Hydrogeological Assessment

FINAL REPORT

Copia Developments

Project Name:
Proposed Apartment Complex
1470 – 1474 Highbury Avenue North
London, Ontario

Project Number:
KCH-00260285-A0

Prepared By:
EXP Services Inc.
405 Maple Grove Road
Unit 6
Cambridge, Ontario, N3E 1B6
t: +1.519.650.4918
f: +1.519.650.4603

Date Submitted:
November 2, 2021

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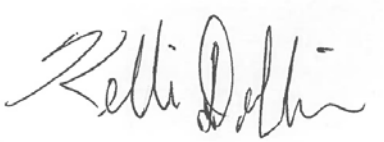

Kelli Dobbin, B.Sc., G.I.T
Gescientist in Training, Earth and Environment

Hagit Blumenthal. M.Sc., P.Geo
Hydrogeologist, Earth and Environment

Heather Jaggard, M.Sc., P.Geo.
Hydrogeologist, Earth and Environment

Date Submitted:

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Executive Summary

EXP Services Inc. (EXP) was retained by **Copia Developments** to conduct a hydrogeological assessment relating to the proposed development of an apartment complex to be located at 1470 – 1474 Highbury Avenue North in London, Ontario, hereinafter referred to as the 'Site'.

The objective of the hydrogeological assessment was to examine the hydrogeological characteristics of the Site 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 water balance, collecting a full year of groundwater elevations to identify any seasonal variations, and assess the landscaped pond located on the property. It is understood that the hydrogeological assessment will be submitted for review and approval by the City of London and the Upper Thames River Conservation Authority (UTRCA).

Dewatering works associated with the proposed construction are anticipated to involve the taking of more than 400,000 litres of groundwater per day, and as such, in accordance with Ontario Ministry of the Environment, Conservation and Parks (MECP) classifications, the project is considered a Category 3 water taking. A Category 3 Permit to Take Water (PTTW) Hydrogeological Report and application will be submitted under separate cover to support construction dewatering activities.

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

- A landscaped pond is present in the eastern portion of the Site. This landscaped pond connects to an unnamed drain which flows south and west of the site and eventually discharges into the Thames River. An area encompassing the pond and the east edge of the Site are considered regulated lands of the UTRCA;
- The majority of the Site is covered with sand underlain by sand and gravel. A clayey silt till unit underlies the sand and gravel and is present along the steep slope on the east side of the Site. Underlying the till is another sand and gravel unit. The upper sand and gravel unit is likely hydraulically connected to the landscape pond;
- Both shallow and intermediate aquifers have had a consistent upward gradient during the monitoring period, indicating discharge conditions on Site;
- Groundwater and surface water elevations have been collected on site for a total of 1 year. The highest groundwater elevation collected on Site was collected in monitoring well BH3/MW-A (deep) with an elevation of 244.96 m amsl on April 14, 2021. The lowest groundwater elevation collected on Site was measured in monitoring well BH1/MW in February 2021 at an elevation of 243.12 m amsl);
- Construction of the Site will include multiple levels of underground parking to approximate depths of 32 feet. At this time it is assumed that construction will involve the installation of cut-off walls down into the underlying till material, through the shallow and intermediate aquifers on Site. A Category 3 Permit to Take Water (PTTW) will be required for construction dewatering;
- Through review of UTRCA online mapping software, the Site is not within a significant groundwater recharge area (SGRA), but the entire Site is mapped as being a highly vulnerable aquifer (HVA);
- A total of six (6) domestic, one (1) commercial, and one (1) irrigation groundwater supply wells are located within a 500 m radius of the Site. These wells were installed into overburden sand aquifers

encountered at depths ranging from 3 m to 12.2 m. Door-to-door well survey indicated there are eleven (11) private water supply wells in the vicinity of the Site;

- Results of the door-to-door survey identified two (2) residences along Webster Street who have requested water level monitoring of their private wells during construction activities;
- Two (2) grain size analyses were carried out on samples of the upper and lower sand and gravel units. The hydraulic conductivity of both samples was 4.7×10^{-5} m/s calculated using the Kozeny-Carman method. Based on single well response tests the hydraulic conductivity ranges from 3.0×10^{-8} m/s to 4.2×10^{-5} m/s of the sand and sand and gravel units on site using the Hvorslev method;
- Surface drainage generally flows to the north in the western portion of the Site and the eastern portion of the Site drains towards the landscaped pond and the unnamed drain;
- The monitoring wells on Site have been maintained for ongoing study past the completion of this report. When the wells are no longer required, they should be decommissioned in accordance with O. Reg. 903; and,
- The water balance calculations indicate that post-construction infiltration volumes can be maintained to 80% pre-development volumes with the construction and effective use of Low Impact Development (LID) practices.

A full year of groundwater elevation monitoring (July 2020 to July 2021) 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 for Site Plan Submission.

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Tables (in text)

Drawings (Appendix A)

1. Introduction and Background

1.1 Background

EXP Services Inc. (EXP) was retained by **Copia Developments** to conduct a hydrogeological study and water balance assessment relating to the proposed development of an apartment complex to be located at 1470 - 1474 Highbury Avenue North in London, Ontario, hereinafter referred to as the 'Site' (**Appendix A, Drawing 1**).

The objective of the hydrogeological study is to examine the hydrogeological characteristics of the Site 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 water balance, collecting a full year of groundwater elevations to identify any seasonal variations; and assess the surface water feature on the property. The assessment provides comments pertaining to potential impacts on hydrogeological conditions at the Site and provides recommendations and design/construction measures, 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 the Site Plan Submission.

Dewatering works associated with the proposed construction are anticipated to involve the taking of more than 400,000 litres of groundwater per day, and as such, in accordance with Ontario Ministry of the Environment, Conservation and Parks (MECP) classifications, the project is considered a Category 3 water taking. A Category 3 Permit to Take Water (PTTW) Hydrogeological Report and application will be submitted under separate cover to support construction dewatering activities.

It is understood that the hydrogeological study and water balance assessment will be submitted for review and approval by the City of London and the Upper Thames River Conservation Authority (UTRCA) as part of the Draft Plan Approval for the proposed development. The study design and report have been compiled in accordance with the City of London Design Specification & Requirements Manual (2019) as well as the Conservation Authority Guidelines for Hydrogeological Assessments (2013).

A landscaped pond is located in the northeast portion of the Site and extends into the adjacent property to the north. Based on this hydrogeological investigation this pond is likely connected to groundwater found in the shallow, unconfined aquifer. This pond has been assessed based on its impact to, and dependence on, groundwater resources on the Site and the analysis is provided based on a full year of monitoring.

The UTRCA administers a regulation made under Section 28 of the Conservation Authorities Act, known as Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (O.Reg. 157/06). The regulation was approved by the Minister of Natural Resources and Forestry on May 4, 2006. This regulation allows the UTRCA to ensure that proposed development and other activities have regard for natural hazard features. The UTRCA implements the regulation by issuing Section 28 permits for works in or near watercourses, valleys, wetlands, or shorelines, when required.

Property owners must obtain permission and/or a letter of clearance from the local Conservation Authority before beginning any development, site alteration, construction, or placement of fill within the regulated area. Permits are also required for any wetland interference, or for altering, straightening, diverting or interfering in any way with the existing channel of a creek, stream or river. It is EXP's understanding that the Site is subject to this regulation, and requires a Section 28 permit, as the Site contains a water feature.

1.2 Proposed Development, Dewatering Controls and Stormwater Management Plans

The development plan for the Site includes three (3) high-rise apartment buildings (Buildings A, B and C) with three (3) levels of underground parking. The Site will have all municipal servicing as well as on site access roads, sidewalks, and some surface parking spaces. The proposed development plan is included in **Appendix B**.

It is currently understood that construction activities will include the installation of cut-off walls around each building foundation to assist with dewatering control during construction. For the purposes of this report and associated dewatering calculations, it is assumed that the cut-off walls will be installed into the underlying till material, approximately 15 meters (m) below existing ground surface. This installation depth is required in order to provide control for the shallow and intermediate aquifers found on Site. The dewatering of the aquifers within the areas of construction will require a Category 3 Permit to Take Water (PTTW) as the estimated dewatering volumes are expected to be above 400,000 L/day.

The proposed stormwater management (SWM) plans for the Site includes connection to the storm sewer outlet on Highbury Avenue North. It is anticipated that Low Impact Development (LID) facilities will be constructed on Site to assist with water balance volumes. Clean water from rooftop runoff is recommended to be utilized in LID facilities as infiltration.

1.3 Terms of Reference and Scope of Work

The hydrogeological assessment was completed in accordance with the scope of work outlined in EXP's Proposal 999-25001726-PP dated May 29, 2020. Authorization to proceed with this investigation was received from Mr. Alex Hois of **Copia Developments**, in a signed proposal dated June 2, 2020. The work plan was provided to the UTRCA and the City of London in an email dated June 3, 2020. Comments were received through emails dated June 4, 2020 and June 16, 2020 and no changes to the proposed field program were required.

The purpose of the assessment was to examine the subsoil and groundwater conditions at the Site by advancing a series of boreholes and installing monitoring wells at the locations chosen by EXP and illustrated on the appended Borehole Location Plan (**Appendix A, Drawing 2**).

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.

   EXP has completed several Geotechnical Investigations and Hydrogeological Assessments in the vicinity of the Site and relevant details from those studies have been incorporated, where appropriate.

2. Field Program: Installation of six (6) monitoring wells in four (4) locations was carried out as part of the field program with two (2) of the locations being completed with sets of nested wells (BH2/MW – A/B and BH3/MW – A/B). In addition, two (2) piezometers and a staff gauge were installed within the landscape pond. Water levels have been measured monthly since installation. Groundwater and surface water quality samples were collected and single well response tests (SWRT) were completed for the purposes of characterizing the hydrogeological conditions at the Site. Water levels were collected from the monitoring wells for a period of 1 year to identify seasonal fluctuations in the groundwater elevations and the hydroperiod of the water feature. This monitoring period was completed between July 2020 and July 2021.

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

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

5. Construction Dewatering Estimates: Based on the proposed construction plans provided to EXP, construction dewatering calculations have been compiled for the groundwater volumes required for extraction within the cut-off walls.

6. Reporting: This task consisted of preparing this hydrogeological assessment report. In preparing this report, EXP has considered the guidance material available in the Conservation Ontario Guidelines for Hydrogeological Assessments (Conservation Ontario, 2013) and City of London Design Specification & Requirements Manual (2019).

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

2. Methodology

Prior to conducting the field work, it was anticipated that shallow near surface groundwater would be present at the Site based on EXP experience in the area and review of the Ministry of the Environment, Conservation and Parks (MECP) Water Well Records for the area. Based on that experience, it was anticipated that a shallow groundwater aquifer would likely be present near surface on the Site. Given that much of the servicing and potential underground parking depths at the Site are expected to be at conventional depths, it was determined that it would be reasonable to install wells within the upper and lower sand and gravel units in order to assist in developing a conceptual model for the groundwater flow system at the Site.

The monitoring wells were also installed for the purpose of providing insight on potential impacts of development on local private well users, the landscaped pond located on Site, as well as construction dewatering requirements needed for an application for a Category 3 Permit To Take Water (PTTW), completed under separate cover.

2.1 Borehole Drilling and Monitoring Well Installations

On June 17, 2020, five (5) boreholes were advanced at three (3) locations in the west portion of the Site with installation of monitoring wells in all five (5) boreholes. Two locations were completed as 'nested' wells to allow for hydrogeological evaluation (BH2/MW – A/B and BH3/MW – A/B). Between March 12 and March 17, 2021, four (4) additional boreholes were advanced (BH101 to BH104) with one additional well installation (BH104/MW). These locations 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. Well installations were confined to the west portion of the Site as the land in the centre and east of the Site was inaccessible due to heavy vegetation and surface water bodies. Boreholes were advanced to depths ranging from 3.0 to 15.7 m below grade.

The boreholes were completed 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. Representative samples of the soils found in the boreholes were submitted for laboratory testing that included moisture content and gradation. Copies of the field borehole logs are provided in **Appendix C**. Copies of the soil gradation analyses are included in **Appendix D**.

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.

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	245.98	246.82	6.6	1.52	Sand and Gravel; Clayey Silt Till
BH2/MW-A	245.99	246.70	8.5	1.52	Sand and Gravel; Clayey Silt Till
BH2/MW-B	245.94	246.85	3.0	1.52	Clayey Silt Till; Sand and Gravel; Sand
BH3/MW-A	246.05	246.82	8.5	1.52	Sand and Gravel; Clayey Silt Till
BH3/MW-B	246.05	246.93	3.7	1.52	Sand and Gravel; Sand
BH104/MW	246.0	246.79	9.0	1.52	Sand

Notes: 1. m amsl denotes metres above mean sea level.
2. m bgs denotes metres below ground surface.

2.2 Piezometer and Staff Gauge Installation

A total of two (2) shallow groundwater piezometers (P-1 and P-2) and one (1) staff gauge were installed on July 27, 2020 in the vicinity of the landscaped pond on the Site where surface water was present (Station 1 and Station 2). The locations are shown on **Drawing 2**. The following **Table 2** outlines the piezometer construction 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 adjacent to Station 1 within the surface water body in order to capture monthly surface water elevations. This staff gauge is referred to as SG1.

Table 2 – Piezometer Construction Details

Station ID	Piezometer ID	Ground Surface Elevation (m amsl)	Top of Piezometer Elevation (m amsl)	Completion Depth (m bgs)	Screen Length (m)	Screened Strata	Staff Gauge Installed
Station 1	**P-1**	243.40*	244.50*	1.00	0.15	Sand and Gravel; Some Cobbles	Yes (SG1)
Station 2	**P-2**	244.19	245.38	0.60	0.15	Sand and Gravel; Occasional Cobbles	No

Notes: 1. m amsl denotes metres above mean sea level.
2. m bgs denotes metres below ground surface.
* Indicates approximate elevations to be confirmed for the final hydrogeological report.

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 monitoring wells BH3/MW-A and BH3/MW-B on October 17, 2020 and March 17, 2021 for analysis of groundwater quality. Groundwater chemistry results are presented and discussed in **Section 4.7**.

2.4 Surface Water Sampling

Surface water samples were collected from SW1 on October 17, 2020 and March 17, 2021 in order to establish baseline surface water quality. Surface water chemistry results are presented and discussed in **Section 4.7**.

2.5 Long-Term Groundwater Elevation Monitoring

Water level monitoring in all monitoring wells, piezometers and staff gauge installed on Site was completed on a monthly basis during the monitoring period from July 2020 to July 2021. Measurements were manually collected using a battery-signal water level tape.

Water level dataloggers were installed in monitoring wells BH3/MW-A and BH3/MW-B, as well as in piezometers P-1 and P-2 to assist in the evaluation of groundwater elevations and influence of precipitation on groundwater levels. An additional logger was placed at surface and used for barometric compensation. The water level dataloggers were installed on July 28, 2020 and remained in place for continued monitoring until the monitoring period was completed, on July 12, 2021. Water level measurements are 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 single well recovery tests (SWRT) within the installed monitoring wells.

The second method involves a calculated estimation of hydraulic conductivity based on soil sample particle size analysis using the Kozeny-Carman method. The two methods used for this study area described in the following subsections.

2.6.1 Single Well Response Tests (SWRTs)

Single well response tests (SWRTs) were completed in monitoring wells BH3/MW-A, BH3/MW-B (October 17, 2020) and MW104 (April 23, 2021) to estimate hydraulic conductivity of the subsurface soils. The test method consisted of an initial purging of the well and subsequent monitoring of the rise in the water level in the well over time.

The mathematical solution by Hvorslev (1951) was used to interpret the data and involved matching a straight-line solution to water-level displacement data collected during the recovery test. The time required for the water level in the well to reach 37% of the initial change (T_o) is determined from the plot, and used in the following equation to estimate the hydraulic conductivity (K);

$$K\ (m/s) = [r^2\ \ln(L/R)] / [2\ L\ T_o]$$

where: r is the radius of the well casing;
R is the radius of the well screen; and,
L is the length of the well screen.

2.6.2 Grain Size Analyses

A total of two (2) soil samples were selected for grain size distribution analysis testing. Due to the nature of the Site soils, estimated hydraulic conductivity (K) values were determined using the Kozeny-Carman methodology. The Kozeny-Carman method of correlating the grain size distribution analysis to the soil hydraulic conductivity is based on the following relationship:

$$K\ (cm/s) = 6.16 \times \left(\frac{\left[0.255\left(1+0.83^{\frac{d60}{d10}}\right)\right]^3}{\left[1-0.255\left(1+0.83^{\frac{d60}{d10}}\right)\right]^2}\right) \times (d_{10})^2$$

3. Site Description and Geologic Setting

3.1 Site Location and Description

The Site is located on the east side of Highbury Avenue North, south of Kilally Road and west of Webster Street. The municipal address is 1470 - 1474 Highbury Avenue North in London Ontario. The Site is generally rectangular and approximately 1.45 ha in size (**Drawing 1**). The Site is generally bounded by agricultural lands to the south with residential developments beyond, and residential developments to the north, east and west.

A landscaped pond is located on the east side of the Site (**Drawing 2**) and extends into the adjacent property to the north. The eastern half of the Site is heavily forested and difficult to access.

The development plan for the Site includes two (2) high-rise apartment buildings with associated roadways and three (3) levels of underground parking, all to be serviced with municipal water and sewer services set at conventional depths. The development will be contained to the west half of the Site. The proposed development plan is included in **Appendix B**.

3.2 Topography and Drainage

The existing topography at the Site is very flat on the west side of the Site. There is a steep slope on the east side of the landscape pond with an elevation difference of approximately 13 m from the east edge of the Site to the water feature. The Site ground elevations range between 259 m above mean sea level (m amsl) in the east and 246 m amsl in the west.

An unnamed drain is present and runs south of the landscape pond area on the Site (**Drawing 3**). This drain continues south to Townsend Drive and then flows west toward the North Thames River. The area surrounding this drain is regulated by the UTRCA, as shown on **Drawing 4**. Surface runoff from the west side of the Site drains slightly to the north and surface runoff from the east side of the Site flows towards the landscape pond and unnamed drain. The proposed development is entirely contained within the area draining north (**Section 5.3**).

The Site is located in the subwatershed of The Forks. Most of the east half of the Site surrounding the water feature and unnamed drain is regulated by the Upper Thames River Conservation Authority (UTRCA), as shown on **Drawing 4**.

3.3 Wetlands and Ecology

There are no mapped wetlands within the Site area. It is understood that an ecological study of the Site is being conducted under separate cover. Details regarding the ecology of the Site, including the landscaped pond, can be referenced in the separate ecological study report.

3.4 Site Geology

3.4.1 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 5**; OGS, 1978) indicates the bedrock surface at an elevation in the range of 226 to 230 m in the vicinity of the Site. The bedrock surface generally slopes to the west in this area. Review of MECP Well records for the area (**Appendix E**) indicates that there are eighteen (18) wells within 500 m of the Site that were drilled to bedrock. Bedrock elevations in the MECP Well records vary greatly, ranging from 202 to 242 m amsl in this area. Bedrock was not encountered during the drilling program completed as part of this investigation.

3.4.2 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 the physiographic region known as the Stratford Till Plain (**Drawing 6**). The Site is located on a spillway (**Drawing 7**).

Quaternary mapping from the UTRCA Map 4 (2005) indicates that the quaternary geology at the Site consists largely of modern alluvial deposits with a small area in the very west of the Site mapped as glaciofluvial deposits (**Drawing 8**).

Surficial geology has also been described by Ontario Geological Society MRD128 (OGS, 2010) as being modern alluvial deposits consisting of clay, silt, sand, and gravel across the entire Site. A fluvial terrace is mapped to be present to the northeast and southwest of the Site (**Drawing 9**).

3.4.3 Site Specific Surficial Geology

Nine (9) boreholes were completed by EXP in seven (7) locations across the west portion of the Site, with installation of monitoring wells in six (6) borehole locations. Two (2) of the locations were completed as ‘nested’ wells to allow for hydrogeological evaluation of the shallow and deep aquifers and potential vertical gradients. The locations of the boreholes are provided in **Drawing 2**. The boreholes were terminated at a maximum depth of between 3.0 and 15.7 m below existing grade. Borehole logs are provided in **Appendix C**.

A generalized stratigraphic cross section through the Site, as shown in **Drawing 10**, is provided as **Drawing 11**. The cross section includes a private well to the east of the property from the MECP Water Well Records (WWR). The surficial geology of the Site is characterized as having an unconfined sand aquifer overlying the majority of the Site and continuing under the landscaped pond feature. The east side of the Site and the slope consist of clayey silt till with a sand and gravel unit on top. Below the unconfined sand aquifer found across the Site is a clayey silt till confining layer. This confining layer ranges in thickness from approximately 2.5 to 4.5 m across the Site. Underlying the confining till is a confined sand and gravel aquifer.

A total of two (2) grain size analyses were completed from samples collected during drilling at BH1 and BH2. The grain size results are discussed in **Section 4.6** *Hydraulic Conductivity*. Laboratory results and graphs are provided in **Appendix D**.

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:

- Dillon Consulting Limited and Golder Associates Ltd. Middlesex-Elgin Groundwater Study, Final Report, submitted to Middlesex and Elgin Counties, dated July 2004, henceforth referred to as the Middlesex-Elgin Groundwater Study;
- 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 Water Well Records (WWR) within 500 m of the perimeter 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 below ground surface (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.

Locally, shallow groundwater flow is expected to follow the local topography, and generally drain towards the south and west towards the unnamed drain and the North Thames River. On a regional scale, the deep overburden aquifer flow direction is reported to be towards the south-southwest (Dillon and Golder, 2004).

Based on the well record information reviewed for this investigation (discussed below), the occurrence of shallow overburden water supply wells in the immediate vicinity of the Site is high.

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 17 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 MECP Water Well Records

A search of the Ontario Ministry of Environment, Conservation and Parks (MECP) Water Well Records (WWR) database resulted in the identification of 73 records for an area within approximately 500 m of the Site boundary. Identified wells are located surrounding the Site (**Drawing 12**), with the majority of the domestic wells to the north and east, and most wells to the west and south identified as monitoring wells or test holes.

Water uses in the area include the following:

- Domestic (31 wells);
- Monitoring or test holes (30 wells);
- Municipal (1);
- Commercial (1);
- Irrigation (1);
- Unknown (1); and
- 8 abandoned wells.

The approximate locations of identified wells are shown on **Drawing 12**, with the MECP WWR Summary provided in **Appendix E**.

Domestic water supply in the local area wells are generally drawing from the confined intermediate sand and gravel aquifer or from the bedrock aquifer. Six (6) domestic wells within 500 m of the Site, as well as the one (1) commercial well and one (1) irrigation well are reported as being less than 10 m deep. These wells were all installed between 1966 and 1985 and may no longer be in use as much of the surrounding area is now developed and on municipal servies.

4.3 Door to Door Well Survey

Municipal services are available in the new developments located to the west and south of the Site. A door-to-door survey was completed along Kilally Road and Webster Street where most domestic wells were noted in the MECP WWRs to confirm whether the shallow domestic wells are still in use.

To date, 11 responses have been received by EXP, and are summarized in Table 3, with full responses provided in **Appendix F**.

Table 3 – Well Survey Questionnaire Response Summary

Address	Response Received
1410 Kilally Road	Municipal Water – No well present
1414 Kilally Road	Municipal Water – No well present
1449 Kilally Road	Private Well- Drilled well, depth unknown, used for gardening Property is also connected to municipal water
1461 Kilally Road	Private Well- Depth unknown Property is also connected to municipal water
1481 Kilally Road	Private Well- 4.9 mbgs dug well used for gardening and car wash Property is also connected to municipal water
1417 Webster Street	Private Well- 25 mbgs drilled well, static water level at 9.1 mbgs No connection to municipal water
1419 Webster Street	Private Well- 21-27 mbgs drilled well No connection to municipal water
1421 Webster Street	Private Well- 27.4 mbgs drilled well No connection to municipal water
1461 Webster Street	Private Well- 29.3 mbgs drilled well No connection to municipal water
1467 Webster Street	Private Well- 25 mbgs drilled well, static water level at 15.5 mbgs No connection to municipal water
1471 Webster Street	Private Well- 24.4 mbgs drilled well, static water level at 15.5 mbgs No connection to municipal water Has requested water levels be collected prior to construction activities
1479 Webster Street	2 private wells: - 8.8 mbgs dug well, 1.8 mbgs static water level - 23.2 mbgs drilled well, 15.5 mbgs static water level No connection to municipal water Has requested water levels and water quality be collected prior to construction activities
1500 Highbury Avenue North	Municipal Water – No well present
1504 Highbury Avenue North	Municipal Water – No well present
1510 Highbury Avenue North	Municipal Water – No well present
1516 Highbury Avenue North	Municipal Water – No well present
1520 Highbury Avenue North	Municipal Water – No well present

Based on the results from the door-to-door survey, it has been confirmed that a number of residences along Webster Street are still utilizing private well water as there are no municipal services along this road.

The owners of 1471 and 1479 Webster Street have requested water levels (both) and water quality (1479 Webster only) be collected prior to construction activities. In particular, 1479 Webster Street has noticed some water level changes in his shallow private well, which he assumes is from the recent construction to the northeast of his property. It is recommended that additional communication be established with these property owners prior to any construction or construction dewatering activities in order to address their concerns. Considering a Category 3 Permit to Take Water (PTTW) will be applied for in relation to construction dewatering, these details will also be included in the PTTW report.

4.4 Site Specific Groundwater Elevations and Flow

Manual water levels in the monitoring wells were collected monthly starting in June 2020 until July, 2021. Details of the monthly water levels are summarized in **Appendix G**.

Dataloggers were installed in two (2) monitoring wells (monitoring wells BH3/MW-A and BH3/MW-B) to provide continuous groundwater elevation monitoring. Dataloggers were installed on July 27, 2020 and collected daily measurements until July 12, 2021. The dataloggers currently remain in the monitoring wells for ongoing measurements until the site has been approved. Datalogger results are presented as hydrographs in **Appendix G**. Manual measurements generally correlate well with datalogger with the exception of two (2) manual measurements in BH3/MW-B from December 15, 2020 and March 17, 2021 and three (3) manual measurements in P-1 from January 21, February 24, and April 23, 2021 that are interpreted to be erroneous. Precipitation data from the London CS station is included on the hydrographs to identify whether surface recharge influences groundwater elevations.

The highest groundwater elevation collected on Site was collected in monitoring well BH3/MW-A (deep) with an elevation of 244.96 m amsl on April 14, 2021. The lowest groundwater elevation collected on Site was measured in monitoring well BH1/MW in February 2021 at an elevation of 243.12 m amsl.

BH3/MW-A Hydrograph (Deep)

The hydrograph for monitoring well BH3/MW-A does not show great variability in groundwater elevation between July and October 2020. From October, groundwater elevations in BH3/MW-A are more responsive to precipitation event and snow melt. It is likely, that purging the well for water quality sampling on October 17, 2020 cleared the screen from smearing effects which resulted in more responsive groundwater elevations. Based on historic weather data from the London CS station, mean temperatures above 0 degrees Celsius were noted from February 24, 2021 resulting in snow melt and higher groundwater elevations. The groundwater elevation well response in BH3/MW-A (deep) to seasonal fluctuations suggests the intermediate, confined aquifer in which this well is installed is not fully confined and is hydraulically connected to the shallow aquifer.

BH3/MW-B Hydrograph (Shallow)

The hydrograph for monitoring well BH3/MW-B show immediate responses to precipitation events, as is evident on the hydrograph shown in **Appendix G**. The elevations of this shallow nested well are consistently lower then the deeper well, suggesting that the deeper well is under hydrostatic pressure conditions. This shallow well also shows very similar groundwater elevations to the measurements collected in the piezometer P-1, indicating that both of

these installations were in the same aquifer, and indicates connectivity between the shallow aquifer and the landscape pond.

Shallow groundwater flow across the Site is affected by hydraulic conductivity, topography, drainage, and geology. Shallow and deep groundwater elevation maps were created based on groundwater measurements collected from monitoring wells screened in the shallow and intermediate aquifers on March 17, 2021. Based on the groundwater elevations across the Site it is determined that shallow groundwater is generally flowing in a northwest-northeast direction and deep groundwater is generally flowing to the southwest. Groundwater elevations and flow direction are presented in **Drawing 13** and **Drawing 14**.

4.4.1 Landscaped Pond

Dataloggers were installed in the piezometers (P-1 and P-2) located within the landscaped pond in Station 1 and Station 2, respectively. The piezometers were installed into the underlying sand and gravel. The hydrographs of the piezometers are in **Appendix G**. Similarly to monitoring well BH3/MW-B (shallow), groundwater elevations measured in P-1 fluctuated in response to precipitation and snow melt events indicating the landscape pond is hydraulically connected to the shallow aquifer in which BH3/MW-B is installed. Groundwater elevations in P-1 ranged from 243.47 and 244.24 m amsl. Surface water elevations at the staff gauge ranged from 243.55 and 244.25 m amsl and were generally lower than groundwater elevations at P-1 suggesting upwelling conditions at the landscape pond.

The P-2 hydrograph shows a response to precipitation events on March 26 and April 12, 2021. Due to dry conditions between July 27, 2020 and March 17, 2021 information regarding groundwater elevations at this location is limited.

4.4.2 Hydraulic Gradients

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.

In both nested monitoring wells BH2/MW-A/B and BH3/MW-A/B groundwater elevations collected indicate an upward gradient and discharge conditions.

4.5 Hydroperiod and Recharge

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.

As discussed in Section 4.4 above, there are two groundwater bearing units present on the Site. The shallow system occurs within the shallow sandy aquifer and the second groundwater bearing unit is the underlying sand and gravel aquifer. The difference in static water level between the two aquifers is less than a meter. Both aquifers have had a consistent upward gradient during the monitoring period, indicating discharge conditions on Site. The response of the deeper aquifer to seasonal fluctuations with a similar pattern to the shallow aquifer suggest the deeper aquifer is hydraulically connected to the shallow aquifer and is not fully confined.

Water level monitoring on the Site was completed for a 12-month period, beginning July 2020. The range in manual groundwater elevations measured across the Site (a measurable component of a hydroperiod) throughout the monitoring period is shown in **Table 4** below. The newly installed monitoring well BH104/MW has not been included as only four (4) months of data is available and does not represent an annual comparable range. As shown in **Table 4**, the largest variation in manual water levels occurs in the northwest portion of the Site at BH2/MW-A/B, with a range of 1.10 m.

Table 4: Hydroperiod as defined by Manual Measurements

Location ID	Minimum Groundwater Elevation (m amsl)	Maximum Groundwater Elevation (m amsl)	Range (m)
BH1/MW	243.12	244.01	0.89
BH2/MW-A	243.57	244.67	1.10
BH2/MW-B	243.43	244.53	1.10
BH3/MW-A	244.42	244.84	0.42
BH3/MW-B	243.42	244.47	1.05
P-1	243.50	244.22	0.72
P-2	243.63	244.10	0.47

Typically, groundwater recharging conditions are occurring on Site from approximately October to April, as observed in the hydrographs (BH3/MW A/B and P-1). Throughout the recharging seasons in 2020 – 2021, there were approximately four (4) separate surges of recharge which are seen on the hydrographs. The magnitude of groundwater increase during these surges is as follows:

- August 27 to September 10, recharge of 0.2 m over 14 days (average of 0.01 m per day);
- March 25 to March 27, recharge of 0.14 m over 2 days (average of 0.07 m per day);
- April 12 to April 18, recharge of 0.09 m over 6 days (average of 0.02 m per day); and,
- June 25 to July 1, recharge of 0.19 m over 6 days (average of 0.03 m per day).

Therefore, during recharging events, the aquifer is found to recharge on the order of 0.01 m to 0.07 m per day.

Additionally, recharging conditions are occurring from roughly December to April as observed in the hydrographs. Warmer temperatures and snow melt beginning at the end of February 2021 also resulted in significant groundwater recharge.

Groundwater recharge did not occur from approximately early-January to late-February, 2021, as can be seen in all the hydrographs. Minimal precipitation was recorded during this period, in addition to very cold seasonal temperatures. The combination of minimal precipitation and cold temperatures was likely the reason why limited (or no) groundwater recharge occurred during this time.

The piezometer P-1 located within the landscape pond shows similar water level fluctuations and recharge surges as BH3/MW-A/B. Due to extensive dry conditions at P-2, information regarding recharge conditions is minimal at this location.

Throughout the monitoring period, surface water was present and fluctuated in a similar manner as in BH3/MWA-B and P-1.

4.6 Hydraulic Conductivity

Single well recovery tests (SWRT) were performed on three (3) monitoring wells on Site (BH3/MW-A, BH3/MW-B and BH104/MW) to evaluate the hydraulic characteristics of the upper and lower sand aquifer units. The results of the tests are summarized in **Table 5**, and the calculations are presented in **Appendix H**. The results provide information regarding the hydraulic conductivity of the soils surrounding the well screen.

Based on these tests the hydraulic conductivity of the upper sand and gravel was found to be 4.2×10^{-5} m/s and the underlying sand and gravel unit was found to be 7.8×10^{-6} m/s. Literature values for hydraulic conductivities range from 10^{-5} to 10^{-2} m/s for sand (Table 2.2, Freeze and Cherry; 1979). The underlying sand and gravel unit is therefore slightly below this typical range.

Also, the hydraulic conductivity results for the underlying sand unit encountered in borehole BH104/MW was found to be 3.0×10^{-8} m/s. This value is quite low for a unit classified as a sand, however the unit was logged in the field as fine to medium grained and dense to very dense (see borehole log in **Appendix C**).

Grain size analyses were carried out on select soil samples collected from the boreholes, with results summarized in **Table 5**, and shown graphically in **Appendix D**.

A total of two (2) soil samples from Site were selected for grain size distribution analysis testing. Due to the nature of the Site soils, estimated hydraulic conductivity (K) values were determined using the Kozeny-Carman method.

Based on the grain size analyses, the hydraulic conductivity for the upper and lower sand and gravel aquifers is 4.7×10^{-5} m/s. The results of all hydraulic conductivity testing to date are compiled in the table below.

Table 5 – Hydraulic Conductivity Results

Sample ID	Lithology	Hydraulic Conductivity (m/s)
BH3/MW-A	Sand and Gravel (deep/lower aquifer)	7.8×10^{-6}
BH3/MW-B	Sand and Gravel (shallow/upper aquifer)	4.2×10^{-5}
BH104/MW	Sand	3.0×10^{-8}
Grain Size Analyses		
BH1/MW, Sa 7 (6.1 – 6.6 m deep)	Sand and Gravel (deep/lower aquifer)	4.7×10^{-5}
BH2/MW, Sa 2 (1.5 - 2 m deep)	Sand and Gravel (shallow/upper aquifer)	4.7×10^{-5}

4.7 Groundwater and Surface Water Quality

Groundwater and surface water sampling was completed on October 17, 2020 and March 17, 2021. A total of two (2) groundwater monitoring wells (BH3/MW-A and BH3/MW-B) and one (1) surface water location (SW Station 1) was selected for sampling. Water quality tables are presented in **Appendix I** and complete laboratory chain of custody results are provided in **Appendix J**.

Groundwater quality was compared to the Ontario Drinking Water Quality Standards, Objectives and Guidelines (ODWQS) (O.Reg. 169/03). Although the groundwater on Site is not planned for use as drinking water, these guidelines are used for comparison sake only. As demonstrated in the tabulated results in **Appendix I**, none of the parameters tested exceeded the ODWQS guidelines for any of the wells tested on October 17, 2020 and March 17, 2021.

Surface water quality was compared to Ontario Provincial Water Quality Objectives (PWQO) (MOEE 1994). The PWQO guideline for iron (300 ug/L) exceeded during both sampling events (27000 ug/L in October 2020 and 310 ug/L in March 2021). During the sampling event on October 17, 2020 surface water Station 1 also exceeded the PWQO for aluminum, arsenic, cadmium, chromium, cobalt, copper, lead, silver, vanadium and zinc. All the remaining tested parameters met PWQO guidelines for both sampling events. Complete chain of custody laboratory results are provided in **Appendix J**.

A Piper Diagram was prepared for the groundwater and surface water quality samples collected on October 17, 2020 and March 17, 2021 and is shown in **Drawing 15**. The water quality results generally plot within the calcium magnesium bicarbonate alkaline zone of the Piper Diagram. The groundwater and surface water quality results are all generally quite similar, especially the surface water samples and monitoring well BH3/MW-B (shallow), further suggesting interaction of the shallow groundwater table and the landscaped pond.

Schoeller Diagrams were also prepared for the groundwater and surface water quality samples collected on October 17, 2020 and March 17, 2021 for Major and Minor Ions (**Drawings 16a and 16b**). The groundwater samples between the shallow and deep nested wells are similar for both the Major and Minor Ions, indicating likely some interaction between aquifers. The groundwater samples differ from the surface water samples for some Major Ions (Ca, Mg, Ma) as the surface water samples show orders of magnitude higher concentrations. Chloride and sulphate which can be used as chemical tracers were similar in the surface water sample SW1 and the wells BH3/MW-A and BH3/MW-B, indicating the landscape pond water quality is likely connected to the shallow and intermediate aquifers which discharge into the pond.

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 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, ON). 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, Runoff and Recharge

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 K.

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.

The soils at the Site were not mapped by the Ministry of Agriculture, Food and Rural Affairs. Based on borehole logs, the surficial soils at the Site are A-type soils (fine sand).

Typically, groundwater recharging conditions are occurring from approximately October to April, as observed in BH3/MW-A/B and P-1. Snow melting conditions in late February (i.e. a jump in groundwater elevations) can be observed on the hydrographs.

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. This water balance will be provided to the stormwater engineer for consideration as part of the design of the proposed SWM strategy for the Site.

In general, the site comprises a land area of approximately 1.59 hectares. To complete the Pre-development water balance, the Site was divided into two (2) drainage areas: Area 1 (0.8 ha) with drainage to the north; and Area 2 with drainage to the landscape pond (0.79 ha). These drainage areas are presented in **Appendix K**.

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 K**.

Post-development calculations have been completed based on the current Development Plan, as included in **Appendix B**. Detailed assumptions for the post-development water balance are included in **Appendix K**. Based on the Development Plan, the proposed development will be entirely contained within drainage Area 1 draining to the north and drainage Area 2 will remained undeveloped post-construction.

Table 6 provides a summary of the pre and post development water balance calculations.

Table 6: Summary of Water Balance Estimates for Area 1

	Pre Development (m^3/year)	Post Development (m^3/year)	% Difference	Post Development with Mitigation (m^3/year)	% Difference with Mitigation
Estimated Runoff	1,720	5,658	229%	3,395	197%
Estimated Infiltration	1,884	425	-77%	1,557	83%

Conservation Ontario Guidelines (Conservation Ontario, 2013) suggest a target of 80% of the pre-development infiltration being maintained in the post-development conditions. A 40% reduction in runoff would allow for post-development infiltration to be 83% of the pre-development infiltration, which exceeds the target of 80%.

Due to the increased impermeable surfaces (such as rooftops, roadways, sidewalks, driveways), the proposed development is expected to result in a reduction in the post-development infiltration level, and a corresponding increase in the estimated run-off. The use of secondary infiltration opportunities and run-off reduction techniques to improve post development infiltration is described below.

5.4 Low Impact Development (LID) Practices

Low Impact Development (LID) is a stormwater management strategy that seeks to mitigate the impacts of increased runoff and stormwater pollution by managing runoff as close to its source as possible (TRCA, 2010). Effective management of stormwater is critical to the continued health of our streams, rivers, lakes, fisheries and terrestrial habitats. The primary objectives of stormwater management include maintaining the hydrologic cycle, protecting water quality, and preventing increased erosion and flooding.

The following list provides some mitigation measures which may be taken into consideration, during the detailed design stage of the development. These measures may include secondary infiltration by directing and capturing run-off water from impervious surfaces into landscaped areas where existing infiltration capacity can be utilized. More specifically, considerations may include the following:

- Landscaped areas should be graded to promote infiltration of surface water. Increased topsoil depth throughout yard and green space areas to reduce runoff. In general, a run-off reduction up to 30% may be possible in areas where increased topsoil thicknesses are utilized depending on final topsoil thickness, storm duration and intensity;
- Collection of rooftop run-off into side yard and rear yard swales and/or vegetative filter strips, which can be directed to infiltration trenches to promote infiltration;
- Installation of linear bioswales to collect and promote infiltration;
- Routing pavement runoff to grassed areas;
- Planting of trees and bushes; and,

- Installing oil/grit separators.

It is noted that water quality will need to be accounted for in the design of any mitigation measure, such as permeable pavers and pervious pipes, to account for potential impacts from contaminate sources such as winter maintenance on roads and parking lots.

If LID measures are being considered as part of the post-development design, consideration should be given to conducting field percolation tests, at proposed LID locations.

In terms of maintaining infiltration rates in post-development, the most effective stormwater management practices include installing infiltration trenches, lot grading, roof leader discharge to soakaway pits/pervious areas, using pervious pipes, and installing pervious catch-basins.

It is recommended that some of these practices be utilized in site planning and design in order to mitigate the impact of increased runoff and stormwater pollution. By implementing LID practices during development, infiltration volumes can be effectively stored and returned to the natural environment by various development technologies and methods described above.

6. Construction Dewatering Calculations

Construction dewatering calculations have been compiled for the following assumptions:

- Cut-off walls will be installed into the underlying till, to depths of approximately 232.7 mASL (13.3 mgbs). Both upper and lower aquifers are anticipated to be cut-off during construction activities;
- Highest groundwater elevations on site are 244.84 mASL;
- Excavations of 100 m x 25 m;
- Lowest slab elevation is 236.29 mASL;
- Lowest foundation elevation is 234.79 mASL;
- Top of underlying till confining unit is 232.6 mASL;
- Toe elevation of caisson wall is 232.6 mASL;
- The hydraulic conductivity value of the sand and gravel is 4.2E-05 m/s;

Detailed dewatering spreadsheets will be provided in the Category 3 PTTW report, however, it is assumed that dewatering of over 400,000 L/day will be required to remove the groundwater from within each caisson wall (cut-off wall) excavation.

7. Sourcewater Protection Considerations

7.1 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 Site is located outside of a SGRA (**Drawing 17**), however the areas to the east and south are within a SGRA with a vulnerability of 6.

7.2 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 nearly the entire Site is located within an HVA area, except for an area in the southwest corner of the Site (**Drawing 18**).

8. Impact Assessment

8.1 Water Well Users

Several potable wells in the area are sourced from the intermediate sand and gravel aquifer which is confined below the clayey silt till. According to the MECP WWR within 500 m of the Site, six (6) domestic wells, one (1) commercial, and one (1) irrigation well were noted to be installed at depths less than 10 mbgs.

The door-to-door survey resulted in responses from multiple private well owners, including the owners of 1471 and 1479 Webster Street. Both of these private well owners voiced concern over the potential construction dewatering for the Site and requested water levels and water quality (1479 Webster only) be collected prior to construction activities. In particular, 1479 Webster Street has noticed some water level changes in his shallow private well, which he assumes is from the recent construction to the northeast of his property. It is recommended that additional communication be established with these property owners prior to any construction or construction dewatering activities in order to address their concerns. Considering a Category 3 Permit to Take Water (PTTW) will be applied for in relation to construction dewatering, these details will also be included in that permit application and report.

At this time, it is assumed that construction and construction dewatering activities will be contained within cut-off walls, effectively removing any impact to the surrounding shallow and intermediate aquifers. It is not anticipated that any impact will be observed in any of the surrounding private wells.

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.

8.2 Surface Water Features

8.2.1 Landscaped Pond

A landscaped pond is present on the east side of the Site (**Drawing 2)**. As indicated in **Section 4.4**, based on groundwater levels in the monitoring wells, piezometer, and surface water elevations, the landscape pond is directly connected to the shallow groundwater table. The pond is also fed by surface runoff from the eastern portion of the Site. At this time is it assumed that the western portion of the Site, in which the development is proposed, drains to the north of the Site and does not contribute runoff to the landscaped pond.

Considering the construction and dewatering of the Site will be contained within cut-off walls, the shallow aquifer supply to the landscaped pond will not be disrupted. It is important to note that the cut-off walls need to be effectively installed into the underlying till.

8.2.2 General Comments

Based on drainage mapping (**Appendix K**), drainage from the proposed development portion of the Site is expected to flow north. However, as due diligence, the following comments are provided with recommendations to help minimize impact to the landscape pond:

- During the site grading work, suitable sedimentation controls will be required to help control and reduce the turbidity of run-off water;
- A Best Management Practice (BMP) and spill contingency plan (including a spill action response plan) should 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;
- Re-establishing vegetative cover in disturbed areas following the completion of the construction work;
- Limit the use of commercial fertilizers in landscaped areas which border a habitat feature; and,
- Limit the use of salts or other additives for ice and snow control on the roadways and parking areas.

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 Ministry of the Environment, Conservation and Parks (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 co-authored by Ms. Kelli Dobbin, G.I.T and Ms. Hagit Blumenthal M.Sc., P.Geo. Ms. Dobbin obtained a Bachelor of Science Degree from the University of Waterloo and has been working in the field for 6 years. She has authored reports for numerous projects including residential and commercial developments that require hydrogeological input, groundwater impact assessments and calculated groundwater removal quantities for short-term construction.

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 9 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 Ministry of Environment, Conservation and Parks (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 Permit to Take Water (PTTW) have been part of her routine assignments.

10. References

Barnett, P.J., Cowan, W.R. and Henry, A.P. 1991. Quaternary geology of Ontario, southern sheet; Ontario Geological Survey, Map 2556.

Chapman, L.J. and Putnam, D.F., 1984. The Physiography of Southern Ontario, Ontario Geological Survey, Special Volume 2, 270p.

Conservation Ontario. 2013. Hydrogeological Assessment Submissions - Conservation Ontario Guidelines to Support Development Applications. June.

Corporation of the City of London. 2019. Design Specifications & Requirements Manual. Updated August 2019.

Dillon Consulting Limited and Golder Associates Ltd. (Dillon and Golder). 2004. Middlesex-Elgin Groundwater Study, Final Report, submitted to Middlesex and Elgin Counties.

Freeze, R. A. and J.A. Cherry. 1979. Groundwater. Prentice-Hall Inc. New Jersey. 604 pp

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.

Hewitt D. F. 1972. Paleozoic Geology of Southern Ontario, Ontario Div. Mines, GR105, Map 2254.

Ministry of the Environment: Water Well Records. https://www.ontario.ca/environment-and-energy/map-well-records.

Ministry of the Environment (MOE). 2001. Groundwater Studies 2001/2002, Technical Terms of Reference

Ministry of the Environment (MOE). 2003. Stormwater Management Planning and Design Manual.

Ministry of the Environment (MOE). 2008. Technical Rules: Assessment Report, Clean Water Act, 2006

Ministry of Environment and Energy (MOEE). 1994. Water Management Policies, Guidelines, Provincial Water Quality Objectives of the Ministry of Environment and Energy. Reprinted: February 1999.

Ontario Department of Mines. 1978. St. Thomas Sheet, Southern Ontario, Bedrock Topography Series, Map P 482.

Ontario Department of Mines and North Affairs. 1972. 1:253,440 scale, Physiography of the Southwestern Portion of Southern Ontario. Ontario Geological Survey, Map 2225.

Ontario Geological Survey (OGS). 2010. Surficial geology of Southern Ontario, Miscellaneous Release--Data 128-REV.

Ontario Geological Survey (OGS). 2011. Bedrock Geology of Ontario, 1:250 000 scale, Miscellaneous Release Data 126-Revision 1.

Steenhuis T.S. and W.H. Van Der Molen. 1986. The Thornthwaite-Mather Procedure as a Simple Engineering Method to Predict Recharge. Journal of Hydrology, 84. p. 221—229.

Thames-Sydenham and Region Source Protection Committee. 2011. Upper Thames River Source Protection Area, Approved Updated Assessment Report. 12 August.

Thornthwaite, C. W. & J. R. Mather. 1957. Instructions and Tables for Computing Potential Evapotranspiration and the Water Balance. Centerton, N.J., Laboratory of Climatology, Publications in Climatology, v. 10, no. 3, p. 185-311.

Toronto and Region Conservation Authority and Credit Valley Conservation Authority (TRCA and CVC) 2010. Low Impact Development Stormwater Management Planning and Design Guide. Version 1.0.

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 **Copia Developments** 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

-LEGEND-

Approximate Site Boundary

Image Source: Google Earth Pro (July 2018)

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Site Location Plan
Prepared By: E.B.	Reviewed By: H.J.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
AUGUST 2020	1:10,000	KCH-00260285-A0	1

-LEGEND-

BH1/MW	Approximate Borehole Location (June, 2020)
P1	Approximate Piezometer Location
SG1	Approximate Staff Gauge Location
	Approximate Site Boundary
BH101	Approximate Borehole Location (March, 2021)

Image Source: Google Earth Pro (July 2018)

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Borehole Location Plan
Prepared By: J.M.	Reviewed By: H.B.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
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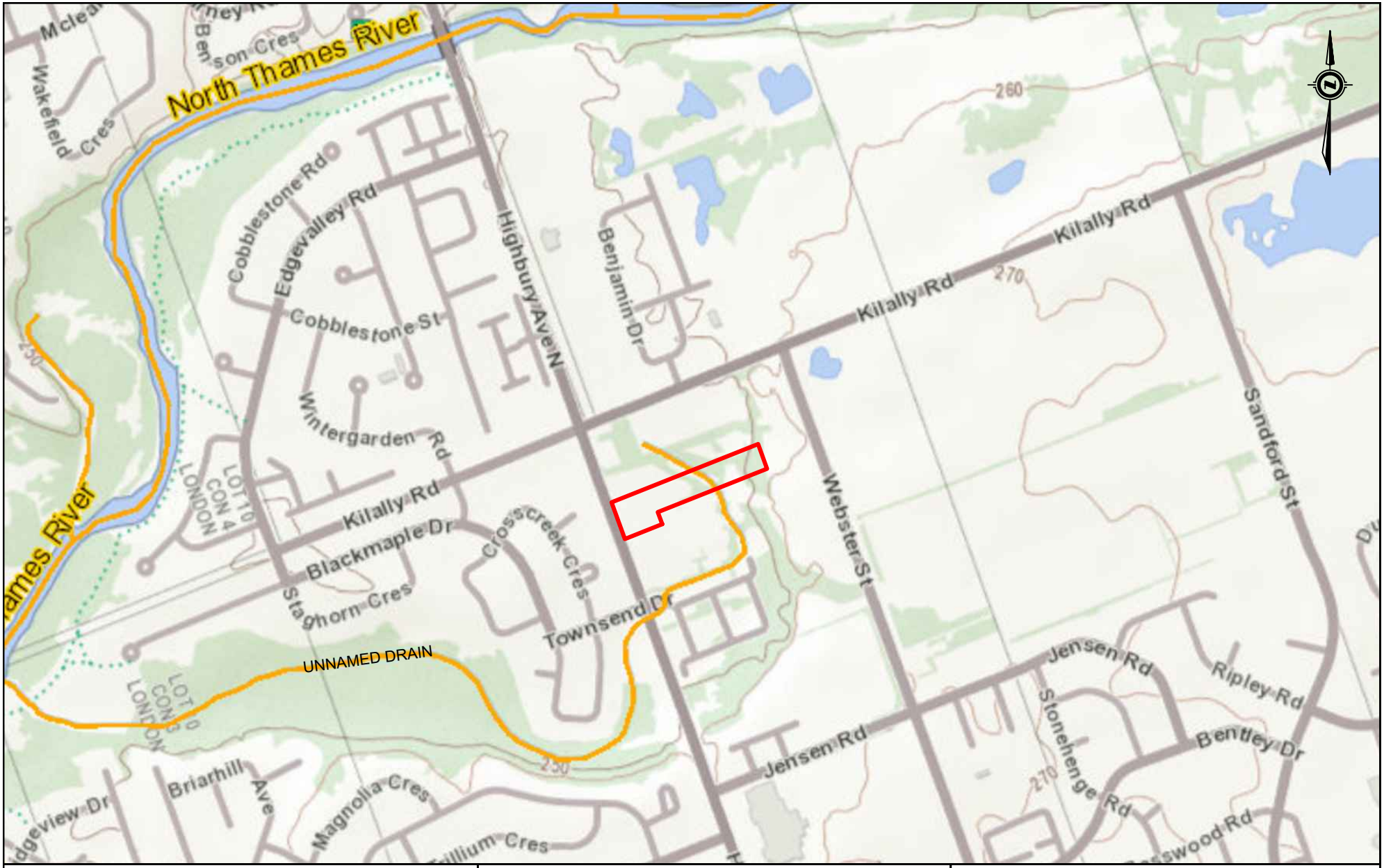

-LEGEND-

- Approximate Site Boundary
- Constructed Open/Unknown Drain
- Constructed Closed/Tiled Drain

Image Source: OMAFRA Mapping; www.gisapplication.lrc.gov.on.ca

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Site Area Drainage
Prepared By: E.B.	Reviewed By: H.J.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
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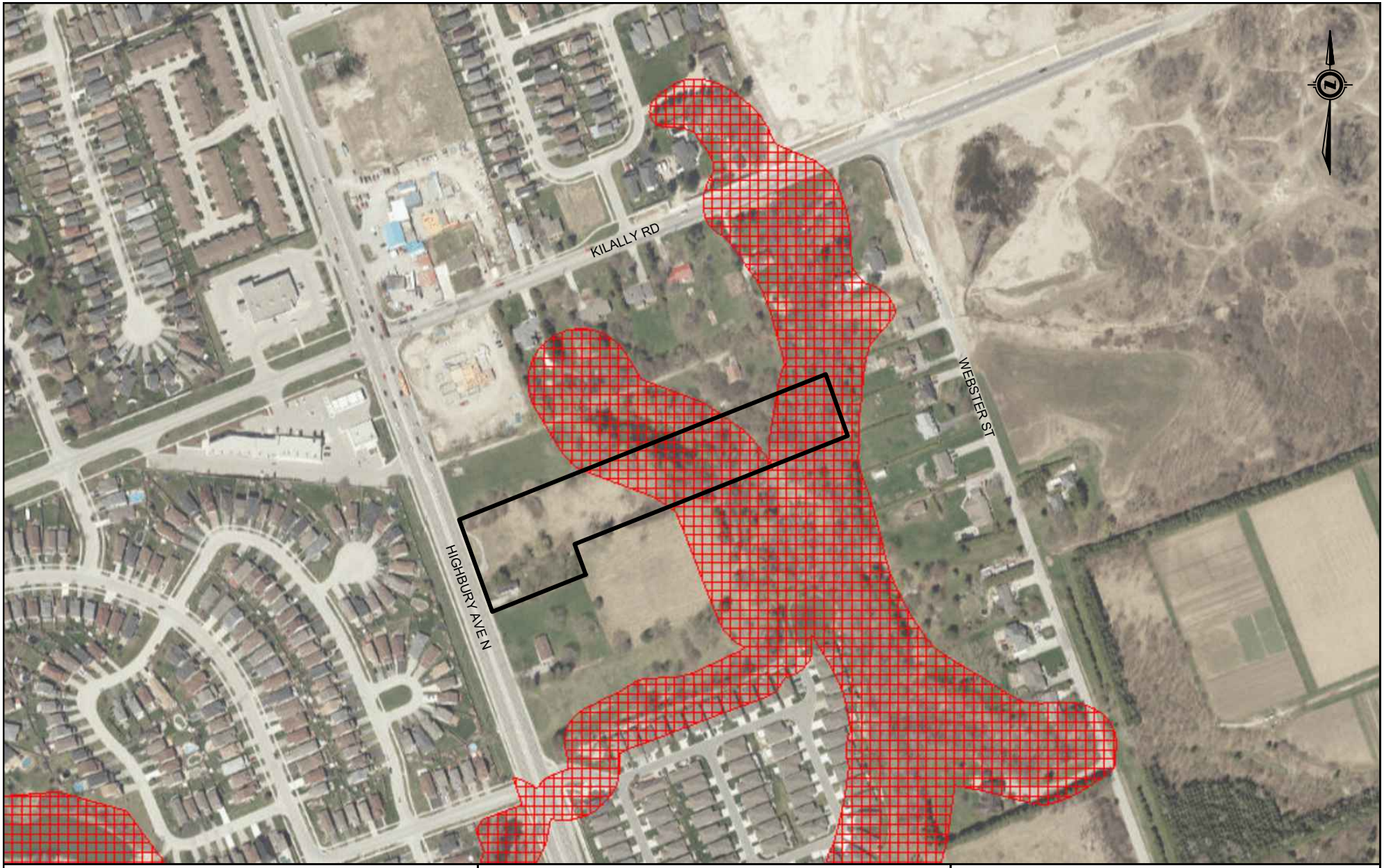

-LEGEND-

Approximate Site Boundary

Regulated Lands of the Upper Thames River Conservation Authority (UTRCA)

Image Source: City of London Mapping Software; maps.london.ca

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Regulated Lands of the UTRCA
Prepared By: E.B.	Reviewed By: H.J.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
AUGUST 2020	1:4,000	KCH-00260285-A0	4

-LEGEND-

- Approximate Site Boundary
- 751 — Bedrock Surface Elevation in a Well or Test Hole (feet)
- 700 — Contours on Bedrock Surface (feet)

Image Source: Ontario Geological Survey. 1980. Bedrock Topography Series, Bedrock Topography of the Lucan Area, Southern Ontario, Map P291.

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Bedrock Topography
Prepared By: E.B.	Reviewed By: H.J.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
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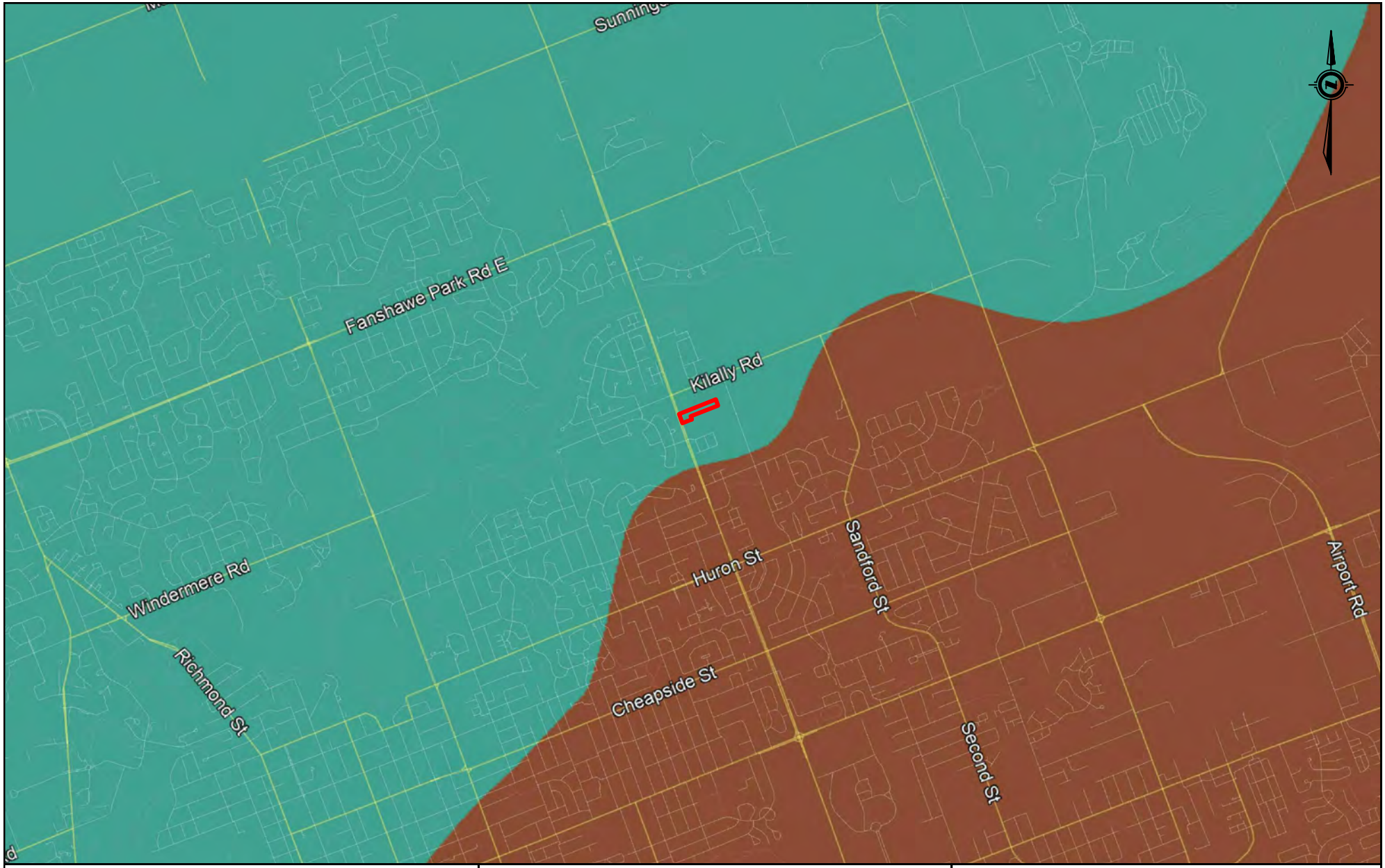


-LEGEND-

- Approximate Site Boundary
- Stratford Till Plain
- Caradoc Sand Plains and London Annex

Image Source: Chapman, L.J. and Putnam, D.F. 1984. Physiography of Southern Ontario; Ontario Geological Survey, Map P.2715 (coloured).

Hydrogeological Assessment

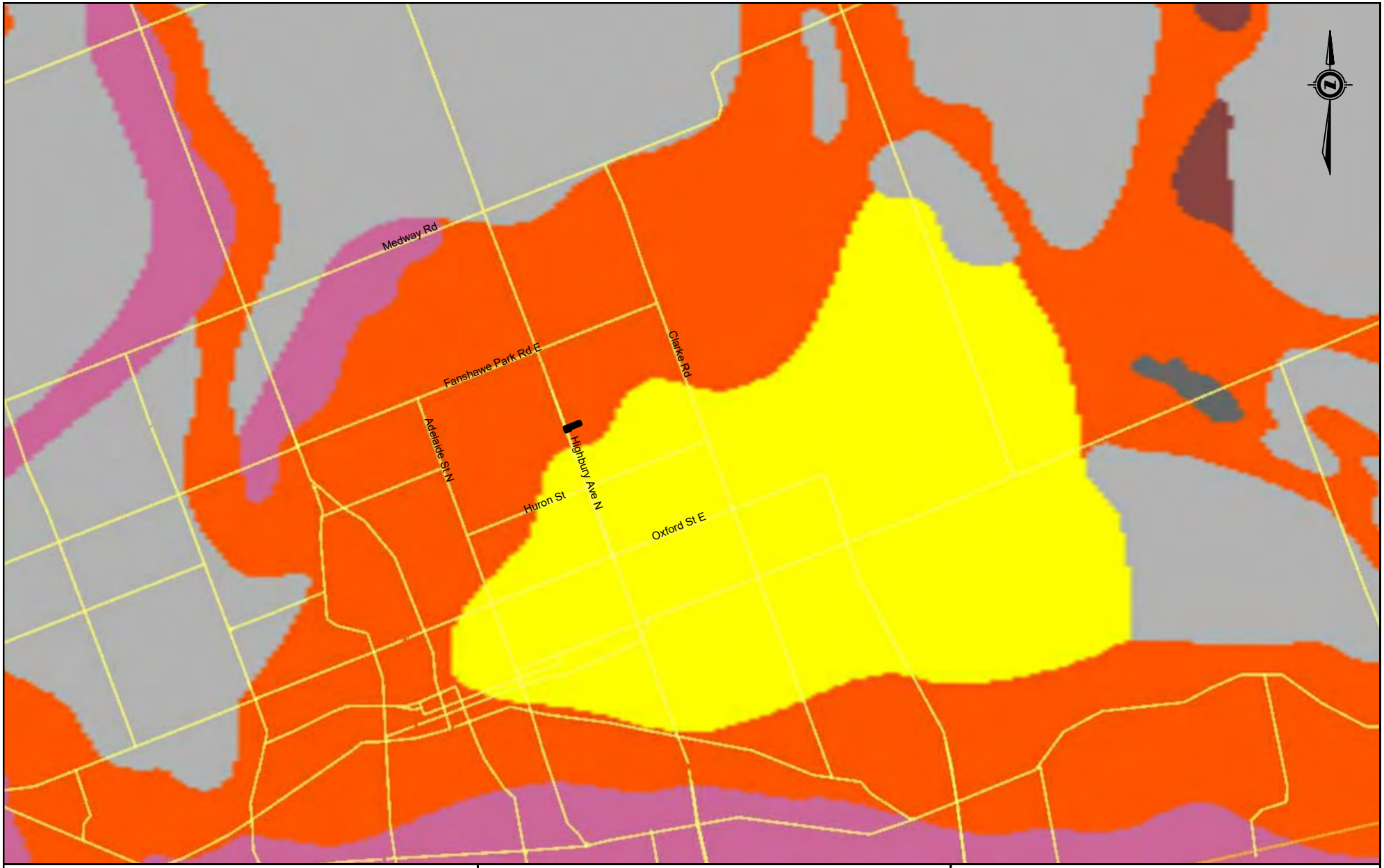
Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Physiographic Regions
Prepared By: E.B.	Reviewed By: H.J.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
AUGUST 2020	1:40,000	KCH-00260285-A0	6



-LEGEND-

- Approximate Site Boundary
- Till Moraines
- Spillways
- Till Plains (Undrumlinized)
- Sand Plains

Image Source: Chapman, L.J. and Putnam, D.F. 1984. Physiography of Southern Ontario; Ontario Geological Survey, Miscellaneous Release--Data 228.

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Physiographic Landforms
Prepared By: K.D.	Reviewed By: H.J.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
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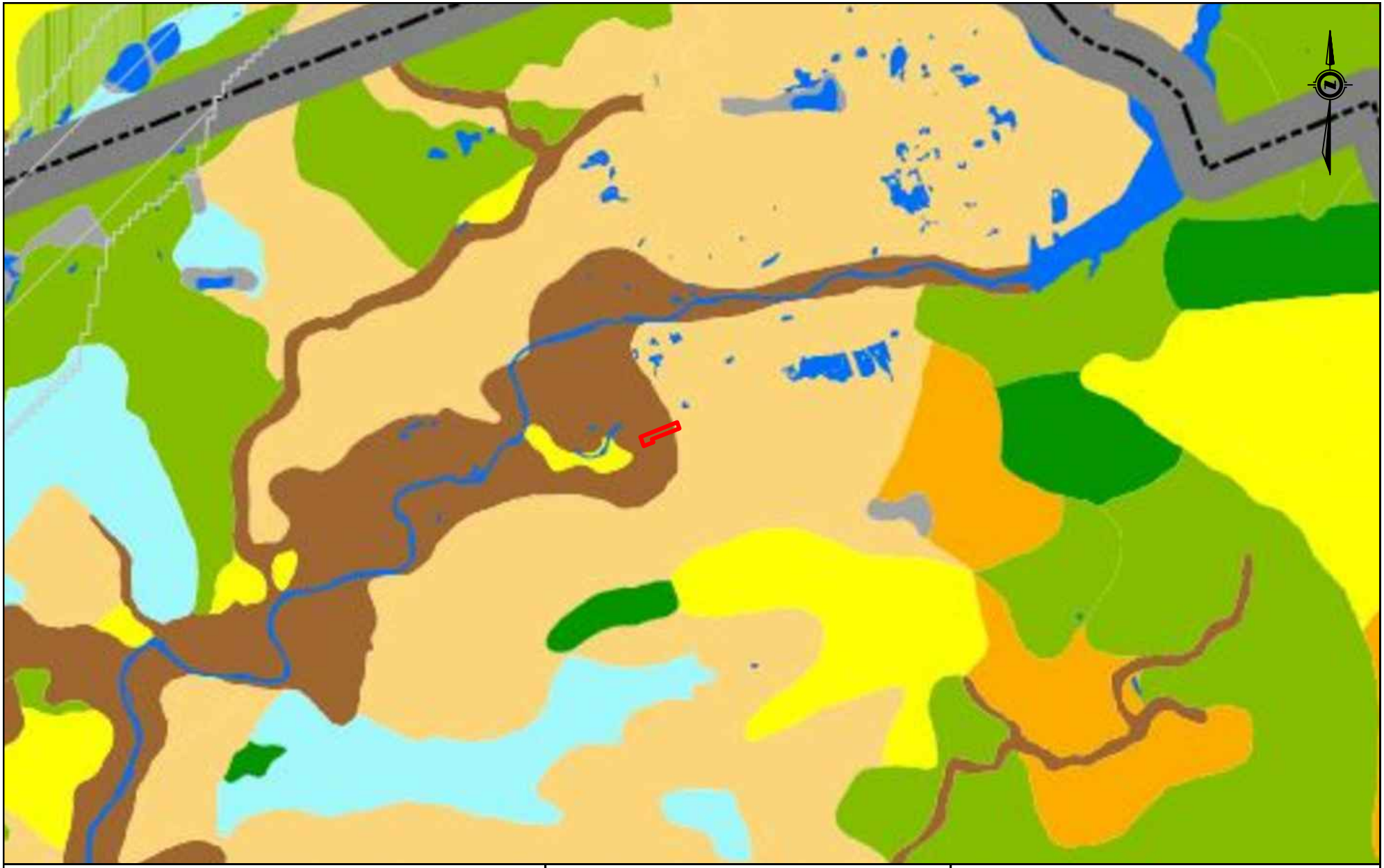

-LEGEND-

- Approximate Site Boundary
- Stone-poor, carbonate-derived silty to sandy till
- Glaciolacustine-derived silty to clayey till
- Ice-contact stratified deposits
- Glaciofluvial Deposits
- Massive well laminated
- Coarse-textured glaciolacustrine deposits
- Modern alluvial deposits
- Organic Deposits

Image Source: UTRCA, 2005. Map 4 - Quaternary Geology.

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Quaternary Geology
Prepared By: M.B.	Reviewed By: H.J.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
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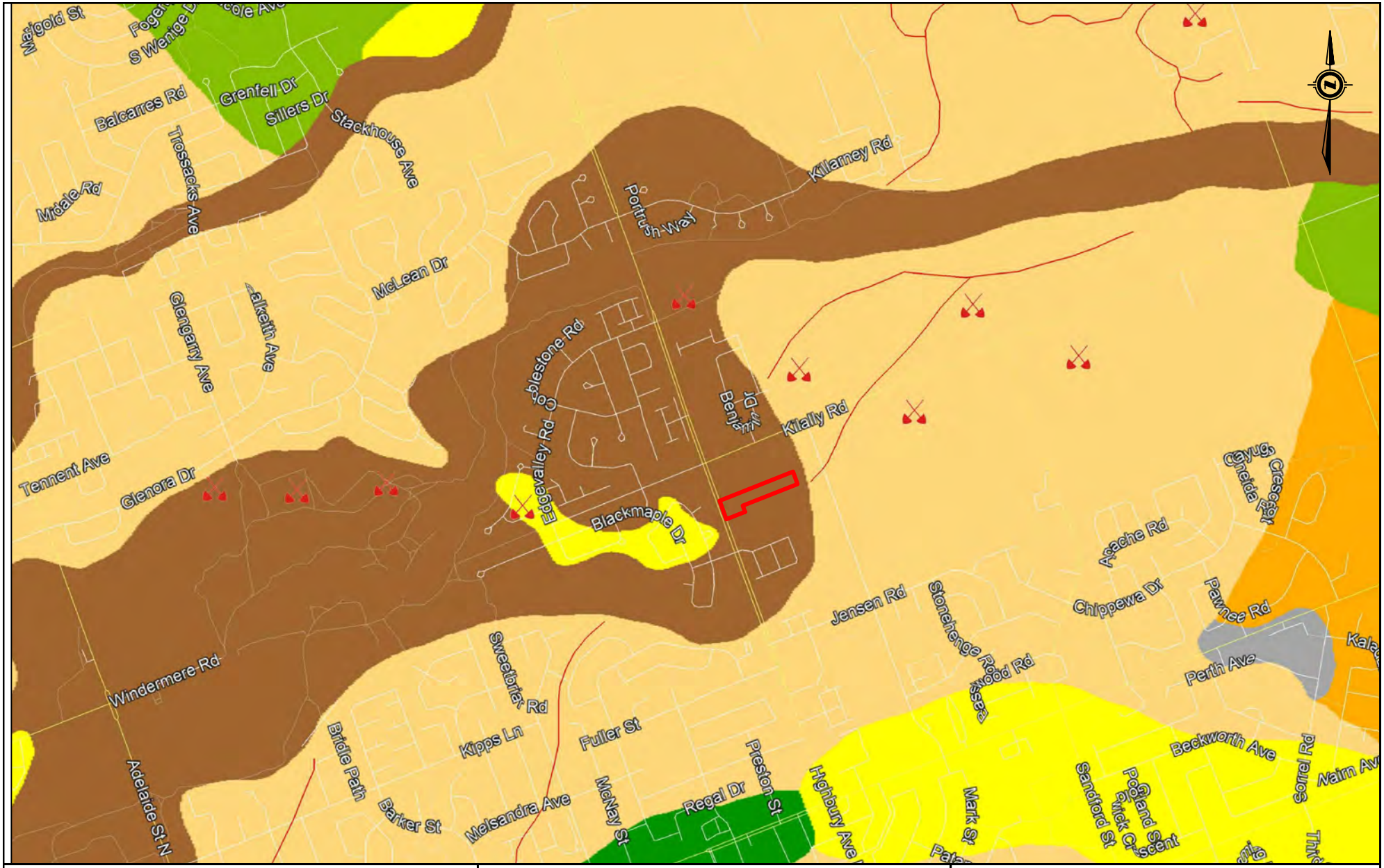


-LEGEND-

- Approximate Site Boundary
- Organic Deposits
- Modern Alluvial Deposits
- Coarse-textured glaciolacustrine deposits
- Ice-contact stratified deposit
- Stone-poor, sandy silt to silty sand textured till
- Clay to silt-textured till
- Fluvial Terrace

Image Source: ; The Ontario Geological Survey. 2003. Surficial Geology of Southern Ontario.

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Surficial Geology
Prepared By: M.B.	Reviewed By: H.J.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
AUGUST 2020	1:20,000	KCH-00260285-A0	9

-NOTES-

1. The site plan was reproduced from Google Earth Pro and City of London Digital Mapping (2017) and should be read in conjunction with EXP Hydrogeological Assessment KCH-00260285-A0

Hydrogeological Assessment

Proposed Development

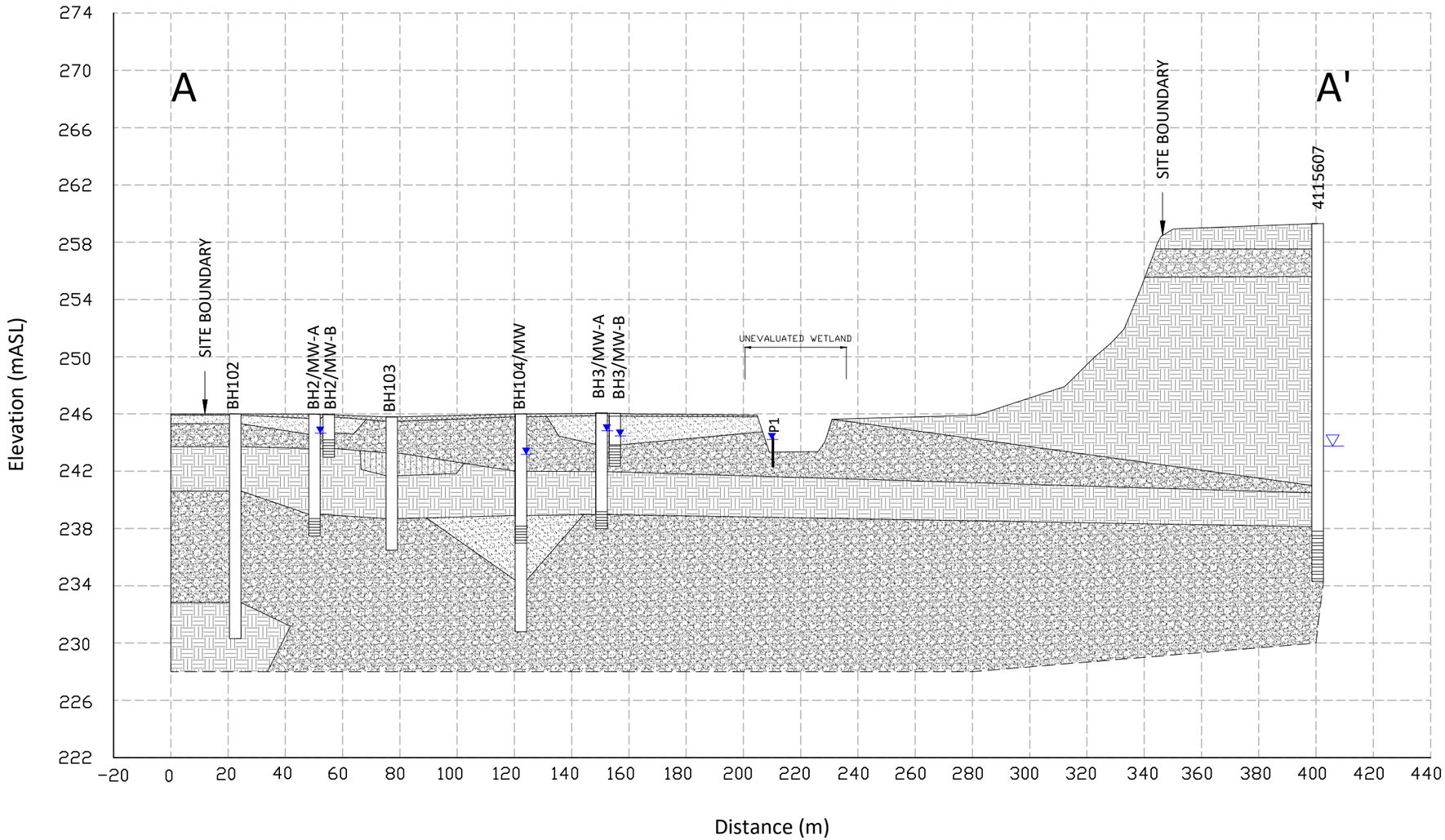
1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Cross Section Location Plan
DRAWN BY:	J.M.
REVIEWED BY:	H.B.
DATE	JUNE 2021

EXP Services Inc.
15701 Robin's Hill Road
London, ON, N5V 0A5

SCALE	PROJECT NO.	DWG.
1:2000	KCH-00260285-A0	10

CROSS SECTION A-A'



-LEGEND-

- Groundwater Measurement March 2021
- Groundwater Measurement MECP Well Log
- Topsoil
- Sand & Gravel
- Sand
- Sand Silt
- Clayey Silt Till

-NOTES-

1. The boundaries and soil types have been established only at borehole locations. Between boreholes they are assumed and may be subject to considerable error.
2. The cross section should be read in conjunction with EXP Hydrogeological Assessment KCH-00260285-A0

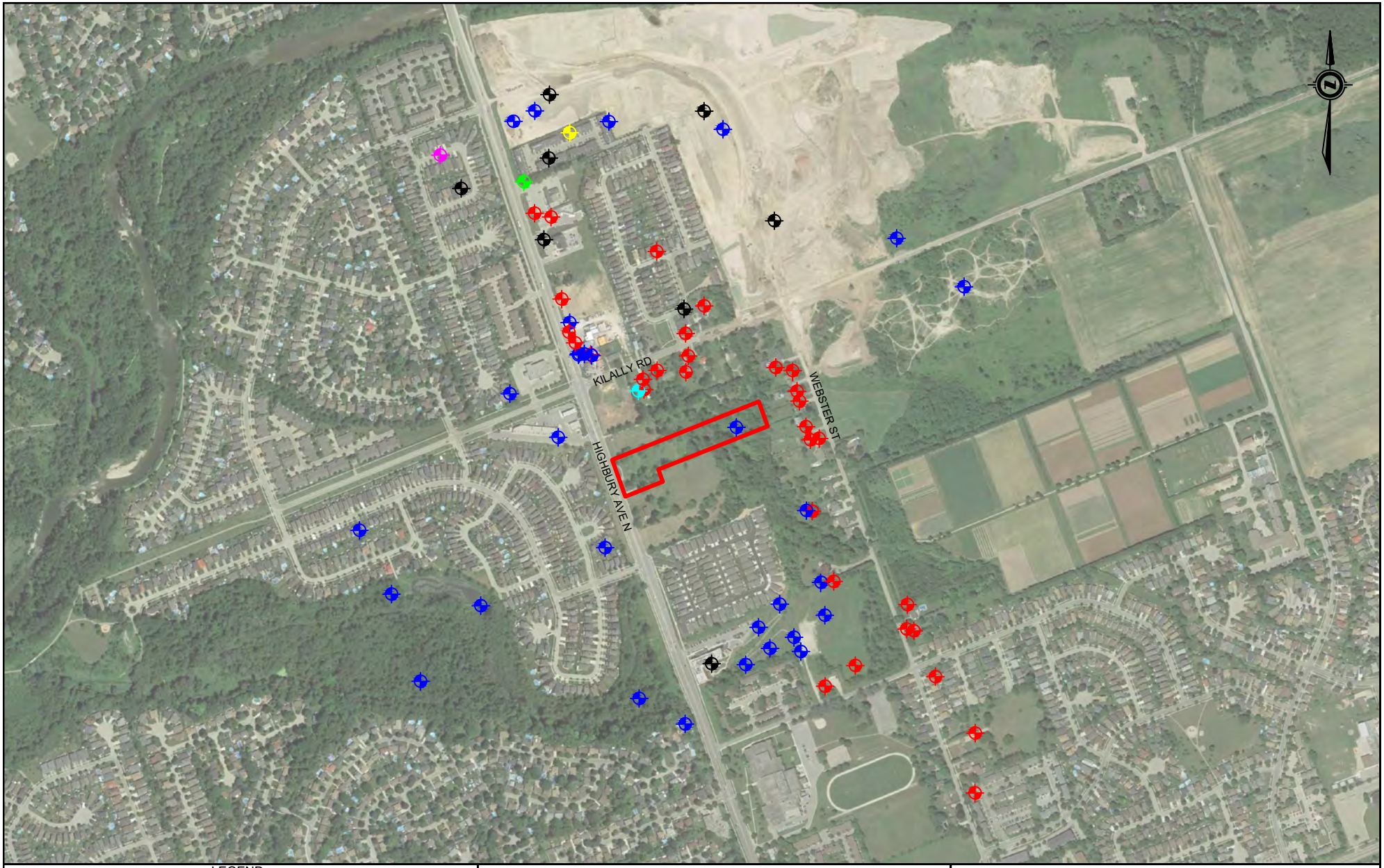
Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Cross Section A - A'
DRAWN BY: J.M. / REVIEWED BY: H.B. / DATE: June 2021	
SCALE: H=1:1500, V=1:300 (11x17) / PROJECT NO.: KCH-00260285-A0 / DWG.: 11	

EXP Services Inc.
15701 Robin's Hill Road
London, ON, N5V 0A5



-LEGEND-

- Approximate Site Boundary
- Monitoring Well / Test Hole
- Domestic Well
- Municipal Well
- Commercial Well
- Irrigation Well
- Well of Unknown Use
- Abandoned Well

Image Source: Google Earth Pro (July 2018)

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Approximate Location of MECP Registered Wells
Prepared By: K.D.	Reviewed By: H.J.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
SEPTEMBER 2020	1:10,000	KCH-00260285-A0	12

-LEGEND-

- BH1/MW — Approximate Borehole Location
- Station 1 — Surface Water Station Location
- Approximate Site Boundary
- (244.47) — Shallow Groundwater Elevation (mAMSL), March 17, 2021
- Groundwater Equipotential Lines
- Inferred Groundwater Flow Direction

Image Source: Google Earth Pro (July 2018)

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Shallow Groundwater Flow Plan
Prepared By: J.M.	Reviewed By: H.B.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
July 2021	1:2,000	KCH-00260285-A0	13

-LEGEND-

BH1/MW	Approximate Borehole Location
Station 1	Surface Water Station Location
	Approximate Site Boundary
(243.98)	Deep Groundwater Elevation (mAMSL), March 17, 2021
	Groundwater Equipotential Lines
	Inferred Groundwater Flow Direction

Image Source: Google Earth Pro (July 2018)

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT: Copia Developments

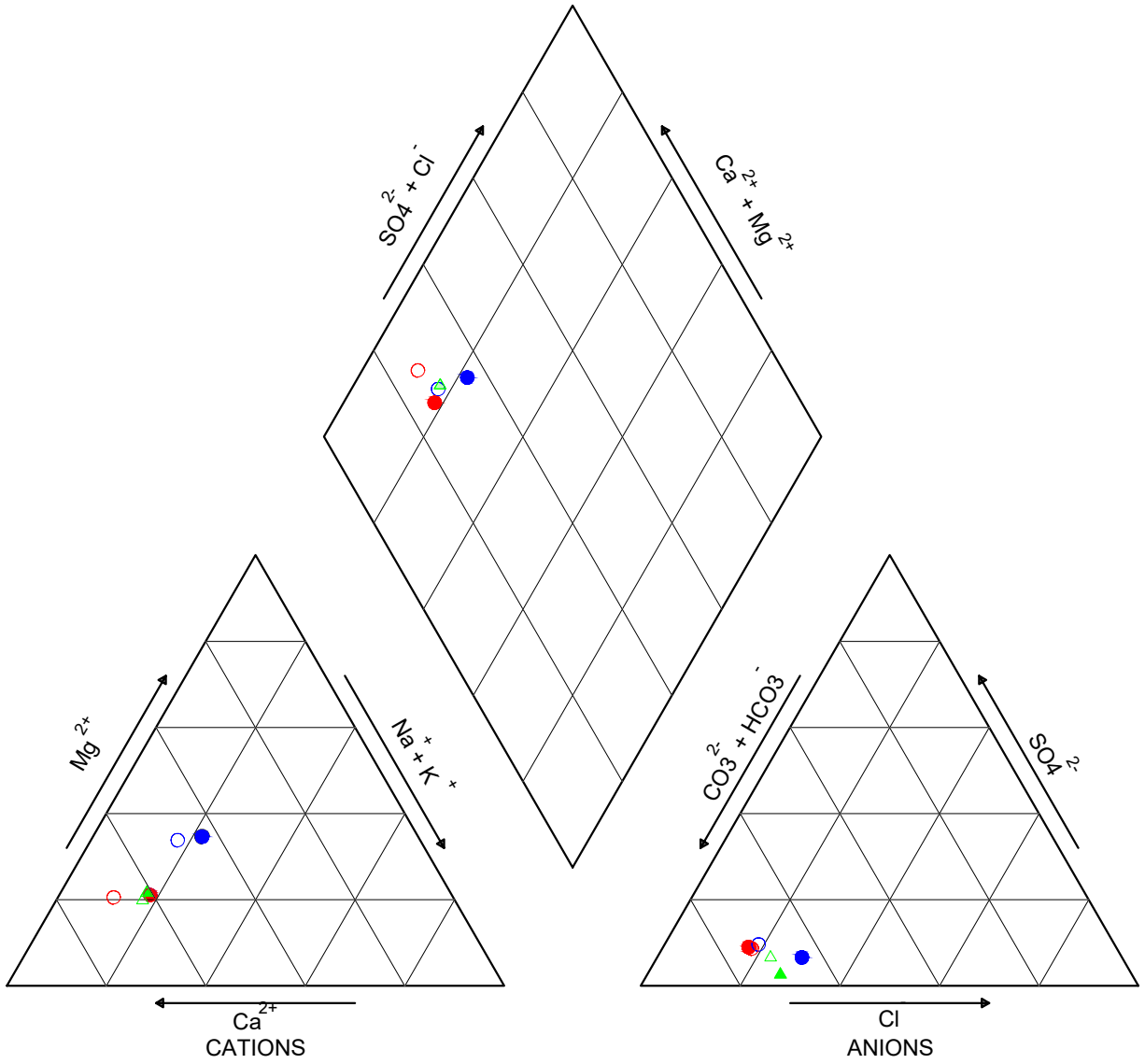
TITLE: Deep Groundwater Flow Plan

Prepared By: J.M.

Reviewed By: H.B.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
July 2021	1:2,000	KCH-00260285-A0	14



-LEGEND-

- MW3A October 2020
- MW3A March 2021
- MW3B October 2020
- MW3B March 2021
- SW1 October 2020
- SW1 March 2021

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Piper Diagram for Water Quality
Prepared By: K.D.	Reviewed By: H.B.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
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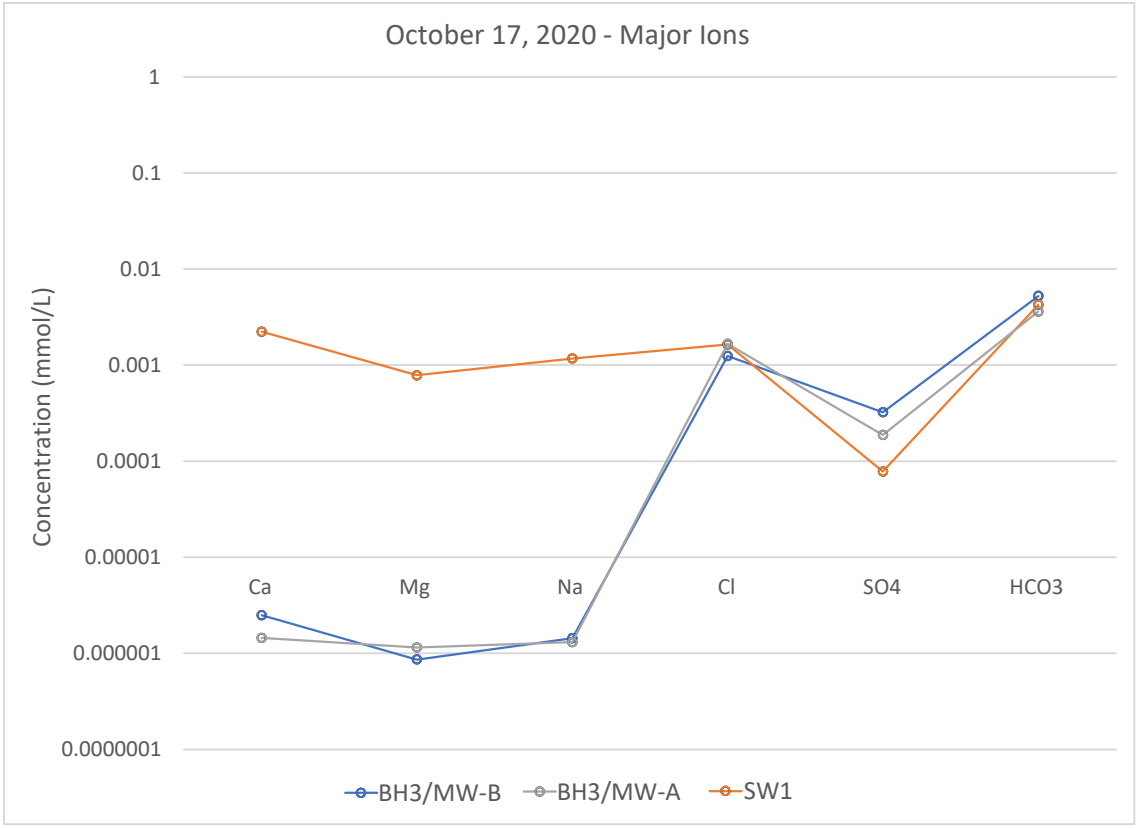
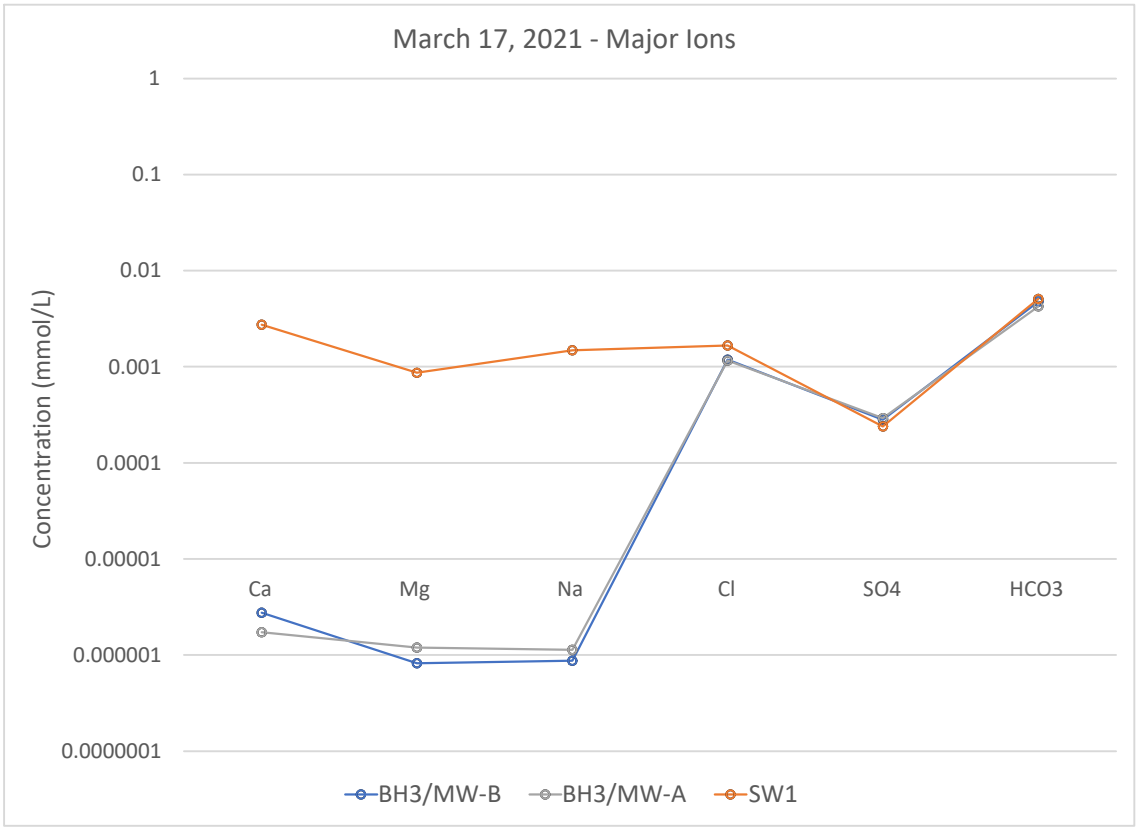


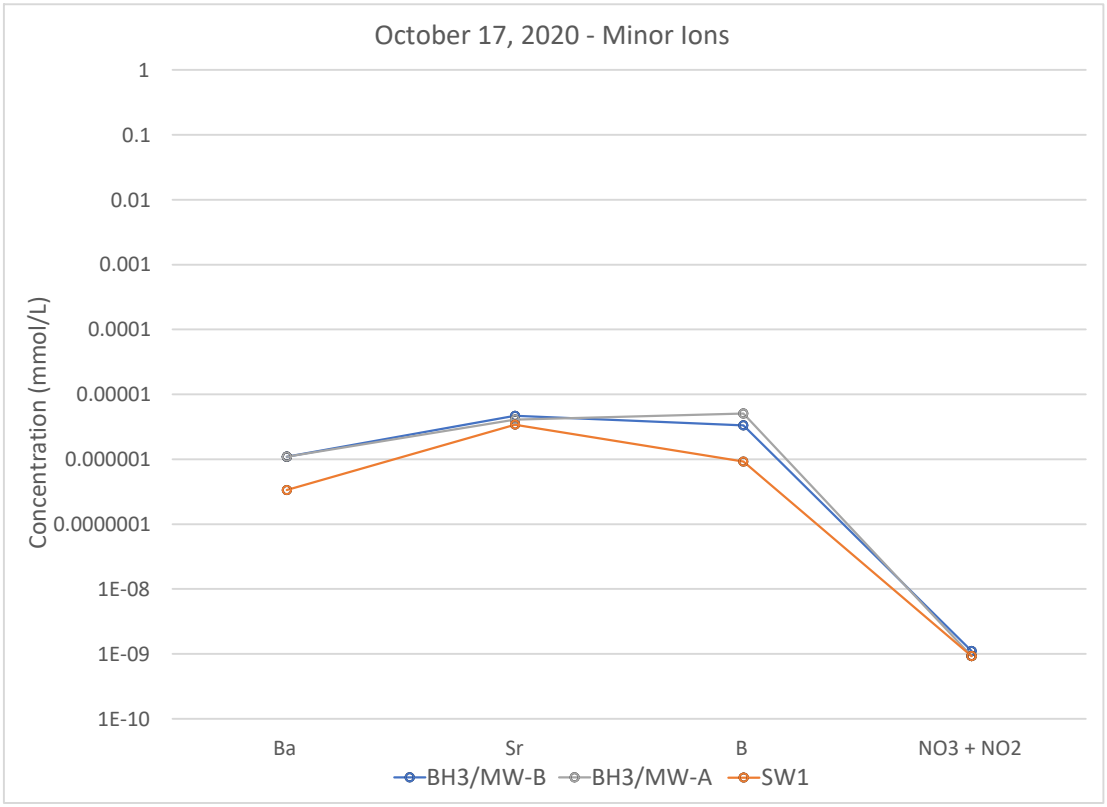


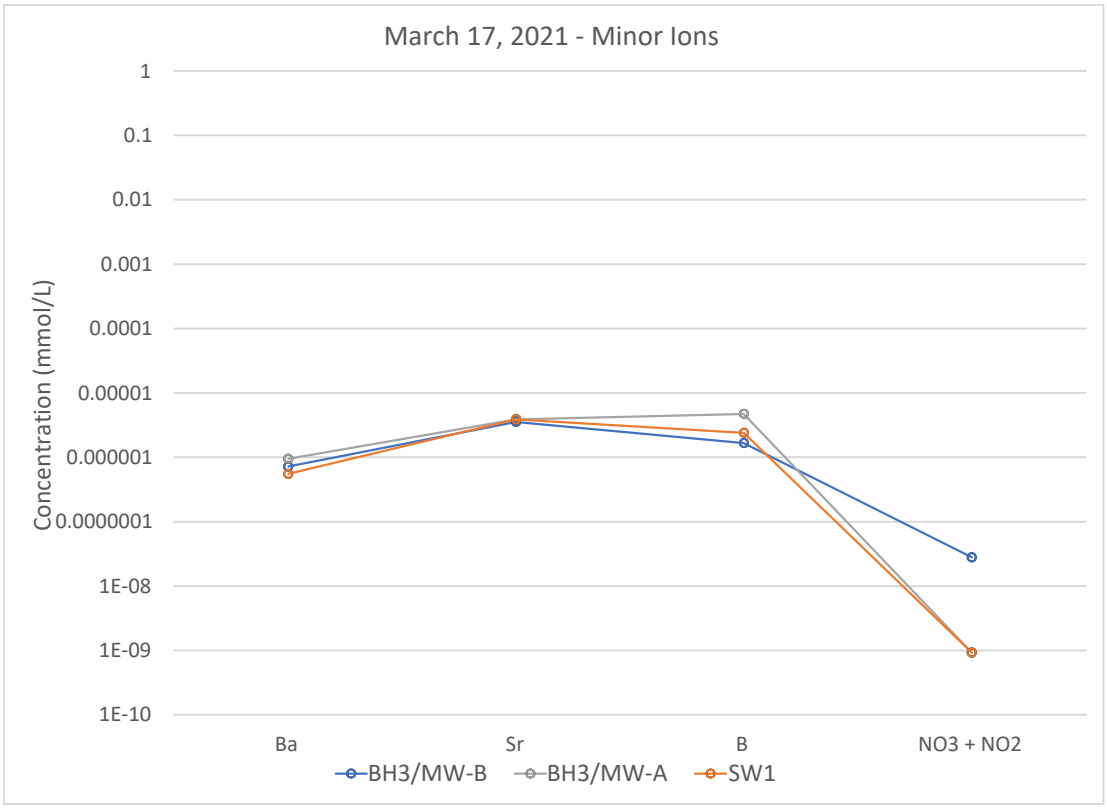
Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Schoeller Diagram for Water Quality - Major Ions
Prepared By: K.D.	Reviewed By: H.B.
	EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5
DATE: June 2021	SCALE: NA
PROJECT NO.: KCH-00260285-A0	DWG.: 16a





Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Schoeller Diagram for Water Quality - Minor Ions
Prepared By: K.D.	Reviewed By: H.B.
	EXP Services Inc. 15701 Robin's Hill Road, London, ON, N5V 0A5
DATE: June 2021	SCALE: NA
PROJECT NO.: KCH-00260285-A0	DWG.: 16b

-LEGEND-

Approximate Site Boundary

Significant Groundwater Recharge Area - Approved

Image Source: Thames-Sydenham & Region Source Protection. 2021.

Hydrogeological Assessment

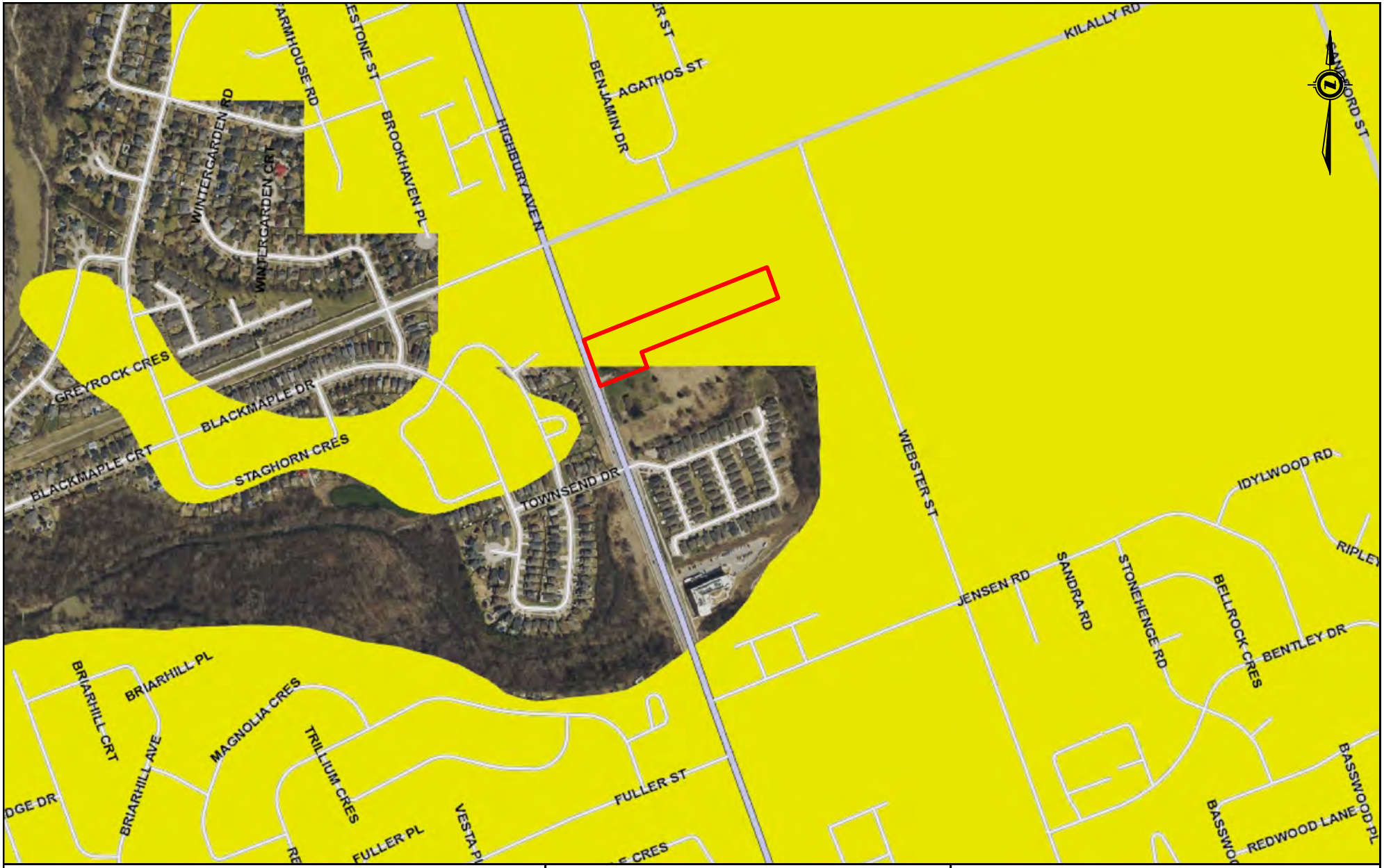
Proposed Development

1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Significant Groundwater Recharge Area
Prepared By: K.D.	Reviewed By: H.J.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
JULY 2021	1:16,000	KCH-00260285-A0	17



-LEGEND-

Approximate Site Boundary

Highly Vulnerable Aquifer

Image Source: Thames-Sydenham & Region Source Protection. 2020.

Hydrogeological Assessment

Proposed Development

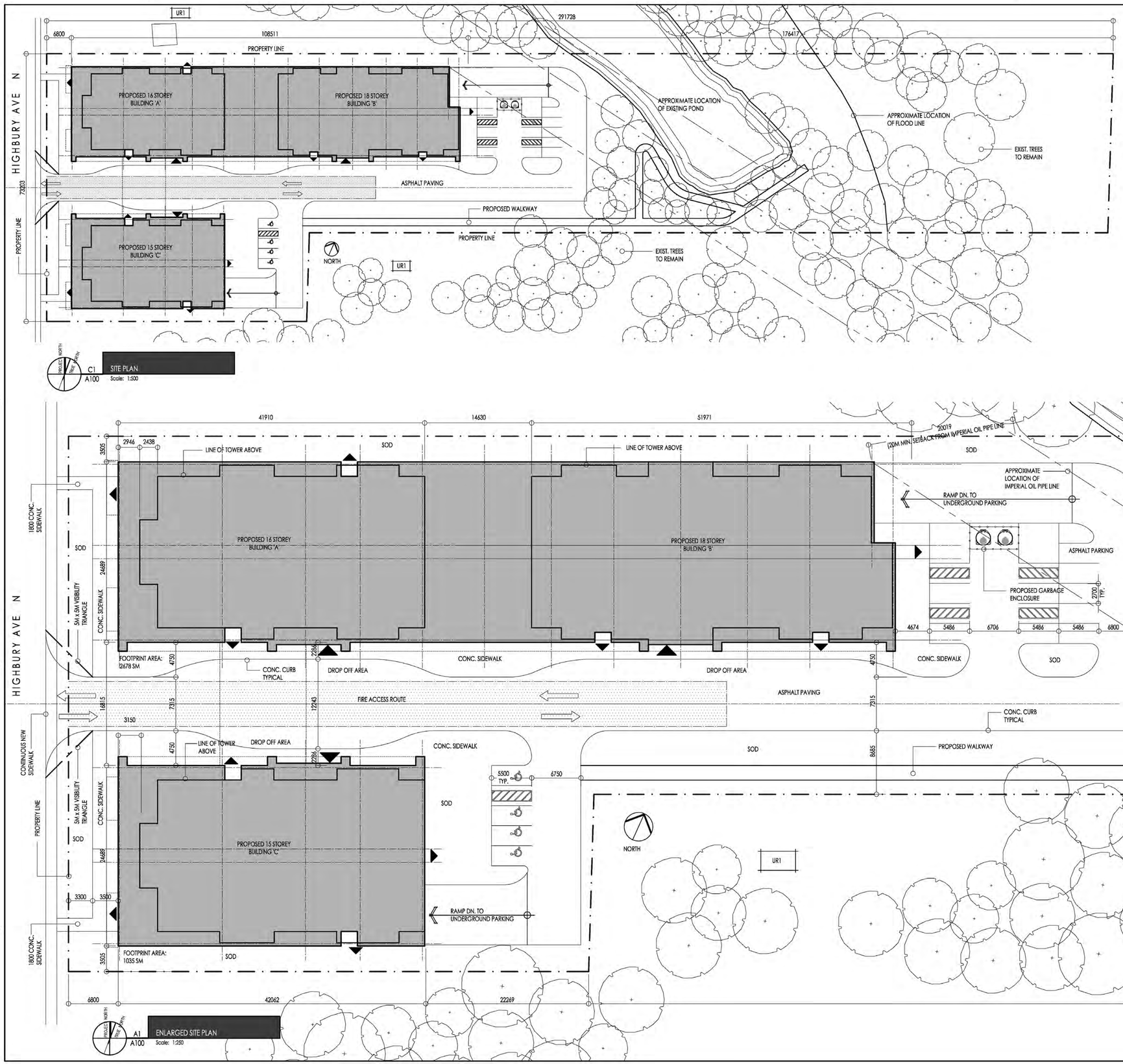
1470-1474 Highbury Avenue North, London, Ontario

CLIENT	Copia Developments
TITLE	Highly Vulnerable Aquifer
Prepared By: M.B.	Reviewed By: H.J.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	SCALE	PROJECT NO.	DWG.
AUGUST 2020	1:8,000	KCH-00260285-A0	18

Appendix B – Development Plan



C1 A100 SITE PLAN
Scale: 1:500

A1 A100 ENLARGED SITE PLAN
Scale: 1:250

Firm Name:	MATTER ARCHITECTURAL STUDIO INC. 120 WELLINGTON STREET, SUITE 102 LONDON, ONTARIO, N6B 2K6
Certificate of Practice Number:	5472
Name of Project:	HIGHBURY AVE RESIDENTIAL DEVELOPMENT
Location:	1470-1474 HIGHBURY AVE. LONDON, ONTARIO

ITEM	Ontario 2012 Building Code Data Matrix, Part 3 or 9		OBC Reference	
			References are to Division B unless noted	
1.	Project Description	■ New / ☐ Addition / ☐ Alteration / ☐ Change of Use	☐ Part 11 / 11.1 to 11.5	■ Part 3 / ☐ Part 9: 1.1.2. [A] / 9.10.1.3.
2.	Major Occupancy(s)	Group 'C' - RESIDENTIAL OCCUPANCY	3.1.2.1. (1)	9.10.2
3.	Building Area (m2)	BUILDING 'A & B' 2,590 sm BUILDING 'B' 1,035 sm	1.4.1.2. [A]	1.4.1.2. [A]
4.	Gross Area (m2)	Existing ____ New 48,665 Total 48,665	1.4.1.2. [A]	1.4.1.2. [A]
5.	Number of Storeys	Above Grade 18 Below Grade N/A	1.4.1.2. [A] & 3.2.1.1	1.4.1.2. [A] & 9.10.4
6.	Number of Streets/Fire Fighter Access	2	3.2.2.10 & 3.2.5.	9.10.20
7.	Building Height			
8.	Building Classification	3.2.2.42 Group C, Any Height, Any Area, Sprinklered	3.2.2.20-.83	9.10.2
9.	Sprinkler System Proposed	■ Entire Building / ☐ Selected Compartments / ☐ Selected Floor Areas / ☐ Basement ☐ in lieu of roof rating / ☐ not required	3.2.2.20-.83 3.2.1.5. 3.2.2.17. INDEX	9.10.8.2 INDEX
10.	Standpipe Required	☐ Yes ■ No	3.2.9.	N/A
11.	Fire Alarm Required	■ Yes ☐ No	3.2.4.	9.10.18
12.	Water Service / Supply is Adequate	■ Yes ☐ No	3.2.5.7.	N/A
13.	High Building	■ Yes ☐ No	3.2.6.	N/A
14.	Const. Restrictions	☐ Combustible Permitted ■ Non-Combustible Required ☐ Both	3.2.2.20-.83	9.10.6
	Actual Const.	☐ Combustible ■ Non-Combustible ☐ Both		
15.	Mezzanine(s) Area (m2)	N/A	3.2.1.1.(3)-(8)	9.10.4.1
16.	Occupant Load based on:	☐ m2/person ■ design of building	3.1.17	9.9.1.3
17.	Plumbing Facilities:	Occupancy Load Fl. — Fixtures: Female W.C. / Lav's / Male W.C. / Lav's	3.7.4 3.7.4.2 3.7.4.3	
18.	Barrier-Free Design	■ Yes ☐ No	3.8	9.5.2
19.	Hazardous Substances	☐ Yes ■ No	3.3.1.2. & 3.3.1.19.	9.10.1.3.(4)
20.	Required Fire Resistance Rating (FRR)	Horizontal Assemblies FRR (Hours) — Listed Design No. or Description (SG-2) Floors 2 Hours - Roof NO RATING Hours Mezzanine N/A Hours - FRR of Supporting Members — Listed Design No. or Description (SG-2) Floors 2 Hours - Roof NO RATING Hours - Mezzanine N/A Hours -	3.2.2.20-.83 3.2.1.4	9.10.8 9.10.9
21.	Spatial Separation - Construction of Exterior Walls		3.2.3	9.10.14

Wall	Area of EFB (m2)	L.D. (M)	L/H or H/L	Permitted Max. % of Openings	Proposed % of Openings	FRR (Hours)	Listed Design or Description	Comb. Const.	Comb. Const. Nonc. Cladding	Non-Comb. Const.
North										
South										
East										
West										

22. Other - Describe

SITE DATA: NF1(1), OS1, UR1 (EXISTING)		
	REQ'D./ MAX./ MIN.	PROPOSED BUILDING 'A' 16 STOREY : BUILDING 'B' 18 STOREY : BUILDING A&B - 298 UNITS BUILDING 'C' 15 STOREY - 102 UNITS TOTAL: 400 UNITS
PROPOSED ZONED USE		VARIANCE REQUIRED
LOT AREA	700 SQ. M (MIN.)	14,533 SQ. M (1.453 HA)
LOT FRONTAGE	30 M (MIN.)	73.2 M
LOT DEPTH	30 M (MIN.)	291.7 M
FRONT SETBACK	8 M (MIN.) for arterial road 6 M (MIN.) for primary collector	6.8 M
REAR YARD SETBACK	6 M (MIN.)	182.8 M for BUILDING 'A' 22.2 M for BUILDING 'C'
INTERIOR SIDE YARD	6 M (MIN.)	3.5 M for BUILDING 'A' 3.5 M for BUILDING 'C'
LOT COVERAGE	30% (MAX.)	25.5 %
BUILDING HEIGHT	12 M (MAX.)	74 M
LANDSCAPED OPEN SPACE	25% (MIN.)	38.7 %
PARKING	1.25 / UNIT for an Apt Bldg, parking standard area 3, section 4.19 (400x1.25 = 500 STALLS REQ'D.)	410 PROVIDED

A5 A100 SITE DATA
Scale: N.T.S

Key Plan:

NO.	DATE:	ISSUED FOR:	BY:
1	18/10/09	PRE-CONSUL SPA	TEAM1

matter.

Matter Architectural Studio Inc.
120 Wellington Road - #102
London, Ontario, N6B 2K6

p: 519.601.6274

www.matterinc.ca

Project Title:
1470 - 1474
HIGHBURY AVE RESIDENTIAL DEVELOPMENT

1470-1474 Highbury Ave. London, ON.

Sheet Name:
SITE PLAN, SITE DATA
O.B.C. MATRIX

Scale: AS SHOWN
Project No: 18-066
Sheet No: SP100

Appendix C – Borehole Logs

BOREHOLE LOG

BH1/MW
Sheet 1 of 1

CLIENT **Copia Developments** PROJECT NO. **KCH-00260285-A0**

PROJECT **Proposed Development** DATUM **Geodetic**

LOCATION **1470-1474 Highbury Avenue, London, ON** DATES: Boring **June 17, 2020** Water Level

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	246.0								
	245.9	**GRANULAR** - 100 mm							
	245.7	**TOPSOIL** - 200 mm							
1		**FILL** - sandy silt, brown/black, some clay, trace gravel, trace organics, loose to compact, moist			SS	S1	200	16	
2					SS	S2	300	8	
	243.5								
	243.3	**SAND AND GRAVEL** - brown, trace silt, compact, wet			SS	S3	350	21	
3		**CLAYEY SILT TILL** - grey, some sand, trace gravel, very stiff to hard, moist			SS	S4	150	25	
4					SS	S5	350	38	
		- trace clay near 4.4 m bgs							
	241.1				SS	S6	400	50*	
5		**SAND AND GRAVEL** - grey, trace silt, dense, wet							
6					SS	S7	300	47	
	239.4								
		End of Borehole at 6.6 m bgs.							
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 interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report KCH-00260285-A0.
2) bgs denotes below ground surface.
3) No significant methane gas concentration was detected upon completion of drilling.
4) * denotes N = 50 blows per 125 mm split spoon sampler penetration.

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-A
Sheet 1 of 1

CLIENT **Copia Developments** PROJECT NO. **KCH-00260285-A0**
PROJECT **Proposed Development** DATUM **Geodetic**
LOCATION **1470-1474 Highbury Avenue, London, ON** DATES: Boring **June 17, 2020** Water Level

DEPTH (m bgs)	ELEVATION (~m)	STRATA DESCRIPTION	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm)	SAMPLES N VALUE (blows)	MOISTURE CONTENT (%)
0	**246.0**						
	245.7	**TOPSOIL** - 250 mm					
1		**SAND** - brown, trace silt, trace gravel, loose, moist	SS	S1	150	6	
	244.6						
2		**SAND AND GRAVEL** - brown, trace silt, compact, moist	SS	S2	300	20	
	243.6	- becoming wet near 2.1 m bgs					
3		**CLAYEY SILT TILL** - grey, some sand, trace gravel, very stiff to hard, moist	SS	S3	350	30	
			SS	S4	450	34	
4							
5			SS	S5	300	28	
6							
			SS	S6	400	40	
7	239.0						
		SAND AND GRAVEL - grey, trace silt, occasional clayey layering, dense, wet					
8			SS	S7	400	31	
	237.5						
9		**End of Borehole at 8.5 m bgs.**					

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 interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report KCH-00260285-A0.
2) bgs denotes below ground surface.
3) No significant methane gas concentration was detected upon completion of drilling.

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-B
Sheet 1 of 1

CLIENT **Copia Developments** PROJECT NO. **KCH-00260285-A0**
PROJECT **Proposed Development** DATUM **Geodetic**
LOCATION **1470-1474 Highbury Avenue, London, ON** DATES: Boring **June 17, 2020** Water Level

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
	245.9									✤ 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	245.7	**TOPSOIL** - 250 mm								
		SAND - brown, trace silt, trace gravel, loose, moist								
1	244.6									
		SAND AND GRAVEL - brown, trace silt, compact, moist								
2	243.5	- becoming wet near 2.1 m bgs								
		CLAYEY SILT TILL - grey, some sand, trace gravel, very stiff to hard, moist								
3	242.9									
		End of Borehole at 3.0 m bgs.								
4										
5										
6										
7										
8										
9										

NOTES

1) Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report KCH-00260285-A0.
2) bgs denotes below ground surface.
3) No significant methane gas concentration was detected upon completion of drilling.

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-A
Sheet 1 of 1

CLIENT **Copia Developments** PROJECT NO. **KCH-00260285-A0**

PROJECT **Proposed Development** DATUM **Geodetic**

LOCATION **1470-1474 Highbury Avenue, London, ON** DATES: Boring **June 17, 2020** Water Level

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	246.1								
	245.9	**TOPSOIL** - 200 mm							
		SAND - brown, trace silt, trace gravel, loose, moist			SS	S1	200	4	
1									
					SS	S2	300	9	
2	243.9								
		SAND AND GRAVEL - brown, trace silt, occasional cobbles, very dense, wet			SS	S3	75	50*	
3					SS	S4	0	50**	
4	242.0								
		CLAYEY SILT TILL - grey, some sand, trace gravel, hard, moist			SS	S5	300	46	
5									
		- becoming very moist with trace clay near 5.6 m bgs							
6					SS	S6	75	50*	
	239.0								
7		**SAND AND GRAVEL** - grey, trace silt, very dense, wet							
					SS	S7	200	50*	
8	237.5								
		End of Borehole at 8.1 m bgs.							
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 interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report KCH-00260285-A0.
2) bgs denotes below ground surface.
3) No significant methane gas concentration was detected upon completion of drilling.
4) * denotes N = 50 blows per 100 mm split spoon sampler penetration.
** denotes N = 50 blows per 50 mm split spoon sampler penetration.

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-B
Sheet 1 of 1

CLIENT **Copia Developments** PROJECT NO. **KCH-00260285-A0**
PROJECT **Proposed Development** DATUM **Geodetic**
LOCATION **1470-1474 Highbury Avenue, London, ON** DATES: Boring **June 17, 2020** Water Level

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	246.1									S Field Vane Test (#=Sensitivity); Penetrometer; Torvane; 100 200 kPa; W_P W W_L; SPT N Value; Dynamic Cone; 10 20 30 40
	245.9	**TOPSOIL** - 200 mm								
		SAND - brown, trace silt, trace gravel, loose, moist								
1										
2	243.9									
		SAND AND GRAVEL - brown, trace silt, occasional cobbles, very dense, wet								
3	242.4									
		End of Borehole at 3.7 m bgs.								
4										
5										
6										
7										
8										
9										

NOTES

1) Borehole interpretation requires assistance by EXP before use by others. Borehole Logs must be read in conjunction with EXP Report KCH-00260285-A0.
2) bgs denotes below ground surface.
3) No significant methane gas concentration was detected upon completion of drilling.

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

BH101
Sheet 1 of 1

CLIENT **1985780 Ontario Inc.** PROJECT NO. **LON-21003692-A0**
PROJECT **Proposed Apartment Buildings** DATUM **Geodetic**
LOCATION **1470/1474 Highbury Ave N, London, ON** DATES: Boring **March 17, 2021** Water Level

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	245.6								
	245.4	**TOPSOIL** - 200 mm							
1		**SAND AND GRAVEL** - brown, trace to some silt, occasional cobbles, dense, damp to wet							
	243.9								
2		**SILT TILL** - brown, some clay, some sand to sandy, trace gravel, dense, damp to moist			SS	S1	300	47	8
		- becoming grey near 2.4 m bgs							
3		- dilatant layering near 3.1 m bgs			SS	S2	450	45	11
4		- becoming clayey near 4.0 m bgs							
5					SS	S3	400	45	9
	240.0								
6		**SAND** - grey, fine to medium grained, trace silt, very dense, wet			SS	S4	400	60	13
	239.2								
7		**SAND AND GRAVEL** - grey, trace to some silt, frequent cobbles, very dense, wet							
8					SS	S5	300	66	10
9					SS	S6	300	50*	7
10									
11					SS	S7	300	50*	8
	233.6								
12		- possible boulder near 12.0 m bgs			SS	S8	0	50*	
		End of Borehole at 12.0 m bgs. Auger Refusal.							
13									
14									
15									
16									

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 and must be read in conjunction with EXP Report LON-21003692-A0.
2) bgs denotes below ground surface.
3) Borehole open to 5.5 m bgs and water measured near 1.2 m bgs upon completion of drilling.
4) No significant methane gas concentration was detected upon completion of drilling.

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

BH102
Sheet 1 of 1

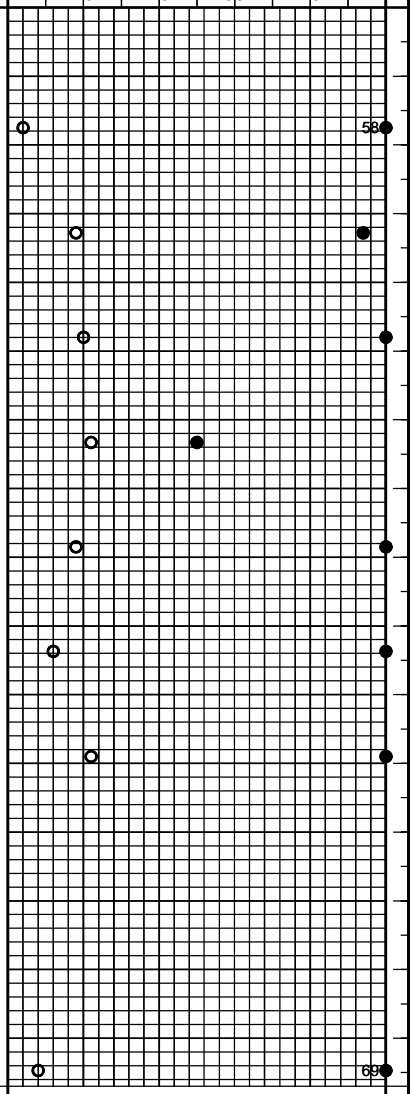
CLIENT **1985780 Ontario Inc.** PROJECT NO. **LON-21003692-A0**
PROJECT **Proposed Apartment Buildings** DATUM **Geodetic**
LOCATION **1470/1474 Highbury Ave N, London, ON** DATES: Boring **March 16, 2021** Water Level

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	246.0								
	245.7	**TOPSOIL** - 300 mm							
1	245.1	**FILL** - sandy silt, brown/black, some clay, trace gravel, brick fragments, moist							
		SAND AND GRAVEL - brown, trace silt, occasional cobbles, very dense, damp			SS	S1	300	58	2
2	243.5								
		SILT TILL - grey, some clay, some sand, trace gravel, dense to very dense, damp to moist			SS	S2	400	47	9
3									
4									
					SS	S3	450	50	10
5	240.4								
		SAND AND GRAVEL - grey, trace silt, frequent cobbles, compact to very dense, wet			SS	S4	200	25	11
6									
7									
					SS	S5	100	50*	9
8									
9									
					SS	S6	150	50*	6
10									
11					SS	S7	125	50*	11
12									
13	232.6								
		CLAYEY SILT TILL - grey, trace sand, trace gravel, hard, moist							
14									
15									
	230.3				SS	S8	300	69	4
16		**End of Borehole at 15.7 m bgs.**							

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 and must be read in conjunction with EXP Report LON-21003692-A0.
2) bgs denotes below ground surface.
3) Borehole open to 7.6 m bgs and water measured near 6.1 m bgs upon completion of drilling.
4) No significant methane gas concentration was detected upon completion of drilling.

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

BH103
Sheet 1 of 1

CLIENT **1985780 Ontario Inc.** PROJECT NO. **LON-21003692-A0**

PROJECT **Proposed Apartment Buildings** DATUM **Geodetic**

LOCATION **1470/1474 Highbury Ave N, London, ON** DATES: Boring **March 12, 2021** Water Level

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	245.8								
	245.5	**TOPSOIL** - 250 mm							
1		**SAND AND GRAVEL** - brown, trace silt, occasional cobbles, compact to dense, damp to wet			SS	S1	250	30	4
2	243.3								
3		**SANDY SILT** - grey, dilatant, dense, wet			SS	S2	300	45	18
4	241.7								
5		**SILT TILL** - grey, some clay, some sand, trace gravel, compact to very dense, damp to moist			SS	S3	300	26	15
6					SS	S4	400	87	8
7	238.7								
8		**SAND AND GRAVEL** - grey, trace silt, silt layering, frequent cobbles, very dense, wet			SS	S5	0	50	
9	236.5				SS	S6	125	50	8
10		**End of Borehole at 9.3 m bgs. Auger Refusal.**							
11									
12									
13									
14									
15									
16									

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

87

NOTES

1) Borehole Log interpretation requires assistance by EXP before use by others and must be read in conjunction with EXP Report LON-21003692-A0.
2) bgs denotes below ground surface.
3) Borehole open to 4.3 m bgs and water measured near 2.4 m bgs upon completion of drilling.
4) No significant methane gas concentration was detected upon completion of drilling.

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

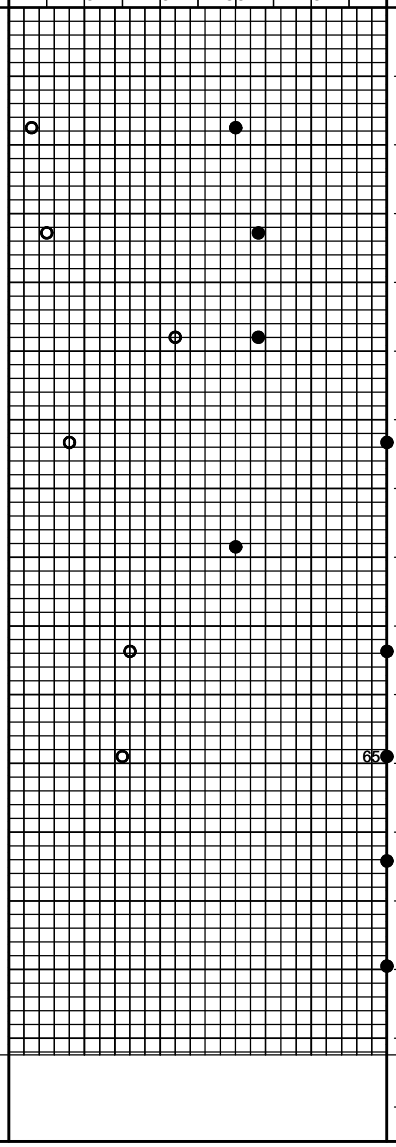
BH104/MW
Sheet 1 of 1

CLIENT **1985780 Ontario Inc.** PROJECT NO. **LON-21003692-A0**

PROJECT **Proposed Apartment Buildings** DATUM **Geodetic**

LOCATION **1470/1474 Highbury Ave N, London, ON** DATES: Boring **March 12, 2021** Water Level **May 4/21**

DEPTH (m bgs)	ELEVATION (~m)	STRATA DESCRIPTION	SAMPLES TYPE	SAMPLES NUMBER	SAMPLES RECOVERY (mm)	SAMPLES N VALUE (blows)	MOISTURE CONTENT (%)
0	246.0						
	245.8	**TOPSOIL** - 200 mm					
1		**SAND AND GRAVEL** - brown, trace silt, occasional cobbles, dense, damp to moist					
2			SS	S1	300	30	3
3		- becoming wet near 2.5 m bgs	SS	S2	150	33	5
4	242.0						
		SILT TILL - grey, some clay, some sand, trace gravel, dense to very dense, damp to moist	SS	S3	250	33	22
5							
6			SS	S4	150	50 *	8
7	238.9						
		SAND - grey, fine to medium grained, trace silt, trace to some gravel, dense to very dense, wet	SS	S5	400	30	
8		- occasional cobbles and sand and gravel layers					
9			SS	S6	450	50 *	16
10							
11			SS	S7	450	65	15
	234.4						
12		**SAND AND GRAVEL** - grey, trace silt, frequent cobbles, very dense, wet	SS	S8	0	50 *	
13							
14			SS	S9	0	50 *	
15	230.8	- possible boulder at 15.2 m bgs					
		End of Borehole at 15.2 m bgs. Auger Refusal.					
16							



NOTES

1) Borehole Log interpretation requires assistance by EXP before use by others and must be read in conjunction with EXP Report LON-21003692-A0.
2) bgs denotes below ground surface.
3) No significant methane gas concentration was detected upon completion of drilling.

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

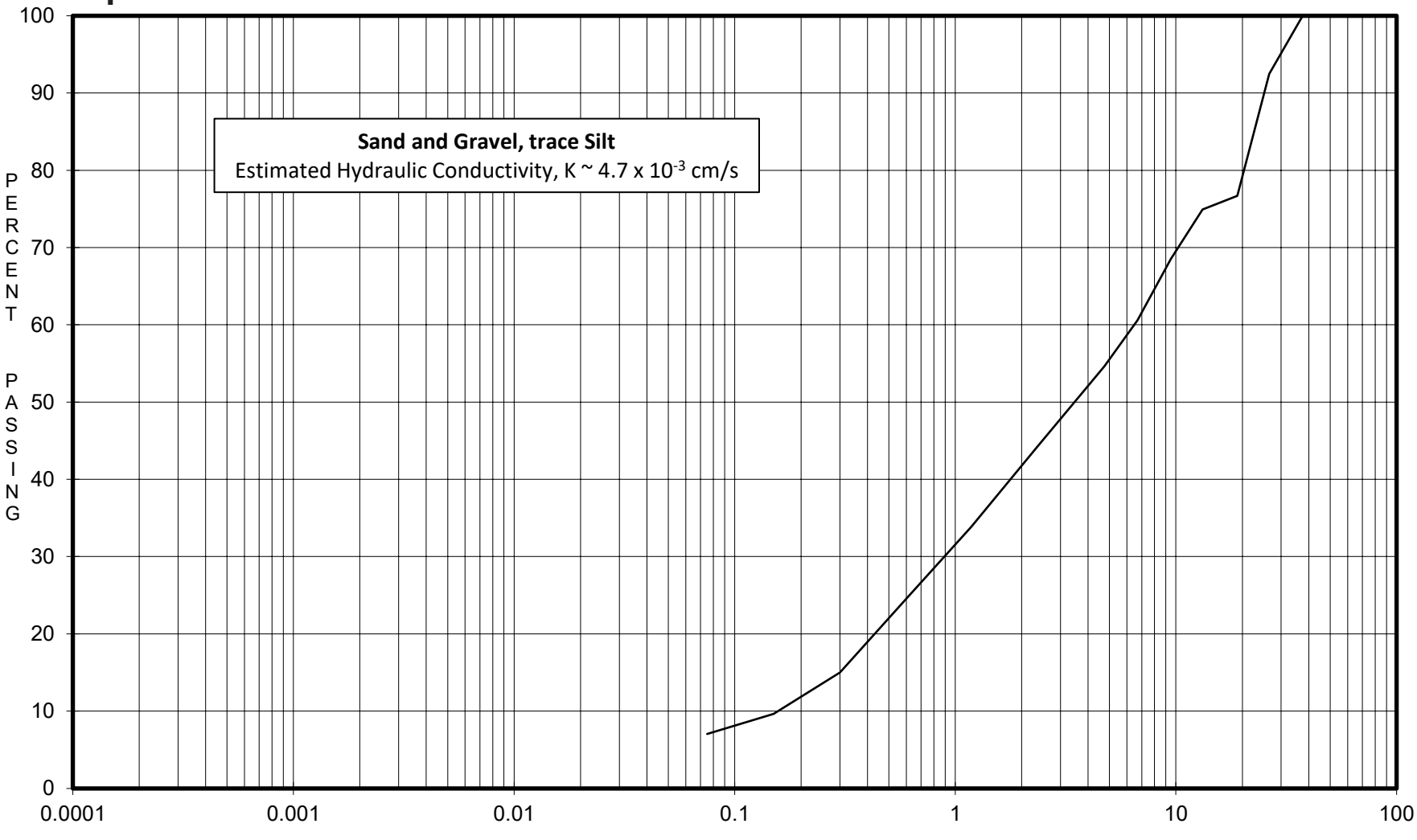
OTHER TESTS

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)

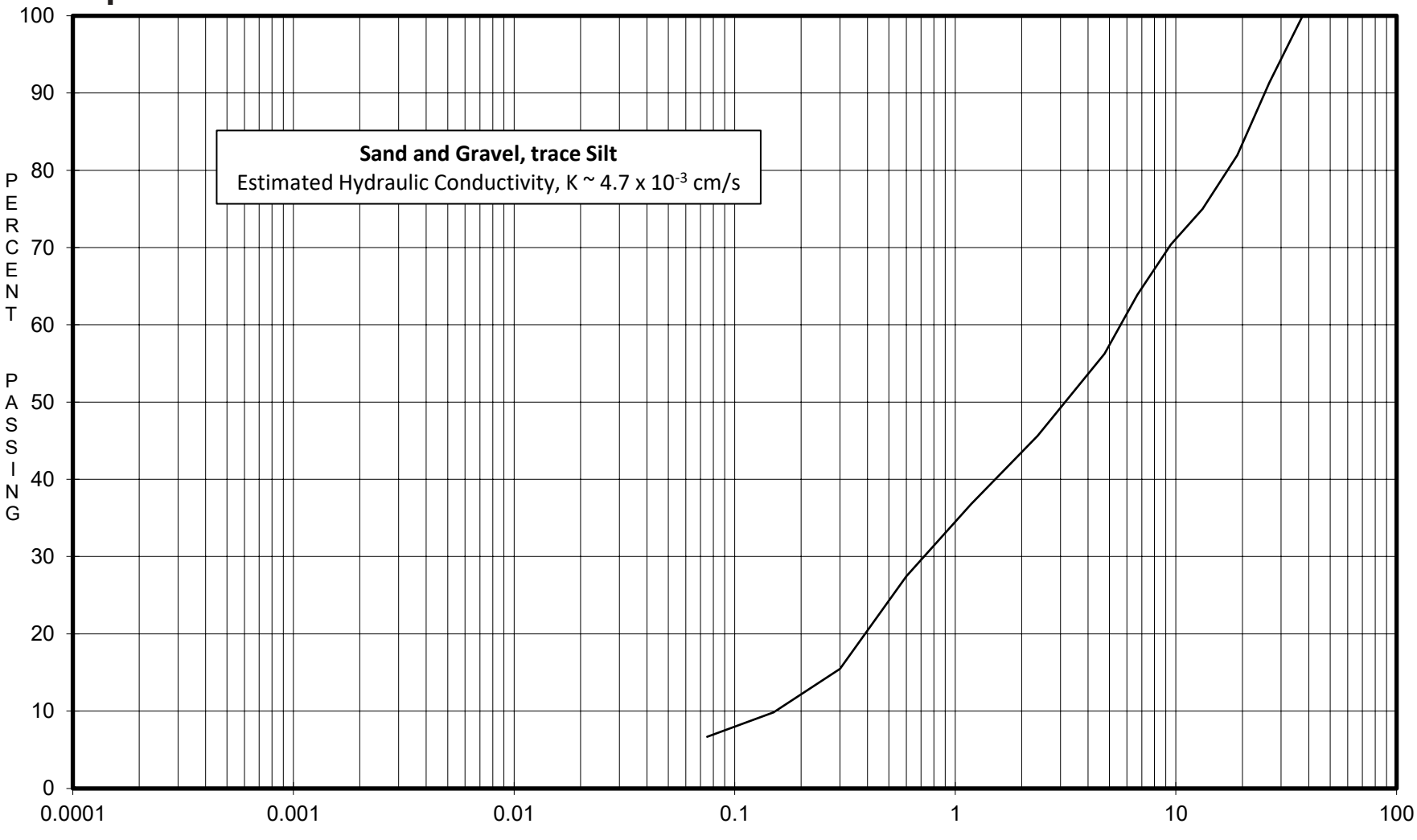
Appendix D – Grain Size Analyses

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 (BH1 S7, 6.1 to 6.6 m bgs)**			**1470 Highbury Avenue North, London Project: KCH-00260285-A0**						**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 (BH2 S2, 1.5 to 2.0 m bgs)**			**1470 Highbury Avenue North, London Project: KCH-00260285-A0**						**Figure 2**

Appendix E – MECP Water Well Record Summary

Water Well Records

Wednesday, 2 September, 2020

10:18:52

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
LONDON CITY	17 482174 4764423 W	1977/07 5466	6	FR 0019	8/10/6/8:0	DO		4108280 ()	BLCK LOAM PORS 0001 BRWN GRVL DRY PORS 0012 GREY GRVL CLAY 0018 GREY GRVL PORS 0020
LONDON CITY	17 482094 4764303 W	1975/07 4741	8	FR 0010	10/15/5/2:0	DO		4107405 ()	FILL CLAY 0006 GRVL 0024
LONDON CITY	17 482714 4763563 W	1977/06 3009	5	FR 0087	54/57/6/1:30	DO		4108108 ()	GREY GRVL 0004 GREY CLAY SAND STNS 0083 GREY FSND 0086 GREY GRVL SAND 0087
LONDON CITY	17 482434 4763748 W	1987/09 5413	5	FR 0084	73/73/10/20:0	DO		4111051 (10000)	GREY GRVL STNS DRY 0012 GREY CLAY BLDR HARD 0022 GREY CLAY STNS HARD 0047 YLLW SAND STNS DRY 0072 GREY GRVL SAND SILT 0084
LONDON CITY	17 482393 4763827 W	2007/05 6607	2.31	FR 0016			0012 20	7047112 (Z70538) A051239	BRWN SAND STNS FILL 0013 BRWN SAND SILT FILL 0028 BRWN SAND SLTY TILL 0031
LONDON CITY	17 482328 4763824 W	2012/11 7238				MO	0010 10	7192993 (Z160021) A139749	BRWN FILL 0010 GREY TILL SILT HARD 0020
LONDON CITY (LONDON CON 03 008	17 482714 4763653 W	1958/06 1708	4 4	SU 0148	77/105/8/4:0	ST DO		4101580 ()	MSND 0012 HPAN STNS 0140 SHLE 0145 LMSN 0149
LONDON CITY (LONDON CON 03 009	17 482014 4764033 W	1948/12 2801	8					4101590 ()	LOAM 0003 GRVL 0005 GRVL STNS CLAY 0008 CLAY STNS 0025 CLAY GRVL 0044 BLUE CLAY 0048 BRWN CLAY 0051 CLAY GRVL 0054 BLUE CLAY 0056 BRWN CLAY SHLE 0059 ROCK 0060
LONDON CITY (LONDON CON 03 009	17 481614 4763923 W	1948/12 2801	8					4101589 ()	LOAM 0001 CLAY GRVL STNS 0025 CLAY GRVL 0030 HPAN 0040 CLAY GRVL 0046 HPAN 0054 CLAY GRVL 0060 BRWN CLAY 0065 CLAY GRVL 0076 BLCK SHLE CLAY 0082 ROCK 0089
LONDON CITY (LONDON CON 03 009	17 481784 4763903 W	1948/12 2801	8		3/10/45/:			4101588 ()	LOAM 0001 GRVL 0008 GRVL CLAY 0015 MSND GRVL 0017 GRVL CLAY 0024 MSND GRVL 0027 GRVL MSND 0036 GRVL 0037 CLAY GRVL 0053 BLCK SHLE CLAY 0058 ROCK 0060
LONDON CITY (LONDON CON 03 009	17 481684 4763753 W	1948/11 2801	8					4101587 ()	LOAM 0002 MSND 0004 BLDR GRVL 0010 CLAY GRVL 0026 MSND GRVL 0028 CLAY GRVL 0058 ROCK 0060
LONDON CITY (LONDON CON 03 009	17 481554 4764053 W	1948/11 2801	8					4101586 ()	GRVL 0005 GRVL CLAY 0007 MSND GRVL 0012 CLAY GRVL 0025 CLAY MSND 0048 CLAY GRVL 0057 HPAN 0060 GRVL CLAY 0062 CLAY 0075 BLCK SHLE CLAY 0078 CLAY GRVL 0080 BLUE CLAY 0088 CLAY GRVL 0095 ROCK 0096
LONDON CITY (LONDON CON 03 009	17 482174 4763683 W	1949/03 2801	8		4/15/85/:			4101592 ()	MUCK STNS 0008 CLAY STNS GRVL 0020 MSND CLAY 0027 MSND GRVL 0039 GRVL CLAY 0048 BRWN CLAY 0059 QSND 0061 ROCK 0062
LONDON CITY (LONDON CON 03 009	17 481924 4764213 W	1930/05 3347	3					4101594 ()	LOAM 0002 GRVL 0008 CLAY MSND GRVL 0040 GRVL 0043 CLAY GRVL 0056 SHLE 0076

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
LONDON CITY (LONDON CON 03 009	17 482084 4763733 W	1949/02 2801	8					4101591 ()	LOAM 0005 GRVL CLAY BLDR 0017 GRVL 0021 GRVL CLAY MSND 0035 MSND 0037 MSND GRVL CLAY 0044 CLAY GRVL 0049 BLUE CLAY 0059 ROCK 0060
LONDON CITY (LONDON CON 04 009	17 481754 4764683 W	1948/09 2801	8	UK	8/12/1/:	NU		4101750 () A	LOAM 0003 CLAY GRVL 0043 GRVL 0059 GRVL CLAY 0060 BLUE CLAY 0071 BRWN CLAY 0073 BLCK SHLE 0074 ROCK 0075
LONDON CITY (LONDON CON 04 009	17 481834 4764313 W	1948/09 2801	2	UK 0018	7///:	NU		4101751 ()	LOAM 0002 CLAY GRVL 0016 GRVL CLAY 0026 CLAY GRVL 0030 HPAN 0035 CLAY 0074 BLCK SHLE 0075 ROCK 0076
LONDON TOWNSHIP	17 482073 4764303 W	2018/09 3366	8		11///:			7323350 (Z297535)	
LONDON TOWNSHIP	17 481887 4764849 W	2019/03 7190	2 4	0027	27///:	MO	0040 10	7331887 (Z305984) A264255	BRWN GRVL SAND 0025 ROCK HARD 0035 BRWN SILT CLAY TILL 0040
LONDON TOWNSHIP	17 481850 4764809 W	2019/03 7190	2 4	0007	7///:	MO	0010 5	7331888 (Z305985) A264256	BRWN GRVL SAND DNSE 0010
LONDON TOWNSHIP	17 481997 4764383 W	2017/04 7320	2			TH MO	0015 10	7288380 (Z256434) A225253	BRWN FILL 0008 BRWN CLAY TILL 0015
LONDON TOWNSHIP	17 481982 4764369 W	2017/04 7320	2			TH MO	0015	7288378 (Z256432) A225255	BRWN FILL 0007 BRWN CLAY TILL 0015
LONDON TOWNSHIP	17 482220 4763792 W	2012/08 7238	16			MN OT		7185399 (Z149596) A	
LONDON TOWNSHIP	17 482281 4763806 W	2012/11 7238				MO	0015 10	7192989 (Z160024) A139745	BRWN FILL LOOS PCKD 0025
LONDON TOWNSHIP	17 482379 4763850 W	2012/11 7238				MO	0008 10	7192990 (Z160025) A139751	BRWN FILL 0010 GREY TILL SILT HARD 0018
LONDON TOWNSHIP	17 482433 4763879 W	2012/11 7238				MO	0010 10	7192991 (Z160026) A139746	BRWN FILL 0006 BRWN SILT CLAY DNSE 0015 GREY TILL SILT HARD 0020
LONDON TOWNSHIP	17 482424 4763944 W	2012/11 7238				MO	0010 10	7192992 (Z160019) A139748	BRWN FILL LOOS 0006 BRWN TILL SILT HARD 0020
LONDON TOWNSHIP	17 481972 4764374 W	2017/04 7320	2			TH MO	0015 10	7288379 (Z256433) A225254	BRWN FILL 0007 BRWN CLAY TILL 0015
LONDON TOWNSHIP	17 482307 4763852 W	2012/11 7238				MO	0015 10	7192994 (Z160022) A139752	BRWN FILL LOOS 0015 BRWN TILL SILT HARD 0025

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
LONDON TOWNSHIP	17 482354 4763906 W	2012/11 7238				MO	0015 10	7192995 (Z160023) A139750	BRWN FILL LOOS 0020 GREY SAND GRVL CMTD 0025
LONDON TOWNSHIP	17 481949 4764453 W	2017/04 7320	2	UT		TH MO	0030 10	7287064 (Z256461) A219973	BRWN FILL 0008 BRWN TILL CLAY 0020 BRWN TILL SILT 0024 BRWN SAND GRVL 0030
LONDON TOWNSHIP	17 481970 4764378 W	2017/04 7320	2			TH MO	0015 10	7288377 (Z256559) A225256	BRWN FILL 0008 BRWN CLAY TILL 0015
LONDON TOWNSHIP CON 03 007	17 482694 4764513 W	1949/11 2801	8					4101572 ()	LOAM 0002 MSND CLAY STNS 0005 CLAY GRVL MSND 0107 HPAN 0111 GRVL 0117 GRVL CLAY 0120 GRVL 0123 GRVL CLAY 0125 GRVL 0126 BRWN CLAY GRVL SHLE 0129 BLUE CLAY 0136 BLCK SHLE 0139 ROCK 0140
LONDON TOWNSHIP CON 03 008	17 482424 4764223 W	1961/07 4711	5	FR 0091	56/80/4/3:0	DO		4101581 ()	LOAM 0001 MSND 0050 CLAY 0070 HPAN 0072 GRVL 0084 MSND 0089 GRVL 0091
LONDON TOWNSHIP CON 03 008	17 482414 4764083 W	1965/08 4711	6	FR 0073	54/58/4/4:0	DO		4101585 ()	GRVL 0064 CSND 0073 GRVL 0074
LONDON TOWNSHIP CON 03 008	17 482604 4763853 W	1966/06 2607	36 30	FR 0006	3/10/1/2:0	DO		4101584 ()	GRVL 0005 BLUE CLAY 0006 QSND 0007 BLUE CLAY STNS 0012
LONDON TOWNSHIP CON 03 008	17 482634 4763783 W	1961/09 2607	36	FR 0010	3/8/2/5:0	DO		4101582 ()	MSND 0004 BLUE CLAY STNS 0010
LONDON TOWNSHIP CON 03 008	17 482374 4764343 W	1955/06 4711	6	FR 0081	30/60/4/5:0	DO		4101577 ()	LOAM 0002 BRWN CLAY 0025 BLUE CLAY 0030 MSND 0050 BRWN CLAY 0070 HPAN 0081 GRVL 0082
LONDON TOWNSHIP CON 03 008	17 482274 4764243 W	1949/02 2801	8		2/12/45/:			4101575 ()	LOAM 0002 MSND 0006 GRVL BLDR 0023 GRVL 0027 GRVL CLAY 0032 GRVL 0043 CLAY GRVL 0045 BLUE CLAY 0051 BRWN CLAY ROCK 0059
LONDON TOWNSHIP CON 03 008	17 482404 4764083 W	1949/01 2801	8					4101574 ()	LOAM 0002 MSND 0005 GRVL 0007 GRVL CLAY STNS 0015 CLAY STNS 0030 GRVL CLAY 0031 GRVL 0033 GRVL CLAY 0039 CLAY GRVL 0059 BRWN CLAY SHLE 0061 ROCK 0062
LONDON TOWNSHIP CON 03 008	17 482354 4764363 W	1963/11 4711	5	FR 0063	50/59/4/5:0	DO		4101583 ()	GRVL STNS 0063
LONDON TOWNSHIP CON 03 008	17 482594 4763903 W	1979/05 5466	6	FR 0063	55/66/9/3:0	DO	0063 3	4109166 ()	BLCK LOAM PORS 0001 BRWN SAND GRVL PCKD 0006 BRWN CLAY STNS DNSE 0008 GREY GRVL SAND CLAY 0016 GREY CLAY GRVL 0023 GREY GRVL SAND CLAY 0032 GREY CLAY DNSE 0059 GREY GRVL SAND CLAY 0062 GREY GRVL SAND PORS 0070
LONDON TOWNSHIP CON 03 008	17 482389 4764315 W	2011/07 7090	6.61	FR 0072 FR 0078	44/51/15/1:30	DO	0072 8	7175693 (Z136356) A109033	BLCK LOAM 0002 BRWN FILL 0006 BRWN CLAY 0011 GREY CLAY STNS 0071 BLUE GRVL 0080
LONDON TOWNSHIP CON 03 008	17 482388 4764288 W	2004/04 3366	5.11 4.11	FR 0070	51/69/10/6:	DO	0071 10	4115607 (Z05933) A002624	BRWN CLAY 0006 BRWN GRVL 0012 GREY CLAY HPAN GRVL 0060 GREY GRVL 0062 GREY CLAY 0070 GREY CSND CGVL 0082

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
LONDON TOWNSHIP CON 03 008	17 482490 4763794 L	2003/08 4876	6 5	FR 0078	55/56/12/1:30	DO	0087 3	4115397 (265074)	BRWN CLAY STNS DNSE 0022 GREY CLAY STNS DNSE 0053 GREY GRVL CLAY HARD 0078 GREY GRVL SAND LOOS 0090
LONDON TOWNSHIP CON 03 008	17 482180 4764376 W	2002/10 4876	6 5	FR 0074	48/49/18/2:0	DO	0074 4	4114985 (242090)	BRWN CLAY STNS 0012 BRWN GRVL CLAY SOFT 0023 GREY CLAY STNS 0049 GREY GRVL CLAY SOFT 0074 GREY GRVL SAND LOOS 0082 GREY CLAY GRVL HARD 0083
LONDON TOWNSHIP CON 03 008	17 482584 4763873 W	1987/12 2604	5 5	FR 0080	57/75/10/1:30	DO	0077 3	4111087 (04425)	BRWN LOAM 0002 BRWN CLAY STNS 0009 GREY GRVL 0013 GREY CLAY STNS 0075 GREY FGVL 0077 GREY GRVL CLAY LYRD 0088
LONDON TOWNSHIP CON 03 008	17 482094 4764323 W	1985/07 4741	5	FR 0019	4/7/12/10:0	DO		4110359 ()	LOAM 0002 GRVL 0014 CLAY 0019 GRVL 0026
LONDON TOWNSHIP CON 03 008	17 482174 4764343 W	1985/03 1708	5	FR 0018	2/9/7/8:0	DO		4110225 ()	LOAM DKCL 0002 BRWN CLAY GRVL STNS 0009 GREY CLAY GRVL 0018 GRVL 0019
LONDON TOWNSHIP CON 03 008	17 482454 4763963 W	1980/09 1708	5	FR 0054	49/52/15/16:0	DO	0071 8	4109363 ()	FILL 0003 BRWN CLAY GRVL 0013 BRWN CLAY GRVL STNS 0034 GREY CLAY GRVL STNS 0054 GRVL SAND CMTD 0080 GREY CLAY GRVL 0081
LONDON TOWNSHIP CON 03 008	17 482404 4764243 W	1973/05 3009	5	FR 0084	59/60/5/2:0	DO		4106266 ()	BRWN CLAY SAND 0014 BRWN FSND 0024 GREY CSND CLAY 0075 GREY FSND CLAY 0083 GRVL SAND 0084
LONDON TOWNSHIP CON 03 008	17 482114 4764363 W	1984/07 4741	5	FR 0002 FR 0040	-15/20/10/10:0	DO	0035 3	4110092 ()	GRVL SNDY 0008 CLAY 0022 GRVL CLAY 0040
LONDON TOWNSHIP CON 04 007	17 482204 4764843 W	2006/08 4876						4116741 (Z53072) A	
LONDON TOWNSHIP CON 04 007	17 482569 4764594 W	2019/04 7190	4 2	UT 0012	12///:	MT	0012 5	7333281 (Z309556) A266850	BRWN LOAM LOOS SOFT 0000 BRWN FILL SAND GRVL 0008 BRWN SAND GRVL LOOS 0017
LONDON TOWNSHIP CON 04 008	17 481954 4764423 W	1959/09 4711	5	FR 0040	25/25/6/3:0	DO		4101742 ()	MSND GRVL STNS 0040
LONDON TOWNSHIP CON 04 008	17 481905 4764594 W	2013/09 3366	5		16///:			7209355 (Z176692) A141245 A	
LONDON TOWNSHIP CON 04 008	17 481914 4764858 W	2003/12 2801				NU		4115567 (Z02147) A	
LONDON TOWNSHIP CON 04 008	17 482114 4764573 W	1963/11 4741	7 7	FR 0045	16/17/15/4:0	DO		4101745 ()	GRVL 0020 CLAY 0045 GRVL 0046
LONDON TOWNSHIP CON 04 008	17 481964 4764403 W	1960/07 4711	5	FR 0043	25/25/6/3:0	DO		4101744 ()	STNS GRVL 0018 CLAY 0030 GRVL 0043
LONDON TOWNSHIP CON 04 008	17 481893 4764647 W	1988/12 1708	8 5	FR 0050	14/18/15/3:0	DO		4111555 (28073)	LOAM 0001 BRWN GRVL DRTY DRY 0011 GREY CLAY GRVL 0026 GRVL SAND CMTD 0048 GRVL SAND 0050
LONDON TOWNSHIP CON 04 008	17 481923 4764632 W	1988/10 1708		FR 0052	14/15/17/1:0	DO		4111554 (28071)	LOAM 0001 BRWN GRVL DRY 0012 GREY CLAY GRVL 0025 GREY CLAY GRVL SAND 0046 GREY GRVL SAND 0052

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
LONDON TOWNSHIP CON 04 008	17 481994 4764383 W	1959/09 4711	5	FR 0036	25/26/6/3:0	DO		4101743 ()	MSND GRVL STNS 0036
LONDON TOWNSHIP CON 04 008	17 481954 4764803 W	1951/05 2801	16 16	UK	19/41/833/32:0	MN	0048 10	4101731 ()	LOAM 0002 GRVL 0007 CLAY STNS 0016 CLAY GRVL 0026 GRVL BLDR 0032 GRVL 0058 GRVL CLAY 0059
LONDON TOWNSHIP CON 04 008	17 481934 4764493 W	1959/08 4711	5	FR 0025	10/15/6/3:0	DO		4101741 ()	LOAM 0002 STNS 0007 HPAN 0012 HPAN 0025 GRVL 0026
LONDON TOWNSHIP CON 04 008	17 482174 4764463 W	1971/03 3009	4					4105358 () A	GREY GRVL 0018 BLUE CLAY 0054
LONDON TOWNSHIP CON 04 008	17 481864 4764703 W	1959/05 1728	7	FR 0028	18/20/40/6:0	CO	0024 5	4101740 ()	GRVL 0010 CLAY GRVL 0028 GRVL 0029
LONDON TOWNSHIP CON 04 008	17 482214 4764463 W	1971/03 3009	4 4	SU 0100	0/22/10/3:0	DO		4105356 ()	BRWN GRVL 0022 BLUE CLAY 0026 GREY FSND CLAY 0060 BLUE CLAY STNS FSND 0075 BLCK LMSN 0095 BRWN LMSN 0102
LONDON TOWNSHIP CON 04 008	17 481914 4764743 W	1948/08 2801	8					4101724 () A	LOAM 0001 GRVL 0006 CLAY GRVL 0026 CLAY 0035 GRVL 0054 ROCK 0055
LONDON TOWNSHIP CON 04 008	17 482354 4764633 W	1949/04 2801	8					4101726 () A	LOAM 0002 GRVL CLAY 0008 CLAY 0017 CLAY MSND 0020 CLAY 0025 CLAY GRVL MSND 0060 BLUE CLAY 0066 BRWN CLAY 0071 CLAY GRVL 0083 ROCK 0085
LONDON TOWNSHIP CON 04 008	17 482244 4764803 W	1950/10 2801	8					4101728 ()	LOAM 0001 GRVL STNS 0011 CLAY GRVL 0027 GRVL 0033 GRVL CLAY 0040 CLAY GRVL 0043 GRVL 0046 GRVL CLAY 0054 GRVL 0059 MSND GRVL 0061 GRVL CLAY 0064 MSND GRVL CLAY 0068 GRVL CLAY 0082 GRVL 0083 ROCK 0084
LONDON TOWNSHIP CON 04 008	17 482034 4764833 W	1951/01 2801	8					4101730 ()	LOAM 0001 GRVL STNS 0005 GRVL CLAY 0010 CLAY GRVL 0032 GRVL 0045 GRVL BLDR 0047 GRVL BLDR CLAY 0050 GRVL CLAY 0061 CLAY 0065
LONDON TOWNSHIP CON 04 009	17 481714 4764743 W	1978/05 2607	36 30	FR 0008	8/8/30/3:0	IR		4108479 ()	CGVL 0010 BLUE CLAY 0014
WEST NISSOURI TOWNSH CON 03 008	17 482414 4764228 W	1986/05 4871	6 5	FR 0088	56/63/20/8:0	DO	0088 3	4110710 (NA)	BRWN CLAY STNS GRVL 0022 BLUE CLAY STNS 0030 BRWN SAND CLAY STNS 0065 BLUE CLAY STNS 0088 GREY SAND 0091 BLUE CLAY STNS 0096

TOWNSHIP CON LOT UTM DATE CNTR CASING DIA WATER PUMP TEST WELL USE SCREEN WELL FORMATION

Notes:
UTM: UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
DATE CNTR: Date Work Completedand Well Contractor Licence Number
CASING DIA: Casing diameter in inches
WATER: Unit of Depth in Fee. See Table 4 for Meaning of Code

PUMP TEST: Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour : Minutes
WELL USE: See Table 3 for Meaning of Code
SCREEN: Screen Depth and Length in feet
WELL: WEL{ AUDIT # } Well Tag . A: Abandonment; P: Partial Data Entry Only
FORMATION: See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms

Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK
CLN	CLEAN	FOSS	FOSILIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE		
DNSE	DENSE	GYPS	GYPSUM	PCKD	PACKED	SLTY	SILTY		
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDS	SANDSTONE		
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDYOAPSTONE		

2. Core Color

Code	Description
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Well Use

Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial	MT	Monitoring TestHole
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail

Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		

Appendix F – Well Survey Questionnaire Responses

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

Reference: KCH-00260285-A0

September 10, 2020

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 Kilally Road, between Highbury Avenue North and Webster Street, and along Webster Street between Kilally Road and Jensen Road in London, 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.

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).

Agree to Provide Well Information

ereby disclose the following information to **EXP Services Inc**. regarding the well on bject property (noted below) and in doing so, acknowledge that the monitoring results n available to the public on request.

Name	The Kangaroo's pouch Daycare		
Address	1410 / 1414 Kilally rd London on		
Phone			
Existing well	☑ No wells present at the address noted above ☐ Yes – please refer to requested details below		
Location of Well *Describe location, in eference to existing uildings or structures. preferred, you can rovide a sketch on the ack of this page)*			
epth of Well		**Date Drilled** (estimate, if not known)	
ype of Well: ug/Bored or Drilled)		**Static Water Level**	
o you have unicipal water?	☐ No ☑ Yes – if yes, is the well still being used? NO .		

Decline to Provide Well Information

hoose not to provide information regarding onsite well (s) to **EXP Services Inc.** *wing address:* _____.

's Signature

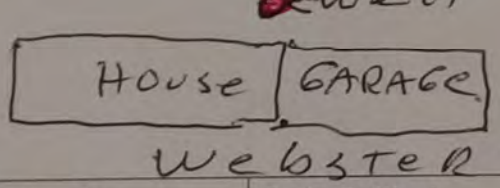
Sept. 14, 2020
Date

eturn to:

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	Audrey & Richard Desabrais		
Address	1417 Webster St		
Phone	519-4556012.		
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)	West side of the house. 		
Depth of Well	82 ft.	**Date Drilled** (estimate, if not known)	1955
Type of Well: (Dug/Bored or Drilled)	Drilled	**Static Water Level**	30ft.
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:* _____.

Audrey Desabrais
Owner's Signature

Sept 11/2020
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	Rick & Sandra Foster		
Address	1419 Webster St		
Phone	519-455-1666		
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)	In the front yard on the north side.		
Depth of Well	70-90 feet	**Date Drilled** (estimate, if not known)	2003
Type of Well: (Dug/Bored or Drilled)	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: _____.

Sandra Foster
Owner's Signature

Sep 11, 2020
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 Release Form

September 10, 2020 KCH-00260285-A0

WELL SURVEY QUESTIONNAIRE
(please select the appropriate box)

SEP 15 2020

☑ ***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	Phuong Pham		
Address	1421 Webster St. London ON		
Phone	519 851-5091		
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 corner South of the house near the deck.		
Depth of Well	90ft	**Date Drilled** (estimate, if not known)	2002
Type of Well: (Dug/Bored or Drilled)	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: _____.

P. Pham — Owner's Signature

Sept 14/20 — Date

Please return to:

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

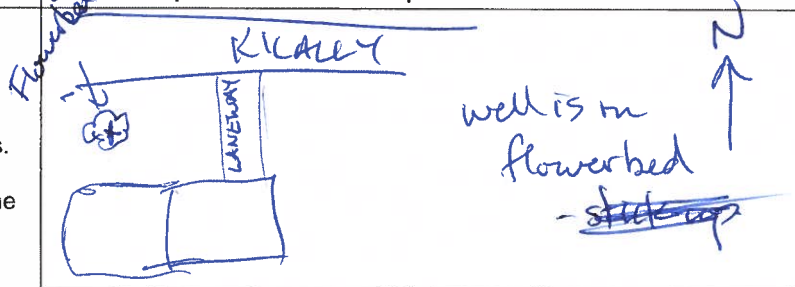
Fax: 519-963-1152

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	LUISA CARDUCCI		
Address	1449 Killally Rd		
Phone	519-453-0766		
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	don't know	**Date Drilled** (estimate, if not known)	~1984
Type of Well: (Dug/Bored or Drilled)	drilled	**Static Water Level**	unknown.
Do you have Municipal water?	☐ No ☒ Yes – if yes, is the well still being used? Yes - used for watering outside.		

☐ ***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

October 1, 2020
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	CHRIS SCOTT		
Address	1461 KILALLY ROAD, LONDON		
Phone	519 451 2690		
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)	East side of main building about 30m from house.		
Depth of Well	Not known	**Date Drilled** (estimate, if not known)	1960's
Type of Well: (Dug/Bored or Drilled)	Not known	**Static Water Level**	Not known.
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: _____.

_____ 14/9/20
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).

SEP 2 9 2020

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	Wayne Morley		
Address	1461 Webster St		
Phone	519-453-2646		
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	96 Feet	**Date Drilled** (estimate, if not known)	1986
Type of Well: (Dug/Bored or Drilled)	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: _____.

R Wayne Morley
Owner's Signature

Sept 17/2020
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	Kevin Allen		
Address	1467 Webster st		
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)	• Front yard • 30ft From front door • 6ft From driveway		
Depth of Well	82 Feet	**Date Drilled** (estimate, if not known)	April 11, 2004
Type of Well: (Dug/Bored or Drilled)	DRILLED	**Static Water Level**	SWL 51 Feet
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: _____.

K Allen
Owner's Signature

Sept 14/2020
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	SHAWN HARRINGTON		
Address	1471 WEBSTER ST.		
Phone	519-455-7968		
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)	FRONT YARD, IN FRONT OF GARAGE. 165 feet off road.		
Depth of Well	80 feet	**Date Drilled** (estimate, if not known)	2011 07 19
Type of Well: (Dug/Bored or Drilled)	Drilled	**Static Water Level**	Not known at present time
Do you have Municipal water?	☑ No ☐ Yes – if yes, is the well still being used?	Should be documented before any work performed	

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

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

_____ 2020 SEP 17

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	JAMES MCNEIL		
Address	1479 WEBSTER ST, LONDON, ON N5V 3R1		
Phone	226 663 1030		
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)	- NEAR NORTHWEST CORNER OF PROPERTY - APPROXIMATELY 25 m S/ - AT BOTTOM OF SLOPE, JUST ABOVE RETAINING WALL		
Depth of Well	29'	**Date Drilled** (estimate, if not known)	1960
Type of Well: (Dug/Bored or Drilled)	DUG	**Static Water Level**	6' HISTORICALLY IT WAS @ 11' (BEFORE CONSTRUCTION TO EAST IN JAN 2019)
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

Oct 2/20
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	JAMIE MCNEIL		
Address	1479 WEBSTER ST.		
Phone	226 663 1030		
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)	JUST NORTH OF HOUSE TAG # A 227757 APPROXIMATELY 260 m s l 336 ft SOUTH OF KILALLY RD. AND 85' WEST OF WEBSTER ST.		
Depth of Well	76'	**Date Drilled** (estimate, if not known)	SEPT 2019
Type of Well: (Dug/Bored or Drilled)	DRILLED	**Static Water Level**	50.7'
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 Record

Regulation 903 Ontario Water Resources Act

Well Tag No. (Place Sticker and/or Print Below): Tag#: A 227757

Page 1 of 1

Last Name / Organization: MCNEIL		E-mail Address: N/A	
Address of Well Location (Street Number/Name): 1479 WEBSTER ST.	Municipality: LONDON	Province: ONT	Postal Code: N5V3R1
			Well Constructed by Well Owner
			Telephone No. (inc. area code): 2266631080

Well Location

Address of Well Location (Street Number/Name): 1479 WEBSTER ST.	Township: LONDON	Lot: N/A	Concession: N/A
County/District/Municipality: MIDDLESEX	City/Town/Village: CITY OF LONDON	Province: Ontario	Postal Code: N5V3R1
UTM Coordinates: Zone 17, Easting 481236, Northing 4764362 (NAD 83)	Municipal Plan and Sublot Number: —	Other: —	

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

General Colour	Most Common Material	Other Materials	General Description	Depth (m/ft) From	To
BLACK	TOPSOIL		LOAM	0	2
BROWN	CLAY	MARL STREAKS	SOFT	2	24
BROWN	GRAVEL	SAND	DRY	24	46
GREY	CLAY		STONEY	46	61
BLUE	GRAVEL	SAND	LAYERED, CEMENTED	61	76
GREY	CLAY		HARD.	76	78

Annular Space

Depth Set at (m/ft) From	To	Type of Sealant Used (Material and Type)	Volume Placed (m³/ft³)
0	23	HIGH SOLIDS BENTONITE	7.6
23	55	GEL/SAND SLURRY	10.3
55	76	SILICA SAND PACK	6.7

Method of Construction

- [ ] Cable Tool
- [x] Rotary (Conventional)
- [ ] Rotary (Reverse)
- [ ] Boring
- [ ] Air percussion
- [ ] Other, specify
- [ ] Diamond
- [ ] Jetting
- [ ] Driving
- [ ] Digging

Well Use

- [ ] Public
- [x] Domestic
- [ ] Livestock
- [ ] Irrigation
- [ ] Industrial
- [ ] Other, specify
- [ ] Commercial
- [ ] Municipal
- [ ] Test Hole
- [ ] Cooling & Air Conditioning
- [ ] Not used
- [ ] Dewatering
- [ ] Monitoring

Construction Record - Casing

Inside Diameter (cm/in)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (cm/in)	Depth (m/ft) From	To
6"	STEEL	.219	+2	64

Status of Well

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

Construction Record - Screen

Outside Diameter (cm/in)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (m/ft) From	To
6"	STAINLESS (HEAVY)	10	64	76

Water Details

Water found at Depth (m/ft)	Kind of Water	
76	[ ] Gas	[x] Fresh [ ] Untested [ ] Other, specify
	[ ] Gas	[ ] Fresh [ ] Untested [ ] Other, specify
	[ ] Gas	[ ] Fresh [ ] Untested [ ] Other, specify

Hole Diameter

Depth (m/ft) From	To	Diameter (cm/in)
0	78	10"

Results of Well Yield Testing

After test of well yield, water was:
- [x] Clear and sand free
- [ ] Other, specify

If pumping discontinued, give reason: CLEAR

Pump intake set at (m/ft): 73

Pumping rate (l/min / GPM): 8 GPM

Duration of pumping: 1 hrs + 15 min

Final water level end of pumping (m/ft): 50'7

If flowing give rate (l/min / GPM): NOT

Recommended pump depth (m/ft): 73

Recommended pump rate (l/min / GPM): 8 GPM

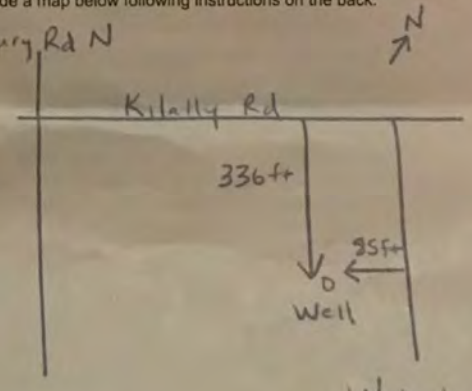
Well production (l/min / GPM): 9 GPM

Disinfected? [x] Yes [ ] No

Draw Down Time (min)	Draw Down Water Level (m/ft)	Recovery Time (min)	Recovery Water Level (m/ft)
Static Level	46		50'7
1	47'10	1	49'5
2	48'7	2	48'8
3	49'	3	48'1
4	49'4	4	47'6
5	49'7	5	46'11
10	50'6	10	46'1
15	50'6	15	46
20	50'7	20	46
25	50'7	25	46
30	50'7	30	46
40	50'7	40	46
50	50'7	50	46
60	50'7	60	46

Map of Well Location

Please provide a map below following instructions on the back.



Comments: Well is approx 85 ft from Webster St

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
Hayden Water Wells Co. Inc.	7090
Business Address (Street Number/Name)	**Municipality**
35339 Saintsbury Line	Lucan Biddulph
Province	**Postal Code**
ON	N0M2J0
Business E-mail Address	
info@haydenwaterwells.com	
Bus. Telephone No. (inc. area code)	**Name of Well Technician (Last Name, First Name)**
5199227005	Hayden Jay
Well Technician's Licence No.	**Signature of Technician and/or Contractor**
1034	

Date Submitted: 2019 10 31

Well owner's information package delivered: [x] Yes [ ] No

Date Package Delivered: 2019 10 16

Date Work Completed: 2019 10 16

Ministry Use Only

Audit No. Z318810

Received

0506E (2018/12)

Well Owner's Copy

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	David Cale		
Address	1481 - Kilally Rd. London		
Phone	519 453 1363		
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)	In Front of House - between Kilally Rd and house		
Depth of Well	16'	**Date Drilled** (estimate, if not known)	1962
Type of Well: (Dug/Bored or Drilled)	Dug	**Static Water Level**	Not Sure
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: _____.

David Dale
Owner's Signature

Sept 10/2020
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).

Hagit Blumenthal

From: Heather Jaggard
Sent: Friday, June 18, 2021 1:16 PM
To: Hagit Blumenthal
Subject: FW: LOCAL SURVEY OF POTABLE WELLS
Attachments: information request09102020.pdf; Highbury Ave Corp Ownership Plan (1).jpg

Heather Jaggard, M.Sc., P.Geo., QP
EXP | Hydrogeologist, Project Manager
t : +1.226.616.0748 | m : +1.905.977.9030 | e : heather.jaggard@exp.com

exp.com | legal disclaimer
keep it green, read from the screen

From: B. Giancola <bgiancola@rogers.com>
Sent: Thursday, September 10, 2020 8:14 PM
To: Heather Jaggard <Heather.Jaggard@exp.com>
Cc: Janet Brabender <accounting2@skyviewpoolandspa.com>
Subject: Fw: LOCAL SURVEY OF POTABLE WELLS

Hello Heather.

There are no wells on our following properties:

1410 Kilally Rd
1414 Kilally Rd
1500 Highbury Ave
1504 Highbury Ave
1510 Highbury Ave
1516 Highbury Ave
1520 Highbury Ave

Please see map attached.

Have a good weekend.

Ben Giancola
519-902-6311 Cell

----- Forwarded Message -----
From: Janet Brabender <accounting2@skyviewpoolandspa.com>
To: Ben Giancola <bgiancola@rogers.com>
Cc: Martina Pike <accounting@skyviewpoolandspa.com>
Sent: Thursday, September 10, 2020, 04:44:06 p.m. EDT
Subject: LOCAL SURVEY OF POTABLE WELLS

Good afternoon Ben

The attached was dropped in our mailbox today, just addressed to owner/resident. Thanks for taking care of this.

Janet

Appendix G – Water Levels and Hydrographs

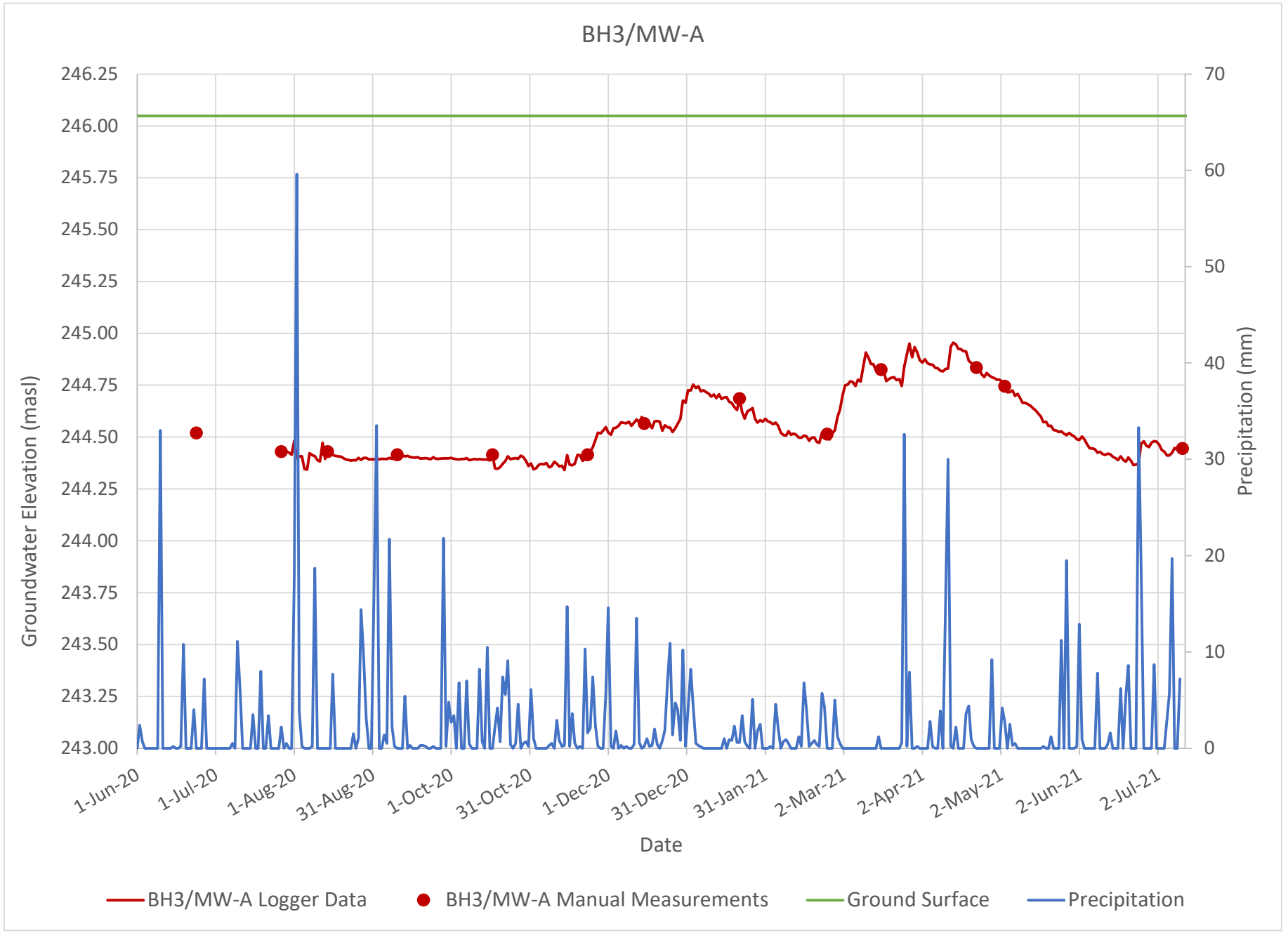
KCH-00260285-A0
1470 Highbury Avenue North, London

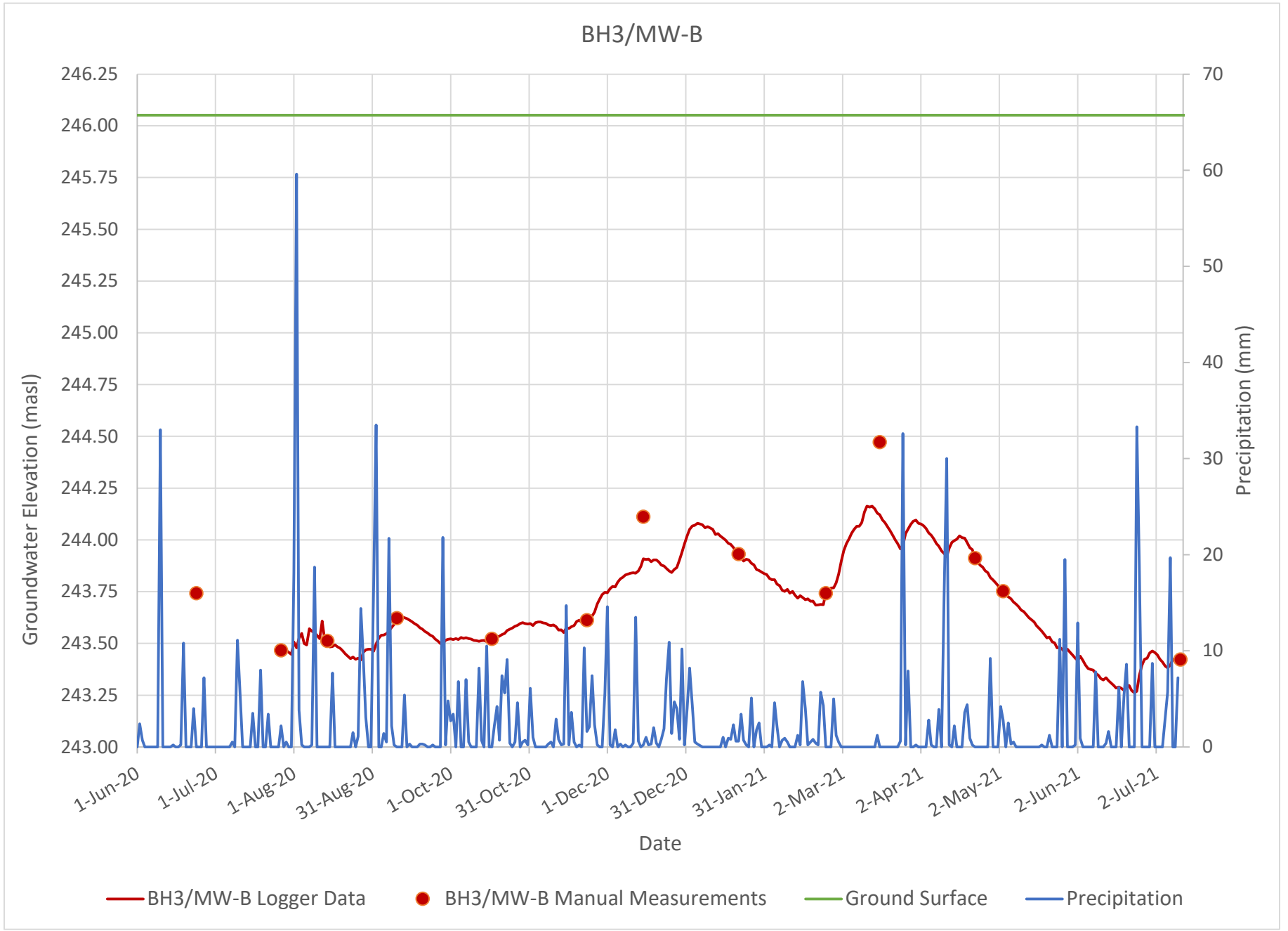
Water Elevation Monitoring

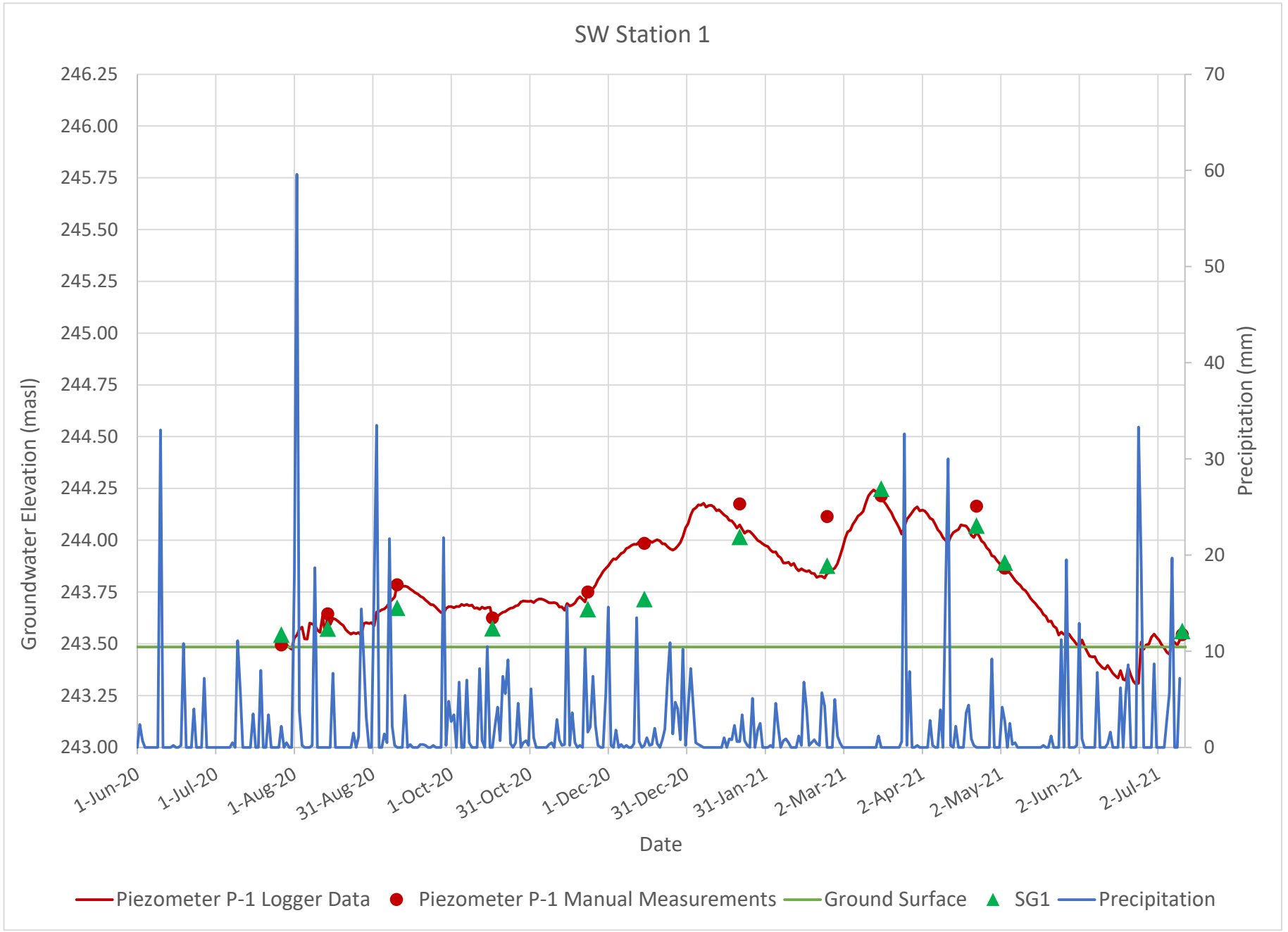
Well ID	BH1/MW	BH2A/MW	BH2B/MW	BH3A/MW	BH3B/MW	BH104/MW	P1 Inside	P1 Outside	P2-S Inside	P2-S Outside	SG1
Ground Surface Elevation (masl)	245.98	245.99	245.94	246.05	246.05	246.05	243.49	243.49	244.19	244.19	243.32
Top of Pipe Elevation (masl)	246.82	246.70	246.85	246.82	246.93	246.79	244.81	244.81	245.38	245.38	244.32
Groundwater Elevation (masl)											
24-Jun-20	243.90	244.60	243.69	244.52	243.74	-	-	-	-	-	-
27-Jul-20	243.72	244.35	243.45	244.43	243.47	-	243.19	Dry	Dry	Dry	243.55
14-Aug-20	243.71	244.33	243.47	244.43	243.51	-	243.34	Dry	Dry	Dry	243.57
10-Sep-20	243.76	244.37	243.53	244.42	243.62	-	243.48	243.78	Dry	Dry	243.67
17-Oct-20	243.67	244.24	243.46	244.42	243.52	-	243.32	Dry	Dry	Dry	243.58
23-Nov-20	243.69	244.28	243.53	244.42	243.61	-	243.45	243.76	Dry	Dry	243.67
15-Dec-20	243.84	244.44	243.78	244.57	244.11	-	243.68	244.03	Dry	Dry	243.72
21-Jan-21	243.87	244.52	243.83	244.69	243.93	-	243.87	244.14	Dry	Dry	244.02
24-Feb-21	243.12	243.57	244.53	244.52	243.74	-	244.12	244.28	Dry	Dry	243.88
17-Mar-21	243.98	244.67	243.94	244.83	244.47	244.78	244.22	244.24	244.10	Dry	244.25
23-Apr-21	244.01	244.65	243.80	244.84	243.91	244.66	244.17	244.05	243.87	Dry	244.07
04-May-21	243.95	244.57	243.67	244.75	243.75	244.60	243.87	243.87	243.85	Dry	243.89
12-Jul-21	243.75	244.28	243.43	244.45	243.42	244.30	243.55	Dry	243.63	Dry	243.56

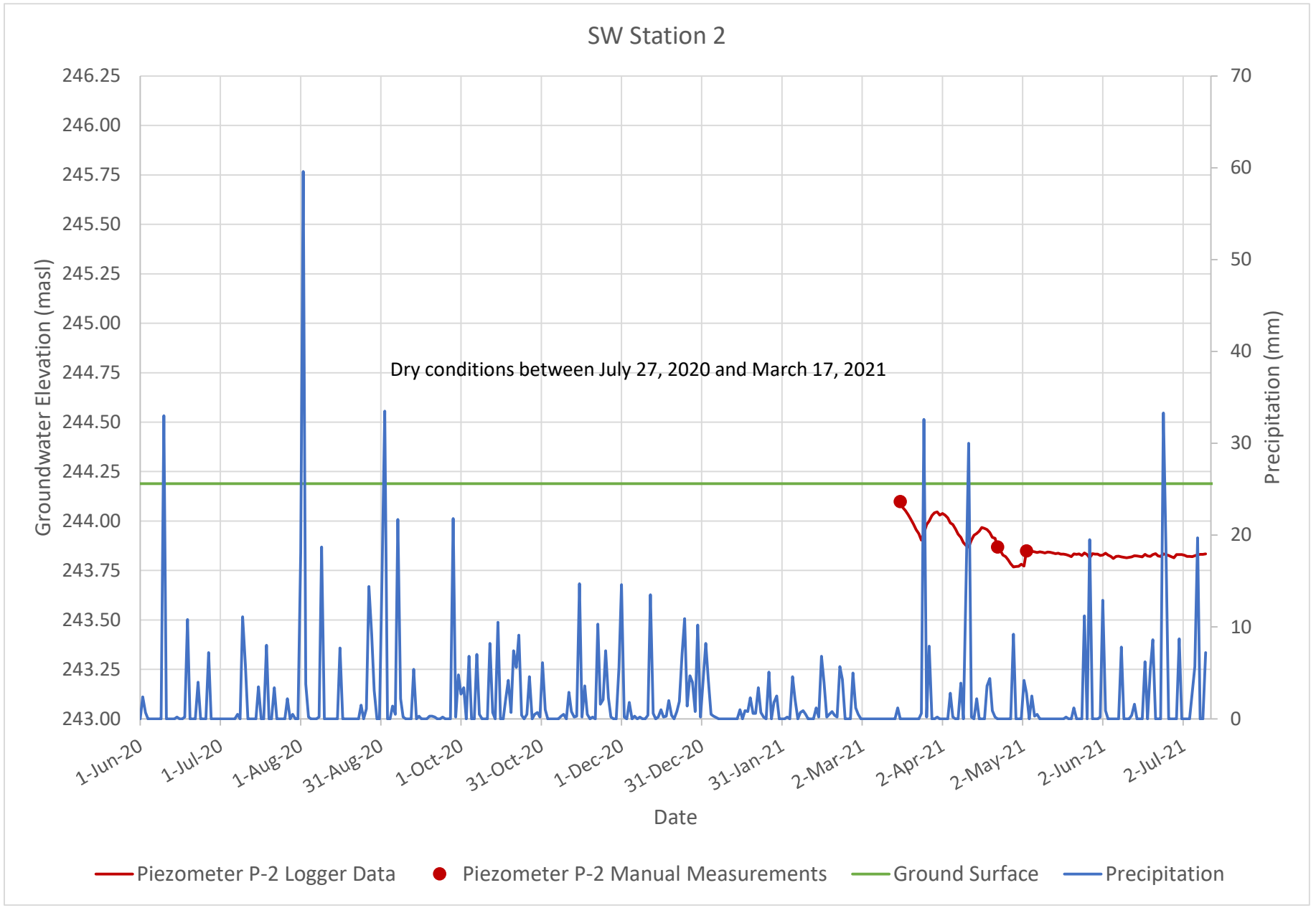
Well ID	BH1/MW	BH2A/MW	BH2B/MW	BH3A/MW	BH3B/MW	BH104/MW	P1 Inside	P2-S Inside
Groundwater Levels (m bgs)								
24-Jun-20	2.09	1.39	2.25	1.53	2.31	-	-	-
27-Jul-20	2.27	1.64	2.49	1.62	2.59	-	0.30	Dry
14-Aug-20	2.28	1.66	2.47	1.62	2.54	-	0.15	Dry
10-Sep-20	2.22	1.62	2.41	1.63	2.43	-	0.01	Dry
17-Oct-20	2.32	1.75	2.48	1.63	2.53	-	0.17	Dry
23-Nov-20	2.30	1.71	2.41	1.63	2.44	-	0.04	Dry
15-Dec-20	2.15	1.55	2.16	1.48	1.94	-	-0.19	Dry
21-Jan-21	2.12	1.47	2.11	1.36	2.12	-	-0.38	Dry
24-Feb-21	2.87	2.42	1.41	1.53	2.31	-	-0.63	Dry
17-Mar-21	2.01	1.32	2.00	1.22	1.58	1.27	-0.73	0.09
23-Apr-21	1.98	1.34	2.14	1.21	2.14	1.39	-0.68	0.32
04-May-21	2.04	1.42	2.27	1.30	2.30	1.45	-0.38	0.34
12-Jul-21	2.24	1.71	2.51	1.60	2.63	1.75	-0.06	0.56

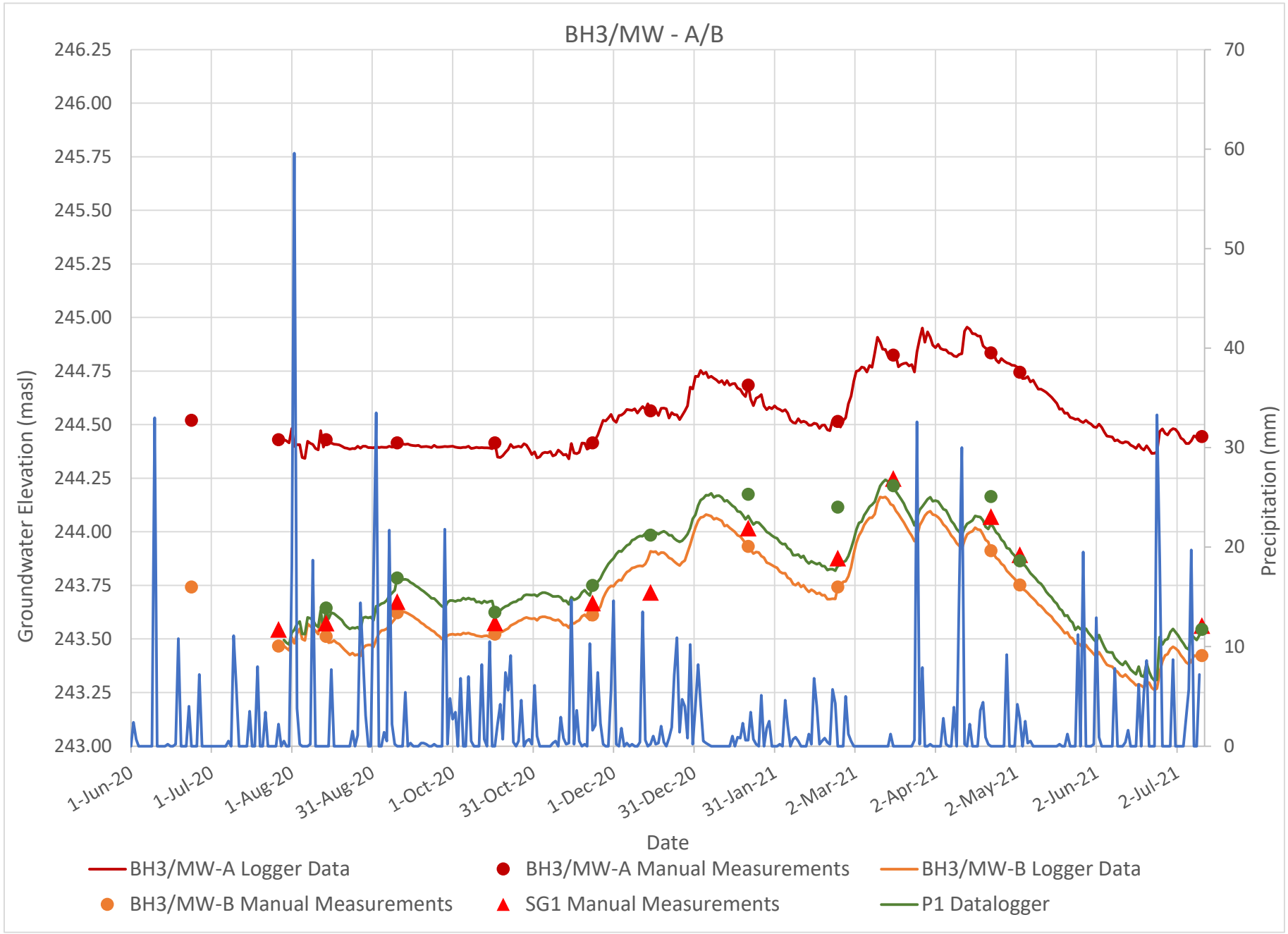
Notes:
- indicates not measured


BH3/MW-A
Groundwater Elevation (masl)
Precipitation (mm)
246.25
246.00
245.75
245.50
245.25
245.00
244.75
244.50
244.25
244.00
243.75
243.50
243.25
243.00
70
60
50
40
30
20
10
0
1-Jun-20
1-Jul-20
1-Aug-20
31-Aug-20
1-Oct-20
31-Oct-20
1-Dec-20
31-Dec-20
31-Jan-21
2-Mar-21
2-Apr-21
2-May-21
2-Jun-21
2-Jul-21
Date
BH3/MW-A Logger Data
BH3/MW-A Manual Measurements
Ground Surface
Precipitation


BH3/MW-B
246.25
246.00
245.75
245.50
245.25
245.00
244.75
244.50
244.25
244.00
243.75
243.50
243.25
243.00
Groundwater Elevation (masl)
70
60
50
40
30
20
10
0
Precipitation (mm)
1-Jun-20
1-Jul-20
1-Aug-20
31-Aug-20
1-Oct-20
31-Oct-20
1-Dec-20
31-Dec-20
31-Jan-21
2-Mar-21
2-Apr-21
2-May-21
2-Jun-21
2-Jul-21
Date
BH3/MW-B Logger Data
BH3/MW-B Manual Measurements
Ground Surface
Precipitation


SW Station 1
Groundwater Elevation (masl)
Precipitation (mm)
246.25
246.00
245.75
245.50
245.25
245.00
244.75
244.50
244.25
244.00
243.75
243.50
243.25
243.00
70
60
50
40
30
20
10
0
1-Jun-20
1-Jul-20
1-Aug-20
31-Aug-20
1-Oct-20
31-Oct-20
1-Dec-20
31-Dec-20
31-Jan-21
2-Mar-21
2-Apr-21
2-May-21
2-Jun-21
2-Jul-21
Date
Piezometer P-1 Logger Data
Piezometer P-1 Manual Measurements
Ground Surface
SG1
Precipitation

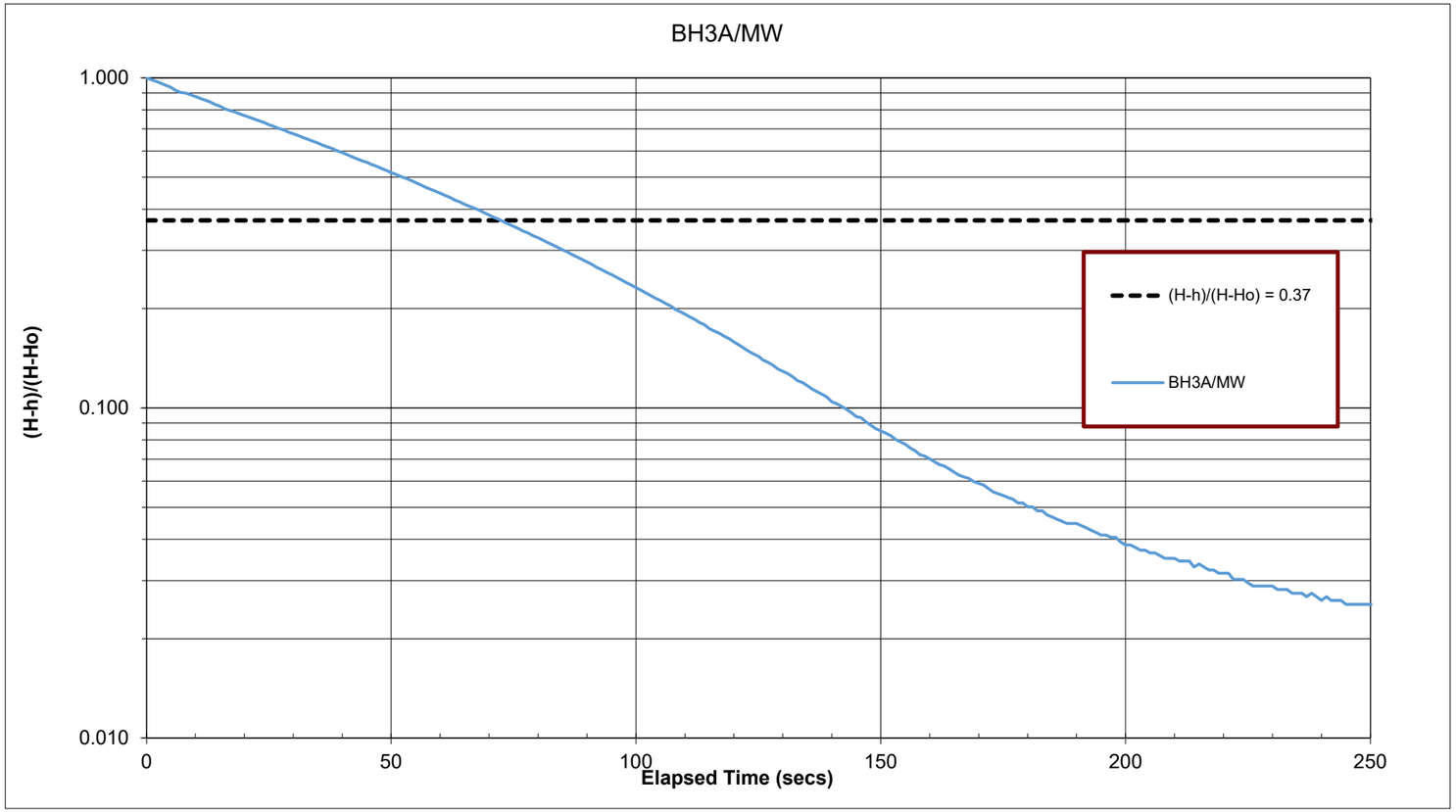

SW Station 2
Groundwater Elevation (masl)
Precipitation (mm)
246.25
246.00
245.75
245.50
245.25
245.00
244.75
244.50
244.25
244.00
243.75
243.50
243.25
243.00
70
60
50
40
30
20
10
0
Dry conditions between July 27, 2020 and March 17, 2021
1-Jun-20
1-Jul-20
1-Aug-20
31-Aug-20
1-Oct-20
31-Oct-20
1-Dec-20
31-Dec-20
31-Jan-21
2-Mar-21
2-Apr-21
2-May-21
2-Jun-21
2-Jul-21
Date
Piezometer P-2 Logger Data
Piezometer P-2 Manual Measurements
Ground Surface
Precipitation

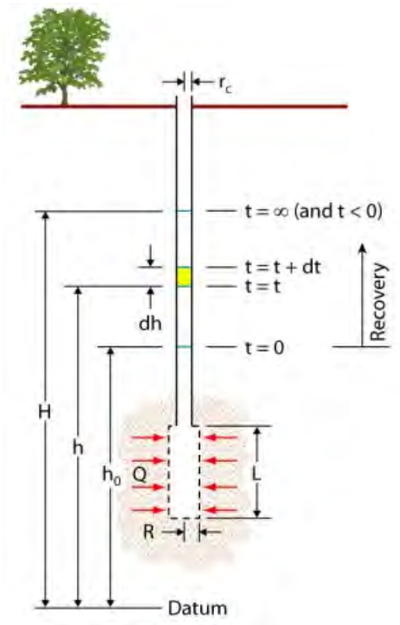

BH3/MW - A/B
Groundwater Elevation (masl)
Precipitation (mm)
246.25
246.00
245.75
245.50
245.25
245.00
244.75
244.50
244.25
244.00
243.75
243.50
243.25
243.00
70
60
50
40
30
20
10
0
1-Jun-20
1-Jul-20
1-Aug-20
31-Aug-20
1-Oct-20
31-Oct-20
1-Dec-20
31-Dec-20
31-Jan-21
2-Mar-21
2-Apr-21
2-May-21
2-Jun-21
2-Jul-21
Date
BH3/MW-A Logger Data
BH3/MW-A Manual Measurements
BH3/MW-B Logger Data
BH3/MW-B Manual Measurements
SG1 Manual Measurements
P1 Datalogger

Appendix H – Single Well Response Test Data

Recovery Testing - Hvorslev Method (1951)

Project Number	KCH-00260285-A0
Date ot Test	17-Oct-20
Completed by	MB





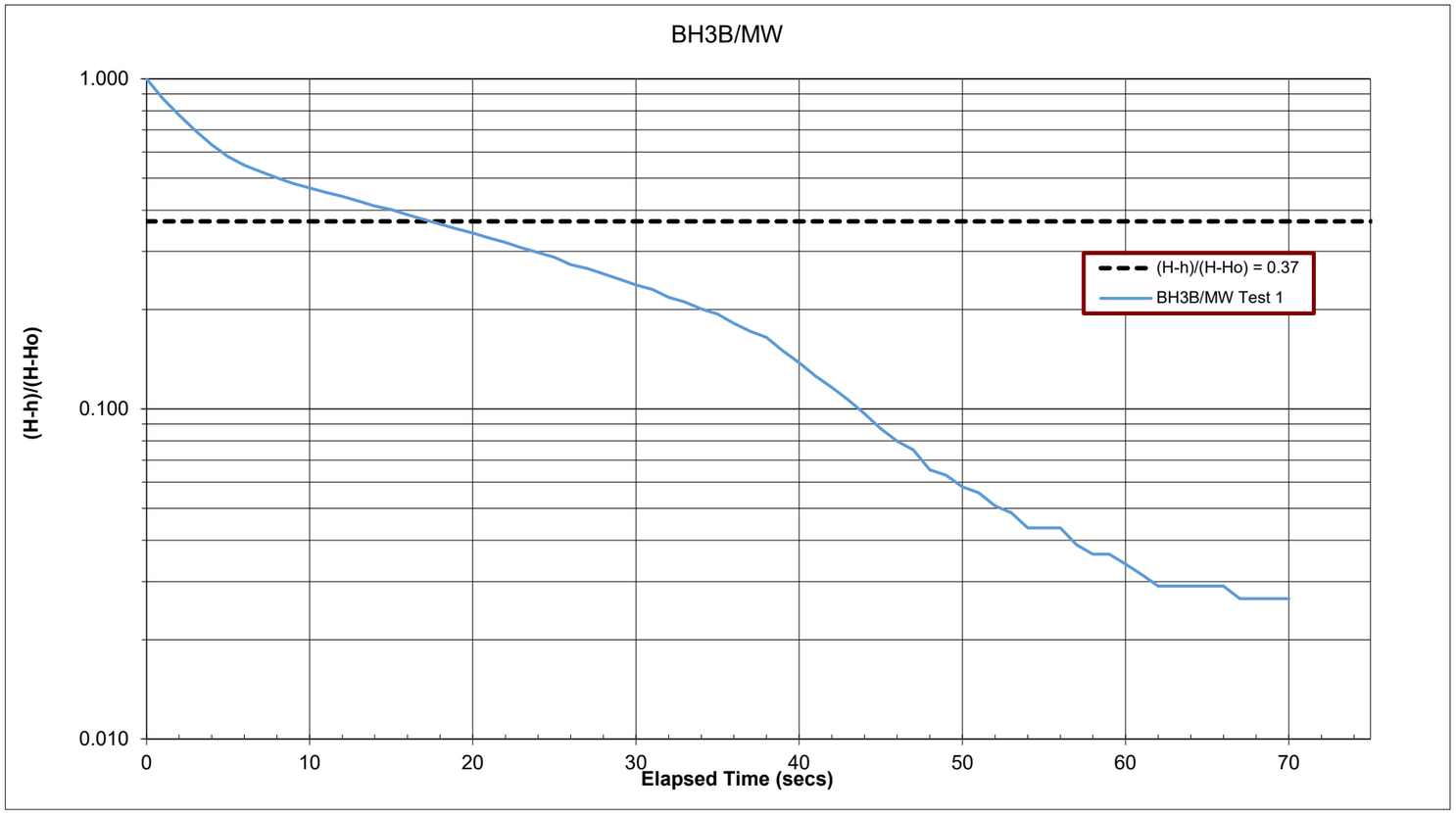
Initial Water Level	1.63 m bgs
Maximum Drawdown	1.46 m
r (m) =	0.0254
L (m) =	1.52
R (m) =	0.1080
T_o (sec) =	72
K (m/s) =	7.8E-06

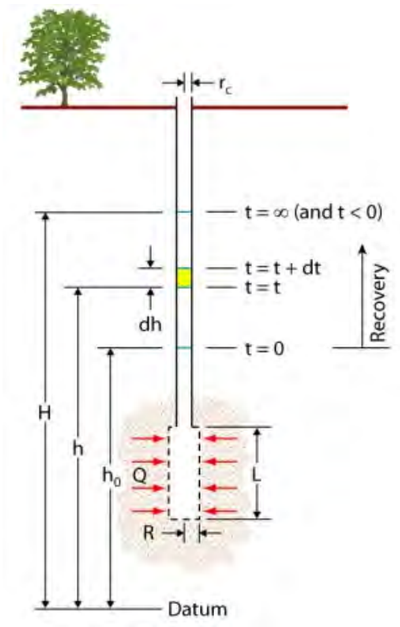
Note:
1 - T_o is determined from plots where (H-h)/(H-Ho) = 0.37

K = Hydraulic Conductivity
r = radius of well casing
R = Radius of well screen or filter pack
L = Length of the well screen (in Slug Test) or the length of submerged portion of the well screen (in Rising Head)
T_0 = time for water level to rise or fall to 37% of the initial change

Recovery Testing - Hvorslev Method (1951)

Project Number	KCH-00260285-A0
Date ot Test	17-Oct-20
Completed by	MB





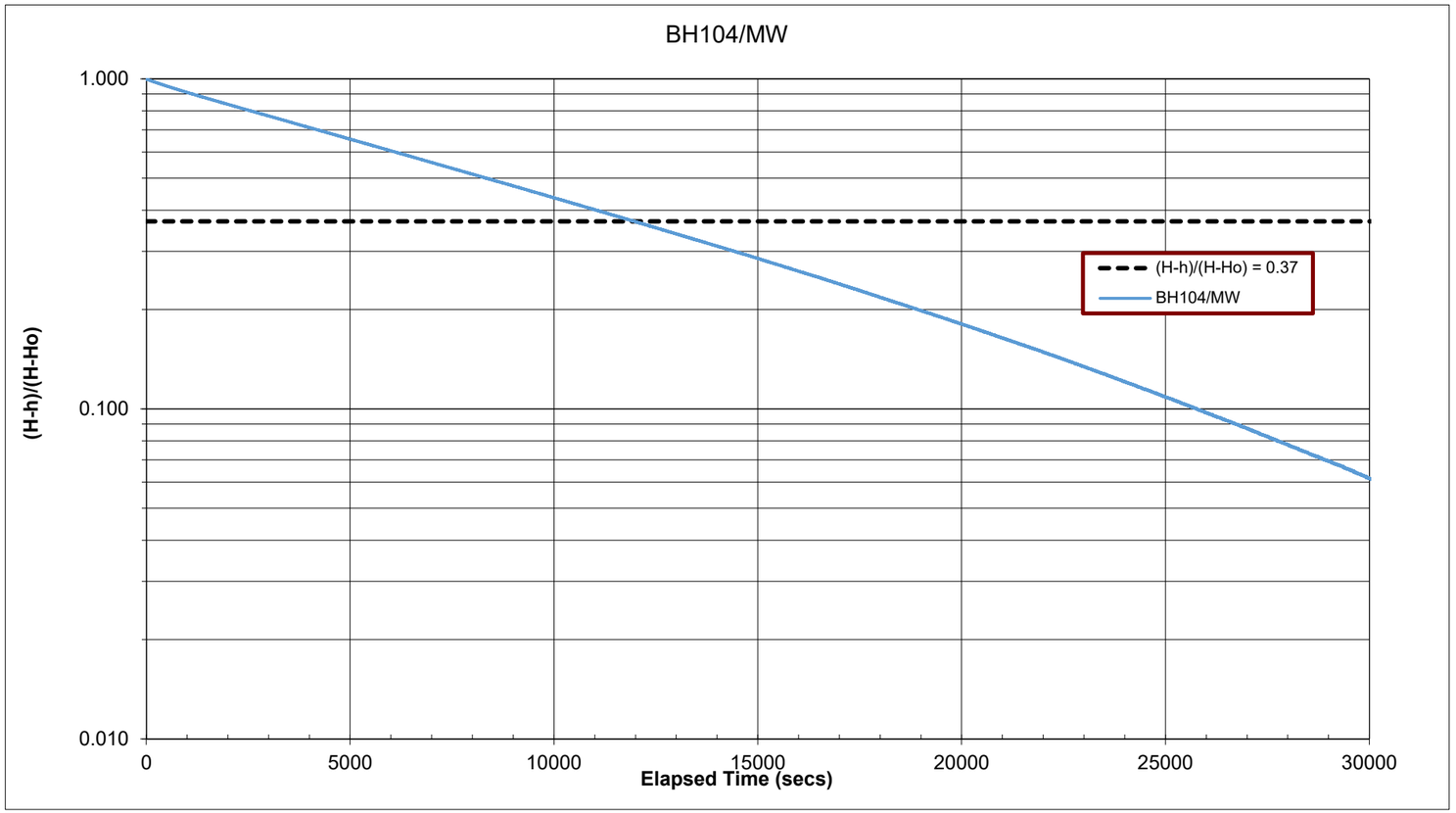
3.26	Initial Water Level	2.53 m bgs
	Maximum Drawdown	0.41 m
	r (m) =	0.0254
	L (m) =	0.99
3.26	R (m) =	0.1080
	T_o (sec) =	17
	K (m/s) =	4.2E-05

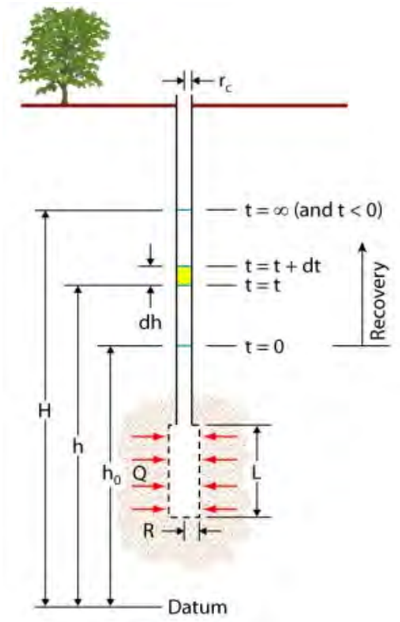
Note:
1 - T_o is determined from plots where (H-h)/(H-Ho) = 0.37

K = Hydraulic Conductivity
r = radius of well casing
R = Radius of well screen or filter pack
L = Length of the well screen (in Slug Test) or the length of submerged portion of the well screen (in Rising Head)
T_0 = time for water level to rise or fall to 37% of the initial change

Recovery Testing - Hvorslev Method (1951)

Project Number	KCH-00260285-A0
Date ot Test	23-Apr-21
Completed by	M. Bertens





0.8		Initial Water Level	1.33 m bgs
2.13		Maximum Drawdown	5.15 m
1.33			
		r (m) =	0.0254
		L (m) =	3.05
	3.26	R (m) =	0.1080
		T_o (sec) =	11,972
		K (m/s) =	3.0E-08

Note:
1 - T_o is determined from plots where (H-h)/(H-Ho) = 0.37

K = Hydraulic Conductivity
r = radius of well casing
R = Radius of well screen or filter pack
L = Length of the well screen (in Slug Test) or the length of submerged portion of the well screen (in Rising Head)
T_0 = time for water level to rise or fall to 37% of the initial change

Appendix I – Water Quality Tables

Groundwater Quality Results
1470 Highbury Avenue North, London, ON
Project No. KCH-00260285

CRITERIA	ODWQS	UNITS	17-Oct-20	17-Mar-21	17-Oct-20	17-Mar-21
			BH3/MW-A		BH3/MW-B	
Calculated Parameters						
Anion Sum	-	me/L	6.56	6.92	8.26	7.82
Bicarb. Alkalinity (calc. as CaCO3)	-	mg/L	220	260	320	290
Calculated TDS	-	mg/L	350	370	440	420
Carb. Alkalinity (calc. as CaCO3)	-	mg/L	2.2	3.4	2.3	2.2
Cation Sum	-	me/L	6.66	7.07	8.41	7.97
Hardness (CaCO3)	-	mg/L	260	290	350	350
Ion Balance (% Difference)	-	%	0.76	1.08	0.91	0.96
Langelier Index (@ 20C)	-	N/A	0.692	0.966	0.947	0.962
Langelier Index (@ 4C)	-	N/A	0.443	0.717	0.699	0.714
Saturation pH (@ 20C)	-	N/A	7.32	7.18	6.94	6.95
Saturation pH (@ 4C)	-	N/A	7.57	7.43	7.19	7.19
Inorganics						
Total Ammonia-N	-	mg/L	0.12	<0.050	0.068	<0.050
Conductivity	-	umho/cm	630	680	760	760
Dissolved Organic Carbon	-	mg/L	1.7	0.91	1.7	2.3
Orthophosphate (P)	-	mg/L	<0.010	<0.010	<0.010	<0.010
pH	-	pH	8.01	8.15	7.88	7.91
Dissolved Sulphate (SO4)	-	mg/L	18	28	31	27
Alkalinity (Total as CaCO3)	-	mg/L	230	260	320	290
Dissolved Chloride (Cl-)	-	mg/L	59	41	44	42
Nitrite (N)	1	mg/L	<0.010	<0.010	<0.010	0.011
Nitrate (N)	10	mg/L	<0.10	<0.10	0.12	2.99
Nitrate + Nitrite (N)	-	mg/L	<0.10	<0.10	0.12	3.01
Metals						
Dissolved Aluminum (Al)	-	ug/L	6	<4.9	5.7	7.3
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	150	130	150	99
Dissolved Beryllium (Be)	-	ug/L	<0.40	<0.40	<0.40	<0.40
Dissolved Boron (B)	5000	ug/L	55	51	36	18
Dissolved Cadmium (Cd)	5	ug/L	<0.090	<0.090	<0.090	<0.090
Dissolved Calcium (Ca)	-	ug/L	58000	69000	100000	110000
Dissolved Chromium (Cr)	50	ug/L	<5.0	<5.0	<5.0	<5.0
Dissolved Cobalt (Co)	-	ug/L	<0.50	<0.50	0.55	<0.50
Dissolved Copper (Cu)	-	ug/L	<0.90	1.1	1.7	2.5
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	28000	29000	21000	20000
Dissolved Manganese (Mn)	-	ug/L	14	3.3	130	<2.0
Dissolved Molybdenum (Mo)	-	ug/L	21	6.9	1.8	<0.50
Dissolved Nickel (Ni)	-	ug/L	1.3	1	1.7	2.5
Dissolved Phosphorus (P)	-	ug/L	<100	<100	<100	<100
Dissolved Potassium (K)	-	ug/L	6300	4100	2800	1500
Dissolved Selenium (Se)	50	ug/L	<2.0	<2.0	<2.0	<2.0
Dissolved Silicon (Si)	-	ug/L	5900	6400	5800	4600
Dissolved Silver (Ag)	-	ug/L	<0.090	<0.090	<0.090	<0.090
Dissolved Sodium (Na)	-	ug/L	30000	26000	33000	20000
Dissolved Strontium (Sr)	-	ug/L	360	340	410	310
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	0.78	0.26	1.2	0.66
Dissolved Vanadium (V)	-	ug/L	0.72	<0.50	1	<0.50
Dissolved Zinc (Zn)	-	ug/L	<5.0	<5.0	<5.0	<5.0

TABLE NOTES:

Results compared to Ontario Drinking Water Quality Standards (ODWQS) Maximum Allowable Concentration.

Values highlighted GREY and bold exceed parameter guidelines

Surface Water Quality Results
1470 Highbury Avenue North, London, ON
Project No. KCH-00260285

CRITERIA	PWQO	UNITS	17-Oct-20	17-Mar-21
			SW1	
Calculated Parameters				
Bicarb. Alkalinity (calc. as CaCO3)		mg/L	260	310
Calculated TDS		mg/L	360	450
Carb. Alkalinity (calc. as CaCO3)		mg/L	2	2.7
Hardness (CaCO3)		mg/L	290	360
Langelier Index (@ 20C)		N/A	0.827	1.04
Langelier Index (@ 4C)		N/A	0.579	0.794
Saturation pH (@ 20C)		N/A	7.1	6.92
Saturation pH (@ 4C)		N/A	7.34	7.16
Inorganics				
Total Ammonia-N		mg/L	0.16	<0.050
Conductivity		umho/cm	640	830
Total Organic Carbon (TOC)		mg/L	85 (1)	3.8
Orthophosphate (P)		mg/L	<0.010	<0.010
pH	6.5 - 8.5	pH	7.92	7.96
Total Phosphorus		mg/L	2.2	0.014
Dissolved Sulphate (SO4)		mg/L	7.5	23
Turbidity		NTU	10	1.6
Alkalinity (Total as CaCO3)		mg/L	260	320
Dissolved Chloride (Cl-)		mg/L	58	59
Nitrite (N)		mg/L	<0.010	<0.010
Nitrate (N)		mg/L	<0.10	<0.10
Metals				
Dissolved Calcium (Ca)		mg/L	85	110
Dissolved Magnesium (Mg)		mg/L	19	21
Dissolved Potassium (K)		mg/L	4	2
Dissolved Sodium (Na)		mg/L	29	35
Total Aluminum (Al)	75	ug/L	**13000**	9
Total Antimony (Sb)	20	ug/L	0.69	<0.50
Total Arsenic (As)	5	ug/L	**7**	<1.0
Total Barium (Ba)		ug/L	1400	77
Total Beryllium (Be)	1100	ug/L	0.66	<0.40
Total Boron (B)	200	ug/L	40	22
Total Cadmium (Cd)	0.5	ug/L	**2**	<0.090
Total Calcium (Ca)		ug/L	630000	110000
Total Chromium (Cr)	8.9	ug/L	**22**	<5.0
Total Cobalt (Co)	0.9	ug/L	**11**	<0.50
Total Copper (Cu)	5	ug/L	**87**	<0.90
Total Iron (Fe)	300	ug/L	**27000**	**310**
Total Lead (Pb)	5	ug/L	**63**	<0.50
Total Magnesium (Mg)		ug/L	40000	21000
Total Manganese (Mn)		ug/L	2300	49
Total Molybdenum (Mo)	40	ug/L	1.3	<0.50
Total Nickel (Ni)	25	ug/L	23	<1.0
Total Potassium (K)		ug/L	11000	1700
Total Selenium (Se)	100	ug/L	3.5	<2.0
Total Silicon (Si)		ug/L	19000	4500
Total Silver (Ag)	0.1	ug/L	**0.19**	<0.090
Total Sodium (Na)		ug/L	33000	34000
Total Strontium (Sr)		ug/L	1000	350
Total Thallium (Tl)	0.3	ug/L	0.15	<0.050
Total Titanium (Ti)		ug/L	300	<5.0
Total Vanadium (V)	6	ug/L	**23**	<0.50
Total Zinc (Zn)	20	ug/L	**500**	<5.0
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	46	76
Dissolved Beryllium (Be)		ug/L	<0.40	<0.40
Dissolved Bismuth (Bi)		ug/L	<1.0	<1.0
Dissolved Boron (B)		ug/L	<10	26
Dissolved Cadmium (Cd)		ug/L	<0.090	<0.090
Dissolved Calcium (Ca)		ug/L	89000	110000
Dissolved Chromium (Cr)		ug/L	<5.0	<5.0
Dissolved Cobalt (Co)		ug/L	<0.50	<0.50
Dissolved Copper (Cu)		ug/L	<0.90	<0.90
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	19000	21000
Dissolved Manganese (Mn)		ug/L	3.8	45
Dissolved Molybdenum (Mo)		ug/L	<0.50	<0.50
Dissolved Nickel (Ni)		ug/L	1.1	<1.0
Dissolved Phosphorus (P)		ug/L	100	<100
Dissolved Potassium (K)		ug/L	3600	1700
Dissolved Selenium (Se)		ug/L	<2.0	<2.0
Dissolved Silicon (Si)		ug/L	2200	4700
Dissolved Silver (Ag)		ug/L	<0.090	<0.090
Dissolved Sodium (Na)		ug/L	27000	34000
Dissolved Strontium (Sr)		ug/L	300	340
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	0.55	0.63
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

Appendix J – Laboratory Chain of Custody

Your Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Your C.O.C. #: 797627-01-01

Attention: Mark Bertens

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

Report Date: 2020/10/23
Report #: R6382340
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C0R4597
Received: 2020/10/19, 09:15

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	2	N/A	2020/10/21	CAM SOP-00448	SM 23 2320 B m
Alkalinity	1	N/A	2020/10/22	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	3	N/A	2020/10/22	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	3	N/A	2020/10/22	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	2	N/A	2020/10/21	CAM SOP-00414	SM 23 2510 m
Conductivity	1	N/A	2020/10/22	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	2	N/A	2020/10/21	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	3	N/A	2020/10/21	CAM SOP 00102/00408/00447	SM 2340 B
Lab Filtered Metals Analysis by ICP	1	2020/10/20	2020/10/21	CAM SOP-00408	EPA 6010D m
Lab Filtered Metals by ICPMS	3	2020/10/20	2020/10/21	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	N/A	2020/10/23	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	2	N/A	2020/10/22		
Anion and Cation Sum	2	N/A	2020/10/22		
Total Ammonia-N	3	N/A	2020/10/22	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	3	N/A	2020/10/21	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	2	2020/10/20	2020/10/21	CAM SOP-00413	SM 4500H+ B m
pH	1	2020/10/20	2020/10/22	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	3	N/A	2020/10/22	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	3	N/A	2020/10/22		Auto Calc
Sat. pH and Langelier Index (@ 4C)	3	N/A	2020/10/22		Auto Calc
Sulphate by Automated Colourimetry	3	N/A	2020/10/22	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	3	N/A	2020/10/22		Auto Calc
Total Organic Carbon (TOC) (3)	1	N/A	2020/10/22	CAM SOP-00446	SM 23 5310B m
Total Phosphorus (Colourimetric)	1	2020/10/21	2020/10/22	CAM SOP-00407	SM 23 4500 P B H m
Turbidity	1	N/A	2020/10/21	CAM SOP-00417	SM 23 2130 B m

Remarks:

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

Your Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Your C.O.C. #: 797627-01-01

Attention: Mark Bertens

exp Services Inc
London Branch
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BV LABS JOB #: C0R4597
Received: 2020/10/19, 09:15

by BV Labs 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 BV Labs profession using accepted testing methodologies, quality assurance and quality control procedures (except where otherwise agreed by the client and BV Labs 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.

BV Labs liability is limited to the actual cost of the requested analyses, unless otherwise agreed in writing. There is no other warranty expressed or implied. BV Labs 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 BV Labs, unless otherwise agreed in writing. BV Labs 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 BV Labs, 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

Bureau Veritas Laboratories
23 Oct 2020 14:06:54

Please direct all questions regarding this Certificate of Analysis to your Project Manager.
Christine Gripton, Senior Project Manager
Email: Christine.Gripton@bvlabs.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 #: C0R4597
Report Date: 2020/10/23

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

RCAP - COMPREHENSIVE (LAB FILTERED)

BV Labs ID		NXU440		NXU441		
Sampling Date		2020/10/17 02:15		2020/10/17 02:30		
COC Number		797627-01-01		797627-01-01		
	UNITS	MW3A	QC Batch	MW3B	RDL	QC Batch
Calculated Parameters						
Anion Sum	me/L	6.56	7007736	8.26	N/A	7007736
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	220	7008657	320	1.0	7008657
Calculated TDS	mg/L	350	7007620	440	1.0	7007620
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.2	7008657	2.3	1.0	7008657
Cation Sum	me/L	6.66	7007736	8.41	N/A	7007736
Hardness (CaCO3)	mg/L	260	7008747	350	1.0	7008747
Ion Balance (% Difference)	%	0.760	7007735	0.910	N/A	7007735
Langelier Index (@ 20C)	N/A	0.692	7007618	0.947		7007618
Langelier Index (@ 4C)	N/A	0.443	7007619	0.699		7007619
Saturation pH (@ 20C)	N/A	7.32	7007618	6.94		7007618
Saturation pH (@ 4C)	N/A	7.57	7007619	7.19		7007619
Inorganics						
Total Ammonia-N	mg/L	0.12	7012945	0.068	0.050	7012945
Conductivity	umho/cm	630	7010248	760	1.0	7010324
Dissolved Organic Carbon	mg/L	1.7	7010554	1.7	0.40	7010554
Orthophosphate (P)	mg/L	<0.010	7010447	<0.010	0.010	7010447
pH	pH	8.01	7010261	7.88		7010327
Dissolved Sulphate (SO4)	mg/L	18	7010446	31	1.0	7010446
Alkalinity (Total as CaCO3)	mg/L	230	7010242	320	1.0	7010308
Dissolved Chloride (Cl-)	mg/L	59	7010440	44	1.0	7010440
Nitrite (N)	mg/L	<0.010	7010775	<0.010	0.010	7010775
Nitrate (N)	mg/L	<0.10	7010775	0.12	0.10	7010775
Nitrate + Nitrite (N)	mg/L	<0.10	7010775	0.12	0.10	7010775
Metals						
Dissolved Aluminum (Al)	ug/L	6.0	7010389	5.7	4.9	7010389
Dissolved Antimony (Sb)	ug/L	<0.50	7010389	<0.50	0.50	7010389
Dissolved Arsenic (As)	ug/L	<1.0	7010389	<1.0	1.0	7010389
Dissolved Barium (Ba)	ug/L	150	7010389	150	2.0	7010389
Dissolved Beryllium (Be)	ug/L	<0.40	7010389	<0.40	0.40	7010389
Dissolved Boron (B)	ug/L	55	7010389	36	10	7010389

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

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BV Labs Job #: C0R4597
Report Date: 2020/10/23

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

RCAP - COMPREHENSIVE (LAB FILTERED)

BV Labs ID		NXU440		NXU441		
Sampling Date		2020/10/17 02:15		2020/10/17 02:30		
COC Number		797627-01-01		797627-01-01		
	UNITS	MW3A	QC Batch	MW3B	RDL	QC Batch
Dissolved Cadmium (Cd)	ug/L	<0.090	7010389	<0.090	0.090	7010389
Dissolved Calcium (Ca)	ug/L	58000	7010389	100000	200	7010389
Dissolved Chromium (Cr)	ug/L	<5.0	7010389	<5.0	5.0	7010389
Dissolved Cobalt (Co)	ug/L	<0.50	7010389	0.55	0.50	7010389
Dissolved Copper (Cu)	ug/L	<0.90	7010389	1.7	0.90	7010389
Dissolved Iron (Fe)	ug/L	<100	7010389	<100	100	7010389
Dissolved Lead (Pb)	ug/L	<0.50	7010389	<0.50	0.50	7010389
Dissolved Magnesium (Mg)	ug/L	28000	7010389	21000	50	7010389
Dissolved Manganese (Mn)	ug/L	14	7010389	130	2.0	7010389
Dissolved Molybdenum (Mo)	ug/L	21	7010389	1.8	0.50	7010389
Dissolved Nickel (Ni)	ug/L	1.3	7010389	1.7	1.0	7010389
Dissolved Phosphorus (P)	ug/L	<100	7010389	<100	100	7010389
Dissolved Potassium (K)	ug/L	6300	7010389	2800	200	7010389
Dissolved Selenium (Se)	ug/L	<2.0	7010389	<2.0	2.0	7010389
Dissolved Silicon (Si)	ug/L	5900	7010389	5800	50	7010389
Dissolved Silver (Ag)	ug/L	<0.090	7010389	<0.090	0.090	7010389
Dissolved Sodium (Na)	ug/L	30000	7010389	33000	100	7010389
Dissolved Strontium (Sr)	ug/L	360	7010389	410	1.0	7010389
Dissolved Thallium (Tl)	ug/L	<0.050	7010389	<0.050	0.050	7010389
Dissolved Titanium (Ti)	ug/L	<5.0	7010389	<5.0	5.0	7010389
Dissolved Uranium (U)	ug/L	0.78	7010389	1.2	0.10	7010389
Dissolved Vanadium (V)	ug/L	0.72	7010389	1.0	0.50	7010389
Dissolved Zinc (Zn)	ug/L	<5.0	7010389	<5.0	5.0	7010389

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0R4597
Report Date: 2020/10/23

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

RCAP - SURFACE WATER (WATER)

BV Labs ID		NXU442		
Sampling Date		2020/10/17 02:45		
COC Number		797627-01-01		
	UNITS	SW1	RDL	QC Batch
Calculated Parameters				
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	260	1.0	7008657
Calculated TDS	mg/L	360	1.0	7007620
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.0	1.0	7008657
Hardness (CaCO3)	mg/L	290	1.0	7007508
Langelier Index (@ 20C)	N/A	0.827		7007618
Langelier Index (@ 4C)	N/A	0.579		7007619
Saturation pH (@ 20C)	N/A	7.10		7007618
Saturation pH (@ 4C)	N/A	7.34		7007619
Inorganics				
Total Ammonia-N	mg/L	0.16	0.050	7012945
Conductivity	umho/cm	640	1.0	7010324
Total Organic Carbon (TOC)	mg/L	85 (1)	4.0	7011987
Orthophosphate (P)	mg/L	<0.010	0.010	7010447
pH	pH	7.92		7010327
Total Phosphorus	mg/L	2.2	0.1	7012446
Dissolved Sulphate (SO4)	mg/L	7.5	1.0	7010446
Turbidity	NTU	10	0.1	7010563
Alkalinity (Total as CaCO3)	mg/L	260	1.0	7010308
Dissolved Chloride (Cl-)	mg/L	58	1.0	7010440
Nitrite (N)	mg/L	<0.010	0.010	7010775
Nitrate (N)	mg/L	<0.10	0.10	7010775
Metals				
Dissolved Calcium (Ca)	mg/L	85	0.05	7010325
Dissolved Magnesium (Mg)	mg/L	19	0.05	7010325
Dissolved Potassium (K)	mg/L	4	1	7010325
Dissolved Sodium (Na)	mg/L	29	0.5	7010325
Total Aluminum (Al)	ug/L	13000	4.9	7014865
Total Antimony (Sb)	ug/L	0.69	0.50	7014865
Total Arsenic (As)	ug/L	7.0	1.0	7014865

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
(1) Due to the sample matrix, sample required dilution. Detection limit was adjusted accordingly.

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BV Labs Job #: C0R4597
Report Date: 2020/10/23

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

RCAP - SURFACE WATER (WATER)

BV Labs ID		NXU442		
Sampling Date		2020/10/17 02:45		
COC Number		797627-01-01		
	UNITS	SW1	RDL	QC Batch
Total Barium (Ba)	ug/L	1400	2.0	7014865
Total Beryllium (Be)	ug/L	0.66	0.40	7014865
Total Boron (B)	ug/L	40	10	7014865
Total Cadmium (Cd)	ug/L	2.0	0.090	7014865
Total Calcium (Ca)	ug/L	630000	1000	7014865
Total Chromium (Cr)	ug/L	22	5.0	7014865
Total Cobalt (Co)	ug/L	11	0.50	7014865
Total Copper (Cu)	ug/L	87	0.90	7014865
Total Iron (Fe)	ug/L	27000	100	7014865
Total Lead (Pb)	ug/L	63	0.50	7014865
Total Magnesium (Mg)	ug/L	40000	50	7014865
Total Manganese (Mn)	ug/L	2300	2.0	7014865
Total Molybdenum (Mo)	ug/L	1.3	0.50	7014865
Total Nickel (Ni)	ug/L	23	1.0	7014865
Total Potassium (K)	ug/L	11000	200	7014865
Total Selenium (Se)	ug/L	3.5	2.0	7014865
Total Silicon (Si)	ug/L	19000	50	7014865
Total Silver (Ag)	ug/L	0.19	0.090	7014865
Total Sodium (Na)	ug/L	33000	100	7014865
Total Strontium (Sr)	ug/L	1000	1.0	7014865
Total Thallium (Tl)	ug/L	0.15	0.050	7014865
Total Titanium (Ti)	ug/L	300	5.0	7014865
Total Vanadium (V)	ug/L	23	0.50	7014865
Total Zinc (Zn)	ug/L	500	5.0	7014865

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0R4597
Report Date: 2020/10/23

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		NXU442		
Sampling Date		2020/10/17 02:45		
COC Number		797627-01-01		
	UNITS	SW1	RDL	QC Batch
Metals				
Dissolved Aluminum (Al)	ug/L	<4.9	4.9	7010389
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	7010389
Dissolved Arsenic (As)	ug/L	<1.0	1.0	7010389
Dissolved Barium (Ba)	ug/L	46	2.0	7010389
Dissolved Beryllium (Be)	ug/L	<0.40	0.40	7010389
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	7010389
Dissolved Boron (B)	ug/L	<10	10	7010389
Dissolved Cadmium (Cd)	ug/L	<0.090	0.090	7010389
Dissolved Calcium (Ca)	ug/L	89000	200	7010389
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	7010389
Dissolved Cobalt (Co)	ug/L	<0.50	0.50	7010389
Dissolved Copper (Cu)	ug/L	<0.90	0.90	7010389
Dissolved Iron (Fe)	ug/L	<100	100	7010389
Dissolved Lead (Pb)	ug/L	<0.50	0.50	7010389
Dissolved Lithium (Li)	ug/L	<5.0	5.0	7010389
Dissolved Magnesium (Mg)	ug/L	19000	50	7010389
Dissolved Manganese (Mn)	ug/L	3.8	2.0	7010389
Dissolved Molybdenum (Mo)	ug/L	<0.50	0.50	7010389
Dissolved Nickel (Ni)	ug/L	1.1	1.0	7010389
Dissolved Phosphorus (P)	ug/L	100	100	7010389
Dissolved Potassium (K)	ug/L	3600	200	7010389
Dissolved Selenium (Se)	ug/L	<2.0	2.0	7010389
Dissolved Silicon (Si)	ug/L	2200	50	7010389
Dissolved Silver (Ag)	ug/L	<0.090	0.090	7010389
Dissolved Sodium (Na)	ug/L	27000	100	7010389
Dissolved Strontium (Sr)	ug/L	300	1.0	7010389
Dissolved Tellurium (Te)	ug/L	<1.0	1.0	7010389
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	7010389
Dissolved Tin (Sn)	ug/L	<1.0	1.0	7010389
Dissolved Titanium (Ti)	ug/L	<5.0	5.0	7010389
Dissolved Tungsten (W)	ug/L	<1.0	1.0	7010389

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0R4597
Report Date: 2020/10/23

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		NXU442		
Sampling Date		2020/10/17 02:45		
COC Number		797627-01-01		
	UNITS	SW1	RDL	QC Batch
Dissolved Uranium (U)	ug/L	0.55	0.10	7010389
Dissolved Vanadium (V)	ug/L	<0.50	0.50	7010389
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	7010389
Dissolved Zirconium (Zr)	ug/L	<1.0	1.0	7010389

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C0R4597
Report Date: 2020/10/23

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

TEST SUMMARY

BV Labs ID: NXU440
Sample ID: MW3A
Matrix: Water

Collected: 2020/10/17
Shipped:
Received: 2020/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7010242	N/A	2020/10/22	Yogesh Patel
Carbonate, Bicarbonate and Hydroxide	CALC	7008657	N/A	2020/10/22	Automated Statchk
Chloride by Automated Colourimetry	KONE	7010440	N/A	2020/10/22	Deonarine Ramnarine
Conductivity	AT	7010248	N/A	2020/10/22	Yogesh Patel
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7010554	N/A	2020/10/21	Nimarta Singh
Hardness (calculated as CaCO3)		7008747	N/A	2020/10/21	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	7010389	2020/10/20	2020/10/21	Arefa Dabhad
Ion Balance (% Difference)	CALC	7007735	N/A	2020/10/22	Automated Statchk
Anion and Cation Sum	CALC	7007736	N/A	2020/10/22	Automated Statchk
Total Ammonia-N	LACH/NH4	7012945	N/A	2020/10/22	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7010775	N/A	2020/10/21	Chandra Nandlal
pH	AT	7010261	2020/10/20	2020/10/22	Yogesh Patel
Orthophosphate	KONE	7010447	N/A	2020/10/22	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	7007618	N/A	2020/10/22	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7007619	N/A	2020/10/22	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7010446	N/A	2020/10/22	Deonarine Ramnarine
Total Dissolved Solids (TDS calc)	CALC	7007620	N/A	2020/10/22	Automated Statchk

BV Labs ID: NXU441
Sample ID: MW3B
Matrix: Water

Collected: 2020/10/17
Shipped:
Received: 2020/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7010308	N/A	2020/10/21	Yogesh Patel
Carbonate, Bicarbonate and Hydroxide	CALC	7008657	N/A	2020/10/22	Automated Statchk
Chloride by Automated Colourimetry	KONE	7010440	N/A	2020/10/22	Deonarine Ramnarine
Conductivity	AT	7010324	N/A	2020/10/21	Yogesh Patel
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7010554	N/A	2020/10/21	Nimarta Singh
Hardness (calculated as CaCO3)		7008747	N/A	2020/10/21	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	7010389	2020/10/20	2020/10/21	Arefa Dabhad
Ion Balance (% Difference)	CALC	7007735	N/A	2020/10/22	Automated Statchk
Anion and Cation Sum	CALC	7007736	N/A	2020/10/22	Automated Statchk
Total Ammonia-N	LACH/NH4	7012945	N/A	2020/10/22	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7010775	N/A	2020/10/21	Chandra Nandlal
pH	AT	7010327	2020/10/20	2020/10/21	Yogesh Patel
Orthophosphate	KONE	7010447	N/A	2020/10/22	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	7007618	N/A	2020/10/22	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7007619	N/A	2020/10/22	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7010446	N/A	2020/10/22	Deonarine Ramnarine
Total Dissolved Solids (TDS calc)	CALC	7007620	N/A	2020/10/22	Automated Statchk

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BV Labs Job #: C0R4597
Report Date: 2020/10/23

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

TEST SUMMARY

BV Labs ID: NXU442
Sample ID: SW1
Matrix: Water

Collected: 2020/10/17
Shipped:
Received: 2020/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7010308	N/A	2020/10/21	Yogesh Patel
Carbonate, Bicarbonate and Hydroxide	CALC	7008657	N/A	2020/10/22	Automated Statchk
Chloride by Automated Colourimetry	KONE	7010440	N/A	2020/10/22	Deonarine Ramnarine
Conductivity	AT	7010324	N/A	2020/10/21	Yogesh Patel
Hardness (calculated as CaCO3)		7007508	N/A	2020/10/21	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	7010325	2020/10/20	2020/10/21	Medhat Nasr
Lab Filtered Metals by ICPMS	ICP/MS	7010389	2020/10/20	2020/10/21	Arefa Dabhad
Total Metals Analysis by ICPMS	ICP/MS	7014865	N/A	2020/10/23	Arefa Dabhad
Total Ammonia-N	LACH/NH4	7012945	N/A	2020/10/22	Amanpreet Sappal
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7010775	N/A	2020/10/21	Chandra Nandlal
pH	AT	7010327	2020/10/20	2020/10/21	Yogesh Patel
Orthophosphate	KONE	7010447	N/A	2020/10/22	Alina Dobreanu
Sat. pH and Langelier Index (@ 20C)	CALC	7007618	N/A	2020/10/22	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7007619	N/A	2020/10/22	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7010446	N/A	2020/10/22	Deonarine Ramnarine
Total Dissolved Solids (TDS calc)	CALC	7007620	N/A	2020/10/22	Automated Statchk
Total Organic Carbon (TOC)	TOCV/NDIR	7011987	N/A	2020/10/22	Nimarta Singh
Total Phosphorus (Colourimetric)	LACH/P	7012446	2020/10/21	2020/10/22	Shivani Shivani
Turbidity	AT	7010563	N/A	2020/10/21	Viorica Rotaru

BV Labs ID: NXU442 Dup
Sample ID: SW1
Matrix: Water

Collected: 2020/10/17
Shipped:
Received: 2020/10/19

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Lab Filtered Metals by ICPMS	ICP/MS	7010389	2020/10/20	2020/10/21	Arefa Dabhad
Turbidity	AT	7010563	N/A	2020/10/21	Viorica Rotaru

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BV Labs Job #: C0R4597
Report Date: 2020/10/23

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

GENERAL COMMENTS

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

Package 1	5.0°C

Results relate only to the items tested.

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BV Labs Job #: C0R4597
Report Date: 2020/10/23

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

			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
7010242	Alkalinity (Total as CaCO3)	2020/10/21			96	85 - 115	<1.0	mg/L	0.97	20		
7010248	Conductivity	2020/10/21			99	85 - 115	<1.0	umho/cm	0	25		
7010261	pH	2020/10/21			102	98 - 103			0.74	N/A		
7010308	Alkalinity (Total as CaCO3)	2020/10/21			97	85 - 115	<1.0	mg/L	0.75	20		
7010324	Conductivity	2020/10/21			98	85 - 115	<1.0	umho/cm	0	25		
7010325	Dissolved Calcium (Ca)	2020/10/21	105	80 - 120	103	80 - 120	<0.05	mg/L	0.42	25		
7010325	Dissolved Magnesium (Mg)	2020/10/21	101	80 - 120	98	80 - 120	<0.05	mg/L	0.47	25		
7010325	Dissolved Potassium (K)	2020/10/21	102	80 - 120	100	80 - 120	<1	mg/L	NC	25		
7010325	Dissolved Sodium (Na)	2020/10/21	101	80 - 120	100	80 - 120	<0.5	mg/L	0.020	25		
7010327	pH	2020/10/21			102	98 - 103			0.61	N/A		
7010389	Dissolved Aluminum (Al)	2020/10/21	102	80 - 120	103	80 - 120	<4.9	ug/L	NC	20		
7010389	Dissolved Antimony (Sb)	2020/10/21	104	80 - 120	101	80 - 120	<0.50	ug/L	NC	20		
7010389	Dissolved Arsenic (As)	2020/10/21	99	80 - 120	100	80 - 120	<1.0	ug/L	NC	20		
7010389	Dissolved Barium (Ba)	2020/10/21	101	80 - 120	101	80 - 120	<2.0	ug/L	1.6	20		
7010389	Dissolved Beryllium (Be)	2020/10/21	97	80 - 120	95	80 - 120	<0.40	ug/L	NC	20		
7010389	Dissolved Bismuth (Bi)	2020/10/21	95	80 - 120	95	80 - 120	<1.0	ug/L	NC	20		
7010389	Dissolved Boron (B)	2020/10/21	92	80 - 120	93	80 - 120	<10	ug/L	NC	20		
7010389	Dissolved Cadmium (Cd)	2020/10/21	101	80 - 120	99	80 - 120	<0.090	ug/L	NC	20		
7010389	Dissolved Calcium (Ca)	2020/10/21	100	80 - 120	100	80 - 120	<200	ug/L	0.051	20		
7010389	Dissolved Chromium (Cr)	2020/10/21	94	80 - 120	95	80 - 120	<5.0	ug/L	NC	20		
7010389	Dissolved Cobalt (Co)	2020/10/21	98	80 - 120	100	80 - 120	<0.50	ug/L	NC	20		
7010389	Dissolved Copper (Cu)	2020/10/21	105	80 - 120	103	80 - 120	<0.90	ug/L	NC	20		
7010389	Dissolved Iron (Fe)	2020/10/21	97	80 - 120	99	80 - 120	<100	ug/L	NC	20		
7010389	Dissolved Lead (Pb)	2020/10/21	97	80 - 120	97	80 - 120	<0.50	ug/L	NC	20		
7010389	Dissolved Lithium (Li)	2020/10/21	102	80 - 120	103	80 - 120	<5.0	ug/L	NC	20		
7010389	Dissolved Magnesium (Mg)	2020/10/21	94	80 - 120	100	80 - 120	<50	ug/L	0.41	20		
7010389	Dissolved Manganese (Mn)	2020/10/21	98	80 - 120	101	80 - 120	<2.0	ug/L	NC	20		
7010389	Dissolved Molybdenum (Mo)	2020/10/21	98	80 - 120	96	80 - 120	<0.50	ug/L	NC	20		
7010389	Dissolved Nickel (Ni)	2020/10/21	95	80 - 120	98	80 - 120	<1.0	ug/L	8.7	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
7010389	Dissolved Phosphorus (P)	2020/10/21	97	80 - 120	115	80 - 120	<100	ug/L	0.34	20		
7010389	Dissolved Potassium (K)	2020/10/21	103	80 - 120	103	80 - 120	<200	ug/L	1.4	20		
7010389	Dissolved Selenium (Se)	2020/10/21	98	80 - 120	100	80 - 120	<2.0	ug/L	NC	20		
7010389	Dissolved Silicon (Si)	2020/10/21	102	80 - 120	102	80 - 120	<50	ug/L	0.11	20		
7010389	Dissolved Silver (Ag)	2020/10/21	95	80 - 120	93	80 - 120	<0.090	ug/L	NC	20		
7010389	Dissolved Sodium (Na)	2020/10/21	95	80 - 120	99	80 - 120	<100	ug/L	0.39	20		
7010389	Dissolved Strontium (Sr)	2020/10/21	99	80 - 120	101	80 - 120	<1.0	ug/L	0.84	20		
7010389	Dissolved Tellurium (Te)	2020/10/21	105	80 - 120	103	80 - 120	<1.0	ug/L	NC	20		
7010389	Dissolved Thallium (Tl)	2020/10/21	102	80 - 120	98	80 - 120	<0.050	ug/L	NC	20		
7010389	Dissolved Tin (Sn)	2020/10/21	104	80 - 120	100	80 - 120	<1.0	ug/L	NC	20		
7010389	Dissolved Titanium (Ti)	2020/10/21	101	80 - 120	100	80 - 120	<5.0	ug/L	NC	20		
7010389	Dissolved Tungsten (W)	2020/10/21	98	80 - 120	93	80 - 120	<1.0	ug/L	NC	20		
7010389	Dissolved Uranium (U)	2020/10/21	98	80 - 120	99	80 - 120	<0.10	ug/L	6.1	20		
7010389	Dissolved Vanadium (V)	2020/10/21	98	80 - 120	98	80 - 120	<0.50	ug/L	NC	20		
7010389	Dissolved Zinc (Zn)	2020/10/21	97	80 - 120	100	80 - 120	<5.0	ug/L	NC	20		
7010389	Dissolved Zirconium (Zr)	2020/10/21	105	80 - 120	103	80 - 120	<1.0	ug/L	NC	20		
7010440	Dissolved Chloride (Cl-)	2020/10/22	84	80 - 120	104	80 - 120	<1.0	mg/L	2.2	20		
7010446	Dissolved Sulphate (SO4)	2020/10/22	125	75 - 125	102	80 - 120	<1.0	mg/L	2.3	20		
7010447	Orthophosphate (P)	2020/10/22	NC	75 - 125	99	80 - 120	<0.010	mg/L	0	25		
7010554	Dissolved Organic Carbon	2020/10/21	92	80 - 120	97	80 - 120	<0.40	mg/L	3.4	20		
7010563	Turbidity	2020/10/21			110	85 - 115	<0.1	NTU	2.8	20		
7010775	Nitrate (N)	2020/10/21	97	80 - 120	100	80 - 120	<0.10	mg/L	3.7	20		
7010775	Nitrite (N)	2020/10/21	91	80 - 120	105	80 - 120	<0.010	mg/L	NC	20		
7011987	Total Organic Carbon (TOC)	2020/10/22	91	80 - 120	97	80 - 120	<0.40	mg/L	3.0	20		
7012446	Total Phosphorus	2020/10/22	95	80 - 120	100	80 - 120	<0.004	mg/L	NC	20	95	80 - 120
7012945	Total Ammonia-N	2020/10/22	89	75 - 125	105	80 - 120	<0.050	mg/L	0.32	20		
7014865	Total Aluminum (Al)	2020/10/23	105	80 - 120	102	80 - 120	<4.9	ug/L	NC	20		
7014865	Total Antimony (Sb)	2020/10/23	103	80 - 120	101	80 - 120	<0.50	ug/L	NC	20		
7014865	Total Arsenic (As)	2020/10/23	98	80 - 120	98	80 - 120	<1.0	ug/L	NC	20		
7014865	Total Barium (Ba)	2020/10/23	101	80 - 120	99	80 - 120	<2.0	ug/L				
7014865	Total Beryllium (Be)	2020/10/23	105	80 - 120	105	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
7014865	Total Boron (B)	2020/10/23	97	80 - 120	99	80 - 120	<10	ug/L				
7014865	Total Cadmium (Cd)	2020/10/23	98	80 - 120	98	80 - 120	<0.090	ug/L	NC	20		
7014865	Total Calcium (Ca)	2020/10/23	123 (1)	80 - 120	97	80 - 120	<200	ug/L				
7014865	Total Chromium (Cr)	2020/10/23	96	80 - 120	96	80 - 120	<5.0	ug/L	NC	20		
7014865	Total Cobalt (Co)	2020/10/23	95	80 - 120	97	80 - 120	<0.50	ug/L	NC	20		
7014865	Total Copper (Cu)	2020/10/23	96	80 - 120	101	80 - 120	<0.90	ug/L	NC	20		
7014865	Total Iron (Fe)	2020/10/23	95	80 - 120	98	80 - 120	<100	ug/L	NC	20		
7014865	Total Lead (Pb)	2020/10/23	95	80 - 120	97	80 - 120	<0.50	ug/L	NC	20		
7014865	Total Magnesium (Mg)	2020/10/23	98	80 - 120	100	80 - 120	<50	ug/L				
7014865	Total Manganese (Mn)	2020/10/23	96	80 - 120	97	80 - 120	<2.0	ug/L	NC	20		
7014865	Total Molybdenum (Mo)	2020/10/23	98	80 - 120	96	80 - 120	<0.50	ug/L	13	20		
7014865	Total Nickel (Ni)	2020/10/23	94	80 - 120	96	80 - 120	<1.0	ug/L	NC	20		
7014865	Total Potassium (K)	2020/10/23	100	80 - 120	98	80 - 120	<200	ug/L				
7014865	Total Selenium (Se)	2020/10/23	105	80 - 120	104	80 - 120	<2.0	ug/L	NC	20		
7014865	Total Silicon (Si)	2020/10/23	99	80 - 120	96	80 - 120	<50	ug/L				
7014865	Total Silver (Ag)	2020/10/23	91	80 - 120	93	80 - 120	<0.090	ug/L	NC	20		
7014865	Total Sodium (Na)	2020/10/23	86	80 - 120	96	80 - 120	<100	ug/L				
7014865	Total Strontium (Sr)	2020/10/23	97	80 - 120	94	80 - 120	<1.0	ug/L				
7014865	Total Thallium (Tl)	2020/10/23	97	80 - 120	98	80 - 120	<0.050	ug/L				
7014865	Total Titanium (Ti)	2020/10/23	99	80 - 120	97	80 - 120	<5.0	ug/L	NC	20		
7014865	Total Vanadium (V)	2020/10/23	96	80 - 120	94	80 - 120	<0.50	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
7014865	Total Zinc (Zn)	2020/10/23	97	80 - 120	98	80 - 120	<5.0	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.

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BV Labs Job #: C0R4597
Report Date: 2020/10/23

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Ewa Pranjic, M.Sc., C.Chem, Scientific 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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Presence of Visible Particulate/Sediment

Maxxam Analytics
CAM ECD 0101375
Page 1 of 1

When there is >1cm of visible particulate/sediment, the amount will be recorded in the field below

	Sample ID	All	Bottle Types: Inorganics					Organics										Hydrocarbons							Volatiles				Other
			CrVI	CN	General	Hg	Metals (Diss.)	Organic 1 of 2	Organic 2 of 2	PCB 1 of 2	PCB 2 of 2	Pest/ Herb 1 of 2	Pest/ Herb 2 of 2	VOC/ AEN 1 of 2	VOC/ ABN 2 of 2	PAH 1 of 2	PAH 2 of 2	Dioxin /Furan	F1 Vial 1	F1 Vial 2	F1 Vial 3	F1 Vial 4	F2-F4 1 of 2	F2-F4 2 of 2	F4G	VOC Vial 1	VOC Vial 2	VOC Vial 3	VOC Vial 4	NH4
1	MW3A	S			3.8		15																						20
2	MW5B	S																											
3	SW1	S																											
4																													
5																													
6																													
7																													
8																													
9																													
10																													

Comments:

Legend:
P	Suspended Particulate
TS	Trace Settled Sediment (less than 1cm accumulation on bottom)
S	Settled Sediment greater than 1cm accumulation on bottom

Recorded By: (Signature/Print) AS DeSouza 2020/10/19

CHAIN OF CUSTODY RECORD

INVOICE TO:

Company Name: #28124 exp Services Inc
Attention: Accounts Payable
Address: 15701 Robin's Hill Rd Unit 2, London ON N5V 0A5
Tel: (519) 963-3000 Fax: (519) 963-1152
Email: AP@exp.com, karen.Burke@exp.com, Lo-Ellen.Mitton

REPORT TO

Company Name: EXP
Attention: Mark Bureau
Address:
Tel: Fax:
Email: Mark.Bureau@exp.com

PROJECT INFORMATION

Quotation #: B91718
P.O. #:
Project: KCH-00260285-A0
Project Name:
Site #: 1470 Highbury Avenue
Sampled By: M. Bureau

Laboratory Use Only:

BV Labs Job #:
Bottle Order #:
COC #:
Project Manager:

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)

☐ Table 1 ☐ Res/Park ☐ Medium/Fine
☐ Table 2 ☐ Ind/Comm ☐ Coarse
☐ Tab # 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)? ____

ANALYSIS REQUESTED (PLEASE BE SPECIFIC)

Field Filtered (please circle): Metals / Hg / Cr VI

	Sample Barcode Label	Sample Location / Identification	Date Sampled	Time Sampled	Matrix	BTEX	PHC F1	PHC F2-F4	# of Bottles	Comments
1		MW3			GW	V			4	
2		MW5			GW	V			4	
3		SW1			SW		X	X	5	
4					SW					
5										
6										
7										
8										
9										
10										

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 W.D. no 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 #)

19-Oct-20 09:15
Christine Gripton
C0R4597
DJN ENV-916

REC'D IN LONDON

RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time
				2020/10/19	09:15
				20/10/19	12:49

jars used and not submitted

Laboratory Use Only

Time Sensitive | Temperature: 5/3.5 °C | Custody Seal Present | Yes | No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. 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

Bureau Veritas Canada (2019) Inc.

Your Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Your C.O.C. #: 817256-01-01

Attention: Heather Jaggard

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

Report Date: 2021/03/24
Report #: R6567860
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BV LABS JOB #: C172774
Received: 2021/03/17, 15:40

Sample Matrix: Water
Samples Received: 3

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Alkalinity	3	N/A	2021/03/19	CAM SOP-00448	SM 23 2320 B m
Carbonate, Bicarbonate and Hydroxide	3	N/A	2021/03/22	CAM SOP-00102	APHA 4500-CO2 D
Chloride by Automated Colourimetry	3	N/A	2021/03/23	CAM SOP-00463	SM 23 4500-Cl E m
Conductivity	3	N/A	2021/03/19	CAM SOP-00414	SM 23 2510 m
Dissolved Organic Carbon (DOC) (1)	2	N/A	2021/03/19	CAM SOP-00446	SM 23 5310 B m
Hardness (calculated as CaCO3)	2	N/A	2021/03/23	CAM SOP 00102/00408/00447	SM 2340 B
Hardness (calculated as CaCO3)	1	N/A	2021/03/24	CAM SOP 00102/00408/00447	SM 2340 B
Lab Filtered Metals Analysis by ICP	1	2021/03/19	2021/03/23	CAM SOP-00408	EPA 6010D m
Lab Filtered Metals by ICPMS	2	2021/03/19	2021/03/22	CAM SOP-00447	EPA 6020B m
Lab Filtered Metals by ICPMS	1	2021/03/19	2021/03/23	CAM SOP-00447	EPA 6020B m
Total Metals Analysis by ICPMS	1	N/A	2021/03/22	CAM SOP-00447	EPA 6020B m
Ion Balance (% Difference)	2	N/A	2021/03/23		
Anion and Cation Sum	2	N/A	2021/03/23		
Total Ammonia-N	3	N/A	2021/03/22	CAM SOP-00441	USGS I-2522-90 m
Nitrate (NO3) and Nitrite (NO2) in Water (2)	3	N/A	2021/03/19	CAM SOP-00440	SM 23 4500-NO3I/NO2B
pH	3	2021/03/19	2021/03/19	CAM SOP-00413	SM 4500H+ B m
Orthophosphate	3	N/A	2021/03/22	CAM SOP-00461	EPA 365.1 m
Sat. pH and Langelier Index (@ 20C)	2	N/A	2021/03/23		Auto Calc
Sat. pH and Langelier Index (@ 20C)	1	N/A	2021/03/24		Auto Calc
Sat. pH and Langelier Index (@ 4C)	2	N/A	2021/03/23		Auto Calc
Sat. pH and Langelier Index (@ 4C)	1	N/A	2021/03/24		Auto Calc
Sulphate by Automated Colourimetry	3	N/A	2021/03/22	CAM SOP-00464	EPA 375.4 m
Total Dissolved Solids (TDS calc)	2	N/A	2021/03/23		Auto Calc
Total Dissolved Solids (TDS calc)	1	N/A	2021/03/24		Auto Calc
Total Organic Carbon (TOC) (3)	1	N/A	2021/03/20	CAM SOP-00446	SM 23 5310B m
Total Phosphorus (Colourimetric)	1	2021/03/22	2021/03/24	CAM SOP-00407	SM 23 4500 P B H m
Turbidity	1	N/A	2021/03/19	CAM SOP-00417	SM 23 2130 B m

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Remarks:

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.

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

Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

Your Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Your C.O.C. #: 817256-01-01

Attention: Heather Jaggard

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Encryption Key

AUTHORIZED REPORT
RAPPORT AUTORISÉ

Bureau Veritas
24 Mar 2021 17:08:55

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.
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Microbiology testing is conducted at 6660 Campobello Rd. Chemistry testing is conducted at 6740 Campobello Rd.

BV Labs Job #: C172774
Report Date: 2021/03/24

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

RCAP - COMPREHENSIVE (LAB FILTERED)

BV Labs ID		PCN802	PCN803		
Sampling Date		2021/03/17	2021/03/17		
COC Number		817256-01-01	817256-01-01		
	UNITS	MW3B	MW3A	RDL	QC Batch
Calculated Parameters					
Anion Sum	me/L	7.82	6.92	N/A	7255601
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	290	260	1.0	7254542
Calculated TDS	mg/L	420	370	1.0	7255604
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.2	3.4	1.0	7254542
Cation Sum	me/L	7.97	7.07	N/A	7255601
Hardness (CaCO3)	mg/L	350	290	1.0	7254512
Ion Balance (% Difference)	%	0.960	1.08	N/A	7255095
Langelier Index (@ 20C)	N/A	0.962	0.966		7255602
Langelier Index (@ 4C)	N/A	0.714	0.717		7255603
Saturation pH (@ 20C)	N/A	6.95	7.18		7255602
Saturation pH (@ 4C)	N/A	7.19	7.43		7255603
Inorganics					
Total Ammonia-N	mg/L	<0.050	<0.050	0.050	7256954
Conductivity	umho/cm	760	680	1.0	7256367
Dissolved Organic Carbon	mg/L	2.3	0.91	0.40	7256881
Orthophosphate (P)	mg/L	<0.010	<0.010	0.010	7256525
pH	pH	7.91	8.15		7256369
Dissolved Sulphate (SO4)	mg/L	27	28	1.0	7256524
Alkalinity (Total as CaCO3)	mg/L	290	260	1.0	7256364
Dissolved Chloride (Cl-)	mg/L	42	41	1.0	7256520
Nitrite (N)	mg/L	0.011	<0.010	0.010	7256379
Nitrate (N)	mg/L	2.99	<0.10	0.10	7256379
Nitrate + Nitrite (N)	mg/L	3.01	<0.10	0.10	7256379
Metals					
Dissolved Aluminum (Al)	ug/L	7.3	<4.9	4.9	7256889
Dissolved Antimony (Sb)	ug/L	<0.50	<0.50	0.50	7256889
Dissolved Arsenic (As)	ug/L	<1.0	<1.0	1.0	7256889
Dissolved Barium (Ba)	ug/L	99	130	2.0	7256889
Dissolved Beryllium (Be)	ug/L	<0.40	<0.40	0.40	7256889
Dissolved Boron (B)	ug/L	18	51	10	7256889
Dissolved Cadmium (Cd)	ug/L	<0.090	<0.090	0.090	7256889

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

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BV Labs Job #: C172774
Report Date: 2021/03/24

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

RCAP - COMPREHENSIVE (LAB FILTERED)

BV Labs ID		PCN802	PCN803		
Sampling Date		2021/03/17	2021/03/17		
COC Number		817256-01-01	817256-01-01		
	UNITS	MW3B	MW3A	RDL	QC Batch
Dissolved Calcium (Ca)	ug/L	110000	69000	200	7256889
Dissolved Chromium (Cr)	ug/L	<5.0	<5.0	5.0	7256889
Dissolved Cobalt (Co)	ug/L	<0.50	<0.50	0.50	7256889
Dissolved Copper (Cu)	ug/L	2.5	1.1	0.90	7256889
Dissolved Iron (Fe)	ug/L	<100	<100	100	7256889
Dissolved Lead (Pb)	ug/L	<0.50	<0.50	0.50	7256889
Dissolved Magnesium (Mg)	ug/L	20000	29000	50	7256889
Dissolved Manganese (Mn)	ug/L	<2.0	3.3	2.0	7256889
Dissolved Molybdenum (Mo)	ug/L	<0.50	6.9	0.50	7256889
Dissolved Nickel (Ni)	ug/L	2.5	1.0	1.0	7256889
Dissolved Phosphorus (P)	ug/L	<100	<100	100	7256889
Dissolved Potassium (K)	ug/L	1500	4100	200	7256889
Dissolved Selenium (Se)	ug/L	<2.0	<2.0	2.0	7256889
Dissolved Silicon (Si)	ug/L	4600	6400	50	7256889
Dissolved Silver (Ag)	ug/L	<0.090	<0.090	0.090	7256889
Dissolved Sodium (Na)	ug/L	20000	26000	100	7256889
Dissolved Strontium (Sr)	ug/L	310	340	1.0	7256889
Dissolved Thallium (Tl)	ug/L	<0.050	<0.050	0.050	7256889
Dissolved Titanium (Ti)	ug/L	<5.0	<5.0	5.0	7256889
Dissolved Uranium (U)	ug/L	0.66	0.26	0.10	7256889
Dissolved Vanadium (V)	ug/L	<0.50	<0.50	0.50	7256889
Dissolved Zinc (Zn)	ug/L	<5.0	<5.0	5.0	7256889

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C172774
Report Date: 2021/03/24

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

RCAP - SURFACE WATER (WATER)

BV Labs ID		PCN804		
Sampling Date		2021/03/17		
COC Number		817256-01-01		
	UNITS	SW1	RDL	QC Batch
Calculated Parameters				
Bicarb. Alkalinity (calc. as CaCO3)	mg/L	310	1.0	7254542
Calculated TDS	mg/L	450	1.0	7255604
Carb. Alkalinity (calc. as CaCO3)	mg/L	2.7	1.0	7254542
Hardness (CaCO3)	mg/L	360	1.0	7254512
Langelier Index (@ 20C)	N/A	1.04		7255602
Langelier Index (@ 4C)	N/A	0.794		7255603
Saturation pH (@ 20C)	N/A	6.92		7255602
Saturation pH (@ 4C)	N/A	7.16		7255603
Inorganics				
Total Ammonia-N	mg/L	<0.050	0.050	7256890
Conductivity	umho/cm	830	1.0	7256367
Total Organic Carbon (TOC)	mg/L	3.8	0.40	7256983
Orthophosphate (P)	mg/L	<0.010	0.010	7256525
pH	pH	7.96		7256369
Total Phosphorus	mg/L	0.014	0.004	7259451
Dissolved Sulphate (SO4)	mg/L	23	1.0	7256524
Turbidity	NTU	1.6	0.1	7256493
Alkalinity (Total as CaCO3)	mg/L	320	1.0	7256364
Dissolved Chloride (Cl-)	mg/L	59	1.0	7256520
Nitrite (N)	mg/L	<0.010	0.010	7256379
Nitrate (N)	mg/L	<0.10	0.10	7256379
Metals				
Dissolved Calcium (Ca)	mg/L	110	0.05	7254919
Dissolved Magnesium (Mg)	mg/L	21	0.05	7254919
Dissolved Potassium (K)	mg/L	2	1	7254919
Dissolved Sodium (Na)	mg/L	35	0.5	7254919
Total Aluminum (Al)	ug/L	9.0	4.9	7260294
Total Antimony (Sb)	ug/L	<0.50	0.50	7260294
Total Arsenic (As)	ug/L	<1.0	1.0	7260294
Total Barium (Ba)	ug/L	77	2.0	7260294
Total Beryllium (Be)	ug/L	<0.40	0.40	7260294
Total Boron (B)	ug/L	22	10	7260294

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C172774
Report Date: 2021/03/24

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

RCAP - SURFACE WATER (WATER)

BV Labs ID		PCN804		
Sampling Date		2021/03/17		
COC Number		817256-01-01		
	UNITS	SW1	RDL	QC Batch
Total Cadmium (Cd)	ug/L	<0.090	0.090	7260294
Total Calcium (Ca)	ug/L	110000	200	7260294
Total Chromium (Cr)	ug/L	<5.0	5.0	7260294
Total Cobalt (Co)	ug/L	<0.50	0.50	7260294
Total Copper (Cu)	ug/L	<0.90	0.90	7260294
Total Iron (Fe)	ug/L	310	100	7260294
Total Lead (Pb)	ug/L	<0.50	0.50	7260294
Total Magnesium (Mg)	ug/L	21000	50	7260294
Total Manganese (Mn)	ug/L	49	2.0	7260294
Total Molybdenum (Mo)	ug/L	<0.50	0.50	7260294
Total Nickel (Ni)	ug/L	<1.0	1.0	7260294
Total Potassium (K)	ug/L	1700	200	7260294
Total Selenium (Se)	ug/L	<2.0	2.0	7260294
Total Silicon (Si)	ug/L	4500	50	7260294
Total Silver (Ag)	ug/L	<0.090	0.090	7260294
Total Sodium (Na)	ug/L	34000	100	7260294
Total Strontium (Sr)	ug/L	350	1.0	7260294
Total Thallium (Tl)	ug/L	<0.050	0.050	7260294
Total Titanium (Ti)	ug/L	<5.0	5.0	7260294
Total Vanadium (V)	ug/L	<0.50	0.50	7260294
Total Zinc (Zn)	ug/L	<5.0	5.0	7260294

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		PCN804		
Sampling Date		2021/03/17		
COC Number		817256-01-01		
	UNITS	SW1	RDL	QC Batch
Metals				
Dissolved Aluminum (Al)	ug/L	<4.9	4.9	7256889
Dissolved Antimony (Sb)	ug/L	<0.50	0.50	7256889
Dissolved Arsenic (As)	ug/L	<1.0	1.0	7256889
Dissolved Barium (Ba)	ug/L	76	2.0	7256889
Dissolved Beryllium (Be)	ug/L	<0.40	0.40	7256889
Dissolved Bismuth (Bi)	ug/L	<1.0	1.0	7256889
Dissolved Boron (B)	ug/L	26	10	7256889
Dissolved Cadmium (Cd)	ug/L	<0.090	0.090	7256889
Dissolved Calcium (Ca)	ug/L	110000	200	7256889
Dissolved Chromium (Cr)	ug/L	<5.0	5.0	7256889
Dissolved Cobalt (Co)	ug/L	<0.50	0.50	7256889
Dissolved Copper (Cu)	ug/L	<0.90	0.90	7256889
Dissolved Iron (Fe)	ug/L	<100	100	7256889
Dissolved Lead (Pb)	ug/L	<0.50	0.50	7256889
Dissolved Lithium (Li)	ug/L	<5.0	5.0	7256889
Dissolved Magnesium (Mg)	ug/L	21000	50	7256889
Dissolved Manganese (Mn)	ug/L	45	2.0	7256889
Dissolved Molybdenum (Mo)	ug/L	<0.50	0.50	7256889
Dissolved Nickel (Ni)	ug/L	<1.0	1.0	7256889
Dissolved Phosphorus (P)	ug/L	<100	100	7256889
Dissolved Potassium (K)	ug/L	1700	200	7256889
Dissolved Selenium (Se)	ug/L	<2.0	2.0	7256889
Dissolved Silicon (Si)	ug/L	4700	50	7256889
Dissolved Silver (Ag)	ug/L	<0.090	0.090	7256889
Dissolved Sodium (Na)	ug/L	34000	100	7256889
Dissolved Strontium (Sr)	ug/L	340	1.0	7256889
Dissolved Tellurium (Te)	ug/L	<1.0	1.0	7256889
Dissolved Thallium (Tl)	ug/L	<0.050	0.050	7256889
Dissolved Tin (Sn)	ug/L	<1.0	1.0	7256889
Dissolved Titanium (Ti)	ug/L	<5.0	5.0	7256889
Dissolved Tungsten (W)	ug/L	<1.0	1.0	7256889
Dissolved Uranium (U)	ug/L	0.63	0.10	7256889

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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BV Labs Job #: C172774
Report Date: 2021/03/24

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

BV Labs ID		PCN804		
Sampling Date		2021/03/17		
COC Number		817256-01-01		
	UNITS	SW1	RDL	QC Batch
Dissolved Vanadium (V)	ug/L	<0.50	0.50	7256889
Dissolved Zinc (Zn)	ug/L	<5.0	5.0	7256889
Dissolved Zirconium (Zr)	ug/L	<1.0	1.0	7256889

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QC Batch = Quality Control Batch

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BV Labs Job #: C172774
Report Date: 2021/03/24

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

TEST SUMMARY

BV Labs ID: PCN802
Sample ID: MW3B
Matrix: Water

Collected: 2021/03/17
Shipped:
Received: 2021/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7256364	N/A	2021/03/19	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7254542	N/A	2021/03/22	Automated Statchk
Chloride by Automated Colourimetry	KONE	7256520	N/A	2021/03/23	Deonarine Ramnarine
Conductivity	AT	7256367	N/A	2021/03/19	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7256881	N/A	2021/03/19	Nimarta Singh
Hardness (calculated as CaCO3)		7254512	N/A	2021/03/23	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	7256889	2021/03/19	2021/03/23	Nan Raykha
Ion Balance (% Difference)	CALC	7255095	N/A	2021/03/23	Automated Statchk
Anion and Cation Sum	CALC	7255601	N/A	2021/03/23	Automated Statchk
Total Ammonia-N	LACH/NH4	7256954	N/A	2021/03/22	Alina Dobreanu
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7256379	N/A	2021/03/19	Chandra Nandlal
pH	AT	7256369	2021/03/19	2021/03/19	Surinder Rai
Orthophosphate	KONE	7256525	N/A	2021/03/22	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7255602	N/A	2021/03/23	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7255603	N/A	2021/03/23	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7256524	N/A	2021/03/22	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7255604	N/A	2021/03/23	Automated Statchk

BV Labs ID: PCN803
Sample ID: MW3A
Matrix: Water

Collected: 2021/03/17
Shipped:
Received: 2021/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7256364	N/A	2021/03/19	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7254542	N/A	2021/03/22	Automated Statchk
Chloride by Automated Colourimetry	KONE	7256520	N/A	2021/03/23	Deonarine Ramnarine
Conductivity	AT	7256367	N/A	2021/03/19	Surinder Rai
Dissolved Organic Carbon (DOC)	TOCV/NDIR	7256881	N/A	2021/03/19	Nimarta Singh
Hardness (calculated as CaCO3)		7254512	N/A	2021/03/23	Automated Statchk
Lab Filtered Metals by ICPMS	ICP/MS	7256889	2021/03/19	2021/03/22	Nan Raykha
Ion Balance (% Difference)	CALC	7255095	N/A	2021/03/23	Automated Statchk
Anion and Cation Sum	CALC	7255601	N/A	2021/03/23	Automated Statchk
Total Ammonia-N	LACH/NH4	7256954	N/A	2021/03/22	Alina Dobreanu
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7256379	N/A	2021/03/19	Chandra Nandlal
pH	AT	7256369	2021/03/19	2021/03/19	Surinder Rai
Orthophosphate	KONE	7256525	N/A	2021/03/22	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7255602	N/A	2021/03/23	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7255603	N/A	2021/03/23	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7256524	N/A	2021/03/22	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7255604	N/A	2021/03/23	Automated Statchk

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BV Labs Job #: C172774
Report Date: 2021/03/24

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

TEST SUMMARY

BV Labs ID: PCN804
Sample ID: SW1
Matrix: Water

Collected: 2021/03/17
Shipped:
Received: 2021/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Alkalinity	AT	7256364	N/A	2021/03/19	Surinder Rai
Carbonate, Bicarbonate and Hydroxide	CALC	7254542	N/A	2021/03/22	Automated Statchk
Chloride by Automated Colourimetry	KONE	7256520	N/A	2021/03/23	Deonarine Ramnarine
Conductivity	AT	7256367	N/A	2021/03/19	Surinder Rai
Hardness (calculated as CaCO3)		7254512	N/A	2021/03/24	Automated Statchk
Lab Filtered Metals Analysis by ICP	ICP	7254919	2021/03/19	2021/03/23	Suban Kanapathippillai
Lab Filtered Metals by ICPMS	ICP/MS	7256889	2021/03/19	2021/03/22	Nan Raykha
Total Metals Analysis by ICPMS	ICP/MS	7260294	N/A	2021/03/22	Daniel Teclu
Total Ammonia-N	LACH/NH4	7256890	N/A	2021/03/22	Alina Dobreanu
Nitrate (NO3) and Nitrite (NO2) in Water	LACH	7256379	N/A	2021/03/19	Chandra Nandlal
pH	AT	7256369	2021/03/19	2021/03/19	Surinder Rai
Orthophosphate	KONE	7256525	N/A	2021/03/22	Avneet Kour Sudan
Sat. pH and Langelier Index (@ 20C)	CALC	7255602	N/A	2021/03/24	Automated Statchk
Sat. pH and Langelier Index (@ 4C)	CALC	7255603	N/A	2021/03/24	Automated Statchk
Sulphate by Automated Colourimetry	KONE	7256524	N/A	2021/03/22	Avneet Kour Sudan
Total Dissolved Solids (TDS calc)	CALC	7255604	N/A	2021/03/24	Automated Statchk
Total Organic Carbon (TOC)	TOCV/NDIR	7256983	N/A	2021/03/20	Nimarta Singh
Total Phosphorus (Colourimetric)	LACH/P	7259451	2021/03/22	2021/03/24	Shivani Shivani
Turbidity	AT	7256493	N/A	2021/03/19	Neil Dassanayake

BV Labs ID: PCN804 Dup
Sample ID: SW1
Matrix: Water

Collected: 2021/03/17
Shipped:
Received: 2021/03/17

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Total Phosphorus (Colourimetric)	LACH/P	7259451	2021/03/22	2021/03/24	Shivani Shivani

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BV Labs Job #: C172774
Report Date: 2021/03/24

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

GENERAL COMMENTS

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

Package 1	5.3°C

Results relate only to the items tested.

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BV Labs Job #: C172774
Report Date: 2021/03/24

QUALITY ASSURANCE REPORT

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

			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
7254919	Dissolved Calcium (Ca)	2021/03/23	64 (1)	80 - 120	97	80 - 120	<0.05	mg/L	0.42	25		
7254919	Dissolved Magnesium (Mg)	2021/03/23	91	80 - 120	97	80 - 120	<0.05	mg/L	0.060	25		
7254919	Dissolved Potassium (K)	2021/03/23	96	80 - 120	96	80 - 120	<1	mg/L	0.10	25		
7254919	Dissolved Sodium (Na)	2021/03/23	83	80 - 120	96	80 - 120	<0.5	mg/L	0.10	25		
7256364	Alkalinity (Total as CaCO3)	2021/03/19			92	85 - 115	<1.0	mg/L	0.26	20		
7256367	Conductivity	2021/03/19			102	85 - 115	<1.0	umho/cm	0.78	25		
7256369	pH	2021/03/19			102	98 - 103			0.18	N/A		
7256379	Nitrate (N)	2021/03/19	98	80 - 120	99	80 - 120	<0.10	mg/L	6.6	20		
7256379	Nitrite (N)	2021/03/19	104	80 - 120	105	80 - 120	<0.010	mg/L	4.4	20		
7256493	Turbidity	2021/03/19			98	85 - 115	<0.1	NTU	2.7	20		
7256520	Dissolved Chloride (Cl-)	2021/03/23	118	80 - 120	103	80 - 120	<1.0	mg/L	1.6	20		
7256524	Dissolved Sulphate (SO4)	2021/03/22	111	75 - 125	101	80 - 120	<1.0	mg/L	0.0015	20		
7256525	Orthophosphate (P)	2021/03/22	112	75 - 125	102	80 - 120	<0.010	mg/L	17	25		
7256881	Dissolved Organic Carbon	2021/03/19	92	80 - 120	99	80 - 120	<0.40	mg/L	2.3	20		
7256889	Dissolved Aluminum (Al)	2021/03/22	104	80 - 120	99	80 - 120	<4.9	ug/L				
7256889	Dissolved Antimony (Sb)	2021/03/22	106	80 - 120	101	80 - 120	<0.50	ug/L	NC	20		
7256889	Dissolved Arsenic (As)	2021/03/22	97	80 - 120	97	80 - 120	<1.0	ug/L				
7256889	Dissolved Barium (Ba)	2021/03/22	101	80 - 120	100	80 - 120	<2.0	ug/L				
7256889	Dissolved Beryllium (Be)	2021/03/22	98	80 - 120	99	80 - 120	<0.40	ug/L	NC	20		
7256889	Dissolved Bismuth (Bi)	2021/03/22	89	80 - 120	99	80 - 120	<1.0	ug/L				
7256889	Dissolved Boron (B)	2021/03/22	98	80 - 120	95	80 - 120	<10	ug/L	2.8	20		
7256889	Dissolved Cadmium (Cd)	2021/03/22	99	80 - 120	99	80 - 120	<0.090	ug/L				
7256889	Dissolved Calcium (Ca)	2021/03/22	121 (1)	80 - 120	97	80 - 120	<200	ug/L				
7256889	Dissolved Chromium (Cr)	2021/03/22	98	80 - 120	97	80 - 120	<5.0	ug/L				
7256889	Dissolved Cobalt (Co)	2021/03/22	97	80 - 120	99	80 - 120	<0.50	ug/L	NC	20		
7256889	Dissolved Copper (Cu)	2021/03/22	104	80 - 120	101	80 - 120	<0.90	ug/L	0	20		
7256889	Dissolved Iron (Fe)	2021/03/22	96	80 - 120	97	80 - 120	<100	ug/L				
7256889	Dissolved Lead (Pb)	2021/03/22	91	80 - 120	97	80 - 120	<0.50	ug/L	NC	20		
7256889	Dissolved Lithium (Li)	2021/03/22	NC	80 - 120	104	80 - 120	<5.0	ug/L				
7256889	Dissolved Magnesium (Mg)	2021/03/22	101	80 - 120	98	80 - 120	<50	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
7256889	Dissolved Manganese (Mn)	2021/03/22	99	80 - 120	99	80 - 120	<2.0	ug/L				
7256889	Dissolved Molybdenum (Mo)	2021/03/22	107	80 - 120	101	80 - 120	<0.50	ug/L	1.6	20		
7256889	Dissolved Nickel (Ni)	2021/03/22	93	80 - 120	96	80 - 120	<1.0	ug/L	NC	20		
7256889	Dissolved Phosphorus (P)	2021/03/22	114	80 - 120	105	80 - 120	<100	ug/L				
7256889	Dissolved Potassium (K)	2021/03/22	105	80 - 120	102	80 - 120	<200	ug/L				
7256889	Dissolved Selenium (Se)	2021/03/22	94	80 - 120	97	80 - 120	<2.0	ug/L				
7256889	Dissolved Silicon (Si)	2021/03/22	107	80 - 120	100	80 - 120	<50	ug/L				
7256889	Dissolved Silver (Ag)	2021/03/22	96	80 - 120	99	80 - 120	<0.090	ug/L				
7256889	Dissolved Sodium (Na)	2021/03/22	NC	80 - 120	96	80 - 120	<100	ug/L	1.1	20		
7256889	Dissolved Strontium (Sr)	2021/03/22	75 (1)	80 - 120	98	80 - 120	<1.0	ug/L				
7256889	Dissolved Tellurium (Te)	2021/03/22	100	80 - 120	100	80 - 120	<1.0	ug/L				
7256889	Dissolved Thallium (Tl)	2021/03/22	92	80 - 120	98	80 - 120	<0.050	ug/L				
7256889	Dissolved Tin (Sn)	2021/03/22	104	80 - 120	101	80 - 120	<1.0	ug/L				
7256889	Dissolved Titanium (Ti)	2021/03/22	102	80 - 120	97	80 - 120	<5.0	ug/L				
7256889	Dissolved Tungsten (W)	2021/03/22	97	80 - 120	97	80 - 120	<1.0	ug/L				
7256889	Dissolved Uranium (U)	2021/03/22	94	80 - 120	96	80 - 120	<0.10	ug/L				
7256889	Dissolved Vanadium (V)	2021/03/22	103	80 - 120	99	80 - 120	<0.50	ug/L	NC	20		
7256889	Dissolved Zinc (Zn)	2021/03/22	93	80 - 120	97	80 - 120	<5.0	ug/L				
7256889	Dissolved Zirconium (Zr)	2021/03/22	111	80 - 120	103	80 - 120	<1.0	ug/L				
7256890	Total Ammonia-N	2021/03/22	100	75 - 125	101	80 - 120	<0.050	mg/L	3.5	20		
7256954	Total Ammonia-N	2021/03/22	100	75 - 125	100	80 - 120	<0.050	mg/L	6.1	20		
7256983	Total Organic Carbon (TOC)	2021/03/19	99	80 - 120	96	80 - 120	<0.40	mg/L	5.2	20		
7259451	Total Phosphorus	2021/03/24	96	80 - 120	104	80 - 120	<0.004	mg/L	2.1	20	97	80 - 120
7260294	Total Aluminum (Al)	2021/03/22	162 (1)	80 - 120	100	80 - 120	<4.9	ug/L				
7260294	Total Antimony (Sb)	2021/03/22	104	80 - 120	102	80 - 120	<0.50	ug/L				
7260294	Total Arsenic (As)	2021/03/22	98	80 - 120	98	80 - 120	<1.0	ug/L				
7260294	Total Barium (Ba)	2021/03/22	98	80 - 120	100	80 - 120	<2.0	ug/L				
7260294	Total Beryllium (Be)	2021/03/22	105	80 - 120	104	80 - 120	<0.40	ug/L				
7260294	Total Boron (B)	2021/03/22	98	80 - 120	98	80 - 120	<10	ug/L				
7260294	Total Cadmium (Cd)	2021/03/22	100	80 - 120	101	80 - 120	<0.090	ug/L				
7260294	Total Calcium (Ca)	2021/03/22	91	80 - 120	98	80 - 120	<200	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
7260294	Total Chromium (Cr)	2021/03/22	97	80 - 120	98	80 - 120	<5.0	ug/L				
7260294	Total Cobalt (Co)	2021/03/22	96	80 - 120	99	80 - 120	<0.50	ug/L				
7260294	Total Copper (Cu)	2021/03/22	102	80 - 120	105	80 - 120	<0.90	ug/L				
7260294	Total Iron (Fe)	2021/03/22	96	80 - 120	98	80 - 120	<100	ug/L				
7260294	Total Lead (Pb)	2021/03/22	95	80 - 120	97	80 - 120	<0.50	ug/L				
7260294	Total Magnesium (Mg)	2021/03/22	94	80 - 120	102	80 - 120	<50	ug/L				
7260294	Total Manganese (Mn)	2021/03/22	95	80 - 120	99	80 - 120	<2.0	ug/L	1.8	20		
7260294	Total Molybdenum (Mo)	2021/03/22	103	80 - 120	101	80 - 120	<0.50	ug/L				
7260294	Total Nickel (Ni)	2021/03/22	94	80 - 120	97	80 - 120	<1.0	ug/L				
7260294	Total Potassium (K)	2021/03/22	103	80 - 120	103	80 - 120	<200	ug/L				
7260294	Total Selenium (Se)	2021/03/22	98	80 - 120	98	80 - 120	<2.0	ug/L				
7260294	Total Silicon (Si)	2021/03/22	100	80 - 120	97	80 - 120	<50	ug/L				
7260294	Total Silver (Ag)	2021/03/22	99	80 - 120	101	80 - 120	<0.090	ug/L				
7260294	Total Sodium (Na)	2021/03/22	86	80 - 120	102	80 - 120	<100	ug/L				
7260294	Total Strontium (Sr)	2021/03/22	102	80 - 120	97	80 - 120	<1.0	ug/L				
7260294	Total Thallium (Tl)	2021/03/22	98	80 - 120	99	80 - 120	<0.050	ug/L				
7260294	Total Titanium (Ti)	2021/03/22	105	80 - 120	94	80 - 120	<5.0	ug/L				
7260294	Total Vanadium (V)	2021/03/22	100	80 - 120	100	80 - 120	<0.50	ug/L				
7260294	Total Zinc (Zn)	2021/03/22	99	80 - 120	104	80 - 120	<5.0	ug/L				

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.

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BV Labs Job #: C172774
Report Date: 2021/03/24

exp Services Inc
Client Project #: KCH-00260285-A0
Site Location: 1470 Highbury Avenue
Sampler Initials: M.B

VALIDATION SIGNATURE PAGE

The analytical data and all QC contained in this report were reviewed and validated by the following individual(s).

Anastassia Hamanov, Scientific Specialist

Ewa Pranjic, M.Sc., C.Chem, Scientific 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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Bureau Veritas Laboratories

CHAIN OF CUSTODY RECORD

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:		Laboratory Use Only:	
Company Name	#28124 exp Services Inc	Company Name		Quotation #	B91718	BV Labs Job #:	Bottle Order #:
Attention	Accounts Payable	Attention		P.O. #			
Address	15701 Robin's Hill Rd Unit 2	Address		Project	KCH-00260285-A0	COC #:	Project Manager
	London ON N5V 0A5			Project Name			
Tel	(519) 963-3000 Fax (519) 963-1152	Tel	Fax	Site #	1470 Highbury Avenue		
Email	AP@exp.com, karen.Burke@exp.com, Lo-Ellen.Mitton	Email		Sampled By			

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 ☐ Med/Fine ☐ Table 2 ☐ Ind/Comm ☐ Coarse ☐ Table 3 ☐ Agri/Other ☐ For RSC ☐ Table ___	☐ CCME ☐ Sanitary Sewer Bylaw ☐ Reg 558 ☐ Storm Sewer Bylaw ☐ MISA Municipality ___ ☒ PWQO ☐ Reg 406 Table ___ ☐ Other ___	

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

ANALYSIS REQUESTED (PLEASE BE SPECIFIC): Field Filtered (please circle): Metals / Hg / Cr VI

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	# of Bottles	Comments
1		[illegible]	[illegible]	[illegible]	GW	[illegible]	[illegible]
2		[illegible]			GW	[illegible]	
3		[illegible]			SW	[illegible]	
4							
5							
6							
7							
8							
9							
10							ON ICE

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 #)

17-Mar-21 15:40
Christine Gripton
C172774

* 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
[illegible]	[illegible]	3:35	C. Gripton	21/03/17	1540		Temperature (°C) on Receipt: 3/6/7°C
			[illegible]	[illegible]	[illegible]		Custody Seal: Present / Intact — Yes / No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BV LABS' STANDARD TERMS AND CONDITIONS. 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

Appendix K – Water Balance Assessment

-LEGEND-

- Approximate Site Boundary (15974 sq m)
- Area 1 (8036 sq m)
- Area 2 (7938 sq m)

Image Source: Google Earth Pro (July 2018); City of London Digital Mapping (2017)

Hydrogeological Assessment

Proposed Development

1470-1474 Highbury Ave. North, London, Ontario

CLIENT	Copia Developments
TITLE	Site Drainage Areas
Prepared By: J.M.	Reviewed By: H.B.

EXP Services Inc.
15701 Robin's Hill Road, London, ON, N5V 0A5

DATE	APPROXIMATE SCALE	PROJECT NO.	DWG.
JULY 2021	1:2,000	KCH-00260285-A0	K-1

Project Name: 1470-1474 Highbury Ave. N
Project Number: KCH-00260285
Client: Copia Developments

Monthly Water Balance

TABLE K1 - PRE-DEVELOPMENT WATER BALANCE CALCULATIONS

AREA 1 - Drains to North	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)
Urban Lawn	721	4,578	**8,036**	Fine Sand	A	50	0.8	3.3	-10.0	0.92
Forested Area	0	2,737		Fine Sand	A	250	0.9			

	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	
URBAN LAWN (Pervious Area)													
Estimated Actual Evapotranspiration (mm/month)	8.9	10.8	20.3	38.4	70.3	102.6	109.1	83.7	56.3	30.5	16.0	10.0	556.9
Surplus (mm/month)	36.5	49.1	82.0	67.6	19.5	-10.9	-26.4	-0.8	46.7	50.8	82.0	58.6	454.6
Estimated Runoff (mm/month)	36.5	49.1	49.2	13.5	3.9	0.0	0.0	0.0	9.3	10.2	16.4	58.6	246.6
Estimated Infiltration (mm/month)	0.0	0.0	32.8	54.1	15.6	0.0	0.0	0.0	37.4	40.6	65.6	0.0	246.1
Estimated Actual Evapotranspiration (m^3/month)	**41**	**49**	**93**	**176**	**322**	**470**	**499**	**383**	**258**	**140**	**73**	**46**	**2549**
Estimated Runoff (m^3/month)	**167**	**225**	**225**	**62**	**18**	**0**	**0**	**0**	**43**	**47**	**75**	**268**	**1129**
Estimated Infiltration (m^3/month)	**0**	**0**	**150**	**248**	**71**	**0**	**0**	**0**	**171**	**186**	**300**	**0**	**1126**
URBAN LAWN (Impervious Area)													
Estimated Actual Evapotranspiration (mm/month)	8.2	10.8	18.4	19.1	16.2	16.5	14.9	14.9	18.5	14.6	17.6	12.3	182.1
Surplus (mm/month)	37.2	49.1	83.9	86.9	73.6	75.2	67.8	68.0	84.5	66.7	80.4	56.2	829.4
Estimated Runoff (mm/month)	37.2	49.1	83.9	86.9	73.6	75.2	67.8	68.0	84.5	66.7	80.4	56.2	829.4
Estimated Infiltration (mm/month)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Estimated Actual Evapotranspiration (m^3/month)	**6**	**8**	**13**	**14**	**12**	**12**	**11**	**11**	**13**	**11**	**13**	**9**	**131**
Estimated Runoff (m^3/month)	**27**	**35**	**60**	**63**	**53**	**54**	**49**	**49**	**61**	**48**	**58**	**41**	**598**
Estimated Infiltration (m^3/month)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**
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	45.1	6.8	2.0	0.0	0.0	0.0	4.7	5.1	8.2	58.6	215.9
Estimated Infiltration (mm/month)	0.0	0.0	36.9	60.8	17.6	0.0	0.0	0.0	42.0	45.7	73.8	0.0	276.8
Estimated Actual Evapotranspiration (m^3/month)	**24**	**30**	**56**	**105**	**192**	**281**	**320**	**252**	**154**	**83**	**44**	**27**	**1569**
Estimated Runoff (m^3/month)	**100**	**134**	**123**	**18**	**5**	**0**	**0**	**0**	**13**	**14**	**22**	**160**	**591**
Estimated Infiltration (m^3/month)	**0**	**0**	**101**	**166**	**48**	**0**	**0**	**0**	**115**	**125**	**202**	**0**	**758**
AREA 1 TOTALS													
Estimated Actual Evapotranspiration (m^3/month)	**71**	**87**	**162**	**295**	**526**	**762**	**830**	**646**	**425**	**234**	**130**	**82**	**4249**
Estimated Runoff (m^3/month)	**294**	**394**	**409**	**143**	**76**	**54**	**49**	**49**	**116**	**108**	**155**	**469**	**2318**
Estimated Infiltration (m^3/month)	**0**	**0**	**251**	**414**	**119**	**0**	**0**	**0**	**286**	**311**	**502**	**0**	**1884**

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AREA 2 - Drains to Pond	**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 (do not include Pond as contibuting area) - 847 m2	0	7,092	**7,092**	Fine Sand	A	250		0.8	3.3	-10.0	0.92		
FORESTED AREA													
Initial 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
Initial Runoff (mm/month)	36.5	49.1	49.2	13.5	3.9	0.0	0.0	0.0	9.3	10.2	16.4	58.6	246.6
Estimated Infiltration (mm/month)	0.0	0.0	32.8	54.1	15.6	0.0	0.0	0.0	37.4	40.6	65.6	0.0	246.1
Estimated Actual Evapotranspiration (m^3/month)	**63**	**77**	**144**	**272**	**499**	**728**	**828**	**654**	**399**	**216**	**113**	**71**	**4064**
Estimated Runoff (m^3/month)	**259**	**348**	**349**	**96**	**28**	**0**	**0**	**0**	**66**	**72**	**116**	**415**	**1749**
Estimated Infiltration (m^3/month)	**0**	**0**	**233**	**383**	**111**	**0**	**0**	**0**	**265**	**288**	**465**	**0**	**1745**
AREA 2 TOTALS													
Estimated Actual Evapotranspiration (m^3/month)	**63**	**77**	**144**	**272**	**499**	**728**	**828**	**654**	**399**	**216**	**113**	**71**	**4064**
Estimated Runoff (m^3/month)	**259**	**348**	**349**	**96**	**28**	**0**	**0**	**0**	**66**	**72**	**116**	**415**	**1749**
Estimated Infiltration (m^3/month)	**0**	**0**	**233**	**383**	**111**	**0**	**0**	**0**	**265**	**288**	**465**	**0**	**1745**

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TABLE K2 - POST-DEVELOPMENT WATER BALANCE CALCULATIONS

AREA 1 - Proposed Development Area	**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)**
Urban Lawn	0	1728	**8036**	Fine Sand	A	50	0.8	3.3	-10.0	0.92
Impervious Surfaces	6308	0								

	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	
URBAN LAWN													
Estimated Actual Evapotranspiration (mm/month)	8.9	10.8	20.3	38.4	70.3	102.6	109.1	83.7	56.3	30.5	16.0	10.0	556.9
Surplus (mm/month)	36.5	49.1	82.0	67.6	19.5	-10.9	-26.4	-0.8	46.7	50.8	82.0	58.6	454.6
Estimated Runoff (mm/month)	36.5	49.1	49.2	13.5	3.9	0.0	0.0	0.0	9.3	10.2	16.4	58.6	246.6
Estimated Infiltration (mm/month)	0.0	0.0	32.8	54.1	15.6	0.0	0.0	0.0	37.4	40.6	65.6	0.0	246.1
Estimated Actual Evapotranspiration (m^3/month)	**15**	**19**	**35**	**66**	**121**	**177**	**188**	**145**	**97**	**53**	**28**	**17**	**962**
Estimated Runoff (m^3/month)	**63**	**85**	**85**	**23**	**7**	**0**	**0**	**0**	**16**	**18**	**28**	**101**	**426**
Estimated Infiltration (m^3/month)	**0**	**0**	**57**	**93**	**27**	**0**	**0**	**0**	**65**	**70**	**113**	**0**	**425**
Impervious Surfaces													
Estimated Actual Evapotranspiration (mm/month)	8.2	10.8	18.4	19.1	16.2	16.5	14.9	14.9	18.5	14.6	17.6	12.3	182.1
Estimated Runoff (mm/month)	37.2	49.1	83.9	86.9	73.6	75.2	67.8	68.0	84.5	66.7	80.4	56.2	829.4
Estimated Infiltration (mm/month)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Estimated Actual Evapotranspiration (m^3/month)	**52**	**68**	**116**	**120**	**102**	**104**	**94**	**94**	**117**	**92**	**111**	**78**	1148.5
Estimated Runoff (m^3/month)	**235**	**310**	**529**	**548**	**465**	**474**	**428**	**429**	**533**	**421**	**507**	**355**	5232.3
Estimated Infiltration (m^3/month)	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	0.0
AREA 1 TOTALS													
Estimated Actual Evapotranspiration (m^3/month)	**67**	**87**	**151**	**187**	**223**	**281**	**282**	**239**	**214**	**145**	**139**	**95**	**2111**
Estimated Runoff (m^3/month)	**298**	**394**	**614**	**572**	**471**	**474**	**428**	**429**	**549**	**438**	**535**	**456**	**5658**
Estimated Infiltration (m^3/month)	**0**	**0**	**57**	**93**	**27**	**0**	**0**	**0**	**65**	**70**	**113**	**0**	**425**

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AREA 2 - Area Draining to Pond	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)		
Grassed Landscaped Areas	0	7,092	**7,092**	Fine Sand	A	250		0.8	3.3	-10.0	0.92		
Impermeable Surfaces (Rooftops and Pavements)													
Area Draining to Pond													
Initial 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
Initial Runoff (mm/month)	36.5	49.1	49.2	13.5	3.9	0.0	0.0	0.0	9.3	10.2	16.4	58.6	246.6
Estimated Infiltration (mm/month)	0.0	0.0	32.8	54.1	15.6	0.0	0.0	0.0	37.4	40.6	65.6	0.0	246.1
Estimated Actual Evapotranspiration (m^3/month)	**63**	**77**	**144**	**272**	**499**	**728**	**828**	**654**	**399**	**216**	**113**	**71**	**4064**
Estimated Runoff (m^3/month)	**259**	**348**	**349**	**96**	**28**	**0**	**0**	**0**	**66**	**72**	**116**	**415**	**1749**
Estimated Infiltration (m^3/month)	**0**	**0**	**233**	**383**	**111**	**0**	**0**	**0**	**265**	**288**	**465**	**0**	**1745**
AREA 2 TOTALS													
Estimated Actual Evapotranspiration (m^3/month)	**63**	**77**	**144**	**272**	**499**	**728**	**828**	**654**	**399**	**216**	**113**	**71**	**4064**
Estimated Runoff (m^3/month)	**259**	**348**	**349**	**96**	**28**	**0**	**0**	**0**	**66**	**72**	**116**	**415**	**1749**
Estimated Infiltration (m^3/month)	**0**	**0**	**233**	**383**	**111**	**0**	**0**	**0**	**265**	**288**	**465**	**0**	**1745**

With Mitigation:		
Estimated Runoff	m^3/year	3395
Estimated Infiltration	m^3/year	1557
Runoff reduction		0.4
Effectiveness		0.5

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TABLE K3 - WATER BALANCE SUMMARY

AREA 1 - Drains to North (PRE-DEVELOPMENT)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Totals
AREA 1 TOTALS													
Estimated Actual Evapotranspiration (m3/month)	71	87	162	295	526	762	830	646	425	234	130	82	4118
Estimated Runoff (m3/month)	294	394	409	143	76	54	49	49	116	108	155	469	1720
Estimated Infiltration (m3/month)	0	0	251	414	119	0	0	0	286	311	502	0	1884

AREA 1 - Drains to North - Development Area (POST-DEVELOPMENT)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Totals
AREA 1 TOTALS													
Estimated Actual Evapotranspiration (m3/month)	67	87	151	187	223	281	282	239	214	145	139	95	2111
Estimated Runoff (m3/month)	298	394	614	572	471	474	428	429	549	438	535	456	5658
Estimated Infiltration (m3/month)	0	0	57	93	27	0	0	0	65	70	113	0	425

AREA 2 - Drains to Pond (DOES NOT CHANGE)	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Totals
Estimated Actual Evapotranspiration (m^3/month)	63	77	144	272	499	728	828	654	399	216	113	71	4064
Estimated Runoff (m^3/month)	259	348	349	96	28	0	0	0	66	72	116	415	1749
Estimated Infiltration (m^3/month)	0	0	233	383	111	0	0	0	265	288	465	0	1745

AREA 1 TOTALS	PRE	POST	VOL CHANGE	% CHANGE	Post Mitigation	% Difference with Mitigation
Estimated Runoff (m3/year)	1720	5658	3,938	229%	3395	197%
Estimated Infiltration (m3/year)	1884	425	(1,459)	-77%	1557	83%

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TABLE K4 - 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 impervious areas is the sum of precipitation as rain and snow melt multiplied by a factor of 0.18.

8. Mitigation measures include the redirection of 40% of runoff to LID features

LIMITATIONS AND USE OF REPORT

BASIS OF REPORT

This report ("Report") is based on site conditions known or inferred by the hydrogeological investigation undertaken as of the date of the Report. Should changes occur which potentially impact the hydrogeological 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.

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