DEWATERING ASSESSMENT – PROPOSED EXCAVATION

1047 Richmond Road
Ottawa, Ontario

CO972.00

FINAL REPORT

March 4, 2025
Revised: April 10, 2025

Prepared for:

FENGATE DEVELOPMENT HOLDINGS LP

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1.0 INTRODUCTION

Terrapex Environmental Ltd. (Terrapex) has been retained by Fengate Development Holdings LP to carry out a hydrogeological investigation, including dewatering assessment for the proposed excavation. The purpose of this investigation was to assess estimated dewatering quality and quantity for the proposed excavation.

The area of interest is located on the property of 1047 Richmond Road in Ottawa, Ontario (the Site). The location of the Site is provided on **Figure 1**. It is understood that the proposed footprint, shown on **Figure 2** will be carried out in two phases, with the footprint shaded darker to be carried out at a later date. The dewatering estimates provided in this report are limited to the first phase of excavation.

2.0 SITE CHARACTERIZATION

Review of online Ministry of Environment, Conservation and Parks (MECP) mapping (Source Protection Atlas, accessed July 2024), indicated that the area of interest is within a groundwater intake protection zone (Zone 2), which was identified as a groundwater and surface water area that discharges to a river body (i.e., the River of Ottawa). The Site was also reported to overlie a shallow-seated aquifer which is inclined towards infiltration (MECP; Source Protection Atlas, accessed July 2024). Based on historical reporting, the Site is not located in an area designated in a municipal official plan as a well-head protection area (WSP, 2023).

A review of the available well records shows that there are 131 reported wells within approximately 500 metres of the subject property. Of the known wells, two (2) wells within 100 metres are reported to be purposed for water supply use.

3.0 FIELDWORK

3.1 GROUNDWATER MONITORING WELL CONSTRUCTION

As part of the hydrogeological investigations, monitoring wells constructed by Golder Associates Ltd. (Golder, now WSP Canada Inc.) in September and November 2021, and May and October 2022 were used. The fieldwork for this project was carried out under the supervision of a licensed Professional Hydrogeologist in accordance with the provincial Professional Geoscientists Act (2002). A summary of test well construction specifications is provided in **Table 1**, below. The locations of the monitoring wells are provided in **Figure 2**.

TABLE 1: SUMMARY OF GROUNDWATER MONITORING CONDITIONS

Well ID	Date of Construction	Approximate Location (UTM Zone 18T)		Approximate Ground Surface Elevation	Measured Screened Interval	Soils at Screened Interval	SPT N-Value at Screened Interval
		metres east	metres north	masl	mbg		
BH21-1	24-Sep-2021	361274	5026290	65.73	4.57 to 7.62	Limestone	-
BH21-2	21-Sep-2021	361298	5026359	65.46	3.96 to 7.01	Limestone	-
BH21-3	22-Sep-2021	361289	5026355	65.24	4.57 to 7.62	Limestone	-
BH21-4	21-Sep-2021	361314	5026370	65.09	4.57 to 7.62	Limestone	-
BH21-5	24-Sep-2021	361328	5026358	65.47	4.57 to 7.62	Limestone	-
BH21-11	12-Nov-2021	439016	5024866	65.26	2.49 to 5.54	Limestone	-
BH21-14	12-Nov-2021	439036	5024909	64.84	3.05 to 4.57	Limestone	-
BH21-15A	12-Nov-2021	439046	5024914	64.84	3.96 to 7.01	Limestone	RQD 40% to 80%
BH21-15B	12-Nov-2021	439046	5024914	64.84	1.53 to 3.05	Silty Sand to Sand	-
BH21-19	25-Nov-2021	439039	5024882	65.95	2.70 to 5.13	Limestone	-
BH21-20	24-Nov-2021	439047	5024862	65.93	3.30 to 5.18	Limestone	-
BH21-21	21-Dec-2021	439040	5024927	64.41	1.64 to 4.92	Silty and Sand	-
BH21-22	21-Dec-2021	439033	5024915	64.62	1.31 to 4.59	Sand	-
BH22-1	11-May-2022	439049	5024907	65.02	8.06 to 9.60	Limestone	-
BH22-2	9-May-2022	439035	5024907	64.90	4.41 to 7.46	Limestone	-
BH22-3	10-May-2022	439053	5024917	64.85	5.18 to 6.7	Limestone	-
BH22-4	9-May-2022	439027	5024905	64.75	4.87 to 7.92	Limestone	-
BH22-5	11-May-2022	439071	5024856	65.94	7.61 to 10.66	Limestone	-
BH22-6	3-Oct-2022	439037	5024908	64.90	6.00 to 7.00	Limestone	-
BH22-7	3-Oct-2022	439047	5024904	65.11	6.00 to 7.01	Limestone	-
BH22-8	4-Nov-2022	439037	5024909	64.87	9.00 to 10.00	Limestone	-
BH22-9 (S)	15-May-2023	439049	5024939	64.22	4.57 to 7.62	Limestone	-
BH22-9 (D)	15-May-2023	439050	5024939	64.23	9.06 to 10.66	Limestone	-
BH22-10 (S)	15-May-2023	439067	5024926	64.83	4.57 to 7.62	Limestone	-
BH22-10 (D)	15-May-2023	439068	5024925	64.81	9.06 to 10.06	Limestone	-

Information taken from Phase Two Environmental Site Assessment, 1047 Richmond Rd, Ottawa, Ontario; WSP, October 2023

Based on the information in **Table 1**, above and the appended borehole logs provided in **Appendix I**, the interface between overburden and bedrock ranges from 58.11 masl to 63.92

masl, with an average elevation of 61.99 masl. The average depth-to-bedrock is used as part of the dewatering estimates, below.

3.2 GROUNDWATER MONITORING

Groundwater measurements were reported during ten (10) site visit events, carried out by Golder/WSP and Terrapex between October 4, 2021, and June 27, 2024. A summary of the groundwater depths is presented in **Table 2**. The recorded water levels reflect the groundwater conditions on the dates they were measured.

The most recent groundwater monitoring visit event was carried out by Terrapex on June 27, 2024. In this visit, groundwater piezometric head measurements were measured manually at locations BH21-1 to BH21-4, BH21-11, BH21-14, BH21-15A, BH21-15B, BH21-20 to BH21-22, BH22-2 to BH22-8, BH22-10(S), and BH22-10(D) by Terrapex.

TABLE 2: MEASURED GROUNDWATER LEVELS

Location Identification	Screened Interval	Depth to Bedrock	Ground Surface Elevation	Groundwater Measurements									
				2021			2022		2023				2024
				Oct 4	Nov 30	Dec 22	May 26	Nov 15	May 23	Jun 30	Jul 19	Aug 8	Jun 27
	mbg		masl	mbg (masl)	mbg (masl)	mbg (masl)	mbg (masl)	mbg (masl)	mbg (masl)	mbg (masl)	mbg (masl)	mbg (masl)	mbg (masl)
BH21-1	4.57 to 7.62	1.83	65.73	*7.69 (58.04)*	*7.63 (58.10)*	*7.66 (58.70)*	NM	NM	NM	NM	NM	7.54 (58.19)	4.18 (61.55)
BH21-2	3.96 to 7.01	2.66	65.46	*4.54 (60.92)*	*4.58 (60.88)*	*4.58 (60.88)*	NM	NM	NM	NM	NM	4.32 (61.14)	2.89 (62.57)
BH21-3	4.57 to 7.62	3.05	65.24	*4.28 (60.96)*	*3.80 (61.44)*	*3.80 (61.44)*	NM	NM	NM	NM	NM	3.52 (61.72)	0.85 (64.39)
BH21-4	4.57 to 7.62	3.66	65.09	*2.65 (62.44)*	*2.83 (62.26)*	*2.83 (62.26)*	*2.44 (62.65)*	*3.17 (61.92)*	*2.64 (62.45)*	*3.09 (62.0)*	*2.55 (62.54)*	2.03 (63.06)	2.06 (63.03)
BH21-5	4.57 to 7.62	3.66	65.47	*3.95 (61.52)*	*4.04 (61.43)*	*3.94 (61.53)*	NM	NM	NM	NM	NM	DC	DC
BH21-11	2.49 to 5.54	1.52	65.26	NI	*2.96 (62.30)*	*2.96 (62.30)*	NM	NM	NM	NM	NM	2.28 (62.98)	2.10 (63.17)
BH21-14	3.05 to 4.57	1.68	64.84	NI	*2.48 (62.36)*	*2.44 (62.40)*	*2.13 (62.71)*	*2.80 (62.05)*	*2.40 (62.44)*	*2.43 (62.41)*	*2.23 (62.61)*	1.84 (63.00)	**1.80 (63.04)**
BH21-15A	3.96 to 7.01	3.15	64.84	NI	*2.74 (62.10)*	*2.74 (62.10)*	NM	NM	*2.46 (62.38)*	NM	NM	NM	2.81 (62.03)
BH21-15B	1.53 to 3.05	3.15	64.84	NI	*2.59 (62.25)*	*2.59 (62.25)*	NM	NM	*2.38 (62.46)*	NM	NM	NM	1.83 (63.01)
BH21-19	2.70 to 5.13	2.03	65.95	NI	*3.44 (62.51)*	*3.44 (62.51)*	NM	NM	NM	NM	NM	NM	NM
BH21-20	3.30 to 5.18	2.29	65.93	NI	*3.82 (62.11)*	*3.82 (62.11)*	NM	NM	NM	NM	NM	NM	2.14 (63.79)
BH21-21	1.64 to 4.92	4.26	64.41	NI	NI	*2.43 (61.98)*	NM	NM	NM	*2.27 (62.14)*	NM	2.03 (62.38)	1.67 (62.75)
BH21-22	1.31 to 4.59	2.95	64.62	NI	NI	*2.72 (61.90)*	NM	NM	*2.37 (62.25)*	*2.27 (62.35)*	NM	1.90 (62.72)	1.74 (62.88)
BH22-1	8.06 to 9.60	3.40	65.02	NI	NI	NI	*7.87 (57.15)*	*8.20 (56.82)*	*7.57 (57.45)*	*7.72 (57.30)*	*7.84 (57.18)*	NM (-)	NM (-)
BH22-2	4.41 to 7.46	2.90	64.90	NI	NI	NI	*6.98 (57.92)*	*2.98 (61.92)*	*2.37 (62.53)*	*3.10 (61.80)*	*2.58 (62.32)*	NM (-)	2.10 (62.80)
BH22-3	5.18 to 6.7	2.74	64.85	NI	NI	NI	*2.30 (62.55)*	*6.81 (58.04)*	*7.42 (57.43)*	*7.36 (57.49)*	*6.83 (58.02)*	6.79 (58.06)	6.71 (58.14)

BH22-4	4.87 to 7.92	2.29	64.75	NI	NI	NI	*6.85 (57.90)*	*7.10 (57.65)*	*7.14 (57.61)*	*7.10 (57.65)*	*6.83 (57.92)*	6.53 (58.22)	6.49 (58.26)
BH22-5	7.61 to 10.66	3.35	65.94	NI	NI	NI	*7.79 (58.15)*	NM	*7.95 (57.99)*	*7.86 (58.08)*	NM	7.84 (58.10)	7.49 (58.46)
BH22-6	6.00 to 7.00	2.50	64.90	NI	NI	NI	NI	*6.85 (58.05)*	*6.85 (58.05)*	*6.78 (58.12)*	*7.02 (57.88)*	6.72 (58.18)	6.19 (58.71)
BH22-7	6.00 to 7.01	3.20	65.11	NI	NI	NI	NI	*6.92 (58.19)*	*6.90 (58.21)*	NM (-)	*6.77 (58.34)*	6.65 (58.46)	6.64 (58.47)
BH22-8	9.00 to 10.00	2.65	64.87	NI	NI	NI	NI	*8.11 (56.76)*	*8.00 (56.87)*	*7.83 (57.04)*	*7.87 (57.00)*	7.66 (57.21)	7.52 (57.35)
BH22-9 (S)	4.57 to 7.62	4.11	64.22	NI	NI	NI	NI	NI	*7.51 (56.71)*	NM	NM	5.44 (58.78)	NM (-)
BH22-9 (D)	9.06 to 10.66	4.11	64.23	NI	NI	NI	NI	NI	*8.56 (55.67)*	NM	NM	7.85 (56.38)	NM (-)
BH22-10 (S)	4.57 to 7.62	3.96	64.83	NI	NI	NI	NI	NI	*7.49 (57.34)*	NM	NM	7.04 (57.79)	6.55 (58.28)
BH22-10 (D)	9.06 to 10.06	3.96	64.81	NI	NI	NI	NI	NI	***9.15 (55.66)***	NM	NM	7.86 (56.95)	7.49 (57.33)

Elevations taken from Borehole logs released by WSP, 2023
masl = metres above sea level
mbg = metres below ground
NI = not installed
NM = not measured
DC = decommissioned
Italics indicate groundwater measurements carried out by others
Shaded cells indicate high/low values.
Green cells indicate an aquifer which is generally more shallow, and not connected to the aquifer screened in the others.

Based on the information above, groundwater appears to within two separate layers, which are not defined by depth of screen or by adjacent materials screened in. Further, these wells are not linked spatially, as seen in BH21-14, BH22-08, BH22-06, and BH22-03, which are clustered in the same general area. Further description is provided below:

- Wells BH21-1, BH22-1, and BH22-3 through BH22-10 have water levels ranging from 4.18 mbg to 9.15 mbg.
- Wells BH21-3 through BH21-5, BH21-11, BH21-14, BH21-15, BH21-19 through BH21-22, and BH22-2 were observed to have water levels ranging from 0.85 mbg to 4.58 mbg.
- It is noted that wells BH21-3 through BH21-5, and BH21-15A are screened deeper, but appear to have piezometric head levels more similar to the 'shallow' aquifer.

This suggests two separate aquifers that are not connected, and controlled by bedrock fractures and other paths-of-least-resistance that do not link. Infiltrated waters are also understood to follow the surface of the bedrock, before penetrating downwards.

These two aquifers were considered separate for the purposes of dewatering estimates.

Based on a visual examination of the measured water levels summarized in **Table 2**, the vertical hydraulic gradient direction is downward, indicating the Site generally functions as a recharge area. Groundwater found within the overburden is assumed to recharge into the bedrock through fractures and other paths-of-least-resistance. This corroborates the aquifer conditions reported by the MECP Source Protection Atlas.

3.3 HYDROSTRATIGRAPHIC CONCEPT

Based on the measurements summarized in **Table 2** and borehole information, Terrapex has interpreted a hydrostratigraphic concept where unconnected aquifers occupy the same geographical area and are controlled by fracture systems.

For the purpose of the calculations, subsurface conditions are considered to be saturated (with one aquifer or another), from a depth of 1.80 mbg (BH21-14) to the bottom of the excavation. When considering 'saturated', this indicates that water will occupy encountered fractures at those depths, and not uniformly through porosity.

It is noted that a groundwater level of 0.83 mbg was measured at location BH21-3. This value does not corroborate the historical measurements reported for this location, and is presumed to be a result of a damaged flush-mount cap.

3.4 HYDRAULIC TESTING

To estimate the hydraulic conductivity (K) of the soil and/or bedrock materials adjacent to the screened intervals at the tested monitoring wells, single well response tests were carried out at

locations BH21-14, BH22-4, BH21-4, BH21-15, BH21-22, BH22-08 and BH21-01. Single Well Response test reports are provided in **Appendix II**.

The tests were carried out by rapidly removing a volume of water from the well (Rising Head Test) or adding a volume of water from a well (Falling Head Test) and monitoring the subsequent water level recovery to the static water level conditions. The Bouwer and Rice (1976) method was applied to test data, using the unconfined solution. The data was analyzed using the AQTESOLV™ (v. 4.50). A summary of the single well response tests carried out is presented below in **Table 3**.

TABLE 3: HYDRAULIC CONDUCTIVITY

Location Identification	Description of Soil Moisture Conditions	Soils at Screened Interval	Screened Interval	SPT N-Value at Screened Interval	Estimated Hydraulic Conductivity
			mbg		K (m/s)
BH21-14	Saturated	Crushed limestone	2.7 to 4.57	-	1.89×10^{-6}
BH22-4	Saturated	Limestone (bedrock)	4.3 to 7.92	-	1.59×10^{-6}
BH21-4	Saturated	Limestone (bedrock)	4.57 to 7.62	-	1.82×10^{-6}
BH21-15A	Saturated	Limestone (bedrock)	3.96 to 7.01	RQD 40% to 80%	1.80×10^{-6}
BH21-22	Saturated	Sand and silt	0.9 to 4.27	-	8.64×10^{-6}
BH21-22	Saturated	Limestone (bedrock)	0.9 to 4.27	-	3.24×10^{-8}
BH22-08	Saturated	Limestone (bedrock)	8.5 to 10	-	1.64×10^{-6}
BH21-01	Saturated	Limestone (bedrock)	8.08 to 9.6	-	1.27×10^{-7}

mbg– indicates 'metres below ground.
masl– indicates 'metres above sea level.
Shaded cell indicates the highest ('fastest') hydraulic conductivities for overburden and bedrock.

As summarized in **Table 3**, hydraulic conductivities were consistently estimated to be approximately from 3.24×10^{-8} m/s to 8.64×10^{-6} m/s at the locations and depths tested. The highest measured hydraulic conductivity for the overburden was 8.64×10^{-6} m/s, seen in the sand and silt materials, whereas the highest measured hydraulic conductivity for the bedrock was 1.82×10^{-6} m/s.

These results are consistent with sand and silt and bedrock, and are considered relatively semi-pervious and impervious, respectively (Bear 1972; Freeze and Cherry, 1979).

4.0 HYDROCHEMICAL ANALYSES – DISCHARGE CRITERIA ASSESSMENT

Analytical laboratory investigations were carried out to characterize the hydrochemical conditions of the groundwater at the Site for the purposes of temporary dewatering and long term foundation drainage operations. One representative non-filtered groundwater sample was collected at location MW202 on March 18, 2025 using low-flow draw methods and sent to and sent to Bureau Veritas Laboratory (BV) in Mississauga, Ontario under contract with Terrapex. BV is accredited by Standards Council of Canada (SCC) to International Standard ISO/IEC 17025:2005, General Requirement for the Competence of Testing and Calibration Laboratories. Monitoring well MW202 was selected at the time as a "worst-case" for groundwater concentrations at the Site based on previous analytical results prior to remediation.

Based on the analytical laboratory findings, tested parameters complied with the criteria of the City of Ottawa Sewer Use Bylaw for Sanitary and Combined Sewers.

Laboratory Reports for the results are provided in **Appendix III**.

5.0 DEWATERING ASSESSMENT

Temporary dewatering estimates were based on provided concept dimensions for the proposed construction excavation, and based on the steady state inflow, which is expected to be consistent through the excavation operations. Estimates for the overburden and bedrock were calculated independently.

The planned development may require buried municipal infrastructure, such as piped sanitary sewer, storm sewer and other utilities. The depths of excavation trenches associated with the construction of that infrastructure are presently not determined. Where below the water table, seepage management should be anticipated for installing of this infrastructure under dry and safer working conditions.

5.1 BUILDING GEOMETRY AND HYDROGEOLOGY

We understand that it is proposed to redevelop the property with a multi-storey building with two (2) levels of underground (Building A). The provided cross-section (Drawing A300; rla/architecture, 24 March 2025) indicates that the P2 lower surface has an elevation of 57.800 masl. The average ground elevation of all surveyed monitoring well locations in **Table 2** was calculated to be 65.04 masl, which means the P2 lower surface would be approximately 7.24 mbg. As such, the proposed excavation depth is expected to cut into the saturated zone and dewatering will be required during construction.

Provided floor plans (Site Plan SP-1; rla/architecture, 2025-03-24) show an irregular floor plan shape of approximately 4,815.46 m^2.

It is understood that the excavation above represents a portion of the total excavation, and that the remaining footprint for Tower B will be excavated at a later date.

5.2 ESTIMATED CONSTRUCTION DEWATERING VOLUMES

The hydraulic conductivities derived from *in situ* testing were used to estimate a worst-case scenario for temporary construction dewatering rates. It is understood that the area of the P2 subsurface level is approximately 4,815.46 m^2 and the longest length of the building is approximately 77.67 m (Drawing #19186 of the Site Plan, sheet SP-1; rla/architecture, 24 March 2025). Dewatering estimates of the irregularly shaped building footprint were simplified to a rectangle with dimensions of 77.67 m by 62 m, representative of the area of the P2 subsurface level, and a depth to the P2 lower surface level of 7.24 mbg.

At the time of this report release, designs for Tower B were not available to Terrapex. It is understood that the remaining footprint for Tower B will be excavated at a later date.

The following assumptions were made:

Excavation Footprint:	**Phase One ('west side' Tower A)** 77.67 m x 62 m (~4,815 m²)
Approximate Ground Surface:	0 mbg datum (approximately 65.0 masl)
Target dewatering depth:	7.24 mbg + 1 m (slab) = 8.24 mbg
Hydraulic conductivity:	8.6×10^{-6} m/s (overburden) 1.8×10^{-6} m/s (bedrock)
Highest measured static groundwater elevation:	1.80 mbg (at BH21-14) (64.39 masl)
Estimated Drawdown:	Total Drawdown: 8.24 mbg – 1.80 mbg = 6.44 m Overburden: 65 masl - 61.99 masl – 1.80 mbg = 2.16 m Bedrock: 6.44 m – 2.16 m = 4.28 m

To estimate the steady state dewatering rate, the modified Jacob's equation was applied, as presented in Powers et. al. (2007), using the groundwater conditions summarized above. The dewatering rate was estimated for radial flow and flow to a trench from a line source. The steady state dewatering rate estimates are summarized in **Table 4**, below.

TABLE 4: SUMMARY OF ESTIMATED CONSTRUCTION DEWATERING VOLUMES FOR CONCEPT DEVELOPMENT

		(A)	(B)	(C)	(D)	
Excavation Concept	**Dimensions [2]**	**Estimated Dewatering Volume**	**Incident Precipitation [1]**	**Total Dewatering Volume (A+B)**	**Design Dewatering Volume (A x FOS) + B**	**Zone of Influence (ZOI)**
	(length / width / drawdown)	**(L/day)**	**(L/day)**	**(L/day)**	**(L/day)**	**(m radius)**
Phase One ('west side' Tower A)[3]						
Overburden $K = 8.6 \times 10^{-6}$ m/s	77.67 m / 62 m / 2.16 m	28,282	72,233	100,515	114,656	19
Bedrock $K = 1.8 \times 10^{-6}$ m/s	77.67 m / 62 m / 4.28 m	128,191	-	128,191	192,287	17
Total Estimated Dewatering	**77.67 m / 62 m / 6.44 m**	**156,473**	**72,233**	**228,706**	**306,943**	**19 m within overburden**

[1] Based on a storm with a precipitation of 15 mm
[2] Dimensions provided in rla/architecture (2025-03-24)
FOS = Factor of Safety of 1.5

5.3 TOTAL DEWATERING RATE

Water takings in excess of 50,000 L/day are regulated by the Ministry of Environment, Conservation and Parks (MECP). Certain construction dewatering activities up to 400,000 L/day may qualify for a self-registration process under the Environmental Activity Sector Registry ("EASR"). A Category 3 PTTW is required where the proposed water taking is greater than 400,000 L/day.

Temporary construction dewatering calculations, based on the assumption and analyses above, are provided in **Appendix II**. **Table 4** summarizes the anticipated steady state dewatering rate estimates. It is noted that higher dewatering rates may be required initially for short periods of time to remove the volume of groundwater stored within the adjacent pore space and/or bedrock and suppress the groundwater level to 6.44 mbg.

As summarized in **Table 4**, based on the conditions encountered during the hydrogeological field investigations, the excavation is anticipated to required temporary construction dewatering (inclusive of incident rainfall and a Factor of Safety of 1.5) equivalent to approximately 306,943 L/day during the construction of Tower A.

5.4 ZONE OF INFLUENCE

The radius of influence is the distance range beyond which the drawdown on groundwater caused by dewatering is not expected to be detectable. The dewatering zone of influence was estimated for the excavation area using the groundwater elevations and hydraulic conductivities provided above and using the empirical Sichart and Kyrieleis relationship described in Powers (2007).

The estimated Zones of Influence are provided in **Table 4**, above, and as part of the analyses provided in **Appendix II**.

Zone of Influence - Overburden
Based on the hydraulic conductivity and proposed excavation dimensions, the dewatering operations are anticipated to have a Zone of Influence (ZOI) equivalent to a 19-metre radius from the dewatering locations.

Zone of Influence - Bedrock
Based on the hydraulic conductivity and proposed excavation dimensions, the dewatering operations are anticipated to have a Zone of Influence (ZOI) equivalent to a 17-metre radius from the dewatering locations.

It is understood that the zone of influence relies on soil porosity as part of the estimate calculations. Bedrock, by nature, does not have porosity and the ZOI is reliant upon local fracture system connectivity. As such, the ZOI for the bedrock is strictly an estimate.

5.5 INCIDENT PRECIPITATION

In addition to groundwater inflows, the total dewatering rate needs to consider the removal of incident precipitation that must be handled with the groundwater. Obstructions, berms and/or grading should be used to direct overland drainage away from the excavations to the extent possible.

A 15 mm precipitation event was used for the estimates provided in **Table 4**, above.

5.6 PERMITTING

Water takings in excess of 50,000 L/day are regulated by the Ministry of Environment, Conservation and Parks (MECP). Certain construction dewatering activities up to 400,000 L/day may qualify for a self-registration process under the Environmental Activity Sector Registry (“EASR”). A Category 3 Permit to Take Water (PTTW) is required where the proposed water taking is greater than 400,000 L/day. It is understood that permitting with the province no longer requires the contribution of incident rainfall (July 1, 2022).

The volumes summarized above indicate that an Environmental Activity Sector Registration (EASR) will be required during construction for the concept excavation dimensions for Tower A. This assumes that one tower will be excavated at a time. Should both towers be excavated at the same time, a Permit to Take Water (PTTW) would be required.

It is noted that dewatering operations will need to draw the groundwater to at least one meter below the excavation floor (CFEM, 2006).

6.0 WATER TAKING PLAN

6.1 NATURAL ENVIRONMENT CONSIDERATIONS

Site dewatering is not anticipated to have any negative impacts on the natural environment as the durations and volumes expected will not have a measurable effect on nearby well levels and all groundwater will pass through an onsite groundwater treatment system before discharging to a sanitary sewer pipe. Specific measures have been recommended to reduce potential risks during excavation dewatering. These best management practices (BMPs) should be followed:

- Appropriate sediment, contamination and erosion control measures must be used by the contractor to regulate stormwater and discharge water. Equipment should not be at risk of contaminating soil or water and flows must be controlled; and,
- Appropriate spill management (location and response procedures) plan will be developed and used by the contractor.

6.2 POTENTIAL SETTLEMENT ISSUES

As mentioned in **Section 5.4**, the ZOI was calculated to be approximately 19 m within overburden and approximately 17 m within bedrock (**Table 5**, above).

Localized subsidence immediately adjacent to the excavation due to a loss of hydrostatic pressure with the soil pore space, and care should be given to operating within the ZOI with machinery. Ground response beyond the limits of the investigation may vary where soil conditions vary; however, assuming conditions are relatively consistent through the dewatering zone of influence, the expected settlement is anticipated to decrease with increasing distance from the excavation.

6.3 ENVIRONMENTAL MANAGEMENT PLAN (EMP)

In order to monitor and mitigate potential impacts of any dewatering operation, it is recommended that an Environmental Management Plan (EMP) be developed. The key points of the proposed recommended EMP are as follows:

- To monitor groundwater levels;
- To measure and record dewatering volumes;
- To assess groundwater/surface water interactions;
- To assess possible changes in groundwater quality;
- To carry out settlement monitoring inspections; and,
- To provide mitigation and adaptive management, when necessary.

Where a higher level of confidence is required, such as locations where a building structure is nearby, the contractor may implement a settlement monitoring program to confirm that

settlements are less than 25 mm or as otherwise specified by utility owners. The settlement monitoring program would include an array of in-ground monitoring points founded on the building, which would be surveyed periodically to confirm that no subsidence is occurring.

Shop drawings indicating the proposed in-ground monitoring point type/construction and the location of each point should be submitted by the contractor and approved by the engineer prior to construction. Monitoring should start prior to excavation to obtain a baseline, then weekly during excavation and dewatering, then monthly after excavation is complete until the groundwater level is permitted to return to static conditions.

6.4 EXPECTED AREA OF INFLUENCE

As discussed in Section 4.1, the Zone of Influence (ZOI) is estimated to be 19m within overburden and approximately 17 m within bedrock (**Table 5**, above).

The nearest potable well to the Site (MOE Well Record 1503902, drilled to a depth of 29 m) is located approximately 150 m from the anticipated dewatering operations. This well was constructed in 1953 and is assumed to not be in use. As such, water supply is not anticipated to be affected by the water taking. Shop drawings indicating the proposed in-ground monitoring point type/construction and the location of each point should be submitted by the contractor and approved by the engineer prior to construction. Monitoring should start prior to excavation to obtain a baseline, then weekly during excavation and dewatering, then monthly after excavation is complete until the groundwater level is permitted to return to static conditions.

7.0 DISCHARGE PLAN

7.1 MAXIMUM QUANTITY TO BE DISCHARGED

The maximum quantity of water to be discharged is estimated to be 306,943 L/day for each tower. A Specialist Dewatering Contractor will carry out dewatering operations as appropriate using best management practices and will be operated for up to 24 hours per day.
The total dewatering of the excavation is estimated to be 306,943 L/day for each tower, inclusive of incident precipitation and with a factor of safety of 1.5. The recommended **EASR limit being applied for is 399,000 L/day.**

7.2 DISCHARGE LOCATION

The proposed discharge location for the excavation is shown on **Figure 3**. Water will be pumped from the excavation to a groundwater treatment system using a pipe or hose. Treated water will be discharged to a sanitary sewer pipe on the Site. Locations are subject to change pending discussion with the contractor.

7.3 GROUNDWATER TREATMENT AND DISCHARGE

As summarized in **Section 4**, all groundwater quality parameters met the requirements of the City of Ottawa Sewer Use Criteria for Sanitary and Combined Sewers,. Based on the results, treatment of the groundwater effluent would not be required prior to discharge to the sanitary sewer, although additional sampling may be required.

7.4 MONITORING

Dewatering and discharge monitoring will be conducted during dewatering operations in accordance with the requirements detailed below. Monitoring records need to be retained for up to five years after completion of all dewatering activities at the Site and will include the following:

- Visual inspection of the discharge effluent at least once daily to ensure there is no visible oil or sheen;
- Water quantity (i.e., water taking rates) will be metered and recorded by the contractor on a daily basis;
- Discharge activities will be suspended if:
    - Any parameters in the discharge water exceeds the established criteria identified above; or
    - Visible oil or sheen is observed in the discharge water.

Until suitable water quality conditions are restored (either through settling or using the mitigation measures identified above), discharge activities will be postponed, and a filtered water quality

sample will be collected and submitted for laboratory analysis of turbidity, TSS, and other parameters regulated under the municipal sanitary sewer permit.

7.5 QUALIFICATIONS OF QP

The water taking plan was prepared by Zen Keizars, P.Geo. and Andrew Durbano, P.Geo., on July 26, 2024. Copies of both curricula vitae are presented in **Appendix IV**.

8.0 REPORTING AND NOTIFICATION REQUIREMENTS

An EASR identifies a number of reporting and notification requirements that need to be undertaken within specific time periods. These reporting requirements include:

- Any changes to the information included in the EASR will be made by the contractor online within 30 days of becoming aware of these changes.
- A request needs to be submitted to remove the registration from the EASR if and once the contractor no longer engaging in the prescribed activity.
- The actual volume of water taken daily shall be reported to the Ministry on or before March 31 in each year. If no water is taken, then a “no taking” report must be entered. The water takings shall be reported online through the Regulatory Self-Reporting System (RSRS) which is accessed through the same online account as the EASR. A record of the water taking must be created and retained by the registrant for a period of five years after the last day of water taking. The record shall state:
    - the dates on which groundwater, storm water or both were taken;
    - for each day on which groundwater, storm water or both were taken, the average rate at which it was taken in litres per second; and
    - the volume of ground water, storm water or both taken each day in litres.
- If the taking of water is intended to continue for more than 365 days, the contractor must provide written notice about the taking to the local municipalities (upper-tier and lower or single tier, if applicable) and any conservation authority within whose jurisdiction the proposed water taking is located prior to commencing dewatering. This notification must include:
    - the name of the person proposing to take and discharge the water;
    - the dates on which the water will be taken;
    - where the water taken from; and
    - the location of the proposed discharge.
- If the taking of water is no longer needed, within 30 days after the day the activity is ceased, the contactor must give notice to the MECP that the water taking is complete by filing that information on EASR online registration.
- If a complaint is received with respect to the taking of water and the complaint relates to the natural environment, the Ministry shall be notified of the complaint immediately after the complaint is received. Notification shall be to the local District Office of the Ministry during normal business hours and after hours to the **Ministry’s Spills Action Centre by calling 416-325-3000 or 1-800-268-6060**. A record of the complaint must be made and retained for a minimum period of five years and have the following minimal information:
    - the date and time the complaint was received;

- a copy of the complaint, if it is a written complaint;
- a summary of the complaint, if it is not a written complaint; and
- a summary of measures taken, if any, to address the complaint.

A record of all water quality measurements and analytical results, as well as daily dewatering rates needs to be retained by the contractor and client and may be requested by the MECP for up to 5 years after dewatering activities have been completed.

9.0 CONCLUSIONS AND RECOMMENDATIONS

The following summarizes the information above, obtained during the review of the Site:

- **The subsurface stratigraphy** is generally comprised of compact to very dense sandy silt to sand and silt, very stiff to hard clayey silt, dense to very dense sand and gravel, and very dense silty sand and sand. The soil throughout the Site is overlain by fill materials consisting of loose silty sand, compact sand, loose sandy clay, and firm to stiff clayey silt. All boreholes were covered by asphaltic concrete.
- *In-situ* measurements of **the static groundwater** level ranged from approximately 1.80 mbg to 9.15 mbg.
- **Hydraulic conductivity** maximums were estimated to be approximately 8.6×10^{-6} m/s in the overburden, and 1.8×10^{-6} m/s in the bedrock.
- **Analytical hydrochemical analyses** indicate that tested groundwater does meet the criteria for the City of Ottawa discharge to sanitary and combined sewers. Note that results for dioxins and furans, and N-Nitrosodimethylamine were still pending at the time of this report.
- **The temporary construction dewatering volume** was estimated to be 306,943 L/day for Tower A (inclusive of incident rainfall and with a Factor of Safety of 1.5 for groundwater contributions) and is dependant on the number of fractures encountered.
- Based on these concepts, the volumes summarized above indicate that **an Environmental Activity Sector Registration (EASR) will be required during construction for the concept** excavation dimensions for Tower A. It is assumed that one tower will be excavated at a time.
- A Private Water Discharge Agreement would be required for discharge of construction dewatering effluent to sewer services.

10.0 CLOSURE

This report has been completed in accordance with the terms of reference for this project as agreed upon by Fengate Development Holdings LP (the Client) and Terrapex Environmental Ltd. (Terrapex) and generally accepted hydrogeological consulting practices in this area.

The reported information is believed to provide a reasonable representation of the general hydrogeological conditions at the site; however, studies of this nature have inherent limitations. The data were collected at specific locations and conditions may vary at other locations, or with the passage of time. Where applicable, the assessment of the environmental quality of groundwater was limited to a study of those chemical parameters specifically addressed in this report.

Terrapex has relied in good faith on information and representations obtained from the Client and third parties and, except where specifically identified, has made no attempt to verify such information. Terrapex accepts no responsibility for any deficiency or inaccuracy in this report as a result of any misstatement, omission, misrepresentation, or fraudulent act of those providing information. Terrapex shall not be responsible for conditions or consequences arising from relevant facts that were concealed, withheld, or not fully disclosed at the time of the study.

This report has been prepared for the sole use of Fengate Development Holdings LP. Terrapex accepts no liability for claims arising from the use of this report, or from actions taken or decisions made as a result of this report, by parties other than Fengate Development Holdings LP.

Respectfully submitted,

TERRAPEX ENVIRONMENTAL LTD.

Andrew Durbano, M.Sc., P.Geo.
Hydrogeologist

Zen Keizars, P.Geo., FGC.
Senior Hydrogeologist

FIGURES

LEGEND

SITE BOUNDARY

DATA SOURCE: ESRI
MAP PROJECTION: NAD 1983 UTM Zone 18N

CLIENT: FENGATE

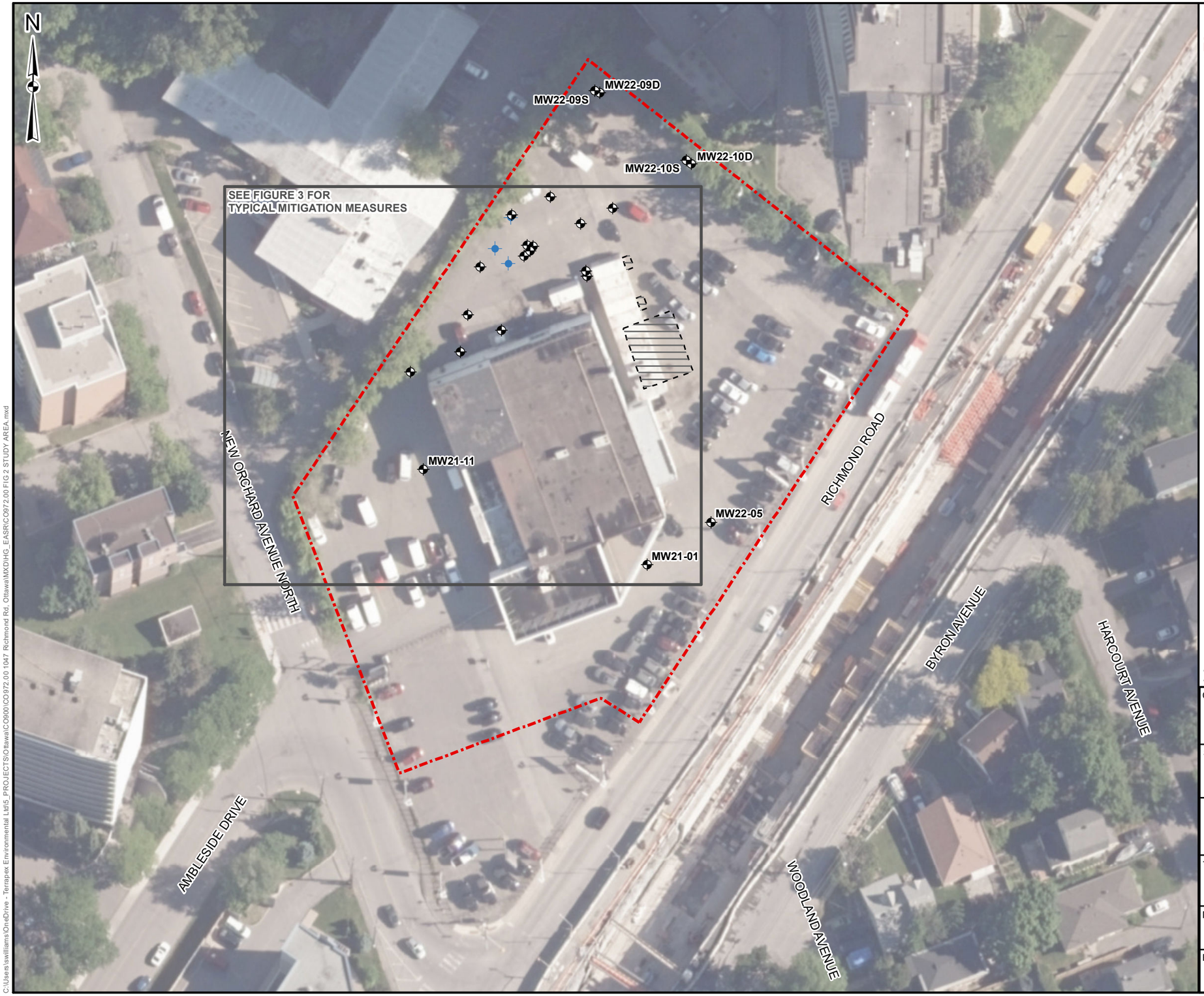
SITE LOCATION: 1047 RICHMOND ROAD
OTTAWA, ONTARIO

TERRAPEX

TITLE: **SITE LOCATION**

DRAWN BY: JS	PROJECT NO.: CO972.00	CHECKED BY: ZK
REVISION: 00	DATE: JULY 2024	**FIGURE: 1**

swilliams C:\Users\swilliams\OneDrive - Terrapex Environmental Ltd\5_PROJECTS\Ottawa\CO900\CO972.00 1047 Richmond Rd, Ottawa\MXD\HG_EASR\CO972.00 FIG 1 SITE LOCATION.mxd



C:\Users\swilliams\OneDrive - Terrapex Environmental Ltd\5_PROJECTS\Ottawa\CO900\CO972.00 1047 Richmond Rd, Ottawa\MXD\HG_EASR\CO972.00 FIG 2 STUDY AREA.mxd

LEGEND

- SITE BOUNDARY
- EXCAVATION LOCATION
- BOREHOLE (TERRAPEX)
- MONITORING WELL (OTHERS)

0 10 20 30 40 50
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT: FENGATE

SITE LOCATION: 1047 RICHMOND ROAD OTTAWA, ONTARIO

TERRAPEX

TITLE: **STUDY AREA**

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS/SW	CO972.00	ZK
REVISION: 00	DATE: JULY 2024	FIGURE: **2**

LEGEND

- SITE BOUNDARY
- PROPOSED EXCAVATION FOR UNDERGROUND PARKING
- PROPOSED DISCHARGE TREATMENT SYSTEM LOCATION
- EXISTING SANITARY SEWER LINE

NOTES:

1. LOCATION OF DISCHARGE TREATMENT SYSTEM IS TO BE DETERMINED AFTER DISCUSSIONS WITH THE CONTRACTOR.
2. THE DISCHARGE LOCATION TO SANITARY SEWER IS TO BE DETERMINED AFTER DISCUSSIONS WITH THE CONTRACTOR.

0 10 20
Metres

DATA SOURCE: CITY OF OTTAWA
MAP PROJECTION: NAD 1983 UTM ZONE 18N

CLIENT: FENGATE

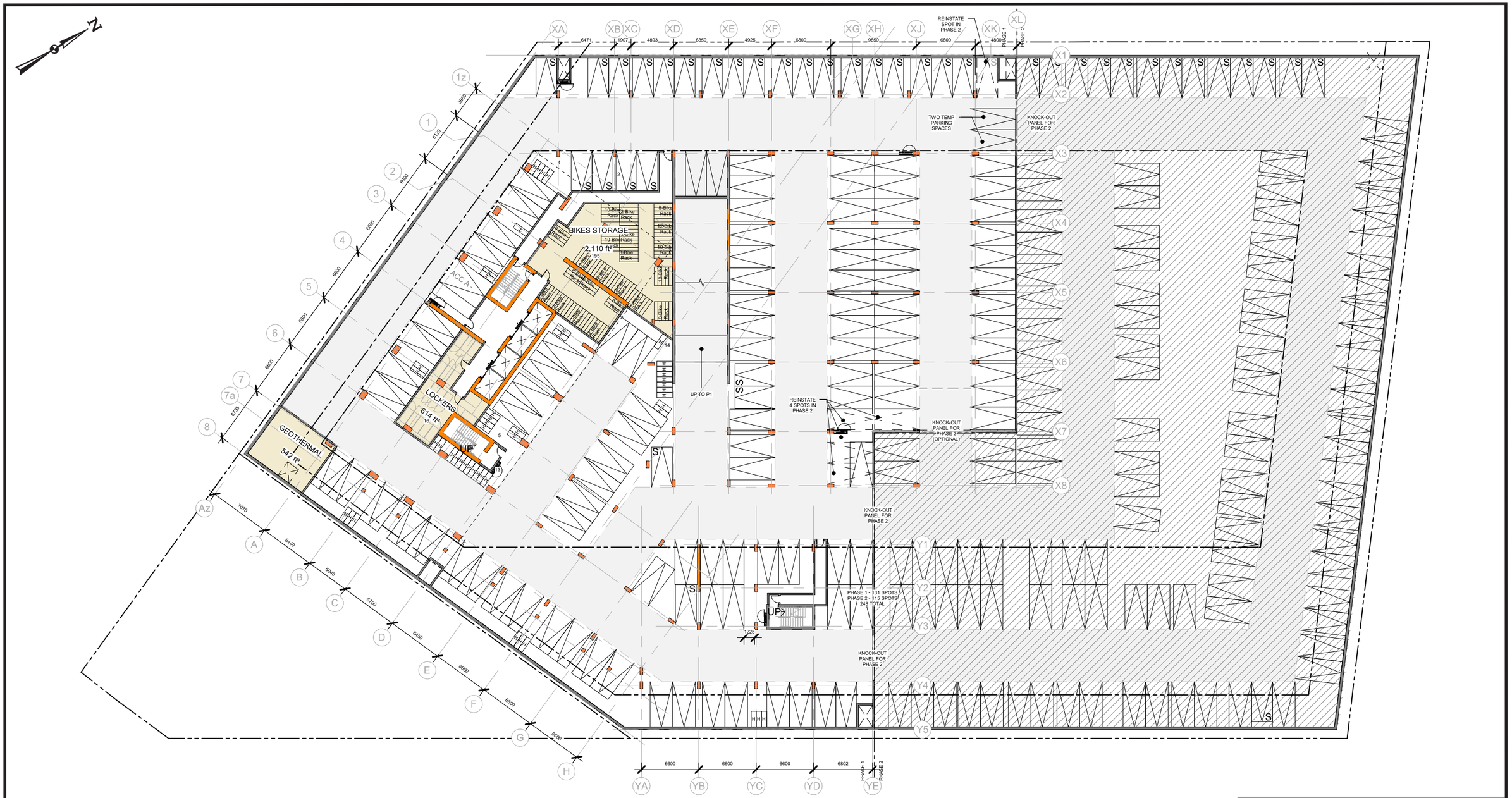
SITE LOCATION: 1047 RICHMOND ROAD OTTAWA, ONTARIO

TERRAPEX

TITLE: **TYPICAL MITIGATION MEASURES**

DRAWN BY:	PROJECT NO.:	CHECKED BY:
JS/SW	CO972.00	ZK
REVISION:	**DATE:**	**FIGURE:**
00	APRIL 2025	**3**

C:\Users\jserrou\OneDrive - Terrapex Environmental Ltd\PROJECTS\Ottawa\CO900\CO972.00 1047 Richmond Rd, Ottawa\MXD\HG_EASR\CO972.00 FIG 3 TYPICAL MITIGATION MEASURES.mxd



LEGEND

- CISTERN
- AMENITY
- COMMERCIAL
- SERVICES
- COMMON AREA
- TOWNHOMES
- STUDIO
- ONE BED
- ONE BED + DEN
- TWO BED
- TWO BED + DEN
- THREE BED

SCALE: AS SHOWN

NOTE: FLOOR PLAN PROVIDED BY CLIENT.

CLIENT: FENGATE

SITE LOCATION: 1047 RICHMOND ROAD OTTAWA, ONTARIO

TERRAPEX

TITLE: **P2 FLOOR PLAN**

DRAWN BY:	PROJECT NO.:	CHECKED BY:
SW	CO972.00	ZK
REVISION:	DATE:	FIGURE:
00	JANUARY 2025	4

APPENDIX I

BOREHOLE LOG REPORTS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-01

SHEET 1 OF 1

LOCATION: N 5026314.5 ;E 361326.2

BORING DATE: September 24, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.73						
0	Power Auger 200 mm Diam. (Hollow Stem)	ASPHALT		0.00						
		FILL - (SW) gravelly SAND, angular; brown (PAVEMENT STRUCTURE); non-cohesive, moist		0.10 65.43	1	SS	19	ND		Flush Mount Casing
		FILL - (SM) gravelly SILTY SAND; grey to dark brown, trace sand (SP); non-coohesive, moist, compact to very loose		0.30					Metals	
1					2	SS	4	ND		
					3	SS	2	ND	PHCs, VOCs	
				63.90						
2	Air Hammer H Bit	BEDROCK (Auger Refusal) (Air hammer from 1.83 m to 7.62 m)		1.83						Bentonite Seal
3										
4										Sllica Sand
5										
6										50 mm Diam. PVC #10 Slot Screen
7				58.11						
		End of Borehole		7.62						
8		Note(s): 1. Water level at BH21-01 measured at a depth of 7.68 m (Elev. 58.04 m) on October 4, 2021 2. Record of borehole log not prepared for geotechnical engineering purposes								
9										
10										

DEPTH SCALE

1 : 50

GOLDER

LOGGED: DG

CHECKED: AG

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-02

SHEET 1 OF 1

LOCATION: N 5026359.3 ;E 361297.8

BORING DATE: September 21, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp — W — Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		65.46							
0	Power Auger 200 mm Diam. (Hollow Stem)	ASPHALT		0.08							Flush Mount Casing
		FILL - (SW) gravellyl SAND, angular; grey (PAVEMENT STRUCTURE); non-cohesive, moist		65.16	1	SS	22	ND			
		FILL - (SP) SAND, fine to medium, trace silt; brown; non-cohesive, moist, compact to dense		0.30	2	SS	31	ND		Metals	
1				64.24							
		FILL - (SM/GP) SILTY SAND and GRAVEL; dark brown, contains brick fragments and rootlets; non-cohesive, moist, compact		1.22	3	SS	10	ND			
				63.63							
2		Highly weathered BEDROCK		1.83	4	SS	>84	ND			Bentonite Seal
					5	SS	>50	ND		PHCs, VOCs	
3				62.41							
	Air Hammer H Bit	BEDROCK (Auger Refusal) (Air hammer from 3.05 M TO 7.62 M)		3.05							
4											Sllica Sand
5											
6											50 mm Diam. PVC #10 Slot Screen
7				57.84							
		End of Borehole		7.62							
8		Note(s):									
		1. Water level at BH21-03 measured at a depth of 3.17 m (Elev. 62.28 m) on October 4, 2021									
		2. Record of borehole log not prepared for geotechnical engineering purposes									
9											
10											

DEPTH SCALE

1 : 50

GOLDER

LOGGED: DG

CHECKED: AG

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-03

SHEET 1 OF 1

LOCATION: N 5026355.1 ;E 361289.2

BORING DATE: September 21 & 22, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.24						
0	Power Auger 200 mm Diam. (Hollow Stem)	ASPHALT		0.08						Flush Mount Casing
		FILL - (SW) gravelly SAND, angular; grey (PAVEMENT STRUCTURE); non-cohesive, moist		64.63	1	SS	43	ND	VOCs	
		FILL - (SP) SAND, fine to medium, trace silt; brown; non-cohesive, moist, dense		0.61	2	SS	31	ND	PHCs	
1				64.02						
		FILL - (SM) SILTY SAND, some topsoil, trace gravel; dark brown, contains shale fragments; non-cohesive, moist, compact		1.22	3	SS	12	ND	Metals	
				63.41						
2		Highly weathered BEDROCK		1.83	4	SS	>94	ND		Bentonite Seal
					5	SS	52/ 6"			
				62.19						
3	Air Hammer H Bit	BEDROCK (Auger Refusal) (Air hammer from 3.05 m to 7.62 m)		3.05						
4										
5										Sllica Sand
6										50 mm Diam. PVC #10 Slot Screen
7				57.62						
		End of Borehole		7.62						
8		Note(s):								
		1. Water level at BH21-03 measured at a depth of 3.56 m (Elev. 61.68 m) on October 4, 2021								
		2. Record of borehole log not prepared for geotechnical engineering purposes								
9										
10										

DEPTH SCALE

1 : 50

GOLDER

LOGGED: DG

CHECKED: AG

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-04

SHEET 1 OF 1

LOCATION: N 5026369.7 ;E 361313.7

BORING DATE: September 21, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.09							
0	Power Auger 200 mm Diam. (Hollow Stem)	ASPHALT		0.05							Flush Mount Casing
		FILL - (SM) SILTY SAND, trace gravel; brown to grey brown, contains wood fragments; non-cohesive, moist, loose to compact			1	SS	9	ND		VOCs	
1					2	SS	10	ND			
					3	SS	7	ND			
2					4	SS	14	ND			Bentonite Seal
				62.65							
		(SM) gravelly SILTY SAND; grey brown, contains cobbles and boulders (GLACIAL TILL); non-cohesive, wet, dense		2.44	5	SS	49	ND			
3					6	SS	55/4"	ND		PHCs	
				61.43							
	Air Hammer H Bit	BEDROCK (Auger Refusal) (Air hammer from 3.66 m to 7.62 m)		3.66							
4											Sllica Sand
5											
6											50 mm Diam. PVC #10 Slot Screen
7				57.47							
		End of Borehole		7.62							
8		Note(s):									
		1. Water level at BH21-01 measured at a depth of 2.50 m (Elev. 62.59 m) on October 4, 2021									
		2. Record of borehole log not prepared for geotechnical engineering purposes									
9											
10											

DEPTH SCALE

1 : 50

GOLDER

LOGGED: DG

CHECKED: AG

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-05

SHEET 1 OF 1

LOCATION: N 5026358.2 ;E 361327.9

BORING DATE: September 22/24, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		65.47						
	Power Auger 200 mm Diam. (Hollow Stem)	ASPHALT		0.08						Flush Mount Casing
		FILL - (SP) SAND, fine to coarse, some gravel, trace silt; brown; non-cohesive, moist, compact		64.86	1	SS	15	ND		
1		FILL - (SM/GW) SILTY SAND and GRAVEL; dark brown, contains wood fragments; non-cohesive, moist, compact		0.61	2	SS	20	ND		PHCs, VOCs
				64.02	3	SS	52/0"	ND		PHCs, VOCs
		Possible FILL - (SP) SILTY SAND, fine to coarse, trace silt, trace gravel; grey brown; non-cohesive, moist, compact to dense		1.45	4	SS	20	ND		
2					5	SS	39	ND		Bentonite Seal
				62.73						
		(SM) gravelly SILTY SAND, non-plastic fines; grey brown, contains cobbles (GLACIAL TILL); non-cohesive, moist, dense		2.74	6	SS	46	ND		
3					7	SS	34/10"	ND		
				61.82						
	Air Hammer H Bit	BEDROCK (Auger Refusal) (Air hammer from 3.65 m to 7.62 m)		3.65						Sllica Sand
4										
5										
6										50 mm Diam. PVC #10 Slot Screen
7				57.85						
		End of Borehole		7.62						
8		Note(s):								
		1. Water level at BH21-01 measured at a depth of 3.85 m (Elev 61.62 m) on October 4, 2021								
9		2. Record of borehole log not prepared for geotechnical engineering purposes								
10										

DEPTH SCALE

1 : 50

GOLDER

LOGGED: DG

CHECKED: AG

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-11

SHEET 1 OF 1

LOCATION: N 5026332.1 ;E 361283.0

BORING DATE: November 12, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.26						
0	Power Auger, Geoprobe	GRAVEL		0.00 / 64.96						Flush Mount Casing
		(SP) SAND; brown; non-cohesive, dry		0.30 / 64.50	1	SS		ND		
1		(SM) SILTY SAND; grey-brown; non-cohesive, dry		0.76 / 63.74	2	SS		ND		Metals, PHCs, VOCs; Bentonite Seal
		Soft, broken, LIMESTONE		1.52	3	SS		ND		Metals
2										Sllica Sand
3										
4										50 mm Diam. PVC #10 Slot Screen
5				59.72						
		End of Borehole Upon Refusal		5.54						
6		Note(s): 1. Water level at BH21-11 measured at a depth of 2.96 m (Elev. 62.30 m) on November 30, 2021 2. Record of borehole log not prepared for geotechnical engineering purposes								
7										
8										
9										
10										

DEPTH SCALE

1 : 50

GOLDER

LOGGED: AB

CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-12

SHEET 1 OF 1

LOCATION: N 5026352.5 ;E 361280.2

BORING DATE: November 11, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		64.88						
0	Power Auger Geoprobe	GRAVEL		0.00						
				64.58	1	SS		⊕ ND		
		(SP) SAND; brown; non-cohesive, dry		0.30						
1					2	SS		⊕ ND		Metals
					3	SS		□ ND ⊕		Metals, PHCs, VOCs
2		Soft, crushed, LIMESTONE		1.98						
				62.34	4	SS		⊕		
		End of Borehole Upon Refusal		2.54						
3		Note(s): 1. Record of borehole log not prepared for geotechnical engineering purposes								
4										
5										
6										
7										
8										
9										
10										

DEPTH SCALE

1 : 50

GOLDER

LOGGED: AB

CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-13

SHEET 1 OF 1

LOCATION: N 5026364.0 ;E 361291.0

BORING DATE: November 11, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ *ND = Not Detected* (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ *ND = Not Detected* (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp — W — Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		64.86						
0	Power Auger Geoprobe	GRAVEL		0.00 / 64.56	1	SS		ND		
1		(SP) SAND; brown; non-cohesive, dry		0.30	2	SS		ND		Metals
				63.18						
2		Soft, crushed, LIMESTONE		1.68 / 62.73	3	SS		ND		Metals
		End of Borehole Upon Refusal		2.13						
3		Note(s): 1. Record of borehole log not prepared for geotechnical engineering purposes								
4										
5										
6										
7										
8										
9										
10										

DEPTH SCALE
1 : 50

GOLDER

LOGGED: AB
CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-14

SHEET 1 OF 1

LOCATION: N 5026375.7 ;E 361302.2

BORING DATE: November 12, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected) 100 200 300 400 / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected) 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3} / WATER CONTENT PERCENT Wp W Wl 20 40 60 80	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		64.84						
0	Power Auger Geoprobe	GRAVEL		0.00						Flush Mount Casing
		(SP) SAND; brown; non-cohesive, dry		0.15	1	SS		ND		
		(SM) SILTY SAND; grey-brown; non-cohesive, dry		64.08						
1					2	SS		ND		Bentonite Seal
				63.16						
		Soft, crushed, LIMESTONE		1.68	3	SS		ND		PHCs, VOCs
2										
3										Sllica Sand
4				60.27						50 mm Diam. PVC #10 Slot Screen
		End of Borehole Upon Refusal		4.57						
5		Note(s):								
		1. Water level at BH21-14 measured at a depth of 2.48 m (Elev. 62.36 m) on November 30, 2021								
		2. Record of borehole log not prepared for geotechnical engineering purposes								
6										
7										
8										
9										
10										

DEPTH SCALE

1 : 50

GOLDER

LOGGED: AB

CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-15

SHEET 1 OF 2

LOCATION: N 5026380.1 ;E 361312.4

BORING DATE: November 12, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		64.84							A B
0	Power Auger Geoprobe	GRAVEL		0.00							
		(SP) SAND; brown; non-cohesive, dry		0.15	1	SS		⊕ ND			
				64.08							
1		(SM) SILTY SAND; grey-brown; non-cohesive, moist		0.76	2	SS		⊕ ND			
				63.01	3	SS		□ ND		PHCs, VOCs	
2		(SP) SAND; grey; non-cohesive, wet		1.83							
					4	SS		□⊕ ND			
3				61.69							
		Soft, crushed, LIMESTONE		3.15	5	SS					
				61.05							
		Borehole continued on RECORD OF DRILLHOLE 21-15		3.79							
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

GOLDER

LOGGED: AB

CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF DRILLHOLE: 21-15

SHEET 2 OF 2

LOCATION: N 5026380.1 ;E 361312.4

DRILLING DATE: November 12, 2021

DATUM: Geodetic

INCLINATION: -90° AZIMUTH: ---

DRILL RIG: Geoprobe

DRILLING CONTRACTOR: Marathon

JN - Joint; FLT - Fault; SHR- Shear; VN - Vein; CJ - Conjugate
BD - Bedding; FO- Foliation; CO- Contact; OR- Orthogonal; CL - Cleavage
PL - Planar; CU- Curved; UN- Undulating; ST - Stepped; IR - Irregular
PO- Polished; K - Slickensided; SM- Smooth; Ro - Rough; MB- Mechanical Break
BR - Broken Rock
NOTE: For additional abbreviations refer to list of abbreviations & symbols.

DEPTH SCALE METRES	DRILLING RECORD	DESCRIPTION	SYMBOLIC LOG	ELEV. DEPTH (m)	RUN No.	COLOUR % RETURN	FLUSH	RECOVERY TOTAL CORE %	RECOVERY SOLID CORE %	R.Q.D. %	FRACT. INDEX PER 0.25 m	DISCONTINUITY DATA DIP w.r.t. CORE AXIS	DISCONTINUITY DATA TYPE AND SURFACE DESCRIPTION	Jcon	Jr	Ja	HYDRAULIC CONDUCTIVITY K, cm/sec	Diametral Point Load Index (MPa)	RMC -Q' AVG.
		BEDROCK SURFACE		60.88															
4	Rotary Drill HQ3 Core	Thin-medium bedded, grey, LIMESTONE		3.96	1	100													
5				59.48															
6		Thin-medium bedded, grey, LIMESTONE		5.36	2	100													
7				57.83															
		End of Drillhole		7.01															

Note(s):

1. Water level at BH21-15A measured at a depth of 2.74 m (Elev. 62.10 m) on November 30, 2021

2. Water level at BH21-15B measured at a depth of 2.59 m (Elev. 62.25 m) on November 30, 2021

3. Record of borehole log not prepared for geotechnical engineering purposes

A B

DEPTH SCALE

1 : 50

GOLDER

LOGGED: AB

CHECKED: DS

MIS-RCK 004 21494078.GPJ GAL-MISS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-16

SHEET 1 OF 1

LOCATION: N 5026367.9 ;E 361324.2

BORING DATE: November 11, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected) 100 200 300 400	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected) 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3}	WATER CONTENT PERCENT Wp W Wl 20 40 60 80	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.27									
0	Power Auger / Geoprobe	GRAVEL		0.00									
		(SM) SILTY SAND; grey-brown; non-cohesive, dry		0.15	1	SS		ND					
1					2	SS						PHCs, VOCs	
					3	SS							
2		End of Borehole Upon Refusal		63.34 1.93									
3		Note(s): 1. Record of borehole log not prepared for geotechnical engineering purposes											
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE
1 : 50

GOLDER

LOGGED: AB
CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-17

SHEET 1 OF 1

LOCATION: N 5026361.4 ;E 361337.9

BORING DATE: November 11, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected) 100 200 300 400	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected) 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3}	WATER CONTENT PERCENT Wp W Wl 20 40 60 80	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.64									
0	Power Auger Geoprobe	GRAVEL		0.00									
		(SM) SILTY SAND; grey-brown; non-cohesive, dry		0.15	1	SS		ND					
1					2	SS		ND				PHCs, VOCs	
2					3	SS		ND					
				63.15									
		End of Borehole Upon Refusal		2.49									
3		Note(s): 1. Record of borehole log not prepared for geotechnical engineering purposes											
4													
5													
6													
7													
8													
9													
10													

DEPTH SCALE
1 : 50

GOLDER

LOGGED: AB
CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-18

SHEET 1 OF 1

LOCATION: N 5026348.5 ;E 361331.5

BORING DATE: November 11, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.70							
0	Power Auger Geoprobe	GRAVEL		0.00							
		(SP) SAND; brown; non-cohesive, dry		0.15	1	SS		ND			
1					2	SS		ND		PHCs, VOCs	
				64.18							
		(SM) SILTY SAND; grey-brown; non-cohesive, moist to wet		1.52	3	SS		ND			
2					4	SS		ND			
				62.96							
		End of Borehole Upon Refusal		2.74							
3		Note(s): 1. Record of borehole log not prepared for geotechnical engineering purposes									
4											
5											
6											
7											
8											
9											
10											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: AB
CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-19

SHEET 1 OF 1

LOCATION: N 5026348.9 ;E 361305.7

BORING DATE: November 25, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.95							
0	Hilti TE 3000 AVR Hammer Drill	CONCRETE pad		0.00 65.75							Flush Mount Casing
		FILL - (SP) SAND, fine, trace silt; light brown; non-cohesive, dry, loose		0.20	1	SS		ND		PHCs, VOCs	
1					2	SS		ND			
					3	SS		ND			Bentonite Seal
				64.32							
		(CL) SILTY CLAY, trace sand; dark grey; non-cohesive, dry, compact		1.63							
2				63.92	4	SS		ND			
		BEDROCK		2.03							
		- Fractured zone from 2.4 m to 3.1 m depth									Silica Sand
3	Power Auger Geoprobe										
4											52 mm Diam. PVC #10 Slot Screen
5				60.82							
		End of Borehole		5.13							
		Note(s): 1. Water level at BH21-19 measured at a depth of 3.44 m (Elev. 62.51 m) on November 30, 2021 2. Record of borehole log not prepared for geotechnical engineering purposes									
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

GOLDER

LOGGED: GS

CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-20

SHEET 1 OF 1

LOCATION: N 5026328.5 ;E 361313.9

BORING DATE: November 24, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.93						
0	Power Auger / Geoprobe	CONCRETE pad		0.00						Flush Mount Casing
		FILL - (SP) SAND, fine, trace silt, trace clay, trace gravel; light to dark brown, cobbles; non-cohesive; dry		0.13	1	SS		ND		
1					2	SS		ND		PHCs, VOCs
				64.41						
		(CL) SILTY CLAY, trace sand, trace gravel; dark grey; non-cohesive, dry		1.52	3	SS		ND		Bentonite Seal
2				63.64						
		BEDROCK		2.29	4	SS		ND		
3										Silica Sand
4										52 mm Diam. PVC #10 Slot Screen
5				60.75						
		End of Borehole		5.18						
6		Note(s): 1. Water level at BH21-20 measured at a depth of 3.82 m (Elev. 62.11 m) on November 30, 2021 2. Record of borehole log not prepared for geotechnical engineering purposes								
7										
8										
9										
10										

DEPTH SCALE

1 : 50

GOLDER

LOGGED: GS

CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-21

SHEET 1 OF 1

LOCATION: N 5026393.6 ;E 361305.9

BORING DATE: December 21, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		64.41						
0	Power Auger / Geoprobe	ASPHALT		0.00						
		SAND; brown; non-cohesive, moist		0.15	1	SS		ND		Bentonite
				63.60						
1		SILT, trace sand; grey; cohesive, moidy		0.81	2	SS		ND		Silica Sand
				62.89						
		SAND, trace gravel; brown; non-cohesive		1.52	3	SS				
2					4	SS		ND		
				61.36						
3		SAND, trace gravel; brown; non-cohesive, wet		3.05	5	SS				#10 Slot Screen
				60.90						
		BEDROCK		3.51	6	SS		ND		
				60.45						
4		End of Borehole		3.96						

Note(s):

1. Water level at BH21-21 measured at a depth of 2.43 m (Elev. 61.98 m) on December 22, 2021

2. Record of borehole log not prepared for geotechnical engineering purposes

5 6 7 8 9 10

DEPTH SCALE

1 : 50

GOLDER

LOGGED: DS

CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-22

SHEET 1 OF 1

LOCATION: N 5026381.4 ;E 361298.9

BORING DATE: December 21, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		64.62							
0	Power Auger / Geoprobe	ASPHALT		0.00							
		SAND; brown; non-cohesive, moist		0.15	1	SS		ND			Bentonite
1											Silica Sand
				63.10							
		SAND; brown; non-cohesive, moist		1.52	2	SS		ND			
2				62.18							
		SILT, trace sand; grey brown; non-cohesive, moist		2.44	3	SS		ND			PVC #10 Slot Screen
				61.88							
		BEDROCK		2.74							
3											
4				60.35							
		End of Borehole		4.27							
5		Note(s):									
		1. Water level at BH21-22 measured at a depth of 2.72 m (Elev. 61.90 m) on December 22, 2021									
		2. Record of borehole log not prepared for geotechnical engineering purposes									
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

GOLDER

LOGGED: DS

CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-23

SHEET 1 OF 1

LOCATION: N 5026359.1 ;E 361327.6

BORING DATE: December 21, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. DEPTH (m)	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp — W — Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.50							
0	Power Auger / Geoprobe	ASPHALT		0.00							
		SAND; brown; non-cohesive, moist		0.15	1	SS		ND			
1				63.98							
		SILTY SAND, some coarse sand; brown; non-cohesive, moist		1.52	2	SS		ND			
2											
					3	SS		ND			
3				62.15	4	SS		□	⊕		
		BEDROCK		3.35							
				61.84							
		End of Borehole		3.66							
4		Note(s):									
		1. Borehole log not for geotechnical purposes.									
5											
6											
7											
8											
9											
10											

DEPTH SCALE

1 : 50

GOLDER

LOGGED: DS

CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-24

SHEET 1 OF 1

LOCATION: N 5026357.1 ;E 361328.2

BORING DATE: December 21, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected) 100 200 300 400 / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected) 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3} / WATER CONTENT PERCENT Wp W Wl 20 40 60 80	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.51						
0	Power Auger / Geoprobe	ASPHALTIC CONCRETE		0.00						
		SAND; dark brown, contains rootlets; non-cohesive, moist		0.15	1	SS				
1					2	SS		⊕ □		
				63.99						
		SILTY SAND; grey; non-cohesive, moist		1.52						
2					3	SS				
					4	SS		⊕ □		
3					5	SS		□ ⊕		
				61.85						
		End of Borehole		3.66						
4		Note(s):								
		1. Borehole log not for geotechnical purposes.								
5										
6										
7										
8										
9										
10										

DEPTH SCALE

1 : 50

GOLDER

LOGGED: DS

CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: 21-25

SHEET 1 OF 1

LOCATION: N 5026315.8 ;E 361338.3

BORING DATE: December 21, 2021

DATUM: Geodetic

SAMPLER HAMMER, 64kg; DROP, 760mm

PENETRATION TEST HAMMER, 64kg; DROP, 760mm

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.30m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		66.01						
0	Power Auger / Geoprobe	ASPHALT		0.00						
		SAND		0.15	1	SS		ND		
1										
					2	SS		ND		
2				63.93						
		SILTY SAND, trace gravel; grey; non-cohesive, moist		2.08	3	SS				
3				62.96						
		BEDROCK		3.05	4	SS		ND		
				62.66						
		End of Borehole		3.35						
		Note(s):								
4		1. Borehole log not for geotechnical purposes.								
5										
6										
7										
8										
9										
10										

DEPTH SCALE
1 : 50

GOLDER

LOGGED: DS
CHECKED: DS

MIS-BHS 001 21494078.GPJ GAL-MIS.GDT 3/3/22 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: BH22-01

SHEET 1 OF 2

LOCATION: N 5026373.18; E 361314.80

BORING DATE: May 11, 2022

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Geoprobe

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected) 100 200 300 400	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected) 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3}	WATER CONTENT PERCENT Wp W Wl 20 40 60 80	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		65.02									
0	Power Auger / Geoprobe	FILL - (SW) SAND and GRAVEL, with asphalt fragments; non-cohesive, dry		0.00 / 64.77									Flush Mount Casing
		FILL - (SP) SAND, medium to coarse, trace silt and gravel; brown; non-cohesive, moist		0.25 / 63.50	1	DP	-	ND					
1					2	DP	-	ND					
		FILL - (SM) SILTY SAND, medium to coarse, gravelly; grey brown; non-cohesive, moist to wet		1.52 / 61.62	3	DP	-	ND					
2					4	DP	-	ND					
3					5	DP	-	ND					
	Air Hammer	BEDROCK		3.40									Bentonite Seal
4													
5													
6													
7													D ▽
8													Silica Sand
		CONTINUED NEXT PAGE											

DEPTH SCALE

1 : 40

LOGGED: DG

CHECKED:

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PROJECT: 21494078

RECORD OF BOREHOLE: BH22-01

SHEET 2 OF 2

LOCATION: N 5026373.18; E 361314.80

BORING DATE: May 11, 2022

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Geoprobe

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
8		*--- CONTINUED FROM PREVIOUS PAGE ---*								
8	Air Hammer	BEDROCK		55.42						52 mm Diam. PVC #10 Slot Screen
9		END OF BOREHOLE		9.60						
10		Notes: 1. Water level at BH22-01 measured at a depth of 8.20 m (Elev. 56.82 m) on May 26, 2022. 2. Borehole log not prepared for geotechnical engineering purposes.								
11										
12										
13										
14										
15										
16										

DEPTH SCALE

1 : 40

LOGGED: DG

CHECKED:

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PROJECT: 21494078

RECORD OF BOREHOLE: BH22-02

SHEET 1 OF 2

LOCATION: N 5026383.15; E 361318.50

BORING DATE: May 9, 2022

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Geoprobe

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] (ND = Not Detected) 100 200 300 400 / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] (ND = Not Detected) 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3} / WATER CONTENT PERCENT Wp W Wl 20 40 60 80	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		64.90						
	Direct Push, 130 mm Diam. Casing	FILL - (SP) gravelly SAND, with asphalt fragments; grey brown; moist, non-cohesive, moist		0.00 / 64.60						Silica Sand
		FILL - (SP) SAND, medium to coarse, some fines; brown; non-cohesive, moist		0.30	1	DP	-	ND		
1					2	DP	-	ND		
		FILL - (SP/SC) SAND to CLAYEY SAND, low to high plastic fines; grey to dark brown; non-cohesive, moist		63.61 / 1.29 / 63.38						
		GLACIAL TILL to WEATHERED BEDROCK		1.52						
2					3	DP	-	ND		Bentonite Seal
					4	DP	-	ND		
		BEDROCK		62.00 / 2.90						
3										
4										Silica Sand
5	Air Hammer									
6										52 mm Diam. PVC #10 Slot Screen
7				57.44						
		END OF BOREHOLE		7.46						
		Notes:								
		1. Water level at BH22-02 measured at a								
8		*CONTINUED NEXT PAGE*								

DEPTH SCALE

1 : 40

LOGGED: KG

CHECKED:

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PROJECT: 21494078

RECORD OF BOREHOLE: BH22-02

SHEET 2 OF 2

LOCATION: N 5026383.15; E 361318.50

BORING DATE: May 9, 2022

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Geoprobe

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected 100 200 300 400 / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3} / WATER CONTENT PERCENT Wp W Wl 20 40 60 80	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
8		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		depth of 2.98 m (Elev. 61.92 m) on May 26, 2022. 2. Borehole log not prepared for geotechnical engineering purposes.									
9											
10											
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12											
13											
14											
15											
16											

DEPTH SCALE

1 : 40

LOGGED: KG

CHECKED:

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PROJECT: 21494078

LOCATION: N 5026373.77; E 361301.53

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: BH22-03

BORING DATE: May 10, 2022

DRILL RIG: Geoprobe

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		64.85						
	Power Auger / Geoprobe	FILL - (SW) gravelly SAND, asphalt, fragments; grey brown; non-cohesive, dry		0.00 / 64.55						Flush Mount Casing
		FILL - (SM) SILTY SAND, medium to coarse, gravelly; brown; non-cohesive, moist		0.30	1	DP	-	ND		
1					2	DP	-	ND		
					3	DP	-	ND		
2					4	DP	-	ND		Bentonite Seal
	Air Hammer	BEDROCK		62.11 / 2.74						
3										
4										
5										Silica Sand
6				58.15						52 mm Diam. PVC #10 Slot Screen
		END OF BOREHOLE		6.70						
7		Notes: 1. Water level at BH22-03 measured at a depth of 7.38 m (Elev. 57.47 m) on May 26, 2022. 2. Borehole log not prepared for geotechnical engineering purposes.								▽ S
8										

DEPTH SCALE

1 : 40

LOGGED: DG

CHECKED:

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PROJECT: 21494078

RECORD OF BOREHOLE: BH22-04

SHEET 1 OF 2

LOCATION: N 5026371.34; E 361293.22

BORING DATE: May 9, 2022

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Geoprobe

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		64.75									
0	Direct Push, 130 mm Diam. Casing	FILL - (SP) gravelly SAND, with asphalt fragments; grey brown; non-cohesive, moist		0.00									
				64.45									
		FILL - (SP) SAND, medium to coarse, some fines; brown; non-cohesive, moist		0.30	1	DP	-						Silica Sand
1					2	DP	-						
				63.46									
		FILL - (SP/SC) SAND to CLAYEY SAND, low plastic fines; brown; non-cohesive, moist		1.29									
				63.23									
		GLACIAL TILL to WEATHERED CRUST		1.52									
2					3	DP	-						
				62.46									
	Air Hammer	BEDROCK		2.29									Bentonite Seal
3													
4													
													Silica Sand
5													
6													52 mm Diam. PVC #10 Slot Screen
7													▽ S
				56.83									
8				7.92									
		CONTINUED NEXT PAGE											

DEPTH SCALE

1 : 40

LOGGED: DG

CHECKED:

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PROJECT: 21494078

RECORD OF BOREHOLE: BH22-04

SHEET 2 OF 2

LOCATION: N 5026371.34; E 361293.22

BORING DATE: May 9, 2022

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG: Geoprobe

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
8		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		END OF BOREHOLE Notes: 1. Water level at BH22-04 measured at a depth of 7.09 m (Elev. 57.66 m) on May 26, 2022. 2. Borehole log not prepared for geotechnical engineering purposes.									
9											
10											
11											
12											
13											
14											
15											
16											

DEPTH SCALE

1 : 40

LOGGED: DG

CHECKED:

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PROJECT: 21494078

LOCATION: N 5026323.15; E 361338.38

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: BH22-05

BORING DATE: May 11, 2022

DRILL RIG: Geoprobe

SHEET 1 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		65.94						
0	Power Auger / Geoprobe	FILL - (SW) gravelly SAND, angular; grey, with asphalt fragments; non-cohesive, dry		0.00 / 65.64						Flush Mount Casing
0	Power Auger / Geoprobe	FILL - (SP) SAND, medium to coarse, gravelly; brown; non-cohesive, moist		0.30	1	DP	-	ND		
1	Power Auger / Geoprobe				2	DP	-	ND		
1	Power Auger / Geoprobe	FILL - (SM) SILTY SAND, medium to coarse, gravelly; grey brown; non-cohesie, moist		64.42 / 1.52						
2	Power Auger / Geoprobe				3	DP	-	ND		
2	Power Auger / Geoprobe				4	DP	-	ND		
3	Power Auger / Geoprobe				5	DP	-	ND		
3	Power Auger / Geoprobe			62.59						
3	Air Hammer	BEDROCK		3.35						Bentonite Seal
4	Air Hammer									
5	Air Hammer									
6	Air Hammer									
7	Air Hammer									Silica Sand
8	Air Hammer									52 mm Diam. PVC #10 Slot Screen
8		*CONTINUED NEXT PAGE*								

DEPTH SCALE

1 : 40

LOGGED: DG

CHECKED:

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PROJECT: 21494078

LOCATION: N 5026323.15; E 361338.38

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

RECORD OF BOREHOLE: BH22-05

BORING DATE: May 11, 2022

DRILL RIG: Geoprobe

SHEET 2 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
8		*--- CONTINUED FROM PREVIOUS PAGE ---*								
8	Air Hammer	BEDROCK								52 mm Diam. PVC #10 Slot Screen
9										
10				55.28						
		END OF BOREHOLE		10.66						
11		Notes:								
		1. Water level at BH22-05 measured at a depth of 7.79 m (Elev. 58.15 m) on May 26, 2022.								
		2. Borehole log not prepared for geotechnical engineering purposes.								
12										
13										
14										
15										
16										

DEPTH SCALE

1 : 40

LOGGED: DG

CHECKED:

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PROJECT: 21494078

RECORD OF BOREHOLE: BH22-06

SHEET 1 OF 2

LOCATION: N 5026374.80; E 361302.66

BORING DATE: October 3, 2022

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		64.90							
		ASPHALT (50 mm)		0.00 / 0.05							Flush Mount Casing
		FILL - (SP/GP) SAND and GRAVEL		64.65 / 0.25							
1		FILL - (SP) SAND, trace gravel; brown; non-cohesive, moist									
2				62.85							
		(SM) SILTY SAND, some fines, trace gravel; brown-grey; non-cohesive, moist		2.05 / 62.40							
		BEDROCK (Limestone)		2.50							Bentonite Seal
3											
4											
5											
6											Sllica Sand
											50 mm Diam. PVC #10 Slot Screen
7				57.90							
		END OF BOREHOLE		7.00							
		Notes:									
		1. Water level at BH22-06 measured at a depth of 6.08 m (Elev. 58.82 m) on May 26, 2022.									
		2. Borehole log not prepared for geotechnical engineering purposes.									
8		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 40

LOGGED: JB

CHECKED: DS

GTA-BHS 001 S:\CLIENTS\FENGATE\1047_RICHMOND_RD\02_DATA\GINT\21494078.GPJ GAL-MIS.GDT 10/2/23 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: BH22-06

SHEET 2 OF 2

LOCATION: N 5026374.80; E 361302.66

BORING DATE: October 3, 2022

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
8		*--- CONTINUED FROM PREVIOUS PAGE ---*									S
9											
10											
11											
12											
13											
14											
15											
16											

DEPTH SCALE

1 : 40

LOGGED: JB

CHECKED: DS

GTA-BHS 001 S:\CLIENTS\FENGATE\1047_RICHMOND_RD\02_DATA\GINT\21494078.GPJ GAL-MIS.GDT 10/2/23 ZS

PROJECT: 21494078

RECORD OF BOREHOLE: BH22-07

SHEET 1 OF 1

LOCATION: N 5026370.88; E 361313.48

BORING DATE: October 3, 2022

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		65.11							
		ASPHALT (50 mm)		0.00 / 0.05							Flush Mount Casing
		FILL - (SP/GP) SAND and GRAVEL		64.91							
		FILL - (SM) SILTY SAND, trace gravel; brown; non-cohesive, moist		0.20							
1											
2				63.06							
		(SM) Gravelly SILTY SAND, trace cobbles and crushed boulders; brown-grey; non-cohesive, moist		2.05							
3				61.91							Bentonite Seal
		BEDROCK (Limestone)		3.20							
4											
5											
6											Sllica Sand
											50 mm Diam. PVC #10 Slot Screen
7				58.11							
		END OF BOREHOLE		7.00							
8		Notes: 1. Water level at BH22-07 measured at a depth of 6.91 m (Elev. 58.20 m) on May 26, 2022. 2. Borehole log not prepared for geotechnical engineering purposes.									

DEPTH SCALE

1 : 40

LOGGED: JB

CHECKED: DS

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PROJECT: 21494078

RECORD OF BOREHOLE: BH22-08

SHEET 1 OF 2

LOCATION: N 5026375.62; E 361303.08

BORING DATE: October 3, 2022

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		64.87							
		ASPHALT (50 mm)		0.00							
		FILL - (SP/GP) SAND and GRAVEL		0.05							
				64.57							Flush Mount Casing
		FILL - (SP) SAND, trace gravel; brown; non-cohesive, moist		0.30							
1											
2				62.69							
		(SM) SILTY SAND, some fines, trace gravel; brown-grey; non-cohesive, moist		2.18							
				62.22							Bentonite Seal
		BEDROCK (Limestone)		2.65							
3											
4											
5											
6											
7											▽ D
8		*CONTINUED NEXT PAGE*									

DEPTH SCALE

1 : 40

LOGGED: JB

CHECKED: DS

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PROJECT: 21494078

RECORD OF BOREHOLE: BH22-08

SHEET 2 OF 2

LOCATION: N 5026375.62; E 361303.08

BORING DATE: October 3, 2022

DATUM: Geodetic

SPT/DCPT HAMMER: MASS, 64kg; DROP, 760mm

DRILL RIG:

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
8		*--- CONTINUED FROM PREVIOUS PAGE ---*									
8		BEDROCK (Limestone)									Bentonite Seal
9											Silica Sand
10				54.87							50 mm Diam. PVC #10 Slot Screen
10		END OF BOREHOLE		10.00							
11		Notes:									
12		1. Water level at BH22-08 measured at a depth of 8.11 m (Elev. 56.76 m) on May 26, 2022.									
13		2. Borehole log not prepared for geotechnical engineering purposes.									
14											
15											
16											

DEPTH SCALE

1 : 40

LOGGED: JB

CHECKED: DS

PROJECT: 21494078

LOCATION: N 5026404.46; E 361315.65

RECORD OF BOREHOLE: BH22-09

BORING DATE: May 15 - 16, 2023

DRILL RIG: Massenza MI3

SHEET 1 OF 3

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected) 100 200 300 400	HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected) 100 200 300 400	HYDRAULIC CONDUCTIVITY, k, cm/s 10^{-6} 10^{-5} 10^{-4} 10^{-3}	WATER CONTENT PERCENT Wp W Wl 20 40 60 80	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		64.23									
0	Air Rotary 140 mm Casing	ASPHALTIC CONCRETE		0.00 / 0.05									
		FILL - (SW) gravelly SAND, angular; grey; (Pavement Structure)		64.03 / 0.20									
		FILL - (SM) SILTY SAND, trace gravel, organic matter; dark brown; non-cohesive, moist		0.30	1			ND					Flushmount
1		FILL - (SW) gravelly SAND, fine to coarse, trace silt; brown; non-cohesive, moist			2			ND					
		(SM) gravelly SILTY SAND, thin to thick laminations, fine to coarse, contains cobbles and boulders; brown to grey-brown (TILL); non-cohesive, moist to wet		63.16 / 1.07	3			ND					
2					4			ND					Bentonite Seal
3					5			ND					
					6			ND					
4				60.12									
	Air Rotary 89 mm Air Hammer	Slightly weathered to fresh, medium to thickly bedded, medium grey, fine grained, non-porous to faintly porous, medium strong, Dolostone interbedded with shale, limestone and sandstone		4.11									Sand #2
5													
6													Screen
7													
8													Bentonite Seal
		CONTINUED NEXT PAGE											

DEPTH SCALE

1 : 40

LOGGED:

CHECKED: DS

GTA-BHS 001 S:\CLIENTS\FENGATE\1047_RICHMOND_RD\02_DATA\GINT\21494078.GPJ GAL-MIS.GDT 10/2/23 ZS

PROJECT: 21494078

LOCATION: N 5026404.46; E 361315.65

RECORD OF BOREHOLE: BH22-09

BORING DATE: May 15 - 16, 2023

DRILL RIG: Massenza MI3

SHEET 2 OF 3

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
8		*--- CONTINUED FROM PREVIOUS PAGE ---*								
8	Air Rotary, 89 mm Air Hammer	Slightly weathered to fresh, medium to thickly bedded, medium grey, fine grained, non-porous to faintly porous, medium strong, Dolostone interbedded with shale, limestone and sandstone								Bentonite Seal; D; Sand #2; Screen
10				54.17						
10		END OF BOREHOLE		10.06						
11										
12										
13										
14										
15										
16										

DEPTH SCALE

1 : 40

LOGGED:

CHECKED: DS

GTA-BHS 001 S:\CLIENTS\FENGATE\1047_RICHMOND_RD\02_DATA\GINT\21494078.GPJ GAL-MIS.GDT 10/2/23 ZS

PROJECT: 21494078

LOCATION: N 5026390.88; E 361333.63

RECORD OF BOREHOLE: BH22-10

BORING DATE: May 15 - 16, 2023

DRILL RIG: Massenza MI3

SHEET 1 OF 3

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ (ND = Not Detected; 100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ (ND = Not Detected; 100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
0		GROUND SURFACE		64.81						
	Air Rotary, 140 mm Casing	ASPHALTIC CONCRETE		0.00						
		FILL - (SW) gravelly SAND, angular; grey; (Pavement Structure)		0.08						
		FILL - (SP) SAND, fine to medium, some gravel to gravelly, trace silt; brown; non-cohesive, moist		0.15 / 64.35	1			ND		Flushmount
				0.46						
1		(SM) gravelly SILTY SAND, trace plastic fines, contains cobbles and boulders; grey-brown (TILL); non-cohesive, moist			2			ND		
				63.29	3			ND		
		(SW) gravelly SAND, fine to coarse, trace silt; brown; non-cohesive, moist		1.52						
2					4			ND		
				62.52						
		(SM) gravelly SILTY SAND, contains cobbles and boulders, thin laminations of sand, fine to coarse; grey-brown (TILL); non-cohesive, wet		2.29						Bentonite Seal
3					5			ND		
					6			ND		
					7			ND		
				60.85						
4	Air Rotary, 89 mm Air Hammer	Slightly weathered to fresh, medium to thickly bedded, medium grey, fine grained, non-porous to faintly porous, medium strong, Dolostone, interbeddded witth shale, limestone and sandstone		3.96						Sand #2
5										
6										Screen
7										SP
8										Bentonite Seal
		CONTINUED NEXT PAGE								

DEPTH SCALE

1 : 40

LOGGED:

CHECKED: DS

GTA-BHS 001 S:\CLIENTS\FENGATE\1047_RICHMOND_RD\02_DATA\GINT\21494078.GPJ GAL-MIS.GDT 10/2/23 ZS

PROJECT: 21494078

LOCATION: N 5026390.88; E 361333.63

RECORD OF BOREHOLE: BH22-10

BORING DATE: May 15 - 16, 2023

DRILL RIG: Massenza MI3

SHEET 2 OF 3

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	HEADSPACE COMBUSTIBLE VAPOUR CONCENTRATIONS [PPM] ⊕ ND = Not Detected (100 200 300 400) / HEADSPACE ORGANIC VAPOUR CONCENTRATIONS [PPM] □ ND = Not Detected (100 200 300 400)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT Wp W Wl (20 40 60 80)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
8		*--- CONTINUED FROM PREVIOUS PAGE ---*								
8	Air Rotary 89 mm Air Hammer	Slightly weathered to fresh, medium to thickly bedded, medium grey, fine grained, non-porous to faintly porous, medium strong, Dolostone, interbeddded witth shale, limestone and sandstone								Bentonite Seal; Sand #2; D; Screen; Sand #2
10				54.45						
10		END OF BOREHOLE		10.36						
11										
12										
13										
14										
15										
16										

DEPTH SCALE

1 : 40

LOGGED:

CHECKED: DS

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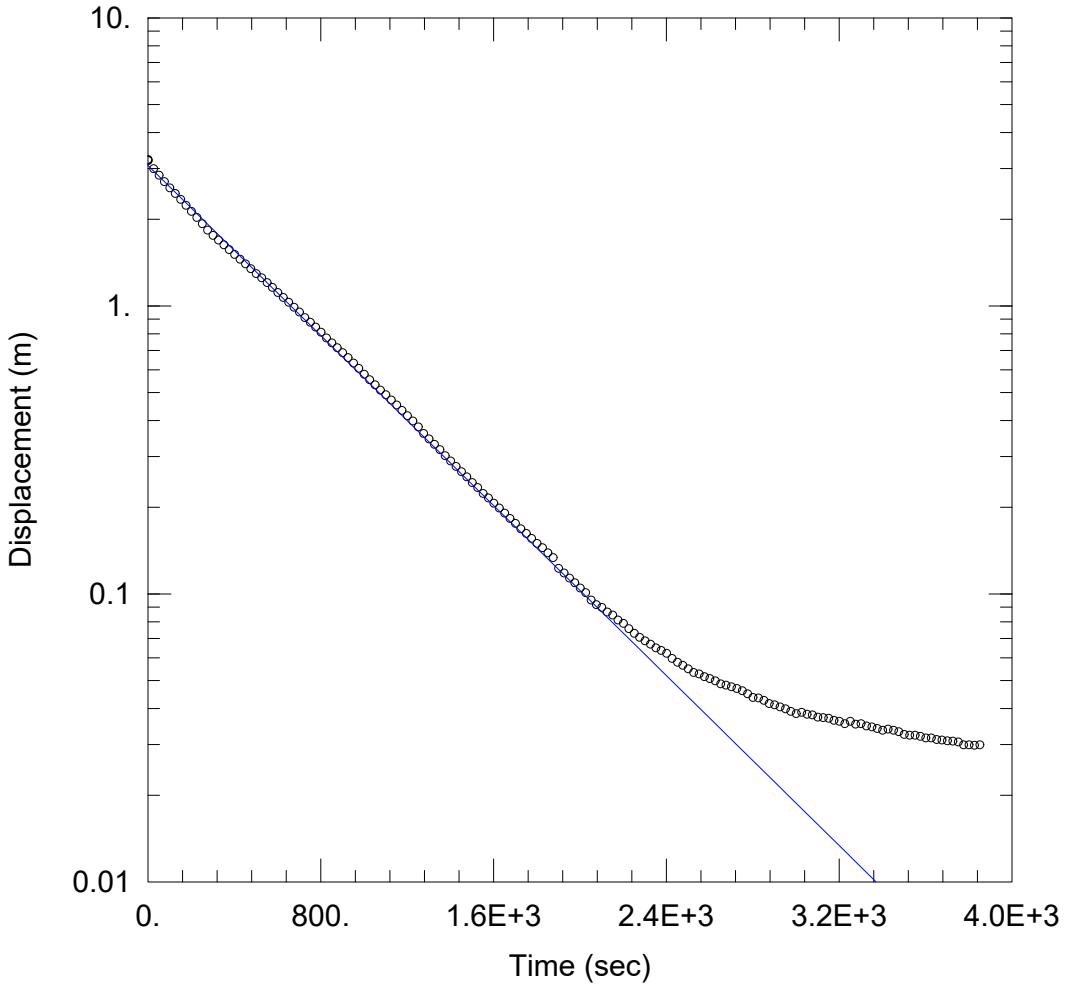
APPENDIX II

HYDRAULIC ANALYSES



WELL TEST ANALYSIS

Data Set: C:\...\ktest_ BH2204_CO972.00.aqt
Date: 07/10/24 Time: 09:34:25

PROJECT INFORMATION

Company: Terrapex Environmental Limited
Client: 1047 Richmond Nominee Inc.
Project: CT972.00
Location: 1047 Richmond Rd, Ottawa, ON
Test Well: BH 22-04
Test Date: July 2, 2024

AQUIFER DATA

Saturated Thickness: 0.996 m Anisotropy Ratio (Kz/Kr): 1.

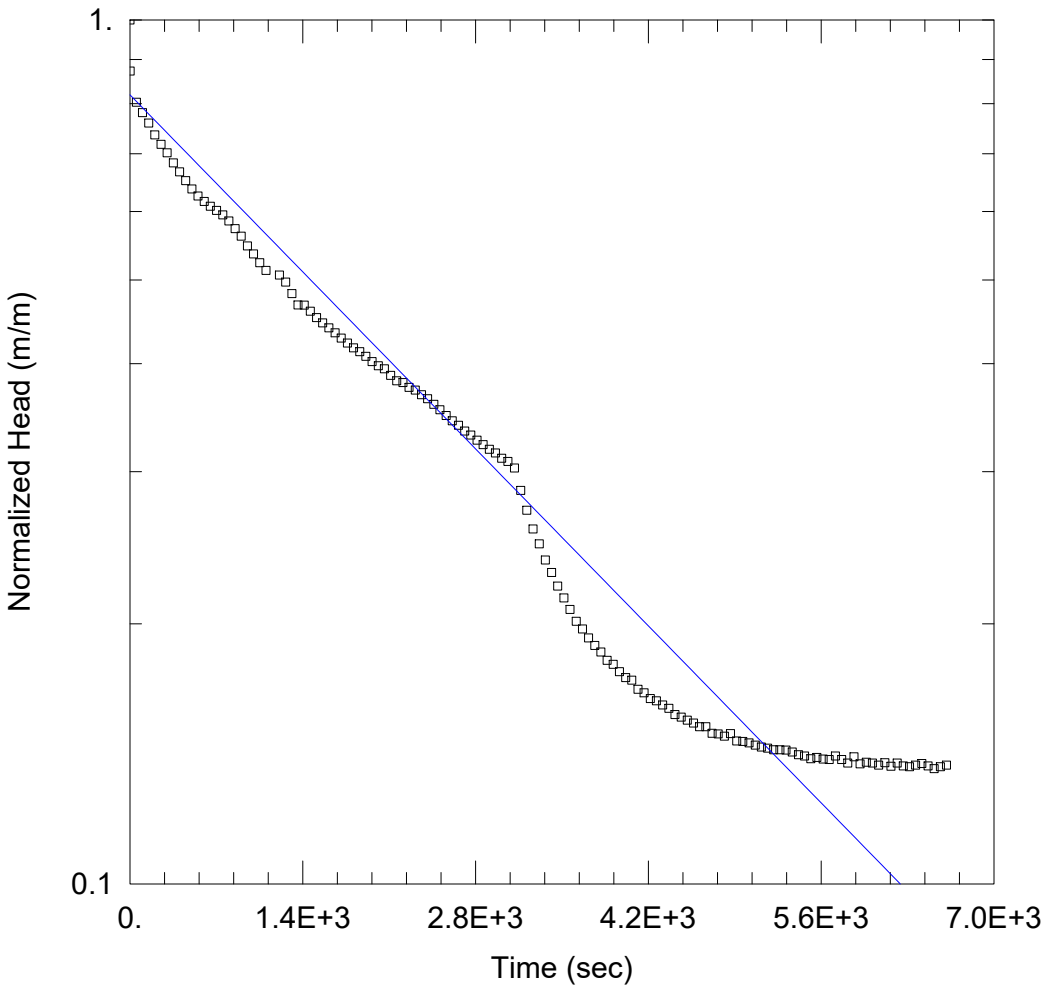
WELL DATA (BH22-04)

Initial Displacement: 3.225 m
Total Well Penetration Depth: 5.884 m
Casing Radius: 0.026 m
Static Water Column Height: 0.996 m
Screen Length: 3.52 m
Well Radius: 0.033 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 2.077E-6 m/sec y0 = 3.074 m



WELL TEST ANALYSIS

Data Set: C:\...\ktest_BH2101_CO972.00.aqt
Date: 07/10/24 Time: 09:38:12

PROJECT INFORMATION

Company: Terrapex Environmental Limited
Client: 1047 Richmond Nominee Inc.
Project: CO972.00
Location: 1047 Richmond Rd, Ottawa, ON.
Test Well: BH21-01
Test Date: July 2, 2024

AQUIFER DATA

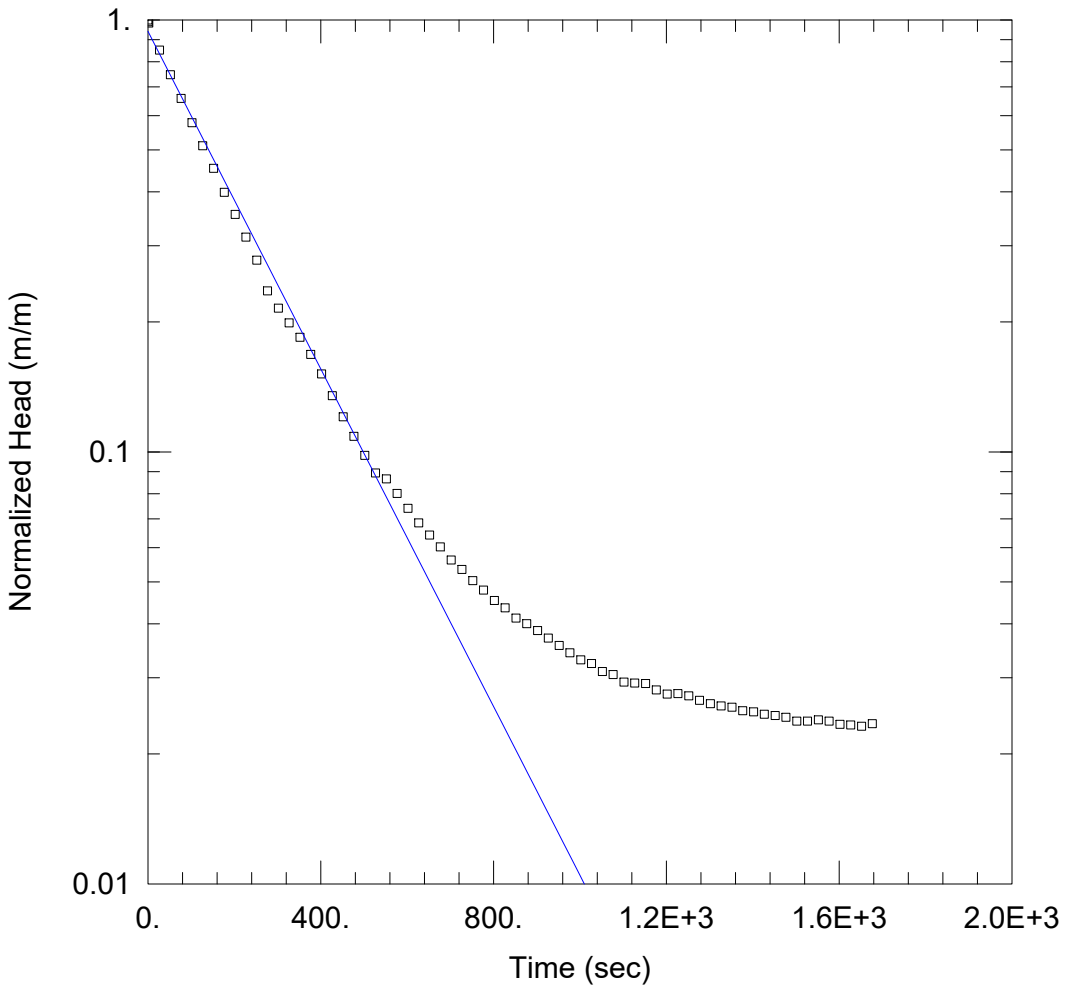
Saturated Thickness: 4.985 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH2101)

Initial Displacement: 0.6833 m
Total Well Penetration Depth: 4.065 m
Casing Radius: 0.026 m
Static Water Column Height: 4.985 m
Screen Length: 3.05 m
Well Radius: 0.031 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 1.267E-7 m/sec
y0 = 0.5595 m



WELL TEST ANALYSIS

Data Set: C:\...\ktest_BH2104_CO972.00.aqt
Date: 07/10/24 Time: 09:41:47

PROJECT INFORMATION

Company: Terrapex Enviromental Limited
Client: 1047 Richmond Nominee Inc.
Project: CO972.00
Location: 1047 Richmond Rd, Ottawa, ON.
Test Well: BH21-04
Test Date: July 2, 2024

AQUIFER DATA

Saturated Thickness: 5.68 m Anisotropy Ratio (Kz/Kr): 1.

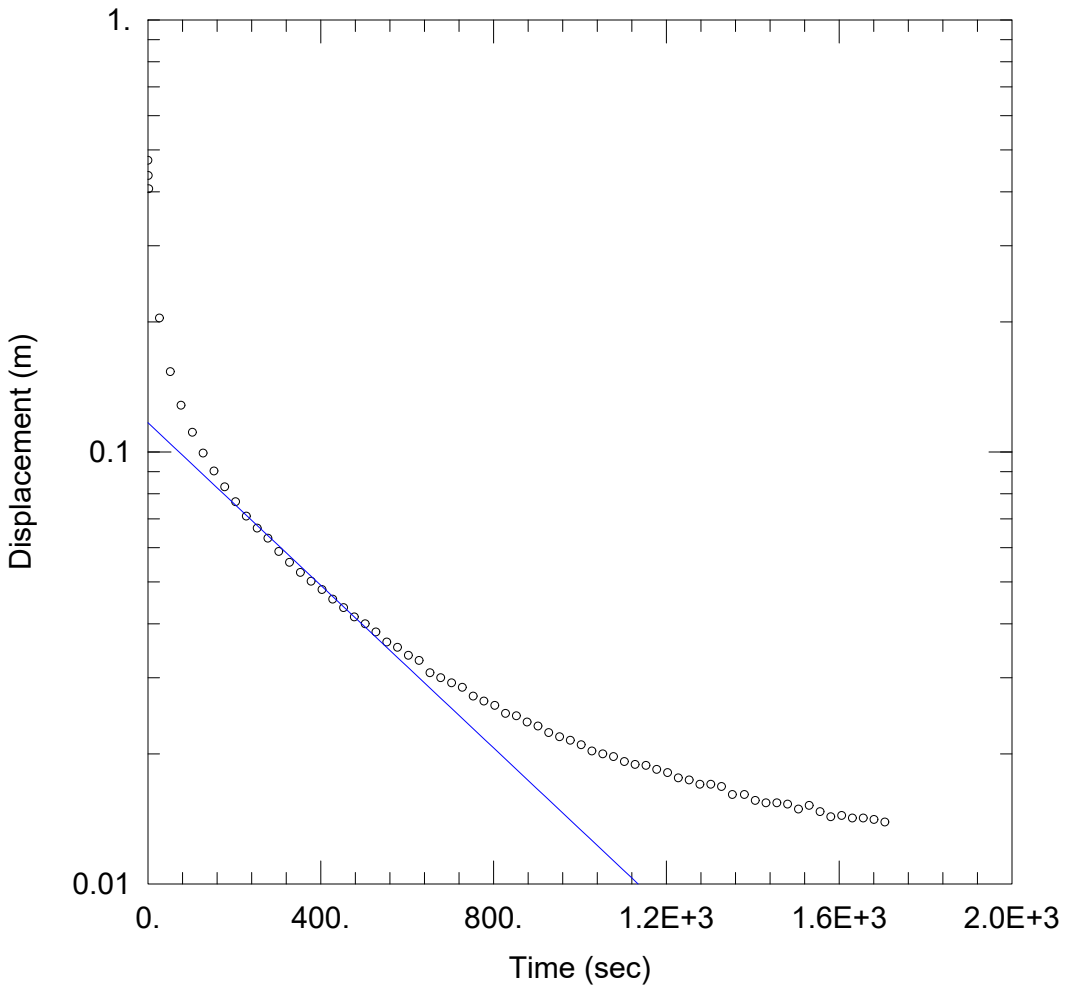
WELL DATA (BH21-04)

Initial Displacement: 1.251 m
Total Well Penetration Depth: 5.37 m
Casing Radius: 0.026 m
Static Water Column Height: 5.68 m
Screen Length: 3.05 m
Well Radius: 0.031 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 1.815E-6 m/sec
y0 = 1.177 m



WELL TEST ANALYSIS

Data Set: C:\...\ktest_BH2114 - 1 inch PVC.aqt
Date: 07/10/24 Time: 09:43:23

PROJECT INFORMATION

Company: Terrapex Environmental Limited
Client: 1047 Richmond Nominee Inc.
Project: CT972.00
Location: 1047 Richmond Rd, Ottawa, ON
Test Well: BH 21-14
Test Date: July 2, 2024

AQUIFER DATA

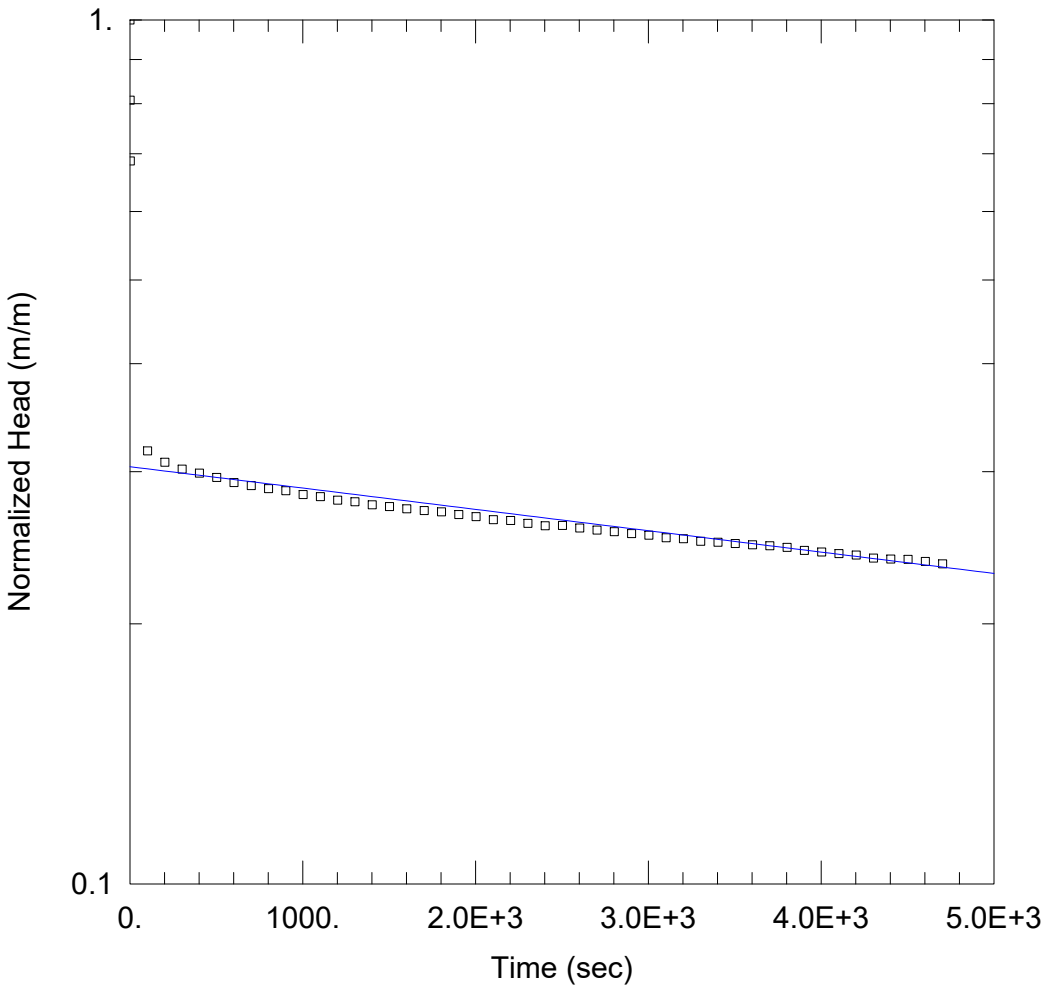
Saturated Thickness: 2.781 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (MW21-14)

Initial Displacement: 0.4731 m
Total Well Penetration Depth: 2.781 m
Casing Radius: 0.01307 m
Static Water Column Height: 2.781 m
Screen Length: 1.845 m
Well Radius: 0.0165 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice
K = 3.909E-7 m/sec
y0 = 0.1168 m



WELL TEST ANALYSIS

Data Set: C:\...\ktest_BH2122_CO972.00_bedrock.aqt
Date: 07/10/24 Time: 09:48:28

PROJECT INFORMATION

Company: Terrapex Environmental Limited
Client: 1047 Richmond Nominee Inc.
Project: CO972.00
Location: 1047 Richmond Rd, Ottawa, ON.
Test Well: BH21-22
Test Date: July 2, 2024

AQUIFER DATA

Saturated Thickness: 2.06 m Anisotropy Ratio (Kz/Kr): 1.

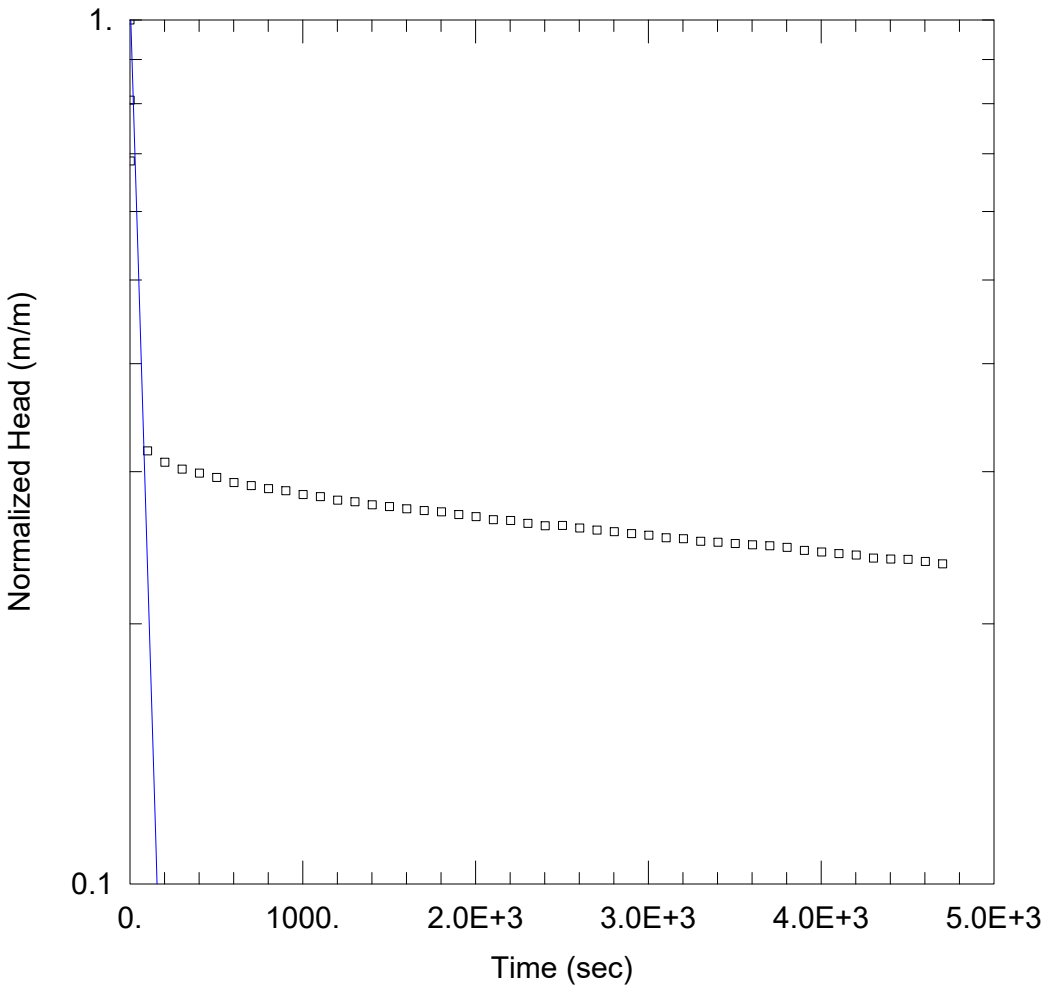
WELL DATA (BH21-22)

Initial Displacement: 0.4674 m
Total Well Penetration Depth: 3.05 m
Casing Radius: 0.026 m
Static Water Column Height: 2.06 m
Screen Length: 3.05 m
Well Radius: 0.031 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 3.241E-8 m/sec
y0 = 0.1421 m



WELL TEST ANALYSIS

Data Set: C:\...\ktest_BH2122_CO972.00_soil.aqt
Date: 07/10/24 Time: 09:49:26

PROJECT INFORMATION

Company: Terrapex Environmental Limited
Client: 1047 Richmond Nominee Inc.
Project: CO972.00
Location: 1047 Richmond Rd, Ottawa, ON.
Test Well: BH21-22
Test Date: July 2, 2024

AQUIFER DATA

Saturated Thickness: 2.06 m Anisotropy Ratio (Kz/Kr): 1.

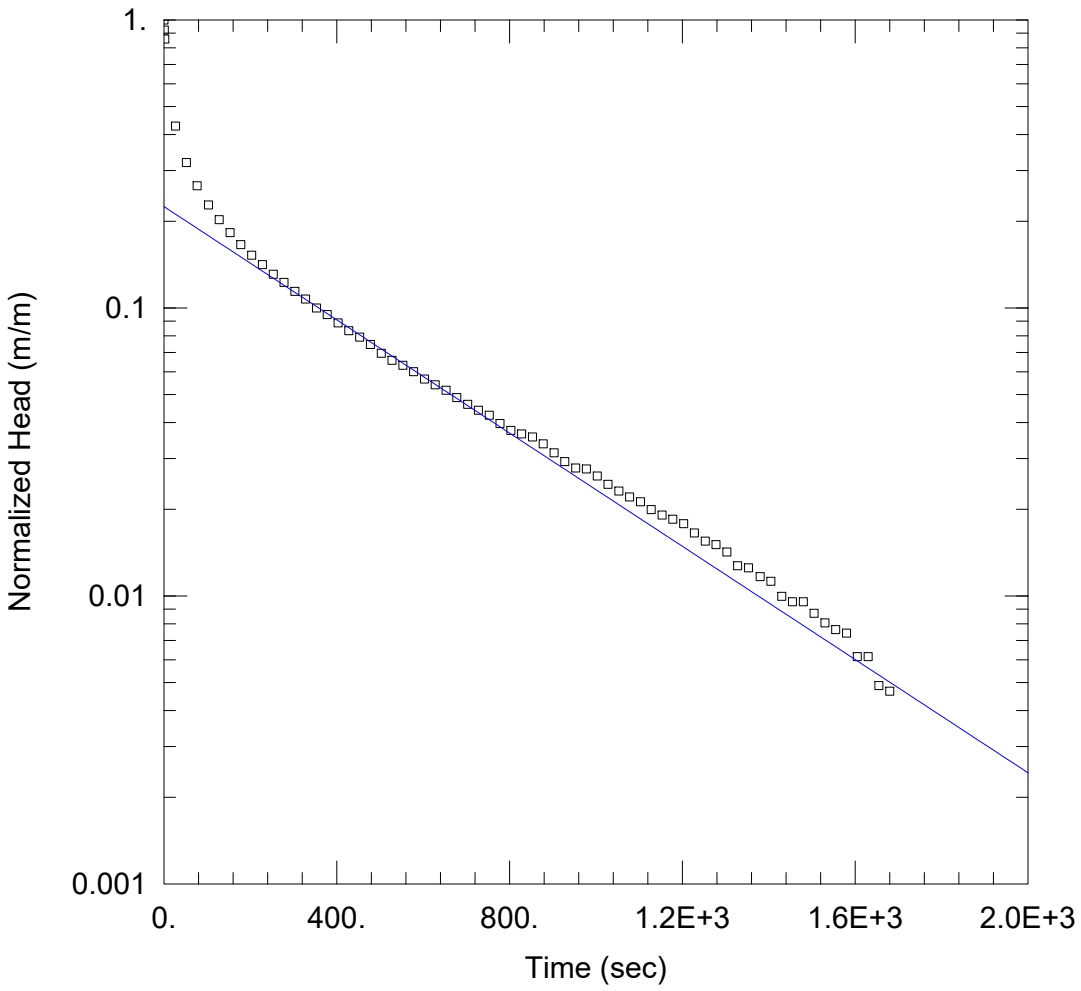
WELL DATA (BH21-22)

Initial Displacement: 0.4674 m
Total Well Penetration Depth: 3.05 m
Casing Radius: 0.026 m
Static Water Column Height: 2.06 m
Screen Length: 3.05 m
Well Radius: 0.031 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Bouwer-Rice

K = 8.64E-6 m/sec
y0 = 0.5062 m



WELL TEST ANALYSIS

Data Set: C:\...\ktest_BH2208_CO972.00.aqt
Date: 07/10/24 Time: 09:50:45

PROJECT INFORMATION

Company: Terrapex Environmental Limited
Client: 1047 Richmond Nominee Inc.
Project: CO972.00
Location: 1047 Richmond Rd, Ottawa, ON.
Test Well: BH22-08
Test Date: July 2, 2024

AQUIFER DATA

Saturated Thickness: 2.36 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH22-08)

Initial Displacement: 0.4713 m
Total Well Penetration Depth: 2.38 m
Casing Radius: 0.026 m
Static Water Column Height: 2.32 m
Screen Length: 1.52 m
Well Radius: 0.031 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Bouwer-Rice

K = 1.642E-6 m/sec y0 = 0.1059 m

APPENDIX II

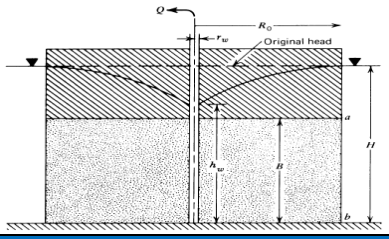
DEWATERING ANALYSES

Construction Dewatering Worksheet - Full Excavation

TERRAPEX

Project:	1047 Richmond Road, Ottawa, Ontario
Project Number:	CO972.00
Location:	Provided Excavation Footprint
Date:	24 March, 2025

Input Parameters



(1)	Aquifer Thickness	(H)	15	m
(2)	Target Aquifer Thickness	(h)	8.56	m
(3)	Effective Drawdown	(Δh)	6.44	m
(4)	Hydraulic Conductivity	(K)	8.6E-06	m/s
(5)	Hydraulic Conductivity	(K)	7.4E-01	m/d
(6)	Excavation length	(a)	77.67	m
(7)	Excavation width	(b)	62	m
(8)	Excavation Length/Width Ratio	(a/b)	1.3	

Distance Calculations

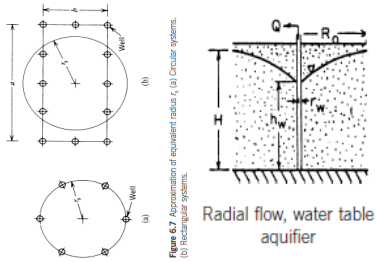


Figure 6.7 Approximation of equivalent radius r_e (a) Circular systems. (b) Rectangular systems.

(9)	**Width of Dewatering**	(L)	28	m
(10)	**Radius/Zone of Influence (ZOI)**	(R_o)	57	m
(11)	**Equivalent Radius of Well** (where a/b ≤ 1.5)	(R_s)	39	m
(12)	**Equivalent Radius of Well** (where a/b > 1.5)	(R_s)		m

Volume Calculations

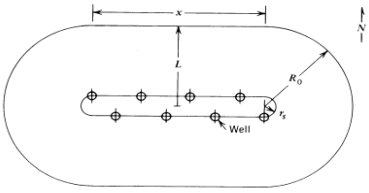


Figure 6.8 Approximate analysis of long, narrow systems.

(13)	**Trench Calculation** (where a/b ≤ 1.5)	(Q)	308	m3/day
		(Q)	308,484	L/day
(14)	**Trench Calculation** (where a/b > 1.5)	(Q)		m3/day
		(Q)		L/day
(15)	**Anticipated Incident Precipitation**		72,233	L/day @ 15mm storm

SUMMARY OF VOLUMES

Estimated Dewatering Volume	(A)	308,484	L/day
Incident Precipitation (15mm storm)	(B)	72,233	L/day
Total Dewatering Volume (A+B)	(C)	380,717	L/day
Design Dewatering Volume (Ax1.5+B)	(D)	534,959	L/day
Permiting Calculation (Ax1.5)		462,726	L/day
Permanent Dewatering (Ax1.5)		462,726	L/day

Relevant Formulae (Powers, 2007)

(9) $R_o / 2$ (eq. 6.15, p. 105)

(10) 3000 (H - h) x sqrt (K) (eq. 6.12, p. 71)

(11) sqrt ((a x b)/ pi) (eq. 6.9, p. 70) (eq. 6.10, p.102)

(12) (a+b)/pi)

(13) (pi x K x (H^2 - h^2)) / ln ((Ro+Rs) / Rs) + 2 x (X x K x (H^2 - h^2)) /(2 x L) (pg. 66,67,68; eq. 6.1 and 6.2)

(14) (pi x K x (H^2 - h^2)) / ln ((Ro+Rs)/ Rs) + 2 x (X x K x (H^2 - h^2)) / (2 x L) (pg. 66,67,68; eq. 6.1 and 6.2)

(15) a x b x 25

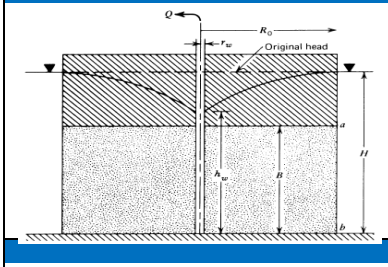
(zk 15sept2022)

Construction Dewatering Worksheet - Excavation Floor

TERRAPEX

Project:	1047 Richmond Road, Ottawa, Ontario
Project Number:	CO972.00
Location:	Lower Layer - Kvalue 3
Date:	24 March, 2025

Input Parameters



	Input Parameters			
(1)	Aquifer Thickness	(H)	12.84	m
(2)	Target Depth	(h)	8.56	m
(3)	Effective Drawdown	(Δh)	4.28	m
(4)	Hydraulic Conductivity	(K)	1.8E-06	m/s
(5)	Hydraulic Conductivity	(K)	1.6E-01	m/d
(6)	Excavation length	(a)	77.67	m
(7)	Excavation width	(b)	62	m
(8)	Excavation Length/Width Ratio	(a/b)	1.3	

Distance Calculations

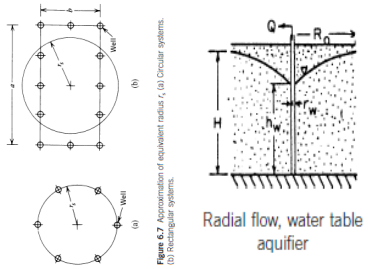


Figure 6.7 Approximation of equivalent radius r_s (a) Circular systems. (b) Rectangular systems.

(9)	**Width of Dewatering**	(L)	9	m
(10)	**Radius/Zone of Influence (ZOI)**	(R_o)	17	m
(11)	**Equivalent Radius of Well** (where a/b ≤ 1.5)	(R_s)	39	m
(12)	**Equivalent Radius of Well** (where a/b > 1.5)	(R_s)		m

Volume Calculations

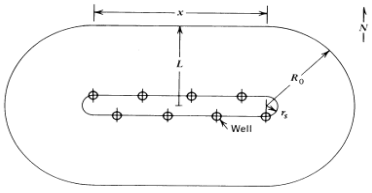


Figure 6.8 Approximate analysis of long, narrow systems.

(13)	**Trench Calculation**	(Q)	128	m3/day
	(where a/b ≤ 1.5)	(Q)	128,191	L/day
(14)	**Trench Calculation**	(Q)		m3/day
	(where a/b > 1.5)	(Q)		L/day
(15)	**Anticipated Incident Precipitation**		72,233	L/day @ 15mm storm

SUMMARY OF VOLUMES

Estimated Dewatering Volume	(A)	128,191	L/day
Incident Precipitation (15mm storm)	(B)	72,233	L/day
Total Dewatering Volume (A+B)	(C)	200,424	L/day
Design Dewatering Volume (Ax1.5+B)	(D)	264,520	L/day
Permiting Calculation (Ax1.5)		192,287	L/day
Permanent Dewatering (Ax1.5)		192,287	L/day

Relevant Formulae (Powers, 2007)

(9)	R_o / 2	(eq. 6.15, p. 105)	
(10)	3000 (H - h) x sqrt (K)	(eq. 6.12, p. 71)	
(11)	sqrt ((a x b)/ pi)	(eq. 6.9, p. 70)	(eq. 6.10, p.102)
(12)	(a+b)/pi)		
(13)	(pi x K x (H^2 - h^2)) / ln ((Ro+Rs) / Rs) + 2 x (X x K x (H^2 - h^2)) /(2 x L)	(pg. 66,67,68; eq. 6.1 and 6.2)	
(14)	(pi x K x (H^2 - h^2)) / ln ((Ro+Rs)/ Rs) + 2 x (X x K x (H^2 - h^2)) / (2 x L)	(pg. 66,67,68; eq. 6.1 and 6.2)	
(15)	a x b x 25		(zk 1Sept2022)

Construction Dewatering Worksheet - Summary of Estimates

TERRAPEX

Project: 1047 Richmond Road, Ottawa, Ontario
Project Number: CO972.00
Location: Provided Excavation
Date: 24 March, 2025

Dewatering Rate Estimates

SUMMARY

Full Excavation using full excavation @ Kvalue 1	308,484	L/day
Cropping Volume from middle and lower layers @ Kvalue 1	280,202	L/day
Resultant Contribution from Upper Layer @ Kvalue 1	**28,282**	**L/day**
Contribution from middle and lower layers @ Kvalue 2	181,290	L/day
Cropping volume from lower layer @ Kvalue 2	181,290	L/day
Resultant Contribution from Middle Layer @ Kvalue 2	**0**	**L/day**
Resultant Contribution from Lower layer @ Kvalue 3 (or floor)	**128,191**	**L/day**
Total (no factor of safety)	**156,473**	**L/day**

DETAILED BREAKDOWN FOR ASSESSING IMPACT OF IMPERMEABLE EXCAVATION SURFACES (if applicable)

	Excavation Surface	Perimeter (m)	Relative Dewatering Contribution (L/day)	Is Surface Designed as Permeable? Yes=1 / No=0	Anticipated Volumes for Surfaces (L/day)
Upper Layer	North Wall	77.7	7,864	1	7,864
	East Wall	62.0	6,277	1	6,277
	South Wall	77.7	7,864	1	7,864
	West Wall	62.0	6,277	1	6,277
Middle Layer	North Wall	77.7	0	1	0
	East Wall	62.0	0	1	0
	South Wall	77.7	0	1	0
	West Wall	62.0	0	1	0
Lower Layer (or floor)	North Wall	77.7	35,643	1	35,643
	East Wall	62.0	28,452	1	28,452
	South Wall	77.7	35,643	1	35,643
	West Wall	62.0	28,452	1	28,452
			Total Groundwater Contribution		**156,473**
				Incident PTTN	72,233

FACTORS OF SAFETY, PERMITTING, AND DESIGN

Estimated Dewatering Volume (A)	156,473	L/day
Incident PPTN (B)	72,233	L/day
Total Dewatering Volume (C)	228,706	L/day
Factor of Safety (FOS)	1.5	
Design Dewatering Volume (A x FOS + B)(D)	**306,943**	**L/day**
PTTW Calculation (no rain, just groundwater)	**234,710**	**L/day**
Permanent Dewatering (A x D), assumes rainwater directed away from foundation	**234,710**	**L/day**
Permanent Dewatering (A x D), assumes rainwater directed away from foundation	**43**	**GPM**

APPENDIX III

HYDROCHEMICAL ANALYSES

Your Project #: CO972.00
Site#: 1047 RICHMOND ROAD
Site Location: FERNGATE RICHMOND
Your C.O.C. #: C#1038203-01-01

Attention: Keith Brown

Terrapex Environmental Ltd
1-20 Gurdwara Rd.
Ottawa, ON
CANADA K2E 8B3

Report Date: 2025/04/07
Report #: R8516006
Version: 2 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BUREAU VERITAS JOB #: C529290
Received: 2025/03/18, 16:20

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
ABN Compounds in Water by GC/MS	1	2025/03/21	2025/03/21	CAM SOP-00301	EPA 8270E m
Sewer Use By-Law Semivolatile Organics	1	2025/03/24	2025/03/25	CAM SOP 00301	EPA 8270 m
Carbonaceous BOD	1	2025/03/20	2025/03/25	CAM SOP-00427	SM 24 5210B m
Total Cyanide	1	2025/03/20	2025/03/20	CAM SOP-00457	OMOE E3015 5 m
Fluoride	1	2025/03/19	2025/03/20	CAM SOP-00449	SM 24 4500-F C m
Formaldehyde (HPLC)	1	2025/03/20	2025/03/21	CAM SOP-00310	EPA 8315A m
Mercury in Water by CVAA	1	2025/04/01	2025/04/01	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	1	2025/03/24	2025/03/24	CAM SOP-00447	EPA 6020B m
E.coli, (CFU/100mL)	1	N/A	2025/03/19	CAM SOP-00552	SM9222B, MECP E3371
Total Nonylphenol in Liquids by HPLC	1	2025/03/22	2025/03/24	CAM SOP-00313	In-house Method
Nonylphenol Ethoxylates in Liquids: HPLC	1	2025/03/22	2025/03/24	CAM SOP-00313	In-house Method
Animal and Vegetable Oil and Grease	1	N/A	2025/03/23	CAM SOP-00326	EPA1664B m,SM5520B m
Total Oil and Grease	1	2025/03/23	2025/03/23	CAM SOP-00326	EPA1664B m,SM5520B m
OC Pesticides (Selected) & PCB (1)	1	2025/03/24	2025/03/25	CAM SOP-00307	EPA 8081B/ 8082A
OC Pesticides Summed Parameters	1	N/A	2025/03/20	CAM SOP-00307	EPA 8081B/ 8082A
Phenols (4AAP)	1	N/A	2025/03/20	CAM SOP-00444	OMOE E3179 m
pH	1	2025/03/19	2025/03/20	CAM SOP-00413	SM 24th-4500H+ B
Sulphate by Automated Turbidimetry	1	N/A	2025/03/20	CAM SOP-00464	SM 24 4500-SO42- E m
Sulphide	1	N/A	2025/03/20	CAM SOP-00455	SM 24 4500-S G m
Total Kjeldahl Nitrogen in Water	1	2025/03/19	2025/03/20	CAM SOP-00938	SM 4500-N B m
Total PAHs (Hamilton, Ottawa S.U.B.) (2)	1	N/A	2025/03/26	CAM SOP - 00301	
Mineral/Synthetic O & G (TPH Heavy Oil) (3)	1	2025/03/23	2025/03/23	CAM SOP-00326	EPA1664B m,SM5520F m
Total Suspended Solids	1	2025/03/20	2025/03/20	CAM SOP-00428	SM 24 2540D m
Volatile Organic Compounds in Water	1	N/A	2025/03/21	CAM SOP-00228	EPA 8260D
Non-Routine Volatile Organic Compounds	1	N/A	2025/03/24	CAM SOP-00226	EPA 8260D m

Remarks:

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

All work recorded herein has been done in accordance with procedures and practices ordinarily exercised by professionals in Bureau Veritas' profession

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

Your Project #: CO972.00
Site#: 1047 RICHMOND ROAD
Site Location: FERNGATE RICHMOND
Your C.O.C. #: C#1038203-01-01

Attention: Keith Brown

Terrapex Environmental Ltd
1-20 Gurdwara Rd.
Ottawa, ON
CANADA K2E 8B3

Report Date: 2025/04/07
Report #: R8516006
Version: 2 - Partial

CERTIFICATE OF ANALYSIS – PARTIAL RESULTS

BUREAU VERITAS JOB #: C529290
Received: 2025/03/18, 16:20

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

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

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

Reference Method suffix “m” indicates test methods incorporate validated modifications from specific reference methods to improve performance.
* RPDs calculated using raw data. The rounding of final results may result in the apparent difference.
(1) Chlordane (Total) = Alpha Chlordane + Gamma Chlordane
(2) Total PAHs include only those PAHs specified in the sewer use by-by-law.
(3) Note: TPH (Heavy Oil) is equivalent to Mineral / Synthetic Oil & Grease

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Katherine Szozda, Project Manager
Email: Katherine.Szozda@bureauveritas.com
Phone# (613)274-0573 Ext:7063633
==========
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

Bureau Veritas Job #: C529290
Report Date: 2025/04/07

Terrapex Environmental Ltd
Client Project #: CO972.00
Site Location: FERNGATE RICHMOND
Sampler Initials: EB

RESULTS OF ANALYSES OF WATER

Bureau Veritas ID		APAK85		
Sampling Date		2025/03/18 11:00		
COC Number		C#1038203-01-01		
	UNITS	**MW202**	**RDL**	**QC Batch**
Calculated Parameters				
Total Animal/Vegetable Oil and Grease	mg/L	1.3	0.50	9893602
Inorganics				
Total Carbonaceous BOD	mg/L	<2	2	9894347
Fluoride (F-)	mg/L	0.55	0.10	9894143
Total Kjeldahl Nitrogen (TKN)	mg/L	1.9	0.10	9894081
pH	pH	9.72		9894144
Phenols-4AAP	mg/L	<0.0010	0.0010	9894519
Total Suspended Solids	mg/L	<10	10	9894875
Dissolved Sulphate (SO4)	mg/L	1200	5.0	9893130
Sulphide	mg/L	<0.020	0.020	9894449
Total Cyanide (CN)	mg/L	<0.0050	0.0050	9894264
Miscellaneous Parameters				
Formaldehyde	ug/L	<10	10	9894794
Petroleum Hydrocarbons				
Total Oil & Grease	mg/L	2.1	0.50	9896095
Total Oil & Grease Mineral/Synthetic	mg/L	0.80	0.50	9896096

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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NONYL PHENOL AND NONYL PHENOL ETHOXYLATE (WATER)

Bureau Veritas ID		APAK85		
Sampling Date		2025/03/18 11:00		
COC Number		C#1038203-01-01		
	UNITS	**MW202**	**RDL**	**QC Batch**
Miscellaneous Parameters				
Nonylphenol Ethoxylate (Total)	mg/L	<0.005	0.005	9895906
Nonylphenol (Total)	mg/L	<0.001	0.001	9895905

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ELEMENTS BY ATOMIC SPECTROSCOPY (WATER)

Bureau Veritas ID		APAK85		
Sampling Date				
COC Number		C#1038203-01-01		
	UNITS	**MW202**	**RDL**	**QC Batch**
Metals				
Mercury (Hg)	mg/L	<0.00010	0.00010	9902107
Total Aluminum (Al)	ug/L	35	4.9	9896591
Total Antimony (Sb)	ug/L	<0.50	0.50	9896591
Total Arsenic (As)	ug/L	<1.0	1.0	9896591
Total Bismuth (Bi)	ug/L	<1.0	1.0	9896591
Total Boron (B)	ug/L	210	10	9896591
Total Cadmium (Cd)	ug/L	<0.090	0.090	9896591
Total Chromium (Cr)	ug/L	7.7	5.0	9896591
Total Cobalt (Co)	ug/L	<0.50	0.50	9896591
Total Copper (Cu)	ug/L	<0.90	0.90	9896591
Total Lead (Pb)	ug/L	<0.50	0.50	9896591
Total Manganese (Mn)	ug/L	<2.0	2.0	9896591
Total Molybdenum (Mo)	ug/L	180	0.50	9896591
Total Nickel (Ni)	ug/L	<1.0	1.0	9896591
Total Phosphorus (P)	ug/L	<100	100	9896591
Total Selenium (Se)	ug/L	3.1	2.0	9896591
Total Silver (Ag)	ug/L	<0.090	0.090	9896591
Total Tin (Sn)	ug/L	<1.0	1.0	9896591
Total Titanium (Ti)	ug/L	<5.0	5.0	9896591
Total Vanadium (V)	ug/L	4.8	0.50	9896591
Total Zinc (Zn)	ug/L	<5.0	5.0	9896591

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		APAK85		
Sampling Date		2025/03/18 11:00		
COC Number		C#1038203-01-01		
	UNITS	**MW202**	**RDL**	**QC Batch**
Semivolatile Organics				
1-Methylnaphthalene	ug/L	<0.3	0.3	9896850
2-Methylnaphthalene	ug/L	<0.3	0.3	9896850
Fluorene	ug/L	<0.3	0.3	9896850
Naphthalene	ug/L	<0.3	0.3	9896850
Di-N-butyl phthalate	ug/L	<2	2	9896850
Bis(2-ethylhexyl)phthalate	ug/L	<2	2	9896850
Phenanthrene	ug/L	<0.2	0.2	9896850
Anthracene	ug/L	<0.2	0.2	9896850
Fluoranthene	ug/L	<0.2	0.2	9896850
Pyrene	ug/L	<0.2	0.2	9896850
Benzo(a)anthracene	ug/L	<0.2	0.2	9896850
Chrysene	ug/L	<0.2	0.2	9896850
Benzo(b/j)fluoranthene	ug/L	<0.2	0.2	9896850
Benzo(k)fluoranthene	ug/L	<0.2	0.2	9896850
Benzo(a)pyrene	ug/L	<0.2	0.2	9896850
Indeno(1,2,3-cd)pyrene	ug/L	<0.2	0.2	9896850
Dibenzo(a,h)anthracene	ug/L	<0.2	0.2	9896850
Benzo(g,h,i)perylene	ug/L	<0.2	0.2	9896850
Dibenzo(a,i)pyrene	ug/L	<0.2	0.2	9896850
Benzo(e)pyrene	ug/L	<0.2	0.2	9896850
Perylene	ug/L	<0.2	0.2	9896850
Dibenzo(a,j) acridine	ug/L	<0.4	0.4	9896850
7H-Dibenzo(c,g) Carbazole	ug/L	<0.4	0.4	9896850
2,4-Dichlorophenol	ug/L	<0.30	0.30	9895187
Benzyl butyl phthalate	ug/L	<0.50	0.50	9895187
Bis(2-chloroethoxy)methane	ug/L	<0.50	0.50	9895187
di-n-octyl phthalate	ug/L	<0.80	0.80	9895187
Diethyl phthalate	ug/L	<1.0	1.0	9895187
Indole	ug/L	<1.0	1.0	9895187
Calculated Parameters				
Total PAHs (18 PAHs)	ug/L	<0.96	0.96	9893886
Surrogate Recovery (%)				
2,4,6-Tribromophenol	%	40		9895187

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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SEMI-VOLATILE ORGANICS BY GC-MS (WATER)

Bureau Veritas ID		APAK85		
Sampling Date		2025/03/18 11:00		
COC Number		C#1038203-01-01		
	UNITS	**MW202**	**RDL**	**QC Batch**
2-Fluorobiphenyl	%	45		9895187
2-Fluorophenol	%	14		9895187
D14-Terphenyl	%	71		9895187
D5-Nitrobenzene	%	48		9895187
D5-Phenol	%	11		9895187
2,4,6-Tribromophenol	%	36		9896850
2-Fluorobiphenyl	%	42		9896850
D14-Terphenyl (FS)	%	96		9896850
D5-Nitrobenzene	%	57		9896850
D8-Acenaphthylene	%	50		9896850

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		APAK85		
Sampling Date		2025/03/18 11:00		
COC Number		C#1038203-01-01		
	UNITS	**MW202**	**RDL**	**QC Batch**
Volatile Organics				
Benzene	ug/L	<0.20	0.20	9894715
Bromodichloromethane	ug/L	<0.50	0.50	9894715
Bromoform	ug/L	<1.0	1.0	9894715
Bromomethane	ug/L	<0.50	0.50	9894715
Carbon Tetrachloride	ug/L	<0.19	0.19	9894715
Chlorobenzene	ug/L	<0.20	0.20	9894715
Chloroethane	ug/L	<1.0	1.0	9894715
Chloroform	ug/L	<0.20	0.20	9894715
Chloromethane	ug/L	<5.0	5.0	9894715
Dibromochloromethane	ug/L	<0.50	0.50	9894715
1,2-Dichlorobenzene	ug/L	<0.40	0.40	9894715
1,3-Dichlorobenzene	ug/L	<0.40	0.40	9894715
1,4-Dichlorobenzene	ug/L	<0.40	0.40	9894715
1,1-Dichloroethane	ug/L	<0.20	0.20	9894715
1,2-Dichloroethane	ug/L	<0.49	0.49	9894715
1,1-Dichloroethylene	ug/L	<0.20	0.20	9894715
cis-1,2-Dichloroethylene	ug/L	<0.50	0.50	9894715
trans-1,2-Dichloroethylene	ug/L	<0.50	0.50	9894715
1,2-Dichloropropane	ug/L	<0.20	0.20	9894715
cis-1,3-Dichloropropene	ug/L	<0.30	0.30	9894715
trans-1,3-Dichloropropene	ug/L	<0.40	0.40	9894715
Ethylbenzene	ug/L	<0.20	0.20	9894715
Ethylene Dibromide	ug/L	<0.19	0.19	9894715
Methylene Chloride(Dichloromethane)	ug/L	<2.0	2.0	9894715
Styrene	ug/L	<0.40	0.40	9894715
1,1,2,2-Tetrachloroethane	ug/L	<0.40	0.40	9894715
Tetrachloroethylene	ug/L	<0.20	0.20	9894715
1,3,5-Trimethylbenzene	ug/L	<1.0	1.0	9894724
Toluene	ug/L	<0.20	0.20	9894715
1,1,1-Trichloroethane	ug/L	<0.20	0.20	9894715
1,1,2-Trichloroethane	ug/L	<0.40	0.40	9894715
Trichloroethylene	ug/L	<0.20	0.20	9894715
Trichlorofluoromethane (FREON 11)	ug/L	<0.50	0.50	9894715

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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VOLATILE ORGANICS BY GC/MS (WATER)

Bureau Veritas ID		APAK85		
Sampling Date		2025/03/18 11:00		
COC Number		C#1038203-01-01		
	UNITS	**MW202**	**RDL**	**QC Batch**
Vinyl Chloride	ug/L	<0.20	0.20	9894715
p+m-Xylene	ug/L	<0.20	0.20	9894715
o-Xylene	ug/L	<0.20	0.20	9894715
Total Xylenes	ug/L	<0.20	0.20	9894715
Surrogate Recovery (%)				
4-Bromofluorobenzene	%	99		9894715
D4-1,2-Dichloroethane	%	107		9894715
D8-Toluene	%	91		9894715
4-Bromofluorobenzene	%	106		9894724
D4-1,2-Dichloroethane	%	114		9894724
D8-Toluene	%	94		9894724

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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ORGANOCHLORINATED PESTICIDES BY GC-ECD (WATER)

Bureau Veritas ID		APAK85		
Sampling Date		2025/03/18 11:00		
COC Number		C#1038203-01-01		
	UNITS	**MW202**	**RDL**	**QC Batch**
Calculated Parameters				
Total PCB	ug/L	<0.05	0.05	9893603
Pesticides & Herbicides				
Hexachlorobenzene	ug/L	<0.005	0.005	9896430
Surrogate Recovery (%)				
2,4,5,6-Tetrachloro-m-xylene	%	66		9896430
Decachlorobiphenyl	%	73		9896430

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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Bureau Veritas Job #: C529290
Report Date: 2025/04/07

Terrapex Environmental Ltd
Client Project #: CO972.00
Site Location: FERNGATE RICHMOND
Sampler Initials: EB

MICROBIOLOGY (WATER)

Bureau Veritas ID		APAK85		
Sampling Date		2025/03/18 11:00		
COC Number		C#1038203-01-01		
	UNITS	**MW202**	**RDL**	**QC Batch**
Microbiological				
Escherichia coli	CFU/100mL	<10	10	9894155

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch

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TEST SUMMARY

Bureau Veritas ID: APAK85
Sample ID: MW202
Matrix: Water

Collected: 2025/03/18
Shipped:
Received: 2025/03/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
ABN Compounds in Water by GC/MS	GC/MS	9895187	2025/03/21	2025/03/21	Ahmed Ismail
Sewer Use By-Law Semivolatile Organics	GC/MS	9896850	2025/03/24	2025/03/25	Ahmed Ismail
Carbonaceous BOD	DO	9894347	2025/03/20	2025/03/25	Gurjot Kaur
Total Cyanide	SKAL/CN	9894264	2025/03/20	2025/03/20	Prgya Panchal
Fluoride	ISE	9894143	2025/03/19	2025/03/20	Nachiketa Gohil
Formaldehyde (HPLC)	LC/UV	9894794	2025/03/20	2025/03/21	Kimberley Linde
Mercury in Water by CVAA	CV/AA	9902107	2025/04/01	2025/04/01	Maitri PATIL
Total Metals Analysis by ICPMS	ICP/MS	9896591	2025/03/24	2025/03/24	Azita Fazaeli
E.coli, (CFU/100mL)	PL	9894155	N/A	2025/03/19	Jessica (Ya Ping) Qiang
Total Nonylphenol in Liquids by HPLC	LC/FLU	9895905	2025/03/22	2025/03/24	Michael Huynh
Nonylphenol Ethoxylates in Liquids: HPLC	LC/FLU	9895906	2025/03/22	2025/03/24	Michael Huynh
Animal and Vegetable Oil and Grease	BAL	9893602	N/A	2025/03/23	Automated Statchk
Total Oil and Grease	BAL	9896095	2025/03/23	2025/03/23	Navneet Singh
OC Pesticides (Selected) & PCB	GC/ECD	9896430	2025/03/24	2025/03/25	Harish Patel
OC Pesticides Summed Parameters	CALC	9893603	N/A	2025/03/20	Automated Statchk
Phenols (4AAP)	TECH/PHEN	9894519	N/A	2025/03/20	Sachi Patel
pH	AT	9894144	2025/03/19	2025/03/20	Nachiketa Gohil
Sulphate by Automated Turbidimetry	SKAL	9893130	N/A	2025/03/20	Alina Dobreanu
Sulphide	ISE/S	9894449	N/A	2025/03/20	Gurparteek KAUR
Total Kjeldahl Nitrogen in Water	SKAL	9894081	2025/03/19	2025/03/20	Kruti Jitesh Patel
Total PAHs (Hamilton, Ottawa S.U.B.)	CALC	9893886	N/A	2025/03/26	Automated Statchk
Mineral/Synthetic O & G (TPH Heavy Oil)	BAL	9896096	2025/03/23	2025/03/23	Navneet Singh
Total Suspended Solids	BAL	9894875	2025/03/20	2025/03/20	Binuja Kodithuwakku Arachchilage
Volatile Organic Compounds in Water	GC/MS	9894715	N/A	2025/03/21	Gabriella Morrone
Non-Routine Volatile Organic Compounds	P&T/MS	9894724	N/A	2025/03/24	Hai Son Tran

Bureau Veritas ID: APAK85 Dup
Sample ID: MW202
Matrix: Water

Collected: 2025/03/18
Shipped:
Received: 2025/03/18

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sewer Use By-Law Semivolatile Organics	GC/MS	9896850	2025/03/24	2025/03/25	Ahmed Ismail
Fluoride	ISE	9894143	2025/03/19	2025/03/20	Nachiketa Gohil
Total Nonylphenol in Liquids by HPLC	LC/FLU	9895905	2025/03/22	2025/03/24	Michael Huynh
Nonylphenol Ethoxylates in Liquids: HPLC	LC/FLU	9895906	2025/03/22	2025/03/24	Michael Huynh
pH	AT	9894144	2025/03/19	2025/03/20	Nachiketa Gohil
Total Suspended Solids	BAL	9894875	2025/03/20	2025/03/20	Binuja Kodithuwakku Arachchilage

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GENERAL COMMENTS

Sample APAK85 [MW202] : VOC Analysis: Due to the sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9893130	ADB	Matrix Spike	Dissolved Sulphate (SO4)	2025/03/20		NC	%	75 - 125
9893130	ADB	Spiked Blank	Dissolved Sulphate (SO4)	2025/03/20		91	%	80 - 120
9893130	ADB	Method Blank	Dissolved Sulphate (SO4)	2025/03/20	<1.0		mg/L	
9893130	ADB	RPD	Dissolved Sulphate (SO4)	2025/03/20	0.61		%	20
9894081	KJP	Matrix Spike	Total Kjeldahl Nitrogen (TKN)	2025/03/20		104	%	80 - 120
9894081	KJP	QC Standard	Total Kjeldahl Nitrogen (TKN)	2025/03/20		97	%	80 - 120
9894081	KJP	Spiked Blank	Total Kjeldahl Nitrogen (TKN)	2025/03/20		99	%	80 - 120
9894081	KJP	Method Blank	Total Kjeldahl Nitrogen (TKN)	2025/03/20	<0.10		mg/L	
9894081	KJP	RPD	Total Kjeldahl Nitrogen (TKN)	2025/03/20	NC		%	20
9894143	NGI	Matrix Spike [APAK85-09]	Fluoride (F-)	2025/03/20		95	%	80 - 120
9894143	NGI	Spiked Blank	Fluoride (F-)	2025/03/20		99	%	80 - 120
9894143	NGI	Method Blank	Fluoride (F-)	2025/03/20	<0.10		mg/L	
9894143	NGI	RPD [APAK85-09]	Fluoride (F-)	2025/03/20	3.3		%	20
9894144	NGI	Spiked Blank	pH	2025/03/20		102	%	98 - 103
9894144	NGI	RPD [APAK85-09]	pH	2025/03/20	0.30		%	N/A
9894264	GYA	Matrix Spike	Total Cyanide (CN)	2025/03/20		94	%	80 - 120
9894264	GYA	Spiked Blank	Total Cyanide (CN)	2025/03/20		93	%	80 - 120
9894264	GYA	Method Blank	Total Cyanide (CN)	2025/03/20	<0.0050		mg/L	
9894264	GYA	RPD	Total Cyanide (CN)	2025/03/20	NC		%	20
9894347	GUJ	QC Standard	Total Carbonaceous BOD	2025/03/25		96	%	80 - 120
9894347	GUJ	Method Blank	Total Carbonaceous BOD	2025/03/25	<2		mg/L	
9894347	GUJ	RPD	Total Carbonaceous BOD	2025/03/25	0.40		%	30
9894449	GTK	Matrix Spike	Sulphide	2025/03/20		82	%	80 - 120
9894449	GTK	Spiked Blank	Sulphide	2025/03/20		97	%	80 - 120
9894449	GTK	Method Blank	Sulphide	2025/03/20	<0.020		mg/L	
9894449	GTK	RPD	Sulphide	2025/03/20	1.6		%	20
9894519	SPC	Matrix Spike	Phenols-4AAP	2025/03/20		100	%	80 - 120
9894519	SPC	Spiked Blank	Phenols-4AAP	2025/03/20		102	%	80 - 120
9894519	SPC	Method Blank	Phenols-4AAP	2025/03/20	<0.0010		mg/L	
9894519	SPC	RPD	Phenols-4AAP	2025/03/20	NC		%	20
9894715	GMN	Matrix Spike	4-Bromofluorobenzene	2025/03/21		100	%	70 - 130
			D4-1,2-Dichloroethane	2025/03/21		103	%	70 - 130
			D8-Toluene	2025/03/21		102	%	70 - 130
			Benzene	2025/03/21		110	%	70 - 130
			Bromodichloromethane	2025/03/21		110	%	70 - 130
			Bromoform	2025/03/21		114	%	70 - 130
			Bromomethane	2025/03/21		110	%	60 - 140
			Carbon Tetrachloride	2025/03/21		112	%	70 - 130
			Chlorobenzene	2025/03/21		103	%	70 - 130
			Chloroethane	2025/03/21		120	%	70 - 130
			Chloroform	2025/03/21		110	%	70 - 130
			Chloromethane	2025/03/21		128	%	60 - 140
			Dibromochloromethane	2025/03/21		114	%	70 - 130
			1,2-Dichlorobenzene	2025/03/21		109	%	70 - 130
			1,3-Dichlorobenzene	2025/03/21		107	%	70 - 130
			1,4-Dichlorobenzene	2025/03/21		111	%	70 - 130
			1,1-Dichloroethane	2025/03/21		106	%	70 - 130
			1,2-Dichloroethane	2025/03/21		116	%	70 - 130
			1,1-Dichloroethylene	2025/03/21		108	%	70 - 130
			cis-1,2-Dichloroethylene	2025/03/21		117	%	70 - 130
			trans-1,2-Dichloroethylene	2025/03/21		115	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichloropropane	2025/03/21		115	%	70 - 130
			cis-1,3-Dichloropropene	2025/03/21		112	%	70 - 130
			trans-1,3-Dichloropropene	2025/03/21		125	%	70 - 130
			Ethylbenzene	2025/03/21		109	%	70 - 130
			Ethylene Dibromide	2025/03/21		112	%	70 - 130
			Methylene Chloride(Dichloromethane)	2025/03/21		107	%	70 - 130
			Styrene	2025/03/21		111	%	70 - 130
			1,1,2,2-Tetrachloroethane	2025/03/21		107	%	70 - 130
			Tetrachloroethylene	2025/03/21		NC	%	70 - 130
			Toluene	2025/03/21		113	%	70 - 130
			1,1,1-Trichloroethane	2025/03/21		106	%	70 - 130
			1,1,2-Trichloroethane	2025/03/21		119	%	70 - 130
			Trichloroethylene	2025/03/21		110	%	70 - 130
			Trichlorofluoromethane (FREON 11)	2025/03/21		110	%	70 - 130
			Vinyl Chloride	2025/03/21		119	%	70 - 130
			p+m-Xylene	2025/03/21		110	%	70 - 130
			o-Xylene	2025/03/21		115	%	70 - 130
9894715	GMN	Spiked Blank	4-Bromofluorobenzene	2025/03/21		99	%	70 - 130
			D4-1,2-Dichloroethane	2025/03/21		99	%	70 - 130
			D8-Toluene	2025/03/21		103	%	70 - 130
			Benzene	2025/03/21		97	%	70 - 130
			Bromodichloromethane	2025/03/21		96	%	70 - 130
			Bromoform	2025/03/21		99	%	70 - 130
			Bromomethane	2025/03/21		97	%	60 - 140
			Carbon Tetrachloride	2025/03/21		101	%	70 - 130
			Chlorobenzene	2025/03/21		92	%	70 - 130
			Chloroethane	2025/03/21		107	%	70 - 130
			Chloroform	2025/03/21		97	%	70 - 130
			Chloromethane	2025/03/21		100	%	60 - 140
			Dibromochloromethane	2025/03/21		99	%	70 - 130
			1,2-Dichlorobenzene	2025/03/21		99	%	70 - 130
			1,3-Dichlorobenzene	2025/03/21		97	%	70 - 130
			1,4-Dichlorobenzene	2025/03/21		102	%	70 - 130
			1,1-Dichloroethane	2025/03/21		94	%	70 - 130
			1,2-Dichloroethane	2025/03/21		100	%	70 - 130
			1,1-Dichloroethylene	2025/03/21		97	%	70 - 130
			cis-1,2-Dichloroethylene	2025/03/21		102	%	70 - 130
			trans-1,2-Dichloroethylene	2025/03/21		102	%	70 - 130
			1,2-Dichloropropane	2025/03/21		100	%	70 - 130
			cis-1,3-Dichloropropene	2025/03/21		93	%	70 - 130
			trans-1,3-Dichloropropene	2025/03/21		101	%	70 - 130
			Ethylbenzene	2025/03/21		100	%	70 - 130
			Ethylene Dibromide	2025/03/21		96	%	70 - 130
			Methylene Chloride(Dichloromethane)	2025/03/21		93	%	70 - 130
			Styrene	2025/03/21		101	%	70 - 130
			1,1,2,2-Tetrachloroethane	2025/03/21		92	%	70 - 130
			Tetrachloroethylene	2025/03/21		95	%	70 - 130
			Toluene	2025/03/21		101	%	70 - 130
			1,1,1-Trichloroethane	2025/03/21		95	%	70 - 130
			1,1,2-Trichloroethane	2025/03/21		104	%	70 - 130
			Trichloroethylene	2025/03/21		98	%	70 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Trichlorofluoromethane (FREON 11)	2025/03/21		99	%	70 - 130
			Vinyl Chloride	2025/03/21		107	%	70 - 130
			p+m-Xylene	2025/03/21		100	%	70 - 130
			o-Xylene	2025/03/21		107	%	70 - 130
9894715	GMN	Method Blank	4-Bromofluorobenzene	2025/03/21		102	%	70 - 130
			D4-1,2-Dichloroethane	2025/03/21		103	%	70 - 130
			D8-Toluene	2025/03/21		92	%	70 - 130
			Benzene	2025/03/21	<0.20		ug/L	
			Bromodichloromethane	2025/03/21	<0.50		ug/L	
			Bromoform	2025/03/21	<1.0		ug/L	
			Bromomethane	2025/03/21	<0.50		ug/L	
			Carbon Tetrachloride	2025/03/21	<0.19		ug/L	
			Chlorobenzene	2025/03/21	<0.20		ug/L	
			Chloroethane	2025/03/21	<1.0		ug/L	
			Chloroform	2025/03/21	<0.20		ug/L	
			Chloromethane	2025/03/21	<5.0		ug/L	
			Dibromochloromethane	2025/03/21	<0.50		ug/L	
			1,2-Dichlorobenzene	2025/03/21	<0.40		ug/L	
			1,3-Dichlorobenzene	2025/03/21	<0.40		ug/L	
			1,4-Dichlorobenzene	2025/03/21	<0.40		ug/L	
			1,1-Dichloroethane	2025/03/21	<0.20		ug/L	
			1,2-Dichloroethane	2025/03/21	<0.49		ug/L	
			1,1-Dichloroethylene	2025/03/21	<0.20		ug/L	
			cis-1,2-Dichloroethylene	2025/03/21	<0.50		ug/L	
			trans-1,2-Dichloroethylene	2025/03/21	<0.50		ug/L	
			1,2-Dichloropropane	2025/03/21	<0.20		ug/L	
			cis-1,3-Dichloropropene	2025/03/21	<0.30		ug/L	
			trans-1,3-Dichloropropene	2025/03/21	<0.40		ug/L	
			Ethylbenzene	2025/03/21	<0.20		ug/L	
			Ethylene Dibromide	2025/03/21	<0.19		ug/L	
			Methylene Chloride(Dichloromethane)	2025/03/21	<2.0		ug/L	
			Styrene	2025/03/21	<0.40		ug/L	
			1,1,2,2-Tetrachloroethane	2025/03/21	<0.40		ug/L	
			Tetrachloroethylene	2025/03/21	<0.20		ug/L	
			Toluene	2025/03/21	<0.20		ug/L	
			1,1,1-Trichloroethane	2025/03/21	<0.20		ug/L	
			1,1,2-Trichloroethane	2025/03/21	<0.40		ug/L	
			Trichloroethylene	2025/03/21	<0.20		ug/L	
			Trichlorofluoromethane (FREON 11)	2025/03/21	<0.50		ug/L	
			Vinyl Chloride	2025/03/21	<0.20		ug/L	
			p+m-Xylene	2025/03/21	<0.20		ug/L	
			o-Xylene	2025/03/21	<0.20		ug/L	
			Total Xylenes	2025/03/21	<0.20		ug/L	
9894715	GMN	RPD	Benzene	2025/03/21	NC		%	30
			Bromodichloromethane	2025/03/21	NC		%	30
			Bromoform	2025/03/21	NC		%	30
			Bromomethane	2025/03/21	NC		%	30
			Carbon Tetrachloride	2025/03/21	NC		%	30
			Chlorobenzene	2025/03/21	NC		%	30
			Chloroform	2025/03/21	1.8		%	30
			Dibromochloromethane	2025/03/21	NC		%	30

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			1,2-Dichlorobenzene	2025/03/21	NC		%	30
			1,3-Dichlorobenzene	2025/03/21	NC		%	30
			1,4-Dichlorobenzene	2025/03/21	NC		%	30
			1,1-Dichloroethane	2025/03/21	NC		%	30
			1,2-Dichloroethane	2025/03/21	NC		%	30
			1,1-Dichloroethylene	2025/03/21	NC		%	30
			cis-1,2-Dichloroethylene	2025/03/21	NC		%	30
			trans-1,2-Dichloroethylene	2025/03/21	NC		%	30
			1,2-Dichloropropane	2025/03/21	NC		%	30
			cis-1,3-Dichloropropene	2025/03/21	NC		%	30
			trans-1,3-Dichloropropene	2025/03/21	NC		%	30
			Ethylbenzene	2025/03/21	NC		%	30
			Ethylene Dibromide	2025/03/21	NC		%	30
			Methylene Chloride(Dichloromethane)	2025/03/21	NC		%	30
			Styrene	2025/03/21	NC		%	30
			1,1,2,2-Tetrachloroethane	2025/03/21	NC		%	30
			Tetrachloroethylene	2025/03/21	0		%	30
			Toluene	2025/03/21	NC		%	30
			1,1,1-Trichloroethane	2025/03/21	NC		%	30
			1,1,2-Trichloroethane	2025/03/21	NC		%	30
			Trichloroethylene	2025/03/21	0.72		%	30
			Trichlorofluoromethane (FREON 11)	2025/03/21	NC		%	30
			Vinyl Chloride	2025/03/21	NC		%	30
			p+m-Xylene	2025/03/21	NC		%	30
			o-Xylene	2025/03/21	NC		%	30
			Total Xylenes	2025/03/21	NC		%	30
9894724	HST	Matrix Spike	4-Bromofluorobenzene	2025/03/24		102	%	70 - 130
			D4-1,2-Dichloroethane	2025/03/24		104	%	70 - 130
			D8-Toluene	2025/03/24		102	%	70 - 130
			1,3,5-Trimethylbenzene	2025/03/24		108	%	60 - 140
9894724	HST	Spiked Blank	4-Bromofluorobenzene	2025/03/24		100	%	70 - 130
			D4-1,2-Dichloroethane	2025/03/24		102	%	70 - 130
			D8-Toluene	2025/03/24		100	%	70 - 130
			1,3,5-Trimethylbenzene	2025/03/24		104	%	60 - 140
9894724	HST	Method Blank	4-Bromofluorobenzene	2025/03/24		104	%	70 - 130
			D4-1,2-Dichloroethane	2025/03/24		111	%	70 - 130
			D8-Toluene	2025/03/24		95	%	70 - 130
			1,3,5-Trimethylbenzene	2025/03/24	<0.20		ug/L	
9894724	HST	RPD	1,3,5-Trimethylbenzene	2025/03/24	NC		%	30
9894794	KIH	Matrix Spike	Formaldehyde	2025/03/21		107	%	40 - 130
9894794	KIH	Spiked Blank	Formaldehyde	2025/03/21		111	%	40 - 130
9894794	KIH	Method Blank	Formaldehyde	2025/03/21	<10		ug/L	
9894794	KIH	RPD	Formaldehyde	2025/03/21	NC		%	40
9894875	BKG	Spiked Blank	Total Suspended Solids	2025/03/20		101	%	80 - 120
9894875	BKG	Method Blank	Total Suspended Solids	2025/03/20	<10		mg/L	
9894875	BKG	RPD [APAK85-10]	Total Suspended Solids	2025/03/20	NC		%	20
9895187	AHI	Matrix Spike [APAK85-05]	2,4,6-Tribromophenol	2025/03/21		59	%	10 - 130
			2-Fluorobiphenyl	2025/03/21		42	%	30 - 130
			2-Fluorophenol	2025/03/21		19	%	10 - 130
			D14-Terphenyl	2025/03/21		61	%	30 - 130
			D5-Nitrobenzene	2025/03/21		49	%	30 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			D5-Phenol	2025/03/21		13	%	10 - 130
			2,4-Dichlorophenol	2025/03/21		49	%	10 - 130
			Benzyl butyl phthalate	2025/03/21		76	%	30 - 130
			Bis(2-chloroethoxy)methane	2025/03/21		50	%	30 - 130
			di-n-octyl phthalate	2025/03/21		94	%	30 - 130
			Diethyl phthalate	2025/03/21		61	%	30 - 130
			Indole	2025/03/21		31	%	30 - 130
9895187	AHI	Spiked Blank	2,4,6-Tribromophenol	2025/03/21		96	%	10 - 130
			2-Fluorobiphenyl	2025/03/21		66	%	30 - 130
			2-Fluorophenol	2025/03/21		40	%	10 - 130
			D14-Terphenyl	2025/03/21		72	%	30 - 130
			D5-Nitrobenzene	2025/03/21		72	%	30 - 130
			D5-Phenol	2025/03/21		29	%	10 - 130
			2,4-Dichlorophenol	2025/03/21		79	%	10 - 130
			Benzyl butyl phthalate	2025/03/21		89	%	30 - 130
			Bis(2-chloroethoxy)methane	2025/03/21		84	%	30 - 130
			di-n-octyl phthalate	2025/03/21		108	%	30 - 130
			Diethyl phthalate	2025/03/21		93	%	30 - 130
			Indole	2025/03/21		63	%	30 - 130
9895187	AHI	Method Blank	2,4,6-Tribromophenol	2025/03/21		73	%	10 - 130
			2-Fluorobiphenyl	2025/03/21		70	%	30 - 130
			2-Fluorophenol	2025/03/21		36	%	10 - 130
			D14-Terphenyl	2025/03/21		74	%	30 - 130
			D5-Nitrobenzene	2025/03/21		75	%	30 - 130
			D5-Phenol	2025/03/21		24	%	10 - 130
			2,4-Dichlorophenol	2025/03/21	<0.30		ug/L	
			Benzyl butyl phthalate	2025/03/21	<0.50		ug/L	
			Bis(2-chloroethoxy)methane	2025/03/21	<0.50		ug/L	
			di-n-octyl phthalate	2025/03/21	<0.80		ug/L	
			Diethyl phthalate	2025/03/21	<1.0		ug/L	
			Indole	2025/03/21	<1.0		ug/L	
9895187	AHI	RPD	2,4-Dichlorophenol	2025/03/21	NC		%	40
			Benzyl butyl phthalate	2025/03/21	NC		%	40
			Bis(2-chloroethoxy)methane	2025/03/21	NC		%	40
			di-n-octyl phthalate	2025/03/21	NC		%	40
			Diethyl phthalate	2025/03/21	NC		%	40
			Indole	2025/03/21	NC		%	40
9895905	MHU	Matrix Spike	Nonylphenol (Total)	2025/03/23		127	%	50 - 130
9895905	MHU	Spiked Blank	Nonylphenol (Total)	2025/03/23		112	%	50 - 130
9895905	MHU	Method Blank	Nonylphenol (Total)	2025/03/24	<0.001		mg/L	
9895905	MHU	RPD [APAK85-06]	Nonylphenol (Total)	2025/03/24	NC		%	40
9895906	MHU	Matrix Spike	Nonylphenol Ethoxylate (Total)	2025/03/23		104	%	50 - 130
9895906	MHU	Spiked Blank	Nonylphenol Ethoxylate (Total)	2025/03/23		107	%	50 - 130
9895906	MHU	Method Blank	Nonylphenol Ethoxylate (Total)	2025/03/24	<0.005		mg/L	
9895906	MHU	RPD [APAK85-06]	Nonylphenol Ethoxylate (Total)	2025/03/24	NC		%	40
9896095	NSG	Spiked Blank	Total Oil & Grease	2025/03/23		99	%	80 - 110
9896095	NSG	RPD	Total Oil & Grease	2025/03/23	0.25		%	25
9896095	NSG	Method Blank	Total Oil & Grease	2025/03/23	<0.50		mg/L	
9896096	NSG	Spiked Blank	Total Oil & Grease Mineral/Synthetic	2025/03/23		96	%	65 - 130
9896096	NSG	RPD	Total Oil & Grease Mineral/Synthetic	2025/03/23	0		%	25
9896096	NSG	Method Blank	Total Oil & Grease Mineral/Synthetic	2025/03/23	<0.50		mg/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9896430	HP1	Matrix Spike [APAK85-07]	2,4,5,6-Tetrachloro-m-xylene	2025/03/25		76	%	50 - 130
			Decachlorobiphenyl	2025/03/25		98	%	50 - 130
			Hexachlorobenzene	2025/03/25		88	%	50 - 130
9896430	HP1	Spiked Blank	2,4,5,6-Tetrachloro-m-xylene	2025/03/25		58	%	50 - 130
			Decachlorobiphenyl	2025/03/25		137 (1)	%	50 - 130
			Hexachlorobenzene	2025/03/25		80	%	50 - 130
9896430	HP1	RPD	Hexachlorobenzene	2025/03/25	0.79		%	30
			Hexachlorobenzene	2025/03/25	NC		%	30
9896430	HP1	Method Blank	2,4,5,6-Tetrachloro-m-xylene	2025/03/25		51	%	50 - 130
			Decachlorobiphenyl	2025/03/25		129	%	50 - 130
			Hexachlorobenzene	2025/03/25	<0.005		ug/L	
9896591	AFZ	Matrix Spike	Total Aluminum (Al)	2025/03/24		NC	%	80 - 120
			Total Antimony (Sb)	2025/03/24		109	%	80 - 120
			Total Arsenic (As)	2025/03/24		108	%	80 - 120
			Total Bismuth (Bi)	2025/03/24		97	%	80 - 120
			Total Boron (B)	2025/03/24		101	%	80 - 120
			Total Cadmium (Cd)	2025/03/24		101	%	80 - 120
			Total Chromium (Cr)	2025/03/24		106	%	80 - 120
			Total Cobalt (Co)	2025/03/24		104	%	80 - 120
			Total Copper (Cu)	2025/03/24		104	%	80 - 120
			Total Lead (Pb)	2025/03/24		100	%	80 - 120
			Total Manganese (Mn)	2025/03/24		103	%	80 - 120
			Total Molybdenum (Mo)	2025/03/24		108	%	80 - 120
			Total Nickel (Ni)	2025/03/24		101	%	80 - 120
			Total Phosphorus (P)	2025/03/24		113	%	80 - 120
			Total Selenium (Se)	2025/03/24		103	%	80 - 120
			Total Silver (Ag)	2025/03/24		98	%	80 - 120
			Total Tin (Sn)	2025/03/24		105	%	80 - 120
			Total Titanium (Ti)	2025/03/24		109	%	80 - 120
			Total Vanadium (V)	2025/03/24		108	%	80 - 120
			Total Zinc (Zn)	2025/03/24		99	%	80 - 120
9896591	AFZ	Spiked Blank	Total Aluminum (Al)	2025/03/24		97	%	80 - 120
			Total Antimony (Sb)	2025/03/24		104	%	80 - 120
			Total Arsenic (As)	2025/03/24		106	%	80 - 120
			Total Bismuth (Bi)	2025/03/24		103	%	80 - 120
			Total Boron (B)	2025/03/24		99	%	80 - 120
			Total Cadmium (Cd)	2025/03/24		102	%	80 - 120
			Total Chromium (Cr)	2025/03/24		102	%	80 - 120
			Total Cobalt (Co)	2025/03/24		102	%	80 - 120
			Total Copper (Cu)	2025/03/24		102	%	80 - 120
			Total Lead (Pb)	2025/03/24		104	%	80 - 120
			Total Manganese (Mn)	2025/03/24		100	%	80 - 120
			Total Molybdenum (Mo)	2025/03/24		100	%	80 - 120
			Total Nickel (Ni)	2025/03/24		101	%	80 - 120
			Total Phosphorus (P)	2025/03/24		100	%	80 - 120
			Total Selenium (Se)	2025/03/24		105	%	80 - 120
			Total Silver (Ag)	2025/03/24		98	%	80 - 120
			Total Tin (Sn)	2025/03/24		100	%	80 - 120
			Total Titanium (Ti)	2025/03/24		95	%	80 - 120
			Total Vanadium (V)	2025/03/24		101	%	80 - 120
			Total Zinc (Zn)	2025/03/24		107	%	80 - 120

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9896591	AFZ	Method Blank	Total Aluminum (Al)	2025/03/24	<4.9		ug/L	
			Total Antimony (Sb)	2025/03/24	<0.50		ug/L	
			Total Arsenic (As)	2025/03/24	<1.0		ug/L	
			Total Bismuth (Bi)	2025/03/24	<1.0		ug/L	
			Total Boron (B)	2025/03/24	<10		ug/L	
			Total Cadmium (Cd)	2025/03/24	<0.090		ug/L	
			Total Chromium (Cr)	2025/03/24	<5.0		ug/L	
			Total Cobalt (Co)	2025/03/24	<0.50		ug/L	
			Total Copper (Cu)	2025/03/24	<0.90		ug/L	
			Total Lead (Pb)	2025/03/24	<0.50		ug/L	
			Total Manganese (Mn)	2025/03/24	<2.0		ug/L	
			Total Molybdenum (Mo)	2025/03/24	<0.50		ug/L	
			Total Nickel (Ni)	2025/03/24	<1.0		ug/L	
			Total Phosphorus (P)	2025/03/24	<100		ug/L	
			Total Selenium (Se)	2025/03/24	<2.0		ug/L	
			Total Silver (Ag)	2025/03/24	<0.090		ug/L	
			Total Tin (Sn)	2025/03/24	<1.0		ug/L	
			Total Titanium (Ti)	2025/03/24	<5.0		ug/L	
			Total Vanadium (V)	2025/03/24	<0.50		ug/L	
			Total Zinc (Zn)	2025/03/24	<5.0		ug/L	
9896591	AFZ	RPD	Total Aluminum (Al)	2025/03/24	0.72		%	20
			Total Antimony (Sb)	2025/03/24	NC		%	20
			Total Arsenic (As)	2025/03/24	18		%	20
			Total Cadmium (Cd)	2025/03/24	NC		%	20
			Total Chromium (Cr)	2025/03/24	2.4		%	20
			Total Cobalt (Co)	2025/03/24	0		%	20
			Total Copper (Cu)	2025/03/24	1.4		%	20
			Total Lead (Pb)	2025/03/24	1.5		%	20
			Total Manganese (Mn)	2025/03/24	3.3		%	20
			Total Molybdenum (Mo)	2025/03/24	2.1		%	20
			Total Nickel (Ni)	2025/03/24	2.8		%	20
			Total Phosphorus (P)	2025/03/24	NC		%	20
			Total Selenium (Se)	2025/03/24	NC		%	20
			Total Silver (Ag)	2025/03/24	NC		%	20
			Total Tin (Sn)	2025/03/24	NC		%	20
			Total Titanium (Ti)	2025/03/24	9.6		%	20
			Total Zinc (Zn)	2025/03/24	1.1		%	20
9896850	AHI	Matrix Spike	1-Methylnaphthalene	2025/03/25		59	%	30 - 130
			2,4,6-Tribromophenol	2025/03/25		55	%	10 - 130
			2-Fluorobiphenyl	2025/03/25		49	%	30 - 130
			2-Methylnaphthalene	2025/03/25		55	%	30 - 130
			D14-Terphenyl (FS)	2025/03/25		97	%	30 - 130
			D5-Nitrobenzene	2025/03/25		63	%	30 - 130
			D8-Acenaphthylene	2025/03/25		55	%	30 - 130
			Fluorene	2025/03/25		61	%	30 - 130
			Naphthalene	2025/03/25		51	%	30 - 130
			Di-N-butyl phthalate	2025/03/25		109	%	30 - 130
			Bis(2-ethylhexyl)phthalate	2025/03/25		105	%	30 - 130
			Phenanthrene	2025/03/25		70	%	30 - 130
			Anthracene	2025/03/25		71	%	30 - 130
			Fluoranthene	2025/03/25		110	%	30 - 130

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Pyrene	2025/03/25		112	%	30 - 130
			Benzo(a)anthracene	2025/03/25		109	%	30 - 130
			Chrysene	2025/03/25		92	%	30 - 130
			Benzo(b/j)fluoranthene	2025/03/25		92	%	30 - 130
			Benzo(k)fluoranthene	2025/03/25		90	%	30 - 130
			Benzo(a)pyrene	2025/03/25		94	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2025/03/25		106	%	30 - 130
			Dibenzo(a,h)anthracene	2025/03/25		105	%	30 - 130
			Benzo(g,h,i)perylene	2025/03/25		110	%	30 - 130
			Dibenzo(a,i)pyrene	2025/03/25		43	%	30 - 130
			Benzo(e)pyrene	2025/03/25		90	%	30 - 130
			Perylene	2025/03/25		109	%	30 - 130
			Dibenzo(a,j) acridine	2025/03/25		97	%	30 - 130
			7H-Dibenzo(c,g) Carbazole	2025/03/25		85	%	30 - 130
9896850	AHI	Spiked Blank	1-Methylnaphthalene	2025/03/25		79	%	30 - 130
			2,4,6-Tribromophenol	2025/03/25		88	%	10 - 130
			2-Fluorobiphenyl	2025/03/25		74	%	30 - 130
			2-Methylnaphthalene	2025/03/25		74	%	30 - 130
			D14-Terphenyl (FS)	2025/03/25		101	%	30 - 130
			D5-Nitrobenzene	2025/03/25		95	%	30 - 130
			D8-Acenaphthylene	2025/03/25		87	%	30 - 130
			Fluorene	2025/03/25		97	%	30 - 130
			Naphthalene	2025/03/25		68	%	30 - 130
			Di-N-butyl phthalate	2025/03/25		99	%	30 - 130
			Bis(2-ethylhexyl)phthalate	2025/03/25		116	%	30 - 130
			Phenanthrene	2025/03/25		105	%	30 - 130
			Anthracene	2025/03/25		104	%	30 - 130
			Fluoranthene	2025/03/25		121	%	30 - 130
			Pyrene	2025/03/25		121	%	30 - 130
			Benzo(a)anthracene	2025/03/25		113	%	30 - 130
			Chrysene	2025/03/25		95	%	30 - 130
			Benzo(b/j)fluoranthene	2025/03/25		99	%	30 - 130
			Benzo(k)fluoranthene	2025/03/25		85	%	30 - 130
			Benzo(a)pyrene	2025/03/25		98	%	30 - 130
			Indeno(1,2,3-cd)pyrene	2025/03/25		109	%	30 - 130
			Dibenzo(a,h)anthracene	2025/03/25		109	%	30 - 130
			Benzo(g,h,i)perylene	2025/03/25		114	%	30 - 130
			Dibenzo(a,i)pyrene	2025/03/25		45	%	30 - 130
			Benzo(e)pyrene	2025/03/25		93	%	30 - 130
			Perylene	2025/03/25		113	%	30 - 130
			Dibenzo(a,j) acridine	2025/03/25		102	%	30 - 130
			7H-Dibenzo(c,g) Carbazole	2025/03/25		92	%	30 - 130
9896850	AHI	Method Blank	1-Methylnaphthalene	2025/03/25	<0.3		ug/L	
			2,4,6-Tribromophenol	2025/03/25		69	%	10 - 130
			2-Fluorobiphenyl	2025/03/25		78	%	30 - 130
			2-Methylnaphthalene	2025/03/25	<0.3		ug/L	
			D14-Terphenyl (FS)	2025/03/25		101	%	30 - 130
			D5-Nitrobenzene	2025/03/25		90	%	30 - 130
			D8-Acenaphthylene	2025/03/25		85	%	30 - 130
			Fluorene	2025/03/25	<0.3		ug/L	
			Naphthalene	2025/03/25	<0.3		ug/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
			Di-N-butyl phthalate	2025/03/25	<2		ug/L	
			Bis(2-ethylhexyl)phthalate	2025/03/25	<2		ug/L	
			Phenanthrene	2025/03/25	<0.2		ug/L	
			Anthracene	2025/03/25	<0.2		ug/L	
			Fluoranthene	2025/03/25	<0.2		ug/L	
			Pyrene	2025/03/25	<0.2		ug/L	
			Benzo(a)anthracene	2025/03/25	<0.2		ug/L	
			Chrysene	2025/03/25	<0.2		ug/L	
			Benzo(b/j)fluoranthene	2025/03/25	<0.2		ug/L	
			Benzo(k)fluoranthene	2025/03/25	<0.2		ug/L	
			Benzo(a)pyrene	2025/03/25	<0.2		ug/L	
			Indeno(1,2,3-cd)pyrene	2025/03/25	<0.2		ug/L	
			Dibenzo(a,h)anthracene	2025/03/25	<0.2		ug/L	
			Benzo(g,h,i)perylene	2025/03/25	<0.2		ug/L	
			Dibenzo(a,i)pyrene	2025/03/25	<0.2		ug/L	
			Benzo(e)pyrene	2025/03/25	<0.2		ug/L	
			Perylene	2025/03/25	<0.2		ug/L	
			Dibenzo(a,j) acridine	2025/03/25	<0.4		ug/L	
			7H-Dibenzo(c,g) Carbazole	2025/03/25	<0.4		ug/L	
9896850	AHI	RPD [APAK85-04]	1-Methylnaphthalene	2025/03/25	NC		%	40
			2-Methylnaphthalene	2025/03/25	NC		%	40
			Fluorene	2025/03/25	NC		%	40
			Naphthalene	2025/03/25	NC		%	40
			Di-N-butyl phthalate	2025/03/25	NC		%	40
			Bis(2-ethylhexyl)phthalate	2025/03/25	NC		%	40
			Phenanthrene	2025/03/25	NC		%	40
			Anthracene	2025/03/25	NC		%	40
			Fluoranthene	2025/03/25	NC		%	40
			Pyrene	2025/03/25	NC		%	40
			Benzo(a)anthracene	2025/03/25	NC		%	40
			Chrysene	2025/03/25	NC		%	40
			Benzo(b/j)fluoranthene	2025/03/25	NC		%	40
			Benzo(k)fluoranthene	2025/03/25	NC		%	40
			Benzo(a)pyrene	2025/03/25	NC		%	40
			Indeno(1,2,3-cd)pyrene	2025/03/25	NC		%	40
			Dibenzo(a,h)anthracene	2025/03/25	NC		%	40
			Benzo(g,h,i)perylene	2025/03/25	NC		%	40
			Dibenzo(a,i)pyrene	2025/03/25	NC		%	40
			Benzo(e)pyrene	2025/03/25	NC		%	40
			Perylene	2025/03/25	NC		%	40
			Dibenzo(a,j) acridine	2025/03/25	NC		%	40
			7H-Dibenzo(c,g) Carbazole	2025/03/25	NC		%	40
9902107	MPJ	Reagent Blank	Mercury (Hg)	2025/04/01	<0.00010		mg/L	
9902107	MPJ	Matrix Spike	Mercury (Hg)	2025/04/01		89	%	75 - 125
9902107	MPJ	Spiked Blank	Mercury (Hg)	2025/04/01		97	%	80 - 120
9902107	MPJ	Method Blank	Mercury (Hg)	2025/04/01	<0.00010		mg/L	

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QUALITY ASSURANCE REPORT(CONT'D)

QA/QC Batch	Init	QC Type	Parameter	Date Analyzed	Value	Recovery	UNITS	QC Limits
9902107	MPJ	RPD	Mercury (Hg)	2025/04/01	NC		%	20

N/A = Not Applicable

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

Reagent Blank: A blank matrix containing all reagents used in the analytical procedure. Used to determine any analytical contamination.

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

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

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

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

Surrogate: A pure or isotopically labeled compound whose behavior mirrors the analytes of interest. Used to evaluate extraction efficiency.

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

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

(1) Surrogate recovery was above the upper control limit. This may represent a high bias in some results.

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VALIDATION SIGNATURE PAGE

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

Jessica (Ya Ping) Qiang, Analyst II

Louise Harding, Scientific Specialist

Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation Signatures page if included, otherwise available by request. For Department specific Analyst/Supervisor validation names, please refer to the Test Summary section if included, otherwise available by request. This report is authorized by Rodney Major, General Manager responsible for Ontario Environmental laboratory operations.

APPENDIX IV

CURRICULUM VITAE

Zen Keizars, P.Geo., FGC

Position:	Senior Hydrogeologist, Durham Office	
Qualifications:	M.Sc. Geology (Geochemistry)	University of Western Ontario
	B.Sc. (Honours) Geology (Geochemistry)	McMaster University
Experience:	Terrapex Environmental Ltd. – Senior Hydrogeologist	2020 to present
	Trent University – Sessional Professor	2015 to present
	Beacon Environmental Ltd. – Practice Lead, Hydrogeology	2018 to 2020
	Golder Environmental Ltd. – Hydrogeologist	2016 to 2018
	Anthropocene Green Inc. – Senior Project Manager	2015 to 2016
	WSP / Genivar – Project Manager	2012 to 2015

Zen Keizars is a Senior Hydrogeologist with over twenty years of experience leading projects, with a focus on hydrogeological investigations and water-balance assessments. His extensive ground-level experience and broad theoretical skill-set are ideal for providing fast and adaptive multi-disciplinary support at any level.

Mr. Keizars is the current Vice President, and a Past President of Professional Geoscientists Ontario (PGO; previously APGO) and a sessional instructor at Trent University, providing instruction in several non-elective third-year courses. Zen sits on several Municipal Committees, including the Groundwater Strategy Steering Committee (City of Toronto), and the Watershed Characterization Committee (City of Peterborough). In recognition of his professionalism and contributions to geoscience, Zen was awarded a lifetime Fellowship to Geoscientists Canada (FGC) in 2020.

Representative projects include the following:

Fotenn Planning & Design:
Hydrogeological Investigation, Ontario Place – 955 Lake Shore Boulevard West, Toronto, Ontario

Corporation of the City of Brampton:
Hydrogeological Investigation, 125 McLaughlin Road North, Brampton, Ontario

Township of King:
Hydrogeological Investigation and Water Balance Assessment, Seneca College - 13990 Dufferin Street, Township of King

Corporation of the County of Prince Edward:
Third-party Peer Review: Hydrogeological Investigation, Stinson Block Road Subdivision, Community of Consecon, Prince Edward County, Ontario

CreateTO :
Hydrogeological Investigation, Bus Station – 610 Bay Street and 130 Elizabeth Street, Toronto, Ontario

CreateTO :
Hydrogeological Investigation, 3586 Lawrence Heights East, Toronto, Ontario

CreateTO :
Hydrogeological Investigation, Bus Station – 610 Bay Street and 130 Elizabeth Street, Toronto, Ontario

CreateTO:
Hydrogeological Investigation, 1190 York Mills Road, Toronto, Ontario

CreateTO:
Hydrogeological Investigation, 1035 Sheppard Avenue West, Toronto, Ontario.

First Capital Asset Management:
Hydrogeological Investigation, 3434 Lawrence Avenue East, Toronto, Ontario.

First Capital Asset Management:
Hydrogeological Investigation, 34-70 Montgomery Avenue, Toronto, Ontario.

First Capital Asset Management:
Hydrogeological Investigation, 2650 Lawrence Avenue East, Toronto, Ontario.

First Capital Asset Management:
Hydrogeological Investigation, 245 Morningside Avenue, Toronto, Ontario.

Hazelview Investments:
Hydrological Review, Proposed Mixed-Use Development, 1590 and 1650 Dundas Street East, Mississauga, Ontario.

Daniels High Rise Corporation:
Hydrogeological Investigation, Proposed Mixed-Use Development, Gerrard Street East and Parliament Street, Toronto, Ontario.

Daniels High Rise Corporation:
Hydrogeological Investigation, Dundas Street East and Postridge Drive, Oakville, Ontario

The MBTW Group:
Unnamed Park 524 and 525 Hydrogeological Assessment and Feature-based Water Balance.

Starlight Investments Inc.:
Hydrogeological Investigation and Water Balance, 37 Johnson Street, Barrie, Ontario.

LIV Communities:
Hydrogeological Investigation and Feature-Based Water Balance, 620 Colborne Avenue, Brantford, Ontario.

GFL:
Hydrogeological Investigation, Proposed Compost Operations Relocation, 17125 Lafleche Road, Moose Creek, Ontario

Smart Centres:
Preliminary Geotechnical and Hydrogeological Investigation, Major Weston Centres Limited Site – Toronto, Ontario.

Smart Centres:
Hydrogeological Investigation and Water Balance, 51, 53, 55, & 75 Bradford St. and 20 Checkley St., Barrie, Ontario

ANDREW DURBANO, M.Sc., P.Geo.

Education:	M.Sc. Geology	2014	University of Saskatchewan, Saskatoon
	B.Sc. Honors Specialization in Environmental Geoscience	2009	University of Western Ontario, London
Professional Associations:	Professional Geoscientist (P.Geo), Professional Geoscientists Ontario (PGO)		
Safety Training:	Standard First Aid and CPR Petroleum Oriented Safety Training (POST) Workplace Hazardous Materials Information System (WHMIS)		

EXPERIENCE

2022 to present – Terrapex Environmental Ltd., Toronto, ON

Project Manager/ Hydrogeologist

Responsible for planning, coordinating, and executing hydrogeological field work programs, including report writing, data compilation, and analysis.

Duties and responsibilities included:

- Conducting groundwater well drilling and installation, groundwater monitoring, groundwater sampling, and well response tests as part of municipal foundation drainage requirements for clients (e.g., land developers)
- Conducting short-term construction dewatering calculations as part of the groundwater provincial permitting process for clients
- Writing detailed technical reports that summarize the methods, findings, and recommendations produced under the described scope of work
- Troubleshooting equipment and logistical issues over the phone with field technicians on site to complete field work in a timely manner
- Training and mentoring field staff in best fieldwork practices and data analysis to help improve efficiency and foster a more team-oriented workplace

2018 to 2022 – Terrapex Environmental Ltd., Toronto, ON

Geo-Environmental Field Technician

Responsible for coordinating and executing a wide range of field work programs, including collection of field data, data compilation, analysis, and assisting in report writing.

Duties and responsibilities included:

- Conducting groundwater well drilling and installation, soil vapour monitoring, groundwater monitoring, surveying, and groundwater sampling as part of municipal and provincial environmental requirements for clients (e.g., landowners, developers)

- Supervision of the decommissioning of groundwater monitoring wells as part of provincial requirements for clients
- Assisting in the completion of detailed technical reports for the purposes of meeting provincial environmental requirements for clients, which included compiling soil and groundwater laboratory analysis data, analyzing groundwater data, and reviewing maps for bedrock geology and topography
- Training and mentoring new/ junior field staff in conducting safe and efficient fieldwork practices and data collection to help maintain a high standard of safety and fostering teamwork while working on site for clients

2014 –2017 – Geological Survey of Canada, Calgary, AB

Physical Scientist

Temporary full-time contract position renewed multiple times between 2014 and 2017, responsible for data compilation, analysis, and report writing of deliverables under the direction of Research Scientists.

Duties and responsibilities included:

- Participating as an active member of a fieldwork expedition to Banks Island, Northwest Territories, operating under a strict timeframe to complete research goals
- Compiling and analyzing relevant petroleum geochemistry data and structural geology data in Excel and ArcGIS
- Geologic modelling of petroleum geochemistry data through use of Geospatial Analyst tool in ArcGIS
- Created maps and technical figures for open file reports and scientific research papers
- Assisted in writing open file reports
- Published a research paper from M.Sc. thesis.

2012 (summer) – Husky Energy, Calgary, AB

Geology Summer Student

Duties and responsibilities included:

- Picking formation tops, created isopach and structure maps, and correlating well log cross-sections using AccuMap and Geographix software
- Logging core for sedimentological analysis
- Participating as part of a team to integrate well log, map data and 3-D seismic to meet project goals within timeframe

2010 –2012 – Geological Survey of Canada, Calgary, AB

Research Affiliate

Duties and responsibilities included:

- Participating as an active member of two fieldwork expeditions on Victoria Island, Northwest Territories operating under a strict timeframe. Mapping was ground-based with handheld devices loaded with ArcGIS software with additional airborne mapping and outcrop stratigraphy
- Measured sections and collected rock samples for the analysis of trace fossils

- Logged core for the detailed examination of sedimentary structures.

Publications

- Durbano, A.M., Hadlari, T., Fallas, K.M., and Jiang, C., 2017. Combined depth and S1 maps from Rock-Eval 6/TOC data of the Canol Formation, northern Mackenzie Valley, Northwest Territories; Geological Survey of Canada, Open File 8206.
- Hadlari, T., Midwinter, D., Galloway, J.M., Dewing, K. and Durbano, A.M., 2016. Mesozoic rift to post-rift tectonostratigraphy of the Sverdrup Basin, Canadian Arctic. Marine and Petroleum Geology 76, 148–158.
- Hadlari, T., MacLean, B.C., Pyle L.J., Fallas, K.M., and Durbano A.M., 2015. A combined depth and thermal maturity map of the Canol Formation, northern Mackenzie Valley, NWT; Geological Survey of Canada, Open File 7865.
- Durbano, A.M., Pratt, B.R., Hadlari, T. and Dewing, K., 2015. Sedimentology of an early Cambrian tide-dominated embayment: Quyuk Formation, Victoria Island, Arctic Canada. Sedimentary Geology 320, 1–18.