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Hydrogeological and Terrain Analysis
Proposed Commercial Development
1508 Thomas Argue Road
Ottawa, Ontario

May 22, 2025 File: 102638.002

BigSteelBox Corporation
1000-1631 Dickson Avenue
Kelowna, British Columbia
V1T 0B5

Attention: Dan Oldfield, Operations Manager, Infrastructure

Re: Hydrogeological and Terrain Analysis
Proposed Commercial Development
1508 Thomas Argue Road
Ottawa, Ontario

BigSteelBox Corporation retained GEMTEC Consulting Engineers and Scientists (GEMTEC) to perform a hydrogeological and terrain analysis to support the Site Plan Control Application for the proposed commercial development to be located at 1508 Thomas Argue Road in Ottawa (Carp), Ontario.

This report is subject to the *Conditions and Limitations of This Report*, which follow the text of the report and are considered an integral part of this report.

INTRODUCTION

The proposed commercial development is located at 1508 Thomas Argue Road and will herein be referred to as the 'site'. The site is approximately 1.2 hectares and is bounded by Thomas Argue Road to the west and the Carp Airport to the north, east, and south. The Lot Grading & Drainage Plan is presented in Appendix A, as prepared by Egis (2025).

The objective of the investigation presented herein is:

- To demonstrate that the construction of any new well on the severed parcel is in accordance with the Ontario Ministry of the Environment, Conservation and Parks (MECP) Wells Regulation (O. Reg. 903);
- To demonstrate that the quality of the well water meets the Ontario Drinking Water Standards and maximum treatable limits prescribed in MECP Procedure D-5-5;
- To demonstrate that the quantity of water meets the MECP Procedure D-5-5 requirements; and
- To demonstrate that the septic impact assessment meets the MECP Procedure D-5-4 requirements.

The scope of the hydrogeological work program is based on the City of Ottawa "Pre-Consultation: Meeting Feedback, Proposed Site Plan Control Application – 1508 Thomas Argue Road" dated August 22, 2023, file number PC2023-0192 (provided in Appendix B). A pre-consultation meeting was held between GEMTEC (Andrius Paznekas; hydrogeologist), Fotenn (Tamara Nahal; planner) and the City of Ottawa (Travis Smith; hydrogeologist) on December 2, 2024. No new field program was proposed, as a hydrogeological investigation report was recently prepared in support of the proposed severance of the site. Provided the proposed water and septic demands of the commercial development are within the ranges of the approved hydrogeological report, the scope of work is limited to a review and discussion of the proposed water and septic demands and associated impact assessment (summary email provided in Appendix B).

BACKGROUND

Project Description

Plans are being prepared for a proposed commercial development to be located at 1508 Thomas Argue Road in Ottawa (Carp), Ontario. The following is understood about the site and project:

- The site is approximately rectangular in shape with plan dimensions of about 100 metres by 140 metres. Based on satellite imagery the site is currently undeveloped with an asphalt roadway through the northern portion and two small (now demolished) buildings on the northeast perimeter of the site.
- Based on drawings prepared by Fotenn, the proposed development will consist of an office building, mini-storage area, as well as stacked shipping containers.
- Asphalt driving lanes and parking spaces will be constructed at the site.
- Perimeter swales will be implemented to manage excess stormwater (i.e., no stormwater management pond).
- The commercial development will be serviced with an on-site private bedrock water supply well and septic system.
    - Bollards will be installed around the wellhead.

Background Reports

In support of the proposed lot severance for the site, the approved hydrogeological investigation report is titled: "Hydrogeological Investigation & Terrain Analysis, Proposed Lot Severance, Borden Lot, 1500 Thomas Argue Road, Carp, Ontario" dated January 10, 2024, and prepared by GEMTEC. The study was completed in accordance with the MECP Procedures D-5-5 and D-5-4 and City of Ottawa Hydrogeological and Terrain Analysis Guidelines (dated March 2021) in support of the proposed commercial lot severance. The hydrogeological report is attached in Appendix C.

The hydrogeological field program included test hole drilling, test well installation and testing (quality and quantity), and septic impact assessment.

TEST WELL CONSTRUCTION

The water supply well proposed to service the commercial development is an existing on-site test well (TW2) drilled as part of the hydrogeological severance investigation (Appendix C). The test well construction details are provided in Table 1.

Table 1: Test Well Construction Details

Well Construction Details – TW2 (Well Tag #A342501)	
Depth to Bedrock (mbgs)	17.1
Length of Well Casing Above Ground Surface (m)	0.66
Length of Well Casing Below Ground Surface (m)	18.9
Depth Water Found (i.e., depth to major fractures observed, mbgs)	89.6
Total Well Depth (mbgs)	91.4
Bedrock Description	Limestone

Note: m = metres and mbgs = metres below ground surface

The on-site water supply well was constructed in accordance with the Wells Regulation (O. Reg. 903) and meets the City of Ottawa Hydrogeological and Terrain Analysis Guidelines for well siting, i.e., well is located at least 3 metres from roadway or building, protected by bollards, and upgradient of the proposed septic system located greater than 18 metres away (refer to the Lot Grading & Drainage plan in Appendix A).

GROUNDWATER QUANTITY

As described in Section 2.1, the proposed development will consist of a storage facility, with a small office building. The proposed site use (storage) does not require water for other consumptive uses beyond sink(s) and toilet(s) for the employees. Based on septic design drawings prepared by DW Land Development Services Inc., the total daily design septic flows are 375 litres, which assumes five employees at 75 litres per employee per day. The water demand was assumed as equivalent to 1.5 times the septic demand.

The on-site groundwater quantity was assessed by means of a pumping test in an on-site test well (TW1; well tag #A342456), which was pumped for 8 to 9 hours at a rate of 15.1 litres per minute. The pumping test withdrew a total of approximately 8,154 litres. Based on the water demand of the proposed storage facility of 562.5 litres per day (1.5 × total daily design septic flows), the on-site test well can supply sufficient groundwater for the proposed use.

GROUNDWATER QUALITY

The previous hydrogeological investigation (Appendix C) concluded that the water quality of the on-site test well meets the Ontario Drinking Water Quality Standards (ODWQS) health-related maximum acceptable concentrations (MAC) and/or maximum concentrations considered reasonably treatable (MCCRT) in accordance with MECP Procedure D-5-5 and the City of Ottawa Hydrogeological and Terrain Analysis Guidelines. It is noted that the total coliform count of 1 CFU/100mL exceeds the ODWQS MAC; the total coliform counts are within MECP guideline D-5-5 acceptable limits for private wells, which is less than 6 CFU/100mL with non-detectable *E. coli* and fecal coliform. Further, ODWQS aesthetic objective and operational guideline exceedances of laboratory turbidity and aluminum, respectively, were noted. The elevated turbidity and aluminum were associated with hydrofracking of TW1, and it has been demonstrated that their concentrations will decrease with additional well development.

The sulphide concentrations of 0.44 mg/L exceeded the ODWQS aesthetic objective of 0.05 mg/L. Sulphide can be related to an unpleasant odour and taste, and it can produce black stains on laundered items, pipes and fixtures. Although ingestion of large quantities of hydrogen sulphide may have toxic effects on humans, it is not likely that an individual would ingest a harmful dose in drinking water.

Low levels of sulphide can be removed effectively using aeration (oxidation with filtration) or chlorinating the water followed by sand or multimedia filtration. According to the MECP Procedures D-5-5, there is no maximum treatable limit for sulphide.

GROUNDWATER IMPACTS

Septic Impact Assessment

The impact on groundwater resources due to wastewater treatment and disposal by an on-site septic system was assessed in accordance with MECP Procedure D-5-4 predictive assessment for commercial/industrial properties (Appendix D).

Based on the nitrate impact assessment for the site, the allowable daily design septic flow for the proposed commercial lot is summarized in Table 2.

Table 2: Calculated Maximum Septic Flows

Hard Surface Area (%)	Maximum Allowable Septic Flow		Maximum Number of Users[2]	
	Conventional Septic	Advanced Septic[1] (50% nitrate reduction)	Conventional Septic	Advanced Septic[1] (50% nitrate reduction)
40 %	952 L/day	2,855 L/day	13	38
50 %	793 L/day	2,379 L/day	11	32
60 %	634 L/day	1,903 L/day	8	25
75 %[3]	396 L/day	1,189 L/day	5	16

Notes:
1. The advanced treatment septic system should be BNQ certified for a minimum nitrate reduction of 50%.
2. Maximum number of users assumes 75 litres per day per person.
3. Estimated hard surface area for the proposed development based on design drawings (provided in Appendix A).
4. Table 2 is a modified Table 7 from GEMTEC (2024) included as Appendix C.

Based on the proposed Lot Grading & Drainage Plan (Appendix A), the hard surface areas (approx. 75%) are greater than that presented in the original hydrogeological investigation (Appendix C). Incorporating 75% hard surface area into the nitrate impact assessment would result in maximum allowable septic flows of 396 and 1,189 litres per day for conventional and advanced treatment systems respectively and 5 and 16 employees for conventional and advanced septic systems respectively. The estimated maximum septic flow for the proposed development of 375 litres per day is below the maximum allowable septic flow of 396 litres per day.

Site Use (Storage Yard)

The proposed development includes an office building and storage units. The risks to groundwater are low as there are no proposed potentially contaminating activities (e.g., chemical handling, waste disposal, etc.) other than vehicle use. Although the risk to groundwater supply users cannot be eliminated, it can be mitigated with Best Management Practices for fuel storage (Liquid Fuels Handling Code and the Ontario Water Resources Act) and through the preparation of a spills prevention, containment, and control plan to protect the aquifer, which is used as a drinking water source for adjacent developments.

Internal road salting has the potential to impact the groundwater supply aquifer, although this risk also remains low as the site is underlain by relatively thick (depth to bedrock is anticipated to be more than 15 metres) and low permeability soils. The impacts of road salting can be further mitigated following the City of Ottawa's "Material Application Policy, Revision 3.2, October 31, 2011" Salt Management Plan.

The on-site snow storage will consist of stockpiled snow from the parking areas and the majority of snowmelt is expected to be diverted to the on-site stormwater management area or regraded ditch to the southwest. It is recommended that the snow storage area is distanced from the wellhead; the grass area and corners of the asphalt southwest of the property appears appropriate.

CONCLUDING REMARKS

Based on the results of this investigation, the proposed commercial development conforms with the conclusions and recommendations of the hydrogeological investigation completed in support of the lot severance (included as Appendix C) and meets the City of Ottawa Hydrogeological and Terrain Analysis Guidelines. The groundwater quantity and quality are sufficient for the proposed use, and the septic impact assessment meets the MECP Procedure D-5-4 predictive assessment limits based on the proposed coverage of hard surface area.

Water Supply Recommendations

The relevant water supply recommendations from the previous hydrogeological investigation (Appendix C) are re-stated below:

- The separation distance between drinking water wells and on-site or neighbouring septic systems should be at least 15 meters in accordance with O. Reg. 903 requirements; this distance should be increased if possible.
- If desired by the owners, water treatment may be used to treat the minor aesthetic objective exceedance of hydrogen sulphide and operational guideline exceedances such as hardness.
    - Water softening by conventional sodium ion exchange may introduce relatively high concentrations of sodium into the drinking water, which may be of concern to persons on a sodium restricted diet. The use of potassium chloride in the water softener (which adds potassium to the water instead of sodium) could be considered as a means of keeping sodium concentrations in softened water at the background level. Alternatively, consideration could be given to providing a cold-water bypass water line for drinking water purposes that is not treated by a water softener.
    - Low levels of sulphide can be removed effectively using aeration or chlorinating the water followed by sand or multimedia filtration (i.e., oxidation with filtration).
- It is recommended that the property owners construct, maintain and test their drinking water well in accordance with the MECP document “Water Supply Wells - Requirements and Best Management Practices, Revised April 2015”.

Septic System Recommendations

The site meets the requirements for on-site septic systems defined by MECP Procedure D-5-4. The following provides recommendations regarding septic system design:

- It is recommended that the property owners construct, maintain and check their site septic system in accordance with the Ontario Building Code and best management practices.
- If advanced treatment systems are utilized, it is recommended that the systems are BQN certified (or equivalent certification) for a minimum nitrate reduction of 50%.
    - It is required that the property owners enter into a maintenance agreement with authorized agents of the advanced treatment septic system manufacturer for the service life of the system.

Other Recommendations

A snow storage area should be designated on the property to maximize retention on site and minimize potential impacts to on-site and off-site water wells.

A spill prevention, containment, and control plan should be prepared to protect the aquifer from contaminant spills.

CLOSURE

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report, please do not hesitate to contact our office.

Respectfully,

GEMTEC Consulting Engineers and Scientists





Andrius Paznekas, M.Sc., P.Geo.
Hydrogeologist

AP/JKA

CONDITIONS AND LIMITATIONS OF THIS REPORT

1. **Standard of Care:** GEMTEC has prepared this report in a manner consistent with generally accepted engineering or environmental consulting practice in the jurisdiction in which the services are provided at the time of the report. No other warranty, expressed or implied is made.
2. **Copyright:** The contents of this report are subject to copyright owned by GEMTEC, save to the extent that copyright has been legally assigned by us to another party or is used by GEMTEC under license. To the extent that GEMTEC owns the copyright in this report, it may not be copied without our prior written agreement for any purpose other than the purpose indicated in this report. The methodology (if any) contained in this report is provided to the Client in confidence and must not be disclosed or copied to third parties without the prior written agreement of GEMTEC. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests.
3. **Complete Report:** This report is of a summary nature and is not intended to stand alone without reference to the instructions given to GEMTEC by the Client, communications between GEMTEC and the Client and to any other reports prepared by GEMTEC for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. GEMTEC cannot be responsible for use of portions of the report without reference to the entire report.
4. **Basis of Report:** This Report has been prepared for the specific site, development, design objectives and purposes that were described to GEMTEC by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document, subject to the limitations provided herein, are only valid to the extent that this report expressly addresses the proposed development, design objectives and purposes. Any change of site conditions, purpose or development plans may alter the validity of the report and GEMTEC cannot be responsible for use of this report, or portions thereof, unless GEMTEC is requested to review any changes and, if necessary, revise the report.
5. **Time Dependence:** If the proposed project is not undertaken by the Client within 18 months following the issuance of this report, or within the timeframe understood by GEMTEC to be contemplated by the Client, the guidance and recommendations within the report should not be considered valid unless reviewed and amended or validated by GEMTEC in writing.
6. **Use of This Report:** The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without GEMTEC's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, GEMTEC may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process.

   Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.
7. **No Legal Representations:** GEMTEC makes no representations whatsoever concerning the legal significance of its findings, or as to other legal matters touched on in this report, including but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.
8. **Decrease in Property Value:** GEMTEC shall not be responsible for any decrease, real or perceived, of the property or site's value or failure to complete a transaction, as a consequence of the information contained in this report.
9. **Reliance on Provided Information:** The evaluation and conclusions contained in this report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations. information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of misstatements, omissions,

misrepresentations. or fraudulent acts of the Client or other persons providing information relied on by us. We are entitled to rely on such representations, information and instructions and are not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

10. **Investigation Limitations:** Site investigation programs are a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions but even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions.

    The data derived from the site investigation program and subsequent laboratory testing are interpreted by trained personnel and extrapolated across the site to form an inferred geological representation and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Conditions between and beyond the borehole/test hole locations may differ from those encountered at the borehole/test hole locations and the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies. Accordingly, GEMTEC does not warrant or guarantee the exactness of of the subsurface descriptions.

    Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

    In addition, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

11. **Sample Disposal:** GEMTEC will dispose of all uncontaminated soil and/or rock samples 60 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fill materials or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

12. **Follow-Up and Construction Services:** All details of the design were not known at the time of submission of GEMTEC's report. GEMTEC should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of GEMTEC's report.

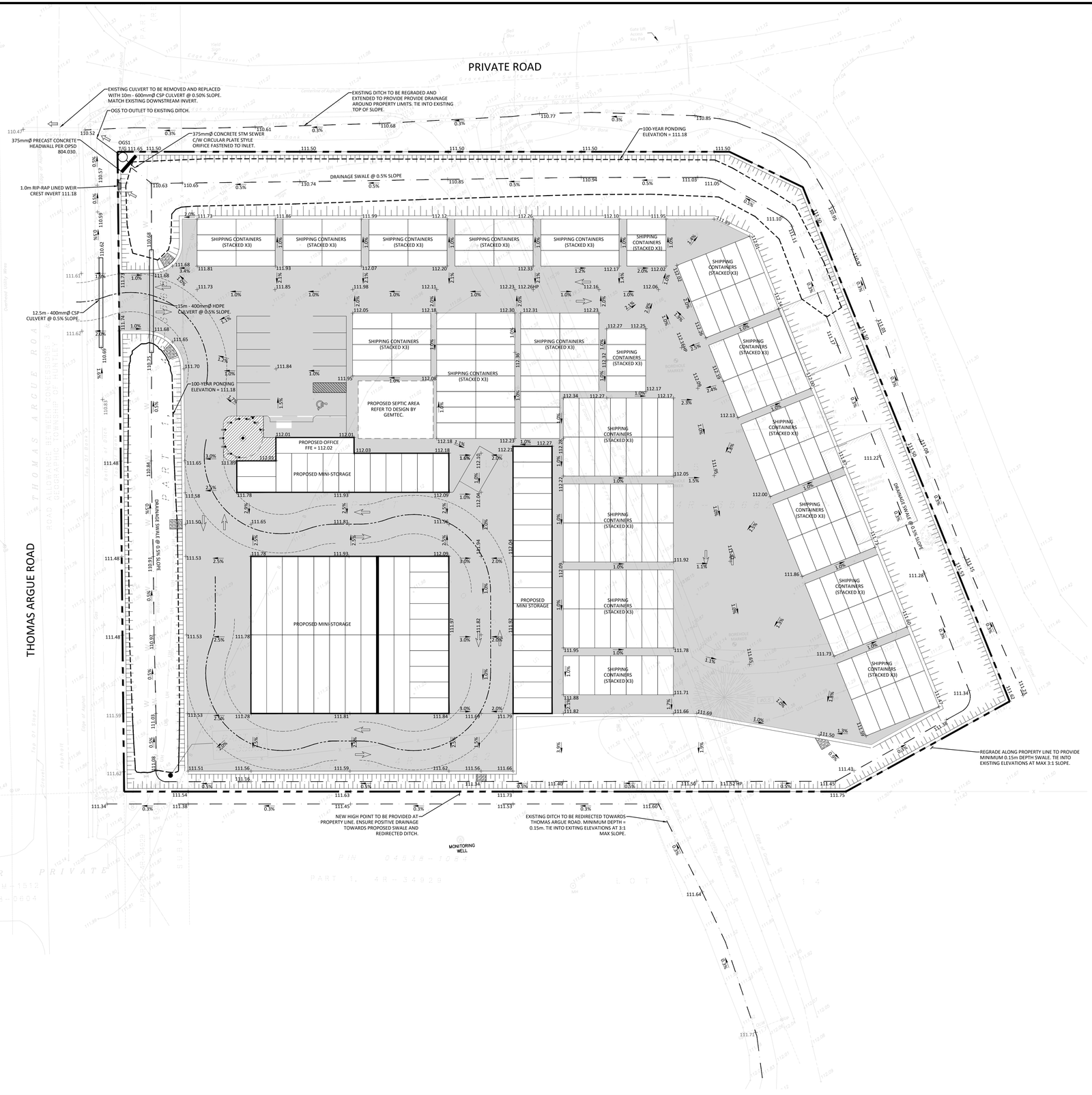
    During construction, GEMTEC should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of GEMTEC's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in GEMTEC's report. Adequate field review, observation and testing during construction are necessary for GEMTEC to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, GEMTEC's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

13. **Changed Conditions:** Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that GEMTEC be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that GEMTEC be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

14. **Drainage:** Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. GEMTEC takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.

APPENDIX A

Lot Grading & Drainage Plan (Egis, 2025)



GENERAL NOTES

1. THE ORIGINAL TOPOGRAPHY, GROUND ELEVATION AND SURVEY DATA SHOWN ARE SUPPLIED FOR INFORMATION PURPOSES ONLY, AND IMPLY NO GUARANTEE OF ACCURACY. IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO VERIFY ALL INFORMATION SHOWN.
2. THIS PLAN IS NOT A CADASTRAL SURVEY SHOWING LEGAL PROPERTY BOUNDARIES AND EASEMENTS. THE PROPERTY BOUNDARIES SHOWN HEREON HAVE BEEN DERIVED INFORMATION SUPPLIED BY (OR SHOWN ON) FAIRHALL, MOFFAT & WOODLAND DRAWING 136(A) - 3 HUNTLEY AND CANNOT BE RELIED UPON TO BE ACCURATE OR COMPLETE. THE SURVEYOR'S DETERMINATION OF THE CURRENT PROPERTY BOUNDARIES AND EASEMENTS CAN ONLY BE DETERMINED BY AN UP-TO-DATE LAND TITLES SEARCH AND A SUBSEQUENT CADASTRAL SURVEY PERFORMED AND CERTIFIED BY AN ONTARIO LAND SURVEYOR.
3. THE CONTRACTOR IS TO OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND APPROVALS FROM THE CITY BEFORE COMMENCING CONSTRUCTION.
4. THE CONTRACTOR IS RESPONSIBLE FOR ALL LAYOUT.
5. THE CONTRACTOR IS TO DETERMINE THE EXACT LOCATION, SIZE, MATERIAL AND ELEVATION OF ALL EXISTING UTILITIES PRIOR TO COMMENCING CONSTRUCTION. PROTECT AND ASSUME ALL RESPONSIBILITY FOR EXISTING UTILITIES WHETHER OR NOT SHOWN ON THESE DRAWINGS. IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
6. RESTORE ALL TRENCHES AND SURFACES OF PUBLIC ROAD ALLOWANCES TO CONDITION EQUAL OR BETTER THAN ORIGINAL CONDITION AND TO THE SATISFACTION OF THE CITY AUTHORITIES.
7. EXCAVATE AND DISPOSE OF ALL EXCESS EXCAVATED MATERIAL, SUCH AS ASPHALT, CURBING AND DEBRIS, OFF SITE AS DIRECTED BY THE ENGINEER AND THE CITY.
8. TOPSOIL TO BE STRIPPED AND STOCKPILED FOR REHABILITATION. CLEAN FILL TO BE PLACED IN FILL AREAS AND COMPACTED TO 95% STANDARD PROCTOR DENSITY.
9. CONTRACTOR TO MINIMIZE THE ACTUAL LIMITS OF REMOVALS AND REINSTATEMENT WHEREVER POSSIBLE, AND SHALL MAKE THEIR OWN JUDGEMENT AND ACCOUNT FOR ALL MATERIAL AND LABOUR REQUIRED FOR ADEQUATELY REINSTATING THE AREA TO PRE-CONSTRUCTION CONDITIONS OR BETTER, AND BEAR THE COST OF THE SAME. NO ADDITIONAL PAYMENT WILL BE MADE FOR REINSTATEMENT WORK NOT SHOWN ON THE CONTRACT DRAWING AS A DIRECT RESULT FROM CONSTRUCTION.
10. ALL DISTURBED AREAS TO BE RESTORED TO ORIGINAL CONDITION OR BETTER UNLESS OTHERWISE SPECIFIED.
11. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL TRAFFIC CONTROL AND SAFETY MEASURES DURING THE CONSTRUCTION PERIOD, INCLUDING THE SUPPLY, INSTALLATION, AND REMOVAL OF ALL NECESSARY SIGNAGE, DELINEATORS, MARKERS AND BARRIERS.
12. DO NOT ALTER GRADING OF THE SITE WITHOUT PRIOR APPROVAL OF THE ENGINEER/CITY.
13. ALL ROADWAY, PARKING LOT, AND GRADING WORKS TO BE UNDERTAKEN IN ACCORDANCE WITH CITY STANDARDS AND SPECIFICATIONS. THE CONTRACTOR IS TO PROVIDE POSITIVE DRAINAGE AWAY FROM THE BUILDING.
14. CONTACT THE CITY FOR INSPECTION OF ROUGH GRADING OF PARKING LOTS, ROADWAYS AND LANDSCAPED AREAS PRIOR TO PLACEMENT OF ASPHALT AND TOPSOIL. ALL DEFICIENCIES NOTED SHALL BE RECTIFIED TO THE CITY'S SATISFACTION PRIOR TO PLACEMENT OF ANY ASPHALT, TOPSOIL, SEED & MULCH AND/OR SOD.
15. ALL DIMENSIONS AND INVERTS MUST BE VERIFIED PRIOR TO CONSTRUCTION, IF THERE IS ANY DISCREPANCY THE CONTRACTOR IS TO NOTIFY THE ENGINEER PROMPTLY.
16. ELECTRICAL, GAS, TELEPHONE AND TELEVISION SERVICE LOCATIONS ARE SUBJECT TO THE INDIVIDUAL AGENCY:
    - ELECTRICAL SERVICE - HYDRO ONE,
    - GAS SERVICE - ENBRIDGE,
    - TELEPHONE SERVICE - BELL CANADA,
    - TELEVISION SERVICE - ROGERS.
16. INSTALLATION TO BE IN ACCORDANCE WITH CURRENT CODES AND STANDARDS OF APPROVAL AGENCIES HYDRO ONE, BELL AND THE CITY.
17. CONTRACTOR TO ENSURE ALL APPLICABLE OPS SPECIFICATIONS ARE FOLLOWED DURING CONSTRUCTION
18. ALL PROPOSED CURB TO BE CONCRETE BARRIER CURB UNLESS OTHERWISE SPECIFIED.

THIS PLAN MUST BE READ IN CONJUNCTION WITH THE GEOTECHNICAL REPORT PREPARED BY GEMTEC, DATED JUNE 4, 2024.

LOCATION PLAN

LEGEND

- CONCRETE BARRIER CURB
- CONCRETE WALKWAY
- PROPOSED ASPHALT
- LSCB# LANDSCAPING CATCHBASIN
- CBMH# T/G CATCHBASIN MANHOLE
- CB# T/G CATCHBASIN
- SMH#A T/G SANITARY SEWER MANHOLE
- HYD B/F FIRE HYDRANT
- WATER VALVE
- WATER METER
- REMOTE WATER METER
- RETAINING WALL
- LIMIT OF CONSTRUCTION
- DRAINAGE SWALE
- DRAINAGE DITCH
- SLOPING AT 3:1 UNLESS SPECIFIED
- 95.50 SURFACE ELEVATION
- 95.50 (S) SWALE ELEVATION
- T/W95.50 B/W 94.25 TOP OF WALL ELEVATION BOTTOM OF WALL ELEVATION
- OVERLAND FLOW ROUTE
- SILT FENCE BARRIER
- STRAW BALE CHECK DAM
- MUD MAT

FOR REVIEW ONLY
NOT FOR CONSTRUCTION

No.	Revisions	Date
1		

Check and verify all dimensions before proceeding with the work

Do not scale drawings

SCALE 1 : 300

0 5 10 15 20 25 30 Metres

egis
115 Walgreen Road, R.R.3
Carp, ON K0A 1L0
Tel: 613-836-2184
Fax: 613-836-3742
www.egis-group.com

Stamp:

Client:
BIGSTEELBOX
1000-1631 DICKSON AVENUE,
KELOWNA, BC V1Y 0B5

Project:
BIGSTEELBOX
1508 THOMAS ARGUE ROAD

Drawing Title:
LOT GRADING & DRAINAGE PLAN

Scale: 1:300	Project Number: CCO-24-2505
Drawn By: FV	
Checked By: RF	Drawing Number: C101
Designed By: FV	

D07-12-XX-XXXX

#XXXXX

FILENAME: U:\Infrastructure\2024\CCO-24-2505 Big Steel Box - 1508 Thomas Argue Road\12 - Drawings\CCO-24-2505 - Presentation.dwg
LAYOUT: C101 - Tuesday, March 11, 2025 - 11:41:47 AM by FVerbeek
DATE PLOTTED: Friday, April 25, 2025 - 8:38:51 AM by CO-STANDARD.ctb

APPENDIX B

Pre-consultation Meeting Feedback and Correspondence

File No.: PC2023-0192

Tamara Nahal
Fotenn Planning and Design
Via email: nahal@fotenn.com

Subject: Pre-Consultation: Meeting Feedback
Proposed Site Plan Control Application –1508 Thomas Argue Road

Please find below information regarding next steps as well as consolidated comments from the above-noted pre-consultation meeting held on August 22, 2023.

Pre-Consultation Preliminary Assessment

1 ☐	**2** ☒	**3** ☐	**4** ☐	**5** ☐

One (1) indicates that considerable major revisions are required while five (5) suggests that the proposal appears to meet the City's key land use policies and guidelines. This assessment is purely advisory and does not consider technical aspects of the proposal or in any way guarantee application approval.

Next Steps

1. A review of the proposal and materials submitted for the above-noted pre-consultation has been undertaken. Please proceed to complete a Phase 2 Pre-consultation Application Form and submit it together with the necessary studies and/or plans to planningcirculations@ottawa.ca.

2. In your subsequent pre-consultation submission, please ensure that all comments or issues detailed herein are addressed. A detailed cover letter stating how each issue has been addressed must be included with the submission materials. Please coordinate the numbering of your responses within the cover letter with the comment number(s) herein.

3. Please note, if your development proposal changes significantly in scope, design, or density before the Phase 3 pre-consultation, you may be required to complete or repeat the Phase 2 pre-consultation process.

Supporting Information and Material Requirements

1. The attached **Study and Plan Identification List** outlines the information and material that has been identified, during this phase of pre-consultation, as either required (R) or advised (A) as part of a future complete application submission.

    a. The required plans and studies must meet the City's Terms of Reference (ToR) and/or Guidelines, as available on Ottawa.ca. These ToR and Guidelines outline

the specific requirements that must be met for each plan or study to be deemed adequate.

b. Additional information regarding fees related to planning applications can be found here.

Consultation with Technical Agencies

1. You are encouraged to consult with technical agencies early in the development process and throughout the development of your project concept. A list of technical agencies and their contact information is enclosed.

Planning

Comments:

1. The subject site is designated Rural Countryside on Schedule B9 – Rural Transect of the Official Plan.

2. Permitted uses within the Rural Countryside designation include small scale light industrial and commercial uses when certain criteria are met, please refer to Policy 9.2 (2)(b) to review criteria.

3. Area-specific policies are statutory policy documents that form part of the Official Plan.

    a. The subject property is located within the Carp Airport Area under the Area-specific policies – Volume 2C. of the Official Plan, see Area-Specific Policy Plan Area 8 – Volume 2C.

    b. As per Policy 8.7 (a) of the Area-specific policies 2C., permitted land uses on land designated as Carp Airport Area include airport and related facilities; light industrial uses; convenience commercial uses, restaurants, hotel, instructional facilities, institutional uses, professional offices and a dwelling unit limited to occupancy by a caretaker, security guard, or person providing similar onsite service.

4. The site is zoned as T1B Subzone – Carp Airport. Some of the permitted uses include light industrial uses, storage yard, and warehouse.

5. The proposed development requires a Site Plan Control Application.

6. This development is proposing to include an office building. Therefore, a sewage and septic system will be required. As per Policy 4.7.1 (5), this site is required to be privately serviced (private well and private sewage system). The proposed locations should be shown on the Site Plan.

7. The proposed development must comply with the current Transport Canada guidelines as it is in the vicinity of the Carp Airport (Policy 10.2.2 (11)).

8. The City of Ottawa has recently updated their Terms of Reference, which outline submission requirements used to deem an application complete. Please ensure all plans, reports and studies meet the requirements of the new Terms of Reference. Some examples for the Site Plan are as follows:

    a. Provide the gross floor area of the proposed office building.

    b. Provide dimensions of all proposed drive aisles (laneways), private approaches (driveways) and required parking spaces.

    c. Ensure dimensions are shown in metric units.

    d. The Site Plan should list the zoning provisions in a chart which clearly identify the required and provided information for each zoning provision.

    e. Identify the location for the well and septic system.

    f. Provide landscaped areas.

9. The provided business plan suggests the shipping containers will be loaded and unloaded at the customer's own property. Once loaded, the shipping container will be picked up at the owner's property and driven to the Thomas Argue site to be stored. As the shipping containers are intended to be moved on a semi-regular basis, they are not considered buildings therefore, they are not considered a warehouse. The use would be considered a storage yard. Should the shipping containers be stored on a permanent basis for the proposed ministorage facility, they would for zoning purposes, be considered buildings and would be considered part of a warehouse use.

10. Minimum parking space rate must be in accordance with Part 4 – Section 101 of the Zoning By-law. The Rural Area is identified as Area D on Schedule 1A of Table 101.

    The land use of Storage Yard (N88) requires 1 parking space per 100 m^2 of gross floor area. As noted above, storage containers would not be considered as buildings and therefore would not count towards gross floor area. However, the office building will count towards gross floor area, and will need to meet the minimum parking space rate.

11. The Carp Road Corridor Community Design Plan Policy 7.2(2) requires a berm or green landscaped edges to hide more unsightly uses within the Corridor. Please include screening of the storage along the frontage of Thomas Argue.

12. For the purpose of this application, the semi-permanent shipping containers to be used as the mini storage facility would be considered buildings under the Zoning By-law. Each container would be considered its own building, so each would have to adhere to the 10m distance from another building as per the T1B Zone. Otherwise, a Minor Variance or Zoning By-law Amendment would have to be

obtained to permit the structures to be closer than 10m from one another. For initial comments on Minor Variance applications, please contact panel3_planners@ottawa.ca with details of the requested variance.

13. Outdoor storage in the T1B Zone does not have any setback requirements. Buildings on the lot must adhere to the zone's setback requirements.

14. The consent to sever application for the property is currently conditionally approved. The severance application must receive final approval in order to proceed with the Site Plan application.

Engineering

Comments:

15. A topographic plan of survey needs to identify all representative elevation points, currently existing features, including all property lines, bodies of water, vegetation, easements etc. It needs to provide a note that references the horizontal and vertical datums that were used and tied into to complete the project, including the local benchmarks. The survey should show the municipal road ROW and dimension the distance between the road centre line and the site property line.

16. Servicing Study and Report (water/sanitary/SWM)

    a. Servicing Study (and Plans) will need to be submitted to the City for review and it needs to demonstrate that the site can be adequately serviced. It should comprehensively address the available water quality and quantity. It should identify the required projected water demand and the expected well capacity (sustainably to be in excess of demand). It should also address sanitary servicing needs.

    b. The report needs to provide all pertinent calculations and justifications to support any claims made in the report. References to other relevant studies need to be made and clearly stated in order to adequately address the servicing needs and underlying ground conditions.

    c. Proposed septic bed sizing needs to be provided, to demonstrate that it will be able to accommodate the generated flows and there is an adequate lot area to provide required nitrate dilution.

    d. Fire-fighting considerations should also be included in the report to determine potential surface area requirements if water storage tanks need to be implemented As per the clarification provided in Technical Bulletin ISTB-2021-03 the FUS fire-fighting methodology is to be used in Rural Areas in all cases.

    e. Erosion and sediment control measures need to be provided.

17. Stormwater

a. SWM report will be required, and it can be submitted, as part of the Site Servicing Study. This report should be completed exceeding the requirements laid out in the City's Site Servicing Study Terms of Reference.

b. Any existing stormwater runoff from adjacent site(s) that crosses the property must be accommodated by the proposed stormwater management design. No adverse effect can be created to the surrounding properties.
Since it is a commercial/industrial subdivision proposal, on-site SWM measures need to be applied to minimize impact to downstream storm control systems.

c. The quantity criteria will be that the 100-year post development peak flow rate must be controlled the 2-year pre-development peak flow rate.

d. The 2-yr storm event using the IDF information derived from the Meteorological Services of Canada rainfall data, taken from the MacDonald Cartier Airport, collected 1966 to 1997.

e. The pre-development runoff coefficient or a maximum equivalent 'C' of 0.5, whichever is less (§ 8.3.7.3).

f. A calculated time of concentration (Cannot be less than 10 minutes).

g. Stormwater flow rates in excess of the 2-year pre-development storm, up to and including the 100-year post-development storm event, must be detained on site.

h. The quality criteria will be enhanced treatment, 80% TSS removal, as per the Carp River Watershed/Subwatershed Study. Reporting of TSS removal shall be extensive and if peer reviewed and published papers are relied on for conclusions, the conclusions shall be patently clear and the report shall show overwhelming agreement.

i. The stormwater management report shall itemize concurrence with the content of the CRWSS and address all Subwatershed criteria pertaining to the SWM site control, such as but not limited to:
    i. Efforts are required to maintain low flow runoff in Summer
    ii. 104 mm/yr infiltration (p.196) – area identified as significant groundwater recharge area
    iii. Runoff shall be provided to achieve cool water thermal regime (p. 159)

j. Runoff will need to be conveyed to a legal and sufficient outlet. If it is proposed to discharge storm water to the existing ditches in the ROW, the ditches will need to be shown to provide continuous flow to an outlet.

k. Capacity of the downstream systems needs to be investigated in detail and concurrence with any existing Drainage Studies or Watershed/Subwatershed Studies needs to be demonstrated. All stormwater management determinations shall have supporting rationale.

l. Low Impact Development (LID) is to be implemented as per the bulletin from the former MOECC (now MECP) titled Expectations RE: Stormwater Management released in February 2015. Note that the City has released a document titled 'Low Impact Development Technical Guidance Report – Implementation in Areas with Potential Hydrogeological Constraints' which aids sites which may have constraints such as low permeability or high groundwater.

m. Note that oil/grit separators, if used, require Environmental Technology Verification (ETV) protocol for ECA approval.

18. An MECP Environmental Compliance Approval is anticipated to be required for the proposed development. Please contact the Ministry of the Environment, Conservation and Parks, Ottawa District Office to arrange a pre-submission consultation:

    a. Charlie Primeau at (613) 521-3450, ext. 251 or Charlie.Primeau@ontario.ca

    b. Please note: Once the development application has been submitted, a request can be made to the City to consider a Transfer of Review (ToR) ECA for SWM works (ponds, ditches, culverts, etc.) for private property, instead of the direct submission ECA. This is subject to approval by the City and MECP. Note that the ECA requirements are currently in transition towards the linear ECA process and more details may become available depending on application submission timeline. It is recommended to check with the City when the development application is submitted to confirm the ECA process at that time

19. Grading and Drainage

    a. A Grading and Drainage Plans will be required identifying the existing and proposed drainage patterns and their relationship with the surface runoff control.

    b. Erosion and sediment control plan needs to be provided as well and it will need to show the erosion and sediment control measures.

c. All Civil plans will need to reference the horizontal and vertical datums that were used and tied into to complete the project, including the local benchmarks.

20. Fire Services

a. It is the responsibility of the owner to ensure that an adequate water supply for firefighting is provided. The FUS (Fire Underwriters Survey) methodology, as opposed to the OBC methodology shall be applied for all rural areas. Enhanced review will be invoked should the construction coefficient be chosen less than 1.

b. Fire Routes now require designation with By-law through the Site Plan process by contacting fireroutes@ottawa.ca.

21. Geotechnical (including sensitive marine clay)

a. A Geotechnical Study will be required. The report should provide sufficient soils and engineering information to confirm that the site(s) are suitable or can be made suitable for development based on the requirements of the Geotechnical Investigation and Reporting Guidelines for Development Applications in the City of Ottawa.

b. Please note that based on available mapping, sensitive marine clays are anticipated on site and enhanced geotechnical investigation and exhaustive analysis will be necessary. Investigation of clays should be undertaken with vane shear testing, Atterberg limits testing (from a number of depths in each column), shrinkage, grain size, grade raise restriction, consolidation, compaction sensitivity, remolded strength and liquefaction analysis - amongst others.

c. Earthquake analysis and potential for seismic liquefaction or rapid lowering of shear strength, of any soil type, analysis is also required to be undertaken and details, with clear conclusions, provided in the report.

d. In sensitive marine clays, trees in proximity to foundations can cause foundation damage. The requirements of the City's Tree Planting in Sensitive Marine Clay Soils – 2017 Guidelines should be contemplated

e. If infiltration measures are proposed onsite (LID), the study should also include infiltration/percolation testing for SWM design.

f. The groundwater level is to be investigated and the level needs to be derived from spring-time investigation. Potential GWT fluctuations need to be identified and their effect on the soil's behaviour needs to be studied and reported. Clear conclusions need to be provided. The foundation drainage needs to be addressed. All conclusions and determinations shall have supporting rationale.

g. City mapping shows unstable slopes within 230 m to the south of the property – potential impacts need to be considered.

22. Hydrogeological and Terrain Analysis

a. A Hydrogeological and Terrain Analysis will be required to establish that there is an adequate quantity and quality of groundwater to support the proposed development(s). The requirements for the Hydrogeological and Terrain Analysis Report are outlined in the City of Ottawa Hydrogeological and Terrain Analysis Guidelines, Section 5.0 titled Site Plans.

b. Note that the expected groundwater in this area has potential to be poor quality and sufficient for domestic use. There are properties in the same bedrock formation to the southwest which had exceedances in colour, fluoride, TDS, sodium, and chloride. Note that mineralized water has been found in nearby wells, O. Reg. 903 states that should mineralized water be present, the well owner shall abandon the well or provide written consent from the Director (MECP approval). If required, a mineralized well approval from the MECP is required prior to site plan approval, as identified in City guidelines.

c. A supply well must be drilled and tested to confirm water quantity and quality suitability prior to site plan approval. Support must be provided for the pump test rate; which should be the maximum day rate. The rate should consider the actual use, or potential uses permitted through zoning if unknown. (MECP Well completed February 16, 2022, received by MOE May 25, 2022)

d. The report is to show that there is a sufficient quantity (in excess of the design demand) and quality of aquifer water for the proposed commercial/industrial development, and it needs to provide assurance of its sustainability. The surficial groundwater level needs to be derived from spring-time investigation.

e. If a SWM pond, infiltration trench or similar stormwater management infrastructure is proposed, it will also need to be included in the Hydrogeological Report and Terrain Analysis.

f. The parameters of water quality that will be tested will be the “subdivision suite” known to local well testing companies, as well as trace metals and VOCs. Requirements are outlined in the City of Ottawa Hydrogeological and Terrain Analysis Guidelines. The report should also provide an assessment of adjacent land uses and concerns and determine if any other parameters need to be tested (e.g. petroleum hydrocarbons, BTEX, Chlorinated solvents, etc.).

g. Bollards, or other means of preventing vehicle access, will need to be provided between areas with vehicle access and the existing or proposed

well(s). The well location should be shown on all plans; the grading plan should indicate that grading around the well meets O.Reg. 903 requirements, i.e. minimum well casing height above ground surface and the land around the well must slope away from the well to prevent pooling.

h. Technical consultation with the hydrogeological report reviewer is encouraged, please provide a detailed work plan to the assigned Infrastructure Project Manager for comment in advance of work on-site.

i. The hydrogeological and terrain analysis report should describe the proposed activities onsite and identify if there are any contamination risks to the aquifer. If proposed activities pose a risk to the aquifer, then mitigation should be recommended (i.e. safe storage of chemicals, spills prevention and response plans, etc.).

j. A Septic System Impact Risk Assessment must be completed as part of the Hydrogeological and Terrain Analysis Report, as per the City's Hydrogeological and Terrain Analysis Report Guidelines and MECP Guideline D-5-4, please refer to the HGTA for the predictive assessment for commercial/industrial developments (not residential developments).

k. If the expected daily design flow is 10,000 L/d or less, the septic permit from the Ottawa Septic System Office must be issued prior to Site Plan Approval being granted.

l. Since this application is a site plan (not lot creation or zoning) septic treatment (i.e. tertiary treatment with nitrate dilution) may be considered as part of the septic impact assessment calculations. A system certified though NSF or BNQ should be recommended if advanced treatment is needed to meet nitrate impact targets.

m. Bollards, or other means of preventing vehicle access, will need to be provided between areas with vehicle access and the proposed septic system(s).

n. It is not clear if there is an existing water well/s and septic bed/s on site. If they need to be decommissioned, the well/s need to be decommissioned in accordance with Well Regulation (O.Reg. 903) under the Ontario Water Resources Act (See O.Reg. 903 - Section 21(3)), and the septic bed/s in accordance to OSSO requirements and to the satisfaction of the OSSO.

23. Construction constraints

a. As shown on the draft 4R plan, there are two easements on the property which must be accounted for, the existing servicing easement along Thomas Argue Road for the private watermain and also the private hydro services easement along the southeast property line.

b. It appears that the property to the south (FBO & Hangar) has a swale which discharges onto this lot. Note that stormwater runoff that enters the site must also be contemplated in the Stormwater Management for the site.

24. Background studies

a. The property is within the Carp River Watershed/Subwatershed Study and Carp Road Corridor Design Plan areas and the proponent should itemize and detail concurrence with the content of these studies and plans.

b. The Carp River Watershed study identifies this property on Figure 3.4.31, the mapping indicates the site has clay soils with groundwater recharge potential of 104 mm/yr.

c. Carp CDP Schedule 2 does not include strict recommendations for groundwater recharge potential.

25. Site Lighting

a. Exterior site lighting will require certification by a licensed professional engineer confirming the design complies with the following:

b. The location of the fixtures, fixture type (make, model, part number and the mounting height) must be shown on one of the approved plans.

i. Lighting must be designed only using fixtures that meet the criteria for Full Cut-off classification, as recognized by the Illuminating Engineering Society of North America (IESNA or IES), and

ii. It must result in minimal light spillage onto adjacent properties. As a guideline, 0.5 foot-candle is normally the maximum allowable spillage.

iii. Lighting Certificate will need to be submitted to the City.

26. Noise Study and a Report will be required, in order to address the noise generated by the Carp Airport activities, directly adjacent to the site. The report needs to investigate noise mitigation measures for the proposed office space, and it needs to provided clear conclusions and recommendations.

27. Environmental Site Assessment (ESA).

A Phase 1 Environmental Site Assessment (ESA) is required, completed in accordance with Ontario Regulation (O.Reg.) 153/04.
A Phase 2 ESA may be required, depending on the outcome of the Phase 1 ESA.

There is an existing structure on site and it is not clear if there is an existing septic bed. Record of site condition might be required.

28. Carp Airport proximity.

    Transport Canada, Carp Airport Authority, Navigation Canada, or other aviation authorities, as required, need to be contacted regarding ponds and lighting or other specific considerations and limitations associated with proposed development in direct proximity to Carp Airport. The City Engineering needs to be copied on the communication. Airport area zoning restrictions imposed by the Airport Vicinity Development Zone need to be considered, as per new OP section 10.2.2.11 (Schedule C14) and current OP, Section 4.8.6.

    a. Noise-sensitive development is not permitted within the 30 NEF/NEP contour lines at the Carp airport.
    b. Proposed development in the vicinity of Carp airport shall comply with current Transport Canada guidelines.
    c. Proposed development in the vicinity of Carp airport will comply with TP 312 Aerodrome Standards, and within runway approach surfaces will be subject to the overall building height provisions of the Federal Airport Zoning Regulations and Recommended Practices affecting building heights.
    d. Prior to Site Plan approval, exterior lighting specifications need to be defined by a qualified Professional Engineer. Confirmation that the defined criteria comply with the requirements, set by the governing airport authority, will need to be presented to the City prior to approval.

29. Easements/ROW.

    Easements and rights-of-ways must be shown on the plans. Information on any existing easements details (who involved parties are, registration number, versions of the document including the latest, related by-laws etc.) with all supporting documentation need to be provided with the application.
    There is a concern of an existing driveway access to the taxi runway and hangar in the middle of the proposal. Solution needs to be provided.

30. Energy conservation.

    Energy conservation is required to be demonstrated throughout design as per section 2.2.3 of the Official Plan (reduction of urban heat, renewable energy, mitigation of climate change impacts) and others.

31. Roads.

    Pease refer to the City of Ottawa Private Approach By-Law 2003-447 for the entrance design and reach out to the City Transportation department for the acceptable entrance locations and distance.

Thomas Argue Road is a local road with a ROW protection of 20 m (10 m from the road centre line to the property limit. Topographic survey will need to confirm the ROW width from the road centre line to the property limit. Road widening might be required, if the ROW width is found to be less than stated above.

32. Special considerations.

    It is not clear if all the conditions of the severance were met.

33. Permits and Approvals

    Please contact the Mississippi Valley Conservation Authority (MVCA), amongst other federal and provincial departments/agencies, to identify all the necessary permits and approvals required to facilitate the development: responsibility rests with the developer and their consultant for determining which approvals are needed and for obtaining all external agency approvals. The address shall be in good standing with all approval agencies, for example MVCA, prior to approval. Copies of confirmation of correspondence will be required by the City of Ottawa from all approval agencies that a form of assent is given. Note that oil/grit separators require Environmental Technology Verification (ETV) protocol for ECA approval. No construction shall commence until after a commence work notification is given by Development Review.

34. Capital Works Projects scheduled

    a. Thomas Argue Road, north of March Rd, is scheduled to be upgraded from gravel to hard surface with a targeted start of 2-3 years.

Feel free to contact Derek Kulyk, Infrastructure Project Manager, for follow-up questions.

Transportation

Comments:

35. A TIA is not required.

36. Ensure that the development proposal complies with the Right-of-Way protection requirements of the Official Plan's Schedule C16. The ROW protection will then be verified at submission. Any requests for exceptions to ROW protection requirements must be discussed with Transportation Planning and concurrence provided by Transportation Planning management.

37. A Road Noise Impact Study is required due to the airport.

Feel free to contact Mike Giampa, Transportation Project Manager, for follow-up questions.

Environment and Trees

Comments:

38. A TCR is required; report should include a Species at Risk review to consider potential significant habitat on adjacent property's structures; also looking for recommendations for locally appropriate native species to inform the landscape plan

39. Tree Planting

    a. A Landscape Plan is a required submission of all Site Plan applications. Please provide a Landscape Plan meeting the requirements of the new Landscape Plan Terms of Reference (https://documents.ottawa.ca/sites/documents/files/landscape_tor_en.pdf).

    b. Please provide street trees within the Thomas Argue ROW. It is recommended to avoid planting nut and fruit-producing trees to avoid wildlife impacts on airport operations.

Feel free to contact Sami Rehman, Environmental Planner, or Nancy Young, Forester, for follow-up questions.

Parkland

Comments:

40. Parkland dedication is assumed to have been provided as part of previous planning applications at the site and is therefore exempt from the requirement to provide parkland dedication as part of the development.

41. The applicant should be aware that the City will be constructing a community scale park, kiddy-corner to the site. Efforts to provide landscaping on the south and west site boundaries are appreciated.

Feel free to contact Anissa McAlpine, Parks Planner for follow-up questions.

Other

42. The High Performance Development Standard (HPDS) is a collection of voluntary and required standards that raise the performance of new building projects to achieve sustainable and resilient design. The HPDS was passed by Council on April 13, 2022.

    a. At this time, the HPDS is not in effect and Council has referred the 2023 HPDS Update Report back to staff with direction to bring forward an updated report to Committee with recommendations for revised phasing

timelines, resource requirements and associated amendments to the Site Plan Control By-law by no later than Q1 2024.

b. Please refer to the HPDS information attached and ottawa.ca/HPDS for more information.

Should there be any questions, please do not hesitate to contact myself or the contact identified for the above areas / disciplines.

Yours Truly,

Jack Graham
Planner I
Development Review Rural

cc.
Erica Ogden-Fedak
Derek Kulyk
Kevin Hall
Sami Rehman
Nancy Young
Anissa McAlpine
Tessa Di Iorio
Mike Giampa

Encl. Study and Plan Identification List
List of Technical Agencies

Outlook

Re: Technical Consultation Request - 1508 Thomas Argue Road

From Andrius Paznekas <andrius.paznekas@gemtec.ca>
Date Mon 2024-12-02 1:49 PM
To Smith, Travis <travis.smith@ottawa.ca>
Cc Tamara Nahal <nahal@fotenn.com>

Hello Travis,

To follow up on our call, a brief summary of our discussions:

- Proposed commercial development (BigSteelBox) storage containers at 1508 Thomas Argue Road.
- GEMTEC prepared Hydrogeological and Terrain Analysis Report in support of the site severance (dated January 2024)
    - Included pumping test in on-site test well with water quality sampling (including VOCs)
    - Included septic impact assessment for commercial uses

To support the proposed site plan control application, our proposed hydrogeological investigation report will reference the existing report (GEMTEC, 2024) for discussion of the water quality, quantity and septic impact assessment. The report will discuss relevant site specific factors for this proposed commercial development, specifically location of well and septic, water demand and septic size and number of employees (to ensure it meets the D-5-4 calculations from the approved hydrog investigation).

Assuming that the water and septic demand are within the ranges from the approved hydrog investigation (GEMTEC, 2024), no new field investigations are proposed.

Let me know if I missed anything.

Thank you,
Andrius

GEMTEC
Consulting Engineers and Scientists

Andrius Paznekas, M.Sc., P.Geo.
Hydrogeologist
Ottawa, ON
tel: 613.836.1422 ext.237 / toll-free: 1.877.243.6832
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APPENDIX C

Hydrogeological Investigation & Terrain Analysis (GEMTEC, 2024)

GEMTEC
www.gemtec.ca

Hydrogeological Investigation & Terrain Analysis
Proposed Lot Severance
Borden Lot
1500 Thomas Argue Road
Carp, Ontario

January 10, 2024 File: 100011.062

West Capital Developments
1500 Thomas Argue
Carp, Ontario
K0A 1L0

Attention: Josh Blokhius

Re: Hydrogeological Investigation and Terrain Analysis
Proposed Lot Severance, Borden Lot
1500 Thomas Argue Road, Carp, Ontario

This letter presents the results of a groundwater quality and quantity assessment, and septic impact assessment carried out as part of a proposed lot severance at 1500 Thomas Argue Road, Ottawa, Ontario.

1.0 INTRODUCTION

The existing property has an area of approximately 134 hectares and is located at 1500 Thomas Argue Road. The proposed “Borden” severance lot will have an area of approximately 1.2 hectares and the lands to be retained consists of approximately 133 hectares. The “Borden” severance lot will be referred to as the “Site” throughout the report. The Site is bounded to the west by Thomas Argue Road, the Carp Airport to the north, east, and south. The Site location is presented in Appendix A, Figure 1.

The objective of the investigation presented herein is:

- To demonstrate that the construction of any new well on the severed parcel is in accordance with the Ministry of the Environment, Conservation and Parks;
- To demonstrate that the quality of the well water meets the Ontario Drinking Water Standards and maximum treatable limits prescribed in Ontario Ministry of Environment, Conservation and Parks (MECP) Procedure D-5-5;
- To demonstrate that the quantity of water meets the MECP requirements; and,
- To demonstrate the septic impact assessment meets the MECP requirements.

2.0 BACKGROUND

2.1 Project Description

The property is located within the West Capital Airpark – Carp Airport, which contains multiple commercial buildings and an active airport, with a total area of approximately 134 hectares (refer to development plans completed by Novatech, Appendix B). The active airport area is

serviced by a private water supply well, located approximately 1.8 kilometers east of the proposed severance lot, and an existing septic system (refer to Carp Airport Private Water System sketch, Appendix B).

2.2 Background Reports

A previous investigation was completed on the property located adjacent to the Site titled: “Terrain Analysis, Proposed Lot Severance, Former FBO Building, 1500 Thomas Argue Road, West Capital Airpark - Carp Airport, Ottawa (Carp), Ontario, dated June 21, 2022. The study involved a septic impact assessment (terrain analysis) of a proposed severance lot of the Former FBO building, lying directly to the east of the Site. The project included drilling and logging of three boreholes, installation and testing of one monitoring well (i.e. water sampling and hydraulic testing), and desktop studies in accordance with MECP Guideline D-5-4 were completed to assess potential septic impacts and to determine the maximum allowable septic flows for the proposed parcel.

A maximum design flow for the parcel was calculated, and it was determined that no septic impacts to the retained lands, private water supply well for the core airport, or downgradient well users were anticipated based on subsurface conditions. .

2.3 MECP Water Well Records

A search of the Ministry of Environment, Conservation and Parks (MECP) water well records (https://www.ontario.ca/environment-and-energy/map-well-records) returned 30 water well records within one kilometre of Site. The average well depth, depth of water found and casing length within one kilometre of the Site are summarized in Table 1 below. A summary of the water well records is provided in Appendix C.

Table 1: MECP well record statistics

Statistical Measure	Depth (m)	Depth to Bedrock (m)	Water Found[1] (m bgs)
Average	33.5	14.0	33.2
Geomean[2]	24.9	6.1	28.2
10th Percentile	8.22	1.6	16.4
90th Percentile	52.4	27.9	62.2

Notes
1. Water found depth as reported on MECP water well record is a measure of the water bearing zone encountered at the time of drilling.
2. Values of 0 were replaced by 0.01 for calculation of geometric mean.

The water wells are completed in the bedrock water supply aquifer and meet the minimum O.Reg 903 casing lengths of 6.0 metres below ground surface. The average depth of water

found (i.e. depth below ground surface of water bearing fractures encountered at the time of drilling) is 33.2 metres. The majority of bedrock wells within one kilometer of site were completed in limestone bedrock, with some records indicating granite and sandstone bedrock. Based on geologic mapping and water well records within one kilometer of Site, the water supply aquifer underlying the Site is interpreted to be the limestone of the Verulam Formation.

3.0 TERRAIN ANALYSIS

3.1 Site Features, and Potential Sources of Contamination

The Site consists of cleared land with two existing structures (to be removed) on the northern portion of the lot. The Site is located within the Carp River Subwatershed of the Mississippi River Watershed. The Mississippi-Rideau Source Protection Area Report (MVRVCA, 2011) was reviewed, and the Site is not within an intake or wellhead protection zone and is not within a significant groundwater recharge area. As such, no development restrictions or risks to source aquifer were identified based on the protection plan.

Potential sources of contamination within 500 metres of the Site include activities related to Carp Airport operations, including existing septic system use and commercial activity, and agricultural activities.

3.2 Topography and Drainage

Topographic mapping data indicates that elevations across the property ranges from approximately 111 to 114 metres above sea level. The elevation on the Site is generally flat, and ranges from 111 to 113 metres above sea level. Regional a local topography indicates a down sloping in elevation towards the northeast, in the direction of the Carp River. The Mississippi-Rideau Source Protection Area Report (MVRVCA, 2011) indicates groundwater table elevations decrease towards the Ottawa River to the northeast. Groundwater flow directions are expected to follow topography and groundwater elevations, and therefore flow towards the northeast.

3.3 Surficial Geology

Surficial geology maps of the Ottawa area (Ontario Geologic Survey, 2010) indicate that the Site is underlain by fine-textured (silt and clay, minor sand and gravel) and coarse textured (sand and gravel, minor silt and clay) glaciomarine deposits. Bedrock geology maps (Armstrong and Dodge, 2007) indicate that bedrock is comprised of interbedded limestone and shale of the Verulam Formation at depths ranging between 10 and 25 metres. Available karst mapping (Brunton and Dodge, 2008) does not indicate the presence of any inferred or potential karstic features.

3.4 Subsurface Conditions

Test pits were advanced across the Site on March 2, 2023, to characterize the surficial geology and overburden thickness. A total of four test pits were advanced, supervised by a member of GEMTEC staff (Appendix A, Figure 2). The location of the test pits was selected based on accessibility and Site coverage. The description of soils encountered during field investigations, and soil thickness are summarized in Table 2.

During the previous investigations completed by GEMTEC on the adjacent land parcel to the east, clayey silt deposits, which were not fully penetrated, were encountered to depths ranging from 3.1 meters to 6.1 meters below surface grade (borehole logs provided in Appendix D).

Table 2: Test Pit Soil Classification

Test Pit	Depth[1] to Bedrock (m)	Soils Description	Groundwater Seepage
23-1	-	**0.00 m - 0.31 m:** Dark brown silty sand, clay, rootlets (TOPSOIL). **0.31 m – 3.25 m**: Brown clayey silt, trace sand	Not Observed
23-2	-	**0.00 m - 0.36 m:** Dark brown silty sand, clay, rootlets (TOPSOIL). **0.36 m – 3.15 m**: Brown clayey silt, trace sand	Not Observed
23-3	-	**0.00 m - 0.25 m:** Dark brown silty sand, clay, rootlets (TOPSOIL). **0.36 m – 3.15 m**: Grey brown clayey silt, trace sand	Not Observed
23-4	-	**0.00 m - 0.38 m:** Dark brown silty sand, clay, rootlets (TOPSOIL). **0.36 m – 3.18 m**: Grey brown clayey silt, trace sand	Not Observed

Notes:
1. Depths are measured below ground surface.
2. bgs = below ground surface.
3. "-" = undetermined.

The soils encountered on the Site were generally described as a thin layer of topsoil underlain by a clayey silt deposit. One hydrometer test was carried out on a sample from TP23-4; the results are provided in Appendix D and are summarized in Table 3.

Table 3: Summary of Hydrometer Test (clayey silt, some sand)

Test Pit Number	Sample Depth (metres)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)
23-4	2.8-2.9	0	10.5	57.1	32.5

Based on test pit field investigation, the overburden is more than 3 meters thick. The subsurface conditions are generally consistent with geologic mapping.

4.0 GROUNDWATER SUPPLY

A groundwater supply investigation was carried out in general accordance with MECP Procedure D-5-5 Technical Guideline for Private Wells: Water Supply Assessment, to determine the quantity and quality of groundwater available for commercial water supply. The results of the groundwater supply investigation are summarized in the following sections.

4.1 Test Well Construction

A new test well was drilled on the subject property (MECP Well ID: A395710) on November 2, 2023 to support the hydrogeological investigation, herein referred to as 'TW1'. TW1 was hydro-fracked on December 5th to increase the available water quantity of the well. The MECP water well record is provided in Appendix E and the construction details are summarized in Table 4. The test well was drilled by Air Rock Drilling Co. Ltd. (License No. 7881). The well grouting and casing installation was supervised by a member of GEMTEC staff.

The approximate location of the test well is provided on the Detailed Site Plan, Figure 2.

Table 4: On-Site Water Well Construction Details

Well Construction Details – TW1 (A395710)	
Depth to Bedrock	15.8 metres
Length of Well Casing Above Ground Surface	0.61 metres
Length of Well Casing Below Ground Surface	17.7 metres
Depth Water Found	89.6, 150.6 meters
Total Well Depth	152.4 metres

Well Construction Details – TW1 (A395710)	
Bedrock Description	Grey and Black Limestone

Notes:

1. Casing length manually measured during on site investigations completed by GEMTEC staff.
2. Bedrock descriptions based on well record.

4.2 Pumping Test Field Procedure and Water Quality Sampling

An 8-hour constant rate pumping test was carried out on test well TW1 by a member of GEMTEC staff on December 7, 2023. The pump discharge was directed to the ground surface at a distance of approximately 10 metres from the test wells and in a manner such that the flow of water on the ground surface was directed away from the test well. At the time of conducting the pump test, an observation well had not been identified. Based on the distance from the well, Site topography and the well depth, it is not expected that the aquifer experienced recharge from the discharged groundwater.

4.2.1 Water Level Measurements

During the pumping tests, water level measurements were taken at regular intervals in the well being pumped using an electric water level tape. After the pump was shut off, water level data was measured until the water level in the well had returned to the static water level before the start of the test, which occurred in less than 24 hours after pump shut off. No observation wells were included in the investigation due to lack of nearby participants. The pumping test drawdown and recovery graph is provided in Appendix F.

4.2.2 Flow Rate Measurements

The well was pumped using an electric submersible pump and portable generator supplied by Air Rock Co. Ltd. The flow rate of the pump discharge hose was constantly monitored using a timed-volume method. Multiple flow measurements were taken within the first hour of the pumping test and then at 30 to 60-minute intervals throughout the remainder of the pumping test to ensure that the discharge rate maintained a constant flow rate (i.e. within 5%). The test well was pumped at a rate of approximately 15.1 litres per minute.

4.2.3 Groundwater Sampling

Total chlorine tests were conducted in the field using a Hach DR 900 colorimeter to ensure that chlorine levels were at non-detectable concentrations prior to bacteriological testing. The temperature, conductivity, total dissolved solids, pH, turbidity, colour and free chlorine levels of the groundwater were measured at periodic intervals during the pumping tests and are summarized in Appendix G. The field equipment used during the pumping test is calibrated by GEMTEC and the details of field equipment are provided in Table 5.

Table 5: Field Equipment Overview

Field Parameters	Manufacturer	Model No.	Detection Limit
Total and Free Chlorine	Hach	DR 900	0.02 mg/L
pH, temperature, Conductivity	Hanna	HI 98129	-
Turbidity	Hanna	HI 98703	0.05 NTU
Colour	Hach	DR 900	5 TCU

Notes:
1. Hach DR900: colour and chlorine zeroed using distilled water prior to measuring field parameters.
2. Hanna HI 98129 calibration check using 4.0 and 7.0 pH solutions (within 5%).
3. Hanna HI98703 calibration check using <0.10, 15.0, 100 NTU (within 5%).

All unfiltered water samples were collected directly from the discharge hose in laboratory supplied bottles, while field filtered samples, were filtered using a 0.45 µm filter. All samples were stored in a cooler with ice packs and subsequently submitted to Paracel laboratories in Ottawa, Ontario, for 'subdivision package' parameters after 4 hours and 8 hours of pumping, and 'trace metals' parameters and volatile organic compounds (VOCs) after 8 hours of pumping. The samples were submitted during the same day of the pumping test; the chain of custody is included with the lab reports in Appendix G.

4.3 MECP Water Well Record Assessment

To assess the groundwater quantity of representative water supply wells, the specific capacity and well yield were calculated for wells with available water well records within 1.0 kilometre of the Site (refer to Appendix H). The 1-hour well yield tests reported on the MECP water well records were used to calculate specific capacity, adjusted specific capacity and well yield. The methodology developed in Risser et al, 2010 was used to calculate these water quantity parameters.

Of the 30 well records reviewed, seven records contained information sufficient to calculate water quantity parameters. The calculated water quantity parameters are summarized in Appendix H. The adjusted specific capacity of the wells were calculated to range from 1 to 10 L/min/m, and the well yields were calculated to range between 33 to 658 L/min, with an average well yield of 159 L/min. Based on the average well yield of 159 L/min, the maximum daily well production considering an 8-hour day would be 76,300 litres per day (159 L/min x 60 mins/hr x 8 hrs).

4.4 Groundwater Quantity

A pumping test was carried out on test well TW1 by a member of GEMTEC staff on December 7, 2023. The well was pumped for a total of 9 hours, with a constant rate of 15.1 litres per

minute for a period of eight hours. It is noted that during the first hour of the pump test, issues with pump discharge hose occurred, resulting in variable flow rate. The flow rate was held at a constant rate of 15.1 litres per minute for the remainder of the pump test. The drawdown and recovery graphs are provided in Appendix F for reference.

A small amount of water was trickling over the top of the above ground casing stick up at the beginning of the test, estimated to be flowing at less than 1 gallon per minute. For the purpose of analysis of the pumping test on TW1, it was assumed that the static water level for the well was the top of the above ground casing stickup.

The aquifer transmissivity was estimated to be 0.3 m^2/day using the Theis Recovery Analysis method (Appendix F). Due to the variable flow rates encountered during the first hour of the test, the transmissivity could not be estimated using the drawdown portion of the test. The hydraulic conductivity, assuming a saturated aquifer thickness of 135 metres is estimated to be 8×10^{-8} m/s. The pumping test details are summarized in Table 6 below and Aqtesolv analyses provided in Appendix F.

Table 6: Pumping Tests Details

Parameter	TW1 (Well Tag# A342456)
Duration (minutes)	480
Flow Rate (litres per minute)	15.1
Static Water Level (m TOC[1])	0.0 (flowing)
Static Water Level (m BGS[2])	-0.61 (flowing)
Well Depth (m BGS[2])	152.4
Available Drawdown[3] (m)	150.0
Water Level at End of Pumping (m TOC)	21.0
Observed Drawdown at End of Pumping (m)	21.6
Percent Drawdown Utilized (%)	14
Specific Capacity (L/min/m)	0.7

Notes:
1. TOC = top of casing. Casing height of approximately 0.60 metres.
2. BGS = below ground surface
3. Available drawdown (water column above pump) assumes pump is set 3 metres above bottom of the well and is measured from the static water level.

During the period of pumping, the water level decreased approximately 21.0 metres, from artesian conditions prior to pumping. Frequent flow rate measurements confirmed that the pumping was maintained at a constant rate of approximately 15.1 litres per minute for eight consecutive hours. Following cessation of pumping, the well recovered 100% within 16 hours. The pumping test withdrew a total volume of approximately 8,154 litres.

A flow rate of 15 litres per minute and a total volume pumped of approximately 8,154 litres is considered to be representative of the water usage expected for future commercial tenants. The estimated maximum daily water requirements are conservatively estimated to be two times the maximum septic design flows, which are calculated to be less than 4,077 litres per day (discussed in Section 5.0 below). As such, the test well is capable of providing greater than two times the maximum septic flow requirements.

Based on the ability of the well to support constant pumping for eight hours and recover 100% within 24 hours, it is our professional opinion that the water quantity supplied by TW1 is suitable for future use.

4.5 Test Well Water Quality

The groundwater quality was assessed by sampling at the 4-hour and 8-hour during the pump test conducted on December 7, 2023. The field and laboratory water quality results are provided in Appendix G.

The laboratory certificates of analysis and summary of laboratory results are provided in Appendix G. The following comments are provided regarding the drinking water quality and exceedances of the ODWQS:

4.5.1 Bacteriological Results

Total and free chlorine were measured at the time of bacteriological sampling confirmed that total chlorine concentrations in the groundwater were non-detectable.

The results of the bacteriological analysis after 4 hours and 8 hours of pumping indicated non-detectable concentrations of indicator species E.coli and fecal coliforms. Total coliform count of 10 CFU/100mL and 1 CFU/100mL were reported for the 4-hour and 8-hour samples respectively, which exceeds the Ontario Drinking Water Quality Standard (ODWQS) maximum acceptable concentration of 0 CFU/100mL. Based on the MECP guidelines D-5-5, total coliform count less than 6 CFU/100mL is considered treatable if E.coli and fecal coliform concentrations are non-detectable.

Elevated concentrations of total coliform is expected to be related to elevated turbidity, and is expected to improve with further well development, as displayed by the decrease in concentration from 10 CFU/100 mL to 1 CFU/100 mL between the 4-hr and 8-hr samples.

Based on the bacteriological testing, the water is suitable for consumption.

4.5.2 Chemical Results

The results of the chemical testing on the water samples indicate the operational guideline for hardness, and the aesthetic objectives for iron, manganese and colour were exceeded in the water samples.

The above noted exceedances are discussed in the follow sections:

Hardness

Hardness was reported to be 216 mg/L and 213 mg/L as $CaCO_3$ after 4 hours and 8 hours of pumping respectively, which exceeds the ODWQS operational guideline for hardness between 80-100 mg/L. Water having a hardness above 100 milligrams per litre as $CaCO_3$ is often softened for domestic use. Water softeners are widely used throughout rural areas to treat hardness and there is no upper treatable limit for hardness. The ODQWS indicates that hardness levels exceeding 200 mg/L as $CaCO_3$ is considered poor but tolerable and hardness levels exceeding 500 mg/L as $CaCO_3$ is considered to be unacceptable for most domestic purposes.

Water softening by conventional sodium ion exchange water softeners that use sodium chloride may introduce relatively high concentrations of sodium into the drinking water, which may be of concern to persons on a sodium restricted diet. The use of potassium chloride in the water softener (which adds potassium to the water instead of sodium) could be considered as a means of keeping sodium concentrations in softened water at the background level. Alternatively, consideration could be given to providing a cold-water bypass water line for drinking water purposes that is not treated by a water softener.

Sulphide

Sulphide concentrations were reported to be 0.52 mg/L and 0.80 mg/L after 4 hours and 8 hours of pumping respectively, which exceeds the ODQWQS aesthetic objective of 0.05 mg/L as hydrogen sulphide. Sulphide can be related to an unpleasant odour and taste, and can produce black stains on laundered items, pipes and fixtures. Although ingestion of large quantities of hydrogen sulphide can produce toxic effects on humans, it is not likely that an individual would ingest a harmful dose in drinking water because of the taste and odour.

Low levels of sulphide can be removed effectively using aeration (oxidation with filtration) or chlorinating the water followed by sand or multimedia filtration. According to the MECP

Procedures D-5-5: Private Wells: Water Supply Assessment, there is no maximum treatable limit for sulphide.

Aluminum

Total Aluminum concentrations were reported to be 0.756 mg/L after 8 hours of pumping, which exceeds the ODWQS operational guideline of 0.1 mg/L. Aluminum in untreated water is found in the form of fine particles of alumino-silicate clay, which can be effectively removed in coagulation/filtration. The aluminum concentrations are below the maximum acceptable concentration of 2.9 mg/L (Health Canada, 2021).

Elevated concentrations of total aluminum are expected to be attributed to the elevated turbidity levels, and therefore suspended aluminum concentrations in the water samples collected, which is supported by the non-detectable dissolved aluminum concentration in the 8-hr field filtered samples. Aluminum concentrations are expected to decrease with further well development.

Turbidity

Turbidity levels were reported to be 5.2 NTU and 8.7 NTU after 4 hours and 8 hours of pumping respectively, which exceeds the ODWQS aesthetic guideline of 5 NTU. Turbidity can be impacted by various factors that the sample is subjected to from the time of sampling to time of analysis (e.g change in temperature, exposure to oxygen, precipitation of metals). Field measurements for turbidity are therefore considered more representative of in-situ water conditions than laboratory analysis. It is noted that field turbidity decreased significantly over the period of the 8-hr test, from 175 NTU after two hours of pumping to 4.5 NTU at the end of the test, which is below the ODWQS aesthetic guideline of 5 NTU.

Turbidity is expected to be reduced to acceptable levels with further well development.

4.6 Adjacent Commercial Well Water Quality

The groundwater quality was also assessed by sampling a commercial well located on an adjacent land parcel with MECP Well ID: A342501, herein referred to as TW2 (well record provided in Appendix E). The well construction details are summarized in Table 6. The approximate location of the private well used for this study is shown on the General Site Plan (Figure 1, Appendix A).

Table 6: TW2 Water Well Construction Details

Well Construction Details – TW2 (A342501)	
Depth to Bedrock	17.1 metres

Well Construction Details – TW2 (A342501)	
Length of Well Casing Above Ground Surface	0.66 metres
Length of Well Casing Below Ground Surface	18.9 metres
Depth Water Found (i.e. depth to major fractures observed, m bgs)	89.6 metres
Total Well Depth	91.4 metres
Bedrock Description	Limestone

The groundwater samples were collected from the pressure tank bypass after running the tap for a minimum of 10 minutes. Water quality samples were submitted for laboratory analysis of 'subdivision package' parameters on February 24, 2023. Additional sampling was completed on May 2, 2023, where samples were submitted for laboratory analysis of trace metal parameters and volatile organic compounds (VOCs). The field and laboratory water quality results are provided in Appendix G.

Total chlorine tests were conducted in the field during all sampling events using a Hach DR 900 colorimeter to ensure that chlorine levels were at non-detectable concentrations prior to bacteriological testing. The temperature, conductivity, total dissolved solids, pH, turbidity, colour and free chlorine levels of the groundwater were measured and are summarized in Appendix G. The field equipment used during the sampling is calibrated by GEMTEC and the details of field equipment are provided in Table 5.

4.6.1 Bacteriological Results

Total and free chlorine were measured at the time of bacteriological sampling confirmed that total chlorine concentrations in the groundwater were non-detectable.

The results of the bacteriological analysis for TW2 on February 24, 2023 indicated non-detectable concentrations of indicator species E.coli, fecal coliforms and total coliforms.

Based on the bacteriological testing, the water is suitable for consumption.

4.6.2 Chemical Results

The results of the chemical testing on the water samples indicate the operational guideline for hardness, and the aesthetic objectives for iron, manganese and colour were exceeded in the water samples.

The above noted exceedances are discussed in the follow sections:

Hardness

The hardness of the water samples collected from TW2 on February 24, 2023 was reported to be 276 mg/L as $CaCO_3$ respectively, which exceeds the ODWQS operational guideline for hardness between 80-100 mg/L. Water having a hardness above 100 milligrams per litre as $CaCO_3$ is often softened for domestic use. Water softeners are widely used throughout rural areas to treat hardness and there is no upper treatable limit for hardness. The ODQWS indicates that hardness levels exceeding 200 mg/L as $CaCO_3$ is considered poor but tolerable and hardness levels exceeding 500 mg/L as $CaCO_3$ is considered to be unacceptable for most domestic purposes.

Water softening by conventional sodium ion exchange water softeners that use sodium chloride may introduce relatively high concentrations of sodium into the drinking water, which may be of concern to persons on a sodium restricted diet. The use of potassium chloride in the water softener (which adds potassium to the water instead of sodium) could be considered as a means of keeping sodium concentrations in softened water at the background level. Alternatively, consideration could be given to providing a cold-water bypass water line for drinking water purposes that is not treated by a water softener.

Sulphide

The sulphide concentration of the water samples collected from TW2 on February 24, 2023 was reported to be 0.44 mg/L, which exceeds the ODQWQS odour-related aesthetic objective of 0.05 mg/L as hydrogen sulphide. Sulphide can be related to an unpleasant odour and taste, and can produce black stains on laundered items, pipes and fixtures. Although ingestion of large quantities of hydrogen sulphide can produce toxic effects on humans, it is not likely that an individual would ingest a harmful dose in drinking water because of the taste and odour.

Low levels of sulphide can be removed effectively using aeration (oxidation with filtration) or chlorinating the water followed by sand or multimedia filtration. According to the MECP Procedures D-5-5: Private Wells: Water Supply Assessment, there is no maximum treatable limit for sulphide.

Iron

The iron concentration of the water samples collected from TW2 on February 24, 2023 was reported to be 2.8 mg/L, which exceeds the ODWQS aesthetic objective of 0.3 mg/L. Elevated levels of iron may cause staining to plumbing fixtures and laundry. However, the iron levels are below the maximum treatable limits of 10.0 mg/L provided in Table 3 of the MECP Guideline D-5-5. Water softeners and/or manganese greensand filters are recommended for iron treatment in Table 3 of the MECP Guideline for concentrations less than 5.0 mg/L.

Turbidity

The turbidity of the sample collected from TW2 on February 24, 2023 was reported to be 5.2 NTU, which exceeds the ODWQS aesthetic guideline of 5 NTU. Turbidity is impacted by various factors that the sample is subjected to from the time of sampling to time of analysis (e.g change in temperature, exposure to oxygen, precipitation of metals). Field measurements for turbidity are therefore considered more representative of in-situ water conditions than laboratory analysis, in which turbidity was measured to be 1.10 NTU.

5.0 GROUNDWATER IMPACTS

The impact on groundwater resources due to wastewater treatment and disposal by the existing onsite sewage disposal system and development on the Site is assessed in the following sections.

5.1 Hydrogeological Sensitivity

Areas of thin soils cover, highly permeable soils, fractured bedrock exposed at ground surface and karst environments can contribute to hydrogeological sensitivity, which may not allow for sufficient attenuative processes for on-site septic systems and negatively impact the receiving aquifer. Areas of thin soil cover, generally taken to be less than two metres, or highly permeable soils were not encountered at the Site. The overburden thickness on site was observed to be greater than 3.0 meters thick based on the test pit investigations, and karst mapping (Brunton and Dodge, 2008) does not indicate the presence of any inferred or potential karstic features at the Site. Based on this information, it is our opinion that the Site is not hydrogeologically sensitive.

5.2 D-5-4 Three-Step Assessment

The potential risk to groundwater resources on and off the Site was assessed in accordance with Ministry of Environment Procedure D-5-4: Technical Guideline for Individual On-Site Sewage Systems: Water Quality Impact Risk Assessment. To evaluate the groundwater impacts, Step Three of the Three-Step Assessment Process outlined in MECP Procedure D-5-4 was followed.

5.2.1 Nitrate Dilution Calculations For Commercial / Industrial Developments

Where it cannot be demonstrated that the effluent is hydrogeologically isolated from the water supply aquifer, the risk of individual on-site septic systems will be assessed using nitrate-nitrogen contaminant loading for commercial/industrial properties. The maximum allowable concentration of nitrate in the groundwater at the boundaries of the subject property is 10 milligrams per litre as per the Ministry of the Environment, Conservation and Parks guideline D-5-4, dated August 1996.

The nitrate concentration at the Site boundaries was calculated using the following information:

- Site area of 11,830 m^2;
- Hard surface areas of 4,732 m^2, 5,915 m^2, and 7,098 m^2, corresponding to 40%, 50% and 60% hard surface areas respectively.
- Infiltration factors and water holding capacity of soils (WHC) based on information obtained from Table 3.1 of the Ministry of Environment Stormwater Management Planning and Design Manual, dated March 2003;
- Soil Factor of 0.2, which represents a medium combination of clay and loam;
- Cover Factor of 0.1 for cultivated land;
- Topography Factor of 0.2, representative of rolling land with an average slope of 2.8 to 3.8 m/km;
- Non-detectable background nitrate concentrations;
    - Negligible nitrate concentrations within the overburden (GEMTEC, 2022) and the bedrock water supply aquifer (non-detectable nitrate reported in TW1);
- Water holding capacity: 100 mm for urban lawns / shallow rooted crops, clay loam soil;
- An annual water surplus of 0.367 metres/year for soils with a water holding capacity of 100 mm;
    - Carleton + Appleton Weather Station (1939-2020). Water surplus datasheet provided in Appendix I;
- The use of advanced treatment systems in the construction of the septic systems at the industrial lot, capable of reducing the concentration of nitrate in the effluent exiting the treatment unit to a maximum of 20 mg/L (this concentration value was utilized when re-simplifying the formula provided in D-5-4 for the purpose of determining the factor used to determine the maximum allowable flow for each lot from the determined available infiltration volume. The factor becomes 1 versus 3 as is the case without advanced treatment).

Details pertaining to the nitrate dilution calculations are summarized in Table 7, and provided in Appendix I. The septic flow for the commercial lot is based on information provided in Section 5.6.3 of Guideline D-5-4, and the MOE SWM Planning and Design Manual, dated March 2003. Based on the nitrate impact assessment for the Site, the allowable daily design sanitary sewage flow (DDSSF) for the proposed industrial lot is summarized in the table below.

Table 7: Calculated Maximum Septic Flows

Hard Surface Area (%)	Maximum allowable septic flow		Maximum Number of Users[2]	
	Conventional Septic	Advanced Septic[1] (50% nitrate reduction)	Conventional Septic	Advanced Septic[1] (50% nitrate reduction)
40 %	952	2,855	13	38

50 %	793	2,379	11	32
60 %	634	1,903	8	25

Notes:
1. The advanced treatment septic system should be BNQ certified for a minimum nitrate reduction of 50%.
2. Maximum number of users assumes 75 litres per day per person.

The development plans for the Site area unknown, and therefore theoretical hard surface areas were used to calculate the maximum allowable design flow for the Site. Areas of hard surface such as parking lots and building cover limit site permeability, and therefore available infiltration for septic effluent dilution. The Site can support 634 L/day to 952 L/day of septic flow for conventional systems, and 1,903 L/day to 2,855 L/day for advanced treatment systems, depending on hard surface cover of the proposed development.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Conclusions

Based on the results of this investigation, the following conclusions and professional opinions are provided:

- The soils encountered on the Site generally consist of a thin layer of topsoil underlain by a clayey silt with some sand. The overburden thickness is greater than 3.0 meters on the Site. Previous GEMTEC investigations on the adjacent land parcel to the east displayed soil thicknesses of greater than 6.1 meters. The MECP water well record for TW1 indicate soil thicknesses of approximately 17 meters. No thin soils, coarse grained soils or exposed bedrock were observed on the Site, and therefore the Site is not considered to be hydrogeologically sensitive.

- The proposed water supply aquifer is anticipated to be limestone bedrock of the Verulam Formation based on available mapping resources and MECP water well records within one kilometer of the Site. TW1 and TW2 on the adjacent property parcel was completed in limestone (interpreted to be the Verulam Formation).
    - The first reported ‘water found depth’ for TW1 and TW2 was at 89.6 meters within the limestone bedrock unit.

- The proposed water supply aquifer has sufficient groundwater quantity for commercial use based on the results of the 8-hour constant rate pumping test, and a review of MECP well records within 1.0 kilometre of the Site.

    - The maximum daily water requirements were conservatively estimated by multiplying the maximum septic flows by a safety factor of two.

        - The calculated maximum design flow for the Site is 2,855 L/day (assuming advanced treatment septic system and 40% hard surface coverage), corresponding to a water demand of 5,710 L/day.
        - The pumping test conducted on TW1 withdrew approximately 8,154 L over an eight-hour period, and can withstand repeated pumping.

    - Well yields within 1 kilometer of the Site range between 33 to 658 L/min, with and average well yield of 159 L/min.
        - Well yields are expected to be sufficient for proposed commercial use, with estimated water demands in excess of the maximum septic design flow for the property

    - Additional water quantity testing is recommended should future lot owners require groundwater in excess of the maximum allowable septic flows (e.g., processing waters).

- The proposed water supply aquifer is not considered to be highly vulnerable to contamination from surficial sources, e.g. septic system effluent, agricultural, or road salt.
    - TW1 is representative of future water supply wells, and does not display evidence of impacts from surficial sources, i.e. non-detectable E.coli, fecal coliform, tannins and lignins, nitrates/nitrites, and concentrations of chloride and sodium within their respective aesthetic objectives.

- The impacts to the water supply aquifer were assessed in accordance with MECP Procedure D-5-4 predictive assessment for commercial/industrial sites. The maximum allowable septic flow calculated for the Site ranges from 634 L/day to 952 L/day for conventional systems, and 1,903 L/day to 2,855 L/day for advanced treatment, depending on hard surface area of the future development. The maximum number of users for the Site ranges from 8 to 13 using a conventional septic system, and 25 to 38 using an advanced treatment septic system.
    - The calculated maximum allowable flows are based estimated future site conditions, ranging from 40% to 60% hard surface cover.
    - The calculated septic capacities are similar to those calculated to commercial developments in the area (i.e. the neighbouring lot to the east, previously investigated by GEMTEC).

- No impacts anticipated to downgradient water well users to the northeast of the Site are expected.

- Partial-isolation can be inferred from the surface/septic receiving unit to the bedrock supply aquifer based on relatively thick overburden (17 metres of overburden recorded at TW1) and low permeability clayey silt ($k < 10^{-5}$ m/s; GEMTEC, 2022).

- The results of the physical, chemical and bacterial groundwater analyses (subdivision package, trace metals and VOCs) after 8 hours of pumping indicate that the water quality from TW1 meets the ODWQS health related maximum acceptable concentrations (with the exception of total coliform) and maximum concentrations considered reasonably treatable (MCCRT) in accordance with MECP Procedure D-5-5.
    - Although total coliform of 1 CFU/100mL exceeds the ODWQS limit of 0 CFU/100mL, the total coliform counts are within MECP guideline D-5-5 acceptable limits for private wells, which is less than 6 CFU/100mL with non-detectable E.coli and fecal coliform.
    - Notable exceedances after 8 hours of pumping include turbidity and aluminum.
        - Laboratory turbidity was reported to be 8.7 NTU after 8 hours of pumping, with field measured turbidity reported to be 4.5 NTU. The field measured turbidity is considered to be more representative of the raw water quality, which meets the ODWQS aesthetic objective of 5 NTU.
        - Total aluminum concentrations were reported to be 0.756 mg/L after 8 hours of pumping, which exceeds the ODWQS operational guideline of 0.1 mg/L, but is below the maximum acceptable concentration of 2.9 mg/L (Health Canada, 2021).
    - It is our professional opinion that the turbidity and associated turbidity related total coliform and aluminum will decrease with further development, as evident by the decreasing trends during the 8-hour pumping test and results of the background private well sampling (TW2). The elevated levels of turbidity are likely attributed to hydrofracking of TW1, which have been demonstrated to decrease with well development.

- The water quality from TW2, located adjacent to the proposed lot severance did not report any ODWQS health related or maximum acceptable concentrations exceedances. Further, the water quality meets the maximum concentrations considered reasonably treatable (MCCRT) in accordance with MECP Procedure D-5-5.

- Some treatment, such as conventional water softeners and manganese greensand filters may be desired by the well owner to treat the operational guideline exceedance for hardness. Aeration (oxidation with filtration) or chlorinating the water followed by sand or multimedia filtration may be desired for aesthetic guideline exceedance of hydrogen sulphide.

- No impacts to retained lands (134 hectares in area) from the proposed severance 1.2 hectares in area with respect to nitrate impacts.

- It is our professional opinion that the proposed severance lot is suitable for commercial development on private water and septic services.

The following provides recommendations regarding well construction specifications and water quality treatment are provided below.

6.2 Water Supply Recommendations

- Any new water well should be constructed in accordance with local and MECP regulations (O.Reg 903).
- The separation distance between drinking water wells and on Site or neighbouring septic systems should be at least 15 meters in accordance with O.Reg. 903 requirement, and increased if possible.
- If desired by owners, water treatment may be used to treat minor aesthetic objective of hydrogen sulphide and operational guideline exceedances of the ODWQS such as hardness.
    - Water softening by conventional sodium ion exchange water softeners that use sodium chloride may introduce relatively high concentrations of sodium into the drinking water, which may be of concern to persons on a sodium restricted diet. The use of potassium chloride in the water softener (which adds potassium to the water instead of sodium) could be considered as a means of keeping sodium concentrations in softened water at the background level. Alternatively, consideration could be given to providing a cold-water bypass water line for drinking water purposes that is not treated by a water softener.
    - Low levels of sulphide can be removed effectively using aeration (oxidation with filtration) or chlorinating the water followed by sand or multimedia filtration.
- The target well depth for the future water supply well on the severed lot is approximately 152 metres below ground surface, consistent with the test well depth TW1. It is noted that the total well depth may vary from the target depth based on the average well depths and water found depths of approximately 33.5 metres and 33.2 metres respectively for wells within one kilometer of the Site.

- For all newly drilled wells, it is recommended that a raw water sample be collected and analyzed for potability requirements (E. coli. and total coliform bacteria).
    - If any bacteriological exceedances of the Ontario Drinking Water Quality Standards (ODWQS) are noted in the sampling, then it is recommended that the homeowner take remedial actions (such as chlorination of the well to eliminate

bacteria) and retest a raw water sample to confirm that the remedial actions were effective.

- It is recommended that newly drilled water wells be developed by the well driller for a following completion of the well drilling. Extended well development may be required to reduce turbidity levels to acceptable limits.

- It is recommended that the property owners construct, maintain and test their drinking water well in accordance with the Ministry of the Environment and Climate Change document “Water Supply Wells - Requirements and Best Management Practices, Revised April 2015”.

Following the MECP D-5-4 guidelines, the Site meets the considerations for onsite sewage disposal systems. The following provides recommendations regarding septic system design:

6.3 Septic System Recommendations

- It is recommended that the property owners construct, maintain and check their Site septic system in accordance with the Ontario Building Code and best management practices.

- If advanced treatment systems are utilized, it is recommended that the systems are BQN certified (or equivalent certification) for a minimum nitrate reduction of 50%.

- It is required that the property owners enter a maintenance agreement with authorized agents of the advanced treatment septic system manufacturer for the service life of the system.

7.0 CLOSURE

We trust this report provides sufficient information for your present purposes. If you have any questions concerning this report, please do not hesitate to contact our office.

Brent Redmond, M.A.Sc., P.Geo.
Hydrogeologist



Andrius Paznekas, M.Sc., P.Geo.
Hydrogeologist



8.0 REFERENCES

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Domenico, P.A. and F.W. Schwartz, 1990. *Physical and Chemical Hydrogeology*, John Wiley & Sons, New York, 824 p

CONDITIONS AND LIMITATIONS OF THIS REPORT

1. **Standard of Care:** GEMTEC has prepared this report in a manner consistent with generally accepted engineering or environmental consulting practice in the jurisdiction in which the services are provided at the time of the report. No other warranty, expressed or implied is made.
2. **Copyright:** The contents of this report are subject to copyright owned by GEMTEC, save to the extent that copyright has been legally assigned by us to another party or is used by GEMTEC under license. To the extent that GEMTEC owns the copyright in this report, it may not be copied without our prior written agreement for any purpose other than the purpose indicated in this report. The methodology (if any) contained in this report is provided to the Client in confidence and must not be disclosed or copied to third parties without the prior written agreement of GEMTEC. Disclosure of that information may constitute an actionable breach of confidence or may otherwise prejudice our commercial interests.
3. **Complete Report:** This report is of a summary nature and is not intended to stand alone without reference to the instructions given to GEMTEC by the Client, communications between GEMTEC and the Client and to any other reports prepared by GEMTEC for the Client relative to the specific site described in the report. In order to properly understand the suggestions, recommendations and opinions expressed in this report, reference must be made to the whole of the report. GEMTEC cannot be responsible for use of portions of the report without reference to the entire report.
4. **Basis of Report:** This Report has been prepared for the specific site, development, design objectives and purposes that were described to GEMTEC by the Client. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location. The applicability and reliability of any of the findings, recommendations, suggestions, or opinions expressed in the document, subject to the limitations provided herein, are only valid to the extent that this report expressly addresses the proposed development, design objectives and purposes. Any change of site conditions, purpose or development plans may alter the validity of the report and GEMTEC cannot be responsible for use of this report, or portions thereof, unless GEMTEC is requested to review any changes and, if necessary, revise the report.
5. **Time Dependence:** If the proposed project is not undertaken by the Client within 18 months following the issuance of this report, or within the timeframe understood by GEMTEC to be contemplated by the Client, the guidance and recommendations within the report should not be considered valid unless reviewed and amended or validated by GEMTEC in writing.
6. **Use of This Report:** The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without GEMTEC's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, GEMTEC may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process.

   Contractors bidding on, or undertaking the work, should rely on their own investigations, as well as their own interpretations of the factual data presented in the report, as to how subsurface conditions may affect their work, including but not limited to proposed construction techniques, schedule, safety and equipment capabilities.
7. **No Legal Representations:** GEMTEC makes no representations whatsoever concerning the legal significance of its findings, or as to other legal matters touched on in this report, including but not limited to, ownership of any property, or the application of any law to the facts set forth herein. With respect to regulatory compliance issues, regulatory statutes are subject to interpretation and change. Such interpretations and regulatory changes should be reviewed with legal counsel.
8. **Decrease in Property Value:** GEMTEC shall not be responsible for any decrease, real or perceived, of the property or site's value or failure to complete a transaction, as a consequence of the information contained in this report.
9. **Reliance on Provided Information:** The evaluation and conclusions contained in this report have been prepared on the basis of conditions in evidence at the time of site inspections and on the basis of information provided to us. We have relied in good faith upon representations. information and instructions provided by the Client and others concerning the site. Accordingly, we cannot accept responsibility for any deficiency, misstatement or inaccuracy contained in this report as a result of misstatements, omissions,

misrepresentations. or fraudulent acts of the Client or other persons providing information relied on by us. We are entitled to rely on such representations, information and instructions and are not required to carry out investigations to determine the truth or accuracy of such representations, information and instructions.

10. **Investigation Limitations:** Site investigation programs are a professional estimate of the scope of investigation required to provide a general profile of subsurface conditions but even a comprehensive investigation, sampling and testing program may fail to detect all or certain subsurface conditions.

    The data derived from the site investigation program and subsequent laboratory testing are interpreted by trained personnel and extrapolated across the site to form an inferred geological representation and an engineering opinion is rendered about overall subsurface conditions and their likely behaviour with regard to the proposed development. Conditions between and beyond the borehole/test hole locations may differ from those encountered at the borehole/test hole locations and the actual conditions at the site might differ from those inferred to exist, since no subsurface exploration program, no matter how comprehensive, can reveal all subsurface details and anomalies. Accordingly, GEMTEC does not warrant or guarantee the exactness of of the subsurface descriptions.

    Soil and groundwater conditions shown in the factual data and described in the report are the observed conditions at the time of their determination or measurement. Unless otherwise noted, those conditions form the basis of the recommendations in the report. Groundwater conditions may vary between and beyond reported locations and can be affected by annual, seasonal and meteorological conditions. The condition of the soil, rock and groundwater may be significantly altered by construction activities (traffic, excavation, groundwater level lowering, pile driving, blasting, etc.) on the site or on adjacent sites. Excavation may expose the soils to changes due to wetting, drying or frost. Unless otherwise indicated the soil must be protected from these changes during construction.

    In addition, fill of variable physical and chemical composition can be present over portions of the site or on adjacent properties. The professional services retained for this project include only the geotechnical aspects of the subsurface conditions at the site, unless otherwise specifically stated and identified in the report. The presence or implication(s) of possible surface and/or subsurface contamination resulting from previous activities or uses of the site and/or resulting from the introduction onto the site of materials from off-site sources are outside the terms of reference for this project and have not been investigated or addressed.

11. **Sample Disposal:** GEMTEC will dispose of all uncontaminated soil and/or rock samples 60 days following issue of this report or, upon written request of the Client, will store uncontaminated samples and materials at the Client's expense. In the event that actual contaminated soils, fill materials or groundwater are encountered or are inferred to be present, all contaminated samples shall remain the property and responsibility of the Client for proper disposal.

12. **Follow-Up and Construction Services:** All details of the design were not known at the time of submission of GEMTEC's report. GEMTEC should be retained to review the final design, project plans and documents prior to construction, to confirm that they are consistent with the intent of GEMTEC's report.

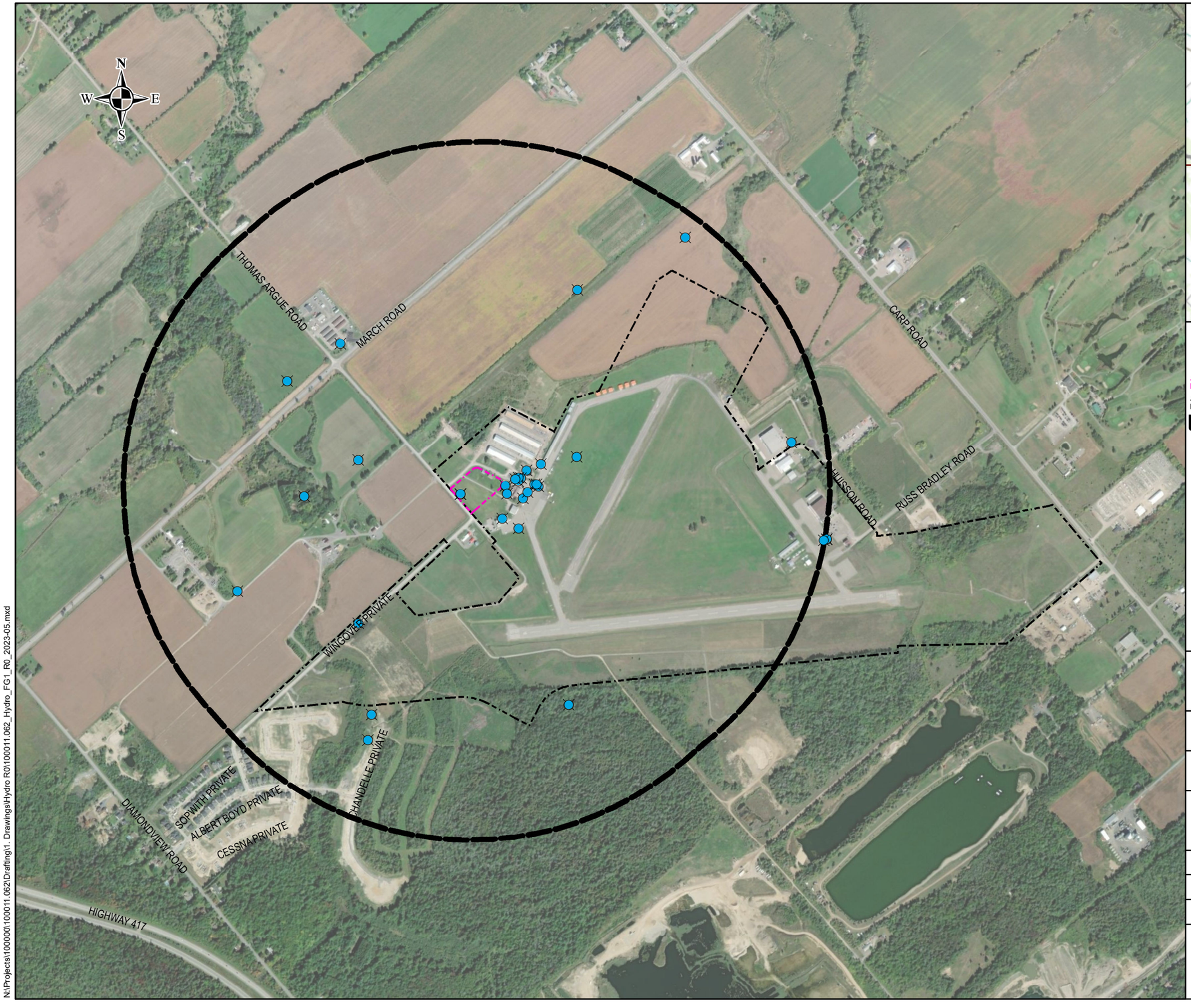
    During construction, GEMTEC should be retained to perform sufficient and timely observations of encountered conditions to confirm and document that the subsurface conditions do not materially differ from those interpreted conditions considered in the preparation of GEMTEC's report and to confirm and document that construction activities do not adversely affect the suggestions, recommendations and opinions contained in GEMTEC's report. Adequate field review, observation and testing during construction are necessary for GEMTEC to be able to provide letters of assurance, in accordance with the requirements of many regulatory authorities. In cases where this recommendation is not followed, GEMTEC's responsibility is limited to interpreting accurately the information encountered at the borehole locations, at the time of their initial determination or measurement during the preparation of the Report.

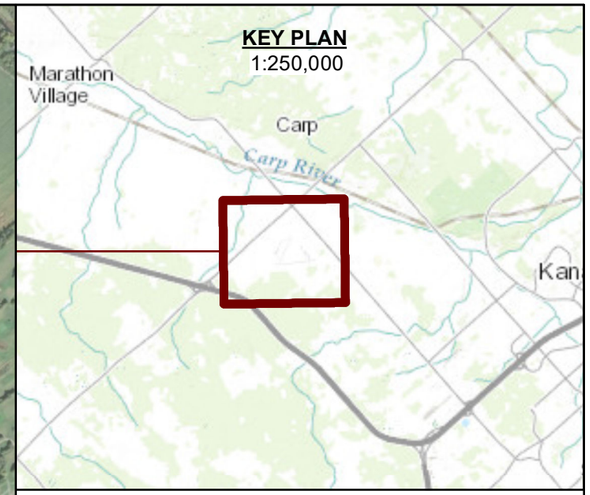
13. **Changed Conditions:** Where conditions encountered at the site differ significantly from those anticipated in this report, either due to natural variability of subsurface conditions or construction activities, it is a condition of this report that GEMTEC be notified of any changes and be provided with an opportunity to review or revise the recommendations within this report. Recognition of changed soil and rock conditions requires experience and it is recommended that GEMTEC be employed to visit the site with sufficient frequency to detect if conditions have changed significantly.

14. **Drainage:** Drainage of subsurface water is commonly required either for temporary or permanent installations for the project. Improper design or construction of drainage or dewatering can have serious consequences. GEMTEC takes no responsibility for the effects of drainage unless specifically involved in the detailed design and construction monitoring of the system.

APPENDIX A

Figures





LEGEND

- MECP WATER WELL RECORD
- PROPOSED SEVERANCE BOUNDARY
- EXISTING PROPERTY BOUNDARY
- 1 km RADIUS FROM PROPERTY BOUNDARY

NOTES:

1. Coordinate system: NAD83/ UTM zone 18N.
2. Geographic dataset source: Ontario GeoHub.
3. Contains information licensed under the Open Government Licence – Ontario.
4. Ministry of the Environment, Conservation and Parks (MECP), 2023. Water Well Information System (WWIS).
5. Service Layer Credits: Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community

Scale
1:12,000
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Drawing
SITE LOCATION PLAN

Client:
NOVATECH ENGINEERS, PLANNERS & LANDSCAPE ARCHITECTS

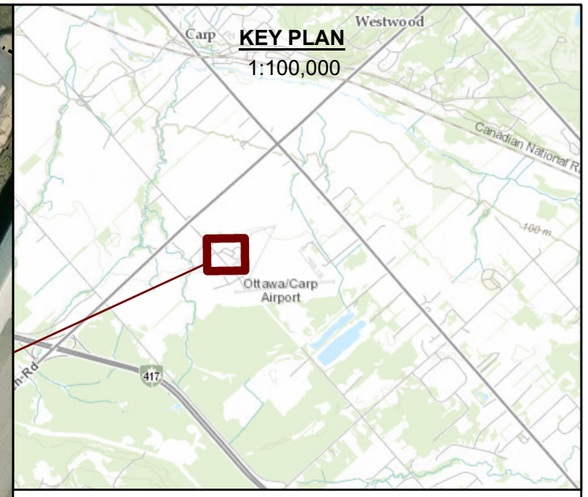
Project
HYDROGEOLOGICAL INVESTIGATION & TERRAIN ANALYSIS
PROPOSED LOT SEVERANCE
1500 THOMAS ARGUE RD
CARP, ONTARIO

Drwn By:	S.L.	Chkd By:	B.R.
Project No.	100011.062	Revision No.	0
Date	MAY 2023	**FIGURE: A.1**	

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N:\Projects\100000\100011.062\Drafting\1. Drawings\Hydro R0\100011.062_Hydro_FG1_R0_2023-05.mxd





LEGEND

- TEST PIT
- TEST WELL
- SEVERANCE BOUNDARY
- PROPERTY BOUNDARY

NOTES:

1. Coordinate system: NAD83/ UTM zone 18N.
2. Geographic dataset source: Ontario GeoHub.
3. Contains information licensed under the Open Government Licence – Ontario.
4. Service Layer Credits: World Topographic Map: City of Ottawa, Ontario Base Map, Province of Ontario, Esri Canada, Esri, © OpenStreetMap contributors, HERE, Garmin, USGS, NGA, EPA, USDA, NPS, AAFC, NRCan
Bing Maps Aerial: © 2023 Microsoft Corporation © 2023 Maxar ©CNES (2023)

Scale
1:1,500
0 20 40 80 120 Meters

Drawing
DETAILED SITE PLAN

Client:
NOVATECH ENGINEERS, PLANNERS & LANDSCAPE ARCHITECTS

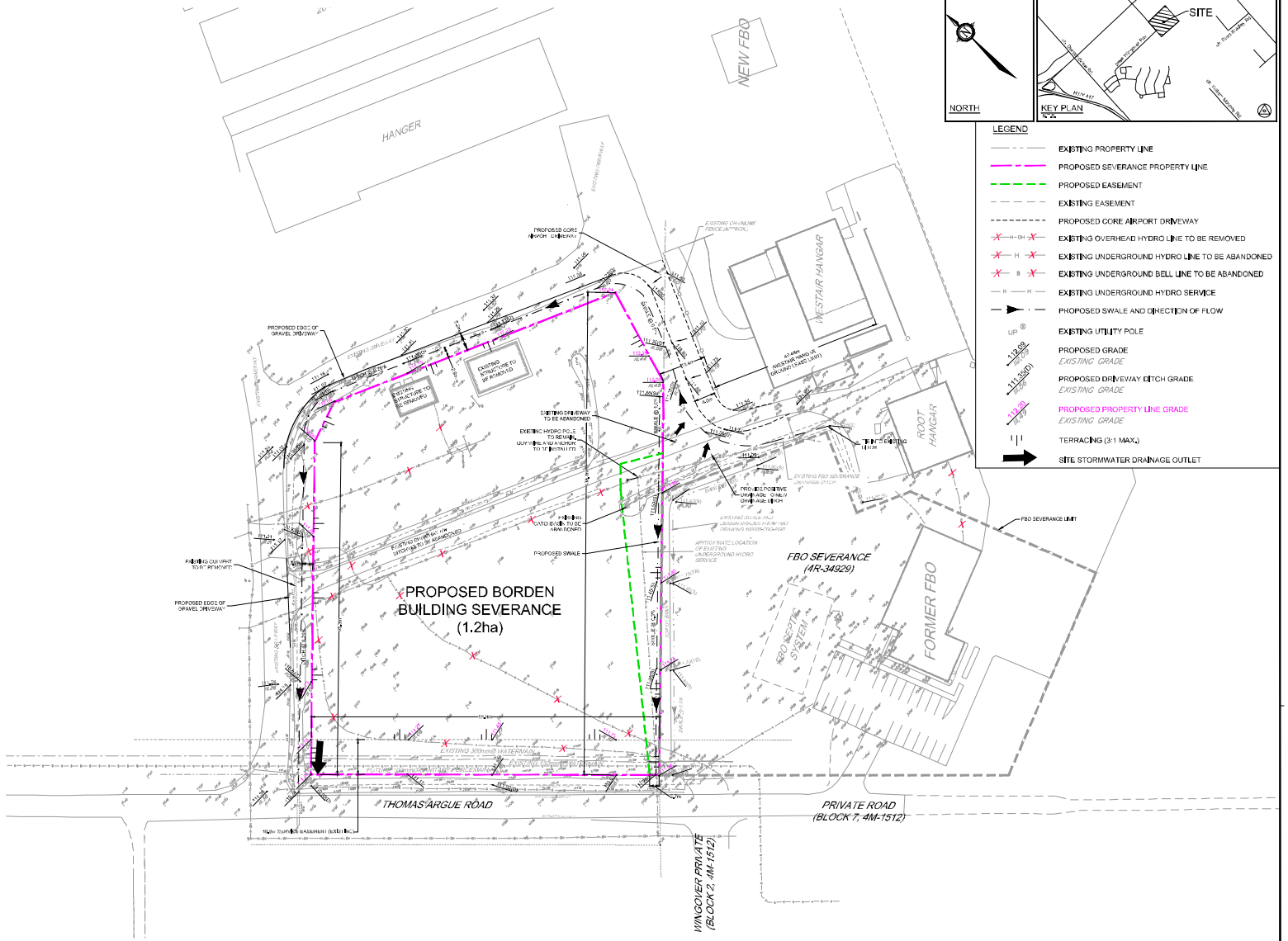
Project
HYDROGEOLOGICAL INVESTIGATION & TERRAIN ANALYSIS
PROPOSED LOT SEVERANCE
1500 THOMAS ARGUE RD
CARP, ONTARIO

Drwn By:	S.L.	Chkd By:	B.R.
Project No.	100011.062	Revision No.	0
Date	DECEMBER 2023		**FIGURE: A.2**

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APPENDIX B

Novatech Figures



SOURCE REFERENCE:
LEGAL, TOPOGRAPHICAL AND UTILITY INFORMATION:
PLAN OF SURVEY OF PART OF LOT 15, CONCESSION 3, GEOGRAPHIC OF NEPEAN, CITY OF OTTAWA - APRIL 26, 2023

NOTE:
THE POSITION OF ALL POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE STARTING WORK, DETERMINE THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

NOT FOR CONSTRUCTION

No.	REVISION	DATE	BY
4.	ISSUED FOR DISCUSSION	JUNE 15 23	ARM
3.	ISSUED FOR DISCUSSION	JUNE 6 23	ARM
2.	ISSUED FOR DISCUSSION	MAY 19 23	ARM
1.	ISSUED FOR DISCUSSION	MAY 11 23	ARM

SCALE
1:500
1:500
0 5 10 15 20

DESIGN	VNP
CHECKED	ARM
DRAWN	VNP
CHECKED	ARM
APPROVED	ARM

FOR REVIEW ONLY

NOVATECH
Engineers, Planners & Landscape Architects
Suite 200, 240 Michael Cowpland Drive
Ottawa, Ontario, Canada K2M 1P6
Telephone | (613) 254-9643
Fax | (613) 254-5867
Website | www.novatech-eng.com

LOCATION
CITY OF OTTAWA
WEST CAPITAL AIRPARK

DRAWING NAME
BORDEN BUILDING SEVERANCE
PRELIMINARY GRADING PLAN

PROJECT No. 102085-16
REV. REV 4
DRAWING No. 102085-16-PGR

M:\2023\102085\CAD\102085-PGR-Borden Dev - Thomas Argue Rd\102085-PGR-Borden Dev - Thomas Argue Rd.dwg, 6/15/2023 1:53:09 PM, novatech

APPENDIX C

MECP Water Well Record Summary

MECP Water Well Record Compilation
(1500 Thomas Argue Road- 1 km search radius)

Well ID	Completed	Depth (m)	Depth to Bedrock (m)	Static Water Level (m bgs)	Water Found (m bgs)	Recommended Pumping Rate (litres per minute)	Water Detail	Well Use	Aquifer Type
1503130	16-11-43	17.7	-	4.3	-	-	UK	PS	Overburden
1503132	21-06-62	29.3	18.3	-	21.3	22.7	FR	PS	Limestone
1503134	23-11-62	28	-	8.2	28	54.6	SU	ST	Overburden
1503143	15-07-60	30.2	28.7	4.6	29.3	34.6	FR	DO	-
1515864	22-11-76	28.3	14.3	2.1	26.2	36.4	FR		Limestone
1518459	16-06-83	71.6	8.5	18.3	54.9, 64, 70.1	22.7	FR	DO	Sandstone
1520126	01-09-85	10.7	5.5	3	6.1	45.5	FR	DO	Limestone
1523100	05-12-88	31.4	1.5	1.2	15.2, 29	63.6	FR	DO	Granite
1531260	21-07-00	36.6	2.4	2.4	33.5	45.5	FR	DO	Sandstone
1534847	13-07-04	121.9	0.0	6.5	-	22.7	-	DO	Limestone
1535237	22-09-04	23.5	17.7	-	-	-	-	NU	Limestone
1535238	21-09-04	21.6	15.8	-	-	-	-	-	Limestone
1535239	21-09-04	39.3	34.7	-	-	-	-	NU	Limestone
1535393	10-11-04	-	-	-	-	-	-	-	-
1535739	30-05-05	4.5	-	-	-	-	-	-	-
1535788	01-08-05	39.6	20.7	1.7	22.5	10	-	MN	Limestone
1536025	10-06-05	32	-	2.9	31	-	-	DO	Overburden
1535368	10-11-04	-	-	-	-	-	GS	-	-
7120508	28-07-08	-	-	-	-	-	-	NU	-
7127229	15-06-09	3.6	-	-	-	-	-	MO	-
7120701	28-07-08	-	-	-	-	-	-	-	-
7120701	28-07-08	-	-	-	-	-	-	-	-
7120701	28-07-08	-	-	-	-	-	-	-	-
7120701	28-07-08	-	-	-	-	-	-	-	-
7120701	29-07-08	-	-	-	-	-	-	-	-
7120701	29-07-08	-	-	-	-	-	-	-	-
7189747	20-09-12	-	-	-	-	-	-	-	-
7279015	08-10-13	-	-	-	-	-	-	-	-
7279742	15-09-16	-	-	-	-	-	-	-	-
7334932	-	-	-	-	-	-	-	-	-

https://www.ontario.ca/page/map-well-records

"Well Use"		"Water Detail"	
DO	Domestic	FR	Fresh
ST	Livestock	SA	Salty
IR	Irrigation	SU	Sulphur

GEMTEC
Consulting Engineers and Scientists

Project: 10011.062
Date: May 2023

MECP Water Well Record Compilation
(1500 Thomas Argue Road- 1 km search radius)

IN	Industrial	MN	Mineral
CO	Commercial	UK	Unknown
MN	Municipal	GS	Gas
PS	Public	IR	Iron
AC	Cooling and A/C		
NU	Not Used		
OT	Other		
TH	Test Hole		
DE	Dewatering		
MO	Monitoring		
MT	Monitoring Test		

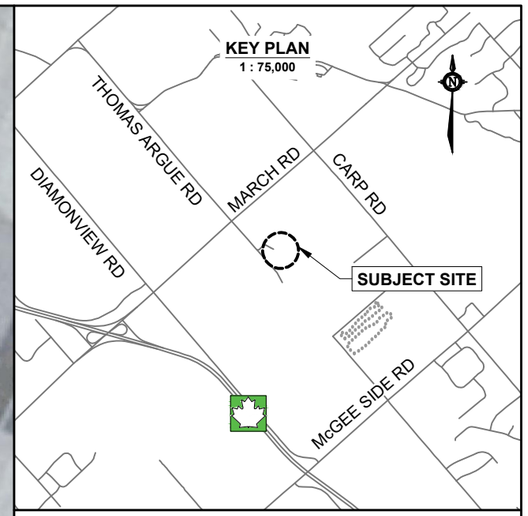
Project: 10011.062
Date: May 2023

APPENDIX D

Borehole Logs and Site Plan from Adjacent Property Parcel
(GEMTEC Project 101491.001)

Hydrometer Data





LEGEND

BH # ← BOREHOLE ID

BOREHOLE LOCATION
(current investigation by GEMTEC)

WELL LOCATION
(current investigation by GEMTEC)

APPROXIMATE SEVERANCE BOUNDARY

Scale
1:1000
0 20 40 60m

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Drawing
BOREHOLE LOCATION PLAN

Client
SHELDON CREEK DEVELOPMENTS

Project
101491.001

HYDROGEOLOGICAL INVESTIGATION
ECA FOR NEW FBO SEPTIC SYSTEM
CARP AIRPORT, CARP, ON

Drwn by
S.L.

Chkd by
A.P.

Date
JUNE, 2022

Rev.
1

FIGURE 1

N:\PROJECTS\101400\101491.001\DRAFTING\1.DRAWINGS\101491.001_HYDROBH_R1_2022-06.DWG

RECORD OF BOREHOLE Borehole 22-1

CLIENT: Sheldon Creek Developments
PROJECT: Terrain Analysis, Proposed Industrial Development
JOB#: 101491.001
LOCATION: See Site Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Feb 18 2022

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface								
		TOPSOIL			1	SS	483	10		
		Loose brown to grey CLAYEY SILT with trace SAND		0.30	2	SS	483	5	MH	
1					3	SS	584	4		
					4	SS	584	4		
2		Very loose brown to grey CLAYEY SILT with trace SAND		2.44	5	SS	533	2		
					6	SS	610	-		
3					7	SS	610	-		
					8	SS	610	-	MH	
4		Very soft grey CLAYEY SILT with trace SAND		4.88	9	SS	584	-		
					10	SS	559	-		
5				6.10						
6										
7										
8										
9										
10										

PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL ⊕ REMOULDED
WATER CONTENT, % W_P W W_L
10 20 30 40 50 60 70 80 90

Hole Plug
Filter Sand
50 milimetre well screen
Filter Sand

GROUNDWATER OBSERVATIONS

DATE	DEPTH (m)	ELEV. (m)
22/02/23	0.7 ▽	
22/03/11	0.5 ▼	

GEMTEC
Consulting Engineers and Scientists

LOGGED: BR
CHECKED: AP

GEO - BOREHOLE LOG 101491.001_GEOTECH_2022-03-28.GPJ GEMTEC 2018.GDT 4/5/22

RECORD OF BOREHOLE Borehole 22-2

CLIENT: Sheldon Creek Developments
PROJECT: Terrain Analysis, Proposed Industrial Development
JOB#: 101491.001
LOCATION: See Site Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Feb 18 2022

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	PENETRATION RESISTANCE (N), BLOWS/0.3m; DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED); WATER CONTENT, % (W_P, W, W_L)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface									
		TOPSOIL			1	SS	356	12			
		Dark brown, SILTY SAND with COBBLE content (FILL)		0.30							
1		Dark to light brown SILTY CLAY		0.76	2	SS	305	5			
		Loose light brown CLAYEY SILT with minor sand		1.22	3	SS	610	3			Native Backfill
2					4	SS	533	1			
					5	SS	610	2			
3				3.05							
4											
5											
6											
7											
8											
9											
10											

10 20 30 40 50 60 70 80 90

GEO - BOREHOLE LOG 101491.001_GEOTECH_2022-03-28.GPJ GEMTEC 2018.GDT 4/5/22

GEMTEC
Consulting Engineers and Scientists

LOGGED: BR
CHECKED: AP

RECORD OF BOREHOLE Borehole 22-3

CLIENT: Sheldon Creek Developments
PROJECT: Terrain Analysis, Proposed Industrial Development
JOB#: 101491.001
LOCATION: See Site Plan, Figure 1

SHEET: 1 OF 1
DATUM: CGVD28
BORING DATE: Feb 18 2022

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES: NUMBER	TYPE	RECOVERY, mm	BLOWS/0.3m	PENETRATION RESISTANCE (N), BLOWS/0.3m / DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m / SHEAR STRENGTH (Cu), kPA (NATURAL, REMOULDED) / WATER CONTENT, %	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		Ground Surface									
		TOPSOIL			1	SS	432	20			
		Light brown CLAYEY SILT		0.30	2	SS	406	7			
1					3	SS	508	5			Native Backfill
		Loose light brown CLAYEY SILT with minor sand		1.83	4	SS	610	3			
2					5	SS	610	2			
3				3.05							
4											
5											
6											
7											
8											
9											
10											

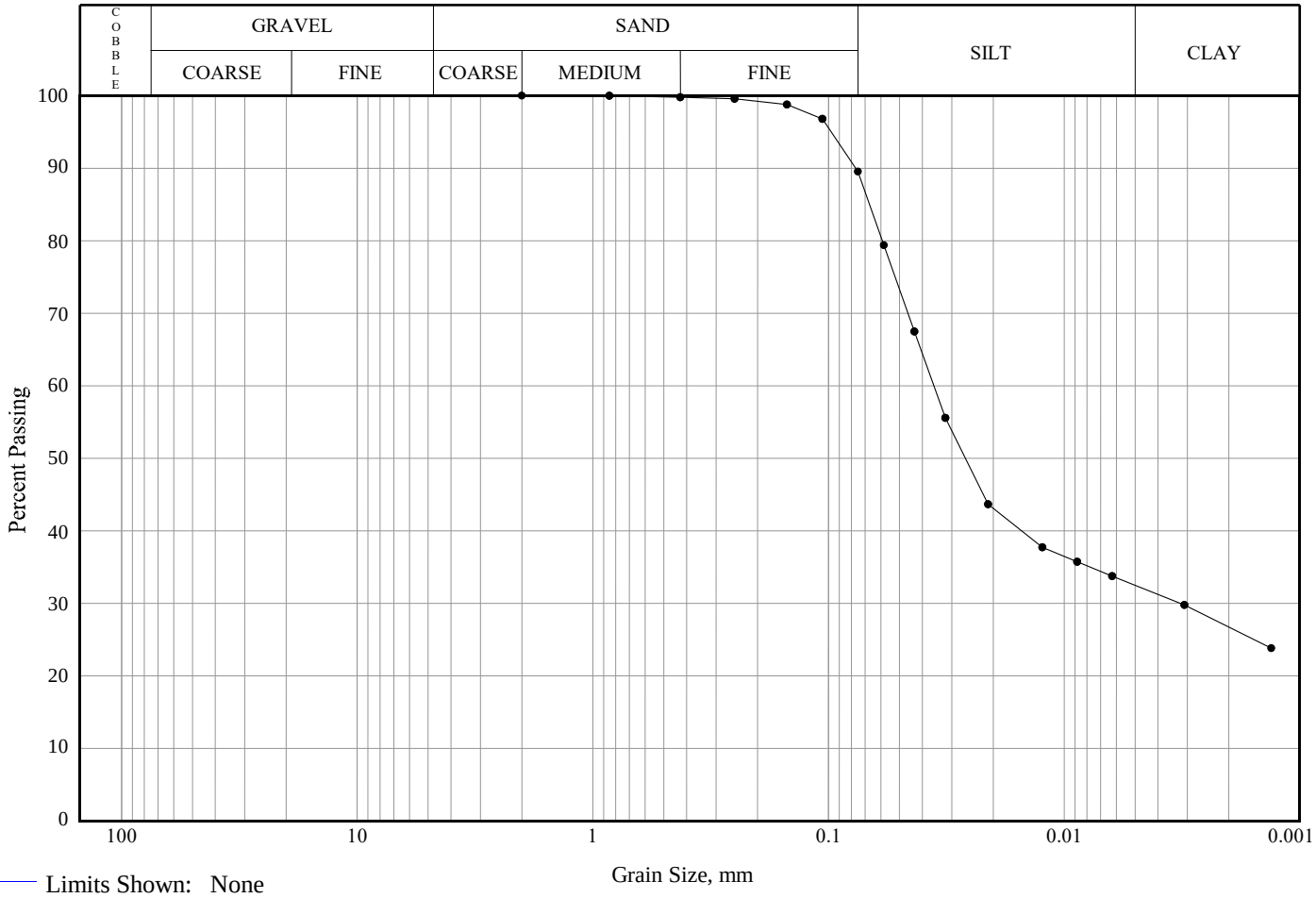
PENETRATION RESISTANCE (N), BLOWS/0.3m
DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m
SHEAR STRENGTH (Cu), kPA: + NATURAL, ⊕ REMOULDED
WATER CONTENT, % W_P W W_L
10 20 30 40 50 60 70 80 90

GEMTEC
Consulting Engineers and Scientists

LOGGED: BR
CHECKED: AP

GEO - BOREHOLE LOG 101491.001_GEOTECH_2022-03-28.GPJ GEMTEC 2018.GDT 4/5/22

GEMTEC Consulting Engineers and Scientists	Client: Novatech Project: Carp Airport Severance – Hydrogeology and Terrain Ana Project #: 100011062	Soils Grading Chart (LS-702/ ASTM D-422)



Limits Shown: None

Line Symbol	Sample	Borehole/ Test Pit	Sample Number	Depth	% Cob.+ Gravel	% Sand	% Silt	% Clay
—●—		TP4	1	2.8-2.9	0.0	10.5	57.1	32.5

Line Symbol	CanFEM Classification	USCS Symbol	D_{10}	D_{15}	D_{30}	D_{50}	D_{60}	D_{85}	% 5-75µm
—●—	Clayey silt , some sand	N/A	---	---	0.00	0.03	0.04	0.07	57.1

APPENDIX E

Test Well Water Well Records

Ontario — Ministry of the Environment, Conservation and Parks

Tag#:A395710 (Print Below)
A395710

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☒ Imperial

Page ____ of ____

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed by Well Owner
	(Carp Airport) 1514947 Ont Inc. (West Capital Developments Operating AS		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
75 First Street Unit 14	Orangeville	ON	L9W 2E7	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1500 Thomas Argue Road	Huntley	13&14	3

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa Carleton	Carp	Ontario	

UTM Coordinates	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 8 3	18	419147	5019309	4R-27606	Part 2

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown	Clay			0'	30'
Blue	Clay			30'	45'
	Boulders	& Gravel		45'	52'
Grey & Black	Limestone	(Soft)		52'	294'
Grey & Black	Limestone	(Soft)		294'	494'
Grey & Black	Limestone	(Soft)		494'	500'

WELL # 3.

(well 1 - A342293 - April 18, 2022 / well 2 - A342501 - Sept 15, 2022)

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
58'	48'	Neat cement	12.48
48'	0'	Bentonite slurry	18.80

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☒ Air percussion
☐ Other, specify SURGED X3

Well Use

☐ Public ☐ Commercial ☐ Not used
☒ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6 1/4"	Steel	.188"	+2'	58'
6"	Open Hole	[redacted]	58'	500'

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Status of Well

☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify Not tested

If pumping discontinued, give reason: X

Pump intake set at (m/ft): 300

Pumping rate (l/min/GPM): 50.3

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 210.8"

If flowing give rate (l/min/GPM): X

Recommended pump depth (m/ft)

Recommended pump rate (l/min/GPM)

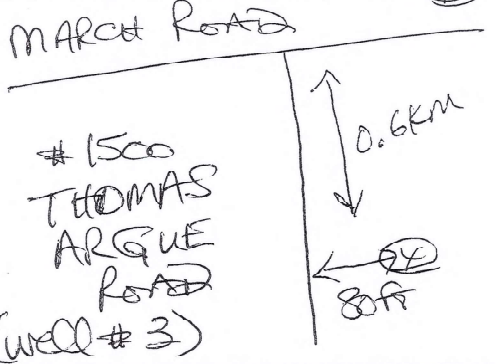
Well production (l/min/GPM)

Disinfected? ☐ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	32'5"		210.8"
1	33'3"	1	205.8
2	34.8	2	205.3
3	38.4	3	205.1
4	41.8	4	204.9
5	45.2	5	204.6
10	61.4	10	204.2
15	78.6	15	203.9
20	95.6	20	203.6
25	112.1	25	203.4
30	128.3	30	203.2
40	159.1	40	203.
50	187.	50	202.9
60	210'8"	60	202.8

Map of Well Location

Please provide a map below following instructions on the back.



Comments:

Water Details

Water found at Depth	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
274 - 294 (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify		0' 58'	9 3/4"
274 - 494 (m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify		58' 500'	6"
(m/ft) ☐ Gas	Kind of Water: ☐ Fresh ☐ Untested ☐ Other, specify			

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Air Rock Drilling Co. Ltd.	C7681

Business Address (Street Number/Name)	Municipality
8888 Franktown Road	Richmond

Province	Postal Code	Business E-mail Address
ON	K0A 2Z0	air-rock@sympatico.ca

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)
6138382170	Hanna, Jeremy

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted (Y Y Y Y M M D D)
T3632		2023 11 30

Well owner's information package delivered: ☒ Yes ☐ No

Date Package Delivered: 2023/11/02

Ministry Use Only

Audit No. Z407981

Received

Ontario — Ministry of the Environment, Conservation and Parks

Tag#: A342501 (Print Below)

A342501

Well Record

Regulation 903 Ontario Water Resources Act

Measurements recorded in: ☐ Metric ☒ Imperial

Page ____ of ____

Well Owner's Information

First Name	Last Name/Organization	E-mail Address	☐ Well Constructed ☐ Well Owner
	(Carp Airport) 1514947 Ont Inc operating as West Capital Development		

Mailing Address (Street Number/Name)	Municipality	Province	Postal Code	Telephone No. (inc. area code)
75 First Street Unit 14	Orangeville	ON	L9W 2E7	

Well Location

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1500 Thomas Argue Road	Huntley	13 & 14	3

County/District/Municipality	City/Town/Village	Province	Postal Code
Ottawa Carleton	Carp	Ontario	

UTM Coordinates Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
NAD 83 18	419279	5019268	4R-27606	PT 2

Overburden and Bedrock Materials/Abandonment Sealing Record (see instructions on the back of this form)

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	Depth (m/ft) To
Brown & Blue	Clay			0	56
Grey & Black	Limestone	(soft)		56	294
Grey & Black	Limestone	(soft)		294	300

Well #2

(Well #1 - TAG A342293 - April 18, 2022)

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
62	52	Neat cement	12.48
52	0	Bentonite slurry	12.6

Method of Construction

☐ Cable Tool ☐ Diamond
☐ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☒ Air percussion
☐ Other, specify SURGED

Well Use

☐ Public ☐ Commercial ☐ Not used
☒ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, specify

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	Depth (m/ft) To
6 1/4"	Steel	.188"	+2'	62'
6 1/8"	Open Hole		62'	300'

Status of Well

☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, specify
☐ Other, specify

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	Depth (m/ft) To

Results of Well Yield Testing

After test of well yield, water was:
☐ Clear and sand free
☐ Other, specify Not tested

If pumping discontinued, give reason: X

Pump intake set at (m/ft): 280'

Pumping rate (l/min/GPM): 18

Duration of pumping: 1 hrs + 0 min

Final water level end of pumping (m/ft): 118.9"

If flowing give rate (l/min/GPM): X 1 GPM

Recommended pump depth (m/ft): 150'

Recommended pump rate (l/min/GPM): 15

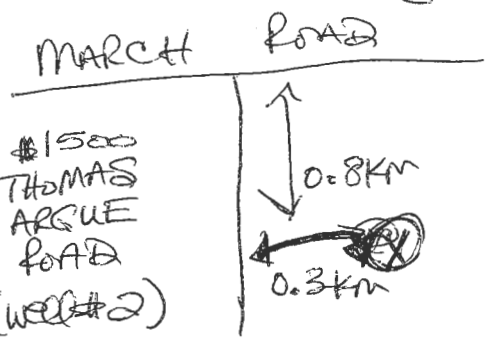
Well production (l/min/GPM): 18

Disinfected? ☒ Yes ☐ No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	Flow		118.9"
1	10.5	1	101.3
2	18.9	2	87
3	26.3	3	79
4	33.2	4	71.6
5	39.2	5	64.7
10	62.6	10	37.1
15	78.2	15	18.6
20	89.1	20	7.4
25	96.9	25	1
30	102.4	30	FLOW
40	109	40	FLOW
50	114.7	50	FLOW
60	118.9"	60	FLOW

Map of Well Location

Please provide a map below following instructions on the back. (N)



Water Details

Water found at Depth	Kind of Water	Hole Diameter Depth From	Depth To	Diameter (cm/in)
294 (m/ft) ☐ Gas	☐ Fresh ☒ Untested ☐ Other, specify			
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify	0'	62'	9 3/4"
(m/ft) ☐ Gas	☐ Fresh ☐ Untested ☐ Other, specify	62'	300'	6 1/8"

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Air Rock Drilling Co. Ltd.	C7681

Business Address (Street Number/Name)	Municipality	Province	Postal Code	Business E-mail Address
6659 Franktown Road	Richmond	ON	K0A 2Z0	air-rock@sympatico.ca

Bus. Telephone No. (inc. area code)	Name of Well Technician (Last Name, First Name)	Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
6138382170	Hanna, Jeremy	T3632		2022 09 30

Comments: 1 HP - 15 GPM Set @ 150 FT

Well owner's information package delivered: ☒ Yes ☐ No

Date Package Delivered: 2022 09 21

Date work completed: 2022 09 15

Ministry Use Only

Audit No. Z394837

Received

0506E (2020/06) © Queen's Printer for Ontario, 2020

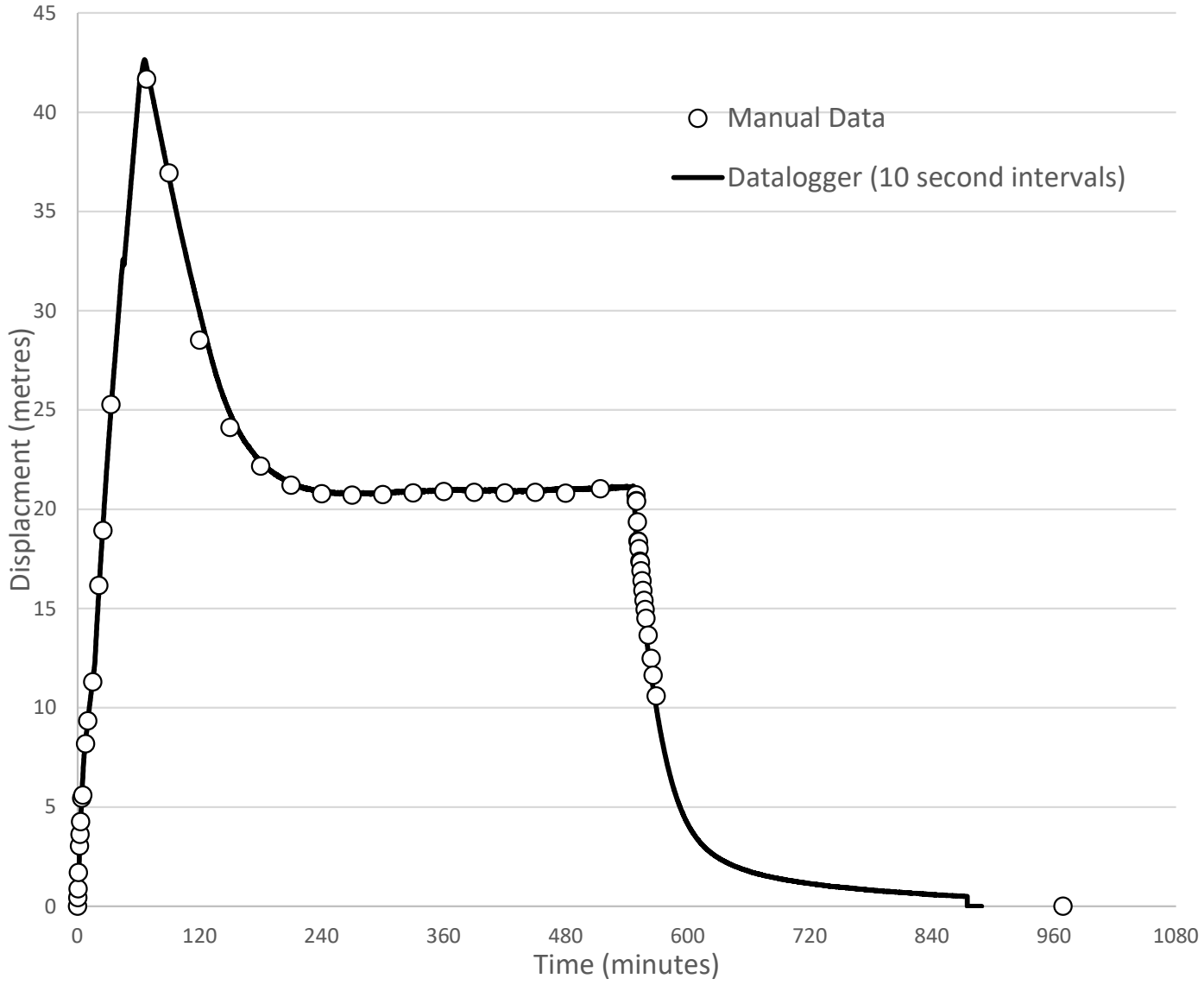
Ministry's Copy

APPENDIX F

Pumping Test Analysis

GEMTEC Consulting Engineers and Scientists	Pumping Test Compilation Report
	Project: Hydrogeological Investigation, 1500 Thomas Argue
	Project Number: 100011.062
	Client: West Capital Developments

Location: 1500 Thomas Argue, Carp, Ontario		
Test Conducted by: SM	Pumping Well: TW1	P-Test Date: Dec 7, 2023
Analysis Performed by: SE	Method: -	Discharge: Constant 15.1 L/min
Duration: 7 hours		



Water Levels TW1

Static : Artesian conditions.

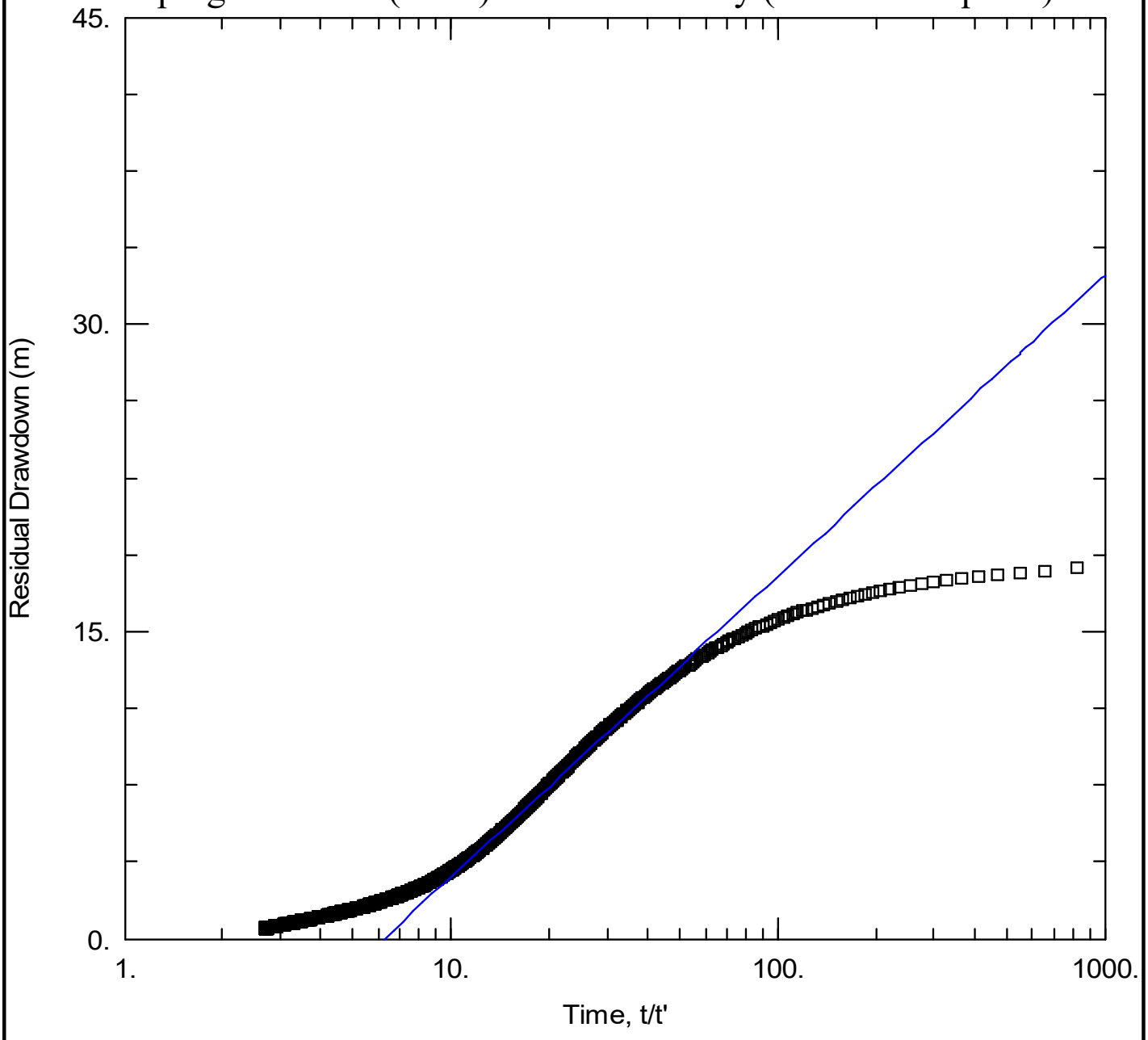
TOC = 0.42 m above ground surface

End of pump test (9-hours): 21.2 m below ground surface

Following recovery (16-hour): -0.61 m bgs (artesian)

GEMTEC Consulting Engineers and Scientists	Pumping Test Compilation Report
	Project: Hydrogeological Investigation, 1500 Thomas Argue
	Project Number: 100011.062
	Client: West Capital Developments

Location: 1500 Thomas Argue, Carp, Ontario		
Test Conducted by: SM	Pumping Well: TW1	P-Test Date: Dec 7, 2023
Analysis Performed by: SE	Method: Theis (Recovery)	Discharge: Constant 15.1 L/min
Duration: 7 hours		



Estimated Transmissivity: 0.3 m^2/day

Estimated Hydraulic Conductivity (based on transmissivity): 2 x 10^{-8} m/s

APPENDIX G

Water Quality Summary & Certificate of Laboratory Analysis

Summary of Labratory Water Quality Measurements

Parameter	Units Date	TW1 4 hr 12/07/2023	TW1 8 hr 12/07/2023	TW1 8 hr Filtered 12/07/2023	TW2 02/24/2023	TW2 05/02/2023	Ontario Drinking Water Standard	Type of Standard[1,2,3]
Microbiological Parameters								
E. Coli	CFU/100 mL	ND (1)	ND (1)	-	ND (1)	-	0	MAC
Fecal Coliforms	CFU/100 mL	**10**	**1**	-	ND (1)	-	0	MAC
Total Coliforms	CFU/100 mL	ND (1)	ND (1)	-	ND (1)	-	-	-
Heterotrophic Plate Count	CFU/mL	1440	910	-	ND (10)	-	-	-
General Inorganics								
Alkalinity, total	mg/L	194	195	-	217	-	30-500	OG
Ammonia as N	mg/L	0.16	0.19	-	0.15	-	-	-
Dissolved Organic Carbon	mg/L	0.9	ND (0.5)	-	0.8	-	5	AO
Colour	TCU	ND (2)	ND (2)	-	2	-	-	-
Colour, apparent	ACU	29	49	-	-	-	5	AO
Conductivity	uS/cm	623	602	-	712	-	-	-
Hardness	mg/L	**216**	**213**	-	**276**	-	80-100	OG
pH	pH Units	8.1	8.2	-	7.8	-	6.5-8.5	OG
Phenolics	mg/L	ND (0.001)	ND (0.001)	-	ND (0.001)	-	-	-
Total Dissolved Solids	mg/L	304	336	-	356	-	500	AO
Sulphide	mg/L	**0.52**	**0.80**	-	**0.44**	-	0.05	AO
Tannin & Lignin	mg/L	ND (0.1)	ND (0.1)	-	ND (0.1)	-	-	-
Total Kjeldahl Nitrogen	mg/L	0.2	0.2	-	0.2	-	-	-
Total Organic Nitrogen[6]	mg/L	0.04	0.01	-	0.05	-	0.15	OG
Turbidity	NTU	**5.2**	**8.7**	-	**5.2**	-	5	AO
Anions								
Chloride	mg/L	57	58	-	54	-	250	AO
Fluoride	mg/L	0.8	0.8	-	0.4	-	1.5	MAC
Nitrate as N	mg/L	ND (0.1)	ND (0.1)	-	ND (0.1)	-	10[4]	MAC
Nitrite as N	mg/L	ND (0.05)	ND (0.05)	-	ND (0.05)	-	1.0[4]	MAC
Sulphate	mg/L	37	38	-	67	-	500	AO
Metals								
Mercury	mg/L	-	ND (0.0001)	ND (0.0001)	-	-	0.001	MAC
Aluminum	mg/L	-	0.756	ND (0.001)	-	-	0.1	OG
Antimony	mg/L	-	ND (0.0005)	ND (0.0005)	-	-	0.006	MAC
Arsenic	mg/L	-	ND (0.001)	ND (0.001)	-	-	0.025	MAC
Barium	mg/L	-	0.173	0.157	-	-	1	MAC
Beryllium	mg/L	-	ND (0.0005)	ND (0.0005)	-	-	-	-
Boron	mg/L	-	0.12	0.12	-	-	5	MAC
Cadmium	mg/L	-	ND (0.0001)	ND (0.0001)	-	-	0.005	MAC
Calcium	mg/L	54.6	54.0	52.4	78.6	-	-	-
Chromium	mg/L	-	0.001	ND (0.001)	-	-	0.05	MAC
Cobalt	mg/L	-	ND (0.0005)	ND (0.0005)	-	-	-	-
Copper	mg/L	-	ND (0.0005)	ND (0.0005)	-	-	1	AO
Iron	mg/L	0.2	0.3	ND (0.1)	2.8	-	0.3	AO
Lead	mg/L	-	ND (0.0001)	ND (0.0001)	-	-	0.01	MAC
Magnesium	mg/L	19.2	18.9	18.0	19.5	-	-	-
Manganese	mg/L	0.007	0.007	0.006	0.012	-	0.05/0.12(11)	AO
Molybdenum	mg/L	-	0.0050	0.0048	-	-	0.001	MAC
Nickel	mg/L	-	ND (0.001)	ND (0.001)	-	-	-	-
Potassium	mg/L	5.7	6.0	5.5	5.1	-	-	-

Summary of Labratory Water Quality Measurements

Parameter	Units Date	TW1 4 hr 12/07/2023	TW1 8 hr 12/07/2023	TW1 8 hr Filtered 12/07/2023	TW2 02/24/2023	TW2 05/02/2023	Ontario Drinking Water Standard	Type of Standard[1,2,3]
Selenium	mg/L	-	ND (0.001)	ND (0.001)	-	-	-	-
Silver	mg/L	-	ND (0.0001)	ND (0.0001)	-	-	0.01	MAC
Sodium	mg/L	53.9	58.1	57.3	45.2	-	-	-
Strontium	mg/L	-	2.96	3.04	-	-	200(20)(5)	AO
Thallium	mg/L	-	ND (0.001)	ND (0.001)	-	-	7(10)	MAC
Uranium	mg/L	-	0.0005	ND (0.0001)	-	-	-	-
Vanadium	mg/L	-	0.0010	ND (0.0005)	-	-	0.02	MAC
Zinc	mg/L	-	ND (0.005)	ND (0.005)	-	-	-	-
Volatiles							5	AO
Acetone	mg/L	-	ND (0.0050)	-	-	ND (0.0050)	-	-
Benzene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.005	MAC
Bromodichloromethane	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.1	MAC
Bromoform	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.1	MAC
Bromomethane	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.1	MAC
Carbon Tetrachloride	mg/L	-	ND (0.0002)	-	-	ND (0.0002)	0.005	MAC
Chlorobenzene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
Chloroethane	mg/L	-	ND (0.0010)	-	-	ND (0.0010)	-	-
Chloroform	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.1	MAC
Dibromochloromethane	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
Dichlorodifluoromethane	mg/L	-	ND (0.0010)	-	-	ND (0.0010)	-	-
Ethylene dibromide (dibromoethane, 1,2-)	mg/L	-	ND (0.0002)	-	-	ND (0.0002)	-	-
1,2-Dichlorobenzene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.2	MAC
1,3-Dichlorobenzene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
1,4-Dichlorobenzene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.005	MAC
1,1-Dichloroethane	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
1,2-Dichloroethane	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.005	MAC
1,1-Dichloroethylene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.014	MAC
cis-1,2-Dichloroethylene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
trans-1,2-Dichloroethylene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
1,2-Dichloroethylene, total	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
1,2-Dichloropropane	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
cis-1,3-Dichloropropylene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
trans-1,3-Dichloropropylene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
1,3-Dichloropropene, total	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
Ethylbenzene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.0024	MAC
Hexane	mg/L	-	ND (0.0010)	-	-	ND (0.0010)	-	-
Methyl Ethyl Ketone (2-Butanone)	mg/L	-	ND (0.0050)	-	-	ND (0.0050)	-	-
Methyl Isobutyl Ketone	mg/L	-	ND (0.0050)	-	-	ND (0.0050)	-	-
Methyl tert-butyl ether	mg/L	-	ND (0.0020)	-	-	ND (0.0020)	-	-
Methylene Chloride	mg/L	-	ND (0.0050)	-	-	ND (0.0050)	0.05	MAC
Styrene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
1,1,1,2-Tetrachloroethane	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
1,1,2,2-Tetrachloroethane	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
Tetrachloroethylene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.03	MAC
Toluene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.024	MAC
1,1,1-Trichloroethane	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
1,1,2-Trichloroethane	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-

Summary of Labratory Water Quality Measurements

Parameter	Units Date	TW1 4 hr 12/07/2023	TW1 8 hr 12/07/2023	TW1 8 hr Filtered 12/07/2023	TW2 02/24/2023	TW2 05/02/2023	Ontario Drinking Water Standard	Type of Standard[1,2,3]
Trichloroethylene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.005	
Trichlorofluoromethane	mg/L	-	ND (0.0010)	-	-	ND (0.0010)	-	-
Vinyl Chloride	mg/L	-	ND (0.0002)	-	-	ND (0.0002)	0.002	MAC
m/p-Xylene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
o-Xylene	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	-	-
Xylenes, total	mg/L	-	ND (0.0005)	-	-	ND (0.0005)	0.3	MAC
Hydrocarbons								
F1 PHCs (C6-C10)	mg/L	-	-	-	-	ND (0.0250)	-	-
F2 PHCs (C10-C16)	mg/L	-	-	-	-	ND (0.1)	-	-
F3 PHCs (C16-C34)	mg/L	-	-	-	-	ND (0.1)	-	-
F4 PHCs (C34-C50)	mg/L	-	-	-	-	ND (0.1)	-	-

NOTES:

1. MAC = Maximum Acceptable Concentration;
2. OG = Operational Guideline
3. AO = Aesthetic Objective
4. The total of Nitrate and Nitrite should not exceed 10 mg/litre.
5. The aesthetic objective for sodium is 200 mg/litre. The local medical officer of health should be notified when the sodium concentration exceeds 20 mg/litre for persons on sodium restricted diets.
6. Organic Nitrogen = Total Kjeldahl Nitrogen - $N\text{-}NH_3$ and should not exceed 0.15 mg/litre.
7. '-' signifies no value provided
8. Values listed in Table 3 in MOE Procedure D-5-5 Technical Guideline for Private Wells: Water Supply Assessment, August 1996
9. 'ND' = No concentration detected above method detection limit
10. Health Canada (2019) MAC for strontium
11. Health Canada (2019) MAC for manganese
12. Filtered metal concentrations are not directly comparable to Ontario Drinking Water Standards

GEMTEC
Consulting Engineers and Scientists

Summary of Field Water Quality Measurements

Date	Time Since Initiaion of Pump	Temp (°C)	pH	Electrical Conductivity (µS/cm)	Total Dissolved Solids (ppm)	Turbidity (NTU)	Colour (ACU[1])	Colour (TCU[2,3])	Free Chlorine (mg/L)	Total Chlorine (mg/L)
02-24-2023	10 minutes	-	7.9	643	321	2.18	-	-	-	-
	15 minutes	11.2	8.18	627	313	1.1	<5	<5	<0.02	<0.02
05-02-2023	15 minutes	10.8	7.71	520	262	0.82	-	-	-	-
	20 minutes	10.6	7.88	530	265	1.14	-	-	-	-
12-07-2023	1 hour									
	2 hour	7.4	7.82	770	330	175				
	3 hour	8	8.12	587	300	30.9				
	4 hour	6	8.02	593	300	6.47	10	<5	<0.02	<0.02
	5 hour	-	-	-	-	-	-	-	-	-
	6 hour	7.69	8.04	590	299	4.89				
	7 hour	7.9	8.06	588	298	5.3				
	8 hour	7.92	8.11	590	300	4.49	12	<5	<0.02	<0.02

NOTES:

1. ACU = Actual Colour Units
2. Field filtered using 0.45 micron filter
3. TCU = True Colour Units

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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive
Kanata, ON K2K 2A9
Attn: Brent Redmond

Client PO: Thomas Argue
Project: 100011.062
Custody: 16804

Report Date: 2-Mar-2023
Order Date: 24-Feb-2023

Order #: 2308325

This Certificate of Analysis contains analytical data applicable to the following samples as submitted :

Paracel ID	Client ID
2308325-01	TW1

Approved By:



Dale Robertson, BSc
Laboratory Director

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Certificate of Analysis

Report Date: 02-Mar-2023

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 24-Feb-2023

Client PO: Thomas Argue

Project Description: 100011.062

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	24-Feb-23	24-Feb-23
Ammonia, as N	EPA 351.2 - Auto Colour	27-Feb-23	27-Feb-23
Anions	EPA 300.1 - IC	27-Feb-23	27-Feb-23
Colour	SM2120 - Spectrophotometric	24-Feb-23	24-Feb-23
Conductivity	EPA 9050A- probe @25 °C	24-Feb-23	24-Feb-23
Dissolved Organic Carbon	MOE E3247B - Combustion IR, filtration	1-Mar-23	1-Mar-23
E. coli	MOE E3407	24-Feb-23	24-Feb-23
Fecal Coliform	SM 9222D	24-Feb-23	24-Feb-23
Heterotrophic Plate Count	SM 9215C	25-Feb-23	25-Feb-23
Metals, ICP-MS	EPA 200.8 - ICP-MS	27-Feb-23	27-Feb-23
pH	EPA 150.1 - pH probe @25 °C	24-Feb-23	24-Feb-23
Phenolics	EPA 420.2 - Auto Colour, 4AAP	27-Feb-23	27-Feb-23
Hardness	Hardness as CaCO3	27-Feb-23	27-Feb-23
Sulphide	SM 4500SE - Colourimetric	1-Mar-23	1-Mar-23
Tannin/Lignin	SM 5550B - Colourimetric	27-Feb-23	27-Feb-23
Total Coliform	MOE E3407	24-Feb-23	24-Feb-23
Total Dissolved Solids	SM 2540C - gravimetric, filtration	28-Feb-23	28-Feb-23
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	24-Feb-23	1-Mar-23
Turbidity	SM 2130B - Turbidity meter	24-Feb-23	24-Feb-23

Certificate of Analysis

Report Date: 02-Mar-2023

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 24-Feb-2023

Client PO: Thomas Argue

Project Description: 100011.062

	Client ID:	TW1	-	-	-
	Sample Date:	24-Feb-23 10:00	-	-	-
	Sample ID:	2308325-01	-	-	-
	MDL/Units	Drinking Water	-	-	-
Microbiological Parameters					
E. coli	1 CFU/100mL	ND	-	-	-
Fecal Coliforms	1 CFU/100mL	ND	-	-	-
Total Coliforms	1 CFU/100mL	ND	-	-	-
Heterotrophic Plate Count	10 CFU/mL	<10	-	-	-
General Inorganics					
Alkalinity, total	5 mg/L	217	-	-	-
Ammonia as N	0.01 mg/L	0.15	-	-	-
Dissolved Organic Carbon	0.5 mg/L	0.8 [2]	-	-	-
Colour	2 TCU	2	-	-	-
Conductivity	5 uS/cm	712	-	-	-
Hardness	mg/L	276	-	-	-
pH	0.1 pH Units	7.8	-	-	-
Phenolics	0.001 mg/L	<0.001	-	-	-
Total Dissolved Solids	10 mg/L	356	-	-	-
Sulphide	0.02 mg/L	0.44	-	-	-
Tannin & Lignin	0.1 mg/L	<0.1	-	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.2	-	-	-
Turbidity	0.1 NTU	5.2	-	-	-
Anions					
Chloride	1 mg/L	54	-	-	-
Fluoride	0.1 mg/L	0.4	-	-	-
Nitrate as N	0.1 mg/L	<0.1	-	-	-
Nitrite as N	0.05 mg/L	<0.05	-	-	-
Sulphate	1 mg/L	67	-	-	-
Metals					
Calcium	0.1 mg/L	78.6	-	-	-
Iron	0.1 mg/L	2.8	-	-	-
Magnesium	0.2 mg/L	19.5	-	-	-
Manganese	0.005 mg/L	0.012	-	-	-
Potassium	0.1 mg/L	5.1	-	-	-
Sodium	0.2 mg/L	45.2	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	ND	1	mg/L						
Fluoride	ND	0.1	mg/L						
Nitrate as N	ND	0.1	mg/L						
Nitrite as N	ND	0.05	mg/L						
Sulphate	ND	1	mg/L						
General Inorganics									
Alkalinity, total	ND	5	mg/L						
Ammonia as N	ND	0.01	mg/L						
Colour	ND	2	TCU						
Conductivity	ND	5	uS/cm						
Phenolics	ND	0.001	mg/L						
Total Dissolved Solids	ND	10	mg/L						
Sulphide	ND	0.02	mg/L						
Tannin & Lignin	ND	0.1	mg/L						
Total Kjeldahl Nitrogen	ND	0.1	mg/L						
Turbidity	ND	0.1	NTU						
Metals									
Calcium	ND	0.1	mg/L						
Iron	ND	0.1	mg/L						
Magnesium	ND	0.2	mg/L						
Manganese	ND	0.005	mg/L						
Potassium	ND	0.1	mg/L						
Sodium	ND	0.2	mg/L						
Microbiological Parameters									
E. coli	ND	1	CFU/100mL						
Fecal Coliforms	ND	1	CFU/100mL						
Total Coliforms	ND	1	CFU/100mL						
Heterotrophic Plate Count	ND	10	CFU/mL						

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	54.0	1	mg/L	54.0			0.0	20	
Fluoride	0.35	0.1	mg/L	0.37			5.8	20	
Nitrate as N	ND	0.1	mg/L	ND			NC	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
Sulphate	67.1	1	mg/L	66.9			0.2	20	
General Inorganics									
Alkalinity, total	216	5	mg/L	217			0.5	14	
Ammonia as N	0.143	0.01	mg/L	0.148			3.6	17.7	
Colour	2	2	TCU	2			0.0	12	
Conductivity	712	5	uS/cm	712			0.0	5	
pH	8.0	0.1	pH Units	7.8			1.5	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	82.0	10	mg/L	84.0			2.4	10	
Sulphide	0.43	0.02	mg/L	0.44			3.2	10	
Tannin & Lignin	0.8	0.1	mg/L	0.8			2.7	11	
Total Kjeldahl Nitrogen	0.18	0.1	mg/L	0.18			0.5	16	
Turbidity	5.1	0.1	NTU	5.2			0.8	10	
Metals									
Calcium	30.8	0.1	mg/L	30.2			2.2	20	
Iron	ND	0.1	mg/L	ND			NC	20	
Magnesium	8.2	0.2	mg/L	8.1			0.4	20	
Manganese	ND	0.005	mg/L	ND			NC	20	
Potassium	1.7	0.1	mg/L	1.7			1.7	20	
Sodium	16.3	0.2	mg/L	15.8			3.5	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	ND	1	CFU/100mL	ND			NC	30	
Heterotrophic Plate Count	ND	10	CFU/mL	ND			NC	30	

Certificate of Analysis

Report Date: 02-Mar-2023

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 24-Feb-2023

Client PO: Thomas Argue

Project Description: 100011.062

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	62.4	1	mg/L	54.0	84.3	70-124			
Fluoride	1.36	0.1	mg/L	0.37	98.9	70-130			
Nitrate as N	1.01	0.1	mg/L	ND	101	77-126			
Nitrite as N	0.916	0.05	mg/L	ND	91.6	82-115			
Sulphate	75.1	1	mg/L	66.9	82.6	70-130			
General Inorganics									
Ammonia as N	1.14	0.01	mg/L	0.148	99.2	81-124			
Phenolics	0.027	0.001	mg/L	ND	108	67-133			
Total Dissolved Solids	84.0	10	mg/L	ND	84.0	75-125			
Sulphide	0.51	0.02	mg/L	ND	102	79-115			
Tannin & Lignin	0.9	0.1	mg/L	ND	93.1	71-113			
Total Kjeldahl Nitrogen	1.21	0.1	mg/L	0.18	103	81-126			
Metals									
Calcium	38100	0.1	mg/L	30200	79.4	80-120			QM-07
Iron	2180	0.1	mg/L	15.5	86.7	80-120			
Magnesium	16800	0.2	mg/L	8120	87.3	80-120			
Manganese	48.7	0.005	mg/L	1.53	94.4	80-120			
Potassium	11400	0.1	mg/L	1690	97.5	80-120			
Sodium	24600	0.2	mg/L	15800	88.7	80-120			

Qualifier Notes:

Sample Qualifiers :

2 : Subcontracted analysis - Caduceon

QC Qualifiers :

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
NC: Not Calculated

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Paracel ID: 2308325

Paracel Order Number	Chain Of Custody Ontario Drinking Water Samples № 16804
2308325	

Client Name:	Gemtec	Project Ref:	100011.062 / Thames Argue	Waterworks Name:	Samples Taken By:
Contact Name:	Brent Redmond	Quote #:		Waterworks Number:	Name: Samuel Esenwa
Address:		PO #:		Address:	Signature:
After Hours Contact:		E-mail:	Brent.Redmond@gemtec.ca		Page ___ of ___
Telephone:		Fax:		Public Health Unit:	Turn Around Time Required: ☐ 1 day ☐ 2 day ☐ 3 day ☑ 4 day

Samples Submitted Under: (Indicate **ONLY one**)
☐ ON REG 170/03 ☐ ON REG 319/08 ☐ Private Well
☐ ON REG 243/07 ☑ Other O.Reg 169/03

Have LSN forms been submitted to MOE/MOHLTC?: ☐ Yes ☐ No ☑ N/A

Are these samples for human consumption?: ☐ Yes ☑ No

All information must be completed before samples will be processed.

Sample Type: R = Raw ; T = Treated ; D = Distribution; P = Plumbing
Source Type: G = Ground Water; S = Surface Water
Reportable: Requires AWQI reporting as per Regulation - Y = Yes; N = No

	LOCATION NAME	SAMPLE ID	Sample Type: R/T/D/P	Source Type: G / S	Reportable: Y / N	Resample	SAMPLE COLLECTED DATE	SAMPLE COLLECTED TIME	# of Containers	Free/Combined Chlorine Residual mg/L	Standing / Flushed: S / F (REG 243)	Total Coliform/E. Coli	HPC	Lead	THM	Subd Pckge	Bacteria		
1		TW1	R	G	N		24-02-23	10:00	8							✓	✓		
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments: Color in ACU & TCU

Method of Delivery: Walk in

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: 2.30 PM	Verified By: Sandra Demonin
Relinquished By (Print): Samuel Esenwa	Date/Time:	Date/Time: Feb 24 23 10:40	Date/Time: Feb 24 16:14
Date/Time: 24-02-23 10:40	Temperature: °C	Temperature: 8.1 °C	pH Verified: ☑ By: Sandra Demonin

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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited

32 Steacie Drive
Kanata, ON K2K 2A9
Attn: Brent Redmond

Client PO:
Project: 100011.062
Custody: 11809

Report Date: 8-May-2023
Order Date: 2-May-2023

Order #: 2318163

This Certificate of Analysis contains analytical data applicable to the following samples as submitted :

Paracel ID	Client ID
2318163-01	TW23-1

Approved By: Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	3-May-23	3-May-23
Metals, ICP-MS	EPA 200.8 - ICP-MS	3-May-23	3-May-23
PHC F1	CWS Tier 1 - P&T GC-FID	4-May-23	4-May-23
PHCs F2 to F4	CWS Tier 1 - GC-FID, extraction	4-May-23	5-May-23
VOCs by P&T GC-MS	EPA 624 - P&T GC-MS	4-May-23	4-May-23

Certificate of Analysis

Report Date: 08-May-2023

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 2-May-2023

Client PO:

Project Description: 100011.062

	Client ID:	TW23-1	-	-	-
	Sample Date:	02-May-23 10:30	-	-	-
	Sample ID:	2318163-01	-	-	-
	MDL/Units	Drinking Water	-	-	-
Metals					
Mercury	0.0001 mg/L	<0.0001	-	-	-
Aluminum	0.001 mg/L	<0.001	-	-	-
Antimony	0.0005 mg/L	<0.0005	-	-	-
Arsenic	0.001 mg/L	<0.001	-	-	-
Barium	0.001 mg/L	0.194	-	-	-
Beryllium	0.0005 mg/L	<0.0005	-	-	-
Boron	0.01 mg/L	0.07	-	-	-
Cadmium	0.0001 mg/L	<0.0001	-	-	-
Calcium	0.1 mg/L	109	-	-	-
Chromium	0.001 mg/L	<0.001	-	-	-
Cobalt	0.0005 mg/L	<0.0005	-	-	-
Copper	0.0005 mg/L	<0.0005	-	-	-
Iron	0.1 mg/L	0.3	-	-	-
Lead	0.0001 mg/L	<0.0001	-	-	-
Magnesium	0.2 mg/L	23.2	-	-	-
Manganese	0.005 mg/L	0.006	-	-	-
Molybdenum	0.0005 mg/L	0.0033	-	-	-
Nickel	0.001 mg/L	<0.001	-	-	-
Potassium	0.1 mg/L	5.4	-	-	-
Selenium	0.001 mg/L	0.001	-	-	-
Silver	0.0001 mg/L	<0.0001	-	-	-
Sodium	0.2 mg/L	52.1	-	-	-
Strontium	0.01 mg/L	4.30	-	-	-
Thallium	0.001 mg/L	<0.001	-	-	-
Uranium	0.0001 mg/L	0.0003	-	-	-
Vanadium	0.0005 mg/L	<0.0005	-	-	-
Zinc	0.005 mg/L	<0.005	-	-	-
Volatiles					
Acetone	0.0050 mg/L	<0.0050	-	-	-
Benzene	0.0005 mg/L	<0.0005	-	-	-
Bromodichloromethane	0.0005 mg/L	<0.0005	-	-	-
Bromoform	0.0005 mg/L	<0.0005	-	-	-
Bromomethane	0.0005 mg/L	<0.0005	-	-	-
Carbon Tetrachloride	0.0002 mg/L	<0.0002	-	-	-
Chlorobenzene	0.0005 mg/L	<0.0005	-	-	-

Certificate of Analysis

Report Date: 08-May-2023

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 2-May-2023

Client PO:

Project Description: 100011.062

	Client ID:	TW23-1	-	-	-
	Sample Date:	02-May-23 10:30	-	-	-
	Sample ID:	2318163-01	-	-	-
	MDL/Units	Drinking Water	-	-	-
Chloroethane	0.0010 mg/L	<0.0010	-	-	-
Chloroform	0.0005 mg/L	<0.0005	-	-	-
Dibromochloromethane	0.0005 mg/L	<0.0005	-	-	-
Dichlorodifluoromethane	0.0010 mg/L	<0.0010	-	-	-
1,2-Dibromoethane	0.0002 mg/L	<0.0002	-	-	-
1,2-Dichlorobenzene	0.0005 mg/L	<0.0005	-	-	-
1,3-Dichlorobenzene	0.0005 mg/L	<0.0005	-	-	-
1,4-Dichlorobenzene	0.0005 mg/L	<0.0005	-	-	-
1,1-Dichloroethane	0.0005 mg/L	<0.0005	-	-	-
1,2-Dichloroethane	0.0005 mg/L	<0.0005	-	-	-
1,1-Dichloroethylene	0.0005 mg/L	<0.0005	-	-	-
cis-1,2-Dichloroethylene	0.0005 mg/L	<0.0005	-	-	-
trans-1,2-Dichloroethylene	0.0005 mg/L	<0.0005	-	-	-
1,2-Dichloroethylene, total	0.0005 mg/L	<0.0005	-	-	-
1,2-Dichloropropane	0.0005 mg/L	<0.0005	-	-	-
cis-1,3-Dichloropropylene	0.0005 mg/L	<0.0005	-	-	-
trans-1,3-Dichloropropylene	0.0005 mg/L	<0.0005	-	-	-
1,3-Dichloropropene, total	0.0005 mg/L	<0.0005	-	-	-
Ethylbenzene	0.0005 mg/L	<0.0005	-	-	-
Hexane	0.0010 mg/L	<0.0010	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.0050 mg/L	<0.0050	-	-	-
Methyl Isobutyl Ketone	0.0050 mg/L	<0.0050	-	-	-
Methyl tert-butyl ether	0.0020 mg/L	<0.0020	-	-	-
Methylene Chloride	0.0050 mg/L	<0.0050	-	-	-
Styrene	0.0005 mg/L	<0.0005	-	-	-
1,1,1,2-Tetrachloroethane	0.0005 mg/L	<0.0005	-	-	-
1,1,2,2-Tetrachloroethane	0.0005 mg/L	<0.0005	-	-	-
Tetrachloroethylene	0.0005 mg/L	<0.0005	-	-	-
Toluene	0.0005 mg/L	<0.0005	-	-	-
1,1,1-Trichloroethane	0.0005 mg/L	<0.0005	-	-	-
1,1,2-Trichloroethane	0.0005 mg/L	<0.0005	-	-	-
Trichloroethylene	0.0005 mg/L	<0.0005	-	-	-
Trichlorofluoromethane	0.0010 mg/L	<0.0010	-	-	-
Vinyl chloride	0.0002 mg/L	<0.0002	-	-	-
m,p-Xylenes	0.0005 mg/L	<0.0005	-	-	-

Certificate of Analysis

Report Date: 08-May-2023

Client: GEMTEC Consulting Engineers and Scientists Limited

Order Date: 2-May-2023

Client PO:

Project Description: 100011.062

	Client ID:	TW23-1	-	-	-
	Sample Date:	02-May-23 10:30	-	-	-
	Sample ID:	2318163-01	-	-	-
	MDL/Units	Drinking Water	-	-	-
o-Xylene	0.0005 mg/L	<0.0005	-	-	-
Xylenes, total	0.0005 mg/L	<0.0005	-	-	-
4-Bromofluorobenzene	Surrogate	99.5%	-	-	-
Dibromofluoromethane	Surrogate	108%	-	-	-
Toluene-d8	Surrogate	109%	-	-	-
Hydrocarbons					
F1 PHCs (C6-C10)	0.0250 mg/L	<0.0250	-	-	-
F2 PHCs (C10-C16)	0.1 mg/L	<0.1	-	-	-
F3 PHCs (C16-C34)	0.1 mg/L	<0.1	-	-	-
F4 PHCs (C34-C50)	0.1 mg/L	<0.1	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	0.0250	mg/L						
F2 PHCs (C10-C16)	ND	0.1	mg/L						
F3 PHCs (C16-C34)	ND	0.1	mg/L						
F4 PHCs (C34-C50)	ND	0.1	mg/L						
Metals									
Mercury	ND	0.0001	mg/L						
Aluminum	ND	0.001	mg/L						
Antimony	ND	0.0005	mg/L						
Arsenic	ND	0.001	mg/L						
Barium	ND	0.001	mg/L						
Beryllium	ND	0.0005	mg/L						
Boron	ND	0.01	mg/L						
Cadmium	ND	0.0001	mg/L						
Calcium	ND	0.1	mg/L						
Chromium	ND	0.001	mg/L						
Cobalt	ND	0.0005	mg/L						
Copper	ND	0.0005	mg/L						
Iron	ND	0.1	mg/L						
Lead	ND	0.0001	mg/L						
Magnesium	ND	0.2	mg/L						
Manganese	ND	0.005	mg/L						
Molybdenum	ND	0.0005	mg/L						
Nickel	ND	0.001	mg/L						
Potassium	ND	0.1	mg/L						
Selenium	ND	0.001	mg/L						
Silver	ND	0.0001	mg/L						
Sodium	ND	0.2	mg/L						
Strontium	ND	0.01	mg/L						
Thallium	ND	0.001	mg/L						
Uranium	ND	0.0001	mg/L						
Vanadium	ND	0.0005	mg/L						
Zinc	ND	0.005	mg/L						
Volatiles									
Acetone	ND	0.0050	mg/L						
Benzene	ND	0.0005	mg/L						
Bromodichloromethane	ND	0.0005	mg/L						
Bromoform	ND	0.0005	mg/L						
Bromomethane	ND	0.0005	mg/L						
Carbon Tetrachloride	ND	0.0002	mg/L						
Chlorobenzene	ND	0.0005	mg/L						
Chloroethane	ND	0.0010	mg/L						
Chloroform	ND	0.0005	mg/L						
Dibromochloromethane	ND	0.0005	mg/L						
Dichlorodifluoromethane	ND	0.0010	mg/L						
1,2-Dibromoethane	ND	0.0002	mg/L						
1,2-Dichlorobenzene	ND	0.0005	mg/L						
1,3-Dichlorobenzene	ND	0.0005	mg/L						
1,4-Dichlorobenzene	ND	0.0005	mg/L						
1,1-Dichloroethane	ND	0.0005	mg/L						
1,2-Dichloroethane	ND	0.0005	mg/L						
1,1-Dichloroethylene	ND	0.0005	mg/L						
cis-1,2-Dichloroethylene	ND	0.0005	mg/L						
trans-1,2-Dichloroethylene	ND	0.0005	mg/L						
1,2-Dichloroethylene, total	ND	0.0005	mg/L						
1,2-Dichloropropane	ND	0.0005	mg/L						
cis-1,3-Dichloropropylene	ND	0.0005	mg/L						
trans-1,3-Dichloropropylene	ND	0.0005	mg/L						
1,3-Dichloropropene, total	ND	0.0005	mg/L						
Ethylbenzene	ND	0.0005	mg/L						

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hexane	ND	0.0010	mg/L						
Methyl Ethyl Ketone (2-Butanone)	ND	0.0050	mg/L						
Methyl Isobutyl Ketone	ND	0.0050	mg/L						
Methyl tert-butyl ether	ND	0.0020	mg/L						
Methylene Chloride	ND	0.0050	mg/L						
Styrene	ND	0.0005	mg/L						
1,1,1,2-Tetrachloroethane	ND	0.0005	mg/L						
1,1,2,2-Tetrachloroethane	ND	0.0005	mg/L						
Tetrachloroethylene	ND	0.0005	mg/L						
Toluene	ND	0.0005	mg/L						
1,1,1-Trichloroethane	ND	0.0005	mg/L						
1,1,2-Trichloroethane	ND	0.0005	mg/L						
Trichloroethylene	ND	0.0005	mg/L						
Trichlorofluoromethane	ND	0.0010	mg/L						
Vinyl chloride	ND	0.0002	mg/L						
m,p-Xylenes	ND	0.0005	mg/L						
o-Xylene	ND	0.0005	mg/L						
Xylenes, total	ND	0.0005	mg/L						
Surrogate: 4-Bromofluorobenzene	*0.0822*		*mg/L*		*103*	*50-140*			
Surrogate: Dibromofluoromethane	*0.0758*		*mg/L*		*94.7*	*50-140*			
Surrogate: Toluene-d8	*0.0970*		*mg/L*		*121*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	ND	0.0250	mg/L	ND			NC	30	
Metals									
Mercury	ND	0.0001	mg/L	ND			NC	20	
Aluminum	ND	0.001	mg/L	ND			NC	20	
Antimony	ND	0.0005	mg/L	ND			NC	20	
Arsenic	ND	0.001	mg/L	ND			NC	20	
Barium	0.195	0.001	mg/L	0.194			0.2	20	
Beryllium	ND	0.0005	mg/L	ND			NC	20	
Boron	0.08	0.01	mg/L	0.07			8.3	20	
Cadmium	ND	0.0001	mg/L	ND			NC	20	
Calcium	107	0.1	mg/L	109			2.4	20	
Chromium	ND	0.001	mg/L	ND			NC	20	
Cobalt	ND	0.0005	mg/L	ND			NC	20	
Copper	ND	0.0005	mg/L	ND			NC	20	
Iron	0.3	0.1	mg/L	0.3			2.8	20	
Lead	ND	0.0001	mg/L	ND			NC	20	
Magnesium	24.4	0.2	mg/L	23.2			4.9	20	
Manganese	0.006	0.005	mg/L	0.006			2.1	20	
Molybdenum	0.0038	0.0005	mg/L	0.0033			11.8	20	
Nickel	ND	0.001	mg/L	ND			NC	20	
Potassium	5.6	0.1	mg/L	5.4			3.8	20	
Selenium	0.001	0.001	mg/L	0.001			18.1	20	
Silver	ND	0.0001	mg/L	ND			NC	20	
Sodium	52.9	0.2	mg/L	52.1			1.6	20	
Thallium	ND	0.001	mg/L	ND			NC	20	
Uranium	0.0003	0.0001	mg/L	0.0003			4.7	20	
Vanadium	ND	0.0005	mg/L	ND			NC	20	
Zinc	ND	0.005	mg/L	ND			NC	20	
Volatiles									
Acetone	ND	0.0050	mg/L	ND			NC	30	
Benzene	ND	0.0005	mg/L	ND			NC	30	
Bromodichloromethane	ND	0.0005	mg/L	ND			NC	30	
Bromoform	ND	0.0005	mg/L	ND			NC	30	
Bromomethane	ND	0.0005	mg/L	ND			NC	30	
Carbon Tetrachloride	ND	0.0002	mg/L	ND			NC	30	
Chlorobenzene	ND	0.0005	mg/L	ND			NC	30	
Chloroethane	ND	0.0010	mg/L	ND			NC	30	
Chloroform	ND	0.0005	mg/L	ND			NC	30	
Dibromochloromethane	ND	0.0005	mg/L	ND			NC	30	
Dichlorodifluoromethane	ND	0.0010	mg/L	ND			NC	30	
1,2-Dibromoethane	ND	0.0002	mg/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.0005	mg/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.0005	mg/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.0005	mg/L	ND			NC	30	
1,1-Dichloroethane	ND	0.0005	mg/L	ND			NC	30	
1,2-Dichloroethane	ND	0.0005	mg/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.0005	mg/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.0005	mg/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.0005	mg/L	ND			NC	30	
1,2-Dichloropropane	ND	0.0005	mg/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.0005	mg/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.0005	mg/L	ND			NC	30	
Ethylbenzene	ND	0.0005	mg/L	ND			NC	30	
Hexane	ND	0.0010	mg/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	0.0050	mg/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	0.0050	mg/L	ND			NC	30	
Methyl tert-butyl ether	ND	0.0020	mg/L	ND			NC	30	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Methylene Chloride	ND	0.0050	mg/L	ND			NC	30	
Styrene	ND	0.0005	mg/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.0005	mg/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.0005	mg/L	ND			NC	30	
Tetrachloroethylene	ND	0.0005	mg/L	ND			NC	30	
Toluene	ND	0.0005	mg/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.0005	mg/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.0005	mg/L	ND			NC	30	
Trichloroethylene	ND	0.0005	mg/L	ND			NC	30	
Trichlorofluoromethane	ND	0.0010	mg/L	ND			NC	30	
Vinyl chloride	ND	0.0002	mg/L	ND			NC	30	
m,p-Xylenes	ND	0.0005	mg/L	ND			NC	30	
o-Xylene	ND	0.0005	mg/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*0.0814*		*mg/L*		*102*	*50-140*			
Surrogate: Dibromofluoromethane	*0.0766*		*mg/L*		*95.8*	*50-140*			
Surrogate: Toluene-d8	*0.0962*		*mg/L*		*120*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Hydrocarbons									
F1 PHCs (C6-C10)	1.91	0.0250	mg/L	ND	95.5	68-117			
F2 PHCs (C10-C16)	1.4	0.1	mg/L	ND	89.5	60-140			
F3 PHCs (C16-C34)	3.7	0.1	mg/L	ND	94.1	60-140			
F4 PHCs (C34-C50)	2.0	0.1	mg/L	ND	82.0	60-140			
Metals									
Mercury	0.0028	0.0001	mg/L	ND	92.9	70-130			
Aluminum	47.8	0.001	mg/L	0.414	94.8	80-120			
Antimony	44.6	0.0005	mg/L	0.429	88.4	80-120			
Arsenic	62.7	0.001	mg/L	0.113	125	80-120			QM-07
Barium	236	0.001	mg/L	194	82.6	80-120			
Beryllium	48.3	0.0005	mg/L	0.0175	96.5	80-120			
Boron	112	0.01	mg/L	69.6	85.6	80-120			
Cadmium	52.7	0.0001	mg/L	0.0072	105	80-120			
Calcium	12200	0.1	mg/L	ND	122	80-120			QS-02
Chromium	60.1	0.001	mg/L	0.207	120	80-120			
Cobalt	56.6	0.0005	mg/L	0.0096	113	80-120			
Copper	49.9	0.0005	mg/L	0.0706	99.7	80-120			
Iron	3050	0.1	mg/L	253	112	80-120			
Lead	45.3	0.0001	mg/L	0.0203	90.5	80-120			
Magnesium	33000	0.2	mg/L	23200	98.1	80-120			
Manganese	65.9	0.005	mg/L	6.02	120	80-120			
Molybdenum	56.7	0.0005	mg/L	3.34	107	80-120			
Nickel	57.7	0.001	mg/L	0.400	115	80-120			
Potassium	16400	0.1	mg/L	5360	110	80-120			
Selenium	55.5	0.001	mg/L	1.45	108	80-120			
Silver	40.8	0.0001	mg/L	0.0014	81.5	80-120			
Sodium	63100	0.2	mg/L	52100	110	80-120			
Thallium	47.9	0.001	mg/L	0.013	95.7	80-120			
Uranium	47.8	0.0001	mg/L	0.324	95.0	80-120			
Vanadium	59.2	0.0005	mg/L	0.0490	118	80-120			
Zinc	51.7	0.005	mg/L	0.532	102	80-120			
Volatiles									
Acetone	0.0918	0.0050	mg/L	ND	91.8	50-140			
Benzene	0.0445	0.0005	mg/L	ND	111	60-130			
Bromodichloromethane	0.0344	0.0005	mg/L	ND	86.1	60-130			
Bromoform	0.0384	0.0005	mg/L	ND	96.1	60-130			
Bromomethane	0.0290	0.0005	mg/L	ND	72.5	50-140			
Carbon Tetrachloride	0.0298	0.0002	mg/L	ND	74.6	60-130			
Chlorobenzene	0.0407	0.0005	mg/L	ND	102	60-130			
Chloroethane	0.0451	0.0010	mg/L	ND	113	50-140			
Chloroform	0.0343	0.0005	mg/L	ND	85.7	60-130			
Dibromochloromethane	0.0364	0.0005	mg/L	ND	90.9	60-130			
Dichlorodifluoromethane	0.0314	0.0010	mg/L	ND	78.5	50-140			
1,2-Dibromoethane	0.0414	0.0002	mg/L	ND	104	60-130			
1,2-Dichlorobenzene	0.0402	0.0005	mg/L	ND	101	60-130			
1,3-Dichlorobenzene	0.0386	0.0005	mg/L	ND	96.5	60-130			
1,4-Dichlorobenzene	0.0363	0.0005	mg/L	ND	90.7	60-130			
1,1-Dichloroethane	0.0441	0.0005	mg/L	ND	110	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
1,2-Dichloroethane	0.0353	0.0005	mg/L	ND	88.2	60-130			
1,1-Dichloroethylene	0.0435	0.0005	mg/L	ND	109	60-130			
cis-1,2-Dichloroethylene	0.0431	0.0005	mg/L	ND	108	60-130			
trans-1,2-Dichloroethylene	0.0412	0.0005	mg/L	ND	103	60-130			
1,2-Dichloropropane	0.0491	0.0005	mg/L	ND	123	60-130			
cis-1,3-Dichloropropylene	0.0331	0.0005	mg/L	ND	82.7	60-130			
trans-1,3-Dichloropropylene	0.0313	0.0005	mg/L	ND	78.3	60-130			
Ethylbenzene	0.0374	0.0005	mg/L	ND	93.6	60-130			
Hexane	0.0304	0.0010	mg/L	ND	76.0	60-130			
Methyl Ethyl Ketone (2-Butanone)	0.129	0.0050	mg/L	ND	129	50-140			
Methyl Isobutyl Ketone	0.104	0.0050	mg/L	ND	104	50-140			
Methyl tert-butyl ether	0.0977	0.0020	mg/L	ND	97.7	50-140			
Methylene Chloride	0.0426	0.0050	mg/L	ND	107	60-130			
Styrene	0.0414	0.0005	mg/L	ND	103	60-130			
1,1,1,2-Tetrachloroethane	0.0335	0.0005	mg/L	ND	83.8	60-130			
1,1,2,2-Tetrachloroethane	0.0362	0.0005	mg/L	ND	90.4	60-130			
Tetrachloroethylene	0.0366	0.0005	mg/L	ND	91.4	60-130			
Toluene	0.0426	0.0005	mg/L	ND	107	60-130			
1,1,1-Trichloroethane	0.0363	0.0005	mg/L	ND	90.8	60-130			
1,1,2-Trichloroethane	0.0446	0.0005	mg/L	ND	111	60-130			
Trichloroethylene	0.0445	0.0005	mg/L	ND	111	60-130			
Trichlorofluoromethane	0.0293	0.0010	mg/L	ND	73.2	60-130			
Vinyl chloride	0.0355	0.0002	mg/L	ND	88.6	50-140			
m,p-Xylenes	0.0761	0.0005	mg/L	ND	95.2	60-130			
o-Xylene	0.0346	0.0005	mg/L	ND	86.4	60-130			
Surrogate: 4-Bromofluorobenzene	*0.0764*		*mg/L*		*95.5*	*50-140*			
Surrogate: Dibromofluoromethane	*0.0750*		*mg/L*		*93.7*	*50-140*			
Surrogate: Toluene-d8	*0.0814*		*mg/L*		*102*	*50-140*			

Qualifier Notes:

QC Qualifiers :

QM-07 The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.
QS-02 Spike level outside of control limits. Analysis batch accepted based on other QC included in the batch.

Sample Data Revisions

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable
ND: Not Detected
MDL: Method Detection Limit
Source Result: Data used as source for matrix and duplicate samples
%REC: Percent recovery.
RPD: Relative percent difference.
NC: Not Calculated

CCME PHC additional information:

- The method for the analysis of PHCs complies with the Reference Method for the CWS PHC and is validated for use in the laboratory. All prescribed quality criteria identified in the method has been met.
- F1 range corrected for BTEX.
- F2 to F3 ranges corrected for appropriate PAHs where available.
- The gravimetric heavy hydrocarbons (F4G) are not to be added to C6 to C50 hydrocarbons.
- In the case where F4 and F4G are both reported, the greater of the two results is to be used for comparison to CWS PHC criteria.
- When reported, data for F4G has been processed using a silica gel cleanup.

PARACEL LABORATORIES LTD

Paracel ID: 2318163

Paracel Order Number	Chain Of Custody Ontario Drinking Water Samples № 11809

Client Name:	GENTEC	Project #:	100011.062	Waterworks Name:	Samples Taken By:
Contact Name:	Brent Pedroni	Quote #:		Waterworks Number:	Name: Brent P
Address:		PO #:		Address:	Signature:
After Hours Contact:		E-mail:	brent.pedroni@GENTEC.com		Page ___ of ___
Telephone:	343-571-9556	Fax:		Public Health Unit:	Turn Around Time Required: ☐ 1 day ☐ 2 day ☐ 3 day ☑ 4 day

Samples Submitted Under: (Indicate **ONLY one**)
☐ ON REG 170/03 ☐ ON REG 319/08 ☐ Private Well
☐ ON REG 243/07 ☑ Other O.Reg 169/03

Have LSN forms been submitted to MOE/MOHLTC?: ☐ Yes ☐ No ☑ N/A

Are these samples for human consumption?: ☐ Yes ☑ No

All information must be completed before samples will be processed.

Sample Type: R = Raw ; T = Treated ; D = Distribution; P = Plumbing
Source Type: G = Ground Water; S = Surface Water
Reportable: Requires AWQI reporting as per Regulation - Y = Yes; N = No

	LOCATION NAME	SAMPLE ID	Sample Type: R/T/D/P	Source Type: G / S	Reportable: Y / N	Resample	SAMPLE COLLECTED DATE	SAMPLE COLLECTED TIME	# of Containers	Free/Combined Chlorine Residual mg/L	Standing / Flushed: S / F (REG 243)	Required Analyses: Total Coliform/E. Coli	HPC	Lead	THM	Trace metals	CFU + unidf	VOCs/BTEX	DHCs
1		TW23-1	R	G	N	/	May 2, 23	10:30	7							X	X	X	X
2																			
3																			
4																			
5																			
6																			
7																			
8																			
9																			
10																			

Comments:

Method of Delivery: Walk

Relinquished By (Sign):	Received By Driver/Depot: Stevey 11:46	Received at Lab: Mississauga	Verified By:
Relinquished By (Print): Brent Pedroni	Date/Time: May 2/23 AM	Date/Time: May 02 2023 04:47	Date/Time: May 2/23 530
Date/Time: May 7, 23 - 11:46	Temperature: 11.2 °C	Temperature: 6.3 °C	pH Verified: ☐ By:

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Certificate of Analysis

GEMTEC Consulting Engineers and Scientists Limited
32 Steacie Drive
Kanata, ON K2K 2A9
Attn: Brent Redmond

Client PO:
Project: 100011.062
Custody: 19646

Report Date: 14-Dec-2023
Order Date: 8-Dec-2023

Order #: 2349430

This Certificate of Analysis contains analytical data applicable to the following samples as submitted:

Paracel ID	Client ID
2349430-01	TW1 4hr
2349430-03	TW1 8hr
2349430-04	TW1 8hr (Filtered)

Approved By:

Mark Foto

Mark Foto, M.Sc.
Lab Supervisor

Analysis Summary Table

Analysis	Method Reference/Description	Extraction Date	Analysis Date
Alkalinity, total to pH 4.5	EPA 310.1 - Titration to pH 4.5	8-Dec-23	8-Dec-23
Ammonia, as N	EPA 351.2 - Auto Colour	11-Dec-23	11-Dec-23
Anions	EPA 300.1 - IC	14-Dec-23	14-Dec-23
Colour	SM2120 - Spectrophotometric	8-Dec-23	8-Dec-23
Colour, apparent	SM2120 - Spectrophotometric	8-Dec-23	8-Dec-23
Conductivity	EPA 9050A- probe @25 °C	8-Dec-23	8-Dec-23
Dissolved Organic Carbon	MOE 3247B - Combustion IR	13-Dec-23	14-Dec-23
E. coli	MOE E3407	8-Dec-23	8-Dec-23
Fecal Coliform	SM 9222D	8-Dec-23	8-Dec-23
Heterotrophic Plate Count	SM 9215C	9-Dec-23	11-Dec-23
Mercury by CVAA	EPA 245.2 - Cold Vapour AA	11-Dec-23	11-Dec-23
Metals, ICP-MS	EPA 200.8 - ICP-MS	11-Dec-23	11-Dec-23
pH	EPA 150.1 - pH probe @25 °C	8-Dec-23	8-Dec-23
Phenolics	EPA 420.2 - Auto Colour, 4AAP	8-Dec-23	8-Dec-23
Hardness	Hardness as CaCO3	11-Dec-23	11-Dec-23
Sulphide	SM 4500SE - Colourimetric	8-Dec-23	8-Dec-23
Tannin/Lignin	SM 5550B - Colourimetric	13-Dec-23	13-Dec-23
Total Coliform	MOE E3407	8-Dec-23	8-Dec-23
Total Dissolved Solids	SM 2540C - gravimetric, filtration	8-Dec-23	9-Dec-23
Total Kjeldahl Nitrogen	EPA 351.2 - Auto Colour, digestion	11-Dec-23	11-Dec-23
Turbidity	SM 2130B - Turbidity meter	8-Dec-23	8-Dec-23
VOCs by P&T GC-MS	EPA 624 - P&T GC-MS	9-Dec-23	9-Dec-23

PARACEL LABORATORIES LTD.

Order #: 2349430

Certificate of Analysis

Report Date: 14-Dec-2023

Client: **GEMTEC Consulting Engineers and Scientists Limited**

Order Date: 8-Dec-2023

Client PO:

Project Description: 100011.062

	Client ID:	TW1 4hr	TW1 8hr	TW1 8hr (Filtered)	-		
	Sample Date:	07-Dec-23 14:20	07-Dec-23 18:20	07-Dec-23 18:20	-	-	-
	Sample ID:	2349430-01	2349430-03	2349430-04	-		
	Matrix:	Drinking Water	Drinking Water	Drinking Water	-		
	MDL/Units						
Microbiological Parameters							
E. coli	1 CFU/100mL	ND	ND	-	-	-	-
Total Coliforms	1 CFU/100mL	10	1	-	-	-	-
Fecal Coliforms	1 CFU/100mL	ND	ND	-	-	-	-
Heterotrophic Plate Count	10 CFU/mL	1440	910	-	-	-	-
General Inorganics							
Alkalinity, total	5 mg/L	194	195	-	-	-	-
Ammonia as N	0.01 mg/L	0.16	0.19	-	-	-	-
Dissolved Organic Carbon	0.5 mg/L	0.9	<0.5	-	-	-	-
Colour, apparent	2 ACU	29	49	-	-	-	-
Colour	2 TCU	<2	<2	-	-	-	-
Conductivity	5 uS/cm	623	602	-	-	-	-
Hardness	1 mg/L	216	213	-	-	-	-
pH	0.1 pH Units	8.1	8.2	-	-	-	-
Phenolics	0.001 mg/L	<0.001	<0.001	-	-	-	-
Total Dissolved Solids	10 mg/L	304	336	-	-	-	-
Sulphide	0.02 mg/L	0.52	0.80	-	-	-	-
Tannin & Lignin	0.1 mg/L	<0.1	<0.1	-	-	-	-
Total Kjeldahl Nitrogen	0.1 mg/L	0.2	0.2	-	-	-	-
Turbidity	0.1 NTU	5.2	8.7	-	-	-	-
Anions							
Chloride	1 mg/L	57	58	-	-	-	-
Fluoride	0.1 mg/L	0.8	0.8	-	-	-	-
Nitrate as N	0.1 mg/L	<0.1	<0.1	-	-	-	-
Nitrite as N	0.05 mg/L	<0.05	<0.05	-	-	-	-
Sulphate	1 mg/L	37	38	-	-	-	-

Certificate of Analysis

Report Date: 14-Dec-2023

Client: **GEMTEC Consulting Engineers and Scientists Limited**

Order Date: 8-Dec-2023

Client PO:

Project Description: 100011.062

	Client ID:	TW1 4hr	TW1 8hr	TW1 8hr (Filtered)	-	-	-
	Sample Date:	07-Dec-23 14:20	07-Dec-23 18:20	07-Dec-23 18:20	-		
	Sample ID:	2349430-01	2349430-03	2349430-04	-		
	Matrix:	Drinking Water	Drinking Water	Drinking Water	-		
	MDL/Units						
Metals							
Mercury	0.0001 mg/L	-	<0.0001	<0.0001	-	-	-
Aluminum	0.001 mg/L	-	0.756	<0.001	-	-	-
Antimony	0.0005 mg/L	-	<0.0005	<0.0005	-	-	-
Arsenic	0.001 mg/L	-	<0.001	<0.001	-	-	-
Barium	0.001 mg/L	-	0.173	0.157	-	-	-
Beryllium	0.0005 mg/L	-	<0.0005	<0.0005	-	-	-
Boron	0.01 mg/L	-	0.12	0.12	-	-	-
Cadmium	0.0001 mg/L	-	<0.0001	<0.0001	-	-	-
Calcium	0.1 mg/L	54.6	54.0	52.4	-	-	-
Chromium	0.001 mg/L	-	0.001	<0.001	-	-	-
Cobalt	0.0005 mg/L	-	<0.0005	<0.0005	-	-	-
Copper	0.0005 mg/L	-	<0.0005	<0.0005	-	-	-
Iron	0.1 mg/L	0.2	0.3	<0.1	-	-	-
Lead	0.0001 mg/L	-	<0.0001	<0.0001	-	-	-
Magnesium	0.2 mg/L	19.2	18.9	18.0	-	-	-
Manganese	0.005 mg/L	0.007	0.007	0.006	-	-	-
Molybdenum	0.0005 mg/L	-	0.0050	0.0048	-	-	-
Nickel	0.001 mg/L	-	<0.001	<0.001	-	-	-
Potassium	0.1 mg/L	5.7	6.0	5.5	-	-	-
Selenium	0.001 mg/L	-	<0.001	<0.001	-	-	-
Silver	0.0001 mg/L	-	<0.0001	<0.0001	-	-	-
Sodium	0.2 mg/L	53.9	58.1	57.3	-	-	-
Strontium	0.01 mg/L	-	2.96	3.04	-	-	-
Thallium	0.001 mg/L	-	<0.001	<0.001	-	-	-
Uranium	0.0001 mg/L	-	0.0005	<0.0001	-	-	-

	Client ID:	TW1 4hr	TW1 8hr	TW1 8hr (Filtered)	-		
	Sample Date:	07-Dec-23 14:20	07-Dec-23 18:20	07-Dec-23 18:20	-	-	-
	Sample ID:	2349430-01	2349430-03	2349430-04	-		
	Matrix:	Drinking Water	Drinking Water	Drinking Water	-		
	MDL/Units						
Metals							
Vanadium	0.0005 mg/L	-	0.0010	<0.0005	-	-	-
Zinc	0.005 mg/L	-	<0.005	<0.005	-	-	-
Volatiles							
Acetone	0.0050 mg/L	-	<0.0050	-	-	-	-
Benzene	0.0005 mg/L	-	<0.0005	-	-	-	-
Bromodichloromethane	0.0005 mg/L	-	<0.0005	-	-	-	-
Bromoform	0.0005 mg/L	-	<0.0005	-	-	-	-
Bromomethane	0.0005 mg/L	-	<0.0005	-	-	-	-
Carbon Tetrachloride	0.0002 mg/L	-	<0.0002	-	-	-	-
Chlorobenzene	0.0005 mg/L	-	<0.0005	-	-	-	-
Chloroethane	0.0010 mg/L	-	<0.0010	-	-	-	-
Chloroform	0.0005 mg/L	-	<0.0005	-	-	-	-
Dibromochloromethane	0.0005 mg/L	-	<0.0005	-	-	-	-
Dichlorodifluoromethane	0.0010 mg/L	-	<0.0010	-	-	-	-
1,2-Dibromoethane	0.0002 mg/L	-	<0.0002	-	-	-	-
1,2-Dichlorobenzene	0.0005 mg/L	-	<0.0005	-	-	-	-
1,3-Dichlorobenzene	0.0005 mg/L	-	<0.0005	-	-	-	-
1,4-Dichlorobenzene	0.0005 mg/L	-	<0.0005	-	-	-	-
1,1-Dichloroethane	0.0005 mg/L	-	<0.0005	-	-	-	-
1,2-Dichloroethane	0.0005 mg/L	-	<0.0005	-	-	-	-
1,1-Dichloroethylene	0.0005 mg/L	-	<0.0005	-	-	-	-
cis-1,2-Dichloroethylene	0.0005 mg/L	-	<0.0005	-	-	-	-
trans-1,2-Dichloroethylene	0.0005 mg/L	-	<0.0005	-	-	-	-
1,2-Dichloroethylene, total	0.0005 mg/L	-	<0.0005	-	-	-	-
1,2-Dichloropropane	0.0005 mg/L	-	<0.0005	-	-	-	-

	Client ID:	TW1 4hr	TW1 8hr	TW1 8hr (Filtered)	-	-	-
	Sample Date:	07-Dec-23 14:20	07-Dec-23 18:20	07-Dec-23 18:20	-		
	Sample ID:	2349430-01	2349430-03	2349430-04	-		
	Matrix:	Drinking Water	Drinking Water	Drinking Water	-		
	MDL/Units						
Volatiles							
cis-1,3-Dichloropropylene	0.0005 mg/L	-	<0.0005	-	-	-	-
trans-1,3-Dichloropropylene	0.0005 mg/L	-	<0.0005	-	-	-	-
1,3-Dichloropropene, total	0.0005 mg/L	-	<0.0005	-	-	-	-
Ethylbenzene	0.0005 mg/L	-	<0.0005	-	-	-	-
Hexane	0.0010 mg/L	-	<0.0010	-	-	-	-
Methyl Ethyl Ketone (2-Butanone)	0.0050 mg/L	-	<0.0050	-	-	-	-
Methyl Isobutyl Ketone	0.0050 mg/L	-	<0.0050	-	-	-	-
Methyl tert-butyl ether	0.0020 mg/L	-	<0.0020	-	-	-	-
Methylene Chloride	0.0050 mg/L	-	<0.0050	-	-	-	-
Styrene	0.0005 mg/L	-	<0.0005	-	-	-	-
1,1,1,2-Tetrachloroethane	0.0005 mg/L	-	<0.0005	-	-	-	-
1,1,2,2-Tetrachloroethane	0.0005 mg/L	-	<0.0005	-	-	-	-
Tetrachloroethylene	0.0005 mg/L	-	<0.0005	-	-	-	-
Toluene	0.0005 mg/L	-	<0.0005	-	-	-	-
1,1,1-Trichloroethane	0.0005 mg/L	-	<0.0005	-	-	-	-
1,1,2-Trichloroethane	0.0005 mg/L	-	<0.0005	-	-	-	-
Trichloroethylene	0.0005 mg/L	-	<0.0005	-	-	-	-
Trichlorofluoromethane	0.0010 mg/L	-	<0.0010	-	-	-	-
Vinyl chloride	0.0002 mg/L	-	<0.0002	-	-	-	-
m,p-Xylenes	0.0005 mg/L	-	<0.0005	-	-	-	-
o-Xylene	0.0005 mg/L	-	<0.0005	-	-	-	-
Xylenes, total	0.0005 mg/L	-	<0.0005	-	-	-	-
Dibromofluoromethane	Surrogate	-	120%	-	-	-	-
4-Bromofluorobenzene	Surrogate	-	116%	-	-	-	-
Toluene-d8	Surrogate	-	101%	-	-	-	-

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions								
Chloride	ND	1	mg/L					
Fluoride	ND	0.1	mg/L					
Nitrate as N	ND	0.1	mg/L					
Nitrite as N	ND	0.05	mg/L					
Sulphate	ND	1	mg/L					
General Inorganics								
Alkalinity, total	ND	5	mg/L					
Ammonia as N	ND	0.01	mg/L					
Dissolved Organic Carbon	ND	0.5	mg/L					
Colour	ND	2	TCU					
Colour, apparent	ND	2	ACU					
Conductivity	ND	5	uS/cm					
Phenolics	ND	0.001	mg/L					
Total Dissolved Solids	ND	10	mg/L					
Sulphide	ND	0.02	mg/L					
Tannin & Lignin	ND	0.1	mg/L					
Total Kjeldahl Nitrogen	ND	0.1	mg/L					
Turbidity	ND	0.1	NTU					
Metals								
Mercury	ND	0.0001	mg/L					
Aluminum	ND	0.001	mg/L					
Antimony	ND	0.0005	mg/L					
Arsenic	ND	0.001	mg/L					
Barium	ND	0.001	mg/L					
Beryllium	ND	0.0005	mg/L					
Boron	ND	0.01	mg/L					
Cadmium	ND	0.0001	mg/L					
Calcium	ND	0.1	mg/L					
Chromium	ND	0.001	mg/L					
Cobalt	ND	0.0005	mg/L					
Copper	ND	0.0005	mg/L					
Iron	ND	0.1	mg/L					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Lead	ND	0.0001	mg/L					
Magnesium	ND	0.2	mg/L					
Manganese	ND	0.005	mg/L					
Molybdenum	ND	0.0005	mg/L					
Nickel	ND	0.001	mg/L					
Potassium	ND	0.1	mg/L					
Selenium	ND	0.001	mg/L					
Silver	ND	0.0001	mg/L					
Sodium	ND	0.2	mg/L					
Strontium	ND	0.01	mg/L					
Thallium	ND	0.001	mg/L					
Uranium	ND	0.0001	mg/L					
Vanadium	ND	0.0005	mg/L					
Zinc	ND	0.005	mg/L					
Microbiological Parameters								
E. coli	ND	1	CFU/100mL					
Total Coliforms	ND	1	CFU/100mL					
Fecal Coliforms	ND	1	CFU/100mL					
Heterotrophic Plate Count	ND	10	CFU/mL					
Volatiles								
Acetone	ND	0.0050	mg/L					
Benzene	ND	0.0005	mg/L					
Bromodichloromethane	ND	0.0005	mg/L					
Bromoform	ND	0.0005	mg/L					
Bromomethane	ND	0.0005	mg/L					
Carbon Tetrachloride	ND	0.0002	mg/L					
Chlorobenzene	ND	0.0005	mg/L					
Chloroethane	ND	0.0010	mg/L					
Chloroform	ND	0.0005	mg/L					
Dibromochloromethane	ND	0.0005	mg/L					
Dichlorodifluoromethane	ND	0.0010	mg/L					
1,2-Dibromoethane	ND	0.0002	mg/L					
1,2-Dichlorobenzene	ND	0.0005	mg/L					

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
1,3-Dichlorobenzene	ND	0.0005	mg/L					
1,4-Dichlorobenzene	ND	0.0005	mg/L					
1,1-Dichloroethane	ND	0.0005	mg/L					
1,2-Dichloroethane	ND	0.0005	mg/L					
1,1-Dichloroethylene	ND	0.0005	mg/L					
cis-1,2-Dichloroethylene	ND	0.0005	mg/L					
trans-1,2-Dichloroethylene	ND	0.0005	mg/L					
1,2-Dichloroethylene, total	ND	0.0005	mg/L					
1,2-Dichloropropane	ND	0.0005	mg/L					
cis-1,3-Dichloropropylene	ND	0.0005	mg/L					
trans-1,3-Dichloropropylene	ND	0.0005	mg/L					
1,3-Dichloropropene, total	ND	0.0005	mg/L					
Ethylbenzene	ND	0.0005	mg/L					
Hexane	ND	0.0010	mg/L					
Methyl Ethyl Ketone (2-Butanone)	ND	0.0050	mg/L					
Methyl Isobutyl Ketone	ND	0.0050	mg/L					
Methyl tert-butyl ether	ND	0.0020	mg/L					
Methylene Chloride	ND	0.0050	mg/L					
Styrene	ND	0.0005	mg/L					
1,1,1,2-Tetrachloroethane	ND	0.0005	mg/L					
1,1,2,2-Tetrachloroethane	ND	0.0005	mg/L					
Tetrachloroethylene	ND	0.0005	mg/L					
Toluene	ND	0.0005	mg/L					
1,1,1-Trichloroethane	ND	0.0005	mg/L					
1,1,2-Trichloroethane	ND	0.0005	mg/L					
Trichloroethylene	ND	0.0005	mg/L					
Trichlorofluoromethane	ND	0.0010	mg/L					
Vinyl chloride	ND	0.0002	mg/L					
m,p-Xylenes	ND	0.0005	mg/L					
o-Xylene	ND	0.0005	mg/L					
Xylenes, total	ND	0.0005	mg/L					
Surrogate: 4-Bromofluorobenzene	*0.0868*		*%*	*109*	*50-140*			

Method Quality Control: Blank

Analyte	Result	Reporting Limit	Units	%REC	%REC Limit	RPD	RPD Limit	Notes
Surrogate: Dibromofluoromethane	*0.0864*		*%*	*108*	*50-140*			
Surrogate: Toluene-d8	*0.0795*		*%*	*99.3*	*50-140*			

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	57.6	1	mg/L	57.3			0.5	20	
Fluoride	0.81	0.1	mg/L	0.83			2.4	20	
Nitrate as N	ND	0.1	mg/L	ND			NC	20	
Nitrite as N	ND	0.05	mg/L	ND			NC	20	
Sulphate	36.5	1	mg/L	36.7			0.7	20	
General Inorganics									
Alkalinity, total	259	5	mg/L	257			0.6	14	
Ammonia as N	0.162	0.01	mg/L	0.162			0.1	17.7	
Dissolved Organic Carbon	0.5	0.5	mg/L	0.9			56.1	37	QR-07
Colour	ND	2	TCU	ND			NC	12	
Colour, apparent	29	2	ACU	29			0.0	12	
Conductivity	834	5	uS/cm	822			1.5	5	
pH	9.1	0.1	pH Units	9.1			0.2	3.3	
Phenolics	ND	0.001	mg/L	ND			NC	10	
Total Dissolved Solids	78.0	10	mg/L	80.0			2.5	10	
Sulphide	0.49	0.02	mg/L	0.52			5.0	10	
Tannin & Lignin	ND	0.1	mg/L	ND			NC	11	
Total Kjeldahl Nitrogen	0.19	0.1	mg/L	0.22			15.9	16	
Turbidity	0.2	0.1	NTU	0.2			0.0	10	
Metals									
Mercury	ND	0.0001	mg/L	ND			NC	20	
Aluminum	0.734	0.001	mg/L	0.756			3.1	20	
Antimony	ND	0.0005	mg/L	ND			NC	20	
Arsenic	ND	0.001	mg/L	ND			NC	20	
Barium	0.169	0.001	mg/L	0.173			2.0	20	
Beryllium	ND	0.0005	mg/L	ND			NC	20	
Boron	0.13	0.01	mg/L	0.12			0.6	20	
Cadmium	ND	0.0001	mg/L	ND			NC	20	
Calcium	54.8	0.1	mg/L	54.0			1.5	20	
Chromium	0.001	0.001	mg/L	0.001			1.0	20	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Cobalt	ND	0.0005	mg/L	ND			NC	20	
Copper	ND	0.0005	mg/L	ND			NC	20	
Iron	0.3	0.1	mg/L	0.3			1.4	20	
Lead	0.0001	0.0001	mg/L	ND			NC	20	
Magnesium	18.7	0.2	mg/L	18.9			1.0	20	
Manganese	0.007	0.005	mg/L	0.007			0.5	20	
Molybdenum	0.0048	0.0005	mg/L	0.0050			3.2	20	
Nickel	ND	0.001	mg/L	ND			NC	20	
Potassium	5.9	0.1	mg/L	6.0			1.2	20	
Selenium	ND	0.001	mg/L	ND			NC	20	
Silver	ND	0.0001	mg/L	ND			NC	20	
Sodium	57.5	0.2	mg/L	58.1			1.0	20	
Thallium	ND	0.001	mg/L	ND			NC	20	
Uranium	0.0005	0.0001	mg/L	0.0005			2.0	20	
Vanadium	0.0010	0.0005	mg/L	0.0010			0.1	20	
Zinc	ND	0.005	mg/L	ND			NC	20	
Microbiological Parameters									
E. coli	ND	1	CFU/100mL	ND			NC	30	
Total Coliforms	3	1	CFU/100mL	10			108.0	30	BAC04
Fecal Coliforms	ND	1	CFU/100mL	ND			NC	30	
Heterotrophic Plate Count	1320	10	CFU/mL	1440			9.0	30	
Volatiles									
Acetone	ND	0.0050	mg/L	ND			NC	30	
Benzene	ND	0.0005	mg/L	ND			NC	30	
Bromodichloromethane	ND	0.0005	mg/L	ND			NC	30	
Bromoform	ND	0.0005	mg/L	ND			NC	30	
Bromomethane	ND	0.0005	mg/L	ND			NC	30	
Carbon Tetrachloride	ND	0.0002	mg/L	ND			NC	30	
Chlorobenzene	ND	0.0005	mg/L	ND			NC	30	
Chloroethane	ND	0.0010	mg/L	ND			NC	30	
Chloroform	ND	0.0005	mg/L	ND			NC	30	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Dibromochloromethane	ND	0.0005	mg/L	ND			NC	30	
Dichlorodifluoromethane	ND	0.0010	mg/L	ND			NC	30	
1,2-Dibromoethane	ND	0.0002	mg/L	ND			NC	30	
1,2-Dichlorobenzene	ND	0.0005	mg/L	ND			NC	30	
1,3-Dichlorobenzene	ND	0.0005	mg/L	ND			NC	30	
1,4-Dichlorobenzene	ND	0.0005	mg/L	ND			NC	30	
1,1-Dichloroethane	ND	0.0005	mg/L	ND			NC	30	
1,2-Dichloroethane	ND	0.0005	mg/L	ND			NC	30	
1,1-Dichloroethylene	ND	0.0005	mg/L	ND			NC	30	
cis-1,2-Dichloroethylene	ND	0.0005	mg/L	ND			NC	30	
trans-1,2-Dichloroethylene	ND	0.0005	mg/L	ND			NC	30	
1,2-Dichloropropane	ND	0.0005	mg/L	ND			NC	30	
cis-1,3-Dichloropropylene	ND	0.0005	mg/L	ND			NC	30	
trans-1,3-Dichloropropylene	ND	0.0005	mg/L	ND			NC	30	
Ethylbenzene	ND	0.0005	mg/L	ND			NC	30	
Hexane	ND	0.0010	mg/L	ND			NC	30	
Methyl Ethyl Ketone (2-Butanone)	ND	0.0050	mg/L	ND			NC	30	
Methyl Isobutyl Ketone	ND	0.0050	mg/L	ND			NC	30	
Methyl tert-butyl ether	ND	0.0020	mg/L	ND			NC	30	
Methylene Chloride	ND	0.0050	mg/L	ND			NC	30	
Styrene	ND	0.0005	mg/L	ND			NC	30	
1,1,1,2-Tetrachloroethane	ND	0.0005	mg/L	ND			NC	30	
1,1,2,2-Tetrachloroethane	ND	0.0005	mg/L	ND			NC	30	
Tetrachloroethylene	ND	0.0005	mg/L	ND			NC	30	
Toluene	ND	0.0005	mg/L	ND			NC	30	
1,1,1-Trichloroethane	ND	0.0005	mg/L	ND			NC	30	
1,1,2-Trichloroethane	ND	0.0005	mg/L	ND			NC	30	
Trichloroethylene	ND	0.0005	mg/L	ND			NC	30	
Trichlorofluoromethane	ND	0.0010	mg/L	ND			NC	30	
Vinyl chloride	ND	0.0002	mg/L	ND			NC	30	
m,p-Xylenes	ND	0.0005	mg/L	ND			NC	30	

Method Quality Control: Duplicate

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
o-Xylene	ND	0.0005	mg/L	ND			NC	30	
Surrogate: 4-Bromofluorobenzene	*0.0877*		*%*		*110*	*50-140*			
Surrogate: Dibromofluoromethane	*0.0915*		*%*		*114*	*50-140*			
Surrogate: Toluene-d8	*0.0727*		*%*		*90.8*	*50-140*			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Anions									
Chloride	66.1	1	mg/L	57.3	88.0	70-124			
Fluoride	1.65	0.1	mg/L	0.83	81.6	70-130			
Nitrate as N	0.97	0.1	mg/L	ND	96.8	77-126			
Nitrite as N	0.928	0.05	mg/L	ND	92.8	82-115			
Sulphate	46.8	1	mg/L	36.7	101	70-130			
General Inorganics									
Ammonia as N	1.12	0.01	mg/L	0.162	96.0	81-124			
Dissolved Organic Carbon	10.0	0.5	mg/L	ND	100	60-133			
Phenolics	0.026	0.001	mg/L	ND	102	67-133			
Total Dissolved Solids	100	10	mg/L	ND	100	75-125			
Sulphide	0.51	0.02	mg/L	ND	101	79-115			
Tannin & Lignin	1.1	0.1	mg/L	ND	108	71-113			
Total Kjeldahl Nitrogen	1.18	0.1	mg/L	0.22	95.2	81-126			
Metals									
Mercury	0.0028	0.0001	mg/L	ND	92.9	70-130			
Aluminum	112	0.001	mg/L	73.1	78.3	80-120			QM-07
Arsenic	49.1	0.001	mg/L	0.595	97.1	80-120			
Barium	61.5	0.001	mg/L	22.5	78.2	80-120			QM-07
Beryllium	47.7	0.0005	mg/L	0.0395	95.3	80-120			
Boron	161	0.01	mg/L	124	72.5	80-120			QM-07
Cadmium	43.3	0.0001	mg/L	0.0061	86.7	80-120			
Calcium	60200	0.1	mg/L	54000	61.5	80-120			QM-07
Chromium	50.6	0.001	mg/L	1.27	98.7	80-120			
Cobalt	46.3	0.0005	mg/L	0.139	92.2	80-120			
Copper	43.4	0.0005	mg/L	0.178	86.5	80-120			
Iron	2520	0.1	mg/L	287	89.2	80-120			
Lead	41.8	0.0001	mg/L	0.0955	83.5	80-120			
Magnesium	27000	0.2	mg/L	18900	80.5	80-120			
Manganese	54.7	0.005	mg/L	7.12	95.2	80-120			
Molybdenum	47.5	0.0005	mg/L	5.00	85.0	80-120			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
Nickel	45.8	0.001	mg/L	0.546	90.4	80-120			
Potassium	15600	0.1	mg/L	5990	96.5	80-120			
Selenium	44.5	0.001	mg/L	0.158	88.6	80-120			
Silver	38.3	0.0001	mg/L	0.0026	76.5	80-120			QM-07
Sodium	8920	0.2	mg/L	ND	89.2	80-120			
Thallium	42.7	0.001	mg/L	0.012	85.4	80-120			
Uranium	46.3	0.0001	mg/L	0.517	91.6	80-120			
Vanadium	51.6	0.0005	mg/L	0.974	101	80-120			
Zinc	43.9	0.005	mg/L	1.32	85.2	80-120			
Volatiles									
Acetone	0.0908	0.0050	mg/L	ND	90.8	50-140			
Benzene	0.0332	0.0005	mg/L	ND	83.0	60-130			
Bromodichloromethane	0.0297	0.0005	mg/L	ND	74.2	60-130			
Bromoform	0.0300	0.0005	mg/L	ND	74.9	60-130			
Bromomethane	0.0327	0.0005	mg/L	ND	81.8	50-140			
Carbon Tetrachloride	0.0308	0.0002	mg/L	ND	77.0	60-130			
Chlorobenzene	0.0309	0.0005	mg/L	ND	77.3	60-130			
Chloroethane	0.0406	0.0010	mg/L	ND	101	50-140			
Chloroform	0.0301	0.0005	mg/L	ND	75.4	60-130			
Dibromochloromethane	0.0392	0.0005	mg/L	ND	98.0	60-130			
Dichlorodifluoromethane	0.0393	0.0010	mg/L	ND	98.2	50-140			
1,2-Dibromoethane	0.0304	0.0002	mg/L	ND	76.0	60-130			
1,2-Dichlorobenzene	0.0297	0.0005	mg/L	ND	74.3	60-130			
1,3-Dichlorobenzene	0.0372	0.0005	mg/L	ND	93.0	60-130			
1,4-Dichlorobenzene	0.0321	0.0005	mg/L	ND	80.3	60-130			
1,1-Dichloroethane	0.0326	0.0005	mg/L	ND	81.5	60-130			
1,2-Dichloroethane	0.0354	0.0005	mg/L	ND	88.6	60-130			
1,1-Dichloroethylene	0.0328	0.0005	mg/L	ND	82.0	60-130			
cis-1,2-Dichloroethylene	0.0323	0.0005	mg/L	ND	80.8	60-130			
trans-1,2-Dichloroethylene	0.0344	0.0005	mg/L	ND	86.1	60-130			
1,2-Dichloropropane	0.0306	0.0005	mg/L	ND	76.4	60-130			

Method Quality Control: Spike

Analyte	Result	Reporting Limit	Units	Source Result	%REC	%REC Limit	RPD	RPD Limit	Notes
cis-1,3-Dichloropropylene	0.0324	0.0005	mg/L	ND	81.0	60-130			
trans-1,3-Dichloropropylene	0.0315	0.0005	mg/L	ND	78.8	60-130			
Ethylbenzene	0.0308	0.0005	mg/L	ND	77.1	60-130			
Hexane	0.0434	0.0010	mg/L	ND	109	60-130			
Methyl Ethyl Ketone (2-Butanone)	0.109	0.0050	mg/L	ND	109	50-140			
Methyl Isobutyl Ketone	0.0863	0.0050	mg/L	ND	86.3	50-140			
Methyl tert-butyl ether	0.0765	0.0020	mg/L	ND	76.5	50-140			
Methylene Chloride	0.0440	0.0050	mg/L	ND	110	60-130			
Styrene	0.0294	0.0005	mg/L	ND	73.4	60-130			
1,1,1,2-Tetrachloroethane	0.0462	0.0005	mg/L	ND	115	60-130			
1,1,2,2-Tetrachloroethane	0.0310	0.0005	mg/L	ND	77.4	60-130			
Tetrachloroethylene	0.0305	0.0005	mg/L	ND	76.3	60-130			
Toluene	0.0303	0.0005	mg/L	ND	75.7	60-130			
1,1,1-Trichloroethane	0.0314	0.0005	mg/L	ND	78.6	60-130			
1,1,2-Trichloroethane	0.0305	0.0005	mg/L	ND	76.2	60-130			
Trichloroethylene	0.0316	0.0005	mg/L	ND	79.0	60-130			
Trichlorofluoromethane	0.0421	0.0010	mg/L	ND	105	60-130			
Vinyl chloride	0.0337	0.0002	mg/L	ND	84.2	50-140			
m,p-Xylenes	0.0782	0.0005	mg/L	ND	97.7	60-130			
o-Xylene	0.0294	0.0005	mg/L	ND	73.6	60-130			
Surrogate: 4-Bromofluorobenzene	*0.0714*		*%*		*89.3*	*50-140*			
Surrogate: Dibromofluoromethane	*0.0829*		*%*		*104*	*50-140*			
Surrogate: Toluene-d8	*0.0749*		*%*		*93.6*	*50-140*			

Qualifier Notes:

Sample Qualifiers :

QC Qualifiers:

BAC04	Duplicate QC data falls within method prescribed 95% confidence limits.
QM-07	The spike recovery was outside acceptance limits for the MS and/or MSD. The batch was accepted based on other acceptable QC.
QR-07	Duplicate result exceeds RPD limits due to non-homogeneity between multiple sample vials. Remainder of QA/QC is acceptable.

Sample Data Revisions:

None

Work Order Revisions / Comments:

None

Other Report Notes:

n/a: not applicable

ND: Not Detected

MDL: Method Detection Limit

Source Result: Data used as source for matrix and duplicate samples

%REC: Percent recovery.

RPD: Relative percent difference.

NC: Not Calculated

Any use of these results implies your agreement that our total liabilty in connection with this work, however arising, shall be limited to the amount paid by you for this work, and that our employees or agents shall not under any circumstances be liable to you in connection with this work.

PARACE LABORATORIES LTD

Paracel ID: 2349430

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Paracel Order Number	Chain Of Custody Ontario Drinking Water Samples № 19646
2349430	

Client Name:	GEMTEC	Project Ref:	100011.062	Waterworks Name:	Samples Taken By:
Contact Name:	Brent Redmond	Quote #:		Waterworks Number:	Name: Brent Redmond
Address:		PO #:		Address:	Signature:
After Hours Contact:		E-mail:	brent.redmond@GEMTEC.ca		Page ____ of ____
Telephone:	343-571-4556	Fax:		Public Health Unit:	Turn Around Time Required: ☐ 1 day ☐ 2 day ☐ 3 day ☑ 4 day

Samples Submitted Under: (Indicate **ONLY one**)
☐ ON REG 170/03 ☐ ON REG 319/08 ☐ Private Well
☐ ON REG 243/07 ☑ Other Orcs 169/03

Have LSN forms been submitted to MOE/MOHLTC?: ☐ Yes ☐ No ☑ N/A

Are these samples for human consumption?: ☐ Yes ☐ No

All information must be completed before samples will be processed.

Sample Type: R = Raw ; T = Treated ; D = Distribution; P = Plumbing
Source Type: G = Ground Water; S = Surface Water
Reportable: Requires AWQI reporting as per Regulation - Y = Yes; N = No

	LOCATION NAME	SAMPLE ID	Sample Type: R/T/D/P	Source Type: G / S	Reportable: Y / N	Resample	SAMPLE COLLECTED DATE	SAMPLE COLLECTED TIME	# of Containers	Free/Combined Chlorine Residual mg/L	Standing / Flushed: S / F (REG 243)	Total Coliform/E. Coli	HPC	Lead	THM	Inclusion	Trace metals	VOC 5
1		TW1 4hr	R	G	N	/	Dec. 7,23	2:20PM	8							X		
2		TW1 8hr	1.	1	11	11	11	6:20PM	13							X	X	X
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		

Comments: → Colour in ACH FYCH
→ May be extra bottles, dispose if not required

Method of Delivery: Walk In

Relinquished By (Sign):	Received By Driver/Depot:	Received at Lab: KB 959	Verified By: Hing
Relinquished By (Print): Adrian Williams	Date/Time:	Date/Time: Dec 8/23	Date/Time: Dec 8, 23 | 11:03
Date/Time: Dec 8 2023 10.00 am	Temperature: °C	Temperature: 1.0 °C	pH Verified: ☑ By: HP

APPENDIX H

Water Quantity Analysis (MECP WWRs)

Water Quantity Parameters
(1500 Thomas Argue Road- 1 km search radius)

Well ID	1515864	1518459	1520126	1523100	1531260	1534847	1535788
Pumping Rate[1] (L/min)	45.5	27.3	45.5	63.6	45.5	22.7	12.0
Static Water Level (m bgs)	2.1	18.3	3.0	1.2	2.4	6.5	1.7
Drawdown (m)	4.6	12.2	4.6	20.1	34.1	19.2	12.6
Well Diameter (m)	0.2	0.2	0.2	0.2	0.2	0.2	0.2
Depth (m)	71.6	71.6	10.7	32.0	36.6	121.9	39.6
Borehole Storage (m^3)	0.1	0.2	0.1	0.4	0.6	0.3	0.2
Borehole storage (L)	83	221	83	365	619	348	229
Total Volume Pumped (L)	2730	1637	2730	3816	2730	1362	720
Specific Capacity[2] (L/min/m)	10	2	10	3	1	1	1
Adjusted Specific Capacity[3] (L/min/m)	10	2	10	3	1	1	1
Available Drawdown[4] (m)	67	50	5	28	31	112	35
Well Yield[5] (L/min)	658	112	46	88	42	133	33

Notes:

1. Pumping rate and drawdown during 1-hour yield test as reported on corresponding MECP water well record.
2. Specific Capacity = pumping rate (litres per minute) / drawdown (metres)
3. Specific Capacity (adj.) is the rate of discharge of a well per unit of drawdown (L/min/m), corrected for wellbore storage effects.
   Adj (SC) = (((volume pumped in litres – volume removed from wellbore storage in litres) / time) / drawdown during 1-hour pumping test)
4. Available Drawdown = distance from static water level to 3 metres above base of the well.
5. Well Yield =Adjusted specific capacity x Available Drawdown (L/min).

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Project: 10011.062
Date: May 2023

APPENDIX I

Nitrate Dilution Calculations

Allowable Flows - Commercial Septic Systems - 1500 Thomas Argue Road, Carp, Ontario

Site	Area m^2	Topography Factor	Soil Factor	Cover Factor	Infiltration Factor	Annual Water Surplus (m^3/year)	Infiltration Volume (m^3/year)
1500 Thomas Argue Road	11,830	0.20	0.10	0.10	0.40	0.367	4342

Hard Surface Area	Available Infiltration [1] (litres per day)	Maximum Septic Flow-Conventional[2] (litres per day)	Maximum Number of Users[3]	Maximum Septic Flow-Advanced[2] (litres per day)	Maximum Number of Users[3]
40%	2855	952	13	2855	38
50%	2379	793	11	2379	32
60%	1903	634	8	1903	25

Notes:

1. Available infiltration (litres per day) = Infiltration volume (m3/year) x (1000 litres/m3) / (365 days/year) x (1 - hard surface area) x Infiltration Factor
2. Incorporates a value of 20 mg/L nitrate in the discharged effluent from the tertiary treatment system. The calculated maximum allowable flow is based on a simplification of the formula provided in Section 5.6.3, utilizing a concentration of 20 mg/L of Nitrate in the effluent discharging from the tertiary treatment unit
3. Assumes 75 litres per day per person

CarletonPlace+Appleton WATER BUDGET MEANS FOR THE PERIOD 1985-2020 DC20492

LAT.... 45.18 WATER HOLDING CAPACITY...100 MM HEAT INDEX... 36.83

LONG... 76.12 LOWER ZONE..... 60 MM A..... 1.082

DATE	TEMP (C)	PCPN	RAIN	MELT	PE	AE	DEF	SURP	SNOW	SOIL	ACC P
31- 1	-9.4	64	17	23	1	1	0	38	58	99	297
28- 2	-8.1	52	15	26	1	1	0	39	68	100	349
31- 3	-2.2	61	29	77	7	7	0	98	24	100	410
30- 4	6.0	78	73	29	32	32	0	70	0	99	489
31- 5	13.3	77	77	0	82	82	0	14	0	81	566
30- 6	18.1	94	94	0	115	110	-5	8	0	57	661
31- 7	20.7	94	94	0	134	114	-20	5	0	32	756
31- 8	19.5	89	89	0	116	92	-24	1	0	28	846
30- 9	15.2	85	85	0	77	70	-7	3	0	41	932
31-10	8.4	88	86	1	37	37	0	16	0	75	88
30-11	1.6	76	58	12	11	11	0	38	6	96	164
31-12	-5.7	69	26	16	2	2	0	37	34	99	233
AVE	6.4	TTL 928	743	184	615	559	-56	367			

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materials testing	service de laboratoire des matériaux

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APPENDIX D

Nitrate Dilution Calculations

Allowable Flows - Commercial Septic Systems - 1508 Thomas Argue Road, Carp, Ontario

Site	Area m^2	Topography Factor	Soil Factor	Cover Factor	Infiltration Factor	Annual Water Surplus (m^3/year)	Infiltration Volume (m^3/year)
1508 Thomas Argue Road	11,830	0.20	0.10	0.10	0.40	0.367	4342

Hard Surface Area	Available Infiltration [1] (litres per day)	Maximum Septic Flow-Conventional[2] (litres per day)	Maximum Number of Users[3]	Maximum Septic Flow-Advanced[2] (litres per day)	Maximum Number of Users[3]
75%	1189	396	5	1189	16

Notes:

1. Available infiltration (litres per day) = Infiltration volume (m^3/year) x (1000 litres/m^3) / (365 days/year) x (1 - hard surface area) x Infiltration Factor
2. Incorporates a value of 20 mg/L nitrate in the discharged effluent from the tertiary treatment system. The calculated maximum allowable flow is based on a simplification of the formula provided in Section 5.6.3, utilizing a concentration of 20 mg/L of Nitrate in the effluent discharging from the tertiary treatment unit
3. Assumes 75 litres per day per person

CarletonPlace+Appleton WATER BUDGET MEANS FOR THE PERIOD 1985-2020 DC20492

LAT.... 45.18 WATER HOLDING CAPACITY...100 MM HEAT INDEX... 36.83

LONG... 76.12 LOWER ZONE..... 60 MM A..... 1.082

DATE	TEMP (C)	PCPN	RAIN	MELT	PE	AE	DEF	SURP	SNOW	SOIL	ACC P
31- 1	-9.4	64	17	23	1	1	0	38	58	99	297
28- 2	-8.1	52	15	26	1	1	0	39	68	100	349
31- 3	-2.2	61	29	77	7	7	0	98	24	100	410
30- 4	6.0	78	73	29	32	32	0	70	0	99	489
31- 5	13.3	77	77	0	82	82	0	14	0	81	566
30- 6	18.1	94	94	0	115	110	-5	8	0	57	661
31- 7	20.7	94	94	0	134	114	-20	5	0	32	756
31- 8	19.5	89	89	0	116	92	-24	1	0	28	846
30- 9	15.2	85	85	0	77	70	-7	3	0	41	932
31-10	8.4	88	86	1	37	37	0	16	0	75	88
30-11	1.6	76	58	12	11	11	0	38	6	96	164
31-12	-5.7	69	26	16	2	2	0	37	34	99	233
AVE	6.4	TTL 928	743	184	615	559	-56	367			

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structural	structures
field services	surveillance de chantier
materials testing	service de laboratoire des matériaux

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