Appendix A

Technical Memorandum #1 – Project Background and Existing Conditions

Region of Waterloo

New Dundee Water Supply Iron and Manganese Upgrades Class Environmental Assessment

Technical Memorandum #1

Project Background and Existing Conditions

Final

Prepared for:

Region of Waterloo

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arva

RVA 194591

September 27, 2022

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September 27, 2022 RVA 194591

Region of Waterloo
Transportation and Environmental Services
Design and Construction Division
150 Frederick Street, 6th Floor
Kitchener, Ontario, N2G 4J3

Attention: Kaoru Yajima

Dear Mr. Yajima:

Re: Technical Memorandum #1
New Dundee Water Supply Iron and Manganese Upgrades Class Environmental Assessment Background Information Review – FINAL Rev 2

Please see enclosed Technical Memorandum #1 as the first submittal for the New Dundee Water Supply Iron and Manganese Upgrades Class Environmental Assessment (EA). This report contains the desktop studies completed by RVA's Natural Heritage and Archaeological subconsultants. This TM has been updated to reflect the change in the treatment design flow as detailed in the meeting dated May 18, 2021.

Yours very truly,

R.V. ANDERSON ASSOCIATES LIMITED

Jonathan Rudyk, P.Eng
Process Engineer

Kirk Worounig, P.Eng., PMP
Project Manager

Encls.

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Technical Memorandum #1

Background and Existing Conditions

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1.0 Introduction

The Region of Waterloo has embarked upon a Class EA for the New Dundee Water Supply Station in the community of New Dundee, which is located approximately 12 km southeast of the Township of Baden. The New Dundee Water Supply Station is located at 156 Alderview Drive in the Township of Wilmot.

The Region is completing this EA to address needed water treatment upgrades that have been identified based on anticipated changes to the Ontario Drinking Water Standards (ODWS). In June 2019, Health Canada issued the Guidelines for Canadian Drinking Water Quality: Guideline Technical Document – Manganese, which established an aesthetic objective of 0.02 mg/L. It can be noted that aesthetic objectives are intended to address non-health related items such as odour, taste, and colour. To be in line with Health Canada recommendations, it is anticipated the provincial objective for manganese will be reduced from 0.05 mg/L to 0.02 mg/L, with a design operating objective of 0.015 mg/L. The New Dundee Well Supply System was identified for potential treatment upgrades in order to consistently meet the anticipated new objective.

In September 2019, the Region retained R.V. Anderson Associates Limited (RVA) to complete the Class Environmental Assessment for the Iron and Manganese Treatment Upgrades.

The following technical memorandum (TM) is provided to summarize the review of the background conditions of the project, including a review of the regulatory framework for manganese treatment, water quality conditions, relevant background reports and desktop studies of the surrounding area.

2.0 Project Objectives

The intent of this project is to complete a Schedule C Class EA to provide recommendations for iron and manganese treatment upgrades to the New Dundee Well Supply System, and to determine the optimal location for the treatment upgrades.

At key stages of the project, technical memoranda will be written to include the following:

- A review of the background information, existing conditions at the New Dundee Water Supply Station, and determine the need for pilot testing. (Technical Memorandum (TM) #1, this document
- Develop evaluation criteria for alternatives. (TM #2)
- Develop and evaluate alternative solutions. (TM #3)
- Develop and evaluate alternative design concepts. (TM #4)
- Environmental study report

3.0 Project Background

3.1 Existing Water Supply System

The New Dundee Well Supply System is one of several Rural Water Supply Systems. The facility was built in response to increased water demands in the area due to the construction of a new subdivision approved by the Region in 1977. These rural water supply systems supply drinking water to their local community, which in this case is the community of New Dundee. The community is currently supplied by two wells, ND04 and ND05, located at 156 Alderview Drive, Wilmot. An orthographic photo of the facility may be seen in **Figure 3.1**. The facility is comprised of a pumphouse, one electrical room, one portable generator, and four inground reservoir cells. Cells 1A and 2A each have a capacity of 28 m^3, cell 1B has a capacity of 131 m^3, and cell 2B has a capacity of 200.5 m^3. The facility has SCADA capability and is connected to the Region of Waterloo's Mannheim Water Treatment Plant. A fence runs around the property and partly onto the property to the north of the site where the wells ND04 and ND05 are located. The property is approximately 970 m^2, excluding the fenced portion located on the property to the north. The property to the north was the Township of Wilmot's property, but the Region of Waterloo has been given permission to use it per an encroachment agreement signed in 2003. A paved area to the southeast of the station is used for parking.

In recent years, the station has had upgrades including the addition of an electrical room, and installation of a portable generator connection on the northeast face of the building.

The drinking water permit for the two wells allows for a combined maximum flow of 983,520 L/day, or 11.38 L/s, per the Permit to Take Water (PTTW) dated January 28, 2019. The two wells pump raw water into a common header where a sodium hypochlorite solution is injected for primary disinfection, before being discharged into reservoir cells 1B and 2B. The water flows from Cell 1B to Cell 1A, and Cell 2B to Cell 2A. These cells are sized to allow sufficient contact time for primary disinfection. After the required contact time is achieved in the reservoir cells, the water is pumped to the distribution system via two vertical turbine pumps out of Cells 1A and 2A. As part of the PTTW, Drinking Water Works Permit (DWWP), and Municipal Drinking Water License (MDWL) flowrates are monitored for both wells and for treated water to the distribution system. Free chlorine residual is measured downstream of primary disinfection (upstream of the reservoirs), with free chlorine residual and turbidity measured on the station discharge to the distribution system.

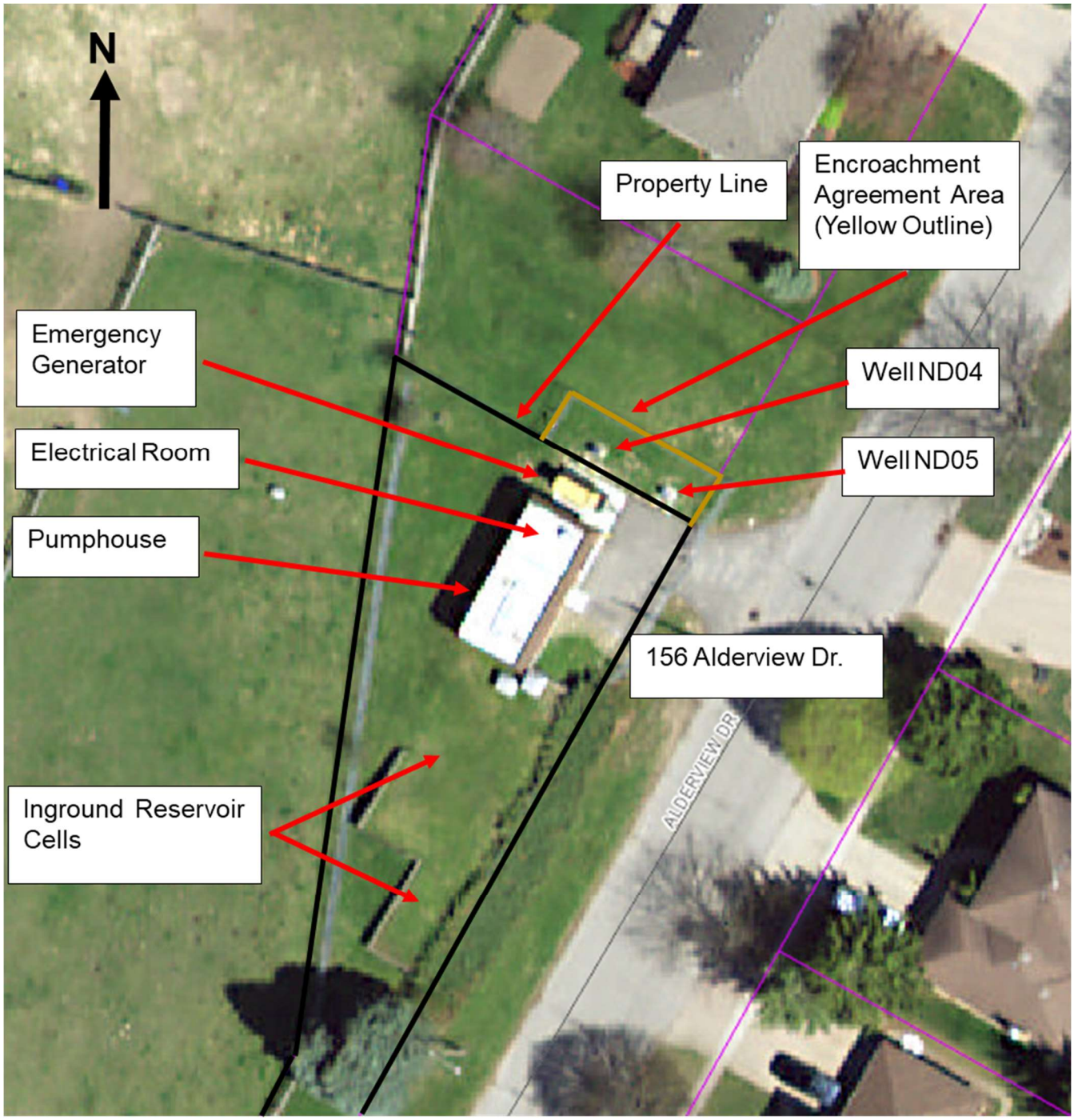

Figure 3.1: Annotated Orthographic Image of New Dundee Well Pump Station

3.1.1 New Dundee Wells Flows

Well flowrate data was supplied by the Region on a daily summative basis, from January 2016 to November 2019. In general, the pumps remained running for the dates given. From January 2016 to November 2019 the wells delivered an average of 2.28 L/s to the distribution system. The minimum and maximum day flowrates recorded were 0.89 L/s and 4.50 L/s respectively.

3.1.1.1 Well ND04

Well ND04 was commissioned in 1990 as part of the pumping station expansion project, which also included the installation of reservoir cell 2B. The well is located approximately 5 m to the northeast of the pumphouse. Based on the Biennial Groundwater Monitoring Report completed by R.J. Burnside & Associates in 2017 this well may be classified as non-GUDI. Well ND04 delivers an average day flow of 1.54 L/s, which accounts for 67% of the well system output to the distribution system. The minimum and maximum day flow this well has produced is 0.76 L/s and 3.22 L/s respectively.

3.1.1.2 Well ND05

As with Well ND04, this well is also classified as non-GUDI. This well is located about 5 m off the east corner of the pumphouse. Well ND05 delivers an average day flowrate of 0.76 L/s which accounts for 33% of the well system output to the distribution system. The minimum and maximum day flow this well has produced is 0.16 L/s and 3.53 L/s respectively. This well was briefly offline from July 19th to July 21st, 2016.

3.1.2 Proposed Design Flow for Iron and Manganese Removal Upgrades

While the PTTW value of 11.38 L/s (0.98 MLD) is sometimes the standard for water treatment capacities in well systems, it is evident based on historical flows that the maximum community water demand is well below the PTTW value. As such, RVA conducted a design flow analysis based on historical daily flows from the well pumps, high lift pumps, and through the Region's 2020 Water and Wastewater Monitoring Report (further detailed in Section 3.4.5) to develop the proposed treatment capacity of the iron and manganese removal system. The findings of this analysis were presented to the Region on May 18, 2021, and a copy of the meeting notes and slides is provided in Appendix A. A summary of the historical water demands from the Water and Wastewater Monitoring Report is given in Table 3.1.

Table 3.1. Average and Peak Day Flow for the period 2016 - 2020

Year	Population	Average Day Flow (L/cap/day)	Average Daily Flow (L/s)	Peak Day Flow (L/cap/day)	Peak Day Flow (L/s)
2016	1126	186.3	2.43	381.7	4.97
2017	1049	184.9	2.24	373.1	4.53
2018	1056	185.4	2.27	362.6	4.43
2019	1056	171.9	2.10	340.2	4.16
2020	1056	**208.3***	2.55	**482.0***	5.89

*Values calculated from Measured Flows.

Based on the available data, RVA selected the maximum observed average day flow and peak day flow to be used for future water demand projection. As such, the average day flow will be set at 208.3 L/cap/day, and the peak day flow will be set at 482.0 L/cap/day. These values have been highlighted in bold in Table 3.1.

The Region's 2020 Water and Wastewater Monitoring Report also lists the population projection of the community of New Dundee for the years of 2021, 2026, and 2031. Therefore, RVA develops the following water demand projection table.

Table 3.2. Demand projection for 2021, 2026 and 2031

Year	Projected Population	Average Day Flow (L/cap/day)	Average Daily Flow (L/s)	Peak Day Flow (L/cap/day)	Peak Day Flow (L/s)
2021	1079	208.3	2.60	482.0	5.89
2026	1135	208.3	2.74	482.0	6.02
2031	1190	208.3	2.87	482.0	**6.64**

Based on the water demand projection, RVA calculated the treatment capacity in Table 3.3.

Table 3.3 – Treatment capacity calculation

Parameter	Description	Calculation	Value (L/s)
A	Future Population Growth	Future Population * per capita requirement	6.6
B	Process Water Use	10% of A	0.7

Parameter	Description	Calculation	Value (L/s)
C	Safety Factor	10% of A+B	0.7
		Total	8.0

Therefore, the proposed treatment design capacity is set at 8.0 L/s (0.69 MLD) for the New Dundee water supply facility such that future peak day demands, and process water uses can be properly handled.

3.2 Design Objective Based on New Regulations

The Ontario Drinking Water Standards had previously set the aesthetic objective (AO) for manganese in water at 0.05 mg/L. However, Health Canada has modified their Guideline concentration to 0.02 mg/L, to ensure that discolouration of laundry and plumbing fixtures will not result due to manganese. Health Canada has also identified a target of 0.015 mg/L which will ensure that precipitated manganese does not accumulate in the distribution system. Finally, Health Canada has established 0.12 mg/L as the maximum acceptable concentration (MAC) for manganese in drinking water.

The design objective for the New Dundee Well Supply System Manganese Treatment Upgrades will be to treat the wells to meet the goal of less than 0.015 mg/L.

3.3 Raw Water Quality

Historical raw water quality data was provided by the Region of Waterloo for the well system from January 2015 to January 2020. The data was evaluated for the minimum, maximum, and average concentrations for manganese and iron. Samples giving concentrations for iron and manganese were excluded from analysis for Well ND05 during a December 2019 sample date. These concentrations were recorded to be six times greater than the average for ND05 Manganese, and twenty times greater than the average for ND05 Iron. A subsequent test in January 2020 confirmed these values were outliers, and thus excluded from the analysis below.

3.3.1 Total Manganese

Table 3.4 – Manganese Concentration in New Dundee Wells Incoming Well Quality and Treated Water (2015 - 2019) (Regional Municipality of Waterloo)

Parameters	ND04 Manganese Concentration	ND05 Manganese Concentration	Treated Water Manganese Concentration
Minimum (mg/L)	0.022	0.019	0.014
Maximum (mg/L)	0.031	0.051	0.023
Average (mg/L)	0.026	0.037	0.018

As can be seen in **Table 3.1**, the manganese concentrations meet the existing provincial AO for manganese, however they exceed or nearly exceed the new AO guideline. The treated water currently falls between the new aesthetic objective and the design target, confirming the need for the manganese treatment system. **Figure 3.2** provides a graphical representation of the samples taken and their relation to the current AO, new AO, and Design Target Concentration. As with **Table 3.1**, the graphical representation shows a consistent concentration of manganese in the treated water being in between the new AO and Design Target Concentrations.

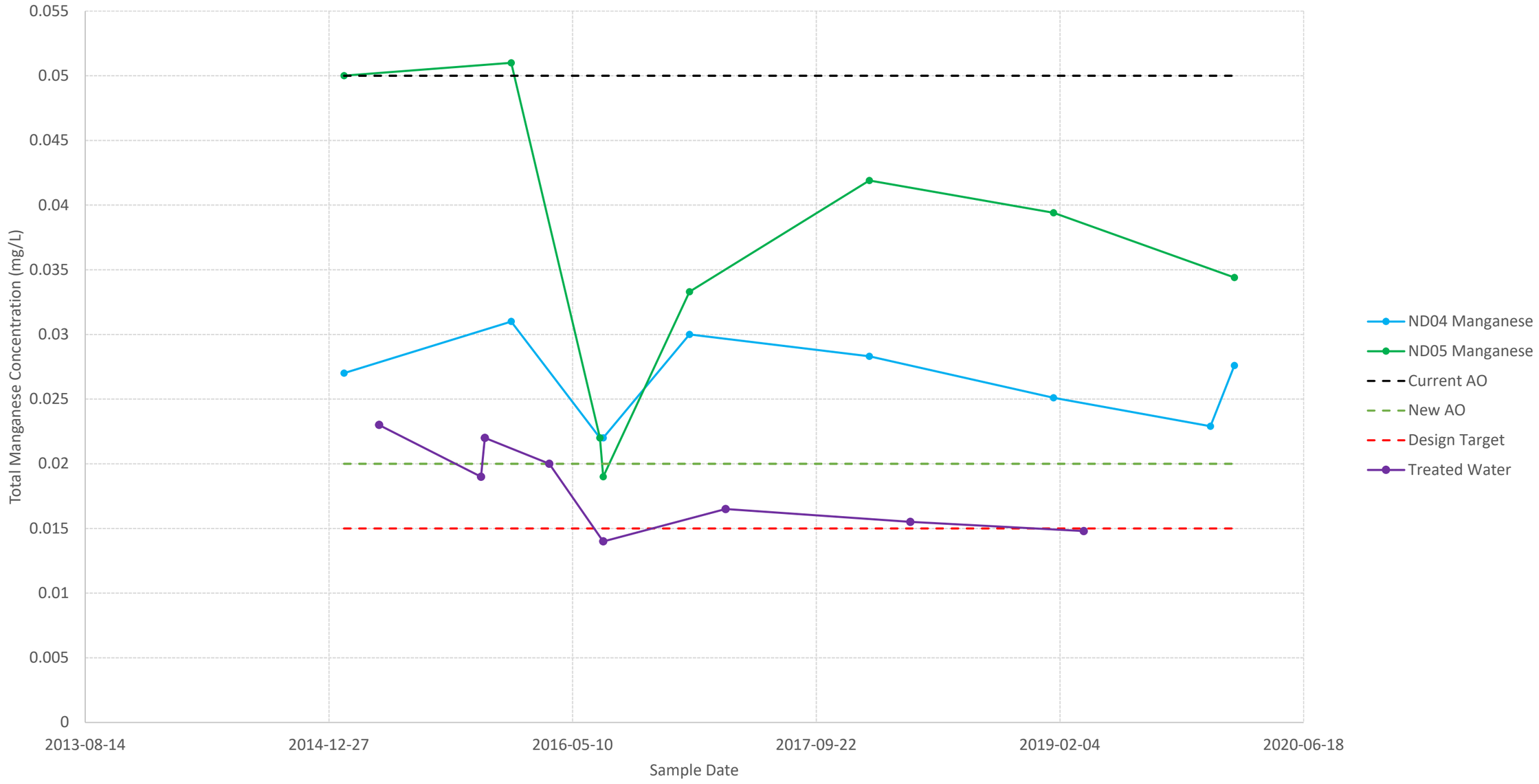

Figure 3.2 Total Manganese Concentrations (2015-2020)

3.3.2 Total Iron

Table 3.5 Iron Concentration in New Dundee Well Supply System Raw Water and Treated Water

Parameters	ND04 Iron Concentration	ND05 Iron Concentration	Treated Water Iron Concentration
Minimum (mg/L)	0.032	0.01	0.01
Maximum (mg/L)	0.1	0.037	0.044
Average (mg/L)	0.061	0.015	0.021

The aesthetic objective for iron in treated drinking water is 0.3 mg/L. In this respect, the raw and treated waters are well below these values. A graphical representation of the samples may be found in **Figure 3.2**. It should be noted that several of the data points are at 0.01 mg/L, which is the Minimum Detection Limit (MDL) for the laboratory testing.

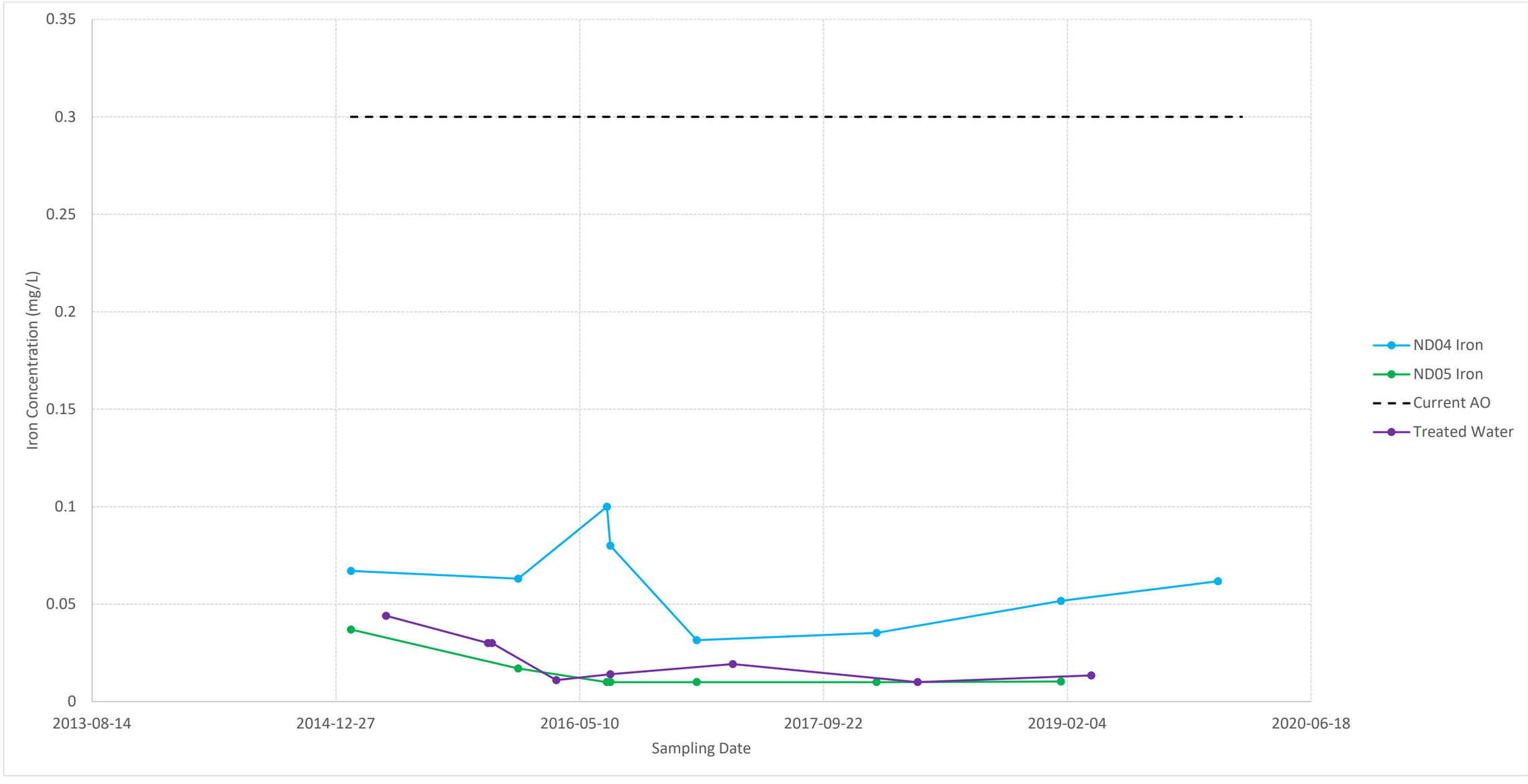

Figure 3.3 Total Iron Concentrations (2015-2020)

3.4 Previous Reports and Documentation`

As part of this Class EA, a background review was completed of previous studies and reports completed related to the New Dundee Well System and Pumping Station. The following subsection is a summary of these findings.

3.4.1 Township of Wilmot Engineers' Report for Water Works of the New Dundee Water Supply System (Earth Tech Canada Inc., 2001)

The Engineers' Report for Water Works was completed as a result of a mandate by the Ministry of the Environment (MOE) in response to the E. Coli outbreak that occurred in Walkerton, Ontario in 2000. The goal of the mandate was to complete a detailed assessment of the physical and operating conditions of all drinking water supply, treatment, and storage works in Ontario. The report also summarizes the operational and physical features at the New Dundee Water Supply Station that require upgrades to be compliant with the standards as dictated by the MOE.

Operationally speaking, the station did not have operational and maintenance manuals, or record drawings on site when this report was written. Operating logs and data had been kept in good working order and monitoring programs have captured the required flows and chlorine residual requirements.

Physically, the station had primary chlorine disinfection, and a confirmation of contact time revealed that the station had an adequate contact time of at least 15 minutes in the clearwell reservoirs. There was backup power available on site to power the entire station including the disinfection system. Each wellhead was protected, well casings were at least 300 mm above grade elevation, and the top of the casings were sealed. The station site was fenced but there was no intrusion alarm for the pumphouse.

Based on the two MOE inspections conducted and referenced to in the report, the MOE recommended that operating and maintenance manuals and record drawings be compiled and kept on site, an intrusion alarm be installed, and a standby chlorination pump be installed for redundancy in the primary disinfection system. These recommendations were subsequently implemented by the Region.

3.4.2 System Wide Water Supply Facility Assessment for the Proposed Health Canada Manganese Guidelines (Stantec Consulting Ltd., 2017)

In response to draft Health Canada guidelines released in 2016, Stantec was retained to complete a high-level, system-wide water facility assessment and determine which facilities required any action to meet the new design target of 0.015 mg/L for Mn in treated water. Forty-six systems were evaluated, and five were determined to require capital upgrades. Counted among the five was the New Dundee Well system.

The Assessment summarized the New Dundee Water Supply system and treated water concentrations. Average treated manganese concentration were found to be 0.021 mg/L, which was confirmed in the current Class EA project.

The facility Stantec recommends was a conventional oxidation and filtration process using sodium hypochlorite as an oxidizer, and Greensand filtration as the filtration process. The constraints present on site due to limited space meant expansion could not occur in the existing pumphouse and electrical room. Two options were presented for expansion areas:

1. Construct the new treatment building on top of the existing inground reservoir cells
2. Purchase adjacent land for new treatment building.

To complete the detailed design, a Class C EA was recommended along with pilot testing to ensure proper public consultation is followed for land acquisition and filters are sized properly.

The schedule for completion of these upgrades was estimated at 42 months for the Class EA, Preliminary Design, and Detailed Design, and 12 months for Construction.

3.4.3 2017 Biennial Groundwater Monitoring Report-New Dundee Well Field, Region of Waterloo (R.J. Burnside & Associates Limited, 2018)

As part of the Permit to Take Water (PTTW) requirements for the New Dundee Well Field and System, biennial reporting of the wells including pumping volumes and monitoring well levels are to be recorded for submission to the Ministry of the Environment, Conservation and Parks (MECP). The objective of this reporting was to monitor the status of the aquifer as it varies from season to season, year

to year, and to determine the effect (if any) that municipal wells have on the aquifer levels.

The report gives the results of the monitoring well levels, pumping rate volumes, and recorded precipitation rates in the surrounding area over a period of ten years, from January 2008 to January 2018.

The results of the report state that no impacts have been reported from private wells regarding water quality or well flowrates. Additionally, the report found that there was no correlation between municipal pumping rates and aquifer levels, and that the aquifer level is related to the monthly precipitation levels.

3.4.4 New Dundee Water Treatment Plant & System Supply Wells ND4, ND5 Asset Inventory & Condition Assessment (C3 Water Inc, 2018)

A condition and inventory assessment was conducted in late 2018 to determine the state of the equipment and building and prepare a list of assets due for replacement including a budgetary cost estimate. The assessments included a capital project definition and sequencing list for a 25-year capital replacement program.

The condition assessment found replacements of the high lift pumps and motors should be scheduled for2028 and replacement of the process piping and valves should be scheduled within the next 25 years. Additionally, the instrumentation system will require periodic replacement in the next 25 years. The total capital cost for the recommended upgrades and repairs was anticipated to be $1,120,000. One noted omission from this condition assessment report is the inground reservoirs were not inspected structurally. The reservoirs were kept in service for the entire duration of the condition assessment, and no portion of the reservoir roof was uncovered.

3.4.5 Water and Wastewater Monitoring Report June 2020 (Region of Waterloo, 2020)

This report is produced on an annual basis to consolidate, collect, and report on water usage, wastewater flows, water treatment operating capacities, development capacity and remaining capacity for all of the Region owned water and wastewater systems. For the New Dundee Water Supply System, the report outlined historical usages up to the year 2020. The report also provides

information on the New Dundee population growth projections to 2031. These values were used in Section 3.1.2, for developing the iron and manganese removal treatment capacity.

4.0 Existing Conditions of Site Area

As part of the development of the background review a site visit was completed on November 19, 2019 by the RVA and Region project team. Natural environment and archaeological desktop studies were also conducted around a 1 km radius of the station site.

4.1 Existing Facility

Figure 4.1: View of pumphouse and standby generator from Alderview Dr, looking west..

The project team visited the existing facility. As can be seen in **Figure 4.1**, the site is fenced in with a storm sewer catchbasin at the end of the driveway. The portable generator may be seen next to the electrical room and pumphouse. There is no sanitary sewer system in New Dundee, and the site does not have any septic servicing.

Figure 4.2: Well ND05 and ND04.

The two wells are located in enclosures next to the portable generator as can be seen in **Figure 4.2**. Well ND05 is in the center frame, and Well ND04 is off to the left.

Figure 4.3: Well system piping, specifically the discharge piping header.

In general, the station piping is in excellent condition, with some noted areas of corrosion as pictured in **Figure 4.3** on the flange at the bottom left of the photo.

Figure 4.4: Manganese presence noted in the raw water chlorine analyzer drain.

On inspection of the raw water chlorine analyzer drain, presence of manganese buildup was noted, as can be seen in **Figure 4.4**.

4.2 Background Natural Sciences Report and Stage 1 Archaeological Assessment (AA)

4.2.1 Background Natural Sciences Report Summary

The Background Natural Sciences Report was completed in April and May 2020 by LGL Limited, an environmental and ecological research consultant company retained by RVA. The report summarizes the various flora and fauna species as well as important physiographical features within the EA Study Area. The full report is available in Appendix A.

The Study Area consists largely of the Alder Lake, Alder Marsh, and the Alder downstream wetland complex. These areas are designated per the Township Official Plan, and these features have associated floodplains as mapped out by the Grand River Conservation Authority (GRCA). The wildlife habitat consists mainly of agricultural and manicured properties, with some deciduous and

coniferous forest pockets. There are a number of bird species that are threatened or are of special concern that may reside in these wildlife habitats.

The findings of this report indicate that any alternate sites chosen as part of the EA process should be subject to bird breeding surveys and an Ecological Landscape Classification (ELC) survey of that specific location.

4.2.2 Stage 1 Archaeological Assessment (AA)

The Stage 1 AA was completed in April and May 2020 by Archeoworks Inc., an archaeological and cultural heritage services consultant retained by RVA. The report analyzes the archaeological and cultural heritage potential of the EA Study Area, and maps locations of areas of archaeological or cultural significance. The report is given as part of the EA process, and is required to be submitted for concurrence with the Ministry of Heritage, Sport, Tourism, and Culture Industries (MHSTCI) prior to the completion of the EA. The full report is available in Appendix B.

The community of New Dundee has several archaeologically and culturally significant features, and therefore contains archaeological potential. The study also identified locations where either due to previous archaeological work, construction, or physiographic features that have low to no archaeological potential and would thus be exempt from additional assessments. The properties immediately to the northwest and northeast of the existing facility have been marked as requiring a Stage 2 AA, with test pit surveys being conducted at 5 m intervals. The farmland further to the north of the site has also been identified as requiring a Stage 2 AA, and because it is farmland, a pedestrian survey is required.

The findings of the Stage 1 Assessment show that for any sites chosen will be subject to additional studies such as a Stage 2 AA.

5.0 Pilot Testing Requirements

As part of this project, RVA considered the need for pilot testing. Pilot testing can be used to confirm the suitability of a proposed treatment system and determine key design parameters such as the filter loading rate. The pilot testing is for the treatment alternative using conventional oxidation using sodium hypochlorite and pressure filtration with catalytic media (MD-80 or GreensandPlus), and would help determine loading rates for the filter, which is a key parameter in sizing requirements for this system.

RVA has considered the application of pilot testing for this application, in conjunction with other projects currently being completed in the Region for iron and manganese treatment. The two other projects are for the Middleton Wells and Shingletown Wells, where pilot testing was completed for both. The principal findings for these reports were:

1. A loading rate of 24.4 m/hr was tested for both pilot tests, with filter runtimes of up to 5 days.
2. The filter effluent met or exceeded the design target removal concentrations in both pilot test studies, showing that these filter types and media work as intended.
3. In both cases, concentrations of copper from 5 ppb to 57 ppb were detected in the backwash. In all cases this value is greater than the Provincial Water Quality Objectives(PWQO) for Ontario, of 5 ppb. The PWQOs are provided as guidance for effluent that may be released to natural waterbodies.
4. In the Middleton pilot test study, filter effluent water quality and rate of headloss accumulation were not affected by recycling the supernatant through the filter.

Based on the results from these two other pilot testing studies, RVA would recommend the following:

1. Pilot testing is not required because iron and manganese levels in New Dundee are similar or lower to the two other pilot studies already conducted.

2. We recommend that the filtration rate be selected at 14.4 m/hr, since pilot testing has not been done and this would provide an additional factor of safety. 14.4 m/hr is the maximum filter loading rate recommended by the AWWA Iron and Manganese Removal Handbook.

3. We would recommend that if the Region decides on this treatment process that the backwash wastewater supernatant be recycled through the filters. The reason is that there could be a risk of copper being released into the environment, although the origin of the low copper levels in both of the other pilot studies is not known. We also do not know if the supernatant will meet the suspended solids concentration limits of the storm sewer. To address these comments, a discussion with the MECP may be warranted, to discuss the applicability of the PWQOs with respect to storm sewer discharges.

6.0 References

AWWA, *Iron and Manganese Removal Handbook*, Second Edition, American Water Works Association, Denver, CO, 2015

C3 Water, New Dundee Water Treatment Plant & System Supply Wells ND4, ND5 Asset Inventory & Condition Assessment, C3 Water Inc with Pretium Anderson Waterloo Inc. & Cole Engineering Group Ltd., Breslau ON, 2018

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MECP, Drinking Water Works Permit, 012-207, Issue No. 2 for the Regional Municipality of Waterloo, Ministry of the Environment, Conservation, and Parks, Toronto, ON, 2016

MECP, Municipal Drinking Water Licence, 012-107, Issue No. 2 for the Regional Municipality of Waterloo, Ministry of the Environment, Conservation, and Parks, Toronto, ON, 2016

MECP, Permit to Take Water, No. 5581 – B84PGT for the Regional Municipality of Waterloo, Ministry of the Environment, Conservation, and Parks, Hamilton, ON, 2019

Regional Municipality of Waterloo, Staff Report to Planning and Development Committee, Township of Wilmot, Plan of Subdivision 30T-77007 (for Regional Council Approval), Regional Municipality of Waterloo, Kitchener, ON, 1977.

Regional Municipality of Waterloo, Water and Wastewater Monitoring Report, Regional Municipality of Waterloo, Kitchener, ON, 2021.

R.J. Burnside, 2017 Biennial Groundwater Monitoring Report – New Dundee Well Field, R.J. Burnside & Associated Limited, Guelph, ON, 2018

Stantec, System Wide Water Supply Facility Assessment for the Proposed Health Canada Manganese Guidelines, Stantec Consulting Ltd., Kitchener, ON, 2017.

Appendix A

Treatment Design Flow Analysis Presentation and Meeting Notes

May 2021

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MEETING NOTES

NEW DUNDEE WATER SUPPLY IRON AND MANGANESE UPGRADES
CLASS ENVIRONMENTAL ASSESSMENT
REGION OF WATERLOO
Flow Analysis Discussion Meeting

DATE: May 18, 2021

PLACE: Online, via Microsoft Teams, from 3:30 PM to 4:30 PM

PROJECT NO.: RVA: 194591

PRESENT:

Region of Waterloo (Region)
Kaoru Yajima – Project Manager & Senior Engineer, Engineering and Planning
David Brook – Senior Engineer, Design and Construction
Pam Law – Manager, Engineering and Planning
Olga Vrentzos – Manager, Operations and Maintenance

R.V. Anderson Associates Limited (RVA)
Kim Sayers – Project Director
Kirk Worounig – Project Manager
Jonathan Rudyk – Project Coordinator

	DISCUSSION:	ACTION BY
1.	**Introductions** • Project teams reintroduced themselves, and Jonathan Rudyk of RVA began the presentation.	Info
2.	**Design Flow Analysis PowerPoint Presentation** *Note: The PowerPoint presentation has been appended to the end of the Meeting Minutes. Slide numbers in the following points refer to PowerPoint slides.	Info
	Slide 7: • The Region stated they do not size design capacities on a peak-hour basis, but the use of the 10% Safety Factor on Slide 6 is still acceptable.	Info
	Slide 9 and 10 • The Region preferred the existing system configuration in slide 9 over that in slide 10 as it was similar to their other FE/Mn removal water treatment plants. • The Region may still elect to run the new well pumps on VFDs, as a method of flow control, so valves at the plant do not need to be manually throttled. Further review of the future well pump starters will be reviewed at the conceptual design phase.	Info Info
	Slide 11:	

	DISCUSSION:	**ACTION BY**
	• The Region agreed that revising the flows to the lower 8 L/s would be the preferred approach, and RVA noted that TMs 1, 3, and 4 would be revised to reflect the change in values. RVA to send an email to document this change.	RVA
	• RVA noted that this would reduce the size of the filters required, backwash supply tanks, backwash equalization tanks, and should reduce the footprint of the facility, per TM 4.	Info
	• The Region inquired about running the filters above the 14.4 m/hr AWWA recommended filtration rate. RVA replied that both Middleton and Shingletown pilot testing showed no loss of efficiency at running raw water with similar characteristics through the filters at up to 20 m/hr.	Info
	• The Region stated that reducing footprint of the new building was a priority if possible, due to the number of comments received in PCC #2 regarding the proposed locations of the new facilities.	Info

Notes prepared by: JPR, KMW

Distribution: Region of Waterloo, RVA

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PLEASE ADVISE THE WRITER OF ANY ERRORS OR OMISSIONS WITHIN 1 WEEK OF RECEIPT OF THESE NOTES

PTTW Design Flow Discussion

TABLE OF CONTENTS

- Objective of Discussion
- Historical Data Review
- Future Connection & Expansion Demands
- Supplier Correspondence
- Proposed Operation of Future Facility
- Recommendations and Discussion

MEETING OBJECTIVE

The objective of this meeting is to propose an alternative treatment design capacity, such that future treatment equipment is adequately designed for the future operation of the plant, and not over-sized.

The design to date has assumed a future treatment design capacity of 11.4 L/s (0.98 MLD) based on the Permit to take Water (PTTW).

HISTORICAL FLOWS

Year	Population	Average Day Flow per capita (L/cap./day)	Average Daily Flow (L/s)	Peak Day Flow per capita (L/cap./day)	Peak Day Flow (L/s)
2015	1126	186	2.42	385.7	5.03
2016	1126	186.3	2.43	381.7	4.97
2017	1049	184.9	2.24	373.1	4.53
2018	1056	185.4	2.27	362.6	4.43
2019	1056	171.9	2.10	340.2	4.16
2020	1056*	208.3	2.55**	482.0	5.89**

*Population data for 2020 not available, assumed 2019 population data.

**Average and max day flows provided by Region of Waterloo unofficial reporting results.

The data above was provided by the 2020 Water and Wastewater Monitoring Report, and from unofficial reporting in 2020.

Values from 2018 to 2020 were confirmed through RVA analysis of discharge flowrate data from the plant.

FUTURE CONNECTION AND EXPANSION DEMANDS

Per capita values were taken as the max. observed in the past six years

- Average Day Flow per capita = 208.3 L/cap./day
- Peak Day Flow per capita = 482.0 L/cap./day

From 2020 Water and Wastewater Monitoring Report:

Year	Population	Average Day Flow per capita (L/cap./day)	Average Daily Flow (L/s)	Peak Day Flow per capita (L/cap./day)	Peak Day Flow (L/s)
2020	1056	208.3	2.55	482.0	5.89
2021	1079	208.3	2.60	482.0	6.02
2026	1135	208.3	2.74	482.0	6.33
2031	1190	208.3	2.87	482.0	6.64

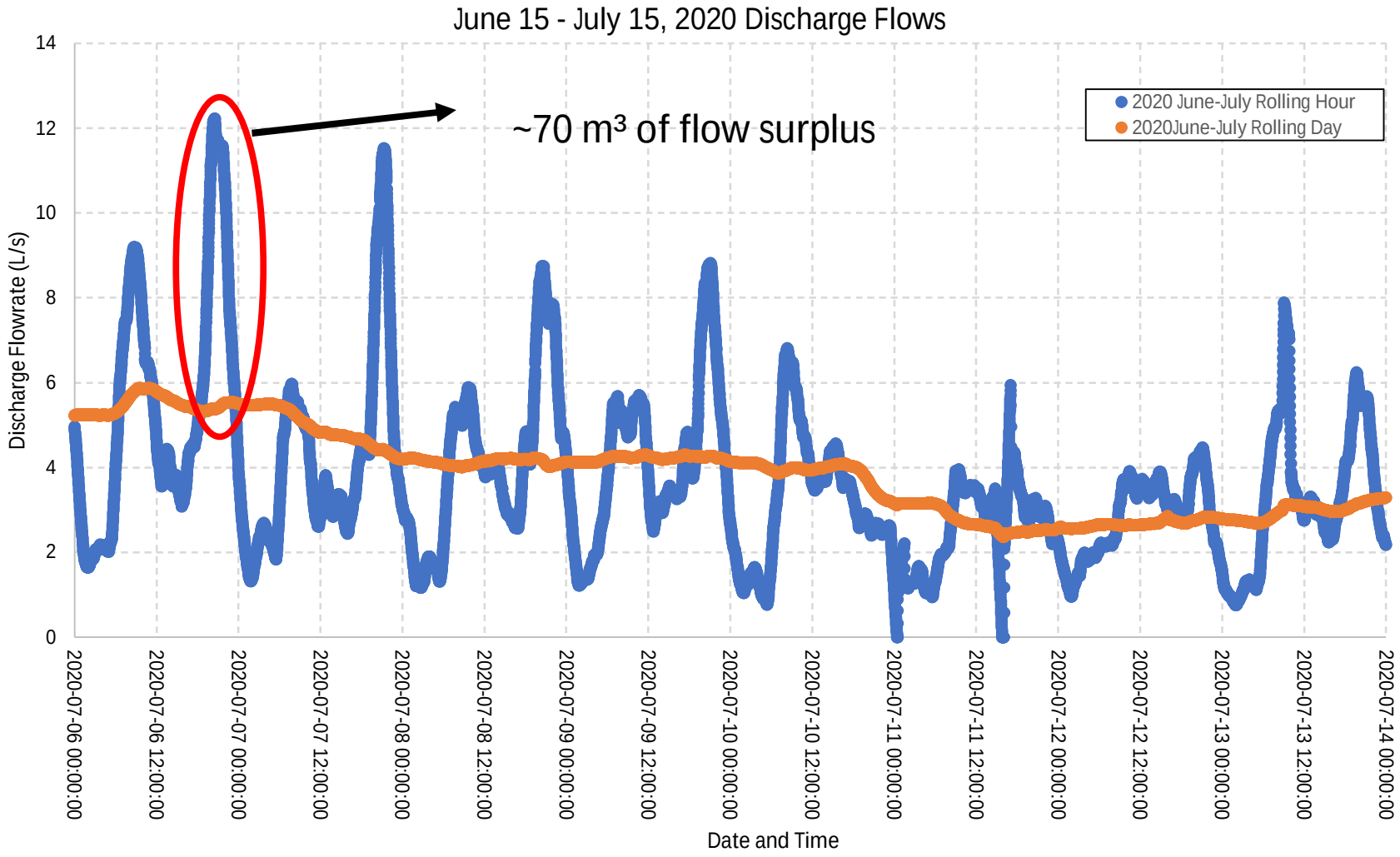
PROPOSED DESIGN FLOW

The proposed treatment capacity is as follows:

Parameter	Description	Calculation	Value (L/s)
A	Future Population Growth	Future Population * per capita requirement	6.6
B	Process Water Use	10% of A	0.7
C	Safety Factor	10% of A + B	0.7
		Total	8.0

8.0 L/s (0.69 ML) is the proposed treatment design flow of the New Dundee water supply facility, to handle future peak day demands and process water uses.

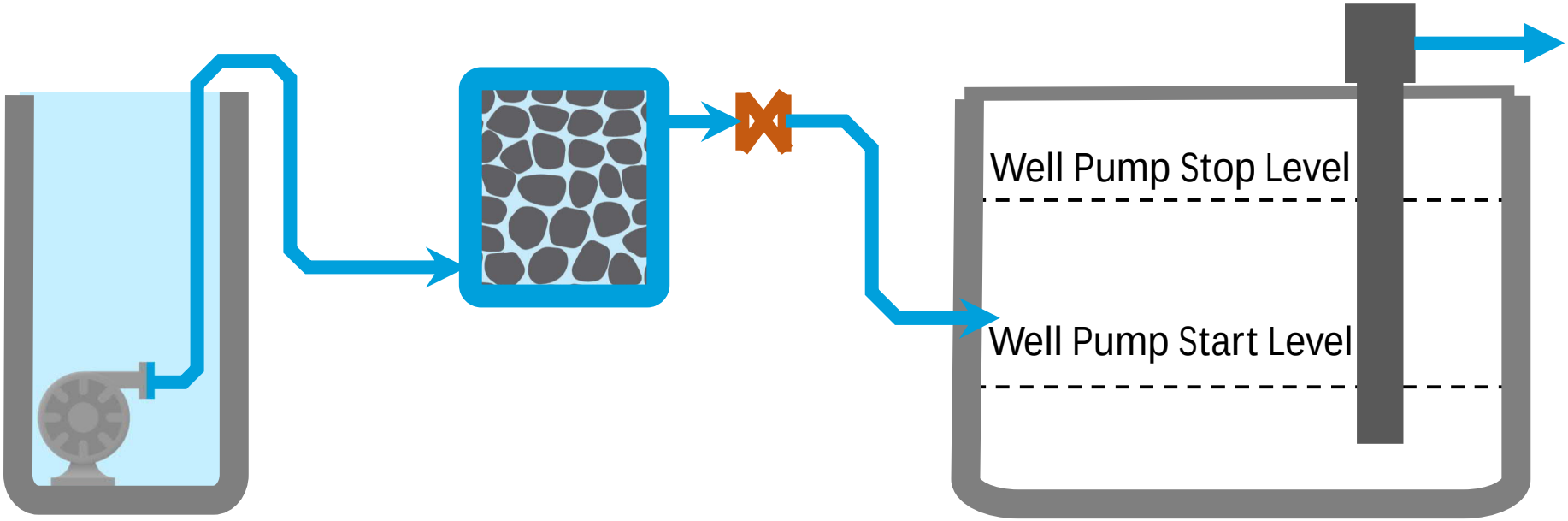
PEAK HOUR VS. PEAK DAY REVIEW



FILTER SIZING

- Basis of Design is 14.4 m/hr Filtration Rate, per AWWA Handbook for Iron and Manganese Removal.
- PTTW (11.4 L/s) Flow Filter Diameter: 1.98 m
- Proposed Design Flow (8.0 L/s) Diameter: 1.68 m
  - Note: Sizing based on a full redundancy configuration, with each filter being able to handle the design treatment flow.
- As a result, backwash flows may reduce from approximately 34 m^3 per filter to 25 m^3 per filter, to be confirmed via future supplier correspondence.

EXISTING SYSTEM OPERATION

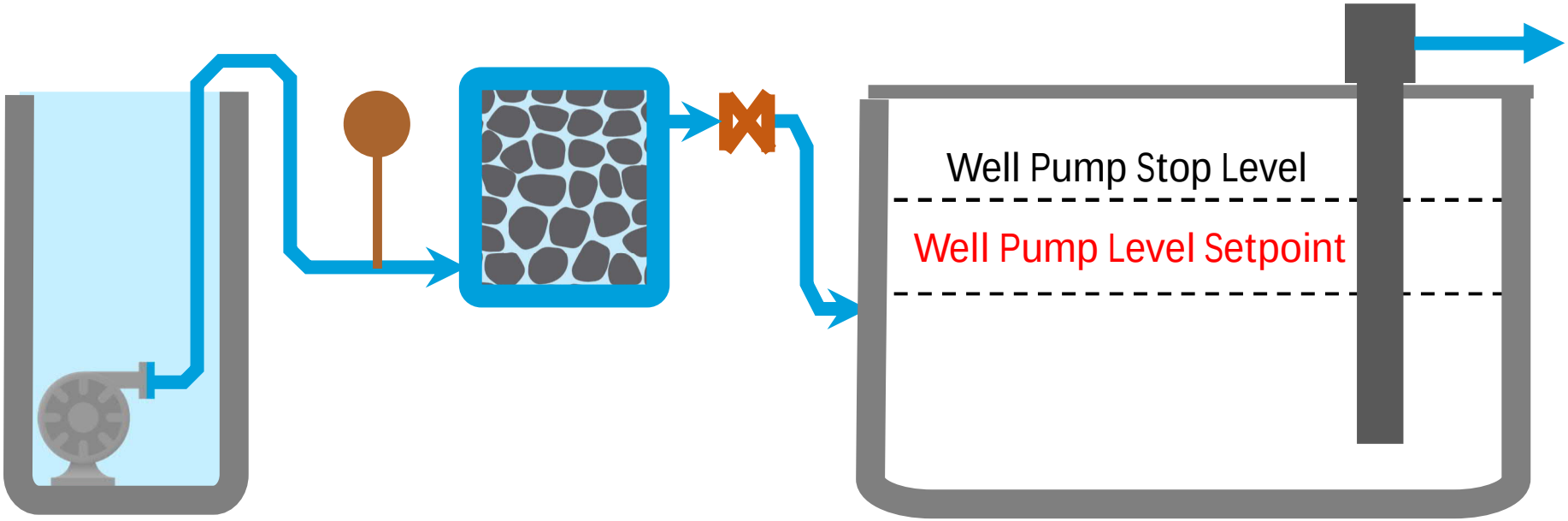


Well Pumps with Soft Starters, each rated for PTTW flows

Pressure filters, with Flow Control Valve at outlet keeping discharge flow constant.

Clearwell, with Start-Stop Level Control, and Vertical Turbine Pumping to Distribution

PROPOSED SYSTEM OPERATION



Well Pumps with VFDs, each rated for new treatment flows, and pressure controlled

Pressure filters, with Flow Control Valve at outlet to throttle flow to meet level setpoint

Clearwell, with Level control setpoint, controlling filter discharge, and Vertical Turbine Pumping to Distribution

NEXT STEPS

- RVA can revise TMs 1, 3, and 4 to reflect the alternate design flows, which includes associated calculations and layouts.
- If the PTTW flows are the preferred design capacity, TM 5 can be completed.

QUESTIONS?

Appendix B
LGL Background Natural Sciences Report
May 2020

LGL LIMITED
environmental research associates

Background Natural Sciences Report

New Dundee Water Supply System Iron and Manganese Upgrades

for:

R.V. Anderson Associates Limited

by:

LGL Limited
environmental research associates

May 2020
LGL File TA8978

New Dundee Water Supply System Iron and Manganese Upgrades

Background Natural Sciences Report

prepared by:

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May 2020
LGL File TA8978

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1.0 Introduction

LGL Limited (LGL) has been retained by R.V. Anderson Associates Ltd (RVA) to provide natural sciences support for the Municipal Class Environmental Assessment (EA) of the New Dundee Water Supply System (WSS) Iron and Manganese Upgrades in the Township of Wilmot Ontario. The project is proceeding as a Schedule C Municipal EA.

The study area is located at 156 Alderview Drive in New Dundee, Ontario. The main natural heritage features in the study area are Alder Lake, Alder Creek, Alder Lake Marsh, and the Alder Creek Wetland Complex. These features, while not on the subject property, are adjacent to the property.

LGL's Background Natural Sciences Report (BNSR) provides a summary of the environmental sensitivities present within the study area and provides direction on protecting these features. The BNSR is for use by the Project Team and to aid in the selection of alternatives and to support the permit approval process. The list of alternatives was not available at the time of this report.

Where the need for an Environmental Management Plan (EMP) is identified by the project team, LGL's technical input as provided in this BNSR will be incorporated by RVA into the overall project EMP. LGL's BNSR describes existing conditions for natural heritage as determined through background screening and does not include primary data collect through field surveys. Once further details of design are available to LGL, new facility locations, the locations and limits of staging/laydown areas, erosion and sediment controls, etc. will be reviewed to identify potential impacts, and appropriate mitigation and management measures to protect natural heritage features such as fish habitat, vegetation, wetlands, and Species at Risk .

1.1 Project Summary

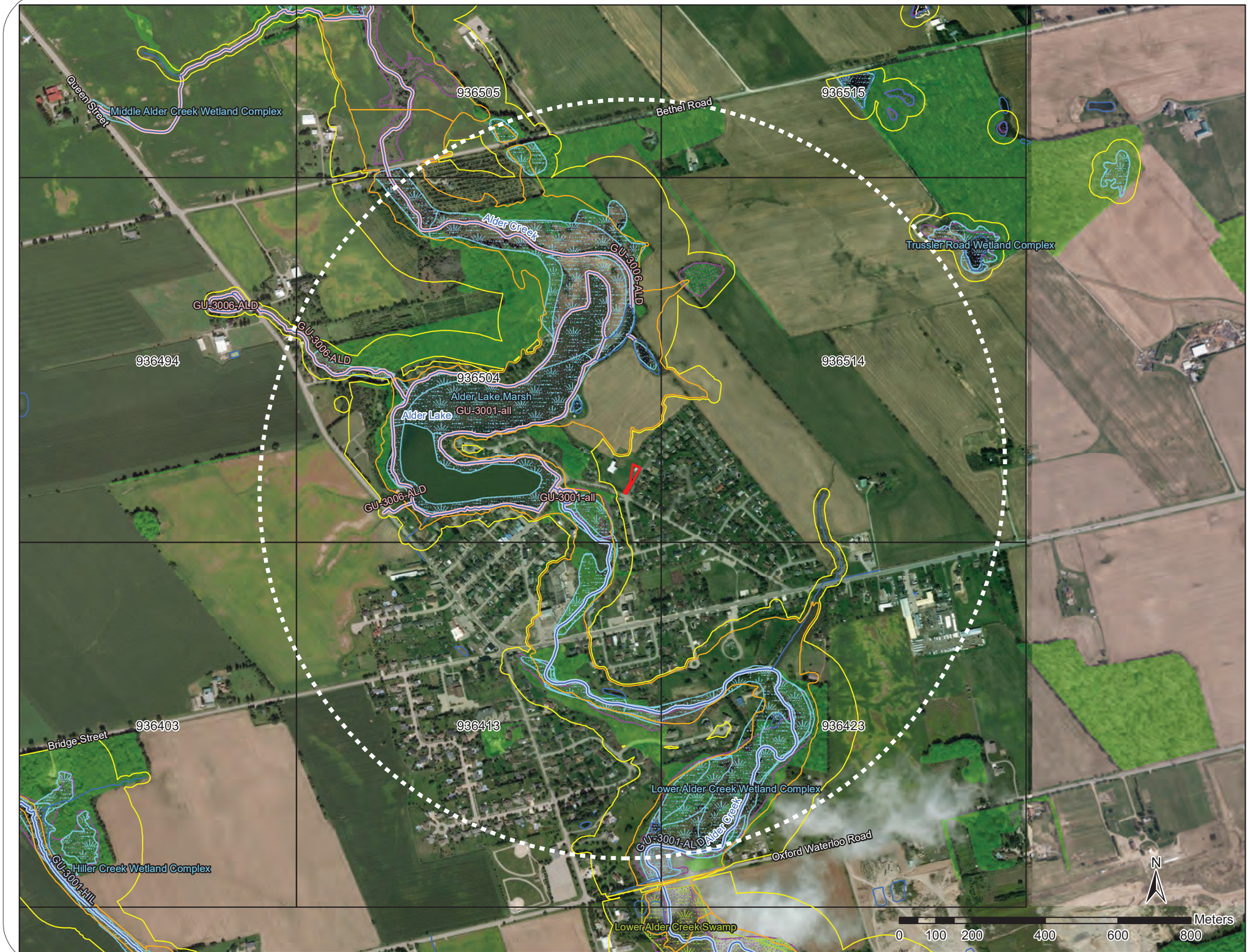
Upgrades to the New Dundee WSS are necessitated by potential changes to the aesthetic Ontario Drinking Water Standards for manganese. A location, footprint, and treatment process will be confirmed through the Class EA process. Options may include a new treatment facility filter on the existing property or adjacent to the existing property. Objectives of the Class EA are to determine to preferred treatment approach, preferred location for the treatment facility, and determine a conceptual layout and design.

2.0 Background Information Records Review

To characterize the study area, LGL has gathered information from available background sources. Information where available was requested or collected from:

- Region of Waterloo;
- Grand River Conservation Authority (GRCA);
- Land Information Ontario (LIO) database;
- Ministry of the Environment, Conservation, and Parks (MECP);
- Natural Heritage Information Centre (NHIC);
- Ministry of Natural Resources and Forestry (MNRF);
- Ontario Breeding Bird Atlas (OBBA); and,
- iNaturalist.

This background review was used to identify the known constraints present within the study area. From there, field surveys will be completed to verify the limits and extent of features identified through background review in relation to the subject property.



Legend

- Subject Property
- 1km Buffer around Property
- Provincially Tracked Species 1x1 km Square (LIO)
- Regulation Limit (GRCA)
- Regulatory Floodplain (GRCA)
- Provincially Significant Wetland (LIO)
- Other Wetland (LIO)
- Wetland (GRCA)
- Watercourse (LIO)
- Waterbody (LIO)
- Wooded Area (LIO)

Aquatic Resource Area Summary (LIO)
Thermal Regime

- Cold
- Warm

Contains Information made available under Grand River Conservation Authority's Open Data Licence v2.0.
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Background Existing Conditions

LGL LIMITED
environmental research associates

Project	TA8978	**Figure**	1
Date	April 2020	**Prepared By:**	KC
Scale	1:10,000	**Verified By:**	DCO

3.0 Natural Heritage Existing Conditions

3.1 Physiography, Soils, Hydrogeology

The study area is located in the south end of Waterloo County. The area was subject to many glacier advancements and retreats from various locations during the Pleistocene ice age (Presant and Wicklund, 1971). As a result of these ice lobes, the formation of massive moraine deposits developed as well as many unsorted or poorly sorted mixtures of clay, silt, sand, gravel and boulder glacial till. Waterloo moraine bisects a large portion of the county and found within the study area. The moraine contains sandy and silty deposits with occasional layers of clay and gravel. The soils within the study area are from the Grand-Kirkland, Burford-Fox, Bennington-Bookington, and Brant-Waterloo series and are developed on range of gravel loam to loamy sand over clay (Presant and Wicklund, 1971). These soils have low water holding capacity and low fertility.

3.2 Designated Natural Areas

Natural areas designated as Regional Core Environmental Features are found within the study area (Map 4 of Regional Official Plan 2015). The subject Natural area associated with Alder Lake and Alder Marsh are part Core Environmental Features. To the east of the subject property, lands are part of Regional Recharge Area. The subject property is mapped as a significant valley on Map 9 (Regional Environmental Features) of the City of Cambridge Official Plan (2018).

3.2.1 Alder Lake and Alder Lake Marsh

Alder Lake is an artificial reservoir created by the New Dundee Dam. Associated with the lake is the Alder Lake Marsh, which contains wetland habitat. The marsh is not designated locally or provincially, though it is regulated by the GRCA. Regulation limits are shown in yellow on Figure 1.

3.2.2 Lower Alder Creek Wetland Complex

The Lower Alder Creek Wetland Complex is associated with Alder Creek, south of the lake, and north of Oxford Waterloo Road. This wetland is comprised of swamp and marsh habitat. This wetland complex is not designated locally or provincially, though it is regulated by the GRCA. Regulation limits are shown in yellow on Figure 1.

3.3 Vegetation and Vegetation Communities

The composition, structure and function of vegetation communities within the subject property were identified through air photo interpretation. Air photos were interpreted to determine the limits and characteristics of the vegetation communities in the study area.

3.3.1 Vegetation Communities

The property is surrounded by residential and agricultural properties. Natural vegetation features are valley and floodplain of Alder Creek. Tableland forests adjacent to the valley consist of deciduous, mix forest and conifer plantations. Wetland communities consist of marshes and swamps (See Figure 2).

3.3.2 Species at Risk

No plant species that are regulated under the Ontario Endangered Species Act (ESA) or the Canada Species at Risk Act (SARA) as Endangered or Threatened were found in the background screening within the project area through the MNRF Natural Heritage Information Centre. Records for Butternut (*Juglans cinerea)* are known in the Region. Butternut are endangered in Ontario.

3.4 Wildlife and Wildlife Habitat

3.4.1 Background Information

Available background information from the Ontario Breeding Bird Atlas (OBBA 2020) and eBird was reviewed for the broader project area. A summary of the database searches is provided in Appendix A. Data from these sources provide data for an area 10km^2, therefore, while these species have some potential to be found in a larger area, there may not be available habitat for them on site within the subject property.

3.4.1.1 Wildlife Habitat

With the study area being located in a predominantly residential and agricultural setting, wildlife habitat in the immediate vicinity of the subject property is somewhat limited. Wildlife habitat is limited to the Alder Creek corridor, including Alder Lake and associated woodlands and wetlands. These areas provide habitat for a variety of wildlife species including birds, mammals, amphibians, and reptiles.

Legend

- Subject Property
- 1km Buffer around Property
- ELC Communities Boundary

FOC	Coniferous Forest
FOD	Deciduous Forest
FOM	Mixed Forest
MAM	Meadow Marsh
MAM2	Mineral Meadow Marsh
MAM2-2	Reed-canary Grass Mineral Meadow Marsh
SWD	Deciduous Swamp
SWM	Mixed Swamp
SWT	Thicket Swamp
OAO	Open Aquatic
CUM	Cultural Meadow
CUP	Plantation
CUP3	Coniferous Plantation
AG	Agricultural
H	Hedgerow
M	Manicured

Data Source; LGL Limited field investigations.

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Vegetation Communities

LGL LIMITED
environmental research associates

Project	TA8978	**Figure**	2
Date	April 2020	**Prepared By:**	KC
Scale	1:10,000	**Verified By:**	DCO

3.4.2 Species at Risk

Through background research, and knowledge of the study area there is potential for the following wildlife Species at Risk (SAR):

- Butternut (*Juglans cinerea*);
- Bald Eagle (*Haliaeetus leucocephalus*);
- Barn Swallow(*Hirundo rustica*);
- Bobolink (*Dolichonyx oryzivorus*);
- Chimney Swift (*Chaetura pelagica*);
- Eastern Meadowlark (*Sturnella magna*);
- Eastern Wood-Pewee (*Contopus virens*);
- Grasshopper Sparrow (*Ammodramus savannarum);*
- Horned Grebe (*Podiceps auritus*);
- Red-headed Woodpecker (*Melanerpes erythrocephalus*);
- Wood Thrush (*Hylocichla mustelina*);
- Blanding's Turtle (*Emydoidea blandingii*);
- Eastern Ribbonsnake (*Thamnophius sauritus sauritus*);
- Northern Map Turtle (*Graptemys geographica*);
- Snapping Turtle (*Chelydra serpentine*);
- Eastern Small-footed Bat (*Myotis leibii*);
- Little Brown Bat (*Myotis lucifugus*);
- Northern Long Eared Bat (*Myotis septentrionalis*); and,
- Tri-Colored Bat (*Perimyotis subflavus*).

A summary of all potential species at risk identified through screening, their habitat requirements, and their potential to be onsite is provided in Section 4.0.

3.5 Aquatic Habitat and Communities

3.5.1 Background Information

There is no aquatic habitat in the vicinity of the current property, however there are several aquatic habitat features in the greater study area, namely Alder Lake to the north west, and Alder Creek to the south east. Alder Creek flows into Alder Lake in the northern portion of the study area and flows south from the Alder Lake Outlet to the Nith River further south. North of the lake, Alder Creek is managed as a warmwater system, however south of the lake, it is managed as a coldwater system and supports various coldwater species such a Brook Trout (*Salvelinus fontinalis*) (see Table 1).

Table 1 Fish Resources in the Study Area.

Common Name	Scientific Name	Thermal Regime	Alder Creek (ARA)	Alder Creek (DFO)	Alder Lake (ARA)
Black Crappie	*Pomoxis nigromaculatus*	Coolwater	x		
Blackside Darter	*Percina maculata*	Coolwater	x		
Bluntnose Minnow	*Pimephales notatus*	Warmwater			x
Brassy Minnow	*Hybognathus hankinsoni*	Coolwater	x		
Brook Stickleback	*Culaea inconstans*	Coolwater	x		
Brook Trout	*Salvelinus fontinalis*	Coldwater	x		
Brown Bullhead	*Ameirus nebulosus*	Warmwater			x
Brown Trout	*Salmo trutta*	Coldwater	x		
Central Mudminnow	*Umbra limi*	Coolwater	x		
Common Carp	*Cyprinus carpio*	Warmwater	x		x
Common Shiner	*Luxilus cornutus*	Coolwater	x		x
Creek Chub	*Semotilus atromaculatus*	Coolwater	x		
Fathead Minnow	*Pimephales promelas*	Warmwater	x		
Golden Redhorse	*Moxostoma erythrurum*	Warmwater	x		
Golden Shiner	*Notemigonus crysoleucas*	Coolwater	x		x
Hornyhead Chub	*Nocomis biguttatus*	Coolwater	x		
Largemouth Bass	*Micropterus salmoides*	Warmwater	x		x
Longnose Dace	*Rhinichthys cataractae*	Coolwater	x		
Northern Hogsucker	*Hypentelium nigricans*	Warmwater	x		
Pumpkinseed	*Lepomis gibbosus*	Warmwater	x		x
Rainbow Trout	*Oncorhynchus mykiss*	Coldwater	x		
Rockbass	*Ambloplites rupestris*	Coolwater	x		

Common Name	Scientific Name	Thermal Regime	Alder Creek (ARA)	Alder Creek (DFO)	Alder Lake (ARA)
Rosyface Shiner	*Notropis rubellus*	Warmwater	x		
Silver Shiner	*Notropis photogensis*	Coolwater		x	
Smallmouth Bass	*Micropterus dolomieu*	Coolwater	x		
Stonecat	*Noturus flavus*	Warmwater	x		
Striped Shiner	*Luxilus chrysocephalus*	Coolwater	x		
White Sucker	*Catostomus commersonii*	Coolwater	x		x

Given the subject site's distance from these features, aquatic impacts are not anticipated, with appropriate site selection and the implementation of best management practices for silt and sediment controls.

3.5.2 Species at Risk

Alder Creek provides habitat for Silver Shiner (*Notropis photogenis*), which is listed as threatened under the provincial Endangered Species Act. Section 4.0 elaborates on Species at Risk in the study area. They prefer to live in medium to large streams with clean cobble and boulders.

4.0 Species at Risk Summary

The *Endangered Species Act* (2007) is administered by the ministry of the Environment, Conservation, and Parks (MECP). A table of potential SAR species (see Table 2) has been complied using information from various sources such as NHIC, OBBA, Ontario Nature, DFO Aquatic SAR Mapping. Several SAR species have the potential to be in the study area, though none have been confirmed. When a short list of alternatives is determined, they will be screened for potential SAR.

Table 2 Species at Risk Screening for the Project.

Species	MNRF NHIC (April 2020)	iNaturalist (2020)	OBBA (2001-2005)	eBird (2020)	DFO SAR Map (April 2020)	Provincial Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Butternut (*Juglans cinerea*)						Endangered	Generally grows in rich, moist, and well-drained soils often found along streams. It may also be found on well-drained gravel sites, especially those made up of limestone. It is also found, though seldom, on dry, rocky and sterile soils. In Ontario, the Butternut generally grows alone or in small groups in deciduous forests as well as in hedgerows	Potential habitat found in study area within woodlands.	ELC survey of proposed alterative locations.
Bald Eagle (*Haliaeetus leucocephalus*)				X		Special Concern	Nests in a variety of habitats, usually forests near open water where they can hunt for fish.	Potential habitat in woodlands near Alder Lake	None
Bank Swallow (*Riparia riparia*)			X			Threatened	Nests in the vertical surfaces of silt and sand substrates. Often these surfaces are found on the banks of waterbodies or gravel pits.	No nesting habitat in study area.	None
Barn Swallow (*Hirundo rustica*)			X	X		Threatened	Prefers farmland; lake/river shorelines; wooded clearings; urban populated areas; rocky cliffs; and wetlands. They nest inside or outside buildings; under bridges and in road culverts; on rock faces and in caves etc.	Habitat for this species is abundant in the study area	ELC survey and breeding bird survey of proposed alterative locations.
Bobolink (*Dolichonyx oryzivorus*)			X	X		Threatened	This species occurs in tallgrass prairies, open meadows, and fallow agricultural fields. It is also often found in hay fields.	Preferred habitat for this species may be found in study area if agricultural fields are hay or pasture.	ELC survey and breeding bird survey of proposed alterative locations.
Canada Warbler (*Wilsonia canadensis*)				X		Special Concern	Nests in deciduous and mixed conifer forests with shrubs and mosses frequently near water.	Potential habitat for this species in the study area.	ELC survey and breeding bird survey of proposed alterative locations.

Species	MNRF NHIC (April 2020)	iNaturalist (2020)	OBBA (2001-2005)	eBird (2020)	DFO SAR Map (April 2020)	Provincial Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Chimney Swift (*Chaetura pelagica*)				X		Threatened	Historically found in deciduous and coniferous, usually wet forest types, all with a well-developed, dense shrub layer; now most are found in urban areas in large uncapped chimneys.	Potential habitat for this species in the study area.	ELC survey and breeding bird survey of proposed alterative locations.
Common Nighthawk (Chordeiles minor)				X			Open habitats with little to no plants. Examples included rock barrens, forest clearings, and logged areas.	Preferred habitat for this species not found in study area.	None
Eastern Meadowlark (*Sturnella magna*)				X		Threatened	This species occurs in tallgrass prairies, open meadows, and fallow agricultural fields.	Preferred habitat for this species may be found in study area if agricultural fields are hay or pasture.	ELC survey and breeding bird survey of proposed alterative locations.
Eastern Wood-Pewee (*Contopus virens*)			X	X		Special Concern	Mixed and deciduous forests in the mid-canopy layer near forest clearings and edges. The forests usually have little understory vegetation.	Potential habitat found in study area within woodlands.	ELC survey and breeding bird survey of proposed alterative locations.
Grasshopper Sparrow (*Ammodramus savannarum)*				X		Special Concern	This species occurs in tallgrass prairies, open meadows, and fallow agricultural fields. It is also often found in hay fields.	Preferred habitat for this species may be found in study area if agricultural fields are hay or pasture.	ELC survey and breeding bird survey of proposed alterative locations.
Horned Grebe (*Podiceps auritus*)				X		Special Concern	This species nests in ponds, marshes, and bays with emergent vegetation. It prefers natural habitat rather than reservoirs and man-made ponds.	Potential habitat found in the study area associated with Alder lake	ELC survey and breeding bird survey of proposed alterative locations.
Red-headed Woodpecker (*Melanerpes erythrocephalus*)				X		Special Concern	Open woodlands and woodland edges. Sometimes found in cemeteries, parks and golf courses.	Potential habitat found in study area within woodlands.	ELC survey and breeding bird survey of proposed alterative locations.
Wood Thrush (*Hylocichla mustelina*)						Special Concern	Mature deciduous and mixed woods. Nests regularly in Sugar Maple and American Beech.	Potential habitat found in study area within woodlands.	ELC survey and breeding bird survey of proposed alterative locations.

Species	MNRF NHIC (April 2020)	iNaturalist (2020)	OBBA (2001-2005)	eBird (2020)	DFO SAR Map (April 2020)	Provincial Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Silver Shiner (*Notropis photogenis*)					X	Threatened	Habitat includes large streams with swift currents and gravel or boulder substrates	Habitat for this species in Alder Creek.	Avoid Alder Creek corridor if possible. Ensure appropriate ESC measures applied to protect species in Alder Creek.
Blandings Turtle (*Emydoidea blandingii*)						Threatened	Found in shallow aquatic habitat such as wetlands, rivers, and lakes	Habitat for this species available in the study area.	Avoid aquatic habitat if possible. Ensure appropriate ESC measures applied to protect species.
Northern Map Turtle (*Graptemys geographica*)						Special Concern	They inhabit rivers and lakes that support molluscs (for prey).	Habitat for this species available in the study area.	Avoid aquatic habitat if possible. Ensure appropriate ESC measures applied to protect species.
Snapping Turtle (*Chelydra serpentina*)	X					Special Concern	Aquatic setting such as lakes, ponds, bays and inlets. This is a highly aquatic species but may leave the water to seek out new aquatic habitats or to lay eggs.	Habitat for this species available in the study area.	Avoid aquatic habitat if possible. Ensure appropriate ESC measures applied to protect species.
Eastern Ribbonsnake (*Thamnophis sauritus*)						Special Concern	They are a semi aquatic species. Their habitat is forests near water, particularly marsh habitat within a forest.	Habitat for this species available in the study area.	Avoid aquatic habitat if possible. Ensure appropriate ESC measures applied to protect species.

Species	MNRF NHIC (April 2020)	iNaturalist (2020)	OBBA (2001-2005)	eBird (2020)	DFO SAR Map (April 2020)	Provincial Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Eastern Small-footed Bat (*Myotis leibii*)						Endangered	Overwintering habitat: Caves and mines Maternal Roosts: Caves, tree cavities, rock outcrops, bridges and buildings	Potential habitat occurs for Maternal roosting sites within the woodlands/forests and in individual trees with suitable cavities. No potential for hibernacula identified.	While not specifically observed, SAR bat species have high potential to occur in woodland communities and may also occur in open grown trees. Consultation for mitigation associated with pruning or tree removal within woodland (no works April 15 to September 30) should be discussed with MECP to ensure compliance under the ESA if tree removals are required.
Little Brown Bat (*Myotis lucifugus*)						Endangered	Overwintering habitat: Caves and mines that remain above 0℃. Maternal Roosts: Often associated with buildings (attics, barns etc.). Occasionally found in trees (25-44 cm dbh).	Potential habitat occurs for Maternal roosting sites within the woodlands/forests and in individual trees with suitable cavities. No potential for hibernacula identified.	While not specifically observed, these SAR bat species have high potential to occur in woodland communities and may also occur in open grown trees. Consultation for mitigation associated with pruning or tree removal within woodland (no works April 15 to September 30) should be discussed with MECP to ensure compliance under the ESA if tree removals are required.

Species	MNRF NHIC (April 2020)	iNaturalist (2020)	OBBA (2001-2005)	eBird (2020)	DFO SAR Map (April 2020)	Provincial Designation	Habitat	Potential for Habitat/Screening Conducted by LGL	Next Steps Recommended
Northern Long Eared Bat (*Myotis septentrionalis*)						Endangered	Overwintering habitat: Caves and mines that remain above 0℃. Maternal Roosts: Often associated with cavities of large diameter trees (25-44 cm dbh) with cavities and crevices. Occasionally found in structures (attics, barns etc.)	Potential habitat occurs for Maternal roosting sites within the woodlands/forests and in individual trees with suitable cavities. No potential for hibernacula identified.	While not specifically observed, these SAR bat species have high potential to occur in woodland communities and may also occur in open grown trees. Consultation for mitigation associated with pruning or tree removal within woodland (no works April 15 to September 30) should be discussed with MECP to ensure compliance under the ESA if tree removals are required.
Tri-Colored Bat (*Perimyotis subflavus*)						Endangered	Overwintering habitat: Caves and mines that remain above 0℃. Maternal Roosts: Often associated with clusters of dead leaves in large diameter Oak or Maple trees	Potential habitat occurs for Maternal roosting sites within the woodlands and in individual trees on property. No potential for hibernacula identified.	While not specifically observed, these SAR bat species have high potential to occur in woodland communities and may also occur in open grown trees. Consultation for mitigation associated with pruning or tree removal within woodland (no works April 15 to September 30) should be discussed with MECP to ensure compliance under the ESA.

5.0 Potential Impacts

Potential terrestrial impacts may be in the form of vegetation and tree removals. Wildlife and wildlife habitat in the project area is mainly associated with the Alder Creek corridor. Avoidance of vegetation removals in this area is the best option to avoid impacts to terrestrial habitat. Based on previous consultation with the MNRF on similar projects, the potential for SAR bat impacts can be mitigated by minimizing the extent of tree removals on the project, and through the application of timing windows for tree clearing activities if needed. Should building impacts be proposed, screening for bat use may be required depending on the building type. Potential impacts for SAR birds can be mitigated by avoiding construction in their habitat if possible or construction outside of the breeding window. If the project requires removal of SAR bird habitat or construction of permanent structures within SAR bird habitat, the project may require permits or approvals under the Endangered Species Act, 2007 from the MECP.

Impacts to aquatic habitat are not anticipated as it is assumed that avoidance of aquatic habitat will be achieved through appropriate site selection as well as mitigation measures such as timing windows, setbacks, and erosion and sediment control measures. Species associated with the aquatic habitat (mussels, fish, turtles) are not expected to be impacted at this time.

5.1 Proposed Mitigation

LGL has reviewed the information available for the project against the natural heritage information compiled above to make the following recommendations to reduce impacts on natural features through project design. The best mitigation would be avoidance of any natural heritage features if possible.

A standalone Erosion and Sediment Control (ESC) Plan should be developed and implemented for the site that minimizes risk of sediment transport into adjacent retained vegetation communities or to the aquatic habitat of Alder Creek during all phases of the project. This plan should include:

- Methods to isolate the construction area;
- Timing of effective ESC measures, where ESCs shall be installed before starting work to prevent the entry of sediment into the watercourse or adjacent areas. Inspect regularly during the course of construction and conduct regular maintenance and repairs as necessary;
- Clearly identified stockpiling and staging areas; and,

- A plan to dispose of any water accumulated onsite from dewatering or pooled stormwater.

Other mitigation measures should include:

- Minimize vegetation and tree removals through facility design;
- Minimize construction area to the extent possible;
- Use appropriate tree protection measures for any work around tree resources within the project area to help protect trees identified to be retained;
- Use previously disturbed areas for construction laydown and staging to the extent possible;
- No vegetation removal should occur between April 1 and August 30 of any given year in order to protect birds afforded protection under the Migratory Birds and Convention Act;
- No tree removal or pruning within the plantation should occur during the bat maternal roosting period for bats (April 15th to September 30th of any given year). Note, this timing window is weather dependant and should be confirmed by MECP once further project details are known;
- Locate site maintenance, vehicle washing and refuelling stations where contaminants are handled off site, and outside of the wellhead protection area; and,
- Ensure that a Spills Management Plan (including materials, instructions regarding their use, education of contract personnel, emergency contact numbers) is on-site at all times for implementation in event of an accidental spill during construction. An emergency spill kit shall be kept on site. A response plan shall also be developed that is to be implemented immediately in the event of a sediment release.

6.0 Recommendations for Selection of Alternatives

Alder Creek, its floodplain and associated wetlands are regulated by the GRCA under Ontario Regulation 150/06 Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses. Avoidance of these areas is advised in order to reduce potential impacts to these natural heritage communities. As more detailed information is determined for potential alternatives, LGL will provide further detail with regard to the selection of a short list of alternatives, the preferred alternative, and the potential for impacts to natural heritage features for each alternative.

7.0 References

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Appendix A Wildlife List.

Scientific Name	Common Name	G-Rank	S-Rank	SARA Schedule	COSEWIC	SARA	SARO	FWCA	MBCA	GRCA	Waterloo Region	Priority Species Waterloo	OBBA 2001-2005	eBird (2020)
Anas rubripes	American Black Duck	G5	S4						X	CP	RS			x
Corvus brachyhrynchos	American Crow	G5	S5B										x	x
Carduelis tristis	American Goldfinch	G5	S5B						X	CP		level 3	x	
Falco sparverius	American Kestrel	G5	S4					P		CP		level 2		x
Turdus migratorius	American Robin	G5	S5B						X				x	x
Spizella arborea	American Tree Sparrow	G5	S4B						X					x
Anas americana	American Widgeon	G5	S4								RS			x
Haliaeetus leucocephalus	Bald Eagle	G5	S2N,S4B		NAR		SC	P						x
Icterus galbula	Baltimore Oriole	G5	S4B						X					x
Riparia riparia	Bank Swallow	G5	S4B	Schedule 1	THR		THR		X	CP		level 2		x
Hirundo rustica	Barn Swallow	G5	S4B	Schedule 1	THR		THR		X	CP		level 3	x	x
Strix varia	Barred Owl	G5	S5					P		CP	RS	level 1		x
Ceryle alcyon	Belted Kingfisher	G5	S4B					P			RS			x
Dendroica fusca	Blackburnian Warbler	G5	S5B						X	CP		level 3		x
Poecile atricapillus	Black-capped Chickadee	G5	S5						X	CP		level 4	x	x
Nycticorax nycticorax	Black-crowned Night-Heron	G5	S3B,S3N						X		RS	level 1		x
Dendroica virens	Black-throated Green Warbler	G5	S5B						X	CP	RS	level 1		x
Cyanocitta cristata	Blue Jay	G5	S5					P					x	x
Dolichonyx oryzivorus	Bobolink	G5	S4B	Schedule 1	THR		THR		X	CP		level 2	x	x
Certhia americana	Brown Creeper	G5	S5B						X	CP	RS	level 2		x
Toxostoma rufum	Brown Thrasher	G5	S4B						X	CP	RS	level 1		x
Molothrus ater	Brown-headed Cowbird	G5	S4B										x	x
Branta canadensis	Canada Goose	G5	S5						X					x
Wilsonia canadensis	Canada Warbler	G5	S4B	Schedule 1	THR	THR	SC		X	CP	RS	level 2		x
Bombycilla cedrorum	Cedar Waxwing	G5	S5B						X				x	x
Spizella passerina	Chipping Sparrow	G5	S5B						X				x	x
Petrochelidon pyrrhonota	Cliff Swallow	G5	S4B						X	CP		level 3		x
Quiscalus quiscula	Common Grackle	G5	S5B										x	x
Mergus merganser	Common Merganser	G5	S5B,S5N						X		RS			x
Chordeiles minor	Common Nighthawk	G5	S4B	Schedule 1	THR	THR	SC		X	CP	RS	level 1		x
Corvus corax	Common Raven	G5	S5					P						x
Carduelis flammea	Common Redpoll	G5	S4B						X					x
Geothlypis trichas	Common Yellowthroat	G5	S5B						X				x	x
Accipiter cooperii	Cooper's Hawk	G5	S4		NAR			P		CP	RS	level 3		x
Junco hyemalis	Dark-eyed Junco	G5	S5B						X	CP				x
Picoides pubescens	Downy Woodpecker	G5	S5						X					x
Sialia sialis	Eastern Bluebird	G5	S5B		NAR				X	CP	RS	level 1		x
Tyrannus tyrannus	Eastern Kingbird	G5	S4B						X	CP		level 3		x
Sturnella magna	Eastern Meadowlark	G5	S4B	Schedule 1	THR		THR		X	CP		level 2		x
Sayornis phoebe	Eastern Phoebe	G5	S5B						X	CP		level 3		x

Scientific Name	Common Name	G-Rank	S-Rank	SARA Schedule	COSEWIC	SARA	SARO	FWCA	MBCA	GRCA	Waterloo Region	Priority Species Waterloo	OBBA 2001-2005	eBird (2020)
Megascops asio	Eastern Screech-Owl	G5	S4		NAR			P						x
Pipilo erythrophthalmus	Eastern Towhee	G5	S4B						X	CP		level 2		x
Contopus virens	Eastern Wood Pewee	G5	S4B	Schedule 1	SC		SC		X				x	x
Sturnus vulgaris	European Starling	G5	SNA										x	x
Spizella pusilla	Field Sparrow	G5	S4B						X	CP		level 3	x	x
Passerella iliaca	Fox Sparrow	G5	S4B						X	CP		level 3		x
Regulus satrapa	Golden-crowned Kinglet	G5	S5B						X	CP	RS	level 3		x
Ammodramus savannarum	Grasshopper Sparrow	G5	S4B						X	CP	RS	level 3		x
Dumetella carolinensis	Gray Catbird	G5	S4B						X	CP		level 4	x	x
Ardea herodias	Great Blue Heron	G5	S4						X		RS			x
Myiarchus crinitus	Great Crested Flycatcher	G5	S4B						X				x	x
Ardea alba	Great Egret	G5	S2B						X					x
Bubo virginianus	Great Horned Owl	G5	S4					P						x
Tringa melanoleuca	Greater Yellowlegs	G5	S4B,S4N						X					x
Butorides virescens	Green Heron	G5	S4B							CP	RS	level 4		x
Picoides villosus	Hairy Woodpecker	G5	S5						X		RS			x
Catharus guttatus	Hermit Thrush	G5	S5B											x
Larus argentatus	Herring Gull	G5	S5B, S5N											x
Podiceps auritus	Horned Grebe	G5	S1B,S4N	No Schedule	SC		SC		X					x
Eremophila alpestris	Horned Lark	G5	S5B						X	CP		level 3	x	x
Carpodacus mexicanus	House Finch	G5	SNA						X					x
Passer domesticus	House Sparrow	G5	SNA											x
Troglodytes aedon	House Wren	G5	S5B						X				x	x
Passerina cyanea	Indigo Bunting	G5	S4B						X				x	x
Charadrius vociferus	Killdeer	G5	S5B,S5N						X				x	x
Empidonax minimus	Least Flycatcher	G5	S4B						X	CP	RS	level 3	x	
Dendroica magnolia	Magnolia Warbler	G5	S5B						X	CP	RS	level 2		x
Anas platyrhynchos	Mallard	G5	S5						X				x	x
Falco columbarius	Merlin	G5	S5B		NAR			P						x
Zenaida macroura	Mourning Dove	G5	S5						X				x	x
Oporornis philadelphia	Mourning Warbler	G5	S4B						X	CP	RS	level 2		x
Vermivora ruficapilla	Nashville Warbler	G5	S5B						X	CP	RS	level 2		x
Cardinalis cardinalis	Northern Cardinal	G5	S5						X				x	x
Colaptes auratus	Northern Flicker	G5	S4B						X					x
Accipiter gentilis atricapillus	Northern Goshawk	G5	S4		NAR			P		CP	RS	level 3		x
Circus cyaneus	Northern Harrier	G5	S4B		NAR			P		CP	RS	level 4		x
Mimus polyglottos	Northern Mockingbird	G5	S4						X	CP	RS	level 1		x
Stelgidopteryx serripennis	Northern Rough-winged Swallow	G5	S4B						X	CP		level 2	x	x
Anas clypeata	Northern Shoveler	G5	S4						X					x
Lanius excubitor	Northern Shrike	G5	SNA						X					x

Scientific Name	Common Name	G-Rank	S-Rank	SARA Schedule	COSEWIC	SARA	SARO	FWCA	MBCA	GRCA	Waterloo Region	Priority Species Waterloo	OBBA 2001-2005	eBird (2020)
Seiurus noveboracensis	Northern Waterthrush	G5	S5B						X	CP	RS	level 2		x
Icterus spurius	Orchard Oriole	G5	S4B						X	CP	RS	level 3		x
Pandion haliaetus	Osprey	G5	S5B					P		CP	RS	level 3		x
Seiurus aurocapilla	Ovenbird	G5	S4B						X	CP	RS	level 4		x
Podilymbus podiceps	Pied-billed Grebe	G5	S4B,S4N						X	CP	RS	level 1		x
Dryocopus pileatus	Pileated Woodpecker	G5	S5						X	CP	RS	level 2		x
Pinicola enucleator	Pine Grosbeak	G5	S4B						X					x
Dendroica pinus	Pine Warbler	G5	S5B						X	CP	RS	level 3		x
Carpodacus purpureus	Purple Finch	G5	S4B						X	CP	RS	level 2		x
Melanerpes carolinus	Red-bellied Woodpecker	G5	S4						X	CP	RS	level 3		x
Sitta canadensis	Red-breasted Nuthatch	G5	S5						X	CP	RS	level 3		x
Vireo olivaceus	Red-eyed Vireo	G5	S5B						X					x
Melanerpes erythrocephalus	Red-headed Woodpecker	G5	S4B	Schedule 1	THR	THR	SC		X	CP	RS	level 1		x
Buteo lineatus	Red-shouldered Hawk	G5	S4B	Schedule 3	NAR	SC		P		CP	RS	level 1		x
Buteo jamaicensis	Red-tailed Hawk	G5	S5		NAR			P						x
Agelaius phoeniceus	Red-winged Blackbird	G5	S4										x	x
Larus delawarensis	Ring-billed Gull	G5	S5B,S4N						X					x
Columba livia	Rock Dove (Pigeon)	G5	SNA										x	x
Pheucticus ludovicianus	Rose-breasted Grosbeak	G5	S4B						X					x
Buteo lagopus	Rough Legged Hawk	G5	S1B,S4N		NAR		NAR	P						x
Archilochus colubris	Ruby-throated Hummingbird	G5	S5B						X	CP	RS	level 3		x
Passerculus sandwichensis	Savannah Sparrow	G5	S4B						X	CP		level 1	x	x
Piranga olivacea	Scarlet Tanager	G5	S4B						X	CP	RS	level 2		x
Accipiter striatus	Sharp-shinned Hawk	G5	S5		NAR			P		CP	RS	level 2		x
Plectrophenax nivalis	Snow Bunting	G5	SNA						X					x
Chen caerulescens	Snow Goose	G5	S5B						X					x
Tringa solitaria	Solitary Sandpiper	G5	S4B						X					x
Melospiza melodia	Song Sparrow	G5	S5B						X				x	x
Actitis macularius	Spotted Sandpiper	G5	S5						X	CP		level 3		x
Melospiza georgiana	Swamp Sparrow	G5	S5B						X	CP	RS	level 2		x
Tachycineta bicolor	Tree Swallow	G5	S4B						X				x	x
Cygnus columbianus	Tundra Swan	G5	S4						X					x
Cathartes aura	Turkey Vulture	G5	S5B					P		CP	RS	level 4		x
Catharus fuscescens	Veery	G5	S4B						X	CP	RS	level 2		x
Pooecetes gramineus	Vesper Sparrow	G5	S4B						X	CP	RS	level 2		x
Vireo gilvus	Warbling Vireo	G5	S5B						X		RS			x
Sturnella neglecta	Western Meadowlark	G5	S3B						X	CP	RS	level 2		x
Sitta carolinensis	White-breasted Nuthatch	G5	S5						X					x
Zonotrichia albicollis	White-throated Sparrow	G5	S5B						X	CP				x

Scientific Name	**Common Name**	**G-Rank**	**S-Rank**	**SARA Schedule**	**COSEWIC**	**SARA**	**SARO**	**FWCA**	**MBCA**	**GRCA**	**Waterloo Region**	**Priority Species Waterloo**	**OBBA 2001-2005**	**eBird (2020)**
Loxia leucoptera	White-winged Crossbill	G5	S5B						X	CP	RS	level 1		x
Maleagris gallopavo	Wild Turkey	G5	S5					G						x
Gallinago delicata	Wilson's Snipe	G5	S5B							CP				x
Troglodytes troglodytes	Winter Wren	G5	S5B						X		RS	level 3		x
Aix sponsa	Wood Duck	G5	S5						X			level 4		x
Helmitheros vermivorum	Worm-eating Warbler	G5	SNA						X					x
Dendroica petechia	Yellow Warbler	G5	S5B						X				x	x
Dendroica coronata	Yellow-rumped Warbler	G5	S5B						X			level 3		x

Appendix A Wildlife List Definitions

G-Rank (Global Rank)

G1- extremely rare; usually 5 or fewer occurrences in the overall range or very few remaining individuals or because of some factor (s) making it especially vulnerable

G2-very rare; usually between 5-20 occurrences in the range or with many individuals in fewer occurrences or because of some factor (s) making it vulnerable to extinction

G3- rare to uncommon; usually between 20 and 100 occurrences; may have fewer occurrences but with a large number of individuals in some populations or may be

susceptible to large-scale disturbances

G4-common; usually more than 100 occurrences, usually not susceptible to immediate threats

G5-very common; demonstrably secure under present conditions

S-Rank (Provincial Rank)

S1-critically imperiled; critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor (s)

such as very steep declines making it especially vulnerable to extirpation from the state/province

S2-imperilled; imperilled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines

or other factors making it very vulnerable to extirpation from the nation or state/province

S3-vulnerable; vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines

or other factors making it vulnerable to extirpation

S4-apparently secure; uncommon but not rare; some cause for long-term concern due to declines or other factors

S5-secure; common, widespread and abundant in the nation or state/province

SNA- not applicable; a conservation status rank is not applicable because species is not a suitable target for conservation activities

SZB-breeding migrants/vagrants

SZN-non-breeding migrants/vagrants

COSEWIC (Committee on the Status of Endangered Wildlife in Canada)

NAR- not at risk; a wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances

THR-threatened; a wildlife species likely to become endangered if limiting factors are not reversed

END-endangered; a wildlife species facing imminent extirpation or extinction

EXT-extirpated; a species no longer existing in the wild in Canada but occurring elsewhere

SC-special concern; a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats

DD-data deficient; a wildlife species for which there is in adequate information to make a direct, or indirect, assessment of its risk of extinction

SARA (Species at Risk Act)

Schedule 1- official list of wildlife species at risk

THR-threatened; a wildlife species likely to become endangered if limiting factors are not reversed

END-endangered; a wildlife species facing imminent extirpation or extinction

EXT-extirpated; a species no longer existing in the wild in Canada but occurring elsewhere

SC-special concern; a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats

SARO (Species at Risk in Ontario)

END-Endangered; a species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA

EXP-Extirpated; a species that no longer exists in the wild in Ontario but exists elsewhere

THR-Threatened; a species that is at risk of becoming endangered in Ontario if limiting factors are not reversed

SC-Special Concern; a species with characteristics that make it sensitive to human activities or natural events

FWCA (Fish and Wildlife Conservation Act)

P - protected species

G - game species

F- Furbearing

MBCA (Migratory Birds Convention Act)

X - Migrant species with afforded protection

SWH-TG (Significant Wildlife Habitat Technical Guide, 2000)

Conservation Priority

level 1-highest priority

level 4-lowest priority

Grand River Conservation Authority

CP= Conservation Priority

Region of Waterloo

RS=Regionally Significant

Appendix C

Archeoworks Stage 1 Archaeological and Cultural Heritage Assessment

May 2020

ARCHEOWORKS INC.

Stage 1 Archaeological Assessment for the New Dundee Water Supply System Iron and Manganese Water Treatment Upgrades Municipal Class Environmental Assessment Located at 156 Alderview Drive and Extending 1000 Metres in all Directions Within Part of Lots 4-5, Concession 2 Block A and Part of Lots 4-7, Concessions 3-4 Block A In the Geographic Township of Wilmot Former County of Waterloo Now in the Township of Wilmot Regional Municipality of Waterloo Ontario

Project #: 008-ND6370-19
Licensee (#): Ian Boyce (P1059)
PIF #: P1059-0066-2020

Revised Report

October 20, 2021

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EXECUTIVE SUMMARY

Archeoworks Inc. was retained by *R.V. Anderson Associates Limited* to conduct a Stage 1 Archaeological Assessment (AA) in support of the Iron and Manganese Water Treatment Upgrades Municipal Class Environment Assessment (Class EA) for the New Dundee Water Supply System, located at municipal address 156 Alderview Drive (herein referred to as the "New Dundee Water Supply System site area"). To support the proposed upgrades to the New Dundee Water Supply System site area, the land extending 1000 metres in all directions around the property was also subject to archaeological assessment. This entire parcel of land will herein be referred to as the "study area." The study area is located in part of Lots 4-5, Concession 2 Block A and part of Lots 4-7, Concessions 3-4 Block A, in the Geographic Township of Wilmot, former County of Waterloo, now in the Township of Wilmot, Regional Municipality of Waterloo, Ontario.

Stage 1 AA background research established elevated potential for the recovery of archaeologically significant materials within the study area. To determine if the archaeological potential classification of the study area is relevant, a desktop review of ground conditions was undertaken using contour mapping, aerial photographs and recent satellite imagery. The desktop review identified parts of the study area as having been subject to previous archaeological assessment and cleared of further archaeological concern, parts as having been subject to deep and extensive disturbances that have removed archaeological potential, and physiographic features of no or low archaeological potential within parts of the study area. The remaining balance of the study area was identified as retaining archaeological potential and requires further archaeological assessment.

Additional historical maps and records were consulted for the New Dundee Union Cemetery (NDUC) and two registered archaeological burial sites (Goettling Site – AiHd-9 and Smith Site – AiHd-10) located within the study area; a limited property inspection was also conducted for the New Dundee Union Cemetery. Further archaeological assessments are required for the NDUC and two burial sites.

Considering the findings detailed in the succeeding sections, the following recommendations are presented:

1. Lands that were subjected to previous archaeological assessments (Archaeologix Inc. (Golder Associates Ltd.), 2002a,b; ARA, 2010; Detritus Consulting Ltd., 2016) and deemed free of further archaeological concern are recommended to be exempt from further assessment.

2. Parts of the study area that were identified as having archaeological potential removed are exempt from requiring Stage 2 AA (extents of these areas to be confirmed during the Stage 2 AA).

3. Parts of the study area that were identified as having no or low archaeological potential are exempt from requiring Stage 2 AA (extents of these areas to be confirmed during the Stage 2 AA).

4. All areas identified as retaining archaeological potential must be subjected to a Stage 2 AA. These areas must be subjected to pedestrian or test pit survey at five-metre intervals in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G.*

5. Should proposed construction impacts occur within 50 metres of the GPS coordinates recorded in the digital *Ontario Archaeological Sites Database* (OASD) site forms available on Past Portal for the approximate locations of the Goettling Site (AiHd-9) and Smith Site (AiHd-10), the following archaeological investigations are required:
    a. As there is the potential to encounter both deeply buried archaeological resources and for archaeological resources to be present near the surface, per *Section 2.1.7*, *Standard 2* of the *2011 S&G*, intensified surface survey methods (Stage 2 test pit or pedestrian survey) must occur over a minimum 20-metre radius around the recorded site GPS coordinates in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G*.
    b. Following the completion of the Stage 2 AA, regardless of the results, the Registrar of Burial Sites at the *Ministry of Government and Consumer Services* and the *Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)* must be contacted regarding recommendations for subsequent stages of fieldwork. Also, the appropriate recommendations for further Stage 3 burial site investigations (e.g., hand excavation, mechanical topsoil removal, construction monitoring, etc.) will be made following the detailed design phase of the proposed development.

6. As per the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 no intrusive activity may occur within the limits of the New Dundee Union Cemetery without consent from the cemetery operator and the *Bereavement Authority of Ontario*.
    a. Should the area within the current cemetery limits be impacted, additional archaeological investigation consisting of Stage 2 test pit survey followed by Stage 3 mechanical topsoil removal is required. A Cemetery Investigation Authorization (CIA) issued by the *Bereavement Authority of Ontario* is also required and needs to be obtained prior to conducting any soil-intrusive work (e.g., Stage 2/3/4 investigations; construction monitoring).

7. Lands within the 20-metre cemetery investigation area surrounding the New Dundee Union Cemetery that were identified as having no potential for unmarked burials (***see Map 12***) do not require a Stage 3 cemetery investigation.

8. Should proposed construction impacts occur within the swaths of land adjacent to the New Dundee Union Cemetery identified as having potential for the recovery of unmarked burials, the following archaeological/cemetery investigations are required:

a. As there is the potential for the New Dundee Union Cemetery to extend into the study area, a Cemetery Investigation Authorization (CIA) issued by the *Bereavement Authority of Ontario* is required and needs to be obtained prior to conducting any soil-intrusive work (e.g., Stage 2/3/4 investigations; construction monitoring).
b. Per *Section 2.2*, *Guideline 4* of the *2011 S&G*, and in accordance with the *Registrar's Directive: Archaeological Assessments & Investigations on Cemetery Lands* (dated April 11, 2018) and the *Registrar's Directive: Authorization of Archaeological Assessments & Investigations on Cemetery Lands* (dated March 1, 2019), further Stage 3 cemetery investigations are required to determine the boundaries of the cemetery. Given the complexity of the field conditions surrounding the New Dundee Union Cemetery, the appropriate recommendations for further Stage 3 cemetery investigations (e.g., hand excavation, mechanical topsoil removal, construction monitoring, etc.) will be made following the detailed design phase of the proposed development. Recommendations for subsequent stages of fieldwork must be made in consultation with the *Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)*.

No construction activities shall take place within the study area prior to the *Ministry of Heritage, Sport, Tourism and Culture Industries* (MHSTCI) (Archaeology Programs Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied.

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PROJECT PERSONNEL

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1.0 PROJECT CONTEXT

1.1 Objectives

The objectives of a Stage 1 Archaeological Assessment (AA), as outlined by the 2011 *Standards and Guidelines for Consultant Archaeologists* (‘*2011 S&G’*) published by the *Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)* (2011), are as follows:

- To provide information about the property’s geography, history, previous archaeological fieldwork and current land condition;
- To evaluate in detail, the property’s archaeological potential, which will support recommendations for a Stage 2 survey for all or parts of the property; and
- To recommend appropriate strategies for a Stage 2 survey.

1.2 Development Context

Archeoworks Inc. was retained by *R.V. Anderson Associates Limited* to conduct a Stage 1 AA in support of the Iron and Manganese Water Treatment Upgrades Municipal Class Environment Assessment (Class EA) for the New Dundee Water Supply System, located at municipal address 156 Alderview Drive (herein referred to as the “New Dundee Water Supply System site area”). To support the proposed upgrades to the New Dundee Water Supply System site area, the land extending 1000 metres in all directions around the property was also subject to archaeological assessment. This entire parcel of land will herein be referred to as the “study area.” The study area is located in part of Lots 4-5, Concession 2 Block A and part of Lots 4-7, Concessions 3-4 Block A, in the Geographic Township of Wilmot, former County of Waterloo, now in the Township of Wilmot, Regional Municipality of Waterloo (***see Appendix A – Map 1***).

This study was triggered by the *Environmental Assessment Act* in support of Schedule C of the Municipal Class EA regulatory process. It was conducted under the project direction of Mr. Ian Boyce, under the archaeological consultant licence number P1059, in accordance with the *Ontario Heritage Act* (2009) and *2011 S&G*. Permission to investigate the study area was granted by *R.V. Anderson Associates Limited* on January 30th, 2020.

The Region of Waterloo has an *Archaeological Facilities Master Plan* (AFMP) which documents archaeological resources and evaluates archaeological potential within the region (Region of Waterloo, 1989). This resource “allows for the modification of development plans at an early stage of planning by allowing developers to arrange for an archaeological assessment of properties which exhibit moderate to high archaeological potential and arrange for the appropriate stage of mitigation or selecting an alternative area for development” (p.1). According to this resource, numerous portions of the study area require archaeological assessment. This mapping is used as preliminary internal research material only, and the Region of Waterloo does not extend permission to circulate this mapping in any form.

1.3 Historical Context

To establish the historical context and archaeological potential of the study area, *Archeoworks Inc.* conducted a review of Indigenous and Euro-Canadian settlement history, and a review of available historical mapping.

The results of this background research are documented below and summarized in **Appendix B – Summary of Background Research**.

1.3.1 Pre-Contact Period

The pre-contact period of Southern Ontario includes numerous Indigenous groups that continually progressed and developed within the environment they inhabited (Ferris, 2013, p.13). **Table 1** includes a brief overview and summary of the pre-contact Indigenous history of Southern Ontario.

Table 1: Pre-Contact Period

Period (Date Range)	Overview and Attributes
Early Paleo-Indian (ca. 11000 to 8500 BC) Late Paleo-Indian (ca. 8500 to 7500 BC)	Small groups of nomadic hunter-gatherers who utilized seasonal and naturally available resources; sites are rare; hunted in small family groups who periodically gathered into larger groups/bands during favourable periods in the hunting cycle; campsites used during travel episodes and found in well-drained soils in elevated situations; sites found primarily along glacial strandlines due to current understanding of regional geological history; artifacts include fluted and lanceolate stone points, scrapers and dart heads. - Gainey, Barnes, Crowfield Fluted Points (Early Paleo-Indian) - Holcombe, Hi-Lo, Lanceolates (Late Paleo-Indian) (Ellis and Deller, 1990, pp.37-64; Wright, 1994, p.25; Ellis, 2013, p.37).
Early Archaic (ca. 7800 to 6000 BC) Middle Archaic (ca. 6000 to 2000 BC) Late Archaic (ca. 2500 to 500 BC)	Descendants of Paleo-Indian ancestors; lithic scatters are the most commonly encountered site type; trade networks appear; artifacts include reformed fluted and lanceolate stone points with notched bases to attach to wooden shaft; ground-stone tools shaped by grinding and polishing; stone axes, adzes and bow and arrow; Shield Archaic in Northern Ontario introduced copper tools. - Side-notched, corner-notched, bifurcate projectile points (Early Archaic) - Stemmed, Otter Creek/Other Side-notched, Brewerton side and corner-notched projectile points (Middle Archaic) - Narrow Point, Broad Point, Small Point projectile points (Late Archaic) (Ellis et al., 1990, pp.65-124; Wright, 1994, pp.26-28; Ellis, 2013, pp.41-46; Dawson, 1983, pp.8-14).
Early Woodland (ca. 800 BC to AD 1)	Evolved out of the Late Archaic Period; introduction of pottery (ceramic) where the earliest were coil-formed, under fired and likely utility usage; two primary cultural complexes: Meadowood (broad extent of occupation in Southern Ontario) and Middlesex (restricted to Eastern Ontario); poorly understood settlement-subsistence patterns; artifacts include cache blades, and side-notched points that were often recycled into other tool forms; primarily Onondaga chert; commonly associated with Saugeen and Point Peninsula complexes; oral traditions of the present-day Michi Saagiig (Mississauga Anishinaabeg), an Algonquian-speaking First Nation group, state that they, “are the descendants of the ancient peoples who

Period (Date Range)	Overview and Attributes
	lived in Ontario during the Archaic and Paleo-Indian periods" (Gitiga Migizi and Kapyrka, 2015, p.1). - Meadowood side-notched projectile points (Spence et al., 1990, pp.125-142; Wright, 1994, pp.29-30; Ferris and Spence, 1995, pp.89-97; Williamson, 2013, pp.48-61; Dawson, 1983, pp.15-19).
Middle Woodland (ca. 200 BC to AD 700)	Three primary cultural complexes: Point Peninsula (generally located throughout south-central and eastern Southern Ontario), Saugeen (generally located southwestern Southern Ontario), and Couture (generally located in southwestern-most part of Ontario); introduction of large "house" structures and substantial middens; settlements have dense debris cover indicating increased degree of sedentism; incipient horticulture; burial mounds present; shared preference for stamped, scallop-edged or tooth-like decoration, but each cultural complex had distinct pottery forms; Laurel Culture (ca. 500 BC to AD 1000) established in boreal forests of Northern Ontario. - Saugeen Point projectile points (Saugeen) - Vanport Point projectile points (Couture) - Snyder Point projectile points - Laurel stemmed and corner-notched projectile points (Spence et al., 1990, pp.142-170; Wright, 1994, pp.28-33; Ferris and Spence, 1995, pp.97-102; Wright, 1999, pp.629-649; Williamson, 2013, pp.48-61; Wright, 1994, p.28; Hessel, 1993, pp.8-9; Dawson, 1983, pp.15-19; Gagné, 2012).
Late (Transitional) Woodland (ca. AD 600 to 1000)	The north shore of Lake Ontario in Southern Ontario was occupied throughout the entire Late Woodland Period by the Mississauga Anishinaabeg (Michi Saagiig); their territory extended north where they would hunt and trap during the winter months, followed by a return to Lake Ontario in the spring and summer; "the traditional territories of the Michi Saagiig span from Gananoque in the east, all along the north shore of Lake Ontario, west to the north shore of Lake Erie at Long Point. The territory spreads as far north as the tributaries that flow into these lakes, from Bancroft and north of the Haliburton highlands" (Gitiga Migizi and Kapyrka, 2015, p.1); the Mississauga were highly mobile and often traveled great distances to obtain resources; Mississauga oral traditions speak of people (the Iroquoian) coming into their territory between AD 500-1000 who wished to establish villages and grow corn; treaties were made and the Mississauga allowed the Iroquois to stay in their traditional territories. Earliest Iroquoian development in Southern Ontario is Princess Point which exhibits few continuities from earlier developments with no apparent predecessors; hypothesized to have migrated into Ontario; the settlement data is limited, but oval houses are present; artifacts include 'Princess Point Ware' vessels that are cord roughened, with horizontal lines and exterior punctation; smoking pipes and ground stone tools are rare; introduction of maize/corn horticulture; continuity of Princess Point and Late Woodland Iroquoian groups. - Triangular projectile points (Fox, 1990, pp.171-188; Ferris and Spence, 1995, pp.102-106; Gitiga Migizi and Kapyrka, 2015, pp.1-3; MCFN, 2017a).
Early Late Woodland (ca. AD 900 to 1300)	Two primary Iroquoian cultures in Southern Ontario: Glen Meyer (located primarily in southwestern Ontario from Long Point on Lake Erie to southwestern shore of Lake Huron) and Pickering (encompassed north of Lake Ontario to Georgian Bay and Lake Nipissing); well-made and thin-walled clay vessels with stamping, incising and punctation; multi-family longhouses and some small, semi-permanent palisade

Period (Date Range)	Overview and Attributes
	villages; adoption of greater variety of harvest products; increase in corn-yielding sites; crudely made smoking pipes, and worked bone/antler present; evolution of the ossuary burials. - Triangular-shaped, basally concave projectile points with downward projecting corners or spurs (Williamson, 1990, pp.291-320; Ferris and Spence, 1995, pp.106-109).
Middle Late Woodland (ca. AD 1300 to 1400)	Two primary Iroquoian cultures in Southern Ontario: Uren and Middleport; decorated clay vessels decrease; well-developed clay pipe complex that includes effigy pipes; increase in village sizes (0.5 to 1.7 hectares) and campsites (0.1 to 0.6 hectares) appear with some palisades; classic longhouse takes form; increasing reliance on maize and other cultigens such as beans and squash; intensive exploitation of locally available land and water resources; from Middleport emerged the Huron-Wendat, Petun, Neutral Natives and the Erie. - Triangular and (side of corner or corner removed) notched projectile points - Middleport Triangular and Middleport Notched projectile points (Dodd et al., 1990, pp.321-360; Ferris and Spence, 1995, pp.109-115).
Late Late Woodland (ca. AD 1400 to 1600)	The Mississauga Anishinaabeg "were the negotiators, the messengers, the diplomats, and they successfully meditated peace throughout this area of Ontario for countless generations" (Gitiga Migizi and Kapyrka, 2015, p.1); the Mississauga Anishinaabeg, along with the Odawa Nation, continued to meet with the Huron-Wendat, Neutral Nation and Petun Nation to ensure their friendly political and economic relations remained strong while the Iroquois continued to establish villages in the Mississauga traditional territory. Two major Iroquoian groups: the Neutral Natives to the west, and the Huron-Wendat to the east; Neutral (called Attiewandaron by the Huron-Wendat) Natives distributed west of the Niagara Escarpment, around the western end of Lake Ontario and eastward across the Niagara Peninsula; sites also found west of the Niagara Escarpment as far as Milton; varying settlements include villages up to five acres in size to isolated fishing cabins; villages tend to be located along smaller creeks, headwaters and marshlands; diet dependent on hunting, gathering, fishing and farming; longhouses present; ossuaries; tribe/band formation; theorized that the Credit River may have functioned as a boundary marker between the ancestral Neutral Natives and ancestral Huron-Wendat peoples. - Neutral Native projectile points are typically small but long and narrow, frequently side-notched (Lennox and Fitzgerald, 1990, pp.405-456; Ramsden, 1990, pp.361-384; Ferris and Spence, 1995, pp.115-122; Warrick, 2000, p.446; Warrick, 2008, p.15; Gitiga Migizi and Kapyrka, 2015, pp.1-3)

1.3.2 Contact Period

The contact period of Southern Ontario is defined by European arrival, interaction and influence with the established Indigenous communities of Southern Ontario. **Table 2** includes an overview of some of the main developments that occurred during the contact period of Southern Ontario.

Table 2: Contact Period

Period (Date Range)	Overview and Attributes
European Contact (ca. AD 1600s)	The Mississauga Anishinaabeg focused on hunting/fishing/gathering with little emphasis on agriculture; highly mobile within their traditional territory; temporary and moveable houses (wigwam); inter-marriage between Algonquian-speaking groups (such as the Nipissing, Algonquin, Odawa, Mississauga and Ojibway) and Iroquois groups likely occurred; Algonquian-speaking groups often wintered with Iroquois neighbours, resulting in a complex archaeological record; oral traditions of the Mississauga Anishinaabeg state that at the time of European Contact, the Mississauga Anishinaabeg retreated to their winter grounds in the north, thus avoiding disease and warfare. Multiple (Iroquoian-speaking) Huron-Wendat villages and campsites north of Lake Simcoe; Neutral Native villages were clustered in the Niagara Peninsula but their territorial hunting grounds stretched from the "Niagara River on the east, Lake Erie on the south, Lake St. Clair on the west, and a hazy Huron-Wendat-Attiewandaron frontier on the north" (Hunt, 1940, p.50); French arrival into Ontario; trade relationship with Huron and French established; Neutral Natives referred to as *la Nation neutre* by Samuel de Champlain but limited European contact with Neutrals; no direct commercial trade relationship was formed between the French and Neutral Natives; Jesuit and Recollét missionaries to Huron-Wendat villages; French missionaries visited Neutral Native villages but no permanent missions were established; trade goods begin to replace traditional tools/items; epidemics (Jury, 1974, pp.3-4; Heidenreich, 1978, pp.368-388; White, 1978, pp.407-411; Lennox and Fitzgerald, 1990, pp.405-456; Trigger, 1994, pp.47-55; Warrick, 2008, pp.12, 245; Fox and Garrad, 2004, p.124; McMillian and Yellowhorn, 2004, pp.110-111).
Five Nations of Iroquois (Haudenosaunee) Arrival (ca. AD 1650s)	The Five (later Six) Nations of Iroquois (or Haudenosaunee), originally located south of the Great Lakes, engaged in warfare with Huron-Wendat neighbours as their territory no longer yielded enough furs; the Five Nations, armed with Dutch firearms, attacked and destroyed numerous Huron-Wendat villages in 1649-50; the small groups that remained became widely dispersed throughout the Great Lakes region, ultimately resettling in Quebec, in southwestern Ontario and in America; to prevent the revival of Huron-Wendat settlements, the Five Nations of Iroquois attacked and destroyed the villages of the Huron-Wendat allies, the Petun Natives; in 1650, what remained of the Petun Natives migrated through Neutral Native territory; the Five Nations of Iroquois attacked Neutrals ca. 1650s and caused their dispersal; the Five Nations, particularly the Seneca, established settlements along the Lake Ontario shoreline at strategic locations along canoe-and-portage routes and used territory for extensive fur trade; villages along the northern shores of Lake Ontario included Ganatsekwyagon at the mouth of the Rouge River, Teiaiagon at a bend near the mouth of the Humber River and along the Niagara River; a fort and trading post, Fort Niagara, had been constructed along the eastern bank of the Niagara River; European fur trade and exploration continued (Smith, 1897, p.40; Robinson, 1965, pp.15-16; Abler and Tooker, 1978, p.506; Schmalz, 1991, pp.12-34; Trigger, 1994, pp.53-59; Williamson, 2013, p.60; Gitiga Migizi and Kapyrka, 2015, p.2).
Anishinaabe Return (ca. AD 1650s to 1700s)	Algonquian-speaking groups within the Anishinaabeg (Ojibway, Chippewa, Odawa, Mississauga and others) returned from the north to their traditional territory of Southern Ontario; by 1690s, the Five Nations settlements were abandoned; battles fought throughout Southern Ontario; by 1701, the Five Nations were

Period (Date Range)	Overview and Attributes
	driven out by the returning Anishinaabe; the Five Nations returned to their homelands south of the Great Lakes, and some remained in parts of Southern Ontario (Hathaway, 1930, p.433; Trigger, 1994, pp.57-59; Johnston, 2004, pp.9-10; Gibson, 2006, pp.35-41; Smith, 2013, pp.16-20; Williamson, 2013, p.60).
Trade, Peace and Conflict (ca. AD 1700 to 1770s)	Great Peace negotiations of 1701 in Montreal established peace around the Great Lakes; collectively referred to Anishinaabe and Five Nations of Iroquois as the First Nations; European commerce and exploration resumed; the Anishinaabe continued to trade with both the English and the French; genesis of the Métis; France and Britain were the basis of the Seven Years' War; French defeat transferred the territory of New France to Britain; Treaty of Paris (1763); Royal Proclamation of 1763 established the government administration of the North American territories ceded by France to Britain and established the framework for the negotiation of treaties with First Nation inhabitants; Pontiac's War; fur trade continued until Euro-Canadian settlement (Schmalz, 1991, pp.35-62, 81; Surtees, 1994, pp.92-97; Johnston, 2004, pp.13-14; Jaenen, 2013; Hall, 2015).
Early British Administration and Euro-Canadian Settlement (ca. AD 1760s to 1790s)	American Revolution (1775 to 1783); American Revolution caused large numbers of United Empire Loyalists, military claimants, immigrants from the British Isle/European locations, and groups who faced persecution in the United States to arrive in Upper Canada; Treaty of Paris (1783) formally recognized the independence of the United States; Province of Quebec divided in 1791 into sparsely populated Upper Canada (now southern Ontario) and culturally French Lower Canada (now southern Quebec); Jay's Treaty of 1795 establishes American/Canadian border along the Great Lakes; large parts of Upper Canada opened to settlement after land cession treaties were secured with various First Nations groups by the British Crown (Department of Indian Affairs, 1891; Government of Ontario, 2014; Jaenen, 2014; Hall, 2019; Surtees, 1994, p.110; Sutherland, 2014).
British Land Treaties (1784-1792)	Haldimand Proclamation of 1784 granted a track of land along the Grand River from its headwaters to Lake Erie to the (now) Six Nations of Iroquois (Haudenosaunee) as compensation for their alliance with the British during the American Revolution; that same year, the Mississauga at the western end of Lake Ontario ceded a large tract of land that "included the Niagara Peninsula, lands close to the head of Lake Ontario, and the north shore of Lake Erie as far west as Cat Fish Creek" (Surtees, 1994, p.103); the purchase became known as the Between the Lakes Purchase, or Treaty No. 3 (Government of Ontario, 2019); a track of land nearly 12 miles (or 19 kilometres) wide on either side of the Grand River was granted to the Six Nations of Iroquois; a document from 1792 confirmed this transaction (Department of Indian Affairs, 1891, p.lxiv; Bricker, 1935, p.82; Bourgeois, 1986, p.11; Surtees, 1994, pp.103-104; Bloomfield, 1995, p.19; Government of Ontario, 2014; Government of Ontario, 2019; MCFN, 2017b).
British Land Treaties (1825-1827)	In 1825, a provisional surrender was made by the Chippewa (Treaty No.27½), and in 1827 a confirmatory surrender (Treaty No.29) was issued where 2,200,000 areas were sold to the British Government; this land encompasses the Township of Wilmot (Department of Indian Affairs, 1891, pp.lxiv, 65-67, 71-75).

1.3.3 Euro-Canadian Settlement Period (1800s to present)

1.3.3.1 Township of Wilmot

The Township of Wilmot, surrounded by other townships in Waterloo County, Perth County and Oxford County, was described as having a favourable climate, fertile soil and numerous streams "rendering it one of the most advantageous locations for the husbandman [a farmer] to be found on the continent" (Parsell & Co., 1881, p.vii). The Township of Wilmot was "first settled in 1822 by Christian Naffziger [also spelled Nafziger], a German of the Menonist persuasion, who applied to the British Government for a free grant of fifty acres of land to each family who should emigrate with him from Germany to Canada" (Sutherland, 1864, p.51; Parsell & Co., 1881, p.vii). Christian Naffziger was part of a society of German Non-Conformists, or Amish, and was originally from Amsterdam (Eby, 1895, p.57). He successfully received the land grants and returned to Canada with a number of German settlers who each received a front quarter of each lot north and south of Erbs Road, Snyder's Road and Bleams Road (Sutherland, 1864, p.51). Consequently, the survey of the Township of Wilmot divided the township into three horizontal blocks of land: the German Blocks North and South of Erbs Road, Snyder's Road and Bleams Road; and Block A and Block B, which were purchased by the Canada Company (Sutherland, 1864, p.51).

Soon after, "Roman Catholics and Lutherans from Alsace and Germany, Anglicans from the British Isles and others joined the initial settlers in clearing land and building roads, mills, shops, churches, schools and villages" (Heritage Wilmot, 2015). In 1825, the township contained 720 individuals; by 1841, there were 2,220 individuals (who were primarily German, with few Canadians); by 1854, there were 4,863 individuals; and by 1861, there were 6,173 individuals living in the Township of Wilmot (Smith, 1846, p.220; Smith, 1851, p.122; Sutherland, 1864, p.51). By the 1850s, there were three grist mills, 14 saw mills and 15,310 acres were under cultivation of the 51,463 acres owned (Smith, 1846, p.220). As the township continued to develop, small villages began to form that serviced the surrounding rural community.

1.3.3.2 Village of New Dundee

In 1830, John Millar and his brothers arrived in the area that would become New Dundee. After purchasing land, John Millar built a dam on Alder Creek for his saw mill and created a mill-pond, known as Alder Lake. After the saw mill was established, a small community formed around it and was named New Dundee after Dundee, Scotland, the birthplace of the Millar Brothers. In 1846, Frederick G. Millar established a flour mill and constructed his home, the Doctor's House, which housed a succession of village doctors throughout the century. Frederick G. Millar also became the first post master of the community (New Dundee, N.D.; LAC, 2020).

The community of New Dundee grew slowly where the commercial endeavours only serviced the village residents and the surrounding farms. These commercial endeavours included a carriage shop, blacksmith shop, harness shop, woodworking shop, meat markets and stores. By 1873, it was described in Lovell's *Gazetteer of British North America* as, "a post village in Waterloo Co., Ont., 12 miles from Berlin. It has 2 stores, 2 hotels, a saw mill and a grist mill. Pop.30" (p.213). By the mid-1800s and 1900s, several larger industrial endeavours were established in the community including the New Dundee Creamery, Buck Broth Hatchery, Robinswood Feed Mill,

Weber Home Centre, Poth Furniture, Colman Hardware Store and Kavelman General Store (Heritage Wilmot, 2013; New Dundee, N.D.).

1.3.4 Past Land Use

1.3.4.1 Pre-1900 Land Use

Several documents were reviewed to gain an understanding of the land use history and of the study area's potential for the recovery of historic pre-1900 remains, namely the 1851 *Patent Plan,* the 1861 *Tremaine's Map of the County of Waterloo* and the 1881 *Illustrated Atlas of the County of Waterloo* (***see Maps 2-4; Tables 3-4***).

According to the 1851 *Patent Plan,* the entire study area encompassed land that was patented by the Canada Company, a land and colonization company in Upper Canada that purchased 2.5 million acres of land from the Upper Canada Government for $295,000 (Baskerville, 2006). One mill site is located within the study area and two mill sites are located within 300 metres of the study area, at the north and south ends along Alder Creek.

According to the 1861 *Tremaine's Map of the County of Waterloo,* one historic homestead and the village lots of New Dundee are depicted within the study area (***see Table 3***). The Alder Creek and Alder Lake are also depicted within the study area. No additional historic homesteads are depicted within 300 metres of the study area. It should be noted that there is an unfortunate crease and wearing away of the map at the location of New Dundee, limiting the ability to know if more historic structures were present in the study area in 1861.

Table 3: Historic Structures within the Study Area in the 1861 Tremaine's Map

Concession	Lot	Owner	Structure(s) Present
Block A, Con.2	4	D. Reiehard	No structure(s)
Block A, Con.2	4	unreadable	No structure(s)
Block A, Con.2	5	David Millar	No structure(s)
Block A, Con.3	4	D. McDonald	No structure(s)
Block A, Con.3	4	Wm. Battler	No structure(s)
Block A, Con.3	4	Samuel Schlichter	No structure(s)
Block A, Con.3	5	D. McDonald	No structure(s)
Block A, Con.3	5	Samuel Schlichter	No structure(s)
Block A, Con.3	5	Miller	No structure(s)
Block A, Con.3	6	Unlisted	One homestead; Village lots
Block A, Con.3	7	Philip Lautenschlager	No structure(s)
Block A, Con.4	4	Christian D. Rosenberger	No structure(s)
Block A, Con.4	5	F. Bray	No structure(s)
Block A, Con.4	5	Unlisted lots	No structure(s)
Block A, Con.4	5	Geo. Shape	No structure(s)
Block A, Con.4	6	Millar	No structure(s)
Block A, Con.4	7	John Millar	No structure(s)

The 1881 *Illustrated Atlas of the County of Waterloo* depicts the study area encompassing one homestead, a cemetery and the village lots of New Dundee (***see Table 4***). The Alder Creek and

Alder Lake continued to be depicted as flowing through the study area. No additional historic structures are depicted within 300 metres of the study area.

Table 4: Historic Structures within the Study Area in the 1881 Illustrated Atlas

Concession	Lot	Owner	Structure(s) Present
Block A, Con.2	4	Unlisted	No structure(s)
Block A, Con.2	5	Geo. Proudfoot	No structure(s)
Block A, Con.3	4	Unlisted	No structure(s)
Block A, Con.3	5	Unlisted	No structure(s)
Block A, Con.3	6	Village of New Dundee	Village Lots; cemetery
Block A, Con.3	6	John Copley Jr.	One homestead
Block A, Con.3	7	Unlisted	No structure(s)
Block A, Con.4	4	Unlisted	No structure(s)
Block A, Con.4	5	Unlisted	No structure(s)
Block A, Con.4	6	Village of New Dundee	Village Lots
Block A, Con.4	7	Village of New Dundee	Village Lots

Additionally, the study area is located along present-day Main Street, Benjamin Street, South Street, North Street, Water Street, Mitchell Street, Saltzberry Path and Front Street, eight streets originally laid out during the survey of the Village of New Dundee. Bethel Road, Queen Street, and Bridge Street, which were originally laid out during the survey of the Township of Wilmot, are also located within the study area. In Ontario, the *2011 S&G* considers areas of early Euro-Canadian settlements (e.g., pioneer homesteads, isolated cabins, farmstead complexes, early wharf or dock complexes, pioneer churches, and early cemeteries), early historic transportation routes (e.g., trails, passes, roads, railways, portage routes), and properties that local histories or informants have identified with possible archaeological sites, historical events, activities, or occupations, as features or characteristics that indicate archaeological potential (per *Section 1.3.1*). Therefore, based on the proximity of both early Euro-Canadian settlements and historic transportation routes, these features contribute to establishing the archaeological potential of the study area.

1.3.4.2 Post-1900 Land Use

To facilitate further evaluation of the established archaeological potential within the study area, a detailed review of topographic maps from 1927 and 1938 (***see Map 5***), aerial imagery from 1954 (***see Map 6***), and satellite images from 2006 and 2019 was undertaken.

The 1927 *Topographic Map* depicted the majority of the study area in land that had been cleared of overgrown vegetation and was likely agricultural lands, as well as pockets of treed areas situated along the northern portion of Alder Lake. Numerous houses are depicted in the study area, specifically clustered within the village of New Dundee. Additionally, three churches, two (masonry) dams, a grist mill, a post office, a blacksmith shop, a garage, cheese factory, a cemetery (the New Dundee Union Cemetery) and two schools are depicted in the village of New Dundee. Alder Lake and Alder Creek are also depicted in the study area. The study area remained unchanged to 1938.

By 1954, the study area primarily consisted of open agricultural lands and woodlots. Numerous houses were constructed within New Dundee, and several farmsteads were also located within the study area. The parcel of land currently located at 156 Alderview Drive appears to have been within an open area cleared for agricultural use.

A review of satellite imagery (Google Earth, 2020a,c) shows that the study area has seen several residential developments in recent years. By 2006, the study area saw subdivision development along the west side of Queen Street, south of Bridge Street and along the east side of Main Street. Apart from this, the majority of the study area remained in open agricultural lands with blocks of forested areas along the northern portion of Alder Lake. Alder Creek also continued to flow through the central portion of the study area. At this time, the New Dundee Water Supply System site area consisted of the fenced off well site surrounded by an open grassed area dotted with trees. The study area remained relatively unchanged to 2019.

1.3.5 Present Land Use

The present land use of the study area is categorized as Environmentally Constrained Lands, Settlement Residential, Settlement Core, Dry Industrial/Commercial, Open Space, Protected Countryside and Prime Agricultural (Township of Wilmot, 2019a; Township of Wilmot, 2019b).

1.4 Archaeological Context

To establish the archaeological context and further establish the archaeological potential of the study area, *Archeoworks Inc*. conducted a comprehensive review of designated and listed heritage properties, commemorative markers and pioneer churches and early cemeteries in relation to the study area. Furthermore, an examination of registered archaeological sites and previous AAs within proximity to the study area limits, and a review of the physiography of the study area were performed.

The results of this background research are documented below and summarized in **Appendix B – Summary of Background Research**.

1.4.1 Designated and Listed Cultural Heritage Resources

Per *Section 1.3.1* of the *2011 S&G*, properties listed on a municipal register or designated under the *Ontario Heritage Act*, or that is a federal, provincial, or municipal historic landmark or site, are considered features or characteristics that indicate archaeological potential. The study area encompasses several designated and listed (or “non-designated”) heritage resources (Township of Wilmot, 2019c; Township of Wilmot, 2019d; Region of Waterloo, 2020; ***see Table 5; Maps 7, 9-10***). Non-designated properties (or “listed” properties) are properties that have cultural heritage value or interest (CHVI) to the community but have not been formally designated (MHSTCI, 2020c).

Further communication with the Region of Waterloo provided an image of all Recognized Heritage Resources within proximity to the New Dundee Water Supply System site area. This

image depicts several additional municipally registered, designated and potentially significant heritage resources within the study area, but details were only provided for those significant cultural heritage resources in relative close proximity to the New Dundee Water Supply System site area (two designated properties and two potentially significant heritage resources/unofficially listed properties) (Region of Waterloo, 2020).

In addition, while a portion of the property at 1522 Bethel Road is located within the study area, the actual designated resource (Bettschen/Hallman/Reier House) is outside the study area limits (within 300 metres) (***see Table 6; Map 7***). Nevertheless, the presence of these features in and within close proximity contributes to establishing the archaeological potential of the study area.

Table 5: Designated and Non-Designated (or Listed) Heritage Resources in the Study Area

Address	Description	Heritage Status
1370 Bridge Street (corner of Bridge Street and Main Street)*	New Dundee Bandshell: built in 1944 by local tradespersons	Designated (by-law 2008-27)
1439 Bridge Street	Bethel Missionary Church: built 1921 and is now a private home	Not designated
1531 Bridge Street	Bethel Church: built 1968	Not designated
169 Front Street	Kavelman's Store/New Dundee Emporium: constructed in 1887 (rear addition in 1888) by Gottlieb Bettschen, a prominent new Dundee resident	Designated (by-law 85-89)
28 Main Street	United Brethren in Christ Church: built 1869, renovations in 1931 and an addition was added in 1958. The church is now a private home	Not designated
56 Main Street	O'Krongli House: built ca. 1860	Not designated
324 Main Street*	ca. 1824; includes the heritage barn	Potentially significant heritage resource (unofficially listed)
168-172 Main Street	Millar/Coleman Store: built ca. 1848. One of New Dundee's oldest structures. E. Coleman installed the first gasoline pump at this site in 1915	Not designated
27 Mill Street*	Doctor's House: one-and-a-half storey board and batten house, constructed in 1850. Later served as the headquarters for village doctors, including Dr. Neil Morrison, Dr. Lorne Stauffer and Dr. L.E. Ritz	Designated (by-law 91-21)
1173 Queen Street	New Dundee Baptist Church: built 1862	Not designated
1177 Queen Street	St. James Lutheran Church: current structure built 1953	Not designated
183 South Street*	ca. 1887	Potentially significant heritage resource (unofficially listed)

'*' denotes heritage resources identified by the Region of Waterloo in close proximity to the New Dundee Water Supply System site area

Table 6: Designated Heritage Resources within 300 Metres of the Study Area

Address	Description	Heritage Status
1522 Bethel Road	Bettschen/Hallman/Reier House: property consists of a two-storey farm home	Designated (by-law 90-15)

1.4.2 Heritage Conservation Districts

Per *Section 1.3.1* of the *2011 S&G*, heritage resources listed on a municipal register or designated under the *Ontario Heritage Act* are considered features or characteristics that indicate archaeological potential. The study area is not located in or within 300 metres of a Heritage Conservation District (Township of Wilmot, 2019a; MHSTCI, 2020). Therefore, this feature does not contribute to establishing the archaeological potential of the study area.

It should be noted that the Township of Wilmot is undertaking a Cultural Heritage Landscape study (commenced 2020) and it is likely that portions of New Dundee will be identified as Cultural Heritage Landscapes including: Alder Lake, New Dundee Community Park and some of the older commercial areas of the Town (Region of Waterloo, 2020).

1.4.3 Commemorative Plaques or Monuments

Per *Section 1.3.1* of the *2011 S&G,* commemorative markers of Indigenous and Euro-Canadian settlements and history which may include local, provincial, or federal monuments, cairns or plaques, or heritage parks are considered features or characteristics that indicate archaeological potential. The study area encompasses two commemorative plaques (Ontario Historic Plaques, 2019; OHT, 2020; waymarking, 2010; ***see Table 7***). Therefore, this feature contributes to establishing the archaeological potential of the study area.

Table 7: Commemorative Plaques within the Study Area

Location	Description
North side of Bridge Street, west of Main Street	William J. Wintemberg, 1876-1941: An outstanding Canadian archaeologist, Wintemberg was born in New Dundee and, as a youth, developed an avid interest in this region's folklore and prehistory. After 1901, he pursued various trades in Toronto but, encouraged by David Boyle of the Provincial Archaeological Museum there, he devoted himself increasingly to archaeological field-work and study. Following his appointment in 1912 to the Victoria Memorial Museum in Ottawa, Wintemberg undertook excavations in eastern Canada, notably in Ontario, Newfoundland, and Nova Scotia. Through his earlier work, and systematic excavations completed in Ontario between 1912 and 1930, he gained international recognition as an authority on Iroquoian prehistory. Wintemberg's major site reports, long a basis for understanding Iroquoian and Algonkian cultures in southern Ontario, have contributed significantly to the advancement of archaeology.
In a small parkette on Main Street, at the south end of Alder Lake	The Founding of New Dundee, 1830-2005: John Millar and his two brothers immigrated to Canada from Dundee, Scotland in the early 1800s. John purchased Crown land here in 1830 and 1832 and dammed Alder Creek to create a mill pond for his saw mill. A village grew next to the mill-pond which he named New Dundee, meaning “in the hollow by the water.” In 1846 John sold a portion of his property to his brother, Frederick, who later laid out the original plan for the village and became its first postmaster. Frederick built a board and batten Carpenters Gothic house in 1850. Home and office to numerous doctors, it is still known as the “Doctor’s House”. Today, the mill pond – known as Alder Lake – remains a focal and recreational point of life in New Dundee.

1.4.4 Pioneer/Historic Cemeteries

Per *Section 1.3.1* of the *2011 S&G*, pioneer churches and early cemeteries are considered features or characteristics that indicate archaeological potential. The New Dundee Union Cemetery (NDUC), located at municipal address 1275 Queen Street, is an early cemetery located in the study area. Therefore, the presence of this feature contributes to establishing the archaeological potential of the study area.

1.4.4.1 NDUC Location and History

The New Dundee Union Cemetery was established ca. 1870 on a farm on the west side of a mill pond (Alder Lake) at the north end of the village. At this time, only the old or lower portion of the cemetery had been donated by Philip Lautenschlager for the purpose of burials. The first burial with a headstone in the cemetery occurred in 1871 and was a family member of the original settlers on land in and around New Dundee. However, it is believed an earlier burial occurred, but no headstone has survived (Hilborn, N.D., pp.8-11; Waterloo Region Branch OGS, 2009).

By 1914, the old or lower portion of the cemetery was nearing capacity. The congregations of the four churches in New Dundee decided to establish a new cemetery and purchased "a little less than three acres of land from Edward C. Diebel, to the north of the first burying ground" in 1914 and 1915 (Hilborn, N.D., pp.8-11; Waterloo Region Branch OGS, 2009; Uttley, 2015). However, review of these two deeds determined these purchases to include roughly 1.6 acres.

This cemetery, both the old and new portions, was formally named the New Dundee Union Cemetery. A cemetery Board of Trustees was established with representatives from each of the church denominations; presently the cemetery is operated by the New Dundee Board of Trade and three churches in the town. Additional land was purchased in 1956 from B. Becker which increased the total land of the cemetery to the present dimensions (Uttley, 2015).

A utility building was constructed in 1985 and a columbarium unit was added in 1997 (Uttley, 2015), both within the 20th century portions of the cemetery. According to the Ontario Genealogical Society (OGS) cemetery transcript, by 2005, several stones from the oldest burials had been broken or detached from their bases. These stones were collected and mounted on a steel rack in the Old Portion of the cemetery (Waterloo Region Branch OGS, 2009).

In 2019 a newspaper article published online in the New Hamburg Independent discussed a local family in New Dundee finding old gravestones along the shore of Alder Lake when maintenance work on the dam had exposed more shoreline. Along the shoreline, two broken headstones were discovered which were determined to be gravestones likely from the 19th century. It is possible that these headstones came from the NDUC which lies next to the Alder Lake reservoir (Booth, 2019).

Per correspondence with the Secretary Treasurer of the cemetery board (i.e., the cemetery operator), in 1989, as a result of an updated land survey, a boundary issue was discovered between the cemetery property and the neighbouring property along the east side. It was previously assumed that the ridgetop on which the cemetery lies was all encompassed within the

cemetery property limits, however it has since been discovered that segments along the ridgetop are actually located on adjacent private property. Since the beginning of 2021, this issue has been in the process of being resolved. A land survey sketch provided by the cemetery operator illustrates two small strips of land that are to be conveyed from the neighbour's property and added to the cemetery property. The land conveyance will add approximately 522 square metres of land to the cemetery property. The cemetery operator has stated that there has been minimal encroachment into the neighbour's property, mostly by a small building and perhaps the outer corner of two or three graves. This encroachment will be non-existent once the land conveyance has been formally registered.

1.4.5 Registered Archaeological Sites

Per *Section 1.1, Standard 1* and *Section 7.5.8, Standard 1* of the *2011 S&G*, the *Ontario Archaeological Sites Database* (OASD) maintained by the *MHSTCI* was consulted in order to provide a summary of registered or known archaeological sites within a minimum one-kilometre distance of the study area limits.

According to the OASD, five registered archaeological sites are located within a one-kilometre radius of the study area (MHSTCI, 2020b) (***see Table 8***). Three of these registered sites (AiHd-9, AiHd-10 and AiHd-130) are located in the study area. A map detailing the location of the registered archaeological sites that fall within one kilometre of the study area is provided within **Map S1** of the attached **Supplementary Document**.

Table 8: Registered Archaeological Sites within One Kilometre of the Study area

Borden #	Name	Cultural Affiliation	Type	Relation to Study Area
AiHd-9	Goettling	-	-	Within the study area
AiHd-10	Smith	-	-	Within the study area
AiHd-130	-	Pre-Contact (Indigenous)	Other: camp/campsite	Within the study area
AiHd-3	Stoltz	Archaic	Unknown, other: camp/campsite	Within 1 km
AiHd-4	Hallman	Archaic	Unknown	Within 1 km

"-" denotes details not provided in OASD

Per *Section 1.3.1* of the *2011 S&G*, previously registered archaeological sites in close proximity are considered to be features or characteristics that indicate archaeological potential. Therefore, given the presence of three registered archaeological sites within the study area limits, this feature contributes to establishing archaeological potential of the study area. Further discussion on the three registered archaeological sites located within the study area is provided in **Sections 1.4.6** and **3.1**.

1.4.6 Previous Archaeological Assessments

Per *Section 1.1, Standard 1* and *Section 7.5.8, Standards 4-5* of the *2011 S&G*, to further establish the archaeological context of the study area, a review of previous AAs carried out within the limits of, or immediately adjacent (i.e., within 50 metres) to the study area — as documented by all available reports — was undertaken. Six archaeological reports were identified (***see Table 9***):

Table 9: Previous Archaeological Assessments

Company, Report Date	Stage of Work	Relation to Study Area	Details and Recommendations
Archaeologix Inc. (Golder Associates Ltd.), 2002a	Stage 1-2 AA	Encompassing part of the study area	Assessment of a 4.8 hectare parcel of land on part of Lot 6, Concession IV, Township of Wilmot. A large strip along the northern part of the property slopes down to a wetland adjacent to Alder Creek; this area was not assessed as it lacks archaeological potential and will be preserved as passive parkland. Parts of the property at the western, eastern and southern edges are steeply sloped and extensively eroded and were not assessed. During the Stage 2 AA, the central portion was test pitted and one archaeological site was discovered – Location 1, a small pre-contact Indigenous camp site of unknown age or cultural affiliation. Stage 3 AA was recommended for Location 1.
Archaeologix Inc. (Golder Associates Ltd.), 2002b	Stage 3 AA	Encompassing part of the study area	Associated with site AiHd-130 (or Location 1 – small pre-contact Indigenous camp site). A total of nine one-metre-square test units were excavated, resulting in the recovery of 30 artifacts. Given the low artifact frequencies and lack of formal or diagnostic tools from the site, it was concluded that it has limited information potential. No further archaeological assessment is recommended.
Archaeological Research Associates Ltd. (ARA), 2010	Stage 1-2 AA	Encompassing part of the study area	Located at 1371 Bridge Street. During the Stage 2 AA, the northern portion of the subject area was disturbed due to imported gravel and heavy landscaping (confirmed by test pit survey); the southern portion of the subject area was subjected to test-pit survey in natural soil conditions; and the central portion was not tested as it falls under the protection of the Grand River Conservation Authority (GRCA). No cultural materials were recovered and no further AA would be productive. It was recommended that the subject area be released from further heritage conditions.
Detritus Consulting Ltd., 2016	Stage 1-2 AA	Encompassing part of the study area	Located on the east side of Queen Street (Regional Road #12), on the northwest side of the Village of New Dundee, and on the north side of the New Dundee Union Cemetery. During the Stage 2 AA, no artifacts were found, and the subject area appeared to be devoid of archaeological resources. No further archaeological assessment of the property is required. Also, as the subject area is located directly adjacent to an active cemetery, it was noted that the nearest headstones were 31 metres away, and a row of mature trees occupies the property line. Due to the distance of the nearest headstones in addition to substantial damage that would be caused to the trees by mechanical topsoil removal (MTR), no MTR is recommended.

Company, Report Date	Stage of Work	Relation to Study Area	Details and Recommendations
Canadian Museum of History, 2021; Lamoureux, 2021; Wagner, 1975; Woolfrey & Chitwood, 1974a	Unknown	Within the study area	Associated with the Goettling Site (AiHd-9), located within the study area. Initially reported by W.J. Wintemberg. The site report states: "About 1850 a skull was found on the Battler farm, north half of lot 4, concession III, Block A, Wilmot township, Waterloo county, Ontario" (Canadian Museum of History, 2021 – William J. Wintemberg fonds). Norman E. Wagner subsequently conducted a survey attempting to locate and examine all the prehistoric sites within the Nith River drainage system in Southern Ontario – an effort was made to locate new sites as well as to relocate and evaluate previously reported sites. The 1975 Wagner report identified one skeleton associated with the site, and the site form provided by the *MHSTCI* stated, "H.I. Smith reported that one skull was found." Wagner reports that "the 6% of the sites which were Burial sites were not investigated for this report, since they were all reported by Wintemberg and excavated during his time" (1975, p.34). Given the inconclusive details surrounding the extent of excavations and archaeological resources/human remains recovered, it must be assumed that there is still potential to encounter this site within the study area.
Canadian Museum of History, 2021; Lamoureux, 2021; Wagner, 1975; Woolfrey & Chitwood, 1974b	Unknown	Within the study area	Associated with the Smith Site (AiHd-10), located within the study area. Initially reported by W.J. Wintemberg. The site report states: "Several skeletons were found in a gravel pit east of New Dundee while removing gravel which was used in raising the dam in 1850. One skull was afterwards brought to the village store, where it was on exhibition for some time. It is not known what became of these specimens. Nothing, so far as I could ascertain, was found with the skeletons. No details as to the manner of the burial are obtainable now. This was on lot 5, concession III, Block A, Wilmot township, Waterloo county, Ontario" (Canadian Museum of History, 2021 – William J. Wintemberg fonds). Norman E. Wagner subsequently conducted a survey attempting to locate and examine all the prehistoric sites within the Nith River drainage system in Southern Ontario – an effort was made to locate new sites as well as to relocate and evaluate previously reported sites. The 1975 Wagner report identified multiple skeletons found in a gravel pit; the site form provided by the *MHSTCI* did not provide any additional details. Wagner reports that "the 6% of the sites which were Burial sites

Company, Report Date	Stage of Work	Relation to Study Area	Details and Recommendations
			were not investigated for this report, since they were all reported by Wintemberg and excavated during his time" (1975, p.34). Given the inconclusive details surrounding the extent of excavations and archaeological resources/human remains recovered, it must be assumed that there is still potential to encounter this site within the study area.

A map detailing the location of all previously assessed areas (where mapping was available) is provided within **Map S1** of the attached **Supplementary Document**.

In addition to the above, the Region of Waterloo has an *Archaeological Facilities Master Plan* (AFMP) that identifies the majority of the study area as having archaeological potential and requiring archaeological assessment; in particular, archaeological assessment is always required at 1522 Bethel Road, 1370 Bridge Street, and surrounding the two registered burial sites (AiHd-9 and AiHd-10) and the New Dundee Union Cemetery (Region of Waterloo, 1989). As previously stated, this mapping is used as preliminary internal research material only, and the Region of Waterloo does not extend permission to circulate this mapping in any form.

1.4.7 Physical Features

1.4.7.1 Physiographic Region

The study area is within the Waterloo Hills physiographic region of Southern Ontario, which chiefly lies in the Regional Municipality of Waterloo. The surface is composed of sandy hills, some of them being ridges of sandy till while others are kames or kame moraines, with outwash sands occupying the intervening hollows. A peculiar characteristic is the preponderance of fine sand, particularly on the surface. Adjoining the hilly region is an extensive area of alluvial terraces of the Grand River spillway system which, although nearly horizontal, contains similar but more uniform sandy and gravelly materials. The Conestogo River and the till plain lying north of it separate the northern end from the main body of this area. In the main part of the region, a number of kettle lakes appear. Small swamps are even more numerous. The soils of the hilly areas are well drained and have developed as mature Grey Brown Luvisolic soils. For the most part they may be classified in four series: Guelph, Harriston, Dumfries, and Waterloo. The Guelph and Harriston soils are found on gentle slopes in the areas where loamy tills occur, while there are some nearly level areas which may have the imperfectly drained London and Listowel soils. Dumfries soils are found in rougher parts where the parent material is a loose gravelly till. Waterloo sandy loam is found on most of the rounded, sandy hills of the area but there are associated small areas of many other types (Chapman & Putnam, 1984, pp.136-137).

1.4.7.2 Soil Types

Several soil types are found within the study area including Bennington-Bookton, Burford-Fox, Brant-Waterloo, Grand-Kirkland and Huron-St. Clements. A description of their characteristics may be found in **Table 10** (Soil Research Institute, 1971).

Table 10: Study Area Soil Types

Soil Association	Description
Bennington-Bookton	Coarse- and medium-textured soils, 1-3 feet in depth, overlaying fine-textured till and lacustrine deposits.
Burford-Fox	Coarse and medium textured soils formed on outwash and shallow lacustrine deposits.
Brant-Waterloo	Moderately coarse- and medium-textured soils formed on lacustrine deposits.
Grand-Kirkland	Coarse- and medium-textured soils formed on recent alluvial deposits.
Huron-St. Clements	Fine-textured soils formed on till or lacustrine deposits.

1.4.7.3 Water Sources

Hydrological features such as primary water sources (i.e., lakes, rivers, creeks, streams) and secondary water sources (i.e., intermittent streams and creeks, springs, marshes, swamps) would have helped supply plant and food resources to the surrounding area and are indicators of archaeological potential (per *Section 1.3.1* of the *2011 S&G*). The study area encompasses Alder Lake, Alder Creek and tributaries of Alder Creek. Therefore, this feature contributes to establishing the archaeological potential of the study area.

Additionally, Alder Lake consists of a distinctive U-shaped bend, or a very tight meander, forming somewhat of a peninsula around Alderside Drive. The shape of this lake was formed partially because of the damning of Alder Creek to create a mill pond in the 1830s, but also probably would have eventually formed over time due to the natural flow and erosion of the watercourse.

1.4.8 Current Land Conditions

The study area is situated mainly within a rural setting of the Township of Wilmot and the suburban setting of New Dundee. The study area encompasses residential properties (extant houses, garages, sheds/outbuildings, etc.), gravel and paved driveways and roadways, commercial properties, a fire station, post office, churches, schools, parks and community recreation centres, the New Dundee Union Cemetery, two municipal wells, areas of open agricultural fields, woodlots and manicured yards, Alder Lake and Alder Creek. The topography is gently rolling with an elevation range of 308-341 metres above sea level.

Specifically, regarding the New Dundee Water Supply System site area, this property is comprised of a pumphouse, two wells, two reservoirs, a paved driveway and parking area, and manicured lawn dotted with trees. The topography in this area is level at an elevation of 322 metres above sea level.

1.4.9 Dates of Desktop and Field Reviews

A desktop review of field conditions using contour mapping available through the VuMap interactive mapping system (VuMAP, 2021 courtesy of First Base Solutions), historic aerial

photographs, and past and current satellite imagery obtained through the Google Earth application was undertaken on April 20th and 21st, 2020.

A field visit ("property inspection") was undertaken on June 11th, 2021 for only the New Dundee Union Cemetery located at 1275 Queen Street in the study area. The purpose of the property inspection was to gain first hand knowledge of the current cemetery property limits, land conditions, placement and dates of headstones/footstones closest to the known cemetery boundaries and to help formulate appropriate cemetery investigation strategies in relation to the current study area. Details regarding the survey methods and results of the cemetery property inspection are presented in **Section 2.0** and **Section 3.5**.

1.5 Confirmation of Archaeological Potential

Based on the information gathered from the background research documented in the preceding sections, elevated archaeological potential has been provisionally established within the study area limits. Features contributing to archaeological potential are summarized in **Appendix B**. Further assessment of conditions within the study area will be addressed in **Section 3.0**.

2.0 CEMETERY PROPERTY INSPECTION

A cemetery property inspection for the New Dundee Union Cemetery was carried out on June 11th, 2021, and conducted in compliance with the standards set forth in *Section 1.2* of the *2011 S&G*. In accordance with *Section 1.2, Standard 2* of the *2011 S&G*, the weather and lighting conditions (high of 23°C and sunny) during the Stage 1 cemetery property inspection permitted good visibility of land features and were conducive to the identification of features of archaeological potential.

The cemetery property inspection involved a visual inspection only and did not include excavation or collection of archaeological resources. The inspection was limited to only the New Dundee Union Cemetery property at 1275 Queen Street and adjacent lands within 20 metres in the study area. This property inspection was carried out by walking around the entire perimeter of the cemetery, assessing the cemetery property limits systematically every five metres to gain first-hand knowledge of the property's geography, topography, and current condition, and to evaluate and map features of archaeological potential (per *Section 1.2, Standard 1* of the *2011 S&G*). In accordance with *Section 1.2, Standards 3-6* of the *2011 S&G*, the cemetery property inspection involved visual confirmation of the presence/absence of previously identified features of archaeological potential (e.g., placement and dates of visible and previously documented grave markers), identification of additional features of archaeological potential not visible on mapping (e.g., former property markers), and the identification and documentation of features that would affect archaeological assessment strategies (e.g., recent land disturbances, overgrown vegetation, wet areas, steep slope, heavy soils, structures and built features, etc.). The Secretary Treasurer and two other cemetery board members attended the cemetery property inspection, providing key insights and details into the burial locations within the cemetery property limits and the history of the burial grounds.

The results of the cemetery property inspection are detailed within ***Section 3.5***. These results, including a representative selection of photographs taken in the field, are also presented in the attached ***Supplementary Document*** as part of a Request for Technical Advice sent to the *MHSTCI* for the New Dundee Union Cemetery. An inventory of the documentary record generated in the field can be found within **Appendix C**.

3.0 ANALYSIS AND CONCLUSIONS

In combination with data gathered from the background research (***see Sections 1.3 and 1.4***), an inspection of contour mapping, aerial photographs, recent satellite imagery and additional historical maps and records, and the cemetery property inspection, an evaluation of the established archaeological potential of the study area was performed. The results of this evaluation are presented in **Maps 7-12**. An inventory of the documented records can be found within **Appendix C**.

3.1 Previous Assessments and Registered Archaeological Sites

Lands encompassed within the study area limits which have already been subjected to an archaeological assessment (Archaeologix Inc. (Golder Associates Ltd.), 2002a, 2002b; ARA, 2010; Detritus Consulting Ltd., 2016), and deemed free of further archaeological concern are recommended to be exempt from further assessment (***see Section 1.4.6, Table 9;*** **Maps 7, 9-10**).

3.1.1 Registered Archaeological Burial Sites

Two registered archaeological burial sites – Goettling Site (AiHd-9) and Smith Site (AiHd-10) are located within the study area (***see Sections 1.4.5 and 1.4.6; see attached Supplementary Document – Map S1***). These two sites were documented in a report by Norman E. Wagner in 1975. The aim of the 1975 report and study was to locate and examine all the prehistoric sites within the Nith River drainage system in Southern Ontario – an effort was made to locate new sites as well as to relocate and evaluate previously reported sites. According to the Ontario Archaeological Sites Database (OASD) original site form provided by the *MHSTCI*, S. Woolfrey and P. Chitwood observed the sites in the field in 1974 (1974a, 1974b) – Woolfrey and Chitwood carried out the bulk of the field research for Norman E. Wagner's *Nith River Site Survey Report*. Wagner reported that "the 6% of the sites which were Burial sites were not investigated for this report, since they were all reported by Wintemberg and excavated during his time" (1975, p.34). Therefore, it appears that Woolfrey and Chitwood relocated the Goettling and Smith burial sites in 1974, but the sites had been previously identified by W.J. Wintemberg.

Records documenting the initial discoveries of the Goettling Site (AiHd-9) and Smith Site (AiHd-10) were located in the Canadian Museum of History archives – William J. Wintemberg fonds (Lamoureux, 2021; Canadian Museum of History, 2021). Wintemberg's notes were brief and provided only very limited additional insight into the location and history of the two burial sites (***see Section 1.4.6, Table 9***). One map titled "Archaeological Map of Wilmot Township, Waterloo County, Ontario – By W.J. Wintemberg, 1903" depicts the hand-drawn locations of both sites which are identified in the legend as "Graves". The Goettling Site (AiHd-9) is identified within Lot 4, Concession 3 Block A in the Township of Wilmot. The Smith Site (AiHd-10) is identified within Lot 5, Concession 3 Block A in the Township of Wilmot.

The requirement for an archaeological excavation at these two registered archaeological sites (Goettling Site - AiHd-9 and Smith Site - AiHd-10) located in the study area is unclear.

Wintemberg's records, the Wagner report (1975) and the Region of Waterloo *Archaeological Facilities Master Plan* (AFMP) identified both as burial sites; however, neither are officially recognized as burial grounds by the *Bereavement Authority of Ontario (BAO)*. Neither the W.J. Wintemberg records nor the 1975 Wagner report provide conclusive details regarding the type of investigation conducted within each site area, the site extent, and whether there still exists the possibility to uncover archaeological resources or human remains in their reported locations. The Region of Waterloo AFMP does, however, indicate that further archaeological assessment is required for these burial sites.

Although the site location details differ slightly between the original site form hand-written by S. Woolfrey and P. Chitwood, and the digital record available on Past Portal, both generally place the Goettling Site within an active agricultural field and the Smith Site in a grassy area adjacent to an extant house and woodlot (***see Map S2***). Given the limited information that could be found for each of these two sites, and their approximate site locations, it must be assumed that there is still elevated potential to encounter these sites within the study area and archaeological assessment remains outstanding.

To ensure recommendations regarding burial site investigations are in line with the most up-to-date advice to guarantee that additional requirements and all possible options are provided, *Archeoworks Inc.* presented the collected data and sought guidance from the *MHSTCI* (***see Supplementary Document – Section 2.0***). Upon provision of the gathered information, the *MHSTCI* offered guidance for the Goettling Site (AiHd-9) and Smith Site (AiHd-10) archaeological fieldwork recommendations within the study area (***see Supplementary Document – Section 3.0***).

Goettling Site (AiHd-9) and Smith Site (AiHd-10) Recommendations

It has been concluded that a Stage 2 property assessment must first be undertaken around the GPS coordinates recorded in the digital OASD site forms available on Past Portal for the approximate location of each site (per *Section 2.1.7, Standard 2* of the *2011 S&G*). These areas must be subjected to an intensified pedestrian or test pit survey in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G* within a minimum 20-metre radius around the recorded site GPS coordinates.

A number of possible outcomes could occur following the Stage 2 property assessment, depending on what, if anything is recovered. Should human remains be discovered during the Stage 2 assessment, the licenced archaeologist must immediately notify the police or coroner and the *Registrar of Burial Sites* at the *Ministry of Government and Consumer Services* who will investigate the discovery. If foul play is ruled out by the coroner, the *Registrar* at the *Ministry of Government and Consumer Services* may order that a burial site investigation be carried out by a licenced archaeologist to determine the age and cultural history of the burial site (in accordance with Ontario Regulation 30/11, Section 174 under the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c. 33).

Given the lack of clarity surrounding the cultural origins and nature of the above noted burial sites, following the completion of the Stage 2 property assessment, regardless of the results (i.e.,

whether or not archaeological resources of cultural heritage value or interest (CHVI) or human remains of archaeological significance were discovered), it is recommended that the *Registrar of Burial Sites* at the *Ministry of Government and Consumer Services* and the *MHSTCI* be consulted regarding detailed recommendations for subsequent stages of fieldwork at the reported site locations. At this stage of the project, it can only be stated that if nothing of forensic or archaeological significance is located during the Stage 2, additional archaeological assessment will be required to confirm the presence or absence of deeply buried human remains associated with the two reported burial site locations. However, exact details and recommendations for subsequent stages of fieldwork beyond Stage 2 for the two reported burial site locations will be refined by the results of the Stage 2 property assessment and conversations with the above-mentioned institutions. It is also currently unclear how the current project will impact the possible burial site locations and therefore recommendations for further Stage 3 burial site investigations will be made following the detailed design phase of the proposed development. Further details and requirements are listed within ***Section 4.0 – Recommendations*** and presented within ***Map S2***.

3.2 Identified Deep and Extensive Disturbances

The study area was evaluated for deep and extensive land alterations – commonly referred to as disturbances – that have severely impacted the integrity of any archaeological resources. Per *Section 1.3.2* of the *2011 S&G*, these include, but are not limited to: quarrying, major landscaping involving grading below topsoil, building footprints, or sewage and infrastructure development.

Disturbances include but are not limited to: the numerous asphalt and gravel roadways, driveways and parking areas, rights-of-ways (gravel shoulders, concrete curbs, sidewalks, embankments, shallow and deep drainage ditching, utilities), extant structures and building footprints (residential houses, outbuildings, churches, schools, commercial buildings, etc.), previous construction and grading activities, and extensive landscaping (patios, walkways, former and extant inground pools, basketball/tennis courts, playgrounds, etc.) (***see Maps 7-10***).

Specific disturbances tied to New Dundee Water Supply System site area include the pumphouse, two wells, two reservoirs, a paved driveway and parking area (***see Map 11***).

The construction of these features would have resulted in severe damage to the integrity of any archaeological resources which may have been present within their footprints and, as such, are exempt from Stage 2 survey. On-site confirmation and documentation of the actual condition and exact extent of the disturbances will, however, be required during a Stage 2 AA.

3.3 Physiographic Features of No or Low Archaeological Potential

The study area was also evaluated for physical features of no or low archaeological potential. These usually include but are not limited to: permanently wet areas, exposed bedrock, and steep

slopes (greater than 20°) except in locations likely to contain pictographs or petroglyphs, as per *Section 2.1, Standard 2.a* of the *2011 S&G.*

Physical features of low or no archaeological potential include the low-lying and permanently wet terrain associated with Alder Creek, Alder Lake, tributaries of Alder Creek and a number of small ponds (***see Maps 7-10***). Areas of steep slope were determined using the contour layer available in the VuMAP interactive mapping system (VuMAP, 2021). On-site confirmation and documentation of the actual condition and exact extent of these features will, however, be required during a Stage 2 AA.

3.4 Identified Areas of Archaeological Potential

Portions of the study area that neither exhibit extensively disturbed conditions nor contain physical features of no or low archaeological potential are therefore considered to retain the established archaeological potential. These areas include but are not limited to: manicured lawns dotted with trees and shrubs, active agricultural fields, woodlots, minor landscaping/gardens, and areas of overgrown vegetation (***see Maps 7-10***). Specifically, within the New Dundee Water Supply System site area this includes manicured lawn dotted with trees (***see Map 11***).

Given the established potential to recover archaeological resources within these identified areas, a Stage 2 AA will be required. Actively or recently cultivated agricultural land must be subjected to pedestrian survey, in accordance with the standards outlined in *Section 2.1.1* of the *2011 S&G*. In areas where ploughing is not possible or viable due to the presence of overgrown vegetation or existing infrastructure and landscaping, a Stage 2 test pit survey at five metre intervals must be performed, in accordance with the standards outlined in *Section 2.1.2* of the *2011 S&G*.

3.5 Cemetery

As per the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 no intrusive activity may occur within the limits of a cemetery without consent from the *Bereavement Authority of Ontario*. The *Registrar's Directive: Archaeological Assessments & Investigations on Cemetery Lands* (dated April 11, 2018) and the *Registrar's Directive: Authorization of Archaeological Assessments & Investigations on Cemetery Lands* (dated March 1, 2019) also require that a Cemetery Investigation Authorization (CIA) be obtained whenever archaeological investigations are contemplated to verify and/or determine the boundaries of a cemetery where available documents cannot confirm the existence and exact locations of burials within that cemetery. The CIA will relieve the archaeologist of the prohibition and liability related to the intentional disturbance of a human burial within a cemetery should such an incident occur.

The New Dundee Union Cemetery, located at 1275 Queen Street, is a currently active 19th century cemetery located within the study area (***see Map 7***). This historic cemetery is considered a sensitive cultural resource of high archaeological potential. Nineteenth century historic cemeteries were not highly regulated, and often employed markers of little substance that have

since disappeared. The possible absence of grave markers can result in inaccurate depictions of the recognized cemetery property limits. Furthermore, the 'sneaking' of burials near the property limits of cemeteries is a phenomenon associated with early 19th century church burial grounds where the congregation influenced who was buried within the cemetery.

To gain a better understanding of the land use history within and immediately adjacent to the New Dundee Union Cemetery, multiple resources and contacts (including the cemetery operator and the *BAO*) were consulted to gather as much information as possible. Following the recommendations from the *MHSTCI* and the *BAO*, all lands within 20 metres of the current cemetery property limits within the study area were reviewed. The collected data, combined with an on-site cemetery property inspection conducted on June 11th, 2021, resulted in an assessment of the potential for unmarked burials within the swaths of lands within the current study area adjacent to the existing New Dundee Union Cemetery property.

Given that cemetery requirements are ongoing and ever changing at the *MHSTCI*, *Archeoworks Inc*. presented the collected data and sought guidance from the *MHSTCI* (***see Supplementary Document – Section 2.0***). This was done to ensure recommendations regarding cemetery investigations are in line with the most up-to-date advice to guarantee that additional requirements and all possible options are provided. Upon provision of the gathered information, the *MHSTCI* offered cemetery investigation recommendations for those swaths of lands within and adjacent to the New Dundee Union Cemetery that fall within the study area (***see Supplementary Document – Section 3.0***).

New Dundee Union Cemetery Recommendations

There is no potential to encounter unmarked burials within portions of the 20-metre cemetery investigation area adjacent to the 1914, 1915 and 1956 portions of the NDUC as well as into Queen Street and land on the west side of this roadway. Due to the lack of potential for uncovering unmarked burials, further cemetery investigation is not required in these areas.

Due to the early date of establishment of the Old Portion of the cemetery (ca. 1870), the proximity of burial markers to the cemetery property limits (on the east side of the road allowance of Queen Street), uncertainty surrounding the locations of buried remains in relation to their associated headstone, markers that have been broken and removed from their original locations, and 19th century gravestones found out-of-place along the shore of Alder Lake, lands directly adjacent to the Old Portion of the NDUC have the potential to encounter unmarked burials. The southern property limits of the Old Portion of the cemetery were confirmed to match the historic limits and therefore this area does not require further cemetery investigations. However, the eastern and western limits could not be defined with as much certainty.

Therefore, further cemetery investigations of these areas are required to confirm the presence or absence of burial features (e.g., unmarked burials) extending beyond the current cemetery property limits. Although exhibiting roadside ditching disturbances and very steep slopes, these lands still retain elevated potential for deeply buried remains and unmarked burials. Per guidance provided by the *MHSTCI*, given the complexity of the field conditions within the areas noted to

retain potential for unmarked burials, and as it is not clear where proposed project construction impacts are to occur, detailed recommendations for Stage 3 cemetery investigations will occur after the detailed project designs are made available. Recommendations for subsequent stages of fieldwork must be made in consultation with the *MHSTCI*.

Additionally, a Cemetery Investigation Authorization (CIA) issued by the *BAO* must be obtained prior to conducting any invasive archaeological fieldwork (e.g., Stage 2/3/4 investigations; construction monitoring) within the identified areas adjacent to the cemetery and also if intrusive work is to occur within the known cemetery property limits; the cemetery operator must also provide consent to any intrusive activities occurring within the cemetery limits. Should the area within the current cemetery property limits be impacted, additional archaeological investigation (Stage 2 AA and Stage 3 AA) will also be required.

Further to what has been outlined above, detailed recommendations concerning further archaeological investigation for the New Dundee Union Cemetery are listed within ***Section 4.0 – Recommendations*** and presented within ***Map 12***.

4.0 RECOMMENDATIONS

Considering the findings outlined within this report, the following recommendations are presented:

1. Lands that were subjected to previous archaeological assessments (Archaeologix Inc. (Golder Associates Ltd.), 2002a,b; ARA, 2010; Detritus Consulting Ltd., 2016) and deemed free of further archaeological concern are recommended to be exempt from further assessment.

2. Parts of the study area that were identified as having archaeological potential removed are exempt from requiring Stage 2 AA (extents of these areas to be confirmed during the Stage 2 AA).

3. Parts of the study area that were identified as having no or low archaeological potential are exempt from requiring Stage 2 AA (extents of these areas to be confirmed during the Stage 2 AA).

4. All areas identified as retaining archaeological potential must be subjected to a Stage 2 AA. These areas must be subjected to pedestrian or test pit survey at five-metre intervals in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G.*

5. Should proposed construction impacts occur within 50 metres of the GPS coordinates recorded in the digital *Ontario Archaeological Sites Database* (OASD) site forms available on Past Portal for the approximate locations of the Goettling Site (AiHd-9) and Smith Site (AiHd-10), the following archaeological investigations are required:
    a. As there is the potential to encounter both deeply buried archaeological resources and for archaeological resources to be present near the surface, per *Section 2.1.7*, *Standard 2* of the *2011 S&G*, intensified surface survey methods (Stage 2 test pit or pedestrian survey) must occur over a minimum 20-metre radius around the recorded site GPS coordinates in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G*.
    b. Following the completion of the Stage 2 AA, regardless of the results, the Registrar of Burial Sites at the *Ministry of Government and Consumer Services* and the *Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)* must be contacted regarding recommendations for subsequent stages of fieldwork. Also, the appropriate recommendations for further Stage 3 burial site investigations (e.g., hand excavation, mechanical topsoil removal, construction monitoring, etc.) will be made following the detailed design phase of the proposed development.

6. As per the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 no intrusive activity may occur within the limits of the New Dundee Union Cemetery without consent from the cemetery operator and the *Bereavement Authority of Ontario*.

a. Should the area within the current cemetery limits be impacted, additional archaeological investigation consisting of Stage 2 test pit survey followed by Stage 3 mechanical topsoil removal is required. A Cemetery Investigation Authorization (CIA) issued by the *Bereavement Authority of Ontario* is also required and needs to be obtained prior to conducting any soil-intrusive work (e.g., Stage 2/3/4 investigations; construction monitoring).

7. Lands within the 20-metre cemetery investigation area surrounding the New Dundee Union Cemetery that were identified as having no potential for unmarked burials (***see Map 12***) do not require a Stage 3 cemetery investigation.

8. Should proposed construction impacts occur within the swaths of land adjacent to the New Dundee Union Cemetery identified as having potential for the recovery of unmarked burials, the following archaeological/cemetery investigations are required:
    a. As there is the potential for the New Dundee Union Cemetery to extend into the study area, a Cemetery Investigation Authorization (CIA) issued by the *Bereavement Authority of Ontario* is required and needs to be obtained prior to conducting any soil-intrusive work (e.g., Stage 2/3/4 investigations; construction monitoring).
    b. Per *Section 2.2*, *Guideline 4* of the *2011 S&G*, and in accordance with the *Registrar's Directive: Archaeological Assessments & Investigations on Cemetery Lands* (dated April 11, 2018) and the *Registrar's Directive: Authorization of Archaeological Assessments & Investigations on Cemetery Lands* (dated March 1, 2019), further Stage 3 cemetery investigations are required to determine the boundaries of the cemetery. Given the complexity of the field conditions surrounding the New Dundee Union Cemetery, the appropriate recommendations for further Stage 3 cemetery investigations (e.g., hand excavation, mechanical topsoil removal, construction monitoring, etc.) will be made following the detailed design phase of the proposed development. Recommendations for subsequent stages of fieldwork must be made in consultation with the *Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)*.

No construction activities shall take place within the study area prior to the *MHSTCI* (Archaeology Programs Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied.

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

1. This report is submitted to the *MHSTCI* as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c. 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the *MHSTCI*, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.

2. It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.

3. Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with Section 48 (1) of the *Ontario Heritage Act*.

4. The *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 requires that any person discovering human remains must notify the police or coroner and the Registrar of Burial Sites at the *Ministry of Government and Consumer Services*.

5. Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.

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6.2 Map Sources

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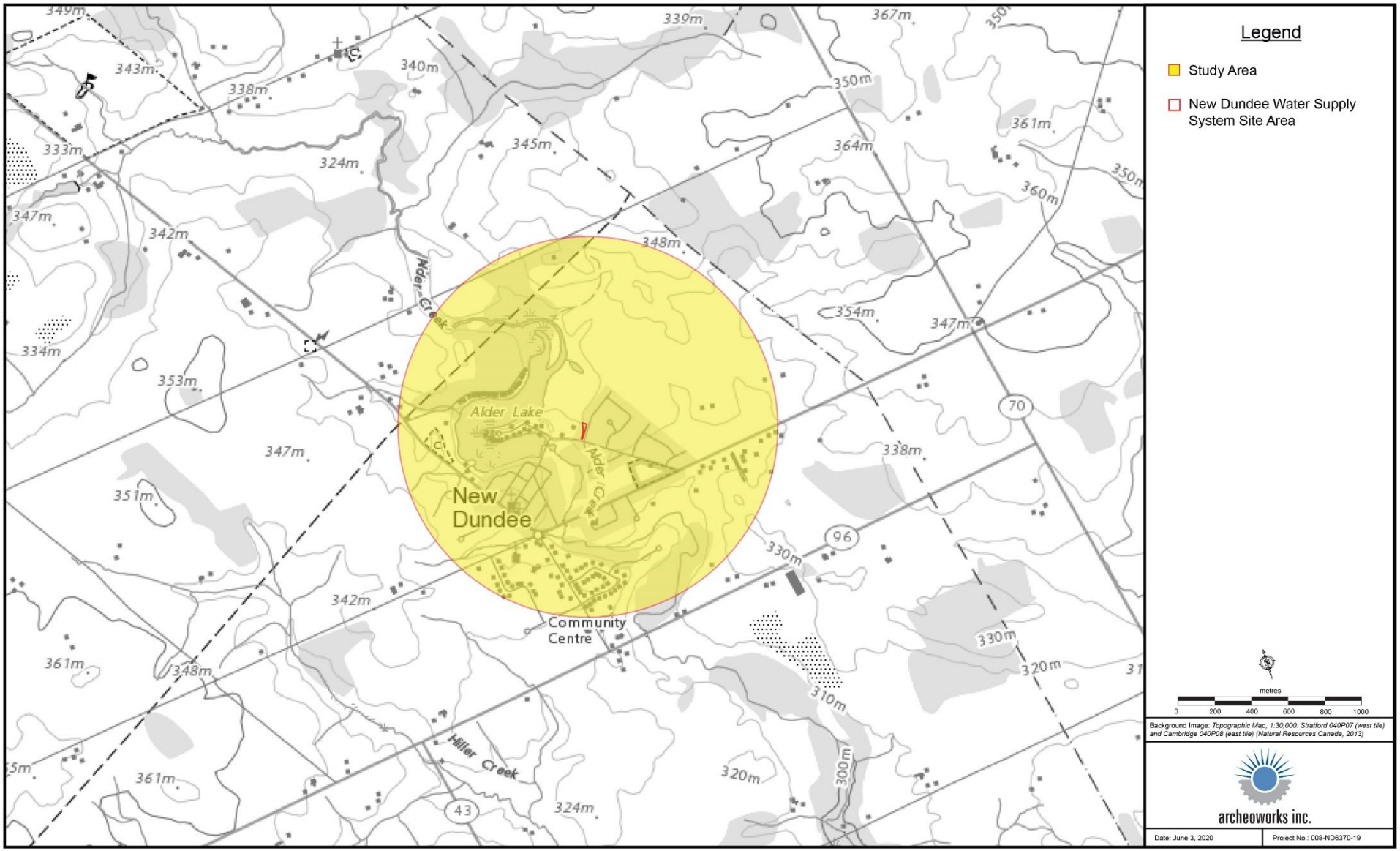
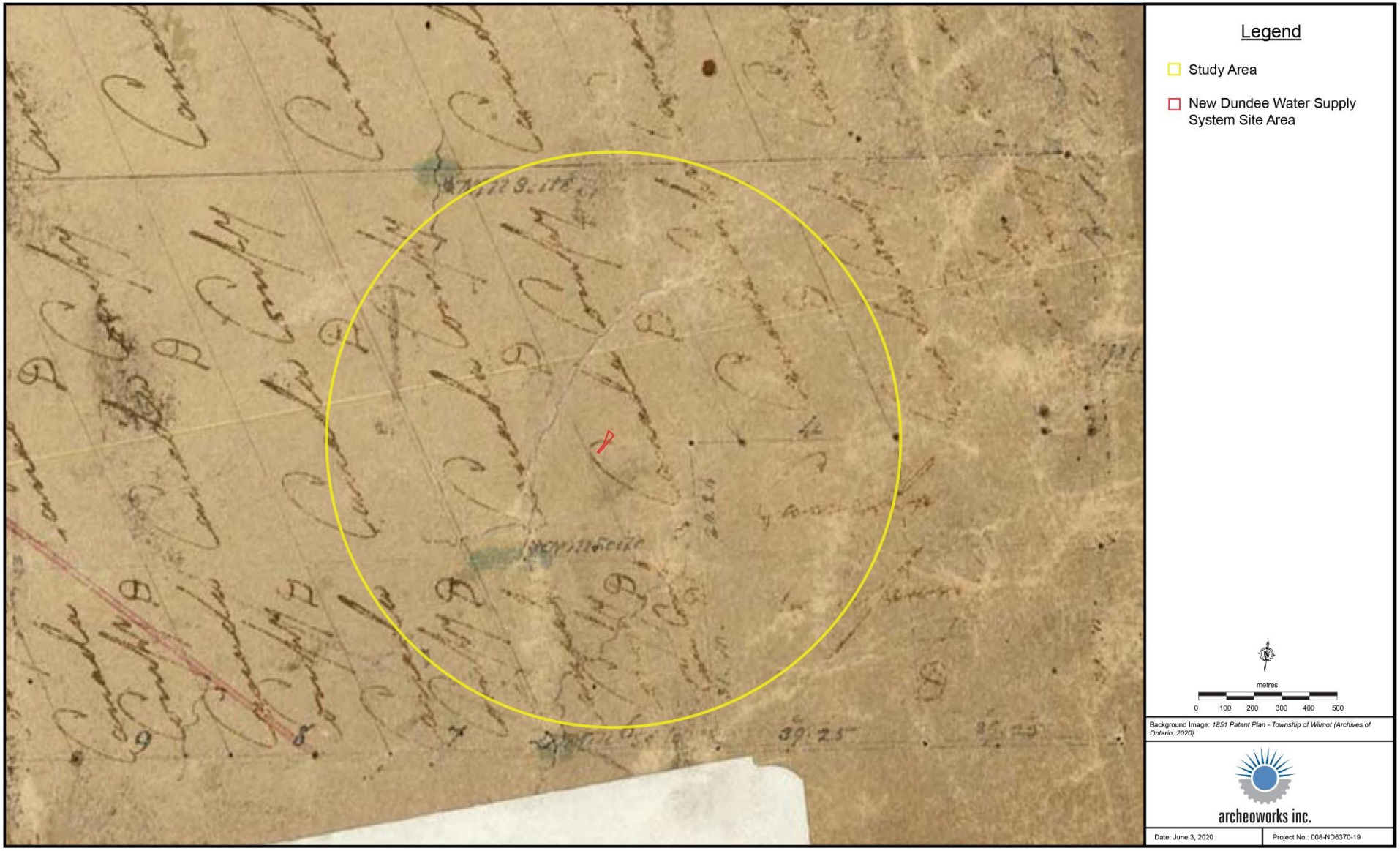
APPENDICES

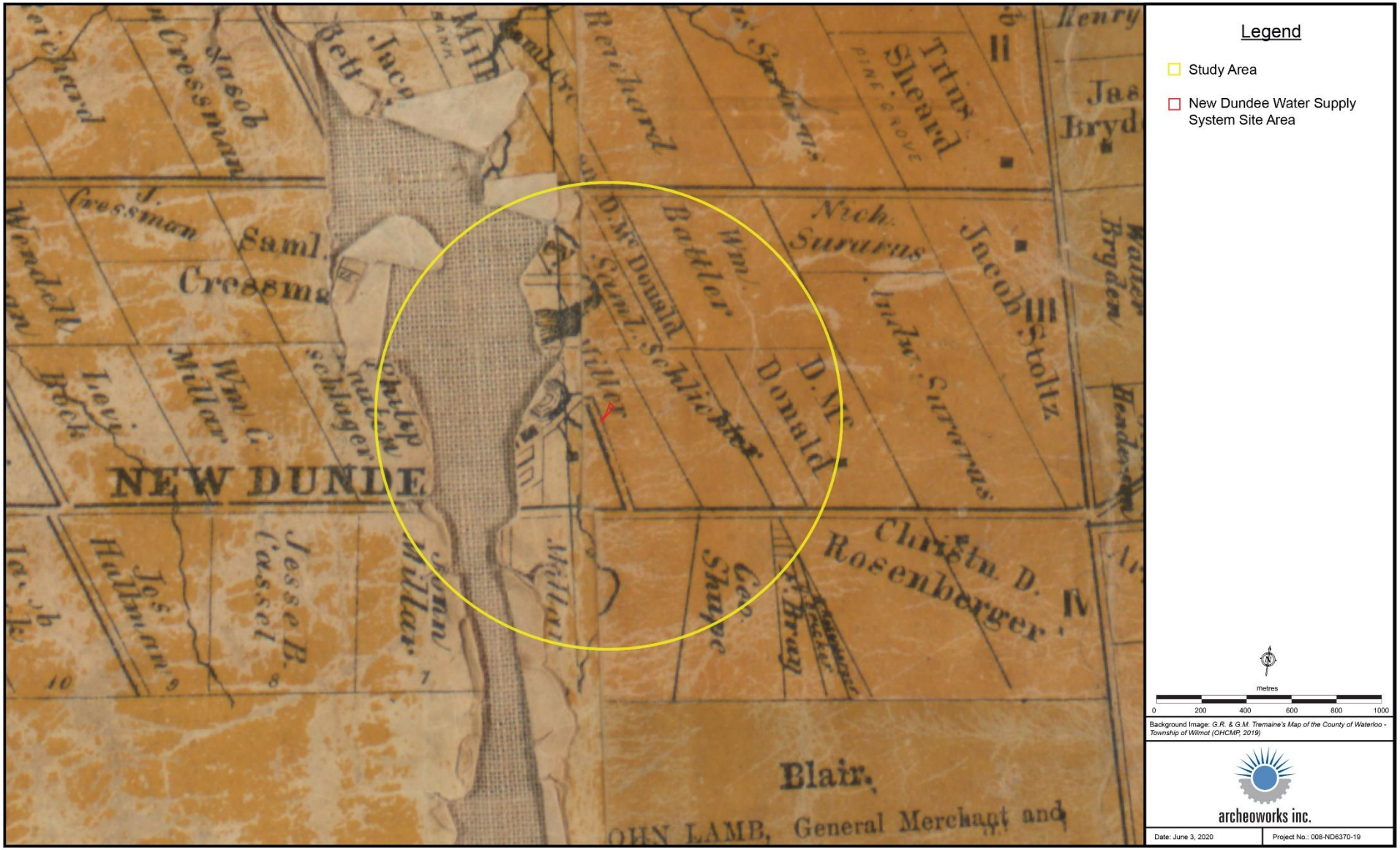
APPENDIX A: MAPS



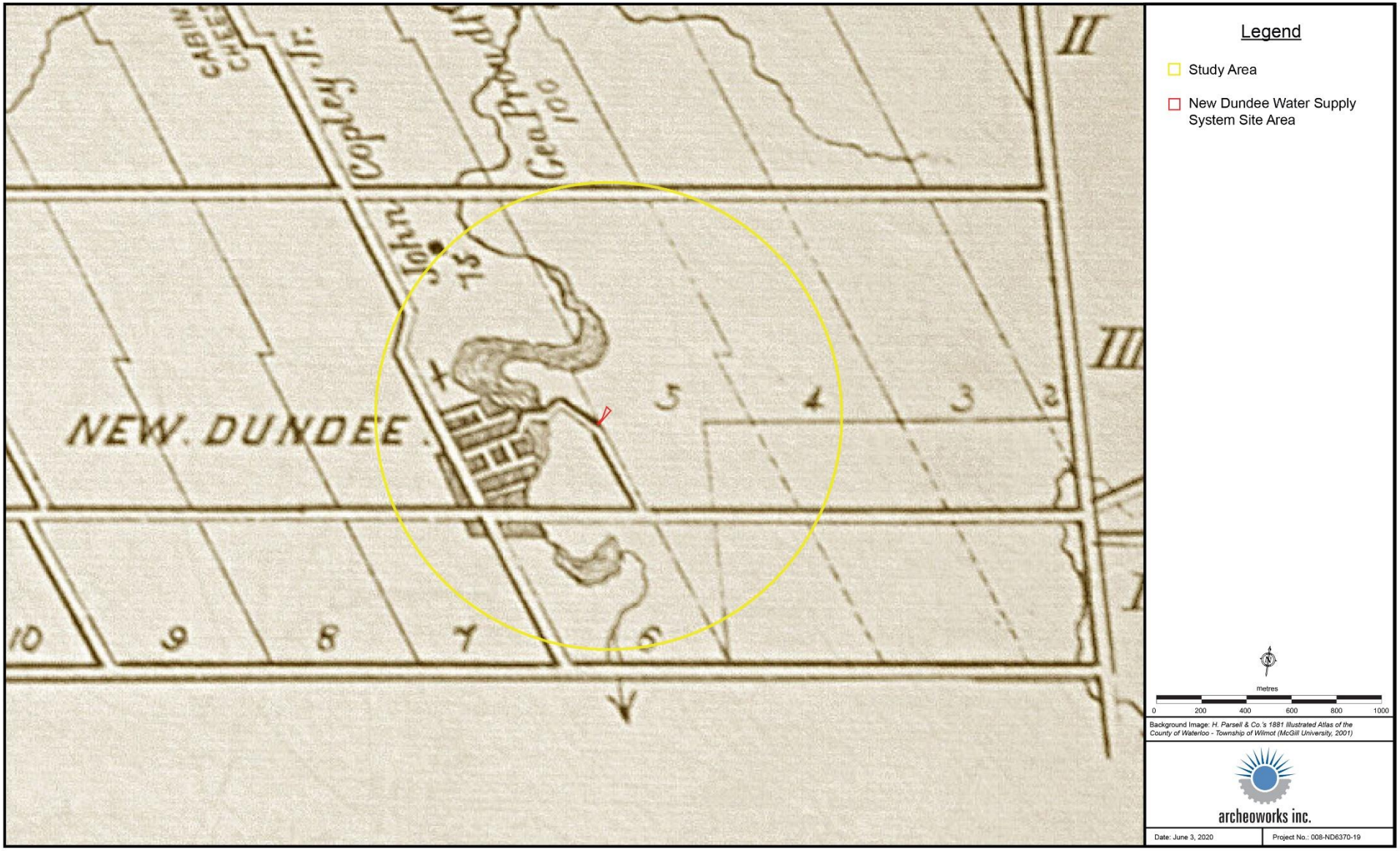
Map 1: Topographic Map, 1:30,000, Stratford 040P07 and Cambridge 040P08 (Natural Resources Canada, 2013) identifying the Stage 1 AA study area and New Dundee Water Supply System site area.



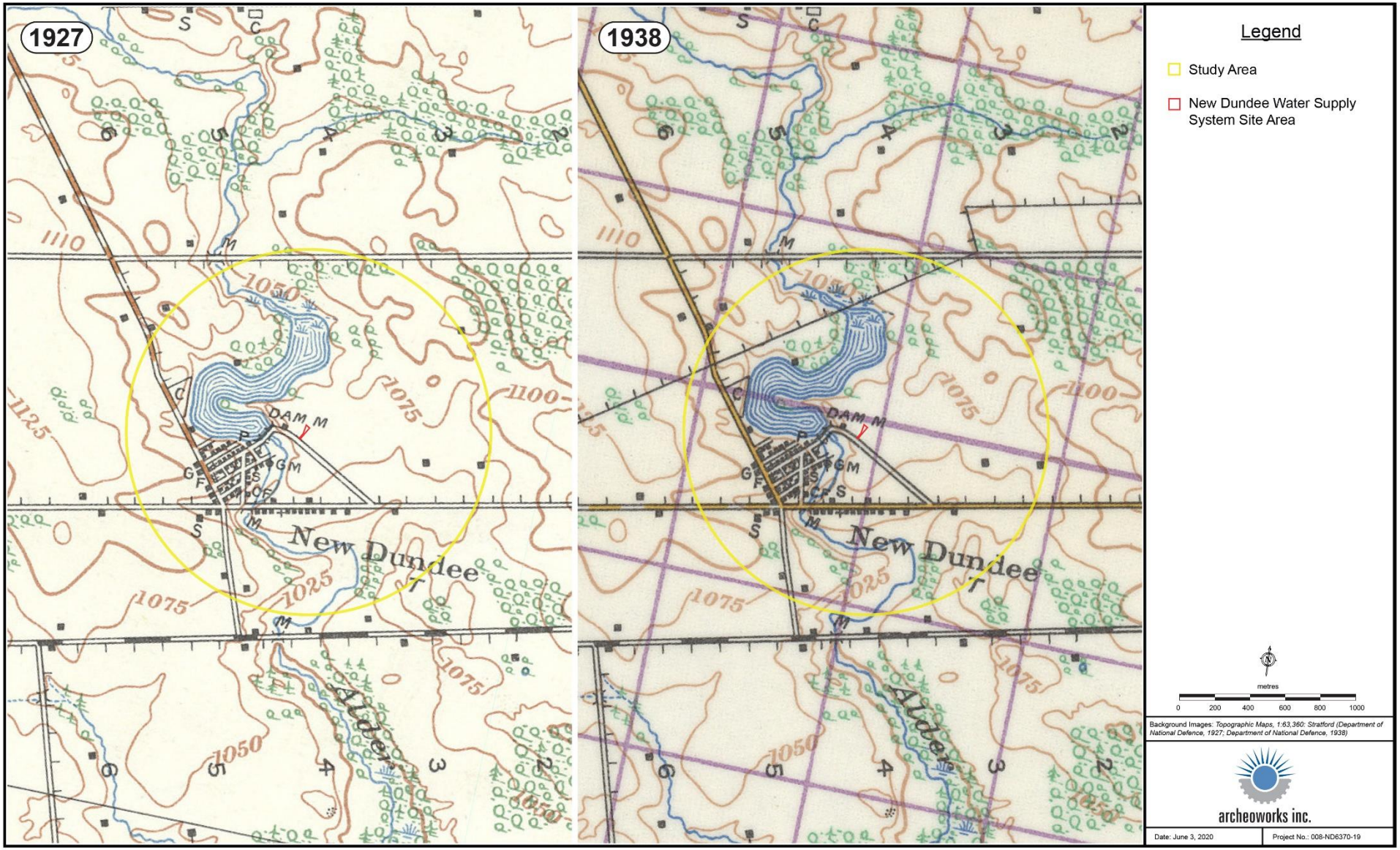
Map 2: Stage 1 AA study area and New Dundee Water Supply System site area within an 1851 Patent Plan – Township of Wilmot (Archives of Ontario, 2020).



Map 3: Stage 1 AA study area and New Dundee Water Supply System site area within G.R. and G.M. Tremaine's 1861 Map of the County of Waterloo – Township of Wilmot (OHCMP, 2019).

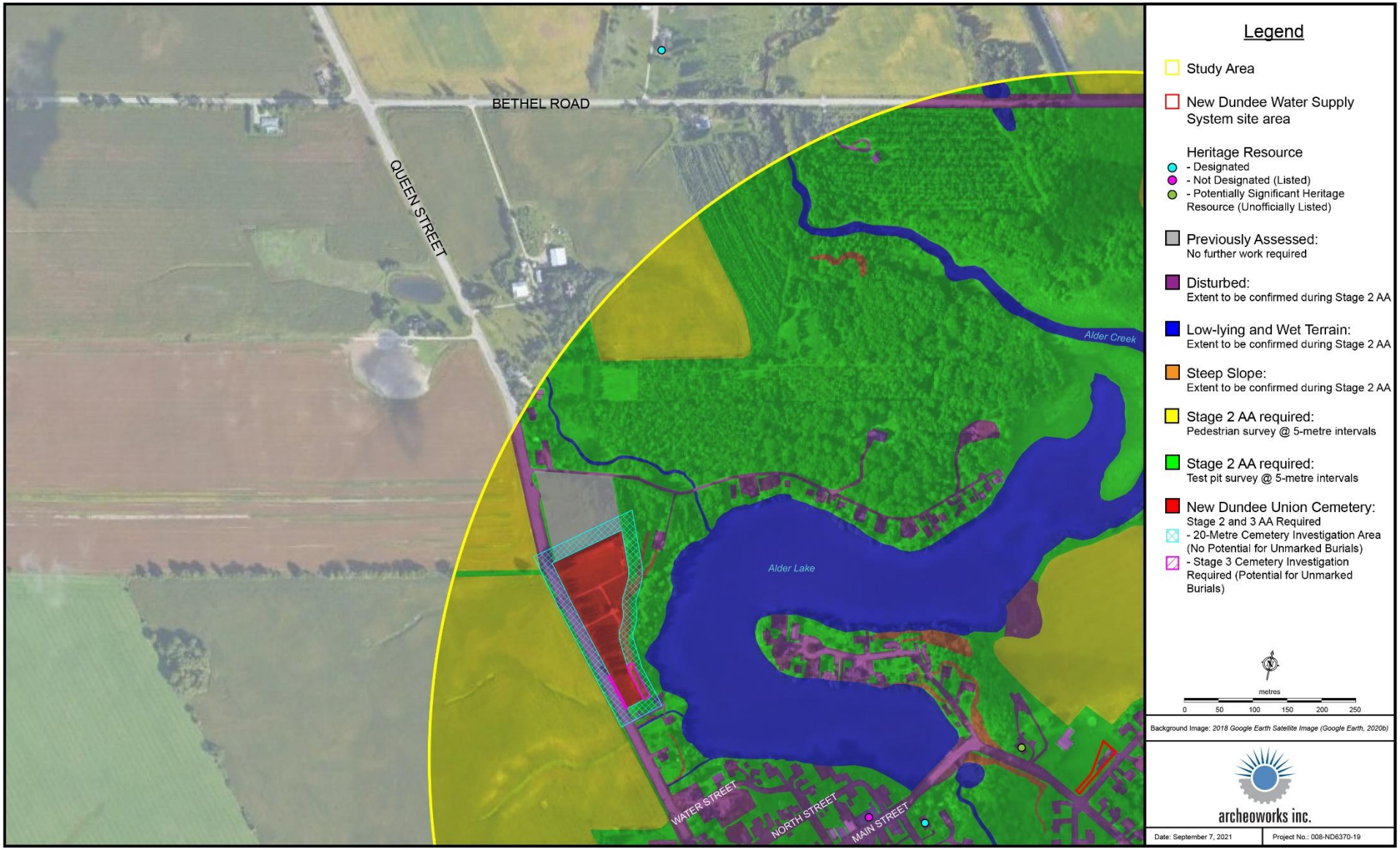


Map 4: Stage 1 AA study area and New Dundee Water Supply System site area within H. Parsell & Co.'s 1881 Illustrated Atlas of the County of Waterloo – Township of Wilmot (McGill University, 2001).

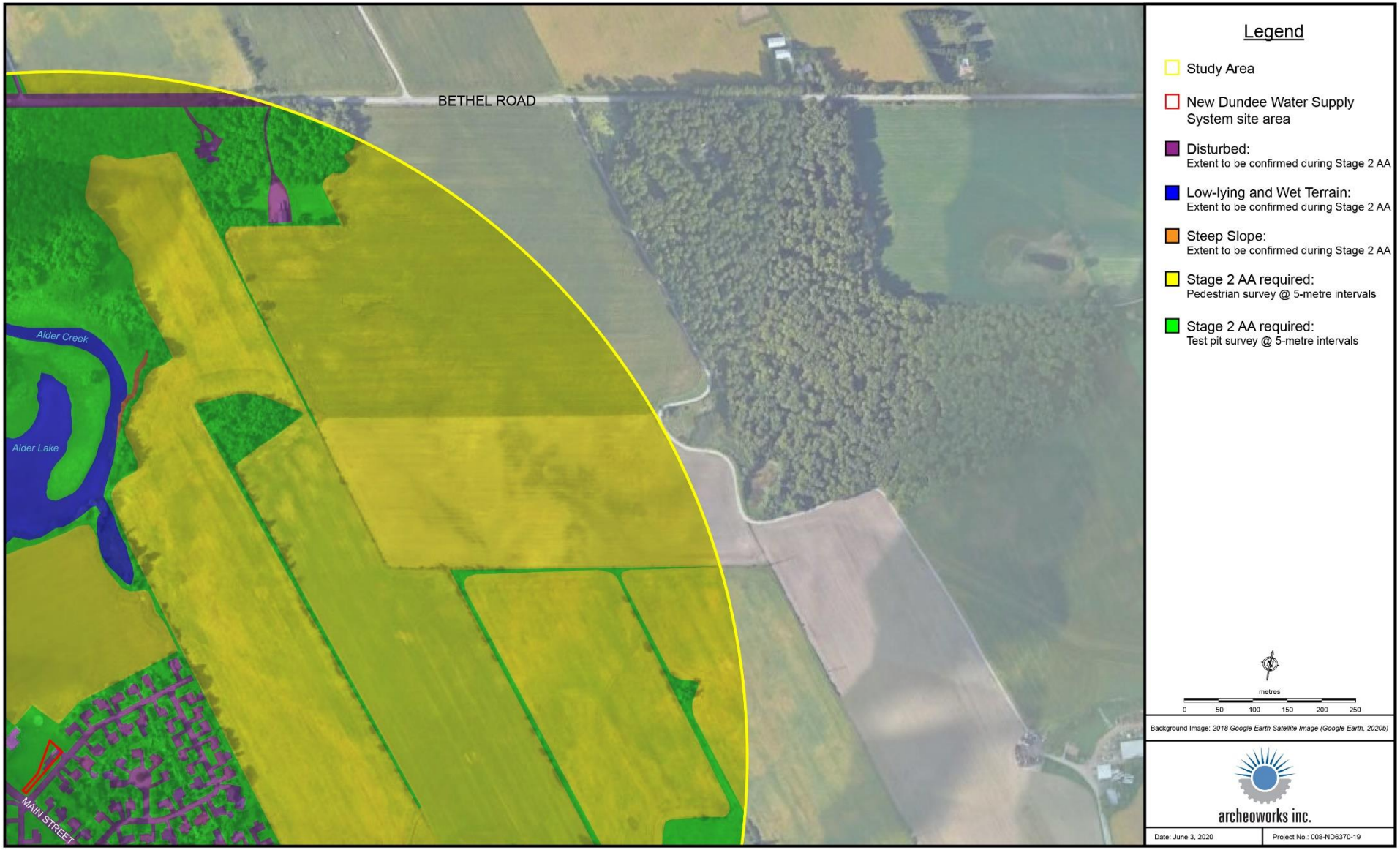


Map 5: Stage 1 AA study area and New Dundee Water Supply System site area within 1927 and 1938 Topographic Maps (Department of National Defence, 1927; Department of National Defence, 1938).

Map 6: Stage 1 AA study area and New Dundee Water Supply System site area within a 1954 aerial photograph (McMaster University Digital Archives, 2020).



Map 7: Stage 1 AA results – northwest section.

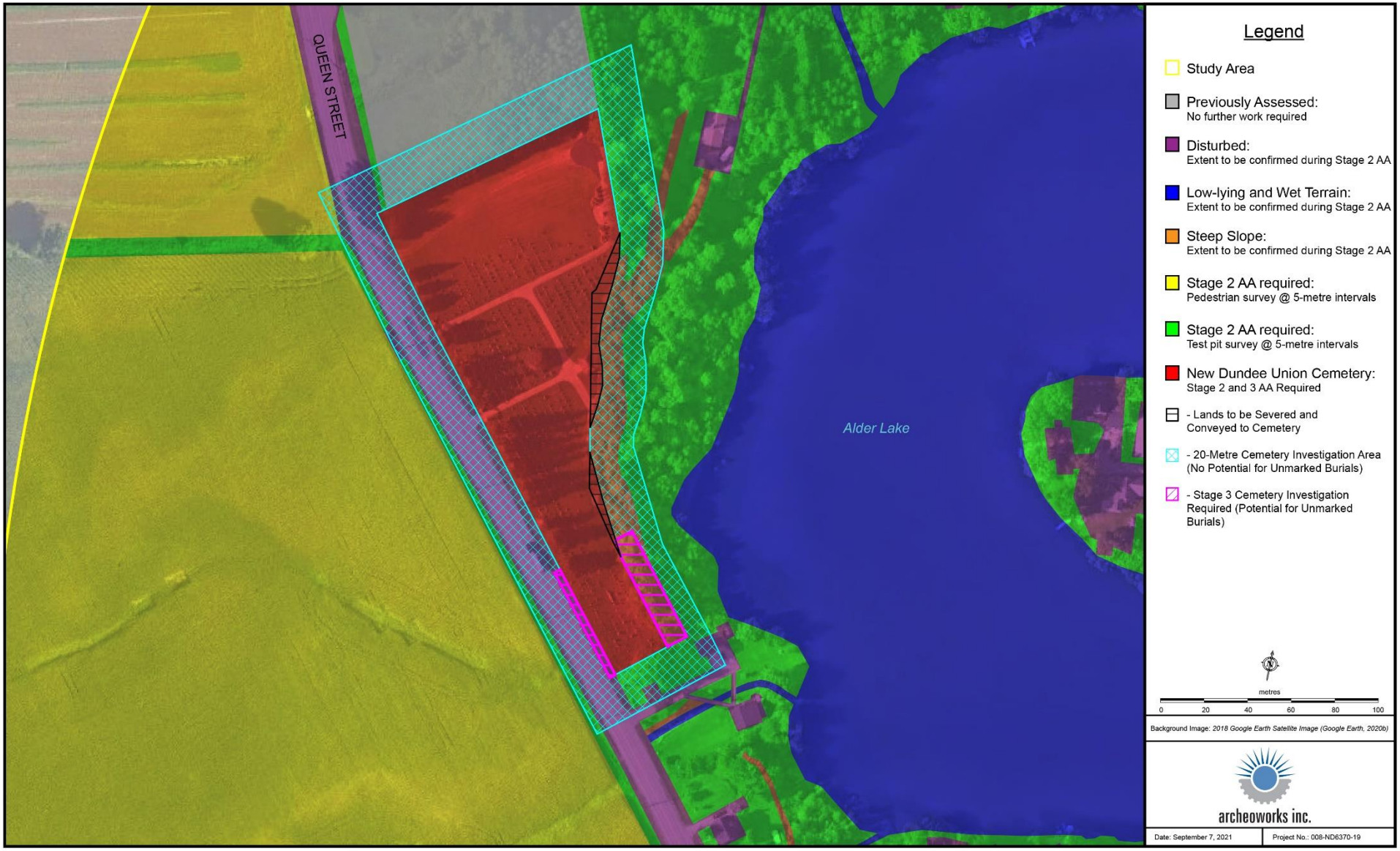


Map 8: Stage 1 AA results – northeast section.

Map 9: Stage 1 AA results – southwest section.

Map 10: Stage 1 AA results – southeast section.

Map 11: Stage 1 AA results – New Dundee Water Supply System site area.



Map 12: Stage 1 AA results – New Dundee Union Cemetery further recommendations.

APPENDIX B: SUMMARY OF BACKGROUND RESEARCH

Feature of Archaeological Potential	Yes	No	Unknown	Comment
1. Known archaeological sites within 300 m?	X			If Yes, potential confirmed
Physical Features	**Yes**	**No**	**Unknown**	**Comment**
2. Is there water on or adjacent to the property?	X			If Yes, potential confirmed
2a. Presence of primary water source within 300 metres of the study area (lakes, rivers, streams, creeks)	X			If Yes, potential confirmed
2b. Presence of secondary water source within 300 metres of the study area (intermittent creeks and streams, springs, marshes, swamps)	X			If Yes, potential confirmed
2c. Features indicating past presence of water source within 300 metres (former shorelines, relic water channels, beach ridges)		X		If Yes, potential confirmed
2d. Accessible or inaccessible shoreline (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh)		X		If Yes, potential confirmed
3. Elevated topography (knolls, drumlins, eskers, plateaus, etc.)		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
4. Pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
5. Distinctive land formations (mounds, caverns, waterfalls, peninsulas, etc.)	X			If Yes to two or more of 3-5 or 7-10, potential confirmed
Cultural Features	**Yes**	**No**	**Unknown**	**Comment**
6. Is there a known burial site or cemetery that is registered with the Cemeteries Regulation Unit on or directly adjacent to the property?	X			If Yes, potential confirmed
7. Associated with food or scarce resource harvest areas (traditional fishing locations, food extraction areas, raw material outcrops, etc.)		X		If Yes to two or more of 3-5 or 7-10, potential confirmed
8. Indications of early Euro-Canadian settlement (monuments, cemeteries, structures, etc.) within 300 metres	X			If Yes to two or more of 3-5 or 7-10, potential confirmed
9. Associated with historic transportation route (historic road, trail, portage, rail corridor, etc.) within 100 metres of the property	X			If Yes to two or more of 3-5 or 7-10, potential confirmed
Property-specific Information	**Yes**	**No**	**Unknown**	**Comment**
10. Contains property designated under the Ontario Heritage Act	X			If Yes, potential confirmed
11. Local knowledge (Indigenous communities, heritage organizations, municipal heritage committees, etc.)	X			If Yes, potential confirmed
12. Recent ground disturbance, not including agricultural cultivation (post-1960, extensive and deep land alterations)	X – parts of the study area			If Yes, low archaeological potential is determined

APPENDIX C: INVENTORY OF DOCUMENTARY AND MATERIAL RECORD

Project Information
Project Number: 008-ND6370-19
Licensee: Ian Boyce (P1059)
MHSTCI PIF: P1059-0066-2020

Document/ Material	Details	Location
1. Research/ Analysis/ Reporting Material	Digital files stored in: /2019/008-ND6370-19 - New Dundee Water Supply Iron + Manganese Upgrades - Waterloo/Stage 1/	Archeoworks Inc., 16715-12 Yonge Street, Suite 1029, Newmarket, ON, Canada, L3X 1X4 Also stored on Archeoworks network servers
2. Written Field Notes/ Annotated Field Maps	Maps/Notes: Two (2) pages	Archeoworks Inc., 16715-12 Yonge Street, Suite 1029, Newmarket, ON, Canada, L3X 1X4 Also stored on Archeoworks network servers
3. Fieldwork photographs	Digital Images: 101 digital photos	Archeoworks Inc., 16715-12 Yonge Street, Suite 1029, Newmarket, ON, Canada, L3X 1X4 Also stored on Archeoworks network servers

Under Section 14 of the Terms and Conditions for Archaeological Licences issued under the Ontario Heritage Act, “the licensee shall hold in safekeeping all artifacts and records of archaeological fieldwork carried out under this licence, except where those artifacts and records are transferred by the licensee to Her Majesty the Queen in right of Ontario or the licensee is directed to deposit them in a public institution in accordance with subsection 66(1) of the Act." The collections are being stored at *Archeoworks Inc.* on the licensee's behalf.

ARCHEOWORKS INC.

Stage 1 Archaeological Assessment for the New Dundee Water Supply System Iron and Manganese Water Treatment Upgrades Municipal Class Environmental Assessment Located at 156 Alderview Drive and Extending 1000 Metres in all Directions Within Part of Lots 4-5, Concession 2 Block A and Part of Lots 4-7, Concessions 3-4 Block A In the Geographic Township of Wilmot Former County of Waterloo Now in the Township of Wilmot Regional Municipality of Waterloo Ontario

Project #: 008-ND6370-19
Licensee (#): Ian Boyce (P1059)
PIF #: P1059-0066-2020

Revised Supplementary Document

October 20, 2021

Presented to:
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16715-12 Yonge Street, Suite 1029
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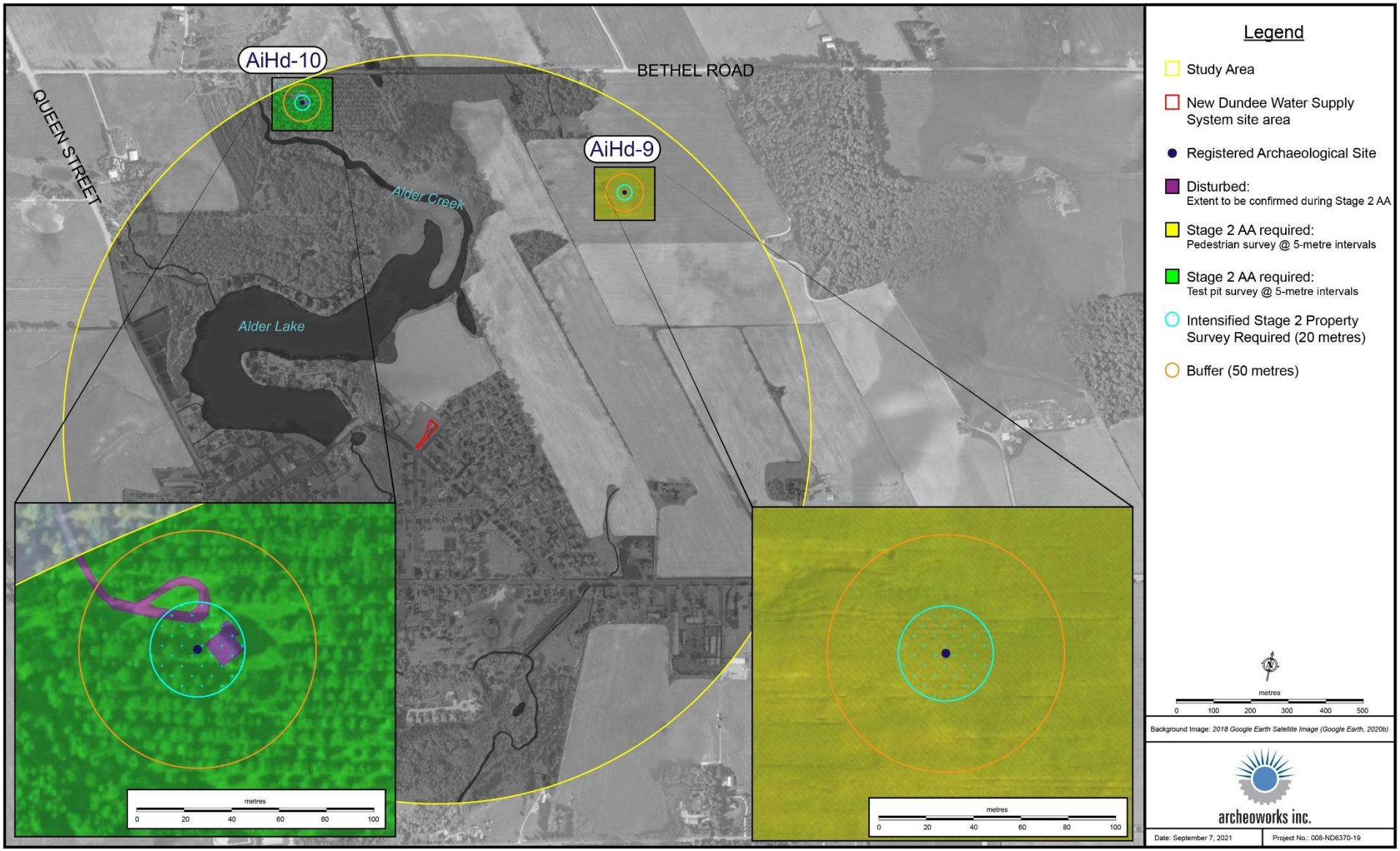
1.0 DETAILED MAPS

Map S1: Identifying the location of registered archaeological sites within one kilometre of the study area and previous archaeological assessments within 50 metres of the study area.



Map S2: Identifying the recorded GPS site locations for registered archaeological sites AiHd-9 and AiHd-10 and further recommendations for site re-location.

2.0 MHSTCI REQUEST FOR TECHNICAL ADVICE

ARCHEOWORKS INC.

Monday, July 05, 2021

Archaeological & Heritage Planning
Ministry of Heritage, Sport, Tourism and Culture Industries
Programs and Services Branch
401 Bay Street, Suite 1700
Toronto, ON, M7A 0A7

RE: Request for Technical Advice for MHSTCI Project Information Form Number P1059-0066-2020 (Stage 1 – New Dundee Water Supply Iron + Manganese Upgrades). Archeoworks Inc. Project Number [008-ND6370-19].

We are writing to the *Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)* to seek technical advice regarding a cemetery and two early registered archaeological sites within the project area in the Township of Wilmot to ensure our recommendations are in line with current standards. The cemetery and sites in question are:

1) New Dundee Union Cemetery (NDUC) (ca. 1870), located at 1275 Queen Street;
2) Two registered archaeological sites identified as burial sites:
    a. Goettling Site (AiHd-9), located in an agricultural field south of the residential property at 1349 Bethel Road; and
    b. Smith Site (AiHd-10), located in a treed area around the residence at 1467 Bethel Road (***see Section 1.0 – Map 1***).

New Dundee Union Cemetery (NDUC)

The New Dundee Union Cemetery (NDUC), located at 1275 Queen Street, is a currently active nineteenth century cemetery located within the study area (***see Map 2***).

In an effort to confirm whether the legal limits of the NDUC are known and if there is the potential for unmarked graves to extend beyond the currently recognized property limits into the study area, detailed background research in accordance with *Section 1.3.1* of the *2011 S&G* was conducted. This involved contacting the cemetery owner/operator for available records, maps, plans etc. (***see Section 2.0***); all relevant records are included in ***Section 3.0.*** These records were then supplemented with information from the results of the Stage 1 property inspection investigating current land conditions (***see Section 4.0***).

Following the recommendations from the *MHSTCI* and the *BAO*, all lands within 20 metres of the current cemetery property limits within the study area were reviewed.

Location and History

The New Dundee Union Cemetery was established in ca. 1870 on a farm on the west side of a mill pond (Alder Lake) at the north end of the village. At this time, only the old or lower portion of the cemetery had been donated by Philip Lautenschlager for the purpose of burials. The first burial with a headstone in the cemetery occurred in 1871 and was a family member of the original settlers on land in and around New Dundee. However, it is believed an earlier burial occurred, but no headstone has survived[1,2].

By 1914, the old or lower portion of the cemetery was nearing capacity. The congregations of the four churches in New Dundee decided to establish a new cemetery and purchased "a little less than three acres of land from Edward

[1] Hilborn, M. (No Date). 'The Union Cemetery' in *New Dundee Tweedsmuir History, Book K.* [Online]. Available at: http://images.ourontario.ca/wilmot/55492/page/10?n= [Accessed 21 April 2020].
[2] Waterloo Region Branch, Ontario Genealogical Society (2009). *New Dundee Union Cemetery – Cemetery Transcript*. Kitchener, Ontario: Ontario Genealogical Society, Waterloo Region Branch.

ARCHEOWORKS INC.

C. Diebel, to the north of the first burying ground" in 1914 and 1915[1,2,3], described in two deeds provided by the cemetery operator (***see Section 3.0***) and transcribed below. However, review of these two deeds determined these purchases to include roughly 1.6 acres.

The 1914 deed described lands commencing:

> "...at the northwest angle of Village Lot number 36 as laid down on the plan of the Village of New Dundee as registered by Frederick G. Millar. Thence along the east side of the said Road allowance north 37°15' west, 160 feet more of less to where the said parcel begins. Thence continuing same course along said Road allowance 526½ feet more or less to a stake. Thence north 52°45' east at right angles to said road allowance 238 feet more or less to a stake. Thence southwesterly 295⅔ feet more or less to a stake 97 feet distant from said road allowance measured northwesterly and at right angles to it from a point on the east side of the same 267 feet measured northwesterly from the point where this parcel begins.
>
> Thence southerly 87 feet more or less to the northeast angle of the old cemetery. Thence south 37°15' east 180 feet more or less to the southeast angle of this parcel of land. Thence southwesterly 90 feet more or less to the place of beginning."

The first paragraph outlines the new parcel of land sold by Edward C. Diebel to the Trustees of the New Dundee Union Cemetery in 1914 while the second paragraph outlines the Old Portion (ca. 1870) of the cemetery in its relationship to the new parcel. The location of Village Lot number 36 was determined based on the 1863 Plan of the Village of New Dundee provided by the cemetery operator (***see Section 3.0***).

The 1915 deed described the sale of an additional segment of land by Edward C. Diebel to the Trustees of the New Dundee Union Cemetery commencing:

> "...686 ½ feet distant from the northwesterly angle of Village Lot number 36 as laid down on F.G. Millar's survey of part of the Village of New Dundee in a course of north 37°15' west and being the northwesterly angle of lands heretofore conveyed by the said grantor to the said grantee for use as a cemetery. Thence continuing said course of north 37°15" west along the easterly side of said road allowance 66 feet more or less to a stake. Thence north 52°45' east at right angles to said road allowance 320 feet more or less to a stake. Thence southwesterly 118 feet more or less to a stake being the northeasterly angle of said heretofore conveyed lands. Thence south 52°45' west 244 feet more or less to the place of beginning."

According to these deeds, the Old Portion of the NDUC coincides with the part of the cemetery immediately north of the property at municipal address 1245 Queen Street and measuring approximately 55 metres north along the east side of the road allowance of Queen Street (***see Map 3***). The parcels of land as described in the 1914 and 1915 deeds are located immediately north of the Old Portion of the cemetery, extending to just past the northernmost roadway within the cemetery. These dimensions are accurate to the currently recognized property limits of the NDUC.

This cemetery, both the old and new portions, was formally named the New Dundee Union Cemetery. A cemetery Board of Trustees was established with representatives from each of the church denominations; presently the cemetery is operated by the New Dundee Board of Trade and three churches in the town. Additional land was purchased in 1956 from B. Becker which increased the total land of the cemetery to the present dimensions[3]. An

[1] Hilborn, M. (No Date). 'The Union Cemetery' in *New Dundee Tweedsmuir History, Book K*. [Online]. Available at: http://images.ourontario.ca/wilmot/55492/page/10?n= [Accessed 21 April 2020].
[2] Waterloo Region Branch, Ontario Genealogical Society (2009). *New Dundee Union Cemetery – Cemetery Transcript*. Kitchener, Ontario: Ontario Genealogical Society, Waterloo Region Branch.
[3] Uttley, B. (2015). *New Dundee Union Cemetery History*. [Online]. Available at: https://images.findagrave.com/photos/2015/333/CEM2178888_1448915089.jpg [Accessed 21 April 2020].

Aug. 18, 1960 survey of the cemetery provided by the operator depicts similar dimensions to those described in the 1914 and 1915 deeds and is also quite accurate to the currently recognized property limits (***see Map 4; Section 3.0***). A survey from 2001 also depicts the same dimensions and property limits (***see Section 3.0***).

A utility building was constructed in 1985 and a columbarium unit was added in 1997[3], both within the 20th century portions of the cemetery. According to the cemetery transcript, by 2005, several stones from the oldest burials had been broken or detached from their bases. These stones were collected and mounted on a steel rack in the Old Portion of the cemetery[2].

In 2019 a newspaper article published online in the *New Hamburg Independent* discussed a local family in New Dundee finding old gravestones along the shore of Alder Lake when maintenance work on the dam had exposed more shoreline. Along the shoreline, two broken headstones were discovered which were determined to be gravestones likely from the 19th century. It is possible that these headstones came from the NDUC which lies next to the Alder Lake reservoir[4].

Cemetery Operator Correspondence

Several additional documents were provided by the cemetery operator which outlined the cemetery's property limits and location of burial plots. The floor plan provided in ***Section 3.0*** depicts Sections A through N within the cemetery. Sections A through F are located within the 1914 and 1915 land additions and Sections G through N are located within the 1956 land addition to the cemetery. Each square within the floor plan has room for five individual plots. During the property inspection it was confirmed by the cemetery board members that all burials in the northern part of the cemetery (i.e., Sections G through N) are 20th century and no one is buried beyond the visible headstones to the treeline. Additional documents provided depicted the location of individual burial plots within the cemetery, specifically Sections A and B and the Old Portion of the cemetery. In these documents and the floor plan, Range 24 is the westernmost row along the cemetery edge adjacent to the roadway. This row is mostly vacant save for several burials at the southern end of Section A and within the Old Portion of the cemetery. For much of the cemetery burials are set further back from the roadway and tree line within Range 23. Due to the New Dundee Union Cemetery Secretary Treasurer's concerns surrounded the legality of displaying the interment rights of those burial plots purchased but not yet occupied as displayed on the burial plot maps, it is at Archeoworks Inc.'s discretion that these burial plot maps were reviewed but will not be presented.

Furthermore, the Secretary Treasurer stated that they are not aware of any "sneaking in" of burials outside the recognized cemetery property limits.

The OGS cemetery transcript also contains a map of the cemetery and transcriptions for each of the visible plot markers[2]. The sections and rows are labelled differently to the records kept by the cemetery, but the document is helpful to understanding the layout of rows in the Old Portion of the Cemetery. The 20th century portion rows are fairly straight and orderly, whereas there is some offset in the Old Portion, with many markers missing from their original locations, having been reset on a central steel rack.

Per correspondence with the Secretary Treasurer, in 1989, as a result of an updated land survey, a boundary issue was discovered between the cemetery property and the neighbouring property along the east side. It was previously assumed that the ridgetop on which the cemetery lies was all encompassed within the cemetery property limits, however it has since been discovered that segments along the ridgetop are actually located on adjacent private

[2] Waterloo Region Branch, Ontario Genealogical Society (2009). *New Dundee Union Cemetery – Cemetery Transcript*. Kitchener, Ontario: Ontario Genealogical Society, Waterloo Region Branch.
[3] Uttley, B. (2015). *New Dundee Union Cemetery History*. [Online]. Available at: https://images.findagrave.com/photos/2015/333/CEM2178888_1448915089.jpg [Accessed 21 April 2020].
[4] Booth, L. (2019). *Residents find Old Gravestones at New Dundee Reservoir. NewHamburgIndpendent.ca*. [Online]. Available at: https://www.newhamburgindependent.ca/news-story/9738727-residents-find-old-gravestones-at-new-dundee-reservoir/ [Accessed 30 April 2020].

property. Since the beginning of 2021, this issue has been in the process of being resolved. A land survey sketch provided by the cemetery operator illustrates two small strips of land that are to be conveyed from the neighbour's property and added to the cemetery property (***see Section 3.0***). The land conveyance will add approximately 522 square metres of land to the cemetery property. The cemetery operator has stated that there has been minimal encroachment into the neighbour's property, mostly by a small building and perhaps the outer corner of two or three graves. This encroachment will be non-existent once the land conveyance has been formally registered.

Previously Assessed Areas

The property adjacent to the northern edge of the cemetery has been previously assessed by Detritus Consulting Ltd. and cleared of further archaeological concern[5] (***see Map 2***). No archaeological resources were encountered during their Stage 2 test pit survey adjacent to the cemetery. The nearest headstones were documented to be approximately 31 metres from northern cemetery property boundaries and a row of mature trees delineated this northern limit. Per their recommendations, "although mechanical topsoil removal (MTR) is often employed in situations where there is the possibility of unmarked graves, the distance to the existing grave markers in this case is far enough that the chance of unmarked graves being located on the project area is considered remote. In addition, MTR in this area would necessitate the removal, or at least very substantial damage to the mature trees. As such, no MTR is recommended." The *BAO* was in agreement with these recommendations and the report was filed with the *MHSTCI* and accepted into the provincial register of reports.

Field Visit

To further determine the potential to uncover unmarked burials beyond the current cemetery property limits, an on-site property inspection of the cemetery took place on June 11th, 2021, the results of which can be seen in **Map 5, Images 1-19**. The property inspection was carried out by walking around the entire perimeter of the NDUC, assessing the cemetery property limits systematically every five metres, with attention paid to the placement of headstones/footstones, the dates on headstones/footstones, topography and current land conditions. The Secretary Treasurer and two other cemetery board members attended the property inspection, providing key insights and details into the burial locations within the cemetery property limits and the history of the burial grounds.

During the field review, particular attention was paid to the headstones nearest to the eastern edge of the property in the Old Portion of the cemetery where the adjacent land was documented as steeply sloping[6] and heavily forested. It is the previous experience of Archeoworks Inc. that burial features are known to extend into steeply sloping terrain, as evidenced by the cemetery investigations at the Albion Congregational Church Burial Ground in Bolton[7]. When asked about the newspaper article reporting on headstones found along the shore of Alder Lake, the Secretary Treasurer was not certain if they were from the NDUC or where exactly they originated. The closest headstone was noted to be two to three metres distant from the steeply sloping terrain which is bordering and partially within the cemetery's eastern edge; there was no visible evidence of a former row or headstone beyond the easternmost documented and visible row. At the southern edge of the Old Portion of the cemetery, the cemetery board members informed that the current property limits match the historic property limits; headstones were documented within four to five metres of the property edge in this area. Along the western edge of the Old Portion of the cemetery, the field review documented headstones right at the top of a ridge that slopes down into the roadside ditching; a cemetery board member informed that there are no known utilities along the 19th century roadside edge of the cemetery, but that there are buried utilities in the right-of-way adjacent to the 20th century portions of the cemetery.

---

[5] Detritus Consulting Ltd. (2016). *Archaeological Assessment (Stages 1, 2) Part of Lots 6 and 7 Concession 3 Block A and Part of Road Allowance between Lots 6 and 7 (Not Travelled) Geographical Township of Wilmot, R.M. of Waterloo Company Project #2015-100, PIF# P017-0470-2016* (PIF# P017-0470-2016).

[6] Grand River Conservation Authority (GRCA) (2020). *Map Your Property – Interactive Web-Map*. [Online]. Available at: maps.grandriver.ca/web-gis/public/?theme=MYP&bbox=511986,4795383,544778,4814157 [Accessed 23 April 2020].

[7] Archeoworks Inc. (2013). Stage 3 Archaeological Assessment: Cemetery Investigation of the Albion Congregational Church Burial Ground, Lot 9, Concession 7, For the Proposed Bolton Elevated Tank and Feedermain, Class EA Study, Town of Caledon, Regional Municipality of Peel, Ontario (PIF#s P029-769-2010; P029-779-2011).

The Secretary Treasurer also indicated that individuals buried in the cemetery in the 20th century were buried facing away from the road: i.e., the headstone was placed on the edge of the plot along the road delineating the western edge of the cemetery property and the body was buried on the eastern side of the headstone, oriented away from the road. They were uncertain, however, on where exactly the bodies of individuals buried in the 19th century were placed in relation to their headstone. Headstones within the 20th century portions of the cemetery are also placed a greater distance away from the cemetery property boundary along the road edge (upwards of four metres within Range 23), in contrast to those in the 19th century portion, some of which are less than a metre from the property edge. During the property inspection, the few plots within the southern part of Section A, Range 24 in the 20th century portion of the cemetery were also documented in closer proximity to the property edge (within two metres).

Recommendations

The portions of the study area falling within the 20-metre cemetery investigation area of the NDUC were then determined to have either low or high potential for unmarked burials (***see Map 2***). These are discussed further below.

Areas of Low Potential

Owing to the late date of establishment of the 1914, 1915 and 1956 portions of the NDUC, better tracking and documentation of burial placements and thus proper observance of property boundaries occurred in these portions of the cemetery. Furthermore, the Deeds of Sale from 1914 and 1915 restrict the NDUC to the east side of Queen Street, making it unlikely that the cemetery extended into the roadway or into lands on the west side of this roadway. Background research also confirmed the presence of utilities in the adjacent right-of-way, human remains buried facing away from the roadway, and plots placed a greater distance in from the roadway compared to the Old Portion of the cemetery. The new land conveyance will also eliminate any possible encroachment of the cemetery into adjacent lands on the eastern side of the property. Therefore, there is low potential to encounter unmarked burials within portions of the 20-metre cemetery investigation area adjacent to the 1914, 1915 and 1956 portions of the NDUC as well as into Queen Street and land on the west side of this roadway. Due to the low potential of uncovering unmarked burials, further cemetery investigation is not required in these areas.

Areas of High Potential

Due to the early date of establishment of the Old Portion of the cemetery (ca. 1870), the proximity of burial markers to the cemetery property limits (on the east side of the road allowance of Queen Street), uncertainty surrounding the locations of buried remains in relation to their associated headstone, markers that have been broken and removed from their original locations, and 19th century gravestones found out-of-place along the shore of Alder Lake, lands directly adjacent to the Old Portion of the NDUC have high potential to encounter unmarked burials. The southern property limits of the Old Portion of the cemetery were confirmed to match the historic limits and therefore this area does not require further cemetery investigations. However, the eastern and western limits could not be defined with as much certainty. Further cemetery investigations of these areas are required to confirm the presence or absence of burial features (e.g., unmarked burials) extending beyond the current cemetery limits. Although exhibiting roadside ditching disturbances and very steep slopes, these lands still retain elevated potential for deeply buried remains and unmarked burials. Furthermore, should the area within the current cemetery limits be impacted, additional archaeological investigation is also required.

Further to what has been outlined above, the following are the proposed recommendations concerning further archaeological investigation for the NDUC:

1. As per the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 no intrusive activity may occur within the limits of the New Dundee Union Cemetery without consent from the *Bereavement Authority of Ontario*.
    a. Should the area within the current cemetery limits be impacted, additional archaeological investigation consisting of Stage 2 test pit survey followed by Stage 3 mechanical topsoil removal is required. A Cemetery Investigation Authorization issued by the *Bereavement Authority of*

Ontario is also required and needs to be obtained prior to conducting any soil-intrusive work (e.g., Stage 2/3/4 investigations; construction monitoring).

2. Lands within the 20-metre cemetery investigation area surrounding the New Dundee Union Cemetery that were identified as having low potential for unmarked burials are considered free of further cemetery investigations.

3. Should proposed construction impacts occur within the swaths of land adjacent to the New Dundee Union Cemetery identified as having high potential for the recovery of unmarked burials, the following archaeological/cemetery investigations are required:
    a. As there is the potential for the New Dundee Union Cemetery to extend into the study area, a Cemetery Investigation Authorization issued by the *Bereavement Authority of Ontario* is required and needs to be obtained prior to conducting any soil-intrusive work (e.g., Stage 2/3/4 investigations; construction monitoring).
    b. Per *Section 2.2*, *Guideline 4* of the *2011 S&G*, and in accordance with the *Registrar's Directive: Archaeological Assessments & Investigations on Cemetery Lands* (dated April 11, 2018) and the *Registrar's Directive: Authorization of Archaeological Assessments & Investigations on Cemetery Lands* (dated March 1, 2019), further cemetery investigations are required to determine the boundaries of a cemetery where records, maps and plans of the cemetery cannot confirm the existence and exact locations of burials within that cemetery. The recommendations for further cemetery investigations are as follows:
        i. In accordance with *Section 2.1.7, Standard 3, Section 3.3.3, Standard 2*, and *Section 4.2.3* of the *2011 S&G*, a Stage 3 investigation consisting of mechanical topsoil removal (MTR) must be undertaken following the lands immediately adjacent to the western edge of the Old Portion of the cemetery (i.e., within 10 metres) to confirm the presence or absence of deeply buried human remains. Mechanical excavation must employ a flat-edged bucket and should begin at the furthest extent from the cemetery that will be investigated and move inward towards the known cemetery limits. Unless human remains are encountered, mechanical stripping of topsoil is to reach sterile subsoil depths.
        ii. Where mechanical topsoil removal is not feasible due to accessibility issues (i.e., in steeply sloped and densely wooded areas) along lands immediately adjacent to the eastern edge of the Old Portion of the cemetery (i.e., within 10 metres), this area will require on-site monitoring by a licensed archaeologist during any construction or other soil disturbing activities per *Section 2.1.7, Standard 4* and *Section 3.3.3, Standard 4* of the *2011 S&G*, to confirm the presence or absence of deeply buried human remains.

Registered Archaeological Burial Sites

Two registered archaeological burial sites – Goettling Site (AiHd-9) and Smith Site (AiHd-10) are located within the study area (***see Map 6***). These two sites were documented in a report by Norman E. Wagner in 1975[8]. The aim of the 1975 report and study was to locate and examine all the prehistoric sites within the Nith River drainage system in Southern Ontario – an effort was made to locate new sites as well as to relocate and evaluate previously reported sites.

Location and History

The Goettling Site is located within the north half of Lot 4, Concession 3 Block A in the Township of Wilmot. According to the Ontario Archaeological Sites Database (OASD) original site form[9] provided by the *MHSTCI*, S. Woolfrey and P. Chitwood observed the site in the field in 1974 – Woolfrey and Chitwood carried out the bulk of the field research for Norman E. Wagner's *Nith River Site Survey Report*. The site form also stated that "H.I. Smith reported that one

[8] Wagner, N. E. (1975). *Nith River Site Survey Report*. On file with the Ministry of Heritage, Sport, Tourism and Culture Industries.
[9] Woolfrey, S. and P. Chitwood. (1974a). *AiHd-9 Site Form*. On file with the Ministry of Heritage, Sport, Tourism and Culture Industries.

skull was found." The 1975 Wagner report also identified one skeleton associated with the site. Wagner reports that "the 6% of the sites which were Burial sites were not investigated for this report, since they were all reported by Wintemberg and excavated during his time" (1975, p.34). Therefore, it appears that Woolfrey and Chitwood relocated the Goettling Site burial in 1974, but the site had been previously identified by W.J. Wintemberg; however, Wintemberg's report detailing excavation at this site could not be located by the Archaeological Data Coordinator[10,11].

The Smith Site is located within the north half of Lot 5, Concession 3 Block A in the Township of Wilmot. According to the OASD original site form[12] provided by the *MHSTCI*, S. Woolfrey and P. Chitwood observed the site in the field in 1974. The site form also indicated the site was located in a "gravel pit east of New Dundee." The 1975 Wagner report identified multiple skeletons found in a gravel pit. As previously mentioned, the Smith Site, as with the Goettling Site, appears to have been relocated by Woolfrey and Chitwood in 1974 and was not further investigated as it has been previously reported and excavated by W.J. Wintebemberg (Wagner, 1975, p.34); Wintemberg's report detailing excavation at this site could not be located by the Archaeological Data Coordinator[10,11].

The requirement for an archaeological excavation at these two registered archaeological sites (Goettling Site - AiHd-9, and Smith Site - AiHd-10) located in the study area is unclear. The Wagner report (1975) and the Region of Waterloo *Archaeological Facilities Master Plan* (AFMP) identified both as burial sites; however, neither are officially recognized as burial grounds by the *BAO*. The 1975 Wagner report did not provide conclusive details regarding the type of investigation conducted within each site area, the site extent, and whether there still exists the possibility to uncover archaeological resources or human remains in their reported locations. Furthermore, the original report detailing excavation at these sites by W.J. Wintemberg could not be located by the Archaeological Data Coordinator. The Region of Waterloo AFMP does, however, indicate that further archaeological assessment is required for these burial sites.

Although the site location details differ slightly between the original hand-written site form and the digital record available on Past Portal, both generally place the Goettling Site within an active agricultural field and the Smith Site in a grassy area adjacent to an extant house and woodlot (***see Map 6***). Given the limited information that could be found for each of these two sites, and their approximate site locations, it must be assumed that there is still elevated potential to encounter these sites within the study area and archaeological assessment remains outstanding.

Recommendations

Therefore, it has been concluded that a Stage 2 property assessment must first be undertaken around the GPS coordinates recorded in the digital OASD site forms available on Past Portal for the approximate location of each site (per *Section 2.1.7, Standard 2* of the *2011 S&G*). These areas must be subjected to an intensified pedestrian or test pit survey at five-metre intervals in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G*) within a minimum 20-metre radius around the recorded site GPS coordinates.

A number of possible outcomes could occur following the Stage 2 property assessment, depending on what, if anything is recovered. Should human remains be discovered during the Stage 2 assessment, the licenced archaeologist must immediately notify the police or coroner and the Registrar of Burials at the *Ministry of Government and Consumer Services* who will investigate the discovery. If foul play is ruled out by the coroner, the Registrar at the *Ministry of Government and Consumer Services* may order that a burial site investigation be carried out by a licenced archaeologist to determine the age and cultural history of the burial site (in accordance with Ontario Regulation 30/11, Section 174 under the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c. 33).

[10] Templeton, L. (2020). Email to archaeology@ontario.ca, re. Report Request: P1059-0066-2020, 04 May 2020.
[11] Templeton, L. (2021). Email to archaeology@ontario.ca, re. Report Request: P1059-0066-2020, 31 May 2021.
[12] Woolfrey, S. and P. Chitwood. (1974b). *AiHd-10 Site Form*. On file with the Ministry of Heritage, Sport, Tourism and Culture Industries.

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Given the lack of clarity surrounding the cultural origins and nature of the above noted burial sites, following the completion of the Stage 2 property assessment, regardless of the results (i.e., whether or not archaeological resources of cultural heritage value or interest (CHVI) or human remains of archaeological significance were discovered), it is recommended that the Registrar at the *Ministry of Government and Consumer Services* and the *MHSTCI* be consulted regarding detailed recommendations for subsequent stages of fieldwork at the reported site locations. At this stage of the project, it can only be stated that if nothing of forensic or archaeological significance is located during the Stage 2, additional archaeological assessment will be required to confirm the presence or absence of deeply buried human remains associated with the two reported burial site locations. However, exact details and recommendations for subsequent stages of fieldwork beyond Stage 2 for the two reported burial site locations will be refined by the results of the Stage 2 property assessment and conversations with the above-mentioned institutions.

Further to what has been outlined above, the following are the proposed recommendations concerning further archaeological investigation for these two registered sites:

1. All areas identified as retaining archaeological potential must be subjected to a Stage 2 AA. These areas must be subjected to pedestrian or test pit survey at five-metre intervals in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G*.

2. Should proposed construction impacts occur within 50 metres of the GPS coordinates recorded in the digital *Ontario Archaeological Sites Database* (OASD) site forms available on Past Portal for the approximate locations of the Goettling Site (AiHd-9) and Smith Site (AiHd-10), the following archaeological investigations are required:
    a. As there is the potential to encounter both deeply buried archaeological resources and for archaeological resources to be present near the surface, per *Section 2.1.7*, *Standard 2* of the *2011 S&G*, intensified surface survey methods (Stage 2 test pit or pedestrian survey) must occur over a minimum 20-metre radius around the recorded site GPS coordinates in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G*.
    b. Following the completion of the Stage 2 AA, regardless of the results, the Registrar of Burials at the *Ministry of Government and Consumer Services* and the *Ministry of Heritage, Sport, Tourism and Culture Industries* (*MHSTCI*) must be contacted regarding recommendations for subsequent stages of fieldwork.

No construction activities shall take place within the study area prior to the *Ministry of Heritage, Sport, Tourism and Culture Industries* (MHSTCI) (Archaeology Programs Unit) confirming in writing that all archaeological licensing and technical review requirements have been satisfied.

In Summary

We are requesting feedback and assistance from the *Ministry of Heritage, Sport, Tourism and Culture Industries* regarding the most up to date advice for the assessment of the New Dundee Union Cemetery and two registered archaeological burial sites to ensure our client is aware of additional requirements and possible options, to ensure our recommendations are in line with current standards, and to ensure ministry compliance. We look forward to working through this process to achieve a successful conclusion. Please do not hesitate to call or email the undersigned with any questions, comments or concerns.

Sincerely,

ARCHEOWORKS INC. 8/41
16715-12 YONGE STREET, SUITE 1029, NEWMARKET, ONTARIO
Tel: 416-676-5597 | Fax: 647-436-1938

ARCHEOWORKS INC.

Ian Boyce (P1059), M.A., B.A. (Honours)
E: iboyce@archeoworks.com

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1.0 MAPS

Map 1: Locations of the New Dundee Union Cemetery and the two registered archaeological burial sites within the study area.

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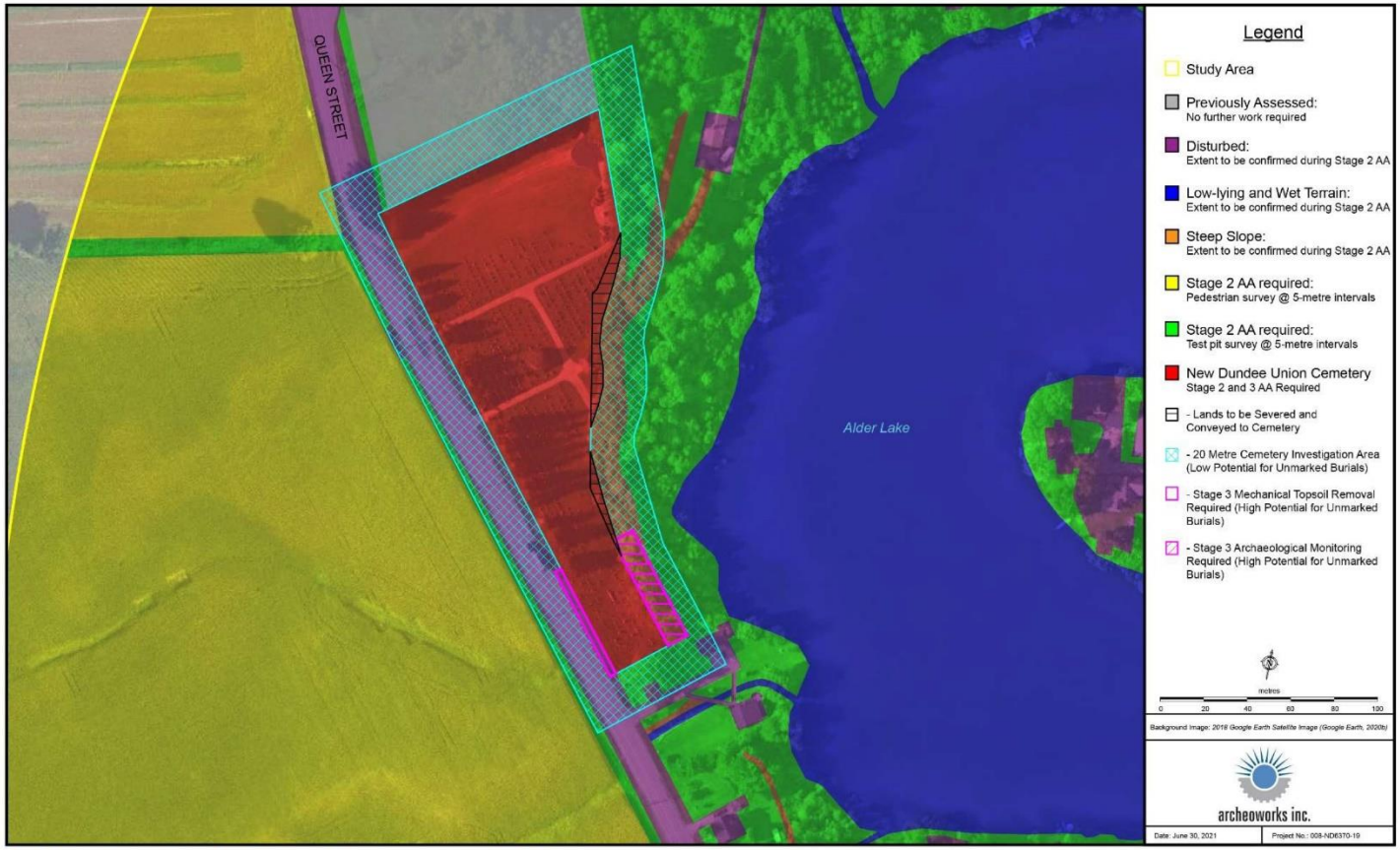

Map 2: Location of the New Dundee Union Cemetery and its 20-metre cemetery investigation area.

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Map 3: Identifying the New Dundee Union Cemetery sections as described within the 1914 and 1915 Deeds of Sale.

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Map 4: Identifying the New Dundee Union Cemetery sections as described within the 1914 and 1915 Deeds of Sale with the Aug. 18, 1960 survey overlay.

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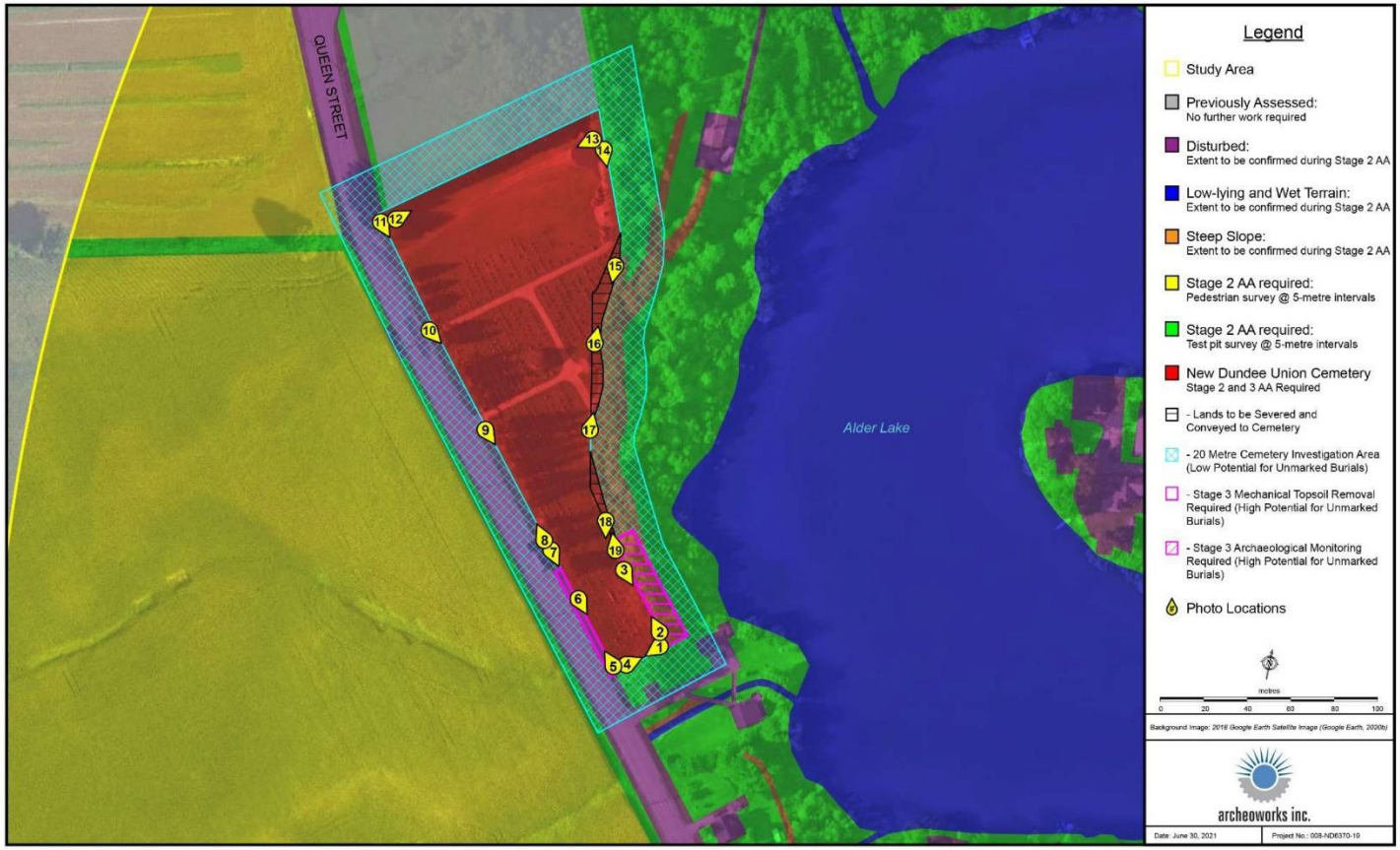

Map 5: Location of the New Dundee Union Cemetery and its 20-metre cemetery investigation area with photo locations indicated.

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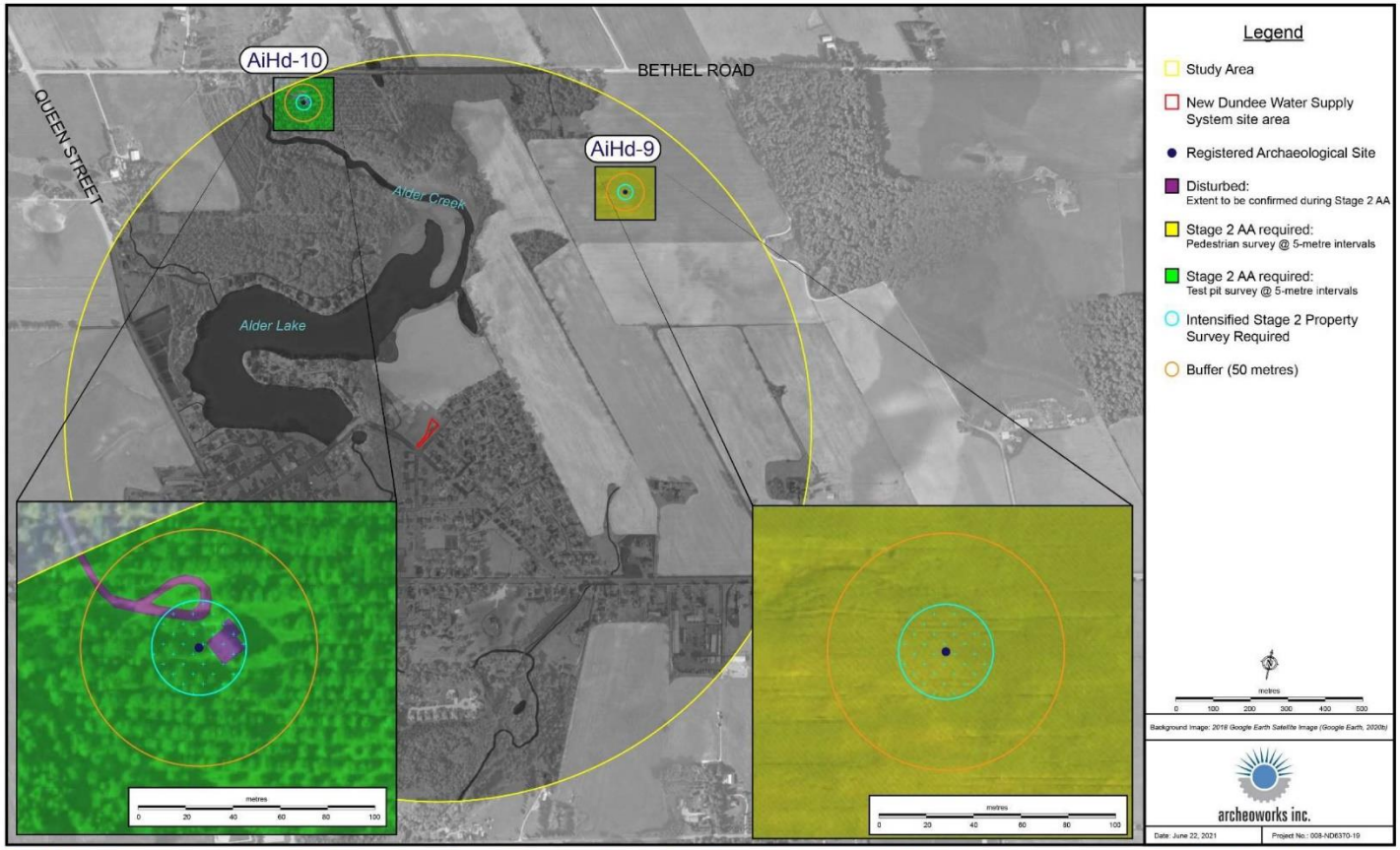

Map 6: Identifying the recorded GPS site locations for registered archaeological sites AiHd-9 and AiHd-10 and further recommendations for site re-location.

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2.0 CORRESPONDENCE

2.1 New Dundee Union Cemetery – Correspondence with Cemetery Operator

From: Elaine Sherk <m.elaine39@gmail.com>
Sent: June 21, 2021 2:53 PM
To: ltempleton@archeoworks.com
Subject: Re: New Dundee Union Cemetery History

Lee - If you need some of that documentation for your purposes, YES, go ahead and include the necessary paperwork.
You will have a better sense than I do about what is not relevant and what is somewhat "classified" and cannot be available to the public.
Thanks for meeting with us a couple of weeks ago. You have a very responsible task!
Elaine Sherk

On Mon, Jun 21, 2021 at 1:01 PM <ltempleton@archeoworks.com> wrote:
Hi Elaine,

Thanks again for meeting with me, the visit was very helpful!

With regards to the email thread below and all the additional details (legal survey, photos, floor plan, the photos taken of the burial plot locations in the old portion of the cemetery, etc.) provided, I am seeking your permission to include them as part of our Supplementary Documentation. A Supplementary Documentation contains sensitive information that is submitted to the *Ministry of Heritage, Sport, Tourism and Culture Industries* (MHSTCI) with the official archaeological report but will be inaccessible to the public as it is not entered in the Ontario Public Register of Archaeological Reports. The additional information provided will help address concerns regarding the potential of unmarked burials adjacent to the current boundaries of the New Dundee Union Cemetery associated with the Iron and Manganese Water Treatment Upgrades Municipal Class Environment Assessment (Class EA) for the New Dundee Water Supply System.

Thanks in advance,

Lee

Lee Templeton, H.B.A.
archeoworks inc.
16715-12 Yonge St., Suite 1029, Newmarket, ON, L3X 1X4
T: 416-948-6896 | F: 647-436-1938

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From: Elaine Sherk <m.elaine39@gmail.com>
Sent: June 8, 2021 4:58 PM
To: ltempleton@archeoworks.com
Subject: Re: New Dundee Union Cemetery History

ARCHEOWORKS INC.

Ok.

On Tue., Jun. 8, 2021, 4:57 p.m. , <ltempleton@archeoworks.com> wrote:
Hi Elaine,

See you Friday at 9am!

Lee

Lee Templeton, H.B.A.

16715-12 Yonge St., Suite 1029, Newmarket, ON, L3X 1X4
T: 416-948-6896 | F: 647-436-1938

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From: Elaine Sherk <m.elaine39@gmail.com>
Sent: June 8, 2021 4:55 PM
To: ltempleton@archeoworks.com
Subject: Re: New Dundee Union Cemetery History

Fine. I will plan to be there. I may invite the chairman of our board as well.
One note - in the whole process of boundary adjustment, we found out that our locator number was incorrect. The correct locator number for New Dundee Union Cemetery is 1275 Queen Street. That number is on a green sign along the roadside.

Elaine Sherk

On Tue., Jun. 8, 2021, 4:37 p.m. , <ltempleton@archeoworks.com> wrote:
Hi Elaine,

Great! I will be there at 9am, unless there is a more suitable time?

Lee

Lee Templeton, H.B.A.
16715-12 Yonge St., Suite 1029, Newmarket, ON, L3X 1X4
T: 416-948-6896 | F: 647-436-1938

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From: Elaine Sherk <m.elaine39@gmail.com>
Sent: June 8, 2021 4:25 PM

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To: ltempleton@archeoworks.com
Subject: Re: New Dundee Union Cemetery History

Lee - Yes, I and/or someone can meet you at the cemetery on Friday, June 11th. Are you able to give us any idea of what time your visit would begin?
As regarding boundaries - as I've mentioned to you already, we are in the process of redrawing one boundary line. You will be able to see clearly what is happening if you are on the site.
Perhaps, in the mean time, from the records I have, I can have a working list of the burials which have taken place at NDUC over the years.
Elaine Sherk

On Tue, Jun 8, 2021 at 4:04 PM <ltempleton@archeoworks.com> wrote:
Hi Elaine,

Apologies for any confusion. I am requesting details regarding the location of burials, specifically about whether burial plots are occupied or not (e.g., if someone is buried in a plot or if a plot is vacant). I do not require details about who is buried there or whether interment rights have been purchased. Per feedback received from the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) and the Registrar's Directive: Authorization for Archaeological Assessments & Investigations on Cemetery Lands outlined by the Bereavement Authority of Ontario (BAO, 2018/2019), we are trying to determine the existence and exact location of burials within the New Dundee Union Cemetery to confirm whether the current boundaries of the cemetery parallel the historic boundaries of the cemetery that were established at the time the cemetery was opened.

Additionally, as part of the feedback received from the MHSTCI, I would like to complete a field visit of the cemetery in the morning of Friday, June 11. This will involve a walk around the cemetery and will include the taking of photos to document the age of interments closest to the boundaries of the cemetery as well as documenting conditions around the cemetery (e.g., roadside ditching, steeply sloping areas, etc.). Please kindly advise if this date and time is suitable.

Thanks again,

Lee

Lee Templeton, H.B.A.
16715-12 Yonge St., Suite 1029, Newmarket, ON, L3X 1X4
T: 416-948-6896 | F: 647-436-1938

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From: Elaine Sherk <m.elaine39@gmail.com>
Sent: May 31, 2021 11:37 AM
To: ltempleton@archeoworks.com
Subject: Re: New Dundee Union Cemetery History

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Lee - Are you really wanting details of exactly where everyone is buried? If this is what you need, and if this is legal, I can scan the pages and send them to you. As I said, there would be over 25 pages in total.
One thing about the detailed maps I have is that we have also marked the plots where people have purchased interment rights, but there is no burial and no monument. I feel as if those details are really not for public display, and that the plots people have purchased, but not used, are really no one else's business at this point.
I have not looked at the Ontario Genealogical Society website, nor contacted the Kitchener Public Library. Would you be able to do that from your end?
Elaine S again

On Mon, May 31, 2021 at 10:18 AM <ltempleton@archeoworks.com> wrote:
Hi Elaine,

Thank you for the pictures, aerial photo and the floor plans, they're helpful!
We also reviewed the Ontario Genealogical Society's New Dundee Union Cemetery Transcript from 2009 and there is a paragraph that states, "*... More recently, a map of the cemetery has been drawn with known graves marked. A copy of this map is at the Kitchener Public Library; the original is used by the cemetery management*" (p.2). Is a copy of this map available?

With regards to the floor plan, would a burial plot map identifying individual plots within the "squares" be available as well?

Thanks again!

Lee

Lee Templeton, H.B.A.
16715-12 Yonge St., Suite 1029, Newmarket, ON, L3X 1X4
T: 416-948-6896 | F: 647-436-1938

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From: Elaine Sherk <m.elaine39@gmail.com>
Sent: May 28, 2021 7:57 PM
To: ltempleton@archeoworks.com
Subject: Re: New Dundee Union Cemetery History

Lee - Attached are a few photos from our cemetery.
The first one shows the main entrance, with a bit of the building whose corner encroaches on the neighbour's property at the moment. The treed cliff-edge is behind the building.
The second one angles to the right of the main entrance, but one can see more stones.
The third one is an aerial photo. You can see the rows of monuments, though they are very small.
The fourth one is the overall "floor plan" of the south-most section.
The fifth one is the overall "floor plan" of the section north of the main driveway. Each little "square" in these last two pictures has room for 5 individual plots.
If you still need more detail, let me know.

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Elaine Sherk

On Fri, May 28, 2021 at 5:33 PM <ltempleton@archeoworks.com> wrote:
Hi Elaine,

Thank you for responding to my email!

That survey is fantastic, and thank you for letting me know about not being aware of any whisperings of "sneaking in" of burials or of burials outside the cemetery limit.

With respect to the details of names on each plot, if its no trouble (even if it's several clear photos of the burial plot map), that would be of great help to us.

Thanks again for all your help and have a great weekend,

Lee

Lee Templeton, H.B.A.
16715-12 Yonge St., Suite 1029, Newmarket, ON, L3X 1X4
T: 416-948-8896 | F: 647-436-1938

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From: Elaine Sherk <m.elaine39@gmail.com>
Sent: May 28, 2021 4:22 PM
To: ltempleton@archeoworks.com
Subject: Re: New Dundee Union Cemetery History

Lee - In 1989, as a result of an updated land survey, a boundary issue was discovered between the cemetery property and a neighbour.. For the last several months we have been going through the process of trying to resolve the issue once and for all. The Township of Wilmot has been involved, and the GRCA, as well as the Bereavement Authority of Ontario office. Because of that problem, I now have a land survey sketch which may help you. I had no such survey until a few months ago.

The attachment shows that two small strips of land (the orange sections) are to be conveyed from the neighbour's property and added to the cemetery property. The "deal" will give us approximately another 522 square metres of land. The new boundary follows the crest of an embankment, so there are certainly no burials down the cliff beyond the new boundary line .

Until this "deal" is completed and all formally registered, we agree that there has been minor encroachment onto the neighbour's property - by a small building (see the survey), and perhaps by the outer corner of two or three graves. This encroachment will all be non-existent once this land conveyance is complete.

I have certainly heard no whisperings of "sneaking in" burials, or of burials outside our limits.

If you need details of names on each plot, I could send you those, though it would take at least 25 scans to cover the whole cemetery.

I hope this helps.

Elaine Sherk

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On Fri, May 28, 2021 at 3:14 PM <ltempleton@archeoworks.com> wrote:
Dear Elaine Sherk,

I hope this email finds you well and safe!

Apologies for troubling you with this again, but to further assist in determining the presence/absence of unmarked burials beyond the current cemetery limits, is it possible to receive a digital copy of the burial plot map of the New Dundee Union Cemetery? The Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) has requested that we review such map, if available.

Additionally, are you aware of any expected social restrictions for the cemetery (e.g., gossip regarding the sneaking in of burials or a burial purposely occurring outside the cemetery limits)?

Should you require any additional details of this request, please do not hesitate to contact me.

Kindest regards,

Lee

Lee Templeton, H.B.A.
16715-12 Yonge St., Suite 1029, Newmarket, ON, L3X 1X4
T: 416-948-6896 | F: 647-436-1938

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From: ltempleton@archeoworks.com <ltempleton@archeoworks.com>
Sent: April 24, 2020 8:26 AM
To: 'Elaine Sherk' <m.elaine39@gmail.com>
Subject: RE: New Dundee Union Cemetery History

Hi Elaine,

Thank you very much for your time digitizing those maps and deeds and forwarding them to me. No problem with the last deed – all that you've previously provided should be sufficient.

This additional research (the maps and deeds you've provided us) is a relatively new requirement by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) to help determine if there is the potential for unmarked burials located outside the present-day cemetery limits. To mitigate any cultural concerns for unmarked burials outside the present-day cemetery limits, the maps and deeds you've provided will help address those concerns. Your assistance has been greatly appreciated!

Thanks again for your time and help.

Kind regards,

ARCHEOWORKS INC.

Lee

Lee Templeton, H.B.A.
16715-12 Yonge St., Suite 1029, Newmarket, ON, L3X 1X4
T: 416-948-6896 | F: 647-436-1938

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From: Elaine Sherk <m.elaine39@gmail.com>
Sent: April 23, 2020 4:58 PM
To: ltempleton@archeoworks.com
Subject: Re: New Dundee Union Cemetery History

Lee - I don't pretend to understand how to read deeds, but I thought they would include some indication of dimensions of the cemetery. I think the only thing I have which I did not send yet is the deed for an additional parcel of land which was purchased in 1957, I think. If that is any help to you, I could scan that. Otherwise, I think you have everything that I have.

Elaine Sherk

On Thu, Apr 23, 2020 at 3:36 PM <ltempleton@archeoworks.com> wrote:
Hi Elaine,

Thank you so much for providing those deeds and maps and your permission to use them in our supplementary document!

Would there be any maps available that outline the dimensions of the 1915 deeds, and the post-1915 sections of the cemetery?

Thanks again for all your time collecting and providing the request documents, very much appreciated!

Lee

Lee Templeton, H.B.A.
16715-12 Yonge St., Suite 1029, Newmarket, ON, L3X 1X4
T: 416-948-6896 | F: 647-436-1938

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From: Elaine Sherk <m.elaine39@gmail.com>
Sent: April 22, 2020 6:05 PM
To: ltempleton@archeoworks.com
Subject: Re: New Dundee Union Cemetery History

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Lee - As long as these survey plans are not accessible to the public, and are used only for your archaeological reports as you have outlined, I don't know why we would need to object to inclusion of the plans in your support documentation.
I am sending some more scans. They are from the earliest records I have, from deeds prepared in 1914 and 1915. I have nothing earlier than these. Since the pages are long, I cannot scan whole pages (at least with the equipment I have), so pages A and B in each case are two scans of one page.
Elaine Sherk

On Wed, Apr 22, 2020 at 4:17 PM <ltempleton@archeoworks.com> wrote:
Hi Elaine,

Thank you very much for those maps – they were helpful to confirm the current property limits!

Would you have any maps/documents from about 1870 (or shortly thereafter) that show/describe the cemetery shortly after it was established?

With respect to the provided survey plans, I am seeking your permission to include the survey plans as part of our Supplementary Documentation. A Supplementary Document contains sensitive information that is submitted to the MHSTCI with the official archaeological report but will be inaccessible to the public and will not be entered in the Ontario Public Register of Archaeological Reports. The information you have provided will help address concerns regarding any potential impacts to the existing cemetery related to the New Dundee Water Supply – Iron and Manganese Water Treatment Upgrades Municipal Class EA.

Please and thank you,

Lee

Lee Templeton, H.B.A.
16715-12 Yonge St., Suite 1029, Newmarket, ON, L3X 1X4
T: 416-948-6896 | F: 647-436-1938

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From: Elaine Sherk <m.elaine39@gmail.com>
Sent: April 22, 2020 11:16 AM
To: ltempleton@archeoworks.com
Subject: Re: New Dundee Union Cemetery History

Lee, I've scanned a few pages, which I am sending to you. Hopefully they will help a little.
Survey 1A and 1B sheets go together, though one needs to be rotated to fit the other.
Survey 2A seems to be an early plan for the village of New Dundee. The cemetery property would be at the upper left of the sheet once the sheet is rotated properly.
Survey 2B is a 1-sheet page, more recent
See if these help at all.
Elaine Sherk

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On Fri, Apr 17, 2020 at 8:52 AM <ltempleton@archeoworks.com> wrote:
Good Morning Elaine,

Thank you very much for responding to my email!

I believe those surveys would be helpful – I would like to request a digital copy of them, if possible.

Are there any older maps available from when the cemetery was first established that shows the original/historical property limits and if those property limits are different from the current property limits?

Thank you for your time and your help!

Lee

Lee Templeton, H.B.A.
16715-12 Yonge St., Suite 1029, Newmarket, ON, L3X 1X4
T: 416-948-6896 | F: 647-436-1938

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From: Elaine Sherk <m.elaine39@gmail.com>
Sent: April 16, 2020 4:04 PM
To: ltempleton@archeoworks.com
Cc: Toman Elwood/Gerry <egtoman@bell.net>
Subject: Re: New Dundee Union Cemetery History

In the cemetery files which were handed to me when I became secretary-treasurer of New Dundee Union Cemetery, there are several papers which appear to be survey-type documents. One is dated in 1972, another (which came from the Wilmot Township office) is dated June, 2001.
Are these helpful at all?
Elaine Sherk

On Thu, Apr 16, 2020 at 9:54 AM <ltempleton@archeoworks.com> wrote:
Dear Elaine Sherk and Elwood Toman,

My name is Lee, an archaeologist and researcher for Archeoworks Inc., an archaeological consulting firm within the Greater Toronto Area.
As part of our background research for a project involving New Dundee Water Supply – Iron and Manganese Water Treatment Upgrades Municipal Class EA (for more information, please see link: https://www.regionofwaterloo.ca/en/resources/water/WAS-2020-3258782-v2-New_Dundee_Class_EA_-_Notice_of_Commencement_Newspaper_advertisement.pdf) in the community of New Dundee, the Ontario Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI) requires that we obtain information from adjacent cemetery owners to ascertain whether or

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not there is or is not human burials in our project area — namely the land surrounding the current cemetery property limits.

To determine if there is the potential to encounter human remains in this area as well as delineating the original/historic vs. current cemetery limits of the New Dundee Union Cemetery, I would like to inquire about the availability of any legal surveys, maps, plans, ground penetrating radar (GPR) surveys, drawings, historical photos, written/oral history, etc. held by the New Dundee Union Cemetery.

Thank you very much for your time. I look forward to your response.

Lee

Lee Templeton, H.B.A.
16715-12 Yonge St., Suite 1029, Newmarket, ON, L3X 1X4
T: 416-948-6896 | F: 647-436-1938

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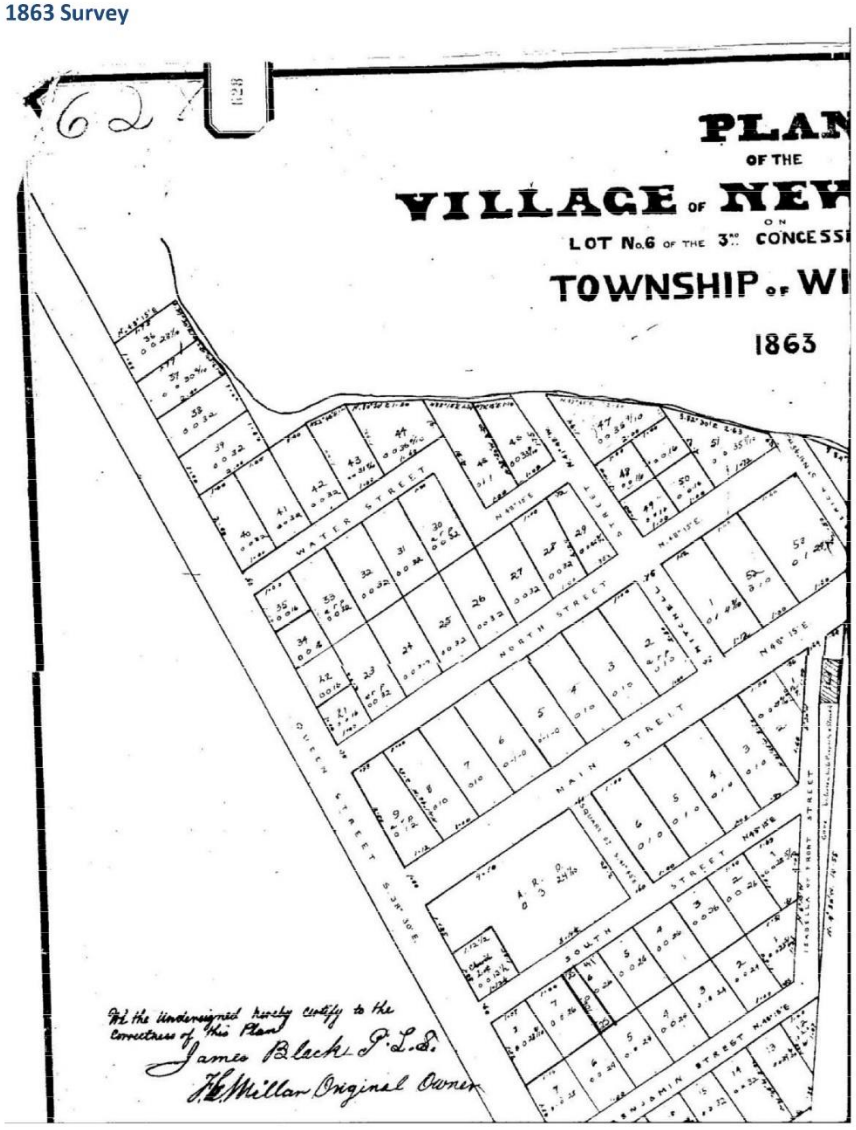
3.0 CEMETERY RECORDS

1863 Survey



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1914 Deed

5-2-14 E W. B. Newsome, Mutual Stationery Co., Toronto.

This Indenture,

made in duplicate the twenty-second day of April
in the year of our Lord one thousand nine hundred and fourteen
In pursuance of the Short Forms of Conveyances Act.

Between Edward G. Diebel of the Township of Wilmot in the County of Waterloo, Farmer, a Bachelor, hereinafter called the Grantor, of the first part and Aaron R. Bock of the Village of New Dundee in the said County of Waterloo, Veterinary Surgeon, Jacob G. Hallman of the said Township of Wilmot, Farmer, Emerson R. Bock of the said Township of Wilmot, Farmer, and Herman Kaelmann of the said Village of New Dundee, Merchant, the Trustees of the New Dundee Union Cemetery hereinafter called the Grantees of the second part

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Witnesseth that in consideration of One Hundred and Eight 48/100 dollars of lawful money of Canada now paid by the said grantees to the said grantor (the receipt whereof is hereby by him acknowledged) he the said grantor **Doth Grant** unto the said grantees ~~in fee simple~~ and their successors in office **All and Singular** that certain parcel or tract of land and premises situate lying and being in the Township of Wilmot in the County of Waterloo and Province of Ontario containing by admeasurement One Acre Two Roods and Nine and one-twelfths perches be the same more or less being composed of a part of the south half of Lot Number Six in the Third Concession of Block A in the said Township of Wilmot and better known and described as follows that is to say:- Commencing on the east side of the Road Allowance between Lots Numbers Six and Seven of the said Third Concession at the north west angle of Village Lot Number Thirty-six as laid down on the plan of the Village of New Dundee as registered by Frederick G. Millar Thence along the east side of said Road allowance North Thirty-seven degrees fifteen minutes west One hundred and

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sixty feet more or less to where the said parcel begins, Thence continuing same course, along said Road allowance Five Hundred and Twenty-six and one-half feet more or less to a stake, Thence North, Fifty-two degrees Forty-five minutes east, at right angles to said road allowance, Two Hundred and Thirty-eight feet more or less to a stake, Thence southwesterly Two Hundred and Ninety-five and two-fifths feet more or less to a stake Ninety-seven feet distant from said road allowance measured north easterly and at right angles to it, from a point in the east side of the same, Two Hundred and sixty-seven feet measured northwesterly from the point where this parcel begins. Thence Southerly Eighty-seven feet more or less to the north east angle of the old cemetery, Thence South Thirty-seven degrees fifteen minutes east, One Hundred and Eighty feet more or less to the south east angle of this parcel of land, Thence South ~~we~~sterly Ninety feet more or less to the place of beginning.

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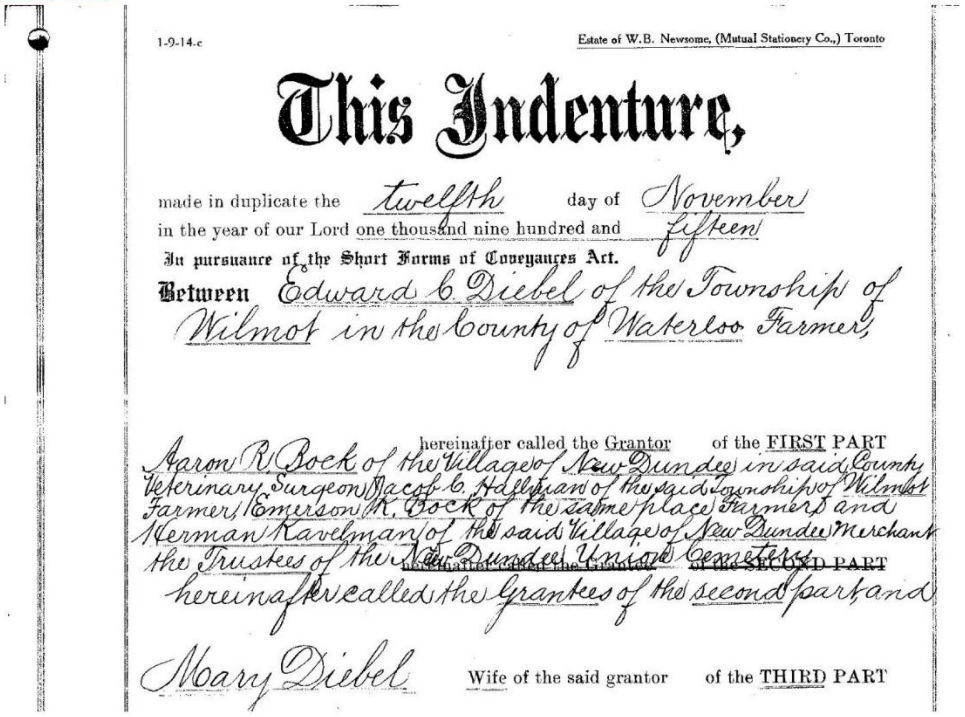
1915 Deed



1-9-14-c

Estate of W.B. Newsome, (Mutual Stationery Co.,) Toronto

This Indenture,

made in duplicate the twelfth day of November
in the year of our Lord one thousand nine hundred and fifteen
In pursuance of the Short Forms of Conveyances Act.
Between Edward C. Diebel of the Township of Wilmot in the County of Waterloo Farmer,

hereinafter called the Grantor of the FIRST PART
Aaron R. Bock of the Village of New Dundee in said County Veterinary Surgeon Jacob C. Adelman of the said Township of Wilmot Farmer, Emerson R. Bock of the same place Farmer and Herman Ravelman of the said Village of New Dundee Merchant the Trustees of the New Dundee Union Cemetery hereinafter called the Grantees of the second part and

Mary Diebel Wife of the said grantor of the THIRD PART

ARCHEOWORKS INC.

Witnesseth that in consideration of Fifty four

dollars of lawful money of Canada now paid by the said grantees to the said grantor (the receipt whereof is hereby by him acknowledged) he the said grantor Doth Grant unto the said Grantees ~~in fee simple~~ and their successors in office All and Singular that certain parcel or tract of land and premises situate lying and being in the Township of Wilmot in the County of Waterloo and Province of Ontario containing by admeasurement Two Roods and Sixteen one hundredths of a Rood be the same more or less being composed of a part of Lot Number Six in the Third Concession of Block A in the said Township of Wilmot and better known and described as follows that is to say:- Commencing at a point in the east side of the road Allowance between Lots Numbers Six and Seven in said Third Concession Six hundred and eighty six and one half feet distant from the north westerly angle of Village Lot Number Thirty six as laid down on F.G. Millar's survey of part of the Village of New Dundee in a course of North Thirty seven degrees fifteen minutes west and being the northwesterly angle of lands heretofore conveyed by the said grantor to the said grantees for use as a cemetery Thence continuing said course of North Thirty seven degrees fifteen minutes west along the easterly side of said Road allowance Sixty six feet more or less to a stake Thence North Fifty two degrees forty five minutes east at right angles to said road allowance Three hundred and twenty feet more or less to a stake, Thence Southwesterly One hundred and eighteen feet more or less to a stake being the north easterly angle

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of said heretofore conveyed lands, Thence South Fifty two degrees forty five minutes west Two Hundred and forty four feet more or less to the place of beginning.

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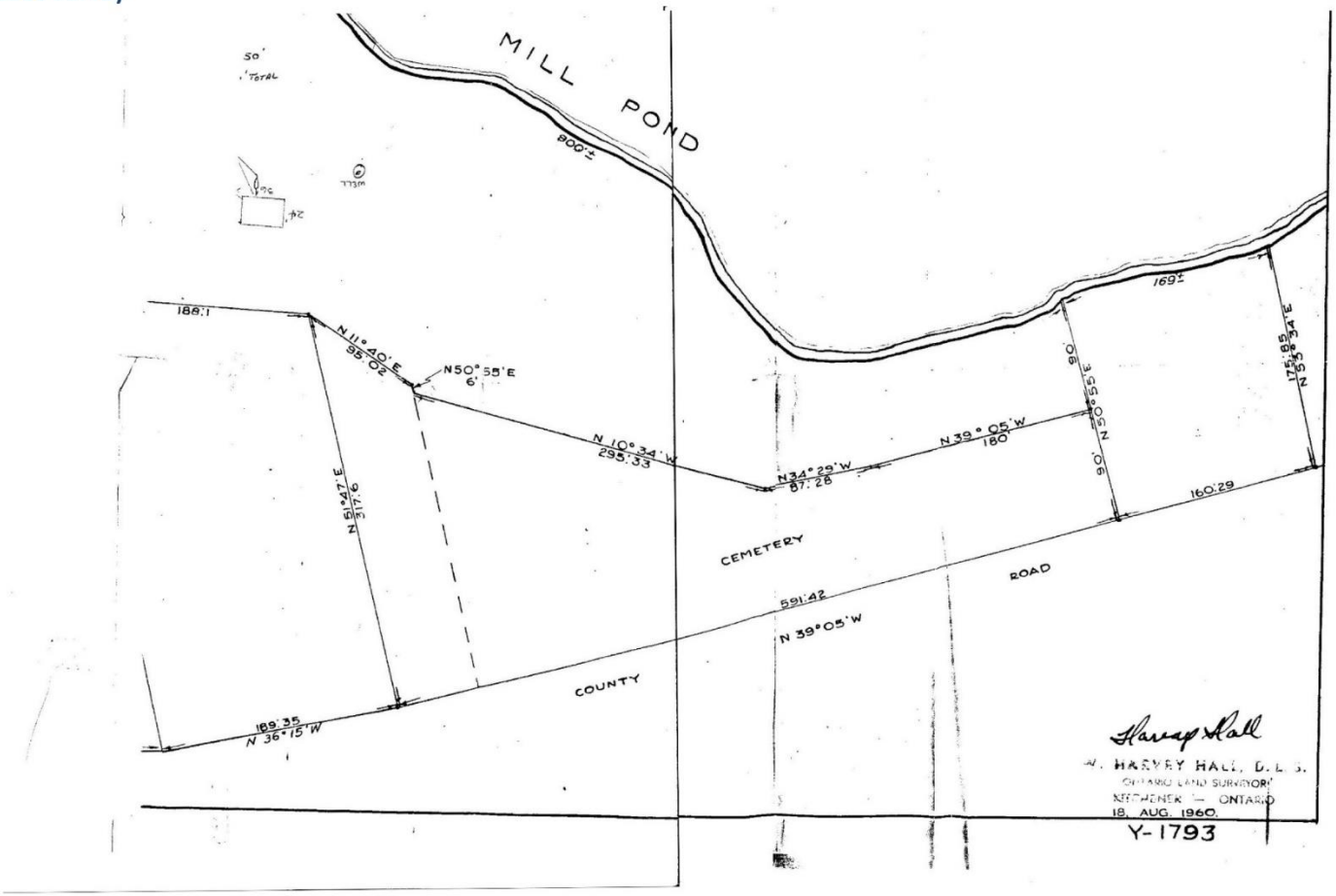
1960 Survey



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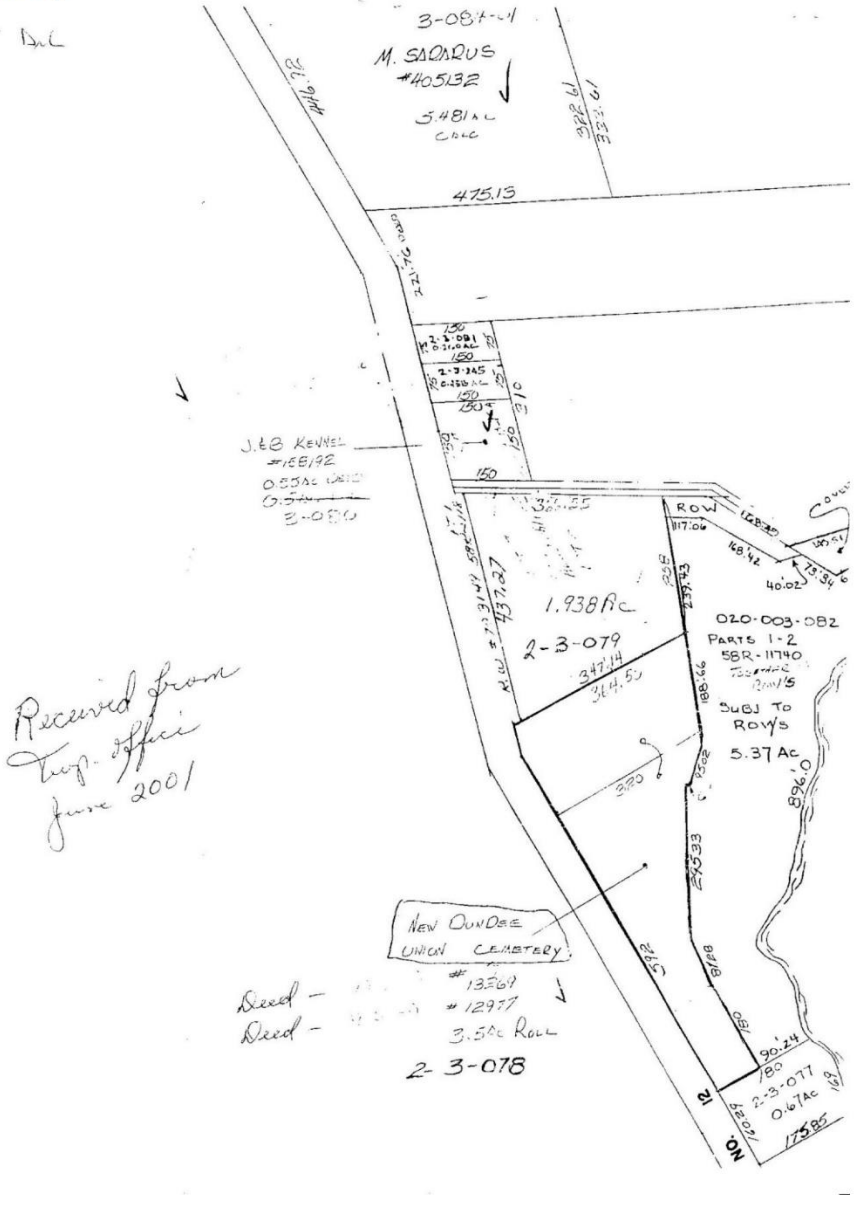
2001 Survey



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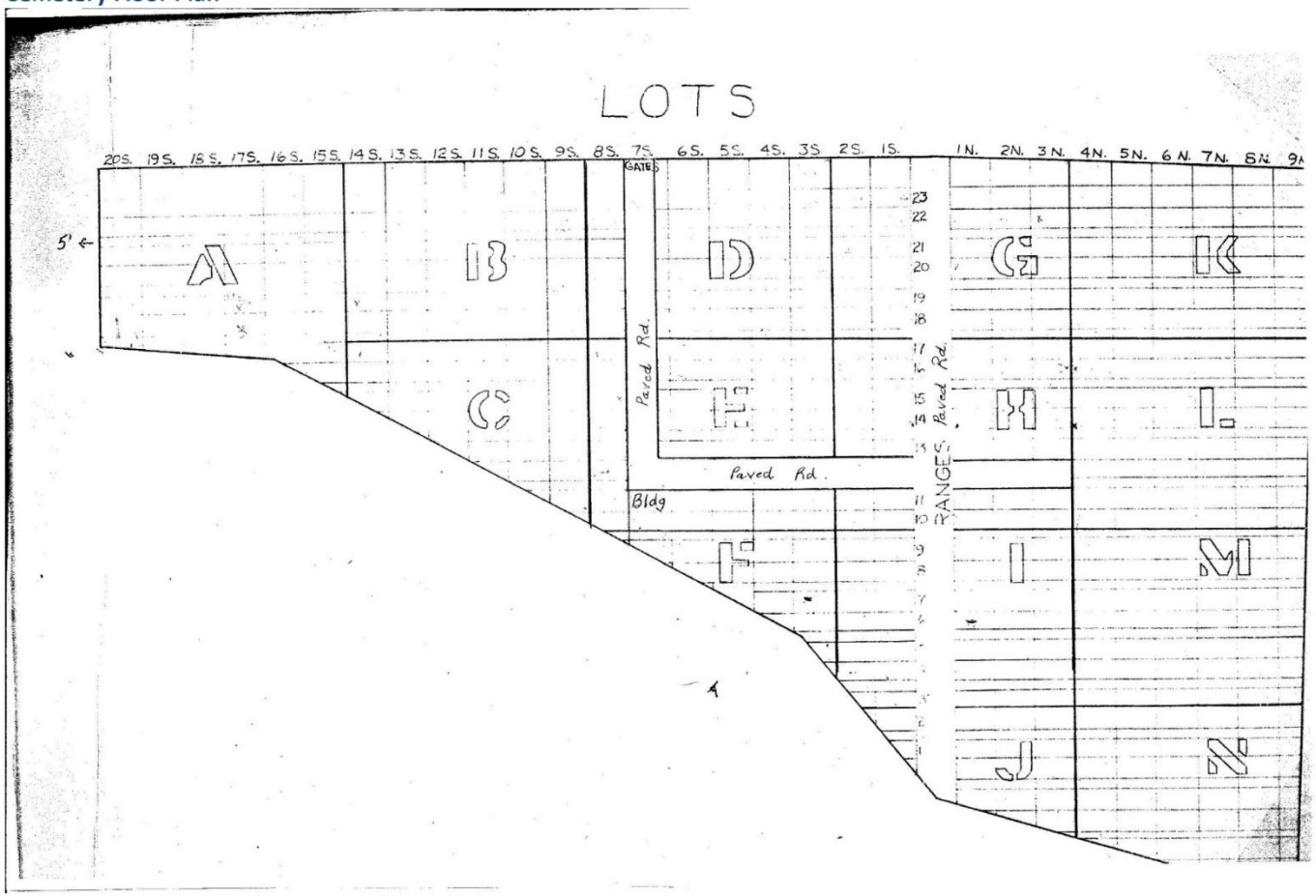
Cemetery Floor Plan



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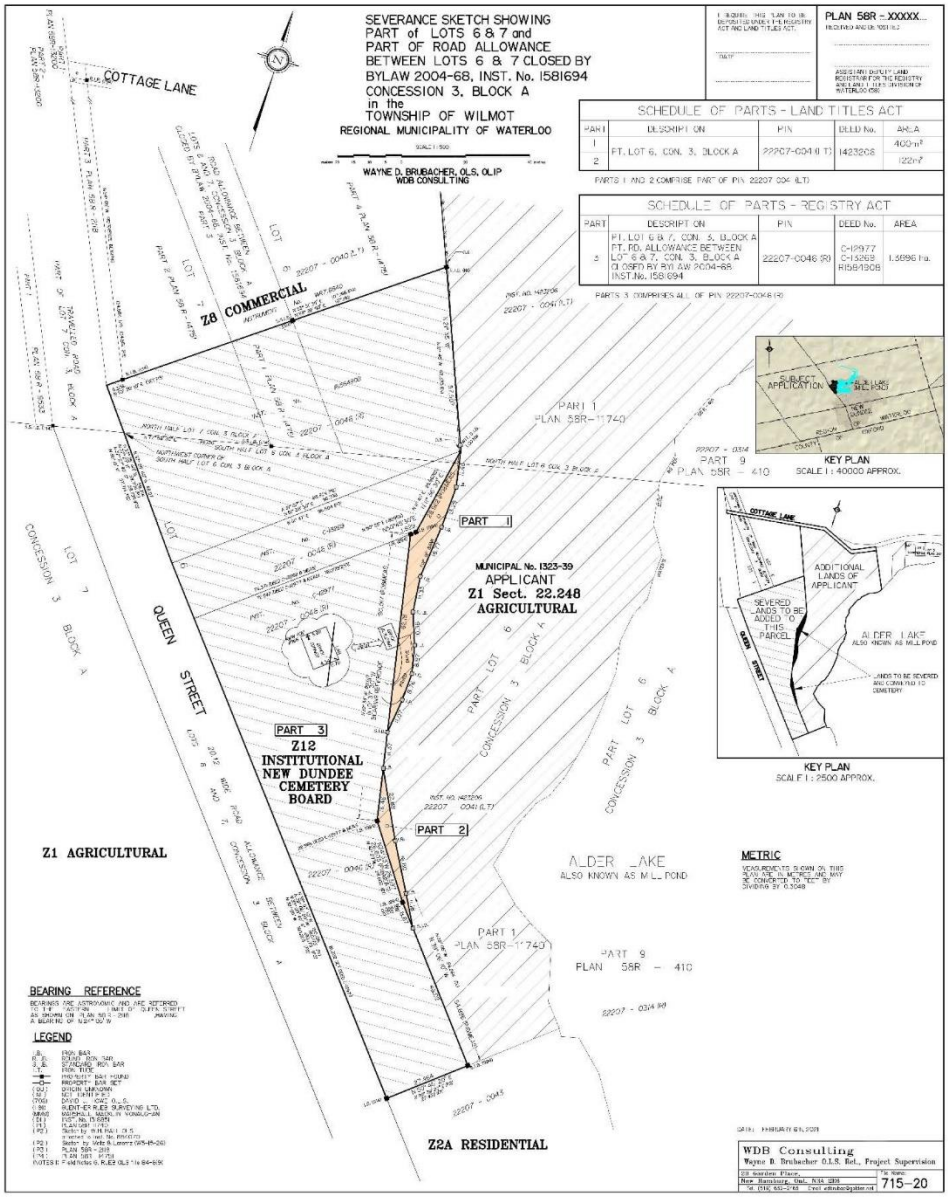
2020 Cemetery Survey Plan & Severance Sketch



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4.0 FIELD REVIEW PHOTOS

Image 1: View of the south side of the Old Portion of the cemetery.

Image 2: View of the east side of the Old Portion of the cemetery adjacent to an area of steep slope.

Image 3: View of the east side of the Old Portion of the cemetery adjacent to an area of steep slope.

Image 4: View of the south side of the Old Portion of the cemetery.

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Image 5: View of the west side of the Old Portion of the cemetery adjacent to roadside ditching.

Image 6: View of the west side of the Old Portion of the cemetery adjacent to roadside ditching.

Image 7: View of the west side of the Old Portion of the cemetery adjacent to roadside ditching. Flat stones in foreground are within the 1914 deed land addition (Section A, Range 24).

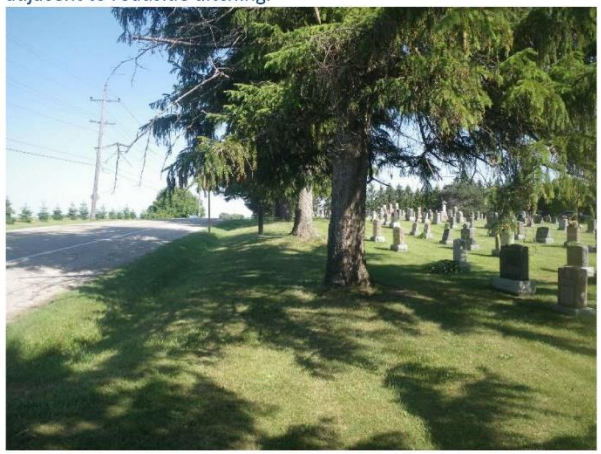

Image 8: View of the west side of the 1914 addition to the cemetery adjacent to roadside ditching.

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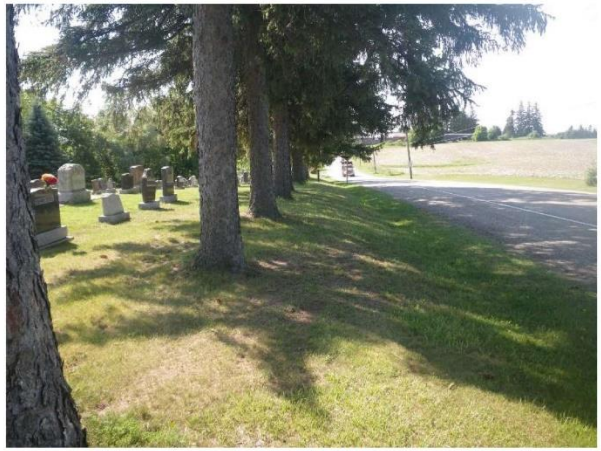

Image 9: View of the west side of the 1914 addition to the cemetery adjacent to roadside ditching.

Image 10: View of the west side of the 1915 addition to the cemetery adjacent to roadside ditching.

Image 11: View of the west side of the 1956 addition to the cemetery adjacent to roadside ditching.

Image 12: View of the north side of the 1956 addition to the cemetery.

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Image 13: View of the north side of the 1956 addition to the cemetery.

Image 14: View of the east side of the 1956 addition to the cemetery.

Image 15: View of the manicured lawn to be conveyed to the cemetery adjacent to the east side of the 1915 addition.

Image 16: View of the manicured lawn to be conveyed to the cemetery adjacent to the east side of the 1914 addition.

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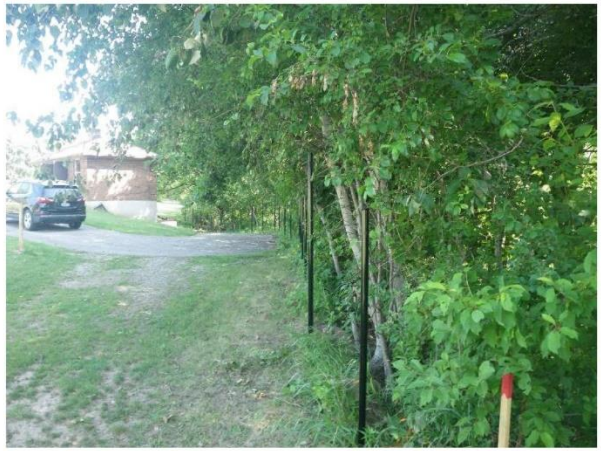

Image 17: View of the manicured lawn and driveway to be conveyed to the cemetery adjacent to the east side of the 1914 addition.

Image 18: View of the east side of the Old Portion of the cemetery.

Image 19: View of manicured lawn to be conveyed to the cemetery adjacent to the east side of the 1914 addition.

3.0 MHSTCI CORRESPONDENCE

From: Prowse, Shari (MHSTCI) <Shari.Prowse@ontario.ca>
Sent: August 31, 2021 2:17 PM
To: Cassandra Lamoureux
Cc: Archaeology (MHSTCI); Hadlari, Wai (MHSTCI); "'Kim Slocki' <kslocki@archeoworks.com>" <'Kim Slocki'; "'Brent Lawson' <blawson@archeoworks.com>" <'Brent Lawson'; ltempleton@archeoworks.com
Subject: FW: Request for Technical Advice - P1059-0066-2020

Hi Casey,

Thanks for the nudge. Recommended wording changes are in green with comments/ recommendations are in yellow.

This advice has been provided by the ministry under the assumption that the information submitted by the licensed archaeologist is complete and accurate. The advice provided applies only to the project in question and is not to be used as a precedent for future projects.
Further measures may need to be taken in the event that additional artifacts or archaeological sites are identified or if the information provided by the licensed archaeologist is otherwise found to be inaccurate, incomplete, misleading, or fraudulent.
Please include a PDF copy of this advice as supplementary documentation to your project report package.

From: Cassy Lamoureux <clamoureux@archeoworks.com>
Sent: August 31, 2021 9:21 AM
To: Prowse, Shari (MHSTCI) <Shari.Prowse@ontario.ca>
Cc: Archaeology (MHSTCI) <archaeology@ontario.ca>; Hadlari, Wai (MHSTCI) <Wai.Hadlari@Ontario.ca>; 'Kim Slocki' <kslocki@archeoworks.com>; 'Brent Lawson' <blawson@archeoworks.com>; ltempleton@archeoworks.com
Subject: RE: Request for Technical Advice - P1059-0066-2020

CAUTION -- EXTERNAL E-MAIL - Do not click links or open attachments unless you recognize the sender.

Good morning Shari,

I am just following up with this Request for Technical Advice below.

Regards,

Cassy

From: Prowse, Shari (MHSTCI) <Shari.Prowse@ontario.ca>
Sent: August 19, 2021 8:50 AM
To: Cassy Lamoureux <clamoureux@archeoworks.com>
Cc: Archaeology (MHSTCI) <archaeology@ontario.ca>; Hadlari, Wai (MHSTCI) <Wai.Hadlari@Ontario.ca>; 'Kim Slocki' <kslocki@archeoworks.com>; 'Brent Lawson' <blawson@archeoworks.com>; ltempleton@archeoworks.com
Subject: RE: Request for Technical Advice - P1059-0066-2020

Hi Casey,

Thank you for your email. I will get back to you next week with a response.

Shari Prowse, MA
Archaeology Review Officer, Archaeology Program Unit
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659 Exeter Road, London ON
Tel/Mobile: (519) 671-7742

From: Cassy Lamoureux <clamoureux@archeoworks.com>
Sent: August 12, 2021 2:11 PM
To: Prowse, Shari (MHSTCI) <Shari.Prowse@ontario.ca>
Cc: Archaeology (MHSTCI) <archaeology@ontario.ca>; Hadlari, Wai (MHSTCI) <Wai.Hadlari@Ontario.ca>; 'Kim Slocki' <kslocki@archeoworks.com>; 'Brent Lawson' <blawson@archeoworks.com>; ltempleton@archeoworks.com
Subject: RE: Request for Technical Advice - P1059-0066-2020

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Hi Shari,

Thank you for your response.

For the New Dundee Union Cemetery, per you feedback and to address Points 3 and 4 of the review letter, we will be including the following recommendations in our revised report:

1. As per the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002, c.33 no intrusive activity may occur within the limits of the New Dundee Union Cemetery without consent from the cemetery operator and the *Bereavement Authority of Ontario*.
    a. Should the area within the current cemetery limits be impacted, additional archaeological investigation consisting of Stage 2 test pit survey followed by Stage 3 mechanical topsoil removal is required. A Cemetery Investigation Authorization (CIA) issued by the *Bereavement Authority of Ontario* is also required and needs to be obtained prior to conducting any soil-intrusive work (e.g., Stage 2/3/4 investigations; construction monitoring).

2. Lands within the 20-metre cemetery investigation area surrounding the New Dundee Union Cemetery that were identified as having ~~low~~ no potential for unmarked burials (please refer to a Figure or a map) do not require a Stage 3 cemetery investigation. ~~are considered free of further cemetery investigation.~~

3. Should proposed construction impacts occur within the swaths of land adjacent to the New Dundee Union Cemetery identified as having ~~high~~ potential for the recovery of unmarked burials, the following archaeological/cemetery investigations are required:
    a. As there is the potential for the New Dundee Union Cemetery to extend into the study area, a Cemetery Investigation Authorization (CIA) issued by the *Bereavement Authority of Ontario* is required and needs to be obtained prior to conducting any soil-intrusive work (e.g., Stage 2/3/4 investigations; construction monitoring).
    b. Per *Section 2.2, Guideline 4* of the *2011 S&G*, and in accordance with the *Registrar's Directive: Archaeological Assessments & Investigations on Cemetery Lands* (dated April 11, 2018) and the *Registrar's Directive: Authorization of Archaeological Assessments & Investigations on Cemetery Lands* (dated March 1, 2019), further Stage 3 cemetery investigations are required to determine the boundaries of the cemetery. Given the complexity of the field conditions surrounding the New Dundee Union Cemetery, the appropriate recommendations for further Stage 3 cemetery investigations (e.g., hand excavation, mechanical topsoil removal, construction monitoring, etc.) will be made following the detailed design phase of the proposed development. Recommendations for subsequent stages of fieldwork must be made in consultation with the *Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)*.

Per your feedback and to address Point 5 of the review letter, for the Goettling Site (AiHd-9) and Smith Site (AiHd-10) we have contacted various institutions in an attempt to find Wintemberg's report/field notes for these sites. The following is a listing of all attempts made:

- Email correspondence with the Archaeological Data Coordinator at the MHSTCI began April 16, 2020 with the last correspondence on July 12, 2021. No response was granted regarding whether or not the MHSTCI holds a copy of Wintemberg's report/notes documenting the two burial sites.
- The Registrar of Burial Sites at the Ministry of Government and Consumer Services (MGCS) was then contacted for any information on the two sites. She did not have anything on file and suggested contacting the Museum of Ontario Archaeology (MOA). Email correspondence dates from July 12 to July 21, 2021.
- The MOA was then contacted. The Collections Manager provided several Wintemberg reports of the surrounding area; however, none of which documented the two burial sites. Since they also did not have anything on file associated with the two burial sites, they recommended contacting the Canadian Museum of History (CMH). Email correspondence dates from July 22 to August 11, 2021.
- Following this, the CMH was then contacted for any relevant reports (Wintemberg or otherwise) documenting the two burial sites. Email correspondence began on August 4, 2021, with a follow up August 12, 2021. To date, no response has been received.

In conclusion, numerous attempts to multiple institutions have been made to locate Wintemberg's report documenting the Goettling Site (AiHd-9) and Smith Site (AiHd-10). To date, no Wintemberg report or notes documenting the Goettling Site (AiHd-9) or Smith Site (AiHd-10) have been located. I would give it a bit more time for this as COVID-19 and vacations may have delayed responses to your emails. To address this I recommend that the report include a recommendations that you will follow up on the background research for these sites prior to carrying out more invasive fieldwork beyond Stage 2.

Similar to your feedback for the New Dundee Union Cemetery, as it is currently unclear how the project will impact the possible burial site locations, the following recommendations will be made in our revised report:

1. Should proposed construction impacts occur within 50 metres of the GPS coordinates recorded in the digital *Ontario Archaeological Sites Database* (OASD) site forms available on Past Portal for the approximate locations of the Goettling Site (AiHd-9) and Smith Site (AiHd-10), the following archaeological investigations are required:
    a. As there is the potential to encounter both deeply buried archaeological resources and for archaeological resources to be present near the surface, per *Section 2.1.7*, *Standard 2* of the *2011 S&G*, intensified surface survey methods (Stage 2 test pit or pedestrian survey) must occur over a minimum 20-metre radius around the recorded site GPS coordinates in accordance with the standards set within *Sections 2.1.1* and *2.1.2* of the *2011 S&G*.
    b. Following the completion of the Stage 2 AA, regardless of the results, the Registrar of Burial Sites at the *Ministry of Government and Consumer Services* and the *Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI)* must be contacted regarding recommendations for subsequent stages of fieldwork. Also, the appropriate recommendations for further Stage 3 burial site investigations (e.g., hand excavation, mechanical topsoil removal, construction monitoring, etc.) will be made following the detailed design phase of the proposed development.

Your guidance on this matter would be greatly appreciated.

Kindest regards,

Cassy

From: Prowse, Shari (MHSTCI) <Shari.Prowse@ontario.ca>
Sent: July 12, 2021 11:28 AM
To: Cassandra Lamoureux <clamoureux@archeoworks.com>
Cc: Archaeology (MHSTCI) <archaeology@ontario.ca>; Hadlari, Wai (MHSTCI) <Wai.Hadlari@Ontario.ca>; Kim Slocki <kslocki@archeoworks.com>; 'Brent Lawson' <blawson@archeoworks.com>; ltempleton@archeoworks.com
Subject: FW: Request for Technical Advice - P1059-0066-2020

Hi Cassandra,

Thank you for your email and the attached request for advice.

Point #3 of the review letter indicates that construction monitoring should be recommended only after it is determined that other methodologies are not appropriate. Construction monitoring is also typically only used during cemetery investigations when it is anticipated that the area is disturbed. In situations where there is potential for unmarked burials, it is more appropriate to carry out this work using hand excavations and/or MTR in advance of construction because this will not disturb the burials as much and if any burials are encountered this could create delays for the project. It is unclear as to how this project will impact the areas with potential for unmarked burials because the subject property includes all lands within 1 km of the project area. It may be a smaller area than anticipated, or not at all. As such, I recommend that you recommend in the revised report that it is better waiting to make detailed recommendations for the Stage 3 cemetery investigation until the detailed design is available given the complexity of the field conditions. The preference would be to see a strategy that includes hand excavations and a more controlled removal of trees in phases (e.g. topping and then excavation in and around tree roots) and topsoil in the areas with potential for burials rather that the full scale removal of trees and roots during construction which could impact burials negatively. Based on the areas to be impacted, it is unclear at this time if this is feasible.

If, however, you are proceeding with a Stage 2 assessment prior to getting the detailed design mapping, I recommend getting a CIA for this work in proximity to the areas with potential for burials if you feel that the boundaries may be unclear in this area despite the information you have been provided.

For the Geottling and Smith sites, I would prefer to see if you can get access to Wintemberg's field notes or any reports on these prior to commenting on any fieldwork strategy. Point 5 of the review letter recommends that you contact MGCS to see if they have any information about these sites. I reached out to the Registrar of Burial sites to see if she has anything on file but I highly doubt it given the date of fieldwork for these sites. I have also sought her advice concerning the process that would be followed if human remains thought to be from these registered sites are encountered and if a new BSI would be required.

If you have any question concerning the above, please do not hesitate to get back to me.

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From: Cassandra Lamoureux <clamoureux@archeoworks.com>
Sent: July 5, 2021 9:44 AM
To: Prowse, Shari (MHSTCI) <Shari.Prowse@ontario.ca>; Archaeology (MHSTCI) <archaeology@ontario.ca>
Cc: kslocki@archeoworks.com; blawson@archeoworks.com; ltempleton@archeoworks.com; iboyce@archeoworks.com
Subject: Request for Technical Advice - P1059-0066-2020

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Please see attached request for technical advice for the New Dundee Union Cemetery and two registered burial sites.

The recommendations contained within have been created based on Archeoworks Inc.'s opinion and current interpretation of *MHSTCI* cemetery requirements. As of June 2021, the *MHSTCI* has not updated the 2011 Standard & Guidelines or issued a Technical Bulletin to address the assessment of cemeteries and lands adjacent to those cemeteries. However, we understand that cemetery requirements are ongoing and ever changing at the *MHSTCI*. Per previous correspondence (dated May 6, 2021), where it has been recommended that archaeological consultants seek advice to ensure that recommendations regarding cemetery investigations are in line with the most up-to-date advice to guarantee that a proponent is aware of additional requirements and possible options, these recommendations are considered incomplete until the final recommendations by the *MHSTCI* are offered.

Cassandra Lamoureux B.Sc.

archeoworks inc.

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