Hydrogeological Investigation

159-163 Sulphur Springs Road, Ancaster

Mizrahi Developments

Prepared by:

SLR Consulting (Canada) Ltd.

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SLR Project No.: 243.24373.00001

Client Reference No: 1

December 6, 2024

Revision Record

Revision	Date	Prepared By	Checked By	Authorized By
1	December 6, 2024	Nolan Boyes	Jason Cole	Jason Cole

Statement of Limitations

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Executive Summary

SLR is pleased to submit the attached report describing the results of our Hydrogeological Investigation for the proposed residential development at 159 – 163 Sulphur Springs Road, Ancaster (the "Site"). The Site is currently occupied by rural residential homes, forested areas, and two ponds. The proposed development includes detached homes, townhomes, road access, open space, park lands, and naturalized areas.

This investigation determined the Site is underlain by coarse-textured glaciolacustrine soil made up primarily of sand and silt. Groundwater levels at the Site were found to be shallow, with water levels ranging from -0.02 to 4.32 metres below ground surface (mbgs). Negative groundwater levels indicate the groundwater is at or above surface.

A Source Water Protection screening was conducted and determined that the development area is within a Significant Groundwater Recharge Area (SGRA) with a vulnerability score of "Not Applicable" (N/A). Due to the vulnerability score of N/A, no development or recharge related constraints are anticipated, however maintaining the pre-development infiltration rates, post-development through the use of Low Impact Development (LID) measures is expected to be required.

A pre-to-post development water balance was completed for the site to determine infiltration and runoff targets. The pre-development infiltration and runoff values were 19,822 m^3/yr and 16,764 m^3/yr respectively. The proposed development added approximately 2.41 ha of imperviousness to the Site. The post-development infiltration and runoff values were 14,675 m^3/yr and 33,563 m^3/yr respectively. This represents a decrease in infiltration by 5,148 m^3/yr (-26%) and an increase in runoff by 16,799 m^3/yr (+100%). Although no recharge policies are applicable on Site, to use of best practice measures such as infiltration-based LIDs to increase infiltration are recommended in this report.

Thank you for the opportunity to work with your team on this project. Please let us know if you have questions or comments on this submission. This report is subject to the Statement of Limitations preceding this summary.

Yours truly,

Nolan Boyes, M.Sc., P.Geo.

Hydrogeologist

Table of Contents

Tables in Text

Figures in Text

Appendices

1.0 Introduction

SLR was retained by Mizrahi Developments (the "Client") to conduct a Hydrogeological Investigation at 159 -163 Sulphur Springs Road, Ancaster, ON (the "Site") (**Figure 1**). The Site is currently occupied by rural residential homes, forested areas, and two ponds. The proposed development includes detached homes, townhomes, road access, open space, park lands, and naturalized areas. The proposed Site plan can be found in **Appendix A**.

This Hydrogeological Investigation is focused on characterizing geological and hydrogeological conditions at the Site and completing pre-to-post development water balance assessment based on the current Site plan. Pre-to-post development infiltration and runoff values will be provided to inform Stormwater Management (SWM) design and Low Impact Development (LID) measures will be recommended based on soil/ groundwater conditions. Hydrogeological related constraints and construction considerations will also be provided.

1.1 Study Objectives

This Hydrogeological Investigation was completed concurrently with the SLR Geotechnical Investigation. The scope of work included for the Hydrogeological Investigation is provided below:

- Document applicable Site background information including surficial geology, physiography, and hydrostratigraphy;
- Install and develop eight (8) groundwater monitoring wells across the Site;
- Complete two (2) groundwater monitoring events to determine the groundwater levels on Site;
- Complete single well response testing (i.e., slug tests) to estimate hydraulic conductivity at select monitoring wells;
- Collect one (1) groundwater quality sample and compare groundwater chemistry to Ontario Drinking Water Standards (ODWS) to establish existing conditions;
- Complete a pre-and-post development water balance assessment to identify infiltration and runoff targets; and
- Prepare a Hydrogeological Investigation report summarizing the soil and groundwater conditions, groundwater levels and flow direction, water balance targets, impact assessment, and hydrogeological constraints.

2.0 Site Setting

2.1 Existing Use

The Site currently hosts rural residential homes, forested area, and two ponds. The Site is surrounded by a mix of urban and rural residences to the west and south, and forested area to the east and north. The northern forested area is associated with the Dundas Valley Conservation Area.

2.2 Environmental Features and Drainage

The Site is located within the Spencer Creek Watershed, within the Sulphur Creek subwatershed. Almost the entirety of the Sulphur Creek subwatershed is located within the Town of Ancaster. The Sulphur Creek subwatershed is approximately 17 km^2 that originates on

LEGEND:

- MONITORING WELL
- BOREHOLE
- WATERCOURSE [1]
- SUBJECT SITE

KEY MAP

NOTES:

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SERVICE LAYER CREDITS: CITY OF HAMILTON, PROVINCE OF ONTARIO, ESRI CANADA, ESRI, TOMTOM, GARMIN, SAFEGRAPH, FAO, METI/NASA, USGS, EPA, NPS, USFWS, NRCAN, PARKS CANADA

1. LIO/MNRF

0 20 40 80 120 160 200 m

SCALE 1:3,200
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 17N

THIS MAP IS FOR CONCEPTUAL PURPOSES ONLY AND SHOULD NOT BE USED FOR NAVIGATION

MIZRAHI DEVELOPMENTS
159 - 163 SULPHUR SPRINGS,
ANCASTER, ON

HYDROGEOLOGICAL INVESTIGATION

SITE MAP

SLR

FIGURE NO:
1

DATE: November 29, 2024

PROJECT NO: 244.024373.00003

the border of the Dundas Valley where it drains east ultimately discharging into Hamilton Harbor (HCA, 2010). Sulphur Creek is located approximately 1km north of the Site boundary.

The Site shows a topographic peak near the southern boundary of the Site, and slopes downwards towards the northern boundary. Two ponds are located within the Site boundary. A small pond located near the southern boundary of the Site, and a large pond located at the northern Site boundary. Both ponds show outlets that flow east out of the Site boundary, which eventually flow north towards Sulphur Creek. Both ponds are interpreted to be anthropogenic.

2.3 Physiography and Geology

The Site is located primarily within the Norfolk Sand Plain physiographic region (Chapman and Putnam, 1984). This region is described as a plain of silts and sands that extends southwest towards Lake Erie. The sands of this plain are usually well drained and discharge into nearby streams and creeks. A small portion of the northern part of the Site, including the northern pond, is with the Niagara Escarpment physiographic region. The Niagara Escarpment is the most dominant physiographic feature within the Hamilton Region and extends from the Niagara River to the Bruce Peninsula. The escarpment separates the Site from a significant elevation drop into the Dundas valley, where several creeks within the watershed flow to ultimately discharge into Hamilton Harbor.

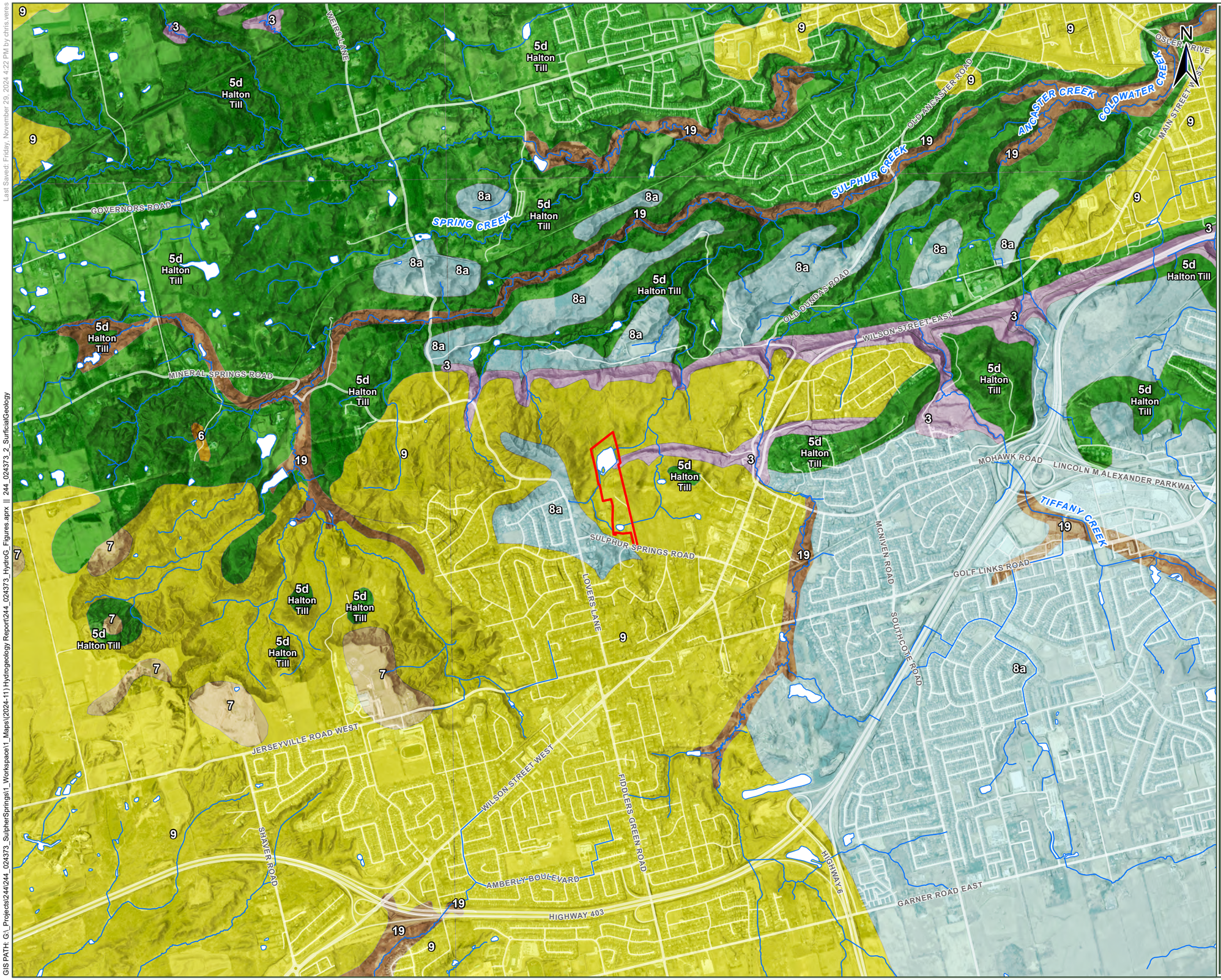
The surficial geology of the area as described by the Ontario Geological Survey (OGS) mapping (**Figure 2**) represents coarse-textured glaciolacustrine deposits including gravels, sands, silts and minor clays. Based on the borehole drilling program, the Site was found to be predominantly underlain by silts rather than sands, but is generally consistent with OGS mapping.

2.4 Hydrogeology

Hydrostratigraphic units can be subdivided into two distinct groups based on their ability to allow groundwater movement: an aquifer and an aquitard. An aquifer is defined as a layer of soil that is permeable enough to permit a usable supply of water to be extracted. An aquitard is a layer of soil that inhibits groundwater movement due to its low permeability. The major regional hydrostratigraphic units that control groundwater at or near the Site are described below:

Coarse-Textured Glaciolacustrine Deposits consisting of sand, gravel, silt and minor clay make up the surficial geologic unit at the Site. This unit typically has a high permeability and therefore forms a surficial aquifer within the Site boundary where horizontal groundwater flow towards groundwater discharge areas is expected. Soils may be less permeable when higher proportions of silt are present in the deposit. As previously described, silt was found to be the dominant soil types underlying the Site.

The **Guelph Formation** makes up the bedrock unit below the glaciolacustrine deposit. This unit is made up of tan colored medium to fine crystalline structured dolostone. This formation is not well exposed within the Niagara escarpment, and often runs parallel to the escarpment (Armstrong and Dodge, 2007). The Guelph Formation typically acts as a bedrock aquifer unit, however, where unfractured, may locally act as an aquiclude below the unconfined glaciolacustrine aquifer.



LEGEND:

- WATERCOURSE [1]
- SUBJECT SITE

SURFICIAL GEOLOGY[2]

PHANEROZOIC / CENOZOIC / QUATERNARY / RECENT

- 19: MODERN ALLUVIAL DEPOSITS *(CLAY, SILT, SAND, GRAVEL, MAY CONTAIN ORGANIC REMAINS)*

PHANEROZOIC / CENOZOIC / QUATERNARY / PLEISTOCENE

- 9: COARSE-TEXTURED GLACIOLACUSTRINE DEPOSITS *(SAND, GRAVEL, MINOR SILT AND CLAY)*
- 8A: FINE-TEXTURED GLACIOLACUSTRINE DEPOSITS *(MASSIVE-WELL LAMINATED)*
- 7: GLACIOFLUVIAL DEPOSITS *(RIVER DEPOSITS AND DELTA TOPSET FACIES)*
- 6: ICE-CONTACT STRATIFIED DEPOSITS *(SAND AND GRAVEL, MINOR SILT, CLAY AND TILL)*
- 5D: TILLL *(CLAY TO SILT-TEXTURED TILL [DERIVED FROM GLACIOLACUSTRINE DEPOSITS OR SHALE])*

PHANEROZOIC / PALEOZOIC

- 3: PALEOZOIC BEDROCK

NOTES:

IMAGERY (2021) FROM CITY OF HAMILTON GIS MAP SERVICE. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENSE – ONTARIO.

1. LIO/MNRF
2. ONTARIO GEOLOGICAL SURVEY 2010 (MAPPED AT 1:50,000). SURFICIAL GEOLOGY OF SOUTHERN ONTARIO; ONTARIO GEOLOGICAL SURVEY. MISCELLANEOUS RELEASE- DATA 128 - REVISED

0 100 200 400 600 800 1,000 m

SCALE 1:25,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 17N

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MIZRAHI DEVELOPMENTS
159 - 163 SULPHUR SPRINGS,
ANCASTER, ON

HYDROGEOLOGICAL INVESTIGATION

SURFICIAL GEOLOGY

SLR

FIGURE NO:
2

DATE: December 2, 2024

PROJECT NO: 244.024373.00003

2.5 Source Water Protection

The Site is in the Hamilton Region Source Protection Area. Each Source Water Protection Plan identifies three main regulatory factors under the *Clean Water Act (2006)* relating to local hydrogeology to consider for Site development: Significant Groundwater Recharge Areas (SGRAs), Highly Vulnerable Aquifers (HVAs), and Wellhead Protection Areas (WHPAs). Source Water Protection mapping for the Site is provided in **Figure 3**. Based on available Source Water Protection mapping, the Site is within a SGRA with a vulnerability score of N/A.

This low vulnerability score suggests meeting pre-development infiltration is likely not required on this Site, however, recharge is recommended to be maintained to the best extent possible. The Site is also within a HVA. Based on the proposed development, this designation will not pose constraints on the development plan.

2.6 MECP Water Well Records

Based on a review of the MECP Water Well Records (WWR) database, 12 wells are present within a 500 m radius of the Site (**Figure 4**). Of these, four (4) are for domestic supply use, three (3) are for monitoring, three (3) are not used, one (1) is for irrigation and one (1) us unknown. The summary of the well uses can be seen in **Table 1**. The depths of the wells ranges from 3.6 to 41.1 meters below ground surface (mbgs) with an average depth of 20.2 mbgs. Water levels within these wells range from 0.6 to 18.3 mbgs.

The depths of the domestic wells range from 7.9 to 20.4 mbgs with an average depth of 15.5 mbgs. Three of these wells are deep drilled wells with one being a shallow bored well. The drilled wells obtain water from the bedrock aquifer below, while the shallow bored well obtains water from the shallow sand aquifer.

Table 1. MECP Water Well Records

Well ID	Year Completed	Well Depth (mbgs)	Static Water Level (mbgs)	Casing Diameter (m)	Well Use
6801892	1956-04-17	36.6	18.3	0.15	Monitoring
6801893	1963-02-08	35.7	-	-	Not Used
6801895	1964-09-03	17.1	11.0	0.15	Domestic
6801897	1956-06-07	23.8	0.6	0.25	Unknown
6807846	1971-06-15	16.5	8.8	0.15	Domestic
6810629	1983-12-08	41.1	12.2	0.15	Not Used
6810792	1984-09-03	20.4	2.4	0.15	Domestic
7105076	2008-01-31	-	-	0.05	Monitoring
7118650	2008-11-07	7.9	-	1.2	Domestic
7125697	2009-07-01	15.2	3.2	0.15	Irrigation
7234460	2014-10-15	3.6	-	-	Not Used
7337872	2019-04-12	4.6	-	0.05	Monitoring

Note: If a "-" is used there is no available data.

PRIVATE ROAD

SULPHUR CREEK TRIBUTARY

MILLCREEK COURT

OLD DUNDAS ROAD

ONTARIO STREET

ANCASTER CREEK

ROUSSEAUX STREET

BH24-7A

BH24-7

BH24-6

BH24-8

BH24-5

BH24-4

BH24-3

BH24-2

BH24-9

BH24-10

BH24-1

SULPHUR SPRINGS ROAD

TINDER LANE

WOODVIEW CRESCENT

WOODLAND DRIVE

DEERVIEW AVENUE

DEERCREEK DRIVE

WILDERNESS DRIVE

FOXRIDGE DRIVE

FALLING BROOK DRIVE

CRESTVIEW AVENUE

CHATTERSON DRIVE

LLOYMINN AVENUE

WADE ROAD

TEMPLER DRIVE

LOVERS LANE

BROOKVIEW COURT

COLLEEN CRESCENT

MCGREGOR CRESCENT

JOANNE COURT

TERRENCE PARK DRIVE

PARKER AVENUE

MAUREEN AVENUE

JUDITH CRESCENT

MANSFIELD DRIVE

REDING ROAD

WILSON STREET EAST

HALSON STREET

GOLFDALE PLACE

ACADEMY STREET

LODOR STREET

CHURCH STREET

N

LEGEND:

- MONITORING WELL
- BOREHOLE
- WATERCOURSE [1]
- SUBJECT SITE

SOURCE WATER PROTECTION [2]

- SIGNIFICANT GROUNDWATER RECHARGE AREA - SCORE: N/A
- HIGHLY VULNERABLE AQUIFER

NOTES:

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1. LIO/MNRF
2. FROM *SOURCE PROTECTION INFORMATION ATLAS*, MECP © KING'S PRINTER FOR ONTARIO 2024

0 25 50 100 150 200 250 m

SCALE 1:7,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 17N

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MIZRAHI DEVELOPMENTS
159 - 163 SULPHUR SPRINGS,
ANCASTER, ON

HYDROGEOLOGICAL INVESTIGATION

SOURCE WATER PROTECTION

SLR

FIGURE NO:
3

DATE: November 29, 2024

PROJECT NO: 244.024373.00003

PRIVATE ROAD
SULPHUR CREEK TRIBUTARY
MILLCREEK COURT
OLD DUNDAS ROAD
ONTARIO STREET
ANCASTER CREEK
ROUSSEAUX STREET
SULPHUR SPRINGS ROAD
WOODVIEW CRESCENT
TINDER LANE
WOODLAND DRIVE
DEERVIEW AVENUE
DEERCREEK DRIVE
WILDERNESS DRIVE
FOXRIDGE DRIVE
FALLING BROOK DRIVE
LLOYMINN AVENUE
CHATTERSON DRIVE
CRESTVIEW AVENUE
WADE ROAD
TEMPLER DRIVE
LOVERS LANE
BROOKVIEW COURT
COLLEEN CRESCENT
MCGREGOR CRESCENT
JOANNE COURT
TERRENCE PARK DRIVE
PARKER AVENUE
MAUREEN AVENUE
JUDITH CRESCENT
MANSFIELD DRIVE
REDING ROAD
WILSON STREET EAST
HALSON STREET
GOLFDALE PLACE
ACADEMY STREET
LODOR STREET
CHURCH STREET

BH24-7A
BH24-7
BH24-6
BH24-8
BH24-5
BH24-4
BH24-3
BH24-2
BH24-9
BH24-10
BH24-1

6810792
7105076
6801897
7125697
7118650
6801895
6807846
7234460
7337872
6801892
6810629
6801893

N

LEGEND:

- MONITORING WELL
- BOREHOLE
- WATERCOURSE [1]
- SUBJECT SITE
- 500M SITE BUFFER

WATER WELL RECORD[2] WITHIN 500 M

BY WELL USE

- WATER SUPPLY
- TEST WELL/MONITORING WELL
- N/A

NOTES:
IMAGERY (2021) FROM CITY OF HAMILTON GIS MAP SERVICE. CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENSE – ONTARIO.

1. LIO/MNRF
2. MECP

0 25 50 100 150 200 250 m

SCALE 1:7,000
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 17N

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MIZRAHI DEVELOPMENTS
159 - 163 SULPHUR SPRINGS,
ANCASTER, ON

HYDROGEOLOGICAL INVESTIGATION

MECP WATER WELL RECORDS WITHIN 500 M OF SITE

SLR

FIGURE NO:
4

DATE: December 2, 2024

PROJECT NO: 244.024373.00003

3.0 Site Specific Conditions

3.1 Borehole Drilling and Monitoring Well Installation

As part of the Geotechnical Investigation, SLR advanced eleven (11) boreholes between October 31st, 2024, and November 13th, 2024 (BH24-1 to BH24-10, BH24-7A). Of these boreholes, eight (8) were completed as groundwater monitoring wells with 2-inch (0.05 m) diameter PVC casing (BH24-1, BH24-2, BH24-3, BH24-4, BH24-5, BH24-7, BH24-9, BH24-10). The location of the boreholes and monitoring wells are presented on **Figure 1**, and the well installation details are presented in **Table 2**. The well depths ranged from 5.5 to 6.1 mbgs, with screen lengths of 3 m. Borehole logs are presented in **Appendix B**.

Table 2. Monitoring Well Installation Details

Borehole ID	Depth (mbgs)	Elevation (masl)	Screened Depth Interval (mbgs)	Screened Geology	Hydrostratigraphic Unit
BH24-1	6.1	224.6	3.1 – 6.1	Silt / Silty Sand	Coarse-textured Glaciolacustrine
BH24-2	6.1	220.3	3.1 – 6.1	Silt / Silty Sand	Coarse-textured Glaciolacustrine
BH24-3	5.7	221.3	5.7 – 7.2	Sand	Coarse-textured Glaciolacustrine
BH24-4	6.1	221.9	3.1 – 6.1	Silt	Coarse-textured Glaciolacustrine
BH24-5	5.5	214.4	2.5 – 5.5	Silt	Coarse-textured Glaciolacustrine
BH24-7	6.1	196.6	3.1 – 6.1	Sandy Silt / Silt	Coarse-textured Glaciolacustrine
BH24-9	6.1	220.9	3.1 – 6.1	Silt	Coarse-textured Glaciolacustrine
BH24-10	5.5	220.9	2.5 – 5.5	Silt	Coarse-textured Glaciolacustrine

3.1.1 Site Specific Geology

The results of the borehole drilling program are summarized below:

Fill: This unit was identified in all boreholes. This unit was composed of silt, with some sand, some clay, and trace gravel. This unit contained rootlets, was brown to grey, moist to wet, and loose to compact. This unit extended to depths ranging from 0.8 to 2.3 mbgs.

Silt / Sandy Silt: This unit was encountered below fill materials in all boreholes except BH24-6A. This unit contained trace to some sand, trace clay, trace gravel, was brown to grey, moist to wet, and loose to compact. This unit ranged in thickness from 0.3 to 4.6 m and extended to depths of 6.7 mbgs.

Sand / Silty Sand: This unit was generally encountered below silt, or at surface in BH24-1, BH24-2, BH24-3, and BH24-9. This unit contained trace clay, trace gravel, was brown to grey, and was loose to compact. This unit ranged in thickness from 1.1 to 4.1 m and extended to depths of 6.7 mbgs.

3.2 Groundwater Levels and Flow

Groundwater levels were measured by SLR personnel on November 6, 2024, and November 12, 2024. Water levels were measured using a water level tape and recorded to the nearest centimeter. **Table 3** provides the measured water levels and elevations. Groundwater flow based on November 12, 2024 water levels is presented in **Figure 5**. Groundwater flow was found to move northwest towards the northern pond, then northeast towards Hamilton Harbour.

Groundwater levels ranged from -0.02 to 4.32 mbgs and groundwater elevation ranged from 192.28 and 223.33 meters above sea level (masl). There is a steep groundwater elevation decline between BH24-5 and BH24-7, coinciding with the topographic elevation change. Groundwater levels at the site were found to be shallow, with most groundwater levels close to surface. Negative groundwater levels were observed at BH24-2, indicating the groundwater level was above surface.

Table 3. Groundwater Monitoring

Borehole ID	Depth (mbgs)	Elevation (masl)	November 6, 2024		November 12, 2024	
			mbgs	**masl**	**mbgs**	**masl**
BH24-1	6.1	224.6	1.31	223.29	1.27	223.33
BH24-2	6.1	220.3	0	220.30	-0.02	220.32
BH24-3	5.5	221.3	1.53	219.77	1.52	219.78
BH24-4	6.1	221.9	2.31	219.59	2.31	219.59
BH24-5	5.5	214.4	0.44	213.96	0.40	214.00
BH24-7	6.1	196.6	4.31	192.29	4.32	192.28
BH24-9	6.1	220.9	0.36	220.54	0.34	220.56
BH24-10	5.5	220.9	1.03	219.87	1.01	219.89

3.3 Hydraulic Conductivity

SLR personnel conducted single well response testing (SWRT) in select monitoring wells to determine the hydraulic conductivity (K) of the screened units found on the property. Wells were developed prior to the completion of the SWRTs by removing three (3) well volumes from the well, or by purging the well until dry. SWRTs were performed after the wells had recovered.

Rising Head Tests (RHT) were conducted by removing approximately (1) litre of water from wells and monitoring the rising head. The rate of recovery for the RHT was measured using a datalogger installed near the bottom of the well set to record water levels at 1 to 5 second intervals. Manual water-level measurements were also collected during the tests. Tests were terminated once 80% recovery had been attained or after half an hour- whichever occurred first.

Hydraulic conductivity values were calculated from the displacement-time data using the Bouwer and Rice (1976) method for unconfined aquifers, as modelled by Aqtesolv™ software. The analysis results are presented in **Appendix C**, and the range of calculated hydraulic conductivity values are summarized in **Table 4.**

LEGEND:

- MONITORING WELL
- BOREHOLE
- WATERCOURSE [1]
- INFERRED GROUNDWATER CONTOUR *(MASL)*
- INFERRED GROUNDWATER FLOW DIRECTION
- SUBJECT SITE

NOTES:

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CONTAINS INFORMATION LICENSED UNDER THE OPEN GOVERNMENT LICENSE – ONTARIO.

1. LIO/MNRF

0 20 40 80 120 160 200 m

SCALE 1:3,200
PAGE SIZE 11 x 17
NAD 1983 UTM Zone 17N

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MIZRAHI DEVELOPMENTS
159 - 163 SULPHUR SPRINGS,
ANCASTER, ON

HYDROGEOLOGICAL INVESTIGATION

GROUNDWATER FLOW

SLR

FIGURE NO:
5

DATE: December 2, 2024

PROJECT NO: 244.024373.00003

Table 4. Hydraulic Conductivity Values

Borehole ID	Screen Depth (mbgs)	Screened Geology	Hydrostratigraphic Unit	Hydraulic Conductivity (m/s)
BH24-1	3.1 – 6.1	Silt / Silty Sand	Coarse-textured Glaciolacustrine	1.1×10^{-6}
BH24-2	3.1 – 6.1	Silt / Silty Sand	Coarse-textured Glaciolacustrine	1.6×10^{-8}
BH24-4	3.1 – 6.1	Silt	Coarse-textured Glaciolacustrine	1.6×10^{-6}
BH24-5	2.5 – 5.5	Silt	Coarse-textured Glaciolacustrine	2.9×10^{-7}
BH24-7	3.1 – 6.1	Sandy Silt / Silt	Coarse-textured Glaciolacustrine	6.7×10^{-7}
BH24-9	3.1 – 6.1	Silt	Coarse-textured Glaciolacustrine	1.3×10^{-7}
BH24-10	2.5 – 5.5	Silt	Coarse-textured Glaciolacustrine	4.5×10^{-8}

3.4 Grain-Size Analysis

The hydraulic conductivity of the overburden soils was calculated using empirical relationships derived by Sauerbrei (1932) which utilize grain size distribution curves of soil samples. The completed grain size distribution curves are provided in **Appendix D**, and the results of the empirical analyses are provided in **Table 5.**

$$K\ (Sauerbrei, 1932) = \frac{\rho g}{\mu}[(3.75 \times 10^{-5}) \times \tau]\left[\frac{n^3}{(1-n)^2}\right] d_{17}^2\ \frac{cm}{s}$$

Where K = hydraulic conductivity (cm/s)

ρ = 3.1x10-8T3 - 7.0x10-6T2 + 4.19x10-5T + 0.99985

g = 980 cms-2

μ = -7.0x10-8T3 + 1.002x10-5T2 – 5.7x10-4T + 0.0178

τ = 1.093x10-4T2 + 2.102x10-2T + 0.5889

n = porosity as a fraction of aquifer volume

T = water temperature (°C)

Table 5. Grain-Size Empirical Analysis

Borehole ID	Sample	Depth (mbgs)	Geology	Hydrostratigraphic Unit	Hydraulic Conductivity (K) (m/s)
BH24-1	SS5	3.3	Silt	Coarse-textured Glaciolacustrine	4.4×10^{-7}
BH24-2	SS6	4.7	Silty Sand	Coarse-textured Glaciolacustrine	1.5×10^{-5}

Borehole ID	Sample	Depth (mbgs)	Geology	Hydrostratigraphic Unit	Hydraulic Conductivity (K) (m/s)
BH24-3	SS7	6.3	Sand	Coarse-textured Glaciolacustrine	8.8×10^{-6}
BH24-4	SS7	6.3	Silt	Coarse-textured Glaciolacustrine	2.9×10^{-7}
BH24-5	SS4	2.4	Silt	Coarse-textured Glaciolacustrine	5.2×10^{-8}
BH24-7	SS2	0.9	Sandy Silt	Coarse-textured Glaciolacustrine	3.0×10^{-7}
BH24-9	SS6	4.7	Silt	Coarse-textured Glaciolacustrine	6.1×10^{-7}
BH24-10	SS5	3.3	Silt	Coarse-textured Glaciolacustrine	5.1×10^{-8}

3.5 Hydraulic Conductivity Summary

The hydraulic conductivity values were calculated to range from 1.6×10^{-8} to 1.5×10^{-5} m/s, with a geomean of 3.6×10^{-7} m/s. The range in the hydraulic conductivity value is due to the variable composition of sand and silt present in the overburden. Thick sand units were identified in BH24-2 and BH24-3, which is reflected in the grain-size analysis hydraulic conductivity values. These hydraulic conductivity values are lower than anticipated for coarse-textured glaciolacustrine deposits, however, is consistent with the high amount of silt found in the soils.

3.6 Groundwater Chemistry

An unfiltered groundwater sample was collected from BH24-5 on November 12, 2024 to determine the background groundwater quality. This sample was analyzed for a suite of water quality parameters and compared against the both the Aesthetic Ontario Drinking Water Standards (ODWS), and the Biological and Chemical ODWS. The exceedances noted when compared to these criteria are summarized in **Table 6**, and the complete analysis is presented in **Appendix D**.

Groundwater quality was generally good and typical for the area, with exceedances in the Aesthetic ODWS noted for colour, hardness, total dissolved solids, turbidity, aluminum, iron and manganese. The metals exceedances are interpreted to be related to elevated turbidity in the sample and are not considered to be a concern for the Site. Exceedances were also noted for total coliforms and sodium. The presence of coliforms is typical in raw groundwater. The elevated sodium may be related to road salting, an interpretation that is supported by the elevated chloride concentration in the sample, and BH24-5 being adjacent to a road.

Table 6. Groundwater Chemistry Exceedances

Parameters	Aesthetic ODWS	Biological and Chemical ODWS	Lowest Detection Limit	Unit	BH24-5
Physical Tests (Matrix: Water)					
Colour, apparent	5	-	2.0	CU	53.0
Hardness (as CaCO3), from total Ca/Mg	80 -> 100	-	0.50	mg/L	495

Parameters	Aesthetic ODWS	Biological and Chemical ODWS	Lowest Detection Limit	Unit	BH24-5
Solids, total dissolved [TDS]	500	-	10	mg/L	752
Coliforms, Escherichia coli [E. coli]	-	1	1	CFU/100mL	2
Total Metals (Matrix: Water)					
Aluminum, total	0.1	-	0.0030	mg/L	0.228
Iron, total	0.3	-	0.010	mg/L	0.414
Manganese, total	0.05	-	0.00010	mg/L	0.594
Sodium, total	200	20	0.050	mg/L	91.4

4.0 Water Balance Assessment

A pre-to-post water balance assessment was completed for the Site to determine the changes to infiltration and runoff that would be expected based on the proposed development.

4.1 Water Surplus

The water surplus describes the difference between precipitation and evapotranspiration (ET) that is available to contribute to infiltration and runoff. The surplus was calculated using the monthly soil-moisture balance approach as described in Thornthwaite and Mather (1957). A soil moisture storage value of 200 mm was chosen, appropriate for fine-textured soils. Data for average monthly precipitation and temperature was derived from the 1991 – 2020 climate normals from the Hamilton RBG meteorological station. Actual evapotranspiration is calculated based on a potential ET (or PET) and soil-moisture storage withdrawal. Monthly PET is estimated using monthly temperature data and is defined as a water loss from a homogeneous vegetation-covered area that never lacks water (Thornthwaite, 1948; Mather, 1978).

The total yearly precipitation as published by the Hamilton RBG meteorological station from 1991 – 2020 Climate Normals is 902 mm/yr. The calculated actual ET (or AET) based on the Thornthwaite and Mather monthly water balance model is approximately 574 mm within the study area (**Table 7**). The calculated PET for the study area is 622 mm/yr, or about 70% of the total precipitation. The estimated water surplus for the Site area is approximately 329 mm/yr (~36% of the total precipitation).

Table 7. Water Surplus

Parameters	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Year
Precipitation	72.9	53.4	68.7	81.3	81	77.6	97.5	66.8	73.5	84.2	78.1	67.3	902.3
Temperature	-5.3	-5	0.2	6.5	13.1	18.5	20.9	20.1	16.1	9.7	3.8	-1.9	8
Potential Evapotranspiration (PET)	0	0	1	32	79	117	137	121	81	42	12	0	622
P - PET	73	53	68	49	2	-40	-39	-54	-8	42	66	67	280
Change in Soil Moisture Storage	0	0	0	0	0	-36	-27	-26	-3	18	44	0	-30
Soil Moisture Storage	150	150	150	150	150	114	87	61	58	76	120	150	-
Actual Evapotranspiration (AET)	0	0	1	32	79	114	125	93	77	42	12	0	574
Soil Moisture Deficit (mm)	0	0	0	0	0	4	12	28	5	0	0	0	49
Surplus (P - AET)	**73**	**53**	**68**	**49**	**2**	**-36**	**-27**	**-26**	**-3**	**42**	**66**	**67**	**328.6**

4.2 Infiltration Factors

The partitioning of the water surplus between runoff and infiltration depends on soil type, topography, and vegetation cover. Water will infiltrate more easily through sands compared to clays, on flat slopes compared to steep slopes, and through natural vegetated soils compared to agricultural crops or urban areas. The method developed by Bernard (1932) and described by the MOEE (1995) was used to estimate infiltration for the Site

The infiltration factors are described in the MOEE manual and are reproduced here for reference (**Table 8**). The infiltration factor is calculated by adding the individual sub-factors at the Site. The water surplus is then multiplied by the total infiltration factor to determine the partitioning between the amount of runoff and the amount of infiltration that occurs annually. The runoff is the total amount of surplus remaining after considering infiltration or (1) – (infiltration factor) = (runoff factor). This approach takes into consideration the three factors previously stated: soil type, topography, and vegetation cover. The topography factor for the Site was determined by drawing transects across the Site and taking the average slope from Google Earth. The soil type factor was determined from surficial geology mapping published by OGS mapping and Site-specific borehole data. The final factor in the MOEE (1995) methodology is the vegetation factor which is based on land cover, agricultural was selected based on Site observations. The total average annual infiltration is estimated by multiplying the appropriate water surplus value by the sum of the three individual factors.

Table 8. Infiltration Factors

Area Description	Infiltration Factor Value
Soil Type: Fine to Coarse-Textured Sands and Silts	**0.4**
Topography / Slope : 2.5% Slope	**0.15**
Vegetation Factor: Meadow	**0.1**
Overall Infiltration Factor	**0.65**

4.3 Pre-Development Water Balance

The results of the pre-development water balance are provided in **Table 9**. The land use area breakdown was estimated based on existing conditions. Based on a Site area of 10.03 ha, it is estimated that 19,822 m^3/yr of precipitation infiltrates and 16,764 m^3/yr runs off.

4.4 Post-Development Water Balance

A post-development water balance was completed using the same methodology as described above. A summary of the post-development water balance is provided in **Table 10**. Based on the concept plan provided in **Appendix A**, the impervious area is estimated to increase by 2.41 ha. In the post-development conditions, it is estimated that 14,675 m^3/yr of precipitation infiltrates and 33,563 m^3/yr runs off. This represents a decrease in infiltration by 5,148 m^3/yr (-26%), and an increase in runoff by 16,799 m^3/yr (+100%).

Table 9. Pre-Development Water Balance

Land Use	Total (ha)	Impervious Factor	Impervious area (ha)	Water Surplus on Impermeable Surfaces (m/yr)	Run off from Impervious Area (m^3/yr)	Estimated Pervious Area (ha)	Water Surplus on Vegetated Pervious Areas (m/yr)	Runoff Coefficient	Runoff Volume From Pervious Area (m^3/yr)	Infiltration Coefficient	Infiltration Volume from Pervious Area (m^3/yr)	Total Runoff Volume (m^3/yr)	Total Infiltration Volume (m^3/yr)
Meadow / Agriculture	9.28	0.00	0.00	0.812	0	9.28	0.329	0.35	10,674	0.65	19,822	10,674	19,822
Road / Paved Area	0.75	1.00	0.75	0.812	6,091	0.00	0.329	0.35	0	0.65	0	6,091	0
Total	**10.03**	**-**	**0.75**	**-**	**6,091**	**9.28**	**-**	**-**	**10,674**	**-**	**19,822**	**16,764**	**19,822**

Table 10. Post-Development Water Balance

Land Use	Total (ha)	Impervious Factor	Impervious area (ha)	Water Surplus on Impermeable Surfaces (m/yr)	Run off from Impervious Area (m^3/yr)	Estimated Pervious Area (ha)	Water Surplus on Vegetated Pervious Areas (m/yr)	Runoff Coefficient	Runoff Volume From Pervious Area (m^3/yr)	Infiltration Coefficient	Infiltration Volume from Pervious Area (m^3/yr)	Total Runoff Volume (m^3/yr)	Total Infiltration Volume (m^3/yr)
Medium Density Residential	3.30	0.70	2.31	0.812	18,759	0.99	0.329	0.35	1,139	0.65	2,115	19,897	2,115
Parks and Open Space	2.15	0.00	0.00	0.812	0	2.15	0.329	0.35	2,473	0.65	4,592	2,473	4,592
Road / Paved Area	0.85	1.00	0.85	0.812	6,903	0.00	0.329	0.35	0	0.65	0	6,903	0
Natural Heritage Area	3.73	0.00	0.00	0.812	0	3.73	0.329	0.35	4,290	0.65	7,967	4,290	7,967
Total	**10.03**	**-**	**3.16**	**-**	**25,661**	**6.87**	**-**	**-**	**7,902**	**-**	**14,675**	**33,563**	**14,675**

5.0 Impact Assessment and Development Considerations

5.1 Water Balance and LIDs

A pre-to-post water balance assessment was completed on the Site to determine the changes to infiltration and runoff post-development. Based on the proposed development plan, the infiltration and runoff post-development is 14,675 and 33,563 m^3/yr respectively. This represents a decrease in infiltration by -5,148 m^3/yr (-26%) and an increase in runoff by 16,799 m^3/yr (+100%).

The use of LIDs may be used to meet pre-development infiltration targets to the best practical extent. Based on groundwater levels at the Site, surface-based LID measures such as grassed swales or shallow infiltration trenches may be utilized. These LID measures may be deployed in areas near BH24-4 or BH24-7 where water levels are greater than 1 mbgs, allowing for successful infiltration. Based on the Site plan, directing rooftop runoff to rear-yard swales may also be considered to increase infiltration post-development

5.2 Source Water Protection

The Site is located within an SGRA with a “N/A” vulnerability score. Due to the “N/A” designation, is it interpreted that maintaining infiltration post-development for this Site is not required. However, it is recommended that best practices are deployed to the most reasonable extent possible to maintain infiltration. The use of LID measures will likely be able to meet the pre-development infiltration targets.

The Site is also within an HVA. This may require the need for a salt management plan to mitigate any potential impacts to the groundwater quality should road salting be considered for the development.

5.3 Natural Environment

Two ponds exist within the current Site boundary and are intended to be maintained post-development. Both of these ponds show streams from the west flowing into the ponds providing surface water input. Both ponds also show outlets flowing east exiting the Site boundary. Based on the fine to coarse-textured soils found on Site, and the high groundwater levels, these ponds are interpreted to be connected to the shallow groundwater table in the unconfined, overburden aquifer. As infiltration will likely be able to be maintained post-development through the deployment of LIDs, no impacts to these ponds is anticipated.

5.4 Existing Groundwater Users

Based on a review of the MECP WWRs database, 12 wells are present within a 500 m radius of the Site, with four (4) being used for domestic water supply. The four domestic wells are:

- MECP WWR #6801895;
- MECP WWR #6807846;
- MECP WWR #6810792, and;
- MECP WWR #7118650

The first three wells are deep drilled wells that obtain potable water from the deep bedrock and not the unconfined overburden aquifer. These wells are unlikely to be negatively impacted by

the development. MECP WWR #7118650 is a bored well with a depth of 7.9 m and obtains potable water from the unconfined silt and sand aquifer. This well is located approximately 100 m west of the southwest corner of the site boundary. As infiltration is intended to be maintained post-development, and this well is located upgradient to cross gradient from the Site, no negative impacts to this well would be expected.

5.5 Basement Separation from Groundwater Table

As described in Section 3.2, the groundwater levels at the site range from -0.02 to 4.32 mbgs, with generally high groundwater levels across the Site. Based on these high groundwater levels, residential units would need to be built as slab on grade without basements.

Should basements be considered for the Project, it is expected that the grade will have to be raised in several locations to accommodate underground structures and allow for sufficient separation from the groundwater table (at least 0.5 m). Additional groundwater level monitoring is recommended to confirm the seasonal high groundwater table at the Site.

5.6 Stormwater Management Pond Considerations

Based on the results of the hydrogeology study, the groundwater table is interpreted to be between -0.02 to 4.32 mbgs across the site and the geometric mean soil permeability is 3.6 x 10^{-7} m/s. Under these conditions, it is expected that any potential SWM ponds should be lined with impermeable clay (1x10^{-8} m/s or lower) to prevent interactions between the groundwater and stormwater.

6.0 Summary and Conclusions

Based on the results of the Hydrogeological Investigation, the following summary and conclusions are presented:

- SLR advanced eleven (11) boreholes between October 31st, 2024, and November 13th, 2024 (BH24-1 – BH24-10, BH24-7A). Of these boreholes, eight (8) were completed as groundwater monitoring wells

- Eleven (11) boreholes were advanced as part of the drilling program. Eight (8) of these boreholes were completed as groundwater monitoring wells. The depths of these wells ranged from 5.5 to 6.1 mbgs.

- The surficial geology at the Site as encountered through borehole drilling consisted of coarse and fine-textured glaciolacustrine silt and sand.

- Groundwater levels at the site were shallow and ranged from -0.02 to 4.32 mbgs. Groundwater elevations ranged from 192.28 and 223.33 masl. The large change in elevation is due to the steep elevation change at the northern Site boundary. Groundwater flow at the site flows northwest towards the northern pond, then northeast towards Hamilton Harbour.

- Single well response tests and grain-size analysis were utilized to determine the hydraulic conductivity values of the soils at the site. The hydraulic conductivity values

were calculated to range from 1.6 x 10^{-8} to 1.5 x 10^{-5} m/s, with a geomean of 3.6 x 10^{-7} m/s.

- A groundwater sample was collected from BH24-5 November 12, 2024. The sample was compared to ODWS to establish current groundwater chemistry. The groundwater chemistry was generally good and typical for raw groundwater but did show elevated sodium and chloride. This may be the result of road salting.

- A Site pre-and-post water balance assessment was completed for the Site. The pre-development infiltration and runoff values were 19,822 m^3/yr and 16,764 m^3/yr respectively. The proposed developed increased the imperviousness to approximately 2.3 ha post-development. The total post-development infiltration and runoff for the Site is estimated to be 14,675 m^3/yr and 33,563 m^3/yr respectively. This represents a decrease in infiltration by 5,148 m^3/yr (-26%) and an increase in runoff by 16,799 m^3/yr (+100%).

- Review of the Source Water Protection Mapping revealed the Site is within a SGRA with a vulnerability score of “N/A”, and within a HVA. Based on the Source Water Protection policies, it is interpreted that no recharge policies apply to the site. However, best efforts should be made to maintain pre-development infiltration values. Shallow LID measures such as grassed swales or infiltration trenches may be utilized in areas where the groundwater levels are found to be deeper than 1 mbgs. Rooftop runoff may also be directed to rear-yard swales to increase overall infiltration. Overall, infiltration should be able to be maintained post-development.

- No adverse impacts to the environment or existing water users are anticipated as a result of the proposed development.

- Due to the high groundwater table at the Site, slab on grade construction should be considered for this Site. Should basements be considered, raising of the grade in several locations would be required.

- Should the use of SWM ponds be considered, due to the high groundwater table and moderately permeable soils, a clay lining will be required to separate the groundwater table from stormwater.

Regards,

SLR Consulting (Canada) Ltd.

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Hydrogeologist

Jason Cole, M.Sc., P.Geo.
Technical Discipline Manager, Hydrogeology and Hydrology

7.0 References

Armstrong D.K. and Dodge J.E.P. 2007:
Paleozoic geology of southern Ontario; Ontario Geological Survey, Miscellaneous Release-Data 219.

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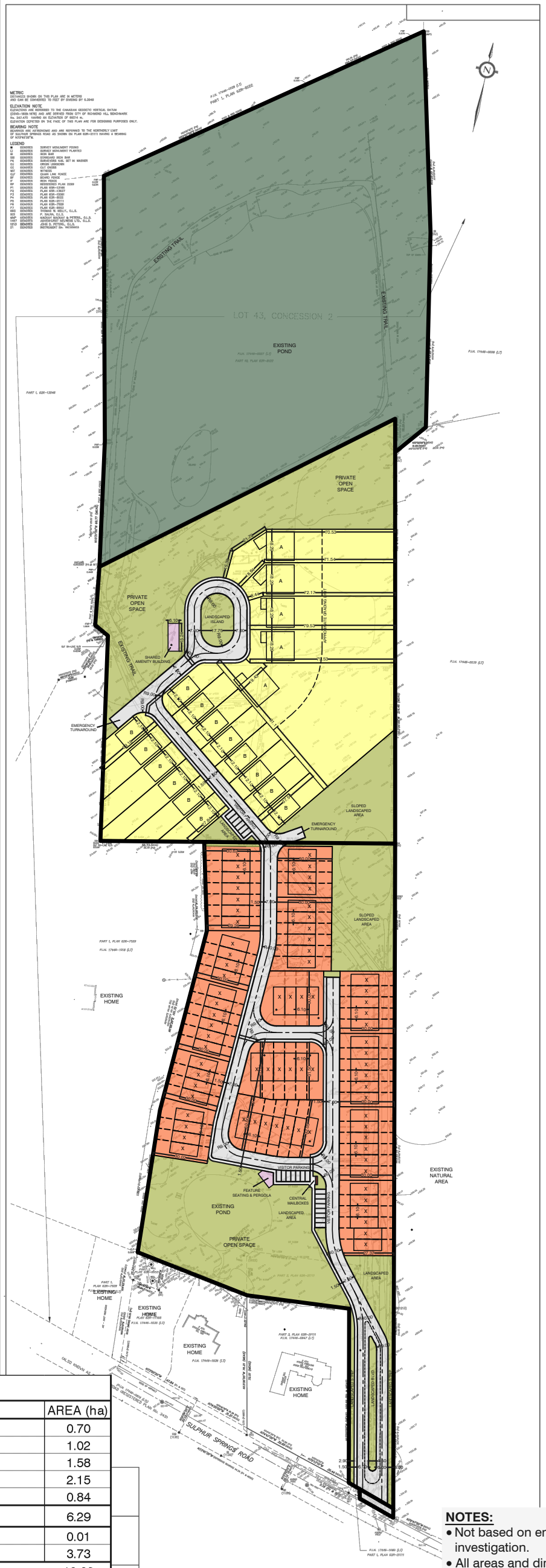
Appendix A Concept Plan (Biglieri, 2024)



SITE STATISTICS		
DESCRIPTION	UNITS	AREA (ha)
DETACHED (12.10m)	14	0.70
DETACHED (16.29m)	5	1.02
BLOCK TOWNHOUSE (6.1m)	75	1.58
PARKS AND OPEN SPACE		2.15
PRIVATE ROAD/SIDEWALK/PARKING		0.84
NET DEVELOPMENT TOTAL	94	6.29
ROAD WIDENING		0.01
NATURAL HERITAGE SERVICE		3.73
TOTAL	94	10.03
SERVICED ROAD LENGTH	877m	
VISITOR PARKING	21 spaces	

NOTES:

- Not based on engineering, enviornmental or any other required technical investigation.
- All areas and dimensions are approximate and subject to change.
- Boundary lines are based on available PDF of a plan of survey.

C:\Users\mpettigrew\The Biglieri Group\TBG_Project - 2020-2024\2024\24218\2 - TBG Design\1 - TBG Working Drawings\1 - AutoCAD\24218-CSP-24.09.09

CONCEPTUAL SITE PLAN

ADDRESS:
159 & 163 SULPHUR SPRINGS ROAD, ANCASTER

Project No:
24218

Scale:
1:2500

September 9, 2024

Designed By:
MP

Appendix B Borehole Logs (SLR, 2024)

Palmer

LOG OF BOREHOLE BH24-01

PROJECT: Geotechnical Investigation - 159-163 Sulphur Springs Road

CLIENT: Mizrahi Developments

PROJECT LOCATION: Ancaster, ON

DATUM: Geodetic

BH LOCATION: N 4786568.922 E 582480.39

Method: Solid Stem Augers

Diameter: 150 mm

Date: Oct 31, 2024

REF. NO.: 244.024373.00003

ENCL NO.: 1

(m) ELEV / DEPTH	CLASSIFICATION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
224.6	Ground Surface					
224.5 0.1	**TOPSOIL:** 80mm				Concrete	
	FILL: silt, some clay, trace sand, trace gravel, brown, moist, loose	1	SS	7	Sand	
224.0					224	
0.7	**FILL:** sandy silt, trace clay, trace gravel, brown, moist, loose to very loose	2	SS	8		
1					Bentonite	
		3	SS	2	223	
2 222.4						
2.3	**SILT:** some to trace clay. trace sand, trace gravel, brown, moist, loose	4	SS	6	222	
3					Sand	
		5	SS	6		0 3 93 4
4 220.5					221	
4.1	**SILTY SAND:** silty sand, trace clay, trace gravel, contains boulder fragments, brown, moist, compact				Screen	
		6	SS	10	220	
5						
					219	
6						
		7	SS	25	Bentonite	
217.9					218	
6.7	**END OF BOREHOLE:** 1) 50mm diameter monitoring well was installed upon completion of drilling. 2) Water Level Readings: Date W. L. Depth (mBGS) 2024-11-06 2.50					

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L

WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ε_f=3% Strain at Failure

Palmer

LOG OF BOREHOLE BH24-02

PROJECT: Geotechnical Investigation - 159-163 Sulphur Springs Road

CLIENT: Mizrahi Developments

PROJECT LOCATION: Ancaster, ON

DATUM: Geodetic

BH LOCATION: N 4786702.007 E 582417.444

Method: Solid Stem Augers

Diameter: 150 mm

Date: Oct 30, 2024

REF. NO.: 244.024373.00003

ENCL NO.: 2

(m) ELEV / DEPTH	CLASSIFICATION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
220.3	Ground Surface							
220.0 / 0.1	**TOPSOIL:** 50mm						Concrete	
	FILL: silt some clay, trace sand, trace gravel, brown to grey, moist to wet, compact to loose		1	SS	6		Sand 220	
1			2	SS	13		219	
			3	SS	7		Bentonite	
2								
218.0 / 2.3	**SILT:** some to trace clay. trace sand, trace gravel, brown, moist, loose		4	SS	7		218	
3							Sand	
			5	SS	5		217	
4								
216.3 / 4.1	**SILTY SAND:** silty sand, trace clay, trace gravel, brown, wet, compact						216	
			6	SS	14		Screen	0 83 16 1
5	grey						215	
6								
214.2	auger refusal at 6.0 m							
6.1	**END OF BOREHOLE:** 1) 50mm diameter monitoring well was installed upon completion of drilling. 2) Water Level Readings: Date 2024-11-06 W. L. Depth (mBGS) 1.56		7	SS	50/ initial 25mm		Bentonite	

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

GROUNDWATER ELEVATIONS

Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: + 3, × 3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

Palmer

LOG OF BOREHOLE BH24-03

PROJECT: Geotechnical Investigation - 159-163 Sulphur Springs Road
CLIENT: Mizrahi Developments
PROJECT LOCATION: Ancaster, ON
DATUM: Geodetic
BH LOCATION: N 4786706.41 E 582360.245

Method: Solid Stem Augers
Diameter: 150 mm
Date: Oct 30, 2024

REF. NO.: 244.024373.00003
ENCL NO.: 3

(m) ELEV / DEPTH	CLASSIFICATION	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
221.3	Ground Surface						
221.2 / 0.1	**TOPSOIL:** 75mm				Concrete		
	FILL: sandy silt, trace clay, trace gravel, brown, moist, compact to loose	1	SS	29	Sand	221	
		2	SS	10		220	
219.8 / 1.5	**FILL:** silt, some clay, trace sand, trace gravel, grey, moist, compact	3	SS	13			
219.0 / 2.3	**SILT:** some clay, trace sand, trace gravel, brown, moist, loose	4	SS	10	Bentonite		
218.7 / 2.6	**SAND:** sand, trace silt, trace clay, trace gravel, brown, wet, loose to compact	5	SS	7		218	
					Sand		
						217	
		6	SS	11	Screen		
						216	
		7	SS	6	Bentonite		3 91 4 2
214.6 / 6.7	**END OF BOREHOLE:** 1) 50mm diameter monitoring well was installed upon completion of drilling. 2) Water Level Readings: Date W. L. Depth (mBGS) 2024-11-06 2.35						

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^{3}$, $\times^{3}$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

Palmer

LOG OF BOREHOLE BH24-04

PROJECT: Geotechnical Investigation - 159-163 Sulphur Springs Road
CLIENT: Mizrahi Developments
PROJECT LOCATION: Ancaster, ON
DATUM: Geodetic
BH LOCATION: N 4786794.508 E 582393.586

Method: Solid Stem Augers
Diameter: 150 mm
Date: Oct 30, 2024

REF. NO.: 244.024373.00003
ENCL NO.: 4

(m) ELEV / DEPTH	CLASSIFICATION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
221.9	Ground Surface											
221.8	**TOPSOIL:** 75mm						Concrete					
0.1	**FILL:** silt, some clay, trace sand, trace gravel, grey, moist, compact		1	SS	9		Sand		○			
1			2	SS	6		221		○			
			3	SS	19		Bentonite		○			
2							220					
219.6												
2.3	**SILT:** some clay, trace sand, trace gravel, grey, moist, compact to loose		4	SS	27				○			
3			5	SS	7		Sand		○			
4							218					
			6	SS	9		Screen		○			
5							217					
6							216					
			7	SS	6		Bentonite		○			0 9 85 6
215.2												
6.7	**END OF BOREHOLE:** 1) 50mm diameter monitoring well was installed upon completion of drilling. 2) Water Level Readings: Date W. L. Depth (mBGS) 2024-11-06 3.14											

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ $^{\varepsilon_f}$=3% Strain at Failure

Palmer

LOG OF BOREHOLE BH24-05

PROJECT: Geotechnical Investigation - 159-163 Sulphur Springs Road
CLIENT: Mizrahi Developments
PROJECT LOCATION: Ancaster, ON
DATUM: Geodetic
BH LOCATION: N 4786884.293 E 582313.732

Method: Solid Stem Augers
Diameter: 150 mm
Date: Oct 30, 2024

REF. NO.: 244.024373.00003
ENCL NO.: 5

(m) ELEV / DEPTH	CLASSIFICATION	NUMBER	TYPE	BLOWS 0.3 m "N"	ELEVATION	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
214.4	Ground Surface					
214.3 / 0.1	**TOPSOIL:** 75mm					
	FILL: silt, some clay, trace sand, trace gravel, grey, moist, loose	1	SS	5		
		2	SS	5		
212.8 / 1.5	**SILT:** some clay, trace sand, trace gravel, brown, moist, compact	3	SS	15		
		4	SS	13		0 9 79 12
		5	SS	18		
		6	SS	11		
208.3 / 6.1	**END OF BOREHOLE:** 1) 50mm diameter monitoring well was installed upon completion of drilling. 2) Water Level Readings: Date 2024-11-06 W. L. Depth (mBGS) 1.29	7	SS	50/ initial 25mm		

Concrete
Sand
214
Bentonite
213
Sand
212
211
Screen
210
209
Bentonite

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100
SHEAR STRENGTH (kPa)
○ UNCONFINED + FIELD VANE & Sensitivity
● QUICK TRIAXIAL × LAB VANE
20 40 60 80 100
PLASTIC LIMIT NATURAL MOISTURE CONTENT LIQUID LIMIT
w_P w w_L
WATER CONTENT (%)
10 20 30
POCKET PEN. (Cu) (kPa)
NATURAL UNIT WT (kN/m³)

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+3, ×3: Numbers refer to Sensitivity
○ε=3% Strain at Failure

Palmer™

LOG OF BOREHOLE BH24-06

PROJECT: Geotechnical Investigation - 159-163 Sulphur Springs Road

CLIENT: Mizrahi Developments | Method: Solid Stem Augers

PROJECT LOCATION: Ancaster, ON | Diameter: 150 mm | REF. NO.: 244.024373.00003

DATUM: Geodetic | Date: Oct 31, 2024 | ENCL NO.: 6

BH LOCATION: N 4787008.677 E 582271.368

ELEV (m) / DEPTH	CLASSIFICATION	SAMPLE NUMBER	TYPE	"N" BLOWS/0.3 m	NATURAL MOISTURE CONTENT
206.0	Ground Surface				
205.9 / 0.0	**ASPHALT:** 100mm				
0.1	**FILL:** sand and gravel, trace silt, trace clay, contains cobbles, brown, moist, compact	1	SS	16	~17% (plotted)
205.2 / 0.8	**FILL:** clayey silt, trace sand, trace gravel, trace rootlets, brown, moist, firm	2	SS	10	~18% (plotted)
204.4 / 1.5	**SANDY SILT:** trace clay, trace gravel, contains boulders, brown, moist to wet, compact	3	SS	18	~26% (plotted)
		4	SS	50/75 mm	~17% (plotted)
203.6 / 2.4	**END OF BOREHOLE UPON PRACTICAL REFUSAL OF AUGER**				

Other columns: STRATA PLOT; GROUND WATER CONDITIONS; ELEVATION (205, 204); DYNAMIC CONE PENETRATION RESISTANCE PLOT (20, 40, 60, 80, 100); SHEAR STRENGTH (kPa): ○ UNCONFINED, ● QUICK TRIAXIAL, + FIELD VANE & Sensitivity, × LAB VANE (20, 40, 60, 80, 100); PLASTIC LIMIT W_P, NATURAL MOISTURE CONTENT W, LIQUID LIMIT W_L; WATER CONTENT (%) (10, 20, 30); POCKET PEN. (Cu) (kPa); NATURAL UNIT WT (kN/m^3); REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL.

GROUNDWATER ELEVATIONS

Measurement 1st 2nd 3rd 4th

GRAPH NOTES: $+^3, \times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

Palmer

LOG OF BOREHOLE BH24-07

PROJECT: Geotechnical Investigation - 159-163 Sulphur Springs Road

CLIENT: Mizrahi Developments

PROJECT LOCATION: Ancaster, ON

DATUM: Geodetic

BH LOCATION: N 4787237.405 E 582313.771

Method: Solid Stem Augers

Diameter: 150 mm

Date: Oct 31, 2024

REF. NO.: 244.024373.00003

ENCL NO.: 8

(m) ELEV / DEPTH	CLASSIFICATION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
196.6	Ground Surface											
196.6	**TOPSOIL:** 80mm						Concrete					
196.5 0.1	**FILL:** sandy silt, trace clay, trace gravel, brown, moist, loose		1	SS	4		Sand					
195.8							196					
0.8	**SANDY SILT:** sandy silt, trace clay, trace gravel, brown, moist, loose to compact		2	SS	7							0 11 83 6
			3	SS	7		Bentonite					
			4	SS	8		194					
							Sand					
			5	SS	13		193					
192.5												
4.1	**SILT:** some clay, trace sand, trace gravel, brown, wet, loose						Screen					
			6	SS	7							
							191					
			7	SS	9		Bentonite					
189.9							190					
6.7	**END OF BOREHOLE:** 1) 50mm diameter monitoring well was installed upon completion of drilling. 2) Water Level Readings: Date W. L. Depth (mBGS) 2024-11-06 5.38											

GROUNDWATER ELEVATIONS

Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε_f=3% Strain at Failure

Palmer

LOG OF BOREHOLE BH24-08

PROJECT: Geotechnical Investigation - 159-163 Sulphur Springs Road

CLIENT: Mizrahi Developments

PROJECT LOCATION: Ancaster, ON

DATUM: Geodetic

BH LOCATION: N 4787000.169 E 582350.072

Method: Solid Stem Augers

Diameter: 150 mm

Date: Oct 30, 2024

REF. NO.: 244.024373.00003

ENCL NO.: 9

(m) ELEV / DEPTH	CLASSIFICATION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"	GROUND WATER CONDITIONS	ELEVATION
213.0	Ground Surface						
213.0	**TOPSOIL:** 75mm						
0.1	**FILL:** silt, some clay, trace sand, trace gravel, brown, moist, loose to very loose		1	SS	4		
			2	SS	3		212
			3	SS	6		211
210.7							
2.3	**SILT:** some clay, trace sand, trace gravel, brown, wet, loose to very loose		4	SS	5		
			5	SS	2		210
			6	SS	50/ initial 25 mm		209
208.3							
4.7	**END OF BOREHOLE UPON PRACTICAL REFUSAL OF AUGER**						

DYNAMIC CONE PENETRATION RESISTANCE PLOT
20 40 60 80 100

SHEAR STRENGTH (kPa)
○ UNCONFINED
● QUICK TRIAXIAL
+ FIELD VANE & Sensitivity
× LAB VANE
20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%)
10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

REMARKS AND GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES
+ 3, × 3: Numbers refer to Sensitivity
○ ε=3% Strain at Failure

Palmer

LOG OF BOREHOLE BH24-09

PROJECT: Geotechnical Investigation - 159-163 Sulphur Springs Road
CLIENT: Mizrahi Developments
PROJECT LOCATION: Ancaster, ON
DATUM: Geodetic
BH LOCATION: N 4786658.579 E 582337.27

Method: Solid Stem Augers
Diameter: 150 mm
Date: Oct 31, 2024

REF. NO.: 244.024373.00003
ENCL NO.: 10

(m) ELEV / DEPTH	CLASSIFICATION	STRATA PLOT	NUMBER	TYPE	"N" BLOWS 0.3 m	GROUND WATER CONDITIONS	ELEVATION	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
220.9	Ground Surface							
220.7	**TOPSOIL:** 120mm						Concrete	
0.1	**FILL:** silt, some clay, trace sand, trace gravel, brown to grey, moist to wet, loose to compact		1	SS	5		Sand	
			2	SS	15		220	
219.3							Bentonite	
1.5	**SILTY SAND:** trace clay, trace gravel, grey, wet, loose to compact		3	SS	9		219	
218.3			4	SS	20		Sand	
2.6	**SILT:** some to trace clay. trace sand, trace gravel, grey, moist, compact to loose		5	SS	18		217	
			6	SS	21		Screen 216	0 10 87 3
							215	
214.1			7	SS	9		Bentonite	
6.7	**END OF BOREHOLE:** 1) 50mm diameter monitoring well was installed upon completion of drilling. 2) Water Level Readings: Date W. L. Depth (mBGS) 2024-11-06 1.31 2024-11-13 0.45							

DYNAMIC CONE PENETRATION RESISTANCE PLOT: 20 40 60 80 100

SHEAR STRENGTH (kPa): ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE; 20 40 60 80 100

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L

WATER CONTENT (%): 10 20 30

POCKET PEN. (Cu) (kPa)

NATURAL UNIT WT (kN/m³)

GROUNDWATER ELEVATIONS
Measurement 1st ▽ 2nd ▼ 3rd ▼ 4th ▼

GRAPH NOTES: $+^3$, $\times^3$: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

Palmer

LOG OF BOREHOLE BH24-10

PROJECT: Geotechnical Investigation - 159-163 Sulphur Springs Road
CLIENT: Mizrahi Developments
PROJECT LOCATION: Ancaster, ON
DATUM: Geodetic
BH LOCATION: N 4786673.772 E 582392.614

Method: Solid Stem Augers
Diameter: 150 mm
Date: Oct 31, 2024

REF. NO.: 244.024373.00003
ENCL NO.: 11

(m) ELEV / DEPTH	CLASSIFICATION	STRATA PLOT	NUMBER	TYPE	BLOWS "N" 0.3 m	GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT w_P / NATURAL MOISTURE CONTENT w / LIQUID LIMIT w_L WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
220.9	Ground Surface											
220.8	**TOPSOIL:** 120mm						Concrete					
0.1	**FILL:** silt, some clay, trace sand, trace gravel, grey, wet, loose to compact		1	SS	6		Sand					
1			2	SS	5		220					
							Bentonite					
2			3	SS	11		219					
218.6												
2.3	**SILT:** some clay, trace sand, trace gravel, brown, wet, loose to compact		4	SS	9		Sand					
3							218					
			5	SS	12							2 6 80 12
4							217					
							Screen					
5			6	SS	12		216					
215.2	auger refusal						Bentonite					
5.6	**END OF BOREHOLE:** 1) 50mm diameter monitoring well was installed upon completion of drilling. 2) Water Level Readings: Date W. L. Depth (mBGS) 2024-11-06 2.11											

GROUNDWATER ELEVATIONS
Measurement 1st 2nd 3rd 4th

GRAPH NOTES: +3, ×3: Numbers refer to Sensitivity; ○ ε=3% Strain at Failure

Palmer

LOG OF BOREHOLE BH24-6A

PROJECT: Geotechnical Investigation - 159-163 Sulphur Springs Road

CLIENT: Mizrahi Developments

PROJECT LOCATION: Ancaster, ON

DATUM: Geodetic

BH LOCATION:

Method: Solid Stem Augers

Diameter: 150 mm

Date: Nov 13, 2024

REF. NO.: 244.024373.00003

ENCL NO.: 7

SOIL PROFILE			SAMPLES			GROUND WATER CONDITIONS	ELEVATION	DYNAMIC CONE PENETRATION RESISTANCE PLOT (20 40 60 80 100) / SHEAR STRENGTH (kPa) ○ UNCONFINED ● QUICK TRIAXIAL + FIELD VANE & Sensitivity × LAB VANE (20 40 60 80 100)	PLASTIC LIMIT / NATURAL MOISTURE CONTENT / LIQUID LIMIT (w_P w w_L) WATER CONTENT (%) (10 20 30)	POCKET PEN. (Cu) (kPa)	NATURAL UNIT WT (kN/m³)	REMARKS AND GRAIN SIZE DISTRIBUTION (%)
(m) ELEV / DEPTH	CLASSIFICATION	STRATA PLOT	NUMBER	TYPE	BLOWS 0.3 m "N"							GR SA SI CL
	Ground Surface											
0.0	**TOPSOIL:** 80mm											
0.1	**FILL:** clayey silt, trace sand, trace gravel, trace rootlets, brown, moist, firm		1	SS	7							
1												
1.0	**FILL:** sandy silt, trace clay, trace gravel, brown, moist, compact		2	SS	16							
1.6	**END OF BOREHOLE UPON PRACTICAL REFUSAL OF AUGER**		3	SS	50/ initial 25mm							

GROUNDWATER ELEVATIONS

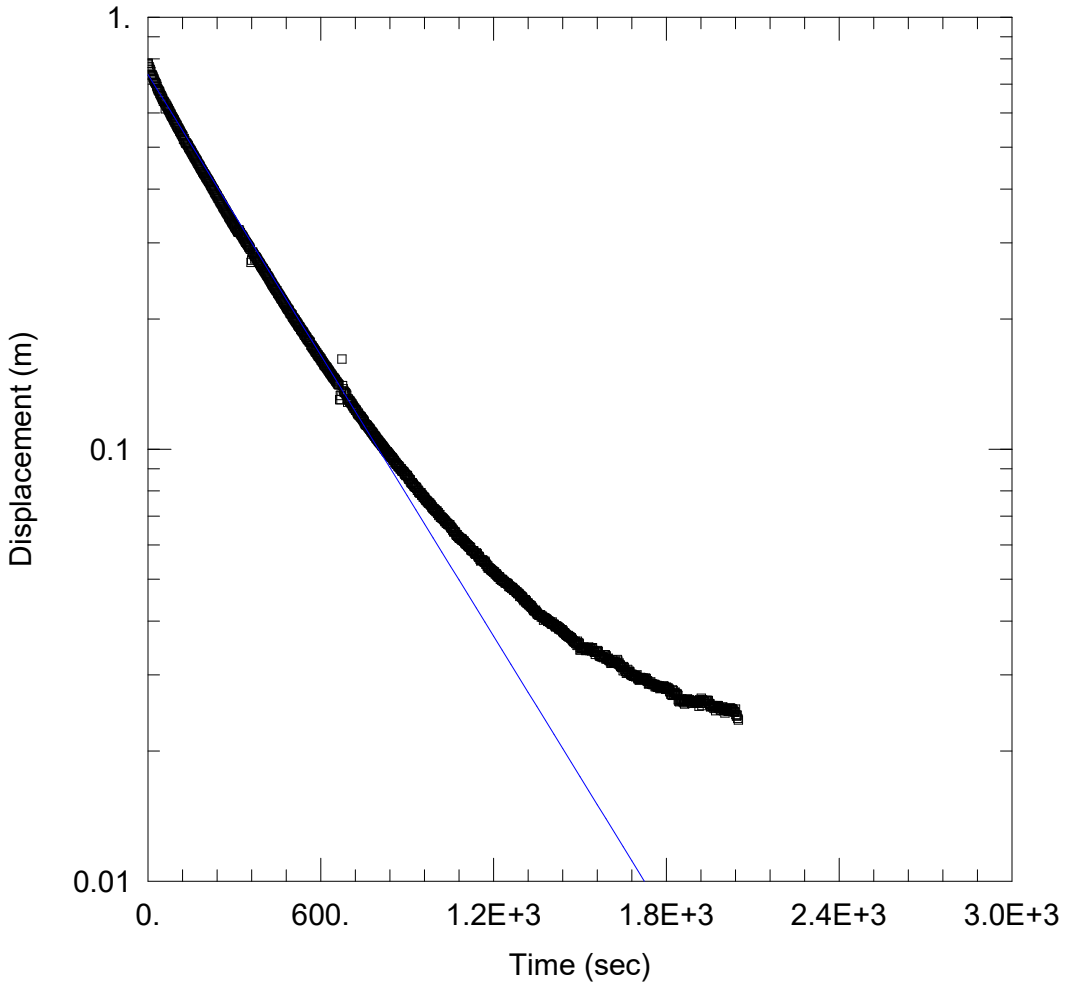
Measurement 1st 2nd 3rd 4th

GRAPH NOTES

+ 3, × 3: Numbers refer to Sensitivity

○ ε=3% Strain at Failure

Appendix C Aqtesolv™ Analysis (SLR, 2024)



PROJECT INFORMATION

Company: SLR
Client: Mizrahi Developments
Project: 244.024373
Test Well: BH24-01

AQUIFER DATA

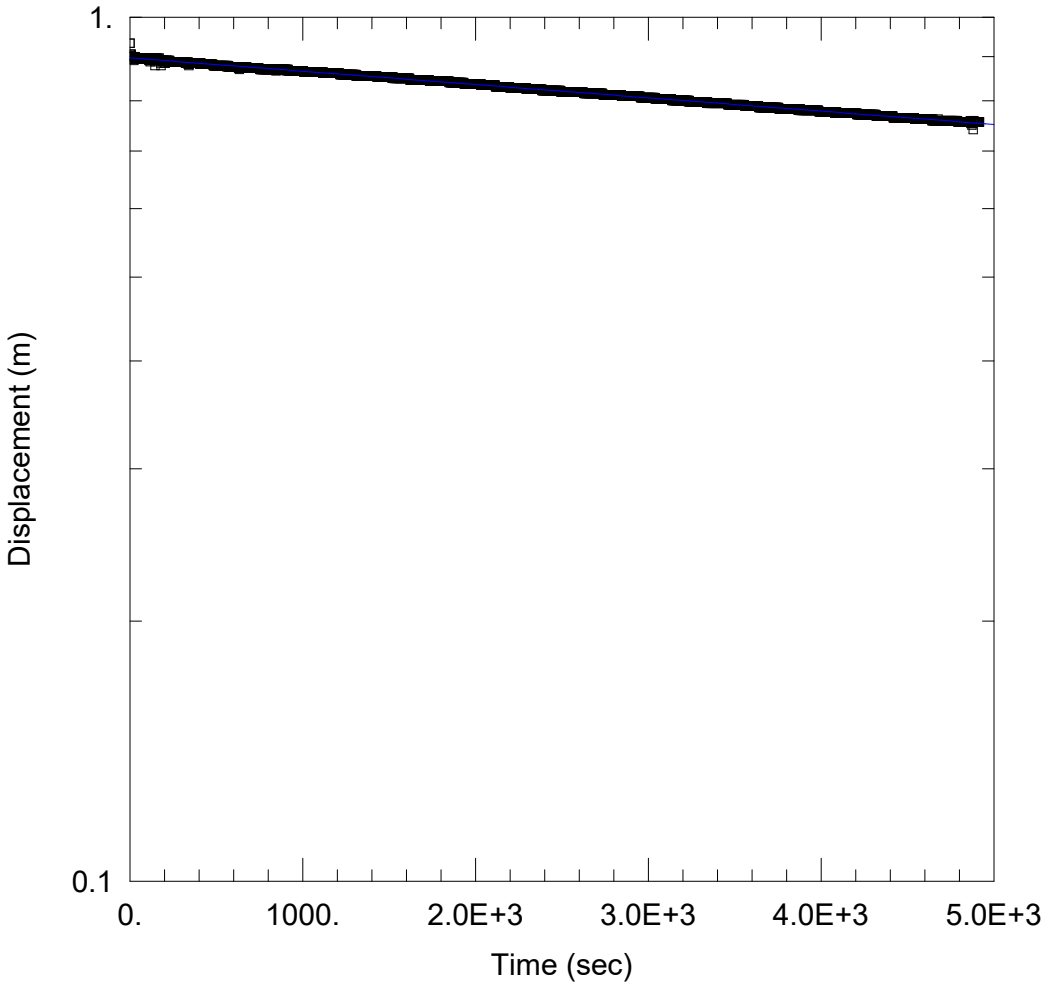
Saturated Thickness: 4.83 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (New Well)

Initial Displacement: 0.7815 m
Total Well Penetration Depth: 4.83 m
Casing Radius: 0.025 m
Static Water Column Height: 4.83 m
Screen Length: 3. m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.051E-6 m/sec
y0 = 0.7367 m



PROJECT INFORMATION

Company: SLR
Client: Mizrahi Developments
Project: 244.024373
Test Well: BH24-02

AQUIFER DATA

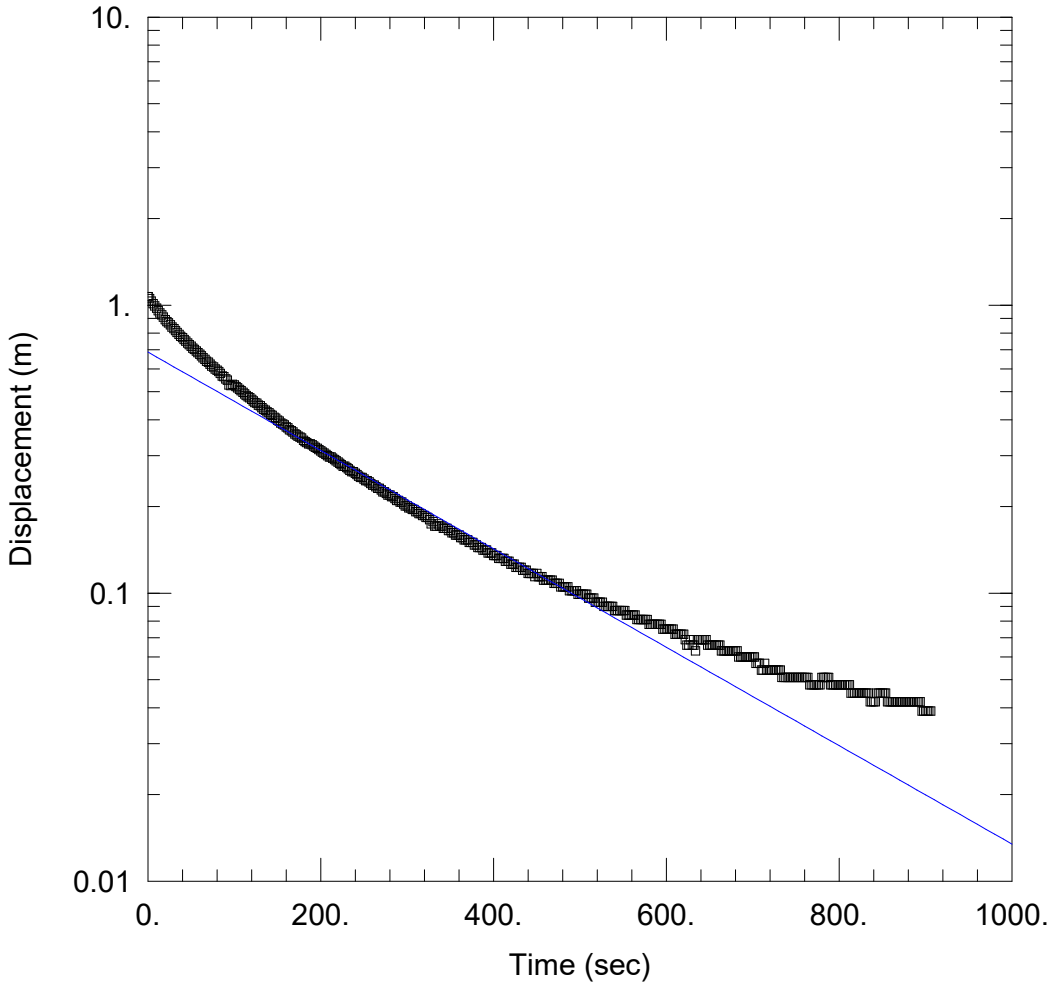
Saturated Thickness: 6.12 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (New Well)

Initial Displacement: 0.933 m
Total Well Penetration Depth: 6.12 m
Casing Radius: 0.025 m
Static Water Column Height: 6.12 m
Screen Length: 3. m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.548E-8 m/sec
y0 = 0.8969 m



PROJECT INFORMATION

Company: SLR
Client: Mizrahi Developments
Project: 244.024373
Test Well: BH24-04

AQUIFER DATA

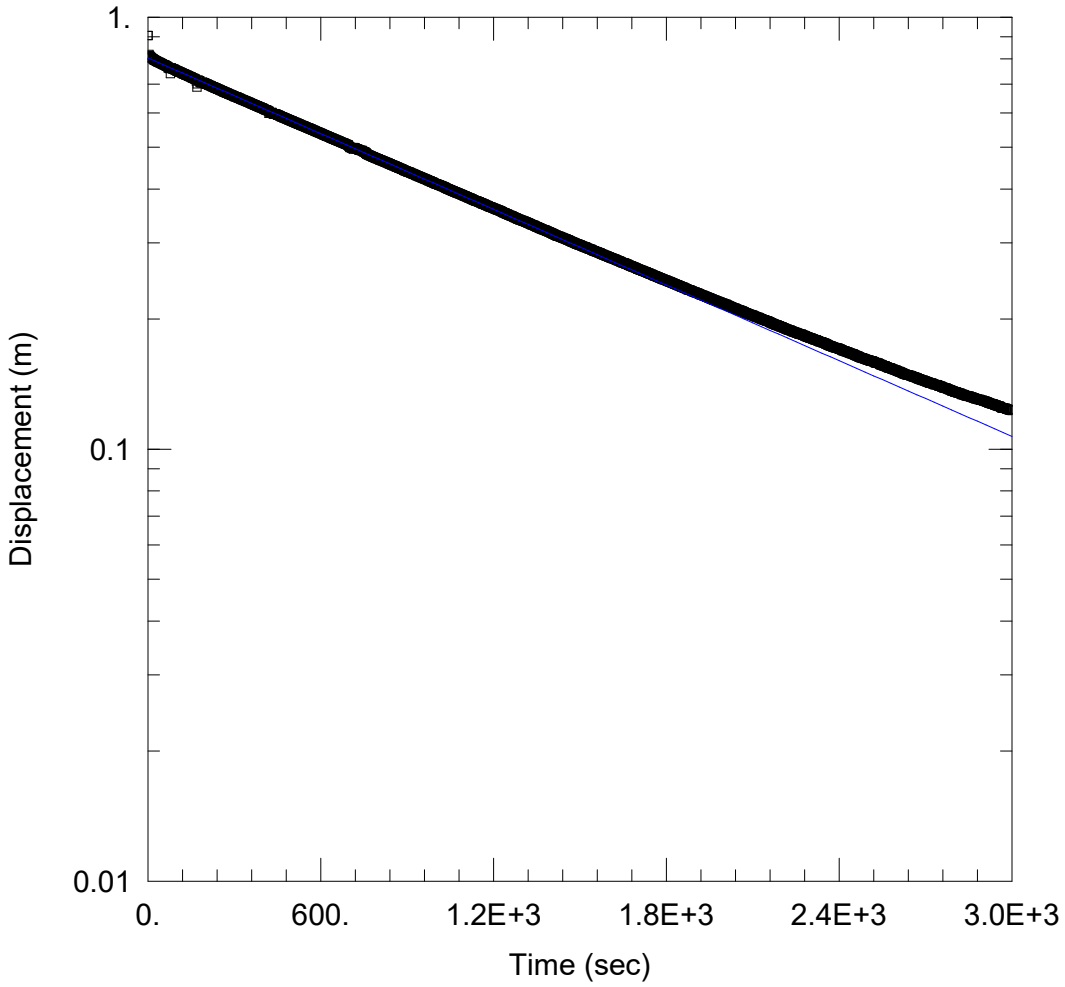
Saturated Thickness: 3.71 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (New Well)

Initial Displacement: 1.071 m
Total Well Penetration Depth: 3.79 m
Casing Radius: 0.025 m
Static Water Column Height: 3.79 m
Screen Length: 3. m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.592E-6 m/sec
y0 = 0.6866 m



PROJECT INFORMATION

Company: SLR
Client: Mizrahi Developments
Project: 244.024373
Test Well: BH24-05

AQUIFER DATA

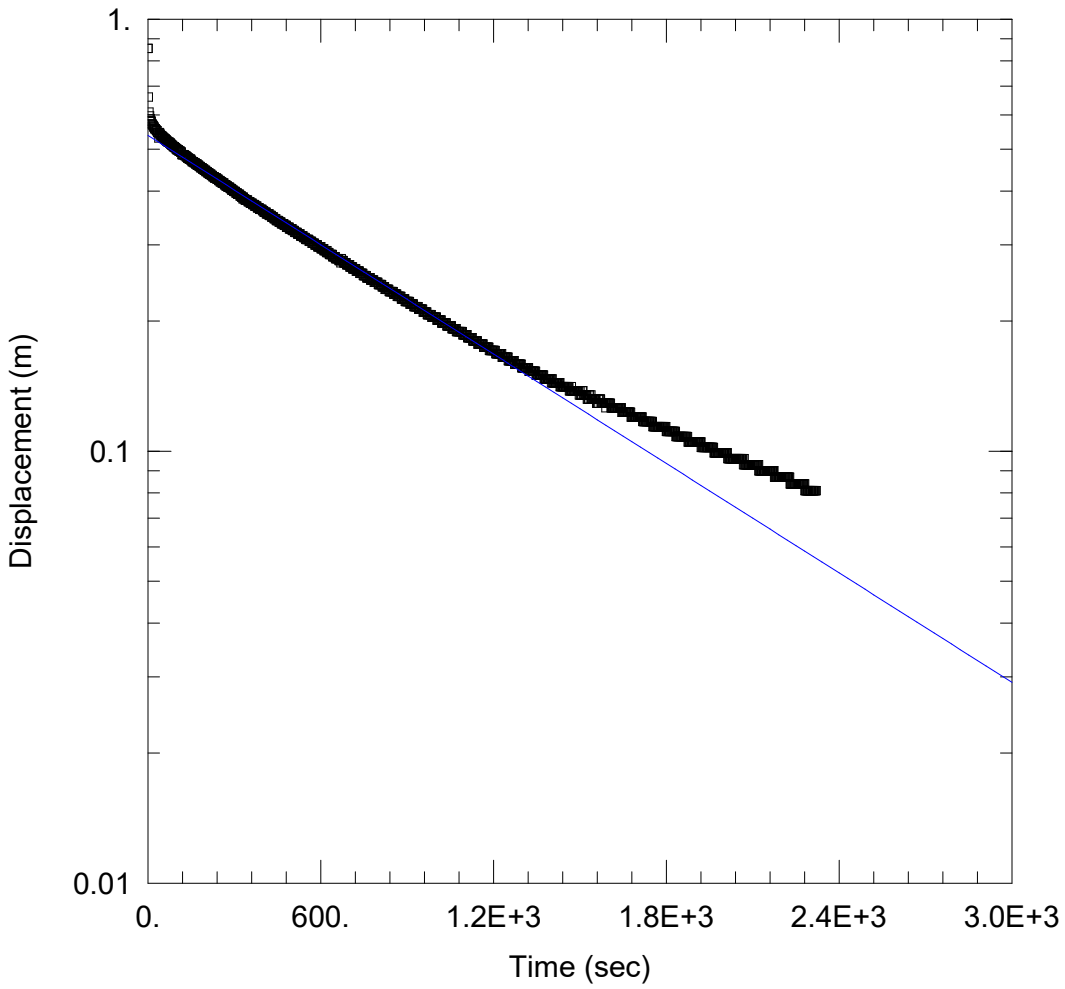
Saturated Thickness: 5.1 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (New Well)

Initial Displacement: 0.9069 m
Total Well Penetration Depth: 5.7 m
Casing Radius: 0.025 m
Static Water Column Height: 5.1 m
Screen Length: 3. m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 2.905E-7 m/sec
y0 = 0.8045 m



PROJECT INFORMATION

Company: SLR
Client: Mizrahi Developments
Project: 244.024373
Test Well: BH24-07

AQUIFER DATA

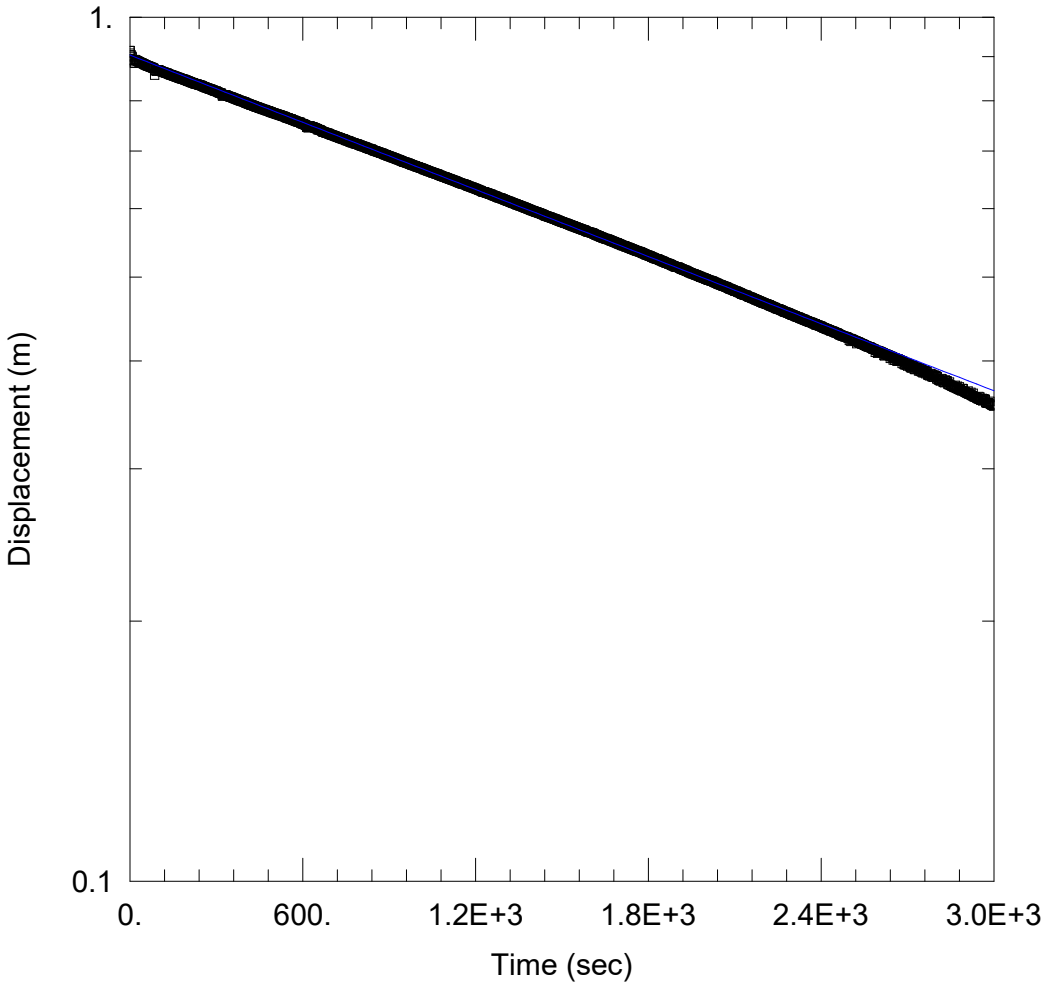
Saturated Thickness: 1.78 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (New Well)

Initial Displacement: 0.855 m
Total Well Penetration Depth: 1.22 m
Casing Radius: 0.025 m
Static Water Column Height: 1.78 m
Screen Length: 1.22 m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 6.718E-7 m/sec
y0 = 0.5383 m



PROJECT INFORMATION

Company: SLR
Client: Mizrahi Developments
Project: 244.024373
Test Well: BH24-09

AQUIFER DATA

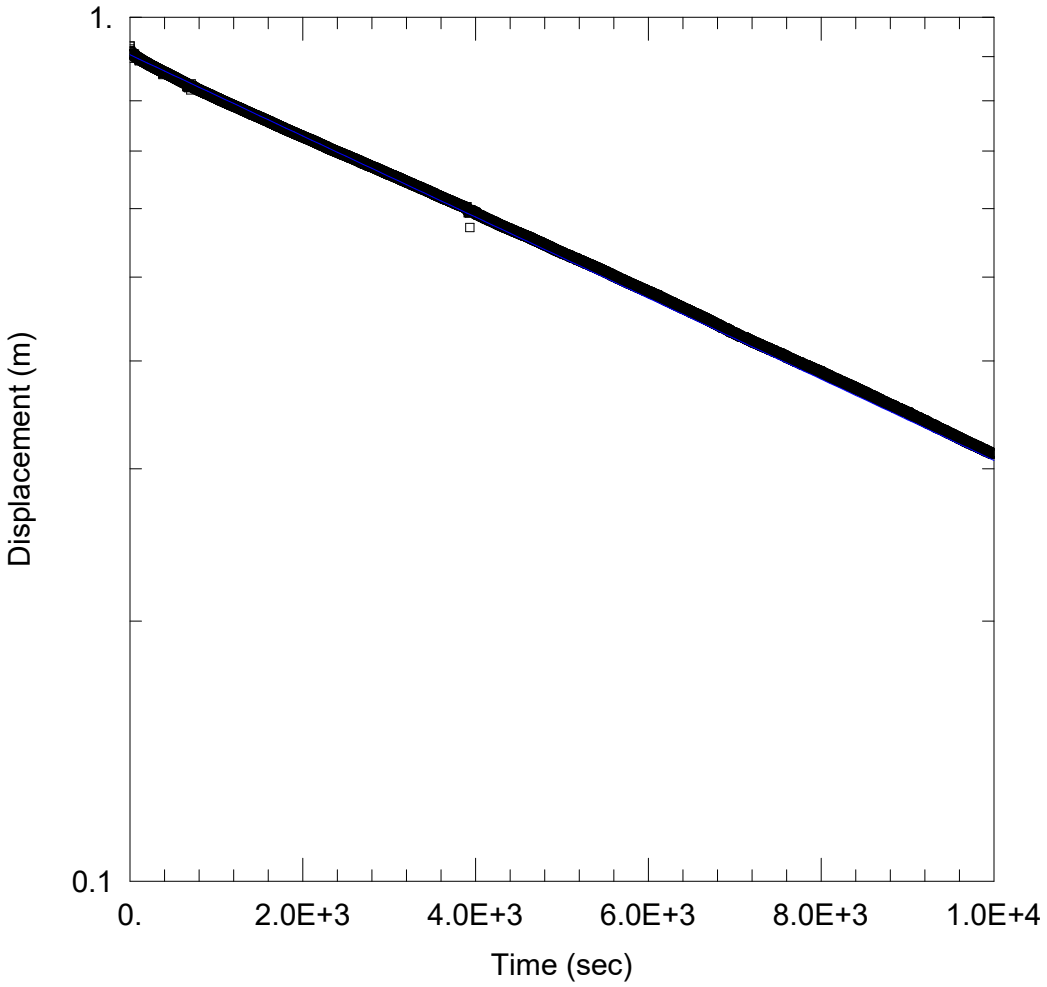
Saturated Thickness: 5.76 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (New Well)

Initial Displacement: 0.9149 m
Total Well Penetration Depth: 5.76 m
Casing Radius: 0.025 m
Static Water Column Height: 5.76 m
Screen Length: 3. m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.29E-7 m/sec
y0 = 0.9035 m



PROJECT INFORMATION

Company: SLR
Client: Mizrahi Developments
Project: 244.024373
Test Well: BH24-10

AQUIFER DATA

Saturated Thickness: 4.49 m
Anisotropy Ratio (Kz/Kr): 0.1

WELL DATA (New Well)

Initial Displacement: 0.9255 m
Total Well Penetration Depth: 4.49 m
Casing Radius: 0.025 m
Static Water Column Height: 4.49 m
Screen Length: 3. m
Well Radius: 0.075 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 4.498E-8 m/sec
y0 = 0.9043 m

Appendix D Grain-Size Analysis (SLR, 2024)

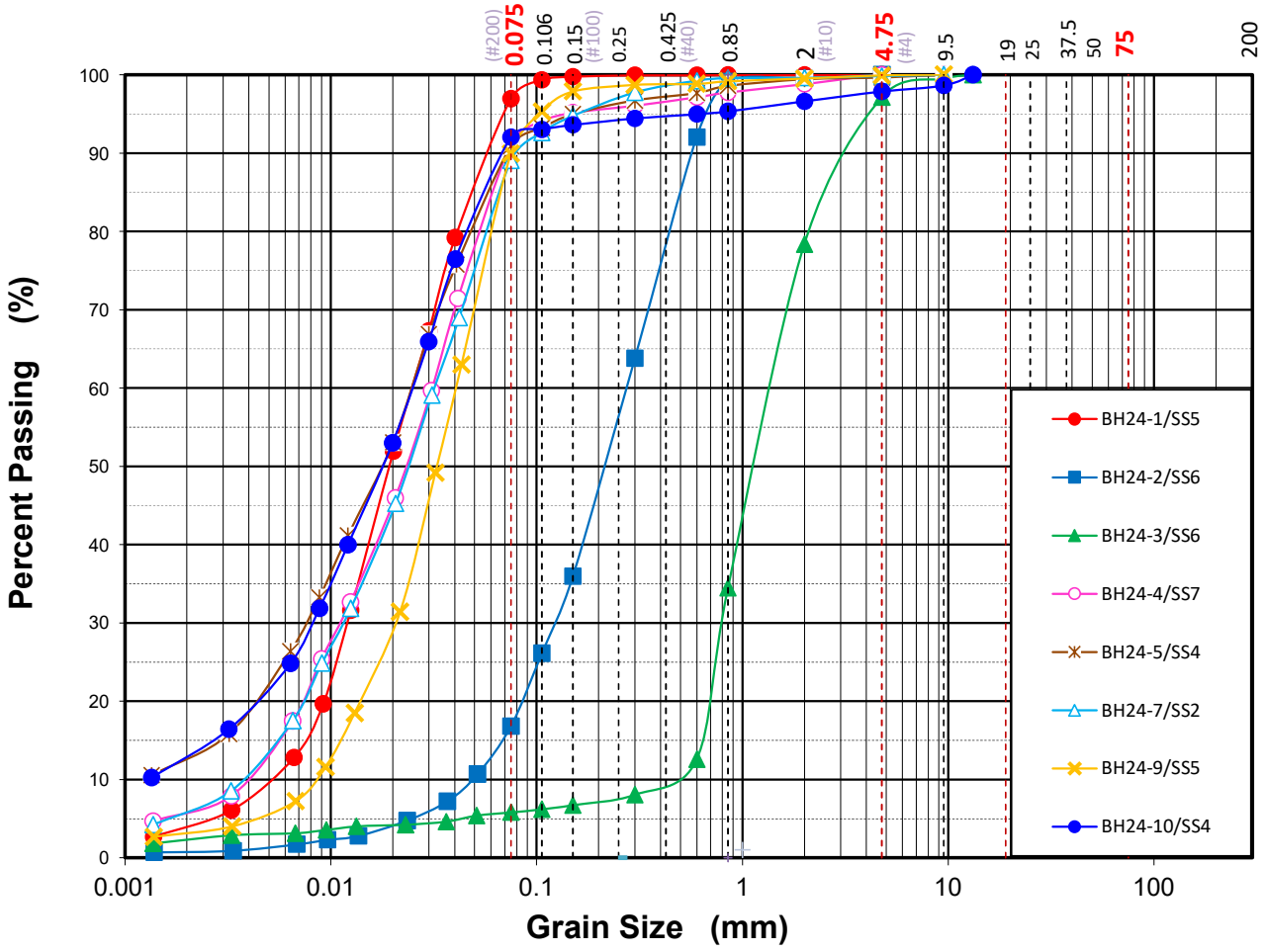
SLR Consulting (Canada) Ltd.
871 Equestrain Ct, Unit 1
Oakville, ON L6L 6L7

Particle Size Distribution Report
(ASTM D421/422)

Project No.:	244.024373.00003	Lab No.:	R24-052
Project Name:	159-163 Sulphur Springs Road	Tested By:	BW
Client:	Mizrahi Developments	Checked By:	OT
Location:	Ancaster, Ontario	Date:	11/15/2024

Test Results

Test No.	Sample No.	Clay	Silt	Sand			Gravel		Cobble+	Remarks
				Fine	Medium	Coarse	Fine	Coarse		
1	BH24-1/SS5	4	93	3			0			
2	BH24-2/SS6	1	16	83			0			
3	BH24-3/SS6	2	4	91			3			
4	BH24-4/SS7	6	85	9			0			
5	BH24-5/SS4	12	79	9			0			
6	BH24-7/SS2	6	83	11			0			
7	BH24-9/SS5	3	87	10			0			
8	BH24-10/SS4	12	80	6			2			



Appendix E Groundwater Chemistry (ALS, 2024)

ALS Canada Ltd.

right solutions.
right partner.

CERTIFICATE OF ANALYSIS (GUIDELINE EVALUATION)

Work Order	: **WT2433802**	Page	: 1 of 6
Client	: **SLR Consulting (Canada) Ltd.**	Laboratory	: ALS Environmental - Waterloo
Contact	: Munjeong Seong	Account Manager	: Andrew Martin
Address	: 871 Equestrian Ct Unit 1 Oakville ON Canada L6L 6L7	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: 244.024373.00003	Date Samples Received	: 12-Nov-2024 16:45
PO	: ----	Date Analysis Commenced	: 13-Nov-2024
C-O-C number	: 20-956299	Issue Date	: 19-Nov-2024 17:07
Sampler	: Munjeong Seong		
Site	: ----		
Quote number	: Ontario - Palmer/SLR 2024 SOA		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Certificate of Analysis contains the following information:

- General Comments
- Analytical Results
- Guideline Comparison

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QC Interpretive report to assist with Quality Review and Sample Receipt Notification (SRN).

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Greg Pokocky	Manager - Inorganics	Inorganics, Waterloo, Ontario
Greg Pokocky	Manager - Inorganics	Metals, Waterloo, Ontario
Jeminikumari Patel		Microbiology, Waterloo, Ontario

No Breaches Found

General Comments

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Refer to the ALS Quality Control Interpretive report (QCI) for applicable references and methodology summaries. Reference methods may incorporate modifications to improve performance.

Where a reported less than (<) result is higher than the LOR, this may be due to primary sample extract/digestate dilution and/or insufficient sample for analysis.
Where the LOR of a reported result differs from standard LOR, this may be due to high moisture content, insufficient sample (reduced weight employed) or matrix interference.

Additional information pertinent to this report will be found in the following separate attachments: Quality Control Report, QA/QC Compliance Assessment to assist with Quality Review and Sample Receipt Notification.

When sampling time information is not provided by the client, sampling dates are shown without a time component. In these instances, the time component has been assumed by the laboratory for processing purposes.

Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to fitness for a particular purpose, or non-infringement. ALS assumes no responsibility for errors or omissions in the information. Guidelines are not adjusted for the hardness, pH or temperature of the sample (the most conservative values are used). Measurement uncertainty is not applied to test results prior to comparison with specified criteria values.

Key : LOR: Limit of Reporting (detection limit).

Unit	*Description*
-	no units
%	percent
µS/cm	microsiemens per centimetre
CFU/100mL	colony forming units per hundred millilitres
CU	colour units (1 cu = 1 mg/l pt)
meq/L	milliequivalents per litre
mg/L	milligrams per litre
NTU	nephelometric turbidity units
pH units	pH units

>: greater than.
<: less than.
Red shading is applied where the result or the LOR is greater than the Guideline Upper Limit (or lower than the Guideline Lower Limit, if applicable).
For drinking water samples, Red shading is applied where the result for E.coli, fecal or total coliforms is greater than or equal to the Guideline Upper Limit.

Qualifiers

Qualifier	Description
DLDS	Detection Limit Raised: Dilution required due to high Dissolved Solids / Electrical Conductivity.
DLUI	Detection Limit Raised: Unknown interference generated an apparent false positive test result.
NDOGN	No Data-Total Coliform and/or E.Coli plate overgrown with non-target.

Analytical Results Evaluation

Matrix: **Groundwater**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID: BH24-5	----	----	----	----	----	----
				Sampling date/time: 12-Nov-2024 10:30	----	----	----	----	----	----
				Sub-Matrix: Groundwater	----	----	----	----	----	----
				WT2433802-001	--------	--------	--------	--------	--------	--------
Physical Tests										
Alkalinity, bicarbonate (as HCO3)	71-52-3	E290/WT	mg/L	364	----	----	----	----	----	----
Alkalinity, carbonate (as CO3)	3812-32-6	E290/WT	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, hydroxide (as OH)	14280-30-9	E290/WT	mg/L	<1.0	----	----	----	----	----	----
Alkalinity, total (as CaCO3)	----	E290/WT	mg/L	298	----	----	----	----	----	----
Colour, apparent	----	E330/WT	CU	53.0	----	----	----	----	----	----
Conductivity	----	E100/WT	µS/cm	1280	----	----	----	----	----	----
Hardness (as CaCO3), from total Ca/Mg	----	EC100A/WT	mg/L	495	----	----	----	----	----	----
pH	----	E108/WT	pH units	7.86	----	----	----	----	----	----
Solids, total dissolved [TDS]	----	E162/WT	mg/L	752 DLDS	----	----	----	----	----	----
Solids, total dissolved [TDS], calculated	----	EC103A/WT	mg/L	832	----	----	----	----	----	----
Turbidity	----	E121/WT	NTU	14.7	----	----	----	----	----	----
Langelier index (@ 20°C)	----	EC105A/WT	-	0.926	----	----	----	----	----	----
Langelier index (@ 4°C)	----	EC105A/WT	-	0.680	----	----	----	----	----	----
pH, saturation (@ 20°C)	----	EC105A/WT	pH units	6.93	----	----	----	----	----	----
pH, saturation (@ 4°C)	----	EC105A/WT	pH units	7.18	----	----	----	----	----	----
Anions and Nutrients										
Ammonia, total (as N)	7664-41-7	E298/WT	mg/L	0.0300	----	----	----	----	----	----
Bromide	24959-67-9	E235.Br/WT	mg/L	<0.50 DLDS	----	----	----	----	----	----
Chloride	16887-00-6	E235.Cl/WT	mg/L	195 DLDS	----	----	----	----	----	----
Fluoride	16984-48-8	E235.F/WT	mg/L	0.223 DLDS	----	----	----	----	----	----
Nitrate (as N)	14797-55-8	E235.NO3/WT	mg/L	<0.100 DLDS	----	----	----	----	----	----
Nitrate + Nitrite (as N)	----	EC235.N+N/WT	mg/L	<0.112	----	----	----	----	----	----
Nitrite (as N)	14797-65-0	E235.NO2/WT	mg/L	<0.050 DLDS	----	----	----	----	----	----
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U/WT	mg/L	<0.0010	----	----	----	----	----	----
Sulfate (as SO4)	14808-79-8	E235.SO4/WT	mg/L	85.8 DLDS	----	----	----	----	----	----
Microbiological Tests										
Coliforms, Escherichia coli [E. coli]	----	E012A.EC/WT	CFU/100 mL	2	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Groundwater**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	BH24-5	----	----	----	----	----	----
				Sampling date/time	12-Nov-2024 10:30	----	----	----	----	----	----
				Sub-Matrix	Groundwater	----	----	----	----	----	----
					WT2433802-001	--------	--------	--------	--------	--------	--------
Microbiological Tests											
Coliforms, total	----	E012.TC/WT	CFU/100 mL		NR NDOGN	----	----	----	----	----	----
coliforms, total background	----	E012.BG.TC/WT	CFU/100 mL		NR NDOGN	----	----	----	----	----	----
Metals											
Sodium adsorption ratio [SAR]	----	EC102/WT	-		1.79	----	----	----	----	----	----
Ion Balance											
Anion sum	----	EC101A/WT	meq/L		13.2	----	----	----	----	----	----
Cation sum (total)	----	EC101A/WT	meq/L		14.0	----	----	----	----	----	----
Ion balance (APHA)	----	EC101A/WT	%		2.94	----	----	----	----	----	----
Ion balance (cations/anions)	----	EC101A/WT	%		106	----	----	----	----	----	----
Total Metals											
Aluminum, total	7429-90-5	E420/WT	mg/L		0.228	----	----	----	----	----	----
Antimony, total	7440-36-0	E420/WT	mg/L		0.00041	----	----	----	----	----	----
Arsenic, total	7440-38-2	E420/WT	mg/L		0.00151	----	----	----	----	----	----
Barium, total	7440-39-3	E420/WT	mg/L		0.241	----	----	----	----	----	----
Beryllium, total	7440-41-7	E420/WT	mg/L		<0.000020	----	----	----	----	----	----
Bismuth, total	7440-69-9	E420/WT	mg/L		<0.000050	----	----	----	----	----	----
Boron, total	7440-42-8	E420/WT	mg/L		0.047	----	----	----	----	----	----
Cadmium, total	7440-43-9	E420/WT	mg/L		0.0000171	----	----	----	----	----	----
Calcium, total	7440-70-2	E420/WT	mg/L		129	----	----	----	----	----	----
Cesium, total	7440-46-2	E420/WT	mg/L		0.000027	----	----	----	----	----	----
Chromium, total	7440-47-3	E420/WT	mg/L		0.00070	----	----	----	----	----	----
Cobalt, total	7440-48-4	E420/WT	mg/L		0.00060	----	----	----	----	----	----
Copper, total	7440-50-8	E420/WT	mg/L		0.00146	----	----	----	----	----	----
Iron, total	7439-89-6	E420/WT	mg/L		0.414	----	----	----	----	----	----
Lead, total	7439-92-1	E420/WT	mg/L		0.000326	----	----	----	----	----	----
Lithium, total	7439-93-2	E420/WT	mg/L		0.0153	----	----	----	----	----	----
Magnesium, total	7439-95-4	E420/WT	mg/L		42.1	----	----	----	----	----	----

Analytical Results Evaluation

Matrix: **Groundwater**

Analyte	CAS Number	Method/Lab	Unit	Client sample ID	BH24-5	----	----	----	----	----	----
				Sampling date/time	12-Nov-2024 10:30	----	----	----	----	----	----
				Sub-Matrix	Groundwater	----	----	----	----	----	----
					WT2433802-001	--------	--------	--------	--------	--------	--------
Total Metals											
Manganese, total	7439-96-5	E420/WT	mg/L		0.594	----	----	----	----	----	----
Molybdenum, total	7439-98-7	E420/WT	mg/L		0.0112	----	----	----	----	----	----
Nickel, total	7440-02-0	E420/WT	mg/L		0.00231	----	----	----	----	----	----
Phosphorus, total	7723-14-0	E420/WT	mg/L		<0.050	----	----	----	----	----	----
Potassium, total	7440-09-7	E420/WT	mg/L		2.88	----	----	----	----	----	----
Rubidium, total	7440-17-7	E420/WT	mg/L		0.00158	----	----	----	----	----	----
Selenium, total	7782-49-2	E420/WT	mg/L		0.000254	----	----	----	----	----	----
Silicon (as SiO2), total	7631-86-9	EC420.SiO2/WT	mg/L		15.9	----	----	----	----	----	----
Silicon, total	7440-21-3	E420/WT	mg/L		7.45	----	----	----	----	----	----
Silver, total	7440-22-4	E420/WT	mg/L		0.000022	----	----	----	----	----	----
Sodium, total	7440-23-5	E420/WT	mg/L		91.4	----	----	----	----	----	----
Strontium, total	7440-24-6	E420/WT	mg/L		2.46	----	----	----	----	----	----
Sulfur, total	7704-34-9	E420/WT	mg/L		31.0	----	----	----	----	----	----
Tellurium, total	13494-80-9	E420/WT	mg/L		0.00020	----	----	----	----	----	----
Thallium, total	7440-28-0	E420/WT	mg/L		0.000012	----	----	----	----	----	----
Thorium, total	7440-29-1	E420/WT	mg/L		0.00011	----	----	----	----	----	----
Tin, total	7440-31-5	E420/WT	mg/L		0.00127	----	----	----	----	----	----
Titanium, total	7440-32-6	E420/WT	mg/L		<0.00600 DLUI	----	----	----	----	----	----
Tungsten, total	7440-33-7	E420/WT	mg/L		<0.00010	----	----	----	----	----	----
Uranium, total	7440-61-1	E420/WT	mg/L		0.0152	----	----	----	----	----	----
Vanadium, total	7440-62-2	E420/WT	mg/L		0.00078	----	----	----	----	----	----
Zinc, total	7440-66-6	E420/WT	mg/L		0.0111	----	----	----	----	----	----
Zirconium, total	7440-67-7	E420/WT	mg/L		0.00022	----	----	----	----	----	----

Please refer to the General Comments section for an explanation of any result qualifiers detected.

Please refer to the Accreditation section for an explanation of analyte accreditations.

Key:

ALS Canada Ltd.

right solutions.
right partner.

QUALITY CONTROL INTERPRETIVE REPORT

Work Order	: **WT2433802**	Page	: 1 of 11
Client	: **SLR Consulting (Canada) Ltd.**	Laboratory	: ALS Environmental - Waterloo
Contact	: Munjeong Seong	Account Manager	: Andrew Martin
Address	: 871 Equestrian Ct Unit 1 Oakville ON Canada L6L 6L7	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: 244.024373.00003	Date Samples Received	: 12-Nov-2024 16:45
PO	: ----	Issue Date	: 19-Nov-2024 17:08
C-O-C number	: 20-956299		
Sampler	: Munjeong Seong		
Site	: ----		
Quote number	: Ontario - Palmer/SLR 2024 SOA		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report is automatically generated by the ALS LIMS (Laboratory Information Management System) through evaluation of Quality Control (QC) results and other QA parameters associated with this submission, and is intended to facilitate rapid data validation by auditors or reviewers. The report highlights any exceptions and outliers to ALS Data Quality Objectives, provides holding time details and exceptions, summarizes QC sample frequencies, and lists applicable methodology references and summaries.

Key

Anonymous: Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number: Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO: Data Quality Objective.
LOR: Limit of Reporting (detection limit).
RPD: Relative Percent Difference.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Summary of Outliers

Outliers : Quality Control Samples

- No Duplicate outliers occur.
- No Laboratory Control Sample (LCS) outliers occur
- No Matrix Spike outliers occur.
- Method Blank value outliers occur - please see following pages for full details.
- No Test sample Surrogate recovery outliers exist.

Outliers: Reference Material (RM) Samples

- No Reference Material (RM) Sample outliers occur.

Outliers : Analysis Holding Time Compliance (Breaches)

- Analysis Holding Time Outliers exist - please see following pages for full details.

Outliers : Frequency of Quality Control Samples

- Quality Control Sample Frequency Outliers occur - please see following pages for full details.

Outliers : Quality Control Samples

Duplicates, Method Blanks, Laboratory Control Samples and Matrix Spikes

Matrix: **Water**

Analyte Group	Laboratory sample ID	Client/Ref Sample ID	Analyte	CAS Number	Method	Result	Limits	Comment
Method Blank (MB) Values								
Total Metals	QC-1762671-001	----	Manganese, total	7439-96-5	E420	0.00019 B mg/L	0.0001 mg/L	Blank result exceeds permitted value

Result Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Analysis Holding Time Compliance

This report summarizes extraction / preparation and analysis times and compares each with ALS recommended holding times, which are selected to meet known provincial and /or federal requirements. In the absence of regulatory hold times, ALS establishes recommendations based on guidelines published by organizations such as CCME, US EPA, APHA Standard Methods, ASTM, or Environment Canada (where available). Dates and holding times reported below represent the first dates of extraction or analysis. If subsequent tests or dilutions exceeded holding times, qualifiers are added (refer to COA).

If samples are identified below as having been analyzed or extracted outside of recommended holding times, measurement uncertainties may be increased, and this should be taken into consideration when interpreting results.

Where actual sampling date is not provided on the chain of custody, the date of receipt with time at 00:00 is used for calculation purposes.

Where only the sample date without time is provided on the chain of custody, the sampling date at 00:00 is used for calculation purposes.

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Ammonia by Fluorescence										
Amber glass total (sulfuric acid) [ON MECP]										
BH24-5	E298	12-Nov-2024	13-Nov-2024	28 days	1 days	✓	14-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Bromide in Water by IC										
HDPE [ON MECP]										
BH24-5	E235.Br	12-Nov-2024	13-Nov-2024	28 days	1 days	✓	14-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Chloride in Water by IC										
HDPE [ON MECP]										
BH24-5	E235.Cl	12-Nov-2024	13-Nov-2024	28 days	1 days	✓	14-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)										
HDPE [ON MECP]										
BH24-5	E378-U	12-Nov-2024	13-Nov-2024	7 days	1 days	✓	13-Nov-2024	7 days	1 days	✓
Anions and Nutrients : Fluoride in Water by IC										
HDPE [ON MECP]										
BH24-5	E235.F	12-Nov-2024	13-Nov-2024	28 days	1 days	✓	14-Nov-2024	28 days	2 days	✓
Anions and Nutrients : Nitrate in Water by IC										
HDPE [ON MECP]										
BH24-5	E235.NO3	12-Nov-2024	13-Nov-2024	7 days	1 days	✓	14-Nov-2024	7 days	2 days	✓
Anions and Nutrients : Nitrite in Water by IC										
HDPE [ON MECP]										
BH24-5	E235.NO2	12-Nov-2024	13-Nov-2024	7 days	1 days	✓	14-Nov-2024	7 days	2 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Anions and Nutrients : Sulfate in Water by IC										
HDPE [ON MECP]										
BH24-5	E235.SO4	12-Nov-2024	13-Nov-2024	28 days	1 days	✓	14-Nov-2024	28 days	2 days	✓
Microbiological Tests : E. coli (MF-mFC-BCIG)										
Sterile HDPE (Sodium thiosulphate) [ON MECP]										
BH24-5	E012A.EC	12-Nov-2024	----	----	----		13-Nov-2024	48 hrs	28 hrs	✓
Microbiological Tests : Total Coliforms (MF-mEndo)										
Sterile HDPE (Sodium thiosulphate) [ON MECP]										
BH24-5	E012.TC	12-Nov-2024	----	----	----		13-Nov-2024	48 hrs	28 hrs	✓
Microbiological Tests : Total Coliforms Background (MF-mEndo)										
Sterile HDPE (Sodium thiosulphate) [ON MECP]										
BH24-5	E012.BG.TC	12-Nov-2024	----	----	----		13-Nov-2024	48 hrs	28 hrs	✓
Physical Tests : Alkalinity Species by Titration										
HDPE [ON MECP]										
BH24-5	E290	12-Nov-2024	13-Nov-2024	14 days	1 days	✓	15-Nov-2024	14 days	3 days	✓
Physical Tests : Colour (Apparent) by Spectrometer										
HDPE [ON MECP]										
BH24-5	E330	12-Nov-2024	----	----	----		15-Nov-2024	48 hrs	70 hrs	× EHT
Physical Tests : Conductivity in Water										
HDPE [ON MECP]										
BH24-5	E100	12-Nov-2024	13-Nov-2024	28 days	1 days	✓	15-Nov-2024	28 days	3 days	✓
Physical Tests : pH by Meter										
HDPE [ON MECP]										
BH24-5	E108	12-Nov-2024	13-Nov-2024	14 days	1 days	✓	15-Nov-2024	14 days	3 days	✓
Physical Tests : TDS by Gravimetry										
HDPE [ON MECP]										
BH24-5	E162	12-Nov-2024	----	----	----		13-Nov-2024	7 days	1 days	✓

Matrix: **Water**

Evaluation: × = Holding time exceedance ; ✓ = Within Holding Time

Analyte Group : Analytical Method / Container / Client Sample ID(s)	Method	Sampling Date	Extraction / Preparation				Analysis			
			Preparation Date	Holding Times Rec	Holding Times Actual	Eval	Analysis Date	Holding Times Rec	Holding Times Actual	Eval
Physical Tests : Turbidity by Nephelometry										
HDPE [ON MECP]										
BH24-5	E121	12-Nov-2024	----	----	----		13-Nov-2024	48 hrs	23 hrs	✓
Total Metals : Total Metals in Water by CRC ICPMS										
HDPE total (nitric acid)										
BH24-5	E420	12-Nov-2024	13-Nov-2024	180 days	1 days	✓	13-Nov-2024	180 days	1 days	✓

Legend & Qualifier Definitions

EHT: Exceeded ALS recommended hold time prior to analysis.

Rec. HT: ALS recommended hold time (see units).

Quality Control Parameter Frequency Compliance

The following report summarizes the frequency of laboratory QC samples analyzed within the analytical batches (QC lots) in which the submitted samples were processed. The actual frequency should be greater than or equal to the expected frequency.

Matrix: **Water**

Evaluation: ✗ = QC frequency outside specification; ✓ = QC frequency within specification.

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Laboratory Duplicates (DUP)							
Alkalinity Species by Titration	E290	1763174	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	1764757	1	13	7.6	5.0	✓
Bromide in Water by IC	E235.Br	1763179	1	4	25.0	5.0	✓
Chloride in Water by IC	E235.Cl	1763180	1	18	5.5	5.0	✓
Colour (Apparent) by Spectrometer	E330	1767748	1	20	5.0	5.0	✓
Conductivity in Water	E100	1763173	1	6	16.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1763181	1	8	12.5	5.0	✓
E. coli (MF-mFC-BCIG)	E012A.EC	1764214	1	7	14.2	5.0	✓
Fluoride in Water by IC	E235.F	1763175	1	9	11.1	5.0	✓
Nitrate in Water by IC	E235.NO3	1763176	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1763178	1	20	5.0	5.0	✓
pH by Meter	E108	1763172	1	9	11.1	5.0	✓
Sulfate in Water by IC	E235.SO4	1763177	1	6	16.6	5.0	✓
TDS by Gravimetry	E162	1763898	1	20	5.0	5.0	✓
Total Coliforms (MF-mEndo)	E012.TC	1764216	1	7	14.2	5.0	✓
Total Coliforms Background (MF-mEndo)	E012.BG.TC	1764217	0	5	0.0	5.0	✗
Total Metals in Water by CRC ICPMS	E420	1762671	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1763283	1	16	6.2	5.0	✓
Laboratory Control Samples (LCS)							
Alkalinity Species by Titration	E290	1763174	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	1764757	1	13	7.6	5.0	✓
Bromide in Water by IC	E235.Br	1763179	1	4	25.0	5.0	✓
Chloride in Water by IC	E235.Cl	1763180	1	18	5.5	5.0	✓
Colour (Apparent) by Spectrometer	E330	1767748	1	20	5.0	5.0	✓
Conductivity in Water	E100	1763173	1	6	16.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1763181	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	1763175	1	9	11.1	5.0	✓
Nitrate in Water by IC	E235.NO3	1763176	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1763178	1	20	5.0	5.0	✓
pH by Meter	E108	1763172	1	9	11.1	5.0	✓
Sulfate in Water by IC	E235.SO4	1763177	1	6	16.6	5.0	✓
TDS by Gravimetry	E162	1763898	1	20	5.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1762671	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1763283	1	16	6.2	5.0	✓
Method Blanks (MB)							

Matrix: **Water**

Evaluation: × = *QC frequency outside specification*; ✓ = *QC frequency within specification.*

Quality Control Sample Type			Count		Frequency (%)		
Analytical Methods	*Method*	*QC Lot #*	*QC*	*Regular*	*Actual*	*Expected*	*Evaluation*
Method Blanks (MB) - Continued							
Alkalinity Species by Titration	E290	1763174	1	16	6.2	5.0	✓
Ammonia by Fluorescence	E298	1764757	1	13	7.6	5.0	✓
Bromide in Water by IC	E235.Br	1763179	1	4	25.0	5.0	✓
Chloride in Water by IC	E235.Cl	1763180	1	18	5.5	5.0	✓
Colour (Apparent) by Spectrometer	E330	1767748	1	20	5.0	5.0	✓
Conductivity in Water	E100	1763173	1	6	16.6	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1763181	1	8	12.5	5.0	✓
E. coli (MF-mFC-BCIG)	E012A.EC	1764214	1	7	14.2	5.0	✓
Fluoride in Water by IC	E235.F	1763175	1	9	11.1	5.0	✓
Nitrate in Water by IC	E235.NO3	1763176	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1763178	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1763177	1	6	16.6	5.0	✓
TDS by Gravimetry	E162	1763898	1	20	5.0	5.0	✓
Total Coliforms (MF-mEndo)	E012.TC	1764216	1	7	14.2	5.0	✓
Total Coliforms Background (MF-mEndo)	E012.BG.TC	1764217	1	5	20.0	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1762671	1	9	11.1	5.0	✓
Turbidity by Nephelometry	E121	1763283	1	16	6.2	5.0	✓
Matrix Spikes (MS)							
Ammonia by Fluorescence	E298	1764757	1	13	7.6	5.0	✓
Bromide in Water by IC	E235.Br	1763179	1	4	25.0	5.0	✓
Chloride in Water by IC	E235.Cl	1763180	1	18	5.5	5.0	✓
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U	1763181	1	8	12.5	5.0	✓
Fluoride in Water by IC	E235.F	1763175	1	9	11.1	5.0	✓
Nitrate in Water by IC	E235.NO3	1763176	1	20	5.0	5.0	✓
Nitrite in Water by IC	E235.NO2	1763178	1	20	5.0	5.0	✓
Sulfate in Water by IC	E235.SO4	1763177	1	6	16.6	5.0	✓
Total Metals in Water by CRC ICPMS	E420	1762671	1	9	11.1	5.0	✓

Methodology References and Summaries

The analytical methods used by ALS are developed using internationally recognized reference methods (where available), such as those published by US EPA, APHA Standard Methods, ASTM, ISO, Environment Canada, BC MOE, and Ontario MOE. Reference methods may incorporate modifications to improve performance (indicated by "mod").

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Total Coliforms Background (MF-mEndo)	E012.BG.TC ALS Environmental - Waterloo	Water	APHA 9222B (mod)	Noncoliform bacteria observed on Total Coliform plates are enumerated.
Total Coliforms (MF-mEndo)	E012.TC ALS Environmental - Waterloo	Water	APHA 9222B (mod)	Following filtration (0.45 µm), and incubation at 35.0 ±0.5°C for 24 hours, colonies exhibiting characteristic morphology of the target organism are enumerated and confirmed.
E. coli (MF-mFC-BCIG)	E012A.EC ALS Environmental - Waterloo	Water	APHA 9222D (mod)	Following filtration (0.45 µm), and incubation at 44.5±0.2°C for 24 hours, colonies exhibiting characteristic morphology of the target organism are enumerated.
Conductivity in Water	E100 ALS Environmental - Waterloo	Water	APHA 2510 (mod)	Conductivity, also known as Electrical Conductivity (EC) or Specific Conductance, is measured by immersion of a conductivity cell with platinum electrodes into a water sample. Conductivity measurements are temperature-compensated to 25°C.
pH by Meter	E108 ALS Environmental - Waterloo	Water	APHA 4500-H (mod)	pH is determined by potentiometric measurement with a pH electrode, and is conducted at ambient laboratory temperature (normally 20 ± 5°C). For high accuracy test results, pH should be measured in the field within the recommended 15 minute hold time.
Turbidity by Nephelometry	E121 ALS Environmental - Waterloo	Water	APHA 2130 B (mod)	Turbidity is measured by the nephelometric method, by measuring the intensity of light scatter under defined conditions.
TDS by Gravimetry	E162 ALS Environmental - Waterloo	Water	APHA 2540 C (mod)	Total Dissolved Solids (TDS) are determined by filtering a sample through a glass fibre filter, with evaporation of the filtrate at 180 ± 2°C for 16 hours or to constant weight, with gravimetric measurement of the residue.
Bromide in Water by IC	E235.Br ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Chloride in Water by IC	E235.Cl ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Fluoride in Water by IC	E235.F ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Nitrite in Water by IC	E235.NO2 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Nitrate in Water by IC	E235.NO3 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Sulfate in Water by IC	E235.SO4 ALS Environmental - Waterloo	Water	EPA 300.1 (mod)	Inorganic anions are analyzed by Ion Chromatography with conductivity and/or UV detection.
Alkalinity Species by Titration	E290 ALS Environmental - Waterloo	Water	APHA 2320 B (mod)	Total alkalinity is determined by potentiometric titration to a pH 4.5 endpoint. Bicarbonate, carbonate and hydroxide alkalinity are calculated from phenolphthalein alkalinity and total alkalinity values.
Ammonia by Fluorescence	E298 ALS Environmental - Waterloo	Water	Method Fialab 100, 2018	Ammonia in water is determined by automated continuous flow analysis with membrane diffusion and fluorescence detection, after reaction with OPA (ortho-phthalaldehyde). This method is approved under US EPA 40 CFR Part 136 (May 2021)
Colour (Apparent) by Spectrometer	E330 ALS Environmental - Waterloo	Water	APHA 2120 C (mod)	Colour (Apparent) is measured in an unfiltered sample spectrophotometrically using the single wavelength method. The colour contribution of settleable solids are not included in the result. This method is intended for potable waters. Colour measurements can be highly pH dependent, and apply to the pH of the sample as received (at time of testing), without pH adjustment.
Dissolved Orthophosphate by Colourimetry (Ultra Trace Level 0.001 mg/L)	E378-U ALS Environmental - Waterloo	Water	APHA 4500-P F (mod)	Dissolved Orthophosphate is determined colourimetrically on a sample that has been lab or field filtered through a 0.45 micron membrane filter. Field filtration is recommended to ensure test results represent conditions at time of sampling.
Total Metals in Water by CRC ICPMS	E420 ALS Environmental - Waterloo	Water	EPA 200.2/6020B (mod)	Water samples are digested with nitric and hydrochloric acids, and analyzed by Collision/Reaction Cell ICPMS. Method Limitation (re: Sulfur): Sulfide and volatile sulfur species may not be recovered by this method.
Hardness (Calculated) from Total Ca/Mg	EC100A ALS Environmental - Waterloo	Water	APHA 2340B	"Hardness (as CaCO3), from total Ca/Mg" is calculated from the sum of total Calcium and Magnesium concentrations, expressed in CaCO3 equivalents. "Total Hardness" refers to the sum of Calcium and Magnesium Hardness. Hardness is normally or preferentially calculated from dissolved Calcium and Magnesium concentrations, because it is a property of water due to dissolved divalent cations. Hardness from total Ca/Mg is normally comparable to Dissolved Hardness in non-turbid waters.

Analytical Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Ion Balance using Total Metals	EC101A ALS Environmental - Waterloo	Water	APHA 1030E	Cation Sum (using total metals), Anion Sum, and Ion Balance are calculated based on guidance from APHA Standard Methods (1030E Checking Correctness of Analysis). Minor ions are included where data is present. Ion Balance cannot be calculated accurately for waters with very low electrical conductivity (EC).
Sodium Adsorption Ratio [SAR] from Total Metals	EC102 ALS Environmental - Waterloo	Water	CCME Sodium Adsorption Ratio (SAR)	The Sodium Adsorption Ratio (SAR) for a water sample is calculated from the Sodium, Calcium, and Magnesium concentrations of the water, using the same calculations as would be used for a sediment paste extract.
TDS calculated from conductivity	EC103A ALS Environmental - Waterloo	Water	APHA 1030 E	Total dissolved solids (as mg/L) can be estimated by multiplying electrical conductance (in umhos/cm) by 0.65.
Saturation Index using Laboratory pH (Ca-T)	EC105A ALS Environmental - Waterloo	Water	APHA 2330B	Langelier Index provides an indication of scale formation potential at a given pH and temperature, and is calculated as per APHA 2330B Saturation Index. Positive values indicate oversaturation with respect to CaCO3. Negative values indicate undersaturation of CaCO3. This calculation uses laboratory pH measurements and provides estimates of Langelier Index at temperatures of 4, 15, 20, 25, 66, and 77°C. Ryznar Stability Index is an alternative index used for scale formation and corrosion potential.
Nitrate and Nitrite (as N) (Calculation)	EC235.N+N ALS Environmental - Waterloo	Water	EPA 300.0	Nitrate and Nitrite (as N) is a calculated parameter. Nitrate and Nitrite (as N) = Nitrite (as N) + Nitrate (as N).
Total Silicon as Silica (Calculation)	EC420.SiO2 ALS Environmental - Waterloo	Water	N/A	Total Silicon (as SiO2) is a calculated parameter. Total Silicon (as SiO2 mg/L) = 2.139 x Total Silicon (mg/L).

Preparation Methods	Method / Lab	Matrix	Method Reference	Method Descriptions
Preparation for Ammonia	EP298 ALS Environmental - Waterloo	Water		Sample preparation for Preserved Nutrients Water Quality Analysis.

QUALITY CONTROL REPORT

Work Order	: **WT2433802**	Page	: 1 of 13
Client	: SLR Consulting (Canada) Ltd.	Laboratory	: ALS Environmental - Waterloo
Contact	: Munjeong Seong	Account Manager	: Andrew Martin
Address	: 871 Equestrian Ct Unit 1 Oakville ON Canada L6L 6L7	Address	: 60 Northland Road, Unit 1 Waterloo, Ontario Canada N2V 2B8
Telephone	: ----	Telephone	: +1 519 886 6910
Project	: 244.024373.00003	Date Samples Received	: 12-Nov-2024 16:45
PO	: ----	Date Analysis Commenced	: 13-Nov-2024
C-O-C number	: 20-956299	Issue Date	: 19-Nov-2024 17:07
Sampler	: Munjeong Seong		
Site	: ----		
Quote number	: Ontario - Palmer/SLR 2024 SOA		
No. of samples received	: 1		
No. of samples analysed	: 1		

This report supersedes any previous report(s) with this reference. Results apply to the sample(s) as submitted. This document shall not be reproduced, except in full.

This Quality Control Report contains the following information:

- Laboratory Duplicate (DUP) Report; Relative Percent Difference (RPD) and Data Quality Objectives
- Matrix Spike (MS) Report; Recovery and Data Quality Objectives
- Method Blank (MB) Report; Recovery and Data Quality Objectives
- Laboratory Control Sample (LCS) Report; Recovery and Data Quality Objectives

Signatories

This document has been electronically signed by the authorized signatories below. Electronic signing is conducted in accordance with US FDA 21 CFR Part 11.

Signatories	*Position*	*Laboratory Department*
Greg Pokocky	Manager - Inorganics	Waterloo Inorganics, Waterloo, Ontario
Greg Pokocky	Manager - Inorganics	Waterloo Metals, Waterloo, Ontario
Jeminikumari Patel		Waterloo Microbiology, Waterloo, Ontario

General Comments

The ALS Quality Control (QC) report is optionally provided to ALS clients upon request. ALS test methods include comprehensive QC checks with every analysis to ensure our high standards of quality are met. Each QC result has a known or expected target value, which is compared against predetermined Data Quality Objectives (DQOs) to provide confidence in the accuracy of associated test results. This report contains detailed results for all QC results applicable to this sample submission. Please refer to the ALS Quality Control Interpretation report (QCI) for applicable method references and methodology summaries.

Key :

Anonymous = Refers to samples which are not part of this work order, but which formed part of the QC process lot.
CAS Number = Chemical Abstracts Service number is a unique identifier assigned to discrete substances.
DQO = Data Quality Objective.
LOR = Limit of Reporting (detection limit).
RPD = Relative Percent Difference
# = Indicates a QC result that did not meet the ALS DQO.

Workorder Comments

Holding times are displayed as "---" if no guidance exists from CCME, Canadian provinces, or broadly recognized international references.

Laboratory Duplicate (DUP) Report

A Laboratory Duplicate (DUP) is a randomly selected intralaboratory replicate sample. Laboratory Duplicates provide information regarding method precision and sample heterogeneity. ALS DQOs for Laboratory Duplicates are expressed as test-specific limits for Relative Percent Difference (RPD), or as an absolute difference limit of 2 times the LOR for low concentration duplicates within ~ 4-10 times the LOR (cut-off is test-specific).

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	LOR	Unit	Original Result	Duplicate Result	RPD(%) or Difference	Duplicate Limits	Qualifier
Physical Tests (QC Lot: 1763172)											
WT2433712-001	Anonymous	pH	----	E108	0.10	pH units	8.30	8.23	0.847%	4%	----
Physical Tests (QC Lot: 1763173)											
WT2433712-001	Anonymous	Conductivity	----	E100	1.0	µS/cm	1090	1080	0.0921%	10%	----
Physical Tests (QC Lot: 1763174)											
WT2433712-001	Anonymous	Alkalinity, total (as CaCO3)	----	E290	1.0	mg/L	176	177	0.658%	20%	----
Physical Tests (QC Lot: 1763283)											
WT2433544-001	Anonymous	Turbidity	----	E121	0.10	NTU	3.05	3.11	1.95%	15%	----
Physical Tests (QC Lot: 1763898)											
WT2433686-007	Anonymous	Solids, total dissolved [TDS]	----	E162	20	mg/L	478	462	3.41%	20%	----
Physical Tests (QC Lot: 1767748)											
HA2402870-005	Anonymous	Colour, apparent	----	E330	2.0	CU	12.1	10.8	1.3	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1763175)											
WT2433712-001	Anonymous	Fluoride	16984-48-8	E235.F	0.100	mg/L	0.764	0.758	0.006	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1763176)											
WT2433712-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	0.100	mg/L	<0.100	<0.100	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1763177)											
WT2433712-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	1.50	mg/L	441	442	0.216%	20%	----
Anions and Nutrients (QC Lot: 1763178)											
WT2433712-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1763179)											
WT2433712-001	Anonymous	Bromide	24959-67-9	E235.Br	0.50	mg/L	<0.50	<0.50	0	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1763180)											
WT2433712-001	Anonymous	Chloride	16887-00-6	E235.Cl	2.50	mg/L	2.98	3.05	0.07	Diff <2x LOR	----
Anions and Nutrients (QC Lot: 1763181)											
WT2433706-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	30.0	mg/L	1740	1750	0.332%	20%	----
Anions and Nutrients (QC Lot: 1764757)											
WT2433759-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	0.0050	mg/L	0.259	0.259	0.232%	20%	----
Microbiological Tests (QC Lot: 1764214)											
WT2433802-001	BH24-5	Coliforms, Escherichia coli [E. coli]	----	E012A.EC	1	CFU/100mL	2	1	1	Diff <2x LOR	----
Microbiological Tests (QC Lot: 1764216)											

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Microbiological Tests (QC Lot: 1764216) - continued											
WT2433822-001	Anonymous	Coliforms, total	----	E012.TC	1	CFU/100mL	<1	<1	0	Diff <2x LOR	----
Total Metals (QC Lot: 1762671)											
WT2433759-001	Anonymous	Aluminum, total	7429-90-5	E420	0.0030	mg/L	0.904	0.904	0.0443%	20%	----
		Antimony, total	7440-36-0	E420	0.00010	mg/L	0.00034	0.00035	0.000004	Diff <2x LOR	----
		Arsenic, total	7440-38-2	E420	0.00010	mg/L	0.00033	0.00031	0.00002	Diff <2x LOR	----
		Barium, total	7440-39-3	E420	0.00010	mg/L	0.0544	0.0532	2.24%	20%	----
		Beryllium, total	7440-41-7	E420	0.000020	mg/L	<0.000020	<0.000020	0	Diff <2x LOR	----
		Bismuth, total	7440-69-9	E420	0.000050	mg/L	<0.000050	<0.000050	0	Diff <2x LOR	----
		Boron, total	7440-42-8	E420	0.010	mg/L	0.051	0.052	0.001	Diff <2x LOR	----
		Cadmium, total	7440-43-9	E420	0.0000050	mg/L	0.0000119	0.0000100	0.0000019	Diff <2x LOR	----
		Calcium, total	7440-70-2	E420	0.050	mg/L	45.9	44.5	3.15%	20%	----
		Cesium, total	7440-46-2	E420	0.000010	mg/L	0.000016	0.000018	0.000001	Diff <2x LOR	----
		Chromium, total	7440-47-3	E420	0.00050	mg/L	0.00068	0.00070	0.00002	Diff <2x LOR	----
		Cobalt, total	7440-48-4	E420	0.00010	mg/L	0.00050	0.00050	0.000003	Diff <2x LOR	----
		Copper, total	7440-50-8	E420	0.00050	mg/L	0.00360	0.00361	0.00002	Diff <2x LOR	----
		Iron, total	7439-89-6	E420	0.010	mg/L	0.078	0.078	0.0004	Diff <2x LOR	----
		Lead, total	7439-92-1	E420	0.000050	mg/L	0.000072	0.000073	0.000001	Diff <2x LOR	----
		Lithium, total	7439-93-2	E420	0.0010	mg/L	0.0064	0.0063	0.0001	Diff <2x LOR	----
		Magnesium, total	7439-95-4	E420	0.0050	mg/L	8.45	8.64	2.22%	20%	----
		Manganese, total	7439-96-5	E420	0.00010	mg/L	0.0238	0.0242	1.53%	20%	----
		Molybdenum, total	7439-98-7	E420	0.000050	mg/L	0.00250	0.00260	4.18%	20%	----
		Nickel, total	7440-02-0	E420	0.00050	mg/L	0.00303	0.00306	0.00003	Diff <2x LOR	----
		Phosphorus, total	7723-14-0	E420	0.050	mg/L	<0.050	<0.050	0	Diff <2x LOR	----
		Potassium, total	7440-09-7	E420	0.050	mg/L	30.6	30.4	0.560%	20%	----
		Rubidium, total	7440-17-7	E420	0.00020	mg/L	0.0134	0.0131	2.49%	20%	----
		Selenium, total	7782-49-2	E420	0.000050	mg/L	0.000231	0.000221	0.000010	Diff <2x LOR	----
		Silicon, total	7440-21-3	E420	0.10	mg/L	3.42	3.36	1.61%	20%	----
		Silver, total	7440-22-4	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Sodium, total	7440-23-5	E420	0.050	mg/L	38.2	38.0	0.669%	20%	----
		Strontium, total	7440-24-6	E420	0.00020	mg/L	0.954	0.944	1.11%	20%	----
		Sulfur, total	7704-34-9	E420	0.50	mg/L	38.0	36.8	3.05%	20%	----
		Tellurium, total	13494-80-9	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----
		Thallium, total	7440-28-0	E420	0.000010	mg/L	<0.000010	<0.000010	0	Diff <2x LOR	----
		Thorium, total	7440-29-1	E420	0.00010	mg/L	<0.00010	<0.00010	0	Diff <2x LOR	----

Sub-Matrix: **Water**

					Laboratory Duplicate (DUP) Report						
Laboratory sample ID	*Client sample ID*	*Analyte*	*CAS Number*	*Method*	*LOR*	*Unit*	*Original Result*	*Duplicate Result*	*RPD(%) or Difference*	*Duplicate Limits*	*Qualifier*
Total Metals (QC Lot: 1762671) - continued											
WT2433759-001	Anonymous	Tin, total	7440-31-5	E420	0.00010	mg/L	0.00024	0.00025	0.000008	Diff <2x LOR	----
		Titanium, total	7440-32-6	E420	0.00300	mg/L	<0.00300	<0.00300	0	Diff <2x LOR	----
		Tungsten, total	7440-33-7	E420	0.00010	mg/L	0.00017	0.00018	0.00001	Diff <2x LOR	----
		Uranium, total	7440-61-1	E420	0.000010	mg/L	0.000110	0.000108	1.19%	20%	----
		Vanadium, total	7440-62-2	E420	0.00050	mg/L	0.00083	0.00088	0.00004	Diff <2x LOR	----
		Zinc, total	7440-66-6	E420	0.0030	mg/L	0.0115	0.0111	0.0004	Diff <2x LOR	----
		Zirconium, total	7440-67-7	E420	0.00020	mg/L	<0.00020	<0.00020	0	Diff <2x LOR	----

Method Blank (MB) Report

A Method Blank is an analyte-free matrix that undergoes sample processing identical to that carried out for test samples. Method Blank results are used to monitor and control for potential contamination from the laboratory environment and reagents. For most tests, the DQO for Method Blanks is for the result to be < LOR.

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Physical Tests (QCLot: 1763173)						
Conductivity	----	E100	1	µS/cm	<1.0	----
Physical Tests (QCLot: 1763174)						
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	<1.0	----
Physical Tests (QCLot: 1763283)						
Turbidity	----	E121	0.1	NTU	<0.10	----
Physical Tests (QCLot: 1763898)						
Solids, total dissolved [TDS]	----	E162	10	mg/L	<10	----
Physical Tests (QCLot: 1767748)						
Colour, apparent	----	E330	2	CU	<2.0	----
Anions and Nutrients (QCLot: 1763175)						
Fluoride	16984-48-8	E235.F	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1763176)						
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	<0.020	----
Anions and Nutrients (QCLot: 1763177)						
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	<0.30	----
Anions and Nutrients (QCLot: 1763178)						
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	<0.010	----
Anions and Nutrients (QCLot: 1763179)						
Bromide	24959-67-9	E235.Br	0.1	mg/L	<0.10	----
Anions and Nutrients (QCLot: 1763180)						
Chloride	16887-00-6	E235.Cl	0.5	mg/L	<0.50	----
Anions and Nutrients (QCLot: 1763181)						
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	<0.0010	----
Anions and Nutrients (QCLot: 1764757)						
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	<0.0050	----
Microbiological Tests (QCLot: 1764214)						
Coliforms, Escherichia coli [E. coli]	----	E012A.EC	1	CFU/100mL	<1	----
Microbiological Tests (QCLot: 1764216)						
Coliforms, total	----	E012.TC	1	CFU/100mL	<1	----
Microbiological Tests (QCLot: 1764217)						
coliforms, total background	----	E012.BG.TC	1	CFU/100mL	<1	----
Total Metals (QCLot: 1762671)						

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1762671) - continued						
Aluminum, total	7429-90-5	E420	0.003	mg/L	<0.0030	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	<0.00010	----
Arsenic, total	7440-38-2	E420	0.0001	mg/L	<0.00010	----
Barium, total	7440-39-3	E420	0.0001	mg/L	<0.00010	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	<0.000020	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	<0.000050	----
Boron, total	7440-42-8	E420	0.01	mg/L	<0.010	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	<0.0000050	----
Calcium, total	7440-70-2	E420	0.05	mg/L	<0.050	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	<0.000010	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	<0.00050	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	<0.00010	----
Copper, total	7440-50-8	E420	0.0005	mg/L	<0.00050	----
Iron, total	7439-89-6	E420	0.01	mg/L	<0.010	----
Lead, total	7439-92-1	E420	0.00005	mg/L	<0.000050	----
Lithium, total	7439-93-2	E420	0.001	mg/L	<0.0010	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	<0.0050	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	# 0.00019	B
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	<0.000050	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	<0.00050	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	<0.050	----
Potassium, total	7440-09-7	E420	0.05	mg/L	<0.050	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	<0.00020	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	<0.000050	----
Silicon, total	7440-21-3	E420	0.1	mg/L	<0.10	----
Silver, total	7440-22-4	E420	0.00001	mg/L	<0.000010	----
Sodium, total	7440-23-5	E420	0.05	mg/L	<0.050	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	<0.00020	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	<0.50	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	<0.00020	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	<0.000010	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	<0.00010	----
Tin, total	7440-31-5	E420	0.0001	mg/L	<0.00010	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	<0.00030	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	<0.00010	----

Sub-Matrix: **Water**

Analyte	CAS Number	Method	LOR	Unit	Result	Qualifier
Total Metals (QCLot: 1762671) - continued						
Uranium, total	7440-61-1	E420	0.00001	mg/L	<0.000010	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	<0.00050	----
Zinc, total	7440-66-6	E420	0.003	mg/L	<0.0030	----
Zirconium, total	7440-67-7	E420	0.0002	mg/L	<0.00020	----

Qualifiers

Qualifier	Description
B	*Method Blank exceeds ALS DQO. Associated sample results which are < Limit of Reporting or > 5 times blank level are considered reliable.*

Laboratory Control Sample (LCS) Report

A Laboratory Control Sample (LCS) is an analyte-free matrix that has been fortified (spiked) with test analytes at known concentration and processed in an identical manner to test samples. LCS results are expressed as percent recovery, and are used to monitor and control test method accuracy and precision, independent of test sample matrix.

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Physical Tests (QCLot: 1763172)									
pH	----	E108	----	pH units	7 pH units	101	98.0	102	----
Physical Tests (QCLot: 1763173)									
Conductivity	----	E100	1	µS/cm	1410 µS/cm	99.1	90.0	110	----
Physical Tests (QCLot: 1763174)									
Alkalinity, total (as CaCO3)	----	E290	1	mg/L	150 mg/L	101	85.0	115	----
Physical Tests (QCLot: 1763283)									
Turbidity	----	E121	0.1	NTU	200 NTU	94.5	85.0	115	----
Physical Tests (QCLot: 1763898)									
Solids, total dissolved [TDS]	----	E162	10	mg/L	1000 mg/L	97.4	85.0	115	----
Physical Tests (QCLot: 1767748)									
Colour, apparent	----	E330	2	CU	25 CU	102	85.0	115	----
Anions and Nutrients (QCLot: 1763175)									
Fluoride	16984-48-8	E235.F	0.02	mg/L	1 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1763176)									
Nitrate (as N)	14797-55-8	E235.NO3	0.02	mg/L	2.5 mg/L	99.9	90.0	110	----
Anions and Nutrients (QCLot: 1763177)									
Sulfate (as SO4)	14808-79-8	E235.SO4	0.3	mg/L	100 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1763178)									
Nitrite (as N)	14797-65-0	E235.NO2	0.01	mg/L	0.5 mg/L	101	90.0	110	----
Anions and Nutrients (QCLot: 1763179)									
Bromide	24959-67-9	E235.Br	0.1	mg/L	0.5 mg/L	99.6	85.0	115	----
Anions and Nutrients (QCLot: 1763180)									
Chloride	16887-00-6	E235.Cl	0.5	mg/L	100 mg/L	99.7	90.0	110	----
Anions and Nutrients (QCLot: 1763181)									
Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	0.001	mg/L	0.05 mg/L	104	80.0	120	----
Anions and Nutrients (QCLot: 1764757)									
Ammonia, total (as N)	7664-41-7	E298	0.005	mg/L	0.2 mg/L	99.3	85.0	115	----
Total Metals (QCLot: 1762671)									
Aluminum, total	7429-90-5	E420	0.003	mg/L	0.1 mg/L	99.9	80.0	120	----
Antimony, total	7440-36-0	E420	0.0001	mg/L	0.05 mg/L	105	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1762671) - continued									
Arsenic, total	7440-38-2	E420	0.0001	mg/L	0.05 mg/L	108	80.0	120	----
Barium, total	7440-39-3	E420	0.0001	mg/L	0.012 mg/L	97.9	80.0	120	----
Beryllium, total	7440-41-7	E420	0.00002	mg/L	0.005 mg/L	96.6	80.0	120	----
Bismuth, total	7440-69-9	E420	0.00005	mg/L	0.05 mg/L	97.6	80.0	120	----
Boron, total	7440-42-8	E420	0.01	mg/L	0.05 mg/L	93.1	80.0	120	----
Cadmium, total	7440-43-9	E420	0.000005	mg/L	0.005 mg/L	95.0	80.0	120	----
Calcium, total	7440-70-2	E420	0.05	mg/L	2.5 mg/L	96.2	80.0	120	----
Cesium, total	7440-46-2	E420	0.00001	mg/L	0.002 mg/L	94.3	80.0	120	----
Chromium, total	7440-47-3	E420	0.0005	mg/L	0.012 mg/L	103	80.0	120	----
Cobalt, total	7440-48-4	E420	0.0001	mg/L	0.012 mg/L	101	80.0	120	----
Copper, total	7440-50-8	E420	0.0005	mg/L	0.012 mg/L	101	80.0	120	----
Iron, total	7439-89-6	E420	0.01	mg/L	0.05 mg/L	102	80.0	120	----
Lead, total	7439-92-1	E420	0.00005	mg/L	0.025 mg/L	96.5	80.0	120	----
Lithium, total	7439-93-2	E420	0.001	mg/L	0.012 mg/L	85.3	80.0	120	----
Magnesium, total	7439-95-4	E420	0.005	mg/L	2.5 mg/L	104	80.0	120	----
Manganese, total	7439-96-5	E420	0.0001	mg/L	0.012 mg/L	101	80.0	120	----
Molybdenum, total	7439-98-7	E420	0.00005	mg/L	0.012 mg/L	98.4	80.0	120	----
Nickel, total	7440-02-0	E420	0.0005	mg/L	0.025 mg/L	99.2	80.0	120	----
Phosphorus, total	7723-14-0	E420	0.05	mg/L	0.5 mg/L	102	80.0	120	----
Potassium, total	7440-09-7	E420	0.05	mg/L	2.5 mg/L	103	80.0	120	----
Rubidium, total	7440-17-7	E420	0.0002	mg/L	0.005 mg/L	105	80.0	120	----
Selenium, total	7782-49-2	E420	0.00005	mg/L	0.05 mg/L	103	80.0	120	----
Silicon, total	7440-21-3	E420	0.1	mg/L	0.5 mg/L	103	80.0	120	----
Silver, total	7440-22-4	E420	0.00001	mg/L	0.005 mg/L	89.3	80.0	120	----
Sodium, total	7440-23-5	E420	0.05	mg/L	2.5 mg/L	109	80.0	120	----
Strontium, total	7440-24-6	E420	0.0002	mg/L	0.012 mg/L	94.1	80.0	120	----
Sulfur, total	7704-34-9	E420	0.5	mg/L	2.5 mg/L	98.8	80.0	120	----
Tellurium, total	13494-80-9	E420	0.0002	mg/L	0.005 mg/L	97.8	80.0	120	----
Thallium, total	7440-28-0	E420	0.00001	mg/L	0.05 mg/L	96.9	80.0	120	----
Thorium, total	7440-29-1	E420	0.0001	mg/L	0.005 mg/L	89.3	80.0	120	----
Tin, total	7440-31-5	E420	0.0001	mg/L	0.025 mg/L	94.6	80.0	120	----
Titanium, total	7440-32-6	E420	0.0003	mg/L	0.012 mg/L	94.6	80.0	120	----
Tungsten, total	7440-33-7	E420	0.0001	mg/L	0.005 mg/L	94.2	80.0	120	----
Uranium, total	7440-61-1	E420	0.00001	mg/L	0 mg/L	90.8	80.0	120	----
Vanadium, total	7440-62-2	E420	0.0005	mg/L	0.025 mg/L	105	80.0	120	----
Zinc, total	7440-66-6	E420	0.003	mg/L	0.025 mg/L	97.2	80.0	120	----

Sub-Matrix: **Water**

					Laboratory Control Sample (LCS) Report				
					Spike	Recovery (%)	Recovery Limits (%)		
Analyte	CAS Number	Method	LOR	Unit	Target Concentration	LCS	Low	High	Qualifier
Total Metals (QCLot: 1762671) - continued									
Zirconium, total	7440-67-7	E420	0.0002	mg/L	0.005 mg/L	94.1	80.0	120	----

Matrix Spike (MS) Report

A Matrix Spike (MS) is a randomly selected intra-laboratory replicate sample that has been fortified (spiked) with test analytes at known concentration, and processed in an identical manner to test samples. Matrix Spikes provide information regarding analyte recovery and potential matrix effects. MS DQO exceedances due to sample matrix may sometimes be unavoidable; in such cases, test results for the associated sample (or similar samples) may be subject to bias. ND – Recovery not determined, background level >= 1x spike level.

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Anions and Nutrients (QCLot: 1763175)										
WT2433712-001	Anonymous	Fluoride	16984-48-8	E235.F	5.22 mg/L	5 mg/L	104	75.0	125	----
Anions and Nutrients (QCLot: 1763176)										
WT2433712-001	Anonymous	Nitrate (as N)	14797-55-8	E235.NO3	12.3 mg/L	12.5 mg/L	98.7	75.0	125	----
Anions and Nutrients (QCLot: 1763177)										
WT2433712-001	Anonymous	Sulfate (as SO4)	14808-79-8	E235.SO4	488 mg/L	500 mg/L	97.5	75.0	125	----
Anions and Nutrients (QCLot: 1763178)										
WT2433712-001	Anonymous	Nitrite (as N)	14797-65-0	E235.NO2	2.46 mg/L	2.5 mg/L	98.6	75.0	125	----
Anions and Nutrients (QCLot: 1763179)										
WT2433712-001	Anonymous	Bromide	24959-67-9	E235.Br	2.53 mg/L	2.5 mg/L	101	75.0	125	----
Anions and Nutrients (QCLot: 1763180)										
WT2433712-001	Anonymous	Chloride	16887-00-6	E235.Cl	497 mg/L	500 mg/L	99.5	75.0	125	----
Anions and Nutrients (QCLot: 1763181)										
WT2433706-001	Anonymous	Phosphate, ortho-, dissolved (as P)	14265-44-2	E378-U	ND mg/L	----	ND	70.0	130	----
Anions and Nutrients (QCLot: 1764757)										
WT2433759-001	Anonymous	Ammonia, total (as N)	7664-41-7	E298	ND mg/L	----	ND	75.0	125	----
Total Metals (QCLot: 1762671)										
WT2433760-001	Anonymous	Aluminum, total	7429-90-5	E420	ND mg/L	----	ND	70.0	130	----
		Antimony, total	7440-36-0	E420	0.0529 mg/L	0.05 mg/L	106	70.0	130	----
		Arsenic, total	7440-38-2	E420	0.0529 mg/L	0.05 mg/L	106	70.0	130	----
		Barium, total	7440-39-3	E420	ND mg/L	----	ND	70.0	130	----
		Beryllium, total	7440-41-7	E420	0.00474 mg/L	0.005 mg/L	94.7	70.0	130	----
		Bismuth, total	7440-69-9	E420	0.0456 mg/L	0.05 mg/L	91.2	70.0	130	----
		Boron, total	7440-42-8	E420	ND mg/L	----	ND	70.0	130	----
		Cadmium, total	7440-43-9	E420	0.00468 mg/L	0.005 mg/L	93.6	70.0	130	----
		Calcium, total	7440-70-2	E420	ND mg/L	----	ND	70.0	130	----
		Cesium, total	7440-46-2	E420	0.00238 mg/L	0.002 mg/L	95.1	70.0	130	----
		Chromium, total	7440-47-3	E420	0.0122 mg/L	0.012 mg/L	97.5	70.0	130	----
		Cobalt, total	7440-48-4	E420	0.0121 mg/L	0.012 mg/L	96.5	70.0	130	----
		Copper, total	7440-50-8	E420	ND mg/L	----	ND	70.0	130	----
		Iron, total	7439-89-6	E420	ND mg/L	----	ND	70.0	130	----
		Lead, total	7439-92-1	E420	0.0218 mg/L	0.025 mg/L	87.4	70.0	130	----
		Lithium, total	7439-93-2	E420	0.0106 mg/L	0.012 mg/L	84.8	70.0	130	----
		Magnesium, total	7439-95-4	E420	ND mg/L	----	ND	70.0	130	----
		Manganese, total	7439-96-5	E420	ND mg/L	----	ND	70.0	130	----
		Molybdenum, total	7439-98-7	E420	0.0125 mg/L	0.012 mg/L	100	70.0	130	----

Sub-Matrix: **Water**

					Matrix Spike (MS) Report					
					Spike		Recovery (%)	Recovery Limits (%)		
Laboratory sample ID	Client sample ID	Analyte	CAS Number	Method	Concentration	Target	MS	Low	High	Qualifier
Total Metals (QCLot: 1762671) - continued										
WT2433760-001	Anonymous	Nickel, total	7440-02-0	E420	0.0240 mg/L	0.025 mg/L	95.8	70.0	130	----
		Phosphorus, total	7723-14-0	E420	0.533 mg/L	0.5 mg/L	107	70.0	130	----
		Potassium, total	7440-09-7	E420	ND mg/L	----	ND	70.0	130	----
		Rubidium, total	7440-17-7	E420	0.00495 mg/L	0.005 mg/L	98.9	70.0	130	----
		Selenium, total	7782-49-2	E420	0.0512 mg/L	0.05 mg/L	102	70.0	130	----
		Silicon, total	7440-21-3	E420	ND mg/L	----	ND	70.0	130	----
		Silver, total	7440-22-4	E420	0.00428 mg/L	0.005 mg/L	85.6	70.0	130	----
		Sodium, total	7440-23-5	E420	ND mg/L	----	ND	70.0	130	----
		Strontium, total	7440-24-6	E420	ND mg/L	----	ND	70.0	130	----
		Sulfur, total	7704-34-9	E420	ND mg/L	----	ND	70.0	130	----
		Tellurium, total	13494-80-9	E420	0.00483 mg/L	0.005 mg/L	96.6	70.0	130	----
		Thallium, total	7440-28-0	E420	0.0462 mg/L	0.05 mg/L	92.5	70.0	130	----
		Thorium, total	7440-29-1	E420	0.00416 mg/L	0.005 mg/L	83.2	70.0	130	----
		Tin, total	7440-31-5	E420	0.0234 mg/L	0.025 mg/L	93.8	70.0	130	----
		Titanium, total	7440-32-6	E420	ND mg/L	----	ND	70.0	130	----
		Tungsten, total	7440-33-7	E420	0.00463 mg/L	0.005 mg/L	92.6	70.0	130	----
		Uranium, total	7440-61-1	E420	ND mg/L	----	ND	70.0	130	----
		Vanadium, total	7440-62-2	E420	0.0260 mg/L	0.025 mg/L	104	70.0	130	----
		Zinc, total	7440-66-6	E420	ND mg/L	----	ND	70.0	130	----
		Zirconium, total	7440-67-7	E420	0.00385 mg/L	0.005 mg/L	77.0	70.0	130	----

N-412
MM-430
QC-203

Chain of Custody (COC) / Analytical Request Form

COC Number: 20 - 956299

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Page

Environmental Division
Waterloo
Work Order Reference
WT2433802

Telephone : +1 519 886 6910

Report To	Contact and company name below will appear on the final report	Reports / Recipients	Turnaround Time (TAT) Requested
Company:	SLR Consulting / Palmer	Select Report Format: ☑ PDF ☑ EXCEL ☐ EDD (DIGITAL)	☑ Routine [R] if received by 3pm M-F - no surcharges apply
Contact:	Munjeong Seong	Merge QC/QCI Reports with COA ☑ YES ☐ NO ☐ N/A	☐ 4 day [P4] if received by 3pm M-F - 20% rush surcharge mini
Phone:	647 937 1412	☐ Compare Results to Criteria on Report - provide details below if box checked	☐ 3 day [P3] if received by 3pm M-F - 25% rush surcharge mir
	Company address below will appear on the final report	Select Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	☐ 2 day [P2] if received by 3pm M-F - 50% rush surcharge mir
Street:	871 Equestrian Ct	Email 1 or Fax Munjeong.Seong@SLRConsulting.com	☐ 1 day [E] if received by 3pm M-F - 100% rush surcharge mir
City/Province:	Oakville ON	Email 2 Nolan.Boyes@SLRConsulting.com	☐ Same day [E2] if received by 10am M-S - 200% rush surcharge. may apply to rush requests on weekends, statutory holidays and r
Postal Code:	L6L 6G7	Email 3	Date and Time Required for all E&P TATs:
Invoice To	Same as Report To ☐ YES ☑ NO	Invoice Recipients	For all tests with rush TATs requested, pl
	Copy of Invoice with Report ☑ YES ☐ NO	Select Invoice Distribution: ☑ EMAIL ☐ MAIL ☐ FAX	Analysis
Company:	SLR Consulting	Email 1 or Fax Nick.Schmidt@SLRConsulting.com	
Contact:	accountsPayable@SLRConsulting.com	Email 2 accountsPayable@SLRConsulting.com	
Project Information		Oil and Gas Required Fields (client use)	
ALS Account # / Quote #:	244-024793.0003	AFE/Cost Center:	PO#
Job #:		Major/Minor Code:	Routing Code:
PO / AFE:		Requisitioner:	
LSD:		Location:	
ALS Lab Work Order # (ALS use only):	WT2433802	ALS Contact: Andrew.	Sampler: Munjeong Seong

ALS Sample # (ALS use only)	Sample Identification and/or Coordinates (This description will appear on the report)	Date (dd-mmm-yy)	Time (hh:mm)	Sample Type	NUMBER OF CONTAINERS	Ontario drinking water standards	SAMPLES ON HOLD	EXTENDED STORAGE REQUIRE	SUSPECTED HAZARD (see notes)
	BH24-5	12-Nov 24	10:30	GW	5				

Indicate Filtered (F), Preserved (P) or Filtered and Preserved (F/P) below

Drinking Water (DW) Samples[1] (client use)	Notes / Specify Limits for result evaluation by selecting from drop-down below (Excel COC only)
Are samples taken from a Regulated DW System? ☐ YES ☑ NO	
Are samples for human consumption/ use? ☐ YES ☑ NO	

SAMPLE RECEIPT DETAILS (ALS use only)

Cooling Method: ☐ NONE ☐ ICE ☐ ICE PACKS ☐ FROZEN ☐ COOLING INITIATED

Submission Comments identified on Sample Receipt Notification: ☐ YES ☐ NO

Cooler Custody Seals Intact: ☐ YES ☐ N/A Sample Custody Seals Intact: ☐ YES ☐ N/A

INITIAL COOLER TEMPERATURES °C				FINAL COOLER TEMPERATURES °C			
				15.8			

SHIPMENT RELEASE (client use)			INITIAL SHIPMENT RECEPTION (ALS use only)			FINAL SHIPMENT RECEPTION (ALS use only)		
Released by: Munjeong Seong	Date: 12 NOV 2024	Time: 1600	Received by:	Date:	Time:	Received by:	Date: 12-NOV-24	Time: 1645

REFER TO BACK PAGE FOR ALS LOCATIONS AND SAMPLING INFORMATION

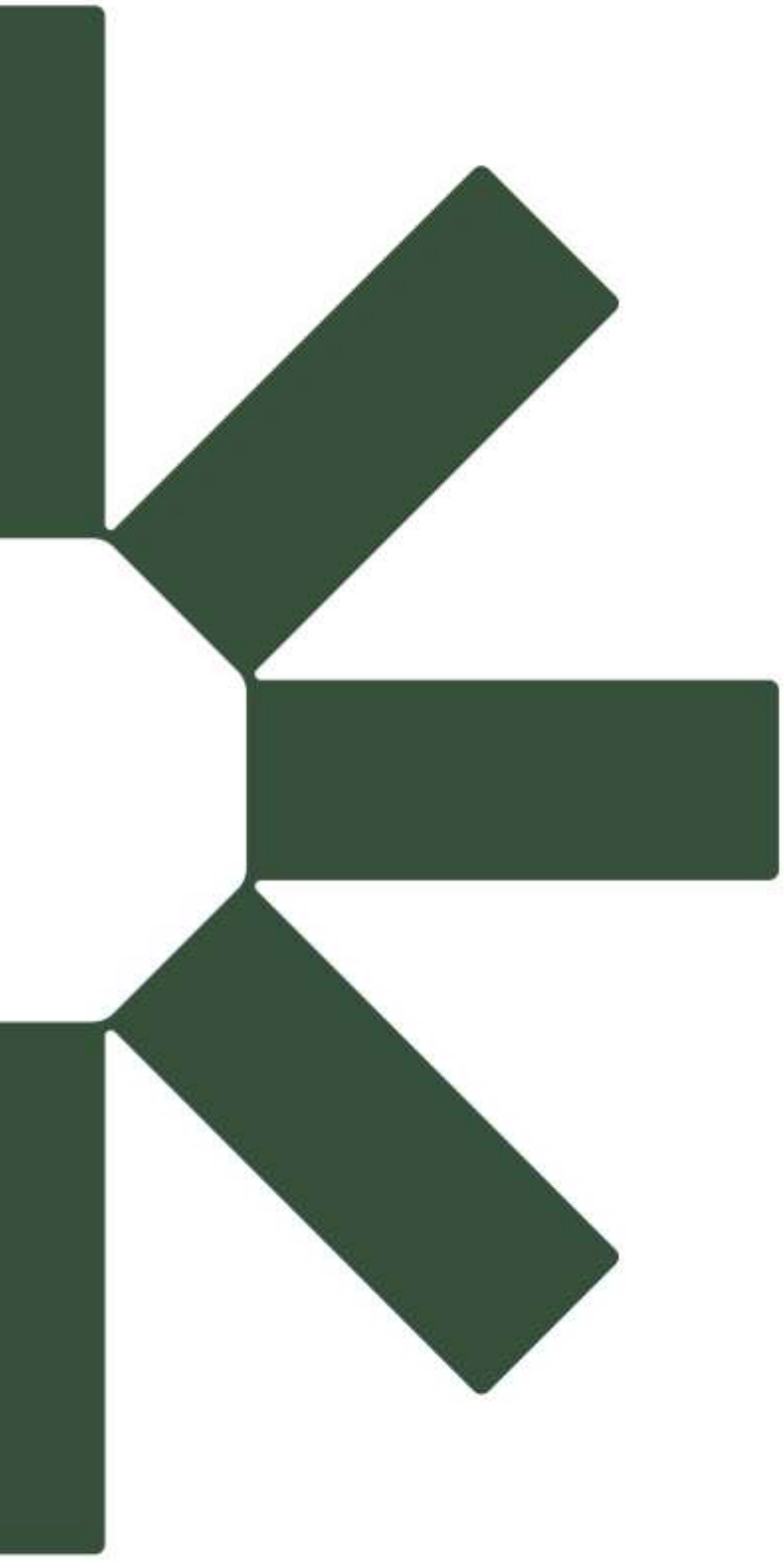
WHITE - LABORATORY COPY YELLOW - CLIENT COPY

ALS 7730 FRONT

Failure to complete all portions of this form may delay analysis. Please fill in this form LEGIBLY. By the use of this form the user acknowledges and agrees with the Terms and Conditions as specified on the back page of the white - report copy.

1. If any water samples are taken from a **Regulated Drinking Water (DW) System**, please submit using an **Authorized DW COC form**.

N-412 MM-430 QC-203



Making Sustainability Happen