Level I and II Hydrogeological Assessment
Elgin Road Pit
FINAL REPORT
Brantam Excavating Inc.

Project Name:
Elgin Road Pit
Municipality of Thames Centre, Ontario

Project Number:
KCH-21009432-A0

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Date Submitted:
February 10, 2023

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February 10, 2023

Executive Summary

EXP Services Inc. (EXP) was retained by **Brantam Excavating Inc.** to conduct a hydrogeological assessment in support of a Class A licence for aggregate extraction at Elgin Road Pit to be located south of Dundas Street and west of Elgin Road in the Municipality of Thames Centre, Ontario, hereinafter referred to as the 'Site'.

The hydrogeological assessment was completed by reviewing the Ministry of the Environment, Conservation and Parks (MECP) Water Well Records (WWR), reviewing the soils and groundwater information provided from a series of sampled boreholes and monitoring wells at the Site, compiling a site wide monthly water balance, collecting over a year of groundwater elevations to identify seasonal variability, and assess the natural heritage features on the property. It is understood that the hydrogeological assessment will be submitted for review and approval by the Ministry of Natural Resources and Forestry (MNRF).

Based on the results of the hydrogeological assessment, the following findings are presented:

- In support of a Class A licence for aggregate extraction at Elgin Road Pit, Water Reports Level 1 and 2 are required for the Site for extraction below the water table;
- Excavation is expected to be completed to an elevation of 269 m above mean sea level (amsl) and a maximum depth of 11 m below ground surface (bgs) with a maximum extraction of 500,000 tonnes per year;
- Natural features on Site include the Humphrey Municipal Drain (also known as Caddy Creek) which runs north to south in the central and western areas of the property and the North Dorchester Swamp Provincially Significant Wetland (PSW) surrounds the southern half of the Drain. In addition, the PSW is contained within a mapped significant woodland on Site;
- The Humphrey Municipal Drain is classified as a coldwater Drain. An ecology study completed on Site indicated the Drain can be described as a coolwater system due to lack of shading upstream (Terrastory, 2023);
- Surface drainage follows Site topography and generally flows towards the Drain and PSW from both the east and west;
- The stratigraphy at the Site is homogeneous consisting of an unconfined aquifer of sand and gravel, sand and minor occurrences of silty sand with a thickness ranging from 3.4 m to more than 8.8 m. The unconfined aquifer is underlain by silt to clayey silt till. In the south portion of the Site (BH5/MW), the stratigraphy is more variable consisting of interlayers of sand, clayey silt till and silt overlying a 2.1 m thick sand and gravel layer which is underlain by clayey silt till;
- Overall, shallow groundwater levels of less than 1 m bgs were noted adjacent to the Humphrey Municipal Drain in monitoring wells BH4/MW and BH5/MW. Shallow groundwater levels between 1 m and 2 m bgs were also noted adjacent to the Drain in the northeast corner of the Site in BH1/MW. The deepest groundwater levels were noted in BH3/MW and in BH6/MW which are the deepest wells onsite;

- Based on groundwater levels in piezometers P-1 and P-2 and surface water levels in staff gauges SG1 and SG2, shallow groundwater is hydraulically connected to the surface water within the Humphrey Municipal Drain and the North Dorchester Swamp PSW with both recharge and discharge conditions observed. Aerial imagery and topographic mapping also suggest discharge conditions east of the Drain between surface water station SW1 and BH3/MW;

- Based on the groundwater elevations across the Site, it is determined that shallow groundwater is generally flowing in a westerly direction towards the Humphrey Municipal Drain and the North Dorchester Swamp PSW which are located downgradient at a lower topographic elevation. It is likely that groundwater also flows towards the Drain and PSW from the west;

- The Site is mapped as a highly vulnerable aquifer and the majority of the area surrounding the PSW on Site is mapped as a significant groundwater recharge area;

- Single Well Response Tests (SWRT) were completed on three (3) of the monitoring wells. Based on the test results, the hydraulic conductivities for the sand and gravel range from 1.5×10^{-4} m/s to 2.8×10^{-3} m/s with a geometric mean of 8.6×10^{-4} m/s;

- A total of eleven (11) grain size analyses were carried out on samples collected from seven (7) test pits completed in 2010. Based on the grain analyses, the hydraulic conductivities range from 3.8×10^{-5} m/s in sand to 1.3×10^{-3} m/s in sand and gravel;

- Groundwater chemistry results did not exceed the Ontario Drinking Water Quality Standards, Objectives and Guidelines (ODWQS) Maximum Acceptable Concentrations (MAC) for any of the analyzed parameters with the exception of nitrate which exceeded the ODWQS of 10 mg/L with a concentration of 41.5 mg/L at BH5/MW-A in March 2022. Surface water chemistry results did not exceed the Ontario Provincial Water Quality Objectives (PWQO) guidelines for surface water;

- Chemistry results plotted on a Piper diagram indicate both the groundwater samples and the surface water samples have similar chemical signature suggesting hydraulic connectivity;

- The proposed pond, with a total area of 12.9 ha, is likely to extend to the approximate 274 m masl groundwater contour line with a final pond elevation of approximately 274.1 m amsl. To allow for seasonal variability and higher water levels during the wet season, the pond should be able to contain final water levels of 274.25 m amsl;

- The proposed pond on Site has the potential to thermally impact the natural features on Site. It is recommended to apply mitigation measures such as maintaining a buffer around the features, use shading techniques and complete a monitoring program during operations to minimize these effects;

- The monitoring wells and surface water stations on Site have been maintained for ongoing study past the completion of this report. When the monitoring wells are no longer required, they should be decommissioned in accordance with O. Reg. 903;

- Based on the water balance assessment, the overall total of infiltration and runoff directed towards the Drain and PSW (Drainage Areas B and C) is 168,121 m^3/year under existing conditions compared to 160,523 m^3/year in the post-development environment suggesting minimal impact in terms of impact on the Drain and/or PSW; and

- A review of MECP WWR within 500 m of the Site indicated eight (8) of the WWR are shallow water supply wells (<10 m bgs). Based on the results from the door-to-door survey, it has been confirmed that at least one (1) residence within 500 m of the Site utilizes private well water. Given that drawdown is expected to be minimal and dewatering activities are not expected, impact to private wells in the vicinity of the Site from aggregate extraction operations is unlikely.

Over a full year of groundwater elevation monitoring (June 2021 to September 2022) and water quality monitoring was completed in support of the hydrogeological investigation. Based on the hydrogeological data collected from the property, a good understanding has been captured regarding the groundwater conditions related to site development. It is our hope that this Final Report will be sufficient to support the Class A licence application for aggregate extraction on Site.

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Appendices

Tables (in text)

Drawings (Appendix A)

1. Introduction and Background

1.1 Background

EXP Services Inc. (EXP) was retained by Brantam Excavating Inc. to conduct a hydrogeological assessment in support of a Class A licence for aggregate extraction at Elgin Road Pit to be located south of Dundas Street and west of Elgin Road in the Municipality of Thames Centre, Ontario, hereinafter referred to as the 'Site' (**Appendix A, Drawing 1**). The proposed plan for the Site is provided in **Appendix B**.

According to the Aggregate Resource Act (1990, updated June 2021), a "Maximum Predicted Water Table Report" is required in support of the licence application which provides a summary of the water table elevations at the Site in relation to the proposed extraction. In addition, for applications proposing to excavate below the maximum predicted water table, a "Water Report" is also required.

Water Report Level 1 determines the potential for impacts to groundwater and surface water resources and their uses and identifies any Source Protections Areas in the vicinity of the Site including Well Head Protections Areas for Quantity (WHPA-Q) and suggested applicable source water protection policies and mitigation measured.

Water Report Level 2 is required when a Water Report Level 1 identifies a potential for impacts from an aggregate site to groundwater and/or surface water resources and their uses. A Water Report Level 2 requires an impact assessment to address potential influence of the operation on groundwater, surface water, private wells and naturally sensitive areas such as wetlands.

Based on hydrogeological conditions onsite, Water Reports Level 1 and 2 are required for the Site.

This report addresses Class A license requirements for a pit which intends to extract aggregate material from above and below the established groundwater table. It includes an assessment in support of the "Maximum Predicted Water Table Report" requirement as well as Level 1 and Level 2 Water Reports in accordance with the Aggregate Resources of Ontario: Technical reports and information standards (Ministry of Natural Resources and Forestry; MNRF, 2020).

The hydrogeological characteristics of the Site were examined by reviewing the Ministry of the Environment, Conservation and Parks (MECP) Water Well Records (WWR), reviewing the soil and groundwater information provided from a series of sampled boreholes and monitoring wells at the Site, compiling a Site wide monthly water balance, collecting over a full year of groundwater elevations to identify seasonal variability; and assess the natural heritage features on the property. The assessment provides comments pertaining to potential impacts on hydrogeological conditions at the Site and provides recommendations, where applicable, to mitigate this potential for impact. This final report includes a full year of data collection thus fulfilling the requirements in support of a Class A license.

Natural features on Site include the Humphrey Municipal Drain (also known as Caddy Creek) which runs north to south in the centre of the property and the North Dorchester Swamp Provincially Significant Wetland (PSW) which surrounds the southern half of the Drain. In addition, the PSW is contained within a mapped significant woodland on Site. Upper Thames River Conservation Authority (UTRCA) Regulated Lands encompass both the Drain and the PSW on Site.

1.2 Terms of Reference and Scope of Work

The investigation was completed in accordance with the scope of work outlined in Proposal Number 999-25001817-PP addressed to Mr. Joe Haasen dated May 3, 2021. An Authorization to proceed with this investigation was received from Mr. Joe Haasen of **Brantam Excavating Inc.** on May 4, 2021.

The scope of work for the Hydrogeological Assessment consisted of the following tasks:

1. Desktop Study: This task consisted of a review of existing information including Site plans, previous reports, geological maps, geological cross sections, groundwater level information, borehole logs, and MECP WWR.

2. Field Program: Installation of six (6) monitoring wells across the Site was carried out as part of the field program. A total of two (2) surface water stations were installed within the surface water Drain found across the Site. Water levels were measured monthly from installation for over twelve (12) months to identify seasonal fluctuations in the groundwater and surface water features on Site. Single well response tests (SWRT) were completed for the purposes of characterizing the hydrogeological conditions at the Site. Two (2) rounds of groundwater and surface water quality samples were collected and submitted for laboratory analysis. In addition, a door-to-door well survey was completed to confirm whether shallow, private supply wells are in use in the vicinity of the Site.

3. Data Evaluation: Evaluation of the available field and laboratory data, and assessment of potential effects on the surrounding environment, as applicable.

4. Water Balance: Preparation of a water balance assessment of the subject Site evaluating pre- and post-development conditions.

5. Reporting: This task consisted of preparing this hydrogeological assessment report. In preparing this report, EXP has considered the guidance material available in the Aggregate Resources of Ontario: Technical reports and information standards (MNRF, 2020).

Reference is made to **Appendix L** of this report, which contains further information necessary for the proper interpretation and use of this report.

1.3 Extraction Plan

The property total area is approximately 43.7 ha, of which the total area to be licensed is approximately 20.7 ha. The proposed area to be extracted and rehabilitated is approximately 17.8 ha (excluding the natural features on Site). The proposed Rehabilitation Plan and pond outlines are shown on the Site Plans in **Appendix B**, please refer to those plans for additional specific details.

Extraction is expected to be carried out in several phases as follows:

- Phase A: establish access on Site, strip topsoil and overburden separately and use to construct berms, complete above water extraction in Area 1 (eastern portion of the Site) from south to north. Undisturbed areas will remain for agricultural use with vegetation maintained in healthy condition.

- Phase B: complete above water extraction of Area 1, strip topsoil and overburden from Area 2 (located west of Area 1), begin extraction of Area 2 from south to north and rehabilitate side slopes of Area 1. Undisturbed areas will remain for agricultural use with vegetation maintained in healthy condition.
- Phase C: complete above water extraction of Area 2, complete below water extraction of Area 2 from north to south, place extracted material in windrows on the pit floor to drain prior to being transported for processing, complete rehabilitation of Area 2 side slopes and maintain vegetation in healthy condition.
- Phase D: complete below water extraction of Area 1 from north to south, continue rehabilitation of Areas 1 and 2 side slopes and shoreline and maintain vegetation in healthy condition.
- Phase E: Remove all equipment structures and stockpiles, rehabilitate roads and extraction Areas 1 and 2 and maintain vegetation in healthy condition.

Extraction will be completed to an elevation of 269 m above mean sea level (amsl) and a maximum depth of 11 m below ground surface (bgs). The maximum expected tonnage to be removed is 500,000 tonnes per year. The Humphrey Municipal Drain and the North Dorchester Swamp PSW on Site will be preserved and a 30 m buffer from the Drain and PSW will be maintained during operations. In addition, a 15 m buffer will be maintained from the dripline of the significant woodland. The primary site access will be located at the southern end of the Site along Elgin Road. The plans provided in **Appendix B** show the various operation stages which denote the extraction zones for each phase of the project, and the site rehabilitation plan which denotes the presence of a pond at completion. Also included in the plans provided in **Appendix B** is a spills response program.

The proposed extraction will extend below the water table to form one (1) permanent pond. It is expected the pond will be 12.9 ha in size upon completion, which will occupy the majority of the Site area east of the PSW. The proposed pond outline is shown on **Drawing 2**. Note that below water extraction at the site will only extend to the till surface to a maximum depth of 11 m bgs, therefore the final maximum pond (below water extraction) depths may be variable.

Aggregate extraction will be completed below water using an excavator or dragline, placed along the pond edge and allowed to drain. There will be no dewatering activities as part of the below water extraction.

Drainage within the rehabilitated area in the post extraction environment will be maintained onsite. Runoff onsite will be directed toward the proposed pond or toward designated infiltration areas. Water will be retained and infiltrated onsite with no other proposed water use, diversion, storage or drainage facilities.

2. Methodology

2.1 Borehole Drilling and Monitoring Well Installations

On June 15 and 16, 2021, six (6) boreholes were advanced and completed as monitoring wells on Site. The locations of the boreholes are all presented on **Drawing 2**. Borehole drilling and monitoring well installation was completed under the technical supervision of EXP. The location and depth of the boreholes was based on the proposed development plan which was provided to EXP. Boreholes were advanced to depths ranging from 5.0 to 9.0 m bgs.

The boreholes were advanced using a track-mounted drill rig and standard 21 cm (8") OD hollow stem auger drilling techniques with split spoon sampling. During the drilling, the stratigraphy in the boreholes was examined and logged in the field by EXP technical personnel. Copies of the field borehole logs are provided in **Appendix C**.

All wells were constructed from 5.1 cm (2") diameter, schedule 40, polyvinyl chloride (PVC), flush-threaded casing. The appropriate number of risers were coupled with screen sections via threaded joints to construct the well. The well screens consisted of PVC pipe with 0.010-inch factory-generated slots. A summary of the well installation details is provided in **Table 1**, with the well locations shown on **Drawing 2**.

A primary filter pack consisting of silica sand was placed around the well screen in the borehole and extended above the top of the well screen. Hole Plug, a swelling bentonite clay that forms an effective barrier to the vertical movement of fluids when installed in a borehole, was used as a seal above the filter pack.

The ground surface and top of well pipe elevations were collected by a Sokkia GPS unit, capable of collecting accurate location and elevation measurements to the mm scale.

Table 1 – Monitoring Well Construction Details

Well ID	Ground Surface Elevation* (m amsl)	Top of Standpipe Elevation* (m amsl)	Completion Depth (m bgs)	Screen Length (m)	Screened Strata
BH1/MW	275.31	276.11	4.6	1.52	Sand and Gravel
BH2/MW	276.53	277.27	5.2	1.52	Sand and Gravel; Silty Sand
BH3/MW	279.09	279.88	9.1	1.52	Sand
BH4/MW	274.39	275.10	3.4	1.52	Sand and Gravel
BH5/MW	274.63	275.41	5.5	1.52	Sand and Gravel; Clayey Silt Till
BH6/MW	279.03	279.79	7.6	1.52	Sand

Notes: 1. m amsl denotes metres above mean sea level.
2. m bgs denotes metres below ground surface.
3. elevations were collected with a Sokkia GPS unit

2.2 Piezometer and Staff Gauge Installations

A total of two (2) surface water stations were installed on Site in June 2021. Each surface water station was installed with a shallow groundwater piezometer and surface water staff gauge. Surface water Station SW1 was installed in the Humphrey Municipal Drain which flows south to the North Dorchester Swamp Provincially Significant Wetland (PSW) Complex. Surface water Station SW2 was installed downstream along the Humphrey Municipal Drain within the North Dorchester Swamp PSW. The locations of each station are shown on **Drawing 2**. The following **Table 2** outlines the surface water station details.

The piezometers were installed with a 6-inch Solinst drive point end (6-inch screen length). The Solinst drive point piezometer ends have a stainless steel, 50 mesh cylindrical filter screen, within a ¾" (20mm) stainless steel drive-point body.

A staff gauge was installed at each surface water station within the surface water body in order to capture monthly surface water elevations. This staff gauges are referred to as SG1 and SG2.

Each piezometer and staff gauge was surveyed using a Sokkia GPS unit, capable of collecting accurate location and elevation measurements to the mm scale.

Table 2 – Surface Water Station Details

Station ID	Piezometer ID	Ground Surface Elevation (m amsl)	Top of Piezometer Elevation (m amsl)	Completion Depth (m bgs)	Screen Length (m)	Staff Gauge Installed
Station SW1	**P-1**	272.90	274.10	0.84	0.15	Yes (SG1)
Station SW2	**P-2**	271.98	273.01	0.58	0.15	Yes (SG2)

Notes: 1. m amsl denotes metres above mean sea level.
2. m bgs denotes metres below ground surface.
3. elevations were collected by a Sokkia GPS unit

2.3 Well Development and Groundwater Sampling

Monitoring wells were developed following installation. The wells were developed to:

- remove fine soil particles adjacent to the well screen that may otherwise interfere with water quality analyses;
- restore the groundwater properties that may have been disturbed during the drilling process;
- improve the hydraulic communication between the well and the geologic materials; and,
- remove water, if any, added during the drilling process.

Wells were generally developed by removing a minimum of ten times the volume of water contained in the well casing (casing volume) where possible using rigid high-density polyethylene (HDPE) tubing fitted with Waterra™ inertial pumps.

Groundwater samples were collected from two (2) selected monitoring wells on September 29, 2021 and March 15, 2022 for analysis of groundwater quality. Groundwater chemistry results are presented and discussed in **Section 4.8**.

2.4 Surface Water Sampling

Surface water samples were collected from the two (2) surface water stations on September 29, 2021 and March 15, 2022 in order to establish baseline surface water quality. Surface water chemistry results are presented and discussed in **Section 4.8**.

2.5 Long-Term Groundwater Elevation Monitoring

Water level monitoring in all monitoring wells and piezometers installed on Site was completed on a monthly basis from installation in June 2021 until the end of May 2022 for a one-year period. Additional monitoring for ecological purposes was completed in August and September 2022. Measurements were manually collected using a battery-signal water level tape.

Water level dataloggers were installed in two (2) monitoring wells (BH2/MW and BH5/MW) and within the shallow groundwater piezometers at surface water stations SW1 and SW2 to assist in the evaluation of seasonal water level fluctuation, groundwater/surface water interactions, and the influence of precipitation on surface water and

groundwater levels across the Site. An additional logger was placed at surface and used for barometric compensation. The dataloggers were installed in the monitoring wells on June 19, 2021 and in the piezometers on June 1, 2021 and remained in place for continued monitoring until September, 2022. Water level measurements were logged every 24 hours.

2.6 Hydraulic Conductivity Testing

Hydraulic conductivity estimates for the soils were determined using two methods. The first method is applicable to saturated soils at depth and involves SWRT within the installed monitoring wells. The second method involves a calculated estimation of hydraulic conductivity based on soil sample particle size analysis.

2.6.1 Single Well Response Tests (SWRTs)

Hydraulic conductivity estimates for the soils were determined using SWRT within monitoring wells BH1/MW, BH4/MW and BH5/MW-A on October 14, 2021 and October 20, 2022 to estimate hydraulic conductivity of the subsurface soils. The test method consisted of water displacement in the wells by purging water (rising head test) and by using a slug (falling and rising head tests) and subsequent monitoring of the water level recovery back to static conditions over time. This method is applicable to saturated soils at depth.

The results from the SWRTs were analyzed using the mathematical solution by Hvorslev (1951) for unconfined aquifer as provided in the software AQTESOLV ™ Pro v. 4.5. Where oscillations were observed indicating an underdamped aquifer response, a solution by Springer-Gelhar (1991) for unconfined aquifer was utilized.

2.6.2 Grain Size Analyses

A total of eleven (11) soil samples were selected for grain size analyses from test pits completed onsite in 2010. Due to the nature of the Site soils, estimated hydraulic conductivity (K) values were determined using different methods depending on the soil sample characteristics including the Kaubisch, Kozeny-Carman, and Beyer methodologies.

3. Site Description and Geologic Setting

3.1 Site Location and Description

The Site is located south of Dundas Street and west of Elgin Road (Concession 1 North Division, Part of Lots 13 and 14 in the Municipality of Thames Centre) 5 km west of Thamesford in the Municipality of Thames Centre, Ontario (**Drawing 1**). The Site is currently occupied by agricultural fields. The Site is irregular in shape and measures approximately 43.7 ha in total area. The Site is bounded by agricultural fields and residences to the north, east and west. East of the Site is a commercial property for agricultural vehicles and an existing active gravel pit (CBM Pit) is located east of Elgin Road. South of the Site is a continuation of the North Dorchester Swamp PSW.

3.2 Topography and Drainage

Based on topographic mapping, the Site is generally hilly. Topography ranges from a high of approximately 281 m amsl located in the centre of the Site to a topographic low of 272 m amsl located at the southern portion of the Site associated with a surface water feature.

Surface runoff onsite drains into the Humphrey Municipal Drain from the east, west as well as from the north. The Drain flows from the northeast corner of the Site along the northern property boundary towards the western portion of the Site. The Drain then turns and flows south of the dwelling located in the northern portion of the Site. The southern half of the Drain is predominantly surrounded by the North Dorchester Swamp PSW. In addition, the PSW is contained within a mapped significant woodland on Site. A topographic low of approximately 274 m amsl is located between surface water station SW1 and monitoring well BH3/MW. A review of aerial imagery indicates this area as seasonally wet. An existing aggregate pond associated with the CBM pit is situated directly east of the Site, across Elgin Road. The natural features on Site are presented in **Drawing 2**.

The Site is situated within the Dorchester watershed. UTRCA Regulated Lands are associated with the Humphrey Municipal Drain and the North Dorchester Swamp PSW encompassing the majority of the Site with the exception of an area at the eastern portion of the Site and a small area in the northwest corner of the Site (**Drawing 3**).

3.3 Site Geology

3.3.1 Bedrock Geology

The Site is underlain by limestone, dolostone and shale of the Dundee Formation (OGS, 2011). This formation consists of 60 to 160 feet (18 to 49 m) of light brown, medium-grained with some minor chert (Hewitt, 1972), and is part of the Algonquin Arch, which forms a ridge along the southwestern Ontario peninsula between the Michigan Basin (to the northwest) and the Appalachian Basin (to the southwest). Bedrock is generally not exposed in the area.

Review of bedrock topography mapping (**Drawing 4**) indicates the bedrock surface is found at an elevation of approximately 250 m amsl in the vicinity of the Site corresponding to aquifer thickness of approximately 25 m. Review of MECP Well records within 500 m from the Site (**Appendix D**) indicates an overburden thickness of approximately 22 to 30 m. Bedrock was not encountered during the drilling program completed as part of this investigation.

3.3.2 Overburden Geology

The physiography of Southwestern Ontario was altered significantly by the glacial and interglacial periods that took place throughout the Quaternary period. The overburden deposits which are present in the study area were formed by numerous glacial events during the late Wisconsinan glacial stage approximately 10,000 to 23,000 years before present. There were two distinct glacial lobes present in Southwestern Ontario during this period. The Huron Lobe advanced from Lake Huron southwards, and the Erie Lobe advanced from the northeast, receding to the east.

During the advancement of the glacial ice sheets, bedrock and unconsolidated sediments were eroded. During the recession of the glaciers, the eroded materials were deposited in lakes, rivers and along spillways, contributing to the present configuration of moraines, abandoned spillways, drumlins, eskers, abandoned shorelines, and various still-water sediment deposits.

Deposits in the area can be contributed to the Port Bruce Stadial period. In the London area, a series of east-west recessional and end moraines were formed, along with the Port Stanley Till Plain. Deposition of the basal portion of the Port Stanley Till was formed during the initial advance of the Erie Lobe. Overlying till was deposited during subsequent cycles of advance and retreat, resulting in silt and sand layering within the till plain.

The surficial deposits were mapped and categorized into a number of physiographic regions by Chapman and Putnam (1984). The Site is part of a physiographic region known as the Oxford Till Plain and is also mapped as undrumlinized till plains landform in the eastern portion of the Site and spillways in the western portion of the Site. Mapping of the physiographic regions and landforms at the Site is provided in **Drawing 5** and **Drawing 6**, respectively.

A review of surficial geological mapping by the Ontario Geological Survey (OGS, 2010) shows the Site is mapped primarily as ice contact stratified deposits of sand and gravel with minor silt, clay and till. Along the western property boundary is a sandy silt to silty sand textured till on Paleozoic terrain (**Drawing 7**).

Authorized aggregate Sites are located immediately east of the Site across Elgin Road and about 1 km northwest of the Site (**Drawing 8**).

3.3.3 Site Specific Surficial Geology

Six (6) boreholes were completed by EXP across the Site, with installation of monitoring wells in all borehole locations. The locations of the boreholes are provided in **Drawing 2**. The boreholes were terminated at a maximum depth of between 5.0 to 9.0 m bgs. Borehole logs are provided in **Appendix C**.

Generalized stratigraphic cross sections through the Site, as shown in **Drawing 9**, are provided in **Drawing 10** and **11**. With the exception of BH5/MW, the overall stratigraphy on Site is relatively homogeneous consisting of an unconfined aquifer of sand and gravel, sand and minor occurrences of silty sand with a thickness ranging from 3.4 m in BH4/MW to more than 8.8 m in BH3/MW. The unconfined aquifer is underlain by silt to clayey silt till. The stratigraphy in BH5/MW is more variable consisting of interlayers of sand, clayey silt till and silt overlying a 2.1 m thick sand and gravel layer. The sand and gravel layer in BH5/MW is underlain by clayey silt till. The following is a general description of the stratigraphy at the Site as shown in the cross sections.

As shown in cross section A-A' (**Drawing 10**), the stratigraphy from north of the Site to the south consists of an unconfined aquifer of sand and gravel, sand and silty sand overlying silt to clayey silt till. The aquifer may be up to

approximately 9 m thick in some areas. Some minor occurrences of silt to sandy silt and shallow silt to clayey silt till were observed in BH5/MW.

As shown in cross section B-B' (**Drawing 11**), the stratigraphy from northwest to southeast consists of sand and gravel, sand and silty sand with a thickness of about 7 m or more. Silt to sandy silt was observed in BH6/MW and a minor occurrence of silt to clayey silt till is interpreted where cross section B-B' intersects cross section A-A'.

4. Hydrogeologic Setting

In addition to the groundwater information collected from the monitoring wells installed at the Site, the following documents were reviewed to gain an understanding of the hydrogeological conditions in the area:

- Goff, K and D.R. Brown, 1981. Ground-Water Resources – Summary. Thames River Basin Water Management Study Technical Report. Ontario Ministry of the Environment, Water Resources Report 14;
- Thames-Sydenham and Region Source Protection Committee. 2011. Upper Thames River Source Protection Area, Approved Updated Assessment Report. 12 August; and,
- MECP WWR within 500 m of the Site.

4.1 Regional Aquifer

Goff and Brown (1981) described the potential for four regional aquifers in the study area; shallow unconfined overburden aquifer, intermediate and deep confined aquifers and a bedrock aquifer.

4.1.1 Overburden Aquifers

The uppermost shallow and unconfined overburden aquifer was described as consisting of lacustrine or glacio-fluvial sands that may, in some locations, be overlain by lower permeability silts and clays. Regionally, the shallow aquifer is generally associated with the Stratford Till Plain and glacial deposits and are typically less than 15 m in thickness. Shallow overburden aquifers are discontinuous in nature and are expected to be linked more directly to precipitation and recharge compared to the intermediate and deep overburden aquifers.

Intermediate depth (15 to 30 m bgs) and deep overburden aquifers (>30 m bgs) aquifers generally consist of saturated sand and gravel deposits in the overburden and are very discontinuous in nature due to the heterogeneous nature of glacial deposits. Sand and gravel layers are present in the Port Stanley and Catfish Creek glacial till sheets. The intermediate depth and deep overburden aquifers are generally confined by overlying silt, clay and glacial till deposits which limit vertical migration of shallow groundwater. Groundwater flow within the deep overburden aquifer is reported to be towards the south-southwest (Dillon and Golder, 2004).

4.1.2 Bedrock Aquifer

The bedrock aquifer is contained within limestone of the Dundee Formation. The water quality is generally good with elevated levels of iron, sodium and chloride in some wells. As with the intermediate and deep overburden aquifers, the bedrock aquifer is confined by the overlying till material, which generally ranges in thickness up to 22 to 30 m in the vicinity of the Site. Wells extending into the shallow fractured bedrock (up to about 3 m) are typically considered to be hydraulically connected to the overlying sand and gravel deposits that are present at the bedrock-overburden interface.

Flow direction in the deeper confined aquifer(s) and regional groundwater system has not been assessed as part of this investigation. However, as part of the Middlesex-Elgin Groundwater Study (Dillon and Golder, 2004), groundwater flow within the deeper aquifer is generally in a south-southwest direction towards Lake Erie.

4.2 Site Specific Groundwater Elevations and Flow

4.2.1 Monitoring Wells

Manual water levels in the monitoring wells were collected monthly from June 2021 until the end of May 2022 with additional monitoring for ecological purposes completed in August and September 2022. Details of the monthly water levels are summarized in **Appendix E**.

Overall, shallow groundwater levels of less than 1 m bgs were noted in monitoring wells BH4/MW and BH5/MW located adjacent to the Humphrey Municipal Drain. Shallow groundwater levels between 1 m and 2 m bgs were also noted in BH1/MW located adjacent to the Drain in the northeast corner of the Site. The deepest groundwater levels were noted in BH3/MW (ranging from 4.62 m to 5.15 m bgs) and in BH6/MW (ranging from 4.39 m to 5.03 m bgs). These are the deepest wells onsite installed to depths of 9.1 m bgs and 7.6 m bgs, respectively.

Dataloggers were installed in monitoring wells BH2/MW, BH5/MW and within the shallow groundwater piezometers at surface water stations SW1 and SW2 to provide continuous water elevation monitoring. Dataloggers were installed in the monitoring wells on June 19, 2021, and within the piezometers on June 1, 2021, and collected daily measurements during that time. Results collected to date are presented in **Appendix E** with precipitation data from weather station London CS (ID 6144478) located approximately 7.5 km northwest of the Site.

The hydrograph for monitoring well BH2/MW, screened in predominantly unconfined sand and gravel from 3.7 m to 5.2 m bgs, shows generally consistent groundwater elevations with elevations increasing as a direct response to significant precipitation events on September 22, 2021 (67 mm) and again on February 17, 2022 (38 mm). Overall, groundwater elevations ranged from 273.42 m to 274.37 m amsl. These groundwater elevations correspond with groundwater levels of 3.11 m and 2.16 m bgs, respectively.

The hydrograph for monitoring well BH5/MW, screened in predominantly sand and gravel from 4.0 m to 5.5 m bgs, shows generally consistent groundwater elevations with a minor gradual increase from September 2021 to March 2022. A direct response to significant precipitation events in BH5/MW was minimal. It is interpreted that the sand and gravel layer in which monitoring well BH5/MW is screened in is less suspectable to recharge events due to overlying lower permeability soils such as clayey silt till and silt. Overall, groundwater elevations ranged from 273.54 m to 274.45 m amsl. These groundwater elevations correspond with groundwater levels of 1.09 m and 0.18 m bgs, respectively.

4.3 Shallow Groundwater and Surface Water Stations

Surface water (SW) Stations 1 and 2 were established along the Humphrey Municipal Drain and within the North Dorchester Swamp PSW. Dataloggers were installed in both stations in the shallow groundwater piezometers (P-1 and P-2) in order to capture readings on a daily basis. Results from the dataloggers are presented in hydrographs presented in **Appendix E**.

Surface water Station 1 is located near the northern extent of the North Dorchester Swamp PSW. The hydrograph for piezometer P-1 shows a gradual increase in groundwater elevations between June and September 2021. Levels increased significantly following a significant precipitation event on September 22, 2021 (67 mm). Since September 2021 groundwater levels decreased gradually with fluctuations of up to 0.7 m. Between February 2022 and May 2022 groundwater levels have remained relatively stable followed by a decrease associated with drier summer months. Overall, groundwater elevations in P-1 ranged from 272.33 m to 274.06 m amsl. These groundwater elevations

correspond with groundwater levels of 0.57 m bgs and 1.16 m above grade, respectively. Above ground water levels in P-1 were observed between September 2021 and September 2022. Surface water readings from the staff gauge, SG1 were generally lower than the piezometer reading indicating an upward vertical gradient and discharge conditions at this location.

Surface water Station 2 is located within the southern downstream portion of the Humphrey Municipal Drain in the North Dorchester Swamp PSW. The hydrograph for piezometer P-2 shows relatively consistent groundwater elevations throughout the monitoring period with fluctuations of up to 0.4 m. Groundwater elevations in P-2 ranged from 271.46 m to 272.42 m amsl. These groundwater elevations correspond with groundwater levels of 0.52 m bgs and 0.44 m above grade, respectively. Direct responses to precipitation events in P-2 and corresponding above ground water levels were observed throughout the monitoring period. Surface water readings from the staff gauge, SG2 were generally higher than the piezometer reading indicating a downward vertical gradient and recharge conditions at this location.

Overall, based on groundwater levels in piezometers P-1 and P-2 and surface water levels in SG1 and SG2, shallow groundwater is hydraulically connected to the surface water within the Humphrey Municipal Drain and the North Dorchester Swamp PSW with both recharge and discharge conditions observed.

4.4 Surface Water and Groundwater Temperatures

Groundwater temperature was monitored daily using dataloggers at BH2/MW, BH5/MW and within the shallow groundwater piezometers at surface water stations SW1 and SW2. In addition, on August 4, 2022 dataloggers were also installed at SG1 and SG2 to monitor surface water temperature at surface water stations SW1 and SW2. Temperature data is provided in **Appendix E**.

In both monitoring wells BH2/MW and BH5/MW groundwater temperature fluctuated seasonally between approximately 8° to 12° Celsius. In the piezometers, the groundwater temperature showed greater seasonal variability ranging from approximately 4° to 15° Celsius. It is interpreted that this wider range of temperatures in piezometers P-1 and P-2 is due to groundwater and surface water interaction.

Surface water temperature collected in August and September, 2022 from both SG1 and SG2 ranged between 15° and 20° Celsius and remained consistently lower than the maximum air temperature indicating discharge conditions at the Humphrey Municipal Drain and PSW. This is in agreement with the classification of the Drain by the Department of Fisheries and Oceans (DFO) as class D (coldwater) as mapped in the AGMAPs (Ministry of agriculture, Food and Rural Affairs). Coldwater conditions are defined as watercourses maintained at temperatures below 22° Celsius to sustain fish species such as Brook Trout (CVC, 2011). Based on an ecology study completed on Site by Terrastory Environmental Consulting Inc., the Drain may be described more accurately as a coolwater system due to lack of shading by upstream trees/shrubs (Terrastory, 2023).

In addition, surface water temperature at SG1 was consistently slightly higher than the temperature at SG2. Given that SG1 is situated in closer proximity to the existing pond at the CBM Pit and downgradient from it, surface water temperature at this location is expected to be more directly influenced by warmer surface water temperature of the existing pond and as a result show slightly elevated temperatures compared to SG2. Additional discussion of impacts to groundwater temperature is provided in **Section 7.4**.

4.5 Hydroperiods

Data Reference is made to the TRCA document Stormwater Management Criteria, Appendix D: Water Balance for Protection of Natural Features (August 2012). By definition, the hydroperiod is the seasonal pattern of water level fluctuation. It is the result of inflow and outflow, surface contours of the landscape, substrate and groundwater conditions. Defining the existing surface water and groundwater conditions in the area is essential in order to provide recommendations, mitigation strategies and contingency measures during the development of the property.

The range in water elevations measured across the Site (a measurable component of a hydroperiod) throughout the monitoring period is shown in **Table 3** below.

Table 3 – Hydroperiod as defined by Groundwater and Surface Water Elevations

Location ID	Minimum Water Elevation (m amsl)	Maximum Water Elevation (m amsl)	Range (m)
BH1/MW	273.77	274.28	0.48
BH2/MW*	273.42	274.37	0.95
BH3/MW	273.93	274.46	0.53
BH4/MW	273.54	274.10	0.56
BH5/MW*	273.54	274.45	0.91
BH6/MW	274.00	274.64	0.64
P-1*	272.33	274.06	1.73
SG1	272.76	273.22	0.46
P-2*	271.46	272.42	0.96
SG2	271.93	272.38	0.45

* based on continuous datalogger data

As shown in **Table 3**, the largest variation in water elevations occurred at P-1 with a range of 1.73 m.

4.6 Hydraulic Gradients and Flow

The horizontal hydraulic gradient across the Site will vary due to the range in topography and resulting range in groundwater elevations. The hydraulic gradient is found to be approximately 0.01 m/m across the Site.

Shallow groundwater flow across the Site is affected by hydraulic conductivity, topography, drainage, and geology. Based on the groundwater elevations across the Site it is determined that shallow groundwater is generally flowing in a westerly direction towards the Humphrey Municipal Drain and the North Dorchester Swamp PSW which are located downgradient at a lower topographic elevation. Groundwater elevations and flow direction are presented in **Drawing 12.** The groundwater flow direction map represents seasonal high groundwater elevations from February, 2022. Groundwater discharging conditions are observed within the Drain and are represented in the Groundwater Flow map in **Drawing 12**. Based on topographic mapping it is likely that groundwater follows topography and flows towards the Drain and PSW also from the west.

9.7 Hydraulic Conductivity

Single well recovery tests (SWRT) were performed on three (3) selected monitoring wells on Site (BH1/MW, BH4/MW, and BH5/MW) to evaluate the hydraulic characteristics of the soil on Site. The results of the tests are summarized in **Table 4**, and the calculations are presented in **Appendix F**. The results provide information regarding the hydraulic conductivity of the soils surrounding the well screen.

Based on these tests, the estimated hydraulic conductivities for the sand and gravel range from 1.5×10^{-4} m/s to 2.8×10^{-3} m/s with a geometric mean of 8.6×10^{-4} m/s. These results agree with literature values of hydraulic conductivities for sand ranging from 10^{-5} to 10^{-2} m/s (Table 2.2, Freeze and Cherry; 1979).

Grain size analyses were carried out on select soil samples collected from seven (7) test pits completed in 2010, with results summarized in **Table 4**, and shown graphically in **Appendix G**. A total of eleven (11) soil samples from Site were selected for grain size distribution analysis testing. Based on the grain size analyses, the hydraulic conductivities range from 3.8×10^{-5} m/s in sand (TP2B) to 1.3×10^{-3} m/s in sand and gravel (TP6). The results of all hydraulic conductivity testing are compiled in the table below.

Table 4 – Hydraulic Conductivity Results

Sample ID	Lithology	Hydraulic Conductivity (m/s)
BH1/MW	Sand and Gravel	1.1×10^{-3} (Falling) 1.5×10^{-3} (Falling) 2.8×10^{-3} (Rising) 2.1×10^{-3} (Rising)
BH4/MW	Sand and Gravel	1.6×10^{-4} (Rising)
BH5/MW	Sand and Gravel; Clayey Silt Till	7.1×10^{-4} (Falling) 1.0×10^{-3} (Falling) 1.5×10^{-4} (Rising) 1.3×10^{-3} (Rising)
Grain Size Analyses		
TP1A	Sand and Gravel	7.3×10^{-4}
TP1B	Sand and Gravel	6.6×10^{-4}
TP2A	Sand	7.0×10^{-5}
TP2B	Sand	3.8×10^{-5}
TP3A	Sand and Gravel	8.0×10^{-5}
TP3B	Sand and Gravel	3.1×10^{-4}
TP4A	Sand	8.4×10^{-4}
TP4B	Sand and Gravel	2.5×10^{-4}
TP5	Sand	4.7×10^{-4}
TP6	Sand and Gravel	1.3×10^{-3}
TP7	Sand and Gravel	2.3×10^{-4}

4.8 Groundwater and Surface Water Quality

Groundwater and surface water sampling was completed on September 29, 2021 and March 15, 2022. A total of two (2) groundwater monitoring wells (BH4/MW and BH5/MW) and two (2) surface water locations (SW Station 1 and Station 2) were selected for sampling. Water quality tables are presented in **Appendix H** and complete laboratory chain of custody results are provided in **Appendix I**.

Groundwater quality was compared to the Ontario Drinking Water Quality Standards, Objectives and Guidelines (ODWQS) Maximum Acceptable Concentrations (MAC; O.Reg. 169/03). Although the groundwater on Site is not planned for use as drinking water, these guidelines are used for comparison's sake only. As demonstrated in the tabulated results in **Appendix H**, no parameters exceeded the ODWQS MAC guidelines for any sampled monitoring wells with the exception of nitrate which exceeded the ODWQS of 10 mg/L with a concentration of 41.5 mg/L at

BH5/MW in March, 2022. Elevated nitrate concentrations are likely the result of fertilizer application in the agricultural fields onsite and surrounding area.

Surface water quality was compared to Ontario Provincial Water Quality Objectives (PWQO) (MOEE 1994). As demonstrated in the tabulated results in **Appendix H**, no parameters exceeded the PWQO guidelines for any sampled surface water stations. Complete chain of custody laboratory results are provided in **Appendix I**.

A Piper Diagram was prepared for the groundwater and surface water quality samples and is shown in **Drawing 13**. Both the groundwater and surface water quality results generally plot within the calcium magnesium bicarbonate zone of the Piper Diagram. Both the groundwater samples and the surface water samples have similar chemical signature suggesting hydraulic connectivity.

4.9 Groundwater Surface Water Interaction

Surface runoff onsite drains into the Humphrey Municipal Drain which is surrounded by the North Dorchester Swamp PSW in the central and southern half of the Site. Based on the groundwater elevations across the Site it is determined that shallow groundwater is generally flowing in a westerly direction towards the Drain and the PSW which are located downgradient at a lower topographic elevation. Based on topographic mapping it is interpreted that groundwater also flows towards the Drain and PSW from the west.

Hydrographs for surface water stations SW1 and SW2 indicate both recharging and discharging conditions and hydraulic connectivity between surface water and the shallow groundwater. The Drain is mapped as class D (coldwater) by the AGMAPs which is further supported by surface water and groundwater temperatures recorded on Site. An ecology study completed on Site indicated the Drain can be described as a coolwater system due to lack of shading upstream (Terrastory, 2023). As a result, it is interpreted that both the Humphrey Municipal Drain and the North Dorchester Swamp PSW are under the direct influence of groundwater flow from the east. Topographic mapping and aerial imagery suggest seasonal groundwater discharging may also occur in the topographic low area of approximately 274 m amsl between surface water station SW1 and monitoring well BH3/MW.

It is likely that the existing pond at the CBM pit on the adjacent lands to the east (upgradient of the Site) is hydraulically connected to the shallow groundwater on Site. As a result, it may influence the temperature regime of the shallow groundwater on Site (particularly in the northern portion of the Site) since the surface water temperature directly correlates with the ambient air temperature. However, these impacts are expected to be mitigated considering the rate of infiltration and horizontal flow and groundwater mixing with groundwater flowing from the west towards the features.

5. Monthly Water Balance Assessment

The monthly water balance assessment for the Site was completed in accordance with the recommendations indicated in the guidance document "Hydrogeological Assessment Submissions: Conservation Authority Guidelines to Support Development Applications" (Conservation Ontario, 2013), and using appropriate site condition values obtained from Table 3.1 of the MOE Stormwater Management Planning and Design Manual (MOE, 2003). The results of the water balance are provided in **Appendix J**.

The water balance accounts for all water in and out-flows in the hydrologic cycle. Precipitation (P) falls as rain and snow. It can then run off towards wetlands, ponds, lakes, and streams (R), infiltrate into the ground (I), or evaporate from surface water and vegetation (ET). When long-term average values of P, R, I, and ET are used, then minimal or no net change to groundwater storage (ΔS) is assumed.

The annual water balance can be stated as follows:

$$P = ET + R + I + \Delta S$$

Where:

P = precipitation (mm/year)

ET = evapotranspiration (mm/year)

R = runoff (mm/year)

I = Infiltration (mm/year)

ΔS = change in groundwater storage (taken as zero) (mm/year)

5.1. Precipitation and Evapotranspiration

The annual total precipitation used for this water balance (1011 mm/yr) is based on data provided by Environment Canada, based on the 30 year average data for climate normals, using the nearest local weather station information (London CS ID 6144478, located approximately 7.5 km northwest of the Site). In this detailed monthly water balance, precipitation as rain and snow are both considered. Snow storage and resulting snow melt in the winter and early spring months is considered as part of the evapotranspiration volumes.

Evapotranspiration combines evaporation and transpiration and refers to the water lost to the atmosphere. The rate of evapotranspiration is a function of the water holding capacity of the soil and varies with soil and vegetation type and amount of impermeable surface cover.

Monthly evapotranspiration volumes were calculated using the monthly water balance graphical interface created by the U.S. Geological Survey (USGS), Open-File report 2007-1088 (McCabe and Markstrom, 2007). This interface uses the principles outlined by Thornthwaite and Mather (1957) and permits the user to easily modify water balance parameters and provide useful estimates of water balance components for a specified location.

The difference between the annual precipitation and the annual evapotranspiration represents the surplus water which is available for infiltration and surface run-off. Distribution of the surplus water to infiltration is based on an infiltration factor based on site conditions for topography, cover vegetation and soil.

5.2 Infiltration and Runoff

The soil water holding capacities and infiltration rate were determined using values presented in Table 3.1 of the MOE Stormwater Management Planning and Design Manual (MOE, 2003) based on the vegetative cover and the hydrologic soil group. The weighted values based on the Site conditions are presented in the calculation sheets provided in **Appendix J**.

Localized infiltration rates will vary based on factors such as the saturated hydraulic conductivity of surface soils, land slope, rainfall intensity, relative soil moisture at the start of a rainfall event, and type of cover on the ground surface.

Based on soil mapping by the Ministry of Agriculture, Food and Rural Affairs, the surficial soils at the Site are predominantly A-B-type soils (fine sand to fine sandy loam) and B-D-type soils (fine sandy loam to clay) associated with the North Dorchester Swamp PSW. For the water balance analysis, soil moisture capacity for A-type soil (fine sand) was utilized, consistent with the borehole logs which indicate the soil cover is mainly sand and gravel and sand.

5.3. Pre-development and Post-development Calculations

Pre-development and Post-development monthly water balance calculations have been carried out and are based on available design data.

In general, the Site comprises a land area of approximately 43.7 ha. To complete the Pre-development water balance, the Site was divided into three (3) drainage areas. The drainage areas are presented in **Appendix J**. Area A (9.54 ha) drains into the Humphrey Municipal Drain and the North Dorchester Swamp PSW from the west. This area will remain intact in the post-development environment. Area B is the PSW (9.20 ha) and Area C (24.92 ha) is the eastern portion of the property which drains into the Drain and PSW from the east. The Drain and PSW will be maintained in the post-development environment with an additional 30 m buffer area.

Existing conditions across the Site result in varying water holding capacities and infiltration factors. Each drainage area was individually estimated for the present coverage of vegetation under Pre-development conditions. Calculation worksheets are provided in **Appendix J**.

Water balance calculations were completed in accordance with the development plans for the Site provided in **Appendix B**. Detailed assumptions for the post-development water balance are included in **Appendix J**.

Table 5 provides a summary of the pre and post development water balance calculations.

Table 5: Summary of Water Balance Estimates

	Pre-Development	Post-Development
Drainage Area A (west of the Drain and PSW)		
Estimated Runoff (m^3/year)	27,977	27,977
Estimated Infiltration (m^3/year)	19,016	19,016
Drainage Area B (PSW)		
Estimated Runoff (m^3/year)	25,514	34,655
Estimated Infiltration (m^3/year)	19,802	26,897
Drainage Area C (east of the Drain and PSW)		
Estimated Runoff (m^3/year)	76,808	26,901
Estimated Infiltration (m^3/year)	45,997	16,110
Proposed Pond		
Estimated Runoff (m^3/year)	N/A	-
Estimated Infiltration (m^3/year)	N/A	55,960

Following extraction operations, the PSW area will be increased due to the additional 30 m buffer area allowing for additional infiltration. In addition, it is assumed that due to aggregate extraction, the soil to be encountered in the proposed pond area will be clayey silt till. Runoff is assumed to be retained and directed towards the proposed pond and infiltration is assumed to equal the surplus (excluding evapotranspiration). To reflect the higher evapotranspiration rates, the potential evapotranspiration was used in the water balance calculations which is a more conservative estimate than actual evapotranspiration. The evaporation rate from the proposed pond is estimated to be higher than the current land surface evapotranspiration rate. Based on the water balance assessment, the overall total of infiltration and runoff directed towards the Drain and PSW (Drainage Areas B and C) is 168,121 m^3/year under existing conditions compared to 160,523 m^3/year in the post-development environment suggesting minimal impact in terms of impact on the Drain and/or PSW.

6. Source Water Protection Considerations

6.1 Significant Groundwater Recharge Areas (SGRA)

Groundwater recharge is largely controlled by soil conditions, and typically occurs in upland areas. The groundwater flow direction has been previously identified as flowing in a southwesterly direction.

As defined in the Clean Water Act (2006), an area is a significant groundwater recharge area if,

1. the area annually recharges water to the underlying aquifer at a rate that is greater than the rate of recharge across the whole of the related groundwater recharge area by a factor of 1.15 or more; or

2. the area annually recharges a volume of water to the underlying aquifer that is 55% or more of the volume determined by subtracting the annual evapotranspiration for the whole of the related groundwater recharge area from the annual precipitation for the whole of the related groundwater recharge area.

An assessment report for the Upper Thames River Source Protection Area was completed by the Thames-Sydenham and Region Source Protection Committee. As defined by the Clean Water Act (2006) and identified by the Thames-Sydenham and Region Source Protection Committee, the majority of the area surrounding the PSW on Site is located within a SGRA (**Drawing 14**).

6.2 Highly Vulnerable Aquifers (HVA)

The susceptibility of an aquifer to contamination is a function of the susceptibility of its recharge area to the infiltration of contaminants. As defined in the *Clean Water Act (2006)*, the vulnerability of groundwater within a source protection area shall be assessed using one or more of the following groundwater vulnerability assessment methods:

1. Intrinsic susceptibility index (ISI).

2. Aquifer vulnerability index (AVI).

3. Surface to aquifer advection time (SAAT).

4. Surface to well advection time (SWAT).

In the Thames-Sydenham and Region, HVAs were mapped using the ISI method. The ISI method is an indexing approach using existing provincial Water Well Information System (WWIS) database. The ISI method is described in detail in the MECP's Technical Terms of Reference (2001). However, in short, the ISI method is a scoring system that takes into consideration the unique hydrogeologic conditions at a particular location. The scores are determined using a combination of the saturated thickness of each unit and an index number related to the soil type, and as such, the scores reflect the susceptibility of the aquifer to contamination.

As defined in the MECP's 2001 Technical Rules,

- an area having an ISI score of less than 30 is considered to be an area of high vulnerability;

- an area having an ISI score greater than or equal to 30, but less than or equal to 80, is considered to be an area of medium vulnerability; and,

- an area having an ISI score of greater than 80 is considered to be an area of low vulnerability.

The Thames-Sydenham and Region Source Protection Committee has determined, using the ISI method, that the Site is located within an HVA with a vulnerability score of 6 (**Drawing 15**).

6.3 Wellhead Protection Areas (WHPA) and Intake Protection Zones (IPZ)

A review of the MECP Source Protection Information Atlas (2023) indicated that the Site is located approximately 3.7 km southwest of the closest WHPA situated in Thamesford, Ontario and over 40 km northeast of the closest IPZ situated in Port Stanley, Ontario. As a result, the proposed activities on Site are not considered a source water threat to these systems or to issue contributing areas.

7. Impact Assessment

7.1 Proposed Aggregate Extraction

The natural sand and gravel soils on Site extend below the shallow groundwater table. As a result, extraction of the granular material will require excavation below the groundwater table to recover these resources. Extraction is expected to be carried out in several phases with extraction above the water table first followed by extraction below the water table. Extraction will be completed using excavators and dragline to an elevation of 269 m amsl (maximum of 11 m bgs). The maximum expected tonnage to be removed is 500,000 tonnes per year.

It is understood that aggregate extraction operations at the site will involve the excavation of sand, and sand and gravel soils from above and below the water table. The sand and sand and gravel layer ranges in thickness from 3.1 m (BH4/MW) and 2.1 m interlayered with finer soils (BH5/MW), both adjacent to the PSW to over 8.8 m in BH3/MW. Aggregate deposits are relatively thick in the eastern portion of the Site extending below the borehole termination depth of 9.0 m bgs (BH3/MW) and becoming thinner further to the west adjacent to the Drain and PSW. Where possible, sand and gravel soils are expected to be completely removed until the clayey silt/silt till is reached. The elevation of the clayey silt/silt till, which underlies the aggregate deposits, is delineated on the cross sections provided on **Drawing 10** and **Drawing 11**. Below the water table extraction area will be occupied by a pond. As noted in the Rehabilitation Plan prepared by Harrington McAvan Ltd., the finished pond area is expected to be about 12.9 ha in size, at completion.

7.2 Impacts to the Shallow Groundwater Level

Excavation of aggregate material will be completed using excavators and dragline to variable depths across the Site. Dewatering during extraction operations will not be required. Upon completion, a 12.9 ha size pond is expected to remain on Site permanently. Excavation of aggregate material below the water table is likely to result in some short and long-term impacts to the groundwater levels. In addition, the proposed pond is likely to affect the water budget on Site due to increased evaporation and recharge.

7.2.1 Short-Term Impacts to Groundwater Levels

Aggregate excavation is expected to result in a minor, short-term lowering of the water level in the proposed pond, due to the formation of a localized zone of depression or void where excavation occurs. Water removal during aggregate extraction is expected to be minimal given that most of the water in the excavator bucket or dragline as well as from nearby excavated aggregated placed in stockpiles adjacent to the proposed pond will likely drain back into the pond. The volume of water in the proposed pond would roughly equal the volume of the excavated material and the void between the excavated granular material. The overall water level is likely to drop slightly as the excavated space or void is filled. The effect of this drawdown is expected to be minimal and localized to the area of excavation.

Using an estimated porosity of the granular material of 0.30, the volume of granular material removed in 1 m^3 bucket is 0.70 m^3. The change in volume is expected to have the greatest effect when the pond is small. As the pond is increased in size, effects of the granular material removal will diminish given that there is more water available in relation to the extraction of one bucket of material.

The volume of water filling the excavation can be estimated using the following equation:

$$Volume\ of\ water\ in\ excavation = (1 - porosity)\ x\ \frac{aggregate\ tonnage}{aggregate\ density}$$

Where,

Daily wet tonnage is assumed at 3,000 tonnes/day (3,000,000 kg/day);

Aggregate dry density is assumed at 1,780 kg/m^3; and

porosity of 0.30.

Aggregate wet density is assumed at 2,080 kg/m^3.

V2 = 1,442 m^3 (= 3,000,000/2,080).

The volume of water that will replace the saturated sand and gravel is approximately 1,442 m^3. Although the pond base is expected to be at variable depths an average pond depth of 10 m is used for calculation purposes to demonstrate the maximum daily drawdowns caused by aggregate excavation. **Table 6** presents the temporary expected drawdowns as the proposed pond is excavated and increases in size up to a final size of 12.9 ha.

The maximum daily drawdown is calculated based on the following equation:

$$Maximum\ Daily\ Drawdown = h_0 - |(V1 - V2)/A|$$

Where,

h_0 is the initial water column of the pond (m), assumed to be 5 m;

V1 is the pond volume (m^3);

V2 is the volume of excavation void (1,180 kg/m^3); and

A is the pond area

Table 6: Temporary Drawdown Calculations

Phase	A	B	C
Pond Area (m^2)	40,000	80,000	129,000
Pond Volume V1 (m^3)	200,000 (= 40,000 x 5)	400,000 (= 80,000 x 5)	645,000 (= 129,000 x 5)
Maximum Daily Excavation Volume V2 (m^3)	1,442	1,442	1,442
Maximum Daily Drawdown (m)	0.036 m	0.018 m	0.011 m

Water level in the pond during the early phase of extraction for the smaller pond size may show daily lowering of up to 4 cm but is expected to be temporary and recover within 24 hours. In the final phases of extraction when the pond approaches its maximum size, this maximum daily drawdown is expected to diminish. This value is very minimal with little to no impacts of groundwater drawdown outside the immediate pond area. Given the negligible daily drawdown expected and the distance of the private wells in the area from the pond, no impact from temporary drawdown to private wells is expected.

7.2.2 Long Term Impacts to Groundwater Levels

Under existing conditions and based on the interpreted seasonal high groundwater flow map provided in **Drawing 12**, the shallow groundwater table drops approximately 2.3 m from east to west with a more significant horizontal gradient in the southern portion of the Drain and PSW. According to the proposed Site plan provided in **Appendix B**, the proposed pond is likely to extend to the approximate 274 m masl groundwater contour line with a final pond elevation of approximately 274.1 m amsl. To allow for seasonal variability and higher water levels during the wet season, the pond should be able to contain final water levels of 274.25 m amsl. Impacts to groundwater levels are expected to be minimal west of the pond with negligible drawdown and some drawdown to the east of the pond where it is expected to be approximately 0.5 m.

As noted previously, the Drain and PSW receive surface runoff from the east, west and north. The features are also supported by groundwater contribution from both the east and west. The proposed pond, as identified in the proposed plan in **Appendix B** will result in a decreased gradient in the shallow groundwater throughout the site. However, the aggregate extraction activities are expected to have minimal impacts on the base flows which sustain the features on Site.

It is important to note that to maintain the water levels in the natural features, the final pond water level should remain higher than the levels observed in the Drain and PSW to prevent surface water runoff from the features towards the proposed pit. In addition, the proposed pond will be surrounded by berms which are expected to prevent direct flow from the pond to the natural features.

7.2.3 Maximum Predicted Groundwater Levels

Overall, groundwater elevations observed in the monitoring wells (BH1/MW to BH6/MW) ranged from 273.42 m amsl (BH2/MW) to 274.64 m amsl (BH6/MW) during the monitoring period between June 16 2021 and September 15, 2022. Maximum shallow groundwater elevation observed in the surface water stations was 274.1 at SW1. Therefore, as previously stated, pond elevation should be able to contain final groundwater levels of 274.25 masl at a minimum to account for wet weather (high groundwater) conditions and to ensure the water level in the pond is greater than the water level in the Drain/PSW.

7.3 Impacts to Groundwater Temperature

The Groundwater Flow Map provided on **Drawing 12** shows a shallow groundwater flow direction west towards the Humphrey Municipal Drain and the North Dorchester Swamp PSW. The existing pond at the CBM pit to the east (upgradient of the Site) is expected to be hydraulically connected to the shallow groundwater on Site. As a result, it may impact the temperature regime of the shallow groundwater on Site (particularly in the northern portion of the Site) since the surface water temperature directly correlates with the ambient air temperature. It is anticipated that the introduction of the proposed pond will result in some additional thermal impact to the groundwater.

Discharge conditions on Site confirm the classification of the Humphrey Municipal Drain on Site as a coldwater/coolwater Drain. Therefore, the proposed pond has the potential to impact the surface water temperature of the Drain and PSW. These impacts are expected to be mitigated considering that the time required for infiltration into the subgrade soils and lateral flow will allow the water temperature to adjust to similar temperature as that of the shallow groundwater. Groundwater mixing with groundwater flowing from the west towards the features will also contribute to mitigating temperature impacts to the features. Additional suggested mitigation measures are listed below:

- maintaining a sufficient buffer between the features and the proposed pond;
- applying planting strategies to shade the proposed pond and/or Drain; and,
- completing an on-going monitoring program.

7.4 Water Well Users

A search of the Ontario MECP WWR database was completed using a buffer of 500 m from the Site boundaries. This resulted in the identification of 43 records (**Drawing 16**). The majority of the wells were found to be located along Dundas Street and Elgin Road east of the Site.

Water uses in the area include the following:

- Domestic or domestic and a secondary use such as irrigation, livestock or commercial (33 wells);
- Livestock (1)
- Commercial (2)
- Monitoring, test holes or observation wells (4 wells);
- Unknown or other use (2); and
- Abandoned wells (1).

The approximate locations of identified wells are shown on **Drawing 16**, with the MECP WWR Summary provided in **Appendix D**.

Domestic water supply in the local area wells is generally drawing from the confined intermediate sand and gravel aquifer or from the bedrock aquifer. Eight (8) domestic wells within 500 m of the Site are reported as being less than 10 m deep. If construction activities extend into the sand and gravel aquifer, there may be some impact to these shallow wells. A well survey was completed to further assess potential impacts. Results of the well survey are presented below.

Monitoring wells have been installed at the Site as part of the Site investigations to document stabilized groundwater conditions. Prior to the Site grading work, and when the monitoring wells are determined to be no longer required, the wells should be properly decommissioned in accordance with Ontario Regulation 903. Decommissioning a well which is no longer in use helps to ensure the safety of those in the vicinity of the well, prevents surface water infiltration into an aquifer via the well, prevents the vertical movement of water within a well, conserves aquifer yield and hydraulic head and can potentially remove a physical hazard.

7.5 Door to Door Well Survey

A door-to-door survey was completed in the vicinity of the mapped MECP WWR within 500 m of the Site along Dundas Street to the north, Elgin Road to the east, Trafalgar Street to the South and Banks Road to the west to confirm whether the shallow domestic wells are still in use. Well survey forms were delivered to residences on November 9, 2021.

To date, one (1) response has been received by EXP, and is summarized in **Table 7**, with the full response provided in **Appendix K**.

Table 7 – Well Survey Questionnaire Response Summary

Address	Response Received
5628 Dundas Street	Private Well: ~ 6.1 m bgs shallow dug well installed in ~1972 No municipal water available

Based on the results from the door-to-door survey, it has been confirmed that at least one (1) residence within 500 m of the Site utilizes private well water. Given that drawdown is expected to be minimal and dewatering activities are not expected, impact to private wells in the vicinity of the Site from aggregate extraction operations is unlikely.

However, as a cautionary measure, it is recommended to provide residents within 150 m of the Site a 24-Hour emergency contact information to facilitate reporting of perceived water supply impacts. Disruption to private water supply in the vicinity of the Site should be notified to the licensee who will report well inference complaints to the MNRF and MECP. In the event of significant disruption to water supply to residences within 150 m of the Site, the licensee will provide alternate temporary water supply while investigating the cause of the disruption.

7.6 Mitigation Measures During Construction

As due diligence, the following comments are provided with recommendations to help minimize impact to the surface water features on Site:

- During the site grading work, suitable sedimentation controls will be required to help control and reduce the turbidity of runoff water;
- A Best Management Practice (BMP) and spill contingency plan (including a spill action response plan) shall be in place for fuel handling, storage and onsite equipment maintenance activities to minimize the risk of contaminant releases as a result of the proposed construction activities; and
- Vegetative cover shall be re-established in disturbed areas as specified in the proposed plan in **Appendix B**.

7.7 Proposed Monitoring Program and Contingency Measures

Aggregate extraction is proposed for excavation below the water table using an excavator and a drag line with no dewatering activities expected. Changes to the water balance are expected to be minor and localized changes in groundwater levels which are expected to result in a flattening of the groundwater gradient are not expected to have an adverse impact on the Humphrey Municipal Drain and North Dorchester Swamp PSW.

The existing monitoring wells and surface water stations located around the perimeter of the proposed pit should be maintained and protected to ensure they are not inadvertently damaged during site preparation works and removal of overburden materials.

The proposed monitoring program includes manual water level and temperature measurements of the existing wells and surface water stations as well as turbidity and total suspended solids (TSS) monitoring both upgradient and downgradient of the Drain on an adjusted frequency basis. During the first year of operations, monitoring is proposed on a monthly basis. In the second year of operations, monitoring is recommended on a quarterly basis until operations are complete and the site has been rehabilitated. Dataloggers are proposed to be installed in monitoring well BH4/MW, piezometer P-2 and staff gauge SG2 to monitor water levels and temperature continuously.

Timing of the quarterly monitoring should coincide with annual regulatory compliance reporting requirements which are required to be submitted on September 30 of each year, to ensure that data submitted to the Ministry of Natural Resources is as current as possible. The data collected during the monitoring period will be reviewed to assess the findings and determine if adjustments are needed to extraction depths as operations proceed to ensure the rehabilitation plans can be achieved.

When the monitoring wells are determined to be no longer required, the wells should be properly decommissioned in accordance with Ontario Regulation 903. This regulation identifies that only certified and qualified well drilling technicians are permitted to direct the decommissioning work for existing wells. Decommissioning a well which is no longer in use helps to ensure the safety of those in the vicinity of the well, prevents surface water infiltration into an aquifer via the well, prevents the vertical movement of water within a well, conserves aquifer yield and hydraulic head and can potentially remove a physical hazard.

8. Recommendations

Based on the information collected in the field and analysis of available data, the following recommendations are provided:

1. In order to maintain the water levels in the natural features on Site, the final pond water level should remain higher than the levels observed in the Drain and PSW to prevent surface water runoff from the features towards the proposed pit. To allow for seasonal variability and higher water levels during the wet season, the pond shall be able to contain final water levels of 274.25 m amsl.
2. Measures to mitigate temperature impacts to the groundwater and natural features on Site shall include:
   - maintaining a sufficient buffer between the features and the proposed pond;
   - applying planting strategies to shade the proposed pond and/or Drain; and
   - completing an on-going monitoring program throughout extraction activities.
3. Residents within 150 m of the Site shall be provided with a 24-Hour emergency contact information to facilitate reporting of perceived water supply impacts.
4. During the site grading work, suitable sedimentation controls will be required to help control and reduce the turbidity of runoff water.
5. A BMP and spill contingency plan (including a spill action response plan) shall be in place for fuel handling, storage and onsite equipment maintenance activities to minimize the risk of contaminant releases as a result of the proposed construction activities.
6. The existing monitoring wells and surface water stations located around the perimeter of the proposed pit shall be maintained and protected during operations.
7. In order to assess potential impacts to groundwater and surface water on Site, a proposed monitoring program on an adjusted frequency will be implemented in the existing monitoring well and surface water stations including monitoring water levels, turbidity, TSS and water temperature. During the first year of operations, monitoring will be completed on a monthly basis. In the second year of operations, monitoring will be completed on a quarterly basis until operations are concluded.

9. Qualifications of Assessors

EXP Services Inc. provides a full range of environmental services through a full-time Earth and Environmental Services Group. EXP's Environmental Services Group has developed a strong working relationship with clients in both the private and public sectors and has developed a positive relationship with the Ontario MECP. Personnel in the numerous branch offices form part of a large network of full-time dedicated environmental professionals in the EXP organization.

This report was authored by Ms. Hagit Blumenthal M.Sc., P.Geo. Ms. Blumenthal has experience in conducting hydrogeological assessments. Ms. Blumenthal is a hydrogeologist and environmental geoscientist with more than 8 years' experience in the environmental field, and is a licensed Professional Geoscientist (P.Geo.) in Ontario. She obtained a Master of Science (M.Sc.) in 2010 from the University of Waterloo and has worked in the Hydrogeological and Environmental fields since then.

This report was reviewed by Ms. Heather Jaggard, M.Sc., P.Geo. Ms. Jaggard is a hydrogeologist and environmental geoscientist with more than 10 years in the environmental field and is a licensed Professional Geoscientist (P.Geo.) in Ontario. She obtained a Master's of Science (M.Sc.) in 2012 from Queen's University in Kingston, and is a Qualified Person (QP) registered with the Ontario MECP. She has worked in the Hydrogeological and Environmental fields since that time. In her professional career for the past few years, Ms. Jaggard has completed numerous hydrogeological assessments and modelling works for land development sites. Environmental site assessments and preparation of submissions for PTTW have been part of her routine assignments.

10. References

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11. General Limitations

The information presented in this report is based on a limited investigation designed to provide information to support an assessment of the current environmental conditions within the subject property. The conclusions and recommendations presented in this report reflect Site conditions existing at the time of the investigation. Consequently, during the future development of the property, conditions not observed during this investigation may become apparent. Should this occur, EXP Services Inc. should be contacted to assess the situation, and the need for additional testing and reporting. EXP has qualified personnel to provide assistance in regard to any future geotechnical and environmental issues related to this property.

Our undertaking at EXP, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the engineering profession. It is intended that the outcome of this investigation assist in reducing the client's risk associated with environmental impairment. Our work should not be considered 'risk mitigation'. No other warranty or representation, either expressed or implied, is included or intended in this report.

The comments given in this report are intended only for the guidance of design engineers. The number of test holes required to determine the localized underground conditions between test holes affecting construction costs, techniques, sequencing, equipment, scheduling, etc. would be much greater than has been carried out for design purposes. Contractors bidding on or undertaking the works should in this light, decide on their own investigations, as well as their own interpretations of the factual borehole results, so that they may draw their own conclusions as to how the subsurface conditions may affect them.

EXP Services Inc. should be retained for a general review of the final design and specifications to verify that this report has been properly interpreted and implemented. If not afforded the privilege of making this review, EXP Services Inc. will assume no responsibility for interpretation of the recommendations in this report

This report was prepared for the exclusive use of **Brantam Excavating Inc.** and may not be reproduced in whole or in part, without the prior written consent of EXP, or used or relied upon in whole or in part by other parties for any purposes whatsoever. Any use which a third party makes of this report, or any part thereof, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

We trust this report is satisfactory for your purposes. Should you have any questions, please do not hesitate to contact this office.

Appendix A - Drawings

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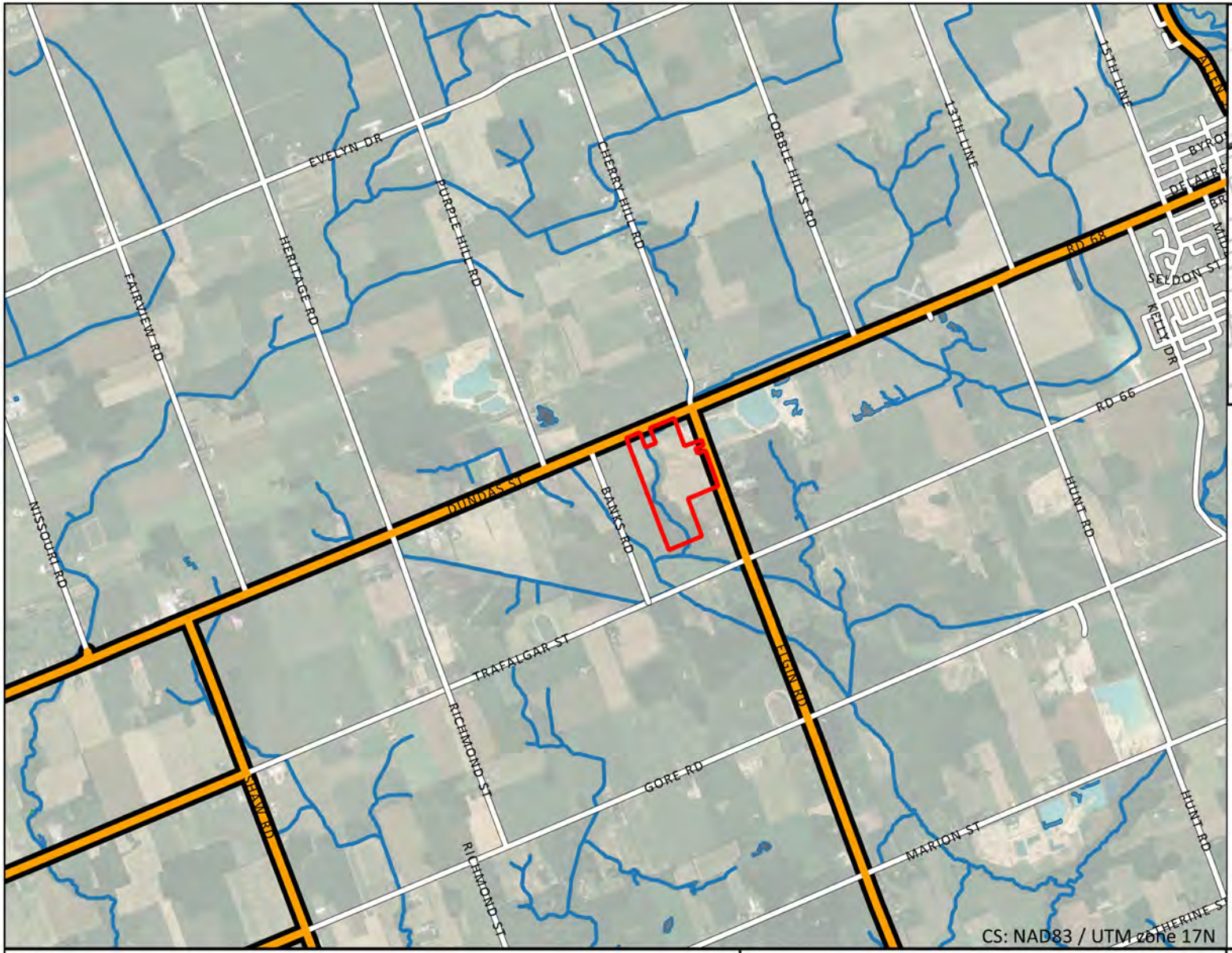

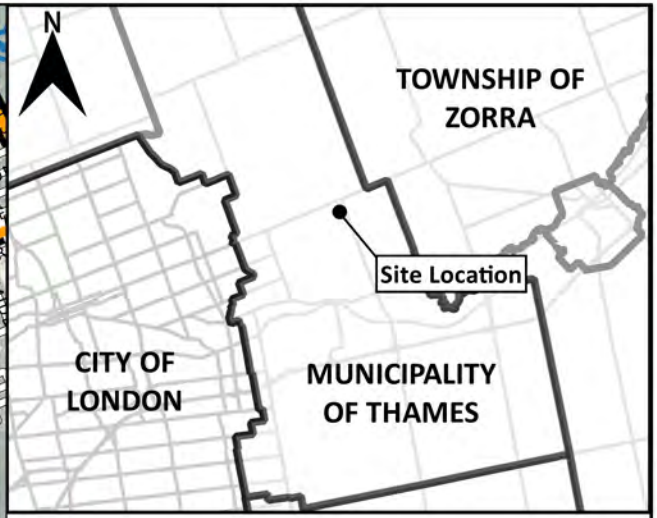

-LEGEND-

- Site Boundary (Approximate)
- Watercourse (OHN)
- Waterbody (OHN)

Notes:

Data Sources:
Contains information licensed under the Open Government License - Ontario
Google Earth Imagery (c) 2022 City of London, First Base Solutions, Maxar Technologies

Hydrogeological Assessment

Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, ON

CLIENT	Brantam Excavating Inc.
TITLE	Site Location Plan
Prepared By: K.W.	Reviewed By: H.J./H.B.

EXP Services Inc.
405 Maple Grove Road, Cambridge, ON N3E 1B6

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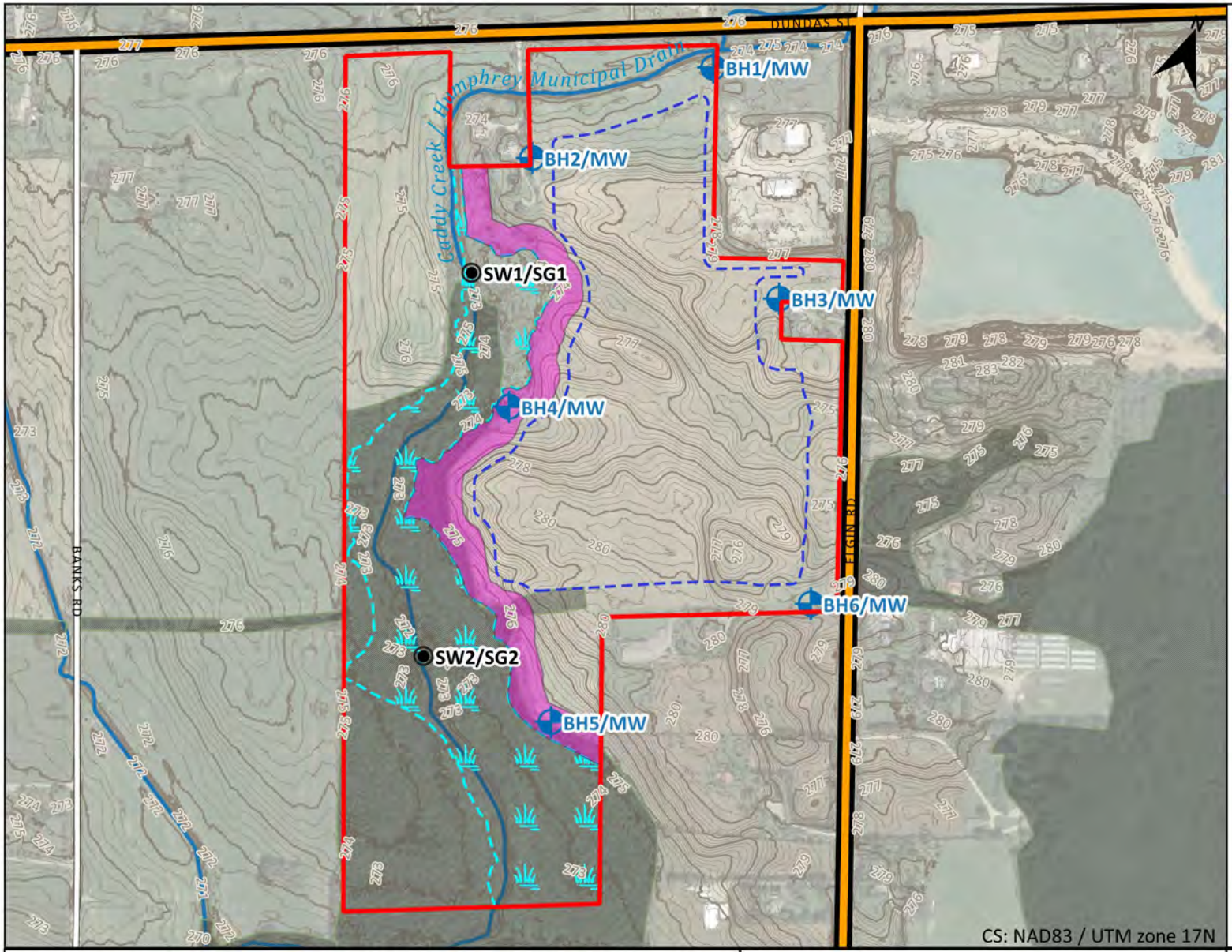

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- Site Boundary (Approximate)
- Proposed Pond (Approximate)
- Significant Woodland (MNRF)
- Watercourse (OHN)
- Waterbody (OHN)
- 30m Buffer (Harrington McAvan, 2022)
- Provincially Significant Wetland (Harrington McAvan, 2022)

Ground Surface Elevation Contour (mamsl)

- Major
- Minor

Investigative Locations

- Monitoring Well
- Surface Water Station

Notes:
Ground surface elevation contours are extracted from the Lidar-Derived Ontario Digital Terrain Model (DTM) available on the Ontario GeoHub Website (0.5m Resolution)

Data Sources:
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Hydrogeological Assessment

Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, ON

CLIENT	Brantam Excavating Inc.
TITLE	Natural Features & Borehole Location Plan
Prepared By: K.W.	Reviewed By: H.J./H.B.

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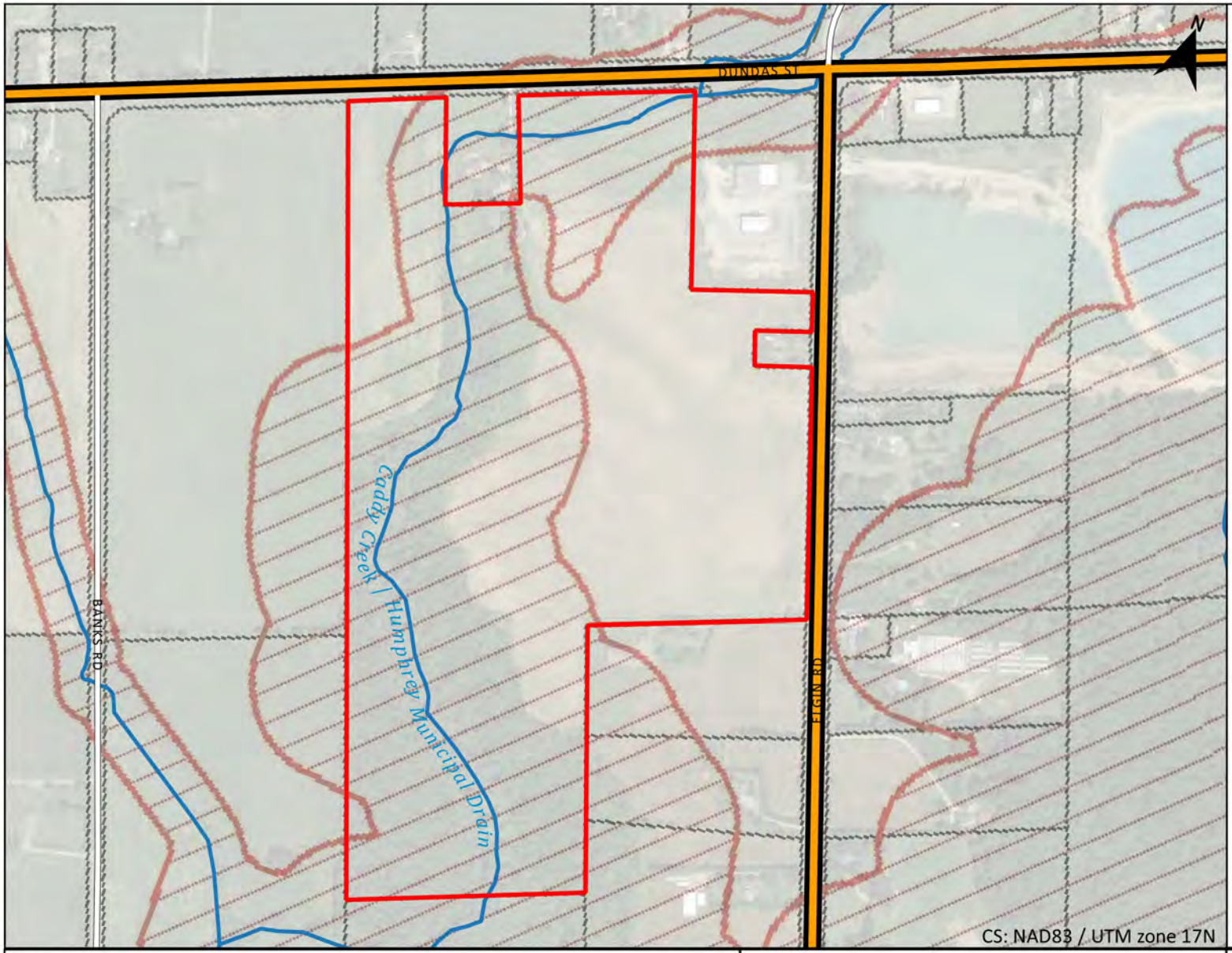

-LEGEND-

- Site Boundary (Approximate)
- Watercourse (OHN)
- Waterbody (OHN)
- Regulated Lands of the Upper Thames River Conservation Authority (UTRCA)

Notes:

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Hydrogeological Assessment

Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, ON

CLIENT	Brantam Excavating Inc.
TITLE	UTRCA Regulated Lands
Prepared By: K.W.	Reviewed By: H.J./H.B.

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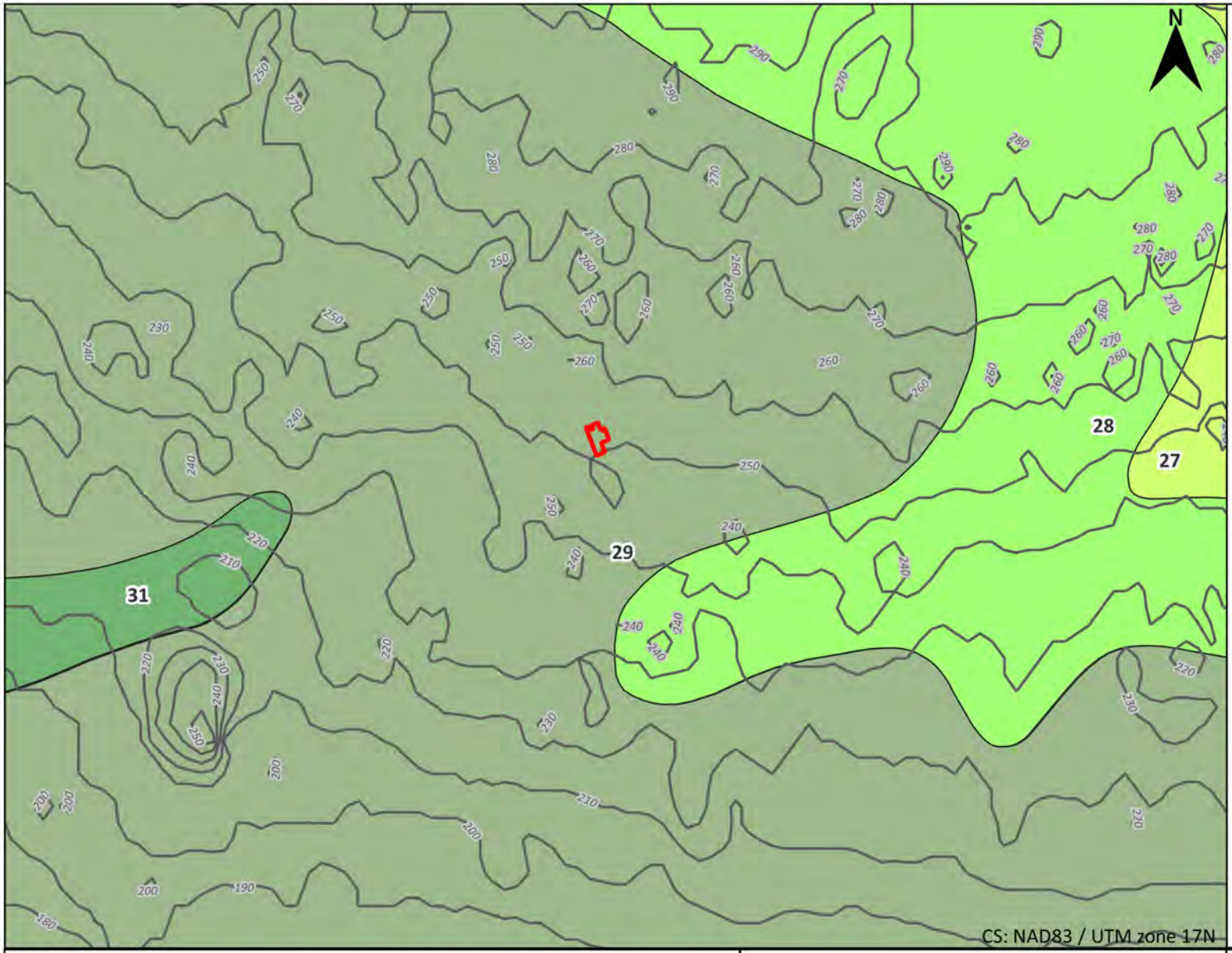

-LEGEND-

Site Boundary (Approximate)

Paleozoic Geology

Bedrock Topography Contours (10m)

27 Amherstburg Formation

28 Lucas Formation

29 Dundee Formation

31 Hamilton Group

Notes:

Data Sources:
Bedrock topography contours extrapolated from Paleozoic Geology data provided by the Ministry of Northern Development, Mines, Natural Resources and Forestry OGSEarth Mapping.
Armstrong, D.K. and Dodge, J.E.P. 2007. Paleozoic geology of southern Ontario; Ontario Geological Survey, Miscellaneous Release - Data 219.

Hydrogeological Assessment

Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, ON

CLIENT: Brantam Excavating Inc.

TITLE: Bedrock Geology & Topography

Prepared By: K.W. | Reviewed By: H.J./H.B.

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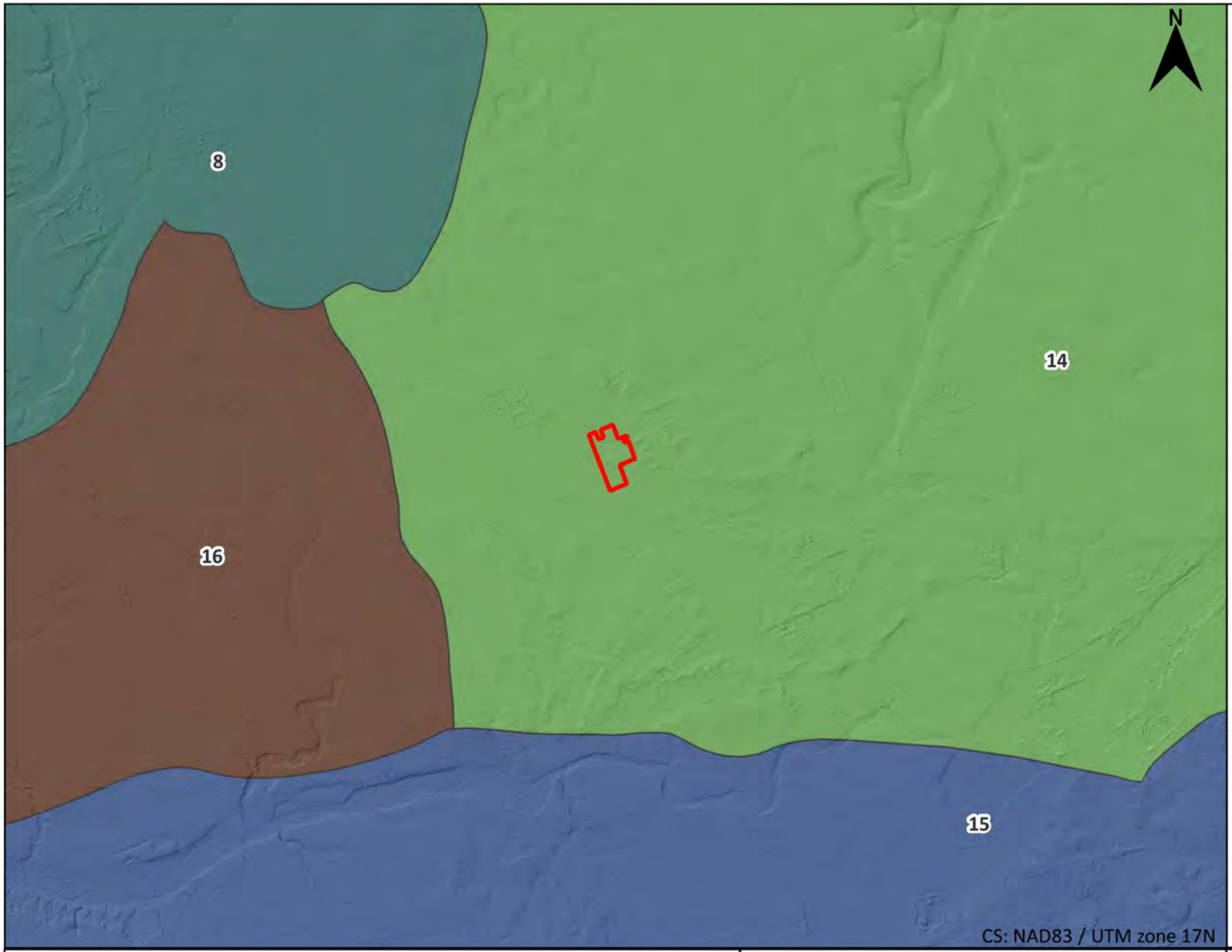

-LEGEND-

Site Boundary (Approximate)

Physiographic Regions

- 8 Stratford Till Plain
- 14 Oxford Till Plain
- 15 Mount Elgin Ridges
- 16 Caradoc Sand Plains and London Annex

Notes:

Data Sources:
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Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 228.

Hydrogeological Assessment

Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, ON

CLIENT: Brantam Excavating Inc.

TITLE: Physiographic Regions

Prepared By: K.W. | Reviewed By: H.J./H.B.

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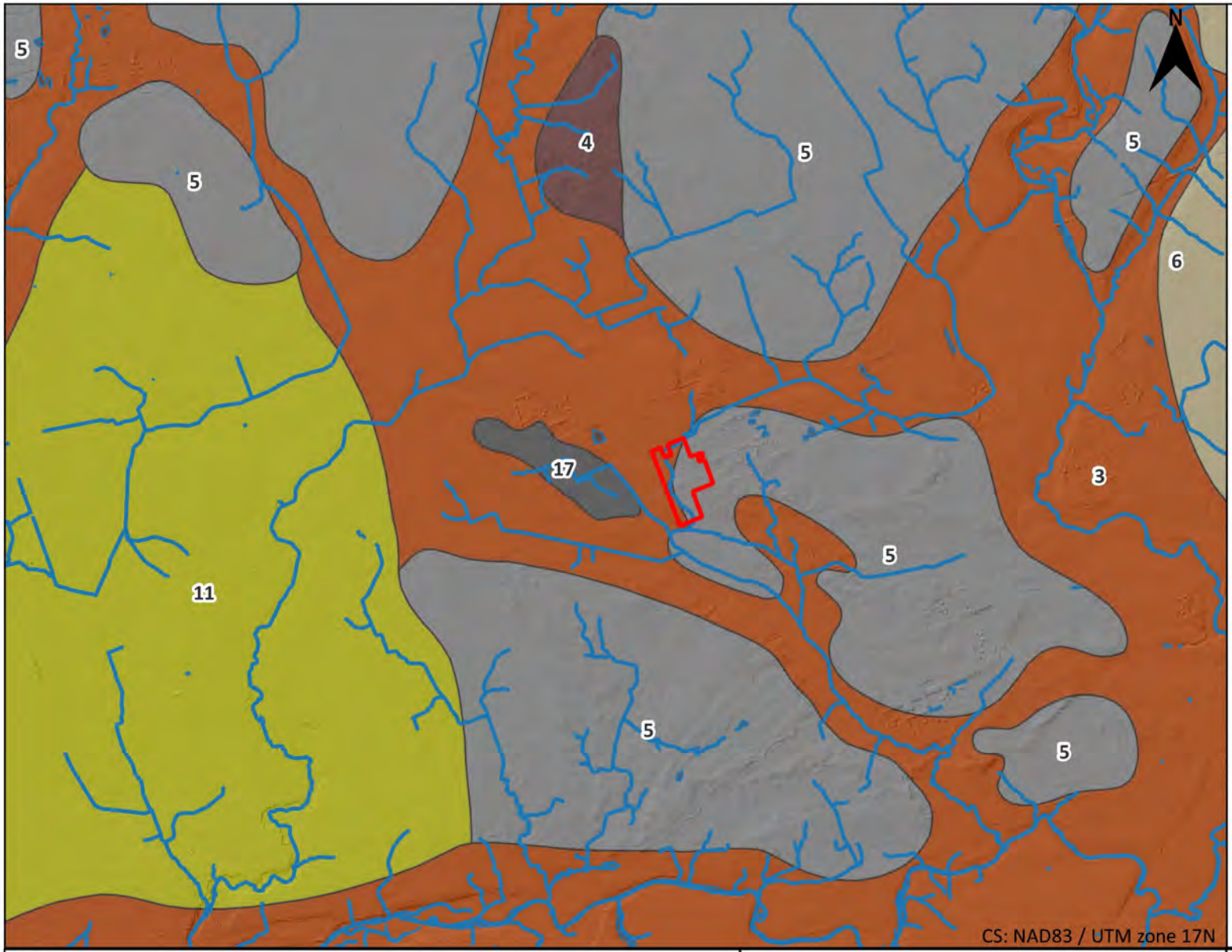

-LEGEND-

- Site Boundary (Approximate)
- Watercourse (OHN)
- Waterbody (OHN)

Physiographic Landforms

- 3 Spillways
- 4 Kame Moraines
- 5 Till Plains (Undrumlinized)
- 6 Till Plains (Drumlinized)
- 11 Sand Plains
- 17 Peat and Muck

Notes:

Data Sources:
Contains information licensed under the Open Government Licence – Ontario.
Chapman, L.J. and Putnam, D.F. 2007. Physiography of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 228.

Hydrogeological Assessment

Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, ON

CLIENT	Brantam Excavating Inc.
TITLE	Physiographic Landforms
Prepared By: K.W.	Reviewed By: H.J./H.B.

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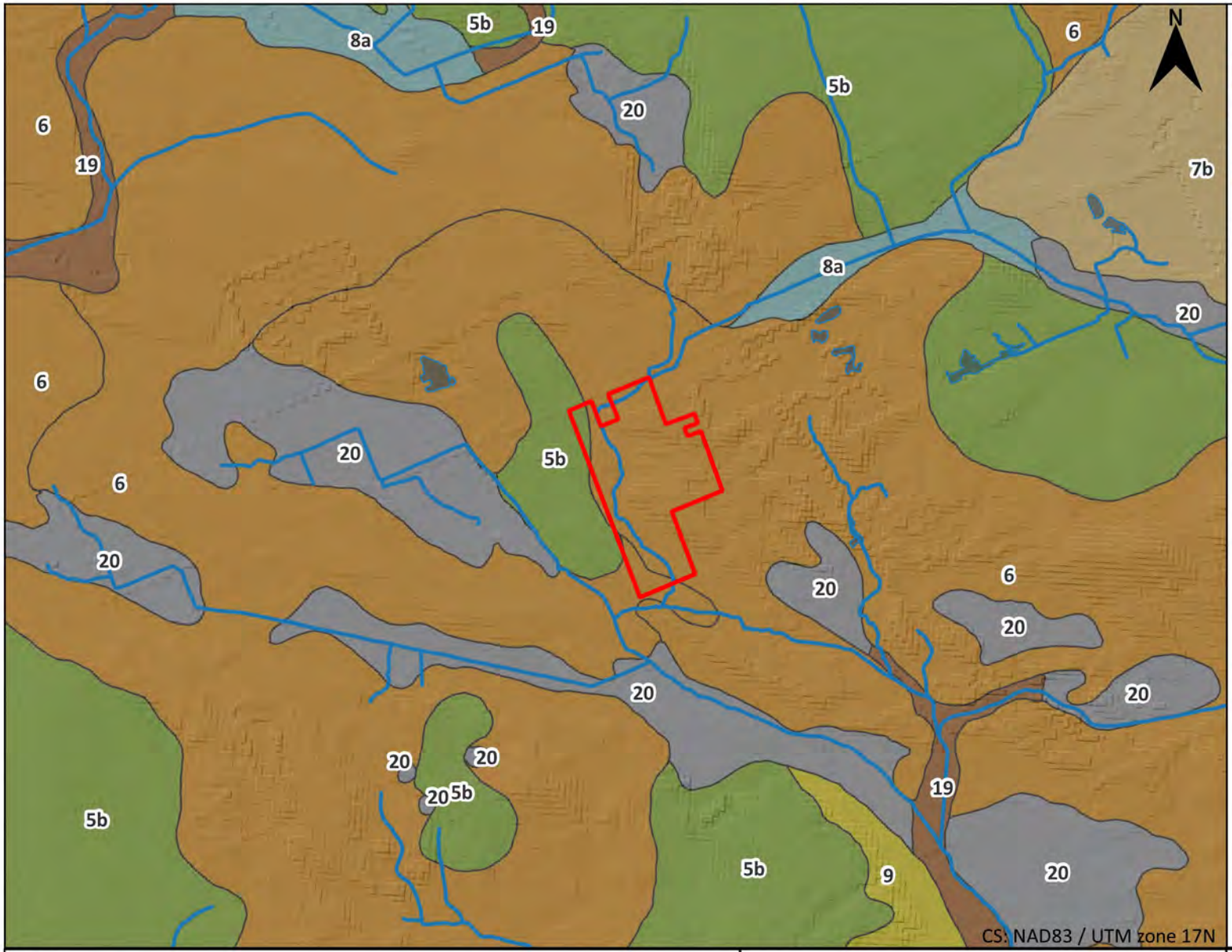

-LEGEND-

- Site Boundary (Approximate)
- Watercourse (OHN)
- Waterbody (OHN)
- Evaluated-Provincially Significant Wetland

Surficial Geology

- 20 Organic Deposits: peat, muck, marl
- 19 Modern Alluvial Deposits: clay, silt, sand, gravel, may contain organic remains
- 9 Coarse-textured Glaciolacustrine Deposits: sand, gravel, minor silt and clay
- 8 Fine-textured Glaciolacustrine Deposits: silt and clay, minor sand and gravel
- 8a Massive to well laminated
- 7 Glaciofluvial Deposits: river deposits and delta top facies
- 7a Sandy Deposits
- 7b Gravelly Deposits
- 6 Ice-contact Stratified Deposits: sand and gravel, minor silt, clay and till
- 5b Stone-poor, sandy silt to silty sand-textured till on Paleozoic terrain

Notes:

Data Sources:
Contains information licensed under the Open Government Licence – Ontario.
Ontario Geological Survey 2010. Surficial geology of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 128 – Revised.

Hydrogeological Assessment

Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, ON

CLIENT: Brantam Excavating Inc.

TITLE: Surficial Geology

Prepared By: K.W. | Reviewed By: H.J./H.B.

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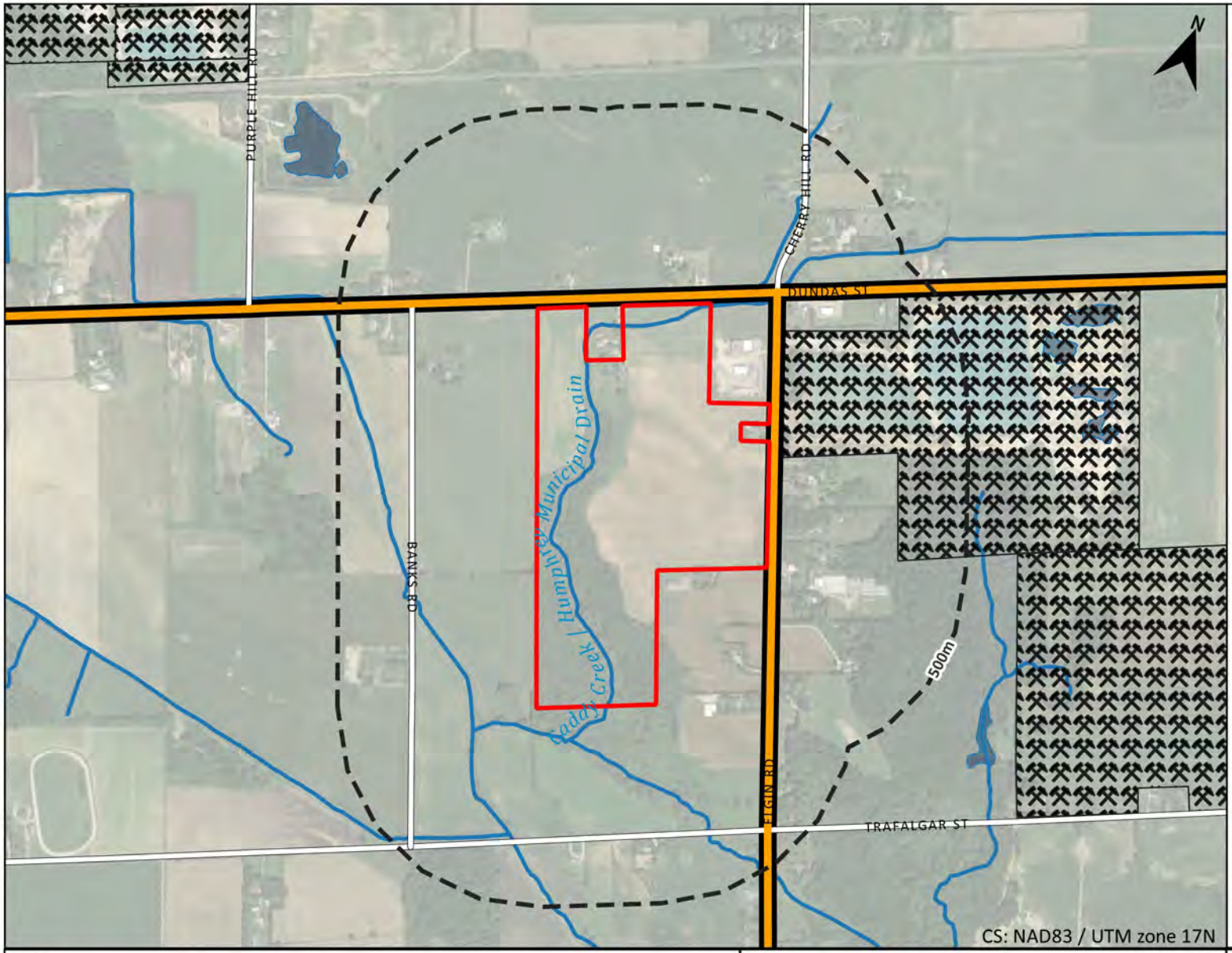

-LEGEND-

- Site Boundary (Approximate)
- 500m Buffer
- Authorized Aggregate Site - Active
- Watercourse (OHN)
- Waterbody (OHN)
- Evaluated-Provincially Significant Wetland

Notes:

Data Sources:
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Hydrogeological Assessment

Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, ON

CLIENT	Brantam Excavating Inc.
TITLE	Authorized Active Aggregate Sites
Prepared By: K.W.	Reviewed By: H.J./H.B.

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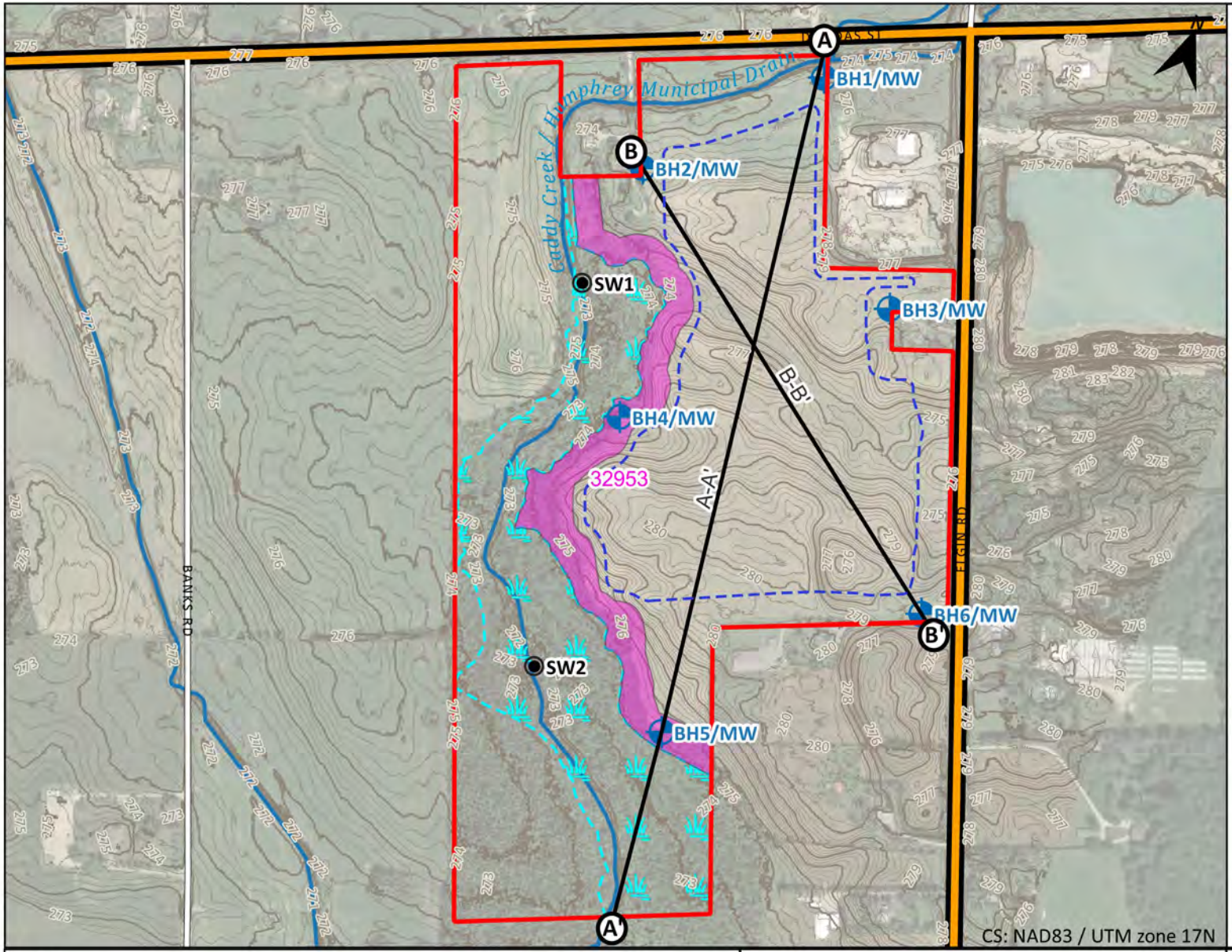

-LEGEND-

- Site Boundary (Approximate)
- Geological Cross-Section
- Proposed Pond (Approximate)
- Provincially Significant Wetland (Harrington McAvan, 2022)
- 30m Buffer (Harrington McAvan, 2022)
- Watercourse (OHN)
- Waterbody (OHN)

Investigative Locations

- Monitoring Well
- Surface Water Station

Ground Surface Elevation Contour (mamsl)

- Major
- Minor

Notes:
Ground surface elevation contours are extracted from the Lidar-Derived Ontario Digital Terrain Model (DTM) available on the Ontario GeoHub Website (0.5m Resolution)

Data Sources:
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Hydrogeological Assessment

Proposed Development

Elgin Road Pit, Thamesford, ON

CLIENT: Brantam Excavating Inc.

TITLE: Geological Cross-Section Location Plan

Prepared By: K.W. | Reviewed By: H.J./H.B.

EXP Services Inc.
405 Maple Grove Road, Cambridge, ON N3E 1B6

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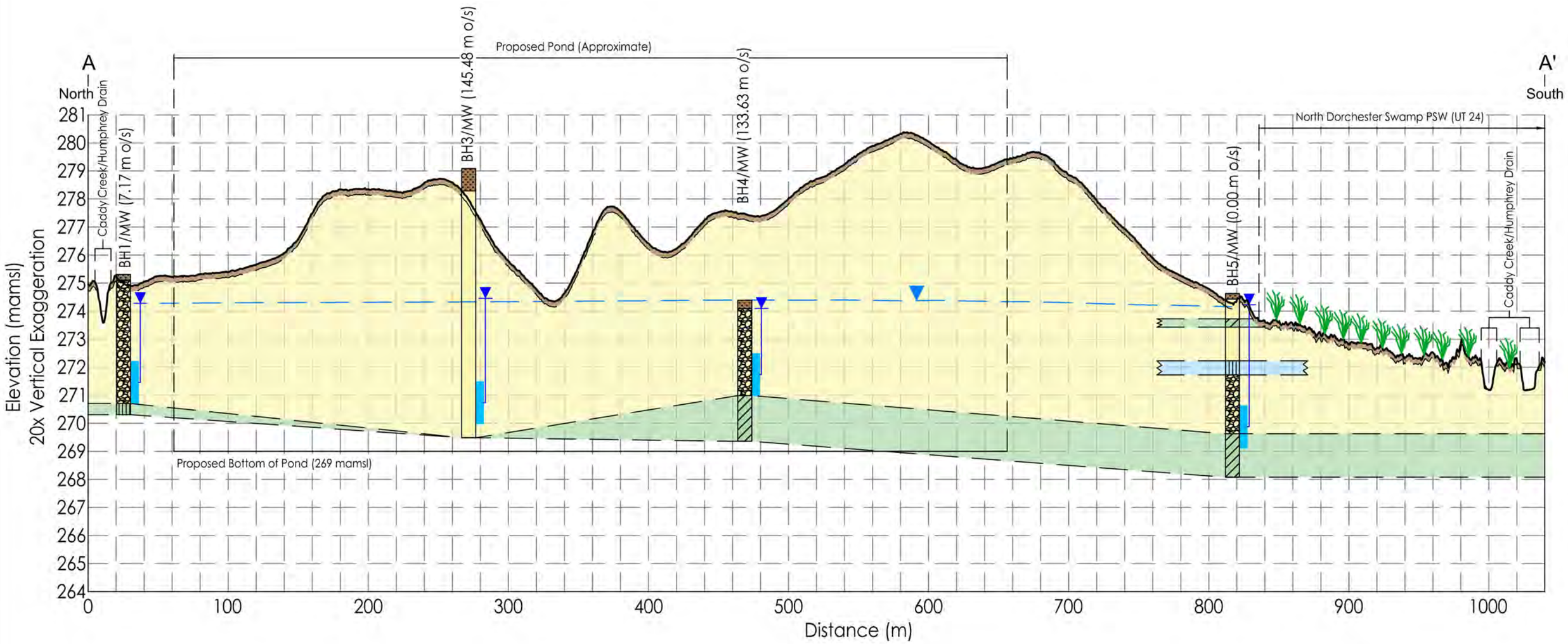


-LEGEND-

Ground Surface (See Notes)

Interpreted Water Table

Lithologies

- Topsoil
- Sand and Gravel
- Sand
- Silty Sand
- Clayey Silt Till
- Silt Till
- Silt
- Sandy Silt

Interpreted Geology

- Topsoil
- Sand / Silty Sand / Sand and Gravel
- Clayey Silt Till / Silt Till
- Silt / Sandy Silt

Borehole

Manual Water Level

Well Screen

-NOTES-

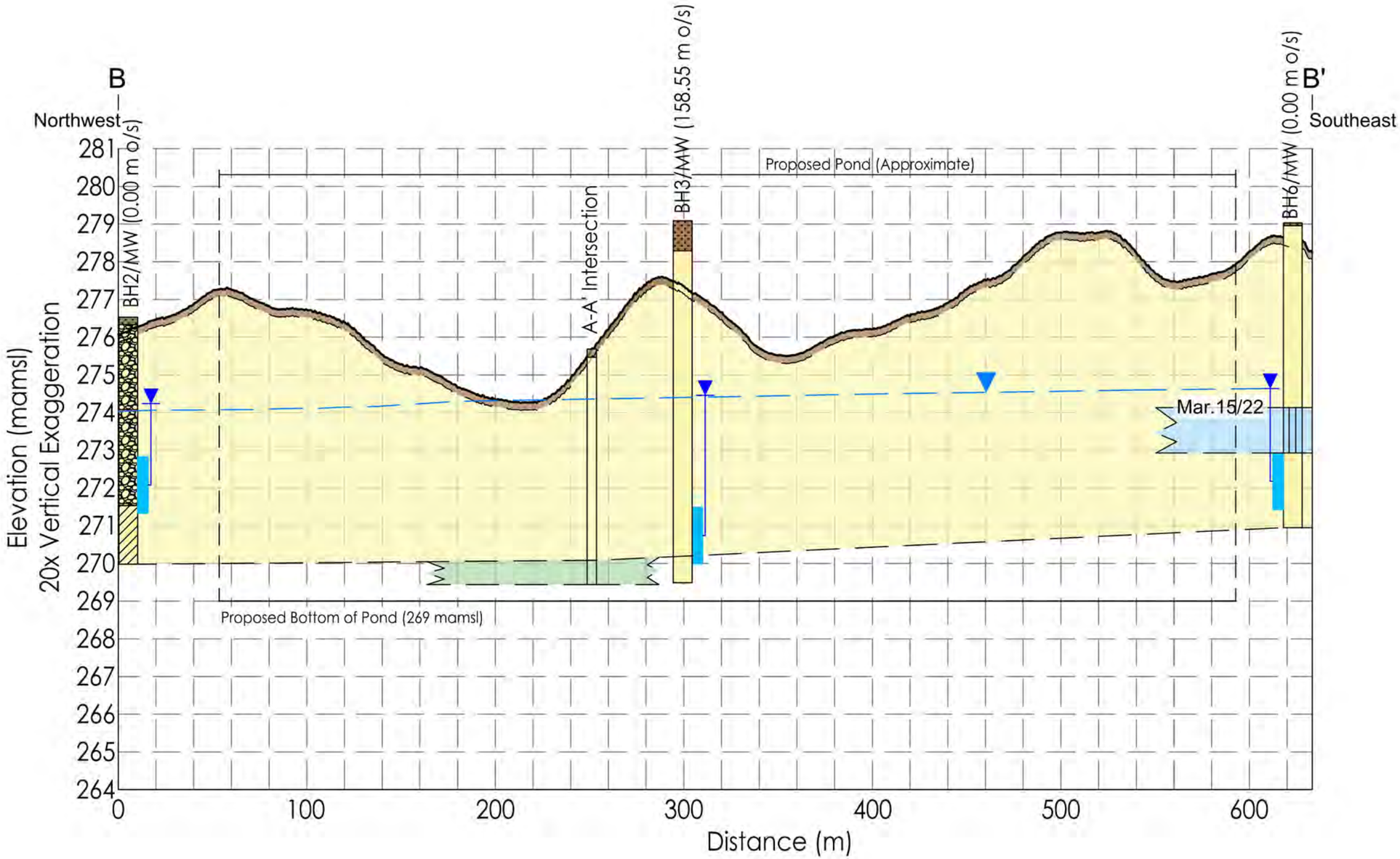
1. The cross section should be read in conjunction with EXP's Hydrogeological Report.
2. The geological interpretation is based on subsurface observations made at each borehole location. Subsurface conditions between and beyond boreholes may vary.
3. The projected ground surface is from the Ontario Lidar-Derived Digital Terrain Model (DTM) available on the Ontario GeoHub website (0.5m Resolution). Differences between the ground surface and top of boreholes are a result of offset distances and actual Site topographical conditions based on the geodetic survey of the monitoring wells.
4. Interpreted water table is based on manual groundwater measurements collected February 24, 2022, unless otherwise noted.
5. The water table has been projected onto the cross-section. Differences between the manual water levels and water table surface are a result of offset distances.
6. Illustrated extents are approximate.

Hydrogeological Assessment

Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, Ontario

CLIENT	Brantam Excavating Inc.
TITLE	Geological Cross Section A - A'
DRAWN BY: K.W. / REVIEWED BY: H.J. / DATE: January 2023	
exp.	EXP Services Inc. 405 Maple Grove Road Cambridge, ON, N3E 1B6
SCALE: As Shown / PROJECT NO.: KCH-21009432-A0 / DWG.: 10	



-LEGEND-

Ground Surface (See Notes)

Interpreted Water Table

Lithologies

- Topsoil
- Sand and Gravel
- Sand
- Silty Sand
- Clayey Silt Till
- Silt Till
- Silt
- Sandy Silt

Interpreted Geology

- Topsoil
- Sand / Silty Sand / Sand and Gravel
- Clayey Silt Till / Silt Till
- Silt / Sandy Silt

Borehole

Manual Water Level

Well Screen

-NOTES-

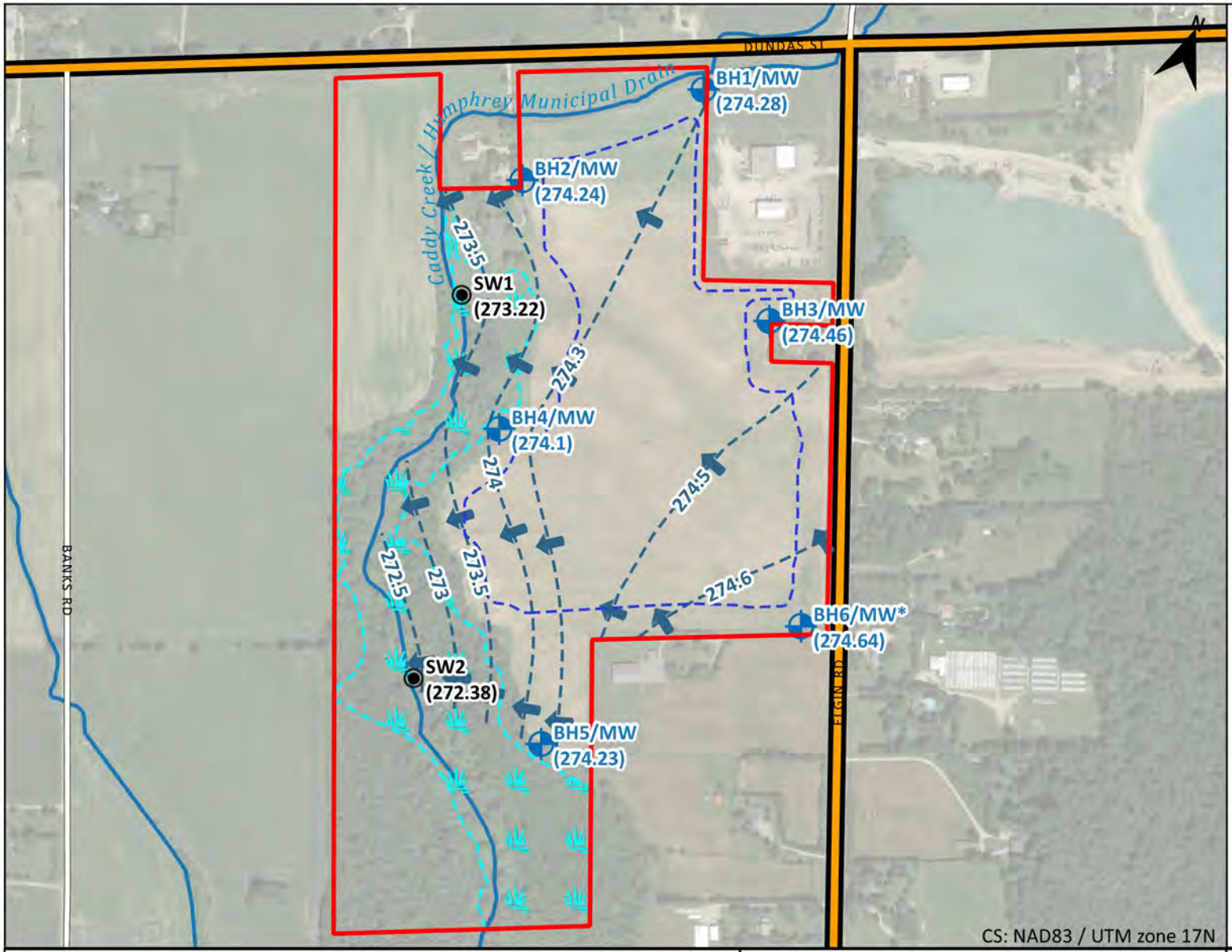
1. The cross section should be read in conjunction with EXP's Hydrogeological Report.
2. The geological interpretation is based on subsurface observations made at each borehole location. Subsurface conditions between and beyond boreholes may vary.
3. The projected ground surface is from the Ontario Lidar-Derived Digital Terrain Model (DTM) available on the Ontario GeoHub website (0.5m Resolution). Differences between the ground surface and top of boreholes are a result of offset distances and actual Site topographical conditions based on the geodetic survey of the monitoring wells.
4. Interpreted water table is based on manual groundwater measurements collected February 24, 2022, unless otherwise noted.
5. The water table has been projected onto the cross-section. Differences between the manual water levels and water table surface are a result of offset distances.
6. Illustrated extents are approximate.

Hydrogeological Assessment

Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, Ontario

CLIENT	Brantam Excavating Inc.
TITLE	Geological Cross Section B - B'
DRAWN BY: K.W. / REVIEWED BY: H.J. / DATE: January 2023	
exp.	EXP Services Inc. 405 Maple Grove Road Cambridge, ON, N3E 1B6
SCALE: As Shown / PROJECT NO.: KCH-21009432-A0 / DWG.: 11	



-LEGEND-

- Site Boundary (Approximate)
- Watercourse (OHN)
- Provincially Significant Wetland (Harrington McAvan, 2022)
- Proposed Pond (Approximate)

Investigative Locations

- Monitoring Well (Groundwater Elevation, mamsl)
- Surface Water Station (Surface Water Elevation, mamsl)
- Monitoring Well Not Used in Interpretation
- Groundwater Elevation Contour (mamsl) & Flow Direction

Notes:
Groundwater flow interpretation based on manual water levels collected February 24, 2022, with the exception of BH6/MW.
*Water level at BH6/MW not measured on February 24, 2022. Groundwater elevation shown and used in the seasonal high groundwater interpretation was collected on March 15, 2022, and represents the highest groundwater elevation observed to date at this location.
Data Sources:
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Google Earth Imagery (c) 2022 City of London, First Base Solutions, Maxar Technologies

Hydrogeological Assessment

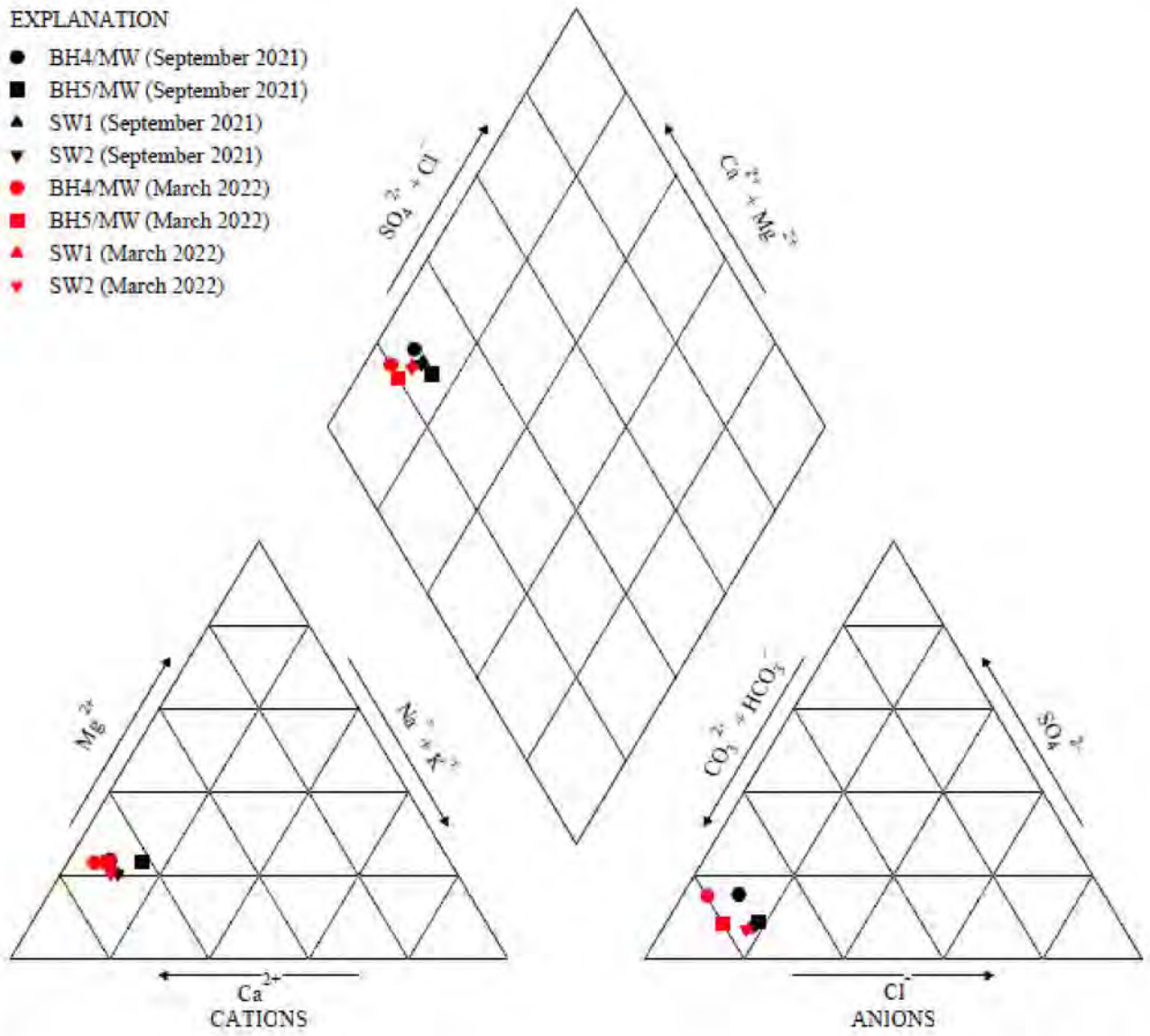
Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, ON

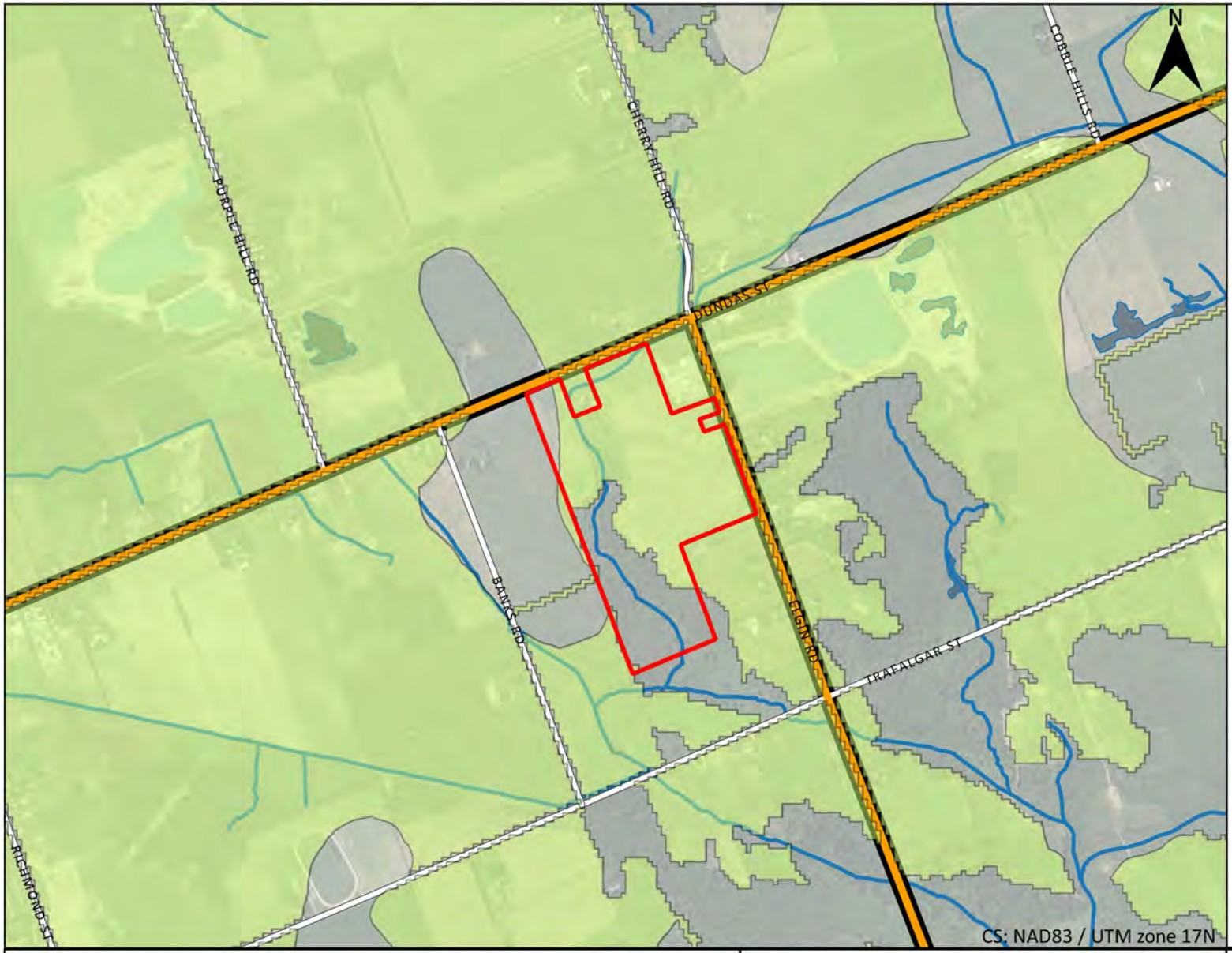
CLIENT	Brantam Excavating Inc.
TITLE	Interpreted Seasonal High Groundwater Flow
Prepared By: K.W.	Reviewed By: H.J./H.B.

EXP Services Inc.
405 Maple Grove Road, Cambridge, ON N3E 1B6

DATE	SCALE	PROJECT NO.	DWG.
January 2023	1:7,000	KCH-21009432-A0	12



	Hydrogeological Assessment	CLIENT	Brantam Excavating Inc.
		TITLE	Piper Diagram for Water Quality
	Proposed Development	Prepared by: H.B	Reviewed by: H.J
		exp.	EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5
	Elgin Road Pit, Thamesford, ON	DATE: November 2022	PROJECT NO.: KCH-21009432-A0 / DWG.: 13



-LEGEND-

- Site Boundary (Approximate)
- SGRA (TSR)
- Watercourse (OHN)
- Waterbody (OHN)

Notes:
TSR - Thames Sydenham and Region Source Protection Region

Data Sources:
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Hydrogeological Assessment

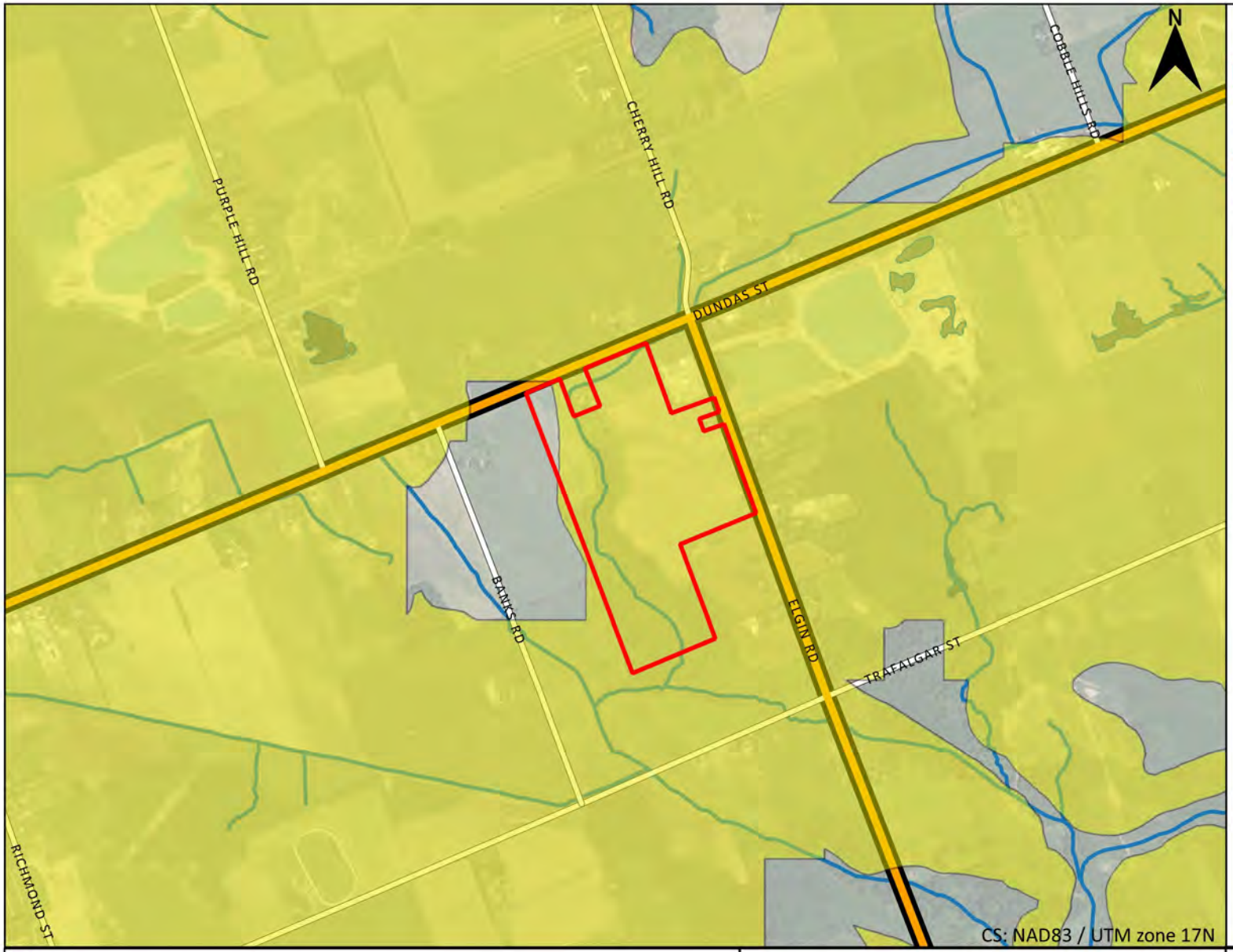
Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, ON

CLIENT	Brantam Excavating Inc.
TITLE	Significant Groundwater Recharge Areas
Prepared By: K.W.	Reviewed By: H.J./H.B.

EXP Services Inc.
405 Maple Grove Road, Cambridge, ON N3E 1B6

DATE	SCALE	PROJECT NO.	DWG.
January 2023	1:20,000	KCH-21009432-A0	14



-LEGEND-

- Site Boundary (Approximate)
- HVA (TSR)
- Watercourse (OHN)
- Waterbody (OHN)

Notes:
TSR - Thames Sydenham and Region Source Protection Region

Data Sources:
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Hydrogeological Assessment

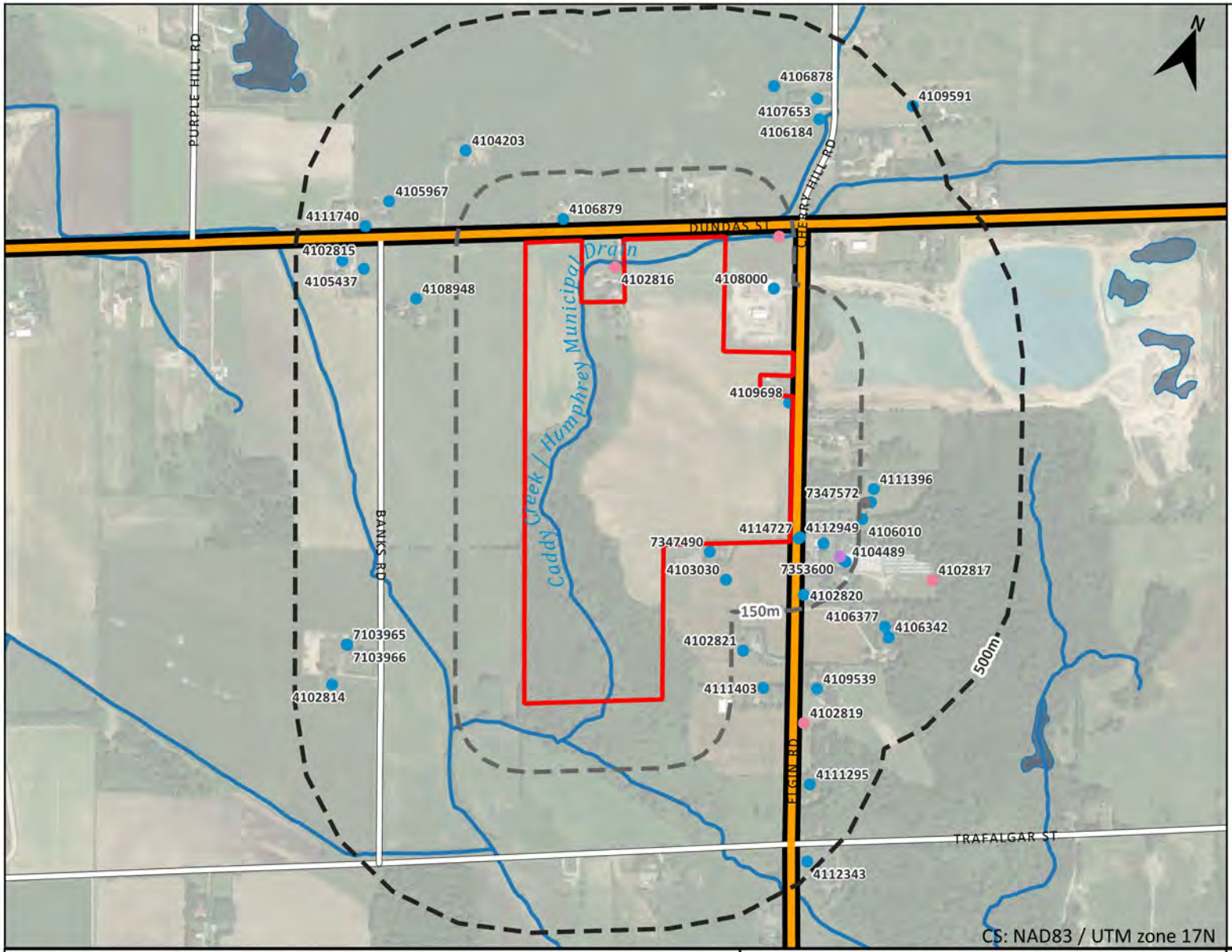
Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, ON

CLIENT	Brantam Excavating Inc.
TITLE	Highly Vulnerable Aquifers
Prepared By: K.W.	Reviewed By: H.J./H.B.

EXP Services Inc.
405 Maple Grove Road, Cambridge, ON N3E 1B6

DATE	SCALE	PROJECT NO.	DWG.
January 2023	1:20,000	KCH-21009432-A0	15



-LEGEND-

- Site Boundary (Approximate)
- 150m Buffer
- 500m Buffer
- Watercourse (OHN)
- Waterbody (OHN)
- Evaluated-Provincially Significant Wetland

MECP WWR & Final Status

- Water Supply
- Test Hole
- Replacement Well
- Abandoned-Other
- Other Status

Notes:
MECP well locations are provided by the MECP Water Well Information System (WWIS) online database. Actual locations may differ.

Data Sources:
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Google Earth Imagery (c) 2022 City of London, First Base Solutions, Maxar Technologies

Hydrogeological Assessment

Proposed Aggregate Extraction

Elgin Road Pit, Thamesford, ON

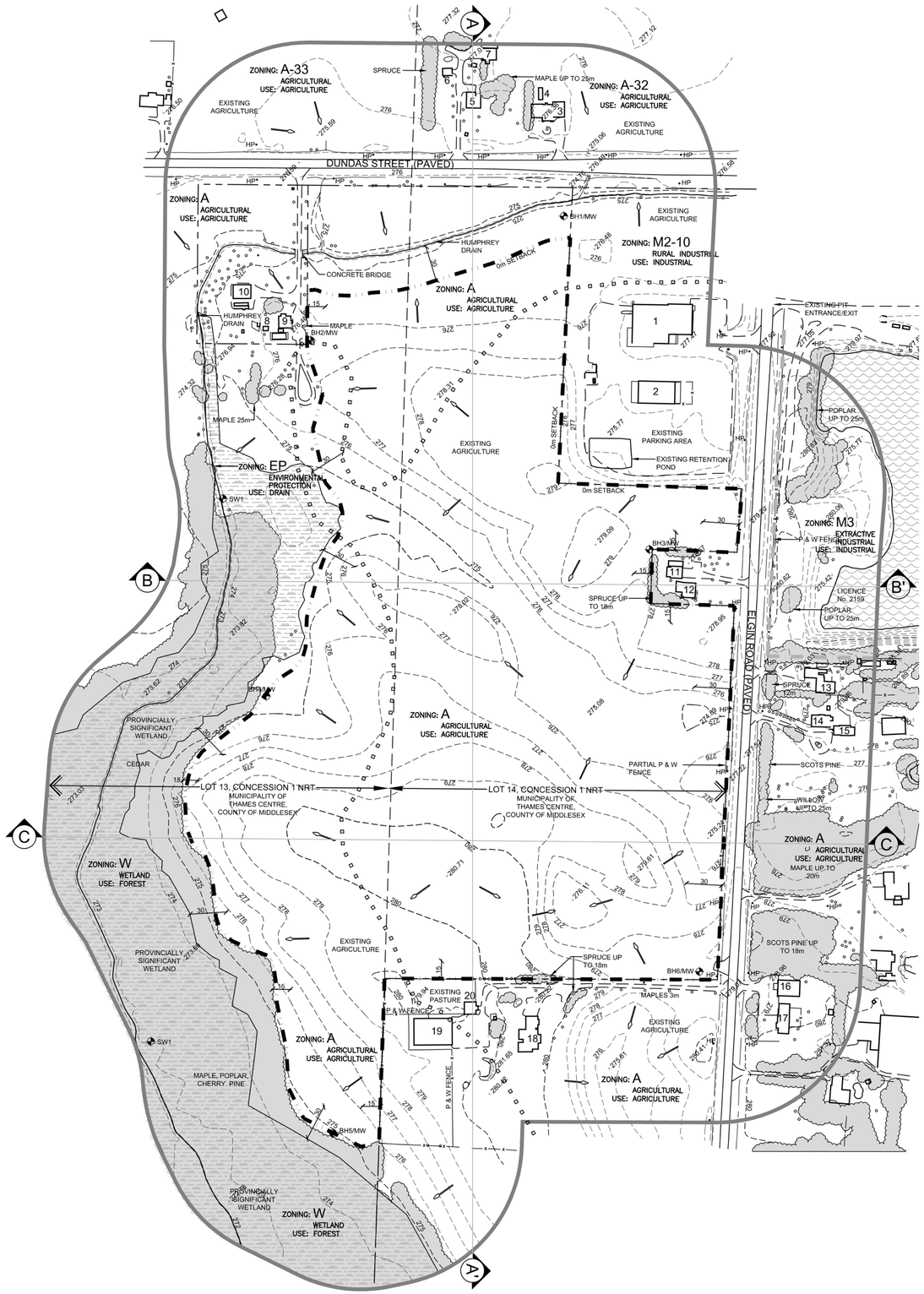
CLIENT	Brantam Excavating Inc.
TITLE	MECP WWR within 500m & 150m
Prepared By: K.W.	Reviewed By: H.J./H.B.

EXP Services Inc.
405 Maple Grove Road, Cambridge, ON N3E 1B6

DATE	SCALE	PROJECT NO.	DWG.
January 2023	1:13,000	KCH-21009432-A0	16

Appendix B – Development Plan

6-405 Maple Grove Road | Cambridge, Ontario | Canada
t: +1.519.650.4918 | f: +1.519.650.4603 | exp.com



EXISTING FEATURES NOTES

GENERAL SITE PLAN INFORMATION

1. THIS SITE PLAN CONSIST OF 5 DRAWINGS AND MUST BE READ COLLECTIVELY.
2. ALL MEASUREMENTS SHOWN ON THIS SITE PLAN ARE IN METRES.
3. THIS SITE PLAN IS PREPARED FOR SUBMISSION TO THE MINISTRY OF NATURAL RESOURCES AND FORESTRY UNDER THE AGGREGATE RESOURCES ACT FOR A CLASS 'A' LICENCE, PIT BELOW THE WATER TABLE.

LICENCE INFORMATION

4. APPLICANT:
   BRANTAM EXCAVATING INC.
   9334 GLENDON DRIVE
   MOUNT BRYDGES, ON
   N0L 1W0

5. TOTAL AREA TO BE LICENCED: 20.7 ha
   TOTAL AREA TO BE EXTRACTED: 17.8 ha
   TOTAL AREA TO REHABILITATED: 17.8 ha

BASE INFORMATION

6. TOPOGRAPHIC INFORMATION WAS OBTAINED FROM FROM TOPOGRAPHIC SURVEY PROVIDED FIRST BASE SOLUTIONS, DATED SEPTEMBER 2022.

   THE SITE WAS FIELD CHECKED BY HARRINGTON MCAVAN LTD., OCTOBER 18, 2022

   REGULATED AREA LINE OBTAINED FROM UTRCA REGULATED AREA SCREENING MAP, OCTOBER 2022.

   WETLAND BOUNDARIES OBTAINED FROM NATURAL ENVIRONMENT REPORT BY TERRASTORY ENVIRONMENTAL CONSULTING, DATED DECEMBER 2022.

7. ZONING INFORMATION OBTAINED FROM MIDDLESEX COUNTY, MIDDLESEX MAPS ONLINE, OCTOBER 2022. PROPOSED LICENCE IS PRESENTLY ZONED A (AGRICULTURE). A ZBA WILL BE APPLIED FOR TO CHANGE A TO M3 (EXTRACTIVE INDUSTRIAL).

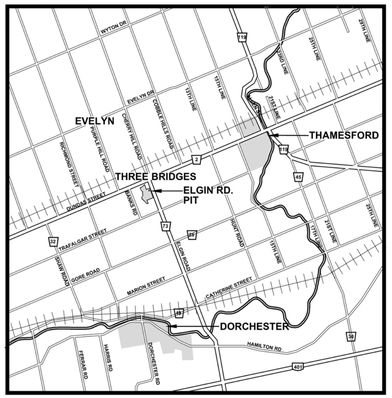
HYDROGEOLOGICAL INFORMATION

8. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORT BY EXP DATED FEBRUARY 2023.
9. THE WATER TABLE ELEVATION VARIES ACROSS THE PROPERTY BETWEEN 273.42 TO 274.64m ABOVE SEA LEVEL (A.S.L.).
10. SOURCE WATER PROTECTION POLICIES DO NO NOT APPLY TO THIS SITE (REFER TO HYDROGEOLOGICAL REPORT)

TECHNICAL REPORTS

11. HYDROGEOLOGICAL INFORMATION WAS OBTAINED FROM REPORT BY EXP DATED FEBRUARY 2023 (REFER TO SHEET 4 OF 5 FOR TECHNICAL RECOMMENDATIONS).
12. NATURAL ENVIRONMENT INFORMATION WAS OBTAINED FROM REPORT BY TERRASTORY ENVIRONMENTAL CONSULTING DATED FEBRUARY 2023 (REFER TO SHEET 4 OF 5 FOR TECHNICAL RECOMMENDATIONS).
13. ARCHAEOLOGICAL INFORMATION WAS OBTAINED FROM REPORT BY LINCOLN ENVIRONMENTAL CONSULTING CORP. DATED NOVEMBER 2021 (REFER TO SHEET 4 OF 5 FOR TECHNICAL RECOMMENDATIONS).
14. ACOUSTIC INFORMATION WAS OBTAINED FROM REPORT BY AERCOUSTICS DATED FEBRUARY 2023 (REFER TO SHEET 4 OF 5 FOR TECHNICAL RECOMMENDATIONS).

KEY MAP



BUILDING LIST

No.	
1.	DEALERSHIP
2.	WORKSHOP
3.	HOUSE
4.	SHED
5.	HOUSE
6.	GARAGE
7.	SHED
8.	SHED
9.	HOUSE
10.	GARAGE
11.	GARAGE
12.	HOUSE
13.	HOUSE
14.	HOUSE
15.	GARAGE
16.	GARAGE
17.	HOUSE
18.	HOUSE
19.	BARN
20.	SHED

LEGEND

- BOUNDARY OF PROPOSED LICENCE
- BOUNDARY OF EXISTING LICENCED AREA
- 120m INFORMATION BOUNDARY
- PROPERTY LINES
- REGULATORY SETBACK AND LIMIT OF EXTRACTION
- LOT LINE
- UTRCA REGULATED AREA LINE
- EXISTING FENCE
- 285 EXISTING 5m ASL CONTOUR LINE
- 284 EXISTING 1m ASL CONTOUR LINE
- 283.95 EXISTING SPOT ELEVATION m ASL
- EXISTING VEGETATION
- EXISTING WATER
- EXISTING WETLAND
- A LOCATION OF SECTION
- 1 EXISTING BUILDING AND NUMBER
- HP EXISTING HYDRO POLE
- DIRECTION OF SURFACE WATER DRAINAGE
- BH/MW BOREHOLE LOCATION AND NUMBER DRILLED AND MONITORING WELL INSTALLED JUNE 15-16, 2021 BY EXP.
- EXISTING ENTRANCE/EXIT

NO.	DATE	REVISIONS	OWNER	HM	MNR

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	HM	MNR

Site Plan Amendments

Harrington McAvan Ltd
41 Main Street, Unit 102
Unionville, Ontario L3R 2E5
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com

Project Name

BRANTAM EXCAVATING
ELGIN ROAD PIT

PART LOT 13 & 14, CONCESSION 1 NRT
MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF NORTH DORCHESTER, COUNTY OF MIDDLESEX

Scale 1:2000
0 10 50 80m

North

Stamp: DRAFT

Drawing Status: SUBMITTED FOR APPROVAL

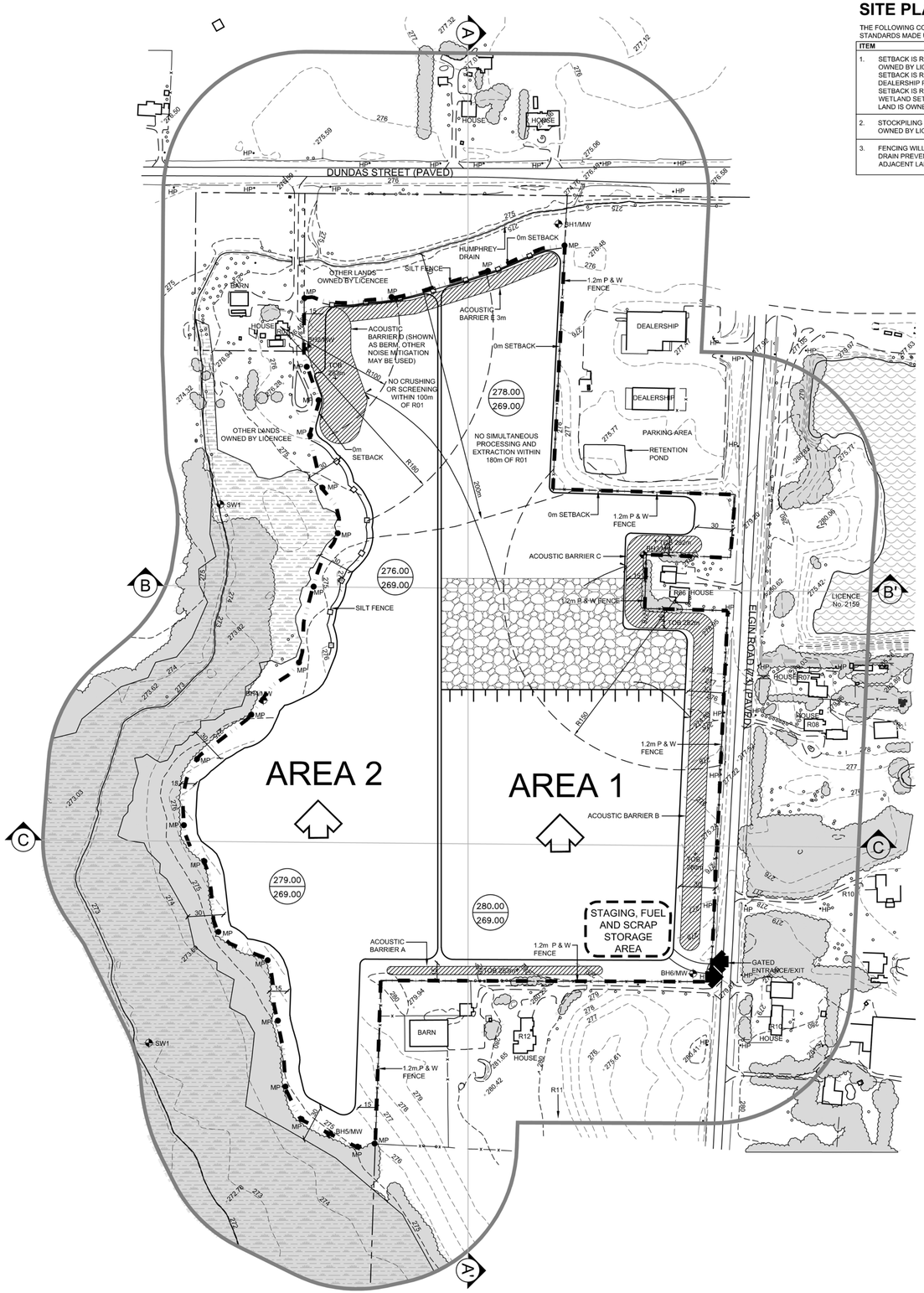
Drawn SB | Checked RM | Issue Date FEB 2023

Drawing Title: EXISTING FEATURES PLAN

Project Number: 22-22

Drawing Number: 1 OF 5

FILE NAME: 22-22/COMP/2222-1.DWG
PLOT DATE: FEBRUARY 15, 2023



SITE PLAN VARIANCES

THE FOLLOWING CONDITIONS ILLUSTRATED ON THESE PLANS VARY FROM THE OF THE PROVINCIAL STANDARDS MADE UNDER THE AGGREGATE RESOURCES ACT

ITEM		SECTION
1.	SETBACK IS REDUCED TO 0m ALONG THE NORTH BOUNDARY, ADJACENT LAND IS OWNED BY LICENSEE. SETBACK IS REDUCED TO 0m ALONG EAST BOUNDARY AROUND JOHN DEER DEALERSHIP PER AGREEMENT WITH ADJACENT LANDOWNER. SETBACK IS REDUCED TO 0m ALONG WEST BOUNDARY BETWEEN THE SIGNIFICANT WETLAND SETBACK AND SETBACK AROUND NORTHWEST RESIDENCE, ADJACENT LAND IS OWNED BY LICENSEE.	**0.13(1)10i**
2.	STOCKPILING MAY OCCUR WITHIN 30m OF THE NORTH BOUNDARY, ADJACENT LANDS OWNED BY LICENSEE.	**0.13(1)13i**
3.	FENCING WILL BE OMITTED FROM THE NORTH BOUNDARY, EXISTING MUNICIPAL DRAIN PREVENTS ACCESS AND ALONG THE WEST BOUNDARY PER AGREEMENT WITH ADJACENT LANDOWNER AND LICENSEE OWNS ADJACENT LAND.	**0.13(3)a**

PHASE A

PHASE A NOTES

1. **ESTABLISH THE ENTRANCE EXIT AND HAUL ROAD INTO THE SITE AT ELGIN ROAD, ACCORDING TO THE APPROPRIATE MUNICIPAL STANDARDS.**
2. **PRIOR TO ANY ON SITE OPERATIONS, CONSTRUCT OR UPGRADE THE FENCING ON THE LICENCED BOUNDARIES TO THE STANDARDS OF THE AGGREGATE RESOURCES ACT (1.2m HIGH WIRE FENCE), EXCEPT WHERE SITE PLAN VARIANCES ARE NOTED AND INSTALL MARKER POSTS. ALL FENCING SHALL BE MAINTAINED.**
3. **PRIOR TO EXTRACTION IN AREA 1, STRIP TOPSOIL AND OVERBURDEN SEPARATELY AND USE THE MATERIALS TO CONSTRUCT ACOUSTICAL BARRIERS A, B, AND C TO RECOMMENDED SPECIFICATIONS FOR PHASE A. EXCESS OVERBURDEN AND TOPSOIL MAY BE STORED IN PILES ON THE PIT FLOOR.**
4. **BEGIN ABOVE WATER EXTRACTION OF AREA 1 IN DIRECTION SHOWN. STOCKPILING AREA MAY BE TEMPORARILY LOCATED NEAR THE PIT FACE DURING THE INITIAL EXCAVATION OF AGGREGATE.**
5. **PRIOR TO EXTRACTION WITHIN 200m OF NORTH EXTRACTION LIMIT CONSTRUCT ACOUSTIC BARRIER D AND E TO RECOMMENDED SPECIFICATIONS.**
6. **UNDISTURBED PORTIONS OF AREAS 1 AND 2 REMAIN IN AGRICULTURAL USE.**
7. **MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS GROWING CONDITION**

OPERATIONS NOTES

GENERAL INFORMATION

1. THIS PLAN DEPICTS A SCHEMATIC OPERATIONS AND REHABILITATION SEQUENCE FOR THIS PROPERTY BASED ON THE BEST INFORMATION AVAILABLE AT THE TIME OF PREPARATION. PHASES SHOWN ARE SCHEMATIC AND WILL BE OPERATED ACCORDING TO MATERIAL QUALITY, SITE HYDROLOGY AND HYDROGEOLOGY OR MARKET DEMAND. PHASES DO NOT REPRESENT ANY SPECIFIC OR EQUAL TIME PERIOD.

   EXTRACTION SHALL FOLLOW THE SEQUENCE SHOWN. WHEN PARTIAL REHABILITATION OF A PHASE IS POSSIBLE IT SHALL BE CARRIED OUT. DEMAND FOR CERTAIN PRODUCTS OR BLENDING OF MATERIALS WILL REQUIRE SOME DEVIATION IN THE EXTRACTION AND REHABILITATION PHASING. ANY DEVIATIONS FROM THE OPERATIONS SEQUENCE SHOWN WILL REQUIRE APPROVAL FROM NDMNRF.

2. SITE PLAN VARIANCES ARE LISTED IN THE SITE PLAN VARIANCE TABLE SHOWN ON THIS PAGE.

EXTRACTION/PROCESSING/HAULING INFORMATION

3. TOTAL AREA TO BE EXTRACTED IS 17.8 HECTARES.

4. MAXIMUM NUMBER OF TONNES OF AGGREGATE TO BE REMOVED FROM THE SITE IN ANY CALENDAR YEAR IS 500,000 TONNES.

   EXTRACTION OF SAND AND GRAVEL ABOVE WATER TABLE WILL TAKE PLACE IN TWO BENCHES, WITH A MAXIMUM HEIGHT OF 4 METRES AND WILL COMPLY WITH OHSA REGULATIONS REGARDING FACE HEIGHTS. THE GROUNDWATER TABLE IS ESTIMATED TO BE BETWEEN ± 273.42 TO 274.64m ASL (SEE REPORT BY EXP). FRONT END LOADERS WILL BE USED TO EXTRACT MATERIAL AND HAUL TRUCKS OR CONVEYORS WILL CARRY MATERIAL VIA HAUL ROADS TO THE PLANT FOR FURTHER PROCESSING. REFER TO SECTIONS A-A', B-B', AND C-C' ON DRAWING 4 OF 5 FOR FURTHER DETAILS.

   PORTABLE PROCESSING EQUIPMENT, FOR CRUSHING AND SCREENING WILL BE USED ON SITE AND WILL BE LOCATED ON THE PIT FLOOR CLOSE TO THE PIT FACE AT START UP. IN ADDITION TO PROCESSING, SITE ACTIVITIES WILL INCLUDE STRIPPING AND REHABILITATION, OPERATIONAL EQUIPMENT MAY INCLUDE TRUCKS, LOADERS, EXCAVATOR, BACKHOES, BULLDOZERS, SCRAPERS, CONVEYORS, WASH PLANTS, AND OTHER RELATED EQUIPMENT. PROCESSING EQUIPMENT, STACKERS AND PRODUCT STOCKPILES WILL NOT EXCEED ±15 METRES IN HEIGHT AND WILL BE LOCATED IN THE AREAS SHOWN AND/OR CLOSE TO PIT FACES.

   MATERIAL FROM OTHER PROPERTIES MAY BE IMPORTED INTO THE SITE FOR BLENDING, CUSTOM PRODUCTS AND/OR RESALE. THIS MAY INCLUDE AGGREGATE AND/OR PEAT AND TOPSOIL (IN AREA 2).

5. EQUIPMENT, SCRAP AND MACHINERY ASSOCIATED WITH THE EXTRACTION OPERATIONS WILL BE REMOVED UPON COMPLETION OF EXTRACTION.

HYDROGEOLOGICAL INFORMATION

6. THE WATER TABLE ELEVATION VARIES ACROSS THIS LICENCE FROM APPROXIMATELY **273.42 TO 274.64m** ABOVE SEA LEVEL (A.S.L.), BASED ON THE EXP HYDROGEOLOGICAL REPORT (SEE ABOVE). REFER TO SECTIONS ON SHEET 4 OF 5.

7. SURFACE DRAINAGE WILL BE DIRECTED TO POND/LOW AREAS FOR WATER TO INFILTRATE INTO THE GRANULAR MATERIALS ON THE PIT FLOOR. THERE WILL BE NO OFF-SITE DITCHING/ DISCHARGE.

NOISE MITIGATION INFORMATION

8. HOURS OF OPERATION:

SITE PREPARATION AND REHABILITATION:	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS
EXCAVATION AND PROCESSING	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS
SHIPPING:	07:00-19:00 WEEKDAYS; 07:00 - NOON SATURDAYS

AIR QUALITY INFORMATION

9. WATER OR CALCIUM CHLORIDE WILL BE APPLIED TO INTERNAL HAUL ROADS AND PROCESSING AREAS AS OFTEN AS REQUIRED TO MITIGATE DUST.

SITE MANAGEMENT INFORMATION

MAINTENANCE/ PROTECTION OF VEGETATION INFORMATION

10. EXISTING VEGETATION WITHIN THE LICENCED AREA SHALL BE MAINTAINED IN A HEALTHY VIGOROUS GROWING CONDITION UNTIL SEQUENTIAL STRIPPING BEGINS OR UNTIL THE REHABILITATION IS COMPLETE. ANY VEGETATION PLANTED AS PART OF SITE IMPROVEMENTS OR PROGRESSIVE AND FINAL REHABILITATION WILL ALSO BE MAINTAINED IN A HEALTHY, VIGOROUS GROWING CONDITION.

FENCING INFORMATION

11. BOUNDARIES OF THE AREA TO BE LICENCED THAT ARE PRESENTLY FENCED ARE SHOWN ON DRAWING 1 OF 5 EXISTING FEATURES. PRIOR TO ANY STRIPPING OR PREPARATION, FENCING ON THE LICENCED BOUNDARIES WILL BE UPGRADED TO 1.2m HIGH WIRE TO COMPLY WITH THE AGGREGATE RESOURCES ACT WHERE REQUIRED. UNFENCED BOUNDARIES SHALL BE DEMARCATED WITH HIGHLY VISIBLE MARKER POSTS AT INTERVISIBLE INTERVALS. SILT/EROSION CONTROL FENCING WILL BE CONSTRUCTED ONCE STRIPPING OCCURS WITHIN 50m OF THE SETBACK ADJACENT TO THE HUMPHREY DRAIN AND THE NATURAL FEATURES AND SHALL BE MAINTAINED UNTIL ADJACENT AREA IS STABLE AND VEGETATED. ALL FENCING SHALL BE MAINTAINED.

TOPSOIL/SUBSOIL/OVERBURDEN STORAGE INFORMATION

12. TOPSOIL AND OVERBURDEN SHALL BE STRIPPED AND STORED SEPARATELY IN BERMS WHERE SHOWN AND IN THE STOCKPILING AREA AS SHOWN.

BERM INFORMATION

13. BERMS SHALL BE CONSTRUCTED AS SPECIFIED IN THE AERCOUSTICS NOISE ASSESSMENT REPORT DATED FEBRUARY 2023 AND SHOWN ON OPS PLAN. BERMS SHALL NOT EXCEED 2:1. REFER TO TYPICAL BERM CROSS SECTION ON DRAWING 3 OF 5. ALL BERMS SHALL BE SEEDED (USING GRASS/ LEGUME MIXTURE, SEE REHABILITATION PLAN, NOTE #7) IMMEDIATELY UPON COMPLETION TO MINIMIZE NOISE, DUST AND EROSION.

14. ON COMPLETION OF THE BERMS, EXCESS ON-SITE OVERBURDEN WILL BE USED TO PROGRESSIVELY BACKFILL AND REHABILITATE THE SITE. TOPSOIL CAN BE TEMPORARILY STOCKPILED ON THE PIT FLOOR.

SCRAP STORAGE INFORMATION

15. ALL SCRAP, USED MACHINERY AND STUMPS GENERATED THROUGH THE OPERATIONS WITHIN THIS LICENCE WILL BE STORED IN THE STAGING AREA AS SHOWN, A MINIMUM OF 30m FROM THE BOUNDARY OF THE SITE AND NOT WITHIN 30m OF ANY BODY OF WATER AND SHALL BE DISPOSED OF ON AN ONGOING BASIS. STUMPS/ WOODY MATERIAL MAY BE CHIPPED AND USED FOR SOIL ENHANCEMENT DURING PROGRESSIVE REHABILITATION. TREES WILL BE HARVESTED AND SOLD AS LUMBER OR UTILIZED FOR FIREWOOD AND/ OR THEIR BEST USE. UPON COMPLETION OF EXTRACTION, ALL SCRAP EQUIPMENT AND USED MACHINERY SHALL BE REMOVED.

PETROLEUM STORAGE INFORMATION

16. FUEL, OIL, RADIATOR AND HYDRAULIC FLUID, AND OTHER CHEMICALS NEEDED FOR THE MAINTENANCE AND FUNCTIONING OF ON-SITE AGGREGATE PROCESSING EQUIPMENT SHALL BE APPROPRIATELY STORED IN ABOVE-GROUND CONTAINERS AND SHALL MEET THE REQUIREMENTS OF THE GASOLINE HANDLING ACT, AS AMENDED, AND THE GASOLINE HANDLING CODE AND REGULATIONS, AS AMENDED BY THE TECHNICAL STANDARDS AND SAFETY ACT (TSSA) AND LIQUID FUELS HANDLING CODE, AND IN ACCORDANCE WITH THE MINISTRY OF THE ENVIRONMENT, CONSERVATION, AND PARK'S CHEMICAL STORAGE GUIDELINES. ALL REFUELING SHALL BE WITHIN A CONTAINMENT PAD. ALL SPILLS TO THE ENVIRONMENT MUST BE REPORTED TO THE SPILLS ACTION CENTRE OF MECP. ANY SPILL SHALL BE REMOVED AND DISPOSED OF AT AN APPROPRIATE MECP APPROVED FACILITY.

LEGEND

- BOUNDARY OF PROPOSED LICENCE
- BOUNDARY OF EXISTING LICENCED AREA
- 120m INFORMATION BOUNDARY
- PROPERTY LINES
- REGULATORY SETBACK AND LIMIT OF EXTRACTION
- EXISTING FENCE
- EXISTING 5m ASL CONTOUR LINE
- EXISTING 1m ASL CONTOUR LINE
- EXISTING SPOT ELEVATION m ASL
- EXISTING VEGETATION
- EXISTING WETLAND
- EXISTING OPEN WATER
- EXTRACTION FACE
- BERM (MIN. HEIGHT AS SHOWN)
- UNDISTURBED AREA
- AREA STRIPPED OF TOPSOIL AND OVERBURDEN
- SILT FENCE
- MP — PROPOSED MARKER POST
- 1 — EXISTING BUILDING AND NUMBER
- HP — EXISTING HYDRO POLE
- DIRECTION OF SURFACE WATER DRAINAGE
- BH/MW — BOREHOLE LOCATION AND NUMBER DRILLED AND MONITORING WELL INSTALLED JUNE 15-16, 2021
- ENTRANCE/ EXIT
- DIRECTION OF EXTRACTION
- DIRECTION OF TOPSOIL AND OVERBURDEN MOVEMENT
- R03 — LOCATION OF NOISE RECEPTOR
- 296.00 / 286.00 — EXISTING ELEVATION / PROPOSED ELEVATION
- A — LOCATION OF SECTION

NO.	DATE	REVISIONS	OWNER	HM	MHR

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	HM	MHR

Site Plan Amendments

Harrington McAvan Ltd
41 Main Street, Unit 102
Unionville, Ontario **L3R 2E5**
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com

Project Name

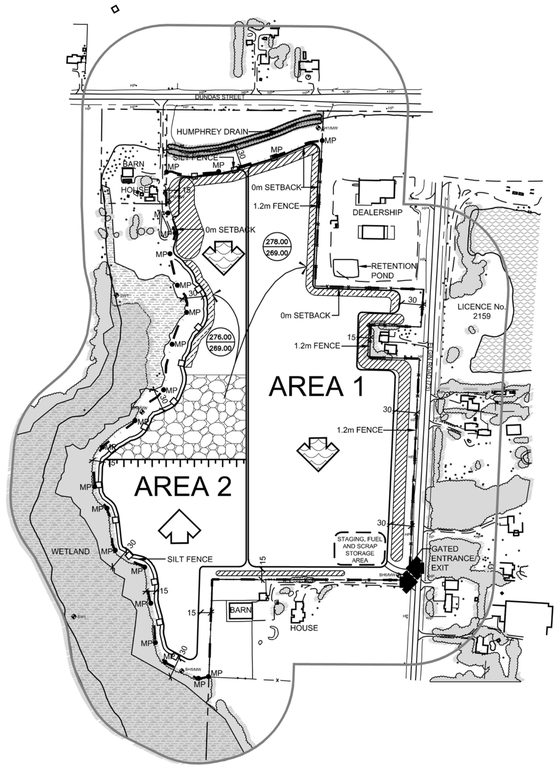
BRANTAM EXCAVATING

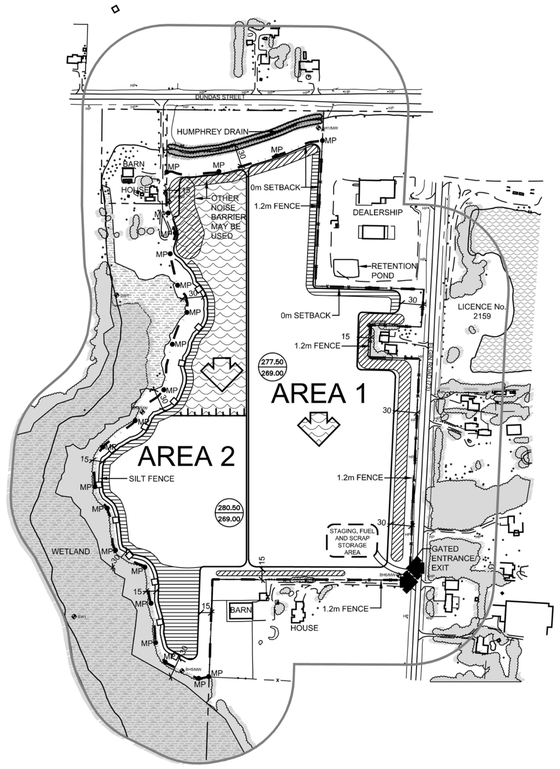
ELGIN ROAD PIT

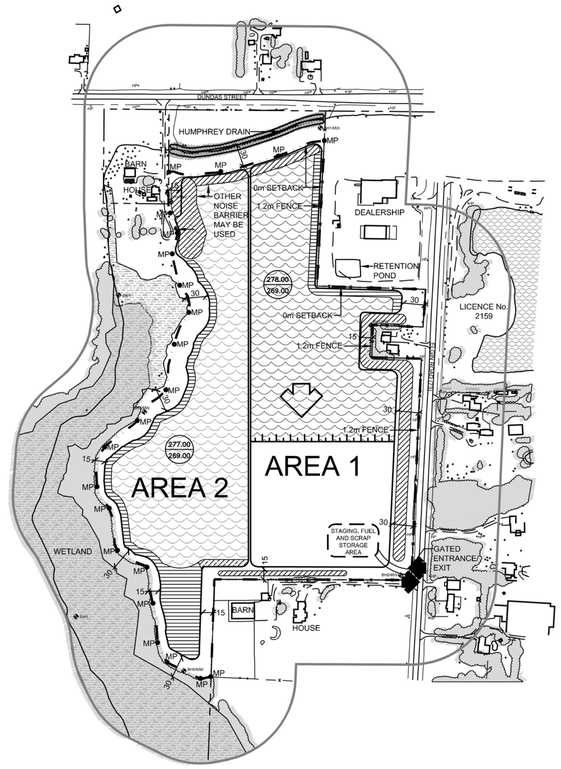
PART LOT 13 & 14, CONCESSION 1 NRT
MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF NORTH DORCHESTER, COUNTY OF MIDDLESEX

Scale 1:2000 0 10 50 80m	**North**	**Stamp** **DRAFT**
Drawing Status SUBMITTED FOR APPROVAL		
Drawn SB	**Checked** RM	**Issue Date** FEB 2023
Drawing Title **OPERATIONAL PLAN PHASE A**		**Project Number** 22-22 **Drawing Number** **2** OF 5

FILE NAME: 22-22/COMP/2222-2.DWG
PLOT DATE: FEBRUARY 15, 2023







PHASE B

1. COMPLETE ABOVE WATER EXTRACTION OF AREA 1.
2. STRIP TOPSOIL AND OVERBURDEN SEPARATELY FROM AREA 2 AND USE THE MATERIAL TO BEGIN PROGRESSIVE REHABILITATION OF AREA 1 SIDE SLOPES AS SHOWN. EXCESS MATERIAL MAY BE STOCKPILED ON THE PIT FLOOR.
3. BEGIN ABOVE WATER EXTRACTION OF AREA 2 IN DIRECTION SHOWN. SHIP MATERIAL TO TEMPORARY PLANT SITE (NOT SHOWN, PORTABLE PROCESSING EQUIPMENT TO BE USED).
4. BEGIN REHABILITATION OF AREA 2 SIDE SLOPES AS EXTRACTION PROCEEDS SOUTH USING MATERIAL STRIPPED IN AREA 2.
5. UNDISTURBED PORTION OF AREA 2 TO REMAIN IN AGRICULTURAL USE.
6. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.

PHASE C

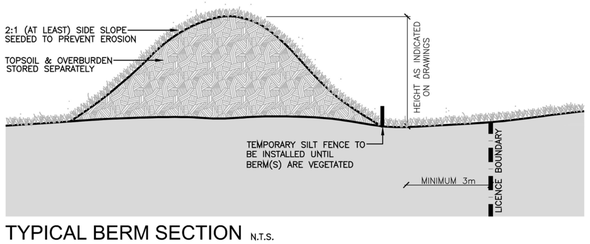
1. COMPLETE ABOVE WATER EXTRACTION OF AREA 2.
2. COMPLETE REHABILITATION OF AREAS SHOWN.
3. BEGIN BELOW WATER EXTRACTION OF AREA 2 IN DIRECTION SHOWN. MATERIAL EXTRACTED FROM BELOW WATER WILL BE PLACED IN WINDROWS ON THE PIT FLOOR TO DRAIN BEFORE BEING TRANSPORTED FOR PROCESSING. SHIP MATERIAL TO TEMPORARY PLANT SITE (NOT SHOWN, PORTABLE PROCESSING EQUIPMENT TO BE USED).
4. COMPLETE BELOW WATER EXTRACTION OF AREA 2.
5. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.

PHASE D

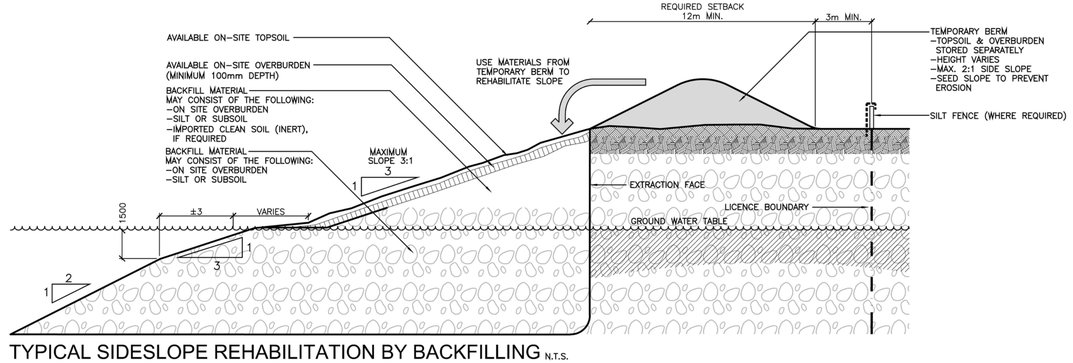
1. BEGIN BELOW WATER EXTRACTION OF AREA 1 IN DIRECTION SHOWN.
2. CONTINUE PROGRESSIVE REHABILITATION OF AREA 2 SIDESLOPES AS SHOWN.
3. COMPLETE BELOW WATER EXTRACTION IN AREA 1.
4. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.

PHASE E (NOT SHOWN)

1. REMOVE ALL EQUIPMENT, STRUCTURES, STOCKPILES AND SCRAP FROM THE SITE AND REHABILITATE ALL HAUL ROADS USING TOPSOIL AND OVERBURDEN STOCKPILED IN BERMS.
2. COMPLETE REHABILITATION OF ALL REMAINING AREAS USING MATERIAL IN ACOUSTIC BERMS.
3. MAINTAIN ALL VEGETATION IN A HEALTHY, VIGOROUS CONDITION.



TYPICAL BERM SECTION N.T.S.



TYPICAL SIDESLOPE REHABILITATION BY BACKFILLING N.T.S.

LEGEND

- BOUNDARY OF PROPOSED LICENCE
- BOUNDARY OF EXISTING LICENCED AREA
- 120m INFORMATION BOUNDARY
- PROPERTY LINES
- REGULATORY SETBACK AND LIMIT OF EXTRACTION
- LOT LINE
- EXISTING FENCE
- EXISTING 5m ASL CONTOUR LINE
- EXISTING 1m ASL CONTOUR LINE
- EXISTING SPOT ELEVATION m ASL
- EXISTING VEGETATION
- EXISTING WETLAND
- EXISTING OPEN WATER
- EXTRACTION FACE
- BERM (MIN. HEIGHT AS SHOWN)
- UNDISTURBED AREA
- AREA STRIPPED OF TOPSOIL AND OVERBURDEN
- PROGRESSIVE REHABILITATION
- COMPLETED REHABILITATION
- SILT FENCE
- EXISTING BUILDING
- EXISTING HYDRO POLE
- BOREHOLE LOCATION AND NUMBER DRILLED AND MONITORING WELL INSTALLED JUNE 15-16, 2021
- ENTRANCE/ EXIT
- DIRECTION OF EXTRACTION
- DIRECTION OF TOPSOIL AND OVERBURDEN MOVEMENT
- LOCATION OF NOISE RECEPTOR
- EXISTING ELEVATION / PROPOSED ELEVATION
- PROPOSED MARKER POST
- LOCATION OF SECTION

NO.	DATE	REVISIONS	OWNER	HM	MNR

Pre Licence Review

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Project Name

BRANTAM EXCAVATING

ELGIN ROAD PIT

PART LOT 13 & 14, CONCESSION 1 NRT
MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF NORTH DORCHESTER, COUNTY OF MIDDLESEX

Scale 1:4000
0 50 100 150m

North

Stamp: DRAFT

Drawing Status: PRELIMINARY FOR DISCUSSION

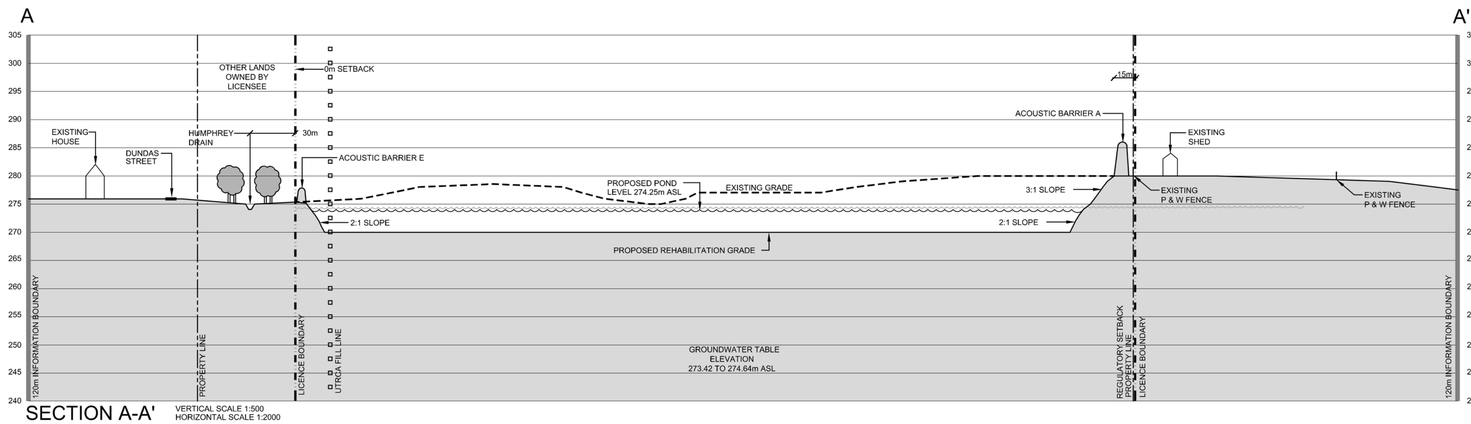
Drawn SB | Checked RM | Issue Date FEB 2023

Drawing Title: OPERATIONAL PLAN PHASES B-E AND DETAILS

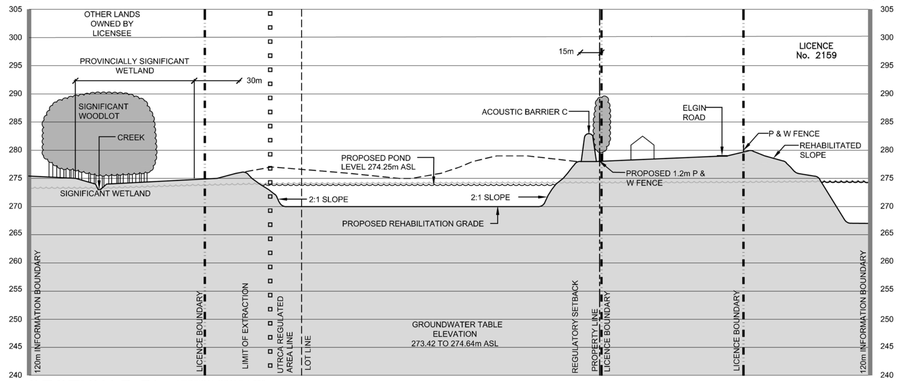
Project Number: 22-22

Drawing Number: 3 OF 5

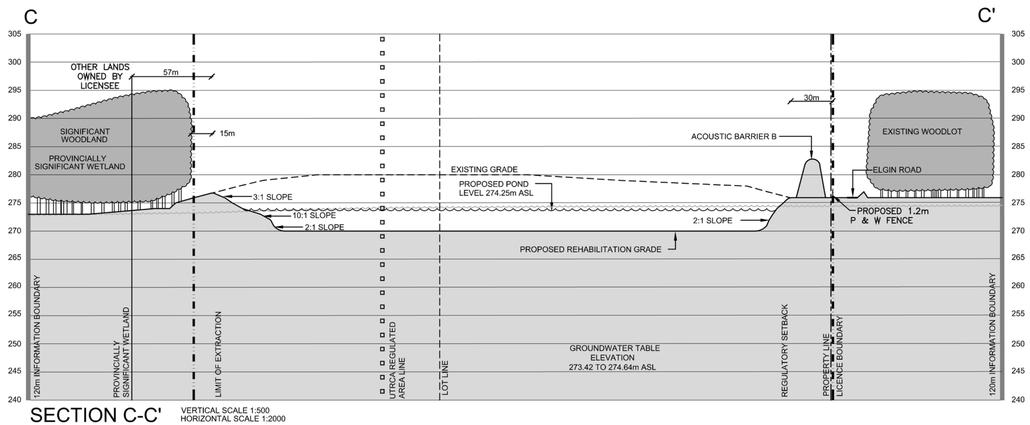
FILE NAME: 22-22/COMP/2222-3.DWG
PLOT DATE: FEBRUARY 15, 2023



SECTION A-A' VERTICAL SCALE 1:500 HORIZONTAL SCALE 1:2000



SECTION B-B' VERTICAL SCALE 1:500 HORIZONTAL SCALE 1:2000



SECTION C-C' VERTICAL SCALE 1:500 HORIZONTAL SCALE 1:2000

NOISE ASSESSMENT - AERCOUSTICS - DATED FEBRUARY 2023

1. THE PROPOSED HOURS OF EXTRACTION, PROCESSING, AND SHIPPING OPERATIONS SHALL BE LIMITED TO THE DAYTIME HOURS ONLY (07:00 TO 19:00).

2. THE EXTRACTION, PROCESSING, AND SHIPPING EQUIPMENT OPERATING IN THE PIT IS LIMITED TO:
   - ONE EXTRACTION LOADER OR SURGE PILE LOADER
   - ONE DRAG LINE OR EXCAVATOR
   - ONE SHIPMENT LOADER
   - ONE PROCESSING PLANT (CRUSHING AND SCREENING)
   - HIGHWAY TRUCKS
   - OFF-ROAD TRUCKS

3. THE AGGREGATE PIT EQUIPMENT SHALL SATISFY THE NOISE EMISSION LEVELS LISTED IN THE BELOW TABLE:

EQUIPMENT	REFERENCE SOUND PRESSURE LEVEL AT 30m
PROCESSING PLANT	80
DRAG LINE	73
SHIPPING/ SURGE PILE LOADER	67[1]
EXTRACTION LOADER	70
HIGHWAY TRUCK 20 km/h	71
OFF ROAD TRUCK 30 km/h	80

1- THE SHIPMENT LOADER AND SURGE PLE LOADERS WERE ASSUMED TO OPERATE AT A 50% DUTY CYCLE.

4. THE SOUND EMISSIONS OF ALL CONSTRUCTION EQUIPMENT INVOLVED IN SITE PREPARATION AND REHABILITATION ACTIVITIES SHALL COMPLY WITH THE SOUND LEVEL LIMITS SPECIFIED IN THE MECP PUBLICATION NPC-115 "CONSTRUCTION EQUIPMENT".

5. NEW EQUIPMENT TECHNOLOGY OR DIFFERENT CONFIGURATIONS MAY ALLOW PROPOSED CHANGES TO ANY PORTION OF THE EXTRACTION AND PROCESSING OPERATIONS INCLUDING ADDITIONAL EQUIPMENT TO OPERATE ON THE SITE, EQUIPMENT TO BE SUBSTITUTED, AND/OR DIFFERENT BERM HEIGHTS, WHILE STILL MEETING THE APPLICABLE SOUND LEVEL LIMITS. CHANGES MAY BE PERMITTED TO THE SITE OPERATIONS AND NOISE CONTROLS PROVIDED THAT THE CHANGES STILL MEET THE SOUND LEVEL LIMITS, AS CONFIRMED THROUGH DOCUMENTATION PREPARED BY A PROFESSIONAL ENGINEER SPECIALIZING IN NOISE CONTROL.

6. AN ACOUSTIC BARRIER IS REQUIRED TO BE SOLID, WITH NO GAPS OR OPENINGS, AND SHALL SATISFY A MINIMUM AREA DENSITY OF 20 KG/M$_2$. IT COULD TAKE THE FORM OF A WORKING FACE, STOCKPILE, ACOUSTIC FENCE, ISO CONTAINERS, A COMBINATION OF THESE, OR ANY CONSTRUCTION SATISFYING THE REQUIREMENTS OF AN ACOUSTIC BARRIER.

7. PRIOR TO EXTRACTION OPERATIONS, THE FOLLOWING ACOUSTICAL BARRIERS SHALL BE ESTABLISHED AS NOTED BELOW AND AS SHOWN ON THE OPERATION PLAN. THESE BARRIERS SHALL REMAIN IN PLACE FOR THE LIFETIME OF THE PIT.

   - BARRIER A - TOP-OF-BARRIER ELEVATION OF 283 MASL WITH APPROXIMATE LENGTH OF 175 M
   - BARRIER B - TOP-OF-BARRIER ELEVATION OF 280 MASL WITH APPROXIMATE LENGTH OF 275 M
   - BARRIER C - TOP-OF-BARRIER OF ELEVATION 282 MASL WITH APPROXIMATE LENGTH OF 150 M

8. PRIOR TO EXTRACTION OR PROCESSING OPERATIONS WITHIN 200 M OF THE NORTHMOST EXTRACTION LIMIT, THE FOLLOWING ACOUSTICAL BARRIERS SHALL BE ESTABLISHED AS NOTED BELOW AND AS SHOWN ON THE OPERATION PLAN. THESE BARRIERS SHALL REMAIN IN PLACE FOR THE LIFETIME OF THE PIT.

   - BARRIER D - TOP-OF-BARRIER ELEVATION OF 283 MASL WITH APPROXIMATE LENGTH OF 100 M
   - BARRIER E - RELATIVE HEIGHT OF 3 M WITH RESPECT TO EXISTING GRADE, WITH APPROXIMATE LENGTH OF 215 M.

9. AN ACOUSTICAL BARRIER SHALL BE ESTABLISHED WITHIN 30 M OF THE PROCESSING PLANT, BREAKING THE LINE OF SIGHT TO THE RECEPTOR LISTED IN TABLE A2, WITH A MINIMUM HEIGHT BASED ON THE RECEPTOR'S DISTANCE FROM THE PROCESSING PLANT AS SPECIFIED IN TABLE BELOW:

TOP OF BARRIER HEIGHT (MASL)	8 M SHIELDING REQUIRED	10 M SHIELDING REQUIRED
R01	WITHIN 400 M	WITHIN 180 M
R06	WITHIN 400 M	WITHIN 150 M
R07-R11	WITHIN 400 M	NEVER
R12	WITHIN 400 M	NEVER

10. THE PROCESSING PLANT SHALL NOT OPERATE WITHIN 100 M OF RECEPTOR R01.

11. EXTRACTION OPERATIONS AND PROCESSING OPERATIONS MAY NOT OCCUR SIMULTANEOUSLY WITHIN 180 M OF RECEPTOR R01.

TECHNICAL RECOMMENDATIONS

THE FOLLOWING ARE THE TECHNICAL RECOMMENDATIONS FROM ALL OF THE EXPERTS' REPORTS AS OF MARCH 2022. ADDITIONAL RECOMMENDATIONS MAY BE INCLUDED AS A RESULT OF THE LICENCE REVIEW PROCESS.

NATURAL ENVIRONMENT ASSESSMENT - TERRASTORY ENVIRONMENTAL CONSULTING INC. DATED FEBRUARY 2023

PROVINCIALLY SIGNIFICANT WETLAND AND OTHER ADJOINING WETLANDS

1. THE 30 M SETBACK FROM THE PSW AND OTHER ADJOINING WETLANDS WILL BE WELL-MARKED UNDER THE DIRECTION OF A QUALIFIED ECOLOGIST PRIOR TO THE COMMENCEMENT OF ADJACENT PIT OPERATIONS.

2. OPERATIONAL ACTIVITIES AND OTHER DISTURBANCES ARE PROHIBITED WITHIN THE 30 M SETBACK FROM THE WETLAND, WHICH WILL BECOME NATURAL, SELF-SUSTAINING VEGETATION (NO MOW OR AGRICULTURAL USES).

SIGNIFICANT WOODLANDS

3. THE 15 M SETBACK FROM THE DRIPLINE OF THE SIGNIFICANT WOODLAND WILL BE WELL-MARKED UNDER THE DIRECTION OF A QUALIFIED ECOLOGIST PRIOR TO THE COMMENCEMENT OF ADJACENT PIT OPERATIONS.

4. OPERATIONAL ACTIVITIES AND OTHER DISTURBANCES ARE PROHIBITED WITHIN THE 15 M SETBACK FROM THE WETLAND BOUNDARY, WHICH WILL BECOME NATURAL, SELF-SUSTAINING VEGETATION (NO MOW OR AGRICULTURAL USES).

5. ANY NECESSARY LIGHTING TO SUPPORT PIT OPERATIONS WILL BE DIRECTED AWAY FROM THE SIGNIFICANT WOODLAND (I.E., EASTWARD OR NORTHWARD) TO THE EXTENT PRACTICABLE.

HABITAT OF ENDANGERED AND THREATENED SPECIES

6. ALL AGGREGATE OPERATIONS WITHIN THE SITE WILL BE UNDERTAKEN CONSISTENT WITH THE DOCUMENT TITLED "BEST MANAGEMENT PRACTICES FOR THE PROTECTION, CREATION AND MAINTENANCE OF BANK SWALLOW HABITAT IN ONTARIO" (OMNRF 2017).

7. ANY NECESSARY REMOVAL OF VEGETATION TO SUPPORT PIT OPERATIONS WILL BE COMPLETED OUTSIDE THE PRIMARY BIRD NESTING AND BAT ACTIVITY PERIODS (I.E., TO BE COMPLETED BETWEEN OCTOBER 1 AND MARCH 31).

FISH HABITAT

8. THE 30 M SETBACK FROM THE BANKFULL CHANNEL OF CADDY CREEK / HUMPHREY MUNICIPAL DRAIN WILL BE WELL-MARKED UNDER THE DIRECTION OF A QUALIFIED ECOLOGIST PRIOR TO THE COMMENCEMENT OF ADJACENT PIT OPERATIONS.

9. OPERATIONAL ACTIVITIES AND OTHER DISTURBANCES ARE PROHIBITED WITHIN THE 30 M SETBACK FROM CADDY CREEK / HUMPHREY MUNICIPAL DRAIN, WHICH WILL BECOME NATURAL, SELF-SUSTAINING VEGETATION (NO MOW OR AGRICULTURAL USES).

10. EROSION AND SEDIMENT CONTROL MEASURES (E.G., INSTALLATION OF SILT FENCING) WILL BE IMPLEMENTED OUTSIDE THE 30 M SETBACK OF CADDY CREEK / HUMPHREY MUNICIPAL DRAIN AND BE REGULARLY MAINTAINED AS REQUIRED TO FUNCTION EFFECTIVELY.

11. A RIPARIAN CORRIDOR ENHANCEMENT PLAN FOR THE 30 M SETBACK FROM THE CADDY CREEK / HUMPHREY MUNICIPAL DRAIN WILL BE PREPARED FOR THE AREA NORTH OF THE SITE, WHICH INCORPORATES THE FOLLOWING ELEMENTS (MINIMUM):
    - TREE AND SHRUB INSTALLATIONS (NATIVE TO MIDDLESEX COUNTY) TO BE INSTALLED WITHIN 5 M OF THE BANKFULL CHANNEL.
    - APPLICATION OF A NATIVE SEED MIXTURE SUITED TO MOIST, UPLAND CONDITIONS TO COVER THE 30 M SETBACK.
    - IMPLEMENTATION OF A MONITORING PLAN FOR THE PURPOSES OF DETERMINING THE SUCCESS OF THE WOODY PLANT INSTALLATIONS AND SEED APPLICATION FOR A PERIOD OF NO LESS THAN THREE (3) GROWING SEASONS.

12. A SURFACE WATER MONITORING PLAN WILL BE PREPARED BY A QUALIFIED PROFESSIONAL FOR CADDY CREEK / HUMPHREY MUNICIPAL DRAIN TO ASSESS THERMAL CONDITIONS AND IS TO BE IMPLEMENTED DURING THE LIFETIME OF OPERATIONS.

HYDROGEOLOGICAL ASSESSMENT - EXP SERVICE INC. - FEBRUARY 2023

1. IN ORDER TO MAINTAIN THE WATER LEVELS IN THE NATURAL FEATURES ON SITE, THE FINAL POND WATER LEVEL SHOULD REMAIN HIGHER THAN THE LEVELS OBSERVED IN THE DRAIN AND PSW TO PREVENT SURFACE WATER RUNOFF FROM THE FEATURES TOWARDS THE PROPOSED PIT. TO ALLOW FOR SEASONAL VARIABILITY AND HIGHER WATER LEVELS DURING THE WET SEASON, THE POND SHALL BE ABLE TO CONTAIN FINAL WATER LEVELS OF 274.25 M AMSL.

2. MEASURES TO MITIGATE TEMPERATURE IMPACTS TO THE GROUNDWATER AND NATURAL FEATURES ON SITE SHALL INCLUDE:
    - MAINTAINING A SUFFICIENT BUFFER BETWEEN THE FEATURES AND THE PROPOSED POND;
    - APPLYING PLANTING STRATEGIES TO SHADE THE PROPOSED POND AND/OR DRAIN; AND
    - COMPLETING AN ON-GOING MONITORING PROGRAM THROUGHOUT EXTRACTION ACTIVITIES.

3. RESIDENTS WITHIN 150 M OF THE SITE SHALL BE PROVIDED WITH A 24-HOUR EMERGENCY CONTACT INFORMATION TO FACILITATE REPORTING OF PERCEIVED WATER SUPPLY IMPACTS.

4. DURING THE SITE GRADING WORK, SUITABLE SEDIMENTATION CONTROLS WILL BE REQUIRED TO HELP CONTROL AND REDUCE THE TURBIDITY OF RUNOFF WATER.

5. A BMP AND SPILL CONTINGENCY PLAN (INCLUDING A SPILL ACTION RESPONSE PLAN) SHALL BE IN PLACE FOR FUEL HANDLING, STORAGE AND ONSITE EQUIPMENT MAINTENANCE ACTIVITIES TO MINIMIZE THE RISK OF CONTAMINANT RELEASES AS A RESULT OF THE PROPOSED CONSTRUCTION ACTIVITIES.

6. THE EXISTING MONITORING WELLS AND SURFACE WATER STATIONS LOCATED AROUND THE PERIMETER OF THE PROPOSED PIT SHALL BE MAINTAINED AND PROTECTED DURING OPERATIONS.

7. IN ORDER TO ASSESS POTENTIAL IMPACTS TO GROUNDWATER AND SURFACE WATER ON SITE, A PROPOSED MONITORING PROGRAM ON AN ADJUSTED FREQUENCY WILL BE IMPLEMENTED IN THE EXISTING MONITORING WELL AND SURFACE WATER STATIONS INCLUDING MONITORING WATER LEVELS, TURBIDITY, TSS AND WATER TEMPERATURE. DURING THE FIRST YEAR OF OPERATIONS, MONITORING WILL BE COMPLETED ON A MONTHLY BASIS. IN THE SECOND YEAR OF OPERATIONS, MONITORING WILL BE COMPLETED ON A QUARTERLY BASIS UNTIL OPERATIONS ARE CONCLUDED.

LEGEND

- BOUNDARY OF PROPOSED LICENCE
- BOUNDARY OF EXISTING LICENCED AREA
- 120m INFORMATION BOUNDARY
- REGULATORY SETBACK AND LIMIT OF EXTRACTION
- LOT LINE
- EXISTING VEGETATION
- EXISTING GRADE
- GROUNDWATER TABLE PROPOSED LEVEL IN POND
- PROPOSED GRADE
- PROPOSED REFORESTATION

SECTION NOTES

GENERAL INFORMATION

1. SECTION LINES ARE INDICATED ON DRAWINGS 1, 2 AND 5.

TECHNICAL RECOMMENDATIONS

THE FOLLOWING ARE THE TECHNICAL RECOMMENDATIONS FROM ALL OF THE EXPERTS' REPORTS AS OF MARCH 2022. ADDITIONAL RECOMMENDATIONS MAY BE INCLUDED AS A RESULT OF THE LICENCE REVIEW PROCESS.

ARCHAEOLOGICAL ASSESSMENT

SHOULD PREVIOUSLY UNDOCUMENTED ARCHAEOLOGICAL RESOURCES BE DISCOVERED, THEY MAY BE A NEW ARCHAEOLOGICAL SITE AND THEREFORE SUBJECT TO SECTION 48(1) OF THE ONTARIO HERITAGE ACT. THE PROPONENT OR PERSON DISCOVERING THE ARCHAEOLOGICAL RESOURCES MUST CEASE ALTERATION OF THE SITE IMMEDIATELY AND ENGAGE A LICENSED CONSULTANT ARCHAEOLOGIST TO CARRY OUT ARCHAEOLOGICAL FIELDWORK, IN COMPLIANCE WITH SECTION 48(1) OF THE ONTARIO HERITAGE ACT.

THE CEMETERIES ACT, R.S.O. 1990 C. C.4 AND THE FUNERAL, BURIAL AND CREMATION SERVICES ACT, 2002, S.O. 2002, C.33 (WHEN PROCLAIMED IN FORCE) REQUIRE THAT ANY PERSON DISCOVERING HUMAN REMAINS MUST NOTIFY THE POLICE OR CORONER AND THE REGISTRAR OF CEMETERIES AT THE MINISTRY OF CONSUMER SERVICES.

NO.	DATE	REVISIONS	OWNER	HM	MNR

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	HM	MNR

Site Plan Amendments

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Project Name

BRANTAM EXCAVATING

ELGIN ROAD PIT

PART LOT 13 & 14, CONCESSION 1 NRT
MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF NORTH DORCHESTER, COUNTY OF MIDDLESEX

Scale 1:4000
0 50 100 150m

North

Stamp: DRAFT

Drawing Status: PRELIMINARY FOR DISCUSSION

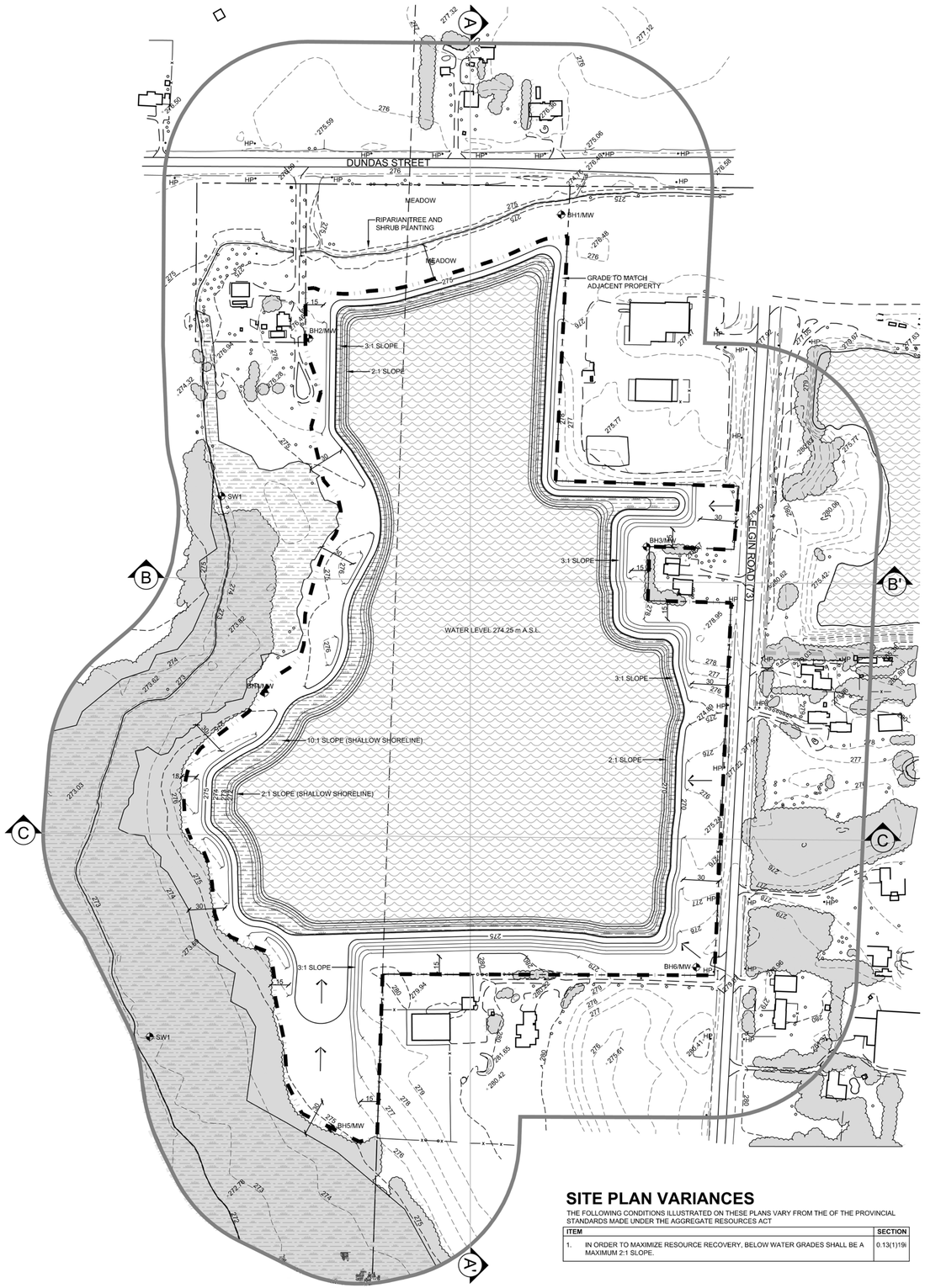
Drawn SB | Checked RM | Issue Date FEB 2023

Drawing Title: SECTIONS AND TECHNICAL RECOMMENDATIONS

Project Number: 22-22

Drawing Number: 4 OF 5

FILE NAME: 22-22/COMP/2222-4.DWG
PLOT DATE: FEBRUARY 15, 2023



SITE PLAN VARIANCES

THE FOLLOWING CONDITIONS ILLUSTRATED ON THESE PLANS VARY FROM THE OF THE PROVINCIAL STANDARDS MADE UNDER THE AGGREGATE RESOURCES ACT

ITEM		SECTION
1.	IN ORDER TO MAXIMIZE RESOURCE RECOVERY, BELOW WATER GRADES SHALL BE A MAXIMUM 2:1 SLOPE.	0.13(1)19i

NOTES CONTINUED

SIDESLOPE/ MEADOW REHABILITATION INFORMATION

GRADING INFORMATION

5. REHABILITATED SLOPES WITHIN THE LICENCED AREA WILL BE CONSTRUCTED AS SHOWN ON THE CROSS SECTIONS. REHABILITATION OF ABOVE WATER SLOPES SHALL BE BY BACKFILLING (MINIMUM 3:1) AND/OR CUT AND FILL METHOD USING AVAILABLE ON-SITE OVERBURDEN AND TOPSOIL FROM WITHIN THE LICENSED AREA AND/OR CLEAN INERT IMPORTED FILL.

IMPORTATION OF FILL INFORMATION

EXCESS SOIL, AS DEFINED IN ONTARIO REGULATION 406/19 UNDER THE ENVIRONMENTAL PROTECTION ACT, MAY BE IMPORTED TO THIS SITE TO FACILITATE THE FOLLOWING REHABILITATION:

i. CREATION OF 3:1 SLOPES
ii. TOP DRESSING TO ESTABLISH VEGETATION

THE QUALITY OF EXCESS SOIL IMPORTED TO THE SITE FOR FINAL PLACEMENT MUST NOT EXCEED THE APPLICABLE EXCESS SOIL QUALITY STANDARDS IN ACCORDANCE WITH O. REG 406/19 AS AMENDED FROM TIME TO TIME AND MUST BE CONSISTENT WITH THE SITE CONDITIONS AND THE END USE IDENTIFIED IN THE APPROVED REHABILITATION PLAN.

EXCESS SOIL IMPORTED TO FACILITATE REHABILITATION AS DESCRIBED SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE "RULES FOR SOIL MANAGEMENT AND EXCESS SOIL QUALITY STANDARDS" PUBLISHED BY THE MINISTRY OF THE ENVIRONMENT, CONSERVATION AND PARKS UNDER O.REG. 406/19, AS AMENDED FROM TIME TO TIME.

THE MAXIMUM TOTAL AMOUNT OF EXCESS SOIL THAT MAY BE IMPORTED TO THIS SITE FOR REHABILITATION PURPOSES IS 40,000 M3.

SAMPLING AND TESTING OF ALL IMPORTED MATERIAL SHALL BE PERFORMED AT SOURCE PRIOR TO THE IMPORTATION OF MATERIAL ONTO THE LICENSED SITE BY A QP UNDER EPA. A QP SHALL ALSO DESIGN A FILL MONITORING PROGRAM.

THE LICENSEE SHALL KEEP DETAILED RECORDS OF THE AMOUNT OF MATERIAL BROUGHT ON SITE FOR REHABILITATION AND THE TESTING RESULTS OF ALL SAMPLES. ALL RECORDS AND TESTING RESULTS SHALL BE AVAILABLE UPON REQUEST BY MNRF OR MECP.

AVAILABLE OVERBURDEN REPLACED WILL BE APPROXIMATELY 100mm THICK.

REFER TO DRAWING 3 AND 4 OF 5, FOR MORE INFORMATION ON BACKFILLING AND CREATION OF REHABILITATED SIDESLOPES.

TOPSOILING INFORMATION

6. ALL AVAILABLE TOPSOIL ON THE SITE WILL REMAIN TO BE USED FOR REHABILITATION OF THIS SITE.

VEGETATION STABILIZATION INFORMATION

7. BERMS SHALL BE SEEDED WITH A MIXTURE OF GRASSES AND LEGUMES THAT MAY INCLUDE THE FOLLOWING AT A RATE OF APPROXIMATELY 125KG/HA:

BUCKWHEAT	RED CLOVER	WHITE CLOVER
TALL FESCUE	ANNUAL RYE	

MEADOW AND SIDE SLOPES SHALL BE SEEDED WITH AVAILABLE SEED SOURCES THAT HAVE BEEN USED IN THE LOCAL AREA EXCLUDING INVASIVE AND NON-NATIVE SPECIES.

OPEN WATER POND REHABILITATION INFORMATION

8. THE AVERAGE WATER LEVEL IN THE POST-EXTRACTION POND IS ESTIMATED TO BE 274.25 m ASL.
9. THE SHAPE AND GRADING OF THE PROPOSED POND IS APPROXIMATE, BASED ON THE BEST AVAILABLE INFORMATION AT THE TIME OF LICENSING. ACTUAL EXTRACTION WILL FOLLOW THE BELOW WATER DEPOSIT AND REHABILITATION SHALL FOLLOW THE CONCEPT ILLUSTRATED.

WETLAND AND TURTLE POND REHABILITATION INFORMATION

10. AREAS SHALL BE REHABILITATED TO WETLAND HABITAT AS FOLLOWS:
- UNDERWATER SLOPES WILL BE FORMED WITH ON-SITE FILL
- UNDERWATER SLOPES SHALL BE A MAXIMUM OF 2:1

11. RESTORATION OF THE NEARSHORE, SHALLOW WETLAND ZONE AS SHOWN ON THE TYPICAL SHALLOW SHORELINE SECTION, SHEET 5 OF 5, WILL GENERALLY BE ACCOMPLISHED AS FOLLOWS:

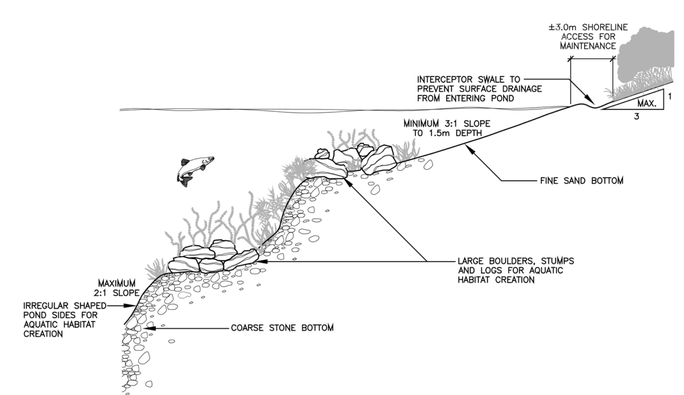
- EXTRACTION AND ROUGH GRADING WILL CREATE A NEARSHORE SHORELINE AREA AT A SLOPE OF 10:1
  FINAL SLOPING OF THE SHORELINE TO CREATE PHYSICAL DIVERSITY BY SCALLOPING THE
- SHORELINE AND ADDING STRUCTURES.
  WOODY DEBRIS- BRANCHES, TREE TRUNKS, STUMPS, ETC. CLEARED IN THE EXTRACTION PROCESS WILL BE SALVAGED WHERE POSSIBLE, FOR USE IN SHORELINE RESTORATION/
- UNDERWATER HABITAT ENHANCEMENT.
  STUMPS, LOGS, BRUSH BUNDLES, ETC. SHALL BE INSTALLED ±30m O.C. ALONG THE
- SHORELINE IN THE SHALLOW ZONE TO CREATE PHYSICAL DIVERSITY.
  OVERSIZE ROCKS NOT UTILIZED IN THE AGGREGATE OPERATIONS WILL ALSO BE PLACED IN
- THE SHALLOW ZONE TO CREATE PHYSICAL DIVERSITY.
  THE INITIAL SHORELINE RESTORATION AREA WILL BE SPORADICALLY PLANTED WITH TREES AND SHRUBS.SPECIES MAY INCLUDE THE FOLLOWING NATIVE PLANTS:

RED MAPLE	PUSSY WILLOW	SILVER MAPLE	RED OSIER
DOGWOOD	STAGHORN SUMAC	SPECKLED ALDER	LARCH
WHITE CEDAR	CHOKE CHERRY	SMOOTH SERVICEBERRY	
COMMON NINEBARK	GRAY DOGWOOD	COMMON ELDERBERRY	

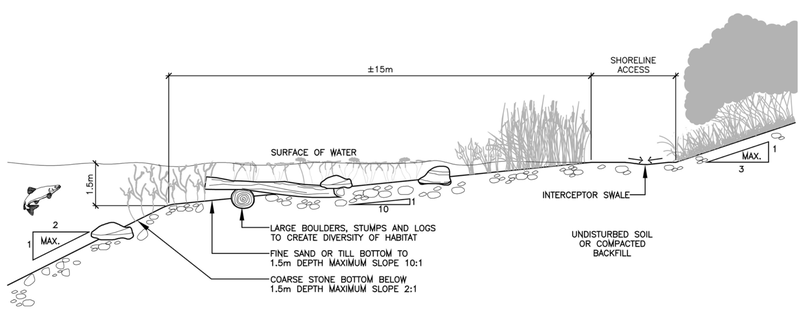
12. INITIAL SHORELINE WETLAND AREAS SHALL BE PLANTED WITH CLUMPS OF EMERGENT AND SUBMERGENT NATIVE WETLAND PLANTS TO INITIATE COLONIZATION OF THE SITE AS NUTRIENT LEVELS INCREASE TO SUPPORT THEM. NATIVE WETLAND PLANTS SUCH AS:

FLOATING PONDWEED	COONTAIL
BROAD LEAVED ARROWHEAD	PICKERELWEED WATER-LILY
COMMON WOOLY BULRUSH	SOFTSTEM BULRUSH
GREEN-FRUITED BURREED	RIVER BULRUSH
BROAD LEAVED ARROWHEAD	DARK GREEN BULRUSH
SWAMP MILKWEED	

WILL BE PLANTED IN CLUSTERS OF 5 AT APPROPRIATE DEPTHS TO BEGIN THE COLONIZATION.



TYPICAL SHORELINE - DEEP SECTION N.T.S.



TYPICAL SHORELINE - WETLAND EDGE N.T.S.

LEGEND

- BOUNDARY OF PROPOSED LICENCE
- BOUNDARY OF EXISTING LICENCED AREA
- 120m INFORMATION BOUNDARY
- PROPERTY LINES
- REGULATORY SETBACK AND LIMIT OF EXTRACTION
- LOT LINE
- EXISTING FENCE
- EXISTING BUILDING AND NUMBER
- EXISTING 5m ASL CONTOUR LINE
- EXISTING HYDRO POLE
- EXISTING 1m ASL CONTOUR LINE
- EXISTING SPOT ELEVATION m ASL
- DIRECTION OF SURFACE WATER DRAINAGE
- PROPOSED 5m CONTOUR LINE
- LOCATION OF SECTION
- PROPOSED 1m CONTOUR LINE
- PROPOSED SPOT ELEVATION
- EXISTING VEGETATION
- EXISTING WETLAND
- PROPOSED WETLAND
- EXISTING OPEN WATER
- PROPOSED OPEN WATER

REHABILITATION NOTES

GENERAL INFORMATION

1. REFER TO SHEET 4 OF 4 FOR SECTIONS, SHEET 2 AND 3 OF 4 FOR OPERATIONS AND PHASING DIAGRAMS AND NOTES AND SHEET 4 OF 4 FOR FINAL REHABILITATION AND NOTES.
2. PROPERTY SHALL BE REHABILITATED TO:

OPEN WATER POND	12.9 HA
WETLAND	1.4 HA
SIDESLOPE/ MEADOW	3.5 HA
FOR A TOTAL OF	17.8 HECTARES.

HYDROGEOLOGICAL INFORMATION

3. HYDROGEOLOGICAL INFORMATION INCLUDING GROUNDWATER ELEVATION WAS OBTAINED FROM REPORT BY EXP DATED JANUARY 2022.
4. THE MAXIMUM PREDICTED WATER TABLE ELEVATION WITHIN THE SITE IS ESTIMATED TO BE BETWEEN 273.42 AND 274.64m ABOVE SEA LEVEL (A.S.L.) BASED ON ABOVE REPORT.

NO.	DATE	REVISIONS	OWNER	HM	MHR

Pre Licence Review

NO.	DATE	REVISIONS	OWNER	HM	MHR

Site Plan Amendments

Harrington McAvan Ltd
41 Main Street, Unit 102
Unionville, Ontario L3R 2E5
Tel: 905-294-8282 Fax: 905-294-7623
www.harringtonmcavan.com

Project Name

BRANTAM EXCAVATING
ELGIN ROAD PIT

PART LOT 13 & 14, CONCESSION 1 NRT
MUNICIPALITY OF THAMES CENTRE (FORMERLY TOWNSHIP OF NORTH DORCHESTER, COUNTY OF MIDDLESEX

Scale 1:2000 (0 10 50 80m)	North	Stamp: DRAFT
Drawing Status: SUBMITTED FOR APPROVAL		
Drawn SB	Checked RM	Issue Date FEB 2023
Drawing Title: REHABILITATION PLAN		Project Number 22-22
		Drawing Number 5 OF 5

FILE NAME: 22-22/COMP/2222-2.DWG
PLOT DATE: FEBRUARY 15, 2023

Appendix C – Borehole and Test Pit Logs

6-405 Maple Grove Road | Cambridge, Ontario | Canada
t: +1.519.650.4918 | f: +1.519.650.4603 | exp.com

BOREHOLE LOG

BH1/MW
Sheet 1 of 1

CLIENT **Brantam Excavating Inc.** PROJECT NO. **KCH-21009432-A0**

PROJECT **Elgin Road Pit HydroG Study** DATUM **Geodetic**

LOCATION **5765 Dundas Street, Zorra Township, ON** DATES: Boring **June 16, 2021** Water Level **Mar 15, 2022**

DEPTH (m bgs)	ELEVATION (m)	STRATA DESCRIPTION	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm)	SAMPLES N VALUE (blows)	MOISTURE CONTENT (%)
0	275.3						
	275.1	**TOPSOIL** - 200 mm					
		SAND and GRAVEL - brown, trace silt, well graded, damp, dense to compact					
1			SS	SA 1	300	44	3
		- becoming wet near 1.4 m bgs					
2			SS	SA 2	300	29	10
			SS	SA 3	200	20	15
3			SS	SA 4	300	18	18
4							
	270.7						
		SILT TILL - grey, some sand, trace gravel, moist, very dense	SS	SA 5	200	50*	9
5	270.3						
		End of borehole at 5.0 m bgs.					
6							
7							
8							
9							

SHEAR STRENGTH
♣ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
100 200 kPa

Atterberg Limits and Moisture
W_P W W_L
● SPT N Value × Dynamic Cone
10 20 30 40

NOTES

1) Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report LON-21009432-A0.
2) Borehole open and water observed near 1.7 m bgs upon completion of drilling.
3) No significant methane gas detected upon completion of drilling.
4) bgs denotes below ground surface.
5) * denotes 50 blows per less than 150 mm split spoon sampler penetration.
6) Water Level Readings:
March 15, 2022 - 1.26 m bgs, Elevation: 274.05 m

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▥ Rock Core (eg. BQ, NQ, etc.) ▥ VN Vane Sample

OTHER TESTS

G Specific Gravity	C Consolidation
H Hydrometer	CD Consolidated Drained Triaxial
S Sieve Analysis	CU Consolidated Undrained Triaxial
γ Unit Weight	UU Unconsolidated Undrained Triaxial
P Field Permeability	UC Unconfined Compression
K Lab Permeability	DS Direct Shear

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

BOREHOLE LOG

BH2/MW
Sheet 1 of 1

CLIENT **Brantam Excavating Inc.** PROJECT NO. **KCH-21009432-A0**

PROJECT **Elgin Road Pit HydroG Study** DATUM **Geodetic**

LOCATION **5765 Dundas Street, Zorra Township, ON** DATES: Boring **June 15, 2021** Water Level **Mar 15, 2022**

DEPTH (m bgs)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm)	SAMPLES N VALUE (blows)	MOISTURE CONTENT (%)
0	276.5								
0	276.3	**TOPSOIL** 760 mm							
0		**SAND AND GRAVEL** Brown, well graded trace silt, very dense to dense, damp							
1		-becoming compact and wet							
2					SS	SA1	0	50*	6
2					SS	SA2	450	42	3
3					SS	SA3	300	16	4
3					SS	SA4	300	12	11
4									
5	271.5				SS	SA5	300	14	11
5		**SILTY SAND** grey, trace gravel, dense, very moist							
6									
6	270.0								
7		**End of Borehole at 6.55 m**			SS	SA6	300	39	11
8									
9									

SHEAR STRENGTH
♣ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
100 200 kPa

Atterberg Limits and Moisture
W_P W W_L
● SPT N Value × Dynamic Cone
10 20 30 40

NOTES

1) Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report LON-21009432-A0.
2) Borehole open and water observed near 3.3 m bgs upon completion of drilling.
3) No significant methane gas detected upon completion of drilling.
4) bgs denotes below ground surface.
5) Water Level Readings:
March 15, 2022 - 2.6 m bgs, Elevation: 273.93 m

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▥ Rock Core (eg. BQ, NQ, etc.) ▥ VN Vane Sample

OTHER TESTS

G Specific Gravity	C Consolidation
H Hydrometer	CD Consolidated Drained Triaxial
S Sieve Analysis	CU Consolidated Undrained Triaxial
γ Unit Weight	UU Unconsolidated Undrained Triaxial
P Field Permeability	UC Unconfined Compression
K Lab Permeability	DS Direct Shear

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

BOREHOLE LOG

BH3/MW
Sheet 1 of 2

CLIENT **Brantam Excavating Inc.** PROJECT NO. **KCH-21009432-A0**

PROJECT **Elgin Road Pit HydroG Study** DATUM **Geodetic**

LOCATION **5765 Dundas Street, Zorra Township, ON** DATES: Boring **June 16, 2021** Water Level **Mar 15, 2022**

DEPTH (m bgs)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm)	SAMPLES N VALUE (blows)	MOISTURE CONTENT (%)
0	279.1	**TOPSOIL** -760 mm							
	278.3								
1		**SAND** -Brown, fine mid grains with some gravel and trace silt, Compact, Moist			SS	S1	400	10	4
2					SS	S2	400	14	4
3					SS	S3	400	10	3
4					SS	S4	400	12	3
5		- becoming very moist to wet near 5 m bgs			SS	S5	450	16	18
6									
7		- becoming fine to coarse-grained and wet near 7 m bgs			SS	S6	300	9	20
8					SS	S7	350	13	22
9									

SHEAR STRENGTH
♣ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
100 200 kPa

Atterberg Limits and Moisture
W_P W W_L
● SPT N Value × Dynamic Cone
10 20 30 40

Continued Next Page

NOTES

1) Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report LON-21009432-A0.
2) Borehole open and water observed near 5.2 m bgs upon completion of drilling.
3) No significant methane gas detected upon completion of drilling.
4) bgs denotes below ground surface.
5) Water Level Readings:
March 15, 2022 - 4.69 m bgs, Elevation: 274.4 m

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▯ Rock Core (eg. BQ, NQ, etc.) ▯ VN Vane Sample

OTHER TESTS

G Specific Gravity	C Consolidation
H Hydrometer	CD Consolidated Drained Triaxial
S Sieve Analysis	CU Consolidated Undrained Triaxial
γ Unit Weight	UU Unconsolidated Undrained Triaxial
P Field Permeability	UC Unconfined Compression
K Lab Permeability	DS Direct Shear

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

BOREHOLE LOG

BH3/MW
Sheet 2 of 2

CLIENT **Brantam Excavating Inc.** PROJECT NO. **KCH-21009432-A0**
PROJECT **Elgin Road Pit HydroG Study** DATUM **Geodetic**
LOCATION **5765 Dundas Street, Zorra Township, ON** DATES: Boring **June 16, 2021** Water Level **Mar 15, 2022**

DEPTH (m bgs)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm)	SAMPLES N VALUE (blows)	MOISTURE CONTENT (%)	SHEAR STRENGTH / Atterberg Limits and Moisture
9	279.1									
	269.5									
		End of Borehole at 9.0 m			SS	S8	350	22	16	
10										
11										
12										
13										
14										
15										
16										
17										
18										

SHEAR STRENGTH
♣ S Field Vane Test (#=Sensitivity)
▲ Penetrometer ■ Torvane
40 80 kPa
Atterberg Limits and Moisture
W_P W W_L
● SPT N Value × Dynamic Cone
10 20 30 40

NOTES

1) Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report LON-21009432-A0.
2) Borehole open and water observed near 5.2 m bgs upon completion of drilling.
3) No significant methane gas detected upon completion of drilling.
4) bgs denotes below ground surface.
5) Water Level Readings:
March 15, 2022 - 4.69 m bgs, Elevation: 274.4 m

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▯ Rock Core (eg. BQ, NQ, etc.) ▯ VN Vane Sample

OTHER TESTS

G Specific Gravity	C Consolidation
H Hydrometer	CD Consolidated Drained Triaxial
S Sieve Analysis	CU Consolidated Undrained Triaxial
γ Unit Weight	UU Unconsolidated Undrained Triaxial
P Field Permeability	UC Unconfined Compression
K Lab Permeability	DS Direct Shear

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

BOREHOLE LOG

BH4/MW
Sheet 1 of 1

CLIENT **Brantam Excavating Inc.** PROJECT NO. **KCH-21009432-A0**

PROJECT **Elgin Road Pit HydroG Study** DATUM **Geodetic**

LOCATION **5765 Dundas Street, Zorra Township, ON** DATES: Boring **June 15, 2021** Water Level **Mar 15, 2022**

DEPTH (m bgs)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm)	SAMPLES N VALUE (blows)	MOISTURE CONTENT (%)
0	274.4								
	274.1	**TOPSOIL** - 250 mm							
1		**SAND AND GRAVEL** grey, trace silt, well graded. compact. wet.			SS	S1	300	13	10
2					SS	S2	350	23	11
3					SS	S3	450	13	16
	271.0				SS	S4	450	13	15
4		**CLAYEY SILT TILL** grey, trace sand, trace gravel, stiff, very moist.							
5	269.4				SS	S5	200	50*	8
		End of Borehole at 5.03 m **Borehole ended due to auger refusal.**							
6									
7									
8									
9									

SHEAR STRENGTH
S Field Vane Test (#=Sensitivity)
Penetrometer Torvane
100 200 kPa

Atterberg Limits and Moisture
W_P W W_L
SPT N Value × Dynamic Cone
10 20 30 40

NOTES

1) Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report LON-21009432-A0.
2) Borehole open and water observed near 1.5 m bgs upon completion of drilling.
3) No significant methane gas detected upon completion of drilling.
4) bgs denotes below ground surface.
5) Water Level Readings:
March 15, 2022 - 0.32 m bgs, Elevation: 274.07 m

SAMPLE LEGEND
AS Auger Sample SS Split Spoon ST Shelby Tube
Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS

G Specific Gravity	C Consolidation
H Hydrometer	CD Consolidated Drained Triaxial
S Sieve Analysis	CU Consolidated Undrained Triaxial
γ Unit Weight	UU Unconsolidated Undrained Triaxial
P Field Permeability	UC Unconfined Compression
K Lab Permeability	DS Direct Shear

WATER LEVELS
Apparent Measured Artesian (see Notes)

BOREHOLE LOG

BH5/MW
Sheet 1 of 1

CLIENT **Brantam Excavating Inc.** PROJECT NO. **KCH-21009432-A0**

PROJECT **Elgin Road Pit HydroG Study** DATUM **Geodetic**

LOCATION **5765 Dundas Street, Zorra Township, ON** DATES: Boring **June 15, 2021** Water Level **Mar 15, 2022**

DEPTH (m bgs)	ELEVATION (m)	STRATA DESCRIPTION	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm)	SAMPLES N VALUE (blows)	MOISTURE CONTENT (%)
0	274.6						
	274.4	**TOPSOIL** - 200 mm					
		SAND grey, some silt, trace gravel, fine to medium grained, loose, moist					
	273.7						
1	273.4	**CLAYEY SILT TILL**brown, trace sand, trace gravel, stiff, moist	SS	S1	450	9	
		SAND brown, fine grained, trace silt, trace gravel, compact, wet	SS	S2	450	16	
2			SS	S3	450	16	
	272.2						
	271.7	**SILT** brown, some clay, sand laminaitons, compact, very moist					
3		**SAND AND GRAVEL** brown, fine to coarse-grained sand, fine gravel, trace silt, compact, wet.	SS	S4	450	12	
4							
			SS	S5	450	26	
5	269.6						
		CLAYEY SILT TILL grey, trace sand, trace gravel, hard, damp.					
6			SS	S6	450	48	
	268.1						
		End of Borehole at 6.55 m					
7							
8							
9							

SHEAR STRENGTH
S Field Vane Test (#=Sensitivity)
Penetrometer Torvane
100 200 kPa

Atterberg Limits and Moisture
W_P W W_L
SPT N Value × Dynamic Cone
10 20 30 40

NOTES

1) Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report LON-21009432-A0.
2) Borehole open and water observed near 1.1 m bgs upon completion of drilling.
3) No significant methane gas detected upon completion of drilling.
4) bgs denotes below ground surface.
5) Water Level Readings:
March 15, 2022 - 0.42 m bgs, Elevation: 274.21 m

SAMPLE LEGEND
AS Auger Sample SS Split Spoon ST Shelby Tube
Rock Core (eg. BQ, NQ, etc.) VN Vane Sample

OTHER TESTS

G Specific Gravity	C Consolidation
H Hydrometer	CD Consolidated Drained Triaxial
S Sieve Analysis	CU Consolidated Undrained Triaxial
γ Unit Weight	UU Unconsolidated Undrained Triaxial
P Field Permeability	UC Unconfined Compression
K Lab Permeability	DS Direct Shear

WATER LEVELS
Apparent Measured Artesian (see Notes)

BOREHOLE LOG

BH6/MW
Sheet 1 of 1

CLIENT **Brantam Excavating Inc.** PROJECT NO. **KCH-21009432-A0**

PROJECT **Elgin Road Pit HydroG Study** DATUM **Geodetic**

LOCATION **5765 Dundas Street, Zorra Township, ON** DATES: Boring **June 15, 2021** Water Level **Mar 15, 2022**

DEPTH (m bgs)	ELEVATION (m)	STRATA DESCRIPTION	STRATA PLOT	WELL LOG	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm)	SAMPLES N VALUE (blows)	MOISTURE CONTENT (%)	SHEAR STRENGTH / Atterberg Limits and Moisture
0	279.0									S Field Vane Test (#=Sensitivity); Penetrometer; Torvane; 100 200 kPa; W_P W W_L; SPT N Value; Dynamic Cone; 10 20 30 40
0	279.0	**TOPSOIL** - 75 mm								
		SAND Brown, fine to medium-grained, trace silt, trace gravel, compact, damp.								
1					SS	S1	300	11		
2					SS	S2	300	16		
3					SS	S3	350	11		
4					SS	S4	300	6		
5	274.1	**SANDY SILT** Brown, trace gravel, compact, very moist, dilatent			SS	S5	350	14		
6	272.9	**SAND** Brown, fine grained, trace silt, trace gravel, compact, wet			SS	S6	450	21		
7										
8	271.0				SS	S7	450	13		
		End of Borehole at 8.08 m								
9										

NOTES

1) Borehole Log interpretation requires assistance by EXP before use by others. Borehole Log must be read in conjunction with EXP Report LON-21009432-A0.
2) Borehole open and water observed near 5.3 m bgs upon completion of drilling.
3) No significant methane gas detected upon completion of drilling.
4) bgs denotes below ground surface.
5) Water Level Readings:
March 15, 2022 - 4.39 m bgs, Elevation: 274.64 m

SAMPLE LEGEND
☒ AS Auger Sample ▨ SS Split Spoon ■ ST Shelby Tube
▯ Rock Core (eg. BQ, NQ, etc.) ▯ VN Vane Sample

OTHER TESTS

G Specific Gravity	C Consolidation
H Hydrometer	CD Consolidated Drained Triaxial
S Sieve Analysis	CU Consolidated Undrained Triaxial
γ Unit Weight	UU Unconsolidated Undrained Triaxial
P Field Permeability	UC Unconfined Compression
K Lab Permeability	DS Direct Shear

WATER LEVELS
▽ Apparent ▼ Measured ▲ Artesian (see Notes)

Accounts: 519.457.9080 Fax: 519.457.8232 Dispatch: 519.461.0615 Fax: 519.461.0616

Sales / Operations: Jamie Martelle 519.521.7692

demar aggregates inc.

Test Pits - Woods Site

Hwy #73 & #2
5765 Dundas St.

TP #1 55m South of ravine, 66m West of farm field perimetre
directly across from house on North side of Hwy #2

	Topsoil	18"	
	Clay	20"	
S	Sand	3.5'	Grey, fine, minimal stone
	Gravel	2.75'	G2 material, 15% above 3"
	Water		
S	Gravel	5'	G2 material, 25% stone above 3"
	Till		

TP#2 34m East of brush pile South of the residence of 5765 Dundas St
TP located in basin between hills

	Topsoil	12"	
	Clay	20"	
S	Sand	7.5'	Pure, no stone, fine
	Water		
S	Sand	7'	Pure, no stone, fine
	Till not reached		

TP#3 Across from residence East of Hwy #73 just South of CBM boundary
35m East of bush line

	Topsoil	20"	
	Clay	30"	
S	Sand	7'	Grey, minor striations, minimal stone
	Water		
S	Sand	7.5'	Grey, minimal tone, marginal increase in small stone content
	Till not reached		

Thorndale – PO Box 72, Thorndale, ON. N0M 2P0

Accounts: 519.457.9080 Fax: 519.457.8232 Dispatch: 519.461.0615 Fax: 519.461.0616

Sales / Operations: Jamie Martelle 519.521.7692

TP #4 20m East of Southern bush line
90m North of Southern boundary

	Topsoil	22"	
	Clay	12"	
S	Sand	3.5'	Coarse material, comparible to bedding sand
S	Sand	20'	White, grey, clean sand, copper colour @ bottom, minor crunching at max extension
	Water		
	Till not reached		

TP #5 40m West of boundary
100m South of red house on Hwy #73

	Topsoil	20"	
	Clay	20"	
S	Sand	2'	Hard to detmine quality because of excess water - farm tile
	Water		
	Till not reached		

TP #6 Directly West of TP #4 15m East of West bushline

	Topsoil	18"	
	Clay	18"	
S	Sand	7.5'	Coarse material, 10% 1/2" stone max size, material gets finer as depth increases
	Water		
	Sand	16'	Fine, clean sand with minimal stone, encountered some 12" stone @ bottom
	Till not reached, but may be close based on presence of 12" stone		

TP #7 100m South and 25m West of TP #1

	Topsoil	18"	
	Clay	22"	
S	Gravel	15'	G1, 15% above 4", turns finer and smaller as depth increases
	Water		
	Gravel	8'	G2, striations of copper and black material (sediment?)
	Till not reached		

Appendix D – MECP Water Well Record Summary

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MECP Water Well Record Summary
Elgin Road Pit, Thames Centre, Ontario
KCH-21009432-A0

WELL_ID	Easting	Northing	Date Completed	Depth (m)	Final Status	Primary Use	Secondary Use
4102814	494964	4764053	11/21/63	27.4	Water Supply	Livestock	
4102815	494654	4764923	12/31/64	30.5	Water Supply	Domestic	
4102816	495214	4765123	8/31/55	23.2	Test Hole		
4102817	496104	4764733	10/05/55	26.8	Test Hole		
4102818	495524	4765313	9/13/55	25.3	Test Hole		
4102819	495954	4764343	9/23/55	29.9	Test Hole		
4102820	495854	4764603	9/25/59	15.5	Water Supply	Domestic	
4102821	495774	4764443	7/22/67	28.7	Water Supply	Livestock	Domestic
4103030	495684	4764573	10/25/66	32	Water Supply	Domestic	
4104203	494819	4765243	8/26/65	5.5	Water Supply	Livestock	Domestic
4104489	495914	4764703	2/05/68	15.8	Water Supply	Domestic	
4104669	495854	4764723	4/11/69	24.4	Water Supply	Domestic	
4105437	494704	4764923	7/02/71	30.5	Water Supply	Domestic	
4105967	494703	4765080	6/30/72	3.7	Water Supply	Domestic	
4106010	495914	4764803	9/15/72	7	Water Supply	Domestic	
4106184	495514	4765583	7/19/72	26.8	Water Supply	Domestic	
4106342	496060	4764584	6/11/73	5.5	Water Supply	Domestic	
4106377	496044	4764602	7/30/73	9.8	Water Supply	Domestic	
4106878	495396	4765615	6/13/74	4.6	Water Supply	Domestic	
4106879	495071	4765180	6/13/74	5.2	Water Supply	Domestic	
4107653	495494	4765623	4/19/76	20.4	Water Supply	Domestic	
4108000	495554	4765203	5/09/77	23.8	Water Supply	Commerical	
4108948	494834	4764903	9/13/79	33.5	Water Supply	Domestic	
4109539	495954	4764423	10/07/81	26.5	Water Supply	Irrigation	Domestic
4109591	495694	4765683	6/25/81	7	Water Supply	Domestic	
4109698	495674	4764983	9/17/82	19.8	Water Supply	Domestic	
4111295	496014	4764223	7/01/88	23.2	Water Supply	Domestic	
4111396	495914	4764873	9/07/89	27.4	Water Supply	Domestic	
4111403	495844	4764383	3/21/88	27.7	Water Supply	Domestic	
4111740	494674	4765011	8/11/89	29	Water Supply	Domestic	
4112343	496069	4764064	11/22/90	22.9	Water Supply	Domestic	
4112949	495801	4764717	6/30/93	10.4	Water Supply	Domestic	Irrigation
4114059	495801	4764717	4/08/99	10.1	Water Supply	Domestic	
4114727	495799	4764714	6/13/01	27.4	Water Supply	Commerical	
4115573	495908	4764704	3/10/04	14.6	Water Supply	Domestic	Commerical
7103965	494963	4764146	3/12/08	17.7	Other Status		
7103966	494963	4764146	3/11/08	25	Water Supply	Domestic	
7128009	494963	4764146	1/17/08	17.7	Water Supply	Domestic	
7347490	495629	4764617	11/07/19	29	Water Supply	Domestic	
7347571	495918	4764844	11/06/19	28.7	Water Supply	Domestic	
7347572	495907	4764838	11/06/19	0	Abandoned-Other		
7353600	495898	4764709	12/16/19	15.8	Replacement Well	Domestic	
7355612	495649	4764650	3/03/20	0			

Appendix E – Water Levels and Hydrographs

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KCH-21009432-A0

Elgin Road Pit - Thames Centre, ON

Groundwater Elevation Monitoring

Well ID	BH1/MW	BH2/MW	BH3/MW	BH4/MW	BH5/MW	BH6/MW
Ground Surface Elevation (m amsl)	275.31	276.53	279.09	274.39	274.63	279.03
Top of Pipe Elevation (m amsl)	276.11	277.27	279.88	275.10	275.41	279.79
Groundwater Elevation (m amsl)						
16-Jun-21	273.80	273.67	274.00	273.66	273.76	274.14
30-Jul-21	273.87	273.70	273.96	273.63	273.72	274.09
28-Aug-21	273.82	273.65	273.97	-	-	274.02
29-Sep-21	274.02	273.91	274.31	273.82	273.85	274.27
14-Oct-21	274.03	273.90	274.30	273.93	273.98	274.37
09-Nov-21	274.04	273.94	274.33	274.07	274.11	274.53
10-Dec-21	274.07	273.95	274.36	274.04	274.14	274.55
19-Jan-22	273.90	273.79	274.23	273.96	274.06	274.50
24-Feb-22	274.28	274.24	274.46	274.10	274.23	-
15-Mar-22	274.05	273.93	274.40	274.07	274.21	274.64
27-Apr-22	273.97	273.85	274.32	274.02	274.11	274.56
30-May-22	273.90	273.78	274.24	273.93	274.05	274.50
03-Aug-22	273.81	273.66	273.99	273.67	273.74	274.14
15-Sep-22	273.77	273.63	273.93	273.54	273.60	274.00

Groundwater Level Monitoring

Well ID	BH1/MW	BH2/MW	BH3/MW	BH4/MW	BH5/MW	BH6/MW
Groundwater Level (m bgs)						
16-Jun-21	1.51	2.87	5.08	0.73	0.86	4.89
30-Jul-21	1.44	2.84	5.12	0.76	0.90	4.94
28-Aug-21	1.49	2.89	5.11	-	-	5.01
29-Sep-21	1.29	2.63	4.77	0.57	0.77	4.76
14-Oct-21	1.28	2.64	4.78	0.46	0.64	4.66
09-Nov-21	1.27	2.60	4.75	0.32	0.51	4.50
10-Dec-21	1.24	2.59	4.72	0.35	0.48	4.48
19-Jan-22	1.41	2.75	4.85	0.43	0.56	4.53
24-Feb-22	1.03	2.30	4.62	0.29	0.39	-
15-Mar-22	1.26	2.61	4.68	0.32	0.41	4.39
27-Apr-22	1.34	2.68	4.76	0.37	0.51	4.47
30-May-22	1.41	2.76	4.84	0.46	0.57	4.53
03-Aug-22	1.50	2.88	5.09	0.72	0.88	4.89
15-Sep-22	1.54	2.91	5.15	0.85	1.02	5.03

Notes:
- indicates not measured

KCH-21009432-A0

Elgin Road Pit - Thames Centre, ON

Water Elevation Monitoring

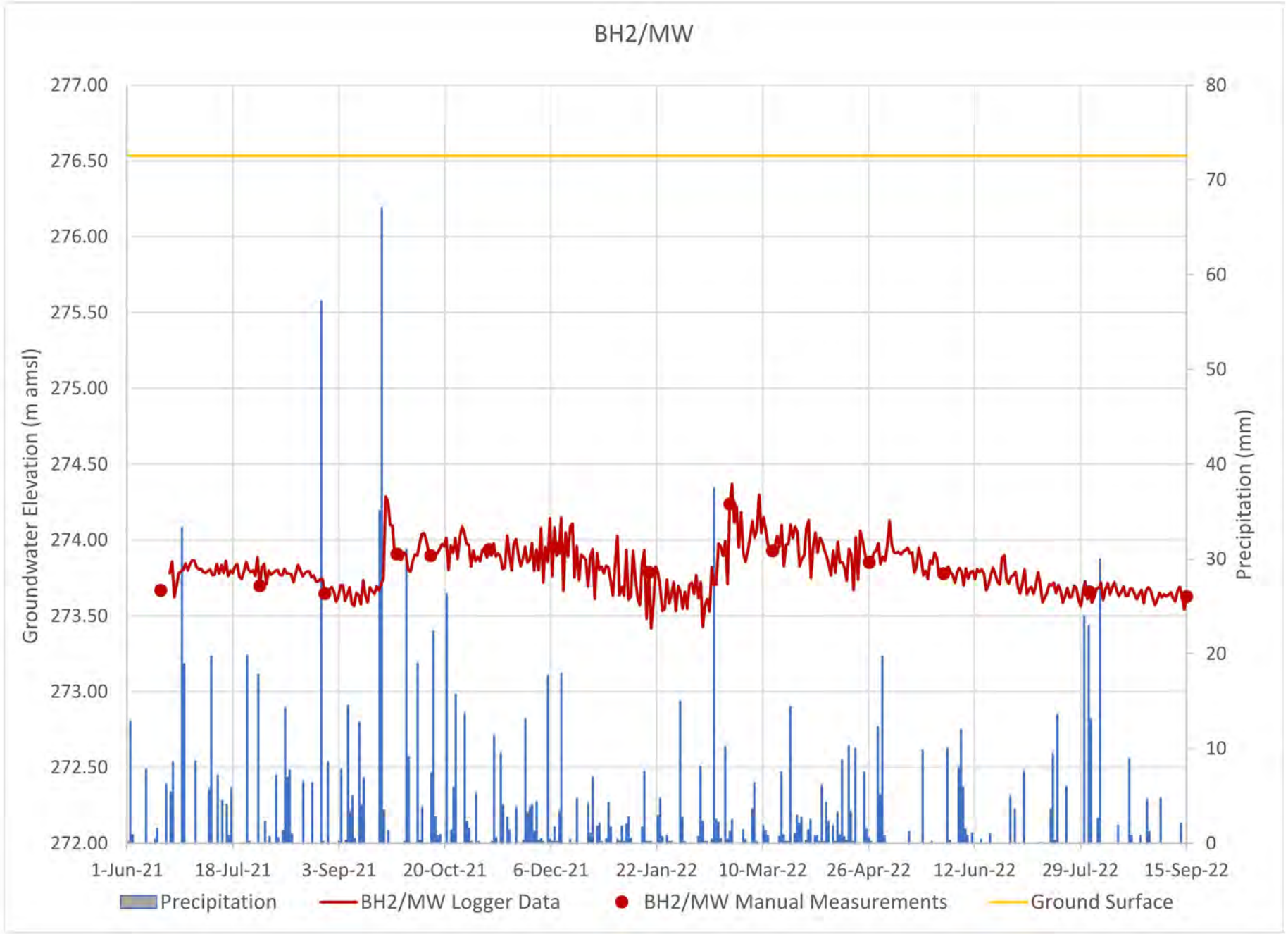
Well ID	P1 Inside	P1 Outside	SG1	P2 Inside	P2 Outside	SG2
Ground Surface Elevation (masl)	272.90	272.90	272.62	271.98	271.98	271.85
Top of Pipe Elevation (masl)	274.10	274.10	-	273.01	273.01	-
Groundwater Elevation						
16-Jun-21	272.46	-	272.77	271.60	271.65	272.02
30-Jul-21	272.77	-	272.80	271.70	271.71	272.05
28-Aug-21	-	-	-	-	-	-
29-Sep-21	273.91	272.91	272.96	271.82	271.81	271.93
14-Oct-21	273.65	272.95	272.92	271.78	271.83	272.13
9-Nov-21	273.45	272.97	272.96	271.75	271.85	272.15
10-Dec-21	273.50	272.98	272.97	271.77	271.87	272.15
19-Jan-22	273.45	DRY	272.85	271.79	271.78	272.10
24-Feb-22	Frozen	273.22	273.22	272.09	272.05	272.38
15-Mar-22	-	273.02	273.01	271.80	271.85	272.18
27-Apr-22	273.26	DRY	272.94	271.82	271.83	272.11
30-May-22	273.22	DRY	272.84	271.65	271.69	272.06
3-Aug-22	273.15	Dry	272.77	271.64	Dry	272.03
15-Sep-22	273.09	Dry	272.76	271.63	Dry	272.03

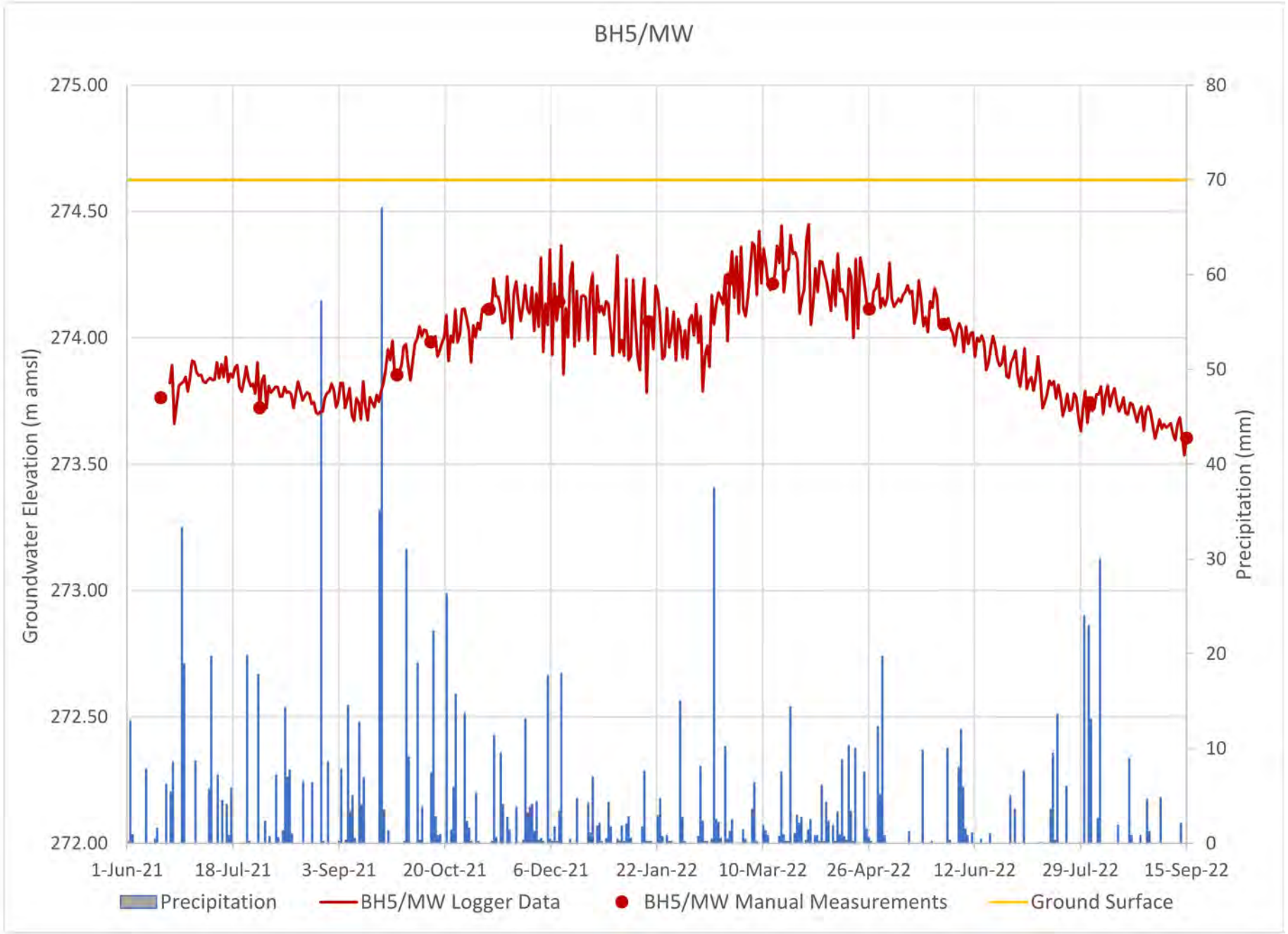
Water Level Monitoring

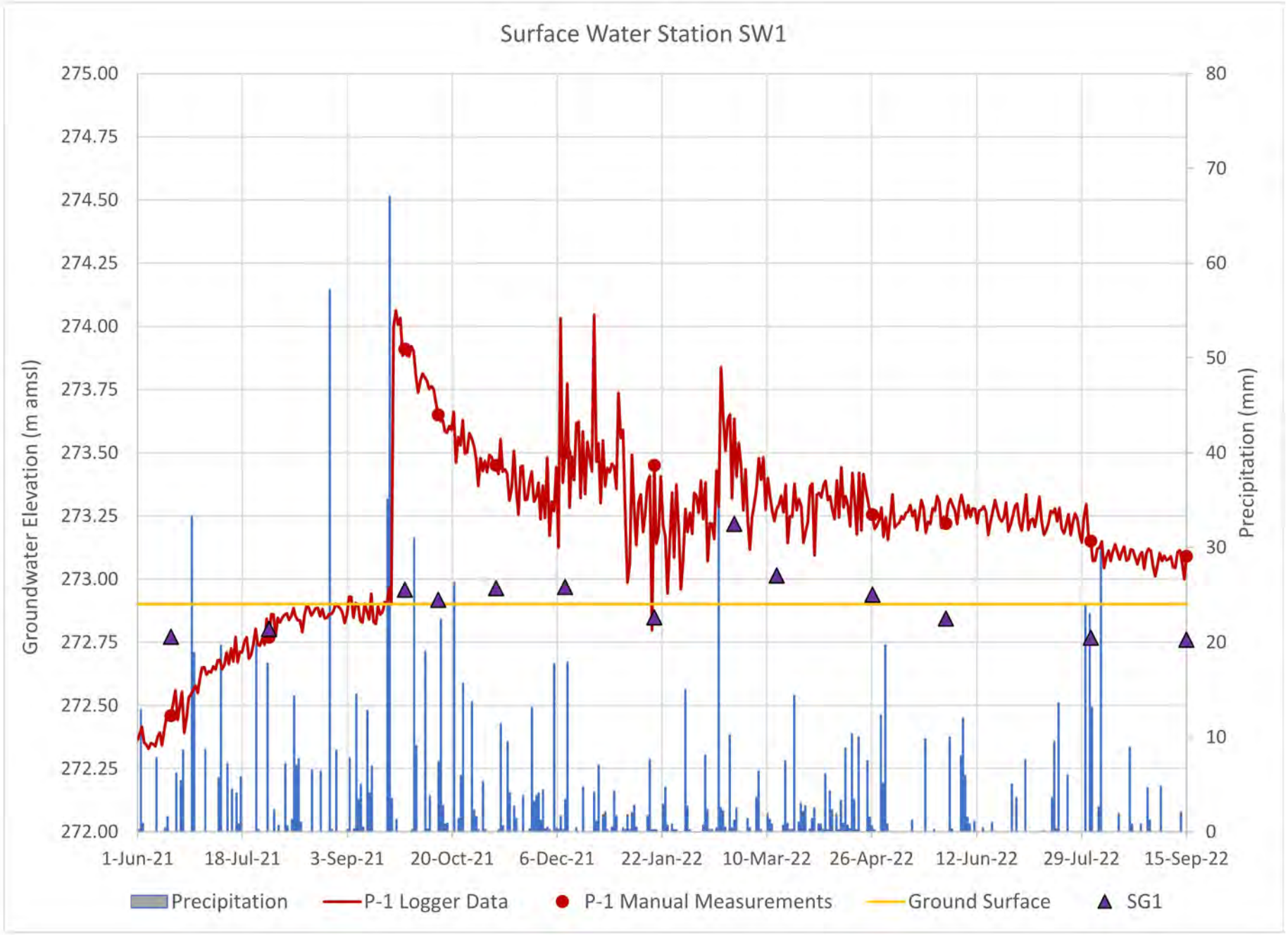
Well ID	P1 Inside	P2 Inside
Groundwater Level (m bgs)		
16-Jun-21	0.44	0.39
30-Jul-21	0.13	0.29
28-Aug-21	-	-
29-Sep-21	-1.01	0.17
14-Oct-21	-0.75	0.21
09-Nov-21	-0.55	0.24
10-Dec-21	-0.60	0.22
19-Jan-22	-0.55	0.20
24-Feb-22	-	-0.10
15-Mar-22	-	0.19
27-Apr-22	-0.35	0.16
30-May-22	-0.32	0.34
03-Aug-22	-0.25	0.35
15-Sep-22	-0.19	0.36

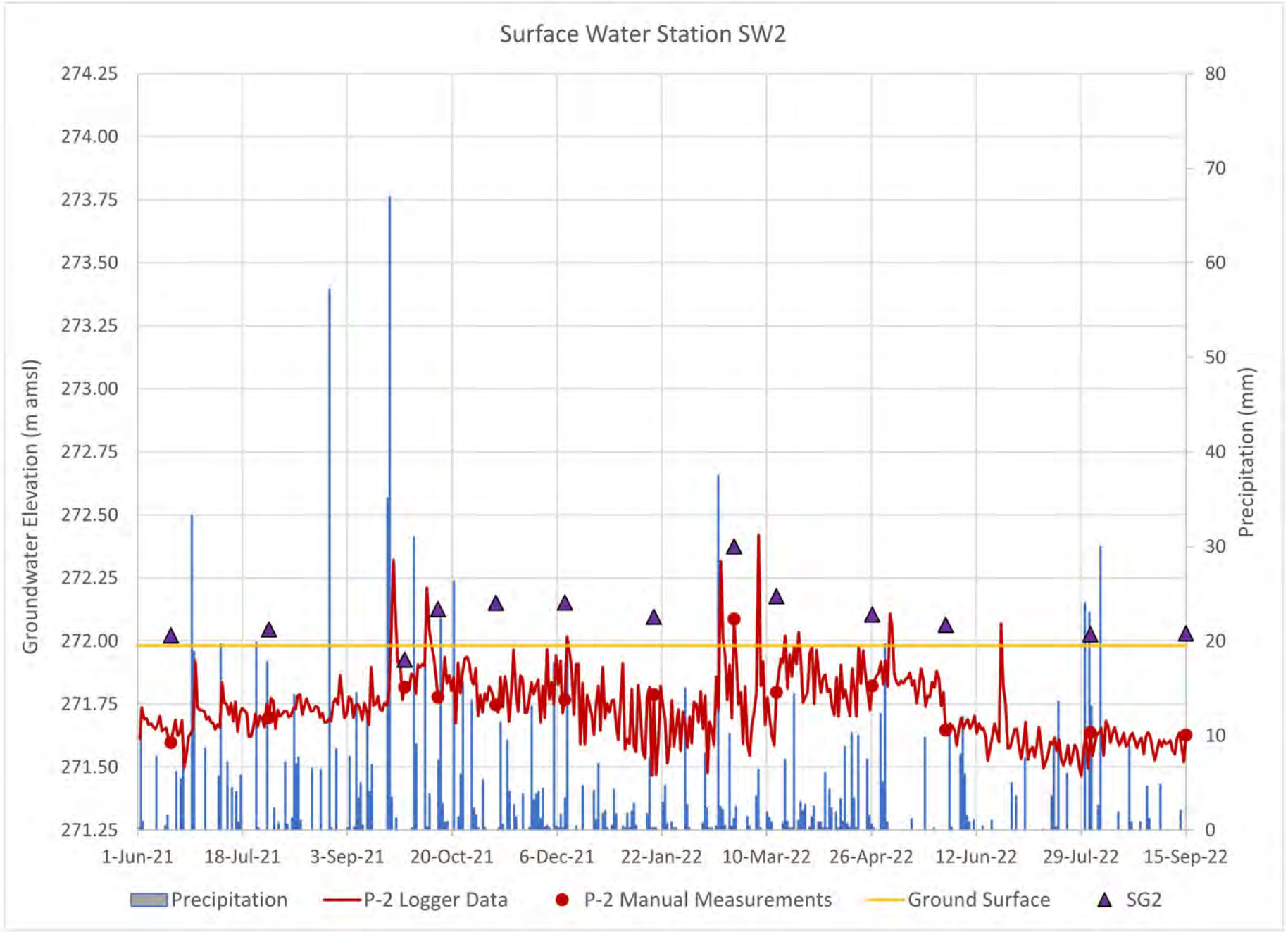
Notes:

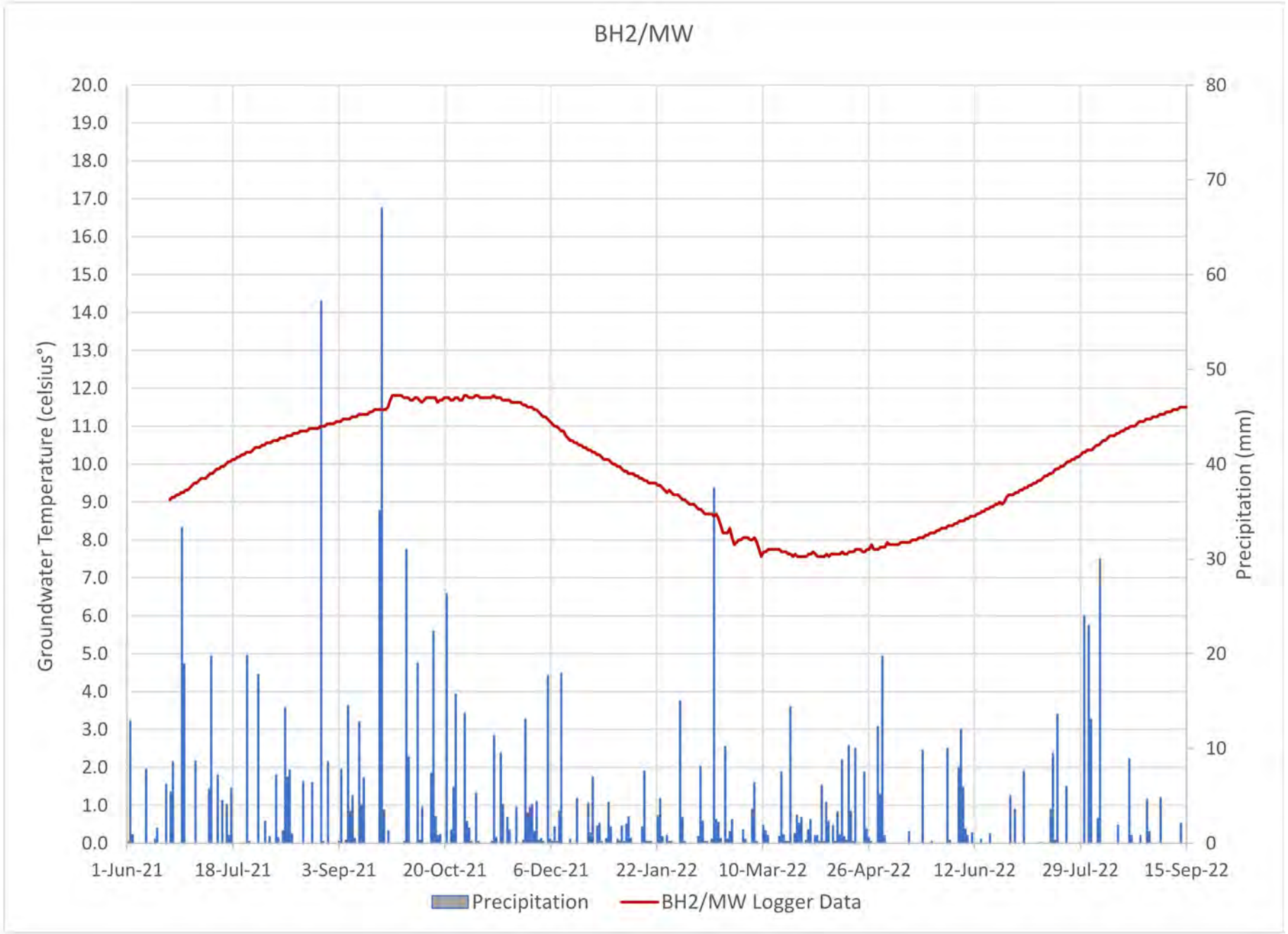
- indicates not measured

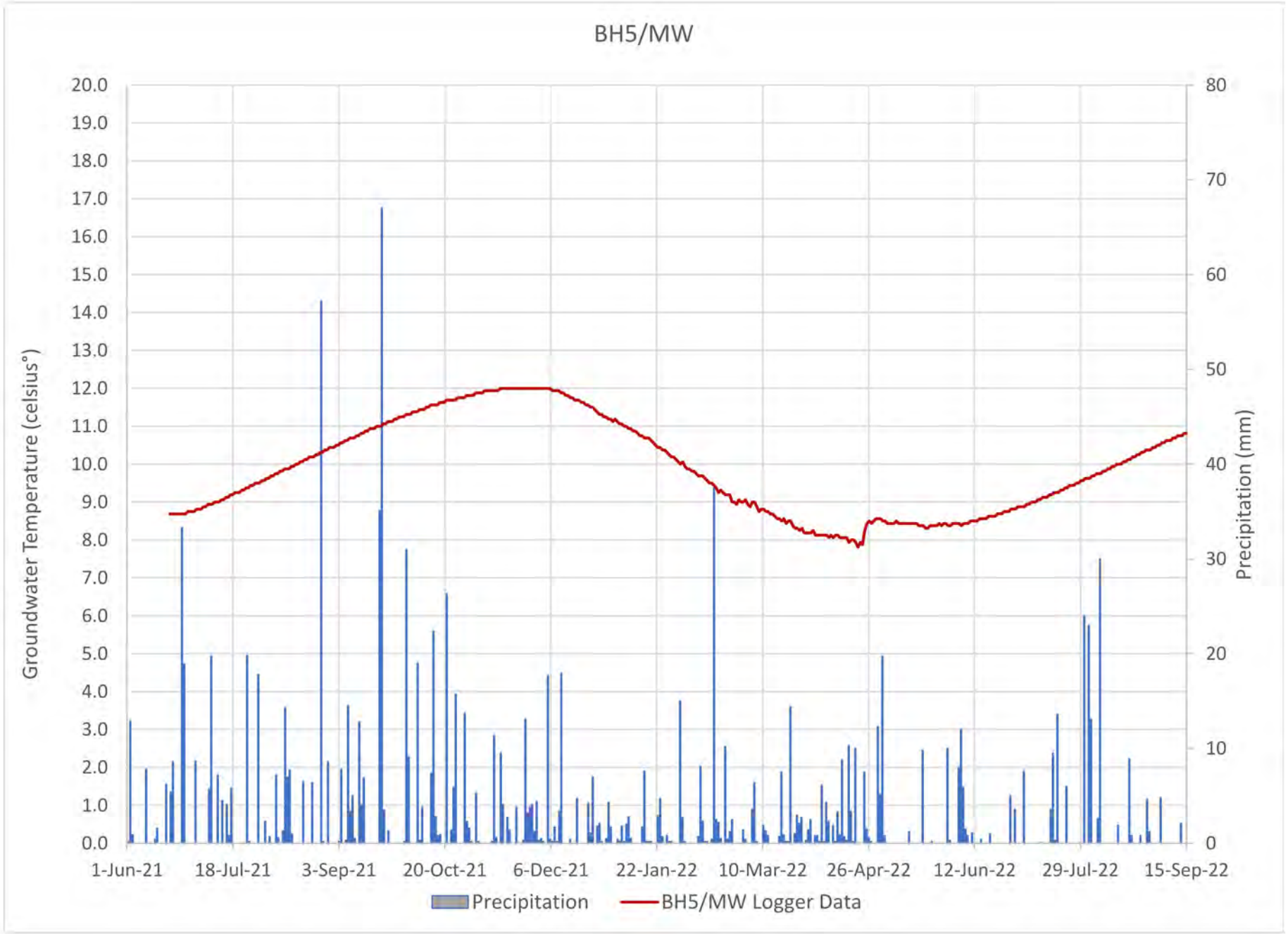

BH2/MW
277.00
276.50
276.00
275.50
275.00
274.50
274.00
273.50
273.00
272.50
272.00
Groundwater Elevation (m amsl)
80
70
60
50
40
30
20
10
0
Precipitation (mm)
1-Jun-21
18-Jul-21
3-Sep-21
20-Oct-21
6-Dec-21
22-Jan-22
10-Mar-22
26-Apr-22
12-Jun-22
29-Jul-22
15-Sep-22
Precipitation
BH2/MW Logger Data
BH2/MW Manual Measurements
Ground Surface

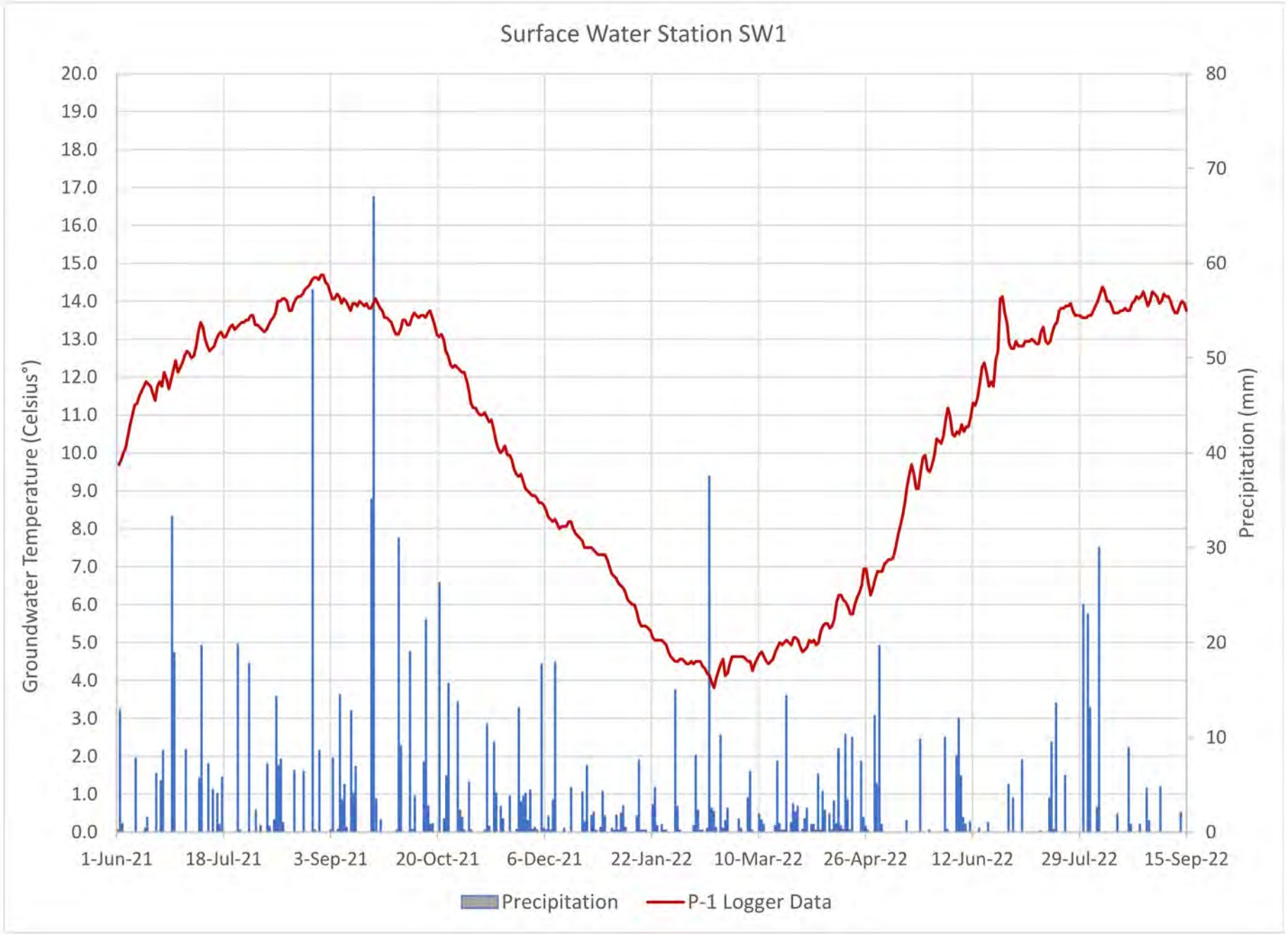

BH5/MW
275.00
274.50
274.00
273.50
273.00
272.50
272.00
Groundwater Elevation (m amsl)
80
70
60
50
40
30
20
10
0
Precipitation (mm)
1-Jun-21
18-Jul-21
3-Sep-21
20-Oct-21
6-Dec-21
22-Jan-22
10-Mar-22
26-Apr-22
12-Jun-22
29-Jul-22
15-Sep-22
Precipitation
BH5/MW Logger Data
BH5/MW Manual Measurements
Ground Surface

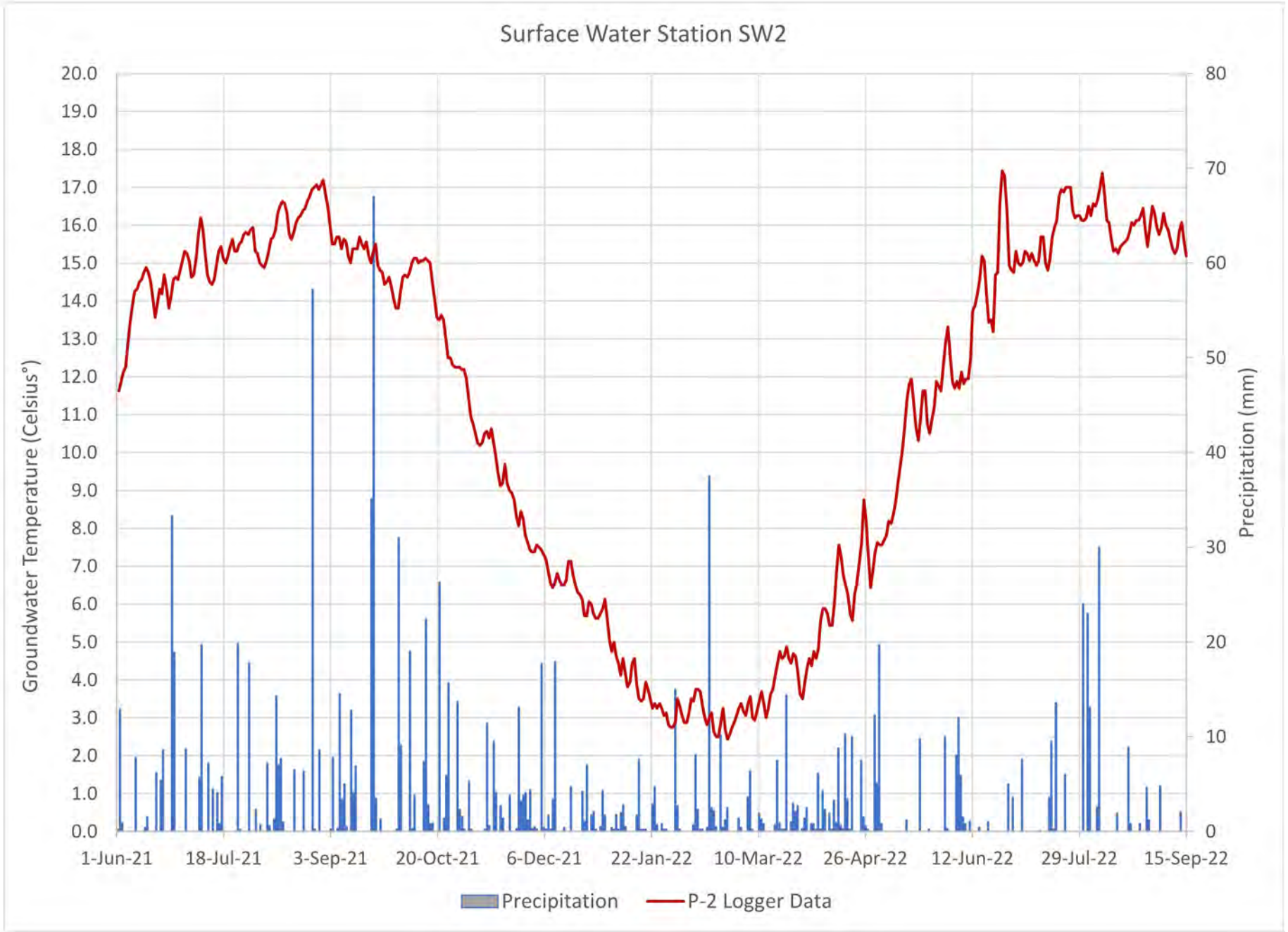

Surface Water Station SW1
Groundwater Elevation (m amsl)
Precipitation (mm)
275.00
274.75
274.50
274.25
274.00
273.75
273.50
273.25
273.00
272.75
272.50
272.25
272.00
80
70
60
50
40
30
20
10
0
1-Jun-21
18-Jul-21
3-Sep-21
20-Oct-21
6-Dec-21
22-Jan-22
10-Mar-22
26-Apr-22
12-Jun-22
29-Jul-22
15-Sep-22
Precipitation
P-1 Logger Data
P-1 Manual Measurements
Ground Surface
SG1


Surface Water Station SW2
Groundwater Elevation (m amsl)
Precipitation (mm)
274.25
274.00
273.75
273.50
273.25
273.00
272.75
272.50
272.25
272.00
271.75
271.50
271.25
80
70
60
50
40
30
20
10
0
1-Jun-21
18-Jul-21
3-Sep-21
20-Oct-21
6-Dec-21
22-Jan-22
10-Mar-22
26-Apr-22
12-Jun-22
29-Jul-22
15-Sep-22
Precipitation
P-2 Logger Data
P-2 Manual Measurements
Ground Surface
SG2


BH2/MW
Groundwater Temperature (celsius°)
Precipitation (mm)
20.0
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
80
70
60
50
40
30
20
10
0
1-Jun-21
18-Jul-21
3-Sep-21
20-Oct-21
6-Dec-21
22-Jan-22
10-Mar-22
26-Apr-22
12-Jun-22
29-Jul-22
15-Sep-22
Precipitation
BH2/MW Logger Data


BH5/MW
Groundwater Temperature (celsius°)
Precipitation (mm)
20.0
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
80
70
60
50
40
30
20
10
0
1-Jun-21
18-Jul-21
3-Sep-21
20-Oct-21
6-Dec-21
22-Jan-22
10-Mar-22
26-Apr-22
12-Jun-22
29-Jul-22
15-Sep-22
Precipitation
BH5/MW Logger Data


Surface Water Station SW1
Groundwater Temperature (Celsius°)
Precipitation (mm)
20.0
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
80
70
60
50
40
30
20
10
0
1-Jun-21
18-Jul-21
3-Sep-21
20-Oct-21
6-Dec-21
22-Jan-22
10-Mar-22
26-Apr-22
12-Jun-22
29-Jul-22
15-Sep-22
Precipitation
P-1 Logger Data


Surface Water Station SW2
Groundwater Temperature (Celsius°)
Precipitation (mm)
20.0
19.0
18.0
17.0
16.0
15.0
14.0
13.0
12.0
11.0
10.0
9.0
8.0
7.0
6.0
5.0
4.0
3.0
2.0
1.0
0.0
80
70
60
50
40
30
20
10
0
1-Jun-21
18-Jul-21
3-Sep-21
20-Oct-21
6-Dec-21
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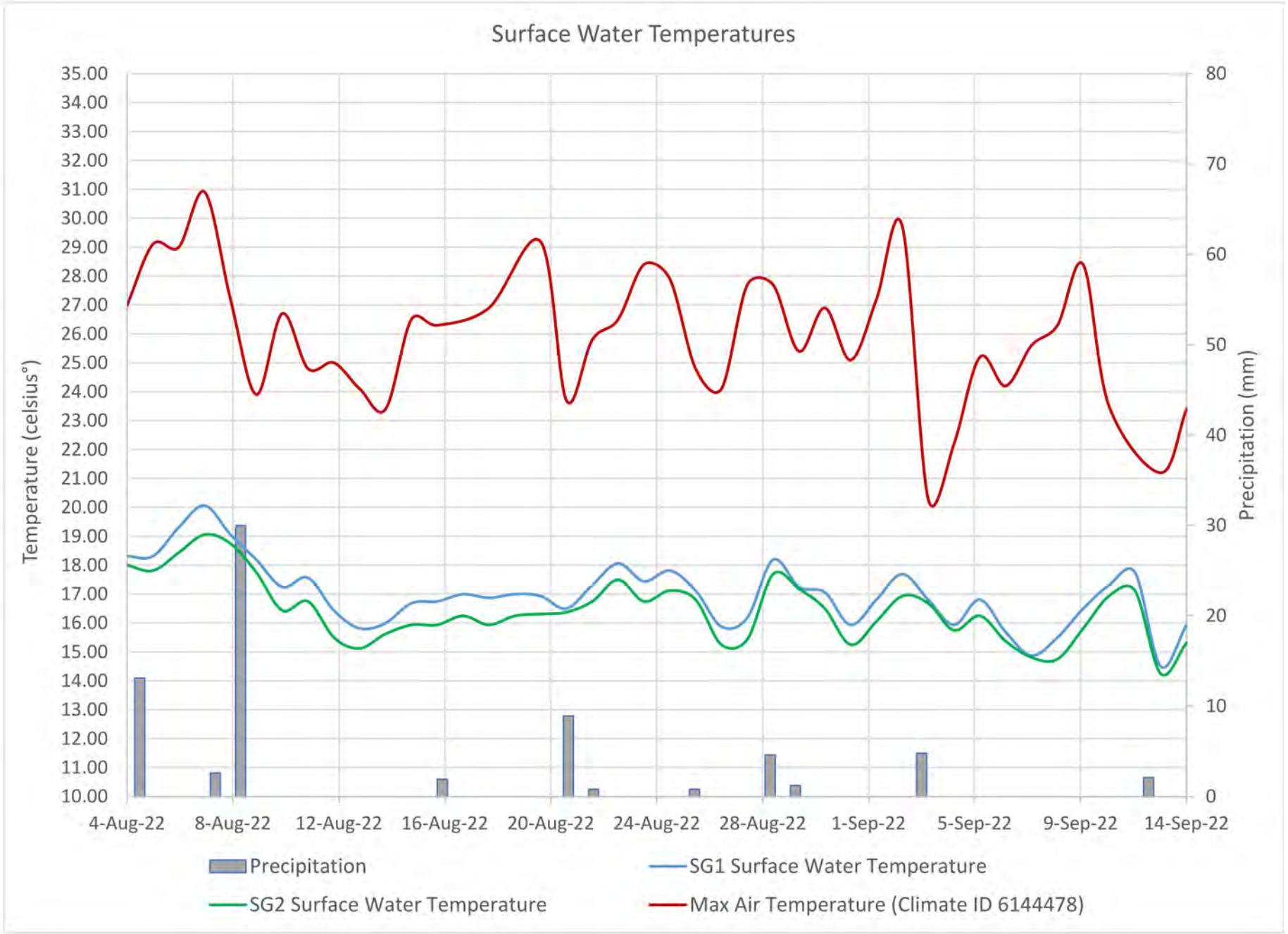
10-Mar-22
26-Apr-22
12-Jun-22
29-Jul-22
15-Sep-22
Precipitation
P-2 Logger Data


Surface Water Temperatures
Temperature (celsius°)
Precipitation (mm)
35.00
34.00
33.00
32.00
31.00
30.00
29.00
28.00
27.00
26.00
25.00
24.00
23.00
22.00
21.00
20.00
19.00
18.00
17.00
16.00
15.00
14.00
13.00
12.00
11.00
10.00
80
70
60
50
40
30
20
10
0
4-Aug-22
8-Aug-22
12-Aug-22
16-Aug-22
20-Aug-22
24-Aug-22
28-Aug-22
1-Sep-22
5-Sep-22
9-Sep-22
14-Sep-22
Precipitation
SG1 Surface Water Temperature
SG2 Surface Water Temperature
Max Air Temperature (Climate ID 6144478)

Appendix F – Single Well Response Test Data

6-405 Maple Grove Road | Cambridge, Ontario | Canada
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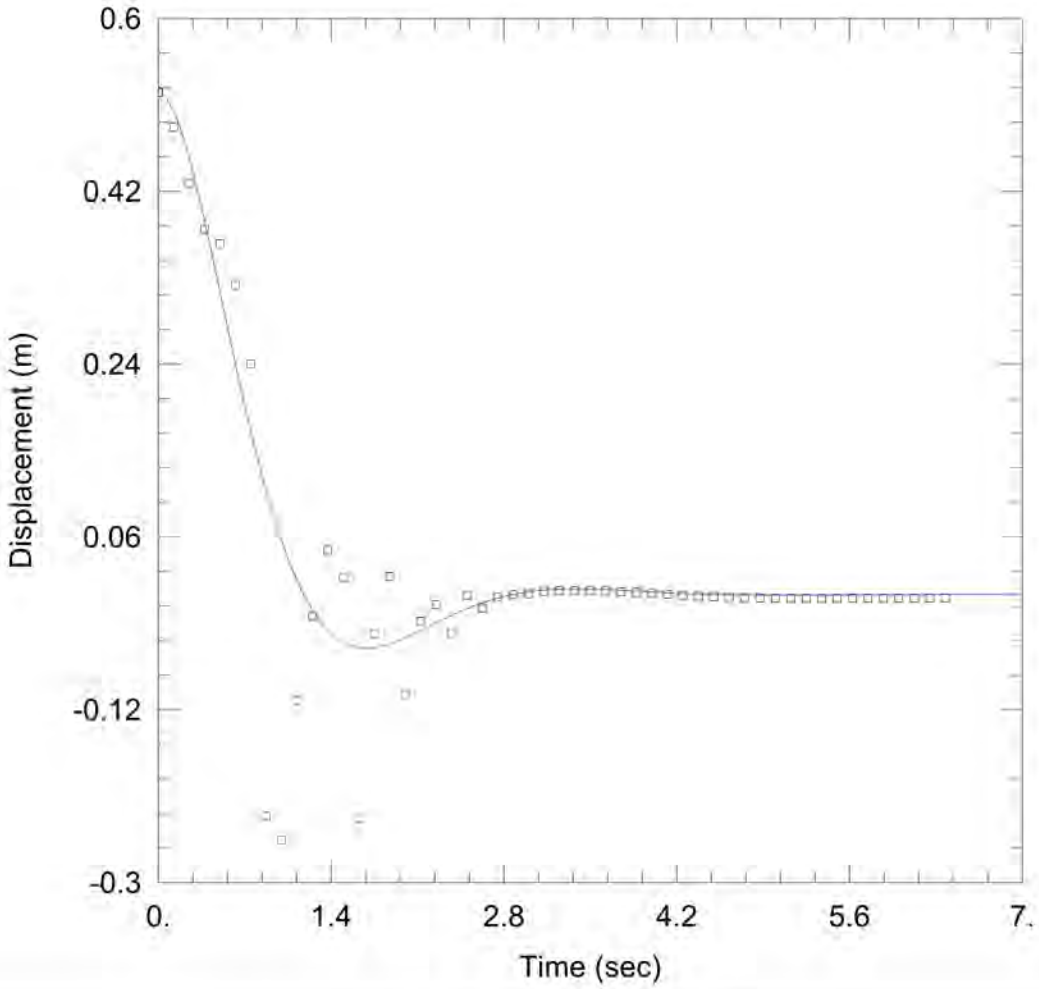


FALLING HEAD TEST 1

Data Set: \...\MW1 Falling 1.aqt
Date: 10/26/22 Time: 13:10:24

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Brantam Excavating Inc.
Project: KCH-21009432-A0
Location: 5765 Dundas Street, Dorchester
Test Date: October 20, 2022

AQUIFER DATA

Saturated Thickness: 2.982 m Anisotropy Ratio (Kz/Kr): 0.4

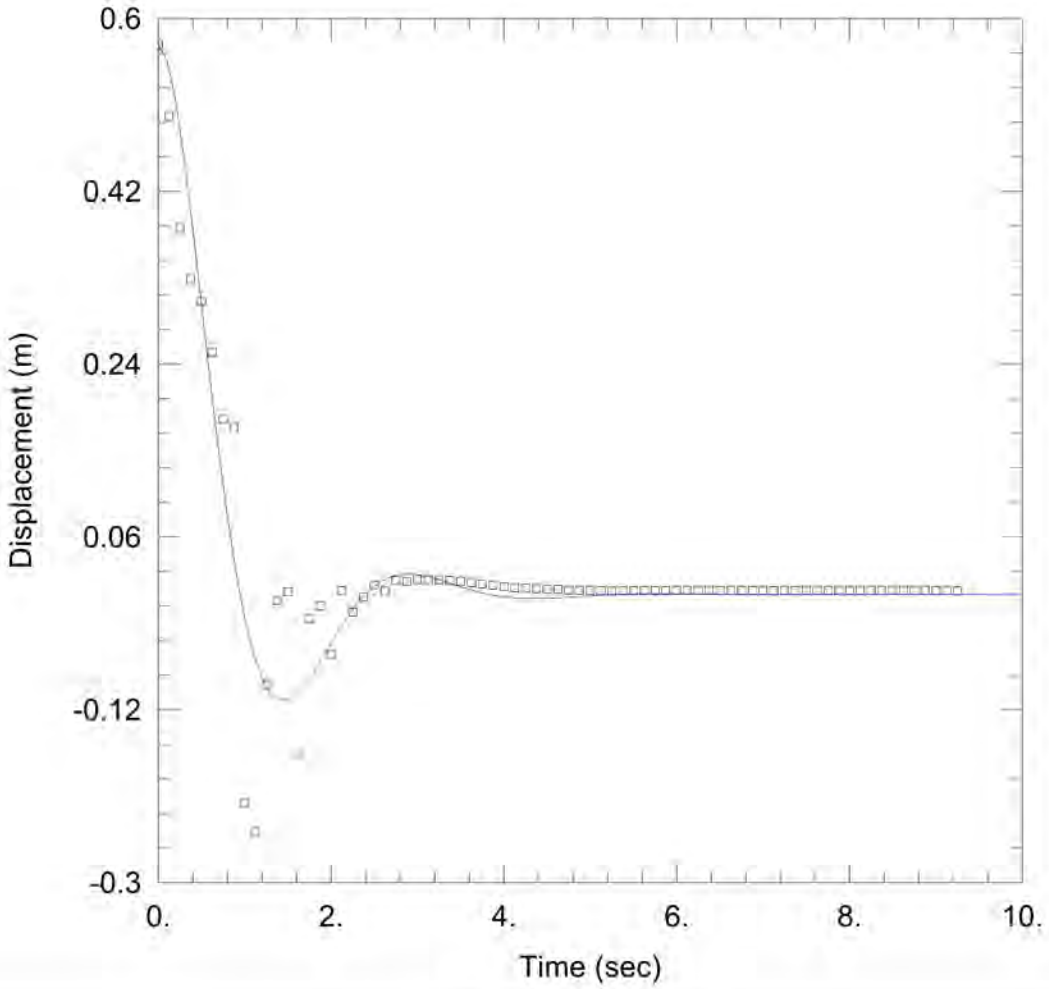
WELL DATA (MW1)

Initial Displacement: 0.5232 m
Total Well Penetration Depth: 2.984 m
Casing Radius: 0.0254 m
Static Water Column Height: 2.982 m
Screen Length: 1.524 m
Well Radius: 0.1048 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.001146 m/sec
Le = 1.878 m



FALLING HEAD TEST 2

Data Set: \...\MW1 Falling 2.aqt
Date: 10/26/22 Time: 13:10:47

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Brantam Excavating Inc.
Project: KCH-21009432-A0
Location: 5765 Dundas Street, Dorchester
Test Date: October 20, 2022

AQUIFER DATA

Saturated Thickness: 2.982 m Anisotropy Ratio (Kz/Kr): 0.4

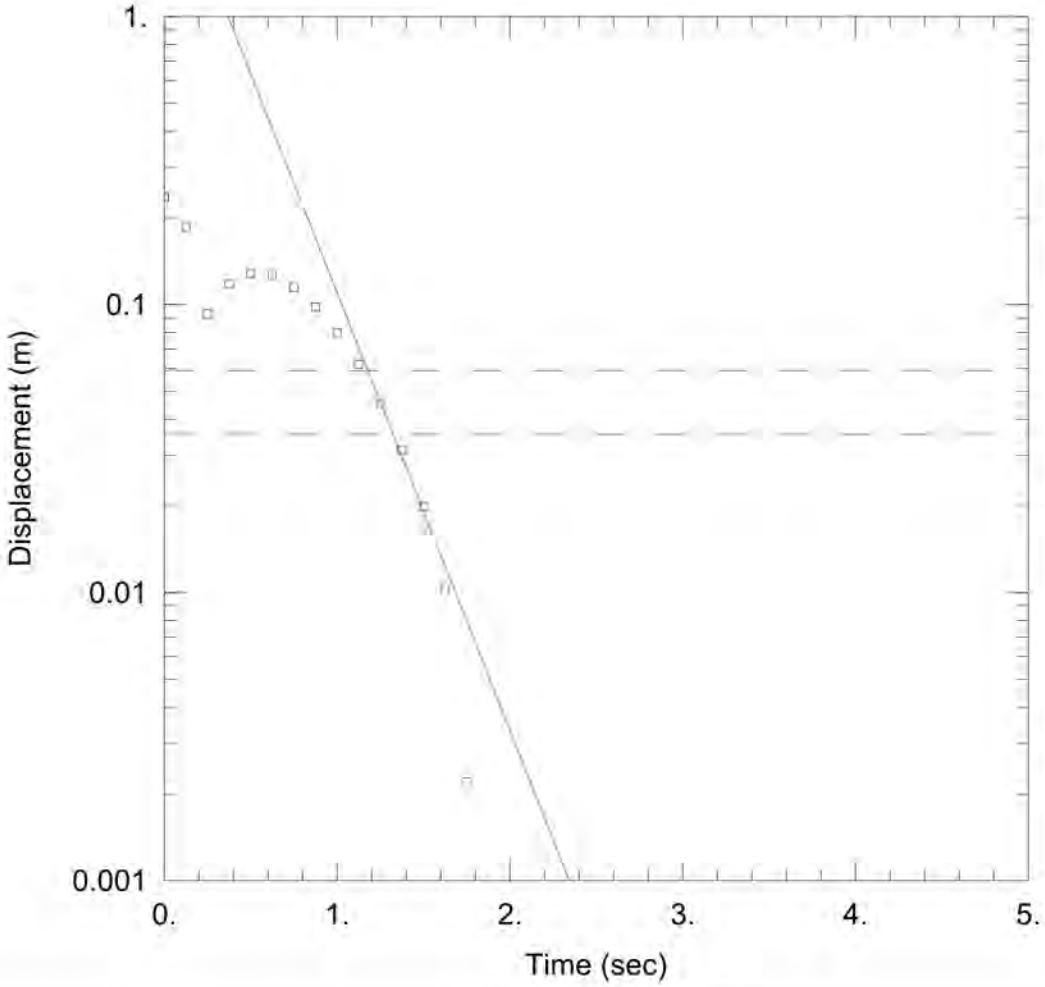
WELL DATA (MW1)

Initial Displacement: 0.5728 m
Total Well Penetration Depth: 2.984 m
Casing Radius: 0.0254 m
Static Water Column Height: 2.982 m
Screen Length: 1.524 m
Well Radius: 0.1048 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar

K = 0.001543 m/sec Le = 1.635 m



RISING HEAD TEST 1

Data Set: \...\MW1 Rising 1.aqt
Date: 10/26/22 Time: 13:11:07

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Brantam Excavating Inc.
Project: KCH-21009432-A0
Location: 5765 Dundas Street, Dorchester
Test Date: October 20, 2022

AQUIFER DATA

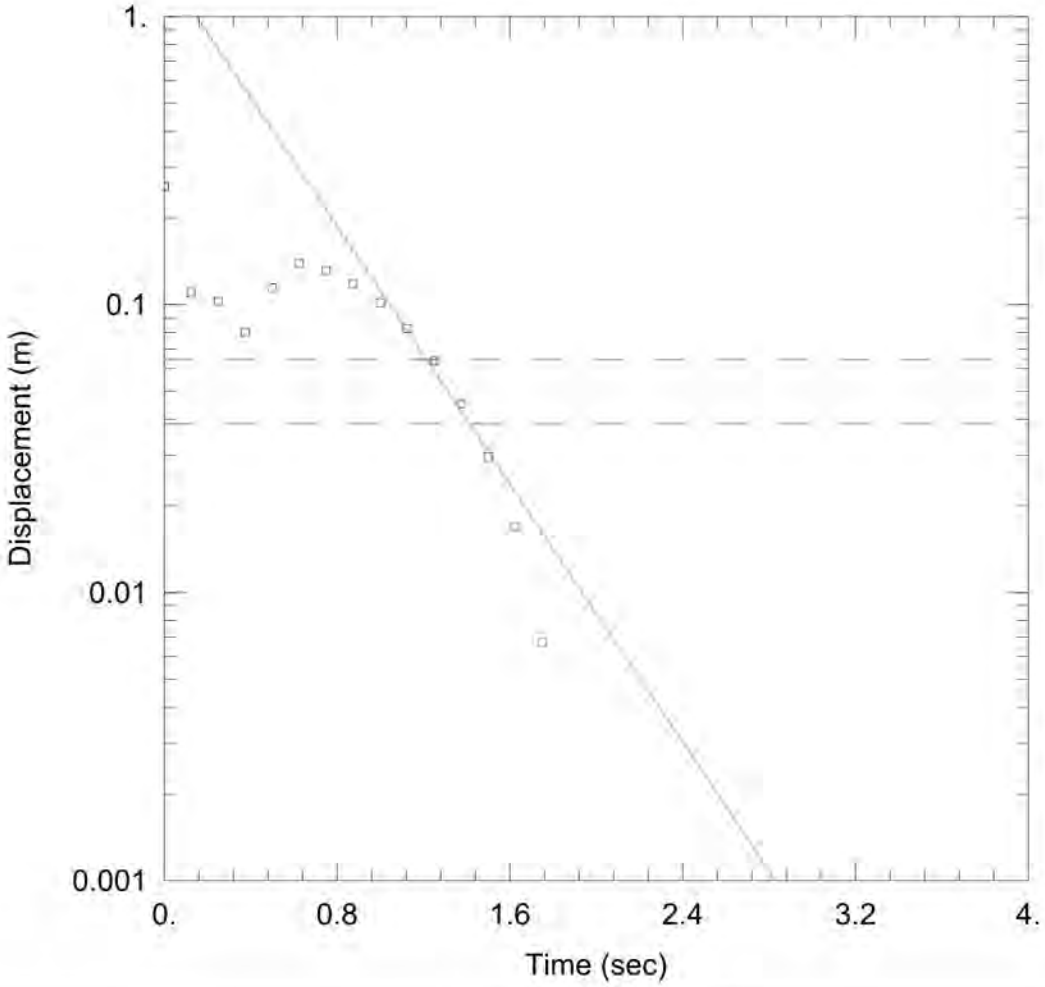
Saturated Thickness: 2.982 m Anisotropy Ratio (Kz/Kr): 0.4

WELL DATA (MW1)

Initial Displacement: 0.2361 m
Total Well Penetration Depth: 2.984 m
Casing Radius: 0.0254 m
Static Water Column Height: 2.982 m
Screen Length: 1.524 m
Well Radius: 0.1048 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.002835 m/sec
y0 = 3.632 m



RISING HEAD TEST 2

Data Set: \...\MW1 Rising 2.aqt
Date: 10/26/22 Time: 13:11:25

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Brantam Excavating Inc.
Project: KCH-21009432-A0
Location: 5765 Dundas Street, Dorchester
Test Date: October 20, 2022

AQUIFER DATA

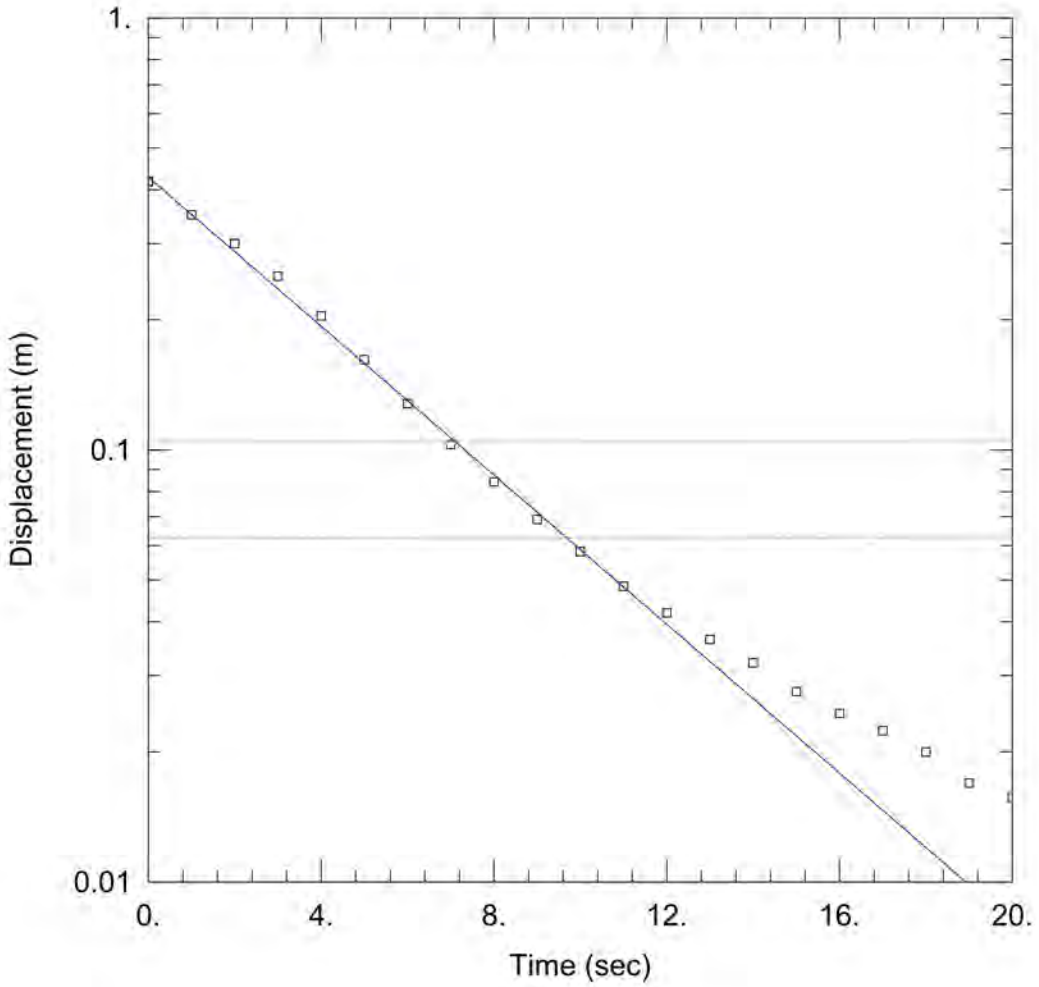
Saturated Thickness: 2.982 m
Anisotropy Ratio (Kz/Kr): 0.4

WELL DATA (MW1)

Initial Displacement: 0.257 m
Total Well Penetration Depth: 2.984 m
Casing Radius: 0.0254 m
Static Water Column Height: 2.982 m
Screen Length: 1.524 m
Well Radius: 0.1048 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.002088 m/sec
y0 = 1.467 m



RISING HEAD TEST 1

Data Set: \...\BH4MW_test 1.aqt
Date: 06/23/22 Time: 10:54:54

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Brantam Excavating Inc.
Project: KCH-21009432-A0
Location: Thamesford, Ontario
Test Date: October 14, 2021

AQUIFER DATA

Saturated Thickness: 2.84 m Anisotropy Ratio (Kz/Kr): 0.4

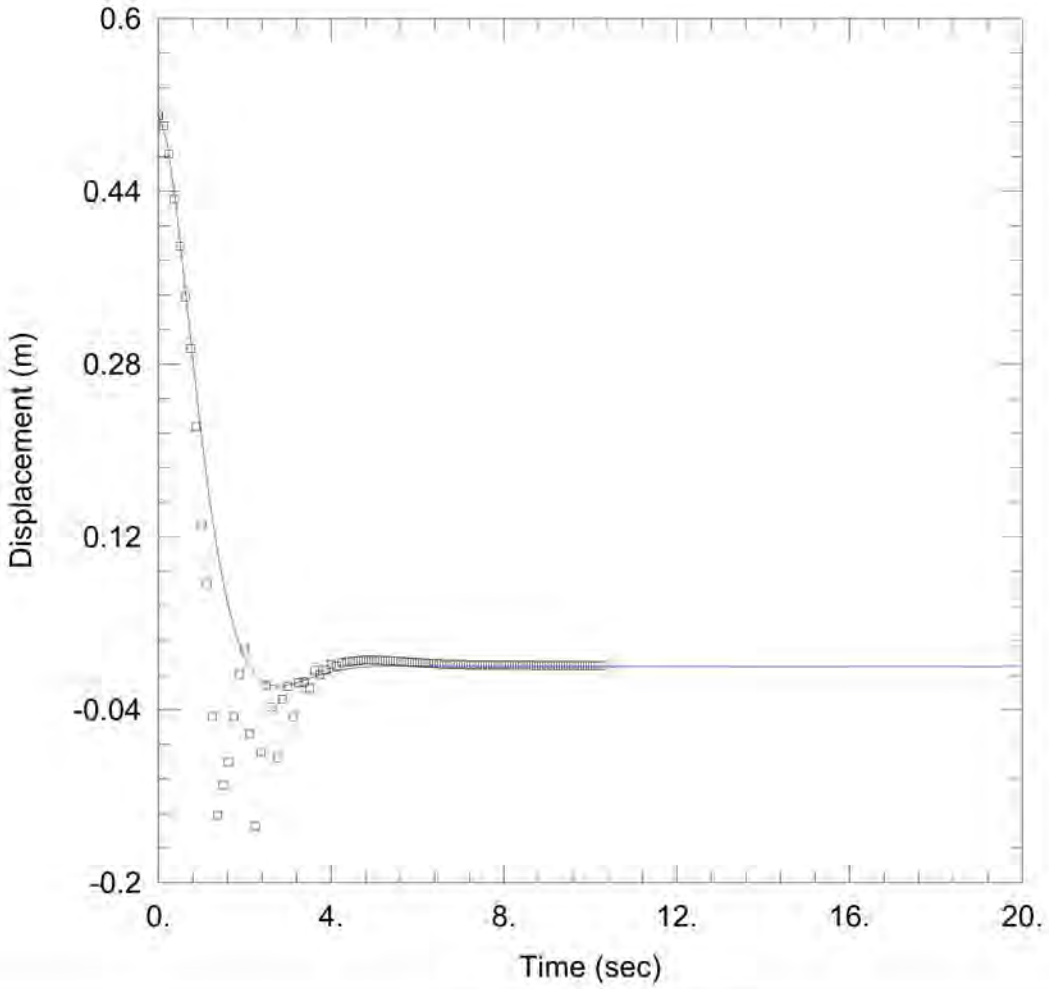
WELL DATA (BH4/MW)

Initial Displacement: 0.4177 m
Total Well Penetration Depth: 2.844 m
Casing Radius: 0.0254 m
Static Water Column Height: 2.84 m
Screen Length: 1.524 m
Well Radius: 0.1048 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 0.0001608 m/sec y0 = 0.4274 m



FALLING HEAD TEST 1

Data Set: \...\MW5 Falling 1.aqt
Date: 10/26/22 Time: 13:11:40

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Brantam Excavating Inc.
Project: KCH-21009432-A0
Location: 5765 Dundas Street, Dorchester
Test Date: October 20, 2022

AQUIFER DATA

Saturated Thickness: 3.87 m Anisotropy Ratio (Kz/Kr): 0.4

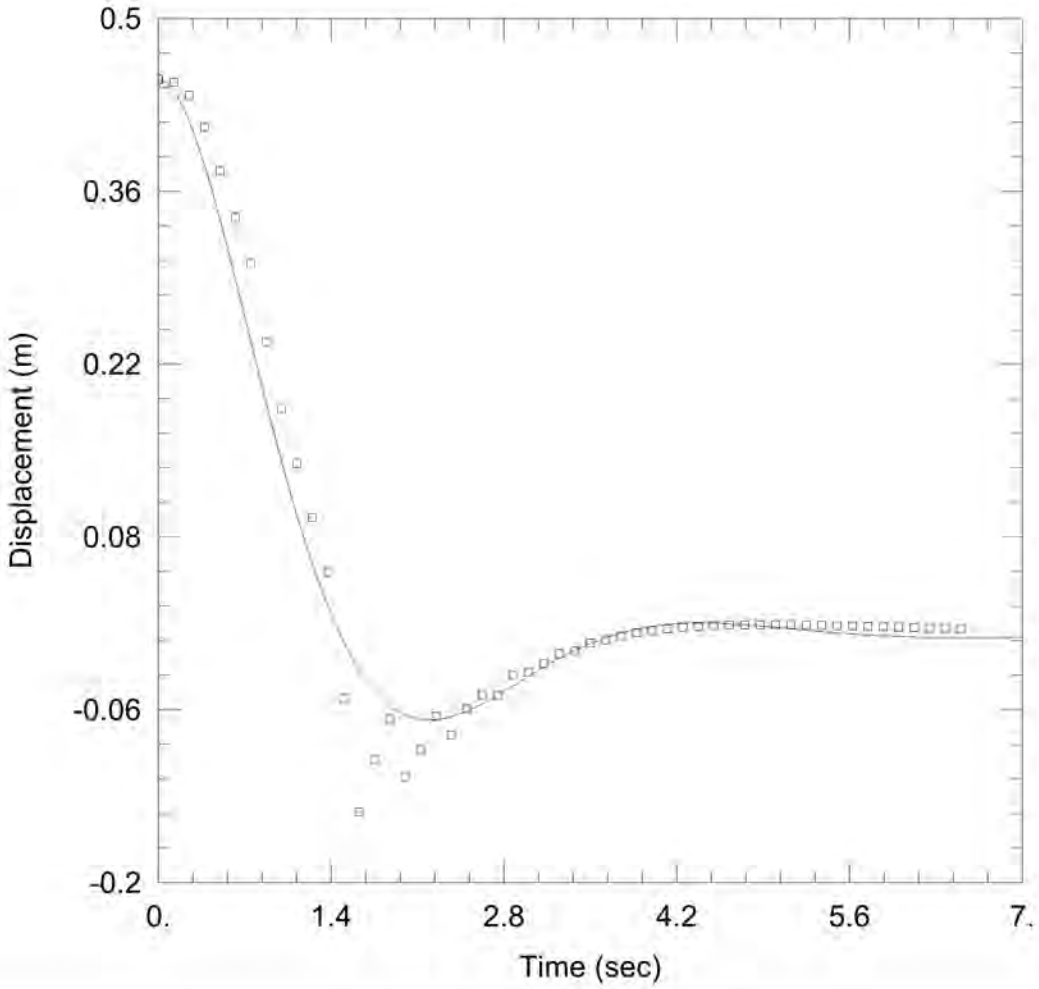
WELL DATA (MW5)

Initial Displacement: 0.5106 m
Total Well Penetration Depth: 4.354 m
Casing Radius: 0.0254 m
Static Water Column Height: 4.36 m
Screen Length: 1.524 m
Well Radius: 0.1048 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Springer-Gelhar

K = 0.0007113 m/sec
Le = 3.593 m



FALLING HEAD TEST 2

Data Set: \...\MW5 Falling 2.aqt
Date: 10/26/22 Time: 13:11:55

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Brantam Excavating Inc.
Project: KCH-21009432-A0
Location: 5765 Dundas Street, Dorchester
Test Date: October 20, 2022

AQUIFER DATA

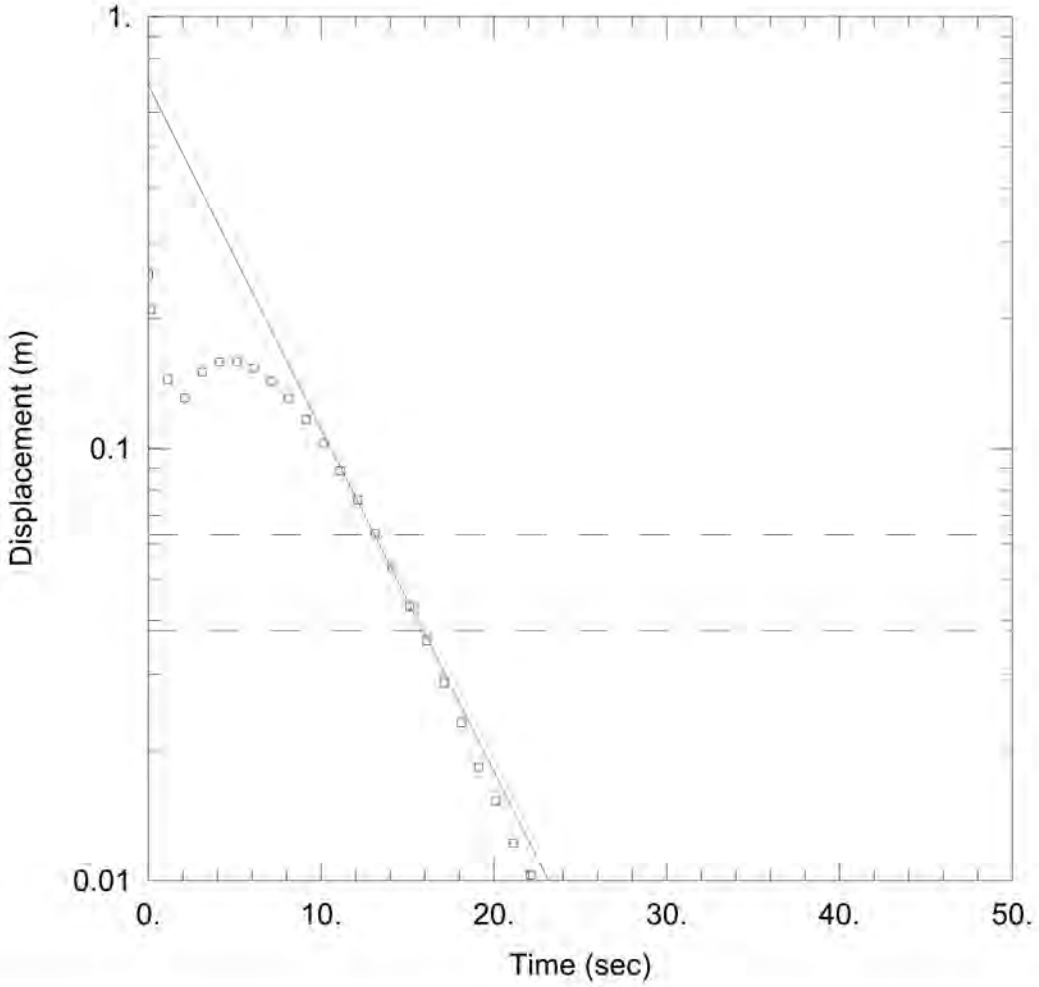
Saturated Thickness: 3.87 m Anisotropy Ratio (Kz/Kr): 0.4

WELL DATA (MW5)

Initial Displacement: 0.4509 m Static Water Column Height: 4.36 m
Total Well Penetration Depth: 4.354 m Screen Length: 1.524 m
Casing Radius: 0.0254 m Well Radius: 0.1048 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Springer-Gelhar
K = 0.001017 m/sec Le = 3.527 m



RISING HEAD TEST 1

Data Set: \...\MW5 Rising 1.aqt
Date: 10/26/22 Time: 13:12:15

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Brantam Excavating Inc.
Project: KCH-21009432-A0
Location: 5765 Dundas Street, Dorchester
Test Date: October 20, 2022

AQUIFER DATA

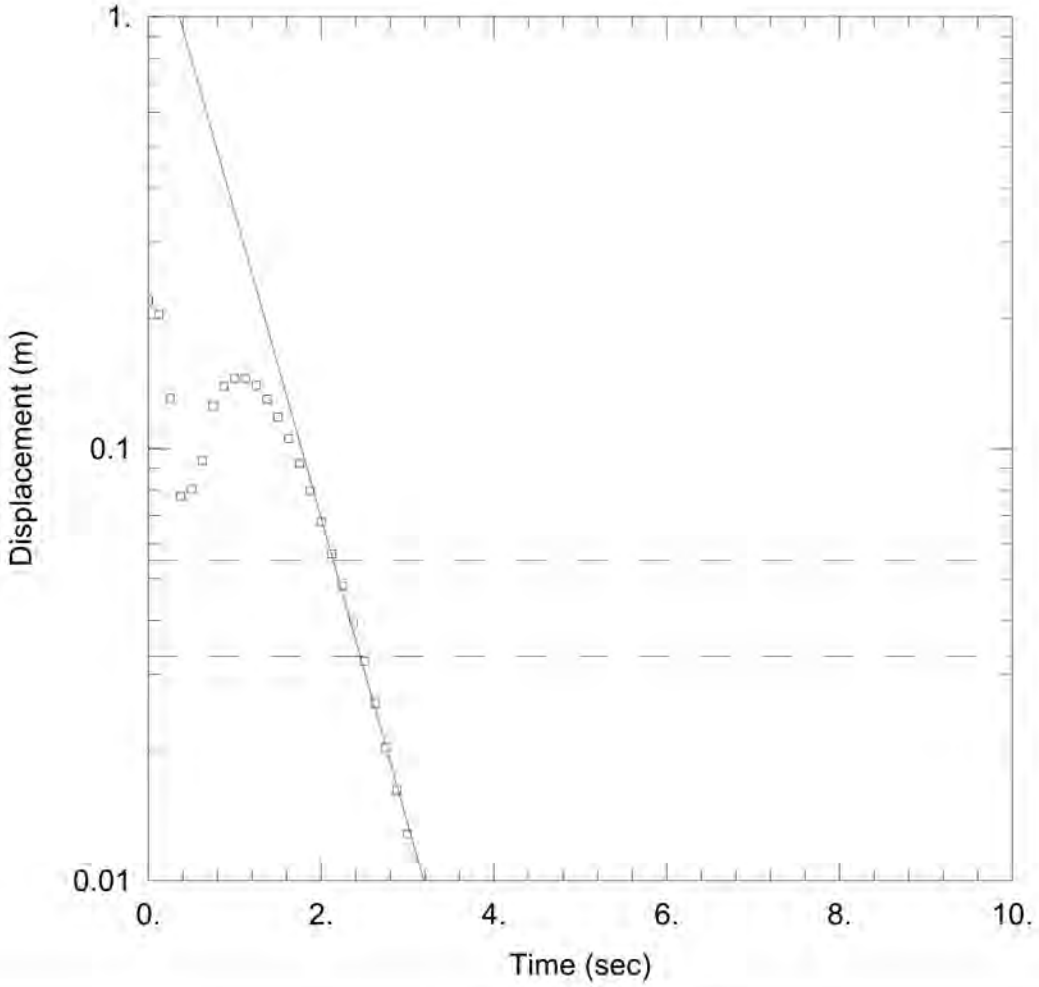
Saturated Thickness: 3.87 m Anisotropy Ratio (Kz/Kr): 0.4

WELL DATA (MW5)

Initial Displacement: 0.2527 m
Total Well Penetration Depth: 4.354 m
Casing Radius: 0.0254 m
Static Water Column Height: 4.36 m
Screen Length: 1.524 m
Well Radius: 0.1048 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 0.0001482 m/sec
y0 = 0.693 m



RISING HEAD TEST 2

Data Set: \...\MW5 Rising 2.aqt
Date: 10/26/22 Time: 13:12:31

PROJECT INFORMATION

Company: EXP Services Inc.
Client: Brantam Excavating Inc.
Project: KCH-21009432-A0
Location: 5765 Dundas Street, Dorchester
Test Date: October 20, 2022

AQUIFER DATA

Saturated Thickness: 3.87 m Anisotropy Ratio (Kz/Kr): 0.4

WELL DATA (MW5)

Initial Displacement: 0.2202 m
Total Well Penetration Depth: 4.354 m
Casing Radius: 0.0254 m
Static Water Column Height: 4.36 m
Screen Length: 1.524 m
Well Radius: 0.1048 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 0.001319 m/sec y0 = 1.792 m

Appendix G – Grain Size Analysis

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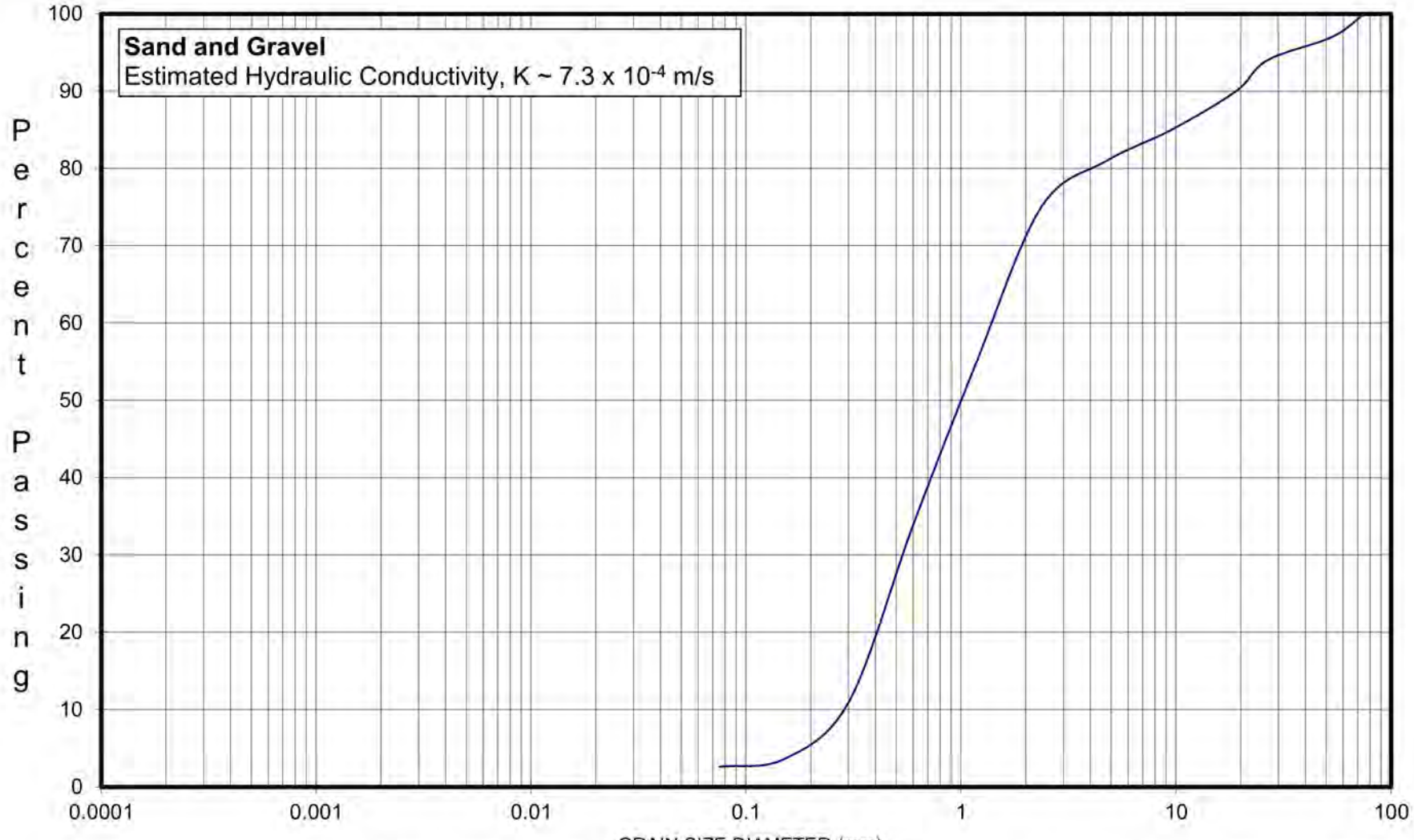
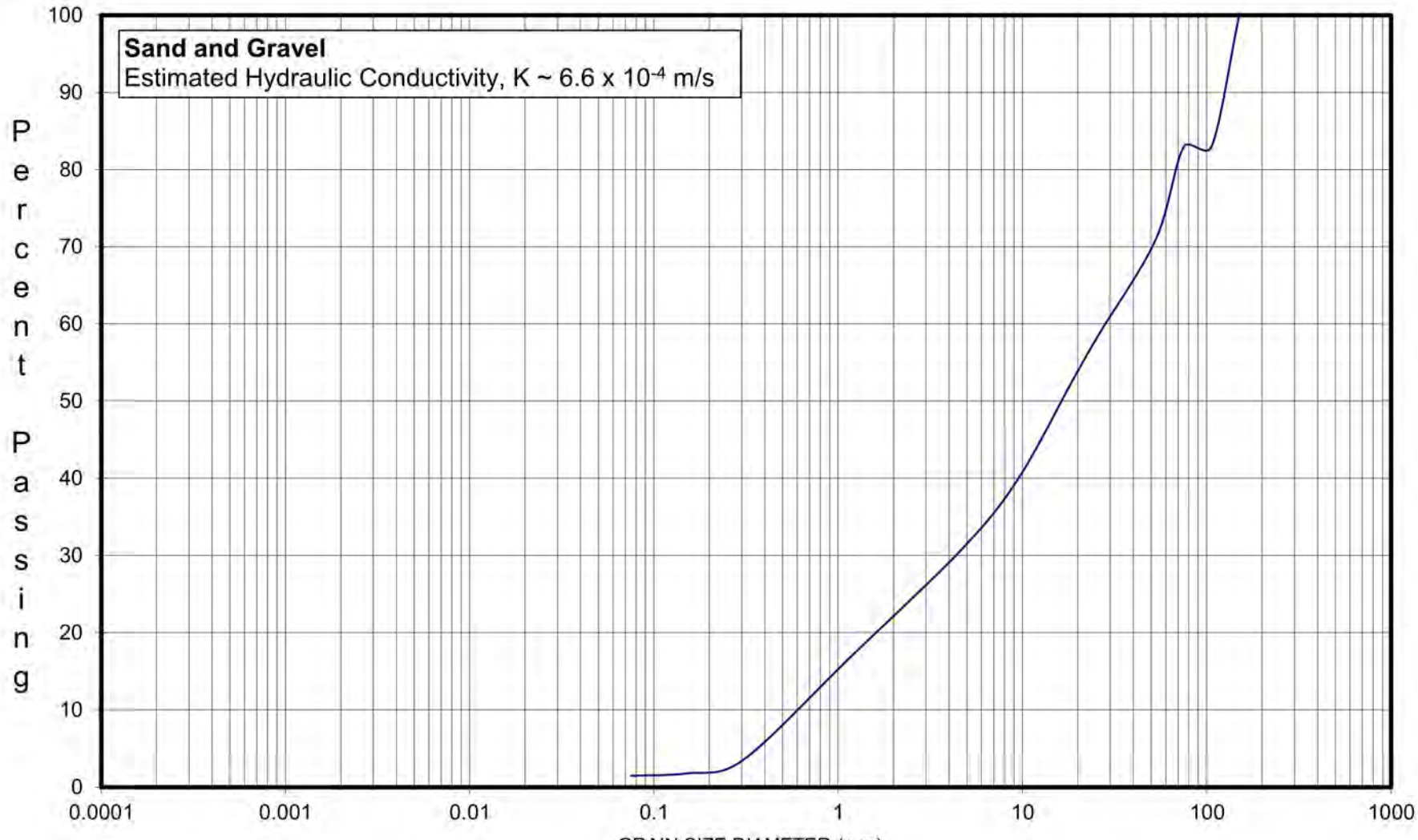
MECHANICAL GRAIN SIZE ANALYSIS



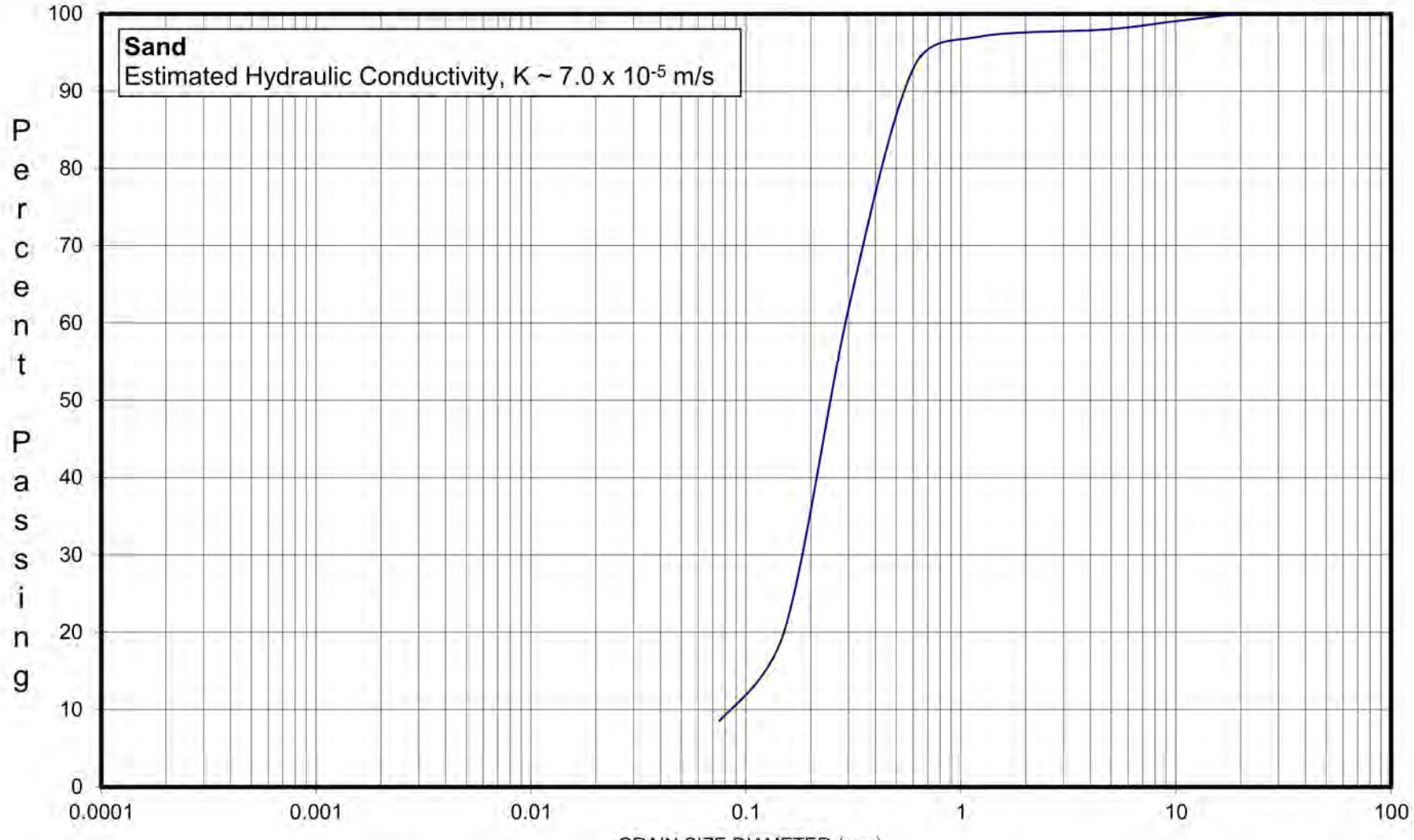
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			
MODIFIED M.I.T. CLASSIFICATION	**Sample Description:** **Sand and Gravel (TP1A Sample No. 10989)**						**Wood-Pit - Hwy2/73** **Project: LO6773AIT**			**Figure 1**

MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			
MODIFIED M.I.T. CLASSIFICATION	**Sample Description:** **Sand and Gravel (TP1B Sample No. 10990)**						**Wood-Pit - Hwy2/73** **Project: LO6773AIT**			**Figure 2**

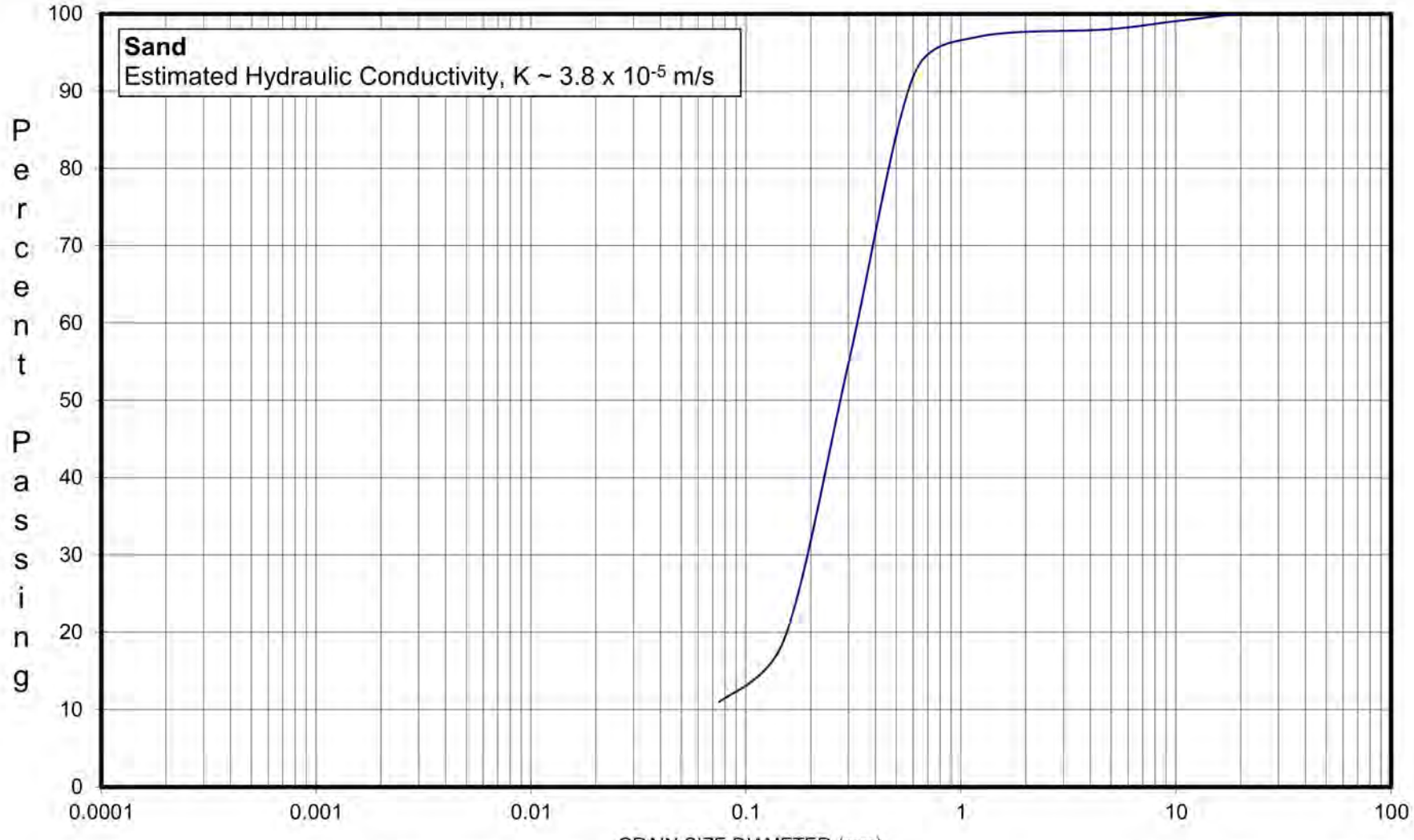
MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			

MODIFIED M.I.T. CLASSIFICATION	**Sample Description:** **Sand (TP2A Sample No. 10991)**	**Wood-Pit - Hwy2/73** **Project: LO6773AIT**	**Figure 3**

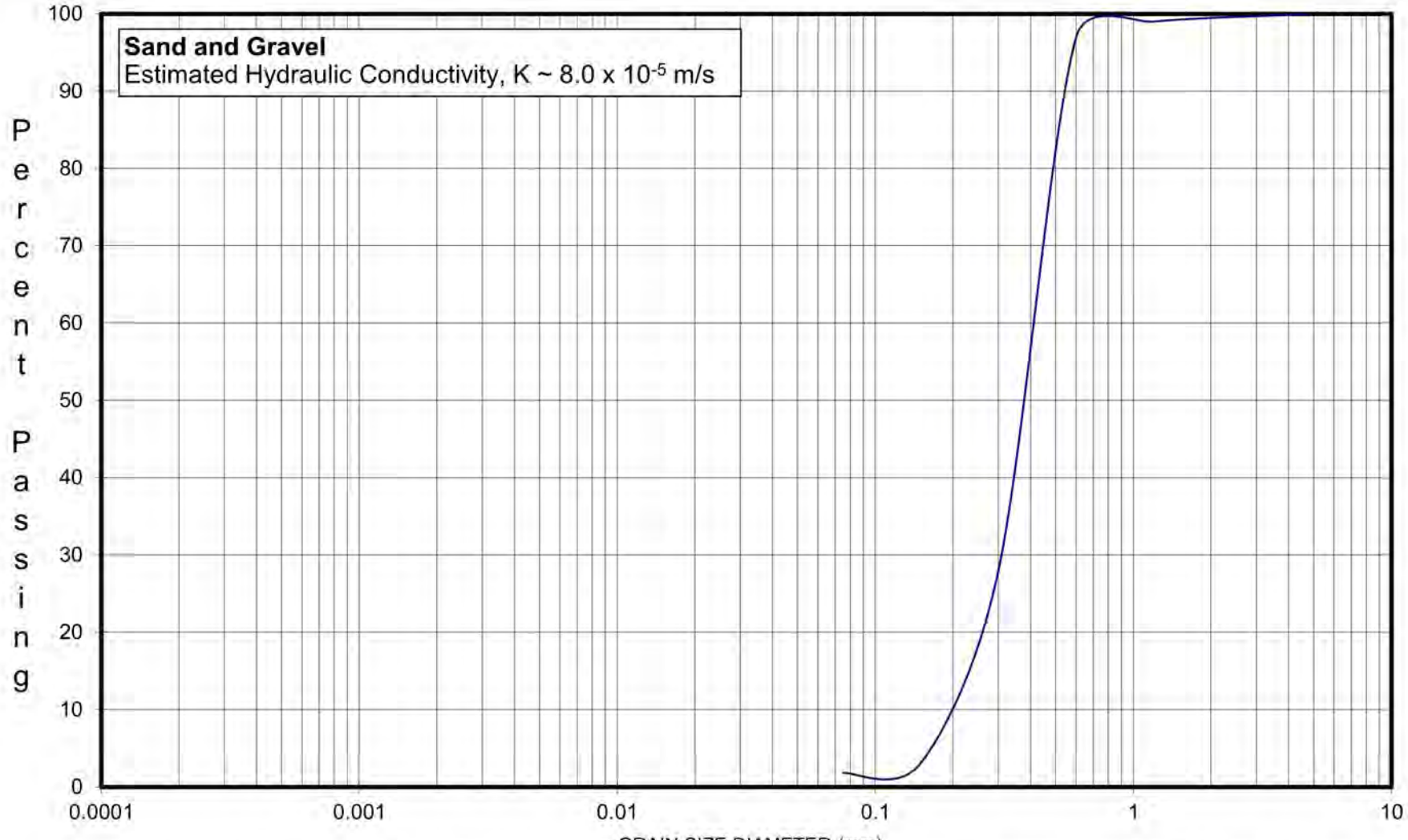
MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE
	SILT			SAND			GRAVEL		

MODIFIED M.I.T. CLASSIFICATION	**Sample Description:** **Sand (TP2B Sample No. 10992)**	**Wood-Pit - Hwy2/73** **Project: LO6773AIT**	**Figure 4**

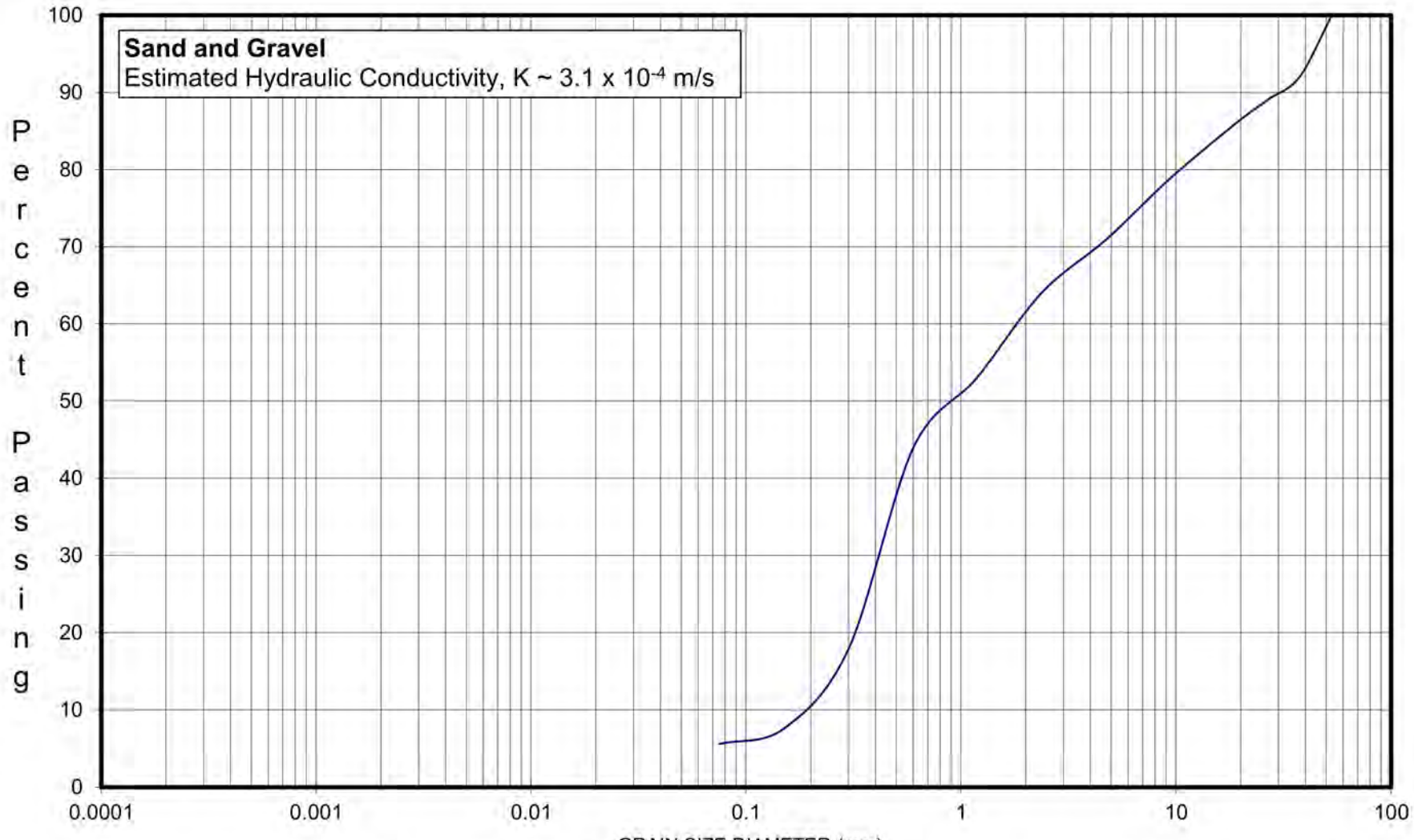
MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			

MODIFIED M.I.T. CLASSIFICATION	**Sample Description:** **Sand and Gravel (TP3A Sample No. 10993)**	**Wood-Pit - Hwy2/73** **Project: LO6773AIT**	**Figure 5**

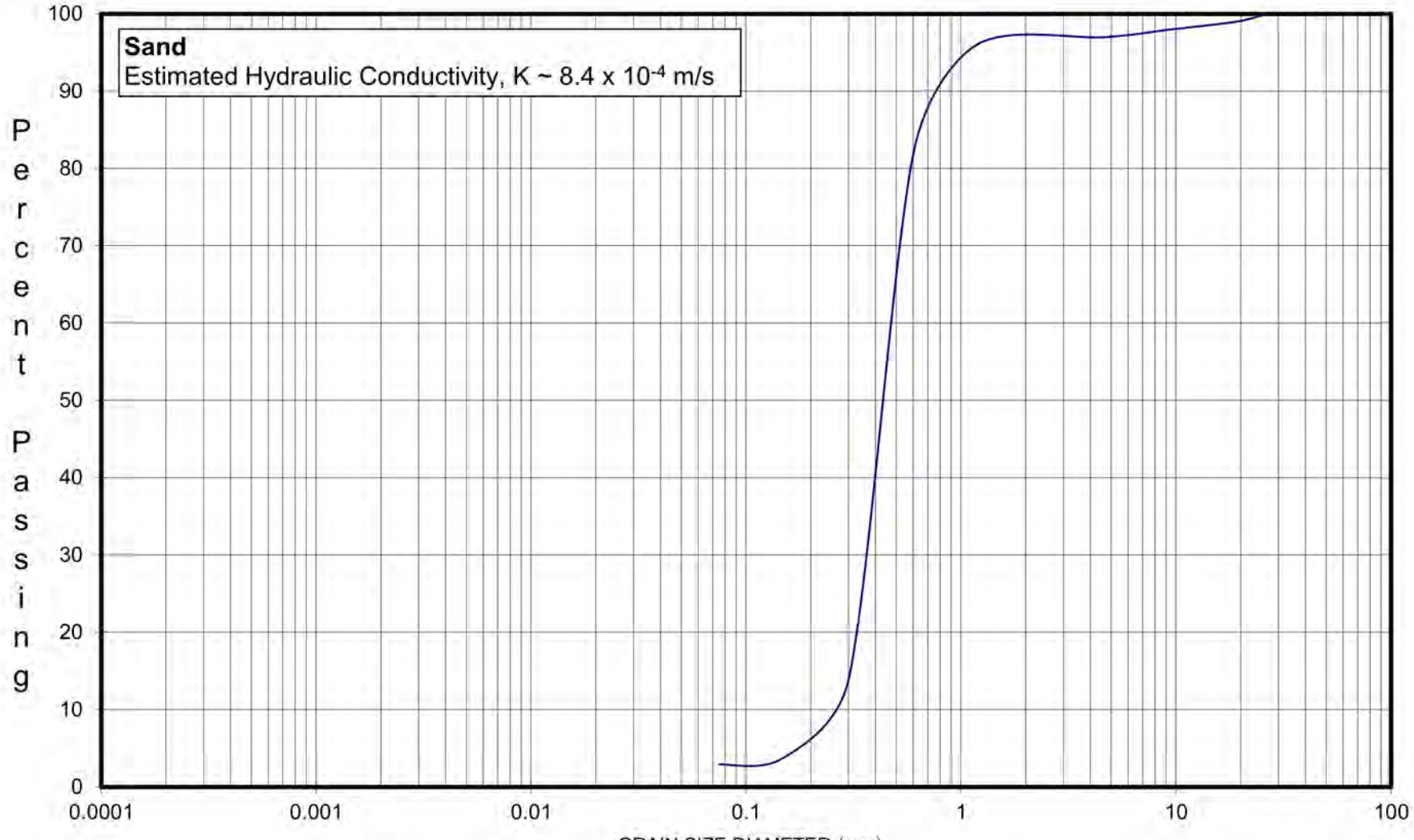
MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			

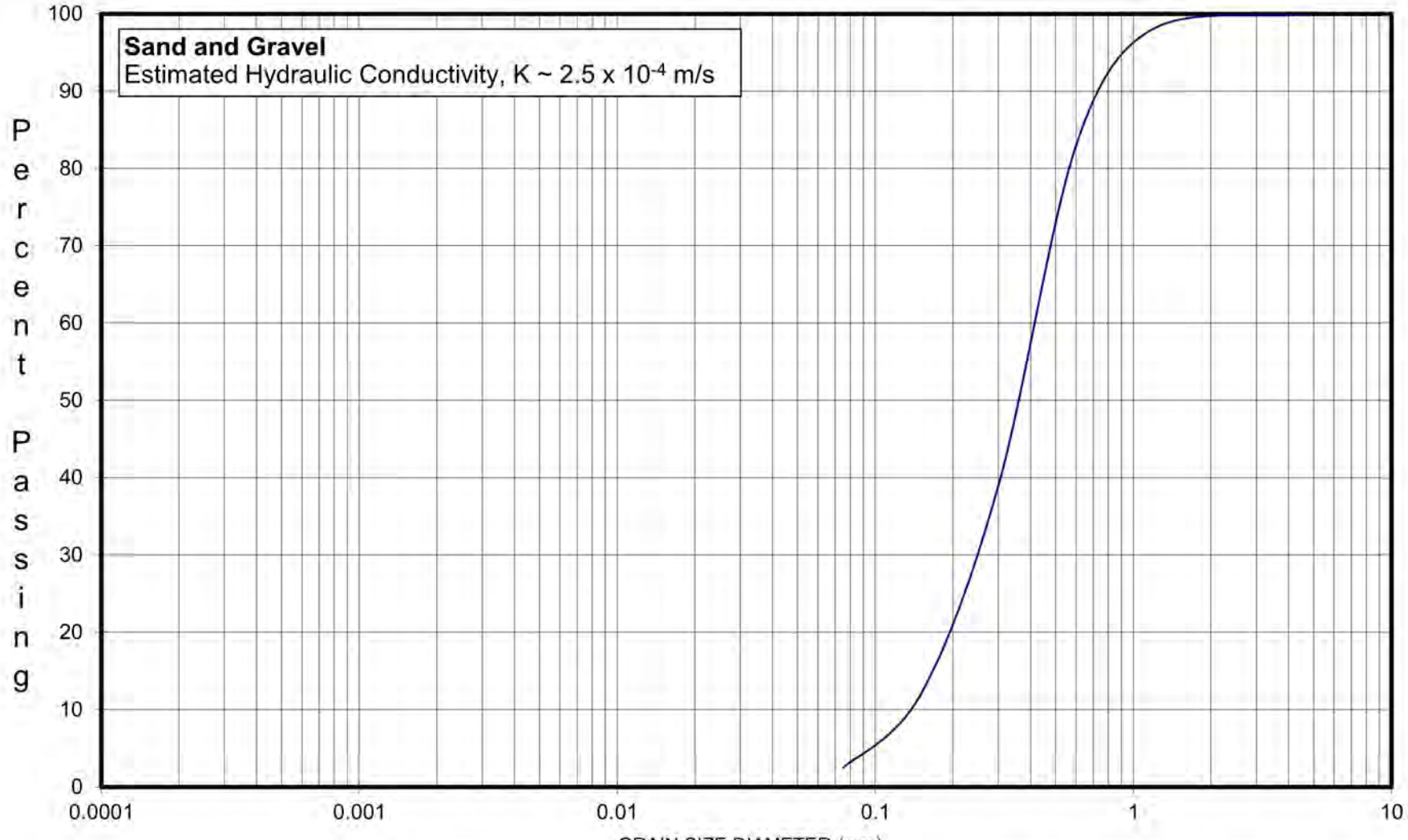
MODIFIED M.I.T. CLASSIFICATION	**Sample Description:** **Sand and Gravel (TP3B Sample No. 10994)**	**Wood-Pit - Hwy2/73** **Project: LO6773AIT**	**Figure 6**

MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			
MODIFIED M.I.T. CLASSIFICATION	**Sample Description: Sand (TP4A Sample No. 10995)**						**Wood-Pit - Hwy2/73 Project: LO6773AIT**			**Figure 7**

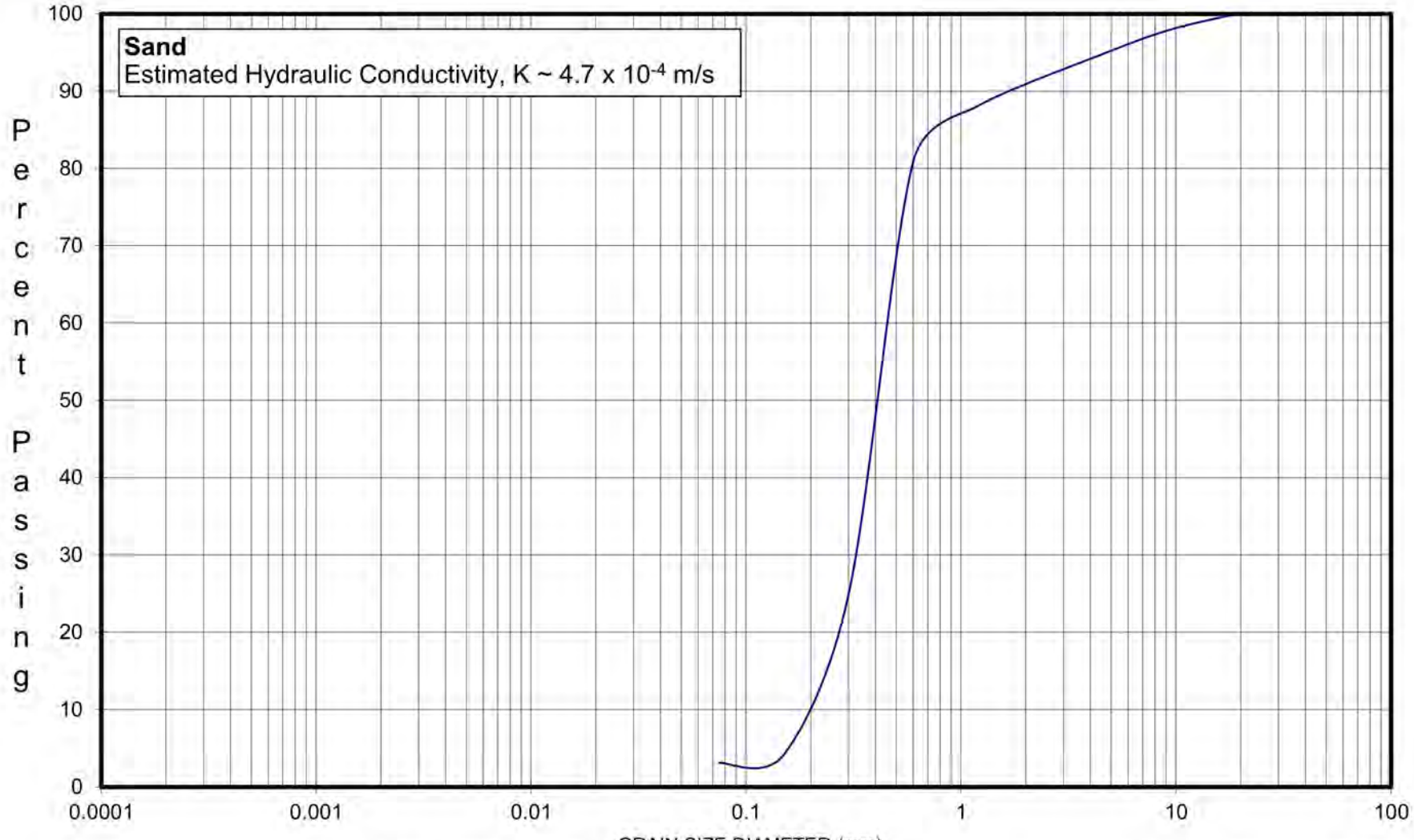
MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			

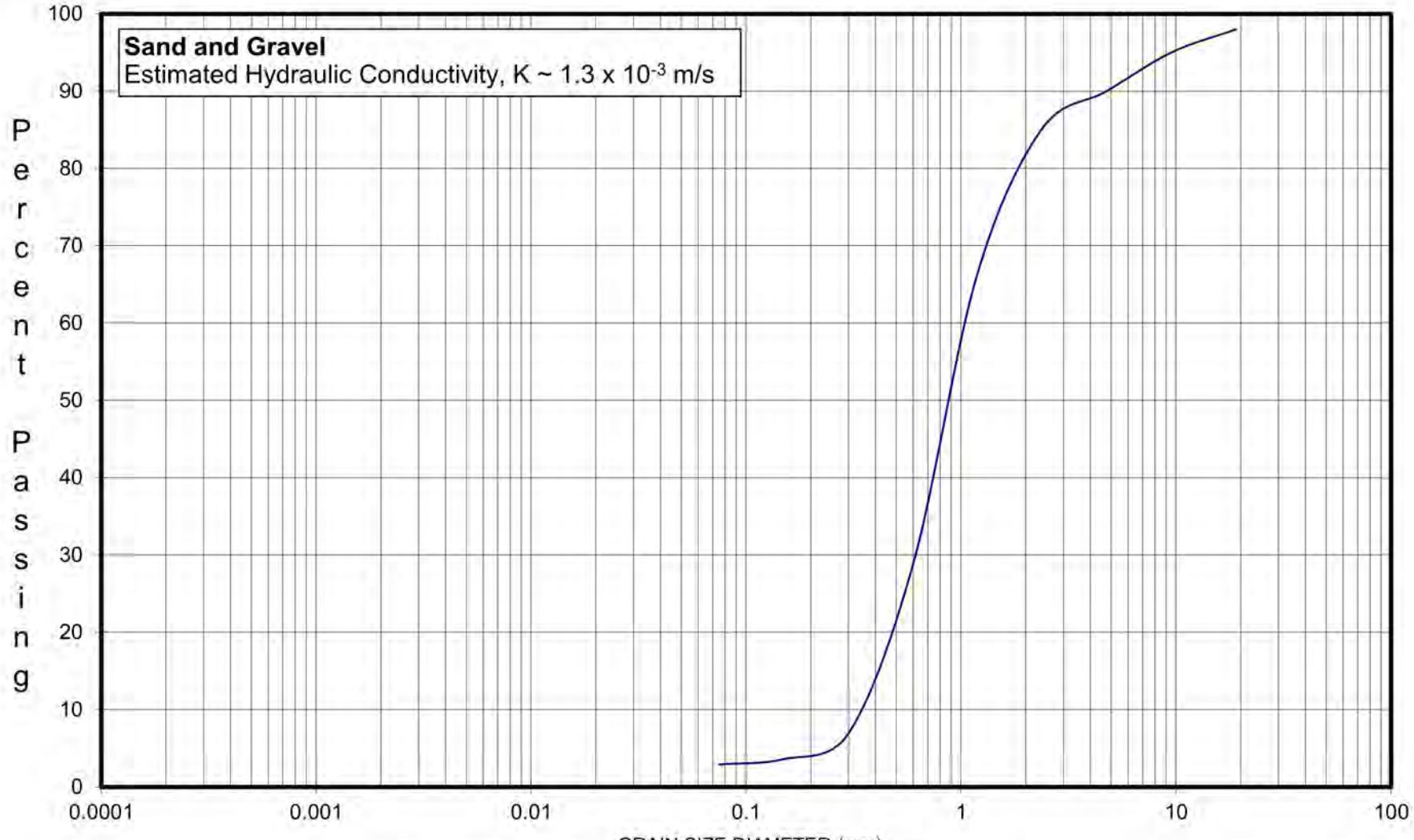
MODIFIED M.I.T. CLASSIFICATION	**Sample Description:** **Sand and Gravel (TP4B Sample No. 10996)**	**Wood-Pit - Hwy2/73** **Project: LO6773AIT**	**Figure 8**

MECHANICAL GRAIN SIZE ANALYSIS



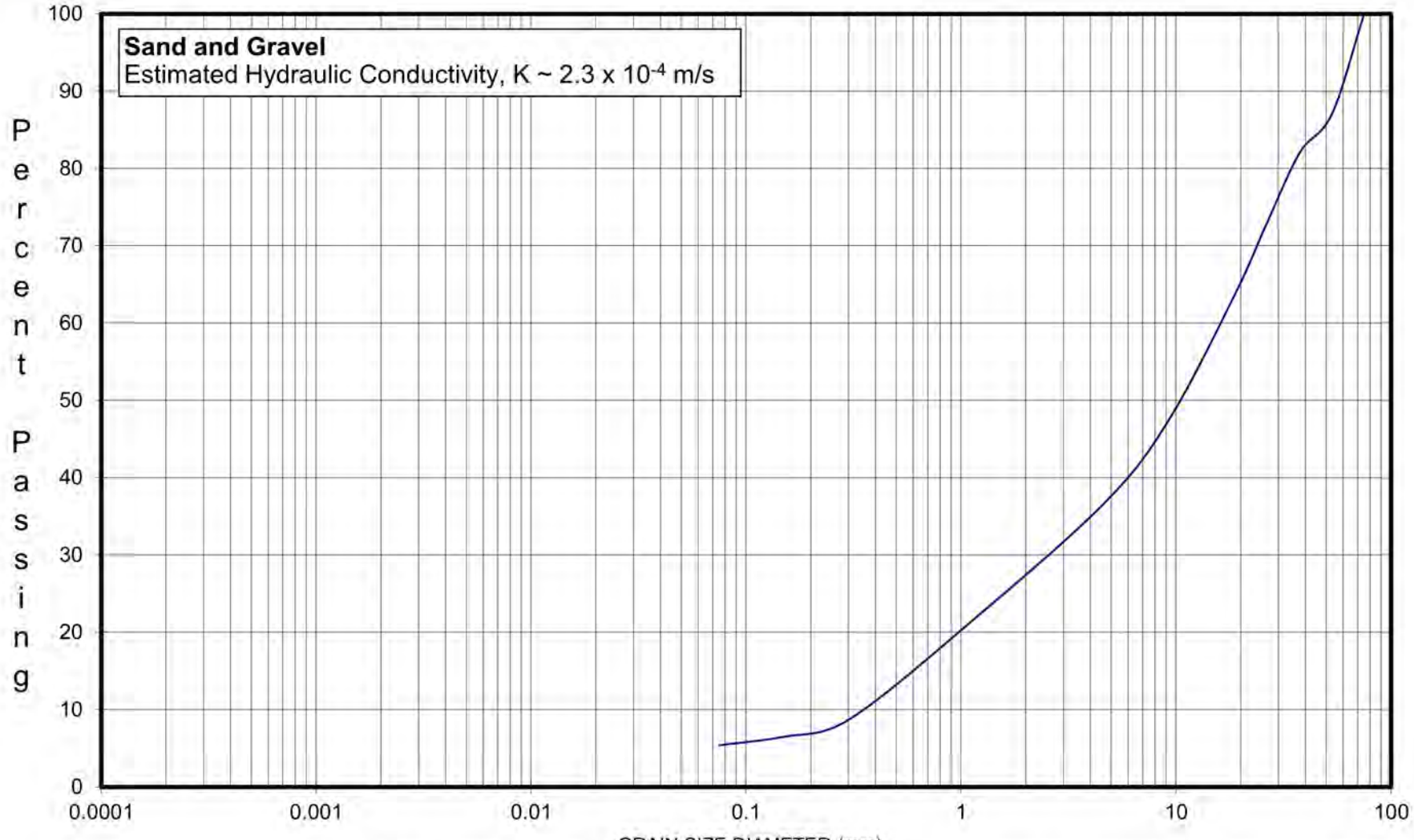
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			
MODIFIED M.I.T. CLASSIFICATION	**Sample Description: Sand (TP5 Sample No. 10997)**						**Wood-Pit - Hwy2/73 Project: LO6773AIT**			**Figure 9**

MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			
MODIFIED M.I.T. CLASSIFICATION	**Sample Description:** **Sand and Gravel (TP6 Sample No. 10998)**						**Wood-Pit - Hwy2/73** **Project: LO6773AIT**			**Figure 10**

MECHANICAL GRAIN SIZE ANALYSIS



CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	
	SILT			SAND			GRAVEL			
MODIFIED M.I.T. CLASSIFICATION	**Sample Description:** **Sand and Gravel (TP7 Sample No. 10999)**						**Wood-Pit - Hwy2/73** **Project: LO6773AIT**			**Figure 11**

Appendix H – Water Quality Tables

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Groundwater Quality Results
Elgin Road Pit
Thames Centre ON
Project No. KCH-21009432-A0

CRITERIA	ODWQS	UNITS	29-Sep-21	15-Mar-22	29-Sep-21	15-Mar-22
			BH4/MW		BH5/MW	
Calculated Parameters						
Anion Sum	-	me/L	6.37	6.17	7.93	12.7
Bicarb. Alkalinity (calc. as CaCO3)	-	mg/L	230	230	290	400
Calculated TDS	-	mg/L	360	340	440	750
Carb. Alkalinity (calc. as CaCO3)	-	mg/L	2.8	2.5	3.1	2.6
Cation Sum	-	me/L	6.95	6.45	8.72	13.3
Hardness (CaCO3)	-	mg/L	320	310	370	610
Ion Balance (% Difference)	-	%	4.36	2.25	4.73	2.2
Langelier Index (@ 20C)	-	N/A	1.03	0.957	1.09	1.2
Langelier Index (@ 4C)	-	N/A	0.781	0.708	0.845	0.952
Saturation pH (@ 20C)	-	N/A	7.1	7.1	6.95	6.64
Saturation pH (@ 4C)	-	N/A	7.35	7.35	7.2	6.89
Inorganics						
Total Ammonia-N	-	mg/L	<0.050	<0.050	<0.050	<0.050
Conductivity	-	umho/cm	600	570	730	1200
Dissolved Organic Carbon	-	mg/L	1.3	1.6	1.5	2.2
Orthophosphate (P)	-	mg/L	<0.010	<0.010	<0.010	<0.010
pH	-	pH	8.13	8.06	8.05	7.84
Dissolved Sulphate (SO4)	-	mg/L	39	35	28	33
Alkalinity (Total as CaCO3)	-	mg/L	230	230	290	410
Dissolved Chloride (Cl-)	-	mg/L	21	8.6	44	34
Nitrite (N)	1	mg/L	0.338	<0.010	0.423	<0.010
Nitrate (N)	10	mg/L	5.02	7.81	2.82	**41.5**
Nitrate + Nitrite (N)	-	mg/L	5.36	7.81	3.24	41.5
Metals						
Dissolved Aluminum (Al)	-	ug/L	5.9	<4.9	5.2	<4.9
Dissolved Antimony (Sb)	6	ug/L	<0.50	<0.50	<0.50	<0.50
Dissolved Arsenic (As)	10	ug/L	<1.0	<1.0	<1.0	<1.0
Dissolved Barium (Ba)	1000	ug/L	52	45	34	45
Dissolved Beryllium (Be)	-	ug/L	<0.40	<0.40	<0.40	<0.40
Dissolved Boron (B)	5000	ug/L	17	16	27	27
Dissolved Cadmium (Cd)	5	ug/L	<0.090	<0.090	<0.090	<0.090
Dissolved Calcium (Ca)	-	ug/L	95000	92000	110000	180000
Dissolved Chromium (Cr)	50	ug/L	<5.0	<5.0	<5.0	<5.0
Dissolved Cobalt (Co)	-	ug/L	<0.50	<0.50	<0.50	<0.50
Dissolved Copper (Cu)	-	ug/L	<0.90	1.7	1.1	2.3
Dissolved Iron (Fe)	-	ug/L	<100	<100	<100	<100
Dissolved Lead (Pb)	10	ug/L	<0.50	<0.50	<0.50	<0.50
Dissolved Magnesium (Mg)	-	ug/L	20000	18000	25000	37000
Dissolved Manganese (Mn)	-	ug/L	7.2	<2.0	34	3.1
Dissolved Molybdenum (Mo)	-	ug/L	1.5	0.59	4.6	<0.50
Dissolved Nickel (Ni)	-	ug/L	<1.0	<1.0	1.2	<1.0
Dissolved Phosphorus (P)	-	ug/L	<100	<100	<100	<100
Dissolved Potassium (K)	-	ug/L	2000	1400	2000	1900
Dissolved Selenium (Se)	50	ug/L	<2.0	<2.0	<2.0	<2.0
Dissolved Silicon (Si)	-	ug/L	4400	3500	4900	5200
Dissolved Silver (Ag)	-	ug/L	<0.090	<0.090	<0.090	<0.090
Dissolved Sodium (Na)	-	ug/L	12000	7200	29000	24000
Dissolved Strontium (Sr)	-	ug/L	140	130	170	260
Dissolved Thallium (Tl)	-	ug/L	<0.050	<0.050	<0.050	<0.050
Dissolved Titanium (Ti)	-	ug/L	<5.0	<5.0	<5.0	<5.0
Dissolved Uranium (U)	20	ug/L	1.9	1.9	4.1	4.5
Dissolved Vanadium (V)	-	ug/L	<0.50	<0.50	<0.50	<0.50
Dissolved Zinc (Zn)	-	ug/L	19	95	9.4	50

TABLE NOTES:

Results compared to Ontario Drinking Water Quality Standards (ODWQS) Maximum Acceptable Concentrati

Values highlighted GREY and bold exceed parameter guidelines

Surface Water Quality Results
Elgin Road Pit
Thames Centre, ON
Project No. KCH-21009432-A0

CRITERIA	PWQO	UNITS	29-Sep-21	15-Mar-22	29-Sep-21	15-Mar-22
			SW Station1		SW Station 2	
Calculated Parameters						
Bicarb. Alkalinity (calc. as CaCO3)	-	mg/L	270	240	270	240
Calculated TDS	-	mg/L	420	350	420	350
Carb. Alkalinity (calc. as CaCO3)	-	mg/L	3.3	3.5	3.8	3.7
Hardness (CaCO3)	-	mg/L	360	290	350	290
Langelier Index (@ 20C)	-	N/A	1.13	1.1	1.2	1.12
Langelier Index (@ 4C)	-	N/A	0.883	0.848	0.952	0.867
Saturation pH (@ 20C)	-	N/A	6.98	7.09	6.98	7.09
Saturation pH (@ 4C)	-	N/A	7.23	7.34	7.23	7.34
Inorganics						
Total Ammonia-N	-	mg/L	<0.050	<0.050	<0.050	<0.050
Conductivity	-	umho/cm	710	620	710	620
Total Organic Carbon (TOC)	-	mg/L	3.8	3.8	3.9	2.9
Orthophosphate (P)	-	mg/L	0.019	<0.010	0.023	<0.010
pH	6.5 - 8.5	pH	8.11	8.19	8.18	8.21
Total Phosphorus	-	mg/L	0.028	0.021	0.029	0.022
Dissolved Sulphate (SO4)	-	mg/L	25	18	24	18
Turbidity	-	NTU	0.7	1.3	0.7	1.3
Alkalinity (Total as CaCO3)	-	mg/L	270	240	270	240
Dissolved Chloride (Cl-)	-	mg/L	41	33	40	32
Nitrite (N)	-	mg/L	0.015	<0.010	0.014	<0.010
Nitrate (N)	-	mg/L	6	6.44	6.05	6.52
Metals						
Total Aluminum (Al)	75	ug/L	40	53	51	47
Total Antimony (Sb)	20	ug/L	<0.50	<0.50	<0.50	<0.50
Total Arsenic (As)	5	ug/L	<1.0	<1.0	<1.0	<1.0
Total Barium (Ba)	-	ug/L	50	32	50	31
Total Beryllium (Be)	1100	ug/L	<0.40	<0.40	<0.40	<0.40
Total Boron (B)	200	ug/L	20	11	19	12
Total Cadmium (Cd)	0.5	ug/L	<0.090	<0.090	<0.090	<0.090
Total Calcium (Ca)	-	ug/L	110000	86000	110000	85000
Total Chromium (Cr)	8.9	ug/L	<5.0	<5.0	<5.0	<5.0
Total Cobalt (Co)	0.9	ug/L	<0.50	<0.50	<0.50	<0.50
Total Copper (Cu)	5	ug/L	2	1.2	2.1	1.1
Total Iron (Fe)	300	ug/L	<100	100	110	<100
Total Lead (Pb)	5	ug/L	<0.50	<0.50	<0.50	<0.50
Total Magnesium (Mg)	-	ug/L	20000	17000	20000	17000
Total Manganese (Mn)	-	ug/L	16	23	15	21
Total Molybdenum (Mo)	40	ug/L	0.58	<0.50	0.6	<0.50
Total Nickel (Ni)	25	ug/L	<1.0	<1.0	<1.0	<1.0
Total Potassium (K)	-	ug/L	3800	2500	3700	2400
Total Selenium (Se)	100	ug/L	<2.0	<2.0	<2.0	<2.0
Total Silicon (Si)	-	ug/L	4200	2300	4100	2200
Total Silver (Ag)	0.1	ug/L	<0.090	<0.090	0.14	<0.090
Total Sodium (Na)	-	ug/L	20000	13000	19000	13000
Total Strontium (Sr)	-	ug/L	160	140	160	130
Total Thallium (Tl)	0.3	ug/L	<0.050	<0.050	<0.050	<0.050
Total Titanium (Ti)	-	ug/L	<5.0	5.2	<5.0	<5.0
Total Tungsten (W)	30	ug/L	<1.0	<1.0	<1.0	<1.0
Total Uranium (U)	5	ug/L	1.2	1.1	1.3	1.1
Total Vanadium (V)	6	ug/L	0.75	<0.50	0.8	<0.50
Total Zinc (Zn)	20	ug/L	<5.0	<5.0	<5.0	<5.0
Total Zirconium (Zr)	4	ug/L	<1.0	<1.0	<1.0	<1.0
Dissolved Metals						
Dissolved Aluminum (Al)	-	ug/L	<4.9	-	<4.9	-
Dissolved Antimony (Sb)	-	ug/L	<0.50	-	<0.50	-
Dissolved Arsenic (As)	-	ug/L	<1.0	-	<1.0	-
Dissolved Barium (Ba)	-	ug/L	50	-	51	-
Dissolved Beryllium (Be)	-	ug/L	<0.40	-	<0.40	-
Dissolved Bismuth (Bi)	-	ug/L	<1.0	-	<1.0	-
Dissolved Boron (B)	-	ug/L	21	-	21	-
Dissolved Cadmium (Cd)	-	ug/L	<0.090	-	<0.090	-
Dissolved Calcium (Ca)	-	ug/L	110000	90000	110000	90000
Dissolved Chromium (Cr)	-	ug/L	<5.0	-	<5.0	-
Dissolved Cobalt (Co)	-	ug/L	<0.50	-	<0.50	-
Dissolved Copper (Cu)	-	ug/L	1.6	-	1.6	-
Dissolved Iron (Fe)	-	ug/L	<100	-	<100	-
Dissolved Lead (Pb)	-	ug/L	<0.50	-	<0.50	-
Dissolved Lithium (Li)	-	ug/L	<5.0	-	<5.0	-
Dissolved Magnesium (Mg)	-	ug/L	20000	17000	20000	16000
Dissolved Manganese (Mn)	-	ug/L	7.9	-	6.1	-
Dissolved Molybdenum (Mo)	-	ug/L	0.56	-	0.64	-
Dissolved Nickel (Ni)	-	ug/L	<1.0	-	<1.0	-
Dissolved Phosphorus (P)	-	ug/L	100	-	<100	-
Dissolved Potassium (K)	-	ug/L	3800	3000	3700	3000
Dissolved Selenium (Se)	-	ug/L	<2.0	-	<2.0	-
Dissolved Silicon (Si)	-	ug/L	4400	-	4400	-
Dissolved Silver (Ag)	-	ug/L	<0.090	-	<0.090	-
Dissolved Sodium (Na)	-	ug/L	19000	13000	19000	13000
Dissolved Strontium (Sr)	-	ug/L	160	-	160	-
Dissolved Tellurium (Te)	-	ug/L	<1.0	-	<1.0	-
Dissolved Thallium (Tl)	-	ug/L	<0.050	-	<0.050	-
Dissolved Tin (Sn)	-	ug/L	<1.0	-	<1.0	-
Dissolved Titanium (Ti)	-	ug/L	<5.0	-	<5.0	-
Dissolved Tungsten (W)	-	ug/L	<1.0	-	<1.0	-
Dissolved Uranium (U)	-	ug/L	1.3	-	1.3	-
Dissolved Vanadium (V)	-	ug/L	<0.50	-	<0.50	-
Dissolved Zinc (Zn)	-	ug/L	<5.0	-	<5.0	-
Dissolved Zirconium (Zr)	-	ug/L	<1.0	-	<1.0	-

TABLE NOTES:
Results compared to Provincial Water Quality Objectives (PWQO), Ministry of the Environment and Energy (1994, revised 1999).
Values highlighted GREY and bold exceed parameter guidelines
Value in **BOLD** indicates detection limit exceeds parameter guideline

Appendix I – Laboratory Chain of Custody

6-405 Maple Grove Road | Cambridge, Ontario | Canada
t: +1.519.650.4918 | f: +1.519.650.4603 | exp.com

Your Project #: KCH-21009432-A0
Site Location: THAMES CENTRE PIT
Your C.O.C. #: 839958-01-01

Attention: Heather Jaggard

exp Services Inc
London Branch
15701 Robin's Hill Rd
Unit 2
London, ON
CANADA N5V 0A5

Report Date: 2021/10/07
Report #: R6843938
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1S3957
Received: 2021/09/30, 08:30

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	2	N/A	2021/10/04	CAM SOP-00448	SM 23 2320 B m
Alkalinity	2	N/A	2021/10/05	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	4	N/A	2021/10/05	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	4	N/A	2021/10/04	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	2	N/A	2021/10/04	CAM SOP-00414	SM 23 2510 m
Conductivity	2	N/A	2021/10/05	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	2	N/A	2021/10/04	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	4	N/A	2021/10/07	CAM SOP 00102/00408/00447	SM 2340 B
Lab Filtered Metals by ICPMS	4	2021/10/04	2021/10/06	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	2	N/A	2021/10/05	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	2	N/A	2021/10/07		
Anion and Cation Sum	2	N/A	2021/10/07		
Total Ammonia-N	4	N/A	2021/10/05	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	2	N/A	2021/10/01	CAM SOP-00440	SM 23 4500-NO3I/NO2B
Nitrate (NO3) and Nitrite (NO2) in Water (2)	2	N/A	2021/10/04	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	2	2021/10/01	2021/10/04	CAM SOP-00413	SM 4500H+ B m
pH	2	2021/10/01	2021/10/05	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	4	N/A	2021/10/04	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	4	N/A	2021/10/07		Auto Calc
Sat. pH and Langelier Index (@ 4C)	4	N/A	2021/10/07		Auto Calc
Sulphate by Automated Colourimetry	4	N/A	2021/10/04	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	4	N/A	2021/10/07		Auto Calc
Total Organic Carbon (TOC) (3)	2	N/A	2021/10/06	CAM SOP-00446	SM 23 5310B m
Total Phosphorus (Colourimetric)	2	2021/10/05	2021/10/05	CAM SOP-00407	SM 23 4500 P B H m
Turbidity	2	N/A	2021/10/01	CAM SOP-00417	SM 23 2130 B m

Remarks:

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau

Your Project #: KCH-21009432-A0
Site Location: THAMES CENTRE PIT
Your C.O.C. #: 839958-01-01

Attention: Heather Jaggard

exp Services Inc
London Branch
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Unit 2
London, ON
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CERTIFICATE OF ANALYSIS

BV LABS JOB #: C1S3957
Received: 2021/09/30, 08:30

Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(3) Total Organic Carbon (TOC) present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bureauveritas.com
Phone# (519)652-9444

This report has been generated and distributed using a secure automated process.
BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

BV Labs Job #: C1S3957
Report Date: 2021/10/07

exp Services Inc
Client Project #: KCH-21009432-A0
Site Location: THAMES CENTRE PIT
Sampler Initials: JM

RCAP - COMPREHENSIVE (LAB FILTERED)

BV Labs ID				QUR292		QUR293		
Sampling Date				2021/09/29 16:30		2021/09/29 17:00		
COC Number				839958-01-01		839958-01-01		
	UNITS	MAC	A/O	MW4	QC Batch	MW5	RDL	QC Batch
Calculated Parameters								
Anion Sum	me/L	-	-	6.37	7610019	7.93	N/A	7610019
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	230	7610010	290	1.0	7610010
Calculated TDS	mg/L	-	500	360	7610017	440	1.0	7610017
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	2.8	7610010	3.1	1.0	7610010
Cation Sum	me/L	-	-	6.95	7610019	8.72	N/A	7610019
Hardness (CaCO3)	mg/L	-	80:100	**320**	7610288	**370**	1.0	7610288
Ion Balance (% Difference)	%	-	-	4.36	7610018	4.73	N/A	7610018
Langelier Index (@ 20C)	N/A	-	-	1.03	7610013	1.09		7610013
Langelier Index (@ 4C)	N/A	-	-	0.781	7610014	0.845		7610014
Saturation pH (@ 20C)	N/A	-	-	7.10	7610013	6.95		7610013
Saturation pH (@ 4C)	N/A	-	-	7.35	7610014	7.20		7610014
Inorganics								
Total Ammonia-N	mg/L	-	-	<0.050	7617146	<0.050	0.050	7617430
Conductivity	umho/cm	-	-	600	7614254	730	1.0	7614254
Dissolved Organic Carbon	mg/L	-	5	1.3	7615096	1.5	0.40	7615096
Orthophosphate (P)	mg/L	-	-	<0.010	7614562	<0.010	0.010	7614562
pH	pH	-	6.5:8.5	8.13	7614255	8.05		7614255
Dissolved Sulphate (SO4)	mg/L	-	500	39	7614561	28	1.0	7614561
Alkalinity (Total as CaCO3)	mg/L	-	30:500	230	7614247	290	1.0	7614247
Dissolved Chloride (Cl-)	mg/L	-	250	21	7614560	44	1.0	7614560
Nitrite (N)	mg/L	1	-	0.338	7613542	0.423	0.010	7613542
Nitrate (N)	mg/L	10	-	5.02	7613542	2.82	0.10	7613542
Nitrate + Nitrite (N)	mg/L	10	-	5.36	7613542	3.24	0.10	7613542
Metals								
Dissolved Aluminum (Al)	ug/L	-	100	5.9	7616806	5.2	4.9	7616806
Dissolved Antimony (Sb)	ug/L	6	-	<0.50	7616806	<0.50	0.50	7616806
Dissolved Arsenic (As)	ug/L	10	-	<1.0	7616806	<1.0	1.0	7616806

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)
N/A = Not Applicable

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BV Labs Job #: C1S3957
Report Date: 2021/10/07

exp Services Inc
Client Project #: KCH-21009432-A0
Site Location: THAMES CENTRE PIT
Sampler Initials: JM

RCAP - COMPREHENSIVE (LAB FILTERED)

BV Labs ID				QUR292		QUR293		
Sampling Date				2021/09/29 16:30		2021/09/29 17:00		
COC Number				839958-01-01		839958-01-01		
	UNITS	MAC	A/O	MW4	QC Batch	MW5	RDL	QC Batch
Dissolved Barium (Ba)	ug/L	1000	-	52	7616806	34	2.0	7616806
Dissolved Beryllium (Be)	ug/L	-	-	<0.40	7616806	<0.40	0.40	7616806
Dissolved Boron (B)	ug/L	5000	-	17	7616806	27	10	7616806
Dissolved Cadmium (Cd)	ug/L	5	-	<0.090	7616806	<0.090	0.090	7616806
Dissolved Calcium (Ca)	ug/L	-	-	95000	7616806	110000	200	7616806
Dissolved Chromium (Cr)	ug/L	50	-	<5.0	7616806	<5.0	5.0	7616806
Dissolved Cobalt (Co)	ug/L	-	-	<0.50	7616806	<0.50	0.50	7616806
Dissolved Copper (Cu)	ug/L	-	1000	<0.90	7616806	1.1	0.90	7616806
Dissolved Iron (Fe)	ug/L	-	300	<100	7616806	<100	100	7616806
Dissolved Lead (Pb)	ug/L	10	-	<0.50	7616806	<0.50	0.50	7616806
Dissolved Magnesium (Mg)	ug/L	-	-	20000	7616806	25000	50	7616806
Dissolved Manganese (Mn)	ug/L	-	50	7.2	7616806	34	2.0	7616806
Dissolved Molybdenum (Mo)	ug/L	-	-	1.5	7616806	4.6	0.50	7616806
Dissolved Nickel (Ni)	ug/L	-	-	<1.0	7616806	1.2	1.0	7616806
Dissolved Phosphorus (P)	ug/L	-	-	<100	7616806	<100	100	7616806
Dissolved Potassium (K)	ug/L	-	-	2000	7616806	2000	200	7616806
Dissolved Selenium (Se)	ug/L	50	-	<2.0	7616806	<2.0	2.0	7616806
Dissolved Silicon (Si)	ug/L	-	-	4400	7616806	4900	50	7616806
Dissolved Silver (Ag)	ug/L	-	-	<0.090	7616806	<0.090	0.090	7616806
Dissolved Sodium (Na)	ug/L	-	200000	12000	7616806	29000	100	7616806
Dissolved Strontium (Sr)	ug/L	-	-	140	7616806	170	1.0	7616806
Dissolved Thallium (Tl)	ug/L	-	-	<0.050	7616806	<0.050	0.050	7616806
Dissolved Titanium (Ti)	ug/L	-	-	<5.0	7616806	<5.0	5.0	7616806
Dissolved Uranium (U)	ug/L	20	-	1.9	7616806	4.1	0.10	7616806
Dissolved Vanadium (V)	ug/L	-	-	<0.50	7616806	<0.50	0.50	7616806
Dissolved Zinc (Zn)	ug/L	-	5000	19	7616806	9.4	5.0	7616806

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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BV Labs Job #: C1S3957
Report Date: 2021/10/07

exp Services Inc
Client Project #: KCH-21009432-A0
Site Location: THAMES CENTRE PIT
Sampler Initials: JM

RCAP - SURFACE WATER (WATER)

BV Labs ID				QUR294	QUR295		
Sampling Date				2021/09/29 17:30	2021/09/29 18:30		
COC Number				839958-01-01	839958-01-01		
	UNITS	MAC	A/O	SW1	SW2	RDL	QC Batch
Calculated Parameters							
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	-	-	270	270	1.0	7610010
Calculated TDS	mg/L	-	500	420	420	1.0	7610017
Carb. Alkalinity (calc. as CaCO3)	mg/L	-	-	3.3	3.8	1.0	7610010
Hardness (CaCO3)	mg/L	-	80:100	**360**	**350**	1.0	7610288
Langelier Index (@ 20C)	N/A	-	-	1.13	1.20		7610013
Langelier Index (@ 4C)	N/A	-	-	0.883	0.952		7610014
Saturation pH (@ 20C)	N/A	-	-	6.98	6.98		7610013
Saturation pH (@ 4C)	N/A	-	-	7.23	7.23		7610014
Inorganics							
Total Ammonia-N	mg/L	-	-	<0.050	<0.050	0.050	7617146
Conductivity	umho/cm	-	-	710	710	1.0	7613005
Total Organic Carbon (TOC)	mg/L	-	-	3.8	3.9	0.40	7617112
Orthophosphate (P)	mg/L	-	-	0.019	0.023	0.010	7613566
pH	pH	-	6.5:8.5	8.11	8.18		7613008
Total Phosphorus	mg/L	-	-	0.028	0.029	0.004	7618342
Dissolved Sulphate (SO4)	mg/L	-	500	25	24	1.0	7613565
Turbidity	NTU	-	5	0.7	0.7	0.1	7611805
Alkalinity (Total as CaCO3)	mg/L	-	30:500	270	270	1.0	7612994
Dissolved Chloride (Cl-)	mg/L	-	250	41	40	1.0	7613553
Nitrite (N)	mg/L	1	-	0.015	0.014	0.010	7612043
Nitrate (N)	mg/L	10	-	6.00	6.05	0.10	7612043
Metals							
Total Aluminum (Al)	ug/L	-	100	40	51	4.9	7617201
Total Antimony (Sb)	ug/L	6	-	<0.50	<0.50	0.50	7617201
Total Arsenic (As)	ug/L	10	-	<1.0	<1.0	1.0	7617201
Total Barium (Ba)	ug/L	1000	-	50	50	2.0	7617201
Total Beryllium (Be)	ug/L	-	-	<0.40	<0.40	0.40	7617201
Total Boron (B)	ug/L	5000	-	20	19	10	7617201

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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RCAP - SURFACE WATER (WATER)

BV Labs ID				QUR294	QUR295		
Sampling Date				2021/09/29 17:30	2021/09/29 18:30		
COC Number				839958-01-01	839958-01-01		
	UNITS	MAC	A/O	SW1	SW2	RDL	QC Batch
Total Cadmium (Cd)	ug/L	5	-	<0.090	<0.090	0.090	7617201
Total Calcium (Ca)	ug/L	-	-	110000	110000	200	7617201
Total Chromium (Cr)	ug/L	50	-	<5.0	<5.0	5.0	7617201
Total Cobalt (Co)	ug/L	-	-	<0.50	<0.50	0.50	7617201
Total Copper (Cu)	ug/L	-	1000	2.0	2.1	0.90	7617201
Total Iron (Fe)	ug/L	-	300	<100	110	100	7617201
Total Lead (Pb)	ug/L	10	-	<0.50	<0.50	0.50	7617201
Total Magnesium (Mg)	ug/L	-	-	20000	20000	50	7617201
Total Manganese (Mn)	ug/L	-	50	16	15	2.0	7617201
Total Molybdenum (Mo)	ug/L	-	-	0.58	0.60	0.50	7617201
Total Nickel (Ni)	ug/L	-	-	<1.0	<1.0	1.0	7617201
Total Potassium (K)	ug/L	-	-	3800	3700	200	7617201
Total Selenium (Se)	ug/L	50	-	<2.0	<2.0	2.0	7617201
Total Silicon (Si)	ug/L	-	-	4200	4100	50	7617201
Total Silver (Ag)	ug/L	-	-	<0.090	0.14	0.090	7617201
Total Sodium (Na)	ug/L	-	200000	20000	19000	100	7617201
Total Strontium (Sr)	ug/L	-	-	160	160	1.0	7617201
Total Thallium (Tl)	ug/L	-	-	<0.050	<0.050	0.050	7617201
Total Titanium (Ti)	ug/L	-	-	<5.0	<5.0	5.0	7617201
Total Tungsten (W)	ug/L	-	-	<1.0	<1.0	1.0	7617201
Total Uranium (U)	ug/L	20	-	1.2	1.3	0.10	7617201
Total Vanadium (V)	ug/L	-	-	0.75	0.80	0.50	7617201
Total Zinc (Zn)	ug/L	-	5000	<5.0	<5.0	5.0	7617201
Total Zirconium (Zr)	ug/L	-	-	<1.0	<1.0	1.0	7617201

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

BV Labs Job #: C1S3957
Report Date: 2021/10/07

exp Services Inc
Client Project #: KCH-21009432-A0
Site Location: THAMES CENTRE PIT
Sampler Initials: JM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID				QUR294	QUR295		
Sampling Date				2021/09/29 17:30	2021/09/29 18:30		
COC Number				839958-01-01	839958-01-01		
	UNITS	MAC	A/O	SW1	SW2	RDL	QC Batch
Metals							
Dissolved Aluminum (Al)	ug/L	-	100	<4.9	<4.9	4.9	7616806
Dissolved Antimony (Sb)	ug/L	6	-	<0.50	<0.50	0.50	7616806
Dissolved Arsenic (As)	ug/L	10	-	<1.0	<1.0	1.0	7616806
Dissolved Barium (Ba)	ug/L	1000	-	50	51	2.0	7616806
Dissolved Beryllium (Be)	ug/L	-	-	<0.40	<0.40	0.40	7616806
Dissolved Bismuth (Bi)	ug/L	-	-	<1.0	<1.0	1.0	7616806
Dissolved Boron (B)	ug/L	5000	-	21	21	10	7616806
Dissolved Cadmium (Cd)	ug/L	5	-	<0.090	<0.090	0.090	7616806
Dissolved Calcium (Ca)	ug/L	-	-	110000	110000	200	7616806
Dissolved Chromium (Cr)	ug/L	50	-	<5.0	<5.0	5.0	7616806
Dissolved Cobalt (Co)	ug/L	-	-	<0.50	<0.50	0.50	7616806
Dissolved Copper (Cu)	ug/L	-	1000	1.6	1.6	0.90	7616806
Dissolved Iron (Fe)	ug/L	-	300	<100	<100	100	7616806
Dissolved Lead (Pb)	ug/L	10	-	<0.50	<0.50	0.50	7616806
Dissolved Lithium (Li)	ug/L	-	-	<5.0	<5.0	5.0	7616806
Dissolved Magnesium (Mg)	ug/L	-	-	20000	20000	50	7616806
Dissolved Manganese (Mn)	ug/L	-	50	7.9	6.1	2.0	7616806
Dissolved Molybdenum (Mo)	ug/L	-	-	0.56	0.64	0.50	7616806
Dissolved Nickel (Ni)	ug/L	-	-	<1.0	<1.0	1.0	7616806
Dissolved Phosphorus (P)	ug/L	-	-	100	<100	100	7616806
Dissolved Potassium (K)	ug/L	-	-	3800	3700	200	7616806
Dissolved Selenium (Se)	ug/L	50	-	<2.0	<2.0	2.0	7616806
Dissolved Silicon (Si)	ug/L	-	-	4400	4400	50	7616806
Dissolved Silver (Ag)	ug/L	-	-	<0.090	<0.090	0.090	7616806
Dissolved Sodium (Na)	ug/L	-	200000	19000	19000	100	7616806
Dissolved Strontium (Sr)	ug/L	-	-	160	160	1.0	7616806
Dissolved Tellurium (Te)	ug/L	-	-	<1.0	<1.0	1.0	7616806
Dissolved Thallium (Tl)	ug/L	-	-	<0.050	<0.050	0.050	7616806

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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BV Labs Job #: C1S3957
Report Date: 2021/10/07

exp Services Inc
Client Project #: KCH-21009432-A0
Site Location: THAMES CENTRE PIT
Sampler Initials: JM

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID				QUR294	QUR295		
Sampling Date				2021/09/29 17:30	2021/09/29 18:30		
COC Number				839958-01-01	839958-01-01		
	UNITS	MAC	A/O	SW1	SW2	RDL	QC Batch
Dissolved Tin (Sn)	ug/L	-	-	<1.0	<1.0	1.0	7616806
Dissolved Titanium (Ti)	ug/L	-	-	<5.0	<5.0	5.0	7616806
Dissolved Tungsten (W)	ug/L	-	-	<1.0	<1.0	1.0	7616806
Dissolved Uranium (U)	ug/L	20	-	1.3	1.3	0.10	7616806
Dissolved Vanadium (V)	ug/L	-	-	<0.50	<0.50	0.50	7616806
Dissolved Zinc (Zn)	ug/L	-	5000	<5.0	<5.0	5.0	7616806
Dissolved Zirconium (Zr)	ug/L	-	-	<1.0	<1.0	1.0	7616806

No Fill	No Exceedance
Grey	Exceeds 1 criteria policy/level
Black	Exceeds both criteria/levels

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
MAC,A/O: Ontario Drinking Water Standards - Maximum Acceptable Concentration [MAC] & Table 4-Chemical/Physical Objectives [A/O] - Not Health Related, respectively
(Made under the Ontario Safe Drinking Water Act, 2002)

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BV Labs Job #: C1S3957
Report Date: 2021/10/07

exp Services Inc
Client Project #: KCH-21009432-A0
Site Location: THAMES CENTRE PIT
Sampler Initials: JM

TEST SUMMARY

BV Labs ID: QUR292
Sample ID: MW4
Matrix: Water

Collected: 2021/09/29
Shipped:
Received: 2021/09/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7614247	N/A	2021/10/05	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7610010	N/A	2021/10/05	Automated Statchk
Chloride by Automated Colourimetry	KONE	7614560	N/A	2021/10/04	Avneet Kour Sudan
Conductivity	AT	7614254	N/A	2021/10/05	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7615096	N/A	2021/10/04	Julianna Castiglione
Hardness (calculated as CaCO3)		7610288	N/A	2021/10/07	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	7616806	2021/10/04	2021/10/06	Prempal Bhatti
Ion Balance (% Difference)	CALC	7610018	N/A	2021/10/07	Automated Statchk
Anion and Cation Sum	CALC	7610019	N/A	2021/10/07	Automated Statchk
Total Ammonia-N	LACH/NH4	7617146	N/A	2021/10/05	Viorica Rotaru
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7613542	N/A	2021/10/04	Chandra Nandlal
pH	AT	7614255	2021/10/01	2021/10/05	Surinder Rai
Orthophosphate	KONE	7614562	N/A	2021/10/04	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7610013	N/A	2021/10/07	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7610014	N/A	2021/10/07	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7614561	N/A	2021/10/04	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7610017	N/A	2021/10/07	Automated Statchk

BV Labs ID: QUR293
Sample ID: MW5
Matrix: Water

Collected: 2021/09/29
Shipped:
Received: 2021/09/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7614247	N/A	2021/10/05	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7610010	N/A	2021/10/05	Automated Statchk
Chloride by Automated Colourimetry	KONE	7614560	N/A	2021/10/04	Avneet Kour Sudan
Conductivity	AT	7614254	N/A	2021/10/05	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7615096	N/A	2021/10/04	Julianna Castiglione
Hardness (calculated as CaCO3)		7610288	N/A	2021/10/07	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	7616806	2021/10/04	2021/10/06	Prempal Bhatti
Ion Balance (% Difference)	CALC	7610018	N/A	2021/10/07	Automated Statchk
Anion and Cation Sum	CALC	7610019	N/A	2021/10/07	Automated Statchk
Total Ammonia-N	LACH/NH4	7617430	N/A	2021/10/05	Viorica Rotaru
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7613542	N/A	2021/10/04	Chandra Nandlal
pH	AT	7614255	2021/10/01	2021/10/05	Surinder Rai
Orthophosphate	KONE	7614562	N/A	2021/10/04	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7610013	N/A	2021/10/07	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7610014	N/A	2021/10/07	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7614561	N/A	2021/10/04	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7610017	N/A	2021/10/07	Automated Statchk

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BV Labs Job #: C1S3957
Report Date: 2021/10/07

exp Services Inc
Client Project #: KCH-21009432-A0
Site Location: THAMES CENTRE PIT
Sampler Initials: JM

TEST SUMMARY

BV Labs ID: QUR294
Sample ID: SW1
Matrix: Water

Collected: 2021/09/29
Shipped:
Received: 2021/09/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7612994	N/A	2021/10/04	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7610010	N/A	2021/10/05	Automated Statchk
Chloride by Automated Colourimetry	KONE	7613553	N/A	2021/10/04	Alina Dobreanu
Conductivity	AT	7613005	N/A	2021/10/04	Surinder Rai
Hardness (calculated as CaCO3)		7610288	N/A	2021/10/07	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	7616806	2021/10/04	2021/10/06	Prempal Bhatti
Total Metals Analysis by ICPMS	ICP/MS	7617201	N/A	2021/10/05	Nan Raykha
Total Ammonia-N	LACH/NH4	7617146	N/A	2021/10/05	Viorica Rotaru
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7612043	N/A	2021/10/01	Chandra Nandlal
pH	AT	7613008	2021/10/01	2021/10/04	Surinder Rai
Orthophosphate	KONE	7613566	N/A	2021/10/04	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7610013	N/A	2021/10/07	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7610014	N/A	2021/10/07	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7613565	N/A	2021/10/04	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7610017	N/A	2021/10/07	Automated Statchk
Total Organic Carbon (TOC)	TOCV/NDIR	7617112	N/A	2021/10/06	Julianna Castiglione
Total Phosphorus (Colourimetric)	LACH/P	7618342	2021/10/05	2021/10/05	Shivani Shivani
Turbidity	AT	7611805	N/A	2021/10/01	Neil Dassanayake

BV Labs ID: QUR295
Sample ID: SW2
Matrix: Water

Collected: 2021/09/29
Shipped:
Received: 2021/09/30

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7612994	N/A	2021/10/04	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7610010	N/A	2021/10/05	Automated Statchk
Chloride by Automated Colourimetry	KONE	7613553	N/A	2021/10/04	Alina Dobreanu
Conductivity	AT	7613005	N/A	2021/10/04	Surinder Rai
Hardness (calculated as CaCO3)		7610288	N/A	2021/10/07	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	7616806	2021/10/04	2021/10/06	Prempal Bhatti
Total Metals Analysis by ICPMS	ICP/MS	7617201	N/A	2021/10/05	Nan Raykha
Total Ammonia-N	LACH/NH4	7617146	N/A	2021/10/05	Viorica Rotaru
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7612043	N/A	2021/10/01	Chandra Nandlal
pH	AT	7613008	2021/10/01	2021/10/04	Surinder Rai
Orthophosphate	KONE	7613566	N/A	2021/10/04	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7610013	N/A	2021/10/07	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7610014	N/A	2021/10/07	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7613565	N/A	2021/10/04	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7610017	N/A	2021/10/07	Automated Statchk
Total Organic Carbon (TOC)	TOCV/NDIR	7617112	N/A	2021/10/06	Julianna Castiglione
Total Phosphorus (Colourimetric)	LACH/P	7618342	2021/10/05	2021/10/05	Shivani Shivani
Turbidity	AT	7611805	N/A	2021/10/01	Neil Dassanayake

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	2.3°C

Results relate only to the items tested.

BV Labs Job #: C1S3957
Report Date: 2021/10/07

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: KCH-21009432-A0
Site Location: THAMES CENTRE PIT
Sampler Initials: JM

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7611805	Turbidity	2021/10/01			95	85 - 115	<0.1	NTU	0.024	20		
7612043	Nitrate (N)	2021/10/01	81	80 - 120	100	80 - 120	<0.10	mg/L	NC	20		
7612043	Nitrite (N)	2021/10/01	105	80 - 120	103	80 - 120	<0.010	mg/L	NC	20		
7612994	Alkalinity (Total as CaCO3)	2021/10/04			95	85 - 115	<1.0	mg/L	1.3	20		
7613005	Conductivity	2021/10/04			101	85 - 115	<1.0	umho/cm	0.084	25		
7613008	pH	2021/10/04			102	98 - 103			2.4	N/A		
7613542	Nitrate (N)	2021/10/04	102	80 - 120	107	80 - 120	<0.10	mg/L	NC	20		
7613542	Nitrite (N)	2021/10/04	102	80 - 120	103	80 - 120	<0.010	mg/L	NC	20		
7613553	Dissolved Chloride (Cl-)	2021/10/04	NC	80 - 120	102	80 - 120	<1.0	mg/L	6.6	20		
7613565	Dissolved Sulphate (SO4)	2021/10/04	95	75 - 125	101	80 - 120	<1.0	mg/L	0.58	20		
7613566	Orthophosphate (P)	2021/10/04	114	75 - 125	99	80 - 120	<0.010	mg/L	NC	25		
7614247	Alkalinity (Total as CaCO3)	2021/10/05			94	85 - 115	<1.0	mg/L	0.41	20		
7614254	Conductivity	2021/10/05			100	85 - 115	<1.0	umho/cm	0.48	25		
7614255	pH	2021/10/05			102	98 - 103			0.13	N/A		
7614560	Dissolved Chloride (Cl-)	2021/10/04	111	80 - 120	102	80 - 120	<1.0	mg/L	5.9	20		
7614561	Dissolved Sulphate (SO4)	2021/10/04	80	75 - 125	97	80 - 120	<1.0	mg/L	0.28	20		
7614562	Orthophosphate (P)	2021/10/04	116	75 - 125	100	80 - 120	<0.010	mg/L	NC	25		
7615096	Dissolved Organic Carbon	2021/10/04	97	80 - 120	98	80 - 120	<0.40	mg/L	0.047	20		
7616806	Dissolved Aluminum (Al)	2021/10/06	105	80 - 120	108	80 - 120	<4.9	ug/L	NC	20		
7616806	Dissolved Antimony (Sb)	2021/10/06	105	80 - 120	104	80 - 120	<0.50	ug/L	NC	20		
7616806	Dissolved Arsenic (As)	2021/10/06	101	80 - 120	103	80 - 120	<1.0	ug/L	NC	20		
7616806	Dissolved Barium (Ba)	2021/10/06	104	80 - 120	105	80 - 120	<2.0	ug/L	3.2	20		
7616806	Dissolved Beryllium (Be)	2021/10/06	109	80 - 120	105	80 - 120	<0.40	ug/L	NC	20		
7616806	Dissolved Bismuth (Bi)	2021/10/06	101	80 - 120	101	80 - 120	<1.0	ug/L				
7616806	Dissolved Boron (B)	2021/10/06	109	80 - 120	104	80 - 120	<10	ug/L	0.90	20		
7616806	Dissolved Cadmium (Cd)	2021/10/06	103	80 - 120	104	80 - 120	<0.090	ug/L	NC	20		
7616806	Dissolved Calcium (Ca)	2021/10/06	86	80 - 120	106	80 - 120	<200	ug/L	3.1	20		
7616806	Dissolved Chromium (Cr)	2021/10/06	99	80 - 120	100	80 - 120	<5.0	ug/L	NC	20		
7616806	Dissolved Cobalt (Co)	2021/10/06	102	80 - 120	103	80 - 120	<0.50	ug/L	NC	20		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7616806	Dissolved Copper (Cu)	2021/10/06	100	80 - 120	105	80 - 120	<0.90	ug/L	9.4	20		
7616806	Dissolved Iron (Fe)	2021/10/06	104	80 - 120	104	80 - 120	<100	ug/L	NC	20		
7616806	Dissolved Lead (Pb)	2021/10/06	100	80 - 120	98	80 - 120	<0.50	ug/L	NC	20		
7616806	Dissolved Lithium (Li)	2021/10/06	111	80 - 120	108	80 - 120	<5.0	ug/L				
7616806	Dissolved Magnesium (Mg)	2021/10/06	106	80 - 120	107	80 - 120	<50	ug/L	0.071	20		
7616806	Dissolved Manganese (Mn)	2021/10/06	104	80 - 120	104	80 - 120	<2.0	ug/L	NC	20		
7616806	Dissolved Molybdenum (Mo)	2021/10/06	100	80 - 120	100	80 - 120	<0.50	ug/L	NC	20		
7616806	Dissolved Nickel (Ni)	2021/10/06	100	80 - 120	102	80 - 120	<1.0	ug/L	NC	20		
7616806	Dissolved Phosphorus (P)	2021/10/06	114	80 - 120	127 (1)	80 - 120	<100	ug/L	NC	20		
7616806	Dissolved Potassium (K)	2021/10/06	107	80 - 120	106	80 - 120	<200	ug/L	0.24	20		
7616806	Dissolved Selenium (Se)	2021/10/06	100	80 - 120	103	80 - 120	<2.0	ug/L	NC	20		
7616806	Dissolved Silicon (Si)	2021/10/06	107	80 - 120	108	80 - 120	<50	ug/L	0.065	20		
7616806	Dissolved Silver (Ag)	2021/10/06	100	80 - 120	100	80 - 120	<0.090	ug/L	NC	20		
7616806	Dissolved Sodium (Na)	2021/10/06	103	80 - 120	105	80 - 120	<100	ug/L	0.13	20		
7616806	Dissolved Strontium (Sr)	2021/10/06	100	80 - 120	102	80 - 120	<1.0	ug/L	1.3	20		
7616806	Dissolved Tellurium (Te)	2021/10/06	103	80 - 120	105	80 - 120	<1.0	ug/L				
7616806	Dissolved Thallium (Tl)	2021/10/06	102	80 - 120	104	80 - 120	<0.050	ug/L	NC	20		
7616806	Dissolved Tin (Sn)	2021/10/06	103	80 - 120	105	80 - 120	<1.0	ug/L				
7616806	Dissolved Titanium (Ti)	2021/10/06	103	80 - 120	104	80 - 120	<5.0	ug/L	NC	20		
7616806	Dissolved Tungsten (W)	2021/10/06	100	80 - 120	101	80 - 120	<1.0	ug/L				
7616806	Dissolved Uranium (U)	2021/10/06	102	80 - 120	101	80 - 120	<0.10	ug/L	2.5	20		
7616806	Dissolved Vanadium (V)	2021/10/06	102	80 - 120	102	80 - 120	<0.50	ug/L	NC	20		
7616806	Dissolved Zinc (Zn)	2021/10/06	100	80 - 120	101	80 - 120	<5.0	ug/L	NC	20		
7616806	Dissolved Zirconium (Zr)	2021/10/06	110	80 - 120	111	80 - 120	<1.0	ug/L				
7617112	Total Organic Carbon (TOC)	2021/10/05	97	80 - 120	97	80 - 120	<0.40	mg/L	NC	20		
7617146	Total Ammonia-N	2021/10/05	103	75 - 125	98	80 - 120	<0.050	mg/L	0.30	20		
7617201	Total Aluminum (Al)	2021/10/05	111	80 - 120	104	80 - 120	<4.9	ug/L	7.8	20		
7617201	Total Antimony (Sb)	2021/10/05	108	80 - 120	107	80 - 120	<0.50	ug/L	NC	20		
7617201	Total Arsenic (As)	2021/10/05	102	80 - 120	98	80 - 120	<1.0	ug/L	NC	20		
7617201	Total Barium (Ba)	2021/10/05	99	80 - 120	100	80 - 120	<2.0	ug/L				
7617201	Total Beryllium (Be)	2021/10/05	107	80 - 120	101	80 - 120	<0.40	ug/L				

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7617201	Total Boron (B)	2021/10/05	103	80 - 120	93	80 - 120	<10	ug/L				
7617201	Total Cadmium (Cd)	2021/10/05	104	80 - 120	103	80 - 120	<0.090	ug/L	NC	20		
7617201	Total Calcium (Ca)	2021/10/05	111	80 - 120	101	80 - 120	<200	ug/L				
7617201	Total Chromium (Cr)	2021/10/05	102	80 - 120	98	80 - 120	<5.0	ug/L	NC	20		
7617201	Total Cobalt (Co)	2021/10/05	100	80 - 120	97	80 - 120	<0.50	ug/L	NC	20		
7617201	Total Copper (Cu)	2021/10/05	105	80 - 120	106	80 - 120	<0.90	ug/L	NC	20		
7617201	Total Iron (Fe)	2021/10/05	100	80 - 120	97	80 - 120	<100	ug/L				
7617201	Total Lead (Pb)	2021/10/05	97	80 - 120	97	80 - 120	<0.50	ug/L	NC	20		
7617201	Total Magnesium (Mg)	2021/10/05	104	80 - 120	100	80 - 120	<50	ug/L				
7617201	Total Manganese (Mn)	2021/10/05	102	80 - 120	99	80 - 120	<2.0	ug/L	2.6	20		
7617201	Total Molybdenum (Mo)	2021/10/05	106	80 - 120	104	80 - 120	<0.50	ug/L	0.81	20		
7617201	Total Nickel (Ni)	2021/10/05	97	80 - 120	97	80 - 120	<1.0	ug/L	13	20		
7617201	Total Potassium (K)	2021/10/05	105	80 - 120	98	80 - 120	<200	ug/L				
7617201	Total Selenium (Se)	2021/10/05	106	80 - 120	105	80 - 120	<2.0	ug/L	NC	20		
7617201	Total Silicon (Si)	2021/10/05	107	80 - 120	101	80 - 120	<50	ug/L				
7617201	Total Silver (Ag)	2021/10/05	103	80 - 120	104	80 - 120	<0.090	ug/L	NC	20		
7617201	Total Sodium (Na)	2021/10/05	92	80 - 120	100	80 - 120	<100	ug/L				
7617201	Total Strontium (Sr)	2021/10/05	97	80 - 120	96	80 - 120	<1.0	ug/L				
7617201	Total Thallium (Tl)	2021/10/05	96	80 - 120	99	80 - 120	<0.050	ug/L				
7617201	Total Titanium (Ti)	2021/10/05	103	80 - 120	100	80 - 120	<5.0	ug/L	4.8	20		
7617201	Total Tungsten (W)	2021/10/05	107	80 - 120	106	80 - 120	<1.0	ug/L				
7617201	Total Uranium (U)	2021/10/05	95	80 - 120	92	80 - 120	<0.10	ug/L				
7617201	Total Vanadium (V)	2021/10/05	104	80 - 120	99	80 - 120	<0.50	ug/L				
7617201	Total Zinc (Zn)	2021/10/05	102	80 - 120	103	80 - 120	<5.0	ug/L	2.2	20		
7617201	Total Zirconium (Zr)	2021/10/05	109	80 - 120	106	80 - 120	<1.0	ug/L				
7617430	Total Ammonia-N	2021/10/05	103	75 - 125	102	80 - 120	<0.050	mg/L	3.7	20		

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7618342	Total Phosphorus	2021/10/05	100	80 - 120	99	80 - 120	<0.004	mg/L	4.3	20	95	80 - 120

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

Bureau Veritas Laboratories 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

BV Labs Job #: C1S3957
Report Date: 2021/10/07

exp Services Inc
Client Project #: KCH-21009432-A0
Site Location: THAMES CENTRE PIT
Sampler Initials: JM

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

[redacted]

Brad Newman, B.Sc., C.Chem., Scientific Service Specialist

BV Labs has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

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IMMEDIATE TEST

Bureau Veritas Laboratories
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Page of

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name:	#28124 exp Services Inc	Company Name:	EXP SERVICES INC.	Quotation #:	B91718	BV Labs Job #:	Bottle Order #:
Attention:	Accounts Payable	Attention:	HEATHER JAGGARD	PO #:			839958
Address:	15701 Robin's Hill Rd Unit 2	Address:		Project:	KCH-21009432-A0	COC #:	Project Manager:
	London ON N5V 0A5			Project Name:	THAMES CENTRE PIT	C#839958-01-01	Christine Gripton
Tel:	(519) 963-3000 Fax: (519) 963-1152	Tel:		Site #:			
Email:	AP@exp.com, karen.Burke@exp.com, Lo-Ellen.Mitton	Email:	JASNEEL.MAHAL@EXP.com HEATHER.JAGGARD@EXP.com	Sampled By:	JM		

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BV LABS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011)	Other Regulations	Special Instructions
☐ Table 1 ☐ Res/Park ☐ Medium/Fine	☐ CCME ☐ Sanitary Sewer Bylaw	
☐ Table 2 ☐ Ind/Comm ☐ Coarse	☐ Reg 558 ☐ Storm Sewer Bylaw	
☐ Table 3 ☐ Agr/Other ☐ For RSC	☐ MISA Municipality	
☐ Table	☐ PWQO ☐ Reg 406 Table	
	☐ Other	
Include Criteria on Certificate of Analysis (Y/N)? YES		

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☒
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: _____ Time Required: _____ ☐
Rush Confirmation Number: _____ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle) Metals / Hg / Cr VI	RCAP - Comprehensive (Lab Filtered)	RCAP - Surface Water	Lab Filtered Metals by ICPMS						# of Bottles	Comments
1		MW4	21/09/29	4:30PM	GW	NO	X								3	
2		MW5	21/09/29	5:00PM	GW	NO	X								3	
3		SW1	21/09/29	5:30PM	SW	NO		X	X						5	
4		SW2	21/09/29	6:30PM	SW	NO		X	X						5	
5																
6																
7																
8																
9																
10																

30-Sep-21 08:30
Christine Gripton
C1S3957
VBV ENV 1512
On Ice

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted	Laboratory Use Only: Time Sensitive	Temperature (°C) on Recei	Custody Seal Present	Yes	No
JASNEEL MAHAL [redacted]	21/09/29	7:30PM	[redacted]	2021/09/30	8:30			2, 3, 2	Intact	✓	
			[redacted]	2021/09/30	18:00						

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO [redacted] SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVLABS.COM/TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVLABS.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

SAMPLES MUST BE KEPT COOL (< 10° C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BV LABS

White: BV Labs Yellow: Client

BV#018550 0.2.1

BV Labs Job #: C1S3957
Report Date: 2021/10/07

exp Services Inc
Client Project #: KCH-21009432-A0
Site Location: THAMES CENTRE PIT
Sampler Initials: JM

Exceedance Summary Table – ODWS (2002)

Result Exceedances

Sample ID	BV Labs ID	Parameter	Criteria	Result	DL	UNITS
No Exceedances						

The exceedance summary table is for information purposes only and should not be considered a comprehensive listing or statement of conformance to applicable regulatory guidelines.

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Your Project #: KCH-21009452
Site Location: HWY 2
Your C.O.C. #: 868526-01-01

Attention: Kelli Dobbin

exp Services Inc
London Branch
15701 Robin's Hill Rd
Unit 2
London, ON
CANADA N5V 0A5

Report Date: 2022/03/23
Report #: R7055275
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C271236
Received: 2022/03/17, 08:30

Sample Matrix: Water
Samples Received: 4

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	4	N/A	2022/03/21	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	4	N/A	2022/03/22	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	4	N/A	2022/03/22	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	4	N/A	2022/03/21	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	2	N/A	2022/03/21	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	2	N/A	2022/03/21	CAM SOP 00102/00408/00447	SM 2340 B
Hardness (calculated as CaCO3)	2	N/A	2022/03/23	CAM SOP 00102/00408/00447	SM 2340 B
Lab Filtered Metals Analysis by ICP	2	2022/03/18	2022/03/21	CAM SOP-00408	EPA 6010D m
Lab Filtered Metals by ICPMS	2	2022/03/18	2022/03/21	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	2	N/A	2022/03/22	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	2	N/A	2022/03/22		
Anion and Cation Sum	2	N/A	2022/03/22		
Total Ammonia-N	4	N/A	2022/03/21	CAM SOP-00441	USGS I-2522-90 m
Nitrate & Nitrite as Nitrogen in Water (2)	4	N/A	2022/03/20	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	4	2022/03/18	2022/03/21	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	4	N/A	2022/03/21	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	2	N/A	2022/03/22		Auto Calc
Sat. pH and Langelier Index (@ 20C)	2	N/A	2022/03/23		Auto Calc
Sat. pH and Langelier Index (@ 4C)	2	N/A	2022/03/22		Auto Calc
Sat. pH and Langelier Index (@ 4C)	2	N/A	2022/03/23		Auto Calc
Sulphate by Automated Colourimetry	4	N/A	2022/03/21	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	2	N/A	2022/03/22		Auto Calc
Total Dissolved Solids (TDS calc)	2	N/A	2022/03/23		Auto Calc
Total Organic Carbon (TOC) (3)	2	N/A	2022/03/21	CAM SOP-00446	SM 23 5310B m
Total Phosphorus (Colourimetric)	2	2022/03/21	2022/03/22	CAM SOP-00407	SM 23 4500 P B H m
Turbidity	2	N/A	2022/03/18	CAM SOP-00417	SM 23 2130 B m

Remarks:

Your Project #: KCH-21009452
Site Location: HWY 2
Your C.O.C. #: 868526-01-01

Attention: Kelli Dobbin

exp Services Inc
London Branch
15701 Robin's Hill Rd
Unit 2
London, ON
CANADA N5V 0A5

Report Date: 2022/03/23
Report #: R7055275
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C271236
Received: 2022/03/17, 08:30

Bureau Veritas is accredited to ISO/IEC 17025 for specific parameters on scopes of accreditation. Unless otherwise noted, procedures used by Bureau Veritas are based upon recognized Provincial, Federal or US method compendia such as CCME, MELCC, EPA, APHA.

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and Bureau Veritas in writing). All data is in statistical control and has met quality control and method performance criteria unless otherwise noted. All method blanks are reported; unless indicated otherwise, associated sample data are not blank corrected. Where applicable, unless otherwise noted, Measurement Uncertainty has not been accounted for when stating conformity to the referenced standard.

Bureau Veritas liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. Bureau Veritas has been retained to provide analysis of samples provided by the Client using the testing methodology referenced in this report. Interpretation and use of test results are the sole responsibility of the Client and are not within the scope of services provided by Bureau Veritas, unless otherwise agreed in writing. Bureau Veritas is not responsible for the accuracy or any data impacts, that result from the information provided by the customer or their agent.

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.

Reference Method suffix "m" indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Dissolved Organic Carbon (DOC) present in the sample should be considered as non-purgeable DOC.
(2) Values for calculated parameters may not appear to add up due to rounding of raw data and significant figures.
(3) Total Organic Carbon (TOC) present in the sample should be considered as non-purgeable TOC.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bureauveritas.com
Phone# (519)652-9444

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports.
For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas Job #: C271236
Report Date: 2022/03/23

exp Services Inc
Client Project #: KCH-21009452
Site Location: HWY 2
Sampler Initials: MB

RCAP - COMPREHENSIVE (LAB FILTERED)

Bureau Veritas ID		SCW006		SCW007		
Sampling Date		2022/03/15		2022/03/15		
COC Number		868526-01-01		868526-01-01		
	UNITS	MW4	RDL	MW5	RDL	QC Batch
Calculated Parameters						
Anion Sum	me/L	6.17	N/A	12.7	N/A	7890536
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	230	1.0	400	1.0	7890530
Calculated TDS	mg/L	340	1.0	750	1.0	7890542
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.5	1.0	2.6	1.0	7890530
Cation Sum	me/L	6.45	N/A	13.3	N/A	7890536
Hardness (CaCO3)	mg/L	310	1.0	610	1.0	7890531
Ion Balance (% Difference)	%	2.25	N/A	2.20	N/A	7890535
Langelier Index (@ 20C)	N/A	0.957		1.20		7890539
Langelier Index (@ 4C)	N/A	0.708		0.952		7890541
Saturation pH (@ 20C)	N/A	7.10		6.64		7890539
Saturation pH (@ 4C)	N/A	7.35		6.89		7890541
Inorganics						
Total Ammonia-N	mg/L	<0.050	0.050	<0.050	0.050	7894170
Conductivity	umho/cm	570	1.0	1200	1.0	7891895
Dissolved Organic Carbon	mg/L	1.6	0.40	2.2	0.40	7891189
Orthophosphate (P)	mg/L	<0.010	0.010	<0.010	0.010	7892015
pH	pH	8.06		7.84		7891903
Dissolved Sulphate (SO4)	mg/L	35	1.0	33	1.0	7892027
Alkalinity (Total as CaCO3)	mg/L	230	1.0	410	1.0	7891878
Dissolved Chloride (Cl-)	mg/L	8.6	1.0	34	1.0	7892024
Nitrite (N)	mg/L	<0.010	0.010	<0.010	0.010	7891864
Nitrate (N)	mg/L	7.81	0.10	41.5	0.50	7891864
Nitrate + Nitrite (N)	mg/L	7.81	0.10	41.5	0.50	7891864
Metals						
Dissolved Aluminum (Al)	ug/L	<4.9	4.9	<4.9	4.9	7891293
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	<0.50	0.50	7891293
Dissolved Arsenic (As)	ug/L	<1.0	1.0	<1.0	1.0	7891293
Dissolved Barium (Ba)	ug/L	45	2.0	45	2.0	7891293
Dissolved Beryllium (Be)	ug/L	<0.40	0.40	<0.40	0.40	7891293
Dissolved Boron (B)	ug/L	16	10	27	10	7891293
Dissolved Cadmium (Cd)	ug/L	<0.090	0.090	<0.090	0.090	7891293

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
N/A = Not Applicable

Bureau Veritas Job #: C271236
Report Date: 2022/03/23

exp Services Inc
Client Project #: KCH-21009452
Site Location: HWY 2
Sampler Initials: MB

RCAP - COMPREHENSIVE (LAB FILTERED)

Bureau Veritas ID		SCW006		SCW007		
Sampling Date		2022/03/15		2022/03/15		
COC Number		868526-01-01		868526-01-01		
	UNITS	MW4	RDL	MW5	RDL	QC Batch
Dissolved Calcium (Ca)	ug/L	92000	200	180000	200	7891293
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	<5.0	5.0	7891293
Dissolved Cobalt (Co)	ug/L	<0.50	0.50	<0.50	0.50	7891293
Dissolved Copper (Cu)	ug/L	1.7	0.90	2.3	0.90	7891293
Dissolved Iron (Fe)	ug/L	<100	100	<100	100	7891293
Dissolved Lead (Pb)	ug/L	<0.50	0.50	<0.50	0.50	7891293
Dissolved Magnesium (Mg)	ug/L	18000	50	37000	50	7891293
Dissolved Manganese (Mn)	ug/L	<2.0	2.0	3.1	2.0	7891293
Dissolved Molybdenum (Mo)	ug/L	0.59	0.50	<0.50	0.50	7891293
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	<1.0	1.0	7891293
Dissolved Phosphorus (P)	ug/L	<100	100	<100	100	7891293
Dissolved Potassium (K)	ug/L	1400	200	1900	200	7891293
Dissolved Selenium (Se)	ug/L	<2.0	2.0	<2.0	2.0	7891293
Dissolved Silicon (Si)	ug/L	3500	50	5200	50	7891293
Dissolved Silver (Ag)	ug/L	<0.090	0.090	<0.090	0.090	7891293
Dissolved Sodium (Na)	ug/L	7200	100	24000	100	7891293
Dissolved Strontium (Sr)	ug/L	130	1.0	260	1.0	7891293
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	<0.050	0.050	7891293
Dissolved Titanium (Ti)	ug/L	<5.0	5.0	<5.0	5.0	7891293
Dissolved Uranium (U)	ug/L	1.9	0.10	4.5	0.10	7891293
Dissolved Vanadium (V)	ug/L	<0.50	0.50	<0.50	0.50	7891293
Dissolved Zinc (Zn)	ug/L	95	5.0	50	5.0	7891293

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C271236
Report Date: 2022/03/23

exp Services Inc
Client Project #: KCH-21009452
Site Location: HWY 2
Sampler Initials: MB

RCAP - SURFACE WATER (WATER)

Bureau Veritas ID		SCW008	SCW009		
Sampling Date		2022/03/15	2022/03/15		
COC Number		868526-01-01	868526-01-01		
	UNITS	SW1	SW2	RDL	QC Batch
Calculated Parameters					
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	240	240	1.0	7890530
Calculated TDS	mg/L	350	350	1.0	7890542
Carb. Alkalinity (calc. as CaCO3)	mg/L	3.5	3.7	1.0	7890530
Hardness (CaCO3)	mg/L	290	290	1.0	7890531
Langelier Index (@ 20C)	N/A	1.10	1.12		7890539
Langelier Index (@ 4C)	N/A	0.848	0.867		7890541
Saturation pH (@ 20C)	N/A	7.09	7.09		7890539
Saturation pH (@ 4C)	N/A	7.34	7.34		7890541
Inorganics					
Total Ammonia-N	mg/L	<0.050	<0.050	0.050	7894170
Conductivity	umho/cm	620	620	1.0	7891895
Total Organic Carbon (TOC)	mg/L	3.8	2.9	0.40	7894189
Orthophosphate (P)	mg/L	<0.010	<0.010	0.010	7892015
pH	pH	8.19	8.21		7891903
Total Phosphorus	mg/L	0.021	0.022	0.004	7893696
Dissolved Sulphate (SO4)	mg/L	18	18	1.0	7892027
Turbidity	NTU	1.3	1.3	0.1	7890924
Alkalinity (Total as CaCO3)	mg/L	240	240	1.0	7891878
Dissolved Chloride (Cl-)	mg/L	33	32	1.0	7892024
Nitrite (N)	mg/L	<0.010	<0.010	0.010	7891864
Nitrate (N)	mg/L	6.44	6.52	0.10	7891864
Metals					
Dissolved Calcium (Ca)	mg/L	90	90	0.05	7891291
Dissolved Magnesium (Mg)	mg/L	17	16	0.05	7891291
Dissolved Potassium (K)	mg/L	3	3	1	7891291
Dissolved Sodium (Na)	mg/L	13	13	0.5	7891291
Total Aluminum (Al)	ug/L	53	47	4.9	7895737
Total Antimony (Sb)	ug/L	<0.50	<0.50	0.50	7895737
Total Arsenic (As)	ug/L	<1.0	<1.0	1.0	7895737
Total Barium (Ba)	ug/L	32	31	2.0	7895737
Total Beryllium (Be)	ug/L	<0.40	<0.40	0.40	7895737
Total Boron (B)	ug/L	11	12	10	7895737

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

Bureau Veritas Job #: C271236
Report Date: 2022/03/23

exp Services Inc
Client Project #: KCH-21009452
Site Location: HWY 2
Sampler Initials: MB

RCAP - SURFACE WATER (WATER)

Bureau Veritas ID		SCW008	SCW009		
Sampling Date		2022/03/15	2022/03/15		
COC Number		868526-01-01	868526-01-01		
	UNITS	SW1	SW2	RDL	QC Batch
Total Cadmium (Cd)	ug/L	<0.090	<0.090	0.090	7895737
Total Calcium (Ca)	ug/L	86000	85000	200	7895737
Total Chromium (Cr)	ug/L	<5.0	<5.0	5.0	7895737
Total Cobalt (Co)	ug/L	<0.50	<0.50	0.50	7895737
Total Copper (Cu)	ug/L	1.2	1.1	0.90	7895737
Total Iron (Fe)	ug/L	100	<100	100	7895737
Total Lead (Pb)	ug/L	<0.50	<0.50	0.50	7895737
Total Magnesium (Mg)	ug/L	17000	17000	50	7895737
Total Manganese (Mn)	ug/L	23	21	2.0	7895737
Total Molybdenum (Mo)	ug/L	<0.50	<0.50	0.50	7895737
Total Nickel (Ni)	ug/L	<1.0	<1.0	1.0	7895737
Total Potassium (K)	ug/L	2500	2400	200	7895737
Total Selenium (Se)	ug/L	<2.0	<2.0	2.0	7895737
Total Silicon (Si)	ug/L	2300	2200	50	7895737
Total Silver (Ag)	ug/L	<0.090	<0.090	0.090	7895737
Total Sodium (Na)	ug/L	13000	13000	100	7895737
Total Strontium (Sr)	ug/L	140	130	1.0	7895737
Total Thallium (Tl)	ug/L	<0.050	<0.050	0.050	7895737
Total Titanium (Ti)	ug/L	5.2	<5.0	5.0	7895737
Total Tungsten (W)	ug/L	<1.0	<1.0	1.0	7895737
Total Uranium (U)	ug/L	1.1	1.1	0.10	7895737
Total Vanadium (V)	ug/L	<0.50	<0.50	0.50	7895737
Total Zinc (Zn)	ug/L	<5.0	<5.0	5.0	7895737
Total Zirconium (Zr)	ug/L	<1.0	<1.0	1.0	7895737

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C271236
Report Date: 2022/03/23

exp Services Inc
Client Project #: KCH-21009452
Site Location: HWY 2
Sampler Initials: MB

TEST SUMMARY

Bureau Veritas ID: SCW006
Sample ID: MW4
Matrix: Water

Collected: 2022/03/15
Shipped:
Received: 2022/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7891878	N/A	2022/03/21	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7890530	N/A	2022/03/22	Automated Statchk
Chloride by Automated Colourimetry	KONE	7892024	N/A	2022/03/22	Alina Dobreanu
Conductivity	AT	7891895	N/A	2022/03/21	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7891189	N/A	2022/03/21	Anna-Kay Gooden
Hardness (calculated as CaCO3)		7890531	N/A	2022/03/21	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	7891293	2022/03/18	2022/03/21	Arefa Dabhad
Ion Balance (% Difference)	CALC	7890535	N/A	2022/03/22	Automated Statchk
Anion and Cation Sum	CALC	7890536	N/A	2022/03/22	Automated Statchk
Total Ammonia-N	LACH/NH4	7894170	N/A	2022/03/21	Raiq Kashif
Nitrate & Nitrite as Nitrogen in Water	LACH	7891864	N/A	2022/03/20	Amanpreet Sappal
pH	AT	7891903	2022/03/18	2022/03/21	Surinder Rai
Orthophosphate	KONE	7892015	N/A	2022/03/21	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7890539	N/A	2022/03/22	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7890541	N/A	2022/03/22	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7892027	N/A	2022/03/21	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7890542	N/A	2022/03/22	Automated Statchk

Bureau Veritas ID: SCW006 Dup
Sample ID: MW4
Matrix: Water

Collected: 2022/03/15
Shipped:
Received: 2022/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7891189	N/A	2022/03/21	Anna-Kay Gooden

Bureau Veritas ID: SCW007
Sample ID: MW5
Matrix: Water

Collected: 2022/03/15
Shipped:
Received: 2022/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7891878	N/A	2022/03/21	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7890530	N/A	2022/03/22	Automated Statchk
Chloride by Automated Colourimetry	KONE	7892024	N/A	2022/03/22	Alina Dobreanu
Conductivity	AT	7891895	N/A	2022/03/21	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7891189	N/A	2022/03/21	Anna-Kay Gooden
Hardness (calculated as CaCO3)		7890531	N/A	2022/03/21	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	7891293	2022/03/18	2022/03/21	Arefa Dabhad
Ion Balance (% Difference)	CALC	7890535	N/A	2022/03/22	Automated Statchk
Anion and Cation Sum	CALC	7890536	N/A	2022/03/22	Automated Statchk
Total Ammonia-N	LACH/NH4	7894170	N/A	2022/03/21	Raiq Kashif
Nitrate & Nitrite as Nitrogen in Water	LACH	7891864	N/A	2022/03/20	Amanpreet Sappal
pH	AT	7891903	2022/03/18	2022/03/21	Surinder Rai
Orthophosphate	KONE	7892015	N/A	2022/03/21	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7890539	N/A	2022/03/22	Automated Statchk

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Bureau Veritas Job #: C271236
Report Date: 2022/03/23

exp Services Inc
Client Project #: KCH-21009452
Site Location: HWY 2
Sampler Initials: MB

TEST SUMMARY

Bureau Veritas ID: SCW007
Sample ID: MW5
Matrix: Water

Collected: 2022/03/15
Shipped:
Received: 2022/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sat. pH and Langelier Index (@ 4C)	CALC	7890541	N/A	2022/03/22	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7892027	N/A	2022/03/21	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7890542	N/A	2022/03/22	Automated Statchk

Bureau Veritas ID: SCW008
Sample ID: SW1
Matrix: Water

Collected: 2022/03/15
Shipped:
Received: 2022/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7891878	N/A	2022/03/21	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7890530	N/A	2022/03/22	Automated Statchk
Chloride by Automated Colourimetry	KONE	7892024	N/A	2022/03/22	Alina Dobreanu
Conductivity	AT	7891895	N/A	2022/03/21	Surinder Rai
Hardness (calculated as CaCO3)		7890531	N/A	2022/03/23	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	7891291	2022/03/18	2022/03/21	Suban Kanapathippllai
Total Metals Analysis by ICPMS	ICP/MS	7895737	N/A	2022/03/22	Prempal Bhatti
Total Ammonia-N	LACH/NH4	7894170	N/A	2022/03/21	Raiq Kashif
Nitrate & Nitrite as Nitrogen in Water	LACH	7891864	N/A	2022/03/20	Amanpreet Sappal
pH	AT	7891903	2022/03/18	2022/03/21	Surinder Rai
Orthophosphate	KONE	7892015	N/A	2022/03/21	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7890539	N/A	2022/03/23	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7890541	N/A	2022/03/23	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7892027	N/A	2022/03/21	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7890542	N/A	2022/03/23	Automated Statchk
Total Organic Carbon (TOC)	TOCV/NDIR	7894189	N/A	2022/03/21	Anna-Kay Gooden
Total Phosphorus (Colourimetric)	LACH/P	7893696	2022/03/21	2022/03/22	Shivani Shivani
Turbidity	AT	7890924	N/A	2022/03/18	Kien Tran

Bureau Veritas ID: SCW009
Sample ID: SW2
Matrix: Water

Collected: 2022/03/15
Shipped:
Received: 2022/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7891878	N/A	2022/03/21	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7890530	N/A	2022/03/22	Automated Statchk
Chloride by Automated Colourimetry	KONE	7892024	N/A	2022/03/22	Alina Dobreanu
Conductivity	AT	7891895	N/A	2022/03/21	Surinder Rai
Hardness (calculated as CaCO3)		7890531	N/A	2022/03/23	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	7891291	2022/03/18	2022/03/21	Suban Kanapathippllai
Total Metals Analysis by ICPMS	ICP/MS	7895737	N/A	2022/03/22	Prempal Bhatti
Total Ammonia-N	LACH/NH4	7894170	N/A	2022/03/21	Raiq Kashif
Nitrate & Nitrite as Nitrogen in Water	LACH	7891864	N/A	2022/03/20	Amanpreet Sappal
pH	AT	7891903	2022/03/18	2022/03/21	Surinder Rai
Orthophosphate	KONE	7892015	N/A	2022/03/21	Avneet Kour Sudan

Bureau Veritas Job #: C271236
Report Date: 2022/03/23

exp Services Inc
Client Project #: KCH-21009452
Site Location: HWY 2
Sampler Initials: MB

TEST SUMMARY

Bureau Veritas ID: SCW009
Sample ID: SW2
Matrix: Water

Collected: 2022/03/15
Shipped:
Received: 2022/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sat. pH and Langelier Index (@ 20C)	CALC	7890539	N/A	2022/03/23	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7890541	N/A	2022/03/23	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7892027	N/A	2022/03/21	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7890542	N/A	2022/03/23	Automated Statchk
Total Organic Carbon (TOC)	TOCV/NDIR	7894189	N/A	2022/03/21	Anna-Kay Gooden
Total Phosphorus (Colourimetric)	LACH/P	7893696	2022/03/21	2022/03/22	Shivani Shivani
Turbidity	AT	7890924	N/A	2022/03/18	Kien Tran

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GENERAL COMMENTS

Each temperature is the average of up to three cooler temperatures taken at receipt

Package 1	3.3°C

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7890924	Turbidity	2022/03/18			98	85 - 115	<0.1	NTU	NC	20		
7891189	Dissolved Organic Carbon	2022/03/21	91	80 - 120	97	80 - 120	<0.40	mg/L	0.70	20		
7891291	Dissolved Calcium (Ca)	2022/03/21	60 (1)	80 - 120	98	80 - 120	<0.05	mg/L	0.24	25		
7891291	Dissolved Magnesium (Mg)	2022/03/21	89	80 - 120	95	80 - 120	<0.05	mg/L	0.51	25		
7891291	Dissolved Potassium (K)	2022/03/21	95	80 - 120	99	80 - 120	<1	mg/L	0.29	25		
7891291	Dissolved Sodium (Na)	2022/03/21	69 (1)	80 - 120	99	80 - 120	<0.5	mg/L	0.63	25		
7891293	Dissolved Aluminum (Al)	2022/03/21	117	80 - 120	105	80 - 120	<4.9	ug/L				
7891293	Dissolved Antimony (Sb)	2022/03/21	108	80 - 120	104	80 - 120	<0.50	ug/L				
7891293	Dissolved Arsenic (As)	2022/03/21	102	80 - 120	100	80 - 120	<1.0	ug/L				
7891293	Dissolved Barium (Ba)	2022/03/21	100	80 - 120	100	80 - 120	<2.0	ug/L				
7891293	Dissolved Beryllium (Be)	2022/03/21	97	80 - 120	95	80 - 120	<0.40	ug/L				
7891293	Dissolved Boron (B)	2022/03/21	92	80 - 120	90	80 - 120	<10	ug/L				
7891293	Dissolved Cadmium (Cd)	2022/03/21	99	80 - 120	102	80 - 120	<0.090	ug/L				
7891293	Dissolved Calcium (Ca)	2022/03/21	183 (1)	80 - 120	104	80 - 120	<200	ug/L	3.2	20		
7891293	Dissolved Chromium (Cr)	2022/03/21	101	80 - 120	97	80 - 120	<5.0	ug/L				
7891293	Dissolved Cobalt (Co)	2022/03/21	98	80 - 120	98	80 - 120	<0.50	ug/L				
7891293	Dissolved Copper (Cu)	2022/03/21	100	80 - 120	100	80 - 120	<0.90	ug/L				
7891293	Dissolved Iron (Fe)	2022/03/21	103	80 - 120	101	80 - 120	<100	ug/L				
7891293	Dissolved Lead (Pb)	2022/03/21	91	80 - 120	99	80 - 120	<0.50	ug/L				
7891293	Dissolved Magnesium (Mg)	2022/03/21	108	80 - 120	99	80 - 120	<50	ug/L	3.5	20		
7891293	Dissolved Manganese (Mn)	2022/03/21	124 (1)	80 - 120	101	80 - 120	<2.0	ug/L				
7891293	Dissolved Molybdenum (Mo)	2022/03/21	107	80 - 120	98	80 - 120	<0.50	ug/L				
7891293	Dissolved Nickel (Ni)	2022/03/21	94	80 - 120	98	80 - 120	<1.0	ug/L				
7891293	Dissolved Phosphorus (P)	2022/03/21	113	80 - 120	116	80 - 120	<100	ug/L				
7891293	Dissolved Potassium (K)	2022/03/21	117	80 - 120	102	80 - 120	<200	ug/L	5.6	20		
7891293	Dissolved Selenium (Se)	2022/03/21	99	80 - 120	102	80 - 120	<2.0	ug/L				
7891293	Dissolved Silicon (Si)	2022/03/21	124 (2)	80 - 120	104	80 - 120	<50	ug/L				
7891293	Dissolved Silver (Ag)	2022/03/21	94	80 - 120	100	80 - 120	<0.090	ug/L				
7891293	Dissolved Sodium (Na)	2022/03/21	1010 (1)	80 - 120	101	80 - 120	<100	ug/L	2.7	20		
7891293	Dissolved Strontium (Sr)	2022/03/21	103	80 - 120	99	80 - 120	<1.0	ug/L				
7891293	Dissolved Thallium (Tl)	2022/03/21	93	80 - 120	106	80 - 120	<0.050	ug/L				

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7891293	Dissolved Titanium (Ti)	2022/03/21	116	80 - 120	103	80 - 120	<5.0	ug/L				
7891293	Dissolved Uranium (U)	2022/03/21	95	80 - 120	100	80 - 120	<0.10	ug/L				
7891293	Dissolved Vanadium (V)	2022/03/21	106	80 - 120	96	80 - 120	<0.50	ug/L				
7891293	Dissolved Zinc (Zn)	2022/03/21	91	80 - 120	100	80 - 120	<5.0	ug/L				
7891864	Nitrate (N)	2022/03/20	111	80 - 120	109	80 - 120	<0.10	mg/L	2.3	20		
7891864	Nitrite (N)	2022/03/20	99	80 - 120	105	80 - 120	<0.010	mg/L	9.4	20		
7891878	Alkalinity (Total as CaCO3)	2022/03/21			96	85 - 115	<1.0	mg/L	1.1	20		
7891895	Conductivity	2022/03/21			101	85 - 115	<1.0	umho/cm	0	25		
7891903	pH	2022/03/21			102	98 - 103			1.9	N/A		
7892015	Orthophosphate (P)	2022/03/21	107	75 - 125	99	80 - 120	<0.010	mg/L	1.8	25		
7892024	Dissolved Chloride (Cl-)	2022/03/22	NC	80 - 120	103	80 - 120	<1.0	mg/L	4.3	20		
7892027	Dissolved Sulphate (SO4)	2022/03/21	118	75 - 125	101	80 - 120	<1.0	mg/L	NC	20		
7893696	Total Phosphorus	2022/03/22	94	80 - 120	102	80 - 120	<0.004	mg/L	NC	20	104	80 - 120
7894170	Total Ammonia-N	2022/03/21	81	75 - 125	99	80 - 120	<0.050	mg/L	14	20		
7894189	Total Organic Carbon (TOC)	2022/03/21	89	80 - 120	95	80 - 120	<0.40	mg/L	3.5	20		
7895737	Total Aluminum (Al)	2022/03/22	NC	80 - 120	97	80 - 120	<4.9	ug/L				
7895737	Total Antimony (Sb)	2022/03/22	NC (3)	80 - 120	103	80 - 120	<0.50	ug/L	NC	20		
7895737	Total Arsenic (As)	2022/03/22	NC (3)	80 - 120	99	80 - 120	<1.0	ug/L	NC	20		
7895737	Total Barium (Ba)	2022/03/22	NC (3)	80 - 120	97	80 - 120	<2.0	ug/L				
7895737	Total Beryllium (Be)	2022/03/22	NC (3)	80 - 120	99	80 - 120	<0.40	ug/L	NC	20		
7895737	Total Boron (B)	2022/03/22	NC (3)	80 - 120	99	80 - 120	<10	ug/L	5.3	20		
7895737	Total Cadmium (Cd)	2022/03/22	NC (3)	80 - 120	99	80 - 120	<0.090	ug/L	NC	20		
7895737	Total Calcium (Ca)	2022/03/22	NC (3)	80 - 120	95	80 - 120	<200	ug/L				
7895737	Total Chromium (Cr)	2022/03/22	NC (3)	80 - 120	96	80 - 120	<5.0	ug/L	NC	20		
7895737	Total Cobalt (Co)	2022/03/22	NC (3)	80 - 120	98	80 - 120	<0.50	ug/L	NC	20		
7895737	Total Copper (Cu)	2022/03/22	NC (3)	80 - 120	96	80 - 120	<0.90	ug/L	2.9	20		
7895737	Total Iron (Fe)	2022/03/22	NC (3)	80 - 120	97	80 - 120	<100	ug/L	NC	20		
7895737	Total Lead (Pb)	2022/03/22	NC (3)	80 - 120	94	80 - 120	<0.50	ug/L	1.5	20		
7895737	Total Magnesium (Mg)	2022/03/22	NC (3)	80 - 120	98	80 - 120	<50	ug/L				
7895737	Total Manganese (Mn)	2022/03/22	NC (3)	80 - 120	99	80 - 120	<2.0	ug/L				

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
7895737	Total Molybdenum (Mo)	2022/03/22	NC (3)	80 - 120	95	80 - 120	<0.50	ug/L	NC	20		
7895737	Total Nickel (Ni)	2022/03/22	NC (3)	80 - 120	97	80 - 120	<1.0	ug/L	NC	20		
7895737	Total Potassium (K)	2022/03/22	NC (3)	80 - 120	95	80 - 120	<200	ug/L				
7895737	Total Selenium (Se)	2022/03/22	NC (3)	80 - 120	102	80 - 120	<2.0	ug/L	NC	20		
7895737	Total Silicon (Si)	2022/03/22	NC (3)	80 - 120	95	80 - 120	<50	ug/L				
7895737	Total Silver (Ag)	2022/03/22	NC (3)	80 - 120	97	80 - 120	<0.090	ug/L	NC	20		
7895737	Total Sodium (Na)	2022/03/22	NC (3)	80 - 120	97	80 - 120	<100	ug/L				
7895737	Total Strontium (Sr)	2022/03/22	NC (3)	80 - 120	97	80 - 120	<1.0	ug/L				
7895737	Total Thallium (Tl)	2022/03/22	NC (3)	80 - 120	96	80 - 120	<0.050	ug/L	NC	20		
7895737	Total Titanium (Ti)	2022/03/22	NC (3)	80 - 120	96	80 - 120	<5.0	ug/L				
7895737	Total Tungsten (W)	2022/03/22	NC (3)	80 - 120	94	80 - 120	<1.0	ug/L	NC	20		
7895737	Total Uranium (U)	2022/03/22	NC (3)	80 - 120	100	80 - 120	<0.10	ug/L	NC	20		
7895737	Total Vanadium (V)	2022/03/22	NC (3)	80 - 120	98	80 - 120	<0.50	ug/L	NC	20		
7895737	Total Zinc (Zn)	2022/03/22	NC (3)	80 - 120	101	80 - 120	<5.0	ug/L	3.8	20		
7895737	Total Zirconium (Zr)	2022/03/22	NC (3)	80 - 120	99	80 - 120	<1.0	ug/L	NC	20		

N/A = Not Applicable

Duplicate: Paired analysis of a separate portion of the same sample. Used to evaluate the variance in the measurement.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate sample matrix interference.

QC Standard: A sample of known concentration prepared by an external agency under stringent conditions. Used as an independent check of method accuracy.

Spiked Blank: A blank matrix sample to which a known amount of the analyte, usually from a second source, has been added. Used to evaluate method accuracy.

Method Blank: A blank matrix containing all reagents used in the analytical procedure. Used to identify laboratory contamination.

NC (Matrix Spike): The recovery in the matrix spike was not calculated. The relative difference between the concentration in the parent sample and the spike amount was too small to permit a reliable recovery calculation (matrix spike concentration was less than the native sample concentration)

NC (Duplicate RPD): The duplicate RPD was not calculated. The concentration in the sample and/or duplicate was too low to permit a reliable RPD calculation (absolute difference <= 2x RDL).

(1) Recovery or RPD for this parameter is outside control limits. The overall quality control for this analysis meets acceptability criteria.

(2) Metal Analysis:Matrix Spike exceeds acceptance limits, probable matrix interference

(3) Matrix Spike not calculated. Original sample and matrix spike sample were analyzed at a dilution, due to high target analytes, or sample matrix interference.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas Job #: C271236
Report Date: 2022/03/23

exp Services Inc
Client Project #: KCH-21009452
Site Location: HWY 2
Sampler Initials: MB

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by:

[redacted]

Ewa Pranjic, M.Sc., C.Chem, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation please refer to the Validation Signature Page.

Bureau Veritas 6740 Campobello Road, Mississauga, Ontario, L5N 2L8 Tel: (905) 817-5700 Toll-Free: 800-563-6266 Fax: (905) 817-5777 www.bvlabs.com

Bureau Veritas
6740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel (905) 817-5700 Toll-free 800-563-6266 Fax (905) 817-5777 www.bvna.com

REC'D IN LONDON

IMMEDIATE TEST

CHAIN OF CUSTODY RECORD

Page of

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name	#28124 exp Services Inc	Company Name		Quotation #	~~B81716~~
Attention	Accounts Payable	Attention	Kelli Dobbin	P.O. #	
Address	15701 Robin's Hill Rd Unit 2	Address		Project	2100932 KCH-~~22000190~~
	London ON N5V 0A5			Project Name	Hwy 2
Tel	(519) 963-3000 Fax (519) 963-1152	Tel	Fax	Site #	
Email	AP@exp.com, Karen.Burke@exp.com	Email	kelli.dobbin@exp.com	Sampled By	Marcello B

Laboratory Use Only:

Bureau Veritas Job #:	Bottle Order #:
	868526
COC #:	Project Manager:
C#868526-01-01	Christine Gripton

MOE REGULATED DRINKING WATER OR WATER INTENDED FOR HUMAN CONSUMPTION MUST BE SUBMITTED ON THE BUREAU VERITAS DRINKING WATER CHAIN OF CUSTODY

Regulation 153 (2011): ☐ Table 1 ☐ Res/Park ☐ Medium/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table ___

Other Regulations: ☐ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558 ☐ Storm Sewer Bylaw ☐ MISA Municipality ___ ☐ PWQO ☐ Reg 406 Table ___ ☐ Other ___

Special Instructions:

Include Criteria on Certificate of Analysis (Y/N)? ___

Turnaround Time (TAT) Required:
Please provide advance notice for rush projects

Regular (Standard) TAT: ☒
(will be applied if Rush TAT is not specified)
Standard TAT = 5-7 Working days for most tests
Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)
Date Required: ___ Time Required: ___ ☐
Rush Confirmation Number: ___ (call lab for #)

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Field Filtered (please circle): Metals / Hg / Cr VI	~~RCAP - Comprehensive (Lab Filtered)~~	RCAP GW	RCAP SW								# of Bottles	Comments
1		MW4	Mar 15 2022	PM	GW			X										
2		MW5	↓	↓	GW			X										
3		SW1	↓	↓	SW				X									
4		SW2	↓	↓	SW				X									
5																		17-Mar-22 08:30 Christine Gripton
6																		C271236
7																	NP4	ENV-868
8																		
9																		
10																		On Ice

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
[redacted] Marcello B	~~22/03/~~ 22/03/15		[redacted]	2022/3/17	8:30	
				2022/03/17	17:57	

Laboratory Use Only

Time Sensitive	Temperature (°C) on Recei	Custody Seal	Yes	No
	3, 4, 3	Present		✓
		Intact		✓

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VE[redacted]TIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/TERMS-AND-CONDITIONS.

* IT IS THE RESPONSIBILITY OF THE RELINQUISHER TO ENSURE THE ACCURACY OF THE CHAIN OF CUSTODY RECORD. AN INCOMPLETE CHAIN OF CUSTODY MAY RESULT IN ANALYTICAL TAT DELAYS.

** SAMPLE CONTAINER, PRESERVATION, HOLD TIME AND PACKAGE INFORMATION CAN BE VIEWED AT WWW.BVNA.COM/RESOURCES/CHAIN-OF-CUSTODY-FORMS.

~~1024~~ 418670

SAMPLES MUST BE KEPT COOL (< 10°C) FROM TIME OF SAMPLING UNTIL DELIVERY TO BUREAU VERITAS

White: Bureau Veritas Yellow: Client

4/4/3

on ice in transport

Appendix J – Water Balance Assessment

6-405 Maple Grove Road | Cambridge, Ontario | Canada
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TABLE J1 - PRE-DEVELOPMENT SITE-WIDE WATER BALANCE CALCULATIONS

Catchment Area A (west of the Drain and PSW)	Impervious Area (m^2)	Pervious Area (m^2)	Total Area (m^2)	Soil Type	Soil Group	Water Holding Capacity (mm)	Infiltration Factor	T_{rain} (°C)	T_{snow} (°C)	Meltmax (%/100)
Forested Area	-	45,978		Sand	A	250	0.7	3.3	-10.0	0.95
Agricultural Land	-	49,400	**95,378**	Sand	A	75	0.6			
Pasture and Shrubs	-	-		-	-	-	-			
Urban Lawn	-	-		-	-	-	-			

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Totals
Average Temperature (°C)	-5.6	-4.5	-0.1	6.8	13.1	18.3	20.8	19.7	15.5	9.2	3.4	-2.6	
Total Precipitation (mm/month)	74.2	65.5	71.5	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	87.5	1011.5
Precipitation as rain (mm/month)	24.5	27.1	53.2	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	48.7	
Precipitation as snow (mm/month)	49.7	38.4	18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.8	
Potential Snow Melt (mm/month)	20.9	32.8	49.1	26.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9	
Actual Snow Melt (mm/month)	20.9	32.8	49.1	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9	
Snow Storage (mm/month)	47.7	53.4	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.9	
FORESTED AREA													
Estimated Actual Evapotranspiration (mm/month)	8.9	10.8	20.3	38.4	70.3	102.6	116.8	92.2	56.3	30.5	16.0	10.0	573.1
Surplus (mm/month)	36.5	49.1	82.0	67.6	19.5	-10.9	-34.1	-9.3	46.7	50.8	82.0	58.6	438.4
Estimated Runoff (mm/month)	36.5	49.1	53.3	20.3	5.9	0.0	0.0	0.0	14.0	15.2	24.6	58.6	277.4
Estimated Infiltration (mm/month)	0.0	0.0	28.7	47.3	13.7	0.0	0.0	0.0	32.7	35.6	57.4	0.0	215.3
Estimated Actual Evapotranspiration (m^3/month)	**409**	**497**	**933**	**1766**	**3232**	**4717**	**5370**	**4239**	**2589**	**1402**	**736**	**460**	**26350**
Estimated Runoff (m^3/month)	**1679**	**2256**	**2450**	**932**	**269**	**0**	**0**	**0**	**644**	**701**	**1131**	**2692**	**12754**
Estimated Infiltration (m^3/month)	**0**	**0**	**1319**	**2175**	**628**	**0**	**0**	**0**	**1503**	**1635**	**2639**	**0**	**9899**
AGRICULTURAL LAND													
Estimated Actual Evapotranspiration (mm/month)	8.9	10.8	20.3	38.4	70.3	102.6	112.3	86.8	56.3	30.5	16.0	10.0	563.2
Surplus (mm/month)	36.5	49.1	82.0	67.6	19.5	-10.9	-29.6	-3.9	46.7	50.8	82.0	58.6	448.3
Estimated Runoff (mm/month)	36.5	49.1	57.4	27.0	7.8	0.0	0.0	0.0	18.7	20.3	32.8	58.6	308.2
Estimated Infiltration (mm/month)	0.0	0.0	24.6	40.5	11.7	0.0	0.0	0.0	28.0	30.5	49.2	0.0	184.5
Estimated Actual Evapotranspiration (m^3/month)	**440**	**534**	**1003**	**1897**	**3473**	**5068**	**5548**	**4288**	**2781**	**1507**	**790**	**494**	**27822**
Estimated Runoff (m^3/month)	**1804**	**2423**	**2835**	**1335**	**385**	**0**	**0**	**0**	**923**	**1004**	**1620**	**2893**	**15223**
Estimated Infiltration (m^3/month)	**0**	**0**	**1215**	**2003**	**578**	**0**	**0**	**0**	**1384**	**1506**	**2430**	**0**	**9116**
Catchment Area A TOTALS													
Estimated Actual Evapotranspiration (m^3/month)	**849**	**1030**	**1936**	**3663**	**6705**	**9786**	**10918**	**8527**	**5370**	**2909**	**1526**	**954**	**54,172**
Estimated Runoff (m^3/month)	**3484**	**4679**	**5285**	**2268**	**654**	**0**	**0**	**0**	**1567**	**1705**	**2751**	**5585**	**27,977**
Estimated Infiltration (m^3/month)	**0**	**0**	**2534**	**4178**	**1206**	**0**	**0**	**0**	**2887**	**3141**	**5070**	**0**	**19,016**

TABLE J1 - POST-DEVELOPMENT SITE-WIDE WATER BALANCE CALCULATIONS

Catchment Area A (west of the Drain and PSW)	Impervious Area (m^2)	Pervious Area (m^2)	Total Area (m^2)	Soil Type	Soil Group	Water Holding Capacity (mm)	Infiltration Factor	T_{rain} (°C)	T_{snow} (°C)	Meltmax (%/100)
Forested Area	-	45,978	95,378	Sand	A	250	0.7	3.3	-10.0	0.95
Agricultural Land	-	49,400		Sand	A	75	0.6			
Pasture and Shrubs	-	-		-	-	-	-			
Urban Lawn	-	-		-	-	-	-			

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Totals
Average Temperature (°C)	-5.6	-4.5	-0.1	6.8	13.1	18.3	20.8	19.7	15.5	9.2	3.4	-2.6	
Total Precipitation (mm/month)	74.2	65.5	71.5	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	87.5	1011.5
Precipitation as rain (mm/month)	24.5	27.1	53.2	83.4	89.8	91.7	82.7	82.9	103.0	81.3	98.0	48.7	
Precipitation as snow (mm/month)	49.7	38.4	18.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	38.8	
Potential Snow Melt (mm/month)	20.9	32.8	49.1	26.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9	
Actual Snow Melt (mm/month)	20.9	32.8	49.1	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	19.9	
Snow Storage (mm/month)	47.7	53.4	22.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.9	
FORESTED AREA													
Estimated Actual Evapotranspiration (mm/month)	8.9	10.8	20.3	38.4	70.3	102.6	116.8	92.2	56.3	30.5	16.0	10.0	573.1
Surplus (mm/month)	36.5	49.1	82.0	67.6	19.5	-10.9	-34.1	-9.3	46.7	50.8	82.0	58.6	438.4
Estimated Runoff (mm/month)	36.5	49.1	53.3	20.3	5.9	0.0	0.0	0.0	14.0	15.2	24.6	58.6	277.4
Estimated Infiltration (mm/month)	0.0	0.0	28.7	47.3	13.7	0.0	0.0	0.0	32.7	35.6	57.4	0.0	215.3
Estimated Actual Evapotranspiration (m^3/month)	**409**	**497**	**933**	**1766**	**3232**	**4717**	**5370**	**4239**	**2589**	**1402**	**736**	**460**	**26350**
Estimated Runoff (m^3/month)	**1679**	**2256**	**2450**	**932**	**269**	**0**	**0**	**0**	**644**	**701**	**1131**	**2692**	**12754**
Estimated Infiltration (m^3/month)	**0**	**0**	**1319**	**2175**	**628**	**0**	**0**	**0**	**1503**	**1635**	**2639**	**0**	**9899**
AGRICULTURAL LAND													
Estimated Actual Evapotranspiration (mm/month)	8.9	10.8	20.3	38.4	70.3	102.6	112.3	86.8	56.3	30.5	16.0	10.0	563.2
Surplus (mm/month)	36.5	49.1	82.0	67.6	19.5	-10.9	-29.6	-3.9	46.7	50.8	82.0	58.6	448.3
Estimated Runoff (mm/month)	36.5	49.1	57.4	27.0	7.8	0.0	0.0	0.0	18.7	20.3	32.8	58.6	308.2
Estimated Infiltration (mm/month)	0.0	0.0	24.6	40.5	11.7	0.0	0.0	0.0	28.0	30.5	49.2	0.0	184.5
Estimated Actual Evapotranspiration (m^3/month)	**440**	**534**	**1003**	**1897**	**3473**	**5068**	**5548**	**4288**	**2781**	**1507**	**790**	**494**	**27822**
Estimated Runoff (m^3/month)	**1804**	**2423**	**2835**	**1335**	**385**	**0**	**0**	**0**	**923**	**1004**	**1620**	**2893**	**15223**
Estimated Infiltration (m^3/month)	**0**	**0**	**1215**	**2003**	**578**	**0**	**0**	**0**	**1384**	**1506**	**2430**	**0**	**9116**
Catchment Area A TOTALS													
Estimated Actual Evapotranspiration (m^3/month)	**849**	**1030**	**1936**	**3663**	**6705**	**9786**	**10918**	**8527**	**5370**	**2909**	**1526**	**954**	**54,172**
Estimated Runoff (m^3/month)	**3484**	**4679**	**5285**	**2268**	**654**	**0**	**0**	**0**	**1567**	**1705**	**2751**	**5585**	**27,977**
Estimated Infiltration (m^3/month)	**0**	**0**	**2534**	**4178**	**1206**	**0**	**0**	**0**	**2887**	**3141**	**5070**	**0**	**19,016**

TABLE K2 - WATER BALANCE ASSUMPTIONS

1. AET occurs year round. Although the average temperature is below 0°C in the winter months, fluctuation above and below the freezing temperature of water occurs. The Thornthwaite model used assumes T_{rain} = 3.3°C and T_{snow} = -10.0°C. When the average monthly temperature falls between these values, the monthly precipitation as rain and snow is derived by assuming a linear interpolation between these values, consistent with the methodology used in the accepted USGS reference material (McCabe, G.J., and Markstrom, S.L., 2007, A monthly water-balance model driven by a graphical use interface: U.S. Geological Survey Open-File report 2007-1088, 6 p.). Values of AET were taken from the Thornthwaite model and are considered to be representative of actual site conditions.

2. Monthly surplus is calculated by summing the precipitation as rain and actual snow melt, less estimated evapotranspiration.

3. Negative surplus values can be achieved during the summer months as water storage is the vadose zone of the soil is subject to evapotranspiration and depleted.

4. Infiltration is assumed not to occur between December and February as frost is typically present throughout those months.

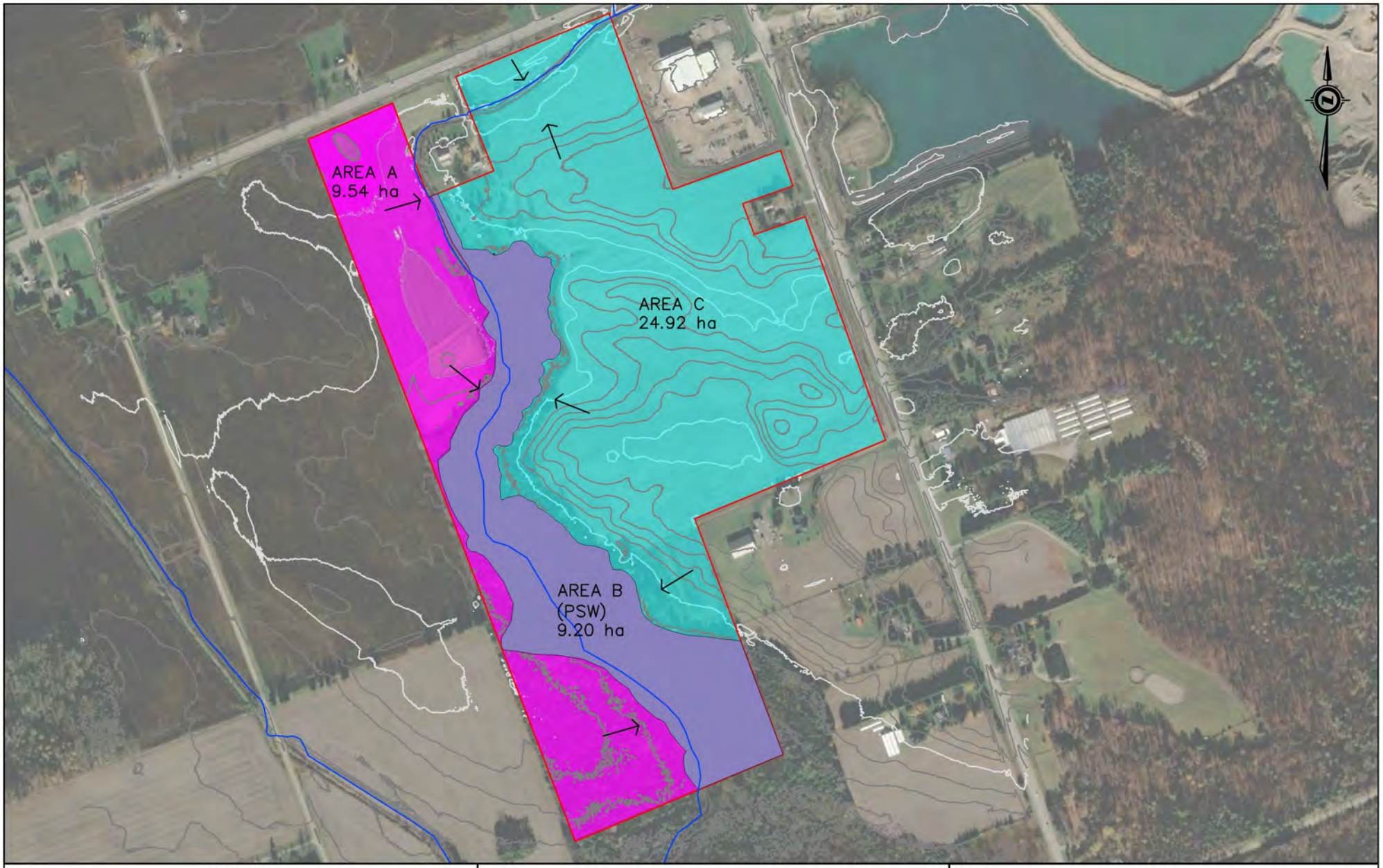
5. Infiltration in March (Average temperature of -0.1°C), is assumed to occur during half of the month.

6. No net infiltration or runoff occur in the summer as the rainfall accumulation is stored on site and infiltration was not assigned a negative value. See Assumption 3.

7. Evapotranspiration in the proposed pond area was estimated as potential evapotranspitation.

8. The soil assumed to be encountered at the proposed pond is clayey silt till with assumed water holding capacity of 125mm.

9. Runoff at the proposed pond is assumed to be 0. Infiltration is estimated to equal the surplus.



-LEGEND-

- Approximate Site Boundary
- Area A (9.54 ha)
- Area B: PSW (9.20 ha)
- Area C (24.92 ha)

Image Source: Google Earth Pro (November 2020). PSW boundary provided by Terrastory Environmental Consulting Inc.

Hydrogeological Assessment

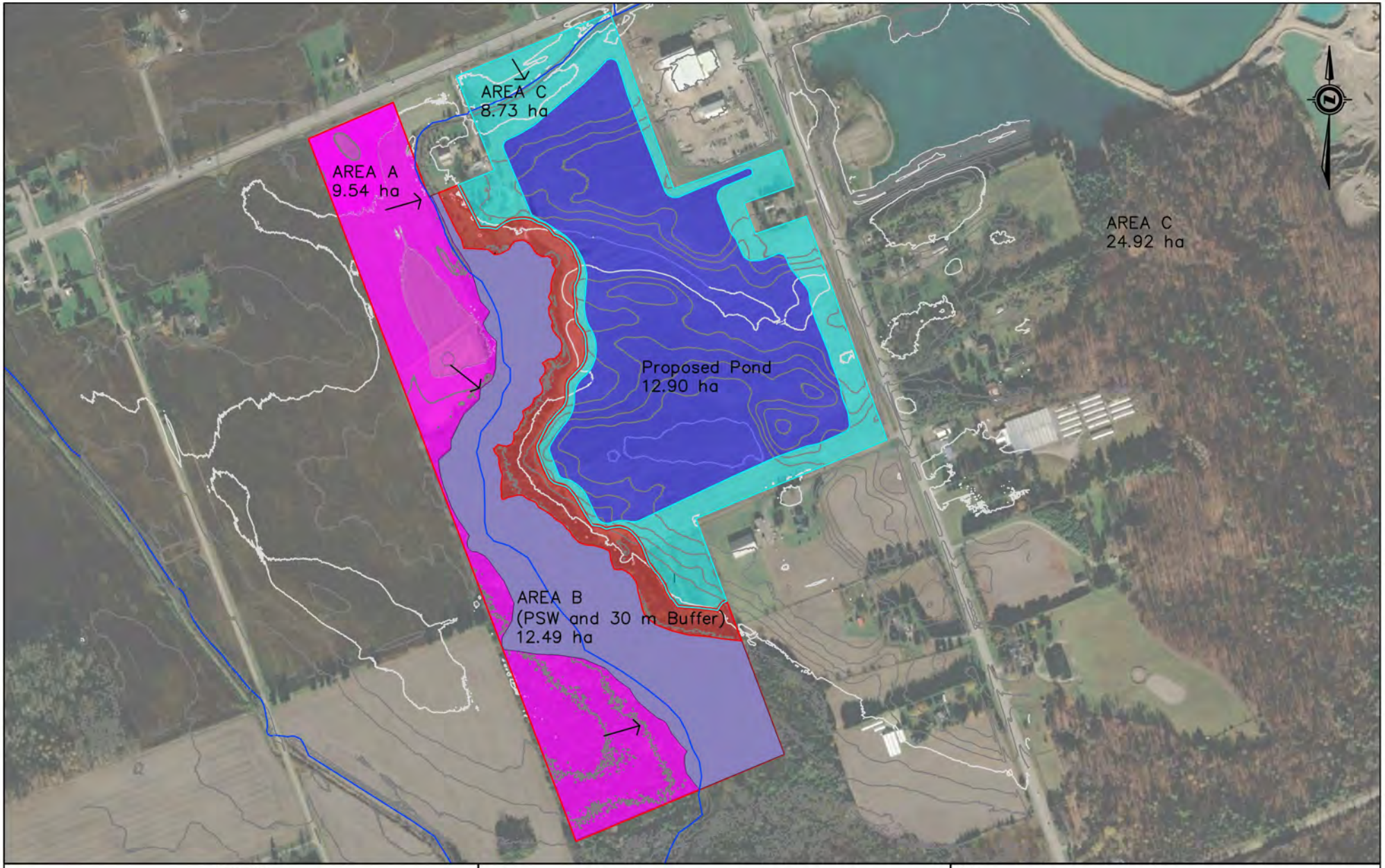
Proposed Development

Elgin Road Pit, Thamesford, Ontario

CLIENT	Brantam Excavating Inc.
TITLE	Pre-Development Catchment Areas
Prepared By: K.D.	Reviewed By: H.B.

EXP Services Inc.
405 Maple Grove Road, Cambridge, ON, N3E 1B6

DATE	SCALE	PROJECT NO.	DWG.
January 2023	1:7,000	KCH-21009432-A0	J1



-LEGEND-

- Approximate Site Boundary
- Area A (9.54 ha)
- Area B: PSW (9.20 ha)
- Area B: 30 m Buffer (3.29 ha)
- Area C (8.73 ha)
- Proposed Pond (12.90 ha)

Image Source: Google Earth Pro (November 2020). PSW and buffer boundaries provided by Terrastory Environmental Consulting Inc. Proposed Pond from Harrington McAvan Ltd.

Hydrogeological Assessment

Proposed Development

Elgin Road Pit, Thamesford, Ontario

CLIENT	Brantam Excavating Inc.
TITLE	Post-Development Catchment Areas
Prepared By: K.D.	Reviewed By: H.B.

EXP Services Inc.
405 Maple Grove Road, Cambridge, ON, N3E 1B6

DATE	SCALE	PROJECT NO.	DWG.
January 2023	1:7,000	KCH-21009432-A0	J2

Appendix K – Well Survey Questionnaire Responses

6-405 Maple Grove Road | Cambridge, Ontario | Canada
t: +1.519.650.4918 | f: +1.519.650.4603 | exp.com

EXP Services Inc.
15701 Robin's Hill Road
London, ON N5V 0A5
Telephone: (519) 963-3000
Facsimile: (519) 963-1152

Reference: KCH-21009432

November 8, 2021

To: Owner/Resident

Request for Information
Local Survey of Potable Wells

EXP Services Inc. has been retained to carry out a survey to obtain local water well information from the properties in the area of Elgin Road, Dundas Street, Trafalgar Street, and Banks Road in Thames Centre, Ontario.

The purpose of the well survey is to assess the locations of any shallow potable wells in the area, including those which may not be recorded in the Ministry of Environment, Conservation and Parks (MECP) Water Well Record Database. We respectfully ask that you provide us with any pertinent well information which will allow us to make a detailed survey of the wells in the area, for submission and review for future development in the area described above.

Attached is a questionnaire that we would like you to fill out, to the best of your knowledge and which can be faxed, mailed, or e-mailed to us, as soon as possible.

Your participation in this project is appreciated; however if you prefer to not participate, we would still appreciate a response indicating that you have declined to provide the requested information. Should you have any questions or concerns regarding the above, please feel free to contact our office to speak with the undersigned.

Yours truly,

EXP Services Inc.

[redacted]

Heather Jaggard, M.Sc., P.Geo
Hydrogeologist, Project Manager

*Please find attached Questionnaire to be completed by the owner/resident.

WELL SURVEY QUESTIONNAIRE
(please select the appropriate box)

☐ ***Agree to Provide Well Information***

I hereby disclose the following information to **EXP Services Inc**. regarding the well on the subject property (noted below) and in doing so, acknowledge that the monitoring results may be available to the public on request.

Name			
Address			
Phone			
Existing well	☐ No wells present at the address noted above ☐ Yes – please refer to requested details below		
Location of Well (Describe location, in reference to existing buildings or structures. If preferred, you can provide a sketch on the back of this page)			
Depth of Well		**Date Drilled** (estimate, if not known)	
Type of Well: (Dug/Bored or Drilled)		**Static Water Level**	
Do you have Municipal water?	☐ No ☐ Yes – if yes, is the well still being used?		

☐ ***Decline to Provide Well Information***

I choose not to provide information regarding onsite well (s) to **EXP Services Inc**. at the following address: _____.

_____ _____
Owner's Signature Date

Please return to:

Heather Jaggard
Exp Services Inc.
15701 Robin's Hill Rd.
London ON
N5V 0A5

Fax: 519-963-1152

E-mail: Heather.Jaggard@exp.com
(please include **WELL SURVEY** in subject line).

WELL SURVEY QUESTIONNAIRE
(please select the appropriate box)

☐ ***Agree to Provide Well Information***

I hereby disclose the following information to **EXP Services Inc.** regarding the well on the subject property (noted below) and in doing so, acknowledge that the monitoring results may be available to the public on request.

Name	Janet Payne		
Address	5628 Dundas St, Dorchester, Ont, N0L-1G4		
Phone	519-268-3587		
Existing well	☐ No wells present at the address noted above ☒ Yes – please refer to requested details below		
Location of Well (Describe location, in reference to existing buildings or structures. If preferred, you can provide a sketch on the back of this page)	back of property - closest to lot line		
Depth of Well	20 ft maybe	**Date Drilled** (estimate, if not known)	1972 ?
Type of Well: (Dug/Bored or Drilled)	Dug	**Static Water Level**	
Do you have Municipal water?	☒ No ☐ Yes – if yes, is the well still being used?		

☐ ***Decline to Provide Well Information***

I choose not to provide information regarding onsite well (s) to **EXP Services Inc.** at the following address: _____.

[redacted]
Owner's Signature

Nov. 15. 2021
Date

Please return to:

Heather Jaggard
Exp Services Inc.
15701 Robin's Hill Rd.
London ON
N5V 0A5

Fax: 519-963-1152

E-mail: Heather.Jaggard@exp.com
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Appendix L – Limitations and Use of Report

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LIMITATIONS AND USE OF REPORT

BASIS OF REPORT

This report ("Report") is based on site conditions known or inferred by the geotechnical investigation undertaken as of the date of the Report. Should changes occur which potentially impact the geotechnical condition of the site, or if construction is implemented more than one year following the date of the Report, the recommendations of EXP may require re-evaluation.

The Report is provided solely for the guidance of design engineers and on the assumption that the design will be in accordance with applicable codes and standards. Any changes in the design features which potentially impact the geotechnical analyses or issues concerning the geotechnical aspects of applicable codes and standards will necessitate a review of the design by EXP. Additional field work and reporting may also be required.

Where applicable, recommended field services are the minimum necessary to ascertain that construction is being carried out in general conformity with building code guidelines, generally accepted practices and EXP's recommendations. Any reduction in the level of services recommended will result in EXP providing qualified opinions regarding the adequacy of the work. EXP can assist design professionals or contractors retained by the Client to review applicable plans, drawings, and specifications as they relate to the Report or to conduct field reviews during construction.

Contractors contemplating work on the site are responsible for conducting an independent investigation and interpretation of the test pit results contained in the Report. The number of test pits necessary to determine the localized underground conditions as they impact construction costs, techniques, sequencing, equipment and scheduling may be greater than those carried out for the purpose of the Report.

Classification and identification of soils, rocks, geological units, contaminant materials, building envelopment assessments, and engineering estimates are based on investigations performed in accordance with the standard of care set out below and require the exercise of judgment. As a result, even comprehensive sampling and testing programs implemented with the appropriate equipment by experienced personnel may fail to locate some conditions. All investigations or building envelope descriptions involve an inherent risk that some conditions will not be detected. All documents or records summarizing investigations are based on assumptions of what exists between the actual points sampled. Actual conditions may vary significantly between the points investigated. Some conditions are subject to change over time. The Report presents the conditions at the sampled points at the time of sampling. Where special concerns exist, or the Client has special considerations or requirements, these should be disclosed to EXP to allow for additional or special investigations to be undertaken not otherwise within the scope of investigation conducted for the purpose of the Report.

RELIANCE ON INFORMATION PROVIDED

The evaluation and conclusions contained in the Report are based on conditions in evidence at the time of site inspections and information provided to EXP by the Client and others. The Report has been prepared for the specific site, development, building, design or building assessment objectives and purpose as communicated by the Client. EXP has relied in good faith upon such representations, information and instructions and accepts no responsibility for any deficiency, misstatement or inaccuracy contained in the Report as a result of any misstatements, omissions, misrepresentation or fraudulent acts of persons providing information. Unless specifically stated otherwise, the applicability and reliability of the findings, recommendations, suggestions or opinions expressed in the Report are only valid to the extent that there has been no material alteration to or variation from any of the information provided to EXP.

STANDARD OF CARE

The Report has been prepared in a manner consistent with the degree of care and skill exercised by engineering consultants currently practicing under similar circumstances and locale. No other warranty, expressed or implied, is made. Unless specifically stated otherwise, the Report does not contain environmental consulting advice.

COMPLETE REPORT

All documents, records, data and files, whether electronic or otherwise, generated as part of this assignment form part of the Report. This material includes, but is not limited to, the terms of reference given to EXP by its client ("Client"), communications between EXP and the Client, other reports, proposals or documents prepared by EXP for the Client in connection with the site described in the Report. In order to properly understand the suggestions, recommendations and opinions expressed in the Report, reference must be made to the Report in its entirety. EXP is not responsible for use by any party of portions of the Report.

USE OF REPORT

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Where EXP has submitted both electronic file and a hard copy of the Report, or any document forming part of the Report, only the signed and sealed hard copy shall be the original documents for record and working purposes. In the event of a dispute or discrepancy, the hard copy shall govern. Electronic files transmitted by EXP have utilize specific software and hardware systems. EXP makes no representation about the compatibility of these files with the Client's current or future software and hardware systems. Regardless of format, the documents described herein are EXP's instruments of professional service and shall not be altered without the written consent of EXP.

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