



BURNSIDE

**Preliminary Report
Mill Creek Drainage Petition**

**Township of West Lincoln
318 Canborough Street
Smithville, ON L0R 2A0**



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Mill Creek Drainage Petition**

**Township of West Lincoln
318 Canborough Street
Smithville, ON L0R 2A0**

**R.J. Burnside & Associates Limited
35 Perry Street
Woodstock ON N4S 3C4 CANADA**

**April 2021
300051132.0000**



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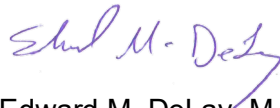
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1	April 14, 2021	Submission to the Township of West Lincoln

R.J. Burnside & Associates Limited

Report Prepared By:



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Water Resources Engineer
ED:ba



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- Appendix C Preliminary Survey Summary
- Appendix D Drawings

Nomenclature

General

ac – acre (0.4047 ha)
Ap. - Approximately
BSWI – buried surface water inlet
CB – catchbasin
CCTV – closed circuit television
CDT – concrete drain tile
CSP – corrugated steel pipe
c/w – complete with
dia. – diameter
DICB – ditch inlet catchbasin
d/s – downstream
ea. – each
FL – fence line
FPPDT – filtered perforated plastic drainage tubing
H – horizontal
ha – hectare (2.471 ac)
HDPE – high density polyethylene
BJB – buried junction box
km – kilometre
LS – lump sum
m – metre
mm – millimetre
m² – square metre
m³ – cubic metre
OB – observation box
o/s – offset
PDT – plastic drainage tubing
PL – property line
PPDT – perforated plastic drainage tubing
RCSP – riveted corrugated steel pipe
ROW – right of way
S & I – supply and install
SPDT – solid plastic drainage tubing
Sta. – station (chainage)
SWI – surface water inlet
SWRP – surface water riser pipe
SWWSP – smoothwall welded steel pipe
t – tonne (2,205 pounds)
u/s – upstream
V – vertical

Other

CA – Conservation Authority
DFO – Fisheries and Oceans Canada
MTO – Ministry of Transportation
MNRF – Ministry of Natural Resources and Forestry
MECP – Ministry of the Environment, Conservation, and Parks
NRCS – Natural Resources Conservation Service
OMAFRA – Ontario Ministry of Agriculture, Food and Rural Affairs
SCS – Soil Conservation Service

1.0 Project Authorization

This preliminary report is being prepared in response to an appointment by the Council of the Township of West Lincoln, dated December 16, 2019 to investigate drainage issues on the properties of the petitioners, in accordance with Sections 4 and 10 of the Drainage Act, R.S.O. 1990.

1.1 Engineer's Report

The proposed options and estimated costs contained herein are intended to reflect the requirements of the stakeholders and are based on information gathered during field survey, the on-site meeting, site landowner meetings, and follow up discussions. Details of the proposed work are described in this report, appendices, and drawings.

This preliminary report includes:

- A preliminary contributing watershed plan.
- Suggested construction options / alternatives.
- Estimated total construction cost.
- Estimated applicable allowances and potential grants.

1.2 Petition for Drainage Works by Owners

The petition dated September 26, 2019 was submitted by Frank Svob, owner of the F. Svob & Frank Svob Farms Ltd. properties (Roll Nos. 6-140-00 and 6-153-00); which consists of Part of Lots 26 & 27, Concession BF in the Township of West Lincoln (Geographic Township of Gainsborough), in the Regional Municipality of Niagara.

2.0 Background Information

2.1 Location

The focus of this report is on a portion of the Mill Creek and its contributing watershed which includes the Svob properties and others and is immediately north of the Welland River and is located on the western side of Victoria Avenue (Highway 24), bounded by Wiley Road to the north, and Boyle and East Chippawa Roads to the west.

The approximate watershed boundary for the proposed municipal drain is as shown on the enclosed Plan and consists of lands in both the Township of West Lincoln (Geographic Township of Gainsborough) and the Town of Pelham (Geographic Township of Pelham), located in the Regional Municipality of Niagara.

The approximate watershed boundary extends from the Welland River north to Vaughan Road, and is bounded to the west by Boyle and East Chippawa Roads, and by Victoria Avenue to the east within the Township of West Lincoln. A smaller contributing area is

located east and south of Victoria Avenue between Sumbler and Webber Roads in the Town of Pelham.

The final extents of the watershed boundary will be confirmed prior to the preparation of any subsequent report.

2.2 History

The existing Mill Creek watercourse on the Svob properties (Roll Nos. 6-140-00 and 6-153-00) outlets into the Welland River and is a natural watercourse. Since this report is for a new municipal drain, there is no documented history for this proposed municipal drain or its watershed.

Random private subsurface drainage tiles were mentioned by some landowners within the watershed south of Wiley Road; however, none of these are known to have any legal status under the Drainage Act.

Also, a private catchbasin and subsurface drainage system was observed immediately south of Concession Road 1, on Lot 27, Concession 1, in the Township of West Lincoln, likely outletting to the south and eventually entering the upstream end of the Mill Creek channel at Wiley Road.

2.3 Existing Conditions

The headwaters of Mill Creek are located in Lots 25 to 28, Concession 2, (Geographic Township of Gainsborough) in the Township of West Lincoln. Surface water crosses Canborough Road at 3 locations at points 'S1', 'T', and 'Q3' on the accompanying watershed plan. Flow then continues south, crossing Concession Road 1 with an additional drainage area at 5 locations at points 'M4', 'M6', 'S', 'Q4', and 'Q2' also as shown.

A private catchbasin and subsurface drainage system was observed on Lot 27, Concession 1 within watershed 'R' on the accompanying watershed plan. The downstream watercourses continue to become further defined paralleling Sheddon Road to the east and west until their confluence with the Mill Creek at points 'M' and 'O' as shown. A series of three inline culvert crossings of the Mill Creek on Wiley Road are shown at points 'M', 'N', and 'O' on the plan at Lot 27, between Broken Front Concession (BFC) and Concession 1.

Two additional watersheds enter the Mill Creek downstream of Wiley Road shown at points 'K1' and 'K2' in Lots 25 & 26, BFC.

Further downstream on Part Lot 26 & 27, BFC, the channel has been maintained in the past and is significantly wider than upstream sections. As the channel enters Lot 28, BFC, the gradient reduces, producing a ponding area. The cross-section of the channel

is much smaller downstream of the ponded area and a landowner crossing has been installed upstream of East Chippawa Road. A significant tributary channel enters Mill Creek at this point whose watershed extends past Victoria Avenue. A concrete box culvert crosses East Chippawa Road and appears to be in good condition; however, this assessment is pending a structural investigation.

Downstream of East Chippawa Road on the golf course property, the channel cross-section remains decreased and there is a series of four inline culvert crossings and one bridge. Also, a tributary enters the channel from the north, prior to outletting into the Welland River. Prior to entering the river, gradient decreases quickly within a treed low area where a tributary enters the channel from the east and evidence of flooding was observed within the golf course.

2.4 Watershed Area & Land Use

The total watershed area of Mill Creek is approximately **750 ha** (1,853 acres). The watershed area was delineated through the examination of topographic contour mapping data with computer aided drafting (CAD) software, geographic information systems (GIS) software, the review of existing municipal drain reports, and supplemented by a field survey and observations. The preliminary watershed area as shown has been incorporated as part of this report.

Current land use within the watershed area is approximately divided as follows:

- 545 ha as agricultural land.
- 93 ha as woodlot.
- 50 ha as treed wetland.
- 18 ha as residential land.
- 25 ha as municipal road Right-of-Way (ROW).
- 19 ha as pasture / grassed.

The proposed Mill Creek watershed shares a contiguous watershed boundary with the following existing municipal drains:

- The Nunn Municipal Drain (1925) to the east.
- The Keenan Drain to the north and east.
- The 15 Mile Drain to the north.

2.5 Soils

Soil Types

The soil survey for Lincoln County taken from Report No. 34 of the Ontario Soil Survey (1963) indicates that the predominant soil type within the watershed area of the

Township of West Lincoln is Haldimand Silt Loam, with areas of Haldimand Clay Loam in the northern and southern areas of the watershed.

- **Haldimand Silt Loam / Clay Loam** - A clay till soil with fair to good surface drainage, rolling to smooth topography, and few stones.

The soil survey for Welland County taken from Report No. 5 of the Ontario Soil Survey (1935) indicates that the predominant soil types within the watershed area of the Town of Pelham are Haldimand Clay Loam and Caistor Clay Loam.

- **Caistor Clay Loam** - A clay till soil with fair to poor surface drainage, smooth to undulating topography, and few stones.

Hydrologic Soil Group

OMAFRA *Publication 29 – the Drainage Guide for Ontario* classifies the following soils within Hydrologic Soil Groups (HSG) per the United States Department of Agriculture (USDA) - *Technical Release 55 (June 1986)*”:

- Haldimand Clay Loam – **HSG ‘C’**.
- Caistor Clay Loam – **HSG ‘C’**.

Soil types classified under HSG ‘C’ are characterized as having moderate to high runoff potential and lower infiltration rates, typically including soils with higher silt and clay content.

Agricultural Capability Rating

The soils within the watershed area have an agricultural capability rating of Class 2 with adverse soil characteristics.

2.6 Utilities Investigation

A utilities investigation was not undertaken as part of this preliminary report; however, it will be a component of a final report.

3.0 Preliminary Investigations

3.1 Desktop Survey

Prior to any on-site reconnaissance, a desktop investigation was completed to compile available information for the existing drainage system, the contributing watershed, and surrounding watersheds.

3.2 Site Investigation No. 1

A preliminary investigation was completed on February 12, 2020 to confirm existing surface culvert locations. This information was used to determine the area of the contributing watershed using a terrain model using geographic information systems (GIS) software.

3.3 Site Investigation No. 2

A subsequent investigation, including a succinct topographic spot survey completed with GPS survey equipment and a site walkthrough, was completed on April 16, 2020. A summary of surveyed information has been provided in Appendix 'C'.

The site walk began at the upstream Wiley Road culvert crossing. Three corrugated steel pipe (CSP) culvert crossings currently exist within the Wiley Road ROW between Sta. 3+531 and 4+013 and appeared to be in good condition. A tributary entered the channel near Sta. 3+601 from Sheddon Road.

It continued downstream through the F. Svob (Roll No. 6-140-00) property where ponded water and stagnant water, likely the result of beaver damming downstream, were evident and onto the A. & R. Wiley (Roll No. 6-155-00) property, ending near Sta. 2+918. Evidence of beaver dam removal was apparent on the Wiley property in this section and several tributaries to the channel were also observed.

Further downstream near the A. & R. Wiley (Roll No. 6-154-00) and F. Svob (Roll No. 6-140-00) property line, the channel became much larger in cross-section likely due to Mr. Svob's maintenance during his ownership. A smoothwall steel culvert crossing within the channel on the Frank Svob Farms Ltd. has eroded and the crossing is no longer passable.

Progressing downstream onto the J. & L. Juhasz (Roll No. 6-138-00) property, aerial photos show evidence of a ponded area which was confirmed on site and further downstream, a CSP culvert farm crossing has recently been installed. The existing channel downstream of the ponding area narrowed significantly in this area.

A sub-surface HDPE outlet pipe and surface swale was found on the T. & R. Reece property (Roll No. 6-137-01) immediately upstream of East Chippawa Road; it extended north and east to Victoria Avenue / Vineland Townline Road (County Road 24) and appeared to have a significant contributing watershed area.

There is an existing concrete box culvert within the East Chippawa Road ROW and it appeared to be in good condition. This box culvert had a much larger cross-sectional area in comparison to other structures within the channel, indicating a larger design standard was used in its design and therefore it should have a higher flow capacity.

Downstream on the Riverview Golf Club property (Thomas & Sung Inc, Roll No. 6-117-00), the channel entered a defined low run which had a smaller cross-sectional area and there was evidence that the channel had seasonally overtopped its banks. A series of 3 smaller diameter culverts and a bridge were observed and the channel continued to lose gradient downstream of a bridge crossing before it entered a wooded wetland area. A tributary was observed entering the channel from the East Chippawa Road ROW near Sta. 0+590.

A tributary entered the channel within the wetland area from the east near Sta. 0+143 and continued past Victoria Avenue / Vineland Townline Road (County Road 24) with what appeared to be a significant contributing area.

A final small diameter CSP culvert crossing controlled outlet flow at the Welland River where there was evidence that the crossing had been overtopped by channel or river flow.

3.4 On-Site Meeting

The on-site meeting for the proposed drain was held on August 6, 2020 on Wiley Road just east of the intersection with Shedden Road.

A summary of the discussion at that meeting has been included in Appendix 'A' of this report and also includes a list of those in attendance who signed in.

Properties with the watercourse on their property between the Welland River and Wiley Road were invited to the meeting. The existing drainage conditions were discussed, in addition to the Drainage Act process, timelines for a typical project under the Act, and several questions and answers as detailed in the included notes.

Mr. Svob expressed interest in the design of a drainage solution to help alleviate flooding issues on his property which is slow to dry out for spring planting. Since approximately 1970 the petitioner has farmed and maintained the channel on the properties at his expense. He also mentioned the main reason for his petition is to develop a schedule for future maintenance of the drain as he has been paying all maintenance costs for work on his property.

Mr. Wiley indicated beaver dams as a major contributor to drainage issues in this portion of the watershed. He has recently trapped and removed the beavers and beaver dams and believes this will address the drainage issues. Mr. Wiley and other landowners indicated their opposition to paying to drain Mr. Svob's property.

Landowners also indicated there were heavy clay soils within the watershed and many other properties do not have tile drainage systems at this time.

The Niagara Peninsula Conservation Authority (NPCA) was not present at the meeting although they were invited. It is assumed that this project would require a permit to proceed as a result of the presence of NPCA regulated lands within the watershed.

Based on discussions during the meeting, it was determined that the primary purpose of this preliminary report would be to evaluate the design of a drainage system to reduce the flooding within the watershed. It was also apparent that there was an appetite to proceed to a final report and provide a legal outlet for lands within the watershed and a schedule for future maintenance work on the drainage system.

3.5 Validity of Petition

This preliminary report has been prepared as a result of a petition under Section 4 and an appointment in accordance with Section 10 of the Drainage Act, R.S.O. 1990 as a new municipal drain.

The area requiring drainage was determined by the Engineer at the on-site meeting to be Part of Lots 26 and 27, BFC (Geographic Township of Gainsborough). The petition submitted is valid on the basis that all the owners in the area requiring drainage have signed it, in accordance with Section 4(1)(a) of the Act.

4.0 Design Criteria & Engineering Considerations

4.1 Hydrologic and Hydraulic Modelling

Detailed hydrologic modeling has not been performed at this point in the project. This would be used to determine specific flowrates for the channel and structure design which is based on runoff resulting from a variety of design storms simulated on the watershed from 2-yr to 100-yr and historic rainfall events for the area such as Hurricane Hazel.

However, a preliminary hydraulic model was created for the watershed using PCSWMM (Version 7.2) software to simulate bankfull flow on the existing drainage system. Bankfull flow means that the water level in the channel would be equal to the top of the channel banks in elevation. This was used to determine potential areas of flooding based on preliminary survey data and to gain some knowledge of the capacity of the existing and proposed drainage systems.

Input parameters for hydraulic modelling were based on watershed land use gathered from aerial photography, field investigations, published hydrologic and hydraulic values, and other relevant resources.

4.2 Drainage System Design

The applicable sections of the "A Guide for Engineers working under the Drainage Act in Ontario" (Publication 852), and the applicable sections of the "Drainage Guide for

Ontario” (Publication 29), both of which were published by the Ontario Ministry of Agriculture and Food and Rural Affairs (OMAFRA), were used to determine and supplement preliminary design considerations for this drainage system.

Existing Channel and Structure Evaluation

Based on field data and the bankfull hydraulic simulation results on the existing drainage system (Mill Creek), it was evident that a deepening and widening of the channel would be required from Wiley Road downstream to the Welland River.

Existing crossings of the Mill Creek were also included as part of the simulation to determine whether they are posing a potential restriction or an obstruction to flow, which would require repair or removal.

The three inline culvert crossings within the Wiley Road ROW and the concrete box culvert within the East Chippawa Road ROW did not appear to be obstructing flow under the hydraulic simulation for existing conditions, however, the culvert crossing on the J. & L Juhasz property (Roll No. 6-138-00) and four culvert crossings on the Thomas & Sung Inc. property (Roll No. 6-117-00) may require replacement as they are overtopping under the simulated bankfull flow.

As part of a detailed design in a final report, the channel and crossing structures would be sized to meet the design criteria specified in Table 1 below taken from OMAFRA Publication 852.

Table 1: Open Drain Design Criteria

Component	Design Storm Return Period ¹
Channel - Rural/Agricultural	2 year
Field Crossings	2 - 5 year
Residential or Major Agricultural Crossings	5 - 10 year
Lower-Tier Municipal Road Crossing	5 - 10 year
Upper-Tier Municipal Road Crossing	10 – 25 year

Table based on OMAFRA Publication 852, dated 2018.

The Municipality and Conservation Authority may require a design varying from those listed.

As a result, the channel would typically be designed to convey the maximum flows resulting from the simulated 2-year return period (RP) design storm and landowner crossings would be designed to convey flows resulting from between a 2 to 5-year RP design storm.

Flood events beyond the 5-year RP design storm may result in water elevations above the top of the culvert and produce flooding upstream of the culverts.

Furthermore, road crossings and primary residential access crossings would be designed to a higher design standard beyond the 5-year RP as shown in Table 1 to accommodate larger flood events.

4.3 Design Considerations for Water Quality

The loss of sediment and nutrients from cropped land is a major concern to water quality in Ontario. Therefore, this project could include several features to minimize these impacts and enhance aquatic habitat including but not limited to:

- Embedded culvert crossings for fish passage.
- Riffle and pool sequences to stabilize the channel in erosion zones, providing aeration within riffles and wintering habitat in refuge pools.
- Substrate salvage within areas of eroded stony channel bed / bottom material.
- Establishing a buffer strip along both sides of the new drain.
- Establishing sediment control basins.

4.4 Future Maintenance

If the Mill Creek became a municipal drain under a final report, manmade obstructions such as undersized, blocked, and / or perched culverts, dams, etc., within a municipal drain may be removed by the Drainage Superintendent under Section 80 of the Drainage Act, R.S.O. 1990 at the cost of that property.

A maintenance schedule would be produced as part of the final report, detailing a breakdown of maintenance costs to individual properties based on the location of the maintenance.

Natural blockages or impediments to flow such as beaver dams or the deposition of sediment within the channel over time would also be removed by the Drainage Superintendent under Section 74 of the Act and assessed to landowners based on the Maintenance Schedule, typically those owner upstream of where the work was completed.

5.0 Environmental and Fisheries Considerations

When a new Engineer's report is prepared that could affect an existing municipal drain, natural watercourse, wetland, or other environmental features, approvals and authorizations are required from regulatory agencies.

This project has already included some correspondence with staff from the Niagara Peninsula Conservation Authority (NPCA), Fisheries and Oceans Canada (DFO), and the Ministry of the Environment, Conservation, and Parks (MECP) which has been summarized in Appendix 'B' in addition to screening memoranda by Burnside Ecologist Staff.

A copy of this report will be sent to agency staff so they can provide additional comments with respect to any proposed design scenarios so that any environmental considerations and concerns relating to the Mill Creek can be addressed and satisfied.

6.0 Allowances & Grants

6.1 Allowances

Allowances are a form of compensation that is provided to the property owner affected by the creation of the municipal drain and its associated work. Allowances proposed under this report include those under Section 29 for Right-of-Way and Section 30 for damages under the Act. The areas and values presented here are approximate and intended to reflect the scope of this project at this time.

Section 29 - Right-of-Way

Right of way allowances will be provided for:

- A right-of-way for the widened portion of the actual channel width.
- A 10 m width for a designated working space and a spoil levelling zone alongside the channel.
- A 3 m wide buffer strip on both sides of the drain would be created and paid for as part of the drain, acting as a surface water filter and setback for any activities adjacent thereto.

Section 30 - Damages

Damage allowances will be provided for:

- A 10 m width for the designated working space and spoil levelling zone alongside the channel would be paid for as a damage allowance in any actively cropped agricultural area(s). The damage width may be increased if required based on the final design requirements.

6.2 Grants

The cost of work performed under the Drainage Act is assessed to the property owners in the watershed of the drainage system. OMAFRA may provide a one-third grant towards any assessment levied on lands assessed at the Farm Property Class Tax Rate.

7.0 Proposed Design Scenarios

Preliminary designs and accompanying cost estimates have been prepared for three separate possible drainage systems or solutions for this watershed. A general

description of the more significant details of each alternative has been provided but is not necessarily limited to the following.

7.1 Scenario No. 1 – No Construction

This scenario would involve proceeding to a final report only and would include:

- Establishing Mill Creek as a municipal drain under the Drainage Act, R.S.O. 1990, by identifying standards (plans, profiles, specifications) through a final Engineer's report adopted by by-law; however, no physical work would be performed on the Mill Creek Drain.
- The report would include assessment schedules to be used to assess the initial costs, and for the cost of any future maintenance or repair work on the drain.
- Allowances covered under this report would be provided under Section 29 for Right-of-Way and Section 30 for damages. The included allowance to establish the 3 m buffer above both channel banks is approximately \$78,210.

In this scenario, the existing Mill Creek would be maintained in its current location and grade, however, if works are required on the system in the future, it would be undertaken by the Township and cost-shared using the proportions in the assessment schedule(s) for maintenance.

Estimated Costs:

Construction:	\$0
Allowances:	\$125,000
Engineering:	\$82,000
Other:	\$28,000
TOTAL – Scenario No. 1	\$235,000

7.2 Scenario No. 2 – Channel Cleanout and Bank Stabilization Only

The second scenario is identical to the first with the addition of construction items. Updated details of the construction process, cost estimates, etc., would be provided following a complete field survey and investigation as part of the scope of a final report prior to construction. This scenario would consist of the following:

- A clean out of the existing channel from the Welland River upstream through the most upstream Wiley Road Culvert, approximately 4,050 m in length. This would not include new excavation but the removal of sedimented material in the channel bottom to encourage flow through the entire system.
- Ap. 572 m of brushing and clearing to establish a 10 m width working space along the channel.
- Spot excavation would address minor high points within the channel to increase flow, especially in areas of low gradient.

- Stabilization of bank slumping, especially at channel bends, culvert inlets / outlets, and erosion prone areas of higher gradient. Supplied and installed approximate quantities included:
 - Over 500 m² of OPSS R-50 quarry stone rip-rap.
 - Over 10,000 m² of hydroseeding on channel banks.
- Environmental features such as sediment basins, riffle structures, and sediment control structures have been included in this cost as typical items used to offset environmental impacts from the works in order to meet the specific requirements of the individual reviewing agencies.
- Construction costs have been estimated approximately 10% higher than typical prices due to fluctuating bids in recent tenders.

The implementation of this option is conditional on receiving the necessary permits, approvals and authorizations from regulatory agencies.

Estimated Costs:

Construction:	\$157,000
Allowances:	\$125,000
Engineering:	\$100,000
Other:	\$28,000
TOTAL – Scenario No. 2	\$410,000

7.3 Scenario No. 3 – Channel Deepening & Widening

The third scenario is similar to the second but includes additional costs for construction, engineering, and contingency due to an increased scope of work. Updated details of the construction process, cost estimates, etc., would be provided following a complete field survey and investigation as part of the scope of a final report prior to construction. This scenario would consist of the following:

- A deepening and widening of the existing channel from the Welland River upstream through the most upstream Wiley Road Culvert, approximately 4,050 m in length. This would include new excavation, and the modification of the existing channel (which is shallow in many locations) to a typical trapezoidal cross-section.
- Approximate dimensions of the new channel would be:
 - 1 m channel bottom width.
 - 2H:1V sideslopes.
 - Typical 1.5 m depth where possible.
- Ap. 526 m of channel relocation and filling along Wiley Road (Sta. 3+419 to Sta. 4+005).
- Ap. 703 m of brushing and clearing to establish a 10 m width working space along the channel.

- Stabilization of bank slumping, especially at channel bends, culvert inlets / outlets, and erosion prone areas of higher gradient. Supplied and installed approximate quantities included:
 - Over 650 m² of OPSS R-50 quarry stone rip-rap.
 - Over 18,000 m² of hydroseeding on channel banks.
- Culvert end erosion protection has been included in this estimate. Any costs to remove, reinstall, replace, improve / repair existing culverts or to add any additional crossings have not been included and are beyond the scope of this report; such items, if deemed necessary, would be addressed in the final report.
- Environmental features such as sediment basins, riffle structures, and sediment control structures have been included in this cost as typical items used to offset environmental impacts from the works in order to meet the specific requirements of the individual reviewing agencies.

The implementation of this option is conditional on receiving the necessary permits, approvals, and authorizations from regulatory agencies.

Estimated Costs:

Construction:	\$255,000
Allowances:	\$125,000
Engineering:	\$132,000
Other:	\$43,000
TOTAL – Scenario No. 3	\$555,000

8.0 Description of Appendices

8.1 Appendix A – On-Site Meeting Notes

A summary of the On-Site Meeting has been included in this Appendix.

8.2 Appendix B – Agency Correspondence

Project recommendations and requirement from the NPCA, MECP/MNRF, and DFO are listed in this Appendix.

8.3 Appendix C – Preliminary Survey Summary

A tabular summary of the field survey data has been included in this Appendix.

8.4 Appendix D – Drawings

Three plan drawings are included with this report, consisting of two watershed plans, and one plan of the proposed work area.

9.0 Conclusions

The content of this preliminary report is the result of three site investigations and one on-site meeting.

There are a number of details relating to this proposed municipal drain that have yet to be determined in consultation with the various stakeholders. The details to be resolved include, but are not necessarily limited to the following items:

- Formal instruction from the Council of West Lincoln to prepare a final report (assuming the petition remains valid after the consideration of this preliminary report).
- Selection of a preferred design scenario or a modification of any of the three proposed herein by the Council of West Lincoln with input from the stakeholders, allowing the Engineer to move forward with the preparation of a final report.
- Determine the upstream extent of the proposed municipal drain, if additional properties wish to petition for an upstream extension.

We submit this preliminary report for review and consideration by the affected stakeholders and await further instructions from both the Council and Staff of the Township of West Lincoln.



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[THE DIFFERENCE IS OUR PEOPLE]



Appendix A

On-Site Meeting Notes



On-Site Meeting Notes

Meeting Date: August 6, 2020 **Project No.:** 300051132.0000
Project Name: Mill Creek Municipal Drain
Meeting Subject: On-Site Meeting
Meeting Location: Wiley Road, Township of West Lincoln
Date Prepared: August 10, 2020

Those in attendance were:

Ed DeLay	R.J. Burnside & Associates Limited (Burnside)	ed.delay@rjburnside.com
Sid Vander Veen	Burnside	sid.vanderveen@rjburnside.com
Michael Siemon	Burnside	michael.siemon@rjburnside.com
Danielle Anders	GM BluePlan Engineering Limited	danielle.anders@gmblueplan.ca
Nathan D'Souza	GM BluePlan Engineering Limited	nathan.dsouza@gmblueplan.ca
Ray Vachon	Township of West Lincoln	rvachon@westlincoln.ca
Frank Svob		franksvob@gmail.com
Paul Burt		vandpburt@gmail.com
Virginia Burt		vandpburt@gmail.com
Nick Misdorp		
Rick Wiley	Wileydale Farms	rickwiley0@gmail.com
Art Wiley	Wileydale Farms	
Scott Shedden		scottshedden99@gmail.com
Jason Beamer		jebeamer@hotmail.com
Mike Vahrmeyer		vahrmeyerm@gmail.com

The following items were discussed

Ed A petition was signed, Council decided to proceed with a preliminary report. The area where the On-Site Meeting is taking place, (along Wiley Road) was the main area of concern.

The following items were discussed

- Sid Explanation of when the Drainage Act is applied (more than one property has water issues). At this point in time, Ed DeLay, the appointed Engineer, has been instructed by the Municipality to only write a preliminary report. After the preliminary report, if a decision is made to move forward with the project, a final Engineer's report will be created.
- Explanation of the report and petition drain process (cost sharing, Council's role, government grants for agricultural properties). The drainage superintendent, Danielle Anders, will then be responsible for maintenance of the drain (cleanouts, beaver removal, etc.).
- Ed Everyone in the watershed will share the costs of this project (this watershed reaches all the way to the railroad to the north). Petitioner Frank Svob's primary concern was cost sharing. Council decided to request a preliminary report; so that engineering costs could be kept lower initially.
- Sid Assessments to individual properties are not typically produced with a preliminary report.
- Rick Wiley He thinks that beavers coming upstream from the Welland River are the source of the "whole problem" because other than in their dammed-up areas, the drain has enough fall and typically flows fast. He removed beavers in 2019 and it helped the drainage issues, but they ended up returning. Art Wiley showed a note with the dates of approximately 6 beaver removals. Rick said that he had some success with trapping the beavers.
- Frank Svob He has paid to clean out this drain multiple times, even though it's not his water that is making its way through his property. Every time he needs to clean the drain out, he pays approximately \$10,000.
- Rick Wiley He thinks each property should solve their own problems, like he does with the beavers. He also expressed his concern that he would not have the means to pay for the drain.
- Sid Explanation of the responsibility that comes with being appointed as Engineer to a municipal drainage project (this project needs to be moved forward, if there continues to be a legitimate petition).
- Explanation of drainage law (common law and rights of drainage).
- Frank Svob Has tiles that are submerged and require drainage.
- Rick Wiley Cannot afford to pay for it when it shows up on his tax bill.

The following items were discussed

- Ed The drain process needs to proceed.
- Rick Wiley Was told that when the Engineer writes a report, they could stop the extents of the work at his property and start it again downstream of his property. He did not want his property included.
- Sid Discussed common law vs. drainage act, area requiring drainage (ARD - Engineer decides what the area is) and that it's the opinion of the Engineer what the ARD is.
- Rick Wiley Thought the issues were solved with the beaver removal, offered to trap beavers for the neighbouring properties.
- Frank Svob The Municipality could benefit from the potential removal of one of the three culverts along Wiley Road, or at least it would help with maintenance of the culverts.
- Ed We (the Engineer) are to approach projects unbiasedly. It comes down to whether someone requires drainage, and it only takes one person with a valid Petition. This is a longer process; the landowners will not see any work or cost for a while. There are still options, which is what we want landowner input for. Asked each landowner individually to share their thoughts.
- Scott
Shedden Undecided.
- Virginia Burt Opposed to the drain – doesn't want to see a large bill with their taxes.
- Nick Misdorp Thought that the issue was solved with the beaver removal.
- Jason
Beamer Is involved in a municipal drainage project in Wainfleet. Costs are high; he would typically try to use his own equipment to solve the issue.
- Frank Svob Did not think he should have to solve the problem of other people's water.
- Rick Wiley Claims not to have issues with sediment buildup because he only farms his land up to the bush, not to up to the banks of the channel.
- Ed Isn't fair for someone like Frank to deal with issues caused by others' water.
- Sid This project will continue unless otherwise directed by the Municipality to stop, or if Frank Svob was to remove his name from the petition.

The following items were discussed

- Mike Vahrmeyer Why are we meeting if the Engineer can go ahead with whatever he wants?
- Ed Encouraged Mike Vahrmeyer to discuss with Council on whether the project should continue. At this meeting they welcome input regarding what they would like done. Explained the factors into how costs are broken down (by land use, size of land contributing, etc.).
- Rick Wiley Left the meeting.
- Danielle Anders Burnside is going to look into things and come up with options. No decisions are yet made.
- Ray Vachon No further comments.
- Ed Any property with farm tax class is eligible to receive grants from OMAFRA. Each property will only pay for the sections of the drain that they use (pay per use system), working spaces (area along the drain that will be damaged during construction) will be compensated to the landowner. Any additional costs associated with construction through the road will be assessed to the road authority.
- Scott Shedden Has seen pike in the drain.
- Ed Part of the Engineer's responsibility is to obtain approvals from agencies (DFO, MNRF, NRCA, etc.). The preliminary report will include a rough cost estimate, but the extent of the report will be determined by Council. In final report stage, a detailed survey, design and drawings would be required. Information meetings would take place. Appeals are considered at that time (there will be no opportunity to appeal the preliminary report – there is no by-law created). Discussed with attendees the timeframes, costs and future drainage superintendent maintenance would look like.
- Frank Svob In the past the flows have been high enough along Wiley Road that overland flow occurs instead of the water running through the road culverts.
- Jason Beamer & Scott Shedden Their farms are tiled into the drain, and they have not yet had issues with it.

The preceding are notes from the meeting as observed by the undersigned. Should there be a need for revision, please advise Burnside within seven days of issuance. In the absence of notification to the contrary, these notes will be deemed to be an accurate record of the meeting.

Notes prepared by:

R.J. Burnside & Associates Limited

Reviewed By:



Michael Siemon
Civil Technologist
MS:ba



Ed DeLay, M.Eng., P.Eng.
Project Engineer

Enclosure(s) Sign-in sheet

Distribution:

Danielle Anders	GM BluePlan Engineering Limited	Via: Email
Nathan D'Souza	GM BluePlan Engineering Limited	Via: Email
Ray Vachon	Township of West Lincoln	Via: Email
Ed Delay	Burnside	Via: Email
Sid Vander Veen	Burnside	Via: Email

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Sign In Sheet

Project Name: Mill Creek Municipal Drain			
Client:	Township of West Lincoln	File No.:	300051132.0000
PM:	Ed DeLay	Date:	August 6, 2020

Name	Business Name	Email Address	Cell Phone	Home Phone	Lot/Con.
Sid Vander Veen	RSB				
Michael Siemon	" "				
Ed DeLay	" "				
Dantelle Anders	GM Blue Plan (Superintendent)				
Nathan D'Souza	GM Blue Plan	nathan.dsouza@gmblueplan.ca	289-300-1515		
Frank Svob		franksvob@gmail.com		905-892-3595	
Paul & Virginia Burt		gandpburt@gmail.com	416-985-7843	416-699-3571	
Nick Misdorp			905-736-1716		
Rick Wiley	Wileydale Farms	rickwiley@gmail.com	905-933-3586		



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Appendix B

Agency Correspondence

NPCA Mapping of Regulated Features
Burnside Technical Memo – Species at Risk Screening (Terrestrial & Wetland)
Burnside Technical Memo – Natural Environment Screening (Aquatic)
DFO Letter of Advice

Appendix B – Agency Project Comments and Documents

Mill Creek Drainage Petition

1.0 General

Regulatory agencies were contacted as part of the environmental investigation as part of this preliminary report. Various facets of the design, construction, and maintenance of drainage systems under the Act are accountable to reviewing agencies such as the local Conservation Authority, Fisheries and Oceans Canada, and the Ministry of the Environment, Conservation, and Parks.

The results of these investigations during the preliminary report help to define the scope of the project and determine potential impacts of timing windows, species at risk, wetlands and regulated areas, etc. and the associated costs.

2.0 Niagara Peninsula Conservation Authority (NPCA)

The NPCA has been apprised of the project throughout its progression. NPCA staff have indicated that their main concern pertained to any proposed work within evaluated and unevaluated wetlands. This concern would also apply to the establishment of the municipal drain without any work being completed. A drawing of current wetland boundaries in the area of interest has been provided by NPCA and has been included as part of this appendix.

Per section 11.2.5 of the NPCA Policy Document (May 21, 2020 consolidation) regarding new municipal drains, extensions, and alterations reads “any proposed construction not deemed maintenance within a wetland or wetland boundary, shall not be permitted”.

The NPCA have taken a position not to allow any new construction under the Drainage Act, R.S.O. 1990, within a wetland or wetland boundary. This policy does not take into consideration potential beneficial effects to the wetland from any proposed work which would be protected under the Act.

This policy appears to be inconsistent with other conservation authorities that we have worked with in the province. It is also inconsistent with the approach take to competing legislation as summarized below from the Agriculture, Food and Rural Affairs Appeal Tribunal decision on the South Sparrow Lake Road Drain in the Township of Severn in 2003.

“This panel is of the view that the DFO and its representatives have a two-fold obligation: firstly to recognize that in our Canadian legal system competing interests have to be resolved by mutual accommodation, and secondly by committing to a timely and appropriate participation in the drainage process.”

(Available at:

<https://www.canlii.org/en/on/onafraat/doc/2003/2003onafraat27/2003onafraat27.html>)

It is our view that the process under the Drainage Act should foster cooperation from all stakeholders to protect the environment and provide drainage outlet to landowners simultaneously and to the highest degree possible.

3.0 Ministry of Environment, Conservation and Parks (MECP) (formerly the Ministry of Natural Resources and Forestry (MNR))

Burnside Terrestrial Ecologists have prepared a technical memorandum as part of a desktop screening for species at risk (SAR) for Mill Creek and is included as part of this appendix.

Multiple SAR were identified as potentially present on and around the study area. The on-site presence of SAR within the study area would be confirmed during the preparation of a final report and is beyond the scope of this report.

4.0 Fisheries & Oceans Canada (DFO)

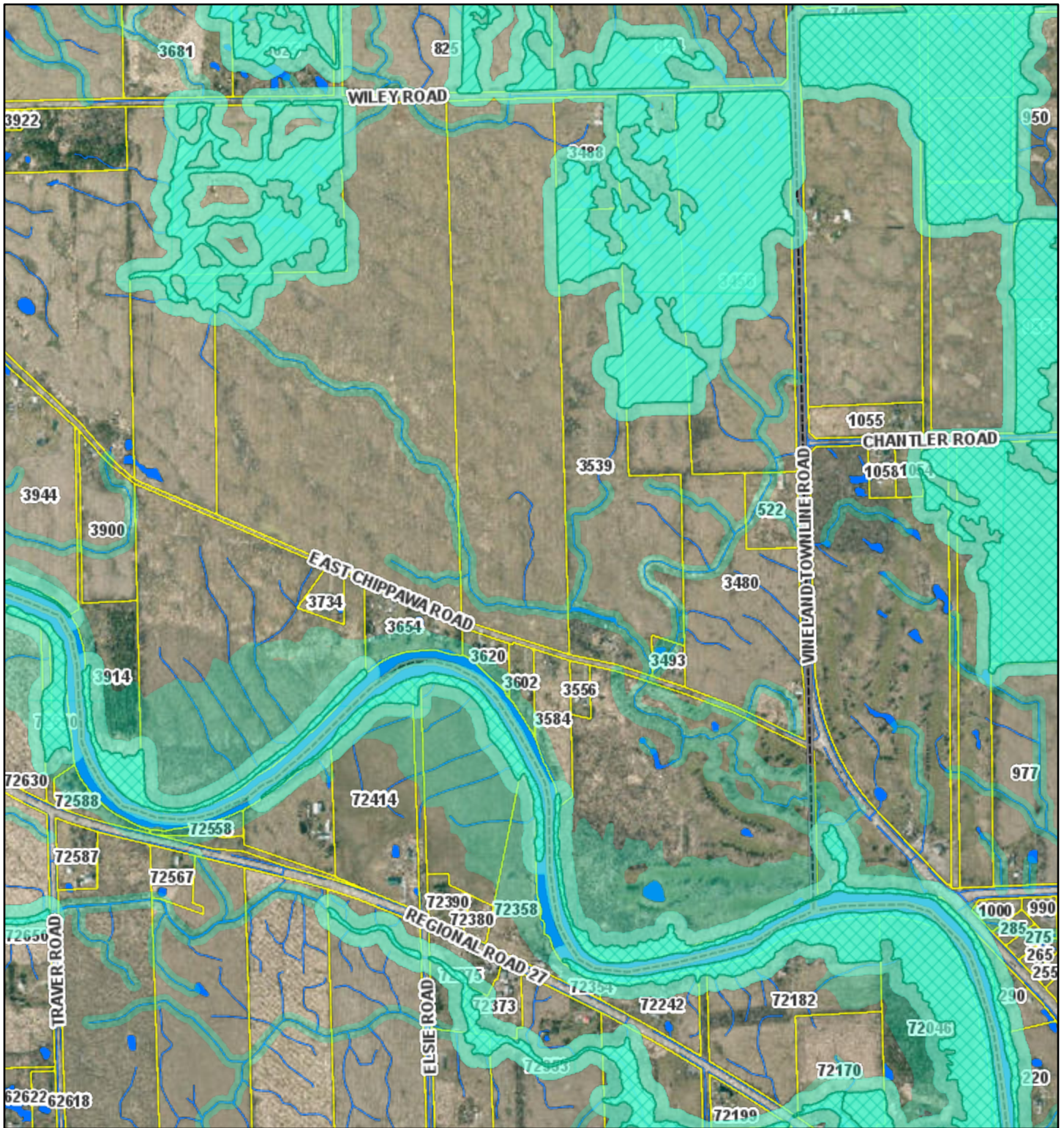
Burnside Aquatic Ecologists have prepared a technical memorandum as part of a desktop screening for Mill Creek and is included as part of this appendix.

As the Mill Creek is currently classed as a natural watercourse, it does not carry a channel classification typical of municipal drains regarding thermal regime, expected species, and timing windows for in-water work due to fish spawning.

The DFO species at risk (SAR) mapping states that two species of mussel inhabit the downstream reaches of the proposed drain near the Welland River. The on-site presence of SAR within the study area would be confirmed during the preparation of a final report and is beyond the scope of this report.

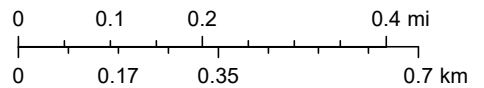
DFO staff were also contacted as part of this preliminary report and indicated that they would provide further comment and direction for construction under a final report.

NPCA Regulated Features



11/3/2020, 3:29:25 PM

1:18,056



- Roads
- Corporate Watershed Divide NPCA
- NPCA APPROXIMATE REGULATION LANDS
- Wetland Allowance
- Regulation Wetlands

NPCA, Brian Lee, Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Web AppBuilder for ArcGIS



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**Species at Risk Screening, Mill Creek
Drainage Petition**

Township of West Lincoln

**R.J. Burnside & Associates Limited
292 Speedvale Avenue West,
Guelph ON N1H 1C4**

**February 4, 2021
300051132.0000**



R.J. Burnside & Associates Limited

Report Prepared By:



Peter De Carvalho, B.Sc., B.Eng, Rest. Cert., E.I.T
Terrestrial Ecologist/Engineering Assistant
PD:js

Report Reviewed By:



Tricia Radburn, M.Sc. (PI), MCIP, RPP
Senior Environmental Planner

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Appendices

Appendix A: Ontario Breeding Bird Atlas Species List

Appendix B: NHIC, DFO Ecological Screening

Appendix C: Natural Heritage Information Centre Species List

Appendix D: DFO ARA Screening

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1.0 Introduction

R. J. Burnside and Associates Limited (Burnside) has been retained by the Township of West Lincoln to investigate drainage issues on the properties of the petitioners of lands within the township, in accordance with Sections 4 and 10 of the Drainage Act, R.S.O. 1990. The site is immediately north of the Welland River and is located on the western side of Victoria Avenue (Highway 24), bounded by Wiley Road to the north, and Boyle and East Chippawa Roads to the west.

A screening for potential Species at Risk (SAR) and SAR habitat has been conducted to ensure compliance with the *Endangered Species Act* (ESA) (2007). SAR and supporting habitats for SAR listed as Endangered or Threatened under the ESA are protected from negative impacts as the result of human activities in Ontario.

The Study Area is predominantly agricultural land use. Small remnant natural areas of forest/wetland and hedgerow can be considered habitat for certain protected species. There are also several large sections of the Wiley Road Wetland Complex, which has been classified as locally significant.

2.0 Species at Risk Screening

Multiple sources were reviewed for species records and historical sightings of Species at Risk (SAR) within the Study Area and surrounding lands. These sources are described below.

2.1 Natural Heritage Information Centre

The Natural Heritage Information Centre (NHIC) is a government entity (Ministry of Conservation, Environment, and Parks) that collects, reviews, manages, and distributes information and data records for natural heritage features, species of conservation concern, significant plant communities, wildlife concentration areas, and natural areas. An NHIC query was conducted for the lands surrounding the proposed project to identify species records and/or Key Natural Heritage Features (KNHF) within the area (NHIC, 2020).

2.2 Ontario Breeding Bird Atlas

The Ontario Breeding Bird Atlas (OBBA) is a comprehensive bird research and conservation project which encompasses over 69,000 point-counts across the province (OBBA, 2005). A complete avian species list for the lands around the Study Area has been reproduced in Appendix A.

2.3 Department of Fisheries and Oceans

Portions of the proposed drain are tributaries of the Welland River are considered regulated surface-water fisheries. Aquatic SAR and fish habitat fall under the jurisdiction of the Department of Fisheries and Oceans (DFO). Known distributions of regulated SAR and SAR habitat in Canada can be reviewed through the Aquatic Species at Risk Maps series, found on <http://www.dfo-mpo.gc.ca>.

3.0 Potential SAR Present

Multiple SAR were identified as potentially present on and around the Study Area. These species, as well as their habitat preferences and probability to be found on the Study Area are discussed on Table 1.

Table 1: Screening Table - Background Review of Species at Risk and Species of Conservation Concern Potentially Present in the Study Area

Common Name **(Source)	Scientific Name	Provincial SARO Status2	Habitat Description	Candidate Habitat Present on the Subject Lands?
AQUATIC				
Lilliput	<i>Toxolasma parvum</i>	THR	Accommodate a variety of soft river substrates (mud, sand, silt). Extremely sensitive to water quality, so more likely to be found in pristine reaches.	Moderate potential for presence within the proposed Mill Creek drain.
Mapleleaf	<i>Quadrula quadrula</i>	SC	Medium to large rivers, slow/moderate currents. Found in substrates varying from packed sand and gravel to clay and mud. Also found in lakes/reservoirs. Uses Channel Catfish as a host of its parasitic larval stage.	Limited potential within the proposed Mill Creek drain due to its size. Moderate potential for presence in Welland River.
AVIAN				
Acadian Flycatcher	<i>Empidonax virescens</i>	END	mature, shady, deciduous forests; heavily wooded ravines; creek bottoms or river swamps; needs at least 30 ha of forest; main threats include forest loss and logging in southern Ontario, residential and agricultural development in or near woodlots limiting good quality habitat	No potential for presence within the Study Area. Forested lands near the proposed drains do not meet the minimum size threshold for this species.
Bald Eagle	<i>Haliaeetus leucocephalus</i>	SC	require large continuous area of deciduous or mixed woods around large lakes, rivers; require area of 255 ha for nesting, shelter, feeding, roosting; prefer open woods with 30 to 50% canopy cover; nest in tall trees 50 to 200 m from shore; require tall, dead, partially dead trees within 400 m of nest for perching; sensitive to toxic chemicals	No potential for presence within the Study Area, though forested lands adjacent to the Welland River to the south likely support this species.
Barn Owl	<i>Tyto alba</i>	END	prefer low-elevation, open country, where their small rodent prey are more abundant. In Canada, they are often associated with agricultural lands, especially pasture. Nests are located in buildings, hollow trees, and cavities in cliffs. In Canada, most nests are found on man-made structures, especially those which are abandoned or unused.	Moderate potential for presence associated with anthropogenic structures. Any disused barns or unsealed structures within the Study Area may be used as Barn Owl nests.
Black Tern	<i>Chlidonias niger</i>	SC	wetlands, coastal or inland marshes; large cattail marshes, marshy edges of rivers, lakes or ponds, wet open fens, wet meadows; returns to same area to nest each year in loose colonies; must have shallow (0.5 to 1 m deep) water and areas of open water near nests; requires marshes >20 ha in size; feeds over adjacent grasslands on insects; also feeds on fish, crayfish and frogs	No potential for presence within the Study Area. Wetland areas in the vicinity of proposed works do not meet the characteristics or minimum size threshold to be considered habitat for Black Tern.
Bobolink (Source: OBBA)	<i>Dolichonyx oryzivorus</i>	THR	Generally prefers open grasslands and hay fields for nesting, typically featuring relatively tall vegetation. Sometimes uses large fields of winter wheat and rye in southwestern Ontario. Sensitive to vegetation structure and composition. Positively associated with high grass-to-forb ratios; moderate litter depth; tolerate wetter portions of fields compared to EAME and more likely to nest closer to field	Moderate potential for nesting habitat present on Subject Lands. This open-area species will use open fields, pastures, and grain cropland for nesting.

Common Name **(Source)	Scientific Name	Provincial SARO Status2	Habitat Description	Candidate Habitat Present on the Subject Lands?
			centers rather than field margins. Lower tolerance to presence of patches of bare ground. Appear to prefer larger fields than EAME.	
Cerulean Warbler (Source: OBBA)	<i>Setophaga cerulea</i>	THR	mature deciduous woodland of Great Lakes- St. Lawrence and Carolinian forests, sometimes coniferous; swamps or bottomlands with large trees; area sensitive species needing extensive areas of forest (>100 ha)	No potential for presence within the Study Area. Forested lands near the proposed drains do not meet the minimum size threshold for this species.
Common Nighthawk	<i>Chordeiles minor</i>	SC	open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs	Moderate potential for presence within the Study Area, especially ploughed fields or barren waste areas or gravel surfaces.
Eastern Meadowlark (Source: OBBA)	<i>Sturnella magna</i>	THR	Generally prefers grassy pastures, meadows and hay fields. Prefers moderately tall grass with abundant litter cover, a high proportion of grass cover, moderate forb density, low proportions of shrub and woody vegetation cover, and low percent of bare ground. Prefers to nest in drier sites and frequently nests around field margins.	Moderate potential for nesting habitat present on Subject Lands. This open-area species will use open fields, pastures, and grain cropland for nesting.
Golden-winged Warbler	<i>Vermivora chrysoptera</i>	SC	early successional habitat; shrubby, grassy abandoned fields with small deciduous trees bordered by low woodland and wooded swamps; alder bogs; deciduous, damp woods; shrubby clearing in deciduous woods with saplings and grasses; brier-woodland edges; requires >10 ha of habitat	Moderate potential for nesting habitat present on Subject Lands associated with any shrub/thicket forest or wetland habitats >10 ha.
Grasshopper Sparrow (Source: OBBA)	<i>Ammodramus saviannarum</i>	SC	Prefers dry, sparsely vegetated grasslands (especially rough or unimproved pastureland) at least 30 ha in area. Typical habitats will support variable growth of forbs and shrubs, though this species may occasionally utilize cultivated hayfields or cereal cropland.	Low-moderate potential for nesting habitat present on Subject Lands. Any fallow fields, pasture, upland meadow, or cereal croplands >30 ha should be considered candidate habitat for Grasshopper Sparrow,
Least Bittern	<i>Ixobrychus exilis</i>	THR	deep marshes, swamps, bogs; marshy borders of lakes, ponds, streams, ditches; dense emergent vegetation of cattail, bulrush, sedge; nests in cattails; intolerant of loss of habitat and human disturbance	Low potential for presence within the Study Area. Wetland areas in the vicinity of proposed works are not anticipated to meet the characteristics for Least Bittern habitat.
Louisiana Waterthrush	<i>Seiurus motacilla</i>	THR	prefers wooded ravines with running streams; also woodland swamps; large tracts of mature deciduous or mixed forests; canopy cover is essential; has strong affinity to nest sites; nests on ground	Moderate potential for nesting habitat within wooded swamps or mature deciduous/mixed forests.
Northern Bobwhite	<i>Colinus virginianus</i>	END	Grassland, prairie or hay fields with woody cover in form of thickets, tangles of vines, shrubs; fence rows or woodland edges; cropland growing corn, soybeans or small grains and clover or grass; well-drained sandy or loamy soil; pond edges.	Moderate potential for nesting habitat present on Subject Lands. Stable, reproducing populations of Northern Bobwhite are

Common Name **(Source)	Scientific Name	Provincial SARO Status2	Habitat Description	Candidate Habitat Present on the Subject Lands?
				extremely rare in Ontario; most occurrences of the species are thought to have escaped from captivity.
Peregrine Falcon	Falco peregrinus	SC	found in a wide range of habitats, from Arctic tundra to sea coasts, prairies and urban centres. These falcons usually build solitary nests on cliff ledges or crevices, but they sometimes build their nests on the ledges of tall buildings or bridges, always near an abundant source of prey. Individuals of the pealei subspecies of the Peregrine Falcon often nest on small cliffs tucked underneath overhanging Sitka spruce roots, but they have been known to nest on cliffs as high as 366 m. These birds occasionally nest in tree nests that have been abandoned by cormorants or bald eagles or in natural tree cavities. Natural nesting habitat does not appear to have changed significantly since the populations crashed, and this habitat is still largely available for re-occupancy	Moderate potential for nesting habitat anywhere where appropriate nesting perches are found, including forests, hydro-poles, tall-buildings, etc.
Red-headed Woodpecker	Melanerpes erythrocephalus	SC	Open, deciduous forest with little understory; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees; feeds on insects and stores nuts or acorns for winter; loss of habitat is limiting factor; requires cavity trees with at least 40 cm dbh; require about 4 ha for a territory	Moderate potential for nesting habitat present. This species can make use of open/interrupted canopy and groupings of individual trees for nesting. Require relatively large, mature trees to accommodate cavities.
Short-eared Owl	Asio flammeus	SC	grasslands, open areas or meadows that are grassy or bushy; marshes, bogs or tundra; both diurnal and nocturnal habits; ground nester; destruction of wetlands by drainage for agriculture is an important factor in the decline of this species; home range 25-125 ha; requires 75-100 ha of continuous open habitat	Moderate potential for nesting habitat present. The open areas and patchy treed wetland mosaic of the Study Area and surrounding landscape can be characterized as candidate habitat which may support Short-eared Owl.
Yellow-breasted Chat	Hylocichla mustelina	END	Inhabits and breeds in woodlands ranging from small (3 ha) and isolated to large and contiguous. The presence of tall trees and a thick understory are usually prerequisites for site occupancy.	Moderate potential for suitable habitat in any woodlands or treed wetlands with tall trees and thick understory.
<i>FLORA</i>				
Eastern Flowering Dogwood	<i>Cornus florida</i>	END	Understory tree of mature deciduous and mixed forests. Associated with floodplains and ravines, though it can also be found in fencerows and along roadsides.	Moderate potential for suitable habitat in any mature woodland/forest in the Carolinian Zone.
<i>MAMMALS</i>				
Eastern Small-footed Myotis	<i>Myotis leibii</i>	END	Active from April-October, the Eastern Small-footed Myotis is Ontario's hardiest bat. It roosts in rocky outcroppings, especially those associated with caves, cracks, and fissures. Roosting habitat tends to correlate with the Niagara Escarpment and the Canadian Shield. This species has been known to utilize	No potential for roosting habitat present. Very little is known about this species' actual range in Ontario. Barns, sheds, bridges,

Common Name **(Source)	Scientific Name	Provincial SARO Status2	Habitat Description	Candidate Habitat Present on the Subject Lands?
			anthropogenic structures such as barns, sheds, guardrails, and culverts during the active season as well. Known to overwinter in Ontario caves.	guardrails, culverts, and aggregate piles are known potential roosting habitats.
Little Brown Myotis	<i>Myotis lucifugus</i>	END	Active from May-September, this species typically roosts in mature cavity trees with cracks, cavities, fissures, or loose bark which it uses to shelter itself and its young. Gregarious by nature, these bats will form larger maternity colonies within clusters of cavity trees in close proximity. Migrates south for winter.	Moderate potential for roosting habitat present in any mature woodlot/forest. Any treed habitat, including plantations, may be suitable for maternity roosting colonies. This species is also known to utilize barns, sheds, and bridges for roosting purposes.
Northern Myotis	<i>Myotis septentrionalis</i>	END	Active from May-September, this species typically roosts in mature cavity trees with cracks, cavities, fissures, or loose bark which it uses to shelter itself and its young. Gregarious by nature, these bats will form larger maternity colonies within clusters of cavity trees in close proximity. Migrates south for winter.	Moderate potential for roosting habitat present. Any treed habitat, including plantations, may be suitable for maternity roosting colonies. This species is also known to utilize barns, sheds, and bridges for roosting purposes.
Tri-colored Bat	<i>Perimyotis subflavus</i>	END	Active from May-September, this species prefers roosting in dead or dying foliage of relatively mature (>10 cm DBH) oaks and maples. Migrates south for winter.	Moderate potential for roosting habitat present in any mature woodlot/forest with oak and maple species, Limited potential for habitat within lone trees/hedgerows. This species is also known to utilize barns, sheds, and bridges for roosting purposes.

4.0 Potential Impacts

Below is an analysis of potential impacts and mitigation strategies to reduce the potential for impacts to species protected under the *ESA*. Adherence to the prescribed strategies and timing windows does not guarantee avoidance of SAR. If disturbance of SAR or regulated SAR habitat cannot be avoided, registration or permitting may be required with MECP and/or DFO.

4.1 Aquatic

One SAR species of mussel was assessed as having moderate potential for presence within the tributaries of the Welland River on the Study Area (Lilliput – *Toxolasma parvum*).

Once the preferred alternative is confirmed regarding channel layouts and project works, consultation with DFO should be sought regarding potential requirements for mussel surveys. If widening, deepening, or enclosure of channel sections is required, DFO authorization would be required. Potential SAR permitting may also be required at this stage.

4.2 Avian

There is moderate potential for the presence of the following species:

- Barn Owl (*Tyto alba*);
- Bobolink (*Dolichonyx oryzivorus*);
- Common Nighthawk (*Chordeiles minor*);
- Eastern Meadowlark (*Sturnella magna*);
- Golden-winged Warbler (*Vermivora chrysoptera*);
- Louisiana Waterthrush (*Parkesia motacilla*);
- Northern Bobwhite (*Colinus virginianus*);
- Peregrine Falcon (*Falco peregrinus*);
- Red-headed Woodpecker (*Melanerpes erythrocephalus*);
- Short-eared Owl (*Asio flammeus*); and
- Yellow-breasted Chat (*Icteria virens*).

Four of these species rely exclusively on natural woodland/wetland areas (Golden-winged Warbler, Louisiana Waterthrush, Red-headed Woodpecker, Yellow-breasted Chat), while several other species rely on a mixture of treed and open habitats (Peregrine Falcon, Short-eared Owl).

Bobolink and Eastern Meadowlark have similar habitat preferences. These species generally prefer forb-dominated open areas with low cover from trees and shrubs. Bobolink will tolerate wetter areas more so than Eastern Meadowlark. Northern

Bobwhite have similar requirements to these other species but need thicket and woody perch areas as well. It should be noted that Northern Bobwhite is at the extreme northern edge of its range in Ontario. Breeding populations of this species are very rare, and most sightings are attributed to released captives or escapees. Though suitable nesting habitat for this species may be present within the project area, nesting individuals are not likely to be found here.

Barn Owls construct nests within anthropogenic structures such as barns, culverts, and bridges. Works around potential breeding habitat for this species should take place outside of the bird breeding window (May 1 – August 31). If tree removal must be carried out within this window, an active nest survey should be conducted by qualified avian ecologist no more than 5 days prior.

Only the species listed as Endangered and Threatened on Table 1 are protected by the ESA. Special Concern species are afforded protection at the municipal level, as these species and their habitats can be considered Significant Wildlife Habitat (SWH). Development within SWH contravenes the Provincial Policy Statement and the Planning Act. It should be noted that activities that may impact migratory bird species, even those not listed as Endangered or Threatened by the ESA, are prohibited under the *Migratory Birds Convention Act* (MBCA) (1994).

4.3 Flora

One Endangered plant species (Flowering Dogwood – *Cornus florida*) was assessed as having moderate potential for presence within natural treed portions of the Study Area. If tree removal is required within natural forested or wetland areas, a survey should be conducted to assess for the potential presence of this species prior to project works.

4.4 Mammals

Three of Ontario's endangered bat species (Little Brown Myotis – *Myotis lucifugus*; Northern Myotis – *Myotis septentrionalis*; Tri-colored Bat – *Perimyotis subflavus*) are predominantly arboreal during the spring and summer, and migrate south for the winter. These species are active through May-August. Roosting habitat is typically mature forest with an abundance of large cavity trees for shelter. Cavity trees include standing trees with knotholes, cavities, loose bark, and in the case of Tri-colored Bat, clusters of dead hanging leaves.

Any anticipated tree removal will first require a survey for the assessment of cavity trees. Removal of these trees should take place outside of the roosting season (May 1 - August 31). Works that may impact anthropogenic bat habitat including barns, sheds, guardrails, and culverts should also take place outside of this window. In the event that impacts to potential bat habitat may take place between May 1 and August

31, surveys should be carried out by a qualified wildlife biologist to assess whether bats may be roosting.

5.0 Conclusion

R. J. Burnside and Associates Limited (Burnside) has been retained by the Township of West Lincoln to investigate drainage issues on properties north of the Welland River on the western side of Victoria Avenue (Highway 24), bounded by Wiley Road to the north, and Boyle and East Chippawa Roads to the west. A screening for potential Species at Risk (SAR) and SAR habitat has been conducted to ensure compliance with all applicable policies and legislation.

The Study Area is predominantly agricultural land use. Small remnant natural areas of forest/wetland and hedgerow can be considered habitat for certain protected species. There are also several large sections of the Wiley Road Wetland Complex, which has been classified as locally significant.

One aquatic mussel species, 11 avian species, one flora species, and three mammalian species were assessed as potentially present on the Study Area and surrounding lands.

6.0 References

Bird Studies Canada. 2008. Marsh Monitoring Program Participant's Handbook for Surveying Amphibians. Retrieved November, 2020 from https://www.ohwetlands.org/uploads/5/0/6/9/50693061/handbook_mmp_amphibians_2009.pdf.

Department of Fisheries and Oceans (DFO). 2016. Distribution of Species at Risk – Maitland Valley Conservation Authority. Retrieved November, 2020 from <https://www.dfo-mpo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html>.

Environment and Climate Change Canada (ECCC). 2016. Species at risk public registry. Retrieved November, 2020 from https://www.registrelep-sararegistry.gc.ca/species/default_e.cfm.

Environment and Climate Change Canada (ECCC) 2002. *Species at Risk Act*. Retrieved November, 2020 from <http://laws-lois.justice.gc.ca/eng/acts/s-15.3/>.

Ministry of the Environment, Climate, and Parks (MECP). 2020. Species at Risk in Ontario List. Retrieved November, 2020 from <https://www.ontario.ca/page/species-risk-ontario>.

Ministry of the Environment, Conservation, and Parks (MECP). 2007. *Endangered Species Act*. Retrieved November, 2020 from <https://www.ontario.ca/laws/statute/07e06>

Natural Heritage Information Centre (NHIC). 2016. Make A Map: Natural Heritage Areas. Retrieved November, 2020 from https://www.gisapplication.lrc.gov.on.ca/mamnh/Index.html?site=MNR_NHLUPS_NaturalHeritage&viewer=NaturalHeritage&locale=en-US

Ontario Breeding Bird Atlas (OBBA). 2005. Nature Counts Data Query. Retrieved November, 2020 from <https://www.birdscanada.org/birdmon/onatlas/main.jsp>



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Appendix A

Ontario Breeding Bird Atlas Species List

Square	Species	Breeding Evidence			
		Max BE	Categ	#Sq	Atlasser Name
17PJ76	Alder Flycatcher	T	PROB	1	Tyler Hoar
17PJ76	American Bittern	S	POSS	1	Tyler Hoar
17PJ76	American Black Duck	H	POSS	1	Tyler Hoar
17PJ76	American Coot	FY	CONF	1	Tyler Hoar
17PJ76	American Crow	NY	CONF	1	Tyler Hoar
17PJ76	American Goldfinch	NY	CONF	1	Tyler Hoar
17PJ76	American Kestrel	CF	CONF	1	Tyler Hoar
17PJ76	American Redstart	CF	CONF	1	Tyler Hoar
17PJ76	American Robin	NY	CONF	1	2 atlassers
17PJ76	American Wigeon	T	PROB	1	Tyler Hoar
17PJ76	American Woodcock	D	PROB	1	Tyler Hoar
17PJ76	Baltimore Oriole	AE	CONF	1	Tyler Hoar
17PJ76	Bank Swallow	NB	CONF	1	
17PJ76	Barn Swallow	NY	CONF	1	Tyler Hoar
17PJ76	Barred Owl	H	POSS	1	Tyler Hoar
17PJ76	Belted Kingfisher	AE	CONF	1	Tyler Hoar
17PJ76	Black Tern	NE	CONF	1	Tyler Hoar
17PJ76	Black-and-white Warbler	T	PROB	1	
17PJ76	Black-billed Cuckoo	T	PROB	1	Tyler Hoar
17PJ76	Blackburnian Warbler	H	POSS	1	Tyler Hoar
17PJ76	Black-capped Chickadee	NY	CONF	1	Dennis Barry
17PJ76	Black-throated Blue Warbler	S	POSS	1	
17PJ76	Black-throated Green Warbler	CF	CONF	1	Tyler Hoar
17PJ76	Blue Jay	NY	CONF	1	Tyler Hoar
17PJ76	Blue-gray Gnatcatcher	NY	CONF	1	Tyler Hoar
17PJ76	Blue-winged Teal	FY	CONF	1	Tyler Hoar
17PJ76	Bobolink	FY	CONF	1	Tyler Hoar
17PJ76	Broad-winged Hawk	H	POSS	1	Tyler Hoar
17PJ76	Brown Creeper	A	PROB	1	Tyler Hoar
17PJ76	Brown Thrasher	NY	CONF	1	Tyler Hoar
17PJ76	Brown-headed Cowbird	FY	CONF	1	Tyler Hoar
17PJ76	Canada Goose	NE	CONF	1	3 atlassers
17PJ76	Carolina Wren	T	PROB	1	Tyler Hoar
17PJ76	Cedar Waxwing	FY	CONF	1	Tyler Hoar
17PJ76	Chestnut-sided Warbler	CF	CONF	1	Tyler Hoar
17PJ76	Chimney Swift	V	PROB	1	Tyler Hoar
17PJ76	Chipping Sparrow	NY	CONF	1	Jim Richards
17PJ76	Clay-colored Sparrow	T	PROB	1	Tyler Hoar
17PJ76	Common Gallinule	T	PROB	1	Tyler Hoar
17PJ76	Common Grackle	NY	CONF	1	
17PJ76	Common Loon	D	PROB	1	Tyler Hoar

Square	Species	Breeding Evidence			
		Max BE	Categ	#Sq	Atlasser Name
17PJ76	Common Merganser	H	POSS	1	
17PJ76	Common Nighthawk	NY	CONF	1	Tyler Hoar
17PJ76	Common Snipe	D	PROB	1	Tyler Hoar
17PJ76	Common Tern	NY	CONF	1	Tyler Hoar
17PJ76	Common Yellowthroat	NY	CONF	1	Tyler Hoar
17PJ76	Cooper's Hawk	NY	CONF	1	Tyler Hoar
17PJ76	Downy Woodpecker	AE	CONF	1	Tyler Hoar
17PJ76	Eastern Bluebird	H	POSS	1	Tyler Hoar
17PJ76	Eastern Kingbird	NE	CONF	1	Tyler Hoar
17PJ76	Eastern Meadowlark	T	PROB	1	Tyler Hoar
17PJ76	Eastern Phoebe	NY	CONF	1	2 atlassers
17PJ76	Eastern Screech-Owl	AE	CONF	1	Tyler Hoar
17PJ76	Eastern Towhee	S	POSS	1	Tyler Hoar
17PJ76	Eastern Wood-Pewee	T	PROB	1	Tyler Hoar
17PJ76	European Starling	NY	CONF	1	Cindy Jahn-Cartwright
17PJ76	Field Sparrow	T	PROB	1	Tyler Hoar
17PJ76	Gadwall	FY	CONF	1	Tyler Hoar
17PJ76	Golden-crowned Kinglet	T	PROB	1	Tyler Hoar
17PJ76	Grasshopper Sparrow	S	POSS	1	Tyler Hoar
17PJ76	Gray Catbird	NY	CONF	1	2 atlassers
17PJ76	Great Blue Heron	NY	CONF	1	Tyler Hoar
17PJ76	Great Crested Flycatcher	A	PROB	1	
17PJ76	Great Horned Owl	NY	CONF	1	Tyler Hoar
17PJ76	Green Heron	NY	CONF	1	2 atlassers
17PJ76	Green-winged Teal	FY	CONF	1	Tyler Hoar
17PJ76	Hairy Woodpecker	AE	CONF	1	Tyler Hoar
17PJ76	Hermit Thrush	S	POSS	1	Tyler Hoar
17PJ76	Herring Gull	NY	CONF	1	Tyler Hoar
17PJ76	Hooded Merganser	FY	CONF	1	Tyler Hoar
17PJ76	Horned Lark	T	PROB	1	Tyler Hoar
17PJ76	House Finch	NY	CONF	1	Tyler Hoar
17PJ76	House Sparrow	NY	CONF	1	
17PJ76	House Wren	NE	CONF	1	Jim Richards
17PJ76	Indigo Bunting	D	PROB	1	
17PJ76	Killdeer	FY	CONF	1	Tyler Hoar
17PJ76	Least Bittern	T	PROB	1	Tyler Hoar
17PJ76	Least Flycatcher	CF	CONF	1	Tyler Hoar
17PJ76	Magnolia Warbler	S	POSS	1	
17PJ76	Mallard	NE	CONF	1	2 atlassers
17PJ76	Marsh Wren	CF	CONF	1	Tyler Hoar

Square	Species	Breeding Evidence			
		Max BE	Categ	#Sq	Atlasser Name
17PJ76	Mourning Dove	NY	CONF	1	Tyler Hoar
17PJ76	Mourning Warbler	A	PROB	1	2 atlassers
17PJ76	Mute Swan	NE	CONF	1	Tyler Hoar
17PJ76	Northern Cardinal	NY	CONF	1	Tyler Hoar
17PJ76	Northern Flicker	NY	CONF	1	Tyler Hoar
17PJ76	Northern Harrier	FY	CONF	1	Tyler Hoar
17PJ76	Northern Mockingbird	NY	CONF	1	2 atlassers
17PJ76	Northern Pintail	T	PROB	1	Tyler Hoar
17PJ76	Northern Rough-winged Swallow	T	PROB	1	Tyler Hoar
17PJ76	Northern Saw-whet Owl	FY	CONF	1	
17PJ76	Northern Shoveler	FY	CONF	1	Tyler Hoar
17PJ76	Northern Waterthrush	T	PROB	1	Tyler Hoar
17PJ76	Orchard Oriole	AE	CONF	1	Tyler Hoar
17PJ76	Ovenbird	T	PROB	1	Tyler Hoar
17PJ76	Pied-billed Grebe	NY	CONF	1	Jim Richards
17PJ76	Pileated Woodpecker	AE	CONF	1	Tyler Hoar
17PJ76	Purple Finch	H	POSS	1	Tyler Hoar
17PJ76	Purple Martin	AE	CONF	1	Tyler Hoar
17PJ76	Red-bellied Woodpecker	S	POSS	1	
17PJ76	Red-breasted Nuthatch	T	PROB	1	Tyler Hoar
17PJ76	Red-eyed Vireo	FY	CONF	1	Tyler Hoar
17PJ76	Redhead	P	PROB	1	Tyler Hoar
17PJ76	Red-headed Woodpecker	AE	CONF	1	Tyler Hoar
17PJ76	Red-tailed Hawk	NY	CONF	1	Tyler Hoar
17PJ76	Red-winged Blackbird	NY	CONF	1	Tyler Hoar
17PJ76	Ring-necked Pheasant	H	POSS	1	Tyler Hoar
17PJ76	Rock Pigeon	NY	CONF	1	Tyler Hoar
17PJ76	Rose-breasted Grosbeak	T	PROB	1	Tyler Hoar
17PJ76	Ruby-throated Hummingbird	D	PROB	1	
17PJ76	Ruddy Duck	FY	CONF	1	Tyler Hoar
17PJ76	Ruffed Grouse	FY	CONF	1	Tyler Hoar
17PJ76	Savannah Sparrow	NE	CONF	1	Tyler Hoar
17PJ76	Sedge Wren	CF	CONF	1	Tyler Hoar
17PJ76	Sharp-shinned Hawk	CF	CONF	1	Tyler Hoar
17PJ76	Song Sparrow	NY	CONF	1	Tyler Hoar
17PJ76	Sora	FY	CONF	1	Tyler Hoar
17PJ76	Spotted Sandpiper	FY	CONF	1	Tyler Hoar
17PJ76	Swamp Sparrow	NY	CONF	1	Tyler Hoar
17PJ76	Tree Swallow	NY	CONF	1	2 atlassers
17PJ76	Trumpeter Swan	NE	CONF	1	Tyler Hoar

Square	Species	Breeding Evidence			
		Max BE	Categ	#Sq	Atlasser Name
17PJ76	Turkey Vulture	NY	CONF	1	Tyler Hoar
17PJ76	Veery	T	PROB	1	Tyler Hoar
17PJ76	Vesper Sparrow	T	PROB	1	Tyler Hoar
17PJ76	Virginia Rail	FY	CONF	1	2 atlassers
17PJ76	Warbling Vireo	NE	CONF	1	Tyler Hoar
17PJ76	White-breasted Nuthatch	A	PROB	1	Tyler Hoar
17PJ76	Willow Flycatcher	T	PROB	1	Tyler Hoar
17PJ76	Winter Wren	S	POSS	1	Tyler Hoar
17PJ76	Wood Duck	FY	CONF	1	Tyler Hoar
17PJ76	Wood Thrush	CF	CONF	1	Tyler Hoar
17PJ76	Yellow Warbler	NY	CONF	1	Tyler Hoar
17PJ76	Yellow-bellied Sapsucker	N	PROB	1	Tyler Hoar
17PJ76	Yellow-billed Cuckoo	H	POSS	1	Tyler Hoar
17PJ76	Yellow-rumped Warbler	H	POSS	1	Tyler Hoar



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Appendix B

Ontario Reptile and Amphibian Species List

Common Name	Number of Individuals	Year of Latest Observation	Observation ID
American Bullfrog	1	2010	123592
American Toad	1	2017	458361
Blanding's Turtle	1	2000	123370
Dekay's Brownsnake	12	2017	366056
Eastern Gartersnake	1	2017	457726
Eastern Musk Turtle	1	1952	407429
Eastern Newt	1	1987	127829
Eastern Red-backed Salamander	1	1993	129158
Gray Treefrog	4	2011	127406
Green Frog	1	2017	452656
Jefferson/Blue-spotted Salamander Complex	1	1981	127797
Midland Painted Turtle	5	2017	458535
Milksnake	1	1987	127844
Mudpuppy	1	1969	127791
Northern Leopard Frog	1	2013	123432
Pickerel Frog	1	1988	124363
Red-eared Slider	1	2009	123407
Snapping Turtle	1	2017	457036
Spotted Salamander	1	1972	127803
Spring Peeper	3	2013	130289
Western Chorus Frog	1	2013	124329
Wood Frog	6	2016	365778



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Appendix C

Natural Heritage Information Centre Species List

NHIC Data Square – 17PJ7163

Element Type	Common Name	Scientific Name	S-Rank	SARO Status	COSEWIC Status	Last Obs Date
SPECIES	Red Mulberry	Morus rubra	S2	END	END	1894-08-01
SPECIES	Northern Bobwhite	Colinus virginianus	S1	END	END	1885
SPECIES	Pronghorn Clubtail	Gomphus graslinellus	S3			6/23/1996

NHIC Data Square – 17PJ7162

Element Type	Common Name	Scientific Name	S-Rank	SARO Status	COSEWIC Status	Last Obs Date
SPECIES	Red Mulberry	Morus rubra	S2	END	END	1894-08-01
SPECIES	Northern Bobwhite	Colinus virginianus	S1	END	END	1885
SPECIES	Pronghorn Clubtail	Gomphus graslinellus	S3			6/23/1996

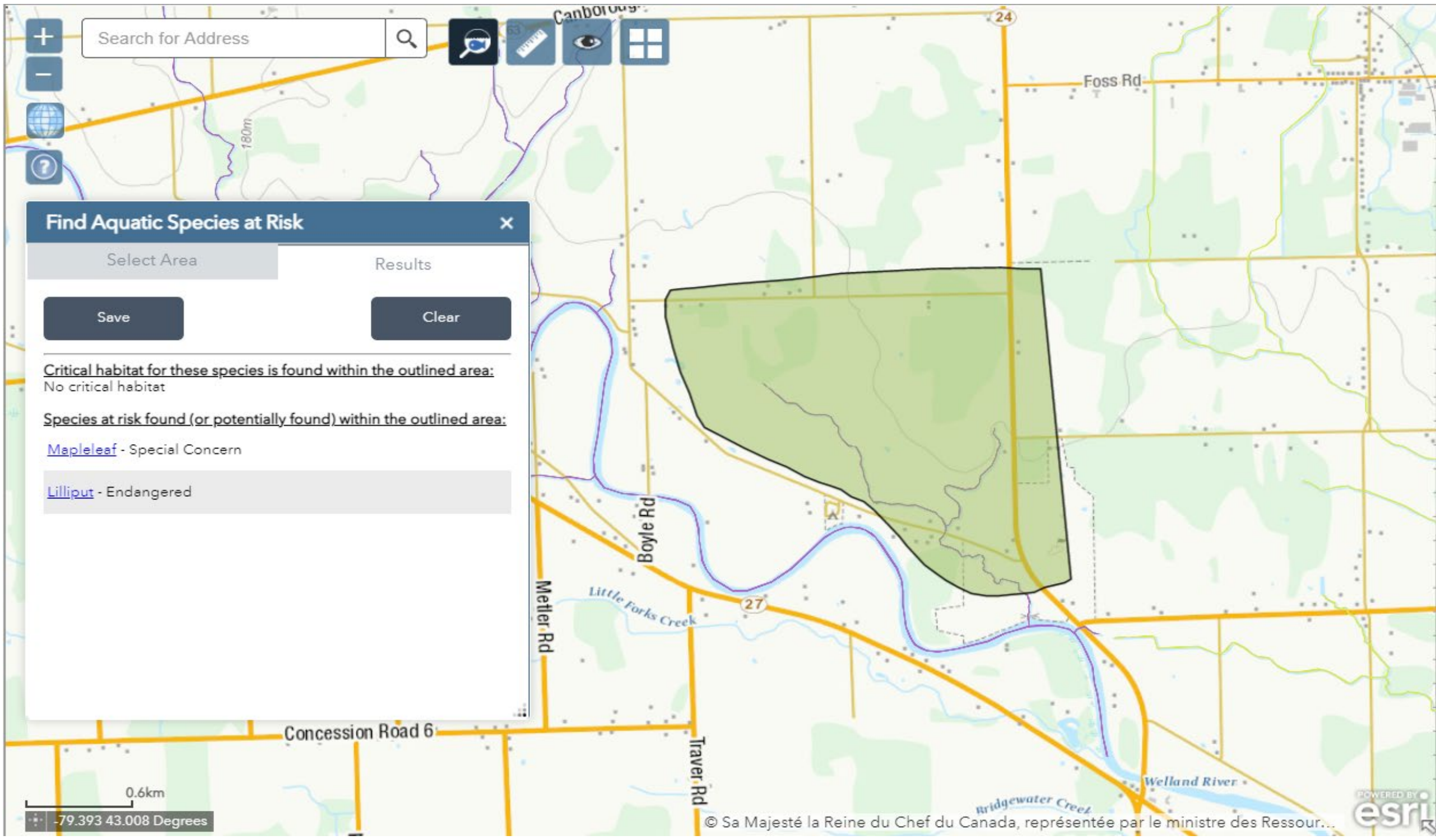


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Appendix D

DFO ARA Screening





Technical Memorandum – Natural Environment Screening

Date: February 5, 2021 **Project No.:** 300051132.0000

Project Name: Mill Creek

Client Name: Township of West Lincoln

Submitted To: Ed DeLay, P.Eng.

Submitted By: Matthew Moote, H..B.Sc., C.Tech., CAN-CISEC-IT, Aquatic Ecologist

Reviewed By: Chris Pfohl, CET, EP, CAN-CISEC, Sr. Aquatic Ecologist

1.0 Project Description

R.J. Burnside & Associates Limited (Burnside) have been retained by the Township of West Lincoln to investigate options for a length of channel proposed to be classified as a Municipal Drain. The results of the aquatic screening of the watercourse are presented below.

2.0 Natural Environment Screening

Burnside's Aquatic Ecology staff reviewed the following sources of information as they relate to the proposed drain:

- Ontario Ministry of Food, Agriculture and Rural Affairs (OMAFRA) AgMaps mapping (2020);
- Ministry of Natural Resources and Forestry (MNRF) Aquatic Resources Area (ARA) mapping (2019);
- Department of Fisheries and Oceans (DFO) Species at Risk (SAR) mapping (2020); and
- Natural Heritage Information Centre (NHIC) mapping (2020).

The DFO SAR mapping states that two species of mussel inhabit the downstream reaches of the proposed drain. These mussel species known as the Lilliput (*Toxolasma parvum*) and Mapleleaf (*Quadrula quadrula*) are classified as Threatened and Special Concern under the provincial Endangered Species Act (ESA) and Endangered and Special Concern under the federal Species at Risk Act (SARA), respectively. The NHIC mapping does not state that any aquatic SAR have been observed in the watercourse in the proposed work area.

The MNRF ARA mapping does not map the watercourse or provide the thermal regime. The proposed drain will outlet to the Welland River. The species historically observed in the Welland River are provided below in Table 1. The MNRF ARA mapping does not provide a thermal regime of the Welland River, although based on the species historically observed in it the watercourse is likely classified as cool. Based on the species below, the timing window for any in-water works would be July 15th to March 15th (No works permitted March 16th - July 14th).

The OMAFRA AgMaps mapping does not classify the watercourse as a municipal drain. The Guidance for Maintaining and Repairing Municipal Drains in Ontario (DFO, 2017) provides a list of sensitive species. There are numerous species listed in Table 1 below which are sensitive fish species in the DFO Guidance document. As a result, the watercourse would likely be classified as an E-Class drain based on the potential presence of spring spawning species, and flow permanency.

Table 1. Species of Fish Historically Observed in the Welland River

Species Name	Scientific Name	Thermal Regime Preference
Bigmouth buffalo	<i>Ictiobus cyprinellus</i>	Warm
Black bullhead	<i>Ameiurus melas</i>	Warm
Black crappie	<i>Pomoxis nigromaculatus</i>	Cool
Blackside darter	<i>Percina maculata</i>	Cool
Bluegill	<i>Lepomis macrochirus</i>	Warm
Bluntnose minnow	<i>Pimephales notatus</i>	Warm
Bowfin	<i>Amia calva</i>	Warm
Brook silverside	<i>Labidesthes sicculus</i>	Warm
Brown bullhead	<i>Ameiurus nebulosus</i>	Warm
Central mudminnow	<i>Umbra limi</i>	Cool
Channel catfish	<i>Ictalurus punctatus</i>	Warm
Common carp	<i>Cyprinus carpio</i>	Warm
Common shiner	<i>Luxilus cornutus</i>	Cool
Emerald shiner	<i>Notropis atherinoides</i>	Cool
Fathead minnow	<i>Pimephales promelas</i>	Warm
Freshwater drum	<i>Aplodinotus grunniens</i>	Warm
Gizzard shad	<i>Dorosoma cepedianum</i>	Cool
Golden shiner	<i>Notemigonus crysoleucas</i>	Cool
Goldfish	<i>Carassius auratus</i>	Warm
Green sunfish	<i>Lepomis cyanellus</i>	Warm
Johnny darter	<i>Etheostoma nigrum</i>	Cool
Largemouth bass	<i>Micropterus salmoides</i>	Warm
Logperch	<i>Percina caprodes</i>	Warm
Mimic shiner	<i>Notropis volucellus</i>	Warm
Northern pike	<i>Esox lucius</i>	Cool
Pumpkinseed	<i>Lepomis gibbosus</i>	Warm
Quillback	<i>Carioides cyprinus</i>	Cool
Rock bass	<i>Ambloplites rupestris</i>	Cool
Rudd	<i>Scardinius erythrophthalmus</i>	Warm
Shorthead redhorse	<i>Moxostoma macrolepidotum</i>	Warm

Species Name	Scientific Name	Thermal Regime Preference
Smallmouth bass	<i>Micropterus dolomieu</i>	Cool
Tadpole madtom	<i>Noturus gyrinus</i>	Warm
Tessellated darter	<i>Etheostoma olmstedii</i>	Cool
Walleye	<i>Sander vitreus</i>	Cool
White bass	<i>Morone chrysops</i>	Warm
White crappie	<i>Pomoxis annularis</i>	Warm
White perch	<i>Morone americana</i>	Warm
White sucker	<i>Catostomus commersonii</i>	Cool
Yellow bullhead	<i>Ameiurus natalis</i>	Warm
Yellow perch	<i>Perca flavescens</i>	Cool

Source: MNRF ARA mapping (2019)

3.0 Conclusion

Burnside has been retained by the Township of West Lincoln to investigate options for the Mill Creek Petition Drain. The DFO SAR mapping states that mussel SAR, Lilliput and Mapleleaf, are present in the downstream reaches of the proposed drain. The watercourse is not thermally classified in the MNRF ARA mapping and a fish species list is not provided for the section of watercourse. Numerous cool and warm water species of fish listed in Table 1 may inhabit the drain seasonally or permanently.

Under the Fisheries Act, it is prohibited to cause Harmful Alteration, Disruption or Destruction of Fish habitat, as well as the death of fish by means other than fishing. As such HADD must be mitigated in the design and construction of any in-water works.

R.J. Burnside & Associates Limited



Matthew Moote
Aquatic Ecologist

MM:js

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Fisheries and Oceans
Canada

Pêches et Océans
Canada

Ontario and Prairie Region
Fish and Fish Habitat Protection Program
867 Lakeshore Rd.
Burlington, ON
L7S 1A1

Région de l'Ontario et des Prairies
Programme de protection du poisson et de son habitat
867 chemin Lakeshore
Burlington, ON
L7S 1A1

March 19, 2021

Our file *Notre référence*

20-HCAA-02228

RJ Burnside & Associates Limited
Attention: Ed Delay
35 Perry Street
Woodstock, ON
N4S 3C4

Subject: Mill Creek Municipal Drain Petition, West Lincoln, Welland River – Recommended Measures to Avoid and Mitigate the Potential for Prohibited Effects to Fish and Fish Habitat, and Prohibited Effects on Listed Aquatic Species at Risk in a New Drainage Report

Dear Mr. Delay:

The Fish and Fish Habitat Protection Program (the Program) of Fisheries and Oceans Canada (DFO) received the draft Preliminary Report for the Mill Creek Drainage Petition (the Report) on February 12, 2021. We understand that you propose to establish Mill Creek as a Municipal Drain under three potential scenarios:

- No construction and proceeding to a final report by identifying engineering standards and cost assessment schedules;
- Channel cleanout for approximately 4,050 metres and brushing and clearing for approximately 572 metres, as well as bank stabilization; or
- Channel deepening and widening for approximately 4,050 metres and approximately 526 metres of channel relocation, as well as approximately 703 metres of brushing and clearing.

We understand the following aquatic species listed under the *Species at Risk Act* may use the area in the vicinity of where your proposal is to be located:

- Mapleleaf Mussel (*Quadrula quadrula*) listed as Special Concern
- Liliput (*Toxolasma parvum*) listed as Endangered

Whether a *Fisheries Act* Authorization will be required depends on several factors including the timing, staging, and final design of the proposed works. Should a *Fisheries Act* Authorization be required, DFO would require offsetting, monitoring, a financial guarantee, and there may be a need to undertake Aboriginal Consultation. For offsetting, DFO would ask for fish-friendly designs and measures to compensate for the impacts associated with the works that cannot be avoided or mitigated. If appropriate avoidance and mitigation measures are implemented and fish-friendly designs are already integrated into the new Drainage Report, in some cases a Letter of Advice may be issued.

Since the project design is not yet finalized, your proposal has not yet been reviewed to determine if a *Fisheries Act* Authorization would be required. Our program would like to promote ideas or measures that help protect fish and fish habitat by avoiding:

- the death of fish by means other than fishing and the harmful alteration, disruption or destruction of fish habitat which are prohibited under subsections 34.4(1) and 35(1) of the *Fisheries Act*; and
- effects to listed aquatic species at risk, any part of their critical habitat or the residences of their individuals in a manner which is prohibited under sections 32, 33 and subsection 58(1) of the *Species at Risk Act*.

The aforementioned impacts are prohibited unless authorized under their respective legislation and regulations. Some recommendations are included below which could help minimize the potential negative impacts of your project.

Once a fixed schedule is established and final designs are completed, a more detailed review can be completed to determine if a Letter of Advice or Authorization is required for the initial construction of the Drain under the new Drainage Report. Please note that future routine maintenance of the Drain still requires a Notification of Drain Maintenance form to be submitted to the Fish and Fish Habitat Protection Program for review.

To avoid and mitigate the potential for prohibited effects to fish and fish habitat (as listed above), we recommend implementing the measures outlined in your plan, in addition to the following listed below:

- Limit the extent of works in Mill Creek to minimize potential impacts to habitat for Lilliput and other species at risk
- Establish buffers along both sides of the channel
- Maintain undisturbed vegetated riparian zone on one bank (limit brushing to one bank only)
- Conduct in-water work during periods of low or no flow
- Plan in-water works, undertakings or activities to respect timing windows to protect fish, including their eggs, juveniles, spawning adults and/or the organisms upon which they feed and migrate (no in-water work between **March 15-July 15 for spring spawners**)
- Implement an erosion and sediment control plan to minimize the mobilization and transport of sediments in the watercourse
- Implement a spill response plan to avoid introducing deleterious substances into the watercourse
- New or replaced culvert crossings should be able to maintain 50% fish passage for average sized pike during a 2-year flood event. Maximum culvert velocities and swim distances can be calculated using the tool at:
<http://www.fishprotectiontools.ca/distancevelocity.html>
- Culvert maintenance should follow DFO's Interim Code of Practice: Culvert Maintenance

Should your plans change or if you have omitted some information in your proposal, further review by the Program may be required. Consult our website (<http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html>) or consult with a qualified environmental consultant to

determine if further review may be necessary. It remains your responsibility to remain in compliance with the *Fisheries Act*, and to avoid prohibited effects on listed aquatic species at risk, any part of their critical habitat or the residences of their individuals. It also remains your responsibility to meet all other federal, territorial, provincial and municipal requirements that apply to your proposal. **Note: this letter is not a formal review of the project under the *Fisheries Act* or *Species at Risk Act*.**

If you have any questions with the content of this letter, please contact Maja Cvetkovic at 289-442-3580 or by email at Maja.Cvetkovic@dfo-mpo.gc.ca. Please refer to the file number referenced above when corresponding with the Program.

Yours sincerely,

A handwritten signature in blue ink that reads "Maja Cvetkovic". The signature is written in a cursive, flowing style.

Maja Cvetkovic
A/Senior Biologist, Fish and Fish Habitat Protection Program

Copy:
Jason Culp, Niagara Peninsula Conservation Authority



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Appendix C

Preliminary Survey Summary



Mill Creek Drainage Petition Field Point Survey Summary

Project: Mill Creek Petition
Date: Apr-21

Township: West Lincoln
Project No.: 300051132

Description / Land Use	Owner	Roll No.	Property Line	Station Interval		Section Interval (m)	Section Avg. Gradient (%)	Description	Technical Notes			
				D/s (m)	U/s (m)							
River	Welland River		0+000	0+000	0	n/a	Outlet	Channel outlet, Water level in Welland River				
Golf Course & Forest	Thomas & Sung Inc. (Riverview Golf Club)	(00-000-00)	0+000 to 0+236	0+000	0+006	6	2.33	Culvert	1,000 mm dia. CSP culvert, fair condition			
				0+006	0+143	137	0.20	Channel	Gradient flattens in this section, channel cross-section narrows, evidence of seasonal flooding.			
				0+143	0+236	93	-0.06		Confluence at Sta. 0+143, gradient flattens in this section.			
Golf Course & Fallow Field	Thomas & Sung Inc. (Riverview Golf Club)	(06-117-00)	0+236 to 0+928	0+236	0+273	37		-0.06	Channel	Gradient flattens in this section, channel cross-section narrows, evidence of seasonal flooding.		
				0+273	0+275	2	Steel bridge crossing					
				0+275	0+402	127	Gradient flattens in this section, channel cross-section narrows, evidence of seasonal flooding.					
							0+402	0+405	3	-3.00	Culvert	1,000 mm dia. CSP culvert, fair condition
							0+405	0+512	107	0.16	Channel	Gradient flattens in this section, channel cross-section narrows, evidence of seasonal flooding.
							0+512	0+516	4	2.25	Culvert	1,000 mm dia. CSP culvert, fair condition
							0+516	0+590	74	0.26	Channel	Confluence at Sta. 0+590.
							0+590	0+700	110	0.25		Land use changes to golf course, channel cross-section narrows, evidence of seasonal flooding.
							0+700	0+705	5	0.00	Culvert	Twin CSP arched culverts installed on side, Ap. 1,000 mm span X 850 mm rise, poor condition.
							0+705	0+928	223	0.21	Channel	Channel cross-section varies, land-use changes to fallow field/scrub brush.
East Chippawa Road	Township of West Lincoln		0+928 to 0+943	0+928	0+946	18	0.44	Culvert	3,650 mm span X 1,950 mm rise Concrete Box Culvert, good condition. Confluence at Sta. 0+950.			

Agricultural & Forest	J. & L. Juhasz	(06-138-00)	0+943 to 1+222	0+946	1+074	128	0.17	Channel	Channel cross-section narrows, evidence of seasonal flooding.	
				1+074	1+080	6	-0.50	Culvert	1,200 mm dia. CSP culvert	
				1+080	1+105	25	0.44	Channel	Channel cross-section narrows, evidence of seasonal flooding.	
				1+105	1+222	117	0.34		Ponded area during floods.	
	Frank Svob Farms Ltd.	(06-153-00)	1+222 to 1+626	1+222	1+470	248	0.07	Channel	Gradient flattens in this section, bank erosion and sediment erosion present.	
				1+470	1+479	9	0.00		Culvert	Steel culvert crossing Ap. 1,400 mm dia., fair condition.
				1+479	1+626	147	0.16	Channel	Channel has been maintained previously and cross-section deepened and widened, bank erosion and sediment deposition evident in areas.	
	Frank Svob	(06-140-00)	1+626 to 2+512	1+626	2+110	484				0.27
				2+110	2+398	288				
				2+398	2+512	114				
	A. & R. Wiley	(06-154-00)	2+512 to 2+617	2+512	2+617	105	0.41		Evidence of beaver dam construction and removal, large amounts of sediment deposition in areas. Multiple confluences with tributaries, mainly from north and west.	
	A. & R. Wiley	(06-155-00)	2+617 to 3+388	2+617	2+918	301	0.25			
				2+918	3+045	127				
				3+045	3+388	343	0.09			
Frank Svob	(06-140-00)	3+388 to 3+531	3+388	3+419	31	-0.08			Evidence of water ponding observed during walkthrough.	
			3+419	3+531	112					
Wiley Road	Township of West Lincoln		3+531 to 3+552	3+531	3+552	21	-0.24		Culvert	Ap. 2,000 mm span X 1,220 mm rise CSP Arched Culvert, good condition.
Agricultural & Forest	S. & C. Shedden	(06-039-00)	3+552 to 3+669	3+552	3+669	117	0.44		Channel	Channel passes through field, possible re-alignment. Confluence at Sta. 3+601.
Wiley Road	Township of West Lincoln		3+669 to 3+689	3+669	3+689	20	0.00		Culvert	Ap. 2,110 mm span X 1,350 mm rise CSP Arched Culvert, good condition.
Agricultural & Forest	Frank Svob	(06-140-00)	3+689 to 3+799	3+689	3+799	110	0.05		Channel	Channel passes through field, possible re-alignment.
	Frank Svob Farms Ltd.	(06-153-00)	3+799 to 3+995	3+799	3+838	39				
				3+838	3+995	157	0.24			
Wiley Road	Township of West Lincoln		3+995 to 4+013	3+995	4+013	18	-0.06	Culvert	Ap. 2,050 mm span X 1,500 mm rise CSP Arched Culvert, good condition.	



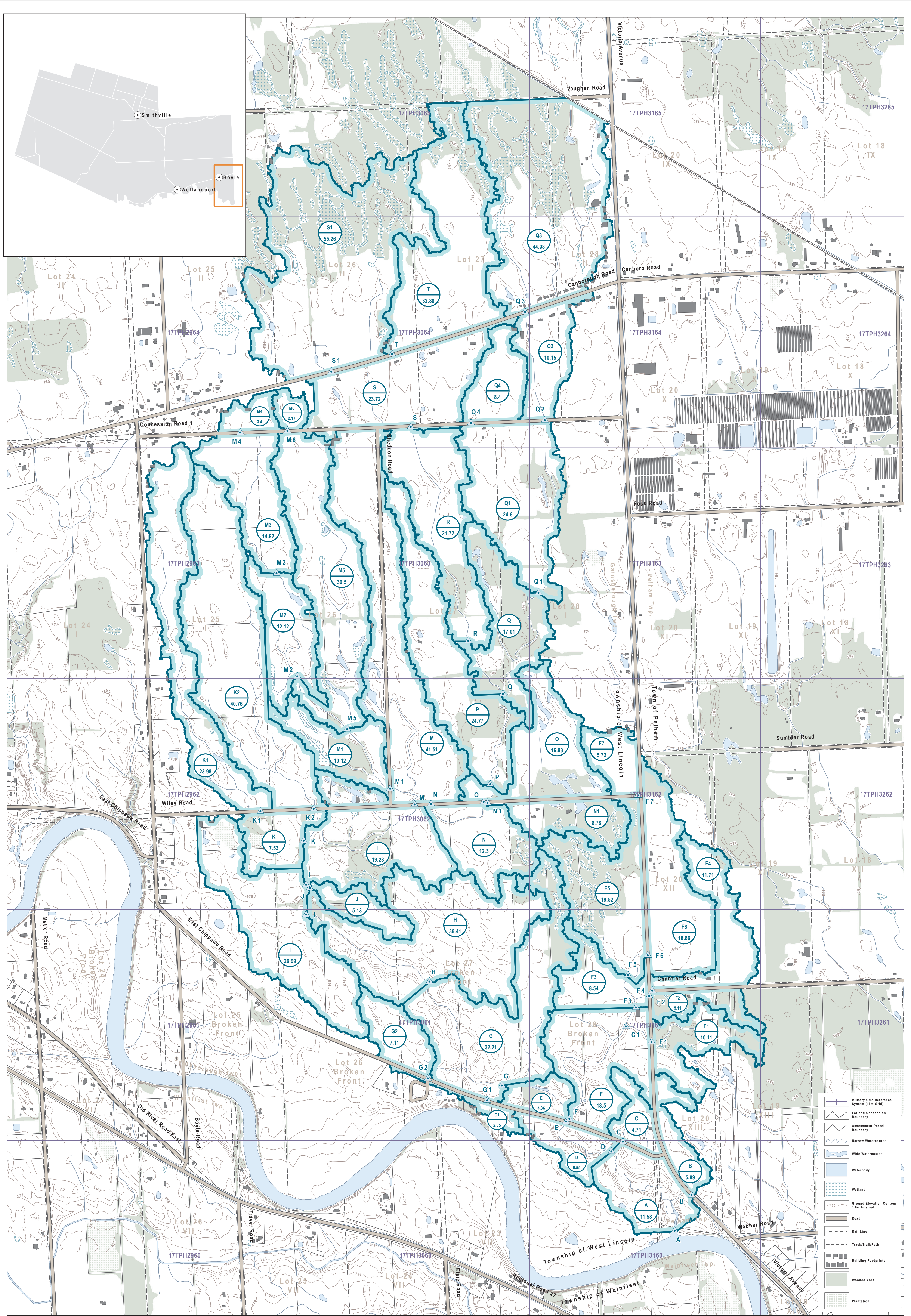
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Appendix D

Drawings

Overall Catchment and Topography Watershed Plan	1 of 2
Detailed Watershed Plan	2 of 2



- Military Grid Reference System (1km Grid)
- Lot and Concession Boundary
- Assessment Parcel Boundary
- Narrow Watercourse
- Wide Watercourse
- Waterbody
- Wetland
- Ground Elevation Contour 1.0m Interval
- Road
- Rail Line
- Track/Trail/Path
- Building Footprints
- Wooded Area
- Plantation

Sources:
 1. Ministry of Natural Resources, © Queen's Printer for Ontario
 2. Niagara Peninsula Conservation Authority
 3. Regional Municipality of Niagara

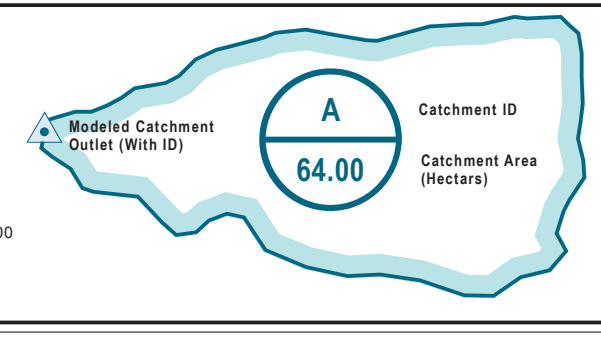
Disclaimer:
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This map is the product of a Geographic Information System (GIS). As such, the data represented on this map may be subject to updates and future reproductions may not be identical.

Datum: North American 1983 CSRS
 Coordinate System: NAD 1983 CSRS UTM Zone 17N
 Projection: Transverse Mercator
 Central Meridian: 81°0'0.00"W
 False Easting: 500,000m
 False Northing: 0m
 Rotation: 0
 Scale Factor: 0.99960

North Arrow
 Grid North

Scale: 0 100 200 300 400 500 600 700 800 Metres



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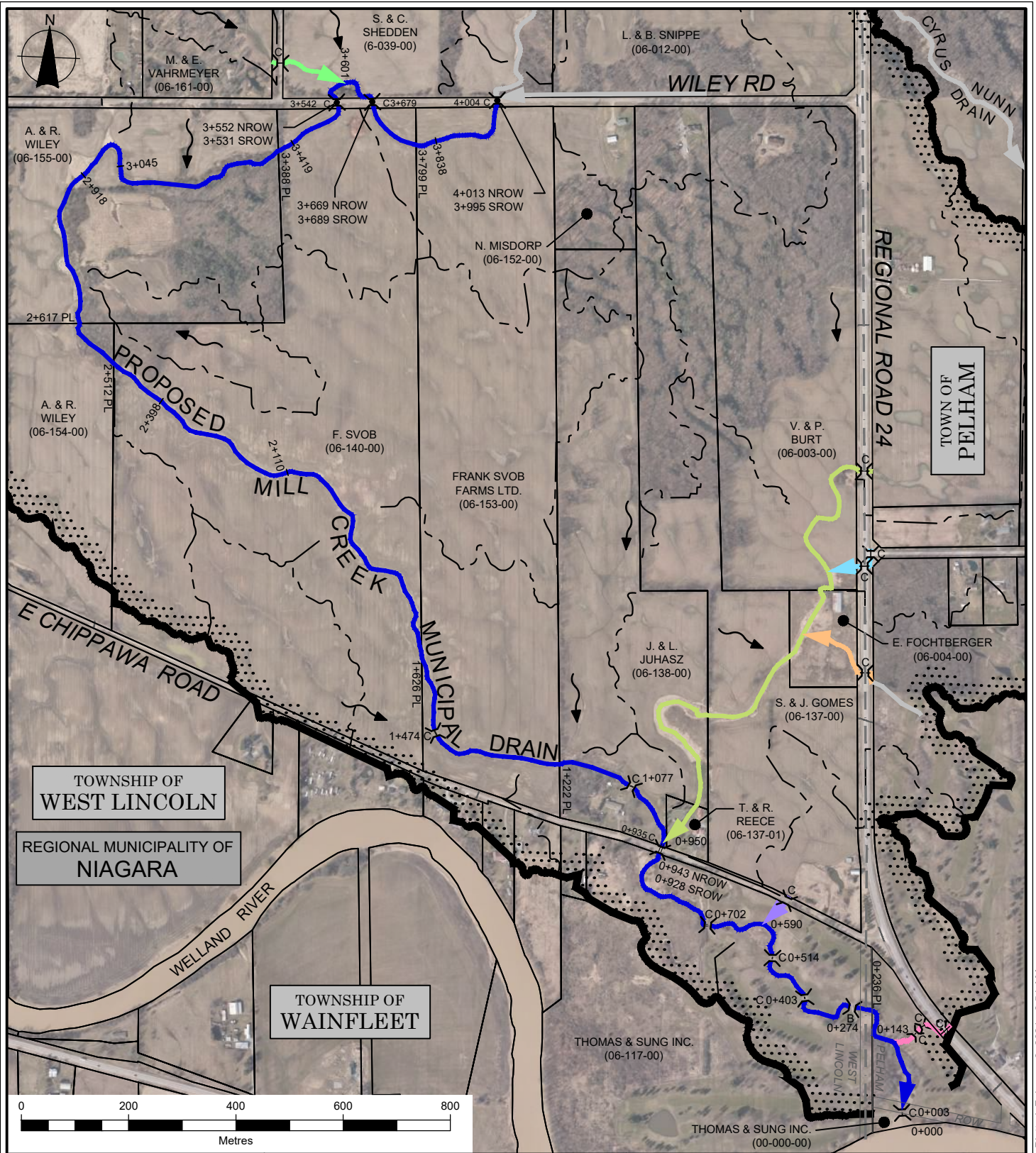
TOWNSHIP OF WEST LINCOLN

Client: _____

MILL CREEK DRAIN CATCHMENT AND TOPOGRAPHY

Map No. 1/1

Drawn	Checked	Date	Map No.
PS	ED	2020/01/31	1/1
Scale:	Project No.:	300051132	
H 1:7,000			



LEGEND

	WATERSHED BOUNDARY
	SUB-WATERSHED BOUNDARY
	PROPOSED OPEN DRAIN
	EXISTING OPEN DRAIN
	EXISTING CLOSED DRAIN
	OVERLAND FLOW DIRECTION
	EXISTING CULVERT

BURNSIDE

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Client
TOWNSHIP OF WEST LINCOLN
 318 CANBOROUGH STREET
 SMITHVILLE, ONTARIO
 L0R 2A0

West Lincoln
 Your Future Naturally

Drawing Title			
MILL CREEK MUNICIPAL DRAIN			
DETAILED WATERSHED PLAN			
Drawn	Checked	Date	Drawing No.
MS/AK	EMD	2021/02/02	1 OF 1
Scale	Project No.		
1:10,000	300051132.0000		

