bike lane request item #2
Roads South – Narrowing of Intersection – item #3
Myron Lazar Provision of Bus stops and shelters item #6

Regards,

Lisa Morrow
Traffic Operations Clerk
☎: (905) 546-2424 x4376
IMPORTANT NOTICE: The Traffic Operations and Engineering Department recognizes that scented products can produce health related symptoms in sensitive individuals, some of which can pose a serious health risk We request that you please refrain from using scented products such as perfume and/aftershave during your visit to our Facility at 1375 Upper Ottawa Street. Thank you!

From: [redacted]
Sent: December-06-18 8:46 AM
To: PW Traffic Operations; sstanlake@dillon.ca
Cc: Ferguson, Lloyd
Subject: Southcote Road (Garner Road to Golf Links Road) Municipal Class EA

Dear Megan and Sabrina:

Thank you for thi opportunity to e pre our intere t and give our reque t concerning the Southcote roadwork We live on John Frederick Drive and have lived with changes to the traffic volume and speed since the development in the Garner neighbourhood to the west of us.
There continue to be issues with speeding and disrespectful driving behaviours including noise and variable acceleration of tho e coming from the new development We would welcome police attention to our treet that ha become a major thoroughfare, and is the main road for school bus pick ups/drop offs. We would also welcome the creation of a three-way stop sign at John Frederick and Annalee. Drivers turning out of Annalee can't see west onto John Frederick, and people with children coming from the local park must cross the same intersection to reach the safety of the sidewalk on the north side of John Frederick

Turning our attention to the new development for Southcote, we have 6 requests for inclusion in your plans:

1 Inclu ion of idewalk on both ide of the road where there are none between Dorval and the bridge over the 403 on one side and between Old Oaks and Stonehenge on the other.

2. Bike lanes, please.

3. Change the intersection by narrowing it, at Stonehenge to encourage drivers to make full stops at right angle curbs instead of rolling stops through curved curbs. Pedestrians crossing Stonehenge are at risk in the wide intersection, as drivers dangerously sweep past them to see into their turns from Stonehenge. Pedestrian lines and stop lines would signal and alert driver to the po ibility of pede trian cro ing and encourage them to reduce their peed before topping Right angle curbs and sidewalks would favourably narrow Stonehenge where it intersects Southcote.

4. Installation of a walkway bridge that allows pedestrian access over the ditch to cross to the path to Cabriolet Crescent. It i impa able in winter and when flooding occur Thank you

5. Provision for bus stops and shelters, since we are surely going in the direction of encouraging people to use the HSR. It is a brisk 20 minute walk to Golf Links already, where one of the closest bus stops exists. If they are not used for buses just yet, driver could make u e of the pace to pull off the road, a they do already

6. Consideration for traffic lights at the interesection of John Frederick and Southcote. Pedestrians take their life in their hands trying to cross Southcote, despite regular radar traps for speeding.

Many thanks for your attention to our input at this time, as I am not able to attend the PIC. My husband, Ken, is planning to be there Monday. Please put us on your mailing list so we may be part of the plans going forward.

Be t regard ,

[redacted] John Frederick Drive

DILLON CONSULTING

Kitchen, Jonathan <jkitchen@dillon.ca>

Comments re assessment study

Stanlake-Wong, Sabrina <sstanlake@dillon.ca> Tue, Dec 11, 2018 at 8:10 PM
To: [redacted]
Cc: southcote@dillon.ca

Thank [redacted] for your input

Sabrina

On Tue, Dec 11, 2018, 8 06 PM [redacted] wrote

> Hi,
> I am writing in response to the latest informational the session December 10th. All in all I believe the plan is sound. It is vital to have separate walkways and bike lanes from roads from a safety perspective. I really like the idea of traffic light at Stonehenge inter ection a it will have the benefit of traffic calming, allow better flow in and out of our driveways, especially those of us near the intersection.
>
> I also am pleased to see a straighter walkway then the hilly, uneven one we have now. I would like to reiterate keeping a many health mature tree alive a po ible
>
> On a final note, from an aesthetic perspective burying the hydro cables and others seem in line with other recent upgrades in our area. From the perspective of property values this is also important. If our road is already been torn up and ignificantly redone, I fail to ee why doing thi would not be part of the plan Recognizing almo t all new housing starts have buried lines (back of Southcote). I cannot believe this cost would be so significant when it is part of all new surveys. I see this a vital part of the upgrade and will continue to petition for it.
>
> Your incerely,
>
> [redacted] Southcote
>
> [redacted]
> Hamilton, ON

DILLON CONSULTING

Lougheed, April <alougheed@dillon.ca>

[redacted]Southcote EAS

1 message

[redacted] Thu, Dec 13, 2018 at 11:35 AM
To: "southcote@dillon.ca" <southcote@dillon.ca>, "trafficOps@hamilton.ca" <trafficOps@hamilton.ca>

Good day

My name is [redacted] and I live at [redacted]Southcote road. I was at the public information night on December 10, 2018. I am excited that we will get a much needed sidewalk between the end of our road to Dorval drive .. can't wait. I also like all the updates and new sidewalks South of us up to Gardner road.

The item I would really like to see is to have the section of road in front of our house that goes north up to the stop sign Re-Paved. As you can see contractors working on or near Southcote road always seem to use this section of road as their yard and with heavy machinery and trucks and dumping of materials this road has been falling apart, not to mention my driveway that I just repaved this summer. The city has patched up the damaged area by the stop sign several times over the years from the garbage trucks turning but it only lasts until the next garbage truck comes. I have been cleaning this road in the spring each year.

Thank you for your time.

[redacted]

[redacted]Southcote Road

Kitchen, Jonathan <jkitchen@dillon.ca>

Southcote Road EA cross-section

[redacted] Tue, Dec 18, 2018 at 2:52 PM
To: "Kitchen, Jonathan" <jkitchen@dillon.ca>

OK thanks!

From: Kitchen, Jonathan jkitchen@dillon ca
Sent: December 18, 2018 2:50 PM
To: [redacted]; 187402
Subject: Re: Southcote Road EA cross-section

Hi [redacted],

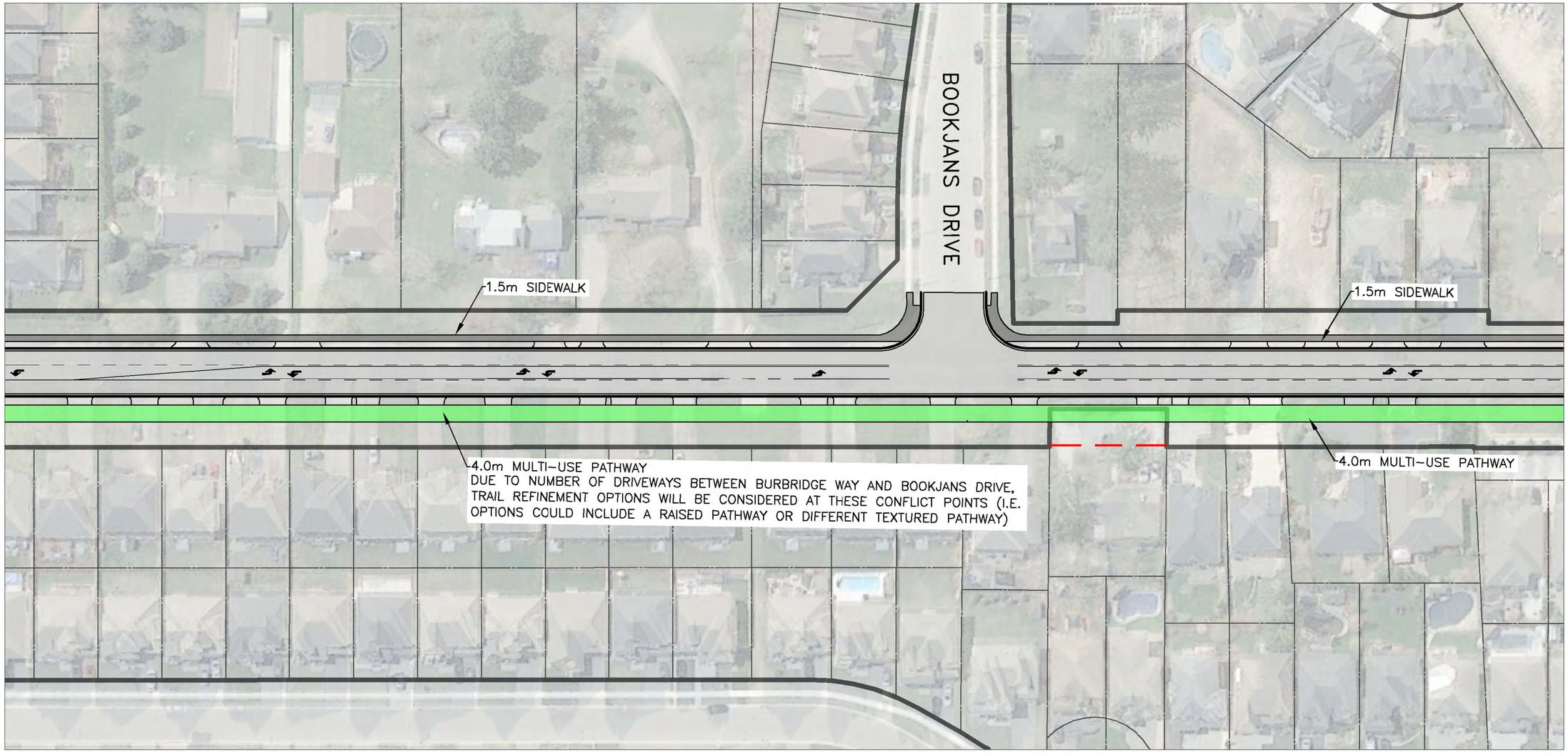
The thicker line (at the tip of the arrow) is the curb, while the narrow strip above the curb is the gutter.

Cheers,
Jonathan

Jonathan Kitchen
Dillon Consulting Limited
51 Breithaupt treet uite 200
Kitchener, Ontario, N2H 5G5
T 519 571 9833 ext 3120
F 519 571 7424
JKitchen@dillon ca
www dillon ca

On Tue, Dec 18, 2018 at 2 39 PM [redacted] wrote

> thanks Jonathan.
>
> Is the narrow strip after the 2 meter section the new curb?
>
> ---
>
> **From:** Kitchen, Jonathan <jkitchen@dillon.ca>
> **Sent:** December 18, 2018 2 22 PM
> **To:** [redacted]
> **Cc:** Sabrina Stanlake; 187402
> **Subject:** Re: Southcote Road EA cross-section
>
> Hi [redacted],
>
> Here is the corrected cross-section for you. Again, my apologies on the previous version.
>
> Cheers,
> Jonathan
>
> **Jonathan Kitchen**
> **Dillon Consulting Limited**
> 51 Breithaupt treet uite 200
> Kitchener, Ontario, N2H 5G5
> T 519 571 9833 ext 3120
> F 519 571 7424



DATE PLOTTED: 12/12/2018 10:28:38 AM
FILE LOCATION: C:\projects\working directory\projects 2018\10ndb\dms14797\Preferred Option_November 2018.dwg

CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

- PROPOSED ROW
- EXISTING ROW
- EXISTING LOT
- PEDESTRIAN CROSSING
- DEVELOPMENT APPLICATIONS
- SIDEWALK
- MULTI-USE TRAIL

PRELIMINARY DESIGN
DECEMBER 2018

SCALE - HORZ.
5m 0 10m

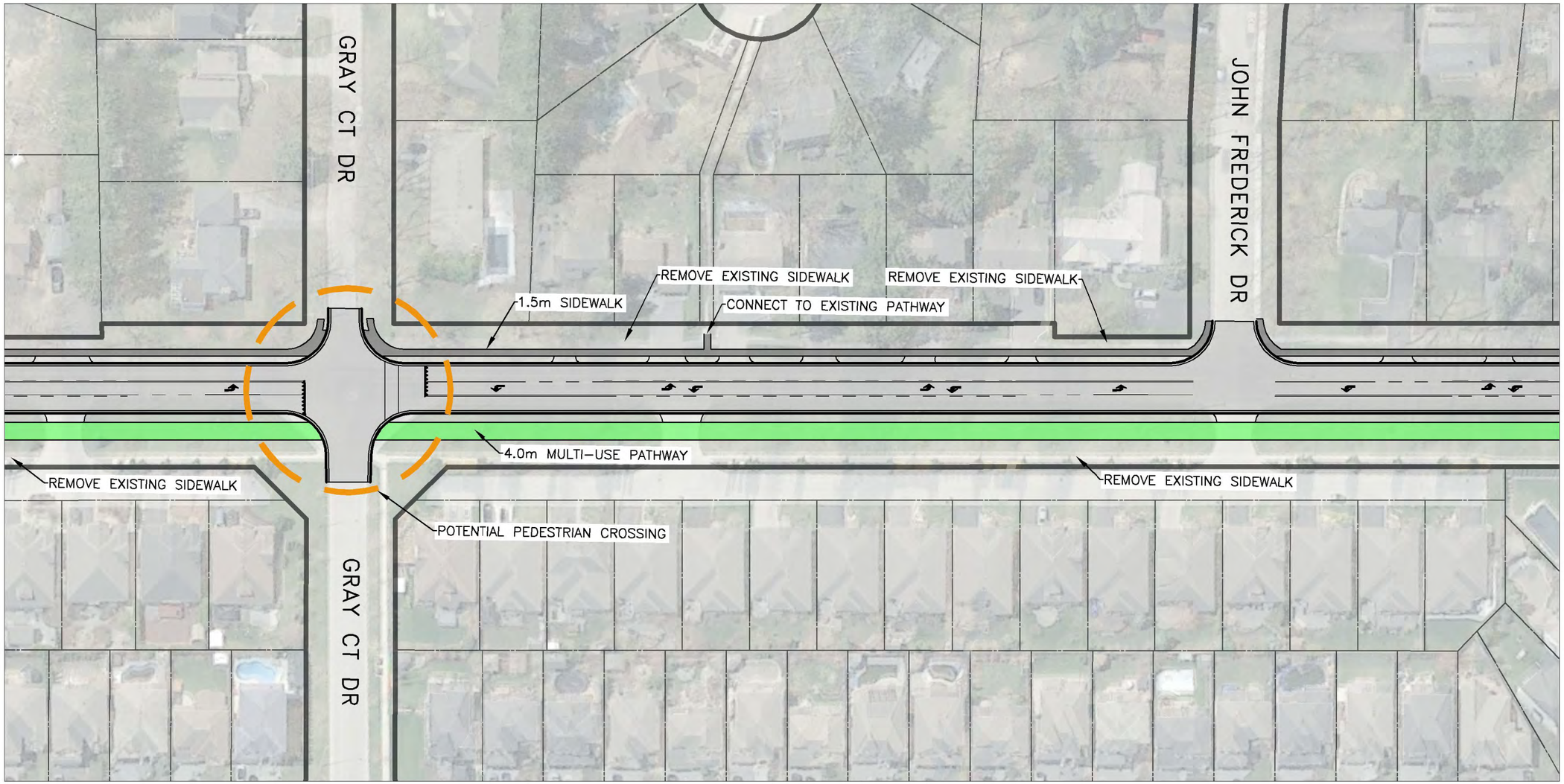
PROJECT No. 16-4360
DATE: December 2018

DILLON CONSULTING

SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

PREFERRED ALTERNATIVE

SHEET 02



CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

PROPOSED ROW
EXISTING ROW
EXISTING LOT
PEDESTRIAN CROSSING
DEVELOPMENT APPLICATIONS
SIDEWALK
MULTI-USE TRAIL

PRELIMINARY DESIGN
DECEMBER 2018

SCALE - HORZ.
5m 0 10m

PROJECT No. 16-4360
DATE: December 2018

DILLON CONSULTING

SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

PREFERRED ALTERNATIVE

SHEET 03

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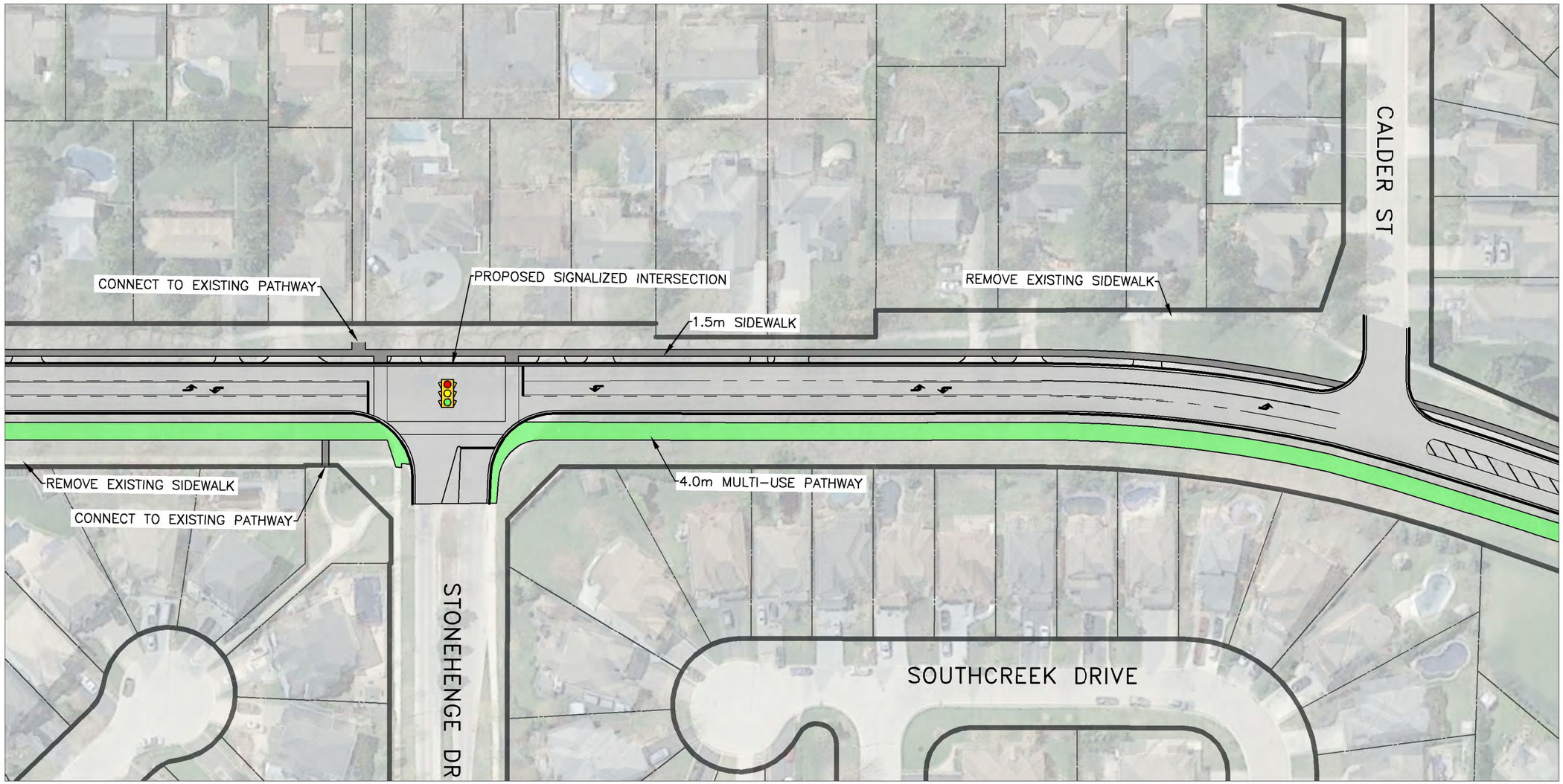

CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

PROPOSED ROW
EXISTING ROW
EXISTING LOT
PEDESTRIAN CROSSING
DEVELOPMENT APPLICATIONS
SIDEWALK
MULTI-USE TRAIL

PRELIMINARY DESIGN
DECEMBER 2018

SCALE - HORZ.
5m 0 10m

PROJECT No. 16-4360
DATE: December 2018

DILLON CONSULTING

SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

PREFERRED ALTERNATIVE

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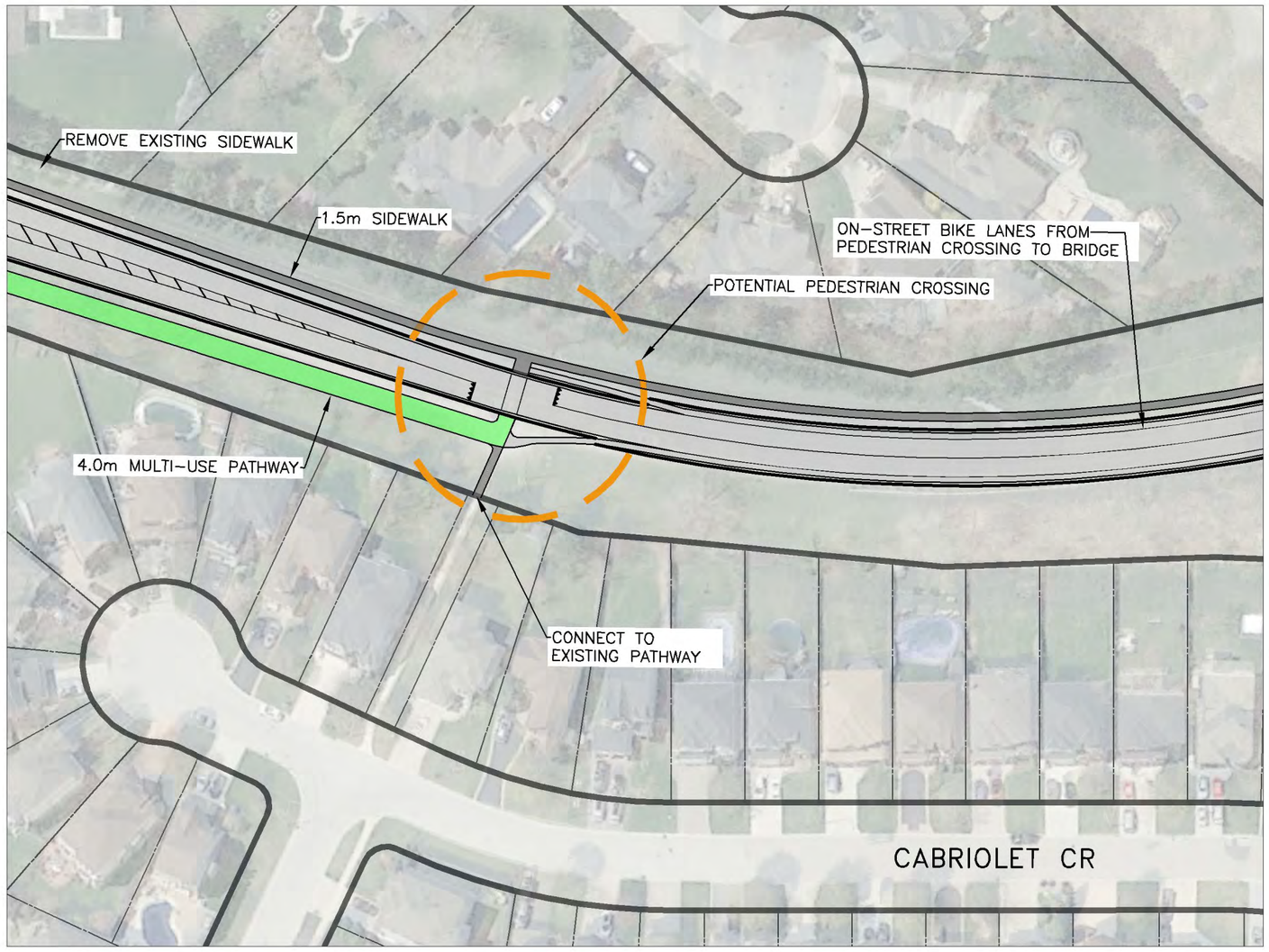

CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

PROPOSED ROW
EXISTING ROW
EXISTING LOT
PEDESTRIAN CROSSING
DEVELOPMENT APPLICATIONS
SIDEWALK
MULTI-USE TRAIL

PRELIMINARY DESIGN
DECEMBER 2018

SCALE - HORZ.
5m 0 10m

PROJECT No. 16-4360
DATE: December 2018

DILLON CONSULTING

SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

PREFERRED ALTERNATIVE

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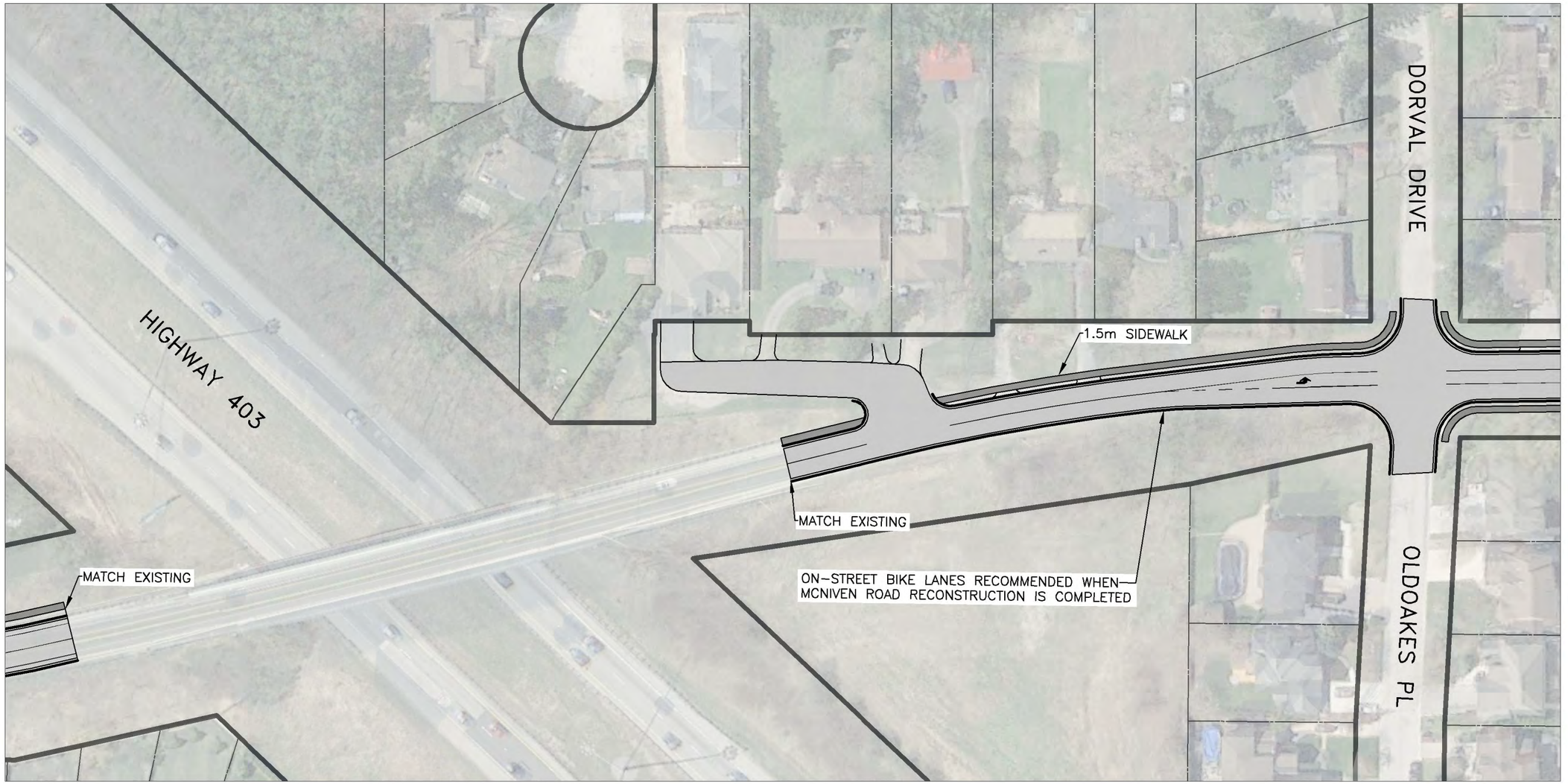

CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

PROPOSED ROW
EXISTING ROW
EXISTING LOT
PEDESTRIAN CROSSING
DEVELOPMENT APPLICATIONS
SIDEWALK
MULTI-USE TRAIL

PRELIMINARY DESIGN
DECEMBER 2018

SCALE - HORZ.
5m 0 10m

PROJECT No. 16-4360
DATE: December 2018

DILLON CONSULTING

SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

PREFERRED ALTERNATIVE

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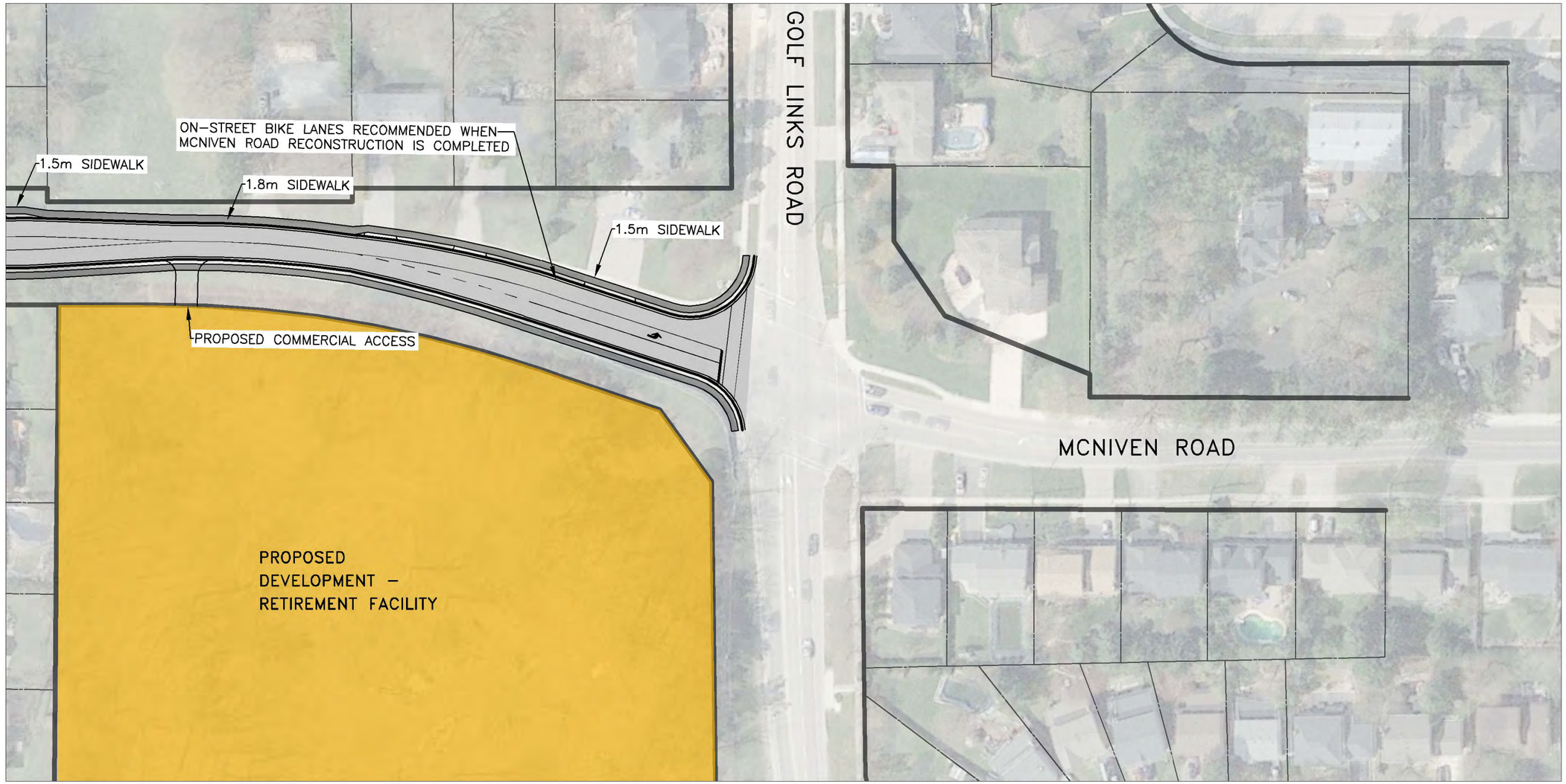

CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

PROPOSED ROW
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PRELIMINARY DESIGN
DECEMBER 2018

SCALE – HORZ.
5m 0 10m

PROJECT No. 16–4360
DATE: December 2018

DILLON CONSULTING

SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

PREFERRED ALTERNATIVE

SHEET 07

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SOUTHCOTE ROAD EA – RECOMMENDED DESIGN
PUBLIC INFORMATION CENTRE #2
DECEMBER 10, 2018

Appendix B

Transportation Analysis

DILLON CONSULTING

CITY OF HAMILTON

Transportation Analysis Report

Southcote Road EA – Phase 3 and Phase 4

March 2019 – 18-7402

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Figures

Tables

Appendices

1.0 Introduction

The City of Hamilton retained Dillon Consulting Limited to complete a Schedule C Municipal Class Environmental Assessment (EA) (2015) for improvements to Southcote Road, from Golf Links Road to Garner Road East. Phases 1 and 2 of the Class EA are documented in the Ancaster Transportation Master Plan (ATMP) (June 2011).

This report documents the existing and planned conditions of the Southcote Road corridor between Golf Links Road and Garner Road East for both automotive and active transportation facilities. Problems and opportunities for each have been idenfi ed for consideration during the development of the alternative design concepts.

1.1 Background

The City of Hamilton's 2007 Transportation Master Plan and 2011 Ancaster Transportation Master Plan both identify the need to widen Southcote Road as part of the broader Growth Related Integrated Development Strategy (GRIDS) for transportation projects.

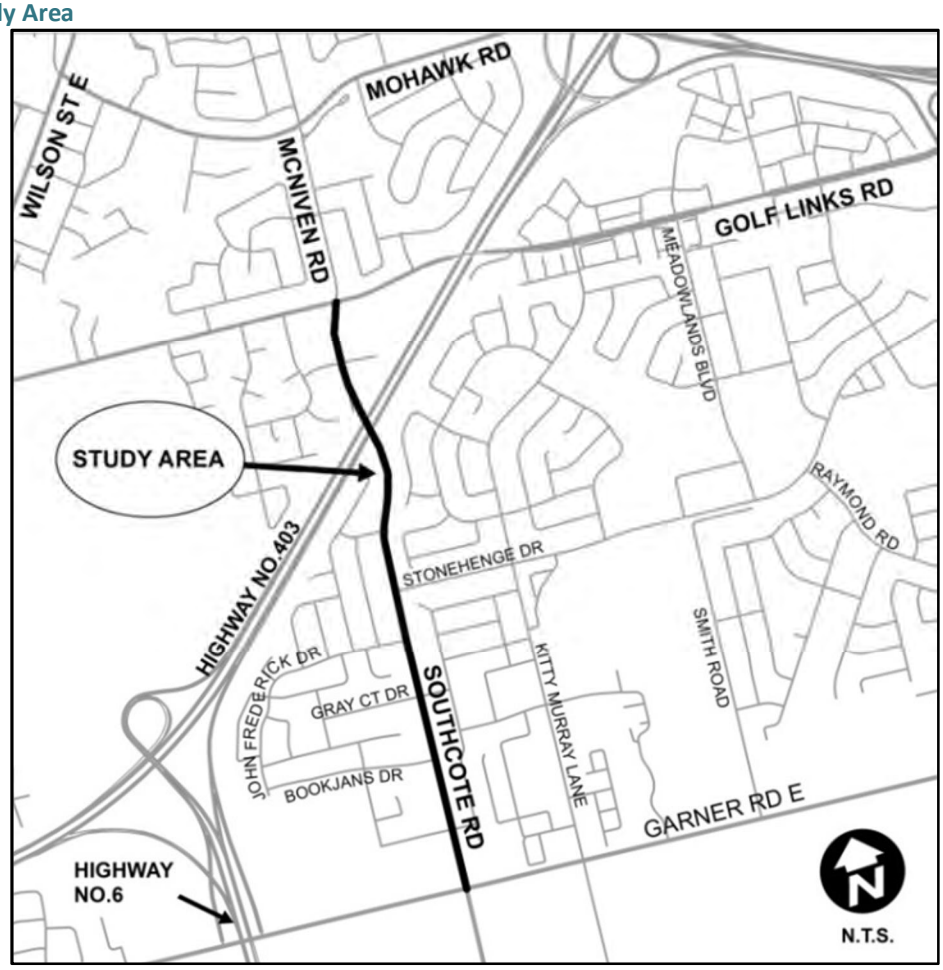
1.2 Study Area

The study area is Southcote Road between Golf Links Road and Garner Road East, a 2.1 -km long north-south minor arterial roadway located within the Ancaster community of the City of Hamilton (*Figure 1*). Southcote Road provides local access to major arterial roads, which in turn provide access to Provincial Highways (6 and 403), Parkways (Lincoln M. Alexander Parkway) and a local commercial area (Meadowlands Power Centre). Southcote Road also serves as a local road with several homes fronting onto it. The land use in the immediate vicinity of the study area is predominately residential in nature.

The following intersections within the study area were reviewed from a traffic operations perspective:

1) Southcote Road / McNiven Road & Golf Links Road (signalized);
2) Southcote Road & Stonehenge Drive (unsignalized);
3) Southcote Road & Gray Court Drive (unsignalized); and
4) Southcote Road & Garner Road East (signalized).

Figure 1: Study Area



1.3 Class Environmental Assessment Process

Municipal infrastructure projects must meet the requirements of the Ontario *Environmental Assessment* (EA) *Act*. The Municipal Class EA (October 2000, as amended in 2007, 2011 and 2015) (MCEA), applies to a group or "class" of municipal infrastructure projects which occur frequently and have relatively minor and predictable impacts. These projects are approved under the EA Act, as long as they are planned, designed and constructed according to the requirements of the Class EA. The study is being completed following the planning process for a Schedule C Class EA:

- Phase 1, "Problem/Opportunity Identification"
- Phase 2, "Alternative Solutions"
- Phase 3, "Alternative Design Concepts for the Preferred Solution"
- Phase 4, "Environmental Study Report"
- Phase 5, "Implementation".

This report provides an overview of Phases 1 and 2, as documented in the Ancaster Transportation Master Plan (2011) and will be used to develop and evaluate Phase 3 Design Concepts.

1.4 Municipal Class EA Phase 1 and Phase 2 Overview

The ATMP documents Phases 1 and 2 of the Class EA process for this project. The following provides a summary of relevant information from the ATMP.

1.4.1 Ancaster Transporta. on Master Plan (2011)

As outlined in the ATMP, the community of Ancaster, in the City of Hamilton, has experienced rapid growth since the mid-nineties. This has led to an increase in traffic volumes in the Ancaster urban area, resulting in congestion and traffic infiltration. The Master Plan was undertaken to prepare a transportation strategy to support Ancaster's current and future transportation needs.

Hamilton is anticipated to experience population and employment growth by 2031 which will affect travel patterns across the region. According to the Hamilton Transportation Master Plan (HTMP), the community of Ancaster had a population of 33,170 in 2006. This is expected to increase to approximately 36,000 by 2011 and 39,000 by 2031. During the same period, employment is expected to increase from 6,000 to over 13,000 jobs. Modelling undertaken as part of the ATMP reflects these population and employment projections. It also encompasses the Ancaster Employment Growth District (AEGD) (southeast of Ancaster) which is projected to contain over 28,000 jobs by 2031.

The objectives of the ATMP study were established to:

- Identify mobility needs for people and goods that are consistent with Ancaster values
- Identify opportunities and targets for transportation mode choices, including public transit, cycling and pedestrian facilities
- Identify infrastructure improvements that are sensitive to the community character, including the existing heritage features
- Develop a transportation strategy that supports Ancaster's urban land uses
- Integrate policies, programs, funding and infrastructure needs
- Develop a Transportation Master Plan for Ancaster
- Satisfy Phases 1 & 2 of the Municipal Class EA process

The Master Plan identified the following transportation goals:

- Reduce commuter traffic infiltration and congestion
    - single occupant vehicles mode split at 69% with a target to reduce to 52% by 2031
    - 2006 auto passenger mode split is 11% with a target to maintain or increase this by 2031
- Increase transit mode share:
    - 2006 transit mode split at 3% with a target of 12% by 2031
- Provide facilities for alternative modes of transportation (e.g. walking and cycling):
    - 2006 walking/cycling mode split at 5% with a target of 15% by 2031
- Involve a range of Transportation Demand Management (TDM) measures (carpooling, telework, etc.) and promote Active Modes (walking, cycling, etc.).

The City of Hamilton's transportation model was used to determine travel demand needs in the Ancaster, factoring in the above mode share targets. Problem areas were idenfi ed and addressed through the development of twelve (12) possible network alternatives for Ancaster, including existing conditions (i.e., a "do nothing" alternative).

The preferred alternative solution (Scenario 12) for the transportation network included the following principles:

- Better utilization of existing roadway capacity by adding two-way left turn lanes to accommodate growth (population and employment)
- Ability to maintain community and historical village character
- Ability to promote active transportation by adding bike lanes and sidewalks.

Many of the roadway improvements recommended in Scenario 12 include the use of a three-lane cross-section (i.e., one lane in each direction with a two-way left turn lane), where feasible depending on the right-of-way available. For roads identified within Scenario 12, sidewalks are recommended to be in place on both sides of the road as well as cycling lanes where identified in Hamilton's Cycling Master Plan, *Shi. ing Gears 2009*.

The list of recommended projects resulting from the ATMP included:

- Three-lane cross-section including a centre two-way left turn lane, where feasible depending on the right-of-way, on sections of Wilson Street, Rousseaux Street, Mohawk Road, McNiven Road, Southcote Road and Garner Road (between Highway 2/Wilson Street and 50 metres west of Shaver Road).

The anticipated timing for widening Southcote Road is 2017 to 2021 with a projected cost of $3.4 M. The northern project limit for the Southcote Road widening from Calder Road to Garner Road should be revisited depending on plans for cycling or multi-use path infrastructure.

The ATMP also noted that collisions were not found to be sufficiently high as to require mitigation. However, as part of the solution to improve transportation safety, the addition of two-way left turn lanes was recommended along Southcote Road. It is recommended that the corridor be monitored for potential traffic operations issues as development occurs (e.g., through more detailed corridor analyses or traffic impact studies).

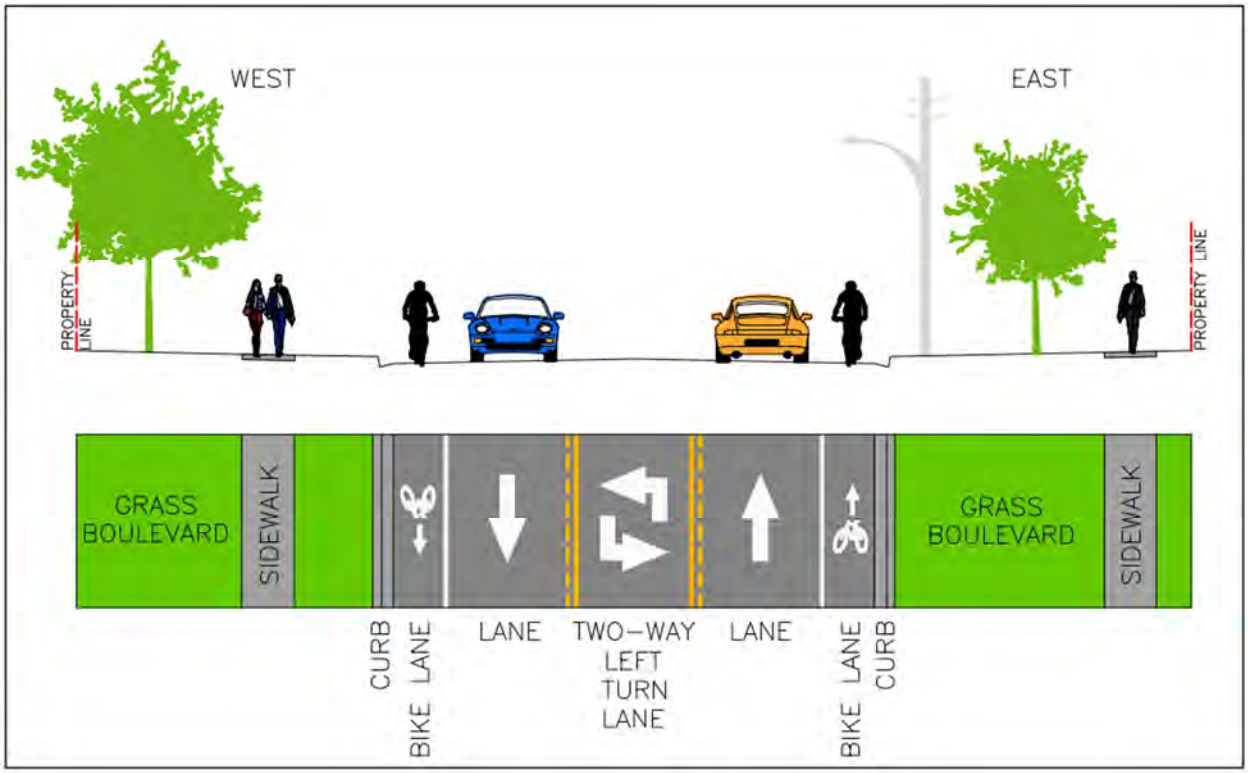
The ATMP recommended based on public input, opportunities to implement crosswalks, Intersection Pedestrian Signals (where warranted), and other roadway treatments to increase safety for pedestrians in the study area.

1.5 Input to the Phase 3 Design Concept

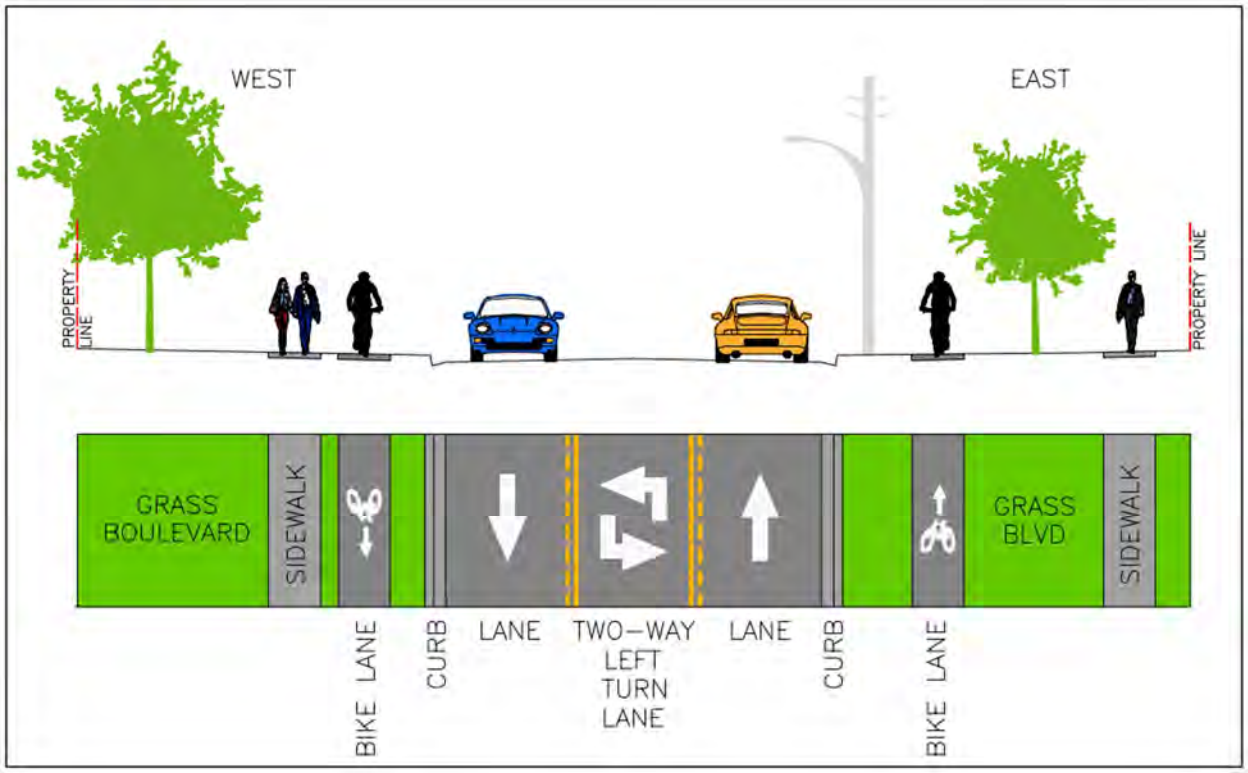
1.5.1 Phase 3 - Alternative Design Concepts

Based on the ATMP, Southcote Road is recommended to have a three-lane cross-section with sidewalks and cycling lanes on both sides of the road. Based on this recommendation, a number of design options were developed for the active transportation facilities along the corridor, as illustrated in the figures below:

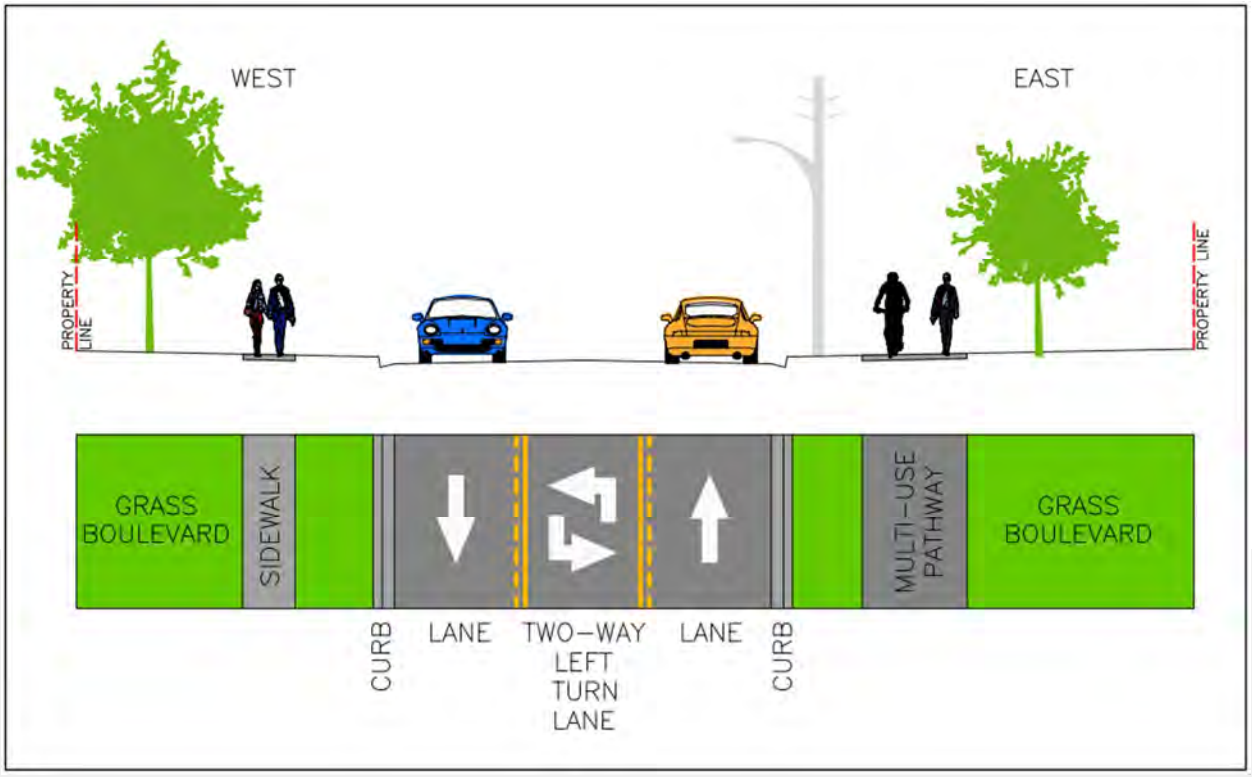
- Option 1 – Continuous sidewalks and on-road bike lanes on both sides of the road



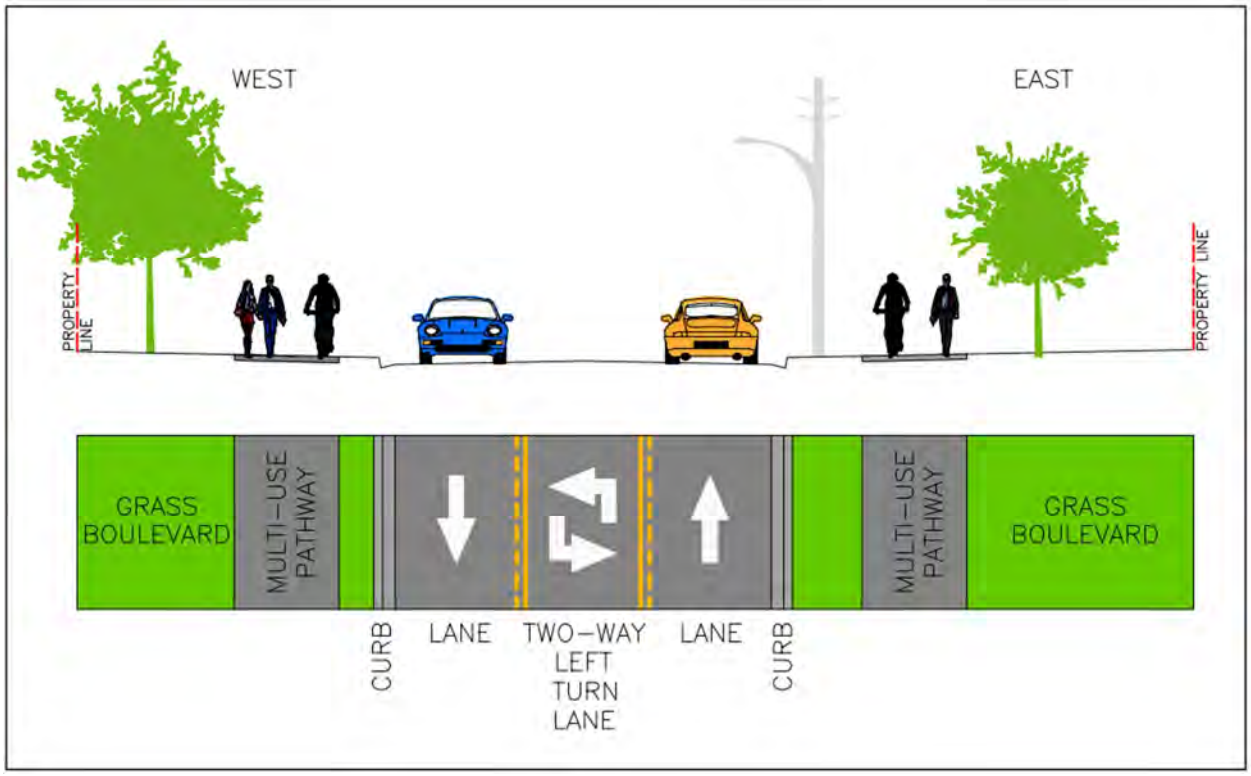
- Option 2 – Continuous sidewalks and protected bike lanes on both sides of the road



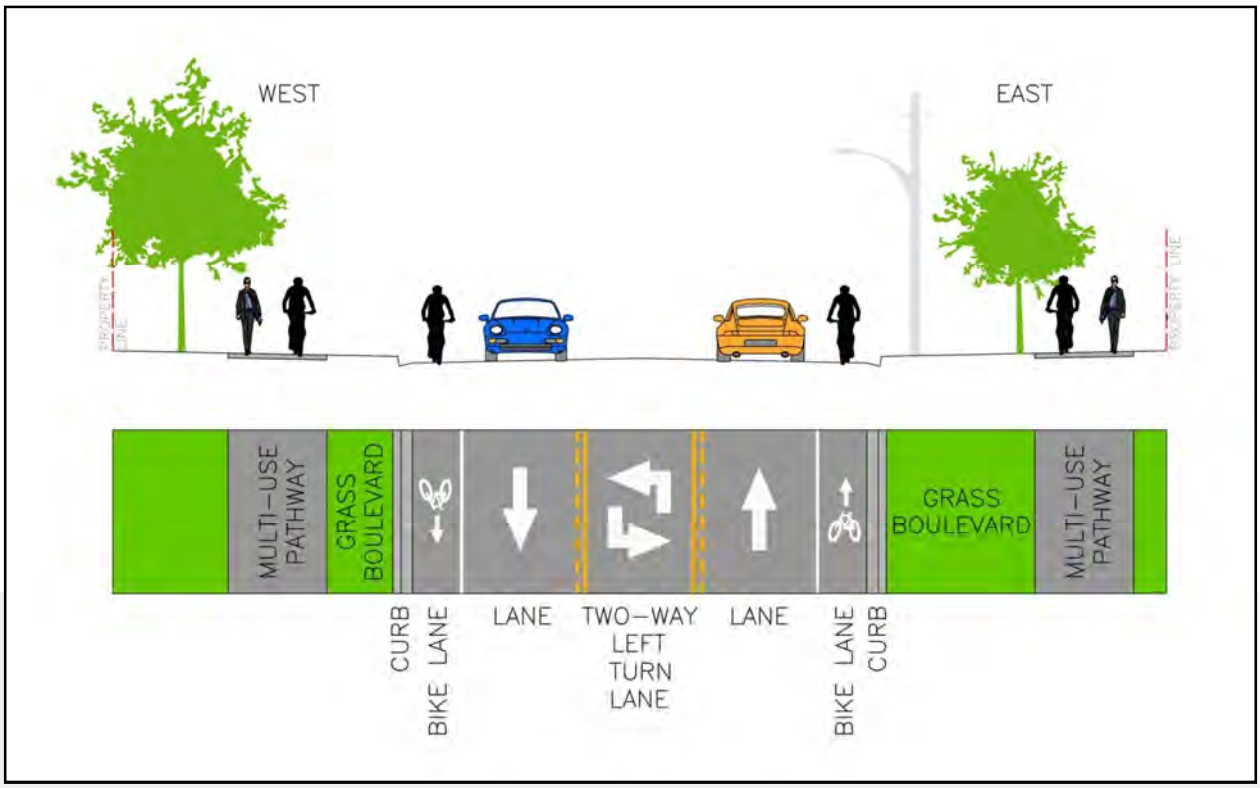
- Option 3 – Sidewalk on one side of the road and multi-use pathway (accommodating two directions of travel) on the other side of the road



- Option 4 – Multi-use pathways on both sides of the road



- Option 5 – Multi-use pathway and on-road bike lanes on both sides of the road



2.0 Existing Conditions

The following provides a summary of the existing conditions within the Southcote Road study area that were assessed as part of this study, but future analysis presented in this report focused on the review of alternative design concepts.

2.1 Road Network

Southcote Road is a north-south roadway, which runs through both urban and rural Ancaster and crosses Highway 403 but does not provide access to it. Southcote Road turns into McNiven Road at its northern terminus and dead ends when it reaches Hamilton International Airport at its southern terminus. Within the study area (Golf Links Road to Garner Road East), Southcote Road is a minor arterial roadway that has a two-lane cross-section. It has signalized intersections at Golf Links Road and Garner Road East, multiple Two-Way Stop Control (TWSC) intersections, and a significant number of residential driveways. The posted speed limit is 50 kilometres per hour with the exception of a short 40 kilometres per hour southbound section of road between Golf Links Road and approximately 150 metres south of Golf Links Road. Stopping/parking is prohibited between Golf Links Road and Dorval Drive / Oldoakes Place.

Golf Links Road is an east-west roadway which runs through urban Ancaster and crosses Highway 403 but does not provide access to it. West of Southcote Road/McNiven Road, Golf Links Road is a collector roadway with a two-lane cross-section. East of Southcote Road/McNiven Road, Golf Links Road is a minor arterial roadway with a two-lane cross-section that changes to a major arterial roadway when it crosses Highway 403. HSR bus routes 5C and 16 travel along this section of Golf Links Road. The westbound bus stop is located at Southcote Road/McNiven Road and the eastbound bus stop is located at Onondaga Drive. Golf Links Road has signalized intersections at Southcote Road and has an unposted speed limit of 50 kilometres per hour.

Stonehenge Drive is an east-west roadway that runs through the Meadowlands neighbourhood of Ancaster. It is a collector roadway that has a two-lane cross-section that connects Southcote Road (in the west) to Stone Church Road (in the east). Stonehenge Drive has TWSC at its intersection with Southcote Road and has an unposted speed limit of 50 kilometres per hour.

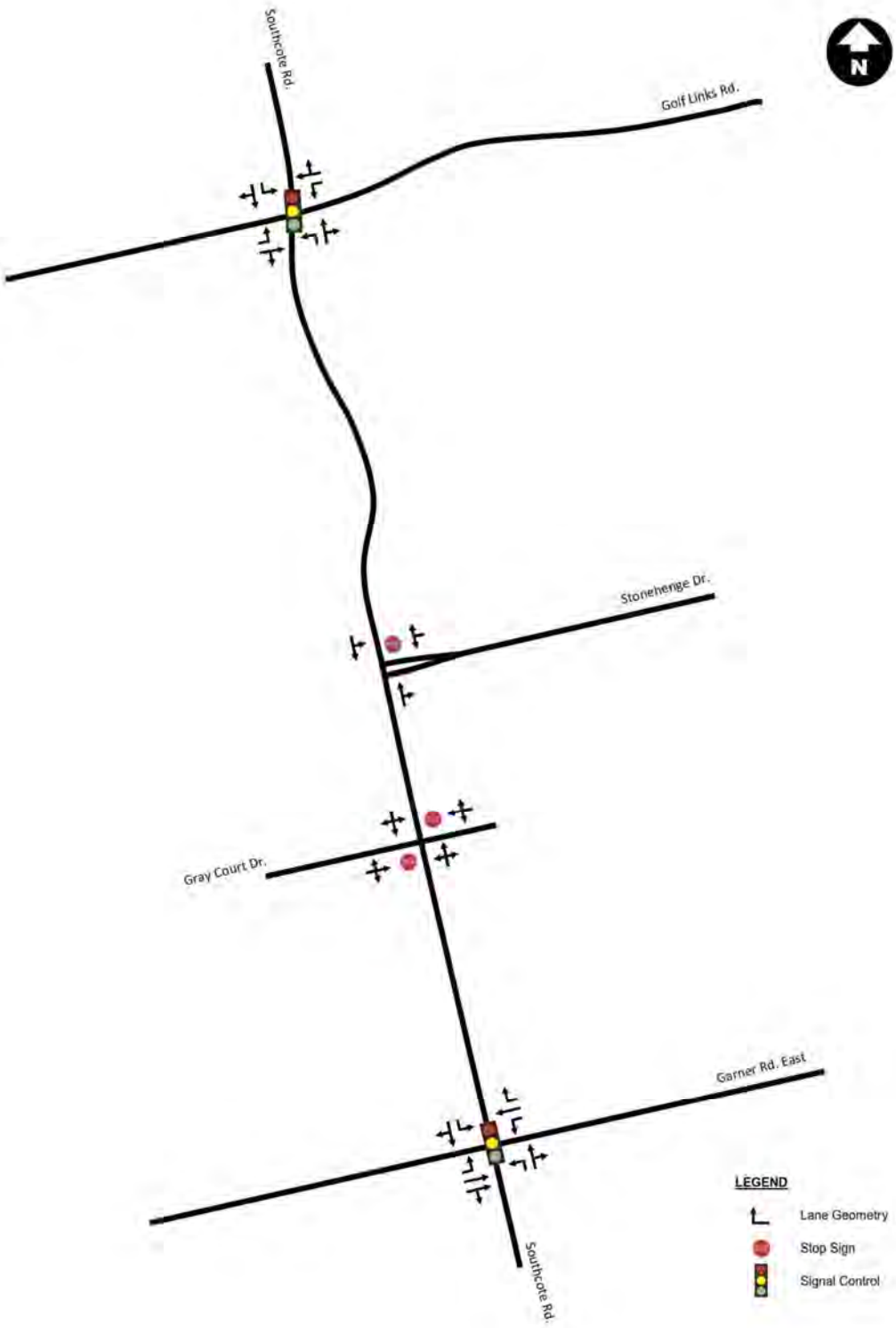
Gray Court Drive is an east-west residential roadway that has a two-lane cross-section. Gray Court Drive has TWSC at its intersection with Southcote Road and has an unposted speed limit of 50 kilometres per hour.

Garner Road East is an east-west roadway that bisects urban and rural Ancaster. Garner Road East is a major arterial roadway that has a two-lane cross-section. Its intersection with Southcote Road is

signalized. The posted speed limit is 60 kilometres per hour. Stopping/parking is prohibited in the immediate vicinity of the Garner Road East and Southcote Road intersection.

Figure 2 illustrates the existing lane configuration and traffic control within the study area.

Figure 2: Existing Traffic Control and Lane Configuration



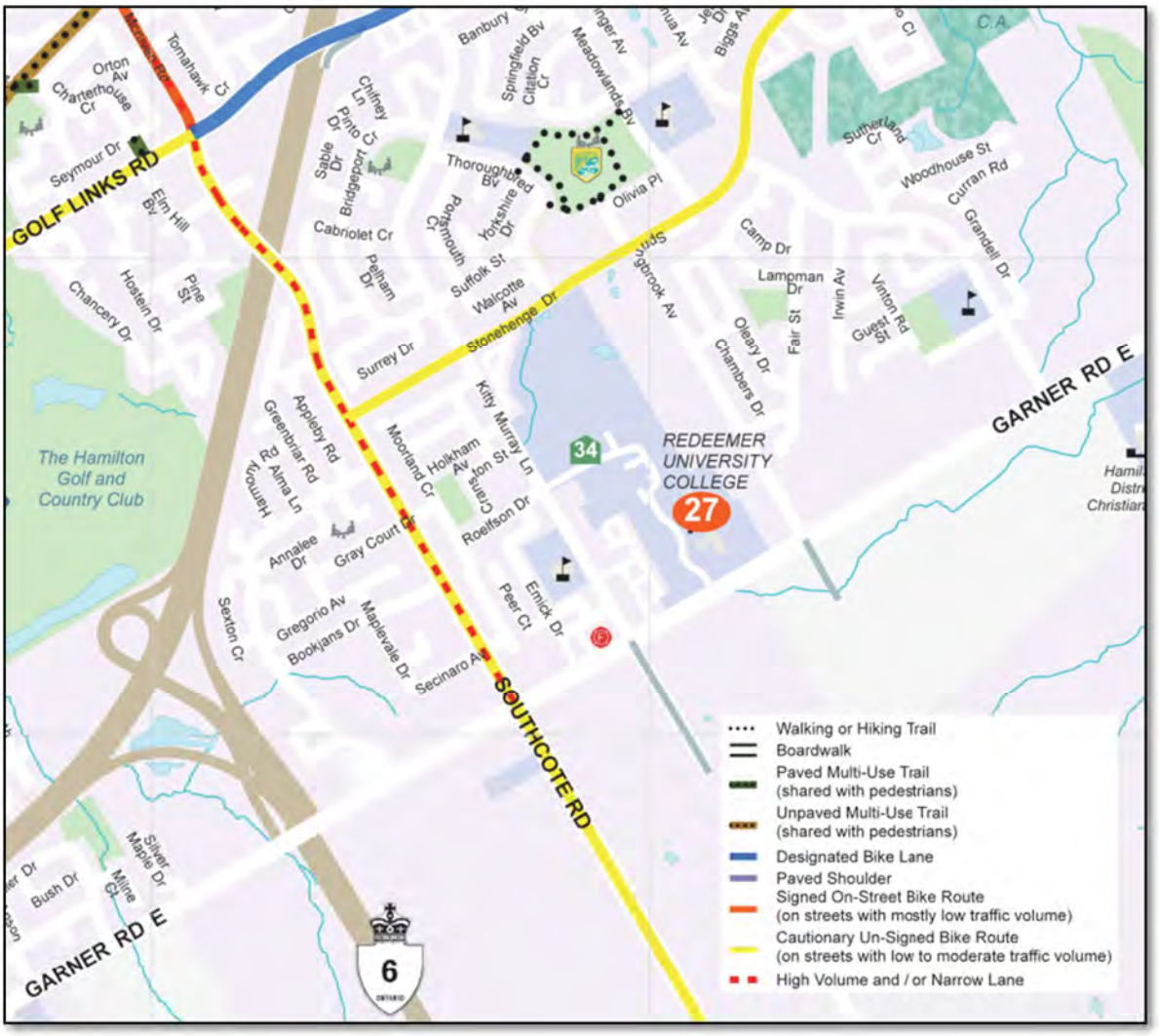
2.2 Active Transportation Network

The following describes the existing active transportation infrastructure and facilities as described by the City of Hamilton's 'Bike Routes, Trails and Parks Map' within the study area:

- Cycling facilities are not currently provided on **Southcote Road**. Southcote Road is classified as a "Cautionary Un-Signed Bike Route" with "High volume and /or narrow Lane".
- **Southcote Road** has intermittent sidewalk infrastructure. Some sections of the road have no sidewalks at all, while other sections have sidewalks on one, or both sides of the road.
- **Golf Links Road** has "Designated Bike Lanes" on both the north and south sides of the roadway east of Southcote Road/McNiven Road. Cycling facilities are not provided on Golf Links Road west of Southcote Road/McNiven Road. This section of Golf Links Road is classified as a "Cautionary Un-signed Bike Route".
- **Golf Links Road** has a sidewalk on the north side of the roadway east of Southcote Road/McNiven Road and sidewalks on both sides of the roadway west of Southcote Road/McNiven Road.
- Cycling facilities are not provided on **Stonehenge Road**. Stonehenge Road is classified as a "Cautionary Un-Signed Bike Route".
- **Stonehenge Road** has sidewalks on both sides of the roadway.
- Cycling facilities are not provided on **Gray Court Drive** and a sidewalk exists only on the north side of the road, east of Southcote Road.
- There are no cycling or pedestrian facilities on **Garner Road East.**

Figure 3 illustrates the existing cycling and trails infrastructure and facilities within the study area.

Figure 3: Existing Cycling and Trails Infrastructure and Facilities



2.3 Traffic Volumes

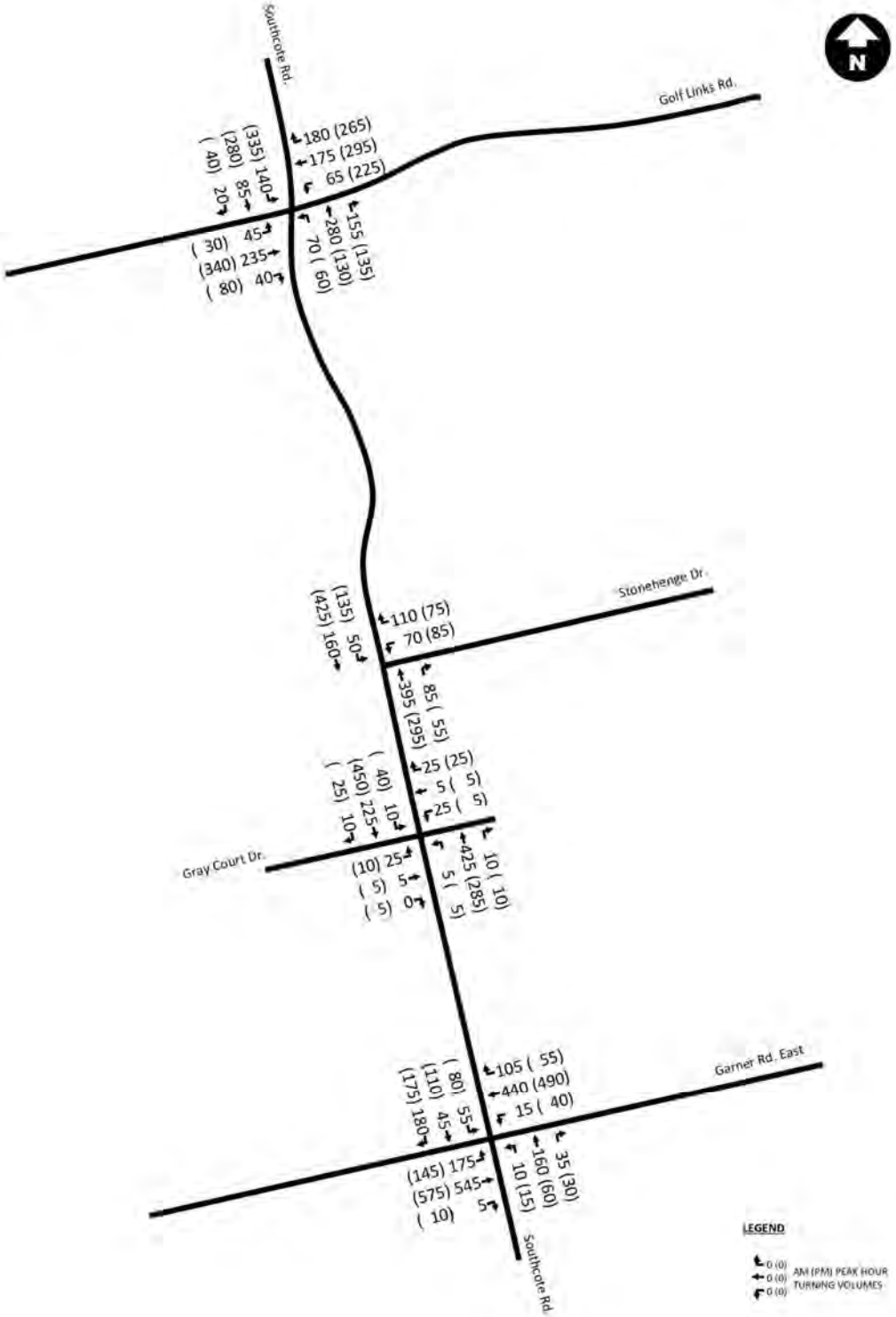
Turning movement count (TMC) traffic data for the study area intersections was collected by the City of Hamilton. The following list indicates the dates when each intersection was counted:

- Southcote Road / McNiven Road & Golf Links Road – Tuesday, April 24th 2018;
- Southcote Road & Stonehenge Drive – Wednesday, May 2nd 2018;
- Southcote Road & Gray Court Drive – Thursday, May 3rd 2018; and
- Southcote Road & Garner Road East – Monday, April 23rd 2018.

Counts were conducted from 7:00 AM to 9:00 AM and 4:00 PM to 6:00 PM. The existing traffic count data is provided in *Appendix A*. During the morning peak period, the peak hour was 8:00 AM to 9:00 AM except at the intersection of Southcote Road & Garner Road East, for which the peak hour was 7:45 AM to 8:45 AM.

During the afternoon peak period, the peak hour was 4:15 PM to 5:15 PM at Southcote Road / McNiven Road & Golf Links Road, 4:30 PM to 5:30 PM at Southcote Road & Stonehenge Drive, and 4:45 PM to 5:45 PM at Southcote Road & Garner Road East, and Southcote Road & Gray Court Drive. Minor traffic volume adjustments aimed at balancing volumes between intersections were required during the AM peak hour. The imbalance in traffic volumes between intersections is expected and is a result of residential roadways and driveways not being incorporated into the model, and general traffic variability as a result of traffic counts being collected on different days. Existing peak hour traffic volumes are illustrated in *Figure 4.* Traffic volumes were rounded to the nearest 5 vehicles.

Figure 4: Existing Traffic Volumes - 2018



3.0 Future Conditions

3.1 Road & Active Transportation Network

Southcote Road will be rebuilt to an urban cross section (which includes curbs and gutters) and will be widened to accommodate a three-lane cross-section. The roadway will also include active transportation facilities including a combination of sidewalks, cycling lanes and/or multi-use trails. The speed limit will remain at 50 km/h.

3.2 Traffic Volumes

Future traffic volumes were determined for the years 2020 and 2031. These years were selected given that the construction of Southcote Road is expected to be complete by the year 2020, and the horizon year in the TMP is 2031. The following sections outline the process and variables that went into calculating the future traffic volumes along Southcote Road.

3.2.1 Background Growth

To determine the amount of background growth on the road network, traffic projections from the City of Hamilton's long-range transportation model were reviewed. Historical (2011) and future (2031) AM peak hour volumes were used to determine background growth along Southcote Road, Golf Links Road, and Garner Road East. These growth factors ultimately account for future growth within the City of Hamilton as forecast by the City of Hamilton's Transportation Master Plan. The 2011 and 2031 Hamilton model plots (total volume) are provided in *Appendix B*. Based upon the trends derived from the model results, the following compounded annual growth rates were applied to the AM scenario:

- Southcote Road – Northbound: 3%
- Golf Links Road – Eastbound: 3%
- Garner Road East – Westbound: 3%
- Southcote Road – Southbound: 1%
- Golf Links Road – Westbound: 1%
- Garner Road East – Eastbound: 1.5%

These growth rates were applied to the PM peak hour volumes, except that the growth rates were reversed to reflect the change in peak travel direction. It should be noted that the growth factors were rounded to the nearest half percent and negative growth factors were manually adjusted up to 1% as negative growth in this area is unlikely and is likely a result of limited localized calibration within the models in the vicinity of the study area. Background growth volumes were rounded to the nearest 5 vehicles.

3.2.2 Area Site Traffic

In addition to the general background growth, outlined in the previous section, developments located in the immediate vicinity of the site must also be taken into consideration. The following sections outline three developments that were identified, the traffic they will generate, and the distribution of those trips. Aggregated background development volumes were rounded to the nearest 5 vehicles.

3.2.2.1 "Parkland Ancaster" Retirement Living and Nursing Home Development by Shannex

A retirement living and nursing home development is planned for the southeast corner of the Southcote Road and Golf Links Road intersection. The municipal address of this site is 558 Golf Links Road. This planned development by Shannex, known as "Parkland Ancaster", includes approximately 380 residential dwelling units comprising 174 'lifestyle apartments', 98 'hospitality & wellness suites', and 108 'assisted living, enriched & memory care' units distributed across two three-storey buildings. There is one vehicle access road envisioned to connect to Golf Links Road. The draft site plan is provided in *Appendix C*.

To account for this background development, the 9th Edition of the *Trip Generation Manual* published by the Institute of Transportation Engineers (ITE) was reviewed to calculate the anticipated vehicle trip generation of this development during weekday peak hours. *Table 1* summarizes the trip generation for the Parkland Ancaster background development.

Table 1: Parkland Ancaster Background Development Trip Generation

ITE Code	Units	AM Peak			PM Peak		
		In	Out	2-Way	In	Out	2-Way
252 - Senior Adult Housing - Attached	380	26	50	76	51	44	95

Trip generation calculations yielded a total two-way volume of 76 and 95 vehicles during the morning and afternoon peak hours. These volumes were then distributed using the existing trip distribution.

3.2.2.2 " Garner Road" Townhouse Development by Cara Custom Homes

A townhouse development is proposed for the vacant northwest corner of the Garner Road East and Southcote Road intersection. The municipal address of this site is 515 Garner Road East. The development will be comprised of 55 residential townhouse units. The proposed development will have two road accesses, Southcote Road and Secinaro Avenue. The draft site plan is provided in *Appendix D*.

To account for this background development, the ITE *Trip Generation Manual* was again reviewed to calculate the anticipated vehicle trips during weekday peak hours. *Table 2* summarizes the trip generation for the 515 Garner Road background development.

Table 2: 515 Garner Road Background Development Trip Generation

ITE Code	Units	AM Peak			PM Peak		
		In	Out	2-Way	In	Out	2-Way
230 - Residential Condominium/Townhouse	55	4	20	24	19	10	29

Trip generation calculations yielded a total two-way volume of 24 and 29 vehicles during the morning and afternoon peak hours. These volumes were then distributed using engineering first principles and the existing trip distribution patterns/proportions.

3.2.2.3 "Elm Hill Boulevard" Townhouse Development

A townhouse development is proposed for the vacant lands surrounded by Golf Links Road, Southcote Road, Dorval Drive and Elm Hill Boulevard. The development will be comprised of 20 residential townhouse units. The proposed development will likely have a single road access to Elm Hill Boulevard.

To account for this background development, the ITE *Trip Generation Manual* was again reviewed to calculate the anticipated vehicle trips during weekday peak hours. *Table 3* summarizes the trip generation for the Elm Hill Boulevard background development.

Table 3: Elm Hill Boulevard Background Development Trip Generation

ITE Code	Units	AM Peak			PM Peak		
		In	Out	2-Way	In	Out	2-Way
230 - Residential Condominium/Townhouse	20	1	8	9	7	3	10

Trip generation calculations yielded a total two-way volume of 9 and 10 vehicles during the morning and a ernoon peak hours. These volumes were then distributed using engineering first principles and the existing trip distribution patterns/proportions.

3.2.3 Trip Distribution & Assignment

The estimated traffic generated for the three background developments was distributed and assigned to the road network using the existing trip distribution patterns and professional engineering judgment. The anticipated total future traffic volumes, which are a combination of existing, background growth, and background development traffic volumes, for the 2020 and 2031 horizon years are illustrated in *Figure 5* and *Figure 6.*

Figure 5: Total Future Traffic Volumes – 2020

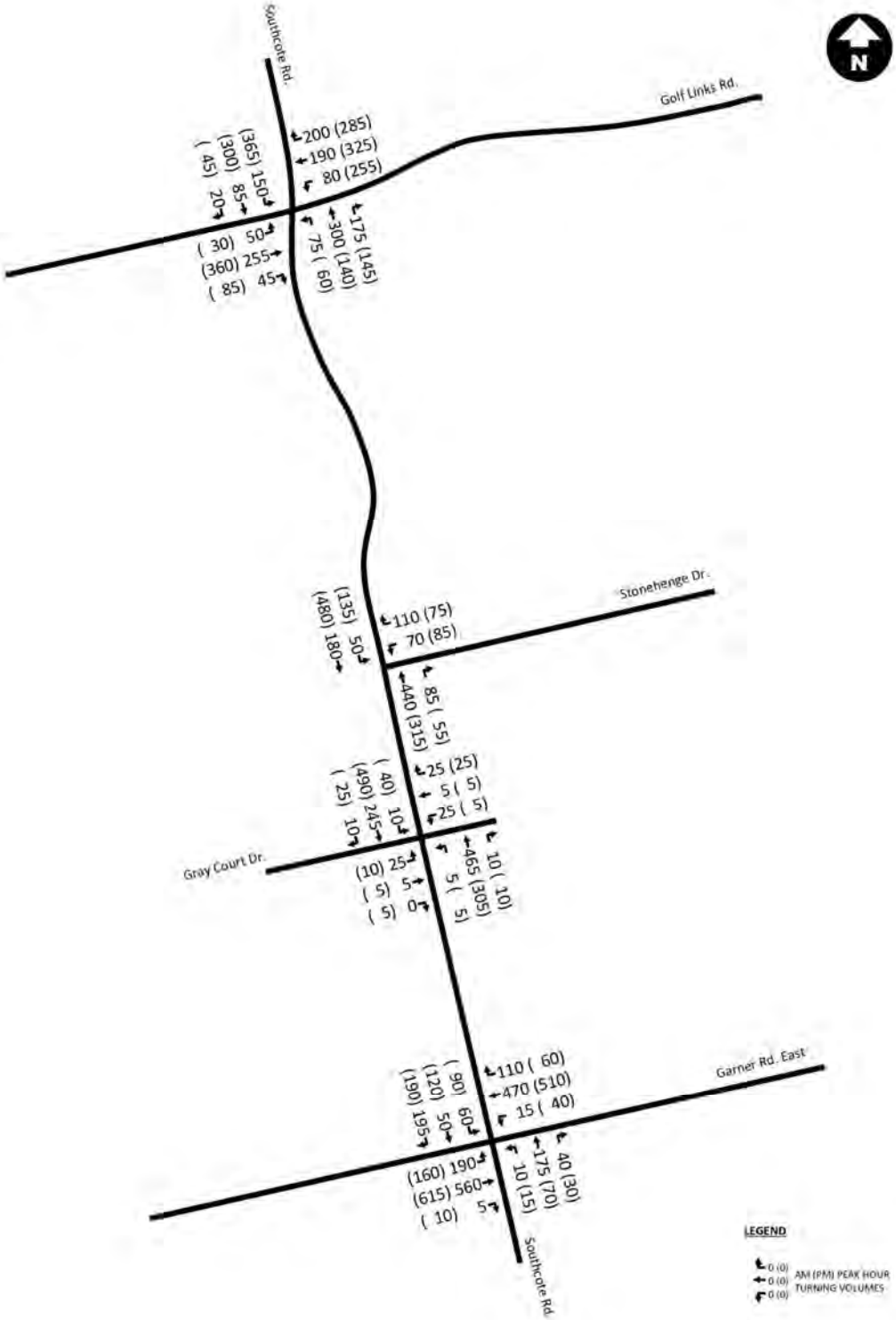
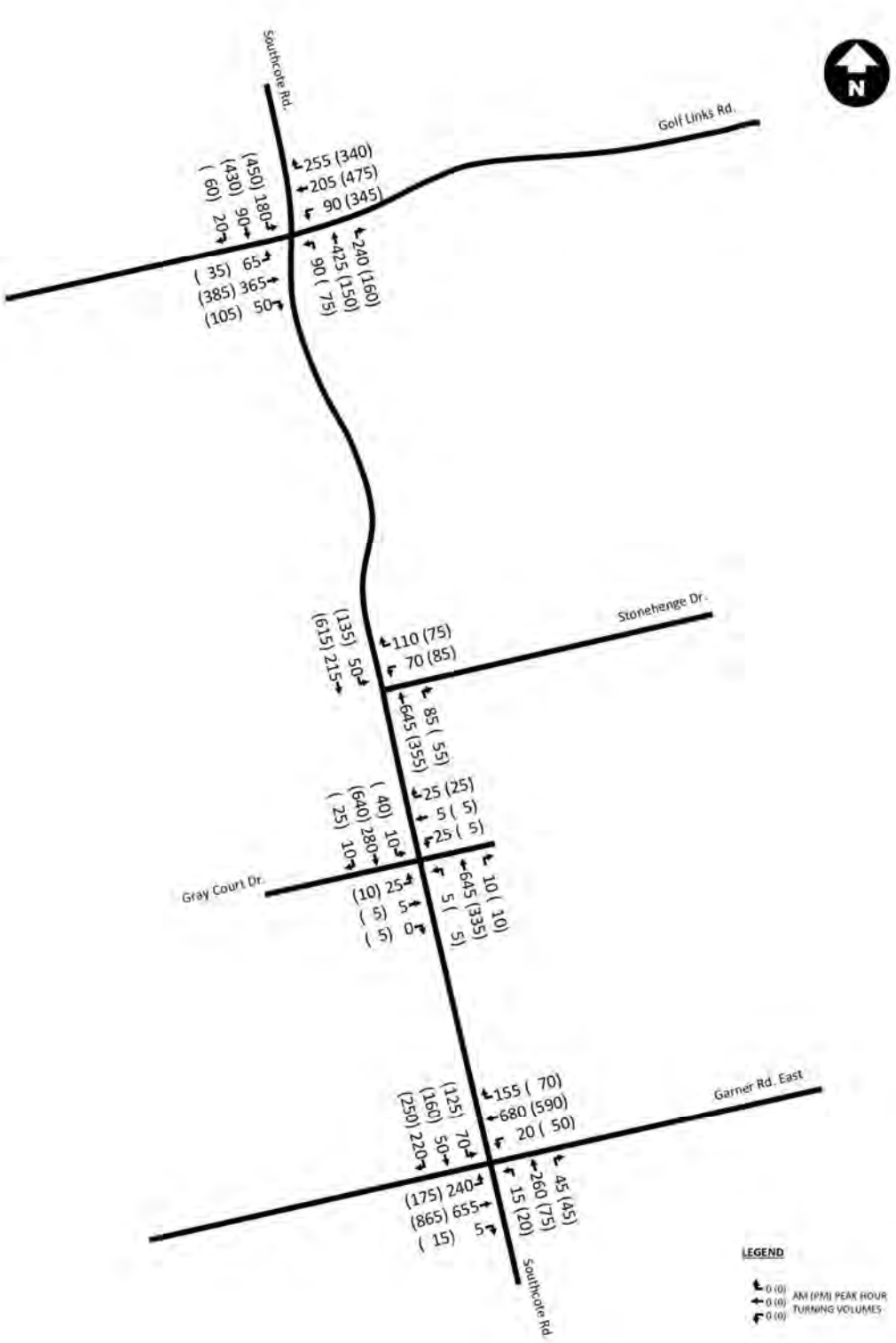


Figure 6: Total Future Traffic Volumes – 2031



4.0 Traffic Assessment

4.1 Methodology

Traffic operations within the study area were analyzed based upon the methodology outlined in the Highway Capacity Manual (HCM), 2000 edition[1], using the Synchro software package (version 8).

The analysis parameters include 15-metre right turn lanes on the westbound approaches to the Golf Links Road & Southcote Road, Stonehenge Drive & Southcote Road, and Gray Court Dive & Southcote Road intersections. This is the means in which Synchro accounts for a single-lane approach where the throat is wide enough to permit right-turning vehicles to bypass a queued vehicle (as documented in the HCM methodology).

The volume-to-capacity (v/c) ratio, average delay, level of service (based on delay) and 95th percentile queue length were identified for each movement. Any critical movements were identified and defined based on MTO parameters (any individual turning movement with a v/c ratio greater than 0.85).

4.2 Existing Conditions

The Synchro analysis results for the existing conditions are summarized in *Table 4*. Detailed Synchro analysis output worksheets are provided in *Appendix E*.

Table 4: Synchro Analysis Results Summary – Existing Conditions

Intersection	*Movement*	*v/c*	*Delay (s/veh)*	*LOS*	*95th %tile Queue (m)*
Southcote Rd / McNiven Rd & Golf Links Rd *(signalized)*	EBL	0.14 (0.10)	21.6 (24.1)	C (C)	16.3 (11.4)
	EBTR	0.52 (0.80)	25.2 (38.9)	C (D)	74.8 (120.3)
	WBL	0.21 (0.76)	16.8 (28.8)	B (C)	16.8 (43.7)
	WBTR	0.26 (0.38)	17.5 (18.5)	B (B)	41.0 (58.6)
	NBL	0.17 (0.22)	20.1 (26.3)	C (C)	19.7 (20.4)
	NBTR	0.75 (0.50)	30.5 (29.1)	C (C)	106.5 (61.4)
	SBL	0.47 (0.72)	16.6 (24.2)	B (C)	25.6 (64.3)
	SBTR	0.13 (0.41)	13.4 (18.2)	B (B)	19.6 (64.8)
	Overall	**0.60 (0.79)**	**22.4 (25.6)**	**C (C)**	-
Southcote Rd & Stonehenge Rd	WB	0.20 (0.46)	14.3 (24.9)	B (C)	6.1 (18.9)
	NB	0.30 (0.23)	0.0 (0.0)	A (A)	0.0 (0.0)
	SB	0.05 (0.13)	2.4 (3.2)	A (A)	1.3 (3.4)

[1] Synchro 8 can also report on the HCM 2010 methodology. However, Synchro's HCM 2010 output for two-way stop controlled intersections does not correctly account for the effect of the right turn flares (large corner radii) that allow right-turning motorists to bypass a vehicle queued to make a left turn. As such, the HCM 2000 report is more reflective of actual conditions on the stop-controlled movements.

Intersection	Movement	v/c	Delay (s/veh)	LOS	95th %tile Queue (m)
Southcote Rd & Gray Court Dr	EB	0.11 (0.09)	18.4 (20.6)	C (C)	2.9 (2.4)
	WB	0.10 (0.05)	14.7 (13.6)	B (B)	2.7 (1.3)
	NB	0.00 (0.01)	0.1 (0.2)	A (A)	0.1 (0.1)
	SB	0.01 (0.04)	0.4 (1.0)	A (A)	0.2 (0.9)
Southcote Rd & Garner Road East *(signalized)*	EBL	0.49 (0.45)	9.6 (9.9)	A (A)	28.4 (26.7)
	EBTR	0.35 (0.37)	7.6 (8.1)	A (A)	28.7 (34.2)
	WBL	0.04 (0.11)	6.3 (7.1)	A (A)	3.2 (7.6)
	WBT	0.52 (0.58)	9.0 (10.3)	A (B)	54.6 (70.2)
	WBR	0.07 (0.04)	6.4 (6.6)	A (A)	5.9 (4.8)
	NBL	0.04 (0.06)	13.6 (13.6)	B (B)	4.5 (5.7)
	NBTR	0.45 (0.16)	15.8 (14.0)	B (B)	38.4 (16.9)
	SBL	0.21 (0.25)	14.5 (14.6)	B (B)	14.4 (19.2)
	SBTR	0.24 (0.54)	14.5 (16.8)	B (B)	20.6 (46.5)
	Overall	**0.50 (0.57)**	**10.1 (10.8)**	**B (B)**	-

Notes: 00 (00) – AM (PM)

Under existing conditions, all four intersections within the study area are operating at good levels of service and are under capacity. The eastbound shared through-right turn movement at the intersection of Southcote Rd / McNiven Road & Golf Links Road is approaching critical movement status during the PM peak hour. This movement has a 95th percentile queue length of 120 metres (or 16 vehicles based upon an assumed, conservative passenger car unit length of 7.5 metres).

4.3 Future Do Nothing Conditions

4.3.1 Total Future Do Nothing - Conditions

The Synchro analysis results for the 2020 Total Future Do Nothing Conditions are summarized in *Table 5*. Detailed Synchro analysis output worksheets are provided in *Appendix E*.

Table 5: Synchro Analysis Results Summary – Do Nothing 2020 Conditions

Intersection	Movement	v/c	Delay (s/veh)	LOS	95th %tile Queue (m)
Southcote Rd / McNiven Rd & Golf Links Rd *(signalized)*	EBL	0.16 (0.10)	22.5 (24.3)	C (C)	17.9 (11.5)
	EBTR	0.57 (0.85)	27.1 (43.6)	C (D)	82.1 (132.4)
	WBL	0.27 (0.89)	17.8 (45.4)	B (D)	19.7 (68.5)
	WBTR	0.28 (0.41)	18.3 (18.7)	B (B)	44.1 (65.4)
	NBL	0.18 (0.23)	20.1 (26.8)	C (C)	21.4 (20.5)
	NBTR	0.81 (0.53)	33.4 (30.0)	C (C)	122.5 (64.9)
	SBL	0.55 (0.81)	18.3 (31.2)	B (C)	27.7 (77.3)
	SBTR	0.13 (0.44)	13.4 (19.0)	B (B)	20.2 (69.9)
	Overall	**0.65 (0.91)**	**24.1 (29.6)**	**C (C)**	-
Southcote Rd & Stonehenge Rd	WB	0.22 (0.52)	15.3 (29.0)	C (D)	6.9 (22.7)
	NB	0.33 (0.24)	0.0 (0.0)	A (A)	0.0 (0.0)
	SB	0.05 (0.13)	2.3 (3.1)	A (A)	1.3 (3.5)

Table 9: Signal Warrant Analysis - Southcote Road & Stonehenge Road

Jus. fication	Description	Minimum Requirement	Compliance		
			Sectional		Entire
		Restricted Flow	Numerical	%	%
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour*)	720	624	87%	50%
	B. Vehicle volume, along minor street (average hour*)	170	85	50%	
2. Delay to cross traffic	A. Vehicle volume, major street (average hour*)	720	539	75%	52%
	B. Combined vehicle and pedestrian volume cross artery from minor streets (average hour*)	75	39	52%	

Based on the signal warrant calcula. ons, traffic control signals are not warranted at the intersection of Southcote Road & Stonehenge Road.

4.6 Total Future TWLTL (Mitigated) - 2031 Conditions

Multiple mitigation measures were reviewed to improve the overall operations for the intersection of Southcote Road / McNiven Road & Golf Links Road without physically altering the intersection. The following mitigation measures were found to be required:

- Optimized the AM Cycle length (97 seconds → 90 seconds)
  - Reduced pedestrian walk time from 20 seconds to 12 seconds
  - Optimized the signal timing splits
- Optimized the PM Cycle length (97 seconds → 115 seconds)
  - Optimized the signal timing splits

The Synchro analysis results for the study area under 2031 total future mitigated conditions are summarized in *Table 10*. Detailed Synchro analysis output worksheets are provided in *Appendix E*.

Table 10: Synchro Analysis Results Summary – 2031 Conditions - Mitigated

Intersection	*Movement*	*v/c*	*Delay (s/veh)*	*LOS*	*95th %tile Queue (m)*
Southcote Rd / McNiven Rd & Golf Links Rd *(signalized)*	EBL	0.22 (0.15)	24.5 (31.3)	C (C)	20.9 (15.7)
	EBTR	0.84 (0.99)	40.9 (79.6)	D (E)	127.2 (192.1)
	WBL	0.54 (1.01)	22.7 (85.4)	C (F)	21.1 (131.5)
	WBTR	0.33 (0.56)	20.7 (23.0)	C (C)	46.2 (118.0)
	NBL	0.19 (0.38)	18.1 (37.8)	B (D)	21.9 (30.4)
	NBTR	1.00 (0.72)	62.2 (46.5)	E (D)	204.7 (93.9)
	SBL	0.94 (1.06)	64.2 (88.0)	E (F)	58.3 (142.2)
	SBTR	0.12 (0.64)	12.3 (27.4)	B (C)	19.2 (127.1)
	Overall	**0.91 (1.09)**	**41.4 (52.4)**	**D (D)**	-

Intersection	Movement	v/c	Delay (s/veh)	LOS	95th %tile Queue (m)
Southcote Rd & Stonehenge Rd	WB	0.32 (0.72)	21.0 (50.3)	C (F)	11.1 (39.3)
	NB	0.46 (0.27)	0.0 (0.0)	A (A)	0.0 (0.0)
	SB	0.06 (0.13)	2.4 (3.1)	A (A)	1.6 (3.6)
Southcote Rd & Gray Court Dr	EB	0.18 (0.14)	28.4 (30.0)	D (D)	4.9 (3.8)
	WB	0.16 (0.08)	20.6 (16.6)	C (C)	4.6 (2.0)
	NB	0.00 (0.01)	0.1 (0.2)	A (A)	0.1 (0.2)
	SB	0.01 (0.04)	0.4 (1.0)	A (A)	0.3 (1.0)
Southcote Rd & Garner Road East *(signalized)*	EBL	0.88 (0.70)	39.1 (20.9)	D (C)	93.7 (48.8)
	EBTR	0.34 (0.52)	7.7 (10.8)	A (B)	44.8 (62.2)
	WBL	0.05 (0.23)	6.2 (9.5)	A (A)	5.0 (11.1)
	WBT	0.64 (0.66)	11.4 (13.6)	B (B)	128.3 (100.5)
	WBR	0.11 (0.05)	6.4 (7.8)	A (A)	8.0 (5.5)
	NBL	0.09 (0.14)	24.7 (17.1)	C (B)	7.0 (9.3)
	NBTR	0.76 (0.20)	37.1 (17.1)	D (B)	78.1 (26.9)
	SBL	0.56 (0.36)	32.7 (18.5)	C (B)	25.8 (35.7)
	SBTR	0.38 (0.76)	26.9 (27.4)	C (C)	35.8 (109.1)
	Overall	**0.85 (0.72)**	**18.5 (15.7)**	**B (B)**	-

Notes: 00 (00) – AM (PM)

Under 2031 Total Future Do Nothing Conditions, multiple intersections will operate poorly, with some movements reaching LOS F.

The intersection of Southcote Road / McNiven Road & Golf Links Road will have multiple critical movements during both peak hours. During the AM peak hour, two movements have reached critical movement status; the northbound shared through-right turn movement and the southbound left turn movement. The eastbound shared through-right turn movement is approaching critical movement status. The 95th percentile southbound left turn queue is expected to be around 62 metres in length, exceeding the 45 metres of storage currently available. During the PM peak hour, three movements have reached critical movement status; the eastbound shared through-right turn movement, the westbound left turn movement, and the southbound left turn movement. The 95th percentile queues for the westbound left turn (130.1 metres) and the southbound left turn (133.6 metres) both exceed the storage currently available.

The intersection of Southcote Road & Garner Road East operates at LOS B overall during both peak hours. During the AM peak hour, the eastbound left turn movement has reached critical movement status.

The westbound approach to the Southcote Road & Stonehenge Road intersection is expected to operate at LOS F during the PM peak hour. While the delays are expected to slightly exceed 50 seconds, the approach is still anticipated to operate within capacity (v/c = 0.72).

All movements at the unsignalized intersection of Southcote Road & Gray Court Drive are expected to operate within capacity at LOS D or better.

4.4 Future - Two-Way Left-Turn Lane (TWLTL)

The planned future conditions for Southcote Road include widening the roadway to a three-lane cross-section to accommodate a two-way left turn lane. This widening does not impact the signalized intersections at Golf Links Road / McNiven Road, or Garner Road East, but it does provide left-turn lanes at the unsignalized intersections and at the numerous residential property driveways that front onto Southcote Road.

4.4.1 Total Future TWLTL - Conditions

The Synchro analysis results for the 2020 Total Future TWLTL Conditions are summarized in *Table 7*. Detailed Synchro analysis output worksheets are provided in *Appendix E*.

Table 7: Synchro Analysis Results Summary – 2020 Conditions

Intersection	*Movement*	*v/c*	*Delay (s/veh)*	*LOS*	*95th %tile Queue (m)*
Southcote Rd / McNiven Rd & Golf Links Rd *(signalized)*	EBL	0.16 (0.10)	22.5 (24.3)	C (C)	17.9 (11.5)
	EBTR	0.57 (0.85)	27.1 (43.6)	C (D)	82.1 (132.4)
	WBL	0.27 (0.89)	17.8 (45.4)	B (D)	19.7 (68.5)
	WBTR	0.28 (0.41)	18.3 (18.7)	B (B)	44.1 (65.4)
	NBL	0.18 (0.23)	20.1 (26.8)	C (C)	21.4 (20.5)
	NBTR	0.81 (0.53)	33.4 (30.0)	C (C)	122.5 (64.9)
	SBL	0.55 (0.81)	18.3 (31.2)	B (C)	27.7 (77.3)
	SBTR	0.13 (0.44)	13.4 (19.0)	B (B)	20.2 (69.9)
	Overall	**0.65 (0.91)**	**24.1 (29.6)**	**C (C)**	-
Southcote Rd & Stonehenge Rd	WB	0.22 (0.52)	15.3 (29.0)	C (D)	6.9 (22.7)
	NB	0.33 (0.24)	0.0 (0.0)	A (A)	0.0 (0.0)
	SBL	0.05 (0.13)	8.7 (8.5)	A (A)	1.3 (3.5)
	SBTR	0.11 (0.31)	0.0 (0.0)	A (A)	0.0 (0.0)
Southcote Rd & Gray Court Dr	EB	0.12 (0.10)	19.9 (22.4)	C (C)	3.2 (2.7)
	WB	0.11 (0.06)	15.6 (14.2)	C (B)	3.0 (1.4)
	NBL	0.00 (0.01)	7.8 (8.7)	A (A)	0.1 (0.1)
	NBTR	0.30 (0.22)	0.0 (0.0)	A (A)	0.0 (0.0)
	SBL	0.01 (0.04)	8.4 (8.1)	A (A)	0.2 (1.0)
	SBTR	0.16 (0.35)	0.0 (0.0)	A (A)	0.0 (0.0)
Southcote Rd & Garner Road East *(signalized)*	EBL	0.55 (0.52)	10.9 (11.2)	B (A)	35.5 (33.9)
	EBTR	0.35 (0.38)	7.7 (8.4)	A (A)	32.2 (40.5)
	WBL	0.04 (0.12)	6.3 (7.3)	A (A)	3.5 (8.2)
	WBT	0.54 (0.60)	9.3 (10.8)	A (A)	64.5 (80.7)
	WBR	0.08 (0.04)	6.4 (6.8)	A (A)	6.3 (5.2)
	NBL	0.04 (0.07)	14.6 (14.2)	B (A)	5.0 (6.2)
	NBTR	0.49 (0.19)	17.2 (14.8)	B (A)	48.3 (20.8)
	SBL	0.23 (0.28)	15.7 (15.4)	B (A)	17.7 (23.1)
	SBTR	0.26 (0.59)	15.7 (18.5)	B (A)	24.5 (56.8)
	Overall	**0.53 (0.59)**	**10.8 (11.6)**	**B (B)**	-

Notes: 00 (00) – AM (PM)

Under total future 2020 conditions, both signalized intersections will operate acceptably overall at LOS C or better. During the PM peak hour, two movements will have reached critical movement status; the eastbound shared through-right turn movement and the westbound left turn movement at the Southcote Road / McNiven Road & Golf Links Road intersection. The 95th percentile queues associated with these two movements can be accommodated by the existing infrastructure.

At the unsignalized intersections, most movements will operate at LOS C or better, except for the westbound movement at the Stonehenge Road intersection in the PM peak hour. During this time, the westbound movement is anticipated to operate at LOS D.

4.4.2 Total Future TWLTL - Conditions

The Synchro analysis results for the study area under 2031 Total Future TWLTL Conditions are summarized in *Table 8*. Detailed Synchro analysis output worksheets are provided in *Appendix E*.

Table 8: Synchro Analysis Results Summary – 2031 Conditions

Intersection	Movement	v/c	Delay (s/veh)	LOS	95th %tile Queue (m)
Southcote Rd / McNiven Rd & Golf Links Rd *(signalized)*	EBL	0.22 (0.14)	26.0 (24.9)	C (C)	22.2 (13.5)
	EBTR	0.84 (0.93)	42.8 (56.2)	D (E)	132.8 (159.9)
	WBL	0.49 (1.32)	22.6 (190.5)	C (F)	21.8 (130.1)
	WBTR	0.32 (0.60)	21.3 (21.8)	C (C)	47.6 (107.5)
	NBL	0.20 (0.32)	19.5 (28.0)	B (C)	25.0 (25.1)
	NBTR	1.02 (0.59)	69.1 (31.7)	E (C)	223.0 (73.4)
	SBL	0.91 (1.07)	57.5 (88.1)	E (F)	62.1 (133.6)
	SBTR	0.13 (0.63)	13.1 (22.4)	B (C)	21.1 (107.3)
	Overall	**0.91 (1.28)**	**43.6 (57.6)**	**D (E)**	-
Southcote Rd & Stonehenge Rd	WB	0.32 (0.72)	21.0 (50.3)	C (F)	11.1 (39.3)
	NB	0.46 (0.27)	0.0 (0.0)	A (A)	0.0 (0.0)
	SBL	0.06 (0.13)	9.5 (8.7)	A (A)	1.6 (3.6)
	SBTR	0.13 (0.40)	0.0 (0.0)	A (A)	0.0 (0.0)
Southcote Rd & Gray Court Dr	EB	0.17 (0.14)	28.2 (29.9)	D (D)	4.9 (3.8)
	WB	0.16 (0.08)	20.5 (16.5)	C (C)	4.5 (2.0)
	NBL	0.00 (0.01)	7.9 (9.3)	A (A)	0.1 (0.2)
	NBTR	0.42 (0.24)	0.0 (0.0)	A (A)	0.0 (0.0)
	SBL	0.01 (0.04)	9.1 (8.2)	A (A)	0.3 (1.0)
	SBTR	0.19 (0.45)	0.0 (0.0)	A (A)	0.0 (0.0)
Southcote Rd & Garner Road East *(signalized)*	EBL	0.88 (0.70)	39.1 (20.9)	D (C)	93.7 (48.8)
	EBTR	0.34 (0.52)	7.7 (10.8)	A (B)	44.8 (62.2)
	WBL	0.05 (0.23)	6.2 (9.5)	A (A)	5.0 (11.1)
	WBT	0.64 (0.66)	11.4 (13.6)	B (B)	128.3 (100.5)
	WBR	0.11 (0.05)	6.4 (7.8)	A (A)	8.0 (5.5)
	NBL	0.09 (0.14)	24.7 (17.1)	C (B)	7.0 (9.3)
	NBTR	0.76 (0.20)	37.1 (17.1)	D (B)	78.1 (26.9)
	SBL	0.56 (0.36)	32.7 (18.5)	C (B)	25.8 (35.7)
	SBTR	0.38 (0.76)	26.9 (27.4)	C (C)	35.8 (109.1)
	Overall	**0.85 (0.72)**	**18.5 (15.7)**	**B (B)**	-

Notes: 00 (00) – AM (PM)

Under total future conditions in 2031, multiple intersections will operate poorly, with some movements reaching LOS F.

The intersection of Southcote Road / McNiven Road & Golf Links Road will have multiple critical movements during both peak hours. During the AM peak hour, two movements have reached critical movement status; the northbound shared through-right turn movement and the southbound left turn movement. The eastbound shared through-right turn movement is approaching critical movement status. The 95th percentile southbound left turn queue is expected to be around 62 metres in length, exceeding the 45 metres of storage currently available. During the PM peak hour, three movements have reached critical movement status; the eastbound shared through-right turn movement, the westbound left turn movement, and the southbound left turn movement. The 95th percentile queues for the westbound left turn (130.1 metres) and the southbound left turn (133.6 metres) both exceed the storage currently available.

The intersection of Southcote Road & Garner Road East operates at LOS B overall during both peak hours. During the AM peak hour, the eastbound left turn movement has reached critical movement status.

The westbound approach to the Southcote Road & Stonehenge Road intersection is expected to operate at LOS F during the PM peak hour. While the delays are expected to slightly exceed 50 seconds, the approach is still anticipated to operate within capacity (v/c = 0.72).

All movements at the unsignalized intersection of Southcote Road & Gray Court Drive are expected to operate within capacity at LOS D or better.

4.5 Signal Warrant Analysis

To assess whether signals would be warranted at the intersection of Southcote Road & Stonehenge Road, signal warrant calculations were undertaken in accordance with the "Projected Volumes" justification methodology outlined in the *Ontario Traffic Manual Book 12 – Traffic Signals*. This methodology was developed to provide guidance on determining whether traffic control signals would be warranted at an intersection as a result of future development (where volumes are predicted for a peak hour(s) only). As a result of the increased uncertainty surrounding volume projections for future developments, the justification must be satisfied to 120% where an intersection currently exists. *Table 9* illustrates the warrant calculations.

Table 9: Signal Warrant Analysis - Southcote Road & Stonehenge Road

Justification	Description	Minimum Requirement	Compliance		
			Sectional		Entire
		Restricted Flow	Numerical	%	%
1. Minimum Vehicular Volume	A. Vehicle volume, all approaches (average hour*)	720	624	87%	50%
	B. Vehicle volume, along minor street (average hour*)	170	85	50%	
2. Delay to cross traffic	A. Vehicle volume, major street (average hour*)	720	539	75%	52%
	B. Combined vehicle and pedestrian volume cross artery from minor streets (average hour*)	75	39	52%	

Based on the signal warrant calculations, traffic control signals are not warranted at the intersection of Southcote Road & Stonehenge Road.

4.6 Total Future TWLTL (Mitigated) - 2031 Conditions

Multiple mitigation measures were reviewed to improve the overall operations for the intersection of Southcote Road / McNiven Road & Golf Links Road without physically altering the intersection. The following mitigation measures were found to be required:

- Optimized the AM Cycle length (97 seconds → 90 seconds)
  - Reduced pedestrian walk time from 20 seconds to 12 seconds
  - Optimized the signal timing splits
- Optimized the PM Cycle length (97 seconds → 115 seconds)
  - Optimized the signal timing splits

The Synchro analysis results for the study area under 2031 total future mitigated conditions are summarized in *Table 10*. Detailed Synchro analysis output worksheets are provided in *Appendix E*.

Table 10: Synchro Analysis Results Summary – 2031 Conditions - Mitigated

Intersection	*Movement*	*v/c*	*Delay (s/veh)*	*LOS*	*95th %tile Queue (m)*
Southcote Rd / McNiven Rd & Golf Links Rd *(signalized)*	EBL	0.22 (0.15)	24.5 (31.3)	C (C)	20.9 (15.7)
	EBTR	0.84 (0.99)	40.9 (79.6)	D (E)	127.2 (192.1)
	WBL	0.54 (1.01)	22.7 (85.4)	C (F)	21.1 (131.5)
	WBTR	0.33 (0.56)	20.7 (23.0)	C (C)	46.2 (118.0)
	NBL	0.19 (0.38)	18.1 (37.8)	B (D)	21.9 (30.4)
	NBTR	1.00 (0.72)	62.2 (46.5)	E (D)	204.7 (93.9)
	SBL	0.94 (1.06)	64.2 (88.0)	E (F)	58.3 (142.2)
	SBTR	0.12 (0.64)	12.3 (27.4)	B (C)	19.2 (127.1)
	Overall	**0.91 (1.09)**	**41.4 (52.4)**	**D (D)**	-

Intersection	Movement	v/c	Delay (s/veh)	LOS	95th %tile Queue (m)
Southcote Rd & Stonehenge Rd	WB	0.32 (0.72)	21.0 (50.3)	C (F)	11.1 (39.3)
	NB	0.46 (0.27)	0.0 (0.0)	A (A)	0.0 (0.0)
	SBL	0.06 (0.13)	9.5 (8.7)	A (A)	1.6 (3.6)
	SBTR	0.13 (0.40)	0.0 (0.0)	A (A)	0.0 (0.0)
Southcote Rd & Gray Court Dr	EB	0.17 (0.14)	28.2 (29.9)	D (D)	4.9 (3.8)
	WB	0.16 (0.08)	20.5 (16.5)	C (C)	4.5 (2.0)
	NBL	0.00 (0.01)	7.9 (9.3)	A (A)	0.1 (0.2)
	NBTR	0.42 (0.24)	0.0 (0.0)	A (A)	0.0 (0.0)
	SBL	0.01 (0.04)	9.1 (8.2)	A (A)	0.3 (1.0)
	SBTR	0.19 (0.45)	0.0 (0.0)	A (A)	0.0 (0.0)
Southcote Rd & Garner Road East *(signalized)*	EBL	0.88 (0.70)	39.1 (20.9)	D (C)	93.7 (48.8)
	EBTR	0.34 (0.52)	7.7 (10.8)	A (B)	44.8 (62.2)
	WBL	0.05 (0.23)	6.2 (9.5)	A (A)	5.0 (11.1)
	WBT	0.64 (0.66)	11.4 (13.6)	B (B)	128.3 (100.5)
	WBR	0.11 (0.05)	6.4 (7.8)	A (A)	8.0 (5.5)
	NBL	0.09 (0.14)	24.7 (17.1)	C (B)	7.0 (9.3)
	NBTR	0.76 (0.20)	37.1 (17.1)	D (B)	78.1 (26.9)
	SBL	0.56 (0.36)	32.7 (18.5)	C (B)	25.8 (35.7)
	SBTR	0.38 (0.76)	26.9 (27.4)	C (C)	35.8 (109.1)
	Overall	**0.85 (0.72)**	**18.5 (15.7)**	**B (B)**	-

Notes: 00 (00) – AM (PM)

Under total future 2031 mitigated conditions, the signalized intersections are operating at LOS D or better overall. Even with the mitigation suggested above, there are still a few movements approaching or slightly over capacity during both peak hours. These movements would likely benefit from physical modifications, including the addition of dedicated turning lanes, however specific physical modifications will be assessed when the intersection is reconstructed.

5.0 Alternative Design Concepts

5.1 Two-Way Left Turn

Based on the previous Synchro analysis, a centre two-way left turn lane would not be required from a technical point of view. However, TWLTLs are beneficial in situations where multiple driveways and intersections exist along a roadway, similar to the subject section of Southcote Road. They enable left turning motorists to use this lane to complete their turn rather than stopping in a through lane (which can create mid-block queues). Given the minor arterial designation of Southcote Road, there is still a functional need to move vehicular traffic, and the provision of a TWLTL will help to ensure that left turn movements do not negatively impact the vehicular throughput of the roadway. As a result, a TWLTL is recommended along the subject section of Southcote Road.

5.2 Active Transportation Facilities

Five Ac. ve Transportation Design Options for Southcote Road were assessed:

Option 1 – Continuous sidewalks and on-road bike lanes on both sides of the road
Option 2 – Continuous sidewalks and protected bike lanes on both sides of the road
Option 3 – Sidewalk on one side of the road and multi-use pathway (accommodating two directions of travel) on the other side of the road
Option 4 – Multi-use pathways on both sides of the road
Option 5 – Multi-use pathway and on-road bike lanes on both sides of the road

Overall, the Active Transportation options will have very little impact on vehicular traffic operations as none of the facilities are shared with vehicular traffic. The impact on traffic operations would be roughly equal across all the options. Option 5 (Multi-use pathway and on-road bike lanes on both sides of the road) is the preferred option as it accommodates: utilitarian and confident cyclists by providing uninterrupted bike lanes along the entire length of the Road; leisure and family cycling by providing multi-use pathways; and pedestrians by providing multi-use pathways. Option 1 (Continuous sidewalks and on-road bike lanes on both sides of the road) is the least preferred option as it does not provide a space for cyclists who are not comfortable using on-road cycling lanes.

5.3 Pedestrian Crossings

Currently there are no controlled pedestrian crossings along Southcote Road between Golf Links Road and Garner Road. One possible pedestrian crossing location could be where the Cabriolet Crescent sidewalk path connects with Southcote Road just south of the Highway 403 overpass. This location is particularly desirable as it connects a large, relatively isolated neighbourhood, to Southcote Road and is the likely termination point for the proposed multi-use path on the east side of Southcote Road. This location would also provide a safe crossing for students traveling to and from Ancaster Meadow Elementary School. Advance warning for southbound motorists on Southcote Road would be required if a pedestrian crossing is implemented at this location, due to the horizontal curve on Southcote Road to the north of this site. A raised median island may also be considered on the approach to reduce vehicle speeds and bring attention to the crossing.

A second pedestrian crossing could be located at the intersection of Stonehenge Drive and Southcote Road. This location is also quite desirable as Stonehenge Drive is a collector roadway with sidewalks on both sides of the road and a sidewalk path from Hackamore Court also connects a large, relatively inaccessible neighbourhood, to this intersection. This location would also provide a safe crossing for students traveling to and from Ancaster Meadow Elementary School and Immaculate Conception Catholic Elementary School.

A third and final pedestrian crossing could be located at the intersection of Gray Court Drive and Southcote Road. This location would provide a safe crossing to and from Moorland Park located just east of Southcote Road on Moorland Crescent. This location would also provide a safe crossing for students traveling to and from Ancaster Meadow Elementary School and Immaculate Conception Catholic Elementary School.

The three proposed pedestrian crossings would provide access between the neighbourhoods on each side of Southcote Road and would divide Southcote Road into four manageable sections ranging in length between 350 - 750 metres in length. The type of pedestrian crossing facility for each of the proposed crossing locations will be identified during detailed design.

5.4 Traffic Calming

The introduction of a three-lane cross-section does create the potential for higher vehicular speeds (due to the widened area for vehicle travel), however the general travel lanes will be narrowed from a width of 3.5 metres to 3.3 metres and the centre turn lane will be 3.5 metres wide to reduce the overall width of the road as much as possible. Implementing on-road cycling lanes does counteract this road widening by identifying specific lateral space for specific users. However, this is only effective when those spaces are used (i.e., when cyclists are present in the cycling lanes and vehicles are stopped in the TWLTL). The road will be upgraded from a rural cross-section to an urban cross-section. Although this isn't a formal traffic calming measure, the addition of curbs can give the visual appearance of a narrower roadway.

Given the arterial roadway functional requirement to move traffic, vertical traffic calming measures are typically discouraged, especially since these measures will impact emergency vehicle response times. One possible measure that could be utilized to slow down traffic and reduce pedestrian-vehicle conflicts at crossing locations is a raised median island. These islands could be constructed at key locations along Southcote Road where driveways do not exist (negating the need for the TWLTL). They would provide an opportunity to improve streetscaping along the corridor (vegetation, etc.) and act as an informal refuge for pedestrians wishing to cross Southcote Road at locations other than defined crossing locations.

6.0 Conclusions and Recommendations

Dillon has completed a traffic review for the Municipal Class Environmental Assessment (EA) being conducted for Southcote Road between Golf Links Road and Garner Road East.

Based on the foregoing analysis, signal optimization measures were utilized to improve the overall level of service at the intersection Southcote Road / McNiven Road & Golf Links Road. The intersection would likely benefit from physical modifications, including the addition of dedicated turning lanes, however specific physical modifications will be assessed when the intersection is reconstructed.

The addition of a centre two-way left turn lane is recommended as a result of the functional need of the roadway, coupled with the multiple driveways and intersections that exist along Southcote Road. This lane will enable left turning motorists to complete their turn without negatively impacting the vehicular throughput of the roadway.

The preferred Active Transportation design is Option 5: Multi-use pathway and on-road bike lanes on both sides of the road. This design is preferred as it offers a variety of on and off road facility types that accommodates all types of users, regardless of age and ability.

Three proposed pedestrian crossings have also been recommended; Southcote Road at the Cabriolet Crescent sidewalk path, Southcote Road and Stonehenge Drive, and Southcote Road and Gray Court Drive. These crossings will enhance pedestrian access to the proposed active transportation facilities while providing safe locations to cross Southcote Road. These safe crossing locations will provide better connections between neighbourhoods on each side of Southcote Road and will support active travel to and from local schools.

By widening the roadway to a three-lane cross-section it does create the potential for higher vehicular speeds. To counteract this, the general travel lanes will be narrowed from a width of 3.5 metres to 3.3 metres and the centre turn lane will be 3.5 metres wide to reduce the overall width of the road as much as possible. Raised median islands could also be constructed at key locations along Southcote Road. They would provide informal refuge for pedestrians wishing to cross Southcote Road at locations other than defined crossing locations and would provide an opportunity to improve streetscaping along the corridor.

Appendix A

Existing Traffic Count Data

City of Hamilton **T U R N I N G M O V E M E N T C O U N T** Loc. Code: 29

Intersection: **Southcote Rd / McNiven Rd** **at** **Golf Links Rd** Total Vehicles: 11,297 Date: Tuesday
Direction: (North/South) (East/West) M.V.E./Year: 8.373 Apr 24, 2018
Road Condition: Dry Weather: Overcast AWDT Factor: 2.18 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			Total	Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Veh's	N side	E side	S side	W side
7:15	7	49	12	10	15	2	19	6	1	8	15	25	169	0	0	0	2
7:30	6	55	25	6	18	4	20	10	4	5	21	20	194	0	2	0	1
7:45	10	50	15	14	20	3	19	18	1	24	24	30	228	0	2	0	0
8:00	13	49	25	9	44	5	43	23	3	14	43	21	292	0	0	0	0
8:15 *	14	82	28	11	49	8	33	23	5	22	44	60	379	0	0	0	0
8:30 *	17	64	50	10	75	8	28	9	5	9	41	30	346	0	0	0	2
8:45 *	16	75	33	8	59	17	29	16	8	16	41	44	362	1	0	0	0
9:00 *	21	57	43	16	54	8	51	35	4	17	50	44	400	0	0	0	0
9:15	7	16	11	13	40	5	44	19	8	19	52	45	279	0	1	1	0
9:30	9	34	11	4	39	3	52	13	2	24	30	26	247	0	0	0	0
9:45	6	34	26	8	79	10	31	26	4	8	47	37	316	0	1	0	0
10:00	10	27	37	1	42	7	40	14	5	17	38	46	284	1	0	0	2
13:45	7	26	23	10	77	13	61	25	6	38	67	24	377	0	2	0	0
14:00	9	19	35	2	92	4	77	14	3	43	105	58	461	0	1	0	0
14:15	8	14	15	2	73	12	42	34	4	52	38	35	329	1	0	0	0
14:30	4	8	23	4	69	13	48	14	0	40	46	31	300	0	2	0	0
14:45 *	6	21	26	3	80	10	53	20	3	24	54	51	351	0	2	0	0
15:00 *	13	30	38	5	82	15	59	32	5	58	71	78	486	0	0	0	0
15:15 *	11	16	30	12	103	24	52	29	8	72	100	75	532	0	0	0	1
15:30 *	12	38	37	13	93	14	88	61	7	67	101	51	582	0	0	0	0
16:15	16	32	27	4	89	17	57	63	15	73	83	56	532	4	0	0	2
16:30 *	16	38	38	15	99	29	84	74	2	47	74	56	572	0	1	1	1
16:45 *	11	33	38	10	85	11	90	75	14	45	57	52	521	0	2	0	0
17:00 *	17	32	28	5	88	20	76	62	10	65	82	83	568	0	0	0	0
17:15 *	17	28	29	2	70	22	84	71	12	66	83	74	558	3	0	0	1
17:30	14	41	27	11	66	18	73	70	14	61	70	46	511	0	0	0	3
17:45	10	34	28	13	73	13	76	69	14	70	93	64	557	0	0	0	2
18:00	10	31	46	2	78	12	94	50	11	54	101	75	564	0	1	0	0
TOTAL	317	1,033	804	223	1,851	327	1,523	975	178	1,058	1,671	1,337		10	17	2	17
APPR.		2,154			2,401			2,676			4,066		11,297			46	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	1	1	0	0	0	3	1	0	0	3	2	11
7:30	0	2	0	0	0	0	2	1	0	0	3	1	9
7:45	1	1	0	1	1	0	5	2	0	1	0	3	15
8:00	2	0	2	0	2	0	7	1	1	1	2	1	19
8:15 *	2	1	3	2	4	0	2	0	2	2	1	2	21
8:30 *	0	1	0	2	2	2	0	0	1	1	1	1	11
8:45 *	0	2	2	1	1	0	2	1	0	1	1	3	14
9:00 *	1	2	2	0	2	0	2	1	0	2	3	0	15
9:15	0	0	0	0	0	0	4	0	0	0	2	2	8
9:30	0	1	0	0	1	0	2	1	0	0	2	0	7
9:45	0	1	2	0	2	1	1	0	0	0	2	1	10
10:00	0	0	1	0	0	0	2	0	0	0	0	1	4
13:45	0	1	1	0	1	0	2	1	0	1	2	0	9
14:00	0	0	1	0	0	0	1	0	0	1	0	2	5
14:15	0	0	0	0	2	1	1	0	0	0	0	1	5
14:30	0	0	2	0	3	0	2	1	0	0	2	3	13
14:45 *	0	2	0	1	0	1	2	1	0	0	0	1	8
15:00 *	1	2	0	0	2	0	0	0	0	0	1	4	10
15:15 *	0	0	1	1	1	3	2	1	2	0	1	1	13
15:30 *	1	0	2	1	1	0	2	2	0	0	5	1	15
16:15	0	2	1	1	3	1	0	1	0	1	2	1	13
16:30 *	1	1	0	0	1	0	5	1	0	0	0	1	10
16:45 *	0	0	0	1	0	0	1	1	1	1	1	1	7
17:00 *	0	1	0	0	2	0	1	1	0	1	0	1	7
17:15 *	1	0	0	0	0	1	1	0	0	1	0	2	6
17:30	1	0	0	0	0	0	2	1	0	1	1	1	7
17:45	0	1	1	0	0	0	0	0	0	1	1	3	7
18:00	0	1	0	0	1	0	2	1	0	1	1	1	8
TOTAL	11	23	22	11	32	10	56	20	7	17	37	41	
APPR.		56			53			83			95		287

TRUCKS

7:15	0	1	1	0	0	0	1	1	0	0	2	0	6
7:30	0	0	0	0	0	0	0	0	0	0	1	0	1
7:45	1	0	0	1	0	0	3	0	0	0	0	0	5
8:00	0	0	0	0	0	0	6	0	0	0	0	0	6
8:15 *	0	1	1	1	0	0	0	0	1	2	0	0	6
8:30 *	0	0	0	0	1	0	0	0	1	1	0	0	3
8:45 *	0	2	1	1	0	0	0	1	0	1	1	1	8
9:00 *	1	1	1	0	1	0	0	0	0	0	3	0	7
9:15	0	0	0	0	0	0	2	0	0	0	1	0	3
9:30	0	0	0	0	0	0	0	0	0	0	1	0	1
9:45	0	1	2	0	2	1	0	0	0	0	2	0	8
10:00	0	0	1	0	0	0	1	0	0	0	0	0	2
13:45	0	1	1	0	1	0	2	1	0	1	2	0	9
14:00	0	0	1	0	0	0	0	0	0	0	0	1	2
14:15	0	0	0	0	2	1	0	0	0	0	0	1	4
14:30	0	0	2	0	3	0	1	0	0	0	2	1	9
14:45 *	0	1	0	0	0	0	1	1	0	0	0	0	3
15:00 *	0	1	0	0	2	0	0	0	0	0	0	2	5
15:15 *	0	0	0	0	0	1	0	0	1	0	1	0	3
15:30 *	0	0	1	0	1	0	0	2	0	0	1	0	5
16:15	0	0	1	1	2	0	0	0	0	1	1	0	6
16:30 *	0	0	0	0	0	0	1	0	0	0	0	0	1
16:45 *	0	0	0	1	0	0	0	1	1	1	1	0	5
17:00 *	0	1	0	0	2	0	0	1	0	1	0	0	5
17:15 *	1	0	0	0	0	1	0	0	0	1	0	1	4
17:30	1	0	0	0	0	0	1	1	0	1	1	0	5
17:45	0	0	1	0	0	0	0	0	0	1	0	2	4
18:00	0	1	0	0	0	0	0	1	0	1	1	0	4
TOTAL	4	11	14	5	17	4	19	10	4	12	21	9	
APPR.		29			26			33			42		130

City of Hamilton **T U R N I N G M O V E M E N T C O U N T** Loc. Code: 52

Intersection: **Southcote Rd** **at** **Stonehenge Dr** Total Vehicles: 5,855 Date: Wednesday
Direction: (North/South) (East/West) M.V.E./Year: 4.061 May 2, 2018
Road Condition: Dry Weather: Clear AWDT Factor: 2.04 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			Total	Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Veh's	N side	E side	S side	W side
7:15	0	55	6	0	0	0	4	16	0	8	0	20	109	0	0	1	0
7:30	0	81	6	0	0	0	11	32	0	13	0	29	172	0	0	0	0
7:45	0	107	9	0	0	0	7	37	0	19	0	32	211	0	0	0	0
8:00 *	0	122	14	0	0	0	4	42	0	26	0	30	238	2	1	0	0
8:15 *	0	118	19	0	0	0	10	45	0	26	0	35	253	0	0	0	0
8:30 *	0	112	20	0	0	0	9	53	0	18	0	33	245	1	0	1	0
8:45 *	0	100	26	0	0	0	15	48	0	14	0	24	227	3	0	1	0
9:00	0	93	20	0	0	0	17	45	0	14	0	37	226	0	1	0	0
9:15	0	70	9	0	0	0	13	55	0	16	0	20	183	0	0	0	0
9:30	0	59	9	0	0	0	13	47	0	21	0	20	169	0	0	0	0
9:45	0	54	10	0	0	0	10	45	0	15	0	25	159	0	0	0	0
10:00	0	65	8	0	0	0	13	35	0	11	0	24	156	4	0	0	0
13:45	0	65	6	0	0	0	15	75	0	7	0	10	178	0	1	0	0
14:00	0	42	8	0	0	0	14	76	0	11	0	13	164	0	0	0	0
14:15	0	50	9	0	0	0	15	73	0	15	0	10	172	0	0	0	0
14:30	0	70	13	0	0	0	17	88	0	10	0	16	214	0	0	0	0
14:45 *	0	47	15	0	0	0	18	62	0	13	0	14	169	0	0	1	0
15:00 *	0	44	10	0	0	0	22	76	0	12	0	11	175	0	0	1	0
15:15 *	0	61	12	0	0	0	24	79	0	14	0	11	201	0	0	0	0
15:30 *	0	62	11	0	0	0	28	100	0	28	0	12	241	0	0	0	0
16:15	0	54	13	0	0	0	23	84	0	25	0	15	214	1	0	0	0
16:30	0	50	17	0	0	0	28	107	0	20	0	16	238	0	0	3	0
16:45 *	0	77	18	0	0	0	28	104	0	22	0	14	263	3	0	0	0
17:00 *	0	73	15	0	0	0	37	122	0	23	0	23	293	0	0	0	0
17:15 *	0	75	14	0	0	0	32	101	0	23	0	16	261	0	0	0	0
17:30 *	0	68	10	0	0	0	38	98	0	15	0	22	251	0	1	0	0
17:45	0	65	8	0	0	0	26	118	0	21	0	17	255	0	2	0	0
18:00	0	57	12	0	0	0	33	80	0	16	0	20	218	1	0	3	0
TOTAL	0	1,996	347	0	0	0	524	1,943	0	476	0	569		15	6	11	0
APPR.		2,343			0			2,467			1,045		5,855			32	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	1	0	0	0	0	0	2	0	0	0	0	3
7:30	0	3	1	0	0	0	1	4	0	0	0	1	10
7:45	0	1	0	0	0	0	1	5	0	3	0	1	11
8:00 *	0	5	2	0	0	0	2	0	0	0	0	2	11
8:15 *	0	3	1	0	0	0	1	1	0	0	0	0	6
8:30 *	0	3	1	0	0	0	0	1	0	1	0	0	6
8:45 *	0	0	1	0	0	0	1	1	0	0	0	0	3
9:00	0	4	0	0	0	0	1	4	0	0	0	1	10
9:15	0	4	0	0	0	0	0	1	0	1	0	0	6
9:30	0	0	2	0	0	0	0	0	0	1	0	1	4
9:45	0	0	0	0	0	0	0	2	0	1	0	0	3
10:00	0	2	0	0	0	0	0	3	0	2	0	0	7
13:45	0	5	0	0	0	0	0	2	0	0	0	0	7
14:00	0	0	0	0	0	0	1	0	0	0	0	0	1
14:15	0	1	0	0	0	0	0	3	0	0	0	0	4
14:30	0	3	0	0	0	0	1	1	0	1	0	3	9
14:45 *	0	2	3	0	0	0	0	2	0	0	0	0	7
15:00 *	0	1	0	0	0	0	2	2	0	0	0	1	6
15:15 *	0	0	1	0	0	0	4	2	0	1	0	1	9
15:30 *	0	0	2	0	0	0	0	2	0	0	0	3	7
16:15	0	1	0	0	0	0	1	1	0	2	0	0	5
16:30	0	0	1	0	0	0	1	1	0	0	0	0	3
16:45 *	0	1	1	0	0	0	0	1	0	0	0	0	3
17:00 *	0	2	0	0	0	0	0	0	0	0	0	0	2
17:15 *	0	0	0	0	0	0	0	1	0	0	0	0	1
17:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	2	0	1	0	0	3
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	42	16	0	0	0	17	44	0	14	0	14	
APPR.		58			0			61			28		147

TRUCKS

7:15	0	0	0	0	0	0	0	2	0	0	0	0	2
7:30	0	0	0	0	0	0	1	2	0	0	0	0	3
7:45	0	0	0	0	0	0	0	3	0	0	0	0	3
8:00 *	0	0	2	0	0	0	0	0	0	0	0	0	2
8:15 *	0	1	0	0	0	0	0	1	0	0	0	0	2
8:30 *	0	0	0	0	0	0	0	0	0	1	0	0	1
8:45 *	0	0	1	0	0	0	0	1	0	0	0	0	2
9:00	0	3	0	0	0	0	0	2	0	0	0	0	5
9:15	0	2	0	0	0	0	0	0	0	1	0	0	3
9:30	0	0	2	0	0	0	0	0	0	1	0	1	4
9:45	0	0	0	0	0	0	0	2	0	1	0	0	3
10:00	0	2	0	0	0	0	0	2	0	1	0	0	5
13:45	0	3	0	0	0	0	0	2	0	0	0	0	5
14:00	0	0	0	0	0	0	1	0	0	0	0	0	1
14:15	0	1	0	0	0	0	0	0	0	0	0	0	1
14:30	0	2	0	0	0	0	0	1	0	1	0	1	5
14:45 *	0	0	0	0	0	0	0	1	0	0	0	0	1
15:00 *	0	1	0	0	0	0	1	2	0	0	0	0	4
15:15 *	0	0	1	0	0	0	0	1	0	0	0	0	2
15:30 *	0	0	0	0	0	0	0	2	0	0	0	1	3
16:15	0	0	0	0	0	0	0	1	0	0	0	0	1
16:30	0	0	1	0	0	0	0	1	0	0	0	0	2
16:45 *	0	1	1	0	0	0	0	1	0	0	0	0	3
17:00 *	0	2	0	0	0	0	0	0	0	0	0	0	2
17:15 *	0	0	0	0	0	0	0	1	0	0	0	0	1
17:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
17:45	0	0	0	0	0	0	0	2	0	1	0	0	3
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	18	8	0	0	0	3	30	0	7	0	3	
APPR.		26			0			33			10		69

City of Hamilton **T U R N I N G M O V E M E N T C O U N T** Loc. Code: 53

Intersection: **Southcote Rd** **at** **Gray Court Dr** Total Vehicles: 4,438 Date: Thursday
Direction: (North/South) (East/West) M.V.E./Year: 2.973 May 3, 2018
Road Condition: Dry Weather: Cloudy AWDT Factor: 1.97 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			Total	Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Veh's	N side	E side	S side	W side
7:15	0	26	0	2	0	2	0	17	1	4	0	6	58	0	0	0	0
7:30	0	42	2	2	0	0	2	22	0	2	0	7	79	0	0	1	0
7:45	2	73	0	1	0	0	0	44	0	10	1	9	140	2	1	0	0
8:00	0	79	1	3	0	3	1	57	1	3	0	9	157	0	0	0	0
8:15 *	0	82	3	11	1	1	1	63	3	9	1	9	184	0	0	0	1
8:30 *	1	87	0	5	0	0	4	38	2	3	2	6	148	0	0	0	0
8:45 *	2	75	2	7	1	1	1	67	2	6	1	7	172	4	0	0	1
9:00 *	0	91	4	2	2	0	2	58	2	7	1	5	174	0	1	0	1
9:15	1	65	2	1	6	1	11	52	3	0	2	2	146	0	0	0	0
9:30	0	55	1	5	0	0	1	53	0	6	1	2	124	1	0	0	0
9:45	0	43	2	6	1	0	1	41	1	3	0	6	104	0	1	0	0
10:00	1	58	0	1	0	1	2	46	2	2	1	0	114	0	0	0	0
13:45	1	43	1	0	0	1	2	64	2	0	1	5	120	0	0	0	0
14:00	1	58	0	0	0	0	4	66	1	0	0	0	130	0	1	0	1
14:15	0	63	1	2	0	0	5	80	1	3	0	4	159	0	0	0	0
14:30	0	53	0	1	0	1	6	69	3	1	1	4	139	0	0	0	0
14:45 *	0	56	2	2	1	0	1	68	4	1	1	5	141	1	1	0	0
15:00 *	0	53	3	1	0	1	6	78	2	1	1	1	147	0	0	0	0
15:15 *	2	55	1	0	1	0	6	83	6	1	0	4	159	4	0	0	0
15:30 *	0	64	7	2	1	0	6	95	1	2	0	5	183	0	0	0	1
16:15	1	64	2	2	2	1	9	92	2	2	3	4	184	0	0	0	0
16:30	1	82	1	1	0	2	7	122	3	1	0	6	226	0	1	0	0
16:45	1	62	3	1	0	0	9	99	4	2	0	1	182	0	0	0	0
17:00 *	2	71	6	3	2	1	12	101	7	1	1	8	215	0	0	0	0
17:15 *	1	61	0	3	1	0	10	113	3	0	2	7	201	1	1	0	0
17:30 *	0	92	1	2	1	3	7	130	6	3	2	4	251	0	0	0	0
17:45 *	0	61	3	1	1	1	9	106	8	1	0	4	195	0	0	0	0
18:00	1	66	3	5	0	0	9	116	1	3	0	2	206	0	0	0	0
TOTAL	18	1,780	51	72	21	20	134	2,040	71	77	22	132		13	7	1	5
APPR.		1,849			113			2,245			231		4,438			26	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	3	0	0	0	0	0	0	0	0	0	0	3
7:45	0	8	0	0	0	0	0	7	0	2	0	1	18
8:00	0	7	0	0	0	0	0	1	0	0	0	0	8
8:15 *	0	6	0	0	0	0	0	1	0	1	0	0	8
8:30 *	1	4	0	0	0	0	0	2	1	0	0	0	8
8:45 *	1	4	0	1	0	0	0	3	0	0	1	0	10
9:00 *	0	0	0	0	0	0	0	3	0	0	0	0	3
9:15	0	4	0	0	1	0	0	4	0	0	0	0	9
9:30	0	2	0	0	0	0	0	1	0	0	0	0	3
9:45	0	1	0	0	0	0	0	0	0	0	0	0	1
10:00	0	2	0	0	0	0	0	1	0	0	0	0	3
13:45	0	0	0	0	0	0	0	4	0	0	0	0	4
14:00	0	2	0	0	0	0	0	0	0	0	0	0	2
14:15	0	0	0	0	0	0	0	4	1	0	0	0	5
14:30	0	1	0	0	0	1	0	4	0	0	0	0	6
14:45 *	0	5	0	0	0	0	0	3	0	0	0	2	10
15:00 *	0	1	0	0	0	0	0	1	0	0	0	0	2
15:15 *	0	0	1	0	0	0	0	0	1	0	0	0	2
15:30 *	0	1	1	0	0	0	0	2	0	0	0	0	4
16:15	1	4	0	0	0	0	0	4	0	0	0	0	9
16:30	0	1	0	0	0	1	0	1	0	0	0	0	3
16:45	0	0	0	0	0	0	0	3	0	0	0	0	3
17:00 *	0	1	0	0	0	0	0	0	0	0	0	0	1
17:15 *	0	0	0	0	0	0	0	1	0	0	0	0	1
17:30 *	0	0	0	0	0	0	0	2	0	0	0	0	2
17:45 *	0	1	0	0	0	0	0	1	0	0	0	0	2
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	3	58	2	1	1	2	0	53	3	3	1	3	
APPR.		63			4			56			7		130

TRUCKS

7:15	0	0	0	0	0	0	0	0	0	0	0	0	0
7:30	0	1	0	0	0	0	0	0	0	0	0	0	1
7:45	0	3	0	0	0	0	0	3	0	0	0	1	7
8:00	0	3	0	0	0	0	0	0	0	0	0	0	3
8:15 *	0	1	0	0	0	0	0	1	0	0	0	0	2
8:30 *	0	2	0	0	0	0	0	2	1	0	0	0	5
8:45 *	0	3	0	1	0	0	0	3	0	0	1	0	8
9:00 *	0	0	0	0	0	0	0	2	0	0	0	0	2
9:15	0	2	0	0	0	0	0	2	0	0	0	0	4
9:30	0	0	0	0	0	0	0	0	0	0	0	0	0
9:45	0	1	0	0	0	0	0	0	0	0	0	0	1
10:00	0	2	0	0	0	0	0	1	0	0	0	0	3
13:45	0	0	0	0	0	0	0	4	0	0	0	0	4
14:00	0	2	0	0	0	0	0	0	0	0	0	0	2
14:15	0	0	0	0	0	0	0	1	1	0	0	0	2
14:30	0	0	0	0	0	1	0	4	0	0	0	0	5
14:45 *	0	1	0	0	0	0	0	2	0	0	0	0	3
15:00 *	0	1	0	0	0	0	0	0	0	0	0	0	1
15:15 *	0	0	0	0	0	0	0	0	0	0	0	0	0
15:30 *	0	0	0	0	0	0	0	0	0	0	0	0	0
16:15	0	1	0	0	0	0	0	1	0	0	0	0	2
16:30	0	1	0	0	0	0	0	1	0	0	0	0	2
16:45	0	0	0	0	0	0	0	2	0	0	0	0	2
17:00 *	0	1	0	0	0	0	0	0	0	0	0	0	1
17:15 *	0	0	0	0	0	0	0	1	0	0	0	0	1
17:30 *	0	0	0	0	0	0	0	2	0	0	0	0	2
17:45 *	0	1	0	0	0	0	0	0	0	0	0	0	1
18:00	0	0	0	0	0	0	0	0	0	0	0	0	0
TOTAL	0	26	0	1	0	1	0	32	2	0	1	1	
APPR.		26			2			34			2		64

City of Hamilton **T U R N I N G M O V E M E N T C O U N T** Loc. Code: 28

Intersection: **Southcote Rd** **at** **Garner Rd E** Total Vehicles: 9,568 Date: Monday
Direction: (North/South) (East/West) M.V.E./Year: 7.157 Apr 23, 2018
Road Condition: Dry Weather: Clear AWDT Factor: 2.2 Period: 7 hours
Comments:

TOTAL VEHICLES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			Total	Pedestrians			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Veh's	N side	E side	S side	W side
7:15	4	12	6	11	54	2	4	6	22	3	77	8	209	0	0	0	0
7:30	1	20	6	12	111	2	2	5	28	1	79	18	285	0	0	0	2
7:45	1	24	5	18	110	3	11	10	35	3	106	19	345	0	0	0	0
8:00 *	1	45	10	34	154	5	9	10	45	4	138	28	483	0	0	0	0
8:15 *	2	38	8	47	151	1	15	4	64	3	138	15	486	0	0	0	0
8:30 *	2	34	11	48	133	0	14	15	43	5	101	24	430	0	0	0	0
8:45 *	3	45	4	46	109	1	15	16	27	3	65	40	374	0	0	0	0
9:00	4	24	6	28	119	1	11	10	33	2	109	17	364	0	0	0	0
9:15	2	15	6	14	100	2	7	8	37	2	102	25	320	1	0	0	0
9:30	1	15	6	17	70	2	10	14	38	0	95	24	292	0	0	0	0
9:45	1	31	4	27	43	4	4	8	18	0	53	13	206	1	0	0	0
10:00	1	24	2	17	53	0	7	12	16	3	67	18	220	0	0	0	0
13:45	0	13	5	33	81	0	12	26	28	8	82	11	299	0	0	0	0
14:00	3	20	7	25	72	4	15	15	33	3	83	17	297	0	0	0	0
14:15	1	21	2	26	68	1	17	21	37	4	72	15	285	0	0	1	0
14:30	2	15	2	25	70	0	13	15	38	1	70	19	270	0	0	0	1
14:45 *	1	24	1	45	60	1	11	8	16	0	19	15	201	1	0	0	0
15:00 *	3	12	2	9	71	2	14	21	31	2	61	15	243	0	0	0	0
15:15 *	4	13	4	37	102	2	17	19	40	6	63	6	313	0	0	0	0
15:30 *	2	19	1	32	121	3	19	24	39	4	116	22	402	2	0	0	1
16:15	1	20	4	24	82	2	12	11	28	12	100	15	311	4	0	0	0
16:30	2	14	9	20	119	5	8	26	52	6	105	18	384	0	0	0	0
16:45	1	24	9	36	107	5	25	20	41	5	97	20	390	0	0	0	0
17:00 *	2	12	9	26	150	1	23	26	43	9	130	11	442	0	0	0	0
17:15 *	3	18	6	34	118	1	19	28	30	15	100	18	390	0	0	0	0
17:30 *	5	13	4	42	147	4	16	30	53	6	145	18	483	1	0	0	0
17:45 *	6	17	9	45	162	3	21	24	50	8	113	6	464	0	0	0	0
18:00	2	14	5	25	122	3	9	19	40	7	114	20	380	0	0	0	0
TOTAL	61	596	153	803	2,859	60	360	451	1,005	125	2,600	495		10	0	1	4
APPR.		810			3,722			1,816			3,220		9,568			15	

TRUCKS & BUSES

15 mins. Ending	North Bd. on N/S			East Bd. on E/W			South Bd. on N/S			West Bd. on E/W			
(Pk.Hr.*)	L	S	R	L	S	R	L	S	R	L	S	R	Total
7:15	0	0	1	0	4	0	0	0	0	0	1	0	6
7:30	1	2	0	0	9	1	0	0	1	0	1	0	15
7:45	1	4	1	2	7	0	0	0	3	0	6	1	25
8:00 *	1	2	0	0	14	2	0	0	5	0	6	1	31
8:15 *	0	1	1	5	11	0	0	0	2	0	7	0	27
8:30 *	0	2	1	3	12	0	1	0	0	0	1	0	20
8:45 *	0	2	1	1	6	0	0	1	1	1	1	2	16
9:00	0	1	1	3	7	0	0	1	1	0	7	0	21
9:15	0	0	1	2	2	0	0	0	1	1	9	1	17
9:30	0	0	1	1	4	0	0	0	2	0	5	4	17
9:45	0	0	0	2	2	0	0	0	1	0	1	0	6
10:00	0	0	0	0	1	0	0	0	2	1	4	0	8
13:45	0	0	0	0	1	0	0	0	0	1	2	1	5
14:00	0	0	0	0	2	0	0	0	1	0	4	2	9
14:15	0	0	0	1	1	0	0	0	1	0	1	0	4
14:30	1	0	0	1	5	0	2	0	1	0	5	1	16
14:45 *	0	0	0	4	5	1	2	0	0	0	1	0	13
15:00 *	0	0	0	0	5	0	1	1	0	1	2	0	10
15:15 *	1	1	0	1	5	0	0	2	0	0	3	0	13
15:30 *	0	1	0	0	6	0	1	0	1	0	7	0	16
16:15	0	2	0	0	2	1	1	0	0	2	5	2	15
16:30	0	0	0	0	4	0	0	0	1	0	2	0	7
16:45	0	0	0	0	2	1	0	0	1	0	4	0	8
17:00 *	0	0	0	0	5	0	1	0	1	0	4	0	11
17:15 *	0	2	0	0	1	0	0	1	0	0	4	1	9
17:30 *	0	0	0	0	3	1	0	0	1	0	5	0	10
17:45 *	0	0	0	0	3	0	0	1	2	0	1	0	7
18:00	0	0	0	0	1	0	0	0	0	0	5	0	6
TOTAL	5	20	8	26	130	7	9	7	29	7	104	16	
APPR.		33			163			45			127		368

TRUCKS

7:15	0	0	0	0	3	0	0	0	0	0	1	0	4
7:30	1	0	0	0	6	0	0	0	0	0	0	0	7
7:45	0	2	0	0	5	0	0	0	0	0	1	0	8
8:00 *	0	1	0	0	4	0	0	0	0	0	2	0	7
8:15 *	0	1	0	2	4	0	0	0	1	0	1	0	9
8:30 *	0	0	0	2	7	0	1	0	0	0	0	0	10
8:45 *	0	0	0	0	5	0	0	1	1	0	0	1	8
9:00	0	0	0	3	2	0	0	0	0	0	3	0	8
9:15	0	0	1	1	0	0	0	0	1	0	3	0	6
9:30	0	0	0	1	4	0	0	0	1	0	3	3	12
9:45	0	0	0	2	2	0	0	0	1	0	1	0	6
10:00	0	0	0	0	1	0	0	0	2	1	3	0	7
13:45	0	0	0	0	0	0	0	0	0	1	1	0	2
14:00	0	0	0	0	2	0	0	0	1	0	2	0	5
14:15	0	0	0	1	1	0	0	0	1	0	0	0	3
14:30	1	0	0	0	1	0	0	0	0	0	2	1	5
14:45 *	0	0	0	0	1	0	0	0	0	0	0	0	1
15:00 *	0	0	0	0	1	0	0	1	0	0	1	0	3
15:15 *	0	0	0	0	0	0	0	1	0	0	1	0	2
15:30 *	0	1	0	0	2	0	1	0	1	0	1	0	6
16:15	0	1	0	0	1	0	0	0	0	0	4	1	7
16:30	0	0	0	0	2	0	0	0	0	0	1	0	3
16:45	0	0	0	0	2	1	0	0	1	0	2	0	6
17:00 *	0	0	0	0	3	0	1	0	1	0	3	0	8
17:15 *	0	0	0	0	1	0	0	1	0	0	3	1	6
17:30 *	0	0	0	0	3	1	0	0	1	0	1	0	6
17:45 *	0	0	0	0	1	0	0	1	1	0	0	0	3
18:00	0	0	0	0	0	0	0	0	0	0	3	0	3
TOTAL	2	6	1	12	64	2	3	5	14	2	43	7	
APPR.		9			78			22			52		161

Appendix B

2011 & 2031 Hamilton model plots (total volume)

2011 Model - Total Volumes

Hamilton EMME/2 Update and Calibration Cole Engineering (S:/2014 Projects/TR/TR14-0407 Hamilton_TMPReviewUpdate/300-Design-Engineering/309-Modelling/2011 Fratar Model/Database/emmebank)
Scenario 2011: copy of scenario 12011 with Updated Network

Appendix D

"515 Garner Road" Draft Site Plan

SECINARO AVENUE

SOUTHCOTE ROAD

GARNER ROAD EAST

PART 1 PLAN 62R-16928

PART 2 PLAN 62R-16928

PLAN 62R-20309

PART 1 PLAN 62R-19459

PART 4 PLAN 62R-16928

PART 4 PLAN 62R-1446

PART 5 PLAN 62R-1446

PART 3 PLAN 62R-1446

BUILDING 1 (4 UNITS)

BUILDING 2 (5 UNITS)

BUILDING 3 (5 UNITS)

BUILDING 4 (5 UNITS)

BUILDING 5 (14 UNITS)

BUILDING 6 (7 UNITS)

BUILDING 7 (4 UNITS)

BUILDING 8 (5 UNITS)

BUILDING 9 (6 UNITS)

PROP. 1.5m WIDE SIDEWALK

55 TOWNHOUSE UNITS
28 VISITOR PARKING SPACES

NOTE:
SURVEY INFORMATION SHOWN ON THIS SKETCH IS APPROXIMATE, COMPILED FROM PLANS IN OUR OFFICE, AND IS NOT BASED ON A LEGAL SURVEY.

A.J. Clarke and Associates Ltd.
SURVEYORS • PLANNERS • ENGINEERS

CONCEPT 2
515 Garner Road
City of Hamilton (Ancaster)

SCALE 1:400

Date: Feb 7, 2018
AJC File 178322

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Appendix E

Synchro Analysis Worksheets

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	235	40	65	175	180	70	280	155	140	85	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	70.0		15.0	55.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			30.0			30.0			20.0		
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		0.978				0.850		0.946			0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1842	0	1703	1863	1599	1787	1773	0	1805	1799	0
Flt Permitted	0.639			0.407			0.684			0.243		
Satd. Flow (perm)	1167	1842	0	730	1863	1599	1287	1773	0	462	1799	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9				181		33			17	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		168.8			261.8			802.5			288.9	
Travel Time (s)		12.2			18.8			57.8			26.0	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	1%	0%	6%	2%	1%	1%	1%	2%	0%	1%	9%
Adj. Flow (vph)	48	253	43	70	188	194	75	301	167	151	91	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	48	296	0	70	188	194	75	468	0	151	113	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	1	2		1	2	
Detector Template	Left	Thru			Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		15.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		13.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		13.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	25.0	25.0		5.0	25.0	25.0	25.0	25.0		4.0	25.0	
Minimum Split (s)	31.1	31.1		8.0	31.1	31.1	42.9	42.9		8.0	42.9	
Total Split (s)	34.1	34.1		10.0	34.1	34.1	42.9	42.9		10.0	42.9	
Total Split (%)	35.2%	35.2%		10.3%	35.2%	35.2%	44.2%	44.2%		10.3%	44.2%	
Maximum Green (s)	28.0	28.0		7.0	28.0	28.0	36.0	36.0		7.0	36.0	
Yellow Time (s)	3.3	3.3		3.0	3.3	3.3	3.3	3.3		3.0	3.3	
All-Red Time (s)	2.8	2.8		0.0	2.8	2.8	3.6	3.6		0.0	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		2.0	3.0	3.0	3.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	None		Max	None	
Walk Time (s)	12.0	12.0			12.0	12.0	20.0	20.0			20.0	
Flash Dont Walk (s)	13.0	13.0			13.0	13.0	16.0	16.0			16.0	
Pedestrian Calls (#/hr)	0	0			0	0	0	0			0	
Act Effct Green (s)	25.5	25.5		35.6	32.5	32.5	28.1	28.1		42.1	38.2	
Actuated g/C Ratio	0.30	0.30		0.42	0.39	0.39	0.34	0.34		0.50	0.46	
v/c Ratio	0.14	0.52		0.19	0.26	0.27	0.17	0.76		0.44	0.14	
Control Delay	25.0	28.8		16.5	19.2	4.7	21.5	32.4		16.0	12.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	25.0	28.8		16.5	19.2	4.7	21.5	32.4		16.0	12.2	
LOS	C	C		B	B	A	C	C		B	B	
Approach Delay		28.3			12.5			30.9			14.4	
Approach LOS		C			B			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 83.8			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.76			
Intersection Signal Delay: 22.5		Intersection LOS: C	
Intersection Capacity Utilization 105.0%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: Southcote Road/McNiven Road & Golflinks Road

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	48	296	70	188	194	75	468	151	113
v/c Ratio	0.14	0.52	0.19	0.26	0.27	0.17	0.76	0.44	0.14
Control Delay	25.0	28.8	16.5	19.2	4.7	21.5	32.4	16.0	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.0	28.8	16.5	19.2	4.7	21.5	32.4	16.0	12.2
Queue Length 50th (m)	5.6	38.4	6.4	19.6	1.2	8.9	65.7	13.4	9.1
Queue Length 95th (m)	16.3	74.8	16.8	41.0	15.3	19.7	106.5	25.6	19.6
Internal Link Dist (m)		144.8		237.8			778.5		264.9
Turn Bay Length (m)	50.0		70.0		15.0	55.0		45.0	
Base Capacity (vph)	393	626	392	851	829	557	786	345	1003
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.12	0.47	0.18	0.22	0.23	0.13	0.60	0.44	0.11

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	45	235	40	65	175	180	70	280	155	140	85	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1843		1703	1863	1599	1787	1774		1805	1799	
Flt Permitted	0.64	1.00		0.41	1.00	1.00	0.68	1.00		0.24	1.00	
Satd. Flow (perm)	1168	1843		729	1863	1599	1287	1774		461	1799	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	48	253	43	70	188	194	75	301	167	151	91	22
RTOR Reduction (vph)	0	6	0	0	0	110	0	22	0	0	9	0
Lane Group Flow (vph)	48	290	0	70	188	84	75	446	0	151	104	0
Heavy Vehicles (%)	4%	1%	0%	6%	2%	1%	1%	1%	2%	0%	1%	9%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	25.5	25.5		33.1	33.1	33.1	28.1	28.1		38.2	38.2	
Effective Green, g (s)	25.5	25.5		33.1	33.1	33.1	28.1	28.1		38.2	38.2	
Actuated g/C Ratio	0.30	0.30		0.39	0.39	0.39	0.33	0.33		0.45	0.45	
Clearance Time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Vehicle Extension (s)	3.0	3.0		2.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	353	557		339	731	627	429	591		322	815	
v/s Ratio Prot		c0.16		0.01	c0.10			c0.25		c0.04	0.06	
v/s Ratio Perm	0.04			0.07		0.05	0.06			0.17		
v/c Ratio	0.14	0.52		0.21	0.26	0.13	0.17	0.75		0.47	0.13	
Uniform Delay, d1	21.4	24.3		16.7	17.3	16.4	19.9	25.0		15.5	13.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	0.9		0.1	0.2	0.1	0.2	5.4		1.1	0.1	
Delay (s)	21.6	25.2		16.8	17.5	16.5	20.1	30.5		16.6	13.4	
Level of Service	C	C		B	B	B	C	C		B	B	
Approach Delay (s)		24.7			17.0			29.0			15.3	
Approach LOS		C			B			C			B	

Intersection Summary					
HCM 2000 Control Delay	22.4	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.60				
Actuated Cycle Length (s)	84.3	Sum of lost time (s)	19.0		
Intersection Capacity Utilization	105.0%	ICU Level of Service	G		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	70	110	395	85	50	160
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	15.0		0.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.976			
Flt Protected	0.950					0.988
Satd. Flow (prot)	1787	1615	1841	0	0	1863
Flt Permitted	0.950					0.988
Satd. Flow (perm)	1787	1615	1841	0	0	1863
Link Speed (k/h)	50		50			50
Link Distance (m)	115.8		365.3			205.1
Travel Time (s)	8.3		26.3			14.8
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	0%	4%	0%	1%
Adj. Flow (vph)	74	117	420	90	53	170
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	117	510	0	0	223
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	8.0		0.0			0.0
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		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	70	110	395	85	50	160
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	74	117	420	90	53	170
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	742	465			511	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	742	465			511	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	80	81			95	
cM capacity (veh/h)	365	601			1065	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	191	511	223
Volume Left	74	0	53
Volume Right	117	90	0
cSH	939	1700	1065
Volume to Capacity	0.20	0.30	0.05
Queue Length 95th (m)	6.1	0.0	1.3
Control Delay (s)	14.3	0.0	2.4
Lane LOS	B		A
Approach Delay (s)	14.3	0.0	2.4
Approach LOS	B		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	51.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	0	25	5	25	5	425	10	10	225	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		15.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		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						0.850		0.997			0.994	
Flt Protected		0.960			0.960			0.999			0.998	
Satd. Flow (prot)	0	1764	0	0	1769	1615	0	1857	0	0	1810	0
Flt Permitted		0.960			0.960			0.999			0.998	
Satd. Flow (perm)	0	1764	0	0	1769	1615	0	1857	0	0	1810	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		179.0			93.2			658.5			365.3	
Travel Time (s)		12.9			6.7			47.4			26.3	
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%	0%	0%	0%	20%	0%	0%	2%	0%	0%	4%	11%
Adj. Flow (vph)	27	5	0	27	5	27	5	462	11	11	245	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	32	27	0	478	0	0	267	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		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	5	0	25	5	25	5	425	10	10	225	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	5	0	27	5	27	5	462	11	11	245	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	766	755	250	753	755	467	255			473		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	766	755	250	753	755	467	255			473		
tC, single (s)	7.1	6.5	6.2	7.1	6.7	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.2	3.3	2.2			2.2		
p0 queue free %	91	98	100	92	98	95	100			99		
cM capacity (veh/h)	295	335	794	321	313	600	1321			1100		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	33	60	478	266
Volume Left	27	27	5	11
Volume Right	0	27	11	11
cSH	301	586	1321	1100
Volume to Capacity	0.11	0.10	0.00	0.01
Queue Length 95th (m)	2.9	2.7	0.1	0.2
Control Delay (s)	18.4	14.7	0.1	0.4
Lane LOS	C	B	A	A
Approach Delay (s)	18.4	14.7	0.1	0.4
Approach LOS	C	B		

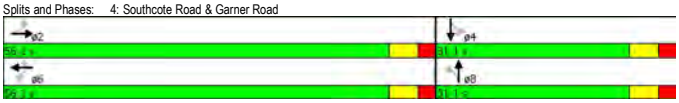
Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	39.9%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	545	5	15	440	105	10	160	35	55	45	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		125.0	130.0		100.0	30.0		0.0	30.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	70.0			60.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850		0.973			0.880	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3469	0	1805	1881	1599	1805	1834	0	1770	1652	0
Flt Permitted	0.431			0.423			0.606			0.624		
Satd. Flow (perm)	803	3469	0	804	1881	1599	1151	1834	0	1162	1652	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				115		12			198	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		406.0			176.0			356.6			658.5	
Travel Time (s)		24.4			10.6			25.7			47.4	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	4%	0%	0%	1%	1%	0%	1%	0%	2%	2%	1%
Adj. Flow (vph)	192	599	5	16	484	115	11	176	38	60	49	198
Shared Lane Traffic (%)												
Lane Group Flow (vph)	192	604	0	16	484	115	11	214	0	60	247	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	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	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	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	26.1	26.1		26.1	26.1	26.1	22.1	22.1		27.1	27.1	
Total Split (s)	56.1	56.1		56.1	56.1	56.1	31.1	31.1		31.1	31.1	
Total Split (%)	64.3%	64.3%		64.3%	64.3%	64.3%	35.7%	35.7%		35.7%	35.7%	
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	25.0	25.0		25.0	25.0	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)										7.0	7.0	
Flash Dont Walk (s)										14.0	14.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)	23.4	23.4		23.4	23.4	23.4	11.8	11.8		11.8	11.8	
Actuated g/C Ratio	0.49	0.49		0.49	0.49	0.49	0.25	0.25		0.25	0.25	
v/c Ratio	0.49	0.35		0.04	0.52	0.14	0.04	0.46		0.21	0.44	
Control Delay	13.4	8.2		6.9	10.9	2.2	16.0	19.1		17.9	7.9	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	13.4	8.2		6.9	10.9	2.2	16.0	19.1		17.9	7.9	
LOS	B	A		A	B	A	B	B		B	A	
Approach Delay		9.4			9.1			19.0			9.8	
Approach LOS		A			A			B			A	

Intersection Summary			
Area Type:	Other		
Cycle Length: 87.2			
Actuated Cycle Length: 47.7			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.52			
Intersection Signal Delay: 10.5		Intersection LOS: B	
Intersection Capacity Utilization 81.9%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Southcote Road & Garner Road



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	192	604	16	484	115	11	214	60	247
v/c Ratio	0.49	0.35	0.04	0.52	0.14	0.04	0.46	0.21	0.44
Control Delay	13.4	8.2	6.9	10.9	2.2	16.0	19.1	17.9	7.9
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	13.4	8.2	6.9	10.9	2.2	16.0	19.1	17.9	7.9
Queue Length 50th (m)	9.2	13.8	0.6	23.7	0.0	0.7	13.2	3.7	3.0
Queue Length 95th (m)	28.4	28.7	3.2	54.6	5.9	4.5	38.4	14.4	20.6
Internal Link Dist (m)		382.0		152.0			332.6		634.5
Turn Bay Length (m)	125.0		130.0		100.0	30.0		30.0	
Base Capacity (vph)	769	3321	770	1801	1536	618	991	624	979
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.25	0.18	0.02	0.27	0.07	0.02	0.22	0.10	0.25

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	545	5	15	440	105	10	160	35	55	45	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.97		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3468		1805	1881	1599	1805	1834		1770	1652	
Flt Permitted	0.43	1.00		0.42	1.00	1.00	0.61	1.00		0.62	1.00	
Satd. Flow (perm)	802	3468		805	1881	1599	1151	1834		1163	1652	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	192	599	5	16	484	115	11	176	38	60	49	198
RTOR Reduction (vph)	0	1	0	0	0	58	0	9	0	0	149	0
Lane Group Flow (vph)	192	603	0	16	484	57	11	205	0	60	98	0
Heavy Vehicles (%)	2%	4%	0%	0%	1%	1%	0%	1%	0%	2%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	23.4	23.4		23.4	23.4	23.4	11.8	11.8		11.8	11.8	
Effective Green, g (s)	23.4	23.4		23.4	23.4	23.4	11.8	11.8		11.8	11.8	
Actuated g/C Ratio	0.49	0.49		0.49	0.49	0.49	0.25	0.25		0.25	0.25	
Clearance Time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	395	1712		397	928	789	286	456		289	411	
v/s Ratio Prot		0.17			c0.26			c0.11			0.06	
v/s Ratio Perm	0.24			0.02		0.04	0.01			0.05		
v/c Ratio	0.49	0.35		0.04	0.52	0.07	0.04	0.45		0.21	0.24	
Uniform Delay, d1	8.0	7.4		6.2	8.2	6.3	13.5	15.1		14.1	14.2	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.2		0.1	0.9	0.1	0.1	0.7		0.4	0.3	
Delay (s)	9.6	7.6		6.3	9.0	6.4	13.6	15.8		14.5	14.5	
Level of Service	A	A		A	A	A	B	B		B	B	
Approach Delay (s)		8.1			8.5			15.7			14.5	
Approach LOS		A			A			B			B	

Intersection Summary					
HCM 2000 Control Delay	10.1	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.50				
Actuated Cycle Length (s)	47.4	Sum of lost time (s)		12.2	
Intersection Capacity Utilization	81.9%	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												
Volume (vph)	30	340	80	225	295	265	60	130	135	335	280	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	70.0		15.0	55.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			30.0			30.0			20.0		
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		0.972				0.850		0.924			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1829	0	1787	1900	1615	1770	1729	0	1805	1841	0
Flt Permitted	0.575			0.207			0.561			0.421		
Satd. Flow (perm)	1061	1829	0	389	1900	1615	1045	1729	0	800	1841	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				166		54			9	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		168.8			261.8			802.5			288.9	
Travel Time (s)		12.2			18.8			57.8			26.0	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	1%	1%	1%	0%	0%	2%	1%	2%	0%	1%	3%
Adj. Flow (vph)	31	351	82	232	304	273	62	134	139	345	289	41
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	433	0	232	304	273	62	273	0	345	330	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	1	2		1	2	
Detector Template	Left	Thru			Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		15.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		13.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		13.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	25.0	25.0		5.0	25.0	25.0	25.0	25.0		5.0	25.0	
Minimum Split (s)	31.1	31.1		8.0	31.1	31.1	34.9	34.9		8.0	34.9	
Total Split (s)	34.1	34.1		13.0	34.1	34.1	34.9	34.9		15.0	34.9	
Total Split (%)	35.2%	35.2%		13.4%	35.2%	35.2%	36.0%	36.0%		15.5%	36.0%	
Maximum Green (s)	28.0	28.0		10.0	28.0	28.0	28.0	28.0		12.0	28.0	
Yellow Time (s)	3.3	3.3		3.0	3.3	3.3	3.3	3.3		3.0	3.3	
All-Red Time (s)	2.8	2.8		0.0	2.8	2.8	3.6	3.6		0.0	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		2.0	3.0	3.0	3.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	None		Max	None	
Walk Time (s)	12.0	12.0			12.0	12.0	12.0	12.0			12.0	
Flash Dont Walk (s)	13.0	13.0			13.0	13.0	16.0	16.0			16.0	
Pedestrian Calls (#/hr)	0	0			0	0	0	0			0	
Act Effct Green (s)	26.6	26.6		42.1	39.0	39.0	25.0	25.0		43.9	40.0	
Actuated g/C Ratio	0.29	0.29		0.46	0.42	0.42	0.27	0.27		0.48	0.43	
v/c Ratio	0.10	0.81		0.72	0.38	0.35	0.22	0.54		0.67	0.41	
Control Delay	25.2	42.7		30.2	19.8	8.2	29.3	27.6		23.9	19.7	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	25.2	42.7		30.2	19.8	8.2	29.3	27.6		23.9	19.7	
LOS	C	D		C	B	A	C	C		C	B	
Approach Delay		41.5			18.9			27.9			21.8	
Approach LOS		D			B			C			C	

Intersection Summary

Area Type: Other
Cycle Length: 97
Actuated Cycle Length: 92
Natural Cycle: 85
Control Type: Semi Act-Uncoord
Maximum v/c Ratio: 0.81
Intersection Signal Delay: 25.7 — Intersection LOS: C
Intersection Capacity Utilization 105.0% — ICU Level of Service G
Analysis Period (min) 15

Splits and Phases: 1: Southcote Road/McNiven Road & Golflinks Road

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	31	433	232	304	273	62	273	345	330
v/c Ratio	0.10	0.81	0.72	0.38	0.35	0.22	0.54	0.67	0.41
Control Delay	25.2	42.7	30.2	19.8	8.2	29.3	27.6	23.9	19.7
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	42.7	30.2	19.8	8.2	29.3	27.6	23.9	19.7
Queue Length 50th (m)	4.3	73.4	26.0	37.8	12.0	9.1	35.1	41.1	40.9
Queue Length 95th (m)	11.4	#120.3	#43.7	58.6	29.1	20.4	61.4	64.3	64.8
Internal Link Dist (m)		144.8		237.8			778.5		264.9
Turn Bay Length (m)	50.0		70.0		15.0	55.0		45.0	
Base Capacity (vph)	323	565	330	846	812	318	563	512	865
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.77	0.70	0.36	0.34	0.19	0.48	0.67	0.38

Intersection Summary

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	340	80	225	295	265	60	130	135	335	280	40
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.92		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1828		1787	1900	1615	1770	1729		1805	1842	
Flt Permitted	0.57	1.00		0.21	1.00	1.00	0.56	1.00		0.42	1.00	
Satd. Flow (perm)	1061	1828		389	1900	1615	1046	1729		800	1842	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	351	82	232	304	273	62	134	139	345	289	41
RTOR Reduction (vph)	0	9	0	0	0	96	0	39	0	0	5	0
Lane Group Flow (vph)	31	424	0	232	304	177	62	234	0	345	325	0
Heavy Vehicles (%)	3%	1%	1%	1%	0%	0%	2%	1%	2%	0%	1%	3%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	26.6	26.6		39.0	39.0	39.0	25.0	25.0		40.0	40.0	
Effective Green, g (s)	26.6	26.6		39.0	39.0	39.0	25.0	25.0		40.0	40.0	
Actuated g/C Ratio	0.29	0.29		0.42	0.42	0.42	0.27	0.27		0.43	0.43	
Clearance Time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Vehicle Extension (s)	3.0	3.0		2.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	306	528		307	805	684	284	469		478	800	
v/s Ratio Prot		0.23		c0.08	0.16			0.14		c0.09	0.18	
v/s Ratio Perm	0.03			c0.24		0.11	0.06			c0.22		
v/c Ratio	0.10	0.80		0.76	0.38	0.26	0.22	0.50		0.72	0.41	
Uniform Delay, d1	23.9	30.3		19.8	18.2	17.2	25.9	28.2		18.8	17.8	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.1	8.7		9.0	0.3	0.2	0.4	0.8		5.3	0.3	
Delay (s)	24.1	38.9		28.8	18.5	17.4	26.3	29.1		24.2	18.2	
Level of Service	C	D		C	B	B	C	C		C	B	
Approach Delay (s)		37.9			21.1			28.5			21.2	
Approach LOS		D			C			C			C	

Intersection Summary

HCM 2000 Control Delay	25.6	HCM 2000 Level of Service	C
HCM 2000 Volume to Capacity ratio	0.79		
Actuated Cycle Length (s)	92.0	Sum of lost time (s)	19.0
Intersection Capacity Utilization	105.0%	ICU Level of Service	G
Analysis Period (min)	15		

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	85	75	295	55	135	425
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	15.0		0.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.979			
Flt Protected	0.950					0.988
Satd. Flow (prot)	1805	1615	1811	0	0	1849
Flt Permitted	0.950					0.988
Satd. Flow (perm)	1805	1615	1811	0	0	1849
Link Speed (k/h)	50		50			50
Link Distance (m)	115.8		365.3			205.1
Travel Time (s)	8.3		26.3			14.8
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	3%	1%	0%	2%
Adj. Flow (vph)	93	82	324	60	148	467
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	82	384	0	0	615
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	8.0		0.0			0.0
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		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	63.4%	ICU Level of Service B	
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	85	75	295	55	135	425
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	93	82	324	60	148	467
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)			2			
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1118	354			385	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1118	354			385	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	54	88			87	
cM capacity (veh/h)	202	694			1185	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	176	385	615
Volume Left	93	0	148
Volume Right	82	60	0
cSH	381	1700	1185
Volume to Capacity	0.46	0.23	0.13
Queue Length 95th (m)	18.9	0.0	3.4
Control Delay (s)	24.9	0.0	3.2
Lane LOS	C		A
Approach Delay (s)	24.9	0.0	3.2
Approach LOS	C		

Intersection Summary			
Average Delay	5.4		
Intersection Capacity Utilization	63.4%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	5	5	5	5	25	5	285	10	40	450	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		15.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		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		0.966				0.850		0.995			0.993	
Flt Protected		0.976			0.976			0.999			0.996	
Satd. Flow (prot)	0	1791	0	0	1854	1615	0	1871	0	0	1863	0
Flt Permitted		0.976			0.976			0.999			0.996	
Satd. Flow (perm)	0	1791	0	0	1854	1615	0	1871	0	0	1863	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		179.0			93.2			658.5			365.3	
Travel Time (s)		12.9			6.7			47.4			26.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	12	6	6	6	6	29	6	331	12	47	523	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	24	0	0	12	29	0	349	0	0	599	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		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	61.1%	ICU Level of Service B	
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	5	5	5	5	25	5	285	10	40	450	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	12	6	6	6	6	29	6	331	12	47	523	29
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	997	985	538	988	994	337	552			343		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	997	985	538	988	994	337	552			343		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	98	99	97	98	96	99			96		
cM capacity (veh/h)	205	239	547	214	236	710	1028			1227		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	23	41	349	599
Volume Left	12	6	6	47
Volume Right	6	29	12	29
cSH	253	788	1028	1227
Volume to Capacity	0.09	0.05	0.01	0.04
Queue Length 95th (m)	2.4	1.3	0.1	0.9
Control Delay (s)	20.6	13.6	0.2	1.0
Lane LOS	C	B	A	A
Approach Delay (s)	20.6	13.6	0.2	1.0
Approach LOS	C	B		

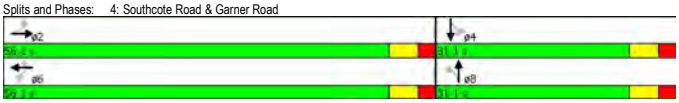
Intersection Summary			
Average Delay	1.7		
Intersection Capacity Utilization	61.1%	ICU Level of Service	B
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	575	10	40	490	55	15	60	30	80	110	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		125.0	130.0		100.0	30.0		0.0	30.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	70.0			60.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997				0.850		0.949			0.908	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3557	0	1805	1881	1583	1805	1803	0	1787	1691	0
Flt Permitted	0.378			0.410			0.510			0.694		
Satd. Flow (perm)	718	3557	0	779	1881	1583	969	1803	0	1306	1691	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				60		29			92	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		406.0			176.0			356.6			658.5	
Travel Time (s)		24.4			10.6			25.7			47.4	
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 (%)	0%	1%	11%	0%	1%	2%	0%	0%	0%	1%	2%	2%
Adj. Flow (vph)	158	625	11	43	533	60	16	65	33	87	120	190
Shared Lane Traffic (%)												
Lane Group Flow (vph)	158	636	0	43	533	60	16	98	0	87	310	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	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	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	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	26.1	26.1		26.1	26.1	26.1	22.1	22.1		27.1	27.1	
Total Split (s)	56.1	56.1		56.1	56.1	56.1	31.1	31.1		31.1	31.1	
Total Split (%)	64.3%	64.3%		64.3%	64.3%	64.3%	35.7%	35.7%		35.7%	35.7%	
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	25.0	25.0		25.0	25.0	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)										7.0	7.0	
Flash Dont Walk (s)										14.0	14.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)	23.9	23.9		23.9	23.9	23.9	13.0	13.0		13.0	13.0	
Actuated g/C Ratio	0.48	0.48		0.48	0.48	0.48	0.26	0.26		0.26	0.26	
v/c Ratio	0.46	0.37		0.11	0.59	0.08	0.06	0.20		0.25	0.61	
Control Delay	14.3	9.0		8.6	12.8	2.9	16.0	12.7		17.8	17.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	14.3	9.0		8.6	12.8	2.9	16.0	12.7		17.8	17.4	
LOS	B	A		A	B	A	B	B		B	B	
Approach Delay		10.0			11.5			13.2			17.5	
Approach LOS		B			B			B			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 87.2			
Actuated Cycle Length: 49.6			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.61			
Intersection Signal Delay: 12.2		Intersection LOS: B	
Intersection Capacity Utilization 74.2%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Southcote Road & Garner Road



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	158	636	43	533	60	16	98	87	310
v/c Ratio	0.46	0.37	0.11	0.59	0.08	0.06	0.20	0.25	0.61
Control Delay	14.3	9.0	8.6	12.8	2.9	16.0	12.7	17.8	17.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	14.3	9.0	8.6	12.8	2.9	16.0	12.7	17.8	17.4
Queue Length 50th (m)	8.0	15.9	1.8	29.3	0.0	1.0	4.2	5.4	14.6
Queue Length 95th (m)	26.7	34.2	7.6	70.2	4.8	5.7	16.9	19.2	46.5
Internal Link Dist (m)		382.0		152.0			332.6		634.5
Turn Bay Length (m)	125.0		130.0		100.0	30.0		30.0	
Base Capacity (vph)	675	3345	732	1769	1492	505	954	681	925
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.23	0.19	0.06	0.30	0.04	0.03	0.10	0.13	0.34

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	145	575	10	40	490	55	15	60	30	80	110	175
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.95		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3559		1805	1881	1583	1805	1804		1787	1691	
Flt Permitted	0.38	1.00		0.41	1.00	1.00	0.51	1.00		0.69	1.00	
Satd. Flow (perm)	718	3559		780	1881	1583	968	1804		1305	1691	
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)	158	625	11	43	533	60	16	65	33	87	120	190
RTOR Reduction (vph)	0	2	0	0	0	31	0	21	0	0	68	0
Lane Group Flow (vph)	158	634	0	43	533	29	16	77	0	87	242	0
Heavy Vehicles (%)	0%	1%	11%	0%	1%	2%	0%	0%	0%	1%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	23.9	23.9		23.9	23.9	23.9	13.0	13.0		13.0	13.0	
Effective Green, g (s)	23.9	23.9		23.9	23.9	23.9	13.0	13.0		13.0	13.0	
Actuated g/C Ratio	0.49	0.49		0.49	0.49	0.49	0.26	0.26		0.26	0.26	
Clearance Time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	349	1732		379	915	770	256	477		345	447	
v/s Ratio Prot		0.18			c0.28			0.04			c0.14	
v/s Ratio Perm	0.22			0.06		0.02	0.02			0.07		
v/c Ratio	0.45	0.37		0.11	0.58	0.04	0.06	0.16		0.25	0.54	
Uniform Delay, d1	8.3	7.9		6.8	9.0	6.6	13.5	13.9		14.2	15.5	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	1.6	0.2		0.2	1.3	0.0	0.1	0.2		0.4	1.3	
Delay (s)	9.9	8.1		7.1	10.3	6.6	13.6	14.0		14.6	16.8	
Level of Service	A	A		A	B	A	B	B		B	B	
Approach Delay (s)		8.5			9.8			14.0			16.4	
Approach LOS		A			A			B			B	

Intersection Summary					
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.57				
Actuated Cycle Length (s)	49.1	Sum of lost time (s)		12.2	
Intersection Capacity Utilization	74.2%	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												
Volume (vph)	50	255	45	80	190	200	75	300	175	150	85	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	70.0		15.0	55.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			30.0			30.0			20.0		
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		0.978				0.850		0.945			0.971	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1736	1843	0	1703	1863	1599	1787	1771	0	1805	1799	0
Flt Permitted	0.630			0.368			0.684			0.204		
Satd. Flow (perm)	1151	1843	0	660	1863	1599	1287	1771	0	388	1799	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		9				185		34			17	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		168.8			261.8			802.5			288.9	
Travel Time (s)		12.2			18.8			57.8			26.0	
Peak Hour Factor	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Heavy Vehicles (%)	4%	1%	0%	6%	2%	1%	1%	1%	2%	0%	1%	9%
Adj. Flow (vph)	54	274	48	86	204	215	81	323	188	161	91	22
Shared Lane Traffic (%)												
Lane Group Flow (vph)	54	322	0	86	204	215	81	511	0	161	113	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	1	2		1	2	
Detector Template	Left	Thru			Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		15.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		13.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		13.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	25.0	25.0		5.0	25.0	25.0	25.0	25.0		5.0	25.0	
Minimum Split (s)	31.1	31.1		8.0	31.1	31.1	42.9	42.9		8.0	42.9	
Total Split (s)	34.1	34.1		10.0	34.1	34.1	42.9	42.9		10.0	42.9	
Total Split (%)	35.2%	35.2%		10.3%	35.2%	35.2%	44.2%	44.2%		10.3%	44.2%	
Maximum Green (s)	28.0	28.0		7.0	28.0	28.0	36.0	36.0		7.0	36.0	
Yellow Time (s)	3.3	3.3		3.0	3.3	3.3	3.3	3.3		3.0	3.3	
All-Red Time (s)	2.8	2.8		0.0	2.8	2.8	3.6	3.6		0.0	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		2.0	3.0	3.0	3.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	None		Max	None	
Walk Time (s)	12.0	12.0			12.0	12.0	20.0	20.0			20.0	
Flash Dont Walk (s)	13.0	13.0			13.0	13.0	16.0	16.0			16.0	
Pedestrian Calls (#/hr)	0	0			0	0	0	0			0	
Act Effct Green (s)	25.8	25.8		36.1	32.9	32.9	29.6	29.6		43.7	39.7	
Actuated g/C Ratio	0.30	0.30		0.42	0.38	0.38	0.34	0.34		0.51	0.46	
v/c Ratio	0.16	0.57		0.25	0.29	0.30	0.18	0.81		0.51	0.13	
Control Delay	26.2	31.1		17.9	20.2	5.6	21.6	35.3		18.1	12.2	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	26.2	31.1		17.9	20.2	5.6	21.6	35.3		18.1	12.2	
LOS	C	C		B	C	A	C	D		B	B	
Approach Delay		30.4			13.6			33.5			15.7	
Approach LOS		C			B			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 85.8			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.81			
Intersection Signal Delay: 24.3		Intersection LOS: C	
Intersection Capacity Utilization 105.0%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: Southcote Road/McNiven Road & Golflinks Road

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	54	322	86	204	215	81	511	161	113
v/c Ratio	0.16	0.57	0.25	0.29	0.30	0.18	0.81	0.51	0.13
Control Delay	26.2	31.1	17.9	20.2	5.6	21.6	35.3	18.1	12.2
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	26.2	31.1	17.9	20.2	5.6	21.6	35.3	18.1	12.2
Queue Length 50th (m)	6.9	45.7	8.5	23.1	3.1	9.8	75.6	14.6	9.3
Queue Length 95th (m)	17.9	82.1	19.7	44.1	18.2	21.4	122.5	27.7	20.2
Internal Link Dist (m)		144.8		237.8			778.5		264.9
Turn Bay Length (m)	50.0		70.0		15.0	55.0		45.0	
Base Capacity (vph)	379	613	363	833	817	545	770	314	982
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.14	0.53	0.24	0.24	0.26	0.15	0.66	0.51	0.12

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	50	255	45	80	190	200	75	300	175	150	85	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.94		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1842		1703	1863	1599	1787	1771		1805	1799	
Flt Permitted	0.63	1.00		0.37	1.00	1.00	0.68	1.00		0.20	1.00	
Satd. Flow (perm)	1151	1842		659	1863	1599	1287	1771		388	1799	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	54	274	48	86	204	215	81	323	188	161	91	22
RTOR Reduction (vph)	0	6	0	0	0	113	0	22	0	0	9	0
Lane Group Flow (vph)	54	316	0	86	204	102	81	489	0	161	104	0
Heavy Vehicles (%)	4%	1%	0%	6%	2%	1%	1%	1%	2%	0%	1%	9%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	25.8	25.8		33.6	33.6	33.6	29.6	29.6		39.7	39.7	
Effective Green, g (s)	25.8	25.8		33.6	33.6	33.6	29.6	29.6		39.7	39.7	
Actuated g/C Ratio	0.30	0.30		0.39	0.39	0.39	0.34	0.34		0.46	0.46	
Clearance Time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Vehicle Extension (s)	3.0	3.0		2.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	344	550		314	725	622	441	607		295	827	
v/s Ratio Prot		c0.17		0.02	c0.11			c0.28		c0.04	0.06	
v/s Ratio Perm	0.05			0.09		0.06	0.06			0.21		
v/c Ratio	0.16	0.57		0.27	0.28	0.16	0.18	0.81		0.55	0.13	
Uniform Delay, d1	22.3	25.6		17.6	18.1	17.2	19.9	25.7		16.2	13.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	1.5		0.2	0.2	0.1	0.2	7.7		2.1	0.1	
Delay (s)	22.5	27.1		17.8	18.3	17.3	20.1	33.4		18.3	13.4	
Level of Service	C	C		B	B	B	C	C		B	B	
Approach Delay (s)		26.4			17.8			31.6			16.3	
Approach LOS		C			B			C			B	

Intersection Summary					
HCM 2000 Control Delay	24.1	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.65				
Actuated Cycle Length (s)	86.3	Sum of lost time (s)	19.0		
Intersection Capacity Utilization	105.0%	ICU Level of Service	G		
Analysis Period (min)	15				

c Critical Lane Group

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	70	110	440	85	50	180
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	15.0		0.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.978			
Flt Protected	0.950					0.989
Satd. Flow (prot)	1787	1615	1846	0	0	1865
Flt Permitted	0.950					0.989
Satd. Flow (perm)	1787	1615	1846	0	0	1865
Link Speed (k/h)	50		50			50
Link Distance (m)	115.8		365.3			205.1
Travel Time (s)	8.3		26.3			14.8
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Heavy Vehicles (%)	1%	0%	0%	4%	0%	1%
Adj. Flow (vph)	74	117	468	90	53	191
Shared Lane Traffic (%)						
Lane Group Flow (vph)	74	117	558	0	0	244
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	8.0		0.0			0.0
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		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	70	110	440	85	50	180
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	74	117	468	90	53	191
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	811	513			559	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	811	513			559	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	78	79			95	
cM capacity (veh/h)	332	565			1022	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	191	559	245
Volume Left	74	0	53
Volume Right	117	90	0
cSH	854	1700	1022
Volume to Capacity	0.22	0.33	0.05
Queue Length 95th (m)	6.9	0.0	1.3
Control Delay (s)	15.3	0.0	2.3
Lane LOS	C		A
Approach Delay (s)	15.3	0.0	2.3
Approach LOS	C		

Intersection Summary			
Average Delay	3.5		
Intersection Capacity Utilization	54.4%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	0	25	5	25	5	465	10	10	245	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		15.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		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						0.850		0.997			0.995	
Flt Protected		0.960			0.960						0.998	
Satd. Flow (prot)	0	1764	0	0	1769	1615	0	1858	0	0	1812	0
Flt Permitted		0.960			0.960						0.998	
Satd. Flow (perm)	0	1764	0	0	1769	1615	0	1858	0	0	1812	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		179.0			93.2			658.5			365.3	
Travel Time (s)		12.9			6.7			47.4			26.3	
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%	0%	0%	0%	20%	0%	0%	2%	0%	0%	4%	11%
Adj. Flow (vph)	27	5	0	27	5	27	5	505	11	11	266	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	32	27	0	521	0	0	288	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		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	5	0	25	5	25	5	465	10	10	245	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	5	0	27	5	27	5	505	11	11	266	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	832	821	272	818	821	511	277			516		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	832	821	272	818	821	511	277			516		
tC, single (s)	7.1	6.5	6.2	7.1	6.7	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.2	3.3	2.2			2.2		
p0 queue free %	90	98	100	91	98	95	100			99		
cM capacity (veh/h)	266	307	772	290	286	567	1297			1060		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	33	60	522	288
Volume Left	27	27	5	11
Volume Right	0	27	11	11
cSH	272	530	1297	1060
Volume to Capacity	0.12	0.11	0.00	0.01
Queue Length 95th (m)	3.2	3.0	0.1	0.2
Control Delay (s)	20.0	15.7	0.1	0.4
Lane LOS	C	C	A	A
Approach Delay (s)	20.0	15.7	0.1	0.4
Approach LOS	C	C		

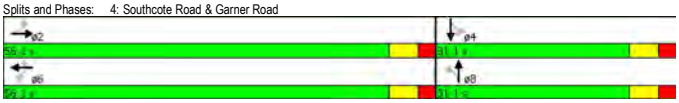
Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	42.0%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	560	5	15	470	110	10	175	40	60	50	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		125.0	130.0		100.0	30.0		0.0	30.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	70.0			60.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850		0.972			0.881	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3469	0	1805	1881	1599	1805	1832	0	1770	1654	0
Flt Permitted	0.402			0.417			0.564			0.612		
Satd. Flow (perm)	749	3469	0	792	1881	1599	1072	1832	0	1140	1654	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		2				121		13			214	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		406.0			176.0			356.6			658.5	
Travel Time (s)		24.4			10.6			25.7			47.4	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	4%	0%	0%	1%	1%	0%	1%	0%	2%	2%	1%
Adj. Flow (vph)	209	615	5	16	516	121	11	192	44	66	55	214
Shared Lane Traffic (%)												
Lane Group Flow (vph)	209	620	0	16	516	121	11	236	0	66	269	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	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	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	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	26.1	26.1		26.1	26.1	26.1	22.1	22.1		27.1	27.1	
Total Split (s)	56.1	56.1		56.1	56.1	56.1	31.1	31.1		31.1	31.1	
Total Split (%)	64.3%	64.3%		64.3%	64.3%	64.3%	35.7%	35.7%		35.7%	35.7%	
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	25.0	25.0		25.0	25.0	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)										7.0	7.0	
Flash Dont Walk (s)										14.0	14.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)	26.1	26.1		26.1	26.1	26.1	12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.50	0.50		0.50	0.50	0.50	0.25	0.25		0.25	0.25	
v/c Ratio	0.55	0.35		0.04	0.54	0.14	0.04	0.51		0.23	0.47	
Control Delay	15.7	8.3		7.1	11.3	2.1	18.2	21.6		20.2	8.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	15.7	8.3		7.1	11.3	2.1	18.2	21.6		20.2	8.6	
LOS	B	A		A	B	A	B	C		C	A	
Approach Delay		10.2			9.5			21.5			10.9	
Approach LOS		B			A			C			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 87.2			
Actuated Cycle Length: 51.7			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.55			
Intersection Signal Delay: 11.4		Intersection LOS: B	
Intersection Capacity Utilization 84.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 4: Southcote Road & Garner Road



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	209	620	16	516	121	11	236	66	269
v/c Ratio	0.55	0.35	0.04	0.54	0.14	0.04	0.51	0.23	0.47
Control Delay	15.7	8.3	7.1	11.3	2.1	18.2	21.6	20.2	8.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	15.7	8.3	7.1	11.3	2.1	18.2	21.6	20.2	8.6
Queue Length 50th (m)	11.2	15.2	0.6	27.4	0.0	0.7	15.8	4.4	3.6
Queue Length 95th (m)	35.5	32.4	3.5	64.5	6.3	5.0	48.3	17.7	24.5
Internal Link Dist (m)		382.0		152.0			332.6		634.5
Turn Bay Length (m)	125.0		130.0		100.0	30.0		30.0	
Base Capacity (vph)	687	3182	726	1725	1477	543	934	577	943
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.30	0.19	0.02	0.30	0.08	0.02	0.25	0.11	0.29

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	190	560	5	15	470	110	10	175	40	60	50	195
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.97		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3468		1805	1881	1599	1805	1832		1770	1653	
Flt Permitted	0.40	1.00		0.42	1.00	1.00	0.56	1.00		0.61	1.00	
Satd. Flow (perm)	748	3468		792	1881	1599	1072	1832		1140	1653	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	209	615	5	16	516	121	11	192	44	66	55	214
RTOR Reduction (vph)	0	1	0	0	0	59	0	10	0	0	160	0
Lane Group Flow (vph)	209	619	0	16	516	62	11	226	0	66	109	0
Heavy Vehicles (%)	2%	4%	0%	0%	1%	1%	0%	1%	0%	2%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	26.1	26.1		26.1	26.1	26.1	12.8	12.8		12.8	12.8	
Effective Green, g (s)	26.1	26.1		26.1	26.1	26.1	12.8	12.8		12.8	12.8	
Actuated g/C Ratio	0.51	0.51		0.51	0.51	0.51	0.25	0.25		0.25	0.25	
Clearance Time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	382	1771		404	960	816	268	458		285	414	
v/s Ratio Prot		0.18			0.27			c0.12			0.07	
v/s Ratio Perm	c0.28			0.02		0.04	0.01			0.06		
v/c Ratio	0.55	0.35		0.04	0.54	0.08	0.04	0.49		0.23	0.26	
Uniform Delay, d1	8.5	7.4		6.2	8.4	6.4	14.5	16.4		15.2	15.4	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	2.4	0.2		0.1	0.9	0.1	0.1	0.8		0.4	0.3	
Delay (s)	10.9	7.7		6.3	9.3	6.4	14.6	17.2		15.7	15.7	
Level of Service	B	A		A	A	A	B	B		B	B	
Approach Delay (s)		8.5			8.7			17.1			15.7	
Approach LOS		A			A			B			B	

Intersection Summary					
HCM 2000 Control Delay	10.8	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.53				
Actuated Cycle Length (s)	51.1	Sum of lost time (s)		12.2	
Intersection Capacity Utilization	84.7%	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												
Volume (vph)	30	360	85	255	325	285	60	140	135	365	300	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		0.0	70.0		15.0	55.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			30.0			30.0			20.0		
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		0.971				0.850		0.926			0.981	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1827	0	1787	1900	1615	1770	1734	0	1805	1841	0
Flt Permitted	0.559			0.174			0.549			0.403		
Satd. Flow (perm)	1031	1827	0	327	1900	1615	1023	1734	0	766	1841	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				162		50			10	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		168.8			261.8			802.5			288.9	
Travel Time (s)		12.2			18.8			57.8			26.0	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	1%	1%	1%	0%	0%	2%	1%	2%	0%	1%	3%
Adj. Flow (vph)	31	371	88	263	335	294	62	144	139	376	309	46
Shared Lane Traffic (%)												
Lane Group Flow (vph)	31	459	0	263	335	294	62	283	0	376	355	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	1	2		1	2	
Detector Template	Left	Thru			Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		15.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		13.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		13.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	25.0	25.0		5.0	25.0	25.0	25.0	25.0		5.0	25.0	
Minimum Split (s)	31.1	31.1		8.0	31.1	31.1	34.9	34.9		8.0	34.9	
Total Split (s)	34.1	34.1		13.0	34.1	34.1	34.9	34.9		15.0	34.9	
Total Split (%)	35.2%	35.2%		13.4%	35.2%	35.2%	36.0%	36.0%		15.5%	36.0%	
Maximum Green (s)	28.0	28.0		10.0	28.0	28.0	28.0	28.0		12.0	28.0	
Yellow Time (s)	3.3	3.3		3.0	3.3	3.3	3.3	3.3		3.0	3.3	
All-Red Time (s)	2.8	2.8		0.0	2.8	2.8	3.6	3.6		0.0	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		2.0	3.0	3.0	3.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	None		Max	None	
Walk Time (s)	12.0	12.0			12.0	12.0	12.0	12.0			12.0	
Flash Dont Walk (s)	13.0	13.0			13.0	13.0	16.0	16.0			16.0	
Pedestrian Calls (#/hr)	0	0			0	0	0	0			0	
Act Effct Green (s)	26.9	26.9		42.9	39.8	39.8	25.0	25.0		44.0	40.0	
Actuated g/C Ratio	0.29	0.29		0.46	0.43	0.43	0.27	0.27		0.47	0.43	
v/c Ratio	0.10	0.86		0.85	0.41	0.37	0.23	0.56		0.76	0.44	
Control Delay	25.2	47.4		43.9	20.2	9.2	29.5	29.1		28.9	20.4	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	25.2	47.4		43.9	20.2	9.2	29.5	29.1		28.9	20.4	
LOS	C	D		D	C	A	C	C		C	C	
Approach Delay		46.0			23.6			29.1			24.8	
Approach LOS		D			C			C			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 97			
Actuated Cycle Length: 92.9			
Natural Cycle: 85			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.86			
Intersection Signal Delay: 29.2		Intersection LOS: C	
Intersection Capacity Utilization 105.0%		ICU Level of Service G	
Analysis Period (min) 15			

Splits and Phases: 1: Southcote Road/McNiven Road & Golflinks Road

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	31	459	263	335	294	62	283	376	355
v/c Ratio	0.10	0.86	0.85	0.41	0.37	0.23	0.56	0.76	0.44
Control Delay	25.2	47.4	43.9	20.2	9.2	29.5	29.1	28.9	20.4
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	25.2	47.4	43.9	20.2	9.2	29.5	29.1	28.9	20.4
Queue Length 50th (m)	4.3	79.4	30.1	42.5	15.0	9.2	38.2	46.6	45.5
Queue Length 95th (m)	11.5	#132.4	#68.5	65.4	33.9	20.5	64.9	#77.3	69.9
Internal Link Dist (m)		144.8		237.8			778.5		264.9
Turn Bay Length (m)	50.0		70.0		15.0	55.0		45.0	
Base Capacity (vph)	310	559	308	838	803	308	557	496	857
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.10	0.82	0.85	0.40	0.37	0.20	0.51	0.76	0.41

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	30	360	85	255	325	285	60	140	135	365	300	45
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.93		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1827		1787	1900	1615	1770	1734		1805	1840	
Flt Permitted	0.56	1.00		0.17	1.00	1.00	0.55	1.00		0.40	1.00	
Satd. Flow (perm)	1031	1827		327	1900	1615	1022	1734		765	1840	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	31	371	88	263	335	294	62	144	139	376	309	46
RTOR Reduction (vph)	0	9	0	0	0	92	0	37	0	0	6	0
Lane Group Flow (vph)	31	450	0	263	335	202	62	246	0	376	349	0
Heavy Vehicles (%)	3%	1%	1%	1%	0%	0%	2%	1%	2%	0%	1%	3%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	26.9	26.9		39.9	39.9	39.9	25.0	25.0		40.0	40.0	
Effective Green, g (s)	26.9	26.9		39.9	39.9	39.9	25.0	25.0		40.0	40.0	
Actuated g/C Ratio	0.29	0.29		0.43	0.43	0.43	0.27	0.27		0.43	0.43	
Clearance Time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Vehicle Extension (s)	3.0	3.0		2.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	298	529		297	816	693	275	466		463	792	
v/s Ratio Prot		0.25		c0.10	0.18			0.14		c0.10	0.19	
v/s Ratio Perm	0.03			c0.28		0.12	0.06			c0.24		
v/c Ratio	0.10	0.85		0.89	0.41	0.29	0.23	0.53		0.81	0.44	
Uniform Delay, d1	24.2	31.1		20.6	18.4	17.3	26.4	28.9		20.8	18.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.2	12.5		24.8	0.3	0.2	0.4	1.1		10.4	0.4	
Delay (s)	24.3	43.6		45.4	18.7	17.5	26.8	30.0		31.2	19.0	
Level of Service	C	D		D	B	B	C	C		C	B	
Approach Delay (s)		42.4			26.2			29.4			25.3	
Approach LOS		D			C			C			C	

Intersection Summary					
HCM 2000 Control Delay	29.6	HCM 2000 Level of Service	C		
HCM 2000 Volume to Capacity ratio	0.91				
Actuated Cycle Length (s)	92.9	Sum of lost time (s)	19.0		
Intersection Capacity Utilization	105.0%	ICU Level of Service	G		
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	85	75	315	55	135	480
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	15.0		0.0	0.0	
Storage Lanes	1	1		0	0	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.980			
Flt Protected	0.950					0.989
Satd. Flow (prot)	1805	1615	1813	0	0	1850
Flt Permitted	0.950					0.989
Satd. Flow (perm)	1805	1615	1813	0	0	1850
Link Speed (k/h)	50		50			50
Link Distance (m)	115.8		365.3			205.1
Travel Time (s)	8.3		26.3			14.8
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	3%	1%	0%	2%
Adj. Flow (vph)	93	82	346	60	148	527
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	82	406	0	0	675
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	8.0		0.0			0.0
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		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	67.4%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	85	75	315	55	135	480
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	93	82	346	60	148	527
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1201	376			407	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1201	376			407	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	48	88			87	
cM capacity (veh/h)	180	675			1163	

Direction, Lane #	WB 1	NB 1	SB 1
Volume Total	176	407	676
Volume Left	93	0	148
Volume Right	82	60	0
cSH	339	1700	1163
Volume to Capacity	0.52	0.24	0.13
Queue Length 95th (m)	22.7	0.0	3.5
Control Delay (s)	29.0	0.0	3.1
Lane LOS	D		A
Approach Delay (s)	29.0	0.0	3.1
Approach LOS	D		

Intersection Summary				
Average Delay		5.7		
Intersection Capacity Utilization		67.4%	ICU Level of Service	C
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	5	5	5	5	25	5	305	10	40	490	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		15.0	0.0		0.0	0.0		0.0
Storage Lanes	0		0	0		1	0		0	0		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		0.966				0.850		0.996			0.994	
Flt Protected		0.976			0.976			0.999			0.996	
Satd. Flow (prot)	0	1791	0	0	1854	1615	0	1873	0	0	1865	0
Flt Permitted		0.976			0.976			0.999			0.996	
Satd. Flow (perm)	0	1791	0	0	1854	1615	0	1873	0	0	1865	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		179.0			93.2			658.5			365.3	
Travel Time (s)		12.9			6.7			47.4			26.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	12	6	6	6	6	29	6	355	12	47	570	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	24	0	0	12	29	0	373	0	0	646	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		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	64.2%	ICU Level of Service	C
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	5	5	5	5	25	5	305	10	40	490	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	12	6	6	6	6	29	6	355	12	47	570	29
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1067	1055	584	1058	1064	360	599			366		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1067	1055	584	1058	1064	360	599			366		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	94	97	99	97	97	96	99			96		
cM capacity (veh/h)	183	217	515	191	215	689	988			1203		

Direction, Lane #	EB 1	WB 1	NB 1	SB 1
Volume Total	23	41	372	645
Volume Left	12	6	6	47
Volume Right	6	29	12	29
cSH	229	710	988	1203
Volume to Capacity	0.10	0.06	0.01	0.04
Queue Length 95th (m)	2.7	1.5	0.1	1.0
Control Delay (s)	22.5	14.3	0.2	1.0
Lane LOS	C	B	A	A
Approach Delay (s)	22.5	14.3	0.2	1.0
Approach LOS	C	B		

Intersection Summary				
Average Delay		1.7		
Intersection Capacity Utilization		64.2%	ICU Level of Service	C
Analysis Period (min)		15		

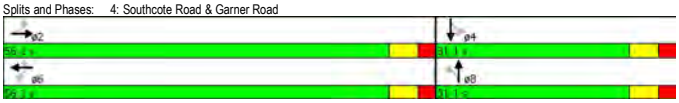
Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	160	615	10	40	510	60	15	70	30	90	120	190
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		125.0	130.0		100.0	30.0		0.0	30.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	70.0			60.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.998				0.850		0.955			0.908	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3561	0	1805	1881	1583	1805	1814	0	1787	1691	0
Flt Permitted	0.358			0.387			0.453			0.687		
Satd. Flow (perm)	680	3561	0	735	1881	1583	861	1814	0	1292	1691	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				65		25			92	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		406.0			176.0			356.6			658.5	
Travel Time (s)		24.4			10.6			25.7			47.4	
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 (%)	0%	1%	11%	0%	1%	2%	0%	0%	0%	1%	2%	2%
Adj. Flow (vph)	174	668	11	43	554	65	16	76	33	98	130	207
Shared Lane Traffic (%)												
Lane Group Flow (vph)	174	679	0	43	554	65	16	109	0	98	337	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	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	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	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	26.1	26.1		26.1	26.1	26.1	22.1	22.1		27.1	27.1	
Total Split (s)	56.1	56.1		56.1	56.1	56.1	31.1	31.1		31.1	31.1	
Total Split (%)	64.3%	64.3%		64.3%	64.3%	64.3%	35.7%	35.7%		35.7%	35.7%	
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	25.0	25.0		25.0	25.0	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)										7.0	7.0	
Flash Dont Walk (s)										14.0	14.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)	25.8	25.8		25.8	25.8	25.8	14.1	14.1		14.1	14.1	
Actuated g/C Ratio	0.49	0.49		0.49	0.49	0.49	0.27	0.27		0.27	0.27	
v/c Ratio	0.52	0.39		0.12	0.60	0.08	0.07	0.22		0.28	0.65	
Control Delay	16.9	9.5		9.1	13.4	2.9	17.4	14.5		19.3	19.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	16.9	9.5		9.1	13.4	2.9	17.4	14.5		19.3	19.6	
LOS	B	A		A	B	A	B	B		B	B	
Approach Delay		11.0			12.1			14.9			19.5	
Approach LOS		B			B			B			B	

Intersection Summary

Area Type:	Other		
Cycle Length: 87.2			
Actuated Cycle Length: 52.8			
Natural Cycle: 60			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.65			
Intersection Signal Delay: 13.4		Intersection LOS: B	
Intersection Capacity Utilization 76.7%		ICU Level of Service D	
Analysis Period (min) 15			

Splits and Phases: 4: Southcote Road & Garner Road



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	174	679	43	554	65	16	109	98	337
v/c Ratio	0.52	0.39	0.12	0.60	0.08	0.07	0.22	0.28	0.65
Control Delay	16.9	9.5	9.1	13.4	2.9	17.4	14.5	19.3	19.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	16.9	9.5	9.1	13.4	2.9	17.4	14.5	19.3	19.6
Queue Length 50th (m)	9.8	18.4	1.9	32.9	0.0	1.0	5.6	6.7	18.2
Queue Length 95th (m)	33.9	40.5	8.2	80.7	5.2	6.2	20.8	23.1	56.8
Internal Link Dist (m)		382.0		152.0			332.6		634.5
Turn Bay Length (m)	125.0		130.0		100.0	30.0		30.0	
Base Capacity (vph)	619	3241	669	1712	1447	428	915	643	887
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.28	0.21	0.06	0.32	0.04	0.04	0.12	0.15	0.38

Intersection Summary

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	65	365	50	90	205	255	90	425	240	180	90	20
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.98		1.00	1.00	0.85	1.00	0.95		1.00	0.97	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1736	1849		1703	1863	1599	1787	1773		1805	1803	
Flt Permitted	0.62	1.00		0.19	1.00	1.00	0.68	1.00		0.11	1.00	
Satd. Flow (perm)	1134	1849		335	1863	1599	1280	1773		202	1803	
Peak-hour factor, PHF	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93	0.93
Adj. Flow (vph)	70	392	54	97	220	274	97	457	258	194	97	22
RTOR Reduction (vph)	0	6	0	0	0	145	0	23	0	0	9	0
Lane Group Flow (vph)	70	440	0	97	220	129	97	692	0	194	110	0
Heavy Vehicles (%)	4%	1%	0%	6%	2%	1%	1%	1%	2%	0%	1%	9%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	25.3	25.3		32.2	32.2	32.2	34.6	34.6		43.6	43.6	
Effective Green, g (s)	25.3	25.3		32.2	32.2	32.2	34.6	34.6		43.6	43.6	
Actuated g/C Ratio	0.28	0.28		0.36	0.36	0.36	0.39	0.39		0.49	0.49	
Clearance Time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Vehicle Extension (s)	3.0	3.0		2.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	323	526		181	675	579	498	690		207	885	
v/s Ratio Prot		c0.24		c0.02	0.12			0.39		c0.06	0.06	
v/s Ratio Perm	0.06			0.17		0.08	0.08			c0.40		
v/c Ratio	0.22	0.84		0.54	0.33	0.22	0.19	1.00		0.94	0.12	
Uniform Delay, d1	24.2	29.8		21.1	20.5	19.6	17.9	27.1		19.6	12.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	11.1		1.5	0.3	0.2	0.2	35.1		44.7	0.1	
Delay (s)	24.5	40.9		22.7	20.7	19.8	18.1	62.2		64.2	12.3	
Level of Service	C	D		C	C	B	B	E		E	B	
Approach Delay (s)		38.7			20.6			56.9			44.5	
Approach LOS		D			C			E			D	

Intersection Summary				
HCM 2000 Control Delay	41.4	HCM 2000 Level of Service	D	
HCM 2000 Volume to Capacity ratio	0.91			
Actuated Cycle Length (s)	88.8	Sum of lost time (s)	19.0	
Intersection Capacity Utilization	107.9%	ICU Level of Service	G	
Analysis Period (min)	15			

c Critical Lane Group

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	70	110	645	85	50	215
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.94	0.94	0.94	0.94	0.94	0.94
Hourly flow rate (vph)	74	117	686	90	53	229
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1066	731			777	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1066	731			777	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	68	72			94	
cM capacity (veh/h)	232	425			849	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	191	777	53	229
Volume Left	74	0	53	0
Volume Right	117	90	0	0
cSH	595	1700	849	1700
Volume to Capacity	0.32	0.46	0.06	0.13
Queue Length 95th (m)	11.1	0.0	1.6	0.0
Control Delay (s)	21.0	0.0	9.5	0.0
Lane LOS	C		A	
Approach Delay (s)	21.0	0.0	1.8	
Approach LOS	C			

Intersection Summary			
Average Delay	3.6		
Intersection Capacity Utilization	52.6%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	25	5	0	25	5	25	5	645	10	10	280	10
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		15.0	50.0		0.0	50.0		0.0
Storage Lanes	0		0	0		1	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
Frt						0.850		0.998			0.995	
Flt Protected		0.960			0.960		0.950			0.950		
Satd. Flow (prot)	0	1764	0	0	1769	1615	1805	1860	0	1805	1814	0
Flt Permitted		0.960			0.960		0.950			0.950		
Satd. Flow (perm)	0	1764	0	0	1769	1615	1805	1860	0	1805	1814	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		179.0			93.2			658.5			365.3	
Travel Time (s)		12.9			6.7			47.4			26.3	
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%	0%	0%	0%	20%	0%	0%	2%	0%	0%	4%	11%
Adj. Flow (vph)	27	5	0	27	5	27	5	701	11	11	304	11
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	32	0	0	32	27	5	712	0	11	315	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		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	51.2%	ICU Level of Service A	
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	25	5	0	25	5	25	5	645	10	10	280	10
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	27	5	0	27	5	27	5	701	11	11	304	11
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1060	1054	310	1046	1054	707	315			712		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1060	1054	310	1046	1054	707	315			712		
tC, single (s)	7.1	6.5	6.2	7.1	6.7	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.2	3.3	2.2			2.2		
p0 queue free %	85	98	100	87	97	94	100			99		
cM capacity (veh/h)	182	224	735	202	206	439	1256			897		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	33	60	5	712	11	315
Volume Left	27	27	5	0	11	0
Volume Right	0	27	0	11	0	11
cSH	188	371	1256	1700	897	1700
Volume to Capacity	0.17	0.16	0.00	0.42	0.01	0.19
Queue Length 95th (m)	4.9	4.5	0.1	0.0	0.3	0.0
Control Delay (s)	28.2	20.5	7.9	0.0	9.1	0.0
Lane LOS	D	C	A		A	
Approach Delay (s)	28.2	20.5	0.1		0.3	
Approach LOS	D	C				

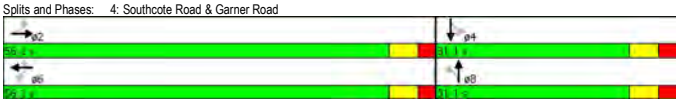
Intersection Summary			
Average Delay	2.0		
Intersection Capacity Utilization	51.2%	ICU Level of Service	A
Analysis Period (min)	15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	655	5	20	680	155	15	260	45	70	50	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		125.0	130.0		100.0	30.0		0.0	30.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	70.0			60.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.999				0.850		0.978			0.878	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3469	0	1805	1881	1599	1805	1842	0	1770	1649	0
Flt Permitted	0.260			0.359			0.388			0.317		
Satd. Flow (perm)	484	3469	0	682	1881	1599	737	1842	0	590	1649	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		1				170		10			198	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		406.0			176.0			356.6			658.5	
Travel Time (s)		24.4			10.6			25.7			47.4	
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	2%	4%	0%	0%	1%	1%	0%	1%	0%	2%	2%	1%
Adj. Flow (vph)	264	720	5	22	747	170	16	286	49	77	55	242
Shared Lane Traffic (%)												
Lane Group Flow (vph)	264	725	0	22	747	170	16	335	0	77	297	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	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	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	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	26.1	26.1		26.1	26.1	26.1	22.1	22.1		27.1	27.1	
Total Split (s)	56.1	56.1		56.1	56.1	56.1	31.1	31.1		31.1	31.1	
Total Split (%)	64.3%	64.3%		64.3%	64.3%	64.3%	35.7%	35.7%		35.7%	35.7%	
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	25.0	25.0		25.0	25.0	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)										7.0	7.0	
Flash Dont Walk (s)										14.0	14.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)	50.1	50.1		50.1	50.1	50.1	18.9	18.9		18.9	18.9	
Actuated g/C Ratio	0.62	0.62		0.62	0.62	0.62	0.23	0.23		0.23	0.23	
v/c Ratio	0.89	0.34		0.05	0.64	0.16	0.09	0.77		0.56	0.56	
Control Delay	49.3	8.7		8.1	14.2	1.8	24.9	40.5		43.9	13.6	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	49.3	8.7		8.1	14.2	1.8	24.9	40.5		43.9	13.6	
LOS	D	A		A	B	A	C	D		D	B	
Approach Delay		19.5			11.8			39.8			19.8	
Approach LOS		B			B			D			B	

Intersection Summary			
Area Type:	Other		
Cycle Length: 87.2			
Actuated Cycle Length: 81.3			
Natural Cycle: 90			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.89			
Intersection Signal Delay: 19.5		Intersection LOS: B	
Intersection Capacity Utilization 97.5%		ICU Level of Service F	
Analysis Period (min) 15			

Splits and Phases: 4: Southcote Road & Garner Road



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	264	725	22	747	170	16	335	77	297
v/c Ratio	0.89	0.34	0.05	0.64	0.16	0.09	0.77	0.56	0.56
Control Delay	49.3	8.7	8.1	14.2	1.8	24.9	40.5	43.9	13.6
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	49.3	8.7	8.1	14.2	1.8	24.9	40.5	43.9	13.6
Queue Length 50th (m)	33.1	27.4	1.3	70.6	0.0	2.1	49.5	11.1	13.2
Queue Length 95th (m)	#93.7	44.8	5.0	128.3	8.0	7.0	78.1	25.8	35.8
Internal Link Dist (m)		382.0		152.0			332.6		634.5
Turn Bay Length (m)	125.0		130.0		100.0	30.0		30.0	
Base Capacity (vph)	298	2139	420	1160	1051	227	574	181	645
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.89	0.34	0.05	0.64	0.16	0.07	0.58	0.43	0.46

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	240	655	5	20	680	155	15	260	45	70	50	220
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.98		1.00	0.88	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1770	3468		1805	1881	1599	1805	1843		1770	1648	
Flt Permitted	0.26	1.00		0.36	1.00	1.00	0.39	1.00		0.32	1.00	
Satd. Flow (perm)	485	3468		682	1881	1599	737	1843		591	1648	
Peak-hour factor, PHF	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91	0.91
Adj. Flow (vph)	264	720	5	22	747	170	16	286	49	77	55	242
RTOR Reduction (vph)	0	0	0	0	0	65	0	8	0	0	152	0
Lane Group Flow (vph)	264	725	0	22	747	105	16	327	0	77	145	0
Heavy Vehicles (%)	2%	4%	0%	0%	1%	1%	0%	1%	0%	2%	2%	1%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	50.2	50.2		50.2	50.2	50.2	18.9	18.9		18.9	18.9	
Effective Green, g (s)	50.2	50.2		50.2	50.2	50.2	18.9	18.9		18.9	18.9	
Actuated g/C Ratio	0.62	0.62		0.62	0.62	0.62	0.23	0.23		0.23	0.23	
Clearance Time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	299	2141		421	1161	987	171	428		137	383	
v/s Ratio Prot		0.21			0.40			c0.18			0.09	
v/s Ratio Perm	c0.54			0.03		0.07	0.02			0.13		
v/c Ratio	0.88	0.34		0.05	0.64	0.11	0.09	0.76		0.56	0.38	
Uniform Delay, d1	13.1	7.5		6.1	9.9	6.4	24.5	29.1		27.5	26.3	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	26.0	0.2		0.1	1.5	0.1	0.2	7.9		5.2	0.6	
Delay (s)	39.1	7.7		6.2	11.4	6.4	24.7	37.1		32.7	26.9	
Level of Service	D	A		A	B	A	C	D		C	C	
Approach Delay (s)		16.1			10.4			36.5			28.1	
Approach LOS		B			B			D			C	

Intersection Summary					
HCM 2000 Control Delay	18.5	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.85				
Actuated Cycle Length (s)	81.3	Sum of lost time (s)		12.2	
Intersection Capacity Utilization	97.5%	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												
Volume (vph)	35	385	105	345	475	340	75	150	160	450	430	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	50.0		25.0	70.0		15.0	55.0		0.0	45.0		0.0
Storage Lanes	1		0	1		1	1		0	1		0
Taper Length (m)	40.0			30.0			30.0			20.0		
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		0.968				0.850		0.923			0.982	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1752	1821	0	1787	1900	1615	1770	1728	0	1805	1843	0
Flt Permitted	0.485			0.118			0.478			0.275		
Satd. Flow (perm)	895	1821	0	222	1900	1615	890	1728	0	522	1843	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		12				118		44			8	
Link Speed (k/h)		50			50			50			40	
Link Distance (m)		168.8			261.8			802.5			288.9	
Travel Time (s)		12.2			18.8			57.8			26.0	
Peak Hour Factor	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Heavy Vehicles (%)	3%	1%	1%	1%	0%	0%	2%	1%	2%	0%	1%	3%
Adj. Flow (vph)	36	397	108	356	490	351	77	155	165	464	443	62
Shared Lane Traffic (%)												
Lane Group Flow (vph)	36	505	0	356	490	351	77	320	0	464	505	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	1	2		1	2	
Detector Template	Left	Thru			Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		15.0	10.0	2.0	2.0	10.0		2.0	10.0	
Trailing Detector (m)	0.0	0.0		13.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Position(m)	0.0	0.0		13.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		1	6	6	8	8		7	4	
Switch Phase												
Minimum Initial (s)	25.0	25.0		5.0	25.0	25.0	25.0	25.0		5.0	25.0	
Minimum Split (s)	31.1	31.1		8.0	31.1	31.1	34.9	34.9		8.0	34.9	
Total Split (s)	37.1	37.1		21.0	58.1	58.1	34.9	34.9		22.0	56.9	
Total Split (%)	32.3%	32.3%		18.3%	50.5%	50.5%	30.3%	30.3%		19.1%	49.5%	
Maximum Green (s)	31.0	31.0		16.0	52.0	52.0	28.0	28.0		19.0	50.0	
Yellow Time (s)	3.3	3.3		3.0	3.3	3.3	3.3	3.3		3.0	3.3	
All-Red Time (s)	2.8	2.8		0.0	2.8	2.8	3.6	3.6		0.0	3.6	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Lead/Lag	Lag	Lag		Lead			Lag	Lag		Lead		
Lead-Lag Optimize?	Yes	Yes		Yes			Yes	Yes		Yes		
Vehicle Extension (s)	3.0	3.0		2.0	3.0	3.0	3.0	3.0		2.0	3.0	
Recall Mode	None	None		None	None	None	None	None		Max	None	
Walk Time (s)	12.0	12.0			12.0	12.0	12.0	12.0			12.0	
Flash Dont Walk (s)	13.0	13.0			13.0	13.0	16.0	16.0			16.0	
Pedestrian Calls (#/hr)	0	0			0	0	0	0			0	
Act Effct Green (s)	31.0	31.0		55.1	52.0	52.0	26.0	26.0		51.9	48.0	
Actuated g/C Ratio	0.27	0.27		0.49	0.46	0.46	0.23	0.23		0.46	0.42	
v/c Ratio	0.15	0.99		1.00	0.56	0.44	0.38	0.74		1.02	0.64	
Control Delay	33.5	79.5		78.0	25.5	15.3	42.8	46.2		72.9	29.8	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	33.5	79.5		78.0	25.5	15.3	42.8	46.2		72.9	29.8	
LOS	C	E		E	C	B	D	D		E	C	
Approach Delay		76.5			38.1			45.5			50.4	
Approach LOS		E			D			D			D	

Intersection Summary			
Area Type:	Other		
Cycle Length: 115			
Actuated Cycle Length: 113			
Natural Cycle: 115			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 1.02			
Intersection Signal Delay: 49.6		Intersection LOS: D	
Intersection Capacity Utilization 114.6%		ICU Level of Service H	
Analysis Period (min) 15			

Splits and Phases: 1: Southcote Road/McNiven Road & Golflinks Road

Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	36	505	356	490	351	77	320	464	505
v/c Ratio	0.15	0.99	1.00	0.56	0.44	0.38	0.74	1.02	0.64
Control Delay	33.5	79.5	78.0	25.5	15.3	42.8	46.2	72.9	29.8
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	33.5	79.5	78.0	25.5	15.3	42.8	46.2	72.9	29.8
Queue Length 50th (m)	6.3	113.5	64.1	79.3	33.8	15.2	60.2	~79.3	89.7
Queue Length 95th (m)	15.7	#192.1	#131.5	118.0	61.0	30.4	93.9	#142.2	127.1
Internal Link Dist (m)		144.8		237.8			778.5		264.9
Turn Bay Length (m)	50.0		70.0		15.0	55.0		45.0	
Base Capacity (vph)	245	508	357	874	806	220	461	455	819
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.15	0.99	1.00	0.56	0.44	0.35	0.69	1.02	0.62

Intersection Summary
~ Volume exceeds capacity, queue is theoretically infinite.
Queue shown is maximum after two cycles.
95th percentile volume exceeds capacity, queue may be longer.
Queue shown is maximum after two cycles.

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	35	385	105	345	475	340	75	150	160	450	430	60
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Lane Util. Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	0.97		1.00	1.00	0.85	1.00	0.92		1.00	0.98	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1752	1821		1787	1900	1615	1770	1727		1805	1842	
Flt Permitted	0.48	1.00		0.12	1.00	1.00	0.48	1.00		0.28	1.00	
Satd. Flow (perm)	894	1821		221	1900	1615	890	1727		523	1842	
Peak-hour factor, PHF	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97	0.97
Adj. Flow (vph)	36	397	108	356	490	351	77	155	165	464	443	62
RTOR Reduction (vph)	0	9	0	0	0	64	0	34	0	0	5	0
Lane Group Flow (vph)	36	496	0	356	490	287	77	286	0	464	500	0
Heavy Vehicles (%)	3%	1%	1%	1%	0%	0%	2%	1%	2%	0%	1%	3%
Turn Type	Perm	NA		pm+pt	NA	Perm	Perm	NA		pm+pt	NA	
Protected Phases		2		1	6			8		7	4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	31.0	31.0		52.0	52.0	52.0	26.0	26.0		48.0	48.0	
Effective Green, g (s)	31.0	31.0		52.0	52.0	52.0	26.0	26.0		48.0	48.0	
Actuated g/C Ratio	0.27	0.27		0.46	0.46	0.46	0.23	0.23		0.42	0.42	
Clearance Time (s)	6.1	6.1		3.0	6.1	6.1	6.9	6.9		3.0	6.9	
Vehicle Extension (s)	3.0	3.0		2.0	3.0	3.0	3.0	3.0		2.0	3.0	
Lane Grp Cap (vph)	245	499		351	874	743	204	397		437	782	
v/s Ratio Prot		0.27		c0.16	0.26			0.17		c0.18	0.27	
v/s Ratio Perm	0.04			c0.30		0.18	0.09			c0.27		
v/c Ratio	0.15	0.99		1.01	0.56	0.39	0.38	0.72		1.06	0.64	
Uniform Delay, d1	31.0	40.9		33.7	22.2	20.0	36.7	40.1		27.6	25.7	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	0.3	38.7		51.7	0.8	0.3	1.2	6.3		60.4	1.7	
Delay (s)	31.3	79.6		85.4	23.0	20.4	37.8	46.5		88.0	27.4	
Level of Service	C	E		F	C	C	D	D		F	C	
Approach Delay (s)		76.4			40.8			44.8			56.4	
Approach LOS		E			D			D			E	

Intersection Summary					
HCM 2000 Control Delay	52.4	HCM 2000 Level of Service		D	
HCM 2000 Volume to Capacity ratio	1.09				
Actuated Cycle Length (s)	113.0	Sum of lost time (s)		19.0	
Intersection Capacity Utilization	114.6%	ICU Level of Service		H	
Analysis Period (min)	15				
c Critical Lane Group					

Lane Group	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (vph)	85	75	355	55	135	615
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0	15.0		0.0	50.0	
Storage Lanes	1	1		0	1	
Taper Length (m)	7.5				7.5	
Lane Util. Factor	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.850	0.982			
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1805	1615	1816	0	1805	1863
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1805	1615	1816	0	1805	1863
Link Speed (k/h)	50		50			50
Link Distance (m)	115.8		365.3			205.1
Travel Time (s)	8.3		26.3			14.8
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Heavy Vehicles (%)	0%	0%	3%	1%	0%	2%
Adj. Flow (vph)	93	82	390	60	148	676
Shared Lane Traffic (%)						
Lane Group Flow (vph)	93	82	450	0	148	676
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Right	Left	Right	Left	Left
Median Width(m)	8.0		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		15	25	
Sign Control	Stop		Free			Free

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	44.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	WBL	WBR	NBT	NBR	SBL	SBT
Lane Configurations						
Volume (veh/h)	85	75	355	55	135	615
Sign Control	Stop		Free			Free
Grade	0%		0%			0%
Peak Hour Factor	0.91	0.91	0.91	0.91	0.91	0.91
Hourly flow rate (vph)	93	82	390	60	148	676
Pedestrians						
Lane Width (m)						
Walking Speed (m/s)						
Percent Blockage						
Right turn flare (veh)		2				
Median type			None			None
Median storage veh)						
Upstream signal (m)						
pX, platoon unblocked						
vC, conflicting volume	1393	420			451	
vC1, stage 1 conf vol						
vC2, stage 2 conf vol						
vCu, unblocked vol	1393	420			451	
tC, single (s)	6.4	6.2			4.1	
tC, 2 stage (s)						
tF (s)	3.5	3.3			2.2	
p0 queue free %	32	87			87	
cM capacity (veh/h)	137	637			1121	

Direction, Lane #	WB 1	NB 1	SB 1	SB 2
Volume Total	176	451	148	676
Volume Left	93	0	148	0
Volume Right	82	60	0	0
cSH	244	1700	1121	1700
Volume to Capacity	0.72	0.27	0.13	0.40
Queue Length 95th (m)	39.3	0.0	3.6	0.0
Control Delay (s)	50.3	0.0	8.7	0.0
Lane LOS	F		A	
Approach Delay (s)	50.3	0.0	1.6	
Approach LOS	F			

Intersection Summary				
Average Delay		7.0		
Intersection Capacity Utilization		44.2%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	10	5	5	5	5	25	5	335	10	40	640	25
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	0.0		0.0	0.0		15.0	50.0		0.0	50.0		0.0
Storage Lanes	0		0	0		1	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
Frt		0.966				0.850		0.996			0.994	
Flt Protected		0.976			0.976		0.950			0.950		
Satd. Flow (prot)	0	1791	0	0	1854	1615	1805	1874	0	1805	1871	0
Flt Permitted		0.976			0.976		0.950			0.950		
Satd. Flow (perm)	0	1791	0	0	1854	1615	1805	1874	0	1805	1871	0
Link Speed (k/h)		50			50			50			50	
Link Distance (m)		179.0			93.2			658.5			365.3	
Travel Time (s)		12.9			6.7			47.4			26.3	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Heavy Vehicles (%)	0%	0%	0%	0%	0%	0%	0%	1%	0%	0%	1%	0%
Adj. Flow (vph)	12	6	6	6	6	29	6	390	12	47	744	29
Shared Lane Traffic (%)												
Lane Group Flow (vph)	0	24	0	0	12	29	6	402	0	47	773	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		Stop			Stop			Free			Free	

Intersection Summary			
Area Type:	Other		
Control Type: Unsignalized			
Intersection Capacity Utilization	49.7%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	10	5	5	5	5	25	5	335	10	40	640	25
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86	0.86
Hourly flow rate (vph)	12	6	6	6	6	29	6	390	12	47	744	29
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)						2						
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1270	1265	759	1253	1273	395	773			401		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1270	1265	759	1253	1273	395	773			401		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	91	96	99	96	96	96	99			96		
cM capacity (veh/h)	131	163	410	139	161	658	851			1168		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	23	41	6	401	47	773
Volume Left	12	6	6	0	47	0
Volume Right	6	29	0	12	0	29
cSH	168	525	851	1700	1168	1700
Volume to Capacity	0.14	0.08	0.01	0.24	0.04	0.45
Queue Length 95th (m)	3.8	2.0	0.2	0.0	1.0	0.0
Control Delay (s)	29.9	16.5	9.3	0.0	8.2	0.0
Lane LOS	D	C	A		A	
Approach Delay (s)	29.9	16.5	0.1		0.5	
Approach LOS	D	C				

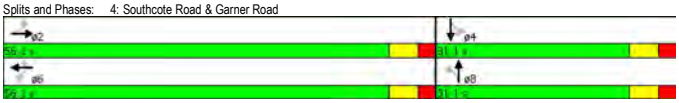
Intersection Summary				
Average Delay		1.4		
Intersection Capacity Utilization		49.7%	ICU Level of Service	A
Analysis Period (min)		15		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	865	15	50	590	70	20	75	45	125	160	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (m)	125.0		125.0	130.0		100.0	30.0		0.0	30.0		0.0
Storage Lanes	1		1	1		1	1		0	1		0
Taper Length (m)	70.0			60.0			10.0			10.0		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frt		0.997				0.850		0.944			0.909	
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1805	3558	0	1805	1881	1583	1805	1794	0	1787	1693	0
Flt Permitted	0.279			0.245			0.272			0.673		
Satd. Flow (perm)	530	3558	0	466	1881	1583	517	1794	0	1266	1693	0
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		3				76		35			90	
Link Speed (k/h)		60			60			50			50	
Link Distance (m)		406.0			176.0			356.6			658.5	
Travel Time (s)		24.4			10.6			25.7			47.4	
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 (%)	0%	1%	11%	0%	1%	2%	0%	0%	0%	1%	2%	2%
Adj. Flow (vph)	190	940	16	54	641	76	22	82	49	136	174	272
Shared Lane Traffic (%)												
Lane Group Flow (vph)	190	956	0	54	641	76	22	131	0	136	446	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	1	2		1	2	
Detector Template	Left	Thru		Left	Thru	Right	Left	Thru		Left	Thru	
Leading Detector (m)	2.0	10.0		2.0	10.0	2.0	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	0.0	
Detector 1 Position(m)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Size(m)	2.0	0.6		2.0	0.6	2.0	2.0	0.6		2.0	0.6	
Detector 1 Type	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex	Cl+Ex		Cl+Ex	Cl+Ex	
Detector 1 Channel												
Detector 1 Extend (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Queue (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 1 Delay (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Detector 2 Position(m)		9.4			9.4			9.4			9.4	
Detector 2 Size(m)		0.6			0.6			0.6			0.6	
Detector 2 Type		Cl+Ex			Cl+Ex			Cl+Ex			Cl+Ex	
Detector 2 Channel												
Detector 2 Extend (s)		0.0			0.0			0.0			0.0	
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Detector Phase	2	2		6	6	6	8	8		4	4	
Switch Phase												
Minimum Initial (s)	20.0	20.0		20.0	20.0	20.0	10.0	10.0		10.0	10.0	
Minimum Split (s)	26.1	26.1		26.1	26.1	26.1	22.1	22.1		27.1	27.1	
Total Split (s)	56.1	56.1		56.1	56.1	56.1	31.1	31.1		31.1	31.1	
Total Split (%)	64.3%	64.3%		64.3%	64.3%	64.3%	35.7%	35.7%		35.7%	35.7%	
Maximum Green (s)	50.0	50.0		50.0	50.0	50.0	25.0	25.0		25.0	25.0	
Yellow Time (s)	3.7	3.7		3.7	3.7	3.7	3.7	3.7		3.7	3.7	
All-Red Time (s)	2.4	2.4		2.4	2.4	2.4	2.4	2.4		2.4	2.4	
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Lost Time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Lead/Lag												
Lead-Lag Optimize?												
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Recall Mode	Min	Min		Min	Min	Min	None	None		None	None	
Walk Time (s)										7.0	7.0	
Flash Dont Walk (s)										14.0	14.0	
Pedestrian Calls (#/hr)										0	0	
Act Effct Green (s)	33.1	33.1		33.1	33.1	33.1	19.1	19.1		19.1	19.1	
Actuated g/C Ratio	0.51	0.51		0.51	0.51	0.51	0.29	0.29		0.29	0.29	
v/c Ratio	0.71	0.53		0.23	0.67	0.09	0.15	0.24		0.37	0.80	
Control Delay	29.6	12.0		12.2	16.2	2.6	24.1	17.0		24.6	31.0	
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0		0.0	0.0	
Total Delay	29.6	12.0		12.2	16.2	2.6	24.1	17.0		24.6	31.0	
LOS	C	B		B	B	A	C	B		C	C	
Approach Delay		14.9			14.6			18.0			29.5	
Approach LOS		B			B			B			C	

Intersection Summary			
Area Type:	Other		
Cycle Length: 87.2			
Actuated Cycle Length: 65.3			
Natural Cycle: 65			
Control Type: Semi Act-Uncoord			
Maximum v/c Ratio: 0.80			
Intersection Signal Delay: 18.2		Intersection LOS: B	
Intersection Capacity Utilization 86.7%		ICU Level of Service E	
Analysis Period (min) 15			

Splits and Phases: 4: Southcote Road & Garner Road



Lane Group	EBL	EBT	WBL	WBT	WBR	NBL	NBT	SBL	SBT
Lane Group Flow (vph)	190	956	54	641	76	22	131	136	446
v/c Ratio	0.71	0.53	0.23	0.67	0.09	0.15	0.24	0.37	0.80
Control Delay	29.6	12.0	12.2	16.2	2.6	24.1	17.0	24.6	31.0
Queue Delay	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	29.6	12.0	12.2	16.2	2.6	24.1	17.0	24.6	31.0
Queue Length 50th (m)	17.5	40.4	3.6	57.3	0.0	2.0	8.8	13.3	40.4
Queue Length 95th (m)	48.8	62.2	11.1	100.5	5.5	9.3	26.9	35.7	#109.1
Internal Link Dist (m)		382.0		152.0			332.6		634.5
Turn Bay Length (m)	125.0		130.0		100.0	30.0		30.0	
Base Capacity (vph)	419	2815	368	1488	1268	212	758	520	749
Starvation Cap Reductn	0	0	0	0	0	0	0	0	0
Spillback Cap Reductn	0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.45	0.34	0.15	0.43	0.06	0.10	0.17	0.26	0.60

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

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (vph)	175	865	15	50	590	70	20	75	45	125	160	250
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Total Lost time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Lane Util. Factor	1.00	0.95		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Frt	1.00	1.00		1.00	1.00	0.85	1.00	0.94		1.00	0.91	
Flt Protected	0.95	1.00		0.95	1.00	1.00	0.95	1.00		0.95	1.00	
Satd. Flow (prot)	1805	3559		1805	1881	1583	1805	1793		1787	1692	
Flt Permitted	0.28	1.00		0.24	1.00	1.00	0.27	1.00		0.67	1.00	
Satd. Flow (perm)	529	3559		465	1881	1583	516	1793		1266	1692	
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)	190	940	16	54	641	76	22	82	49	136	174	272
RTOR Reduction (vph)	0	1	0	0	0	37	0	25	0	0	63	0
Lane Group Flow (vph)	190	955	0	54	641	39	22	106	0	136	383	0
Heavy Vehicles (%)	0%	1%	11%	0%	1%	2%	0%	0%	0%	1%	2%	2%
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA		Perm	NA	
Protected Phases		2			6			8			4	
Permitted Phases	2			6		6	8			4		
Actuated Green, G (s)	33.1	33.1		33.1	33.1	33.1	19.1	19.1		19.1	19.1	
Effective Green, g (s)	33.1	33.1		33.1	33.1	33.1	19.1	19.1		19.1	19.1	
Actuated g/C Ratio	0.51	0.51		0.51	0.51	0.51	0.30	0.30		0.30	0.30	
Clearance Time (s)	6.1	6.1		6.1	6.1	6.1	6.1	6.1		6.1	6.1	
Vehicle Extension (s)	4.5	4.5		4.5	4.5	4.5	3.0	3.0		3.0	3.0	
Lane Grp Cap (vph)	271	1829		238	966	813	153	531		375	501	
v/s Ratio Prot		0.27			0.34			0.06			c0.23	
v/s Ratio Perm	c0.36			0.12		0.02	0.04			0.11		
v/c Ratio	0.70	0.52		0.23	0.66	0.05	0.14	0.20		0.36	0.76	
Uniform Delay, d1	11.9	10.4		8.6	11.5	7.8	16.6	16.9		17.9	20.6	
Progression Factor	1.00	1.00		1.00	1.00	1.00	1.00	1.00		1.00	1.00	
Incremental Delay, d2	9.1	0.4		0.8	2.1	0.0	0.4	0.2		0.6	6.8	
Delay (s)	20.9	10.8		9.5	13.6	7.8	17.1	17.1		18.5	27.4	
Level of Service	C	B		A	B	A	B	B		B	C	
Approach Delay (s)		12.5			12.8			17.1			25.3	
Approach LOS		B			B			B			C	

Intersection Summary					
HCM 2000 Control Delay	15.7	HCM 2000 Level of Service		B	
HCM 2000 Volume to Capacity ratio	0.72				
Actuated Cycle Length (s)	64.4	Sum of lost time (s)		12.2	
Intersection Capacity Utilization	86.7%	ICU Level of Service		E	
Analysis Period (min)	15				
c Critical Lane Group					

Appendix C

Natural Environment Summary

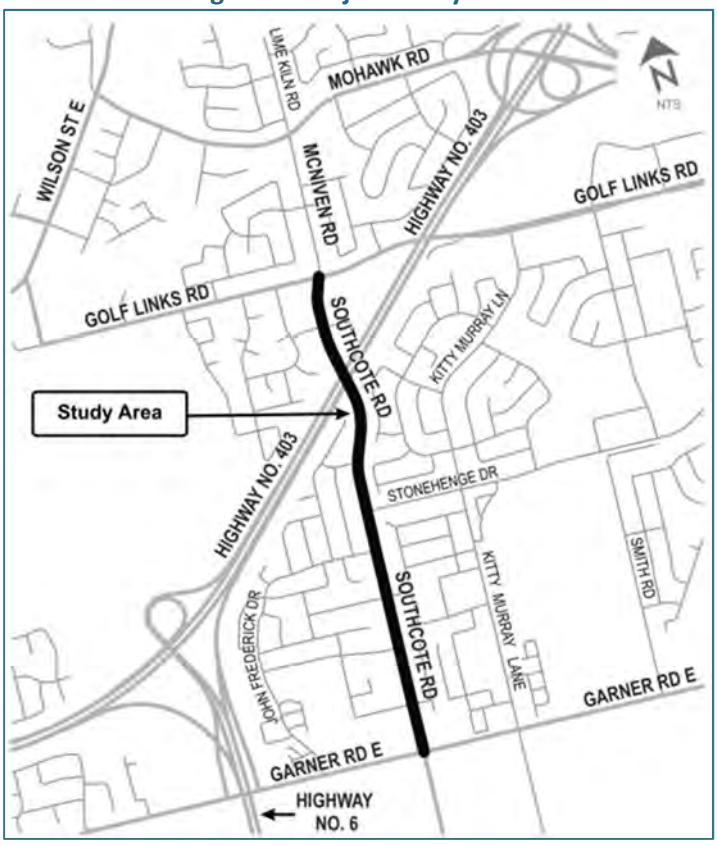
Natural Environment Existing Conditions Summary Memo

MEMO

TO:	City of Hamilton
FROM:	Trevor Goulet, Project Biologist and Arborist, Dillon Consulting Limited
	Sabrina Stanlake-Wong, Project Manager, Dillon Consulting Limited
DATE:	March 11, 2019
SUBJECT:	Southcote Road Municipal Class EA – Natural Environment Existing Conditions Summary
OUR FILE:	18-7402

The City of Hamilton (City) retained Dillon Consulting Limited (Dillon) to complete the Schedule C Municipal Class Environmental Assessment (EA) for improvements to Southcote Road (Golf Links Road to Garner Road East) project (the project). The project study area is outlined on **Figure 1**.

Figure 1: Project Study Area



This memo summarizes the existing natural environment conditions for the project study area based on the results of a background data review and field surveys. A detailed study area for the natural environment review was established as a 120 m buffer surrounding the project alignment along Southcote Road, as shown in **Maps 1 – 3** in **Attachment A**.

Background Review

The background review included the following natural heritage data, information, and mapping:

- A natural heritage information request submitted to the Ministry of Natural Resources and Forestry (MNRF) Guelph District, and the MNRF response received on June 11, 2018
- MNRF natural heritage areas online mapping
- Hamilton Conservation Authority (HCA) online regulated areas mapping
- Fisheries and Oceans Canada (DFO) online mapping of aquatic species at risk
- City of Hamilton Urban Official Plan (UHOP) Schedule B – Natural Heritage System and associated Schedules B1 to B8 outlining key natural heritage features.

Results of the review are outlined as follows.

MNRF Natural Heritage Information

Dillon submitted a natural heritage information request to MNRF Guelph District on April 25, 2018, requesting data for the general area of the project. MNRF Guelph District provided a response on June 11, 2018. The response is provided in **Attachment B**, and is summarized as follows:

- MNRF identified the Tiffany Creek Wetland Complex as a provincially significant wetland (PSW) in the general project area
- MNRF noted that no provincial Area of Natural and Scientific Interest (ANSI) is located in the general project area
- MNRF provided the applicable restricted activity timing window for fisheries protection and provided a list of fish species that have been documented in the general project area
- MNRF provided a list of ten species at risk (SAR; as listed under the *Endangered Species Act, 2007*; ESA) for which there are historical occurrence records in the general project area, and provided a list of SAR known to occur in the City of Hamilton. MNRF also provided recommendations for determining the presence or absence of potential SAR in a project study area.

The list of SAR provided by the MNRF is outlined below, including the status of each SAR as listed under the ESA. Note that SAR and the habitat of SAR listed as *Endangered* or *Threatened* have legal protection under the ESA. Species listed as *Special Concern* do not have legal protection:

- Butternut *(Juglans cinerea)* (Endangered)
- American Chestnut *(Castanea dentata)* (Endangered)
- Barn Owl *(Tyto alba)* (Endangered)
- Yellow-breasted Chat *(Icteria virens)* (Endangered)
- Bank Swallow *(Riparia riparia)* (Threatened)
- Barn Swallow *(Hirundo rustica)* (Threatened)
- Eastern Meadowlark *(Sturnella magna)* (Threatened)
- Wood Thrush *(Hylocichla mustelina)* (Special Concern)
- Snapping Turtle *(Chelydra serpentina)* (Special Concern)
- Cerulean Warbler *(Dendroica cerulea)* (Special Concern)

The list of SAR known to occur in the City of Hamilton is included in the MNRF response provided in **Attachment B**. Potential SAR habitat is discussed below in terms of existing conditions.

MNRF natural heritage areas online mapping (MNRF, 2018) was reviewed to identify mapping of provincial natural heritage features including wetlands, watercourses, waterbodies and woodland features located within the 120 m detailed study area. The mapping identified the following:

- No units of the Tiffany Creek Wetland Complex PSW are located within the 120 m detailed study area of the project. The nearest unit of this PSW is located approximately 420 m to the east of Southcote Road
- Two watercourse features are mapped within the 120 m detailed study area:
    - One located near its south end, approximately 110 m west of Southcote Road at its intersection with Garner Road East. This watercourse appears to be a tributary to Ancaster Creek
    - One located just south of Highway 403 and crossing Southcote Road. However, from review of aerial photography, this watercourse feature is no longer present as the area has been developed
- Four woodland features are mapped within the 120 m detailed study area:
    - One located southeast of the intersection of Southcote Road with Golf Links Road
    - One located northwest of the intersection of Southcote Road with Highway 403
    - One located northeast of the intersection of Southcote Road with Garner Road East
    - One located west of Southcote Road and south of Gray Court Drive. However, from review of aerial photography, this woodland is no longer present as the area has been developed
- No waterbody features are mapped within the detailed study area.

A copy of the MNRF natural heritage areas mapping for the detailed study area is provided in **Figure 2**. These results are discussed further below in terms of existing conditions.

Figure 2: MNRF Natural Heritage Areas Mapping

Hamilton

Southcote Road Municipal Class EA

Natural Environment Summary
Map 3 of 3

Preliminary Design Limits	Parcel	MEM: Mixed Meadow	Butternut 50 m Setback
Study Area (120 m setback)	FOM: Mixed Forest	WOD: Deciduous Woodland	Potential Butternut Habitat (Suitable Seed Dispersal Areas within 50 m
Project Right of Way	MAG: Graminoid Marsh	Potential Butternut Tree (Tree ID#)	Watercourse

Note:Vegetation unit boundaries are approximate

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED, CITY OF HAMILTON

MAP CREATED BY: SFG
MAP CHECKED BY: TG
MAP PROJECTION:Coordinate System: NAD 1983 CSRS UTM Zone 17N

DRAFT

0 12.5 25 50 m SCALE 1:1,750

INSET MAP

FILE LOCATION:
G:\cad\GIS\187402\MXD\Natural Environment Summary.mxd

PROJECT: 187402 STATUS: DRAFT DATE: 2019-03-07

Attachment B

MNRF Information Response

Ministry of Natural Resources And Forestry

Ministère des Richesses naturelles et des Forets

Guelph District
1 Stone Road West
Guelph, Ontario
N1G 4Y2

Telephone: (519) 826-4955
Facsimile: (519) 826-4929

June 11, 2018

Mr. Mike Wolosinecky
Dillon Consulting Limited
mwolosinecky@dillon.ca

RE: SOUTHCOTE ROAD ENVIRONMENTAL ASSESSMENT
GARNER RD AND GOLFLINKS ROAD AREA, CITY OF HAMILTON

Dear Mr. Wolosinecky,

The Ministry of Natural Resources and Forestry (MNRF), Guelph District Office, has reviewed the natural heritage information available for the above-noted property and surrounding area (the "study area"), and offers the following comments:

WETLANDS

The Ministry has identified the following provincially significant wetlands (PSWs) within the study area:

- Tiffany Creek Wetland Complex

As requested, a copy of the wetland evaluation file for the **Tiffany Creek Wetland Complex** is attached. Please be advised that wetland evaluation files are considered "open" files and may be updated from time to time as new information becomes available.

AREAS OF NATURAL AND SCIENTIFIC INTEREST

The Ministry notes that there are no provincially significant Areas of Natural and Scientific Interest (ANSIs) within the study area:

FISHERIES

Restricted activity timing windows are applied to protect fish from impacts of undertakings in and around water during critical life cycle stages. The recommended timing restrictions are **April 1 to June 30** (Note: dates represent when work should be avoided).

The MNRF notes that the following fish species have been documented in the area: brook stickleback, creek chub, eastern blacknose dace, fathead minnow and goldfish.

SPECIES AT RISK

There are records in the area for the following species at risk (SAR):

- Butternut *(Juglans cinerea)* (Endangered)
- American Chestnut *(Castanea dentata)* (Endangered)
- Barn Owl *(Tyto alba)* (Endangered)
- Yellow-breasted Chat *(Icteria virens)* (Endangered)
- Bank Swallow *(Riparia riparia)* (Threatened)
- Barn Swallow *(Hirundo rustica)* (Threatened)
- Eastern Meadowlark *(Sturnella magna)* (Threatened)
- Wood Thrush *(Hylocichla mustelina)* (Special Concern)
- Snapping Turtle *(Chelydra serpentina)* (Special Concern)
- Cerulean Warbler *(Dendroica cerulea)* (Special Concern)

Threatened and Endangered Species receive both individual species and habitat protection under the *Endangered Species Act, 2007* (ESA). SAR habitat prescribed under regulation is listed in Ont. Reg. 242/08 (https://www.ontario.ca/laws/regulation/080242).

Please be advised that because the province has not been surveyed comprehensively for the presence of listed species, the absence of a record does not necessarily indicate the absence of SAR from an area. To determine the presence of SAR for a given study area, the District's recommended approach is as follows:

I. Habitat Inventory

The Ministry recommends undertaking a comprehensive botanical inventory of the entire area that may be subject to direct and indirect impacts from the proposed activity. The vegetation communities should be classified as per the "Ecological Land Classification (ELC) for Southern Ontario" system, to either the "Ecosite" or "Vegetation Type" level. For aquatic habitats in the study area, we recommend that you collect data on the physical characteristics of the waterbodies and inventory the riparian zone vegetation, so that these habitats can be classified as per the Aquatic Ecosites described in the ELC manual.

II. Potential SAR within the Study Area

A list of SAR that have the potential to occur in the area can be produced by cross-referencing the ecosites described during the habitat inventory with the habitat descriptions of SAR known to occur within the planning area. The list of SAR known to occur in the **CITY OF HAMILTON** is attached for your reference. The species-specific COSEWIC status reports (https://www.canada.ca/en/environment-climate-change/services/committee-status-endangered-wildlife.html) are a good source of information on habitat needs and will be helpful in determining the suitability of the study areas ecosites for a given species.

Please note that the Species at Risk in Ontario (SARO) List is a living document that is periodically amended as a result of species assessment and re-assessments conducted by the Committee on the Status of Species at Risk in Ontario (COSSARO). The SARO List can be accessed on the following webpage: https://www.ontario.ca/environment-and-energy/species-risk-ontario-list.

COSSARO also maintains a list of species to be assessed in the future. It is recommended that you take COSSARO's list of anticipated assessments into consideration, especially when the proposed start date of an activity is more than 6 months away, or the project will be

undertaken over a period greater than 6 months. This list can be viewed at: https://www.ontario.ca/page/how-comment-protecting-species-risk.

III. SAR Surveys

The Ministry recommends that each potential SAR identified under Step II is surveyed for, regardless of whether or not the species has been previously recorded in the area. The survey report should describe how each SAR was surveyed for, and provide a rationale for why certain species were not afforded a survey (e.g., habitat within the study area is not suitable for a specific SAR). Please note that some targeted surveys may require provincial authorizations (e.g., ESA permit or Wildlife Scientific Collector's Permit).

ADDITIONAL INFORMATION

Natural heritage features (e.g. wetlands, ANSIs) can be viewed for a given study area through the MNRF's "Make a Map" web application: https://www.ontario.ca/page/make-natural-heritage-area-map. Digital data layers can be obtained through the Land Information Ontario (LIO) geowarehouse https://www.ontario.ca/page/land-information-ontario.

Additionally, the MNRF recommends contacting the municipality and the conservation authority to determine if they have any additional information or records of interest for the study area.

Please be advised that it is your responsibility to comply with all other relevant provincial or federal legislation, municipal by-laws, other MNRF approvals or required approvals from other agencies. If your investigations reveal the presence of Threatened or Endangered species, please contact the MNRF at esa.guelph@ontario.ca for further direction.

I trust that the above information is of assistance.

Sincerely,

Anne Marie Laurence
Management Biologist

cc: Dayna LeClair, Dillon Consulting Limited, dleclair@dillon.ca

Amphibian	SARO	Protection	Habitat Information	Timing and	Survey Pro
Jefferson Salamander *Ambystoma jeffersonianum*	END	Species Protection and Habitat Regulation	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater or rainfall.	Hibernation: October – March Breeding: Late March – Mid	Contact MNRF Guelph District Biologist
Unisexual Ambystoma (Jefferson dominant) *Ambystoma jeffersonianum*	END	Species Protection and General Habitat Protection	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of eph		

Updated: August-14-18

Barn Swallow *Hirundo rustica*	THR	Species Protection and General Habitat Protection	Prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	Migrate South before Winter	Follow Breeding Bird Survey Protocol
Black Tern *Chlidonias niger*	SC	N/A	Generally prefer freshwater marshes and wetlands; nest either on floating material in a marsh or on the ground very close to water	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Bobolink *Dolichonyx oryzivorus*	THR	Species Protection and General Habitat Protection	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands	Migrate South for the Winter	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Canada Warbler *Cardellina canadensis*	SC	N/A	Generally prefers wet coniferous, decidiuous and mixed forest types, with a dense shrub layer. Nests on the ground, on logs or hummocks, and uses dense shrub layer to conceal the nest.	Arrive in Early May Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Cerulean Warbler *Setophaga cerulea*	THR	Species Protection and General Habitat Protection	Generally found in mature deciduous forests with an open understorey; also nests in older, second-growth deciduous forests.	Migrate South for the Winter	Follow Breeding Bird Survey Protocol
Chimney Swift *Chaetura pelagica*	THR	Species Protection and General Habitat Protection	Historically found in deciduous and coniferous, usually wet forest types, all with a well developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys	Nesting - Late April to Mid-May Migrate South in September or Early October	Chimney Swift Monitoring Protocol. Bird Studies Canada, March 2009

Common Nighthawk *Chordeiles minor*	SC	N/A	Generally prefer open, vegetation-free habitats, including dunes, beaches, recently harvested forests, burnt-over areas, lo

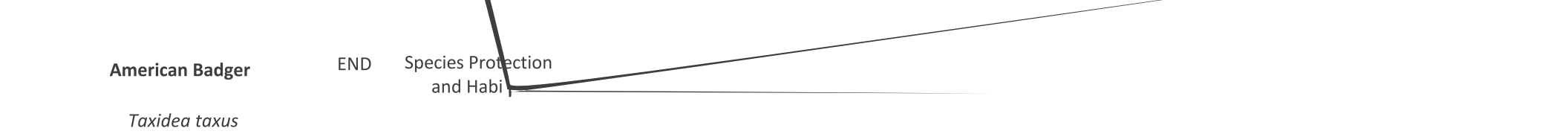
King Rail *Rallus elegans*	END	Species Protection and General Habitat Protection	Generally this species requires large marshes with open shallow water that merges with shrubby areas	Breed from Late April to mid-May Migrate South for the Winter	Follow Marsh Monitoring Protocol.
Least Bittern *Ixobrychus exilis*	THR	Species Protection and General Habitat Protection	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants	Migrate South for the Winter	Follow Marsh Monitoring Protocol; 10 day window of male calling (variable timing). Does not respond well to playback. Very difficult to detect.
Louisiana Waterthrush *Seiurus motacilla*	THR	Species Protection and General Habitat Protection	Generally inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps	Migrate South for the Winter	Follow Breeding Bird Survey Protocol or Marsh Monitoring Protocol
Peregrine Falcon *Falco peregrinus*	SC	N/A	Generally nest on tall, steep cliff ledges adjacent to large waterbodies; some birds adapt to urban environments and nest on ledges of tall buildings, even in densely populated downtown areas.	Active Year Round - Lay Eggs around Easter Hatching occurs around Mother's Day Young fledge around Father's	Visit ideal habitat locations and listen/look for individuals in the vicinity.
Prothonotary Warbler *Protonotaria citrea*	END	Species Protection and General Habitat Protection	Generally found in the dead trees of flooded woodlands or deciduous swamp forests; Carolinia Zone	Migrate South for the Winter Eggs are laid from Late May - Early July	Follow Breeding Bird Survey Protocol
Red-Headed Woodpecker *Melanerpes erythrocephalus*	SC	N/A	Generally prefer open oak and beech forests, grasslands, forest edges, orchards, pastures, riparian forests, roadsides, urban parks, golf courses, cemeteries, as well as along beaver ponds and brooks	Active from May to September	Follow Breeding Bird Survey Protocol
Short-eared Owl *Asio flammeus*	SC	N/A	Generally prefers a wide variety of open habitats, including grasslands, peat bogs, marshes, sand-sage concentrations, old pastures and agricultural fields	Active Year Round	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol

Wood Thrush *Hylocichla mustelina*	SC	N/A	Nests mainly in second-growth and mature deciduous and mixed forests, with saplings and well-developed understory layers. Prefers large forest mosaics, but may also nest in small forest fragments.	Migrate South for the Winter Arrive in Ontario in mid to late spring	Follow Breeding Bird Survey Protocol
Yellow-breasted Chat *Icteria virens*	END	Species Protection and General Habitat Protection	Generally prefer dense thickets around wood edges, riparian areas, and in overgrown clearings	Migrate South for the Winter Arrive in Ontario Early May	Follow Breeding Bird Survey Protocol

Bryophyte	SARO	Protection	Habitat Information	Timing Windows	Survey Protocol
Spoon-leaved Moss *Bryoandersonia illecebra*	END	Species Protection and General Habitat Protection	Generally found in deciduous forests; found on soil that is in or near flat, low-lying, seasonally wet areas.	Active Year Round	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species Best time to survey is during early Spring or late Fall when ground vegetation is minimal

Fish	SARO	Protection	Habitat Information	Timing Windows	Survey Protocol
American Eel *Anguilla rostrata*	END	Species Protection and General Habitat Protection	All fresh water, estuaries and coastal marine waters that are accessible to the Atlantic Ocean; 12-mile Creek watershed and Lake Ontario	Active Year Round	Electrofishing For information please contact your local MNRF office, CA or DFO
Grass Pickerel *Esox americanus vermiculatus*	SC	N/A	Generally occur in wetlands with warm, shallow water and an abundance of aquatic plants; occur in the St. Lawrence River, Lake Ontario, Lake Erie, and Lake Huron	Spawn from late March to early May	For information please contact your local MNRF office, CA and/or DFO
Northern Sunfish *Lepomis peltastes*	SC	N/A	Shallow vegetated areas of quiet, slow flowing rivers and streams, as well as warm lakes and ponds, with sandy banks or rocky bottoms.	Spawning occurs in June and July	For information please contact your local MNRF office, CA and/or DFO

Redside Dace *Clinostomus elongatus*	END	Species Protection and Habitat Regulation	Generally found in pools and slow-moving areas of small headwater streams with a moderate to high gradient	Spawning occurs in May Timing Window is Coldwater - June 1 - September 15	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Silver Shiner *Notropis photogenis*	THR	Species Protection and General Habitat Protection	Generally prefer moderate to large, deep, relatively clear streams with swift currents, and moderate to high gradients	Spawning occurs in May and June	For information please contact your local MNRF office, CA and/or DFO
Insect	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
Monarch Butterfly *Danaus plexippus*	SC	N/A	Exist primarily wherever milkweed and wildflowers exist; abandoned farmland, along roadsides, and other open spaces	Usually migrate south in late September and October	Watch for adults along roadsides and in open fields. Caterpillars feed on milkweeds: Common milkweed grows in open disturbed habitats (fields, roadsides, etc) and swamp milkweed grows in wet habitats (along streams, lakes, marshes) Adults can be spotted from a distance; caterpillars must be looked for carefully on the host plant.
Mottled Duskywing *Erynnis martialis*	END	Species Protection and General Habitat Protection	Generally inhabits a range of grassland, shrubland, and savanna habitats that contain well drained soils and the presence of its host plants Prairie Redroot (Ceanothus herbaceus) or New Jersey Tea (Ceanothus americanus).	Adult butterfly emerges from pupa in late May	Watch for adults near host plants or search for caterpillars on the host plant Adults can be spotted from a distance; caterpillars must be looked for carefully on the host plant.
West Virginia White *Pieris virginiensis*	SC	N/A	Generally prefer moist, deciduous woodlands. The larvae feed only on the leaves of the two-leaved toothwort (Cardamine diphylla), which is a small, spring-blooming plant of the forest floor.	Adult butterfly emerges from pupa in late March; flies only in April and May	Watch for adults within moist, deciduous woodlands Caterpillars feed on the two-leaved toothwort: Toothwort grows in damp, open, rich hardwood woodlands and blooms from April to June. Adults can be spotted from a distance; caterpillars must be searched for carefully by checking host plant
Mammal	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**



American Badger

Taxidea taxus

Mollusc	SARO	Protection	Habitat Information	Timing Windows	Survey Protocol
Eastern Pondmussel *Ligumia nasuta*	Speci	N/A	Generally inhabit sheltered areas of lakes or slow streams in substrates of fine sand and mud	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008).
Lilliput *Taxolasma parvum*	END	Species Protection and General Habitat Protection	Found in a variety of habitats including small to large rivers, wetlands, shallows of lakes, ponds and reservoirs. They are common in soft substrates with over 50% of the substrate type comprised of sand and a mud/muck/silt combination. Typically occur with or near Green Sunfish, Bluegill, White Crappie, and Johnny Darter	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008): Print.
Rainbow *Villosa iris*	SC	N/A	Most abundant in shallow, welloxygenated reaches of small- to medium-sized rivers and sometimes lakes, on substrates of cobble, gravel, sand and occasionally mud.	Active Year Round	Please reference: Mackie, G, T.J Morris, and D Ming. "Protocol for the Detection and Relocation of Freshwater Mussel Species at Risk in Ontario Great Lakes Area (OGLA)." Fisheries and Oceans Canada. (2008): Print.
Plant	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**
American Chestnut *Ca*					

Green Dragon *Arisaema dracontium*	SC	N/A	Generally grows in damp deciduous forests and along streams.	Flowering occurs in May and June	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Hoary Mountain-mint *Pycnanthemum incanum*	END	Species Protection and General Habitat Protection	Oak savannas and prairies, dry sites.	Flowering occurs in July	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Red Mulberry *Morus rubra*	END	Species Protection and General Habitat Protection	Generally grows in moist forest habitats. In Ontario, these include slopes and ravines of the Niagara Escarpment, and sand spits and bottom lands; Can grow in open areas such as hydro corridors	Flowering occurs when leaves emerge in late spring. Fruit emerges in Mid-July.	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from the similar White Mulberry Distinguishing Red Mulberry and the hybrid Red and White Mulberry will require the collection of leaves for generic testing, which requires a 17(2)(b) permit
White Wood Aster *Eurybia divaricata*	THR	Species Protection and General Habitat Protection	Generally grows in open, dry, deciduous forests. It has been suggested that it may benefit from some disturbance, as it often grows along trails.	Flowering occurs in early September, and sets fruit later in the month	Walk slowly and systematically in grid fashion, pausing to scan for plants every 5 meters Use a plant field guide to distinguish from similar species
Reptile	**SARO**	**Protection**	**Habitat Information**	**Timing Windows**	**Survey Protocol**

Blanding's Turtle *Emydoidea blandingii*	THR	Species Protection and General Habitat Protection	Generally occur in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams.	Eggs are laid in June, with hatchlings emerging in late September and early October.	Contact MNR Guelph District Management Biologist to obtain a copy of the protocol
Eastern Hog-nosed Snake *Heterodon platirhinos*	THR	Species Protection and General Habitat Protection	Generally prefer habitats with sandy, well-drained soil and open vegetative cover, such as open woods, brushland, fields, forest edges and disturbed sites. The species is often found near water.	Mating occurs in spring and in August and early September. Eggs are laid in June. Hatching occurs in late August or early September	In early spring, look for individuals near ideal hibernation sites During egg-laying period (June), look for nesting females in sandy areas in early morning and late evening. Rest of the season, survey intensively and systematically by flipping rocks
Eastern Musk Turtle *Sternotherus odoratus*	Speci	Species Protection and General Habitat Protection	Generally prefers shallow, slow-moving water where it typically walks along the bottom rather than swimming	Nests: Late May - Early July Basks under cover of floating vegetation	Best time to survey is during the spring emergence (April - mid-May) from hibernation They stage near hibernating sites and thermoregulate Survey on warm sunny calm days During the cooler times of the year survey on the warmest time of the day
Eastern Ribbonsnake *Thamnophis sauritus*	SC	N/A	Generally occur along the edges of shallow ponds, streams, marshes, swamps, or bogs bordered by dense vegetation that provides cover. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting.	Hibernate: October - April Mating: Early Spring Hatching: Early Fall (September)	Contact MNRF Guelph District Management Biologist to obtain a copy of the protocol

Northern Map Turtle *Graptemys geographica*	SC	N/A	Generally inhabits both lakes and rivers, showing a preference for slow moving currents, muddy bottoms, and abundant aquatic vegetation. These turtles need suitable basking sites (such as rocks and logs) and exposure to the sun for at least part of the day.	Active: At night Hibernate: October - April Hatching: Late August - Early September	Scan shoreline in spring and partially submerged logs/rocks in summer for basking turtles Be aware that map turtles do not allow as close of approach as other turtles before leaving a basking site Snorkel in desired aquatic habitat
Snapping Turtle *Chelydra serpentina*	SC	N/A	Generally inhabit shallow waters where they can hide under the soft mud and leaf litter. Nesting sites usually occur on gravely or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits.	Nesting: Late May and June Hibernate: October - April	Scan offshore rocks and logs for basking turtles (10am-2pm) Snorkel in desired aquatic habitat Nesting Season: Search known or preferred nesting habitat areas for females
Spiny Softshell *Apalone spinifera*	END	Species Protection and General Habitat Protection	Generally prefer marshy creeks, swift-flowing rivers, lakes, impoundments, bays, marshy lagoons, ditches and ponds near rivers	Lay eggs in June or July Hibernate over winter	Best time to survey is during nesting season when females are active laying eggs Visual searches should be conducted in appropriate habitat

ONTARIO MINISTRY of NATURAL RESOURCES and FORESTRY | GUELPH DISTRICT OFFICE
1 Stone Road West, Guelph, Ontario, N1G 4Y2 esa.guelph@ontario.ca

Attachment C

Field Photos

Photo 1: FOM community northeast of the intersection of Southcote Road and Golf Links Road (facing east).

Photo 2: FOM community northwest of the intersection of Southcote Road and Highway 403 (facing south).

Photo 3: MEM community northeast of the intersection of Southcote Road and Highway (facing north; MEM community is to the right of the road).

Photo 4: WOD community northeast of the intersection of Southcote Road and Garner Road East (facing east).

Photo 5: MEM community northwest of the intersection of Southcote Road and Garner Road East (facing west). Note the marsh vegetation of the MAG inclusion (left side of photo).

Photo 6: MAG inclusion adjacent to the WOD community, northeast of the intersection of Southcote Road and Garner Road East (facing southeast).

Attachment D

SAR Screening Table

Attachment D: SAR Screening Table

Group	Scientific Name	Common Name	ESA Status	Habitat Requirements	Potential Habitat in the Study Area	Rationale for Potential to Occur
Amphibians	*Ambystoma jeffersonianum*	Jefferson Salamander	END	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	Low	Although the FOD and WOD communities may provide habitat, their small size and proximity to densely developed areas make potential for species occurrence very low. Detailed surveys to identify ephemeral pools may be required. Absence of such pools can likely preclude potential for habitat.
Amphibians	*Ambystoma laterale* - *jeffersonianum*	Unisexual Ambystoma - Jefferson-dominated	END	Inhabits deciduous and mixed deciduous forests with suitable breeding areas which generally consist of ephemeral (temporary) bodies of water that are fed by spring runoff, groundwater, or springs.	Low	Although the FOD and WOD communities may provide habitat, their small size and proximity to densely developed areas make potential for species occurrence very low. Detailed surveys to identify ephemeral pools may be required. Absence of such pools can likely preclude potential for habitat.
Birds	*Empidonax virescens*	Acadian Flycatcher	END	Generally requires large areas of mature, undisturbed forest; avoids the forest edge; often found in well wooded swamps and ravines.	Low	No suitable habitat observed in the study area.
Birds	*Riparia riparia*	Bank Swallow	THR	It nests in a wide variety of naturally and anthropogenically created vertical banks, which often erode and change over time including aggregate pits and the shores of large lakes and rivers.	Low	No suitable habitat observed in the study area.
Birds	*Tyto alba*	Barn Owl	END	Generally prefer low-elevation, open country; often associated with agricultural lands, especially pasture. Nests are located in buildings, hollow trees and cavities in cliffs.	Low	No suitable habitat observed in the study area.
Birds	*Hirundo rustica*	Barn Swallow	THR	Prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	Yes	Although neither the species nor its nests were observed, the overpass structures associated with Highway 403 may provide habitat. Nest searches would be required to determine presence or absence of nests.

Group	Scientific Name	Common Name	ESA Status	Habitat Requirements	Potential Habitat in the Study Area	Rationale for Potential to Occur
Birds	*Dolichonyx oryzivorus*	Bobolink	THR	Generally prefers open grasslands and hay fields. In migration and in winter uses freshwater marshes and grasslands.	Low	No suitable habitat observed in the study area.
Birds	*Setophaga cerulea*	Cerulean Warbler	THR	Generally found in mature deciduous forests with an open understorey; also nests in older, second-growth deciduous forests.	Low	No suitable habitat observed in the study area.
Birds	*Chaetura pelagica*	Chimney Swift	THR	Historically found in deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys.	Low	No suitable habitat observed in the study area.
Birds	*Sturnella magna*	Eastern Meadowlark	THR	Generally prefers grassy pastures, meadows and hay fields. Nests are always on the ground and usually hidden in or under grass clumps.	Low	No suitable habitat observed in the study area. The MEM communities are not large enough and did not contain the vegetation composition required for the species.
Birds	*Caprimlugus vociferus*	Eastern Whip-poor-will	THR	Generally prefer semi-open deciduous forests or patchy forests with clearings; areas with little ground cover are also preferred; In winter they occupy primarily mixed woods near open areas.	Low	No suitable habitat observed in the study area.
Birds	*Ammodramus henslowii*	Henslow's Sparrow	END	Generally found in old fields, pastures and wet meadows. They prefer areas with dense, tall grasses, and thatch, or decaying plant material.	Low	No suitable habitat observed in the study area.
Birds	*Rallus elegans*	King Rail	END	Generally this species requires large marshes with open shallow water that merges with shrubby areas.	Low	No suitable habitat observed in the study area.

Group	Scientific Name	Common Name	ESA Status	Habitat Requirements	Potential Habitat in the Study Area	Rationale for Potential to Occur
Birds	*Ixobrychus exilis*	Least Bittern	THR	Generally located near pools of open water in relatively large marshes and swamps that are dominated by cattail and other robust emergent plants.	Low	No suitable habitat observed in the study area.
Birds	*Seiurus motacilla*	Louisiana Waterthrush	THR	Generally inhabits mature forests along steeply sloped ravines adjacent to running water. It prefers clear, cold streams and densely wooded swamps.	Low	No suitable habitat observed in the study area.
Birds	*Protonotaria citrea*	Prothonotary Warbler	END	Generally found in the dead trees of flooded woodlands or deciduous swamp forests; Carolinia Zone.	Low	No suitable habitat observed in the study area.
Birds	*Icteria virens*	Yellow-breasted Chat	END	Generally prefer dense thickets around wood edges, riparian areas, and in overgrown clearings.	Low	No suitable habitat observed in the study area.
Bryotphyte	*Bryoandersonia illecebra*	Spoon-leaved Moss	END	Generally found in deciduous forests; found on soil that is in or near flat, low-lying, seasonally wet areas.	Yes	The FOD and WOD communities may provide habitat. Detailed botanical surveys in the spring would be required to identify the species.
Insect	*Erynnis martialis*	Mottled Duskywing	END	Generally inhabits a range of grassland, shrubland, and savanna habitats that contain well drained soils and the presence of its host plants Prairie Redroot (Ceanothus herbaceus) or New Jersey Tea (Ceanothus americanus).	Low	No suitable habitat observed in the study area.
Mammal	*Taxidea taxus*	American Badger	END	Generally prefers open habitats, whether natural (grasslands) or man-made (agricultural fields, road right-of-ways, golf courses).	Low	No suitable habitat observed in the study area. The small size of the MEM fields and proximity to densely developed areas make potential for species occurrence very low.

Group	Scientific Name	Common Name	ESA Status	Habitat Requirements	Potential Habitat in the Study Area	Rationale for Potential to Occur
Mammal	*Myotis leibii*	Eastern Small-footed Myotis	END	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: primarily under loose rocks on exposed rock outcrops, crevices and cliffs, and occasionally in buildings, under bridges and highway overpasses and under tree bark.	Yes	The FOM and WOD woodlands provide potential habitat.
Mammal	*Myotis lucifugus*	Little Brown Myotis	END	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh).	Yes	The FOM and WOD woodlands provide potential habitat.
Mammal	*Myotis septentrionalis*	Northern Myotis	END	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius. Maternal Roosts: Often asssociated with cavities of large diameter trees (25-44 cm dbh). Occasionally found in structures (attics, barns etc.)	Yes	The FOM and WOD woodlands provide potential habitat.
Mammal	*Perimyotis subflavus*	Tri-colored Bat	END	Overwintering habitat: Caves and mines that remain above 0 degrees Celsius Maternal Roosts: Can be in trees or dead clusters of leaves or arboreal lichens on trees. May also use barns or similar structures.	Yes	The FOM and WOD woodlands provide potential habitat.
Reptile	*Emydoidea blandingii*	Blanding's Turtle	THR	Generally occur in freshwater lakes, permanent or temporary pools, slow-flowing streams, marshes and swamps. They prefer shallow water that is rich in nutrients, organic soil and dense vegetation. Adults are generally found in open or partially vegetated sites, and juveniles prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. They dig their nest in a variety of loose substrates, including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow-flowing streams.	Low	No suitable habitat observed in the study area.
Reptile	*Apalone spinifera*	Spiny Softshell	END	Generally prefer marshy creeks, swift-flowing rivers, lakes, impoundments, bays, marshy lagoons, ditches and ponds near rivers.	Low	No suitable habitat observed in the study area.

Group	Scientific Name	Common Name	ESA Status	Habitat Requirements	Potential Habitat in the Study Area	Rationale for Potential to Occur
Reptile	*Heterodon platirhinos*	Eastern Hog-nosed Snake	THR	Generally prefer habitats with sandy, well-drained soil and open vegetative cover, such as open woods, brushland, fields, forest edges and disturbed sites. The species is often found near water.	Low	No suitable habitat observed in the study area.
Plant	*Castanea dentata*	American Chestnut	END	Found in deciduous forest communities; this tree prefers arid forests with acid and sandy soils.	Yes	The FOM and WOD woodlands provide potential habitat. Detailed botanical surveys would be required to determine presence or absence.
Plant	*Frasera caroliniensis*	American Columbo	END	Most commonly associated with open deciduous forested slopes, thickets and clearings; grows in a variety of relatively stable habitats as well as on a wide variety of soils.	Yes	The FOM and WOD woodlands provide potential habitat. Detailed botanical surveys would be required to determine presence or absence.
Plant	*Panax quinquefolius*	American Ginseng	END	Grows in rich, moist, undisturbed and relatively mature deciduous woods in areas of neutral soil (such as over limestone or marble bedrock).	Low	No suitable habitat observed in the study area.
Plant	*Juglans cinerea*	Butternut	END	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldom, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows.	Yes	Four individuals were identifies in the tree inventory. The FOM and WOD woodlands provide potential habitat for others.
Plant	*Betula lenta*	Cherry Birch	END	Generally grows in moist, well-drained soils, but it is also found on coarse-textured or rocky shallow soils.	Yes	The FOM and WOD woodlands provide potential habitat. Detailed botanical surveys would be required to determine presence or absence.
Plant	*Cornus florida*	Eastern Flowering Dogwood	END	Generally grows in deciduous and mixed forests, in the drier areas of its habitat, although it is occasionally found in slightly moist environments; Also grows around edges and hedgerows	Yes	The FOM and WOD woodlands provide potential habitat. Detailed botanical surveys would be required to determine presence or absence.

Group	Scientific Name	Common Name	ESA Status	Habitat Requirements	Potential Habitat in the Study Area	Rationale for Potential to Occur
Plant	*Trichophorum planifolium*	Few-flowered Club-rush	END	Generally found in Dry Fresh Oak deciduous forests and Dry Fresh Oak-Maple-Hickory deciduous forests (only found on Royal Botanical Gardens property).	No	No suitable habitat observed in the study area.
Plant	*Pycnanthemum incanum*	Hoary Mountain-mint	END	Oak savannas and prairies, dry sites.	No	No suitable habitat observed in the study area.
Plant	*Morus rubra*	Red Mulberry	END	Generally grows in moist forest habitats. In Ontario, these include slopes and ravines of the Niagara Escarpment, and sand spits and bottom lands; Can grow in open areas such as hydro corridors	Yes	The FOM and WOD woodlands provide potential habitat. Detailed botanical surveys would be required to determine presence or absence.
Plant	*Eurybia divaricata*	White Wood Aster	THR	Generally grows in open, dry, deciduous forests. It has been suggested that it may benefit from some disturbance, as it often grows along trails.	Yes	The FOM and WOD woodlands provide potential habitat. Detailed botanical surveys would be required to determine presence or absence.

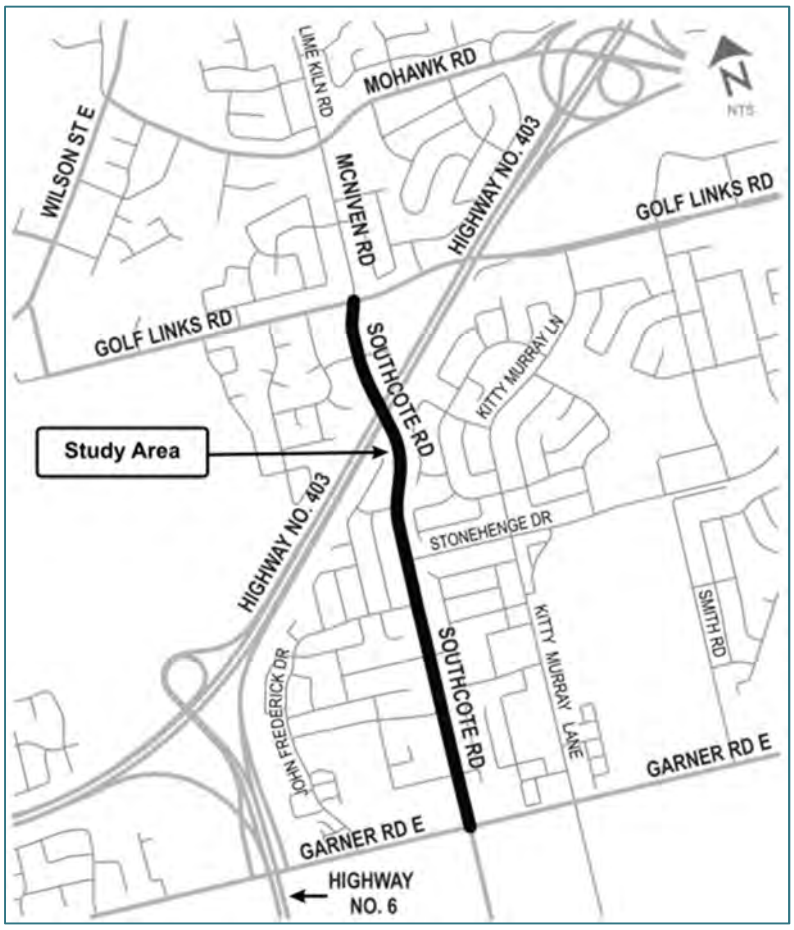
Tree Inventory Memo

MEMO

TO:	City of Hamilton
FROM:	Trevor Goulet, Project Arborist and Biologist, Dillon Consulting Limited Sabrina Stanlake-Wong, Project Manager, Dillon Consulting Limited
DATE:	March 11, 2019
SUBJECT:	Southcote Road Municipal Class EA – Tree Inventory
OUR FILE:	18-7402

The City of Hamilton (City) retained Dillon Consulting Limited (Dillon) to complete the Schedule C Municipal Class Environmental Assessment (EA) for the Southcote Road (Golf Links Road to Garner Road East) improvement project (the project). The project study area is outlined on **Figure 1**. This memo outlines the results of the tree inventory conducted for the project.

Figure 1: Project Study Area



Inventory Methods

The tree inventory was conducted by a Dillon arborist certified by the International Society of Arboriculture (ISA; certification #ON-2236) on Oct. 26, Oct. 30, Nov. 14, and Nov. 21, 2018. The objective of the inventory was to document applicable trees within the project study area. A detailed study area for the tree inventory was established as the limits of the planned right of way (ROW) for the project, consisting of the existing ROW plus existing private property anticipated to be acquired for the project. Inventoried trees included public trees (those entirely within the ROW or with ≥50% of their trunk diameter within the ROW), as well as private trees within 6 m. Trees on private property were inventoried from the nearest City property boundary, and were not affixed with tree tags, as access permission to the properties was not available. Minimum tree size for inclusion in the inventory was trees with a diameter at breast height (DBH; as measured at 1.37 m height) greater than or equal to 10 cm. For each inventoried tree, the following information was documented:

- Identification of species, or genus where species was indeterminable
- Measurement of DBH (for trees with multiple stems branched below breast height, the DBH of each stem was recorded)
- A Level 2 (basic) qualitative visual assessment to determine tree condition
- Assessment of tree hazard
- Georeferencing using a global positioning system, assigning an individual tree identification (ID) number.

The Level 2 basic qualitative visual assessment conducted for the inventory is a visual inspection of the tree and surrounding area to obtain a synthesis of information. It includes a walk around the tree, looking at the site, buttress roots, trunk, and branches. This basic assessment is the standard assessment performed by arborists, and only includes conditions that are detected from the ground using basic tools. The results from a basic assessment should not be relied on for internal, below-ground, or upper-crown condition as these areas may be impossible to see or difficult to assess from ground-level. In the event of a significant change in site conditions prior to the planned repair activities, such as severe weather events, trees within the study area should be reassessed. The condition rating designated to each tree was based on the basic qualitative visual assessment. Using this guide, an overall condition rating (i.e., dead, poor, fair, good or excellent) was given to each tree, based on the criteria outlined in **Table 1**, below. These condition ratings are useful when evaluating the retention and/or replacement value of individual trees. The hazard potential of each tree was also assessed, using the method outlined in the ISA publication *A Photographic Guide to the Evaluation of Hazard Trees in Urban Area - 2nd Edition* (Matheny and Clark, 1994). A hazard tree could be alive or dead but is considered to pose an imminent hazard to persons or property, having the potential for splitting, breaking and/or falling over, and having proximity to a target (persons or property).

Table 1: Tree Condition Rating Categories

Condition	Description
Dead	A specimen tree/stand is considered dead when it has no living tissue.
Poor	Tree shows major symptoms of decline. At least 50% of main scaffold branches are dead, missing or diseased. The trunk shows evidence of advanced rot, deadwood or is hollow throughout. Twig development on the main branches or in the canopy is poor and may have limited sucker growth. Callus growth around wounds is minimal. The tree could decline further to become a safety hazard. Removal should be considered if it is considered a hazard tree.
Fair	Tree shows moderate symptoms of decline in lower canopy or scaffold branches, but more than 50% of scaffold branches are present and viable. The trunk shows limited evidence of rot or insect damage. Good callus growth is present near wound areas. Includes trees with scaffold branches that are healthy but have a "Y" split stem if “included-bark” is evident. Removal or preservation of these trees depends on the location of the specimen and associated target potential, and would depend on the species, and its tolerance to grading, trenching and survival in an urban environment. Some major arboricultural maintenance may be required (e.g., major branch removal, bracing and/or cabling).
Good	Tree shows no symptoms of decline in the trunk, and all scaffold branches are present and are in good condition. Most scaffold branches are at right angles to the trunk, and show good vigour. Small amounts of dead wood may be present in secondary branches, but account for less than 25% of the canopy. Depending on the grading in the immediate area, such a tree would be recommended for preservation and would typically survive to maturity without major arboricultural maintenance.
Excellent	Tree shows no symptoms of decline in trunk, scaffold or secondary branches. Such trees have an excellent growth habit and typically survive to maturity without major arboricultural maintenance.

During the inventory, for those tree species where the foliage characteristics are the primary distinguishing feature for identification and assessment of condition, the positive identification of tree species and condition may have been hindered due to timing of the inventory in late autumn. Trees were identified and condition assessed using reasonable assumptions based on existing conditions.

For trees with multiple stems at or above breast height, a calculated diameter was determined as the square root of the sum of the squares of each stem DBH. This was calculated for the purpose of estimating each tree’s critical root zone (CRZ), discussed below.

Inventory Results

The tree inventory documented 668 trees, which are presented on **Maps 1 – 11** in **Attachment A**. Detailed tree inventory results are provided in **Attachment B**. A summary count of trees inventoried by species/genus is provided below in **Table 2**. In summary, trees of 59 different species/genera were identified. For each species identified in the inventory, the species statuses are provided, as listed under the Ontario *Endangered Species Act, 2007* (ESA), the federal *Species at Risk Act, 2002* (SARA), and the sub-national provincial conservation rank (SRank) listed by the Ontario Natural Heritage Information Centre (NHIC). A summary of species in terms of these statuses is outlined as follows:

- One species (Butternut; *Juglans cinerea*) is listed as *Endangered* under both the ESA and SARA. This species is discussed further below
- One species (Kentucky Coffee Tree; *Gymnocladus dioicus*) is listed as *Threated* under both the ESA and SARA. However, the individuals of this species all appeared to be planted landscape specimens, and as such, do not receive the protections associated with the ESA and SARA, which are applicable only to naturally occurring individuals
- One other species (Honey-locust; *Gleditsia triacanthos*) has an SRank of S2 (very rare in Ontario)
- One species (Eastern Redbud; *Cercis Canadensis*) has an SRank of SX (extirpated from Ontario). However, the individuals of this species all appeared to be planted landscape specimens
- All other species are considered common and secure in Ontario and are not listed under the ESA or SARA
- 20 of the species are considered non-native (SNA) or exotic (SE) to Ontario by NHIC.

Table 2: Summary of Tree Inventory by Species

Species (Scientific)	Species (Common)	ESA Status[1]	SARA Status[1]	SRank[2]	Count
Acer ginnala	Amur Maple	---	---	SE1	1
Acer negundo	Manitoba Maple	---	---	S5	25
Acer platanoides	Norway Maple	---	---	SNA	34
Acer rubrum	Red Maple	---	---	S5	19
Acer saccharinum	Silver Maple	---	---	S5	4
Acer saccharum	Sugar Maple	---	---	S5	25
Acer x freemanii	Freeman's Maple	---	---	SNA	6
Aesculus hippocastanum	Horse Chestnut	---	---	SNA	1
Alnus glutinosa	European Alder	---	---	SNA	1
Betula papyrifera	Paper Birch	---	---	S5	7
Carya cordiformis	Bitternut Hickory	---	---	S5	4
Celtis occidentalis	Common Hackberry	---	---	S4	11
Cercis canadensis	Eastern Redbud	---	---	SX	4
Crataegus sp.	Hawthorn sp.	---	---	---	2
Fagus grandifolia	American Beech	---	---	S4	1
Fraxinus americana	White Ash	---	---	S4	11
Fraxinus excelsior	European Ash	---	---	SNA	1
Fraxinus pennsylvanica	Green Ash	---	---	S4	6
Gleditsia triacanthos	Honey-locust	---	---	S2	40
Gleditsia triacanthos inermis	Thornless Honey-locust	---	---	SNA	7
Gymnocladus dioicus	Kentucky Coffee-tree	THR	THR	S2	3
Juglans cinerea	Butternut	END	END	S3?	4
Juglans nigra	Black Walnut	---	---	S4	3

Species (Scientific)	Species (Common)	ESA Status[1]	SARA Status[1]	SRank[2]	Count
Juniperus virginiana	Eastern Red Cedar	---	---	S5	38
Larix laricina	American Larch	---	---	S5	2
Ligustrum sp.	Privet sp.	---	---	---	4
Liriodendron tulipifera	Tulip Tree	---	---	S4	8
Magnolia × soulangeana	Chinese Magnolia	---	---	---	1
Malus baccata	Siberian Crabapple	---	---	SNA	1
Malus pumila	Common Apple	---	---	SNA	1
Malus sargentii	Crab Apple	---	---	---	5
Ostrya virginiana	Eastern Hop-hornbeam	---	---	S5	1
Picea abies	Norway Spruce	---	---	SNA	20
Picea glauca	White Spruce	---	---	S5	40
Picea pungens	Blue Spruce	---	---	SNA	54
Pinus resinosa	Red Pine	---	---	S5	3
Pinus strobus	Eastern White Pine	---	---	S5	10
Pinus sylvestris	Scotch Pine	---	---	SNA	110
Populus alba	White Poplar	---	---	SNA	1
Populus tremuloides	Trembling Aspen	---	---	S5	2
Prunus avium	Sweet Cherry	---	---	SNA	2
Prunus serotina	Wild Black Cherry	---	---	S5	2
Quercus alba	White Oak	---	---	S5	5
Quercus macrocarpa	Bur Oak	---	---	S5	5
Quercus palustris	Pin Oak	---	---	S4	1
Quercus robur	English Oak	---	---	SNA	7
Quercus rubra	Northern Red Oak	---	---	S5	10
Rhamnus cathartica	Common Buckthorn	---	---	SNA	2
Robinia pseudoacacia	Black Locust	---	---	SNA	22
Salix fragilis	Crack Willow	---	---	S4?	14
Sorbus americana	American Mountain-ash	---	---	S5	1
Sorbus x hybrida	Oakleaf Mountain-ash	---	---	---	6
Styphnolobium japonicum	Japanese pagoda	---	---	---	1
Syringa reticulata ssp. reticulata	Japanese Tree Lilac	---	---	SNA	9
Taxodium distichum	Baldcypress	---	---	SNA	2
Thuja occidentalis	Eastern White Cedar	---	---	S5	16
Tilia cordata	Little-leaf Linden	---	---	SNA	15

Species (Scientific)	Species (Common)	ESA Status[1]	SARA Status[1]	SRank[2]	Count
Ulmus sp.	Elm sp.	---	---	---	13
Zelcova serrate	Japanese Zelcova	---	---	---	3
Indeterminable	Indeterminable	---	---	---	11

[1] END = *Endangered*; THR = *Threatened.*

[2] S5 = Secure; S4 = Common; S3 = Rare to Uncommon; S2 = Very Rare; S1 Extremely Rare; SNA = not applicable for conservation (e.g., non-native); SE = exotic to Ontario; The "?" modifier indicates uncertainty of SRank status due to insufficient information.

Ownership of each inventoried tree (*public* or *private*) is also identified in the inventory results table in **Attachment B**. Of the 668 trees inventoried, 373 are considered public (on City property) while the remaining 295 are considered private (on private property). This is only a preliminary assessment of ownership based on approximate interpretation of property boundaries at the time of the inventory. Final determination of tree ownership may require revision subject to detailed design and implementation of the project, and subject to field verification of tree location and the proportion of each tree on City or private property.

Considerations for Tree Removals

For each inventoried tree, a preliminary assessment was made for whether the tree is anticipated to potentially require removal for the project, or if it can potentially be retained. This included consideration of tree condition and tree proximity to the boundaries of the preliminary design limits that were developed for the EA, as shown on the maps in **Attachment A**. The assessment was based on the following:

- Trees in poor or dead condition and trees identified as hazard are identified for potential removal
- Trees located within or immediately adjacent to the preliminary design limits with an estimated critical root zone (CRZ) that overlaps the preliminary design area by 30% or more are identified for potential removal. Trees included in this removal category would not be expected to survive given the extent of potential construction disturbances (i.e., topsoil stripping, grading, soil compaction, etc.) in the CRZ and/or crown pruning that would be required for construction of the project. The CRZ for each tree was estimated based on DBH using the criteria ranges outlined in **Table 3** below, which are based on common arboriculture practices for estimating CRZ
- Trees adjacent to the limits of the preliminary design for which the estimated CRZ that overlaps the preliminary design area by less than 30% are identified as potentially retained, as the degree of impact from construction disturbances would not be expected to critically impact the tree.

Table 3: Criteria for Estimating Critical Root Zone (CRZ)

Tree DBH (cm)	Estimated Critical Root Zone (m)
<10	1.8
11-40	4.0
41-50	5.0
51-60	6.0
61-70	7.0
71-80	8.0
81-90	9.0
91-100+	10.0

Of the 668 trees inventoried, 109 are identified as potentially requiring removal, while the remainder are identified as potentially retained, as outlined in **Attachment B**. Of these 109 trees identified as potentially requiring removal, 26 trees are in poor or dead condition and/or are identified as hazard trees, six of which also have a CRZ with more than 30% of the preliminary design limits encroaching into the CRZ. The remaining 83 of the 109 trees for removal also have a CRZ with more than 30% of the preliminary design limits encroaching into the CRZ. Of the 109 trees identified as potentially requiring removal, nine are on private property while the remaining 100 are on City property, based on the preliminary interpretation of tree ownership and property boundaries.

The assessment of trees as potentially requiring removal or potentially being retained is based on preliminary design of the project at the time of the EA. The development of the project through detailed design may result in different and/or additional potential impacts to the inventoried trees, which may change the assessment results of one or more trees. Similarly, the assessment of ownership is based on approximate interpretation of property boundaries at the time of the inventory. Final determination of tree ownership may require revision subject to detailed design and implementation of the project, and subject to field verification of tree location and the proportion of each tree on City or private property. Recommendations and future considerations to address these are discussed below.

Recommendations and Future Considerations

The following recommendations and future considerations are provided for further development of the project, such as through the detailed design phase, and construction of the project.

Butternut

Four trees were documented in the tree inventory as Butternut. This species is known to hybridize with other *Juglans* species, including varieties used for landscape plantings. Two of the inventoried trees (ID #028 and #099) appeared to be landscape plantings, while the other two trees (ID #079 and #114) did not, but rather were observed in naturalized areas. It was not determined during the tree inventory if any of the four trees is a hybrid, as this determination typically requires a detailed assessment with

genetic analysis of tissue samples. Naturally occurring Butternuts have legal protection in Ontario under the ESA, prohibiting adverse impacts to certain individuals and their habitat, which is considered areas of suitable seed dispersal within a 50 m radius of Butternut tree.

Based on preliminary design, the project is not anticipated to cause grading/ground disturbance impacts to these four trees or areas of suitable habitat within 50 m of these trees, so no issues with regard to these species and the ESA are anticipated. However, one of the Butternut Trees (tree ID #079) appeared to be affected by Butternut canker disease. It appeared to be in poor health and as such, is identified for potential removal. If, through detailed design and construction, the project may cause impacts to any of these trees, such as removal, pruning, or grading/ground disturbance in areas suitable for seed dispersal within 50 m, the trees should be assessed in detail to confirm whether it is a naturally occurring individual, and whether it is a hybrid or pure Butternut. The assessment should be conducted by a qualified Butternut Health Assessor (BHA) following the protocols outlined by the Ministry of Natural Resources and Forestry (MNRF). The assessment is also intended to determine the health category of Butternuts and their potential degree of infection by Butternut canker disease. Trees determined through the BHA to be Category 1 are considered non-retainable due to advanced infection by the disease. In general, Category 1 trees do not receive legal protection under the ESA. Trees determined through the BHA to be Category 2 are considered retainable, while Category 3 trees are considered important to recovery of the species. Category 2 and Category 3 trees are subject to protection under the ESA. If the project may cause impacts to Category 2 or Category 3 Butternuts, consultation should be conducted with MNRF to initiate the process under to avoid contravention under the ESA. Impacts to Category 2 trees can generally be addressed under Section 23.7 of *Ontario Regulation 242/08* of the ESA. Category 3 trees are generally prohibited from impacts. As two of the four Butternut trees appeared to be on private property (tree ID# 028 and 114), access permission to those properties would need to be arranged.

Kentucky Coffee Tree

Three trees were documented in the tree inventory as Kentucky Coffee Tree. Native stands of this species are protected under the ESA. All three of the trees documented in the inventory appeared to be planted landscape specimens, and therefore do not appear to be subject to the protections of the ESA.

Design Considerations

Detailed design of the project should, to the extent feasible, incorporate the existing trees into the design. Project infrastructure (e.g., road surface, sidewalks, paths, etc.) should be designed to avoid or minimize tree removals and tree maintenance. The design should also avoid or minimize the extent to which infrastructure is located within the critical root zones of trees, which are outlined on **Maps 1 – 11** in **Attachment A**.

Detailed Design and Implementation

Following completion of detailed design and as part of implementation of the project, the information in this tree inventory should be updated and confirmed, including:

- Final determination of trees to be removed and trees to be retained
- Confirmation of species identification and condition during an appropriate season, including consideration of potential changes in condition that may occur in the interim until detailed design
- Final determination of tree ownership (private or public) pending the potential acquisition of private lands for the project, with consideration of precise property lines (e.g., with a surveyor) in areas where trees may span property lines.

Tree Removal and Maintenance

Tree removal and maintenance for the project is potentially subject to a number of City by-laws, including those listed and summarized as follows.

- *By-law No. 15-125 - To Regulate Trees on or Affecting Public Property*, which prohibits the injury or destruction of public trees on City property, except where permitted by the by-law or applicable policy or by a permit from the applicable City Director
- *By-law No. R00-054 - Woodland Conservation to Restrict and Regulate the Destruction of Trees in the Regional Municipality of Hamilton-Wentworth*, which prohibits the destruction of certain trees in woodlands of specific minimum size and tree density on City property, except where permitted by the by-law or applicable policy or by a permit from the applicable City Director
- *By-law No. 2000-118 – A By-law to prohibit the injury or destruction of specified classes of trees on public and private property in the Town of Ancaster*, which prohibits the destruction of certain trees in woodlands of specific minimum size and tree density on City property, except where permitted by the by-law or applicable policy or by a permit from the applicable City Director
- *By-law No. 17-094*, which amends portions of the latter two of the above-listed by-laws.

Implementation of the project should include preparation of an arborist report using the information contained in this tree inventory and updated subject to the detailed design as outlined above, to support the requirements of the above-listed by-laws and/or other applicable by-laws pertaining to tree removal and maintenance.

Attachment A

Maps 1 – 11

Hamilton

Southcote Road Municipal Class EA

Tree Inventory
Map 1 of 11

- Tree Potentially Removed
- Tree Potentially Retained
- Critical Root Zone
- Project Right of Way
- Parcel
- Preliminary Design Limits
- Curb
- Road Edge
- Sidewalk
- Multi-use Path

*Note: Determination of trees to be removed or retained is subject to detailed design

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED,
CITY OF HAMILTON

MAP CREATED BY: SFG
MAP CHECKED BY: TG
MAP PROJECTION: Coordinate System: NAD 1983 CSRS UTM Zone 17N

DRAFT

0 2.5 5 10 m

SCALE 1:500

INSET MAP

FILE LOCATION:
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PROJECT: 187402 STATUS: DRAFT DATE: 2019-03-07

Hamilton

Southcote Road Municipal Class EA

Tree Inventory
Map 2 of 11

- Tree Potentially Removed
- Tree Potentially Retained
- Critical Root Zone
- Project Right of Way
- Parcel
- Preliminary Design Limits
- Curb
- Road Edge
- Sidewalk
- Multi-use Path

*Note: Determination of trees to be removed or retained is subject to detailed design

INSET MAP

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED,
CITY OF HAMILTON

MAP CREATED BY: SFG
MAP CHECKED BY: TG
MAP PROJECTION: Coordinate System: NAD 1983 CSRS UTM Zone 17N

DRAFT

0 2.5 5 10 m

SCALE 1:500

FILE LOCATION:
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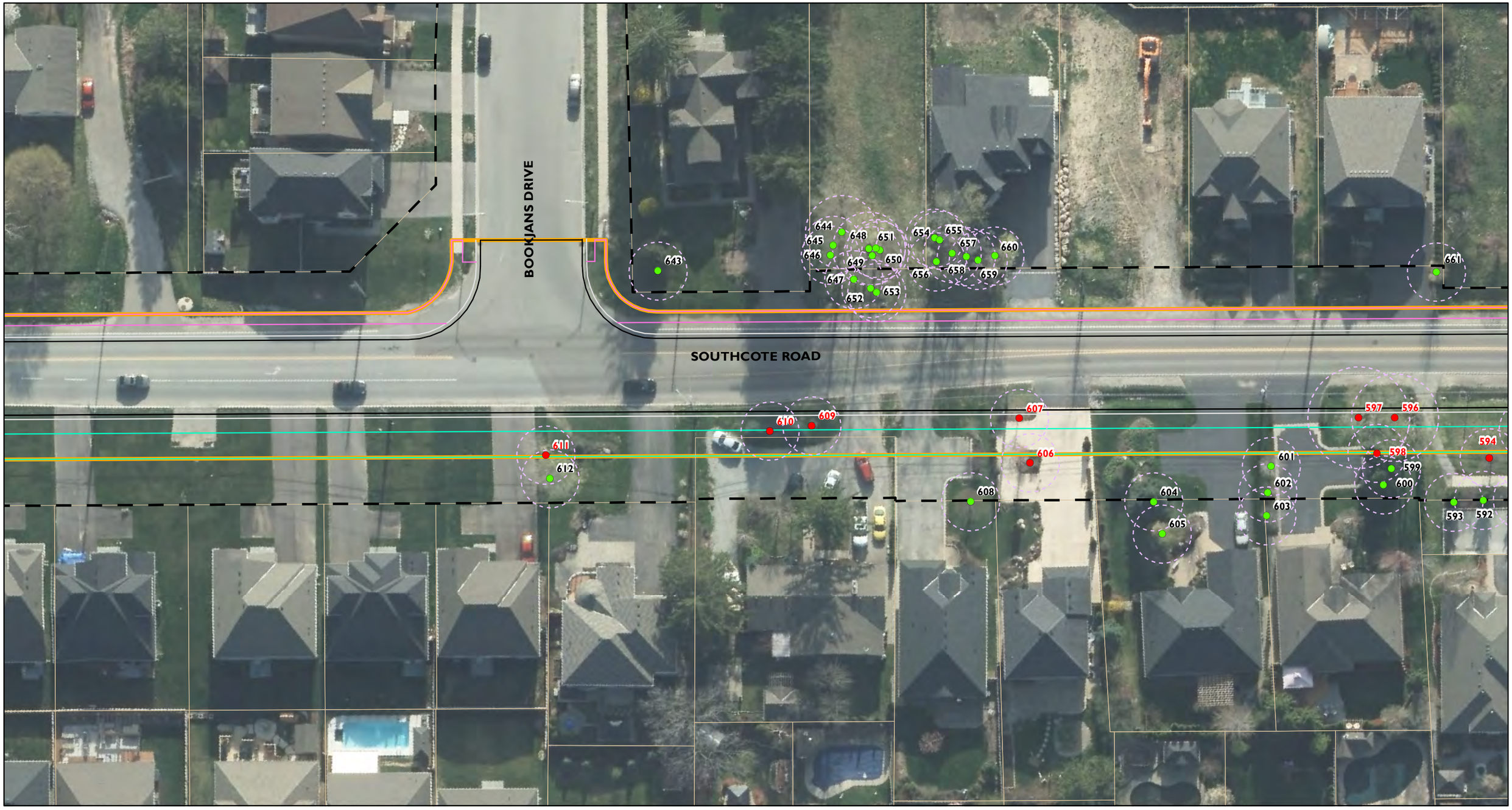
PROJECT: 187402 STATUS: DRAFT DATE: 2019-03-07



Hamilton

Southcote Road Municipal Class EA

Tree Inventory
Map 3 of 11

- Tree Potentially Removed
- Tree Potentially Retained
- Critical Root Zone
- Project Right of Way
- Parcel
- Preliminary Design Limits
- Curb
- Road Edge
- Sidewalk
- Multi-use Path

*Note: Determination of trees to be removed or retained is subject to detailed design

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED,
CITY OF HAMILTON

MAP CREATED BY: SFG
MAP CHECKED BY: TG
MAP PROJECTION: Coordinate System: NAD 1983 CSRS UTM Zone 17N

DRAFT

0 2.5 5 10 m

SCALE 1:500

INSET MAP

FILE LOCATION:
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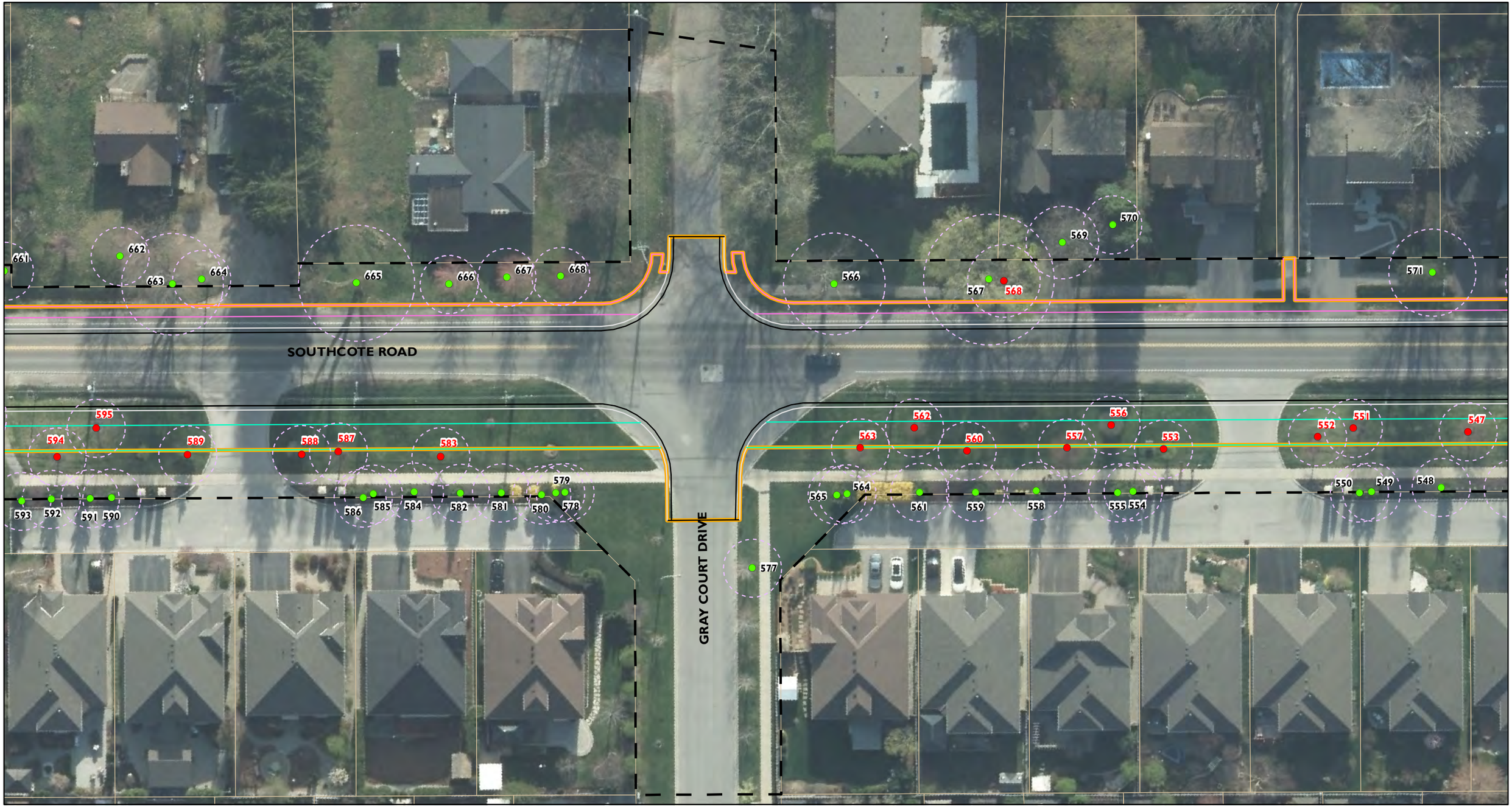
PROJECT: 187402 STATUS: DRAFT DATE: 2019-03-07



Hamilton

Southcote Road Municipal Class EA

Tree Inventory
Map 4 of 11

- Tree Potentially Removed
- Tree Potentially Retained
- Critical Root Zone
- Project Right of Way
- Parcel
- Preliminary Design Limits
- Curb
- Road Edge
- Sidewalk
- Multi-use Path

*Note: Determination of trees to be removed or retained is subject to detailed design

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED,
CITY OF HAMILTON

MAP CREATED BY: SFG
MAP CHECKED BY: TG
MAP PROJECTION: Coordinate System: NAD 1983 CSRS UTM Zone 17N

DRAFT

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SCALE 1:500

INSET MAP

FILE LOCATION:
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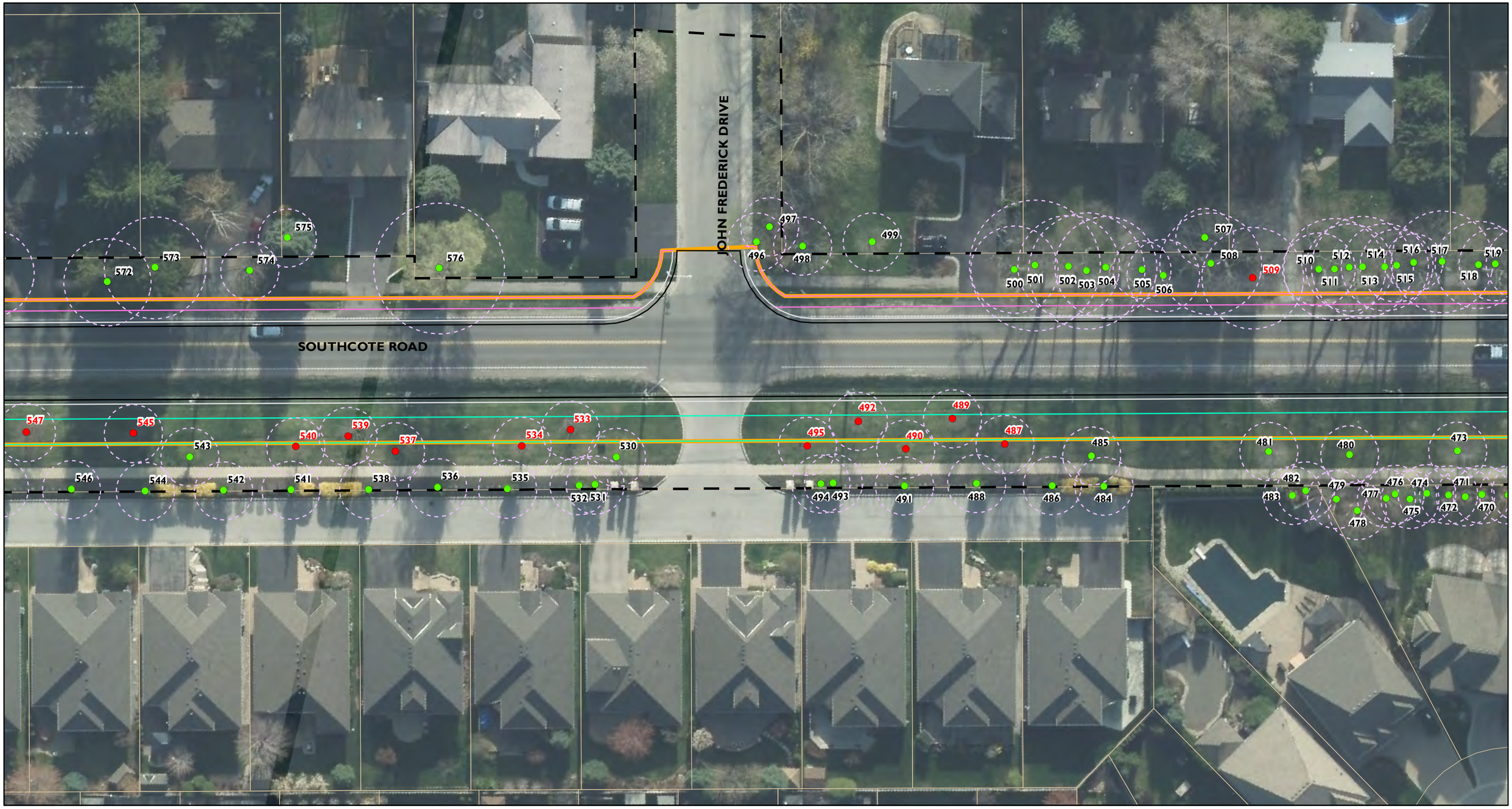
PROJECT: 187402 STATUS: DRAFT DATE: 2019-03-07



Hamilton

Southcote Road Municipal Class EA

Tree Inventory
Map 5 of 11

- Tree Potentially Removed
- Tree Potentially Retained
- Critical Root Zone
- Project Right of Way
- Parcel
- Preliminary Design Limits
- Curb
- Road Edge
- Sidewalk
- Multi-use Path

*Note: Determination of trees to be removed or retained is subject to detailed design

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED,
CITY OF HAMILTON

MAP CREATED BY: SFG
MAP CHECKED BY: TG
MAP PROJECTION: Coordinate System: NAD 1983 CSRS UTM Zone 17N

DRAFT

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SCALE 1:500

INSET MAP

FILE LOCATION:
G:\cad\GIS\187402\MXD\Tree Inventory.mxd

PROJECT: 187402 STATUS: DRAFT DATE: 2019-03-07

SOUTHCOTE ROAD

STONEHENGE DRIVE

Hamilton

Southcote Road Municipal Class EA

Tree Inventory
Map 6 of 11

Tree Potentially Removed	Project Right of Way	Curb	Multi-use Path
Tree Potentially Retained	Parcel	Road Edge	
Critical Root Zone	Preliminary Design Limits	Sidewalk	

*Note: Determination of trees to be removed or retained is subject to detailed design

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED, CITY OF HAMILTON

MAP CREATED BY: SFG
MAP CHECKED BY: TG
MAP PROJECTION: Coordinate System: NAD 1983 CSRS UTM Zone 17N

DRAFT

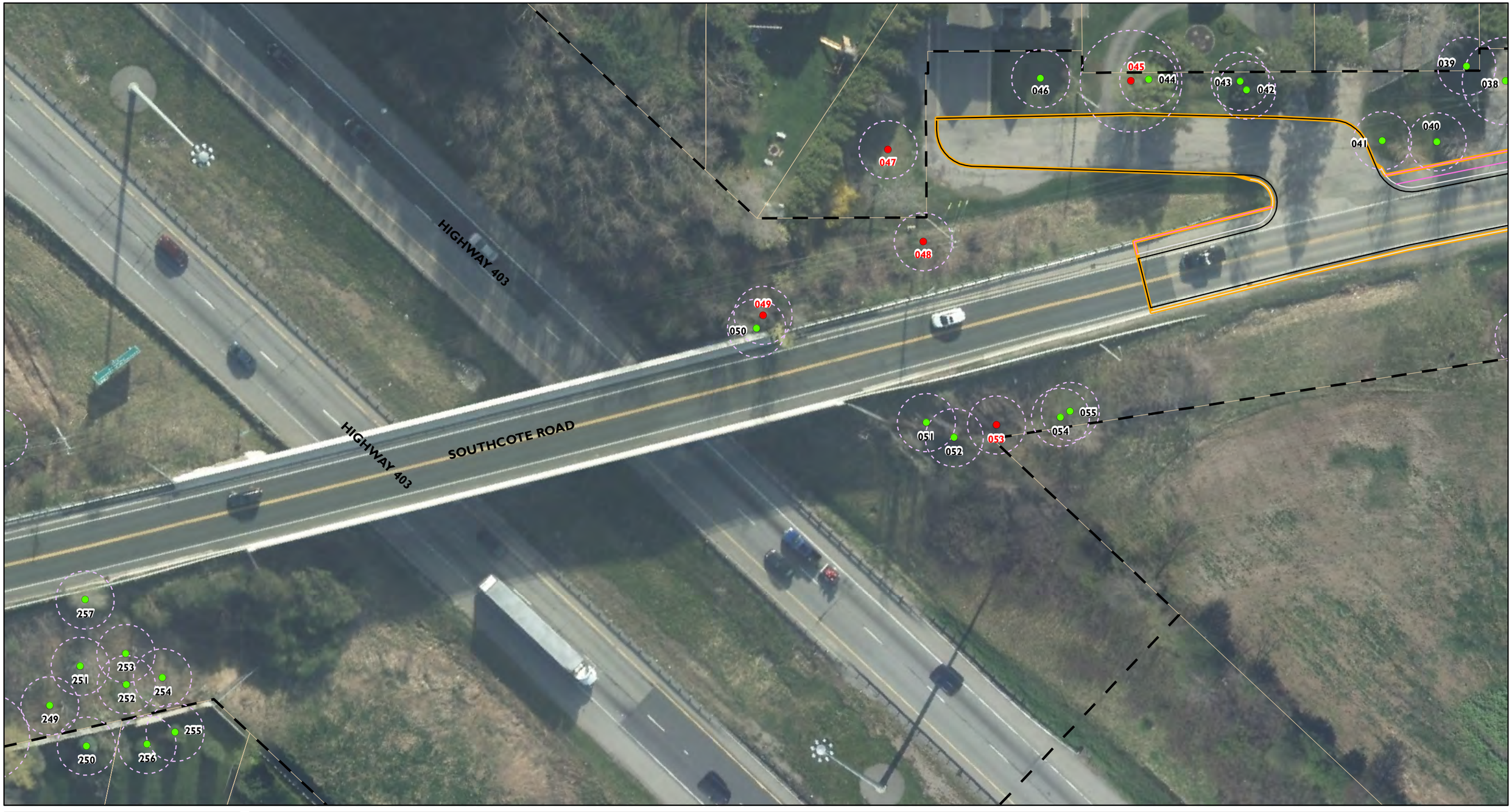
0 2.5 5 10 m

SCALE 1:500

INSET MAP

FILE LOCATION:
G:\cad\GIS\187402\MXD\Tree Inventory.mxd

PROJECT: 187402 STATUS: DRAFT DATE: 2019-03-07



Hamilton

Southcote Road Municipal Class EA

Tree Inventory
Map 9 of 11

- Tree Potentially Removed
- Tree Potentially Retained
- Critical Root Zone
- Project Right of Way
- Parcel
- Preliminary Design Limits
- Curb
- Road Edge
- Sidewalk
- Multi-use Path

*Note: Determination of trees to be removed or retained is subject to detailed design

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED,
CITY OF HAMILTON

MAP CREATED BY: SFG
MAP CHECKED BY: TG
MAP PROJECTION: Coordinate System: NAD 1983 CSRS UTM Zone 17N

DRAFT

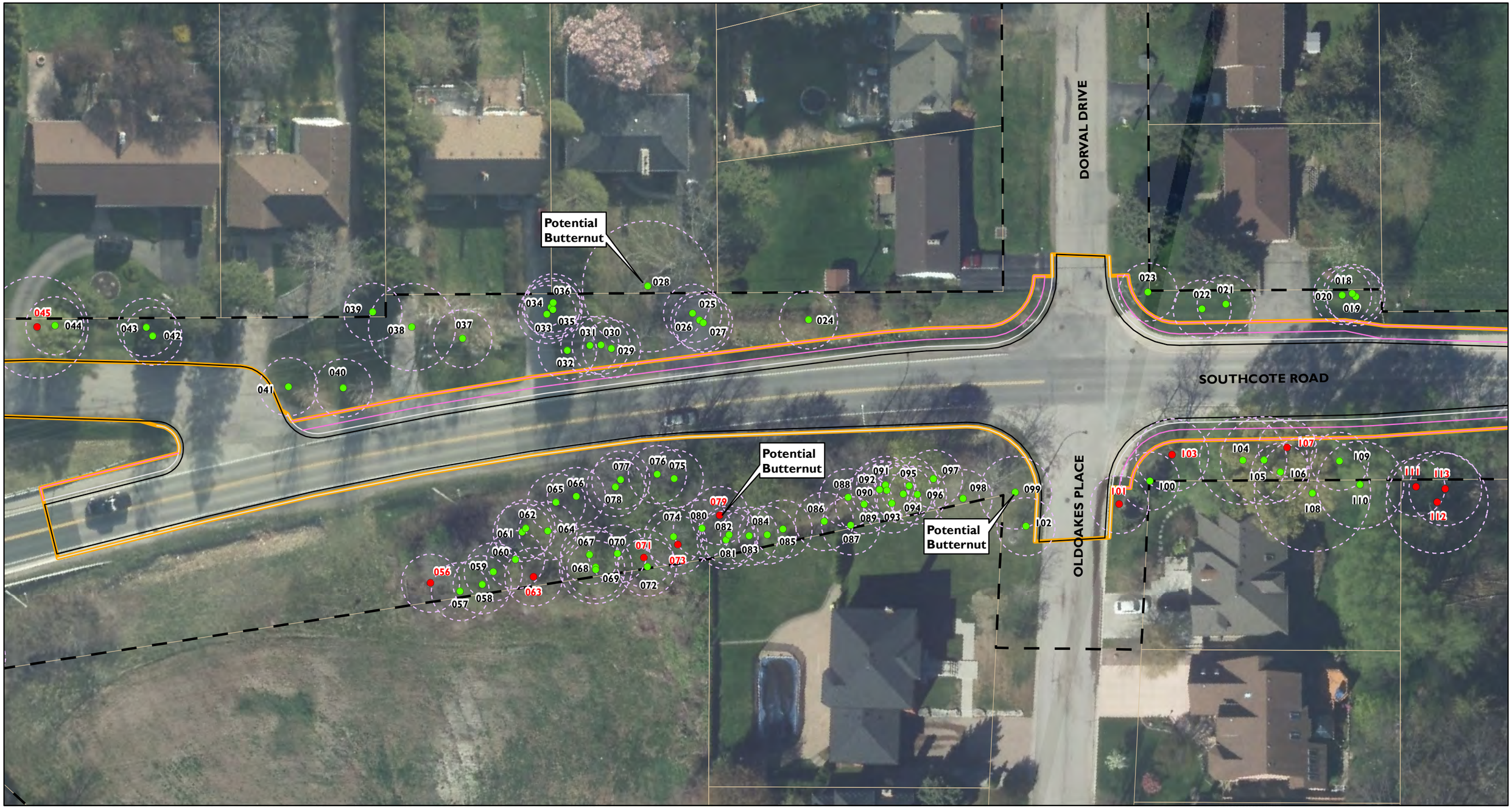
0 2.5 5 10 m

SCALE 1:500

INSET MAP

FILE LOCATION:
G:\cad\GIS\187402\MXD\Tree Inventory.mxd

PROJECT: 187402 STATUS: DRAFT DATE: 2019-03-07



Hamilton

Southcote Road Municipal Class EA

Tree Inventory
Map 10 of 11

- Tree Potentially Removed
- Tree Potentially Retained
- Critical Root Zone
- Project Right of Way
- Parcel
- Preliminary Design Limits
- Curb
- Road Edge
- Sidewalk
- Multi-use Path

*Note: Determination of trees to be removed or retained is subject to detailed design

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED, CITY OF HAMILTON

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DRAFT

0 2.5 5 10 m

SCALE 1:500

INSET MAP

FILE LOCATION:
G:\cad\GIS\187402\MXD\Tree Inventory.mxd

PROJECT: 187402 STATUS: DRAFT DATE: 2019-03-07

SOUTHCOTE ROAD

MCNIVEN ROAD

GOLF LINKS ROAD

Potential Butternut

Hamilton

Southcote Road Municipal Class EA

Tree Inventory
Map 11 of 11

Tree Potentially Removed	Project Right of Way	Curb	Multi-use Path
Tree Potentially Retained	Parcel	Road Edge	
Critical Root Zone	Preliminary Design Limits	Sidewalk	

*Note: Determination of trees to be removed or retained is subject to detailed design

DILLON CONSULTING

MAP DRAWING INFORMATION:
DATA PROVIDED BY DILLON CONSULTING LIMITED,
CITY OF HAMILTON

MAP CREATED BY: SFG
MAP CHECKED BY: TG
MAP PROJECTION: Coordinate System: NAD 1983 CSRS UTM Zone 17N

DRAFT

0 2.5 5 10 m

SCALE 1:500

INSET MAP

FILE LOCATION:
G:\cad\GIS\187402\MXD\Tree Inventory.mxd

PROJECT: 187402 STATUS: DRAFT DATE: 2019-03-07

Attachment B

Tree Inventory Detailed Results

Attachment B – Tree Inventory Detailed Results

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
001	Picea abies (Norway Spruce)	18	18	---	---	---	---	---	---	Good	No	4.0	584210.1763	4786173.522	Public	Retain
002	Tilia cordata (Little-leaf Linden)	37	22	18	16	10	10	10	---	Fair	No	4.0	584219.1512	4786179.048	Public	Retain
003	Tilia cordata (Little-leaf Linden)	39	23	20	20	14	---	---	---	Fair	No	4.0	584223.0753	4786174.475	Public	Retain
004	Picea abies (Norway Spruce)	32	32	---	---	---	---	---	---	Good	No	4.0	584205.6496	4786177.304	Public	Retain
005	Picea abies (Norway Spruce)	42	42	---	---	---	---	---	---	Good	No	5.0	584198.506	4786178.08	Private	Retain
006	Picea abies (Norway Spruce)	15	15	---	---	---	---	---	---	Good	No	4.0	584218.1647	4786166.568	Public	Retain
007	Fraxinus americana (White Ash)	32	32	---	---	---	---	---	---	Fair	No	4.0	584210.2064	4786165.828	Public	Retain
008	Pinus sylvestris (Scotch Pine)	25	25	---	---	---	---	---	---	Fair	No	4.0	584209.7778	4786163.799	Public	Retain
009	Picea glauca (White Spruce)	18	18	---	---	---	---	---	---	Fair	No	4.0	584224.3411	4786140.555	Public	Retain
010	Picea glauca (White Spruce)	36	36	---	---	---	---	---	---	Fair	No	4.0	584217.0547	4786141.639	Public	Retain
011	Fraxinus pennsylvanica (Green Ash)	19	19	---	---	---	---	---	---	Fair	No	4.0	584225.005	4786129.986	Public	Retain
012	Tilia cordata (Little-leaf Linden)	21	21	---	---	---	---	---	---	Good	No	4.0	584227.2731	4786116.22	Public	Retain
013	Tilia cordata (Little-leaf Linden)	19	19	---	---	---	---	---	---	Good	No	4.0	584227.1548	4786108.052	Public	Retain
014	Sorbus americana (American Mountain-ash)	21	14	12	10	---	---	---	---	Good	No	4.0	584223.948	4786109.695	Public	Retain
015	Acer x freemanii (Freeman's Maple)	60	60	---	---	---	---	---	---	Good	No	6.0	584227.7417	4786091.898	Private	Retain
016	Acer x freemanii (Freeman's Maple)	34	34	---	---	---	---	---	---	Good	No	4.0	584229.8421	4786084.028	Public	Retain
017	Picea abies (Norway Spruce)	28	28	---	---	---	---	---	---	Good	No	4.0	584232.7124	4786071.751	Public	Retain
018	Malus sargentii (Crab Apple)	31	20	18	16	---	---	---	---	Fair	No	4.0	584241.0348	4786027.236	Public	Retain
019	Malus sargentii (Crab Apple)	26	16	16	12	---	---	---	---	Fair	No	4.0	584240.7367	4786026.662	Public	Retain
020	Malus sargentii (Crab Apple)	10	10	---	---	---	---	---	---	Good	No	4.0	584241.2719	4786025.383	Public	Retain
021	Picea glauca (White Spruce)	25	25	---	---	---	---	---	---	Good	No	4.0	584246.0634	4786010.067	Public	Retain
022	Picea glauca (White Spruce)	26	26	---	---	---	---	---	---	Good	No	4.0	584247.4582	4786006.994	Public	Retain
023	Picea glauca (White Spruce)	38	38	---	---	---	---	---	---	Good	No	4.0	584246.8623	4785999.201	Public	Retain
024	Acer negundo (Manitoba Maple)	10	10	---	---	---	---	---	---	Fair	No	4.0	584261.0985	4785954.551	Public	Retain
025	Picea abies (Norway Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584263.8011	4785938.782	Public	Retain
026	Picea abies (Norway Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584264.5489	4785939.986	Public	Retain
027	Picea abies (Norway Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584264.7601	4785940.549	Public	Retain
028	Juglans cinerea (Butternut)	86	56	48	32	30	---	---	---	Good	No	9.0	584256.3702	4785934.120	Public	Retain
029	Carya cordiformis (Bitternut Hickory)	30	22	20	---	---	---	---	---	Fair	No	4.0	584271.0745	4785929.023	Public	Retain
030	Carya cordiformis (Bitternut Hickory)	22	22	---	---	---	---	---	---	Good	No	4.0	584270.9114	4785927.503	Public	Retain
031	Carya cordiformis (Bitternut Hickory)	30	30	---	---	---	---	---	---	Good	No	4.0	584271.316	4785926.018	Public	Retain
032	Carya cordiformis (Bitternut Hickory)	25	18	18	---	---	---	---	---	Fair	No	4.0	584272.6944	4785923.159	Public	Retain
033	Thuja occidentalis (Eastern White Cedar)	16	16	---	---	---	---	---	---	Good	No	4.0	584268.4539	4785919.284	Public	Retain

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
034	Thuja occidentalis (Eastern White Cedar)	16	16	---	---	---	---	---	---	Good	No	4.0	584267.402	4785919.631	Public	Retain
035	Thuja occidentalis (Eastern White Cedar)	10	10	---	---	---	---	---	---	Good	No	4.0	584267.6226	4785919.959	Public	Retain
036	Thuja occidentalis (Eastern White Cedar)	10	10	---	---	---	---	---	---	Good	No	4.0	584266.7257	4785919.774	Public	Retain
037	Indeterminable	16	16	---	---	---	---	---	---	Good	No	4.0	584274.3236	4785908.748	Public	Retain
038	Betula papyrifera (Paper Birch)	58	42	40	---	---	---	---	---	Fair	No	6.0	584274.3462	4785901.58	Public	Retain
039	Picea glauca (White Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584273.5645	4785895.879	Private	Retain
040	Acer x freemanii (Freeman's Maple)	24	24	---	---	---	---	---	---	Good	No	4.0	584284.6363	4785894.264	Public	Retain
041	Acer x freemanii (Freeman's Maple)	22	22	---	---	---	---	---	---	Good	No	4.0	584286.1634	4785886.887	Public	Retain
042	Picea glauca (White Spruce)	32	32	---	---	---	---	---	---	Good	No	4.0	584283.5801	4785867.103	Public	Retain
043	Picea glauca (White Spruce)	38	38	---	---	---	---	---	---	Good	No	4.0	584282.6086	4785865.974	Public	Retain
044	Picea glauca (White Spruce)	28	28	---	---	---	---	---	---	Good	No	4.0	584285.2229	4785853.656	Public	Retain
045	Salix fragilis (Crack Willow)	70	42	34	32	30	---	---	---	Poor	Yes	7.0	584285.9628	4785851.327	Public	Remove (Condition)
046	Liriodendron tulipifera (Tulip Tree)	14	14	---	---	---	---	---	---	Good	No	4.0	584288.3995	4785839.122	Public	Retain
047	Fraxinus pennsylvanica (Green Ash)	26	26	---	---	---	---	---	---	Poor	Yes	4.0	584302.6767	4785820.874	Private	Remove (Condition)
048	Fraxinus americana (White Ash)	10	10	---	---	---	---	---	---	Dead	Yes	4.0	584313.9396	4785828.451	Public	Remove (Condition)
049	Indeterminable	16	16	---	---	---	---	---	---	Dead	Yes	4.0	584328.7736	4785809.227	Public	Remove (Condition)
050	Acer platanoides (Norway Maple)	11	11	---	---	---	---	---	---	Good	No	4.0	584330.7042	4785808.759	Public	Retain
051	Populus alba (White Poplar)	12	12	---	---	---	---	---	---	Good	No	4.0	584338.1088	4785834.463	Public	Retain
052	Acer saccharum (Sugar Maple)	10	10	---	---	---	---	---	---	Good	No	4.0	584339.2559	4785838.66	Public	Retain
053	Fraxinus americana (White Ash)	16	16	---	---	---	---	---	---	Dead	Yes	4.0	584336.2466	4785843.939	Public	Remove (Condition)
054	Acer platanoides (Norway Maple)	35	20	18	18	14	---	---	---	Fair	No	4.0	584333.2305	4785852.281	Public	Retain
055	Rhamnus cathartica (Common Buckthorn)	10	10	---	---	---	---	---	---	Good	No	4.0	584332.1549	4785853.397	Public	Retain
056	Fraxinus pennsylvanica (Green Ash)	24	24	---	---	---	---	---	---	Poor	No	4.0	584308.1101	4785911.996	Public	Remove (Condition)
057	Crataegus sp. (Hawthorn species)	13	13	---	---	---	---	---	---	Good	No	4.0	584308.3104	4785916.24	Public	Retain
058	Rhamnus cathartica (Common Buckthorn)	25	14	12	10	10	10	---	---	Good	No	4.0	584306.7087	4785918.98	Public	Retain
059	Fraxinus americana (White Ash)	18	18	---	---	---	---	---	---	Fair	No	4.0	584304.6681	4785920.06	Public	Retain
060	Fraxinus americana (White Ash)	15	15	---	---	---	---	---	---	Fair	No	4.0	584302.3323	4785922.672	Public	Retain
061	Fraxinus americana (White Ash)	20	20	---	---	---	---	---	---	Fair	No	4.0	584298.4632	4785922.728	Public	Retain
062	Fraxinus excelsior (European Ash)	14	14	---	---	---	---	---	---	Fair	No	4.0	584297.8517	4785923.13	Public	Retain
063	Acer negundo (Manitoba Maple)	20	20	---	---	---	---	---	---	Poor	No	4.0	584304.0678	4785925.646	Public	Remove (Condition)
064	Robinia pseudoacacia (Black Locust)	20	20	---	---	---	---	---	---	Good	No	4.0	584297.4934	4785926.125	Public	Retain
065	Robinia pseudoacacia (Black Locust)	16	16	---	---	---	---	---	---	Good	No	4.0	584293.405	4785926.36	Public	Retain
066	Robinia pseudoacacia (Black Locust)	30	30	---	---	---	---	---	---	Fair	No	4.0	584291.9753	4785928.874	Public	Retain
067	Acer negundo (Manitoba Maple)	21	21	---	---	---	---	---	---	Fair	No	4.0	584299.4345	4785932.478	Public	Retain
068	Acer negundo (Manitoba Maple)	48	38	30	---	---	---	---	---	Fair	No	5.0	584300.8667	4785933.665	Public	Retain

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
069	Acer negundo (Manitoba Maple)	37	33	17	---	---	---	---	---	Fair	No	4.0	584301.1995	4785933.755	Public	Retain
070	Crataegus sp. (Hawthorn species)	11	11	---	---	---	---	---	---	Good	No	4.0	584298.3791	4785936.183	Public	Retain
071	Acer negundo (Manitoba Maple)	38	38	---	---	---	---	---	---	Poor	Yes	4.0	584298.1148	4785939.855	Public	Remove (Condition)
072	Robinia pseudoacacia (Black Locust)	37	24	22	18	---	---	---	---	Fair	No	4.0	584299.2403	4785940.579	Public	Retain
073	Acer negundo (Manitoba Maple)	32	32	---	---	---	---	---	---	Poor	Yes	4.0	584295.3348	4785943.984	Public	Remove (Condition)
074	Robinia pseudoacacia (Black Locust)	22	22	---	---	---	---	---	---	Good	No	4.0	584294.4088	4785943.158	Public	Retain
075	Robinia pseudoacacia (Black Locust)	33	24	20	10	---	---	---	---	Fair	No	4.0	584286.564	4785941.457	Public	Retain
076	Robinia pseudoacacia (Black Locust)	28	24	14	---	---	---	---	---	Fair	No	4.0	584286.5226	4785939.056	Public	Retain
077	Robinia pseudoacacia (Black Locust)	35	26	24	---	---	---	---	---	Fair	No	4.0	584288.3859	4785934.326	Public	Retain
078	Robinia pseudoacacia (Black Locust)	10	10	---	---	---	---	---	---	Good	No	4.0	584289.5161	4785933.844	Public	Retain
079	Juglans cinerea (Butternut)	10	10	---	---	---	---	---	---	Poor	No	4.0	584290.0972	4785948.678	Public	Remove (Condition)
080	Robinia pseudoacacia (Black Locust)	34	23	20	14	---	---	---	---	Fair	No	4.0	584292.4027	4785946.766	Public	Retain
081	Robinia pseudoacacia (Black Locust)	23	20	12	---	---	---	---	---	Fair	No	4.0	584293.1675	4785950.308	Public	Retain
082	Robinia pseudoacacia (Black Locust)	14	14	---	---	---	---	---	---	Good	No	4.0	584292.4146	4785950.559	Public	Retain
083	Robinia pseudoacacia (Black Locust)	16	16	---	---	---	---	---	---	Good	No	4.0	584291.9311	4785953.302	Public	Retain
084	Acer negundo (Manitoba Maple)	32	29	14	---	---	---	---	---	Fair	No	4.0	584291.2236	4785955.685	Public	Retain
085	Acer platanoides (Norway Maple)	25	25	---	---	---	---	---	---	Good	No	4.0	584289.952	4785957.592	Public	Retain
086	Robinia pseudoacacia (Black Locust)	24	22	10	---	---	---	---	---	Fair	No	4.0	584287.6581	4785962.893	Public	Retain
087	Quercus rubra (Northern Red Oak)	11	11	---	---	---	---	---	---	Good	No	4.0	584287.387	4785966.571	Public	Retain
088	Robinia pseudoacacia (Black Locust)	21	15	14	---	---	---	---	---	Fair	No	4.0	584283.7153	4785965.386	Public	Retain
089	Robinia pseudoacacia (Black Locust)	18	14	12	---	---	---	---	---	Fair	No	4.0	584284.1479	4785967.749	Public	Retain
090	Robinia pseudoacacia (Black Locust)	15	15	---	---	---	---	---	---	Good	No	4.0	584281.6732	4785969.356	Public	Retain
091	Robinia pseudoacacia (Black Locust)	20	20	---	---	---	---	---	---	Fair	No	4.0	584280.894	4785970.01	Public	Retain
092	Robinia pseudoacacia (Black Locust)	14	14	---	---	---	---	---	---	Good	No	4.0	584281.5773	4785970.386	Public	Retain
093	Robinia pseudoacacia (Black Locust)	17	17	---	---	---	---	---	---	Fair	No	4.0	584283.1788	4785971.437	Public	Retain
094	Fraxinus americana (White Ash)	10	10	---	---	---	---	---	---	Fair	No	4.0	584281.5238	4785972.668	Public	Retain
095	Robinia pseudoacacia (Black Locust)	13	13	---	---	---	---	---	---	Fair	No	4.0	584280.3003	4785973.213	Public	Retain
096	Acer platanoides (Norway Maple)	23	23	---	---	---	---	---	---	Fair	No	4.0	584281.1987	4785974.564	Public	Retain
097	Acer platanoides (Norway Maple)	30	30	---	---	---	---	---	---	Good	No	4.0	584278.5696	4785976.223	Public	Retain
098	Acer saccharum (Sugar Maple)	14	14	---	---	---	---	---	---	Good	No	4.0	584280.3007	4785980.8	Public	Retain
099	Juglans cinerea (Butternut)	40	34	21	---	---	---	---	---	Fair	No	5.0	584277.8643	4785987.618	Public	Retain
100	Thuja occidentalis (Eastern White Cedar)	16	16	---	---	---	---	---	---	Good	No	4.0	584272.1476	4786005.356	Private	Retain
101	Thuja occidentalis (Eastern White Cedar)	12	12	---	---	---	---	---	---	Good	No	4.0	584276.2291	4786001.945	Public	Remove (CRZ)
102	Acer rubrum (Red Maple)	18	18	---	---	---	---	---	---	Good	No	4.0	584282.09	4785990.104	Public	Retain
103	Robinia pseudoacacia (Black Locust)	43	33	24	15	---	---	---	---	Fair	No	5.0	584267.9872	4786007.511	Public	Remove (CRZ)

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
104	Salix fragilis (Crack Willow)	52	28	24	24	22	18	---	---	Fair	No	6.0	584266.5415	4786017.18	Public	Retain
105	Salix fragilis (Crack Willow)	51	28	26	26	22	---	---	---	Fair	No	6.0	584265.8429	4786019.981	Public	Retain
106	Salix fragilis (Crack Willow)	31	24	20	---	---	---	---	---	Fair	No	4.0	584266.9435	4786022.542	Public	Retain
107	Salix fragilis (Crack Willow)	22	22	---	---	---	---	---	---	Fair	No	4.0	584263.4462	4786022.723	Public	Remove (CRZ)
108	Salix fragilis (Crack Willow)	75	60	45	---	---	---	---	---	Fair	No	8.0	584268.7762	4786027.492	Private	Retain
109	Salix fragilis (Crack Willow)	16	16	---	---	---	---	---	---	Fair	No	4.0	584263.6215	4786030.142	Public	Retain
110	Salix fragilis (Crack Willow)	56	32	30	26	22	---	---	---	Fair	No	6.0	584266.1635	4786033.651	Private	Retain
111	Salix fragilis (Crack Willow)	38	38	---	---	---	---	---	---	Poor	Yes	4.0	584264.7374	4786041.191	Private	Remove (Condition)
112	Salix fragilis (Crack Willow)	68	44	40	32	---	---	---	---	Poor	Yes	7.0	584266.1261	4786044.51	Private	Remove (Condition)
113	Salix fragilis (Crack Willow)	50	42	28	---	---	---	---	---	Poor	Yes	5.0	584264.1057	4786045.182	Private	Remove (Condition)
114	Juglans cinerea (Butternut)	28	28	---	---	---	---	---	---	Fair	No	4.0	584263.2772	4786061.506	Private	Retain
115	Fraxinus pennsylvanica (Green Ash)	20	20	---	---	---	---	---	---	Fair	No	4.0	584261.7361	4786064.926	Private	Retain
116	Pinus strobus (Eastern White Pine)	46	46	---	---	---	---	---	---	Good	No	5.0	584258.7079	4786095.048	Private	Retain
117	Quercus rubra (Northern Red Oak)	24	24	---	---	---	---	---	---	Good	No	4.0	584258.4772	4786097.663	Private	Retain
118	Quercus rubra (Northern Red Oak)	42	42	---	---	---	---	---	---	Good	No	5.0	584253.168	4786105.726	Private	Retain
119	Quercus rubra (Northern Red Oak)	38	38	---	---	---	---	---	---	Good	No	4.0	584252.988	4786111.815	Private	Retain
120	Fraxinus americana (White Ash)	11	11	---	---	---	---	---	---	Fair	No	4.0	584248.1698	4786107.43	Public	Retain
121	Fraxinus pennsylvanica (Green Ash)	13	13	---	---	---	---	---	---	Fair	No	4.0	584248.6496	4786116.972	Public	Retain
122	Quercus rubra (Northern Red Oak)	36	36	---	---	---	---	---	---	Good	No	4.0	584253.0473	4786124.584	Private	Retain
123	Quercus rubra (Northern Red Oak)	30	30	---	---	---	---	---	---	Good	No	4.0	584255.2924	4786132.986	Private	Retain
124	Picea glauca (White Spruce)	24	24	---	---	---	---	---	---	Good	No	4.0	584257.1637	4786135.626	Private	Retain
125	Pinus resinosa (Red Pine)	22	22	---	---	---	---	---	---	Fair	No	4.0	584256.4012	4786136.501	Private	Retain
126	Pinus resinosa (Red Pine)	34	34	---	---	---	---	---	---	Good	No	4.0	584255.3787	4786137.23	Private	Retain
127	Pinus resinosa (Red Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584254.1052	4786138.123	Private	Retain
128	Pinus strobus (Eastern White Pine)	42	42	---	---	---	---	---	---	Good	No	5.0	584256.0139	4786149.281	Private	Retain
129	Acer negundo (Manitoba Maple)	31	24	20	---	---	---	---	---	Fair	No	4.0	584254.5345	4786150.76	Private	Retain
130	Prunus avium (Sweet Cherry)	18	18	---	---	---	---	---	---	Good	No	4.0	584256.3719	4786150.925	Private	Retain
131	Pinus strobus (Eastern White Pine)	30	30	---	---	---	---	---	---	Good	No	4.0	584259.7055	4786152.001	Private	Retain
132	Pinus strobus (Eastern White Pine)	34	34	---	---	---	---	---	---	Good	No	4.0	584258.0834	4786152.412	Private	Retain
133	Acer negundo (Manitoba Maple)	22	22	---	---	---	---	---	---	Good	No	4.0	584254.285	4786152.56	Private	Retain
134	Acer negundo (Manitoba Maple)	18	18	---	---	---	---	---	---	Good	No	4.0	584257.4901	4786154.639	Private	Retain
135	Quercus alba (White Oak)	38	38	---	---	---	---	---	---	Good	No	4.0	584254.3623	4786161.978	Public	Retain
136	Pinus strobus (Eastern White Pine)	40	40	---	---	---	---	---	---	Good	No	5.0	584259.9078	4786161.806	Private	Retain
137	Acer platanoides (Norway Maple)	24	24	---	---	---	---	---	---	Fair	No	4.0	584260.3509	4786167.59	Private	Retain
138	Pinus sylvestris (Scotch Pine)	18	18	---	---	---	---	---	---	Good	No	4.0	584267.3136	4786185.056	Private	Retain

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
139	Thuja occidentalis (Eastern White Cedar)	16	12	10	---	---	---	---	---	Good	No	4.0	584262.9926	4786190.133	Public	Retain
140	Thuja occidentalis (Eastern White Cedar)	10	10	---	---	---	---	---	---	Good	No	4.0	584267.4491	4786190.603	Public	Retain
141	Prunus serotina (Wild Black Cherry)	60	60	---	---	---	---	---	---	Fair	No	6.0	584268.4096	4786188.553	Private	Retain
142	Thuja occidentalis (Eastern White Cedar)	10	10	---	---	---	---	---	---	Good	No	4.0	584271.1026	4786190.908	Private	Retain
143	Thuja occidentalis (Eastern White Cedar)	10	10	---	---	---	---	---	---	Good	No	4.0	584273.0923	4786191.166	Private	Retain
144	Quercus alba (White Oak)	60	60	---	---	---	---	---	---	Good	No	6.0	584280.2049	4786191.636	Private	Retain
145	Larix laricina (American Larch)	36	36	---	---	---	---	---	---	Poor	Yes	4.0	584274.7885	4786189.503	Private	Remove (Condition)
146	Pinus sylvestris (Scotch Pine)	30	30	---	---	---	---	---	---	Fair	No	4.0	584368.9063	4785710.46	Public	Retain
147	Pinus sylvestris (Scotch Pine)	26	26	---	---	---	---	---	---	Fair	No	4.0	584367.9082	4785705.758	Public	Retain
148	Salix fragilis (Crack Willow)	34	24	20	14	---	---	---	---	Fair	No	4.0	584367.408	4785703.889	Public	Retain
149	Pinus sylvestris (Scotch Pine)	28	28	---	---	---	---	---	---	Fair	No	4.0	584366.5332	4785702.837	Public	Retain
150	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Good	No	4.0	584364.6601	4785697.896	Private	Retain
151	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Good	No	4.0	584367.5616	4785694.108	Private	Retain
152	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584368.1162	4785691.486	Private	Retain
153	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Fair	No	4.0	584368.2432	4785691.464	Private	Retain
154	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584370.9636	4785688.125	Private	Retain
155	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584374.3953	4785681.532	Private	Retain
156	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Good	No	4.0	584376.7632	4785675.386	Private	Retain
157	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Good	No	4.0	584377.4791	4785672.211	Private	Retain
158	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584378.8138	4785671.073	Private	Retain
159	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584379.6939	4785669.958	Private	Retain
160	Pinus sylvestris (Scotch Pine)	18	18	---	---	---	---	---	---	Good	No	4.0	584380.439	4785669.28	Private	Retain
161	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584380.6306	4785667.352	Private	Retain
162	Pinus sylvestris (Scotch Pine)	18	18	---	---	---	---	---	---	Good	No	4.0	584380.3362	4785666.72	Private	Retain
163	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584381.7737	4785665.669	Private	Retain
164	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Good	No	4.0	584383.1498	4785663.723	Private	Retain
165	Pinus sylvestris (Scotch Pine)	18	18	---	---	---	---	---	---	Good	No	4.0	584383.792	4785661.663	Private	Retain
166	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584384.645	4785660.85	Private	Retain
167	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584385.9005	4785656.616	Private	Retain
168	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Good	No	4.0	584387.2713	4785657.031	Private	Retain
169	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584388.0088	4785653.817	Private	Retain
170	Pinus sylvestris (Scotch Pine)	18	18	---	---	---	---	---	---	Good	No	4.0	584388.3185	4785652.938	Private	Retain
171	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584389.6645	4785651.196	Private	Retain
172	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584389.8347	4785650.036	Private	Retain
173	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Good	No	4.0	584391.69	4785647.816	Private	Retain

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
174	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584392.9868	4785643.218	Private	Retain
175	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584395.2218	4785639.645	Private	Retain
176	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Good	No	4.0	584395.3255	4785638.642	Private	Retain
177	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Fair	No	4.0	584395.8865	4785638.713	Private	Retain
178	Gleditsia triacanthos inermis (Thornless Honey-locust)	26	26	---	---	---	---	---	---	Good	No	4.0	584394.7456	4785636.308	Private	Retain
179	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584396.9324	4785636.715	Private	Retain
180	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584397.0182	4785640.649	Public	Retain
181	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584395.8601	4785645.544	Public	Retain
182	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584394.4564	4785646.478	Public	Retain
183	Pinus sylvestris (Scotch Pine)	26	26	---	---	---	---	---	---	Good	No	4.0	584394.3356	4785648.924	Public	Retain
184	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584393.4137	4785647.024	Public	Retain
185	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Good	No	4.0	584392.9775	4785649.451	Public	Retain
186	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Good	No	4.0	584392.3183	4785650.749	Public	Retain
187	Pinus sylvestris (Scotch Pine)	32	32	---	---	---	---	---	---	Good	No	4.0	584392.0914	4785652.054	Public	Retain
188	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584399.0912	4785629.19	Private	Retain
189	Pinus sylvestris (Scotch Pine)	18	18	---	---	---	---	---	---	Good	No	4.0	584399.2604	4785627.362	Private	Retain
190	Gleditsia triacanthos inermis (Thornless Honey-locust)	28	28	---	---	---	---	---	---	Good	No	4.0	584397.655	4785627.75	Private	Retain
191	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584399.5275	4785625.545	Private	Retain
192	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584399.4224	4785623.99	Private	Retain
193	Pinus sylvestris (Scotch Pine)	18	18	---	---	---	---	---	---	Good	No	4.0	584398.7621	4785622.63	Private	Retain
194	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584399.4174	4785619.566	Private	Retain
195	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584399.2181	4785616.341	Private	Retain
196	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584399.156	4785614.569	Private	Retain
197	Pinus sylvestris (Scotch Pine)	16	16	---	---	---	---	---	---	Good	No	4.0	584399.4274	4785613.232	Private	Retain
198	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584399.6402	4785610.973	Private	Retain
199	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584399.2219	4785607.163	Private	Retain
200	Pinus sylvestris (Scotch Pine)	26	26	---	---	---	---	---	---	Good	No	4.0	584399.7136	4785605.332	Private	Retain
201	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584399.4435	4785604.575	Private	Retain
202	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Fair	No	4.0	584399.9274	4785601.816	Private	Retain
203	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584400.321	4785599.802	Private	Retain
204	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584400.2512	4785596.952	Private	Retain
205	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584400.5397	4785596.125	Private	Retain
206	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584400.46	4785591.716	Private	Retain
207	Pinus sylvestris (Scotch Pine)	26	26	---	---	---	---	---	---	Good	No	4.0	584400.6604	4785588.612	Private	Retain
208	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584399.9579	4785587.156	Private	Retain

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
209	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Good	No	4.0	584400.9816	4785586.309	Private	Retain
210	Pinus sylvestris (Scotch Pine)	26	26	---	---	---	---	---	---	Good	No	4.0	584400.6458	4785584.886	Private	Retain
211	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584400.7242	4785584.077	Private	Retain
212	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584400.7404	4785583.187	Private	Retain
213	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584400.8037	4785581.173	Private	Retain
214	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584400.5857	4785579.461	Private	Retain
215	Pinus sylvestris (Scotch Pine)	16	16	---	---	---	---	---	---	Good	No	4.0	584401.0142	4785574.538	Private	Retain
216	Pinus sylvestris (Scotch Pine)	30	30	---	---	---	---	---	---	Fair	No	4.0	584400.625	4785573.216	Private	Retain
217	Acer platanoides (Norway Maple)	20	20	---	---	---	---	---	---	Fair	No	4.0	584400.9546	4785572.089	Private	Retain
218	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Fair	No	4.0	584400.5626	4785570.099	Private	Retain
219	Pinus sylvestris (Scotch Pine)	26	26	---	---	---	---	---	---	Good	No	4.0	584400.0982	4785566.341	Private	Retain
220	Acer platanoides (Norway Maple)	13	13	---	---	---	---	---	---	Fair	No	4.0	584406.1008	4785560.673	Public	Retain
221	Acer platanoides (Norway Maple)	22	22	---	---	---	---	---	---	Fair	No	4.0	584399.9864	4785561.773	Private	Retain
222	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Fair	No	4.0	584399.1601	4785558.186	Private	Retain
223	Pinus sylvestris (Scotch Pine)	30	30	---	---	---	---	---	---	Fair	No	4.0	584400.1374	4785552.807	Private	Retain
224	Pinus sylvestris (Scotch Pine)	18	18	---	---	---	---	---	---	Good	No	4.0	584400.3187	4785550.487	Private	Retain
225	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584401.1655	4785547.789	Private	Retain
226	Gleditsia triacanthos inermis (Thornless Honey-locust)	18	18	---	---	---	---	---	---	Good	No	4.0	584440.1489	4785559.702	Public	Retain
227	Thuja occidentalis (Eastern White Cedar)	10	10	---	---	---	---	---	---	Good	No	4.0	584441.4823	4785566.68	Private	Retain
228	Liriodendron tulipifera (Tulip Tree)	16	16	---	---	---	---	---	---	Good	No	4.0	584438.302	4785572.335	Public	Retain
229	Liriodendron tulipifera (Tulip Tree)	17	17	---	---	---	---	---	---	Good	No	4.0	584435.2363	4785578.914	Public	Retain
230	Liriodendron tulipifera (Tulip Tree)	18	18	---	---	---	---	---	---	Good	No	4.0	584437.6431	4785586.446	Public	Retain
231	Malus pumila (Common Apple)	17	10	10	10	---	---	---	---	Good	No	4.0	584440.2628	4785585.642	Public	Retain
232	Acer saccharinum (Silver Maple)	76	76	---	---	---	---	---	---	Good	No	8.0	584434.8598	4785596.66	Public	Retain
233	Picea abies (Norway Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584438.0236	4785622.302	Private	Retain
234	Fagus grandifolia (American Beech)	20	20	---	---	---	---	---	---	Good	No	4.0	584438.1114	4785625.889	Private	Retain
235	Styphnolobium japonicum (Japanese pagoda)	17	10	10	10	---	---	---	---	Good	No	4.0	584432.6079	4785624.105	Public	Retain
236	Acer saccharinum (Silver Maple)	57	32	28	26	24	12	---	---	Fair	No	6.0	584427.9116	4785637.624	Public	Retain
237	Acer negundo (Manitoba Maple)	24	24	---	---	---	---	---	---	Good	No	4.0	584432.6154	4785644.774	Public	Retain
238	Celtis occidentalis (Common Hackberry)	18	18	---	---	---	---	---	---	Good	No	4.0	584425.2848	4785655.664	Public	Retain
239	Celtis occidentalis (Common Hackberry)	11	11	---	---	---	---	---	---	Good	No	4.0	584421.4792	4785667.555	Public	Retain
240	Acer saccharum (Sugar Maple)	10	10	---	---	---	---	---	---	Fair	No	4.0	584426.236	4785677.775	Private	Retain
241	Celtis occidentalis (Common Hackberry)	10	10	---	---	---	---	---	---	Good	No	4.0	584418.8206	4785680.971	Public	Retain
242	Acer x freemanii (Freeman's Maple)	16	12	10	---	---	---	---	---	Fair	No	4.0	584423.449	4785689.9	Private	Retain
243	Acer negundo (Manitoba Maple)	13	13	---	---	---	---	---	---	Good	No	4.0	584412.0321	4785709.157	Public	Retain

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
244	Acer platanoides (Norway Maple)	10	10	---	---	---	---	---	---	Good	No	4.0	584417.0621	4785710.207	Private	Retain
245	Acer platanoides (Norway Maple)	10	10	---	---	---	---	---	---	Good	No	4.0	584415.2458	4785714.034	Private	Retain
246	Salix fragilis (Crack Willow)	53	36	20	18	18	16	10	10	Fair	No	6.0	584409.4153	4785718.089	Public	Retain
247	Acer negundo (Manitoba Maple)	23	18	14	---	---	---	---	---	Fair	No	4.0	584406.4085	4785710.415	Public	Retain
248	Acer negundo (Manitoba Maple)	22	18	12	---	---	---	---	---	Fair	No	4.0	584402.9144	4785711.361	Public	Retain
249	Gymnocladus dioicus (Kentucky Coffee-tree)	14	14	---	---	---	---	---	---	Good	No	4.0	584403.2176	4785725.67	Public	Retain
250	Picea pungens (Blue Spruce)	12	12	---	---	---	---	---	---	Good	No	4.0	584407.5184	4785731.822	Private	Retain
251	Celtis occidentalis (Common Hackberry)	20	20	---	---	---	---	---	---	Good	No	4.0	584397.0033	4785728.531	Public	Retain
252	Celtis occidentalis (Common Hackberry)	14	14	---	---	---	---	---	---	Good	No	4.0	584398.0398	4785735.273	Public	Retain
253	Gymnocladus dioicus (Kentucky Coffee-tree)	14	14	---	---	---	---	---	---	Good	No	4.0	584393.8815	4785734.255	Public	Retain
254	Gymnocladus dioicus (Kentucky Coffee-tree)	10	10	---	---	---	---	---	---	Good	No	4.0	584395.9936	4785739.914	Public	Retain
255	Picea pungens (Blue Spruce)	12	12	---	---	---	---	---	---	Good	No	4.0	584402.9252	4785743.293	Private	Retain
256	Picea pungens (Blue Spruce)	12	12	---	---	---	---	---	---	Good	No	4.0	584405.4191	4785739.919	Private	Retain
257	Ulmus sp. (Elm species)	22	16	12	10	---	---	---	---	Fair	No	4.0	584387.9517	4785727.125	Public	Retain
258	Tilia cordata (Little-leaf Linden)	18	18	---	---	---	---	---	---	Good	No	4.0	584436.8571	4785553.512	Public	Retain
259	Picea glauca (White Spruce)	24	24	---	---	---	---	---	---	Good	No	4.0	584440.8504	4785550.236	Private	Retain
260	Picea pungens (Blue Spruce)	20	20	---	---	---	---	---	---	Good	No	4.0	584439.2699	4785544.994	Private	Retain
261	Tilia cordata (Little-leaf Linden)	20	20	---	---	---	---	---	---	Good	No	4.0	584434.8264	4785543.522	Public	Retain
262	Cercis canadensis (Eastern Redbud)	12	12	---	---	---	---	---	---	Good	No	4.0	584430.6391	4785535.52	Public	Retain
263	Tilia cordata (Little-leaf Linden)	22	22	---	---	---	---	---	---	Good	No	4.0	584432.9768	4785527.917	Public	Retain
264	Quercus macrocarpa (Bur Oak)	22	22	---	---	---	---	---	---	Good	No	4.0	584430.8723	4785520.878	Public	Retain
265	Quercus macrocarpa (Bur Oak)	24	24	---	---	---	---	---	---	Good	No	4.0	584431.3766	4785514.92	Public	Retain
266	Quercus macrocarpa (Bur Oak)	25	25	---	---	---	---	---	---	Good	No	4.0	584430.9657	4785508.872	Public	Retain
267	Zelcova serrate (Japanese Zelkova)	30	30	---	---	---	---	---	---	Good	No	4.0	584429.513	4785500.342	Public	Retain
268	Zelcova serrate (Japanese Zelkova)	32	32	---	---	---	---	---	---	Good	No	4.0	584426.0967	4785493.018	Public	Remove (CRZ)
269	Zelcova serrate (Japanese Zelkova)	29	29	---	---	---	---	---	---	Good	No	4.0	584427.299	4785486.9	Public	Retain
270	Acer saccharinum (Silver Maple)	36	36	---	---	---	---	---	---	Poor	Yes	4.0	584424.8163	4785474.741	Public	Remove (Condition and CRZ)
271	Ulmus sp. (Elm species)	11	11	---	---	---	---	---	---	Good	No	4.0	584425.4341	4785463.593	Public	Retain
272	Alnus glutinosa (European Alder)	10	10	---	---	---	---	---	---	Fair	No	4.0	584421.272	4785459.583	Public	Remove (CRZ)
273	Picea pungens (Blue Spruce)	18	18	---	---	---	---	---	---	Good	No	4.0	584430.9614	4785444.433	Private	Retain
274	Picea pungens (Blue Spruce)	14	14	---	---	---	---	---	---	Good	No	4.0	584431.6784	4785441.636	Private	Retain
275	Picea pungens (Blue Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584429.2878	4785441.789	Private	Retain
276	Picea pungens (Blue Spruce)	20	20	---	---	---	---	---	---	Good	No	4.0	584429.1279	4785439.416	Private	Retain
277	Ulmus sp. (Elm species)	34	34	---	---	---	---	---	---	Good	No	4.0	584422.8957	4785438.799	Public	Retain
278	Picea pungens (Blue Spruce)	23	20	12	---	---	---	---	---	Fair	No	4.0	584428.4915	4785433.603	Private	Retain

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
279	Picea pungens (Blue Spruce)	18	18	---	---	---	---	---	---	Good	No	4.0	584428.4842	4785431.405	Private	Retain
280	Ulmus sp. (Elm species)	34	34	---	---	---	---	---	---	Good	No	4.0	584422.6129	4785428.698	Public	Retain
281	Aesculus hippocastanum (Horse Chestnut)	20	20	---	---	---	---	---	---	Good	No	4.0	584427.8899	4785426.435	Private	Retain
282	Picea pungens (Blue Spruce)	24	24	---	---	---	---	---	---	Good	No	4.0	584427.8832	4785424.15	Private	Retain
283	Picea pungens (Blue Spruce)	20	20	---	---	---	---	---	---	Good	No	4.0	584428.1842	4785422.008	Private	Retain
284	Picea pungens (Blue Spruce)	14	14	---	---	---	---	---	---	Good	No	4.0	584429.9943	4785421.288	Private	Retain
285	Picea pungens (Blue Spruce)	20	20	---	---	---	---	---	---	Good	No	4.0	584428.474	4785419.371	Private	Retain
286	Taxodium distichum (Baldcypress)	16	16	---	---	---	---	---	---	Good	No	4.0	584428.8393	4785416.945	Private	Retain
287	Taxodium distichum (Baldcypress)	14	14	---	---	---	---	---	---	Good	No	4.0	584428.7875	4785416.056	Private	Retain
288	Acer saccharinum (Silver Maple)	84	84	---	---	---	---	---	---	Fair	No	9.0	584422.4753	4785415.297	Public	Remove (CRZ)
289	Picea pungens (Blue Spruce)	26	26	---	---	---	---	---	---	Fair	No	4.0	584389.5176	4785427.907	Private	Retain
290	Picea pungens (Blue Spruce)	28	28	---	---	---	---	---	---	Good	No	4.0	584386.2639	4785427.176	Private	Retain
291	Picea pungens (Blue Spruce)	30	30	---	---	---	---	---	---	Good	No	4.0	584390.0584	4785440.673	Private	Retain
292	Juniperus virginiana (Eastern Red Cedar)	18	18	---	---	---	---	---	---	Good	No	4.0	584390.0471	4785442.556	Private	Retain
293	Picea pungens (Blue Spruce)	28	28	---	---	---	---	---	---	Fair	No	4.0	584389.3807	4785446.113	Private	Retain
294	Picea pungens (Blue Spruce)	26	26	---	---	---	---	---	---	Good	No	4.0	584393.6583	4785447.271	Private	Retain
295	Pinus sylvestris (Scotch Pine)	30	30	---	---	---	---	---	---	Fair	No	4.0	584394.6851	4785451.879	Private	Retain
296	Picea pungens (Blue Spruce)	20	20	---	---	---	---	---	---	Fair	No	4.0	584394.9324	4785454.348	Private	Retain
297	Pinus sylvestris (Scotch Pine)	32	32	---	---	---	---	---	---	Good	No	4.0	584396.0113	4785455.877	Private	Retain
298	Picea pungens (Blue Spruce)	26	26	---	---	---	---	---	---	Good	No	4.0	584395.9589	4785457.815	Private	Retain
299	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584396.3793	4785460.572	Private	Retain
300	Picea pungens (Blue Spruce)	20	20	---	---	---	---	---	---	Good	No	4.0	584396.5094	4785462.475	Private	Retain
301	Pinus sylvestris (Scotch Pine)	32	32	---	---	---	---	---	---	Good	No	4.0	584396.9274	4785463.717	Private	Retain
302	Picea pungens (Blue Spruce)	24	24	---	---	---	---	---	---	Good	No	4.0	584396.4545	4785464.964	Private	Retain
303	Pinus sylvestris (Scotch Pine)	34	34	---	---	---	---	---	---	Good	No	4.0	584397.0921	4785467.209	Private	Retain
304	Picea pungens (Blue Spruce)	28	28	---	---	---	---	---	---	Good	No	4.0	584397.1118	4785469.445	Private	Retain
305	Picea pungens (Blue Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584396.4951	4785472.32	Private	Retain
306	Picea pungens (Blue Spruce)	36	36	---	---	---	---	---	---	Good	No	4.0	584395.5318	4785476.494	Private	Retain
307	Picea pungens (Blue Spruce)	32	32	---	---	---	---	---	---	Good	No	4.0	584397.2679	4785481.106	Private	Retain
308	Picea pungens (Blue Spruce)	18	18	---	---	---	---	---	---	Good	No	4.0	584397.5889	4785484.422	Private	Retain
309	Picea pungens (Blue Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584398.0142	4785486.482	Private	Retain
310	Picea pungens (Blue Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584398.1719	4785488.719	Private	Retain
311	Picea pungens (Blue Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584398.3972	4785490.145	Private	Retain
312	Picea pungens (Blue Spruce)	14	14	---	---	---	---	---	---	Good	No	4.0	584398.186	4785491.067	Private	Retain
313	Picea pungens (Blue Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584398.6724	4785492.722	Private	Retain

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
314	Pinus sylvestris (Scotch Pine)	26	26	---	---	---	---	---	---	Fair	No	4.0	584395.0919	4785493.758	Private	Retain
315	Picea pungens (Blue Spruce)	20	20	---	---	---	---	---	---	Good	No	4.0	584398.8859	4785494.586	Private	Retain
316	Picea pungens (Blue Spruce)	24	24	---	---	---	---	---	---	Good	No	4.0	584398.6525	4785495.99	Private	Retain
317	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Fair	No	4.0	584396.1804	4785496.159	Private	Retain
318	Picea pungens (Blue Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584398.6815	4785496.909	Private	Retain
319	Picea pungens (Blue Spruce)	24	24	---	---	---	---	---	---	Good	No	4.0	584398.4689	4785497.912	Private	Retain
320	Picea pungens (Blue Spruce)	14	14	---	---	---	---	---	---	Good	No	4.0	584397.1684	4785499.344	Private	Retain
321	Picea pungens (Blue Spruce)	26	26	---	---	---	---	---	---	Good	No	4.0	584398.8933	4785500.902	Private	Retain
322	Picea pungens (Blue Spruce)	26	26	---	---	---	---	---	---	Good	No	4.0	584398.4535	4785502.666	Private	Retain
323	Picea pungens (Blue Spruce)	20	20	---	---	---	---	---	---	Good	No	4.0	584396.1492	4785507.682	Private	Retain
324	Picea pungens (Blue Spruce)	24	24	---	---	---	---	---	---	Good	No	4.0	584399.2778	4785506.651	Private	Retain
325	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Fair	No	4.0	584398.685	4785512.056	Private	Retain
326	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584399.5066	4785513.848	Private	Retain
327	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Fair	No	4.0	584399.3079	4785515.555	Private	Retain
328	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584399.5359	4785517.612	Private	Retain
329	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584399.4823	4785520.131	Private	Retain
330	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584400.0117	4785522.501	Private	Retain
331	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Fair	No	4.0	584400.0432	4785525.203	Private	Retain
332	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584399.6051	4785527.617	Private	Retain
333	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584399.5312	4785531.176	Private	Retain
334	Acer platanoides (Norway Maple)	22	22	---	---	---	---	---	---	Fair	No	4.0	584406.4521	4785532.24	Public	Retain
335	Pinus sylvestris (Scotch Pine)	18	18	---	---	---	---	---	---	Good	No	4.0	584400.0628	4785534.442	Private	Retain
336	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584400.1758	4785536.194	Private	Retain
337	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584400.664	4785537.903	Private	Retain
338	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584400.8386	4785539.289	Private	Retain
339	Pinus sylvestris (Scotch Pine)	22	22	---	---	---	---	---	---	Good	No	4.0	584400.4286	4785540.921	Private	Retain
340	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Fair	No	4.0	584399.0963	4785542.919	Private	Retain
341	Gleditsia triacanthos (Honey-locust)	19	12	10	10	---	---	---	---	Good	No	4.0	584388.23	4785407.315	Public	Retain
342	Picea glauca (White Spruce)	22	22	---	---	---	---	---	---	Good	No	4.0	584384.6882	4785403.089	Public	Retain
343	Cercis canadensis (Eastern Redbud)	16	16	---	---	---	---	---	---	Good	No	4.0	584384.2852	4785401.72	Public	Retain
344	Pinus sylvestris (Scotch Pine)	26	26	---	---	---	---	---	---	Fair	No	4.0	584384.4312	4785392.808	Private	Retain
345	Juglans nigra (Black Walnut)	30	30	---	---	---	---	---	---	Fair	No	4.0	584390.4533	4785394.131	Public	Retain
346	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Fair	No	4.0	584385.42	4785390.157	Private	Retain
347	Pinus sylvestris (Scotch Pine)	28	28	---	---	---	---	---	---	Good	No	4.0	584386.6652	4785385.578	Private	Retain
348	Picea glauca (White Spruce)	38	38	---	---	---	---	---	---	Good	No	4.0	584388.1222	4785381.589	Private	Retain

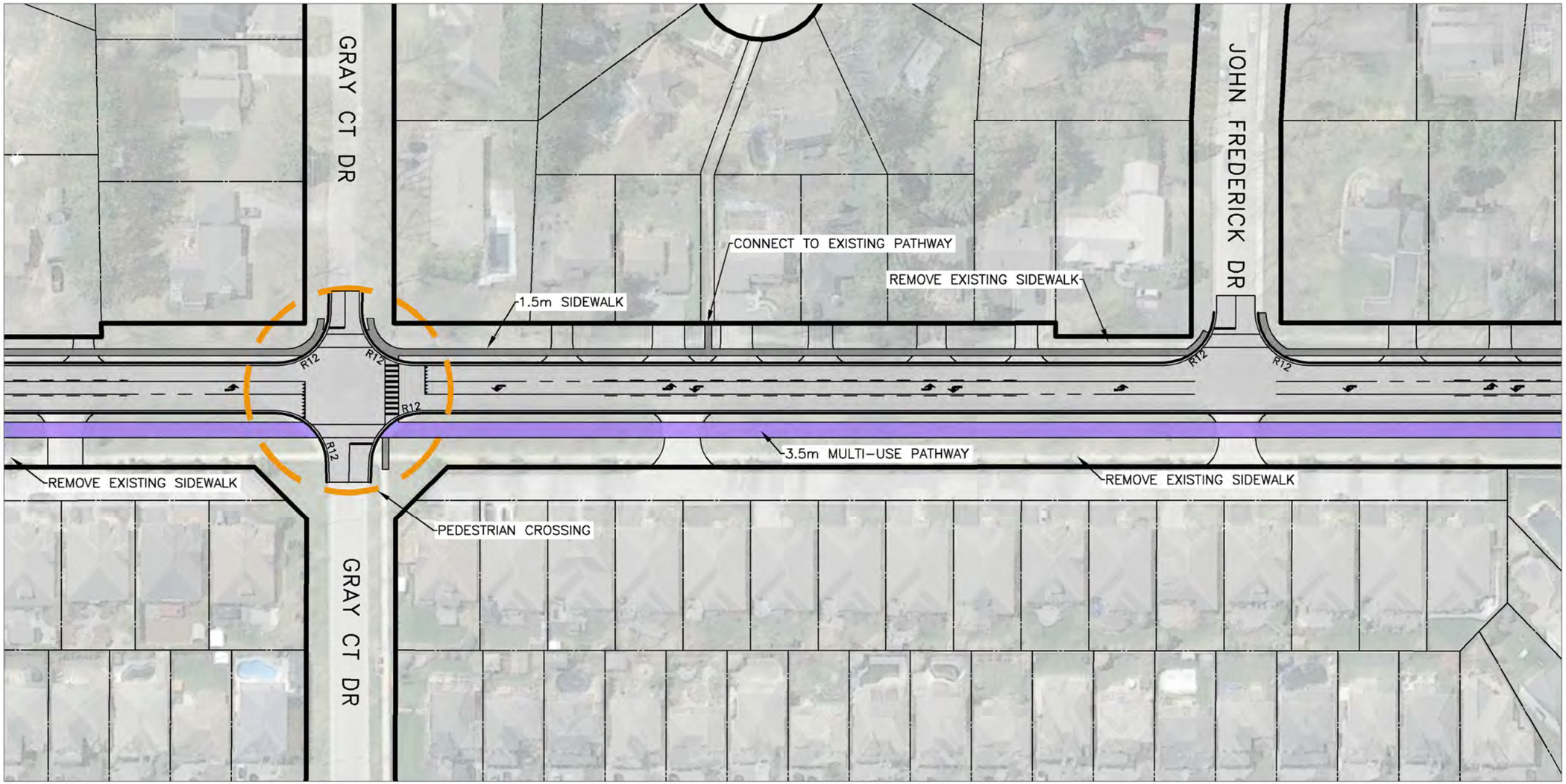
Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
349	Picea glauca (White Spruce)	32	32	---	---	---	---	---	---	Good	No	4.0	584384.8678	4785381.006	Private	Retain
350	Picea glauca (White Spruce)	30	30	---	---	---	---	---	---	Good	No	4.0	584385.0008	4785377.835	Private	Retain
351	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Good	No	4.0	584390.3355	4785374.097	Private	Retain
352	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584390.7012	4785371.719	Private	Retain
353	Pinus sylvestris (Scotch Pine)	26	26	---	---	---	---	---	---	Good	No	4.0	584389.7728	4785366.224	Private	Retain
354	Celtis occidentalis (Common Hackberry)	13	13	---	---	---	---	---	---	Good	No	4.0	584417.3423	4785405.051	Public	Remove (CRZ)
355	Celtis occidentalis (Common Hackberry)	20	20	---	---	---	---	---	---	Good	No	4.0	584421.2803	4785398.162	Public	Remove (CRZ)
356	Acer x freemanii (Freeman's Maple)	40	30	20	18	---	---	---	---	Fair	No	5.0	584419.94	4785393.093	Public	Remove (CRZ)
357	Celtis occidentalis (Common Hackberry)	22	22	---	---	---	---	---	---	Good	No	4.0	584422.6637	4785391.191	Public	Retain
358	Quercus alba (White Oak)	20	20	---	---	---	---	---	---	Good	No	4.0	584418.7914	4785384.339	Public	Remove (CRZ)
359	Liriodendron tulipifera (Tulip Tree)	26	26	---	---	---	---	---	---	Good	No	4.0	584424.6448	4785380.4	Public	Retain
360	Quercus alba (White Oak)	12	12	---	---	---	---	---	---	Good	No	4.0	584430.4066	4785380.023	Private	Retain
361	Liriodendron tulipifera (Tulip Tree)	14	14	---	---	---	---	---	---	Good	No	4.0	584419.8209	4785372.329	Public	Remove (CRZ)
362	Quercus macrocarpa (Bur Oak)	20	20	---	---	---	---	---	---	Good	No	4.0	584424.6248	4785367.711	Public	Retain
363	Picea glauca (White Spruce)	15	15	---	---	---	---	---	---	Good	No	4.0	584432.7053	4785364.544	Private	Retain
364	Picea glauca (White Spruce)	12	12	---	---	---	---	---	---	Good	No	4.0	584433.0247	4785360.907	Private	Retain
365	Picea glauca (White Spruce)	17	14	10	---	---	---	---	---	Good	No	4.0	584433.3386	4785359.011	Private	Retain
366	Picea glauca (White Spruce)	12	12	---	---	---	---	---	---	Fair	No	4.0	584434.2502	4785354.59	Private	Retain
367	Quercus alba (White Oak)	18	18	---	---	---	---	---	---	Good	No	4.0	584427.1546	4785358.436	Public	Retain
368	Quercus macrocarpa (Bur Oak)	10	10	---	---	---	---	---	---	Good	No	4.0	584424.0354	4785350.375	Public	Remove (CRZ)
369	Acer negundo (Manitoba Maple)	26	26	---	---	---	---	---	---	Fair	No	4.0	584432.1986	4785350.475	Public	Retain
370	Picea glauca (White Spruce)	15	15	---	---	---	---	---	---	Good	No	4.0	584436.4121	4785350.103	Private	Retain
371	Acer negundo (Manitoba Maple)	32	32	---	---	---	---	---	---	Fair	No	4.0	584424.458	4785342.473	Public	Remove (CRZ)
372	Fraxinus americana (White Ash)	21	16	14	---	---	---	---	---	Poor	Yes	4.0	584427.7097	4785338.516	Public	Remove (Condition and CRZ)
373	Acer negundo (Manitoba Maple)	30	30	---	---	---	---	---	---	Fair	No	4.0	584428.4465	4785332.961	Public	Remove (CRZ)
374	Populus tremuloides (Trembling Aspen)	31	24	20	---	---	---	---	---	Fair	No	4.0	584427.7728	4785330.364	Public	Remove (CRZ)
375	Ostrya virginiana (Eastern Hop-hornbeam)	11	11	---	---	---	---	---	---	Good	No	4.0	584432.0109	4785328.161	Public	Remove (CRZ)
376	Fraxinus americana (White Ash)	28	28	---	---	---	---	---	---	Fair	No	4.0	584427.1604	4785323.753	Public	Remove (CRZ)
377	Acer platanoides (Norway Maple)	24	20	14	---	---	---	---	---	Fair	No	4.0	584434.4209	4785323.666	Public	Retain
378	Acer platanoides (Norway Maple)	29	24	16	---	---	---	---	---	Fair	No	4.0	584432.3657	4785318.127	Public	Remove (CRZ)
379	Acer platanoides (Norway Maple)	10	10	---	---	---	---	---	---	Fair	No	4.0	584430.7663	4785319.561	Public	Remove (CRZ)
380	Acer platanoides (Norway Maple)	14	14	---	---	---	---	---	---	Good	No	4.0	584430.5465	4785318.351	Public	Remove (CRZ)
381	Acer platanoides (Norway Maple)	35	26	24	---	---	---	---	---	Fair	No	4.0	584430.1985	4785317.832	Public	Remove (CRZ)
382	Acer negundo (Manitoba Maple)	16	16	---	---	---	---	---	---	Fair	No	4.0	584429.7469	4785315.799	Public	Remove (CRZ)
383	Acer negundo (Manitoba Maple)	12	12	---	---	---	---	---	---	Fair	No	4.0	584429.3158	4785314.517	Public	Remove (CRZ)

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
384	Acer platanoides (Norway Maple)	22	22	---	---	---	---	---	---	Good	No	4.0	584430.1653	4785315.273	Public	Remove (CRZ)
385	Acer negundo (Manitoba Maple)	16	16	---	---	---	---	---	---	Good	No	4.0	584429.7192	4785315.788	Public	Remove (CRZ)
386	Acer platanoides (Norway Maple)	16	16	---	---	---	---	---	---	Fair	No	4.0	584430.2606	4785315.344	Public	Remove (CRZ)
387	Acer negundo (Manitoba Maple)	20	20	---	---	---	---	---	---	Fair	No	4.0	584432.4147	4785313.401	Public	Remove (CRZ)
388	Acer platanoides (Norway Maple)	24	24	---	---	---	---	---	---	Good	No	4.0	584432.9353	4785310.84	Public	Remove (CRZ)
389	Acer negundo (Manitoba Maple)	48	34	30	16	---	---	---	---	Poor	Yes	5.0	584434.1482	4785310.445	Public	Remove (Condition and CRZ)
390	Acer platanoides (Norway Maple)	12	12	---	---	---	---	---	---	Good	No	4.0	584435.9993	4785309.877	Public	Remove (CRZ)
391	Prunus serotina (Wild Black Cherry)	60	42	40	16	---	---	---	---	Poor	Yes	6.0	584434.3166	4785308.745	Public	Remove (Condition and CRZ)
392	Acer platanoides (Norway Maple)	12	12	---	---	---	---	---	---	Fair	No	4.0	584432.9193	4785307.571	Public	Remove (CRZ)
393	Ulmus sp. (Elm species)	26	26	---	---	---	---	---	---	Good	No	4.0	584431.6825	4785304.158	Public	Remove (CRZ)
394	Acer platanoides (Norway Maple)	24	24	---	---	---	---	---	---	Fair	No	4.0	584433.4467	4785306.291	Public	Remove (CRZ)
395	Acer platanoides (Norway Maple)	20	20	---	---	---	---	---	---	Fair	No	4.0	584436.5781	4785307.47	Public	Remove (CRZ)
396	Magnolia × soulangeana (Saucer Magnolia)	10	10	---	---	---	---	---	---	Good	No	4.0	584443.8368	4785309.288	Private	Retain
397	Picea pungens (Blue Spruce)	14	14	---	---	---	---	---	---	Good	No	4.0	584442.631	4785319.91	Private	Retain
398	Ulmus sp. (Elm species)	22	22	---	---	---	---	---	---	Good	No	4.0	584435.7049	4785298.742	Public	Remove (CRZ)
399	Syringa reticulata ssp. reticulata (Japanese Tree Lilac)	20	20	---	---	---	---	---	---	Good	No	4.0	584443.5699	4785303.973	Public	Retain
400	Ulmus sp. (Elm species)	35	26	24	---	---	---	---	---	Fair	No	4.0	584437.9784	4785296.196	Public	Remove (CRZ)
401	Ulmus sp. (Elm species)	34	26	22	---	---	---	---	---	Fair	No	4.0	584438.4123	4785294.836	Public	Remove (CRZ)
402	Ulmus sp. (Elm species)	32	28	16	---	---	---	---	---	Fair	No	4.0	584435.6156	4785291.31	Public	Remove (CRZ)
403	Acer negundo (Manitoba Maple)	24	24	---	---	---	---	---	---	Fair	No	4.0	584437.5713	4785287.137	Public	Remove (CRZ)
404	Acer negundo (Manitoba Maple)	33	24	22	---	---	---	---	---	Fair	No	4.0	584437.6137	4785286.586	Public	Remove (CRZ)
405	Picea abies (Norway Spruce)	20	20	---	---	---	---	---	---	Good	No	4.0	584442.3001	4785289.291	Public	Retain
406	Picea abies (Norway Spruce)	12	12	---	---	---	---	---	---	Good	No	4.0	584440.5503	4785292.122	Public	Remove (CRZ)
407	Thuja occidentalis (Eastern White Cedar)	10	10	---	---	---	---	---	---	Good	No	4.0	584451.126	4785274.348	Private	Retain
408	Thuja occidentalis (Eastern White Cedar)	10	10	---	---	---	---	---	---	Good	No	4.0	584451.3969	4785273.053	Private	Retain
409	Thuja occidentalis (Eastern White Cedar)	10	10	---	---	---	---	---	---	Good	No	4.0	584451.3921	4785271.855	Public	Retain
410	Thuja occidentalis (Eastern White Cedar)	10	10	---	---	---	---	---	---	Good	No	4.0	584451.8009	4785270.73	Public	Retain
411	Thuja occidentalis (Eastern White Cedar)	10	10	---	---	---	---	---	---	Good	No	4.0	584453.5754	4785264.744	Private	Retain
412	Sorbus x hybrida (Oakleaf Mountain Ash)	11	11	---	---	---	---	---	---	Good	No	4.0	584442.2427	4785280.137	Public	Remove (CRZ)
413	Sorbus x hybrida (Oakleaf Mountain Ash)	18	18	---	---	---	---	---	---	Good	No	4.0	584443.5014	4785268.518	Public	Remove (CRZ)
414	Celtis occidentalis (Common Hackberry)	20	20	---	---	---	---	---	---	Good	No	4.0	584449.2554	4785264.074	Public	Retain
415	Celtis occidentalis (Common Hackberry)	12	12	---	---	---	---	---	---	Good	No	4.0	584452.7179	4785253.163	Public	Retain
416	Gleditsia triacanthos (Honey-locust)	70	70	---	---	---	---	---	---	Good	No	7.0	584432.2788	4785221.471	Public	Retain
417	Gleditsia triacanthos (Honey-locust)	43	43	---	---	---	---	---	---	Good	No	5.0	584430.7155	4785227.855	Public	Retain
418	Gleditsia triacanthos (Honey-locust)	58	58	---	---	---	---	---	---	Good	No	6.0	584430.0471	4785238.829	Public	Retain

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
419	Gleditsia triacanthos (Honey-locust)	64	64	---	---	---	---	---	---	Good	No	7.0	584425.8344	4785247.248	Public	Retain
420	Gleditsia triacanthos (Honey-locust)	64	64	---	---	---	---	---	---	Good	No	7.0	584425.8061	4785249.322	Public	Retain
421	Gleditsia triacanthos (Honey-locust)	60	60	---	---	---	---	---	---	Good	No	6.0	584426.0405	4785250.58	Public	Retain
422	Gleditsia triacanthos (Honey-locust)	51	51	---	---	---	---	---	---	Fair	No	6.0	584425.8118	4785251.895	Public	Retain
423	Gleditsia triacanthos (Honey-locust)	35	35	---	---	---	---	---	---	Fair	No	4.0	584425.5099	4785254.858	Public	Retain
424	Populus tremuloides (Trembling Aspen)	16	16	---	---	---	---	---	---	Good	No	4.0	584422.0205	4785257.212	Private	Retain
425	Gleditsia triacanthos (Honey-locust)	66	66	---	---	---	---	---	---	Good	No	7.0	584423.9084	4785259.408	Private	Retain
426	Gleditsia triacanthos (Honey-locust)	52	52	---	---	---	---	---	---	Fair	No	6.0	584423.7498	4785261.15	Private	Retain
427	Gleditsia triacanthos (Honey-locust)	80	80	---	---	---	---	---	---	Good	No	8.0	584420.5707	4785274.118	Private	Retain
428	Picea pungens (Blue Spruce)	42	42	---	---	---	---	---	---	Good	No	5.0	584416.406	4785292.198	Private	Retain
429	Pinus strobus (Eastern White Pine)	68	60	32	---	---	---	---	---	Fair	No	7.0	584411.2893	4785292.988	Private	Retain
430	Larix laricina (American Larch)	54	54	---	---	---	---	---	---	Good	No	6.0	584412.8626	4785299.359	Private	Retain
431	Picea pungens (Blue Spruce)	20	20	---	---	---	---	---	---	Good	No	4.0	584412.9756	4785301.905	Private	Retain
432	Prunus avium (Sweet Cherry)	33	22	18	16	---	---	---	---	Poor	No	4.0	584410.4611	4785307.199	Public	Remove (Condition)
433	Indeterminable	24	24	---	---	---	---	---	---	Fair	No	4.0	584409.4322	4785313.041	Public	Retain
434	Indeterminable	14	14	---	---	---	---	---	---	Good	No	4.0	584407.9246	4785316.731	Public	Retain
435	Picea glauca (White Spruce)	26	26	---	---	---	---	---	---	Good	No	4.0	584399.2687	4785331.172	Private	Retain
436	Picea glauca (White Spruce)	20	20	---	---	---	---	---	---	Good	No	4.0	584396.6108	4785330.739	Private	Retain
437	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Fair	No	4.0	584397.1812	4785341.808	Private	Retain
438	Pinus sylvestris (Scotch Pine)	28	28	---	---	---	---	---	---	Good	No	4.0	584393.8657	4785344.115	Private	Retain
439	Pinus sylvestris (Scotch Pine)	30	30	---	---	---	---	---	---	Fair	No	4.0	584396.8871	4785345.489	Private	Retain
440	Pinus sylvestris (Scotch Pine)	24	24	---	---	---	---	---	---	Good	No	4.0	584393.5788	4785346.409	Private	Retain
441	Pinus sylvestris (Scotch Pine)	20	20	---	---	---	---	---	---	Dead	Yes	4.0	584396.5488	4785347.31	Private	Remove (Condition)
442	Pinus sylvestris (Scotch Pine)	28	28	---	---	---	---	---	---	Fair	No	4.0	584393.3804	4785348.609	Private	Retain
443	Picea glauca (White Spruce)	28	28	---	---	---	---	---	---	Good	No	4.0	584395.1819	4785354.294	Private	Retain
444	Picea glauca (White Spruce)	32	32	---	---	---	---	---	---	Good	No	4.0	584391.9534	4785353.448	Private	Retain
445	Picea glauca (White Spruce)	30	30	---	---	---	---	---	---	Good	No	4.0	584394.4267	4785356.511	Private	Retain
446	Picea glauca (White Spruce)	16	16	---	---	---	---	---	---	Fair	No	4.0	584392.2243	4785356.1	Private	Retain
447	Picea glauca (White Spruce)	14	14	---	---	---	---	---	---	Dead	Yes	4.0	584390.9825	4785355.888	Private	Remove (Condition)
448	Gleditsia triacanthos inermis (Thornless Honey-locust)	24	24	---	---	---	---	---	---	Good	No	4.0	584483.4696	4785221.639	Public	Retain
449	Gleditsia triacanthos inermis (Thornless Honey-locust)	22	22	---	---	---	---	---	---	Good	No	4.0	584478.4877	4785220.795	Public	Retain
450	Fraxinus americana (White Ash)	22	22	---	---	---	---	---	---	Poor	Yes	4.0	584479.7091	4785210.737	Public	Remove (Condition)
451	Acer rubrum (Red Maple)	20	20	---	---	---	---	---	---	Good	No	4.0	584487.5449	4785208.349	Private	Retain
452	Acer rubrum (Red Maple)	20	20	---	---	---	---	---	---	Good	No	4.0	584488.2421	4785200.211	Private	Retain
453	Gleditsia triacanthos inermis (Thornless Honey-locust)	12	12	---	---	---	---	---	---	Good	No	4.0	584482.8475	4785192.121	Private	Retain

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
454	Gleditsia triacanthos inermis (Thornless Honey-locust)	18	18	---	---	---	---	---	---	Good	No	4.0	584477.3977	4785198.144	Private	Retain
455	Picea abies (Norway Spruce)	12	12	---	---	---	---	---	---	Good	No	4.0	584476.6766	4785192.696	Private	Retain
456	Malus baccata (Siberian Crabapple)	10	10	---	---	---	---	---	---	Good	No	4.0	584473.8768	4785190.265	Private	Retain
457	Liriodendron tulipifera (Tulip Tree)	16	16	---	---	---	---	---	---	Good	No	4.0	584467.9095	4785185.028	Public	Retain
458	Acer platanoides (Norway Maple)	16	16	---	---	---	---	---	---	Fair	No	4.0	584473.528	4785181.888	Private	Retain
459	Sorbus x hybrida (Oakleaf Mountain Ash)	20	20	---	---	---	---	---	---	Good	No	4.0	584467.2412	4785176.315	Public	Remove (CRZ)
460	Ulmus sp. (Elm species)	32	32	---	---	---	---	---	---	Good	No	4.0	584469.7117	4785173.583	Public	Retain
461	Acer platanoides (Norway Maple)	12	12	---	---	---	---	---	---	Good	No	4.0	584474.8469	4785177.019	Private	Retain
462	Acer platanoides (Norway Maple)	10	10	---	---	---	---	---	---	Good	No	4.0	584476.4275	4785171.584	Private	Retain
463	Acer platanoides (Norway Maple)	10	10	---	---	---	---	---	---	Good	No	4.0	584477.4934	4785167.649	Private	Retain
464	Betula papyrifera (Paper Birch)	12	12	---	---	---	---	---	---	Good	No	4.0	584479.6519	4785165.128	Private	Retain
465	Betula papyrifera (Paper Birch)	10	10	---	---	---	---	---	---	Good	No	4.0	584477.7888	4785165.94	Private	Retain
466	Acer ginnala (Amur Maple)	14	14	---	---	---	---	---	---	Fair	No	4.0	584469.2267	4785164.996	Public	Remove (CRZ)
467	Ulmus sp. (Elm species)	14	14	---	---	---	---	---	---	Good	No	4.0	584474.5801	4785160.152	Public	Retain
468	Quercus robur (English Oak)	18	18	---	---	---	---	---	---	Good	No	4.0	584479.7905	4785157.699	Private	Retain
469	Quercus robur (English Oak)	18	18	---	---	---	---	---	---	Good	No	4.0	584480.4863	4785156.104	Private	Retain
470	Quercus robur (English Oak)	16	16	---	---	---	---	---	---	Good	No	4.0	584481.2667	4785152.559	Private	Retain
471	Quercus robur (English Oak)	10	10	---	---	---	---	---	---	Good	No	4.0	584482.0722	4785150.386	Private	Retain
472	Quercus robur (English Oak)	18	18	---	---	---	---	---	---	Good	No	4.0	584482.3521	4785148.089	Private	Retain
473	Ulmus sp. (Elm species)	28	28	---	---	---	---	---	---	Good	No	4.0	584476.1894	4785147.941	Public	Retain
474	Pinus strobus (Eastern White Pine)	10	10	---	---	---	---	---	---	Good	No	4.0	584482.8267	4785145.121	Private	Retain
475	Pinus strobus (Eastern White Pine)	15	15	---	---	---	---	---	---	Good	No	4.0	584484.1476	4785143.038	Private	Retain
476	Pinus strobus (Eastern White Pine)	10	10	---	---	---	---	---	---	Good	No	4.0	584483.9059	4785140.897	Private	Retain
477	Betula papyrifera (Paper Birch)	36	22	20	18	10	---	---	---	Fair	No	4.0	584484.7256	4785139.842	Private	Retain
478	Betula papyrifera (Paper Birch)	38	22	20	18	16	---	---	---	Fair	No	4.0	584487.2848	4785136.324	Private	Retain
479	Betula papyrifera (Paper Birch)	31	20	18	16	---	---	---	---	Fair	No	4.0	584486.4271	4785133.178	Private	Retain
480	Liriodendron tulipifera (Tulip Tree)	12	12	---	---	---	---	---	---	Good	No	4.0	584480.0369	4785133.571	Public	Retain
481	Ulmus sp. (Elm species)	26	26	---	---	---	---	---	---	Good	No	4.0	584482.0907	4785122.626	Public	Retain
482	Quercus robur (English Oak)	12	12	---	---	---	---	---	---	Good	No	4.0	584486.2307	4785128.79	Private	Retain
483	Quercus robur (English Oak)	16	16	---	---	---	---	---	---	Good	No	4.0	584487.2526	4785127.17	Private	Retain
484	Juniperus virginiana (Eastern Red Cedar)	12	12	---	---	---	---	---	---	Good	No	4.0	584491.8535	4785101.591	Public	Retain
485	Syringa reticulata ssp. reticulata (Japanese Tree Lilac)	10	10	---	---	---	---	---	---	Good	No	4.0	584488.1724	4785098.996	Public	Retain
486	Juniperus virginiana (Eastern Red Cedar)	10	10	---	---	---	---	---	---	Good	No	4.0	584493.3802	4785094.642	Public	Retain
487	Tilia cordata (Little-leaf Linden)	20	20	---	---	---	---	---	---	Good	No	4.0	584489.3057	4785087.015	Public	Remove (CRZ)
488	Juniperus virginiana (Eastern Red Cedar)	12	12	---	---	---	---	---	---	Good	No	4.0	584495.4464	4785084.431	Public	Retain

Tree ID#	Species	DBH[1]	DBH1	DBH2	DBH3	DBH4	DBH5	DBH6	DBH7	Condition	Hazard	CRZ (m)[2]	Easting (UTM 17T)	Easting (UTM 17T)	Ownership	Remove or Retain[3]
489	Sorbus x hybrida (Oakleaf Mountain Ash)	14	14	---	---	---	---	---	---	Good	No	4.0	584487.4918	4785079.18	Public	Remove (CRZ)
490	Syringa reticulata ssp. reticulata (Japanese Tree Lilac)	12	12	---	---	---	---	---	---	Good	No	4.0	584493.0222	4785073.855	Public	Remove (CRZ)
491	Juniperus virginiana (Eastern Red Cedar)	12	12	---	---	---	---	---	---	Good	No	4.0	584497.9909	4785074.836	Public	Retain
492	Acer rubrum (Red Maple)	10	10	---	---	---	---	---	---	Good	No	4.0	584490.7555			



CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

PROPOSED ROW
EXISTING ROW
EXISTING LOT
PEDESTRIAN CROSSING
DEVELOPMENT APPLICATIONS
SIDEWALK
MULTI-USE PATHWAY

SCALE - HORZ.
5m 0 10m

PROJECT No. 16-4360
DATE: April 2019

DILLON CONSULTING

SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

PREFERRED ALTERNATIVE

SHEET 03

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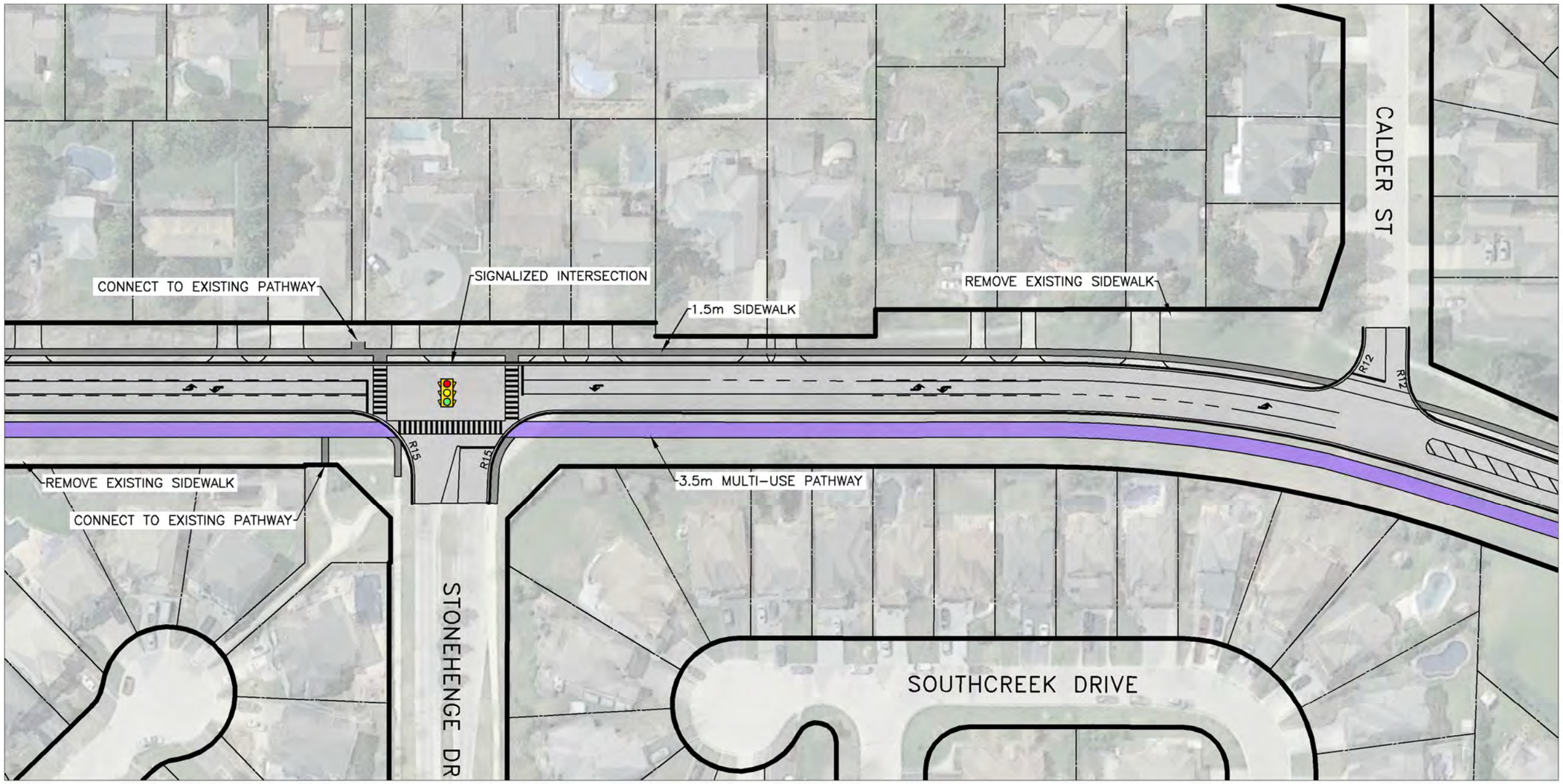

CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

PROPOSED ROW
EXISTING ROW
EXISTING LOT
PEDESTRIAN CROSSING
DEVELOPMENT APPLICATIONS
SIDEWALK
MULTI-USE PATHWAY

SCALE - HORZ.
5m 0 10m

PROJECT No. 16-4360
DATE: April 2019

DILLON CONSULTING

SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

PREFERRED ALTERNATIVE

SHEET 04

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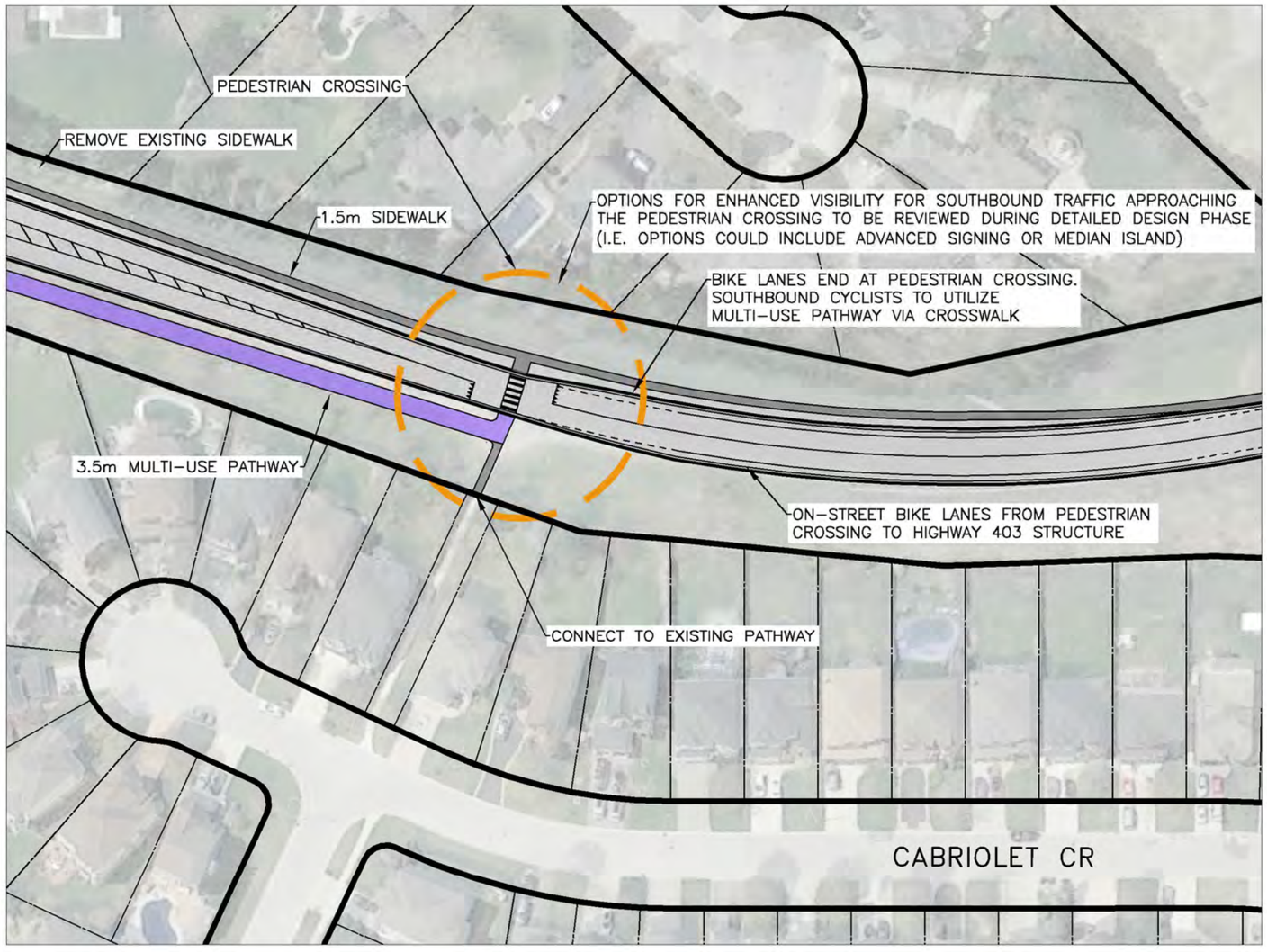

CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

PROPOSED ROW
EXISTING ROW
EXISTING LOT
PEDESTRIAN CROSSING
DEVELOPMENT APPLICATIONS
SIDEWALK
MULTI-USE PATHWAY

SCALE - HORZ.
5m 0 10m

PROJECT No. 16-4360
DATE: April 2019

DILLON CONSULTING

SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

PREFERRED ALTERNATIVE

SHEET 05

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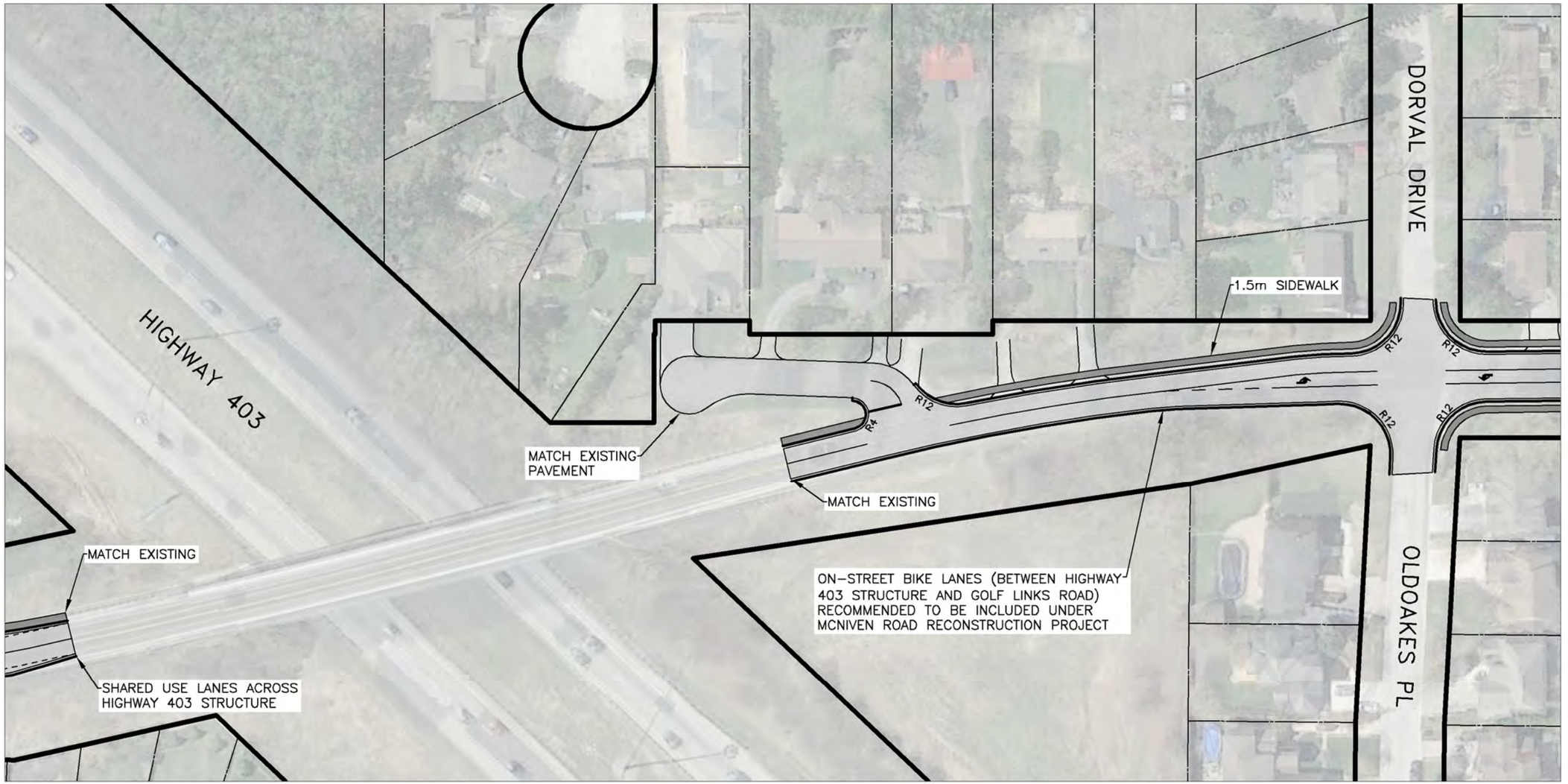

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CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

PROPOSED ROW
EXISTING ROW
EXISTING LOT
PEDESTRIAN CROSSING
DEVELOPMENT APPLICATIONS
SIDEWALK
MULTI-USE PATHWAY

SCALE - HORZ.
5m 0 10m

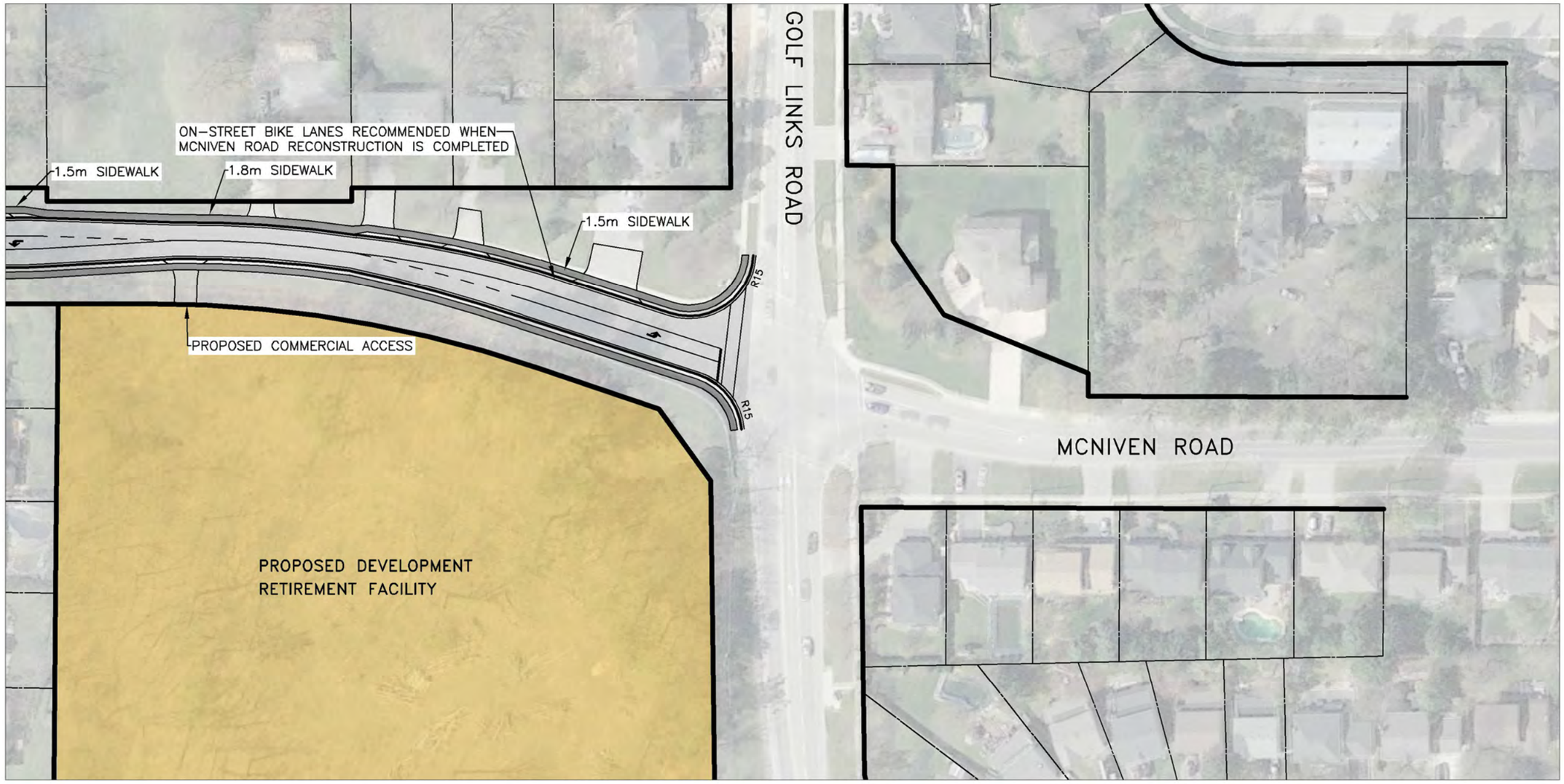
PROJECT No. 16-4360
DATE: April 2019

DILLON CONSULTING

SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

PREFERRED ALTERNATIVE

SHEET 06



CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

- PROPOSED ROW
- EXISTING ROW
- EXISTING LOT
- PEDESTRIAN CROSSING
- DEVELOPMENT APPLICATIONS
- SIDEWALK
- MULTI-USE PATHWAY

SCALE - HORZ.
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PROJECT No. 16-4360
DATE: April 2019

DILLON CONSULTING

SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

PREFERRED ALTERNATIVE

SHEET 07

DATE PLOTTED: 4/12/2019 11:41:54 AM
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Appendix E

MTCS Checklists

Ontario

Ministry of Tourism, Culture and Sport

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes

A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area:
  - is a recognized heritage property
  - may be of cultural heritage value
- it includes all areas that may be impacted by project activities, including – but not limited to:
  - the main project area
  - temporary storage
  - staging and working areas
  - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Cultural Heritage Evaluation Report (CHER)

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a qualified person(s) (see page 5 for definitions) to undertake a cultural heritage evaluation report (CHER).

The CHER will help you:

- identify, evaluate and protect cultural heritage resources on your property or project area
- reduce potential delays and risks to a project

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – separate checklist
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages for more detailed information and when completing this form.

Project or Property Name
Southcote Road (Garner Road to Golf Links Road) Municipal Class Environmental Assessment, Schedule C

Project or Property Location (upper and lower or single tier municipality)
Southcote Road (Garner Road to Golf Links Road)

Proponent Name
City of Hamilton, Ontario

Proponent Contact Information
Megan Salvucci, Megan.Salvucci@hamilton.ca | 905-546-2424 x 4101

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?	☐	☑

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

Part A: Screening for known (or recognized) Cultural Heritage Value

	Yes	No
2. Has the property (or project area) been evaluated before and found **not** to be of cultural heritage value?	☐	☑

If Yes, do **not** complete the rest of the checklist.

The proponent, property owner and/or approval authority will:

- summarize the previous evaluation and
- add this checklist to the project file, with the appropriate documents that demonstrate a cultural heritage evaluation was undertaken

The summary and appropriate documentation may be:

- submitted as part of a report requirement
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Is the property (or project area):		
a. identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value?	☐	☑
b. a National Historic Site (or part of)?	☐	☑
c. designated under the *Heritage Railway Stations Protection Act*?	☐	☑
d. designated under the *Heritage Lighthouse Protection Act*?	☐	☑
e. identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office (FHBRO)?	☐	☑
f. located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?	☐	☑

If Yes to any of the above questions, you need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report, if a Statement of Cultural Heritage Value has not previously been prepared or the statement needs to be updated

If a Statement of Cultural Heritage Value has been prepared previously and if alterations or development are proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No, continue to Question 4.

Part B: Screening for Potential Cultural Heritage Value

		Yes	No
4.	Does the property (or project area) contain a parcel of land that:		
	a. is the subject of a municipal, provincial or federal commemorative or interpretive plaque?	☐	☑
	b. has or is adjacent to a known burial site and/or cemetery?	☑	☐
	c. is in a Canadian Heritage River watershed?	☐	☑
	d. contains buildings or structures that are 40 or more years old?	☐	☑

Part C: Other Considerations

		Yes	No
5.	Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area):		
	a. is considered a landmark in the local community or contains any structures or sites that are important in defining the character of the area?	☐	☑
	b. has a special association with a community, person or historical event?	☐	☑
	c. contains or is part of a cultural heritage landscape?	☐	☑

If Yes to one or more of the above questions (Part B and C), there is potential for cultural heritage resources on the property or within the project area.

You need to hire a qualified person(s) to undertake:

- a Cultural Heritage Evaluation Report (CHER)

If the property is determined to be of cultural heritage value and alterations or development is proposed, you need to hire a qualified person(s) to undertake:

- a Heritage Impact Assessment (HIA) – the report will assess and avoid, eliminate or mitigate impacts

If No to all of the above questions, there is low potential for built heritage or cultural heritage landscape on the property.

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g. under the *Environmental Assessment Act, Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
  - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

For more information, see the Ministry of Tourism, Culture and Sport's Ontario Heritage Toolkit or Standards and Guidelines for Conservation of Provincial Heritage Properties.

In this context, the following definitions apply:

- **qualified person(s)** means individuals – professional engineers, architects, archaeologists, etc. – having relevant, recent experience in the conservation of cultural heritage resources.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may already be in place for identifying potential cultural heritage resources, including:

- one endorsed by a municipality
- an environmental assessment process e.g. screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport (MTCS) under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s.B.2.]

Part A: Screening for known (or recognized) Cultural Heritage Value

2. Has the property (or project area) been evaluated before and found not to be of cultural heritage value?

Respond 'yes' to this question, if all of the following are true:

A property can be considered not to be of cultural heritage value if:

- a Cultural Heritage Evaluation Report (CHER) - or equivalent - has been prepared for the property with the advice of a qualified person and it has been determined not to be of cultural heritage value and/or
- the municipal heritage committee has evaluated the property for its cultural heritage value or interest and determined that the property is not of cultural heritage value or interest

A property may need to be re-evaluated, if:

- there is evidence that its heritage attributes may have changed
- new information is available
- the existing Statement of Cultural Heritage Value does not provide the information necessary to manage the property
- the evaluation took place after 2005 and did not use the criteria in Regulations 9/06 and 10/06

Note: Ontario government ministries and public bodies [prescribed under Regulation 157/10] may continue to use their existing evaluation processes, until the evaluation process required under section B.2 of the Standards & Guidelines for Conservation of Provincial Heritage Properties has been developed and approved by MTCS.

To determine if your property or project area has been evaluated, contact:

- the approval authority
- the proponent
- the Ministry of Tourism, Culture and Sport

3a. Is the property (or project area) identified, designated or otherwise protected under the *Ontario Heritage Act* as being of cultural heritage value e.g.:

i. designated under the *Ontario Heritage Act*

- individual designation (Part IV)
- part of a heritage conservation district (Part V)

Individual Designation – Part IV

A property that is designated:

- by a municipal by-law as being of cultural heritage value or interest [s.29 of the *Ontario Heritage Act*]
- by order of the Minister of Tourism, Culture and Sport as being of cultural heritage value or interest of provincial significance [s.34.5]. **Note**: To date, no properties have been designated by the Minister.

Heritage Conservation District – Part V

A property or project area that is located within an area designated by a municipal by-law as a heritage conservation district [s. 41 of the *Ontario Heritage Act*].

For more information on Parts IV and V, contact:

- municipal clerk
- Ontario Heritage Trust
- local land registry office (for a title search)

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ii. subject of an agreement, covenant or easement entered into under Parts II or IV of the *Ontario Heritage Act*

An agreement, covenant or easement is usually between the owner of a property and a conservation body or level of government. It is usually registered on title.

The primary purpose of the agreement is to:

- preserve, conserve, and maintain a cultural heritage resource
- prevent its destruction, demolition or loss

For more information, contact:

- Ontario Heritage Trust - for an agreement, covenant or easement [clause 10 (1) (c) of the *Ontario Heritage Act*]
- municipal clerk – for a property that is the subject of an easement or a covenant [s.37 of the *Ontario Heritage Act*]
- local land registry office (for a title search)

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iii. listed on a register of heritage properties maintained by the municipality

Municipal registers are the official lists - or record - of cultural heritage properties identified as being important to the community.

Registers include:

- all properties that are designated under the *Ontario Heritage Act* (Part IV or V)
- properties that have not been formally designated, but have been identified as having cultural heritage value or interest to the community

For more information, contact:

- municipal clerk
- municipal heritage planning staff
- municipal heritage committee

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iv. subject to a notice of:

- intention to designate (under Part IV of the *Ontario Heritage Act*)
- a Heritage Conservation District study area bylaw (under Part V of the *Ontario Heritage Act*)

A property that is subject to a **notice of intention to designate** as a property of cultural heritage value or interest and the notice is in accordance with:

- section 29 of the *Ontario Heritage Act*
- section 34.6 of the *Ontario Heritage Act*. **Note**: To date, the only applicable property is Meldrum Bay Inn, Manitoulin Island. [s.34.6]

An area designated by a municipal by-law made under section 40.1 of the *Ontario Heritage Act* as a **heritage conservation district study area**.

For more information, contact:

- municipal clerk – for a property that is the subject of notice of intention [s. 29 and s. 40.1]
- Ontario Heritage Trust

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v. included in the Ministry of Tourism, Culture and Sport's list of provincial heritage properties

Provincial heritage properties are properties the Government of Ontario owns or controls that have cultural heritage value or interest.

The Ministry of Tourism, Culture and Sport (MTCS) maintains a list of all provincial heritage properties based on information provided by ministries and prescribed public bodies. As they are identified, MTCS adds properties to the list of provincial heritage properties.

For more information, contact the MTCS Registrar at registrar@ontario.ca.

3b. Is the property (or project area) a National Historic Site (or part of)?

National Historic Sites are properties or districts of national historic significance that are designated by the Federal Minister of the Environment, under the *Canada National Parks Act*, based on the advice of the Historic Sites and Monuments Board of Canada.

For more information, see the National Historic Sites website.

3c. Is the property (or project area) designated under the *Heritage Railway Stations Protection Act*?

The *Heritage Railway Stations Protection Act* protects heritage railway stations that are owned by a railway company under federal jurisdiction. Designated railway stations that pass from federal ownership may continue to have cultural heritage value.

For more information, see the Directory of Designated Heritage Railway Stations.

3d. Is the property (or project area) designated under the *Heritage Lighthouse Protection Act*?

The *Heritage Lighthouse Protection Act* helps preserve historically significant Canadian lighthouses. The Act sets up a public nomination process and includes heritage building conservation standards for lighthouses which are officially designated.

For more information, see the Heritage Lighthouses of Canada website.

3e. Is the property (or project area) identified as a Federal Heritage Building by the Federal Heritage Buildings Review Office?

The role of the Federal Heritage Buildings Review Office (FHBRO) is to help the federal government protect the heritage buildings it owns. The policy applies to all federal government departments that administer real property, but not to federal Crown Corporations.

For more information, contact the Federal Heritage Buildings Review Office.

See a directory of all federal heritage designations.

3f. Is the property (or project area) located within a United Nations Educational, Scientific and Cultural Organization (UNESCO) World Heritage Site?

A UNESCO World Heritage Site is a place listed by UNESCO as having outstanding universal value to humanity under the Convention Concerning the Protection of the World Cultural and Natural Heritage. In order to retain the status of a World Heritage Site, each site must maintain its character defining features.

Currently, the Rideau Canal is the only World Heritage Site in Ontario.

For more information, see Parks Canada – World Heritage Site website.

Part B: Screening for potential Cultural Heritage Value

4a. Does the property (or project area) contain a parcel of land that has a municipal, provincial or federal commemorative or interpretive plaque?

Heritage resources are often recognized with formal plaques or markers.

Plaques are prepared by:

- municipalities
- provincial ministries or agencies
- federal ministries or agencies
- local non-government or non-profit organizations

For more information, contact:

- municipal heritage committees or local heritage organizations – for information on the location of plaques in their community
- Ontario Historical Society's Heritage directory – for a list of historical societies and heritage organizations
- Ontario Heritage Trust – for a list of plaques commemorating Ontario's history
- Historic Sites and Monuments Board of Canada – for a list of plaques commemorating Canada's history

4b. Does the property (or project area) contain a parcel of land that has or is adjacent to a known burial site and/or cemetery?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulations, Ontario Ministry of Consumer Services – for a database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, adjacent means contiguous or as otherwise defined in a municipal official plan.

4c. Does the property (or project area) contain a parcel of land that is in a Canadian Heritage River watershed?

The Canadian Heritage River System is a national river conservation program that promotes, protects and enhances the best examples of Canada's river heritage.

Canadian Heritage Rivers must have, and maintain, outstanding natural, cultural and/or recreational values, and a high level of public support.

For more information, contact the Canadian Heritage River System.

If you have questions regarding the boundaries of a watershed, please contact:

- your conservation authority
- municipal staff

4d. Does the property (or project area) contain a parcel of land that contains buildings or structures that are 40 or more years old?

A 40 year 'rule of thumb' is typically used to indicate the potential of a site to be of cultural heritage value. The approximate age of buildings and/or structures may be estimated based on:

- history of the development of the area
- fire insurance maps
- architectural style
- building methods

Property owners may have information on the age of any buildings or structures on their property. The municipality, local land registry office or library may also have background information on the property.

Note: 40+ year old buildings or structure do not necessarily hold cultural heritage value or interest; their age simply indicates a higher potential.

A building or structure can include:

- residential structure
- farm building or outbuilding
- industrial, commercial, or institutional building
- remnant or ruin
- engineering work such as a bridge, canal, dams, etc.

For more information on researching the age of buildings or properties, see the Ontario Heritage Tool Kit Guide Heritage Property Evaluation.

Part C: Other Considerations

5a. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) is considered a landmark in the local community or contains any structures or sites that are important to defining the character of the area?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has potential landmarks or defining structures and sites, for instance:

- buildings or landscape features accessible to the public or readily noticeable and widely known
- complexes of buildings
- monuments
- ruins

5b. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) has a special association with a community, person or historical event?

Local or Aboriginal knowledge may reveal that the project location is situated on a parcel of land that has a special association with a community, person or event of historic interest, for instance:

- Aboriginal sacred site
- traditional-use area
- battlefield
- birthplace of an individual of importance to the community

5c. Is there local or Aboriginal knowledge or accessible documentation suggesting that the property (or project area) contains or is part of a cultural heritage landscape?

Landscapes (which may include a combination of archaeological resources, built heritage resources and landscape elements) may be of cultural heritage value or interest to a community.

For example, an Aboriginal trail, historic road or rail corridor may have been established as a key transportation or trade route and may have been important to the early settlement of an area. Parks, designed gardens or unique landforms such as waterfalls, rock faces, caverns, or mounds are areas that may have connections to a particular event, group or belief.

For more information on Questions 5.a., 5.b. and 5.c., contact:

- Elders in Aboriginal Communities or community researchers who may have information on potential cultural heritage resources. Please note that Aboriginal traditional knowledge may be considered sensitive.
- municipal heritage committees or local heritage organizations
- Ontario Historical Society's "Heritage Directory" - for a list of historical societies and heritage organizations in the province

An internet search may find helpful resources, including:

- historical maps
- historical walking tours
- municipal heritage management plans
- cultural heritage landscape studies
- municipal cultural plans

Information specific to trails may be obtained through Ontario Trails.

Ontario

Ministry of Tourism, Culture and Sport

Programs & Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7

Criteria for Evaluating Archaeological Potential

A Checklist for the Non-Specialist

The **purpose of the checklist** is to determine:

- if a property(ies) or project area may contain archaeological resources i.e., have archaeological potential
- it includes all areas that may be impacted by project activities, including – but not limited to:
  - the main project area
  - temporary storage
  - staging and working areas
  - temporary roads and detours

Processes covered under this checklist, such as:

- *Planning Act*
- *Environmental Assessment Act*
- *Aggregates Resources Act*
- *Ontario Heritage Act* – Standards and Guidelines for Conservation of Provincial Heritage Properties

Archaeological assessment

If you are not sure how to answer one or more of the questions on the checklist, you may want to hire a licensed consultant archaeologist (see page 4 for definitions) to undertake an archaeological assessment.

The assessment will help you:

- identify, evaluate and protect archaeological resources on your property or project area
- reduce potential delays and risks to your project

Note: By law, archaeological assessments **must** be done by a licensed consultant archaeologist. Only a licensed archaeologist can assess – or alter – an archaeological site.

What to do if you:

- **find an archaeological resource**

  If you find something you think may be of archaeological value during project work, you must – by law – stop all activities immediately and contact a licensed consultant archaeologist

  The archaeologist will carry out the fieldwork in compliance with the *Ontario Heritage Act* [s.48(1)].

- **unearth a burial site**

  If you find a burial site containing human remains, you must immediately notify the appropriate authorities (i.e., police, coroner's office, and/or Registrar of Cemeteries) and comply with the *Funeral, Burial and Cremation Services Act.*

Other checklists

Please use a separate checklist for your project, if:

- you are seeking a Renewable Energy Approval under Ontario Regulation 359/09 – separate checklist
- your Parent Class EA document has an approved screening criteria (as referenced in Question 1)

Please refer to the Instructions pages when completing this form.

Project or Property Name
Southcote Road (Garner Road to Golf Links Road) Municipal Class Environmental Assessment, Schedule C

Project or Property Location (upper and lower or single tier municipality)
Southcote Road (Garner Road to Golf Links Road)

Proponent Name
City of Hamilton, Ontario

Proponent Contact Information
Megan Salvucci, Megan.Salvucci@hamilton.ca | 905-546-2424 x 4101

Screening Questions

	Yes	No
1. Is there a pre-approved screening checklist, methodology or process in place?	☐	☑

If Yes, please follow the pre-approved screening checklist, methodology or process.

If No, continue to Question 2.

	Yes	No
2. Has an archaeological assessment been prepared for the property (or project area) and been accepted by MTCS?	☐	☑

If Yes, do **not** complete the rest of the checklist. You are expected to follow the recommendations in the archaeological assessment report(s).

The proponent, property owner and/or approval authority will:

- summarize the previous assessment
- add this checklist to the project file, with the appropriate documents that demonstrate an archaeological assessment was undertaken e.g., MTCS letter stating acceptance of archaeological assessment report

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g., environmental assessment document
- maintained by the property owner, proponent or approval authority

If No, continue to Question 3.

	Yes	No
3. Are there known archaeological sites on or within 300 metres of the property (or the project area)?	☑	☐
4. Is there Aboriginal or local knowledge of archaeological sites on or within 300 metres of the property (or project area)?	☐	☑
5. Is there Aboriginal knowledge or historically documented evidence of past Aboriginal use on or within 300 metres of the property (or project area)?	☐	☑
6. Is there a known burial site or cemetery on the property or adjacent to the property (or project area)?	☑	☐
7. Has the property (or project area) been recognized for its cultural heritage value?	☐	☑

If Yes to any of the above questions (3 to 7), do **not** complete the checklist. Instead, you need to hire a licensed consultant archaeologist to undertake an archaeological assessment of your property or project area.

If No, continue to question 8.

	Yes	No
8. Has the entire property (or project area) been subjected to recent, extensive and intensive disturbance?	☑	☐

If Yes to the preceding question, do **not** complete the checklist. Instead, please keep and maintain a summary of documentation that provides evidence of the recent disturbance.

An archaeological assessment is not required.

If No, continue to question 9.

	Yes	No
9. Are there present or past water sources within 300 metres of the property (or project area)?	☐	☑

If Yes, an archaeological assessment is required.

If No, continue to question 10.

	Yes	No
10. Is there evidence of two or more of the following on the property (or project area)?	☐	☑

- elevated topography
- pockets of well-drained sandy soil
- distinctive land formations
- resource extraction areas
- early historic settlement
- early historic transportation routes

If Yes, an archaeological assessment is required.

If No, there is low potential for archaeological resources at the property (or project area).

The proponent, property owner and/or approval authority will:

- summarize the conclusion
- add this checklist with the appropriate documentation to the project file

The summary and appropriate documentation may be:

- submitted as part of a report requirement e.g., under the *Environmental Assessment Act, Planning Act* processes
- maintained by the property owner, proponent or approval authority

Instructions

Please have the following available, when requesting information related to the screening questions below:

- a clear map showing the location and boundary of the property or project area
  - large scale and small scale showing nearby township names for context purposes
- the municipal addresses of all properties within the project area
- the lot(s), concession(s), and parcel number(s) of all properties within a project area

In this context, the following definitions apply:

- **consultant archaeologist** means, as defined in Ontario regulation as an archaeologist who enters into an agreement with a client to carry out or supervise archaeological fieldwork on behalf of the client, produce reports for or on behalf of the client and provide technical advice to the client. In Ontario, these people also are required to hold a valid professional archaeological licence issued by the Ministry of Tourism, Culture and Sport.
- **proponent** means a person, agency, group or organization that carries out or proposes to carry out an undertaking or is the owner or person having charge, management or control of an undertaking.

1. Is there a pre-approved screening checklist, methodology or process in place?

An existing checklist, methodology or process may be already in place for identifying archaeological potential, including:

- one prepared and adopted by the municipality e.g., archaeological management plan
- an environmental assessment process e.g., screening checklist for municipal bridges
- one that is approved by the Ministry of Tourism, Culture and Sport under the Ontario government's Standards & Guidelines for Conservation of Provincial Heritage Properties [s. B.2.]

2. Has an archaeological assessment been prepared for the property (or project area) and been accepted by MTCS?

Respond 'yes' to this question, if all of the following are true:

- an archaeological assessment report has been prepared and is in compliance with MTCS requirements
  - a letter has been sent by MTCS to the licensed archaeologist confirming that MTCS has added the report to the Ontario Public Register of Archaeological Reports (Register)
- the report states that there are no concerns regarding impacts to archaeological sites

Otherwise, if an assessment has been completed and deemed compliant by the MTCS, and the ministry recommends further archaeological assessment work, this work will need to be completed.

For more information about archaeological assessments, contact:

- approval authority
- proponent
- consultant archaeologist
- Ministry of Tourism, Culture and Sport at archaeology@ontario.ca

3. Are there known archaeological sites on or within 300 metres of the property (or project area)?

MTCS maintains a database of archaeological sites reported to the ministry.

For more information, contact MTCS Archaeological Data Coordinator at archaeology@ontario.ca.

4. Is there Aboriginal or local knowledge of archaeological sites on or within 300 metres of the property?

Check with:

- Aboriginal communities in your area
- local municipal staff

They may have information about archaeological sites that are not included in MTCS' database.

Other sources of local knowledge may include:

- property owner
- local heritage organizations and historical societies
- local museums
- municipal heritage committee
- published local histories

5. Is there Aboriginal knowledge or historically documented evidence of past Aboriginal use on or within 300 metres of the property (or property area)?

Check with:

- Aboriginal communities in your area
- local municipal staff

Other sources of local knowledge may include:

- property owner
- local heritage organizations and historical societies
- local museums
- municipal heritage committee
- published local histories

6. Is there a known burial site or cemetery on the property or adjacent to the property (or project area)?

For more information on known cemeteries and/or burial sites, see:

- Cemeteries Regulation Unit, Ontario Ministry of Consumer Services – for database of registered cemeteries
- Ontario Genealogical Society (OGS) – to locate records of Ontario cemeteries, both currently and no longer in existence; cairns, family plots and burial registers
- Canadian County Atlas Digital Project – to locate early cemeteries

In this context, 'adjacent' means 'contiguous', or as otherwise defined in a municipal official plan.

7. Has the property (or project area) been recognized for its cultural heritage value?

There is a strong chance there may be archaeological resources on your property (or immediate area) if it has been listed, designated or otherwise identified as being of cultural heritage value by:

- your municipality
- Ontario government
- Canadian government

This includes a property that is:

- designated under *Ontario Heritage Act* (the OHA), including:
  - individual designation (Part IV)
  - part of a heritage conservation district (Part V)
  - an archaeological site (Part VI)
- subject to:
  - an agreement, covenant or easement entered into under the OHA (Parts II or IV)
  - a notice of intention to designate (Part IV)
  - a heritage conservation district study area by-law (Part V) of the OHA
- listed on:
  - a municipal register or inventory of heritage properties
  - Ontario government's list of provincial heritage properties
  - Federal government's list of federal heritage buildings
- part of a:
  - National Historic Site
  - UNESCO World Heritage Site
- designated under:
  - *Heritage Railway Station Protection Act*
  - *Heritage Lighthouse Protection Act*
- subject of a municipal, provincial or federal commemorative or interpretive plaque.

To determine if your property or project area is covered by any of the above, see:

- Part A of the MTCS Criteria for Evaluating Potential for Built Heritage and Cultural Heritage Landscapes

Part VI – Archaeological Sites

Includes five sites designated by the Minister under Regulation 875 of the Revised Regulation of Ontario, 1990 (Archaeological Sites) and 3 marine archaeological sites prescribed under Ontario Regulation 11/06.

For more information, check Regulation 875 and Ontario Regulation 11/06.

8. Has the entire property (or project area) been subjected to recent extensive and intensive ground disturbance?

Recent: after-1960

Extensive: over all or most of the area

Intensive: thorough or complete disturbance

Examples of ground disturbance include:

- quarrying
- major landscaping – involving grading below topsoil
- building footprints and associated construction area
  - where the building has deep foundations or a basement
- infrastructure development such as:
  - sewer lines
  - gas lines
  - underground hydro lines
  - roads
  - any associated trenches, ditches, interchanges. **Note**: this applies only to the excavated part of the right-of-way; the remainder of the right-of-way or corridor may not have been impacted.

A ground disturbance does **not** include:

- agricultural cultivation
- gardening
- landscaping

Site visits

You can typically get this information from a site visit. In that case, please document your visit in the process (e.g., report) with:

- photographs
- maps
- detailed descriptions

If a disturbance isn't clear from a site visit or other research, you need to hire a licensed consultant archaeologist to undertake an archaeological assessment.

9. Are there present or past water bodies within 300 metres of the property (or project area)?

Water bodies are associated with past human occupations and use of the land. About 80-90% of archaeological sites are found within 300 metres of water bodies.

Present

- Water bodies:
  - primary - lakes, rivers, streams, creeks
  - secondary - springs, marshes, swamps and intermittent streams and creeks
- accessible or inaccessible shoreline, for example:
  - high bluffs
  - swamps
  - marsh fields by the edge of a lake
  - sandbars stretching into marsh

Water bodies not included:

- man-made water bodies, for example:
  - temporary channels for surface drainage
  - rock chutes and spillways
  - temporarily ponded areas that are normally farmed
  - dugout ponds
- artificial bodies of water intended for storage, treatment or recirculation of:
  - runoff from farm animal yards
  - manure storage facilities
  - sites and outdoor confinement areas

Past

Features indicating past water bodies:

- raised sand or gravel beach ridges – can indicate glacial lake shorelines
- clear dip in the land – can indicate an old river or stream
- shorelines of drained lakes or marshes
- cobble beaches

You can get information about water bodies through:

- a site visit
- aerial photographs
- 1:10,000 scale Ontario Base Maps - or equally detailed and scaled maps.

10. Is there evidence of two or more of the following on the property (or project area)?

- elevated topography
- pockets of well-drained sandy soil
- distinctive land formations
- resource extraction areas
- early historic settlement
- early historic transportation routes

- **Elevated topography**

  Higher ground and elevated positions - surrounded by low or level topography - often indicate past settlement and land use.

  Features such as eskers, drumlins, sizeable knolls, plateaus next to lowlands, or other such features are a strong indication of archaeological potential.

  Find out if your property or project area has elevated topography, through:

  - site inspection
  - aerial photographs
  - topographical maps

- **Pockets of well-drained sandy soil, especially within areas of heavy soil or rocky ground**

  Sandy, well-drained soil - in areas characterized by heavy soil or rocky ground - may indicate archaeological potential

  Find out if your property or project area has sandy soil through:

  - site inspection
  - soil survey reports

- **Distinctive land formations**

  Distinctive land formations include – but are not limited to:

  - waterfalls
  - rock outcrops
  - rock faces
  - caverns
  - mounds, etc.

  They were often important to past inhabitants as special or sacred places. The following sites may be present – or close to – these formations:

  - burials
  - structures
  - offerings
  - rock paintings or carvings

  Find out if your property or project areas has a distinctive land formation through:

  - a site visit
  - aerial photographs
  - 1:10,000 scale Ontario Base Maps - or equally detailed and scaled maps.

- **Resource extraction areas**

  The following resources were collected in these extraction areas:

  - food or medicinal plants e.g., migratory routes, spawning areas, prairie
  - scarce raw materials e.g., quartz, copper, ochre or outcrops of chert
  - resources associated with early historic industry e.g., fur trade, logging, prospecting, mining

  Aboriginal communities may hold traditional knowledge about their past use or resources in the area.

- **Early historic settlement**

  Early Euro-Canadian settlement include – but are not limited to:

  - early military or pioneer settlement e.g., pioneer homesteads, isolated cabins, farmstead complexes
  - early wharf or dock complexes
  - pioneers churches and early cemeteries

  For more information, see below – under the early historic transportation routes.

- **Early historic transportation routes** - such as trails, passes, roads, railways, portage routes, canals.

  For more information, see:

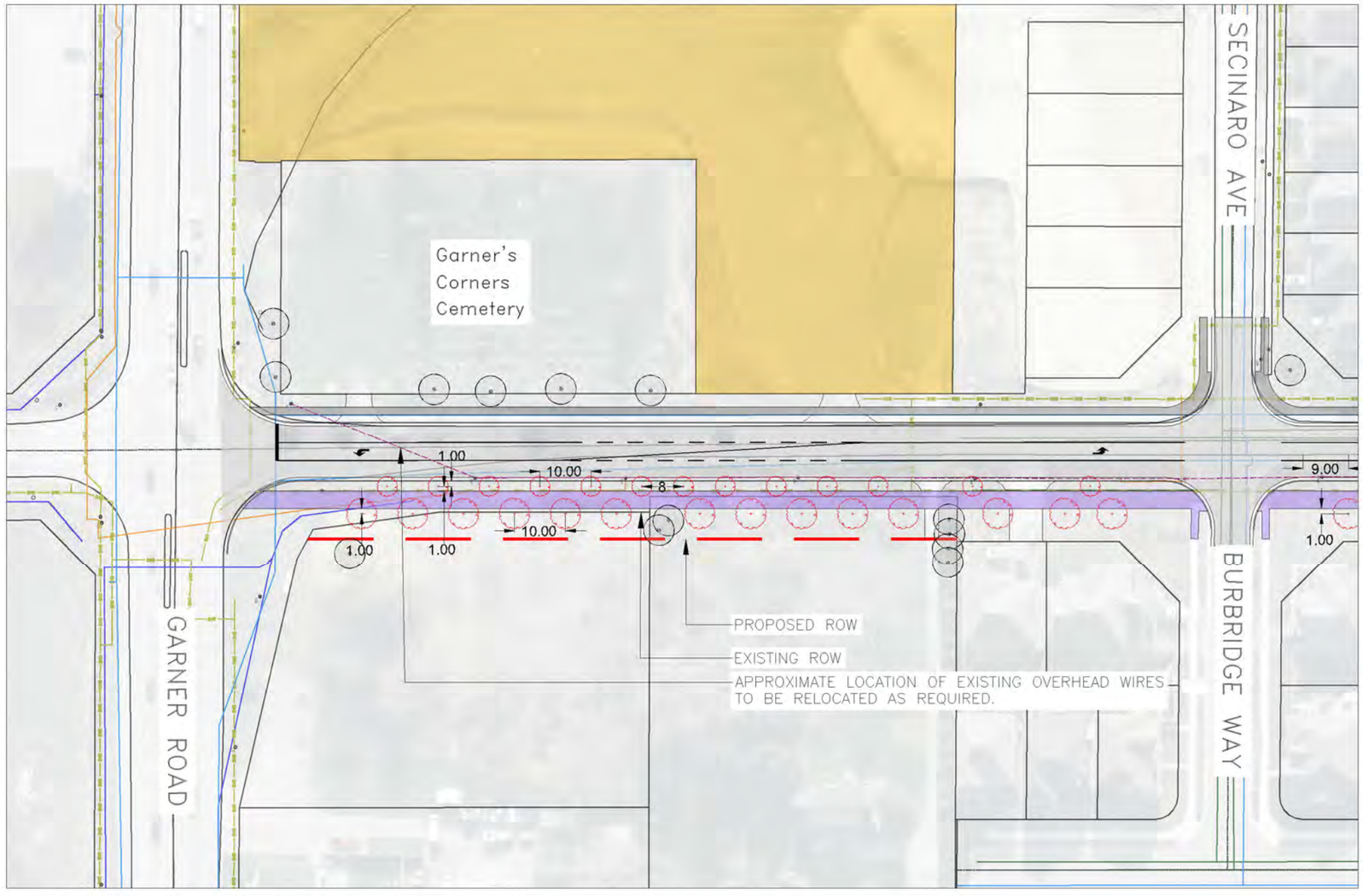
  - historical maps and/or historical atlases
    - for information on early settlement patterns such as trails (including Aboriginal trails), monuments, structures, fences, mills, historic roads, rail corridors, canals, etc.
    - Archives of Ontario holds a large collection of historical maps and historical atlases
    - digital versions of historic atlases are available on the Canadian County Atlas Digital Project
  - commemorative markers or plaques such as local, provincial or federal agencies
  - municipal heritage committee or other local heritage organizations
    - for information on early historic settlements or landscape features (e.g., fences, mill races, etc.)
    - for information on commemorative markers or plaques

Appendix F

Conceptual Landscape Plans

NOTES/ DESIGN CONSIDERATIONS FOR SOUTHCOTE ROAD FROM GARNER ROAD TO GOLF LINKS :

1. PLAN IS PREPARED BASED ON ASSUMPTION THAT ALL EXISTING UNDERGROUND UTILITIES ARE MIN 1M DEEP AND IS SUBJECT TO REVIEW AND CONFIRMATION DURING DETAILED DESIGN.
2. OVERHEAD WIRES, UTILITY POLES AND STREET LIGHTS TO BE RELOCATED AS REQUIRED.
3. LARGE TREES ARE PLANTED AT 10M SPACING.
4. LOW GROWING TREES (MAX 6-8M MATURE HEIGHT) ARE PROPOSED UNDER OR IN 3 METER OF OVERHEAD POWER LINES. WIRE HEIGHT TO BE CONFIRMED DURING DETAILED DESIGN.
5. SIGHT TRIANGLE MEASURING 9X9 M IS CONSIDERED ALONG EACH OF THE INTERSECTION ROADWAYS, MEASURED FROM THE POINT OF INTERSECTION CURB LINES.
6. FIRE HYDRANT, UTILITY PEDESTAL, LIGHT STANDARD LOCATIONS, TRANSFORMER AND WATER VALVE LOCATIONS TO BE IDENTIFIED AND COORDINATED WITH THE LANDSCAPE PLAN DURING DETAILED DESIGN. MIN. 1.5M RADIUS SET BACK FROM EACH IS REQUIRED FOR TREE PLANTING.
7. TREES LOCATED WITH MIN 1.5M SETBACK FROM DRIVEWAY AND MAINTENANCE ACCESSES.
8. TREES LOCATED WITH MIN 0.8M SETBACK FROM CURB FACE.
9. TREES ARE ONLY PROPOSED WHERE THE SOFT SURFACE IS 1.75M WIDE.



EXISTING TREES – TO BE PROTECTED
PROPOSED LARGE DECIDUOUS TREE
PROPOSED SMALL TREE
PROPOSED CONIFEROUS TREE
OVERHEAD HYDRO WIRE

EXISTING GAS PIPE – TO REMAIN
EXISTING WATER MAIN – TO REMAIN
COAXIAL CABLE DUCT – TO REMAIN
BELL CANADA DUCT – TO REMAIN
EXISTING SEWER

CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

PROPOSED ROW
EXISTING ROW
EXISTING LOT
PEDESTRIAN CROSSING

DEVELOPMENT APPLICATIONS
SIDEWALK
MULTI-USE PATHWAY

SCALE – HOR2.
5m 0 10m

PROJECT No. 18-7402
DATE: April 2019

DILLON CONSULTING

SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

LANDSCAPE CONCEPT PLAN

SHEET 01

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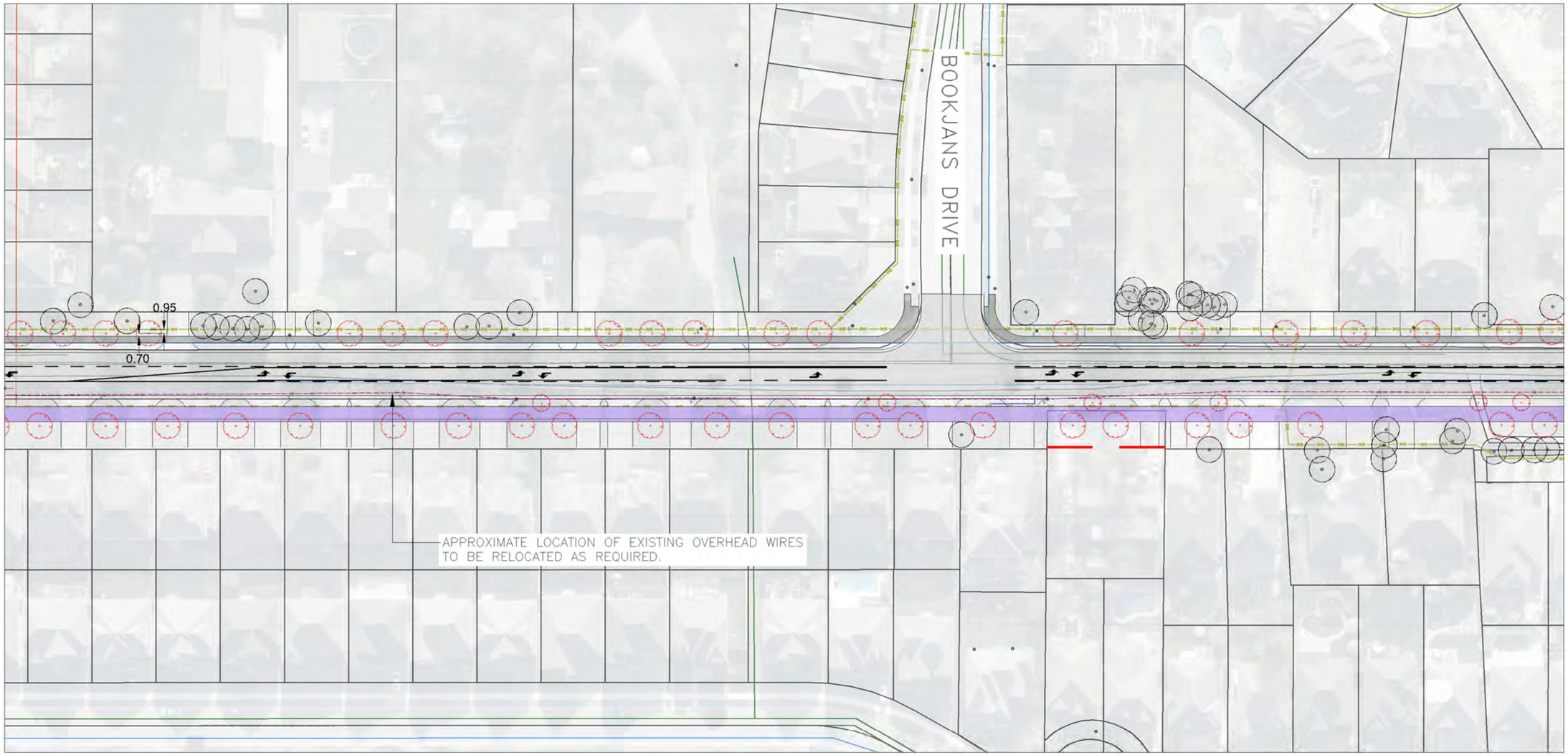

EXISTING TREES – TO BE PROTECTED
PROPOSED LARGE DECIDUOUS TREE
PROPOSED SMALL TREE
PROPOSED CONIFEROUS TREE
OVERHEAD HYDRO WIRE

EXISTING GAS PIPE – TO REMAIN
EXISTING WATER MAIN – TO REMAIN
COAXIAL CABLE DUCT – TO REMAIN
BELL CANADA DUCT – TO REMAIN
EXISTING SEWER

CITY OF HAMILTON
SOUTHCOTE ROAD ROADWAY IMPROVEMENTS
BETWEEN GARNER ROAD AND GOLF LINKS ROAD
ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

PROPOSED ROW
EXISTING ROW
EXISTING LOT
PEDESTRIAN CROSSING

DEVELOPMENT APPLICATIONS
SIDEWALK
MULTI-USE PATHWAY

SCALE – HORIZ.
5m 0 10m

PROJECT No. 18-7402
DATE: April 2019

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SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

LANDSCAPE CONCEPT PLAN

SHEET 02

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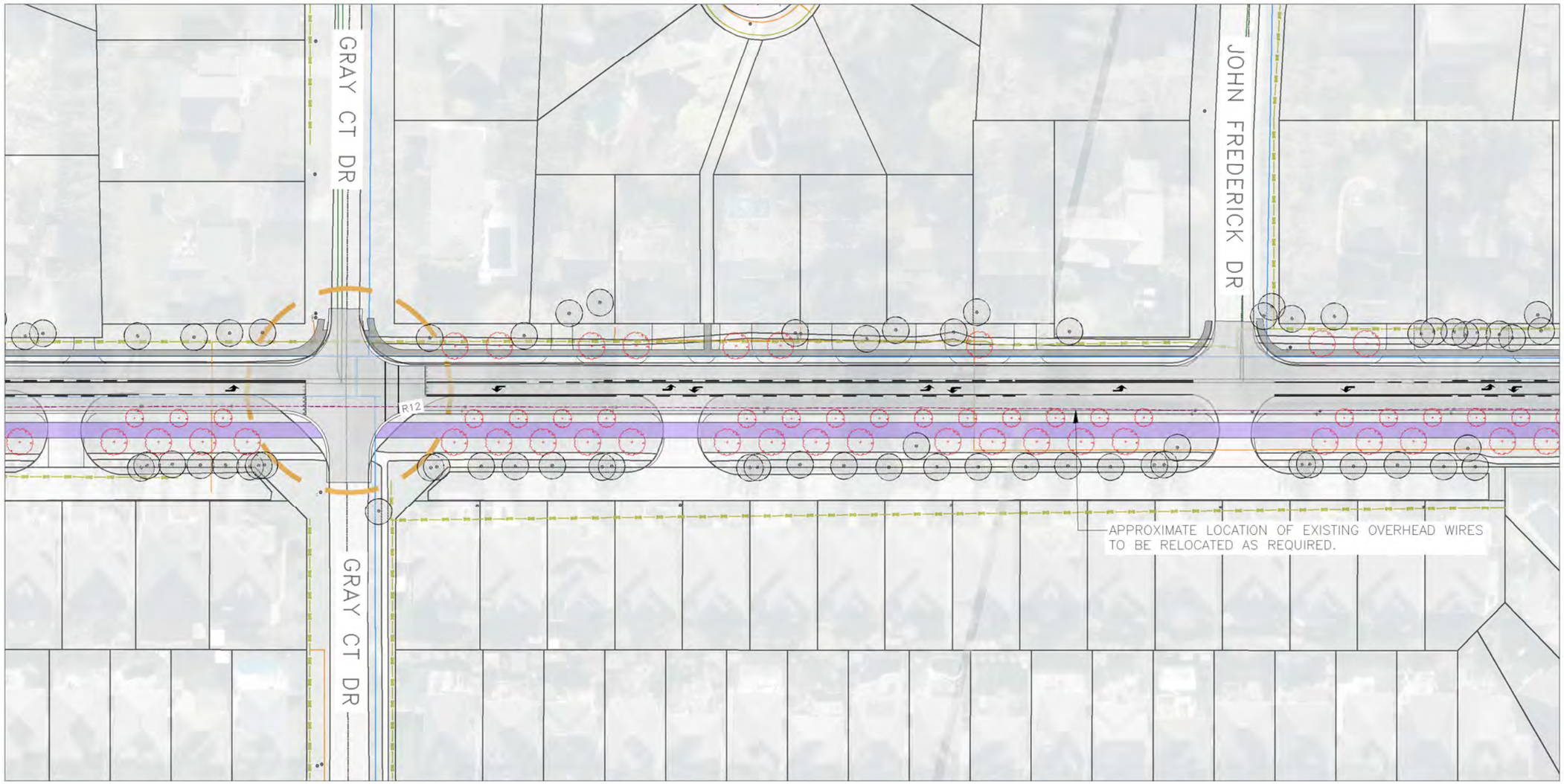

EXISTING TREES – TO BE PROTECTED
PROPOSED LARGE DECIDUOUS TREE
PROPOSED SMALL TREE
PROPOSED CONIFEROUS TREE
OVERHEAD HYDRO WIRE

EXISTING GAS PIPE – TO REMAIN
EXISTING WATER MAIN – TO REMAIN
COAXIAL CABLE DUCT – TO REMAIN
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PEDESTRIAN CROSSING

DEVELOPMENT APPLICATIONS
SIDEWALK
MULTI-USE PATHWAY

SCALE – HORZ.
5m 0 10m

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SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

LANDSCAPE CONCEPT PLAN

SHEET 03

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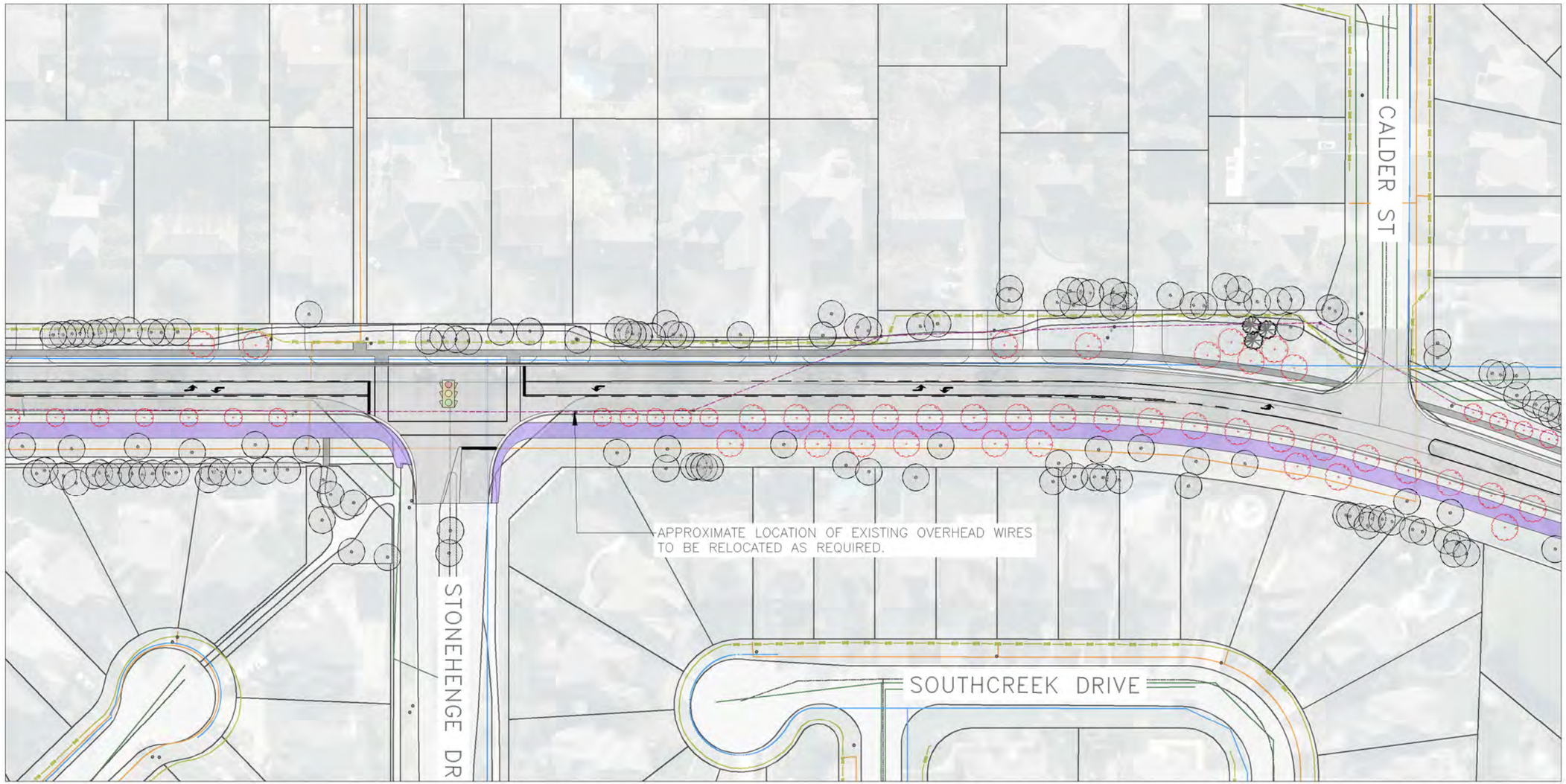

EXISTING TREES – TO BE PROTECTED
PROPOSED LARGE DECIDUOUS TREE
PROPOSED SMALL TREE
PROPOSED CONIFEROUS TREE
OVERHEAD HYDRO WIRE

EXISTING GAS PIPE – TO REMAIN
EXISTING WATER MAIN – TO REMAIN
COAXIAL CABLE DUCT – TO REMAIN
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CITY OF HAMILTON
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ENVIRONMENTAL ASSESSMENT STUDY

Hamilton

PROPOSED ROW
EXISTING ROW
EXISTING LOT
PEDESTRIAN CROSSING

DEVELOPMENT APPLICATIONS
SIDEWALK
MULTI-USE PATHWAY

SCALE – HORZ.
5m 0 10m

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SOUTHCOTE ROAD
ROADWAY IMPROVEMENTS

LANDSCAPE CONCEPT PLAN

SHEET 04

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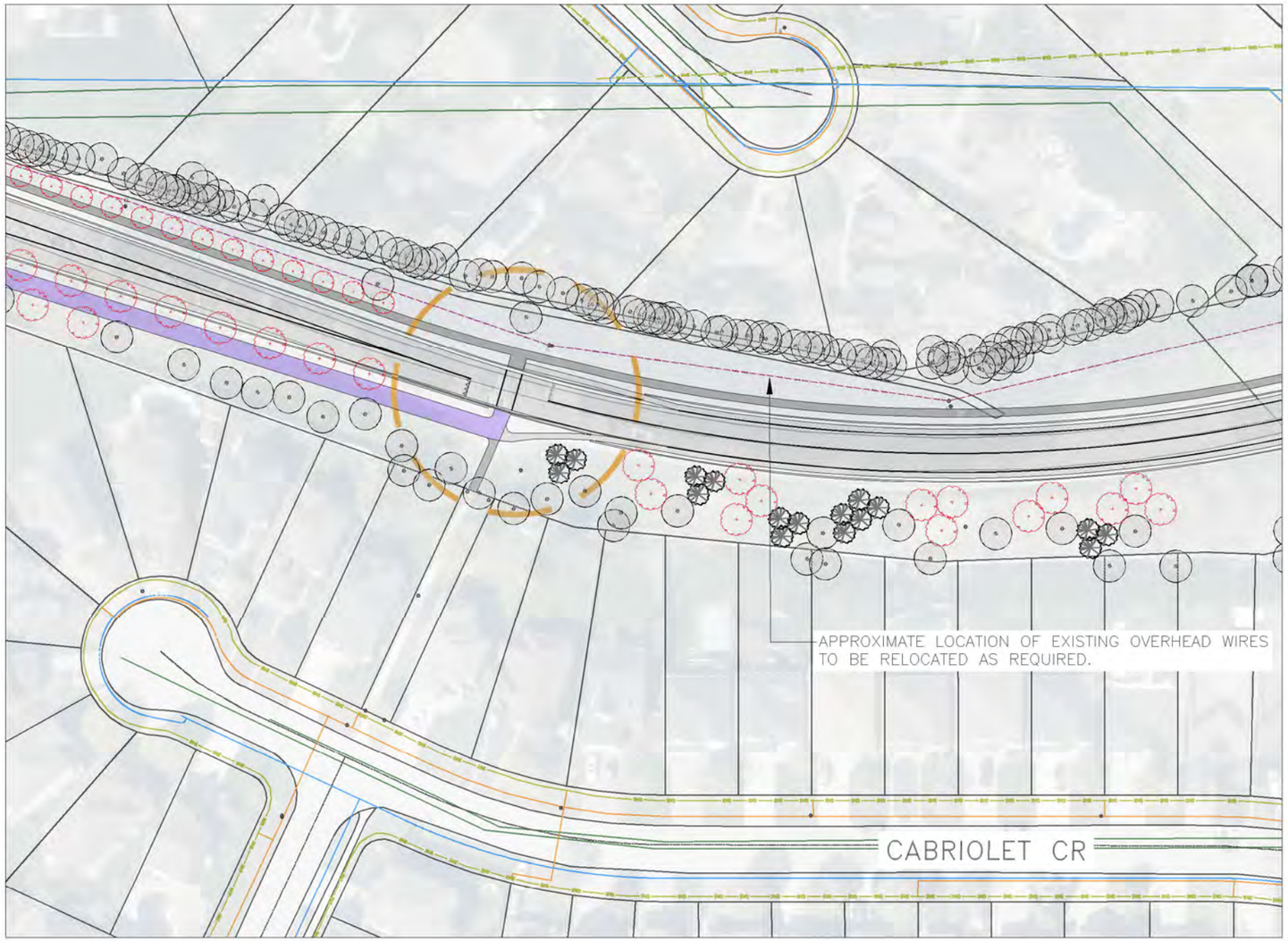

EXISTING TREES – TO BE PROTECTED
PROPOSED LARGE DECIDUOUS TREE
PROPOSED SMALL TREE
PROPOSED CONIFEROUS TREE
OVERHEAD HYDRO WIRE

EXISTING GAS PIPE – TO REMAIN
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COAXIAL CABLE DUCT – TO REMAIN
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SCALE – HORZ.
5m 0 10m

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SOUTHCOTE ROAD
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LANDSCAPE CONCEPT PLAN

SHEET 05

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EXISTING TREES – TO BE PROTECTED
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PROPOSED CONIFEROUS TREE
OVERHEAD HYDRO WIRE

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SHEET 06

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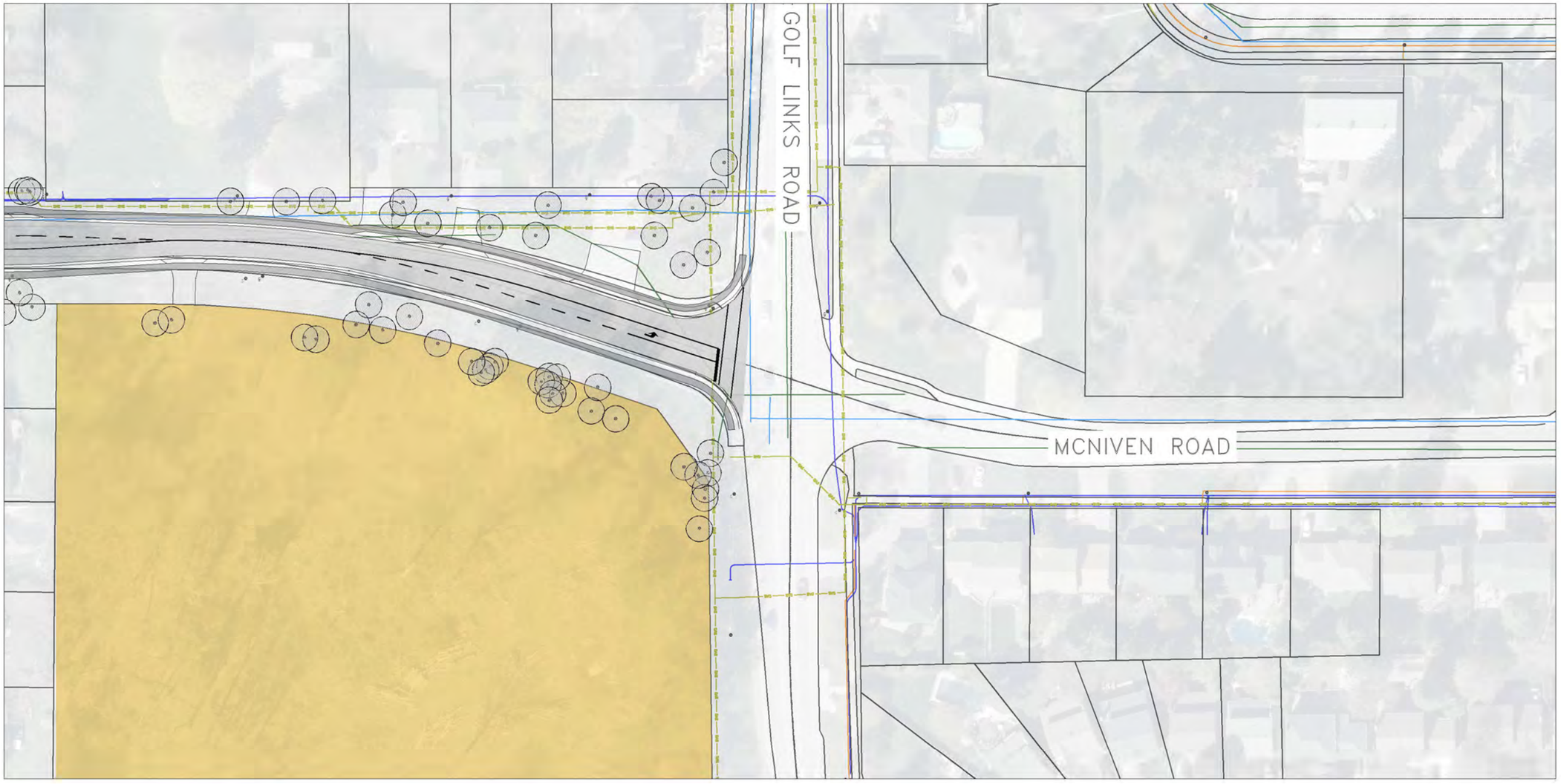

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SCALE – HOR:
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STREET TREE PLANT LIST

Code	Quantity	Botanical Name	Common Name	Native	Size	Cond.	Spacing
Deciduous Trees > 7.5m							
CB		*Carpinus betulus 'Frans Fontaine'*	Frans Fontaine Hornbeam	Y	60mm cal.	WB	
CJ		*Cercidiphyllum japonicum*	Katsura Tree	N	60mm cal.	WB	
CO		*Celtis occidentalis*	Common Hackberry	Y	60mm cal.	WB	
EU		*Eucommia ulmoides*	Hardy Rubber Tree	N	60mm cal.	WB	

CITY OF HAMILTON
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