1376 and 1382 Plains Road East, Burlington, Ontario

L7R 3P8

Hydrogeological Investigation

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1 Introduction

1.1 Project Description

EXP Services Inc. (EXP) was retained by 273119 Ontario Inc.; Manor Care Homes Inc., F.K Deals on Wheels Inc.; 2731115 Ontario Inc. to prepare a Hydrogeological Investigation Report associated with the proposed development located at 1376 and 1382 Plains Road East, Burlington, Ontario (hereinafter referred to as the 'Site').

The Site is currently occupied by two 1 to 2 storey commercial buildings with an associated asphalt parking lot. Low-rise commercial properties bound the Site to the east and west, a CN Railway track bound the Site to the south and Plains Road East to the north.

It is our understanding that 273119 Ontario Inc.; Manor Care Homes Inc., F.K Deals on Wheels Inc.; 2731115 Ontario Inc is seeking to develop the Site with a 25-storey residential structure with one (1) level of underground parking. The Site location plan is shown in Figure 1.

EXP conducted a Preliminary Geotechnical Investigation and Environmental Site Assessment in conjunction with this investigation. The pertinent information gathered from the noted investigations is utilized for this report.

1.2 Project Objectives

The main objectives of the Hydrogeological Investigation are as follows:

- Establish the local hydrogeological settings within the Site;
- Assess construction dewatering flow rates and potential impacts;
- Assess long-term foundation sub-drain discharge volumes;
- Assess groundwater quality; and
- Prepare a Hydrogeological Investigation Report.

1.3 Scope of Work

To achieve the investigation objectives, EXP has completed the following scope of work:

- Reviewed available geological and hydrogeological information for the Site;
- Developed and conducted Single Well Response Tests (SWRT) on seven (7) monitoring wells (combined with geotechnical and environmental investigations) to evaluate hydraulic properties of the saturated soils at the Site. The actual depth of the BH/MWs depended on soil conditions;
- Collected one (1) groundwater sample for laboratory testing of the Halton Region Sanitary and the City of Burlington Storm Sewer Use By-Law parameters;
- Conducted three (3) rounds of water level measurements;
- Evaluated the information collected during the field investigation program, including borehole geological information, SWRT results, groundwater level measurements and groundwater quality;
- Prepared Site plans, cross sections, geological mapping and groundwater contour mapping for the Site;

- Estimated construction dewatering flow rates (Short-Term);
- Provided preliminary estimates of sub-drain discharge volumes (Long-Term);
- Assessed potential impacts and recommend mitigation measures; and
- Prepared a Hydrogeological Investigation Report.

The Hydrogeological Investigation was prepared in accordance with the Ontario Water Resources Act, Ontario Regulation 387/04. The scope of work outlined above was made to assess dewatering and did not include a review of Environmental Site Assessments (ESA).

1.4 Review of Previous Reports

The following report was reviewed as part of this Hydrogeological Investigation:

- EXP Services Inc. (May 12, 2023), Geotechnical Investigation, 1376 and 1382 Plains Road East, Burlington, ON, prepared for 273119 Ontario Inc., Manor Care Homes Inc., F.K Deals on Wheels Inc., and 273115 Ontario Inc.

Any past and/or future geotechnical, hydrogeological, environmental and risk assessments, and updated development/architectural plans should be provided to update this hydrogeological report prior to submission of permits and approvals by the municipalities and agencies.

2 Hydrogeological Setting

2.1 Regional Setting

2.1.1 Regional Physiography

The Site is within a physiographic region known as the Iroquois Plain. The physiographic landform is named Shale Plains. (Chapman & Putnam, 2007). The Iroquois Plain was created along the shores of former Lake Iroquois, an ancient glacial lake. The noted Plain primarily consists of shallow water sandy deposits. The topography of the Iroquois Plain is relatively flat with a gradual slope to the south, toward Lake Ontario.

2.1.2 Regional Geology and Hydrogeology

According to the Ministry of Northern Development and Mines (2012) the surficial geology can be described as coarse textured (foreshore-basinal) glaciolacustrine deposits consisting of sand, gravel, minor silt, and clay. The surficial geology of the Site and surrounding areas is shown on Figure 2. However, silty clay till was encountered in all boreholes, as described in section 2.2.

Based on the available regional geology maps, the subsurface stratigraphy of the Site from top to bottom is summarized in Table 2-1 (Oak Ridge Moraine Groundwater Program, 2026). The overburden thickness is approximately 9.7 m.

Table 2-1: Summary of Subsurface Stratigraphy

Stratigraphic Unit	General Description	Top Elevation of Stratigraphic Unit
Halton Till or Equivalent (Aquitard)	This lithologic unit typically consists of sandy silt to clayey silt till interbedded with silt, clay, sand, and gravel.	99.7
Queenston Formation	Bedrock primarily consists of red shale and siltstone, minor green shale and siltstone, and variable calcareous siltstone to sandstone and limestone interbeds. It belongs to the Upper Ordovician, (Ministry of Northern Development and Mines, 2012).	90.0

Regional groundwater across the area flows southeast, towards Lake Ontario (Oak Ridge Moraine Groundwater Program, 2026). Local deviation from the regional groundwater flow pattern may occur in response to changes in topography and/or soils, as well as the presence of surface water features and/or existing subsurface infrastructure.

2.1.3 Existing Water Well Survey

Water Well Records (WWRs) were compiled from the database maintained by the Ministry of the Environment, Conservation and Parks (MECP) and reviewed to determine the number of water wells documented within a 500-m radius of the Site boundaries. The locations of the MECP WWRs within 500 m of the Site are shown on Figure 3. A summary of the WWR is included in Appendix A.

The MECP WWR database indicates that fifty-eight (58) records within a 500 m radius from the Site centroid where one (1) well record (2810666) is identified on Site (Figure 3 and Appendix A). Well distances are calculated relative to the Site centroid, therefore some distances in Appendix A exceed 500 m.

The database indicates that the off-Site wells are at an approximate distance of fifty-three (53) m or greater from the Site centroid. All off-Site wells were reportedly identified as monitoring and observation wells, test holes, water supply wells, abandoned and/or listed with unclassified/unknown use.

The Well Identification Number (Well ID No.) of the only off-Site water supply well is 2800006 where it is reportedly located 76 m from the Site centroid.

The reported water levels ranged from depths of 0.8 m to 27.4 meters below ground surface (mbgs).

Based on the date of installation of the water supply well (1952) and since the area is municipally serviced, it is unlikely that the noted water supply well is still active.

2.2 Site Setting

2.2.1 Site Topography

The Site is in a commercial and residential land use setting. The topography is considered relatively flat with a regional gradual southeasterly slope towards Lake Ontario.

As indicated on the borehole logs included in Appendix B, the ground surface elevation of the Site ranges between approximately 99.37 to 98.79 meters above sea level (masl).

2.2.2 Local Surface Water Features

The Site is within the Upper Hager Creek watershed areas. No surface water features exist on Site. The nearest surface water feature is Rambo Creek located approximately 440 meters northeast of the Site boundary. Lake Ontario is approximately 2.3 km from the Site boundary to the southeast.

2.2.3 Local Geology and Hydrogeology

A summary of subsurface soil stratigraphy is provided in the following paragraphs. The soil descriptions are based on the geotechnical investigation report (EXP, 2023). They are summarized for the hydrogeological interpretations. As such, the information provided in this section shall not be used for construction design purposes.

Details of the subsurface conditions encountered during the drilling program are summarized on the borehole logs in (Appendix B). The logs include textural descriptions of the subsoil and groundwater conditions. The soil boundaries were inferred from non-continuous sampling and observations during drilling. These boundaries reflect approximate transition zones for the purpose of geotechnical design and should not be interpreted as exact planes of geological change.

The "Notes on Sample Description" preceding the borehole logs form an integral part of and should be read in conjunction with this report.

In general, the stratigraphy at the Site comprises the pavement structure, which overlies a layer of fill material extending to depths of 1.1 to 1.7 m below grade. The underlying native soil consists of stiff to hard silty clay till, which extends to the Queenston Shale bedrock at about 6.1 to 10.5 m. The stratigraphy is further detailed in the subsections below.

Pavement Structure/Topsoil

The pavement structure for the parking areas was encountered at all boreholes and consisted of 25 to 150 mm asphaltic concrete with a granular base ranging in thickness from 0 to 200 mm (no granular base was encountered at Boreholes BH-1 and BH-5).

Fill

Fill material was encountered below the pavement structure in all boreholes extending to approximately 1.1 to 1.7 m below the existing grades. The fill consisted of silty sand with trace to some gravel, trace to some clay. The fill was brown or reddish brown in colour and in a moist to very moist condition, with moisture contents between 14 and 20%. Trace rootlets, dark brown to black organic staining were typically encountered in the fill and trace asphalt inclusions were noted at Boreholes BH-1, BH-3, and BH-5.

Silty Clay Till

A deposit of silty clay till was encountered in all boreholes below the fill and extended to shale bedrock at depths of approximately 6.1 to 10.5 m. The silty clay till included trace sand, gravel, and trace to some shale fragments; was generally brown, reddish brown, or grey in colour; and was in a moist state with moisture contents ranging from 9 to 19%. SPT N values ranged from 10 to greater than 100 per 305 mm of spoon penetration. Based on undrained shear strengths ranging from 75 kPa to greater than 225 kPa as determined by pocket penetrometer measurements, the stratum is classified as stiff to hard in consistency. Two (2) grain size analysis and Atterberg Limits test were conducted on select samples of the stratum. The silty clay material is classified as a low plasticity clay (CL).

Shale

Red shale bedrock of the Queenston Formation was encountered in all boreholes, except BH-4 and BH-6, underlying the till deposit at depths ranging from 9.1 to 10.5 m below grade. The bedrock was proven by coring at Boreholes BH-2 and inferred from drilling observations at the remaining locations. It should be noted that the contact elevations should not be interpreted as exact planes of bedrock since the auger will frequently penetrate some distance into the weathered rock before noticeable resistance is encountered. Further, the distinction between highly weathered shale and the overlying stratum, particularly if the latter contains abundant shale fragments, is not always clear and consequently, some of the soil resting on the surface of the bedrock might be very weak and highly weathered shale.

In general, the Queenston Shale bedrock is highly weathered in the upper portion (becoming more sound with depth), and it exhibits characteristics more commonly encountered with soil than with rock (slake durability index less than 80%, higher moisture content, etc.). Hard limestone interbeds are also possible within the shale.

The borehole and monitoring well locations are shown on Figure 4. Geological cross-sections were generated based on the available borehole logs completed as part of the previous and current investigations and shown on Figure 5 (Cross section A-A'). The cross section shows a simplified representation of soil conditions and soil deposits may be interconnected differently than represented. Borehole logs used to generate both cross-sections are provided in Appendix B.

3 Results

3.1 Monitoring Well Details

The monitoring well network was installed as part of the Geotechnical and Environmental Investigations at the Site. It consists of the following:

- Six (6) shallow overburden monitoring wells (BH/MW 1, BH/MW 3S, BH/MW 4, BH/MW 5S, BH/MW 6, and BH/MW 6A) were installed between March 8 and 13 of 2023;
- Two (2) additional shallow overburden monitoring wells (BH/MW7 and BH/MW8) were installed on July 14 of 2023;
- Three (3) deep monitoring well (BH/MW 2, BH/MW 3D and BH/MW 5D) were installed between March 8 and 13 of 2023.

The diameter of all monitoring wells is 50 mm. All wells were installed with a flush mount protective casing. Borehole logs and monitoring well installation details are provided in Appendix B. The monitoring well locations are shown on Figure 4.

3.2 Water Level Monitoring

As part of the Hydrogeological Investigation, static water levels in the monitoring wells installed outside of the existing building were recorded in three (3) monitoring events, including April 3 and 13 of 2023 and July 17 of 2023. A summary of all static water level data as it relates to the elevation survey is given in Table 3-1 below.

The groundwater elevation recorded in the shallow overburden wells ranged from 92.97 masl (6.04 mbgs at BH/MW 6 on April 3, 2023) to 98.16 masl (0.86 mbgs at BH/MW 6A on April 3, 2023). The groundwater elevation recorded for the deep wells ranged from 94.74 masl (4.15 mbgs at BH/MW 3D on April 13, 2023) to 95.22 masl (4.15 mbgs at BH/MW 2 on April 3, 2023).

One (1) map was created for the Site to show groundwater contours of the shallow water-bearing zone, as measured on April 13 of 2023 monitoring event (Figure 6). Accordingly, the groundwater flow directions in the water-bearing zone is interpreted to be in southeast direction of the Site, towards Lake Ontario, as expected.

It is noted that the direction of localized groundwater flow is significantly influenced by disturbed soil (fill) and underground utilities within the Site. As such, the measured groundwater flow direction may not be representative of the regional flow in the area.

Groundwater levels are expected to show seasonal fluctuations and vary in response to prevailing climate conditions. This may also affect the direction and rate of flow. The on-going seasonal groundwater level monitoring will further refine and provide more information on seasonal groundwater level fluctuations on Site.

Table 3-1: Summary of Measured Groundwater Elevations

Monitoring Well ID	Ground Surface Elevation (masl)	Approximate Full Well Depth (mbgs)	Minimum GW Elevation (masl)	Maximum GW Elevation (masl)	Depth	3-Apr-23	13-Apr-23	17-Jul-23
BH/MW 1	99.11	5.35	94.18	94.26	mbgs	4.93	4.82	-
					masl	94.18	94.26	-
BH/MW 2	99.37	13.84	95.07	95.22	mbgs	4.15	4.30	-
					masl	96.22	95.07	-
BH/MW 3S	99.03	5.63	97.63	97.96	mbgs	1.07	1.40	-
					masl	97.96	97.63	-
BH/MW 3D	98.89	10.50	94.74	94.80	mbgs	4.09	4.15	-
					masl	94.80	94.74	-
BH/MW 4	98.87	5.41	97.90	98.15	mbgs	0.72	0.97	-
					masl	98.15	97.90	-
BH/MW 5S	99.14	5.30	94.29	94.56	mbgs	4.85	4.58	-
					masl	94.29	94.56	-
BH/MW 5D	99.07	9.11	94.70	94.77	mbgs	4.37	4.30	-
					masl	94.70	94.77	-
BH/MW 6	99.01	6.11	92.97	93.18	mbgs	6.04	5.83	-
					masl	92.97	93.18	-
BH/MW 6A	99.02	3.10	98.01	98.16	mbgs	0.86	1.01	-
					masl	**98.16**	98.01	-
BH/MW 7	98.96	5.34	DRY	DRY	mbgs	-	-	DRY
					masl	-	-	DRY
BH/MW 8	98.79	5.36	94.00	94.00	mbgs	-	-	4.79
					masl	-	-	94.00

Notes:
mbgs - meters below ground surface
masl - meters above mean sea level
NA-not available / well destroyed or not accessible

3.3 Hydraulic Conductivity Testing

Seven (7) Single Well Response Tests (SWRT's) were completed on monitoring wells BH/MW 1, BH/MW 2, BH/MW 3S, BH/MW 3D, BH/MW 4, BH/MW 5S, BH/MW 5D on April 13 of 2023. The tests were completed to estimate the saturated hydraulic conductivity (K) of the soils at the well screen depths utilizing data loggers, preprogramed to take measurement on (time in sec/ half sec/minutes) intervals.

The static water level within each monitoring well was measured prior to the start of testing. In advance of performing SWRTs, each monitoring well underwent development to remove fines introduced into the screens following construction. The development process involved purging of the monitoring wells to induce the flow of fresh formation water through the screen. Each monitoring well was permitted to fully recover prior to performing SWRTs.

Hydraulic conductivity values were calculated from the SWRT and constant rate test data as per Hvorslev's solution included in the Aqtesolv Pro. V.4.5 software package. The semi-log plots for normalized drawdown versus time are included in Appendix C.

A summary of the hydraulic conductivities (K-values) estimated from the SWRTs are provided in Tables 3-2A and 3-2B for overburden and bedrock, respectively.

Table 3-2A: Hydraulic Conductivity Testing - Overburden

Monitoring Well	Approximate Well Depth (mbgs)	Screen Interval (mbgs)		Soil Formation Screened	Estimated Hydraulic Conductivity (m/s)
		from	to		
BH/MW 1	5.35	2.35	5.35	Silty Clay Till	4.9E-8
BH/MW 2S	5.63	2.63	5.63	Silty Clay Till	3.7E-7
BH/MW 3D	10.5	7.5	10.5	Silty Clay Till/Shale Bedrock	5.5E-6
BH/MW 4	5.41	2.41	5.41	Silty Clay Till	3.1E-8
BH/MW 5S	5.30	2.3	5.3	Silty Clay Till	4.2E-8
BH/MW 5D	9.11	6.11	9.11	Silty Clay Till/Shale Bedrock	8.8E-6
				Highest Estimated K Value	8.8E-6
				Arithmetic Mean of Estimated K Values	2.5E-6
				Geometric Mean of Estimated K Values	3.2E-7

Table 3-2B: Hydraulic Conductivity Testing - Bedrock

Monitoring Well	Approximate Well Depth (mbgs)	Screen Interval (mbgs)		Soil Formation Screened	Estimated Hydraulic Conductivity (m/s)
		from	to		
BH/MW 2	13.84	10.84	13.84	Shale Bedrock	1.9E-7

SWRTs provide K-estimates of the geological formation surrounding the well screens and may not be representative of bulk formation hydraulic conductivity. As shown in Table 3-2, the highest K-value of the tested water-bearing zone is 8.8E-6 m/s, and the arithmetic mean of the K-values is 2.5E-6 m/s. The geometric mean of the K-values for overburden is 3.2E-7 m/s

3.4 Groundwater Quality

To assess the suitability for discharging pumped groundwater into the sewers owned by the City of Burlington / Halton Region during dewatering activities, one (1) groundwater sample was collected from monitoring well BH/MW 3D on April 13, 2023 using a peristaltic pump. Prior to collecting the noted water sample, approximately three (3) standing well volumes of groundwater were purged from the referred well. The samples were collected unfiltered and placed into pre-cleaned laboratory-supplied vials and/or bottles provided with analytical test group specific preservatives, as required. Dedicated nitrile gloves were used during sample handling. The groundwater samples were submitted for analysis to Bureau Veritas Laboratory, a CALA certified independent laboratory in Mississauga, Ontario. Analytical results are provided in Appendix D.

Table 3-3 summarizes exceedance(s) of the Sanitary (Halton Region) and Storm (City of Burlington) Sewer Use By-Law parameters.

When comparing the chemistry of the collected groundwater samples to the Halton Region Sanitary Sewer Discharge Criteria, there were no parameter exceedances to be reported.

When comparing the chemistry of the collected groundwater samples to the City of Burlington Storm Sewer Discharge Criteria the following parameters reported an exceedance: Total Suspended Solids (TSS) and Total Manganese (Mn).

Reporting detection limits (RDLs) were below the Sewer Use By-Law parameter criteria.

Table 3-3: Summary of Analytical Results

Parameter	Units	Region of Halton Sanitary Sewer Discharge Limit	City of Burlington / Halton Region Storm Sewer Discharge Limit	Concentration BH/MW 3D April 13, 2023
Total Suspended Solids (TSS)	mg/L	350	15	**90**
Total Manganese (Mn)	mg/L	5	0.05	**0.11**

Bold – Exceeds City of Burlington / Halton Region Storm Sewer Discharge Limit.
Bold & underlined – Exceeds City of Burlington / Halton Region Sanitary and Combined Sewer Discharge Limit.

For the short-term dewatering system (construction phase), it is anticipated that TSS levels and some other parameters (for example, Total Metals) in the pumped groundwater may become elevated and exceed both, Sanitary and Storm Sewer Use By-Law limits. To control the concentration of TSS and associated metals, it is recommended that a suitable treatment method be implemented (filtration or decantation facilities and/ or any other applicable treatment system) during construction dewatering activities to discharge to the applicable sewer system. The specifications of the treatment system will need to be adjusted to the reported water quality results by the treatment contractor/process engineer.

For the long-term dewatering discharge to the sanitary sewer system (post-development phase) and based on the water quality test results, the water is suitable to be discharged without a treatment system.

For the long-term dewatering discharge to the storm sewer system (post-development phase) and based on the water quality results, it is recommended to implement a suitable pre-treatment, as required.

The water quality results presented in this report may not be representative of the long-term condition of groundwater quality onSite. As such, regular water quality monitoring is recommended for the post-construction phase, as required by the City of Burlington.

An agreement to discharge into the sewers owned by the City of Burlington / Halton Region will be required prior to releasing dewatering effluent.

The Environmental Site Assessment Report(s) shall be reviewed for more information on the groundwater quality conditions at the Site.

4 Dewatering Assessment

The dimensions of the proposed structure to support the dewatering assessment are summarized in Table 4-1 below.

Table 4-1 Building Dimensions for Dewatering Assessment

Input Parameter	Assumption	Units	Notes
Number of Subgrade Levels	1 Level	-	Underground partial basement for storage and mechanical/electrical services
Ground Elevations	99.50	masl	Established ground elevation
Top of Slab Elevation	95.50	masl	Based on Architectural Drawings. Top of Slab elevation is 4.0 m below established grade
Lowest Footing Elevation	94.00	masl	Assumed to be approximately 1.5 m below the top of slab elevation
Excavation Area (Length x Width)	2,372.5 (52.4 x 45.3)	m^2 (m x m)	Total Approximate area (length x width) of the P1

4.1 Dewatering Flow Rate Estimate and Zone of Influence

The Dupuit-Forcheimer equation for radial flow to an excavation through an unconfined aquifer resting on a horizontal impervious surface was used to obtain a flow rate estimate. Dewatering flow rate is expressed as follows:

$$Q_w = \frac{\pi K(H^2 - h^2)}{Ln\left[\frac{R_o}{r_e}\right]}$$

$$r_e = \frac{a+b}{\pi} \qquad R_o = R_{cj} + r_e$$

Where:

Qw = Rate of pumping (m^3/s)
X = Length of excavation (m)
K = Hydraulic conductivity (m/s)
H = Hydraulic head beyond the influence of pumping (static groundwater elevation) (m)
h = Hydraulic head above the base of aquifer in an excavation (m)
R_0 = Radius of influence (m)
R_{cj} = Cooper-Jacob's radius of influence (m)
r_e = Equivalent perimeter (m)
a = Length of the excavation area (m)
b = Width of the excavation area (m)

It is expected that the initial dewatering rate will be higher to remove groundwater from within the overburden formation. The dewatering rates are expected to decrease once the target water level is achieved in the excavation footprint as groundwater will have been removed, primarily from storage, resulting in lower seepage rates into the excavation.

4.2 Cooper-Jacob's Radius of Influence

The radius of influence (Rcj) for the construction dewatering was calculated based on Cooper-Jacob's equation. This equation is used to predict the distance at which the drawdown resulting from pumping is negligible.

The estimated radius of influence due to pumping is based on Cooper-Jacob's formula as follows:

$$R_{cj} = \sqrt{2.25KDt/s}$$

Where:

Ro = Estimated radius of influence (m)
D = Aquifer thickness (original saturated thickness) (m)
K = Hydraulic conductivity (m/s)
S = Storage coefficient
t = Duration of pumping (s)

4.3 Stormwater

Additional pumping capacity may be required to maintain dry conditions within the excavation during and following significant precipitation events. Therefore, the dewatering rates at the Site should also include removing stormwater from the excavation.

A 15 mm precipitation event was utilized for estimating the stormwater volume. The calculation of the stormwater volume is included in Appendix E.

The estimate of the stormwater volume only accounts for direct precipitation into the excavation. The dimensions of the excavation are considered in the dewatering calculations. Runoff which originated outside of the excavation's footprint is excluded and it should be directed away from the excavation.

During precipitation events greater than 15 mm (ex: 100-year storm), measures should be taken by the contractor to retain stormwater on Site in a safe manner to not exceed the allowable water taking and discharge limits, as necessary. A two (2) and a one hundred (100) year storm event over a 24-hour period are 56.0 and 121.6 mm (refer to Appendix E).

4.4 Results of Dewatering Rate Estimates

4.4.1 Construction Dewatering Rate Estimate

For this assessment, it was assumed that the proposed construction plans include an excavation with shoring extending to the Site boundaries. EXP should be retained to review the assumptions outlined in this section, should the assumed shoring design change.

Short-term (construction) dewatering calculations are presented in Appendix E. the set of architectural drawings included in Appendix F.

Pits (elevator, sump pits) are assumed to have the same excavation depth and dewatering target as the main excavation; deeper pits may require localized dewatering and revised dewatering estimates.

Based on the assumptions provided in this report, the results of the dewatering rate estimate can be summarized as follows:

Table 4-2 Summary of Construction Dewatering Rate

Description	With 1 Level of Underground Parking (L/day)
Total Volume (L/day) Short Term Discharge of Groundwater (construction dewatering) with Safety Factor of 2 (excluding Precipitation)	25,000
Total Volume (L/day) Short Term Discharge of Groundwater (Construction dewatering) with Safety Factor of 2 (including precipitation)	61,000

The peak dewatering flow rates does not account for flow from utility beddings and variations in hydrogeological properties beyond those encountered during this investigation.

Local dewatering may be required for pits (elevator pits, sump pits), if these extend deeper than the dewatering target. Local dewatering is not considered to be part of this assessment. Dewatering estimates should be reviewed once the pit dimensions are available.

Local dewatering may be required for pits (elevator pits, sump pits, raft) and for localized areas with permeable, soft, or wet soil conditions. Local dewatering is not considered to be part of this assessment, but contractor should be ready to install additional system to manage such conditions. Dewatering estimates should be reviewed once the pit dimensions are available.

All grading around the perimeter of the excavation should be graded away from the shoring the systems and ramp/Site access to redirect runoff away from excavation.

The dewatering assumptions are based on using shoring system without open cuts and sloped excavations.

If groundwater cutoff systems (ex: caisson walls, sheet piles) are installed, these should be designed for maximal hydrostatic pressure for shallow and deep water levels, without dewatering on the outer side of the groundwater cutoff. Soldier pile and lagging and caisson wall systems should be designed to account for shallow groundwater conditions and take into consideration that dewatering systems may not provide fully dewatered soil conditions.

If groundwater cutoff systems are used for decreasing long-term dewatering rates, these should be designed as permanent structures to cutoff groundwater inflow in the long-term. All perforations should be sealed permanently (ex: tiebacks, breaches, and cold joints) with no leakages and inspected. Fillers should extend into low permeability deposits (ex: sound bedrock or till) to cutoff groundwater from water bearing zones. Inspections should be conducted to confirm the depth of low permeability deposits along shoring system and that fillers are keyed into low permeability soil deposits.

All grading around the perimeter of the construction Site should be graded away from the shoring the system.

The contractor is responsible for the design of the dewatering systems (depth of wells, screen length, number of wells, spacing sand pack around screens, prevent soil loss etc.) to ensure that dry conditions are always maintained within the excavation at all costs.

Dewatering should be monitored using dedicated monitoring wells within and around the perimeter of the excavation, and these wells should be monitored using manual measurements and with electronic data loggers; records should be maintained on Site to track dewatering progress. Discharge rates should be monitored using calibrated flow meters and records of dewatering progress, and daily precipitation as per MECP requirements should be maintained.

4.4.2 Post-Construction Dewatering Rate Estimate

It is our understanding that the development plan includes a permanent foundation sub-drain system that will ultimately discharge to the municipal sewer system if conventional footings are installed.

The long-term dewatering was based on the same equations as construction dewatering shown in Section 4.1.

The calculation for the estimated flow to the future sub-drain system (with no cutoff walls) is provided in Appendix E. The dewatering target for the foundation drainage system is taken at 0.5 m below the lowest slab elevation.

The foundation drain analysis provides a flow rate estimate. Once the foundation drain is built, actual flow rate measurements of the sump discharge will be required to confirm the estimated flow rate.

Based on the assumptions provided in this report, the estimated sub-drain discharge volumes are summarized in Appendix E. Seasonal and daily fluctuations are expected. These estimates may be affected by hydrogeological conditions beyond those encountered at this time, fluctuations in groundwater regimes, surrounding Site alterations, and existing and future infrastructures.

Table 4-3: Summary of Long-Term Dewatering Rate

Long-Term Dewatering Flow Rate	With 1 Level of Underground Parking (L/day)
Total Volume (L/day) Long-Term Drainage of groundwater (from foundation drainage, weeping tiles, sub slab drainage) with Safety Factor Included	6,000
Long-Term Dewatering Rate without Safety Factor of 1.5	3,840

Intermittent cycling of sump pumps and seasonal fluctuation in groundwater regimes should be considered for pump specifications. A safety factor was applied to the flow rate to account for water level fluctuations due to seasonal changes.

These estimates assume that pits (elevator and/or sump pits) are made as watertight structures (without drainage), if their depths extend below the dewatering target, as previously stated. The dewatering assumptions are based on using shoring system without open cuts. Open cuts can act as preferential groundwater pathways in the long-term and cause foundation drainage volumes to increase.

The sub-drain rate estimate is based on the assumptions outlined in this report. Any variations in hydrogeological conditions beyond those encountered as part of this investigation may significantly influence the sub-drain discharge volumes.

4.5 MECP Water Taking Permits

4.5.1 Short-Term Discharge Rate (Construction Phase)

In accordance with the Ontario Water Resources Act, if the water taking for the construction dewatering is more than 50,000 L/day, then an online registration in the Environmental Activity and Sector Registry (EASR) with the MECP will be required.

As of July 1, 2025, an amendment of O. Reg. 63/16 came into effect to move additional construction site dewatering activities to a registration-first approach by removing the volumetric restriction such that proponents would be required to self-register construction dewatering activities online on the Environmental Activity and Sector Registry (EASR) regardless of the volume of water taking, allowing them to start operations immediately without requiring a Permit to Take Water (PTTW) or an

Environmental Compliance Approval (ECA). The regulation continues to require environmentally protective measures such as monitoring plans, erosion and sediment control, and treatment measures that have been included in the reports to safeguard that the taking of water and subsequent discharge do not cause adverse effects.

The dewatering estimate including a safety factor is greater than MECP threshold for water takings of 50,000 L/day as shown in Table 4-2. Based on the MECP construction dewatering rates, an EASR would be required to facilitate the construction dewatering program for the Subject Lands development area.

A Discharge Plan (dewatering sketch, sewer discharge agreement) must be developed and applied for any discharges from the Site. Monitoring of both water quantity and water quality must be carried out for the entire duration of the construction dewatering phase. During this phase, the Discharge Plan and the daily water taking records must be available onsite.

The EASR, Water Taking Report, Discharge Report, hydrogeological report, and geotechnical assessment of settlements must also be available at the construction Site during the entire construction dewatering. EXP should be notified immediately about any changes to the construction dewatering schedule or design, since the EASR will need to be updated to reflect these modifications.

4.5.2 Long-Term Discharge Rate (Post Construction Phase)

In accordance with the Ontario Water Resources Act and Ontario Regulation 387/04 as amended (as of July 1, 2025), foundation drainage systems used primarily for residential purposes are exempt for takings of up to 379,000 liters of water per day from requiring MECP approval or self-registration.

Based on the dewatering estimate shown in Table 4-3 less than 50,000 L/day, no MECP water taking permit is required to facilitate the post-development phase.

The safety factor for construction (short-term) dewatering is selected larger than for long-term to account for anticipated greater groundwater volumes during initial dewatering. The applied analytical formula is adequate for long-term (steady state) conditions as it omits specific yield and time dependency. When the formula is used for short-term conditions a larger safety factor is recommended to cover a larger initial dewatering rate, which is required to remove stored groundwater. Moreover, a large initial construction dewatering rate is favorable, as it supports reducing the time to reach the dewatering target elevation.

5 Environmental Impact

5.1 Surface Water Features

The Site is located within the Upper Hager Creek watershed. No surface water features exist on Site. The nearest surface water feature is Rambo Creek located approximately 440 meters northeast of the Site boundary. Lake Ontario is approximately 2.3 km from the Site boundary to the southeast.

Due to the limited extent of zone of influence and the wide distance to the nearest surface water feature, no detrimental impacts on surface water features are expected during construction activities.

5.2 Groundwater Sources

Well Records from the MECP Water Well Record (WWR) Database were reviewed to determine the presence and number of water supply wells within a 500 m radius of the Site boundaries. Given that the dewatering zone of influence (ZOI ~ 58 m) is limited and no water supply wells are reportedly identified in anticipated ZOI, no dewatering related impact is expected on water wells in the area.

5.3 Geotechnical Considerations

As per the MECP technical requirement for PTTW and EASRs, the geotechnical assessment of the stability of the soils due to water taking (ex: settlement, soil loss, subsidence, etc.) is required. The water taking should not have unacceptable interference on soils and underground structures (foundations, utilities, etc.).

A letter related to geotechnical issues as it pertains to the Site is required to be completed under a separate cover.

5.4 Groundwater Quality

It is our understanding that the potential effluent from the dewatering system during the construction will be released to the municipal sewer system. As such, the quality of groundwater discharge is required to conform the City of Burlington / Halton Region Sewer Use By-Law.

Dewatering (short- and long-term) may induce migration of contaminants within the zone of influence and beyond due to changing hydraulic gradients, hydrogeological conditions beyond Site boundaries and preferential pathways in utility beddings etc. The water quality sampling conducted as part of this assessment was performed under static conditions. As a result, monitoring may be required during dewatering activities (short- and long-term) to monitor potential migration, and this should be performed more frequently during early dewatering stages.

For the short-term (construction) discharge to the sanitary/storm sewer system and based on the water quality results, it is recommended to implement a suitable pre-treatment, as required.

For the long-term dewatering discharge to the sanitary sewer system (post-development phase) and based on the water quality test results, the water is suitable to be discharged without a treatment system.

For the long-term (post construction) dewatering discharge to the storm sewer system (post-development phase) and based on the water quality results, it is recommended to implement a suitable pre-treatment, as required.

The water quality results presented in this report may not be representative of the long-term condition of groundwater quality on Site.

An agreement to discharge into the sewers owned by the City of Burlington / Halton Region will be required prior to releasing dewatering effluent.

The Environmental Site Assessment Report(s) shall be reviewed for more information on the groundwater quality conditions at the Site.

5.5 Well Decommissioning

In conformance with Regulation 903 of the Ontario Water Resources Act, the installation and eventual decommissioning of any dewatering system wells or monitoring wells must be completed by a licensed well contractor. This will be required for all wells that are no longer in use.

6 Conclusions and Recommendations

Based on the findings of the Hydrogeological Investigation, the following conclusions and recommendations are provided:

- The Site is within the Upper Hager Creek watershed area. It is in the physiographic region known as Iroquois Plain. The physiographic landform is known as shale plain.
- The main overburden soil types encountered during on-Site drilling program is silty clay till.
- Thickness of overburden sediments in the area has been mapped to be approximately 9.7 meters.
- There are no surface water features exist on Site. The nearest surface water features are Rambo Creek located approximately 440 m northeast of the Site. Lake Ontario is approximately 2.3 km southeast from the Site boundary.
- The groundwater elevation recorded in the shallow overburden wells ranged from 92.97 masl (6.04 mbgs) to 98.16 masl (0.86 mbgs). The groundwater elevation recorded for the deep wells ranged from 94.74 masl (4.15 mbgs) to 95.22 masl (4.15 mbgs).
- The direction of groundwater flow is interpreted to be directed to southeast, towards Lake Ontario, as expected.
- The highest estimated bulk hydraulic conductivity for bedrock is approximately 8.8E-06m/s with an arithmetic mean k-value of 2.5E-06 m/s. The geometric mean of the estimated K-values for overburden is 3.2E-07 m/s.
- When comparing the chemistry of the collected groundwater samples to the Halton Region Sanitary Sewer Discharge Criteria, there were no parameter exceedances to be reported.
- When comparing the chemistry of the collected groundwater samples to the City of Burlington Storm Sewer Discharge Criteria the following parameters reported an exceedance: Total Suspended Solids (TSS) and Total Manganese (Mn).
- The construction dewatering including drainage and groundwater control will be required for building construction with one (1) level of underground parking.
- Based on the assumptions outlined in this report, the estimated peak dewatering rate for proposed construction activities is approximately 61,000 L/day. This is the rate which will be required to be discharged to the municipal sewer system. If the municipal sewer system is not available at the time of construction, the discharge point will be the nearest environment and water quality will have to confirm PWQO standards. Alternatively, the dewatering effluent can be hauled off the site to MECP approved disposal facility.
- The estimated dewatering rate for proposed construction activities is above 50,000 L/day, an EASR would be required to facilitate the construction dewatering program for the Site.
- The long-term flow rate of the foundation sub-drain is estimated to be approximately 6,000 L/day. Therefore, no MECP water taking permit is required for the post-development phase. Regular maintenance/cleaning of the sub-drain system is recommended to ensure its proper operation.
- The construction dewatering and long-term estimate of sub-drain discharge volumes is based on the assumptions outlined in this report. Any variations in hydrogeological conditions beyond those encountered as part of this investigation may significantly influence the discharge volumes.
- For the short-term dewatering system (construction phase), it is anticipated that TSS levels and some other parameters (for example, Total Metals) in the pumped groundwater may become elevated and exceed both, Sanitary and Storm Sewer Use By-Law limits. To control the concentration of TSS and associated metals, it is recommended that a suitable treatment method be implemented (filtration or decantation facilities and/ or any other applicable treatment system) during construction dewatering activities to discharge to the applicable sewer system. The specifications of the treatment system will need to be adjusted to the reported water quality results by the treatment contractor/process engineer.

- As per the MECP technical requirement for EASRs, the geotechnical assessment of the stability of the soils due to water taking (ex: settlement, soil loss, subsidence etc.) is required. The water taking should not have unacceptable interference on soils and underground structures (foundations, utilities etc.). A letter related to geotechnical issues as it pertains to the Site is required to be completed under a separate cover.
- The potential discharge from the dewatering system during the construction will be directed to the municipal sewer system. As such, the quality of groundwater discharge will have to conform to the applicable City of Burlington / Halton Region Sewer Use By-Law standards. A discharge permit(s) will be required from the City of Burlington / Halton Region prior any dewatering effluent discharges.
- A Discharge Plan (dewatering sketch, sewer discharge agreement) must be developed and applied for any discharges from the Site. Monitoring of both water quantity and water quality must be carried out for the entire duration of the construction dewatering phase. During this phase, the Discharge Plan and the daily water taking records must be available onsite.
- The EASR, Water Taking Report, Discharge Report, hydrogeological report, and geotechnical assessment of settlements must also be available at the construction Site during the entire construction dewatering. EXP should be notified immediately about any changes to the construction dewatering schedule or design, since the EASR will need to be updated to reflect these modifications.
- In conformance with Regulation 903 of the Ontario Water Resources Act, the installation and eventual decommissioning of any dewatering system wells or monitoring wells must be completed by a licensed well contractor. This will be required for all wells that are no longer in use.

The conclusions and recommendations provided above should be reviewed in conjunction with the entirety of the report. They assume that the present design concept described throughout the report will proceed to construction. This report is solely intended for the construction and long-term dewatering assessments. Any changes to the design concept may result in a modification to the recommendations provided in this report.

7 Limitations

This report is based on a limited investigation designed to provide information to support an assessment of the current hydrogeological conditions within the study area. The conclusions and recommendations presented within this report reflect Site conditions existing at the time of the assessment. EXP must be contacted immediately, if any unforeseen Site conditions are experienced during construction activities. This will allow EXP to review the new findings and provide appropriate recommendations to allow the construction to proceed in a timely and cost-effective manner.

Our undertaking at EXP, therefore, is to perform our work within limits prescribed by our clients, with the usual thoroughness and competence of the geoscience/engineering profession. No other warranty or representation, either expressed or implied, is included or intended in this report.

This report was prepared for the exclusive use of 273119 Ontario Inc.; Manor Care Homes Inc., F.K Deals on Wheels Inc.; 2731115 Ontario Inc. This report may not be reproduced in whole or in part, without the prior written consent of EXP, or used or relied upon in whole or in part by other parties for any purposes whatsoever. Any use which a third party makes of this report, or any part thereof, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. EXP Services Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

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

Sincerely,

EXP Services Inc.



Hammond Lo, M.Eng., P.Eng.
Senior Hydrogeologist
Environmental Services

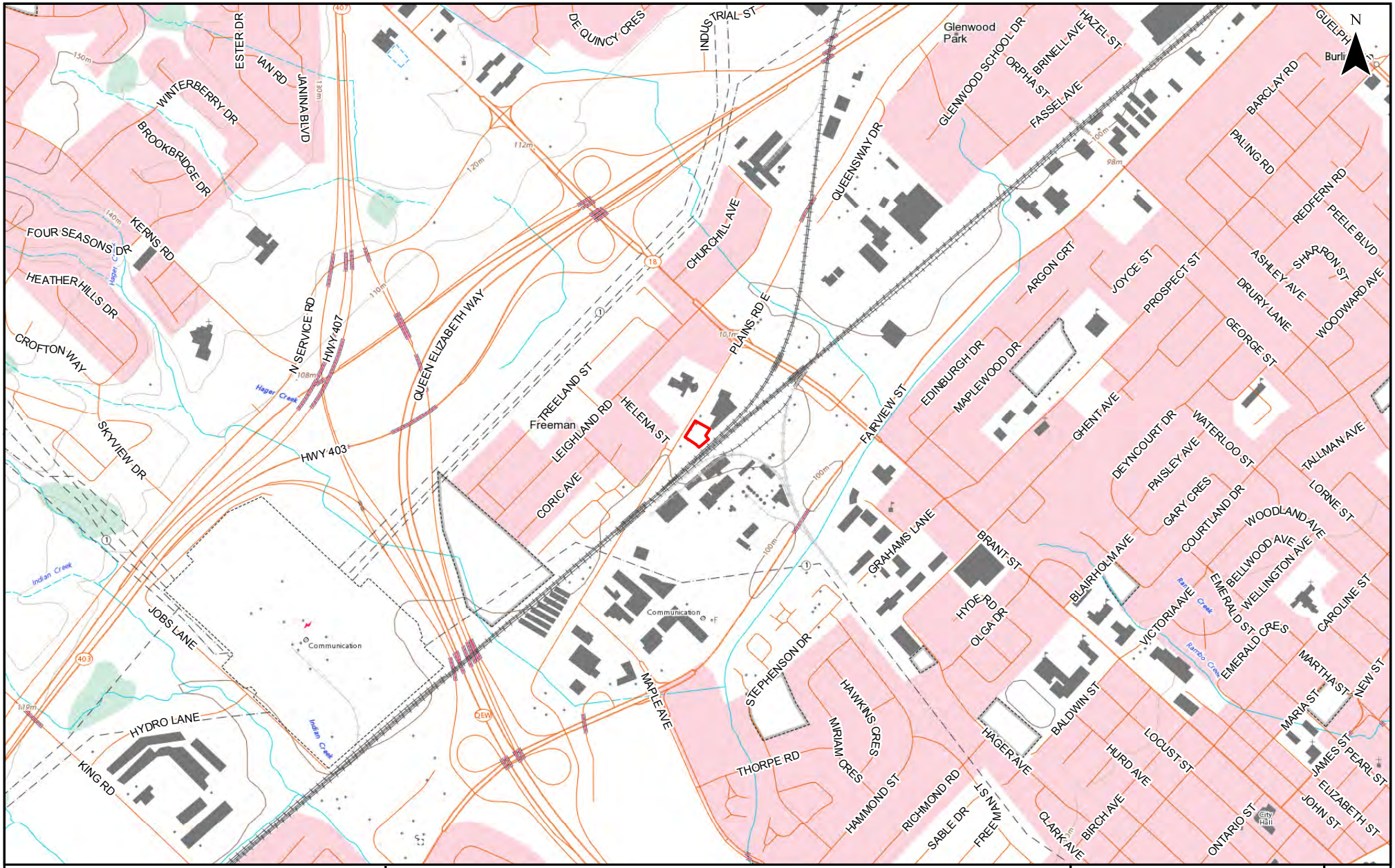


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Senior Hydrogeologist
Environmental Services

8 References

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Figures



SCALE:

0 150 300 450 600 750 m

LEGEND:

APPROXIMATE SITE BOUNDARY

SITE LOCATION PLAN

FIGURE: 1

exp.

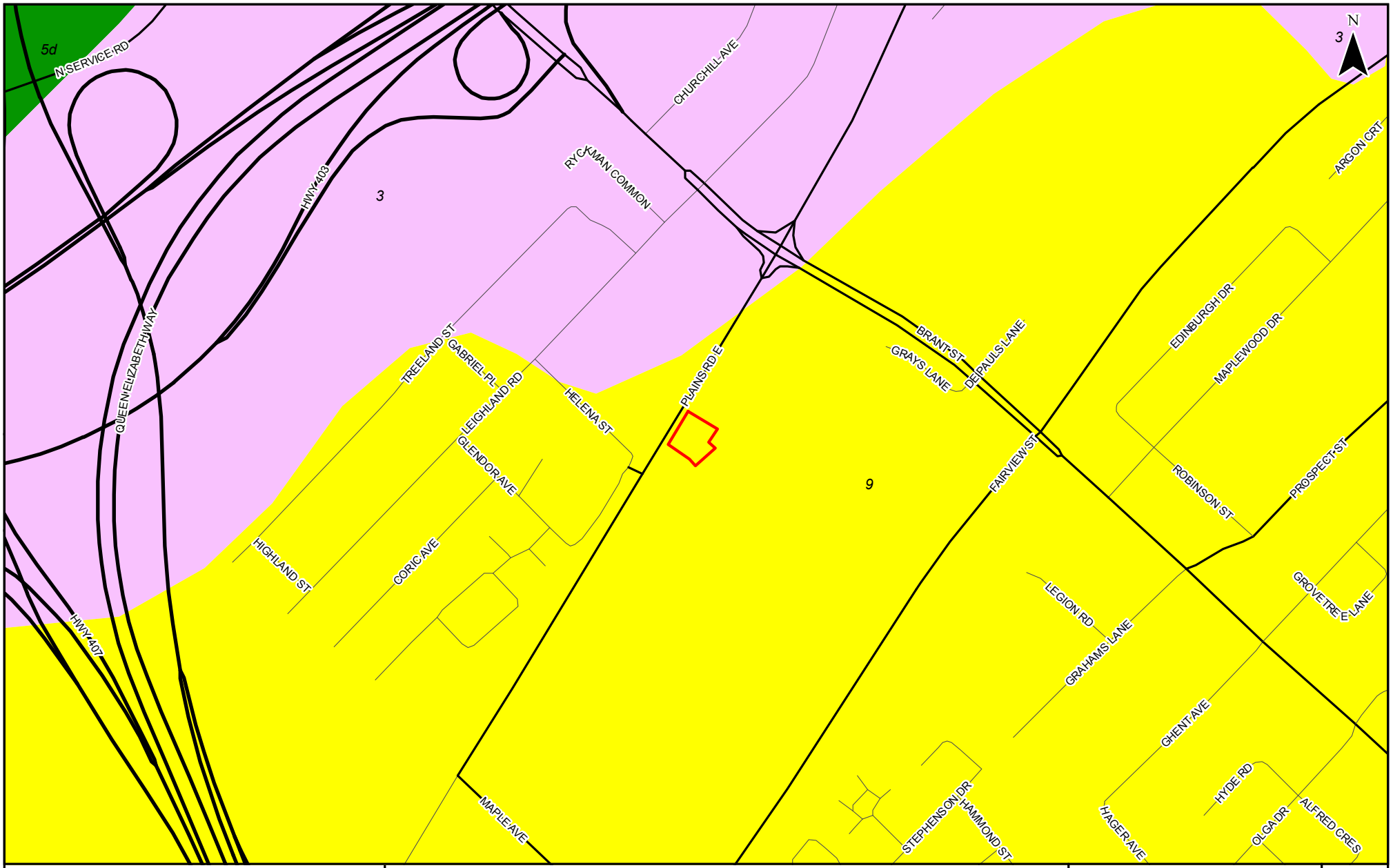
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CHECKED BY: HL

HYDROGEOLOGICAL INVESTIGATION
1376 & 1382 PLAINS ROAD EAST
BURLINGTON, ONTARIO

PROJECT NUMBER: GTR-22029872-A0

DATE: AUGUST 2023



SCALE:
0 100 200 300 400 500 m

SOURCE:
BASED ON ONTARIO GEOLOGICAL SURVEY DATA PUBLISHED IN 2010

exp.

DRAWN BY:	CHECKED BY:
AC	HL

LEGEND:
- APPROXIMATE SITE BOUNDARY
- 9: COARSE-TEXTURED GLACIOLACUSTRINE DEPOSITS
- 5D: GLACIOLACUSTRINE-DERIVED SILTY TO CLAYEY TILL
- 3: PALEOZOIC BEDROCK

SURFICIAL GEOLOGY

FIGURE: 2

HYDROGEOLOGICAL INVESTIGATION
1376 & 1382 PLAINS ROAD EAST
BURLINGTON, ONTARIO

PROJECT NUMBER: GTR-22029872-A0

DATE: AUGUST 2023



SCALE:
0 80 160 240 320 400 m

SOURCE:
BASED ON GOOGLE EARTH IMAGERY DATED 2021,
AVAILABLE WELL RECORD INFORMATION AS OF MARCH 2021

exp.

DRAWN BY:	CHECKED BY:
AC	HL

LEGEND:
- MONITORING WELL / TEST HOLE
- WATER SUPPLY WELL
- ABANDONED WELL
- UNCLASSIFIED / UNFINISHED WELL
- APPROXIMATE SITE BOUNDARY
- 500 m ZONE

MECP WATER WELL RECORDS MAP

FIGURE: 3

HYDROGEOLOGICAL INVESTIGATION
1376 & 1382 PLAINS ROAD EAST
BURLINGTON, ONTARIO

PROJECT NUMBER: GTR-22029872-A0 | DATE: AUGUST 2023



SCALE:

0 5 10 15 20 25 m

LEGEND:

- BOREHOLE / MONITORING WELL (EXP, 2023)
- CROSS SECTION AXIS
- APPROXIMATE SITE BOUNDARY

DRAWN BY:	CHECKED BY:
AC	HL

BOREHOLE / MONITORING WELL LOCATION PLAN

FIGURE: 4

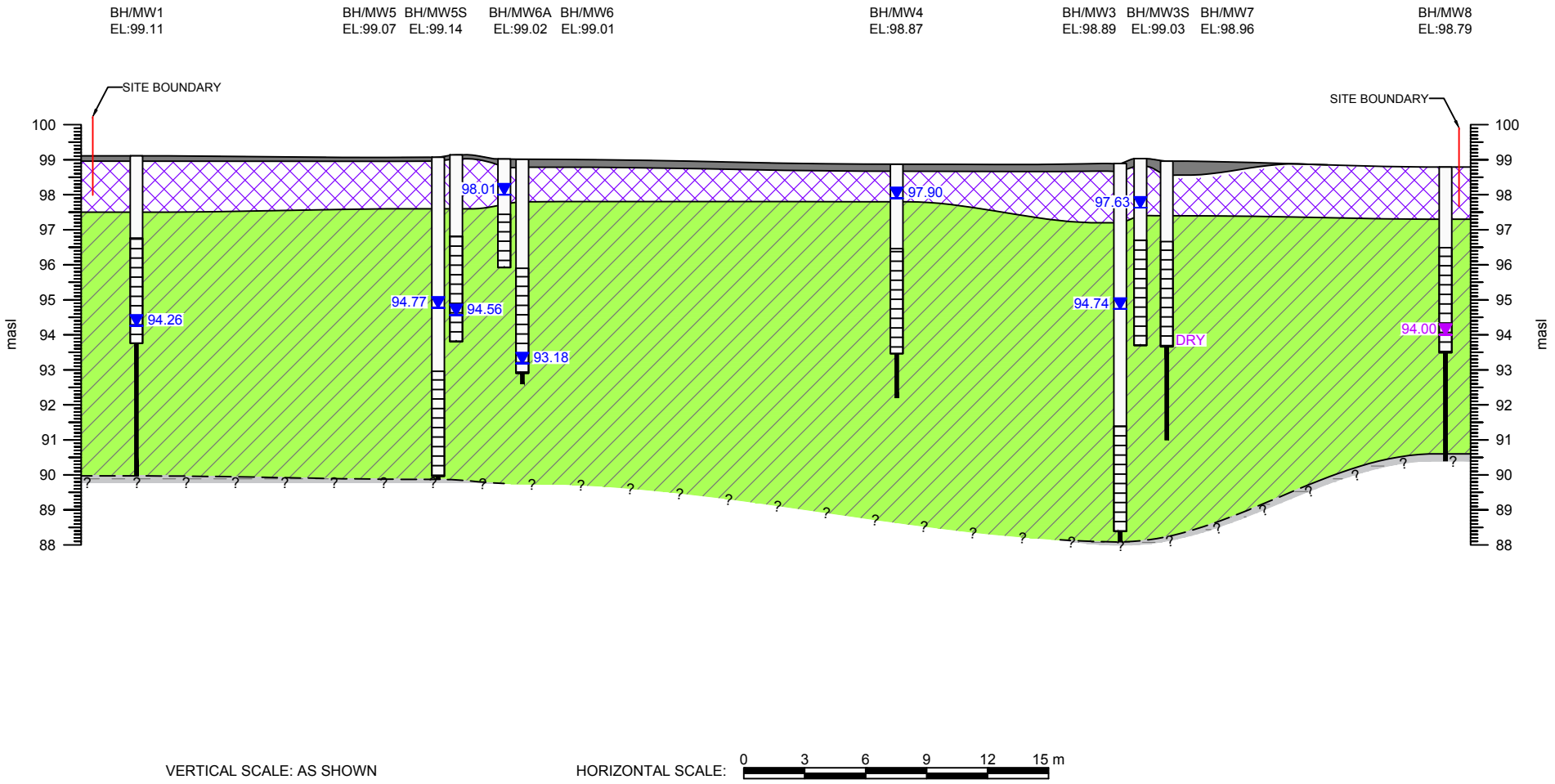
HYDROGEOLOGICAL INVESTIGATION
1376 & 1382 PLAINS ROAD EAST
BURLINGTON, ONTARIO

PROJECT NUMBER: GTR-22029872-A0

DATE: AUGUST 2023

A
NORTH

A'
SOUTH



VERTICAL SCALE: AS SHOWN

HORIZONTAL SCALE: 0 3 6 9 12 15 m

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LEGEND:

- ASPHALT / GRANULAR
- FILL
- SILTY CLAY TILL / CLAYEY SILT TILL
- SHALE BEDROCK
- GROUNDWATER ELEVATION (masl) AS MEASURED ON APRIL 13, 2023
- GROUNDWATER ELEVATION (masl) AS MEASURED ON JULY 17, 2023

TITLE AND LOCATION:

CROSS SECTION A-A'

HYDROGEOLOGICAL INVESTIGATION
1376 & 1382 PLAINS ROAD EAST
BURLINGTON, ONTARIO

PROJECT NO.: GTR-22029872-A0	DWN.: JA
SCALE: AS NOTED	CK: HL
DATE: AUGUST 2023	FIG. NO.: 5

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Appendix A – MECP WWR Summary Table

Off-Site																
BORE_HOLE_ID	WELL_ID	DATE	EAST83	NORTH83	ELEVATION (m ASL)	LOCATION ACCURACY	STREET	CITY	DISTANCE FROM SITE CENTROID (m)	CONSTRUCTION METHOD	WELL DEPTH (m bgs)	WATER FOUND (m bgs)	CASING DIAMETER (cm)	1st USE	2nd USE	FINAL STATUS
11692871	2810666	10/27/2006	595750	4798800	98.5	margin of error : 10 - 30 m	1382 PLAINS RD EAST	BURLIGNTON	8	Boring	3.0	1.0	5.1			Observation Wells

Off-Site																
BORE_HOLE_ID	WELL_ID	DATE	EAST83	NORTH83	ELEVATION (m ASL)	LOCATION ACCURACY	STREET	CITY	DISTANCE FROM SITE CENTROID (m)	CONSTRUCTION METHOD	WELL DEPTH (m bgs)	WATER FOUND (m bgs)	CASING DIAMETER (cm)	1st USE	2nd USE	FINAL STATUS
10146563	2800006	11/20/1952	595682	4798804	99.1	margin of error : 100 m - 300 m			76	Cable Tool	27.4	27.4	15.2	Domestic		Water Supply
11174674	2810057	4/29/2004	595650	4798680	95.7	margin of error : 10 - 30 m	2201 PLAINS RD E	BURLINGTON	159	Boring	6.0	3.0	5.0			Observation Wells
11174691	2810074	9/8/2004	595872	4799113	100.4	margin of error : 10 - 30 m	2011 PLAINS RD E	BURLINGTON	336	Boring	8.0	6.0	5.0			Observation Wells
11179647	6715010	7/6/2004	596235	4798927	96.2	margin of error : 10 - 30 m	131 ONTARIO ST	GUELPH	495	Boring	4.5	3.2	5.0			Observation Wells
1001880127	7114804	10/27/2008	596070	4799042	98.7	margin of error : 10 - 30 m	2070 QUEENSWAY BLVD.	BURLINGTON	397	DIRECT PUSH	4.3		5.2	Monitoring and Test Hole		Monitoring and Test Hole
1001880130	7114805	10/27/2008	596052	4799019	99.1	margin of error : 10 - 30 m	2070 QUEENSWAY BLVD.	BURLINGTON	369	DIRECT PUSH	4.3		5.2	Monitoring and Test Hole		Monitoring and Test Hole
1001880133	7114806	10/27/2008	596040	4799016	99.1	margin of error : 10 - 30 m	2070 QUEEENSWAY BLVD.	BURLINGTON	358	DIRECT PUSH	4.0		5.2	Monitoring and Test Hole		Monitoring and Test Hole
1003529350	7164921	1/31/2011	595833	4798939	99.4	Approximate location: margin of error : 300 m - 1 km			161	Rotary (Convent.)	4.6		4.6	Monitoring		Observation Wells
1003809847	7181756	5/14/2012	596046	4799010	99.1	margin of error : 100 m - 300 m	2070 QUEENSWAY DR	Burlington	359	Driving	3.0		3.8	Monitoring		Observation Wells
1003809850	7181757	5/14/2012	596051	4799006	99.1	margin of error : 30 m - 100 m	2070 QUEENSWAY DR	Burlington	360	Driving	3.0		3.8	Monitoring		
1003809863	7181758	5/14/2012	596063	4799013	98.5	margin of error : 100 m - 300 m	2070 QUEENSWAY DR	Burlington	374	Driving	3.0		3.8	Monitoring		Observation Wells
1004279215	7200999	3/15/2013	595693	4798338	96.6	margin of error : 30 m - 100 m	1254 PLAINS ROAD EAST	BURLINGTON	464	Rotary (Convent.)	5.3		5.1	Monitoring		
1004279218	7201000	3/15/2013	595671	4798317	96.0	margin of error : 30 m - 100 m	1254 PLAINS ROAD EAST	BURLINGTON	488	Rotary (Convent.)	6.1		5.1	Monitoring		
1004279227	7201003		595515	4798368	96.4	margin of error : 30 m - 100 m	1254 PLAINS ROAD EAST	BURLINGTON	493	Rotary (Convent.)	4.6		5.1	Monitoring		
1004279233	7201005	3/18/2013	595471	4798378	96.9	margin of error : 30 m - 100 m	1254 PLAINS RD E		508	Direct Push	4.5		5.2	Monitoring and Test Hole		Monitoring and Test Hole
1004381696	7203959	6/14/2013	595914	4799017	97.0	margin of error : 30 m - 100 m	1446 PLAINS RD E	Burlington	270	Rotary (Convent.)	4.6		5.1	Test Hole		Test Hole
11174675	2810058	7/5/2004	596231	4798928	96.6	margin of error : 10 - 30 m	903 BRANT ST	BURLINGTON	492	Boring	7.6		5.0			Observation Wells
11552451	2810541	4/25/2006	595874	4798871	99.4	margin of error : 10 - 30 m	1390-1400 PLAINS RD.	BIRLINGTON	138	Other Method	3.7		5.1			Abandoned-Other
11552452	2810542	4/19/2006	595455	4798388	96.9	margin of error : 10 - 30 m	1230 PLAINS RD EAST	BURLINGTON	509	Other Method	5.5		5.1			
1002711654	7128794	1/9/2008	596186	4798748	96.2	margin of error : 30 m - 100 m	2075 FAIRVIEW ST.	Burlington	432	Boring			5.1	Monitoring		Abandoned-Other
1002819232	7128794	1/9/2009	596186	4798748	99.6	margin of error : 30 m - 100 m	2075 FAIRVIEW ST.	Burlington	432	BORING			5.1	Monitoring		Abandoned-Other
1002819241	7128794	1/9/2009	596186	4798748	96.6	margin of error : 30 m - 100 m	2075 FAIRVIEW ST.	Burlington	432	BORING			5.1	Monitoring		Abandoned-Other
1005413738	7243101	4/29/2015	596193	4798975	96.7	margin of error : 30 m - 100 m	923 BRANT STREET	Burlington	471	Boring	7.6			Monitoring		
1005793606	7251866	5/26/2015	595589	4798671	98.5	margin of error : 30 m - 100 m	1325 PLAINS RD. E	BURLINGTON	210					Monitoring		Abandoned-Other
1006619743	7290058	5/26/2017	596289	4798790	94.9	margin of error : 30 m - 100 m	855 BRANT STREET	BURLINGTON	532	Direct Push	6.1			Test Hole	Monitoring	Observation Wells
1008307492	7360647	5/14/2020	595604	4798745	98.8	margin of error : 30 m - 100 m	1335 Plains Road East	Burlington	162	Auger	4.6	3.1		Monitoring		Observation Wells
1008568338	7380232	1/28/2021	595620	4798771	98.8	margin of error : 30 m - 100 m	1355 Plains Road East	Burlington	140	Auger	8.5	2.4		Monitoring		Observation Wells
1008568591	7380254	1/28/2021	595630	4798775	98.8	margin of error : 30 m - 100 m	1355 Plains Road East	Burlington	129	Direct Push	4.0	1.8		Monitoring		Observation Wells
1008568594	7380255	1/28/2021	595640	4798776	98.8	margin of error : 30 m - 100 m	1355 Plains Road East	Burlington	119	Direct Push	4.0	1.8		Monitoring		Observation Wells
1008568597	7380256	1/28/2021	595646	4798764	98.8	margin of error : 30 m - 100 m	1355 Plains Road East	Burlington	116	Direct Push	4.0	1.8		Monitoring		Observation Wells
1007557338	7338455	5/17/2019	595637	4798762	98.8	margin of error : 30 m - 100 m	1335 Plains Road East	Burlington	125			0.9		Not Used		Abandoned-Other
1007557362	7338463	5/17/2019	595598	4798732	98.8	margin of error : 30 m - 100 m	1335 Plains Road East	Burlington	172			0.9		Not Used		Abandoned-Other
1007557365	7338464	5/17/2019	595634	4798751	98.7	margin of error : 30 m - 100 m	1335 Plains Road East	Burlington	132			0.9		Not Used		Abandoned-Other
1007557467	7338498	5/17/2019	595616	4798777	98.8	margin of error : 30 m - 100 m	1335 Plains Road East	Burlington	143			0.8		Not Used		Abandoned-Other
1007557488	7338505	5/17/2019	595622	4798773	98.8	margin of error : 30 m - 100 m	1335 Plains Road East	Burlington	137			0.8		Not Used		Abandoned-Other
1007557491	7338506	5/17/2019	595626	4798771	98.8	margin of error : 30 m - 100 m	1335 Plains Road East	Burlington	134			0.9		Not Used		Abandoned-Other
1007557494	7338507	5/17/2019	595631	4798767	98.8	margin of error : 30 m - 100 m	1335 Plains Road East	Burlington	130			0.9		Not Used		Abandoned-Other
1007557497	7338508	5/17/2019	595623	4798763	98.8	margin of error : 30 m - 100 m	1335 Plains Road East	Burlington	139			0.9		Not Used		Abandoned-Other
1007557500	7338509	5/17/2019	595625	4798723	98.2	margin of error : 30 m - 100 m	1335 Plains Road East	Burlington	152			1.8		Not Used		Abandoned-Other
1007557506	7338511	5/17/2019	595603	4798714	99.0	margin of error : 30 m - 100 m	1335 Plains Road East	Burlington	175			1.2		Not Used		Abandoned-Other
1007557515	7338514	5/17/2019	595588	4798725	98.5	margin of error : 30 m - 100 m	1335 Plains Road East	Burlington	184			1.2		Not Used		Abandoned-Other
1008583691	7382220	2/18/2021	595630	4798775	98.8	margin of error : 30 m - 100 m	1355 Plains Road East	Burlington	129			1.8				Abandoned-Other
1008583694	7382221	2/18/2021	595640	4798776	98.8	margin of error : 30 m - 100 m	1355 Plains Road East	Burlington	119			1.8				Abandoned-Other
1008583697	7382222	2/18/2021	595646	4798764	98.8	margin of error : 30 m - 100 m	1355 Plains Road East	Burlington	116			1.8				Abandoned-Other
1008598775	7384174	3/11/2021	595628	4798790	98.4	margin of error : 30 m - 100 m	1355 Plains Road East	Burlington	129			0.9				Abandoned-Other
1008598778	7384175	3/11/2021	595629	4798783	98.8	margin of error : 30 m - 100 m	1355 Plains Road East	Burlington	129			1.4				Abandoned-Other
1008598781	7384176	3/11/2021	595645	4798775	98.8	margin of error : 30 m - 100 m	1355 Plains Road East	Burlington	114			1.6				Abandoned-Other
1008598784	7384177	3/11/2021	595642	4798758	98.8	margin of error : 30 m - 100 m	1355 Plains Road East	Burlington	122			0.9				Abandoned-Other
1007413061	7330854	2/14/2019	596270	4798655	93.9	margin of error : 30 m - 100 m	850 Brant Street	Burlington	532	Boring	4.0			Monitoring		Observation Wells
1007413112	7330857	2/15/2019	596254	4798731	94.5	margin of error : 30 m - 100 m	850 BRANT ST	Burlington	501	Boring	4.8			Monitoring		Observation Wells
1007413156	7330858	2/15/2019	596259	4798693	94.2	margin of error : 30 m - 100 m	850 Brant Street	Burlington	512	Boring	4.8			Monitoring		Monitoring and Test Hole
1008204469	7355019	1/14/2020	595540	4798675	98.5	margin of error : 30 m - 100 m	Glendor Ave	Burlington	249	Rotary (Convent.)	6.1			Monitoring and Test Hole		Monitoring and Test Hole
1003496138	7161863	3/10/2011	596153	4798995	95.8	margin of error : 10 - 30 m			442							
1004383798	7204013	6/13/2013	595884	4798976	99.6	margin of error : 30 m - 100 m			219							
1006075945	7265586	3/10/2016	596019	4798801	97.4	margin of error : 30 m - 100 m			262							
1006298681	7276104	4/25/2016	595736	4798749	98.8	margin of error : 30 m - 100 m			53							
1006870681	7301199	11/21/2017	595868	4798900	99.1	margin of error : 30 m - 100 m			151							

Appendix B – Borehole Logs

Log of Borehole BH/MW1

Project No. GTR-22029872-A0 Drawing No. 1

Project: Phase Two ESA Sheet No. 1 of 1

Location: 1376 and 1382 Plains Road East, Burlington, ON

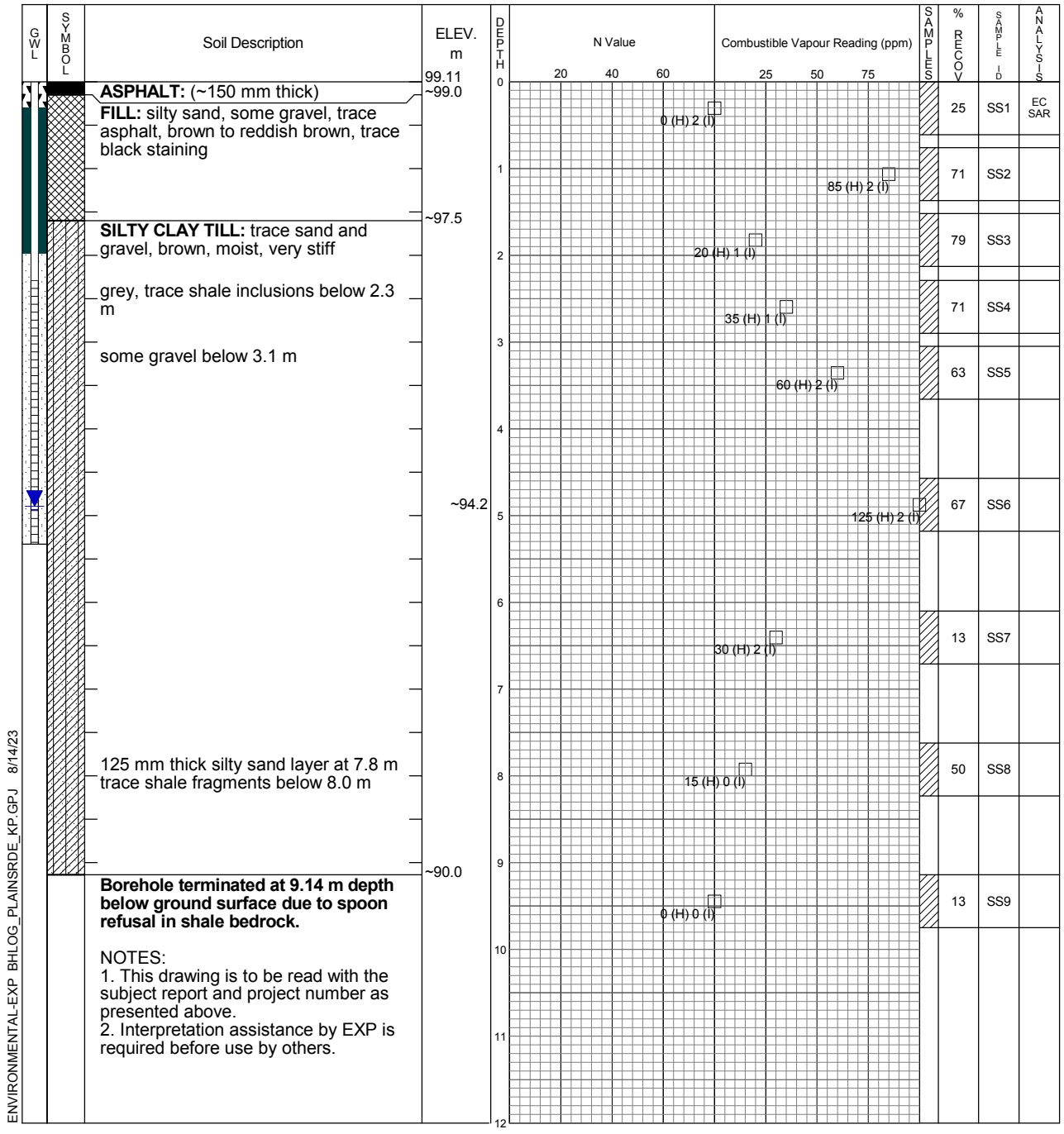
Date Drilled: March 10, 2023

Drill Type: D-120 Truck Mount, Hollow Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		



ENVIRONMENTAL-EXP BHLOG_PLAINSRDE_KP.GPJ 8/14/23

Time	Water Level (m)	Depth to Cave (m)
April 3, 2023	4.930	

EXP Services Inc.
Brampton, Ontario
Telephone: 905-793-9800
Facsimile: 905-793-0641

Log of Borehole BH/MW2

Project No. GTR-22029872-A0 Drawing No. 2

Project: Phase Two ESA Sheet No. 1 of 2

Location: 1376 and 1382 Plains Road East, Burlington, ON

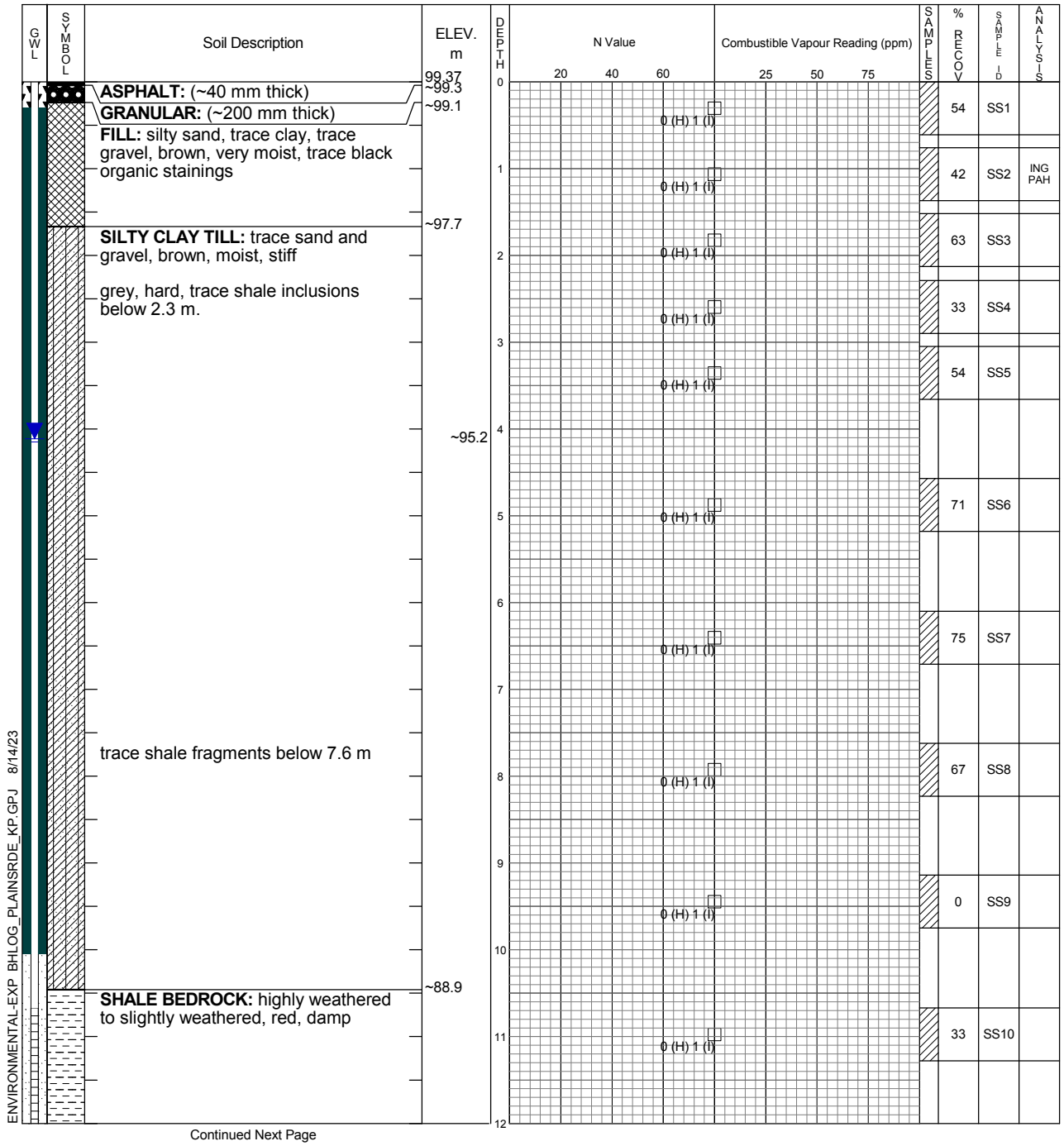
Date Drilled: March. 8, 2023

Drill Type: D-120 Truck Mount, Hollow Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		



Continued Next Page

Time	Water Level (m)	Depth to Cave (m)
April 3, 2023	4.15	

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Facsimile: 905-793-0641

Log of Borehole BH/MW2

Project No. GTR-22029872-A0 Drawing No. 2

Project: Phase Two ESA Sheet No. 2 of 2

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value 20 40 60	Combustible Vapour Reading (ppm) 25 50 75	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			87.37	12						
				13						
			~85.6	14						
		Borehole terminated at 13.8 m below ground surface in shale bedrock.		15						
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.		16						
				17						
				18						
				19						
				20						
				21						
				22						
				23						
				24						
				25						
				26						

ENVIRONMENTAL-EXP BHLOG_PLAINSRDE_KP.GPJ 8/14/23

EXP Services Inc.
Brampton, Ontario
Telephone: 905-793-9800
Facsimile: 905-793-0641

Time	Water Level (m)	Depth to Cave (m)
April 3, 2023	4.15	

Log of Borehole BH/MW3D

Project No. GTR-22029872-A0 | Drawing No. 4

Project: Phase Two ESA | Sheet No. 1 of 2

Location: 1376 and 1382 Plains Road East, Burlington, ON

Date Drilled: March 9, 2023

Drill Type: D-120 Truck Mount, Hollow Stem

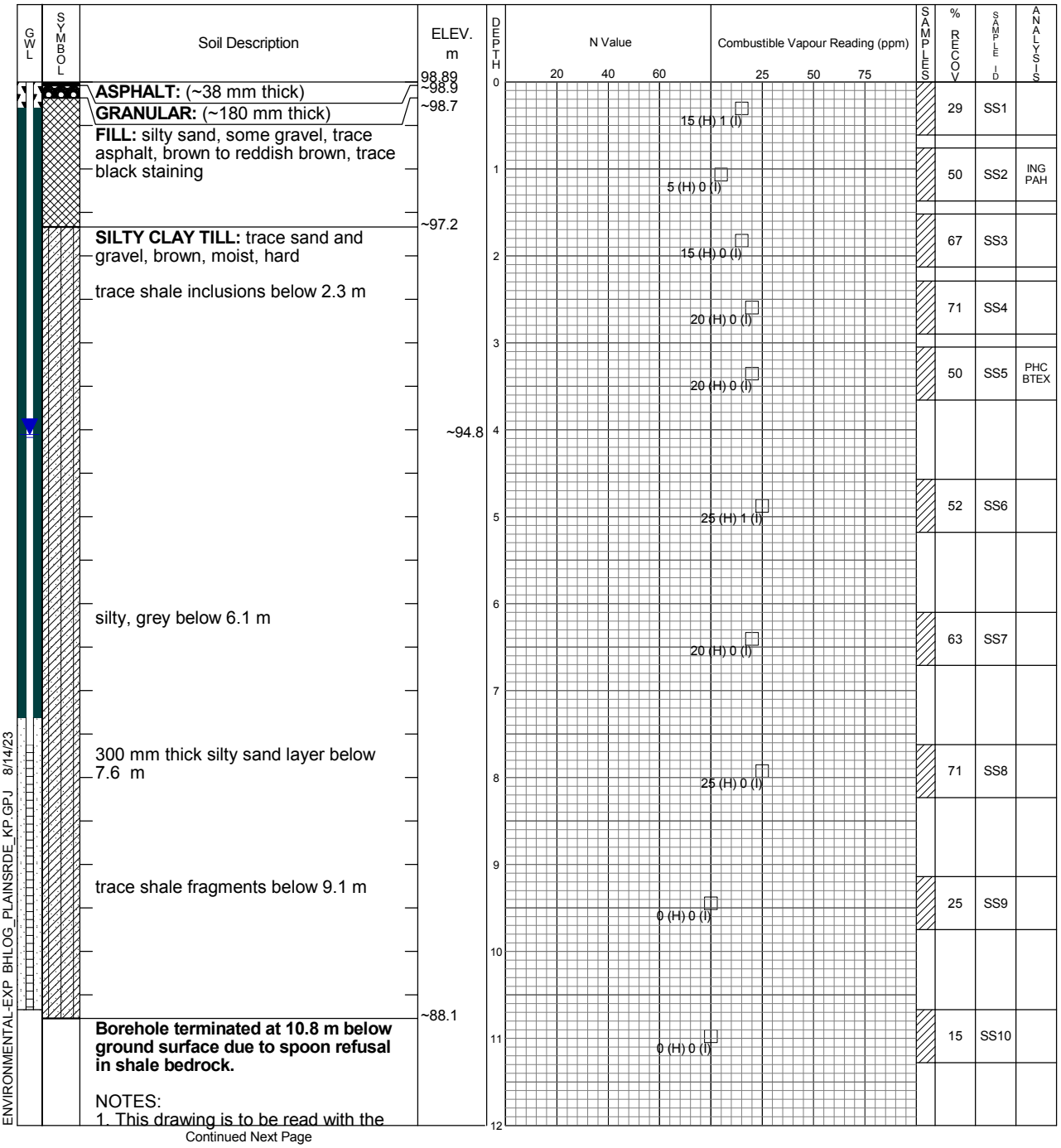
Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			98.89	0
		ASPHALT: (~38 mm thick)	~98.9	
		GRANULAR: (~180 mm thick)	~98.7	
		FILL: silty sand, some gravel, trace asphalt, brown to reddish brown, trace black staining		1
			~97.2	
		SILTY CLAY TILL: trace sand and gravel, brown, moist, hard		2
		trace shale inclusions below 2.3 m		
				3
			~94.8	4
		silty, grey below 6.1 m		5
				6
		300 mm thick silty sand layer below 7.6 m		7
				8
		trace shale fragments below 9.1 m		9
				10
			~88.1	11
		Borehole terminated at 10.8 m below ground surface due to spoon refusal in shale bedrock.		12
		NOTES: 1. This drawing is to be read with the		

Continued Next Page



SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
	29	SS1	
	50	SS2	ING PAH
	67	SS3	
	71	SS4	
	50	SS5	PHC BTEX
	52	SS6	
	63	SS7	
	71	SS8	
	25	SS9	
	15	SS10	

ENVIRONMENTAL-EXP BHLOG_PLAINSRDE_KP.GPJ 8/14/23

EXP Services Inc.
Brampton, Ontario
Telephone: 905-793-9800
Facsimile: 905-793-0641

Time	Water Level (m)	Depth to Cave (m)
April 3, 2023	4.09	

Log of Borehole BH/MW3D

Project No. GTR-22029872-A0 Drawing No. 4

Project: Phase Two ESA Sheet No. 2 of 2

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value	Combustible Vapour Reading (ppm)	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
		subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.	86.89	12 13 14 15 16 17 18 19 20 21 22 23 24 25 26	20 40 60	25 50 75				

ENVIRONMENTAL-EXP BHLOG_PLAINSRDE_KP.GPJ 8/14/23

EXP Services Inc.
Brampton, Ontario
Telephone: 905-793-9800
Facsimile: 905-793-0641

Time	Water Level (m)	Depth to Cave (m)
April 3, 2023	4.09	

Log of Borehole BH/MW3S

Project No. GTR-22029872-A0 Drawing No. 3

Project: Phase Two ESA Sheet No. 1 of 1

Location: 1376 and 1382 Plains Road East, Burlington, ON

Date Drilled: March 10, 2023

Drill Type: D-120 Truck Mount, Solid Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			99.03	0
		ASPHALT: (~38 mm thick)	~99.0	
		GRANULAR: (~180 mm thick)	~98.8	
		FILL: silty sand, some gravel, trace asphalt, brown to reddish brown, trace black staining	~98.0	1
		SILTY CLAY TILL: trace sand and gravel, brown, moist, hard trace shale inclusions below 2.3 m	~97.4	2
		Borehole terminated at 5.33 m below ground surface.	~93.7	5
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.		6

N Value: 20, 40, 60

Combustible Vapour Reading (ppm): 25, 50, 75

SAMPLES | % RECOV | SAMPLE ID | ANALYSIS

ENVIRONMENTAL-EXP BHLOG_PLAINSRDE_KP.GPJ 8/14/23

Time	Water Level (m)	Depth to Cave (m)
April 3, 2023	1.070	

EXP Services Inc.
Brampton, Ontario
Telephone: 905-793-9800
Facsimile: 905-793-0641

Log of Borehole BH/MW4

Project No. GTR-22029872-A0 Drawing No. 5

Project: Phase Two ESA Sheet No. 1 of 1

Location: 1376 and 1382 Plains Road East, Burlington, ON

Date Drilled: March 13, 2023

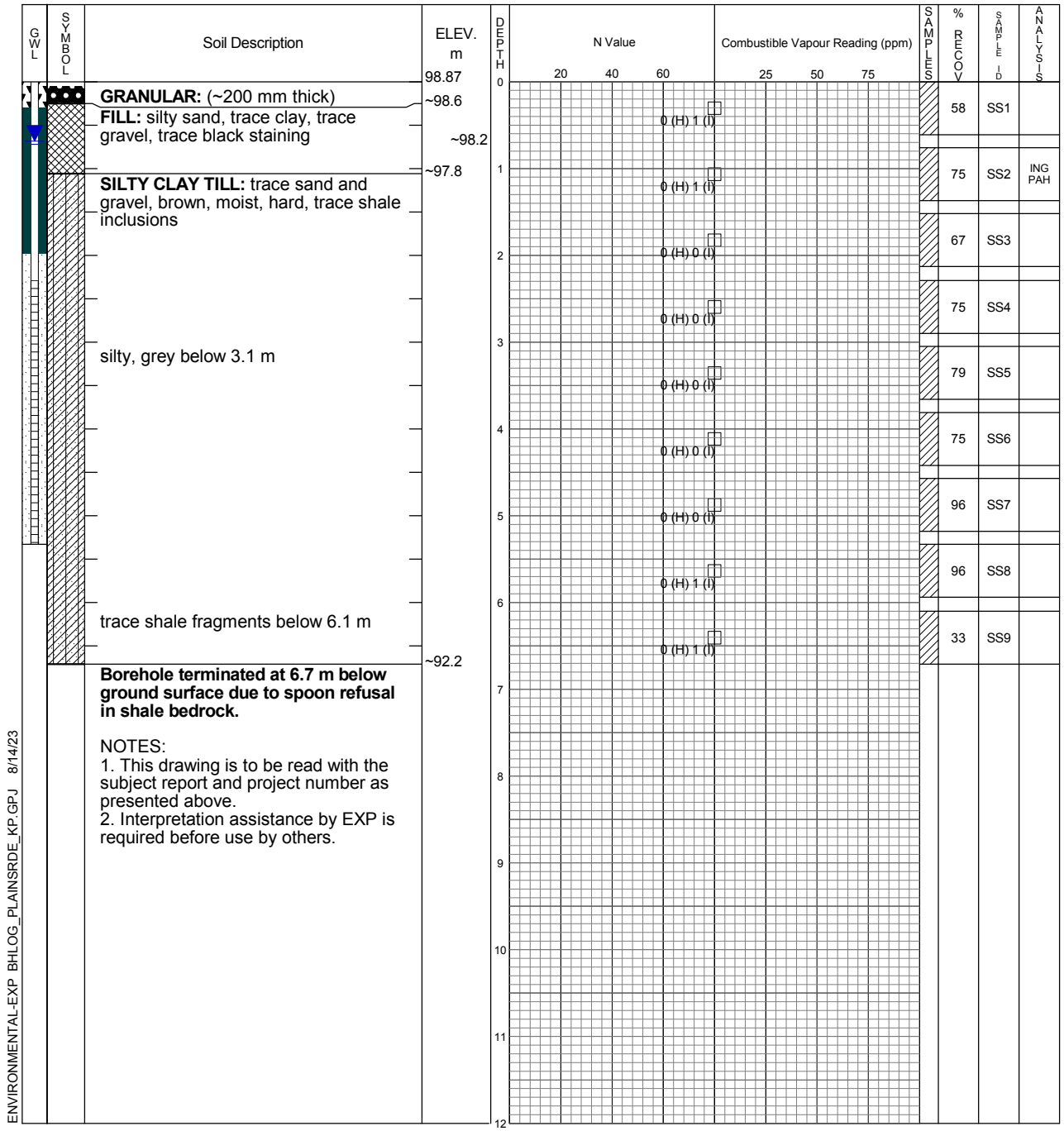
Drill Type: D-120 Truck Mount, Solid Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value 20 40 60	Combustible Vapour Reading (ppm) 25 50 75	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
			98.87	0						
		GRANULAR: (~200 mm thick)	~98.6							
		FILL: silty sand, trace clay, trace gravel, trace black staining	~98.2							
		SILTY CLAY TILL: trace sand and gravel, brown, moist, hard, trace shale inclusions	~97.8	1						
				2						
		silty, grey below 3.1 m		3						
				4						
				5						
		trace shale fragments below 6.1 m		6						
			~92.2	7						
		Borehole terminated at 6.7 m below ground surface due to spoon refusal in shale bedrock.		8						
				9						
				10						
				11						
				12						



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

ENVIRONMENTAL-EXP BHLOG_PLAINSRDE_KP.GPJ 8/14/23

Time	Water Level (m)	Depth to Cave (m)
April 3, 2023	0.720	

EXP Services Inc.
Brampton, Ontario
Telephone: 905-793-9800
Facsimile: 905-793-0641

Log of Borehole BH/MW5D

Project No. GTR-22029872-A0 Drawing No. 6

Project: Phase Two ESA Sheet No. 1 of 1

Location: 1376 and 1382 Plains Road East, Burlington, ON

Date Drilled: March 10, 2023

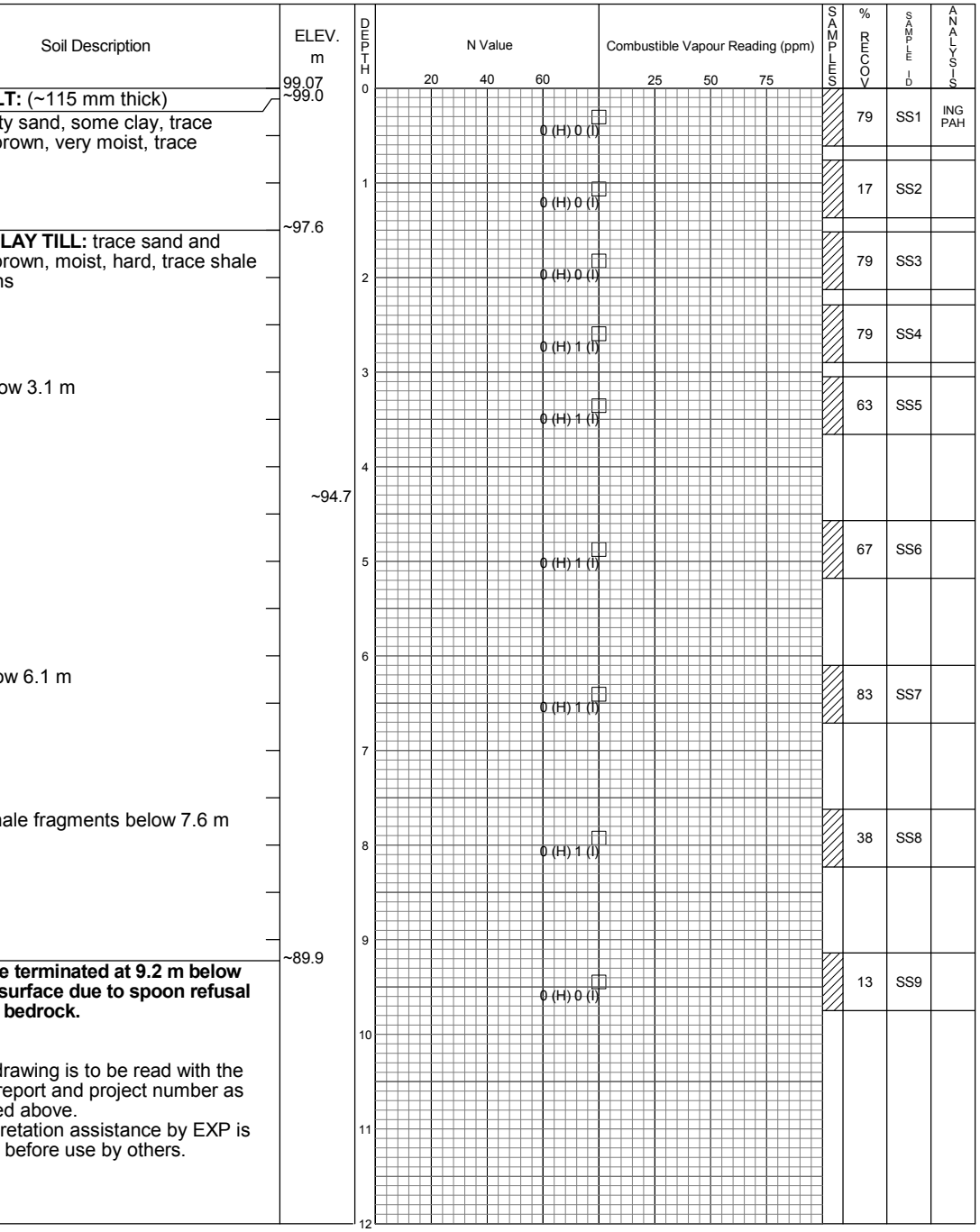
Drill Type: D-120 Truck Mount, Hollow Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			99.07	0
		ASPHALT: (~115 mm thick)	~99.0	
		FILL: silty sand, some clay, trace gravel, brown, very moist, trace asphalt		1
			~97.6	
		SILTY CLAY TILL: trace sand and gravel, brown, moist, hard, trace shale inclusions		2
		grey below 3.1 m		3
			~94.7	4
				5
		silty below 6.1 m		6
				7
		some shale fragments below 7.6 m		8
			~89.9	9
		Borehole terminated at 9.2 m below ground surface due to spoon refusal in shale bedrock.		10
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.		11
				12



SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
	79	SS1	ING PAH
	17	SS2	
	79	SS3	
	79	SS4	
	63	SS5	
	67	SS6	
	83	SS7	
	38	SS8	
	13	SS9	

ENVIRONMENTAL-EXP BHLOG_PLAINSRDE_KP.GPJ 8/14/23

EXP Services Inc.
Brampton, Ontario
Telephone: 905-793-9800
Facsimile: 905-793-0641

Time	Water Level (m)	Depth to Cave (m)
April 3, 2023	4.37	

Log of Borehole BH/MW5S

Project No. GTR-22029872-A0 | Drawing No. 7

Project: Phase Two ESA | Sheet No. 1 of 1

Location: 1376 and 1382 Plains Road East, Burlington, ON

Date Drilled: March 10, 2023

Drill Type: D-120 Truck Mount, Solid Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH
			99.14	0
		ASPHALT: (~115 mm thick)	~99.0	
		FILL: silty sand, some clay, trace gravel, brown, very moist, trace asphalt		1
			~97.6	
		SILTY CLAY TILL: trace sand and gravel, brown, moist, hard, trace shale inclusions		2
		grey below 3.1 m		3
			~94.3	4
			~93.8	5
		Borehole terminated at 5.33 m below ground surface due to spoon refusal in shale bedrock.		6
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by others.		7
				8
				9
				10
				11
				12

N Value: 20, 40, 60

Combustible Vapour Reading (ppm): 25, 50, 75

SAMPLES | % RECOV | SAMPLE ID | ANALYSIS

ENVIRONMENTAL-EXP BHLOG_PLAINSRDE_KP.GPJ 8/14/23

Time	Water Level (m)	Depth to Cave (m)
April 3, 2023	4.850	

EXP Services Inc.
Brampton, Ontario
Telephone: 905-793-9800
Facsimile: 905-793-0641

Log of Borehole BH/MW6

Project No. GTR-22029872-A0 Drawing No. 8

Project: Phase Two ESA Sheet No. 1 of 1

Location: 1376 and 1382 Plains Road East, Burlington, ON

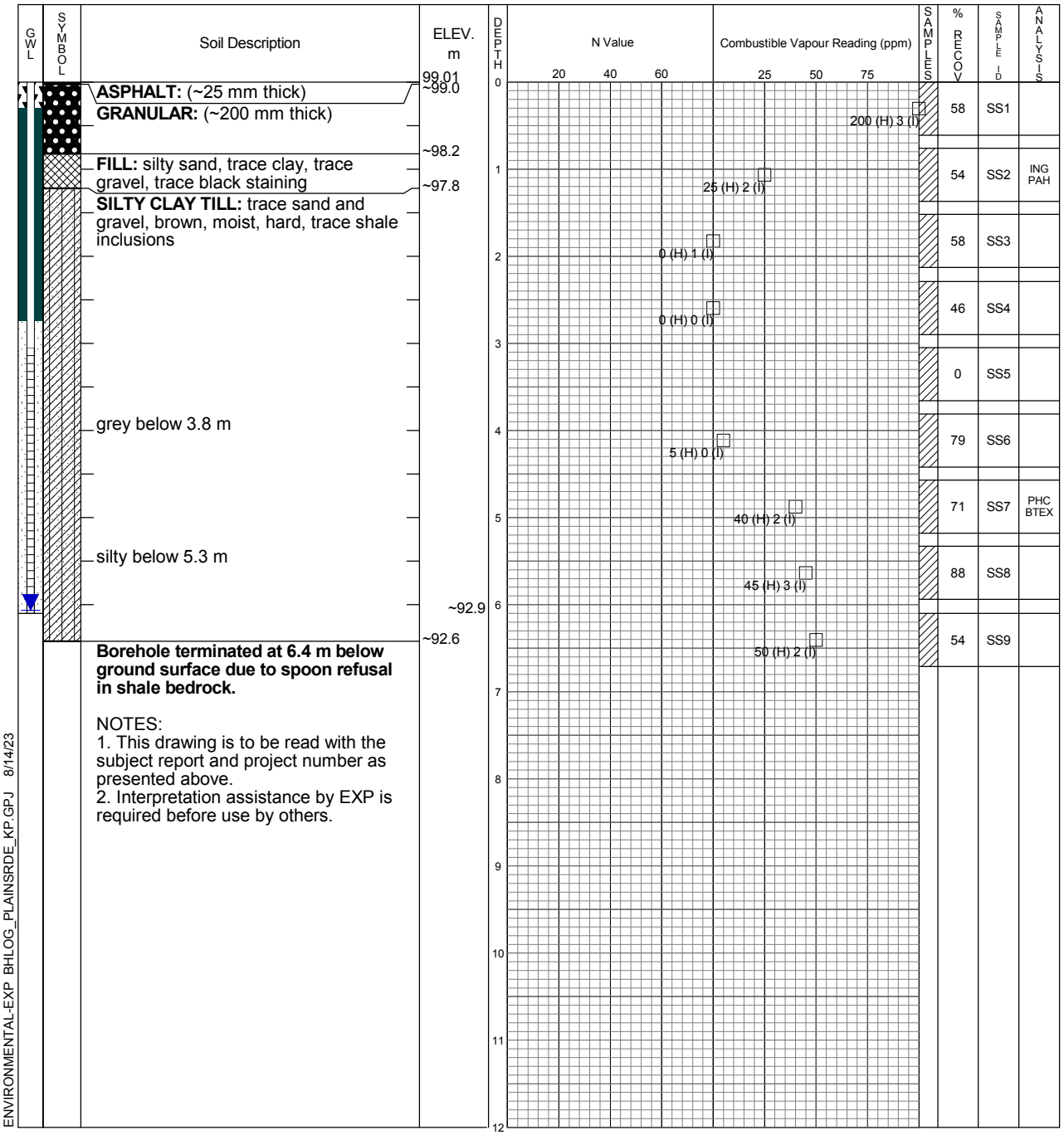
Date Drilled: March 13, 2023

Drill Type: D-120 Truck Mount, Solid Stem

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		



NOTES:
1. This drawing is to be read with the subject report and project number as presented above.
2. Interpretation assistance by EXP is required before use by others.

ENVIRONMENTAL-EXP BHLOG_PLAINSRDE_KP.GPJ 8/14/23

Time	Water Level (m)	Depth to Cave (m)
April 3, 2023	6.040	

EXP Services Inc.
Brampton, Ontario
Telephone: 905-793-9800
Facsimile: 905-793-0641

Log of Borehole BH/MW7

Project No. GTR-22029872-A0 Drawing No. 9

Project: Phase Two ESA Sheet No. 1 of 1

Location: 1376 and 1382 Plains Road East, Burlington, ON

Date Drilled: July 14, 2023

Drill Type: CME-75 Truckmount

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

GWL	SYMBOL	Soil Description	ELEV. m	DEPTH	N Value (20, 40, 60)	Combustible Vapour Reading (ppm) (25, 50, 75)	SAMPLES	% RECOV	SAMPLE ID	ANALYSIS
		GRANULAR: (~450 mm thick)	98.96	0		0 (H) 0 (I)		75	SS1	
		FILL: silty clay, trace sand and gravel, brown, moist, trace black staining	~98.5	1		320 (H) 1 (I)		100	SS2	ING PAH
		SILTY CLAY TILL: trace sand and gravel, brown, moist, hard	~97.4	2		0 (H) 0 (I)		92	SS3	
						0 (H) 0 (I)		100	SS4	
		some sand below 3.8 m		3		15 (H) 1 (I)		100	SS5	
		grey below 4.6 m		4		5 (H) 1 (I)		100	SS6	
				5		5 (H) 1 (I)		100	SS7	
			~92.9	6		15 (H) 1 (I)		75	SS8	
		SILTY CLAY TILL to CLAYEY SILT TILL: some sand, trace gravel, brown, very moist to wet, hard, some shale inclusions		7						
			~91.0	8		210 (H) 1 (I)		42	SS9	
		Borehole terminated at 8.0 m depth below existing grade due to spoon refusal.		9						
		NOTES: 1. This drawing is to be read with the subject report and project number as presented above. 2. Interpretation assistance by EXP is required before use by		10						
				11						
				12						

ENVIRONMENTAL-EXP BHLOG_PLAINSRDE_KP.GPJ 8/14/23

Time	Water Level (m)	Depth to Cave (m)
July 17, 2023	Dry	

EXP Services Inc.
Brampton, Ontario
Telephone: 905-793-9800
Facsimile: 905-793-0641

Log of Borehole BH/MW8

Project No. GTR-22029872-A0 Drawing No. 10

Project: Phase Two ESA Sheet No. 1 of 1

Location: 1376 and 1382 Plains Road East, Burlington, ON

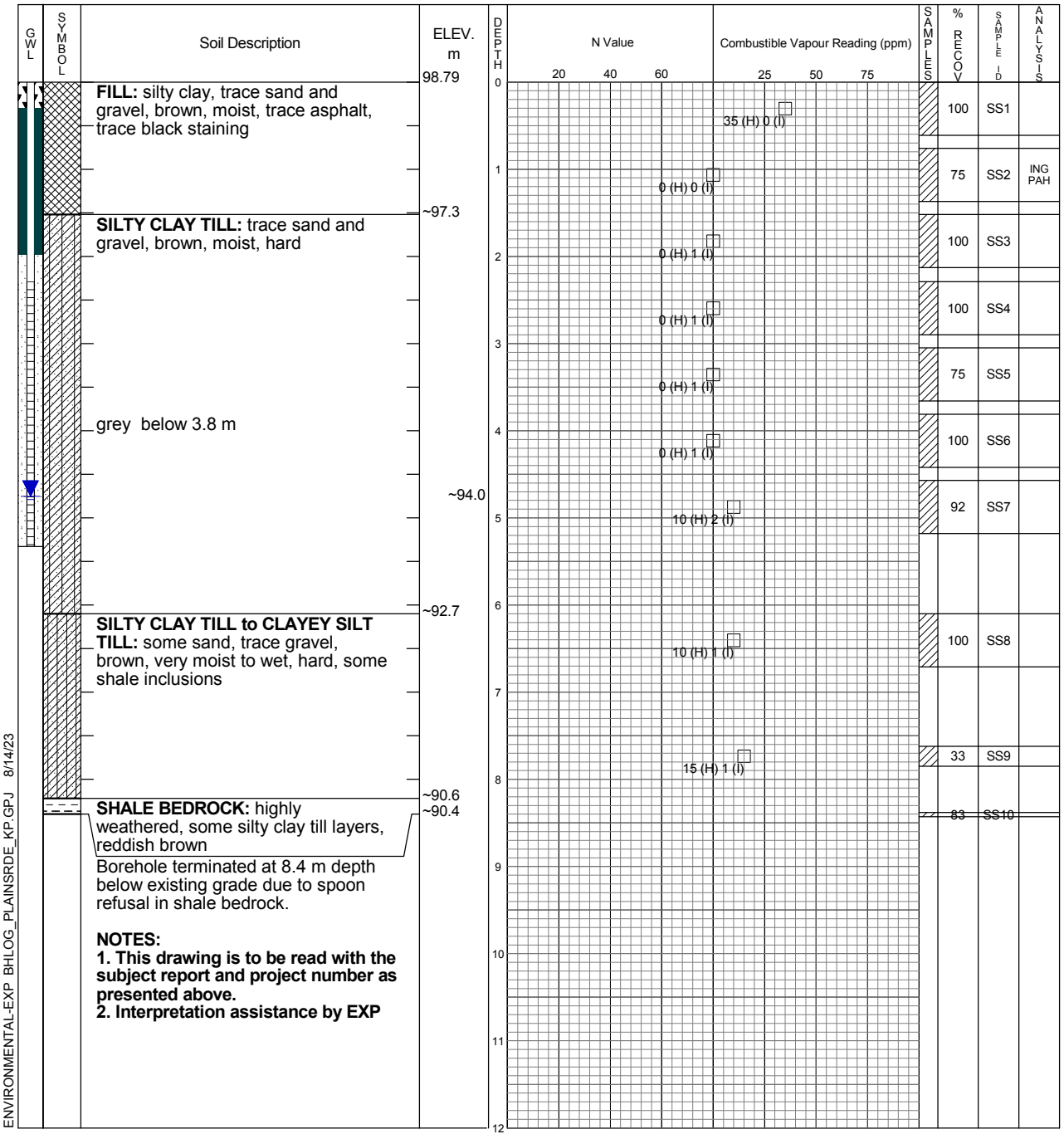
Date Drilled: July 14, 2023

Drill Type: CME-75 Truckmount

Datum: Geodetic

Chemical Analysis

BTEX	Benzene, Toluene, Ethylbenzene and Xylenes	*	Duplicate Sample
ING	Metals and Inorganics	PCB	Polychlorinated Biphenyls
MET	Metals	PHC	Petroleum Hydrocarbons (F1-F4)
PAH	Polycyclic Aromatic Hydrocarbons	VOC	Volatile Organic Compounds
PEST	Organochlorine Pesticides		

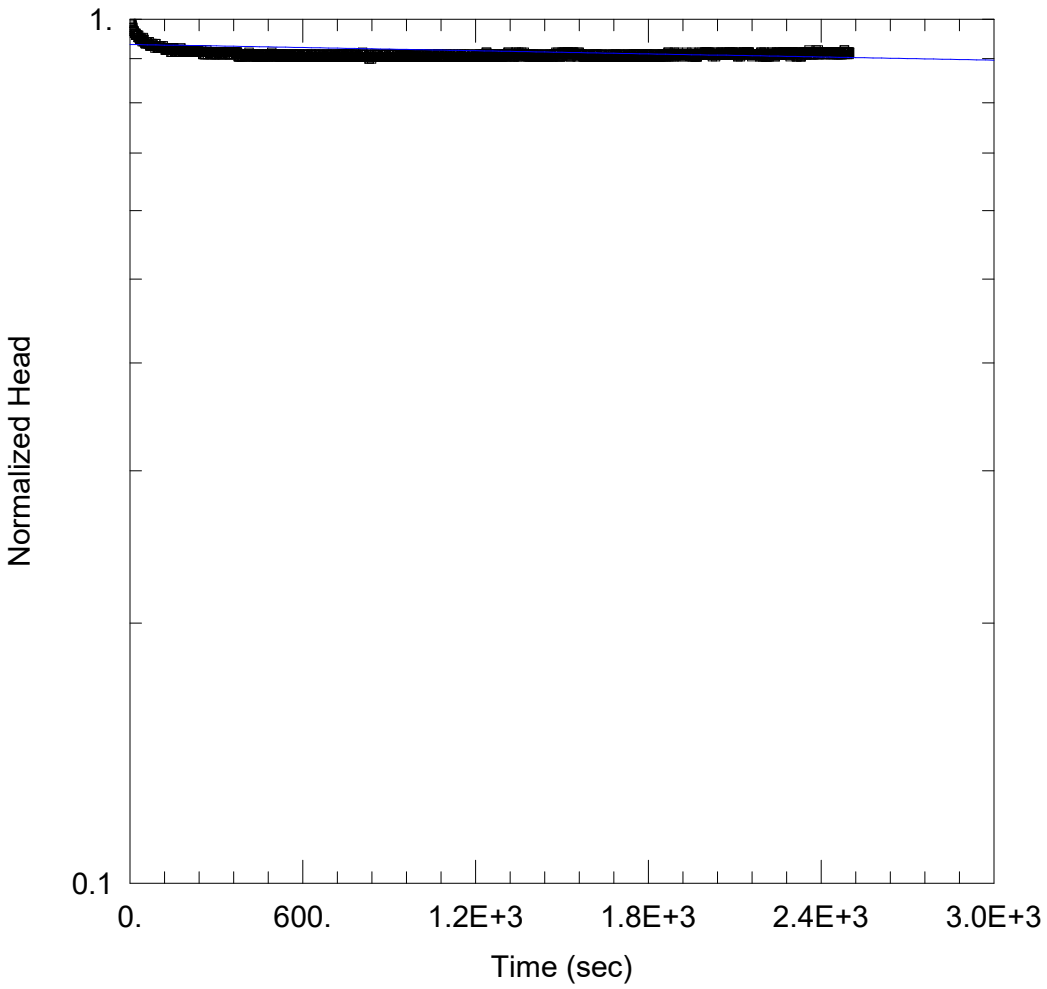


ENVIRONMENTAL-EXP BHLOG_PLAINSRDE_KP.GPJ 8/14/23

Time	Water Level (m)	Depth to Cave (m)
July 17, 2023	4.79	

EXP Services Inc.
Brampton, Ontario
Telephone: 905-793-9800
Facsimile: 905-793-0641

Appendix C – SWRT Procedures and Results



BH/MW 1 RISING HEAD

Data Set: C:\...\BH 1 RH.aqt
Date: 04/14/23 Time: 20:24:50

PROJECT INFORMATION

Company: EXP Services Inc
Client: 273119 Ontario Inc.,
Project: GTR-22029872-A0
Location: 1376 & 1382 Plains Rd E
Test Well: BH/MW 1 Rising Head
Test Date: 13 April 2023

AQUIFER DATA

Saturated Thickness: 0.49 m Anisotropy Ratio (Kz/Kr): 1.

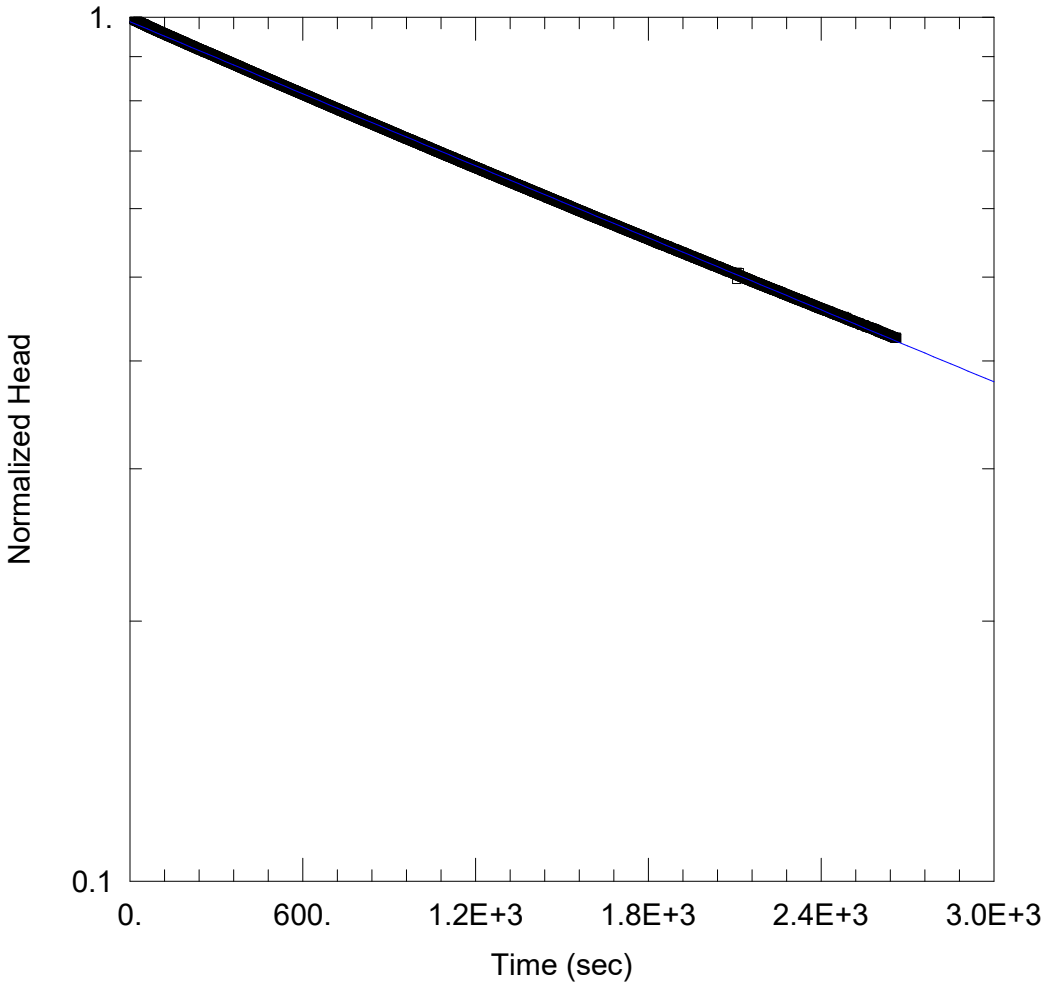
WELL DATA (BH/MW 1 Rising Head)

Initial Displacement: 0.189 m
Total Well Penetration Depth: 3. m
Casing Radius: 0.0254 m
Static Water Column Height: 0.49 m
Screen Length: 3. m
Well Radius: 0.0254 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 4.88E-8 m/sec y0 = 0.1767 m



BH/MW 2 FALLING HEAD

Data Set: C:\...\BH 2 FH.aqt
Date: 04/14/23 Time: 20:30:57

PROJECT INFORMATION

Company: EXP Services Inc
Client: 273119 Ontario Inc.,
Project: GTR-22029872-A0
Location: 1376 & 1382 Plains Rd E
Test Well: BH/MW 2 Falling Head
Test Date: 13 April 2023

AQUIFER DATA

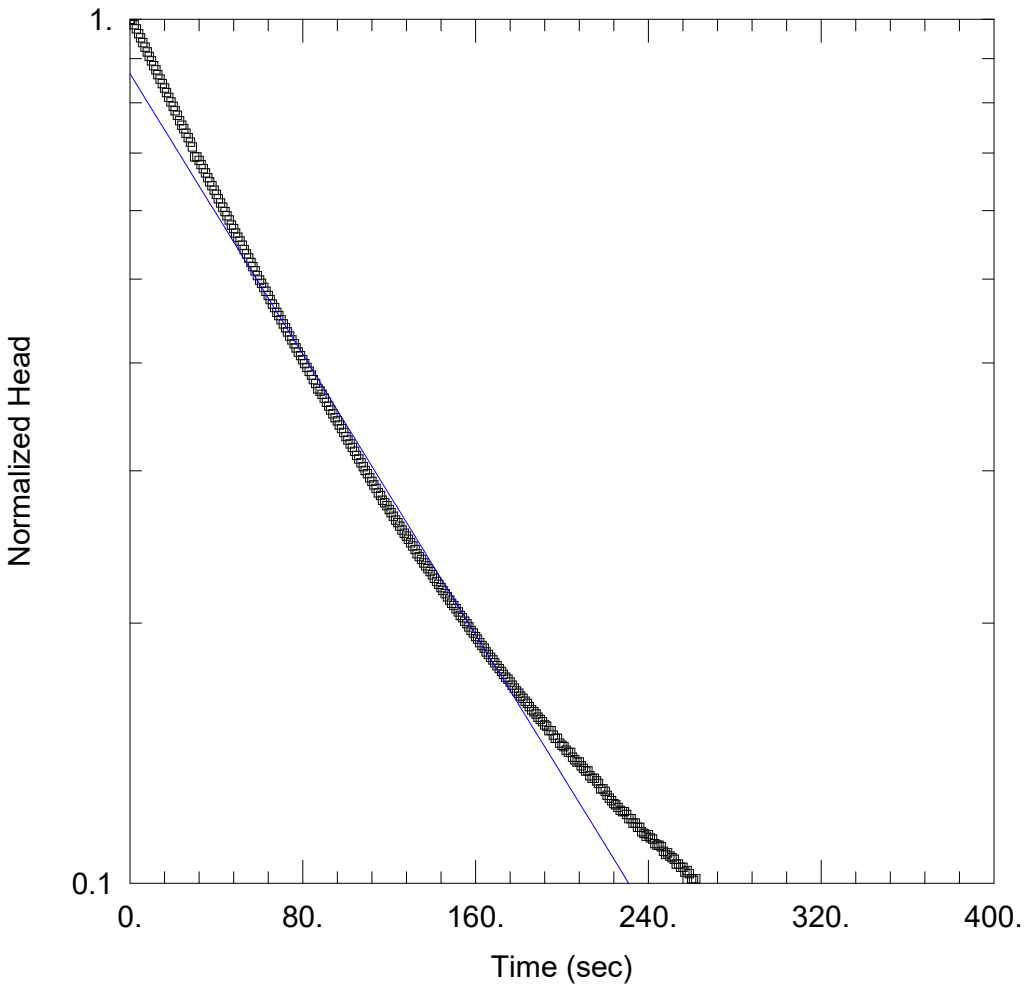
Saturated Thickness: 9.41 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH/MW 2 Falling Head)

Initial Displacement: 3.148 m
Total Well Penetration Depth: 9.41 m
Casing Radius: 0.0254 m
Static Water Column Height: 9.41 m
Screen Length: 3. m
Well Radius: 0.0254 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 1.88E-7 m/sec
y0 = 3.11 m



BH/MW 3D RISING HEAD

Data Set: C:\...\BH 3D RH.aqt
Date: 04/14/23 Time: 20:39:04

PROJECT INFORMATION

Company: EXP Services Inc
Client: 273119 Ontario Inc.,
Project: GTR-22029872-A0
Location: 1376 & 1382 Plains Rd E
Test Well: BH/MW 3D Falling Head
Test Date: 13 April 2023

AQUIFER DATA

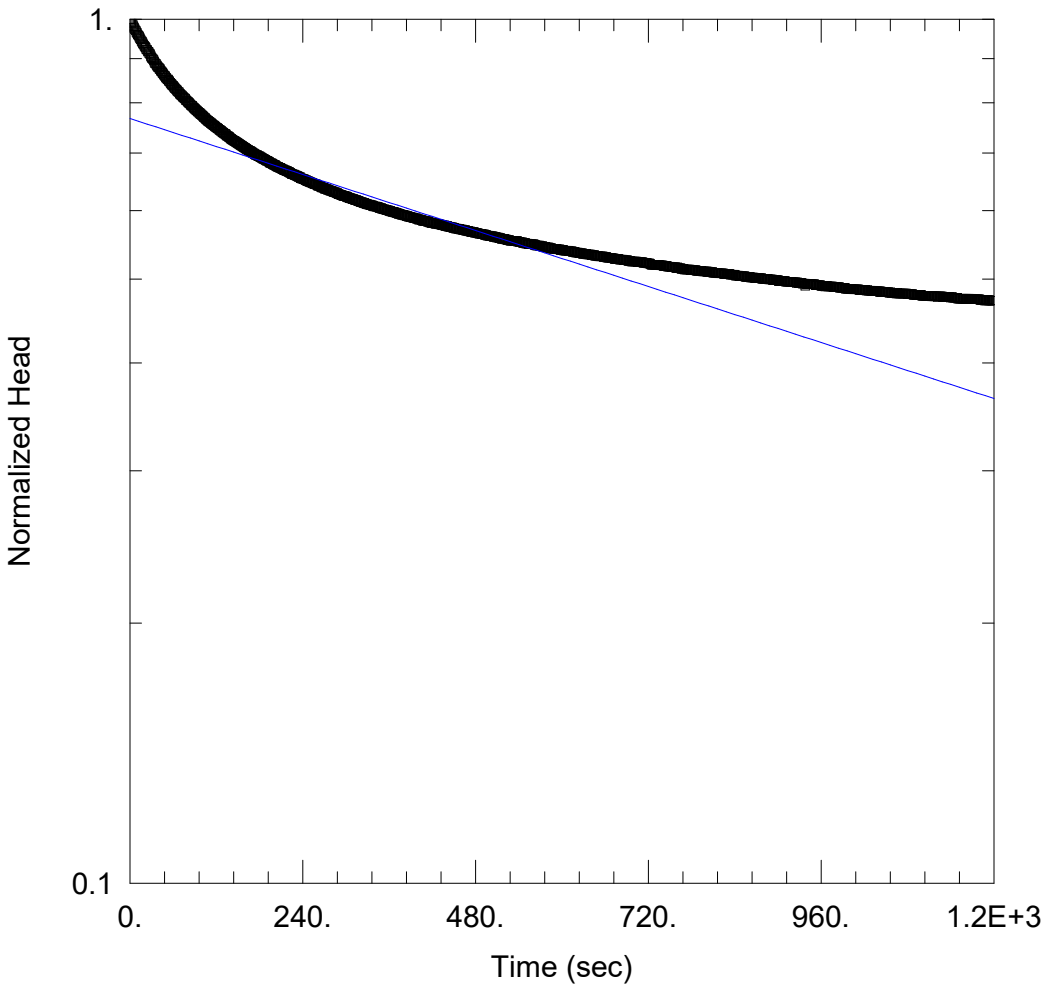
Saturated Thickness: 6.38 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH/MW 3D Rising Head)

Initial Displacement: 2.224 m
Total Well Penetration Depth: 6.38 m
Casing Radius: 0.0254 m
Static Water Column Height: 6.38 m
Screen Length: 3. m
Well Radius: 0.0254 m

SOLUTION

Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 5.489E-6 m/sec
y0 = 1.923 m



BH/MW 3S FALLING HEAD

Data Set: C:\...\BH 3S FH.aqt
Date: 04/14/23 Time: 20:52:07

PROJECT INFORMATION

Company: EXP Services Inc
Client: 273119 Ontario Inc.,
Project: GTR-22029872-A0
Location: 1376 & 1382 Plains Rd E
Test Well: BH/MW 3S Falling Head
Test Date: 13 April 2023

AQUIFER DATA

Saturated Thickness: 4.245 m Anisotropy Ratio (Kz/Kr): 1.

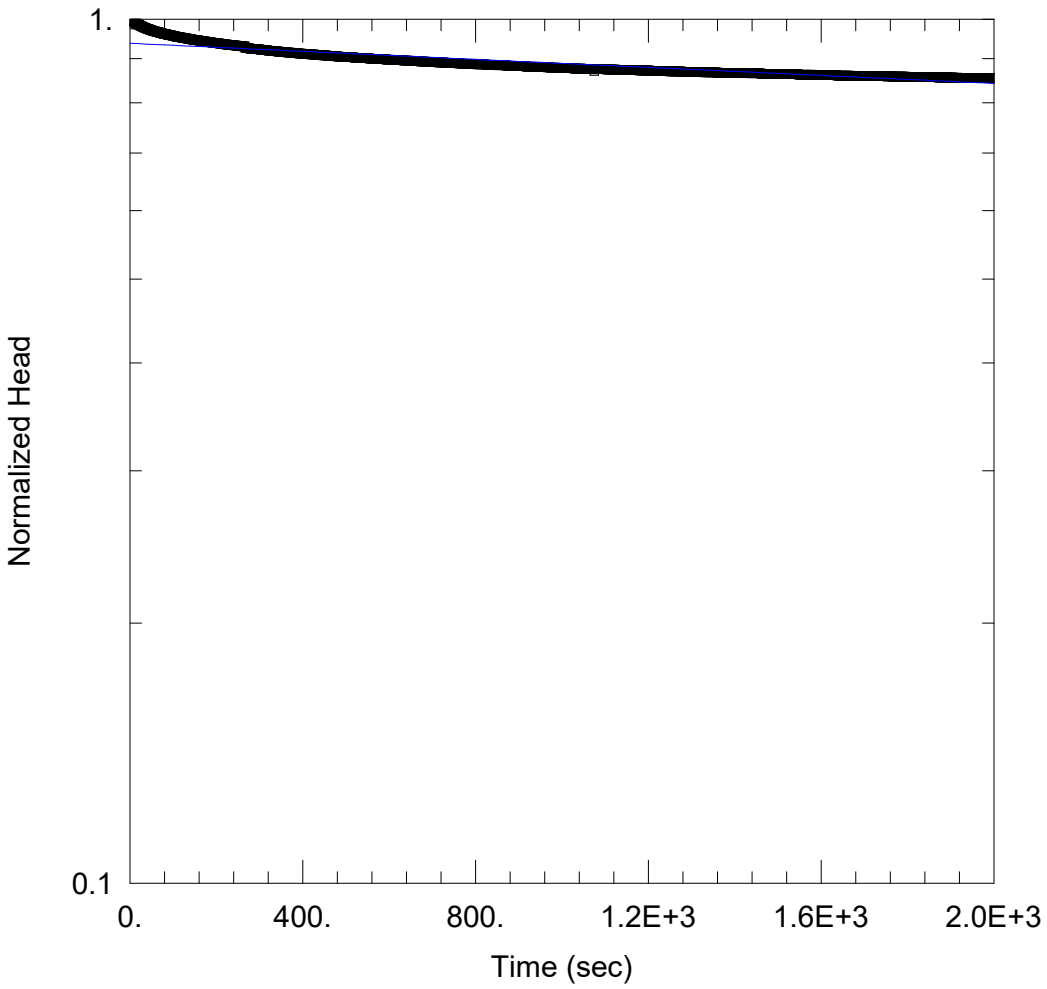
WELL DATA (BH/MW 3S Falling Head)

Initial Displacement: 1.097 m
Total Well Penetration Depth: 4.245 m
Casing Radius: 0.0254 m
Static Water Column Height: 4.245 m
Screen Length: 3. m
Well Radius: 0.0254 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 3.655E-7 m/sec y0 = 0.8417 m



BH/MW 4 RISING HEAD

Data Set: C:\...\BH 4 RH.aqt
Date: 04/14/23 Time: 21:07:25

PROJECT INFORMATION

Company: EXP Services Inc
Client: 273119 Ontario Inc.,
Project: GTR-22029872-A0
Location: 1376 & 1382 Plains Rd E
Test Well: BH/MW 4 Rising Head
Test Date: 13 April 2023

AQUIFER DATA

Saturated Thickness: 4.4 m Anisotropy Ratio (Kz/Kr): 1.

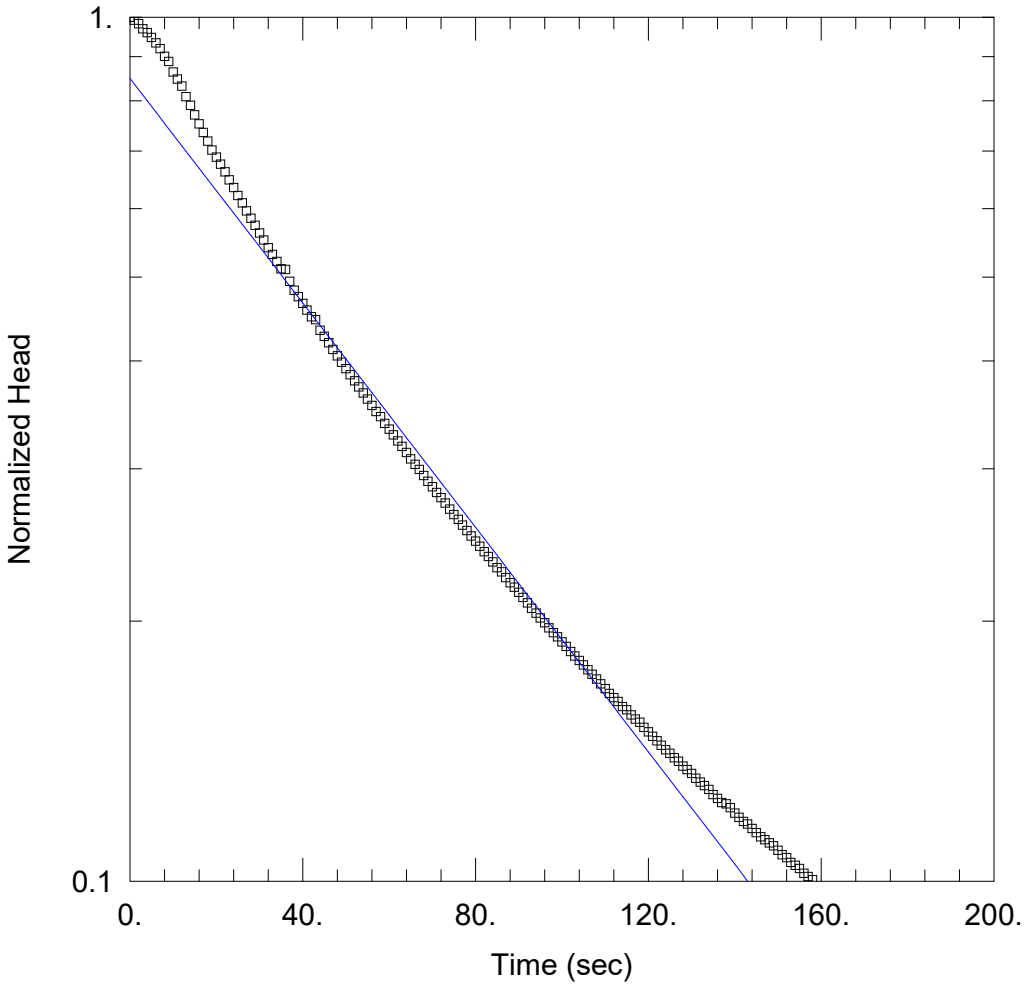
WELL DATA (BH/MW 4 Rising Head)

Initial Displacement: 2.727 m
Total Well Penetration Depth: 4.4 m
Casing Radius: 0.0254 m
Static Water Column Height: 4.4 m
Screen Length: 3. m
Well Radius: 0.0254 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 3.143E-8 m/sec y0 = 2.557 m



BH/MW 5D FALLING HEAD

Data Set: C:\...\BH 5D FH.aqt
Date: 04/14/23 Time: 21:02:33

PROJECT INFORMATION

Company: EXP Services Inc
Client: 273119 Ontario Inc.,
Project: GTR-22029872-A0
Location: 1376 & 1382 Plains Rd E
Test Well: BH/MW 5D Rising Head
Test Date: 13 April 2023

AQUIFER DATA

Saturated Thickness: 4.72 m Anisotropy Ratio (Kz/Kr): 1.

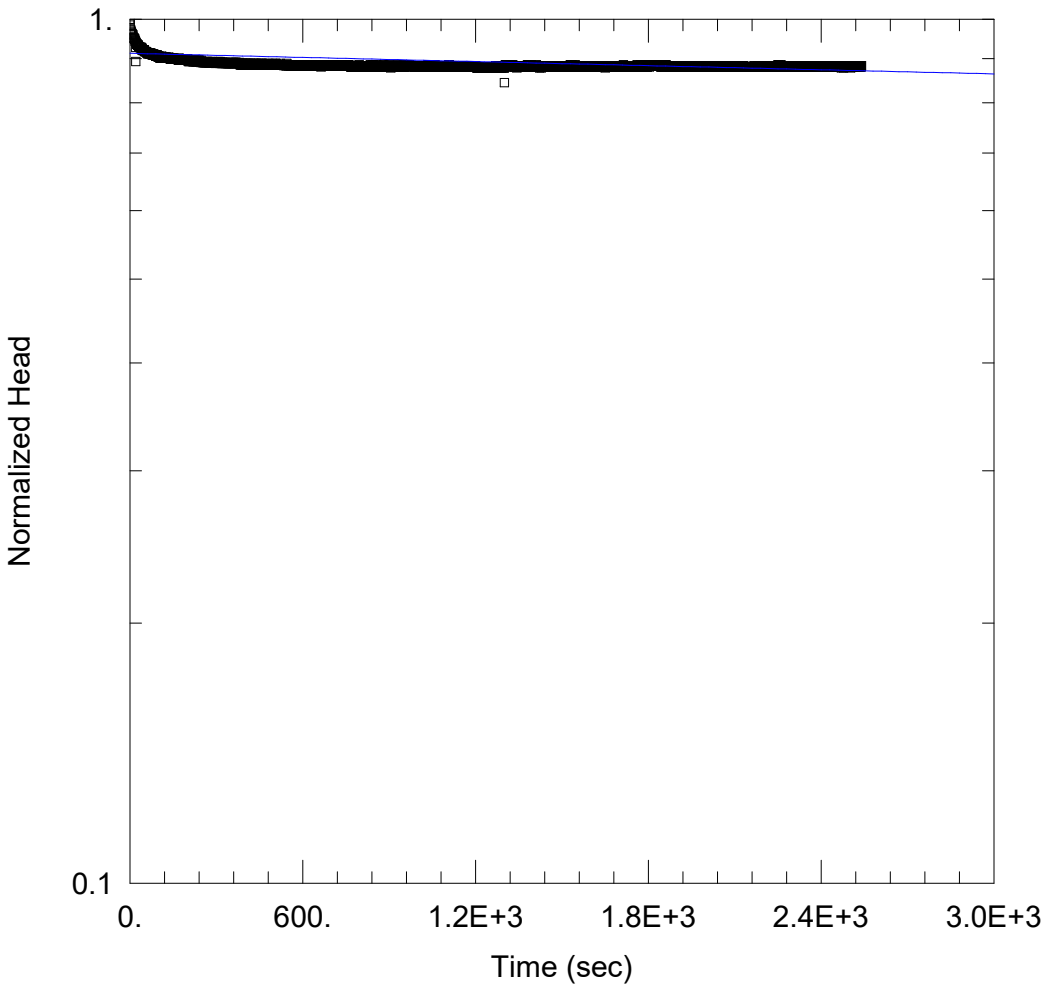
WELL DATA (BH/MW 5D Falling Head)

Initial Displacement: 2.311 m
Total Well Penetration Depth: 4.72 m
Casing Radius: 0.0254 m
Static Water Column Height: 4.72 m
Screen Length: 3. m
Well Radius: 0.0254 m

SOLUTION

Aquifer Model: Unconfined Solution Method: Hvorslev

K = 8.788E-6 m/sec y0 = 1.962 m



BH/MW 5S RISING HEAD

Data Set: C:\...\BH 5S RH.aqt
Date: 04/14/23 Time: 20:55:52

PROJECT INFORMATION

Company: EXP Services Inc
Client: 273119 Ontario Inc.,
Project: GTR-22029872-A0
Location: 1376 & 1382 Plains Rd E
Test Well: BH/MW 5S Rising Head
Test Date: 13 April 2023

AQUIFER DATA

Saturated Thickness: 0.75 m Anisotropy Ratio (Kz/Kr): 1.

WELL DATA (BH/MW 5S Rising Head)

Initial Displacement: 0.385 m
Total Well Penetration Depth: 3. m
Casing Radius: 0.0254 m
Static Water Column Height: 0.75 m
Screen Length: 3. m
Well Radius: 0.0254 m

SOLUTION

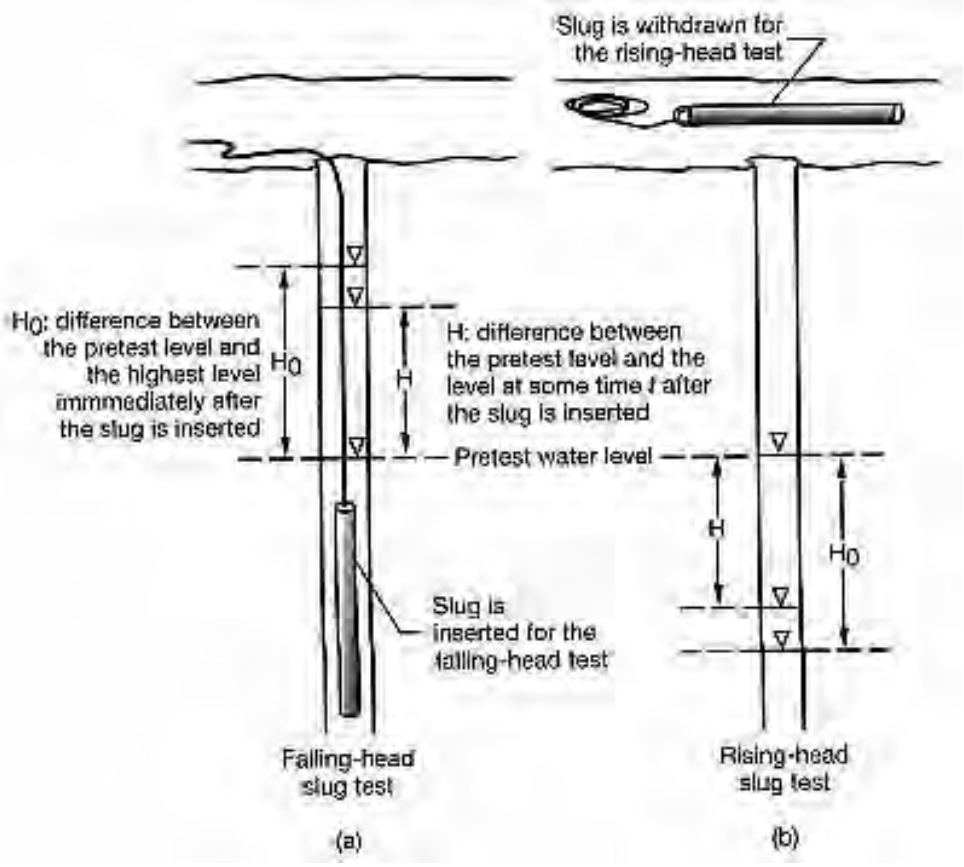
Aquifer Model: Unconfined
Solution Method: Hvorslev
K = 4.165E-8 m/sec
y0 = 0.3515 m

Single Well Response Test Procedure

A Single Well Response Test (SWRT), also known as a bail test or a slug test, is conducted in order to determine the saturated hydraulic conductivity (K) of an aquifer. The method of the SWRT is to characterize the change of groundwater level in a well or borehole over time.

In order to ensure consistency and repeatability, all **exp** employees are to follow the procedure outlined in this document when conducting SWRTs.

The figure below depicts a schematic of a slug and bail test and the respective water level changes.



Initials ___

Slug Test Procedure

Equipment Required

- Copy of a signed health and safety plan
- Copy of the work program
- PPE as required by Site-Specific HASP
- Copy of the monitoring well location plan/site plan
- Waterproof pen and bound field note book
- SWRT field data Entry form
- Disposable gloves
- Duct tape
- Deionized water
- Alconox (phosphate free detergent)
- Spray bottles
- Electronic water level meter and spare batteries
- Solid PVC or stainless steel slug of known volume or clean water
- String (nylon)
- Water pressure transducer (data logger) and baro-logger
- Watch or stop watch with second hand
- Plastic sheeting

Testing Procedure

1. Remove cap from well and collect static water level
2. Remove waterra tubing/bailer and place in garbage bag. Record static water level measurement again.
3. Lower the slug into the well and record the dynamic water level.
4. Record the drawdown (for the slug test) at set five (5) second intervals for the first five (5) minutes, then reduce to every one (1) minute.
5. Continue recording the drawdown until 95% recovery is reached. To calculate this value: Find the difference between the dynamic water level and the static water level, then multiply by 95% (.95). Add the resulting value to the dynamic water level.

   (Static Water Level – Dynamic Water Level).95 + Static Water Level = 95% Recovery Value
6. Once complete, replace the waterra tubing/bailer and re-secure the well cap.

Note: If the well is deep, more than one slug may be inserted by attaching the slugs to a series.

Slugs must be washed with methanol, then lab grade soap, and then rinsed with de-ionized water after each use.

Based on the recorded observations, the hydraulic conductivity (in m/s) of the aquifer will be determined. In order to determine the hydraulic conductivity; the well diameter, radius of the borehole and length of the screen will also be required.

Bail Test Procedure

Equipment Required

- 20 L (5 gal) Graduated pail
- Stop watch or watch with seconds
- Garbage bags
- Water level meter
- Field sheets/log book
- Latex Gloves
- Bailer and Rope

Procedure

1. Remove cap from well and collect static water level.
2. If using a **bailer**:
    a. Affix the rope to the bailer.
    b. Remove the waterra tubing and place in garbage bag
    c. Record static water level measurement again.
    d. Record how much water was removed by either counting the number of full bailers or emptying removed water into a container.
    e. Quickly lower the bailer into the well and remove.
    f. Continue this process until the water level will reduce no further.
    g. Record the dynamic water level.
3. If using **waterra** to bail the water:
    a. Pump the water into graduated bucket until the water level will reduce no further.
    b. Record how much water has been removed.
    c. Record the dynamic water level.
4. Record the recovery at set five (5) second intervals for the first (5) minutes, then reduce to every one (1) minute.
5. Continue recording the drawdown/recovery until 95% recovery is reached.
6. Once complete, replace any waterra tubing that may have been removed from the well and re-secure the well cap.

Appendix D – Laboratory's Certificates of Analysis

Your P.O. #: ENV-BRM
Your Project #: GTR-22029872-A0
Site Location: 1376 and 1382 Plains Rd E, Burlington, ON
Your C.O.C. #: 926376-01-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2023/04/20
Report #: R7595702
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3A3527
Received: 2023/04/13, 16:21

Sample Matrix: Water
Samples Received: 1

Analyses	Quantity	Date Extracted	Date Analyzed	Laboratory Method	Analytical Method
Sewer Use By-Law Semivolatile Organics	1	2023/04/17	2023/04/18	CAM SOP 00301	EPA 8270 m
Biochemical Oxygen Demand (BOD)	1	2023/04/15	2023/04/20	CAM SOP-00427	SM 23 5210B m
Chromium (VI) in Water	1	N/A	2023/04/17	CAM SOP-00436	EPA 7199 m
Total Cyanide	1	2023/04/14	2023/04/14	CAM SOP-00457	OMOE E3015 5 m
Mercury in Water by CVAA	1	2023/04/18	2023/04/18	CAM SOP-00453	EPA 7470A m
Total Metals Analysis by ICPMS	1	2023/04/18	2023/04/18	CAM SOP-00447	EPA 6020B m
E.coli, (CFU/100mL)	1	N/A	2023/04/13	CAM SOP-00552	MECP E3371
Total Nonylphenol in Liquids by HPLC	1	2023/04/14	2023/04/15	CAM SOP-00313	In-house Method
Nonylphenol Ethoxylates in Liquids: HPLC	1	2023/04/14	2023/04/17	CAM SOP-00313	In-house Method
Polychlorinated Biphenyl in Water	1	2023/04/15	2023/04/16	CAM SOP-00309	EPA 8082A m
pH	1	2023/04/15	2023/04/18	CAM SOP-00413	SM 4500H+ B m
Phenols (4AAP)	1	N/A	2023/04/17	CAM SOP-00444	OMOE E3179 m
Total PAHs (Great Lakes Basin Agreement) (1)	1	N/A	2023/04/19	CAM SOP - 00301	EPA 8270 m
Total Suspended Solids	1	2023/04/18	2023/04/19	CAM SOP-00428	SM 23 2540D m
Volatile Organic Compounds in Water	1	N/A	2023/04/18	CAM SOP-00228	EPA 8260D

Remarks:

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

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

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

Solid sample results, except biota, are based on dry weight unless otherwise indicated. Organic analyses are not recovery corrected except for isotope

Your P.O. #: ENV-BRM
Your Project #: GTR-22029872-A0
Site Location: 1376 and 1382 Plains Rd E, Burlington, ON
Your C.O.C. #: 926376-01-01

Attention: Francois Chartier

exp Services Inc
1595 Clark Blvd
Brampton, ON
CANADA L6T 4V1

Report Date: 2023/04/20
Report #: R7595702
Version: 1 - Final

CERTIFICATE OF ANALYSIS

BUREAU VERITAS JOB #: C3A3527
Received: 2023/04/13, 16:21

dilution methods.
Results relate to samples tested. When sampling is not conducted by Bureau Veritas, results relate to the supplied samples tested.
This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
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) Total PAHs include only those PAHs specified in the sewer use by-by-law.

Encryption Key

Please direct all questions regarding this Certificate of Analysis to:
Patricia Legette, Project Manager
Email: Patricia.Legette@bureauveritas.com
Phone# (905)817-5799

==========

This report has been generated and distributed using a secure automated process.
Bureau Veritas has procedures in place to guard against improper use of the electronic signature and have the required "signatories", as per ISO/IEC 17025, signing the reports. For Service Group specific validation, please refer to the Validation 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 #: C3A3527
Report Date: 2023/04/20

exp Services Inc
Client Project #: GTR-22029872-A0
Site Location: 1376 and 1382 Plains Rd E, Burlington, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

BURLINGTON STORM SEWER (WATER)

Bureau Veritas ID			VNS485		
Sampling Date			2023/04/13 11:30		
COC Number			926376-01-01		
	UNITS	Criteria	BH 3D	RDL	QC Batch
Inorganics					
Total BOD	mg/L	15	ND	2	8609860
pH	pH	6.5:8.5	8.10		8610019
Phenols-4AAP	mg/L	0.008	ND	0.0010	8611340
Total Suspended Solids	mg/L	15	**90**	10	8614017
Total Cyanide (CN)	mg/L	0.02	ND	0.0050	8608164
Miscellaneous Parameters					
Nonylphenol Ethoxylate (Total)	mg/L	0.01	ND	0.01	8607434
Nonylphenol (Total)	mg/L	0.001	ND	0.001	8607430
Metals					
Chromium (VI)	ug/L	40	1.2	0.50	8611223
Mercury (Hg)	mg/L	0.0004	ND	0.00010	8613331
Total Arsenic (As)	ug/L	20	3.7	1.0	8613509
Total Cadmium (Cd)	ug/L	8	ND	0.090	8613509
Total Chromium (Cr)	ug/L	80	ND	5.0	8613509
Total Copper (Cu)	ug/L	40	5.1	0.90	8613509
Total Lead (Pb)	ug/L	120	3.4	0.50	8613509
Total Manganese (Mn)	ug/L	50	**110**	2.0	8613509
Total Nickel (Ni)	ug/L	80	5.0	1.0	8613509
Total Phosphorus (P)	ug/L	400	150	100	8613509
Total Selenium (Se)	ug/L	20	ND	2.0	8613509
Total Silver (Ag)	ug/L	120	ND	0.090	8613509
Total Zinc (Zn)	ug/L	40	27	5.0	8613509
Semivolatile Organics					
Naphthalene	ug/L	-	ND	1	8612555
Di-N-butyl phthalate	ug/L	15	ND	8	8612555
Bis(2-ethylhexyl)phthalate	ug/L	8.8	ND	8	8612555
3,3'-Dichlorobenzidine	ug/L	0.8	ND	0.8	8612555

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

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: The City of Burlington Storm Sewer Discharge By-Law 59-2022
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

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

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

Bureau Veritas Job #: C3A3527
Report Date: 2023/04/20

exp Services Inc
Client Project #: GTR-22029872-A0
Site Location: 1376 and 1382 Plains Rd E, Burlington, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

BURLINGTON STORM SEWER (WATER)

Bureau Veritas ID			VNS485		
Sampling Date			2023/04/13 11:30		
COC Number			926376-01-01		
	UNITS	Criteria	BH 3D	RDL	QC Batch
Pentachlorophenol	ug/L	2	ND	2	8612555
Phenanthrene	ug/L	-	ND	0.8	8612555
Anthracene	ug/L	-	ND	0.8	8612555
Fluoranthene	ug/L	-	ND	0.8	8612555
Pyrene	ug/L	-	ND	0.8	8612555
Benzo(a)anthracene	ug/L	-	ND	0.8	8612555
Chrysene	ug/L	-	ND	0.8	8612555
Benzo(b/j)fluoranthene	ug/L	-	ND	0.8	8612555
Benzo(k)fluoranthene	ug/L	-	ND	0.8	8612555
Benzo(a)pyrene	ug/L	-	ND	0.8	8612555
Indeno(1,2,3-cd)pyrene	ug/L	-	ND	0.8	8612555
Dibenzo(a,h)anthracene	ug/L	-	ND	0.8	8612555
Benzo(g,h,i)perylene	ug/L	-	ND	0.8	8612555
Dibenzo(a,i)pyrene	ug/L	-	ND	0.8	8612555
Benzo(e)pyrene	ug/L	-	ND	0.8	8612555
Perylene	ug/L	-	ND	0.8	8612555
Dibenzo(a,j) acridine	ug/L	-	ND	2	8612555
7H-Dibenzo(c,g) Carbazole	ug/L	-	ND	2	8612555
1,6-Dinitropyrene	ug/L	-	ND	2	8612555
1,3-Dinitropyrene	ug/L	-	ND	2	8612555
1,8-Dinitropyrene	ug/L	-	ND	2	8612555
Calculated Parameters					
Total PAHs	ug/L	2	**ND (1)**	4	8606649
Volatile Organics					
Benzene	ug/L	2	ND	0.40	8610858
Chloroform	ug/L	2	ND	0.40	8610858
1,2-Dichlorobenzene	ug/L	5.6	ND	0.80	8610858

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

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: The City of Burlington Storm Sewer Discharge By-Law 59-2022
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

(1) RDL exceeds criteria

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

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

Bureau Veritas Job #: C3A3527
Report Date: 2023/04/20

exp Services Inc
Client Project #: GTR-22029872-A0
Site Location: 1376 and 1382 Plains Rd E, Burlington, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

BURLINGTON STORM SEWER (WATER)

Bureau Veritas ID			VNS485		
Sampling Date			2023/04/13 11:30		
COC Number			926376-01-01		
	UNITS	Criteria	BH 3D	RDL	QC Batch
1,4-Dichlorobenzene	ug/L	6.8	ND	0.80	8610858
cis-1,2-Dichloroethylene	ug/L	5.6	ND	1.0	8610858
trans-1,3-Dichloropropene	ug/L	5.6	ND	0.80	8610858
Ethylbenzene	ug/L	2	ND	0.40	8610858
Methylene Chloride(Dichloromethane)	ug/L	5.2	ND	4.0	8610858
1,1,2,2-Tetrachloroethane	ug/L	17	ND	0.80	8610858
Tetrachloroethylene	ug/L	4.4	ND	0.40	8610858
Toluene	ug/L	2	ND	0.40	8610858
Trichloroethylene	ug/L	7.6	ND	0.40	8610858
Total Xylenes	ug/L	4.4	ND	0.40	8610858
PCBs					
Aroclor 1016	ug/L	-	ND	0.05	8610349
Aroclor 1221	ug/L	-	ND	0.05	8610349
Aroclor 1232	ug/L	-	ND	0.05	8610349
Aroclor 1242	ug/L	-	ND	0.05	8610349
Aroclor 1248	ug/L	-	ND	0.05	8610349
Aroclor 1254	ug/L	-	ND	0.05	8610349
Aroclor 1260	ug/L	-	ND	0.05	8610349
Aroclor 1262	ug/L	-	ND	0.05	8610349
Aroclor 1268	ug/L	-	ND	0.05	8610349
Total PCB	ug/L	0.4	ND	0.05	8610349
Microbiological					
Escherichia coli	CFU/100mL	200	<10	10	8606938
Surrogate Recovery (%)					
2,4,6-Tribromophenol	%	-	70		8612555
2-Fluorobiphenyl	%	-	72		8612555
D14-Terphenyl (FS)	%	-	104		8612555
D5-Nitrobenzene	%	-	116		8612555

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

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: The City of Burlington Storm Sewer Discharge By-Law 59-2022
ND = Not Detected at a concentration equal or greater than the indicated Detection Limit.

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

Bureau Veritas Job #: C3A3527
Report Date: 2023/04/20

exp Services Inc
Client Project #: GTR-22029872-A0
Site Location: 1376 and 1382 Plains Rd E, Burlington, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

BURLINGTON STORM SEWER (WATER)

Bureau Veritas ID			VNS485		
Sampling Date			2023/04/13 11:30		
COC Number			926376-01-01		
	UNITS	Criteria	BH 3D	RDL	QC Batch
D8-Acenaphthylene	%	-	86		8612555
Decachlorobiphenyl	%	-	90		8610349
4-Bromofluorobenzene	%	-	98		8610858
D4-1,2-Dichloroethane	%	-	116		8610858
D8-Toluene	%	-	90		8610858

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

RDL = Reportable Detection Limit
QC Batch = Quality Control Batch
Criteria: The City of Burlington Storm Sewer Discharge By-Law 59-2022

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Sampler Initials: TM

TEST SUMMARY

Bureau Veritas ID: VNS485
Sample ID: BH 3D
Matrix: Water

Collected: 2023/04/13
Shipped:
Received: 2023/04/13

Test Description	Instrumentation	Batch	Extracted	Date Analyzed	Analyst
Sewer Use By-Law Semivolatile Organics	GC/MS	8612555	2023/04/17	2023/04/18	Adriana Zurita
Biochemical Oxygen Demand (BOD)	DO	8609860	2023/04/15	2023/04/20	Gurjot Kaur
Chromium (VI) in Water	IC	8611223	N/A	2023/04/17	Theodora Luck
Total Cyanide	SKAL/CN	8608164	2023/04/14	2023/04/14	Chloe Pollock
Mercury in Water by CVAA	CV/AA	8613331	2023/04/18	2023/04/18	Gagandeep Rai
Total Metals Analysis by ICPMS	ICP/MS	8613509	2023/04/18	2023/04/18	Nan Raykha
E.coli, (CFU/100mL)	PL	8606938	N/A	2023/04/13	Soham Patel
Total Nonylphenol in Liquids by HPLC	LC/FLU	8607430	2023/04/14	2023/04/15	Furneesh Kumar
Nonylphenol Ethoxylates in Liquids: HPLC	LC/FLU	8607434	2023/04/14	2023/04/17	Furneesh Kumar
Polychlorinated Biphenyl in Water	GC/ECD	8610349	2023/04/15	2023/04/16	Svitlana Shaula
pH	AT	8610019	2023/04/15	2023/04/18	Kien Tran
Phenols (4AAP)	TECH/PHEN	8611340	N/A	2023/04/17	Sachi Patel
Total PAHs (Great Lakes Basin Agreement)	CALC	8606649	N/A	2023/04/19	Automated Statchk
Total Suspended Solids	BAL	8614017	2023/04/18	2023/04/19	Shaneil Hall
Volatile Organic Compounds in Water	GC/MS	8610858	N/A	2023/04/18	Skylar Canning

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GENERAL COMMENTS

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

Package 1	22.7°C

Sample VNS485 [BH 3D] : Nonylphenol Ethoxylates Analysis:
Due to background interference, sample required dilution. The Detection limit was adjusted accordingly.

ABN Analysis: Due to the sample matrix, a smaller amount was used for extraction. Detection limits were adjusted accordingly.

Sample VNS485 [BH 3D] : VOC Analysis: Due to sample matrix, sample required dilution. Detection limits were adjusted accordingly.

Results relate only to the items tested.

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QUALITY ASSURANCE REPORT

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8610349	Decachlorobiphenyl	2023/04/16	92	60 - 130	78	60 - 130	88	%				
8610858	4-Bromofluorobenzene	2023/04/18	100	70 - 130	100	70 - 130	101	%				
8610858	D4-1,2-Dichloroethane	2023/04/18	109	70 - 130	106	70 - 130	114	%				
8610858	D8-Toluene	2023/04/18	105	70 - 130	107	70 - 130	90	%				
8612555	2,4,6-Tribromophenol	2023/04/18	86	10 - 130	83	10 - 130	58	%				
8612555	2-Fluorobiphenyl	2023/04/18	69	30 - 130	73	30 - 130	70	%				
8612555	D14-Terphenyl (FS)	2023/04/18	97	30 - 130	97	30 - 130	102	%				
8612555	D5-Nitrobenzene	2023/04/18	101	30 - 130	114	30 - 130	112	%				
8612555	D8-Acenaphthylene	2023/04/18	78	30 - 130	86	30 - 130	82	%				
8607430	Nonylphenol (Total)	2023/04/14	128	50 - 130	323 (1)	50 - 130	ND, RDL=0.001	mg/L	NC	40		
8607434	Nonylphenol Ethoxylate (Total)	2023/04/14	83	50 - 130	89	50 - 130	ND, RDL=0.005	mg/L	NC	40		
8608164	Total Cyanide (CN)	2023/04/14	98	80 - 120	101	80 - 120	ND, RDL=0.0050	mg/L	NC	20		
8609860	Total BOD	2023/04/20					ND,RDL=2	mg/L	NC	30	92	80 - 120
8610019	pH	2023/04/18			102	98 - 103			0.99	N/A		
8610349	Aroclor 1016	2023/04/16					ND, RDL=0.05	ug/L				
8610349	Aroclor 1221	2023/04/16					ND, RDL=0.05	ug/L				
8610349	Aroclor 1232	2023/04/16					ND, RDL=0.05	ug/L				
8610349	Aroclor 1242	2023/04/16					ND, RDL=0.05	ug/L				
8610349	Aroclor 1248	2023/04/16					ND, RDL=0.05	ug/L				
8610349	Aroclor 1254	2023/04/16					ND, RDL=0.05	ug/L				
8610349	Aroclor 1260	2023/04/16	102	60 - 130	78	60 - 130	ND, RDL=0.05	ug/L				
8610349	Aroclor 1262	2023/04/16					ND, RDL=0.05	ug/L				
8610349	Aroclor 1268	2023/04/16					ND, RDL=0.05	ug/L				
8610349	Total PCB	2023/04/16	102	60 - 130	78	60 - 130	ND, RDL=0.05	ug/L	NC	40		
8610858	1,1,2,2-Tetrachloroethane	2023/04/18	109	70 - 130	102	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8610858	1,2-Dichlorobenzene	2023/04/18	98	70 - 130	91	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8610858	1,4-Dichlorobenzene	2023/04/18	116	70 - 130	107	70 - 130	ND, RDL=0.40	ug/L	NC	30		

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

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8610858	Benzene	2023/04/18	99	70 - 130	88	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8610858	Chloroform	2023/04/18	106	70 - 130	94	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8610858	cis-1,2-Dichloroethylene	2023/04/18	109	70 - 130	95	70 - 130	ND, RDL=0.50	ug/L	1.9	30		
8610858	Ethylbenzene	2023/04/18	91	70 - 130	83	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8610858	Methylene Chloride(Dichloromethane)	2023/04/18	109	70 - 130	97	70 - 130	ND, RDL=2.0	ug/L	NC	30		
8610858	Tetrachloroethylene	2023/04/18	92	70 - 130	81	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8610858	Toluene	2023/04/18	94	70 - 130	86	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8610858	Total Xylenes	2023/04/18					ND, RDL=0.20	ug/L	NC	30		
8610858	trans-1,3-Dichloropropene	2023/04/18	119	70 - 130	99	70 - 130	ND, RDL=0.40	ug/L	NC	30		
8610858	Trichloroethylene	2023/04/18	104	70 - 130	91	70 - 130	ND, RDL=0.20	ug/L	NC	30		
8611223	Chromium (VI)	2023/04/17	103	80 - 120	102	80 - 120	ND, RDL=0.50	ug/L	0.51	20		
8611340	Phenols-4AAP	2023/04/17	104	80 - 120	99	80 - 120	ND, RDL=0.0010	mg/L	NC	20		
8612555	1,3-Dinitropyrene	2023/04/18	124	30 - 130	113	30 - 130	ND, RDL=0.4	ug/L	NC	40		
8612555	1,6-Dinitropyrene	2023/04/18	106	30 - 130	115	30 - 130	ND, RDL=0.4	ug/L	NC	40		
8612555	1,8-Dinitropyrene	2023/04/18	124	30 - 130	114	30 - 130	ND, RDL=0.4	ug/L	NC	40		
8612555	3,3'-Dichlorobenzidine	2023/04/18	76	30 - 130	93	30 - 130	ND, RDL=0.8	ug/L	NC	40		
8612555	7H-Dibenzo(c,g) Carbazole	2023/04/18	98	30 - 130	101	30 - 130	ND, RDL=0.4	ug/L	NC	40		
8612555	Anthracene	2023/04/18	89	30 - 130	92	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Benzo(a)anthracene	2023/04/18	104	30 - 130	104	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Benzo(a)pyrene	2023/04/18	111	30 - 130	113	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Benzo(b/j)fluoranthene	2023/04/18	103	30 - 130	110	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Benzo(e)pyrene	2023/04/18	107	30 - 130	108	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Benzo(g,h,i)perylene	2023/04/18	114	30 - 130	115	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Benzo(k)fluoranthene	2023/04/18	96	30 - 130	103	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Bis(2-ethylhexyl)phthalate	2023/04/18	109	30 - 130	109	30 - 130	ND,RDL=2	ug/L	NC	40		
8612555	Chrysene	2023/04/18	105	30 - 130	107	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Dibenzo(a,h)anthracene	2023/04/18	111	30 - 130	111	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Dibenzo(a,i)pyrene	2023/04/18	82	30 - 130	92	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Dibenzo(a,j) acridine	2023/04/18	110	30 - 130	109	30 - 130	ND, RDL=0.4	ug/L	NC	40		

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

QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8612555	Di-N-butyl phthalate	2023/04/18	111	30 - 130	101	30 - 130	ND,RDL=2	ug/L	NC	40		
8612555	Fluoranthene	2023/04/18	103	30 - 130	104	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Indeno(1,2,3-cd)pyrene	2023/04/18	110	30 - 130	110	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Naphthalene	2023/04/18	61	30 - 130	63	30 - 130	ND, RDL=0.3	ug/L				
8612555	Pentachlorophenol	2023/04/18	50	30 - 130	48	30 - 130	ND,RDL=1	ug/L	NC	40		
8612555	Perylene	2023/04/18	101	30 - 130	103	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Phenanthrene	2023/04/18	89	30 - 130	92	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8612555	Pyrene	2023/04/18	103	30 - 130	104	30 - 130	ND, RDL=0.2	ug/L	NC	40		
8613331	Mercury (Hg)	2023/04/18	97	75 - 125	102	80 - 120	ND, RDL=0.00010	mg/L	NC	20		
8613509	Total Arsenic (As)	2023/04/18	104	80 - 120	101	80 - 120	ND, RDL=1.0	ug/L	1.1	20		
8613509	Total Cadmium (Cd)	2023/04/18	106	80 - 120	99	80 - 120	ND, RDL=0.090	ug/L	NC	20		
8613509	Total Chromium (Cr)	2023/04/18	102	80 - 120	98	80 - 120	ND, RDL=5.0	ug/L	NC	20		
8613509	Total Copper (Cu)	2023/04/18	103	80 - 120	98	80 - 120	ND, RDL=0.90	ug/L	1.7	20		
8613509	Total Lead (Pb)	2023/04/18	98	80 - 120	96	80 - 120	ND, RDL=0.50	ug/L	0.73	20		
8613509	Total Manganese (Mn)	2023/04/18	99	80 - 120	94	80 - 120	ND, RDL=2.0	ug/L	4.0	20		
8613509	Total Nickel (Ni)	2023/04/18	98	80 - 120	95	80 - 120	ND, RDL=1.0	ug/L	0.18	20		
8613509	Total Phosphorus (P)	2023/04/18	124 (2)	80 - 120	117	80 - 120	ND, RDL=100	ug/L	NC	20		
8613509	Total Selenium (Se)	2023/04/18	107	80 - 120	102	80 - 120	ND, RDL=2.0	ug/L	NC	20		
8613509	Total Silver (Ag)	2023/04/18	108	80 - 120	100	80 - 120	ND, RDL=0.090	ug/L	NC	20		
8613509	Total Zinc (Zn)	2023/04/18	106	80 - 120	104	80 - 120	ND, RDL=5.0	ug/L	NC	20		

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QUALITY ASSURANCE REPORT(CONT'D)

			Matrix Spike		SPIKED BLANK		Method Blank		RPD		QC Standard	
QC Batch	Parameter	Date	% Recovery	QC Limits	% Recovery	QC Limits	Value	UNITS	Value (%)	QC Limits	% Recovery	QC Limits
8614017	Total Suspended Solids	2023/04/19					ND, RDL=10	mg/L	NC	20	96	85 - 115

N/A = Not Applicable

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

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

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

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

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

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

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) The recovery was above the upper control limit. This may represent a high bias in some results for this specific analyte. For results that were not detected (ND), this potential bias has no impact.

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

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

Bureau Veritas Job #: C3A3527
Report Date: 2023/04/20

exp Services Inc
Client Project #: GTR-22029872-A0
Site Location: 1376 and 1382 Plains Rd E, Burlington, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

VALIDATION SIGNATURE PAGE

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



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

Soham N Patel

Soham Patel, Senior Analyst

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 {0}, {1} responsible for {2} {3} laboratory operations.

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MICRO

Bureau Veritas
5740 Campobello Road, Mississauga, Ontario Canada L5N 2L8 Tel (905) 817-5700 Toll-free 800-563-6266 Fax (905) 817-5777 www.bvna.com

CHA

13-Apr-23 16:21

Patricia Legette

C3A3527

SPJ ENV-1565

INVOICE TO:		REPORT TO:		PROJECT INFORMATION:	
Company Name:	#30554 exp Services Inc	Company Name:	ExP Services Inc	Quotation #:	C20374
Attention:	Accounts Payable	Attention:	Francois Chartier	P.O. #:	ENV-BRM STREAM 2
Address:	1595 Clark Blvd	Address:	Thabiso.Modise@exp.com	Project:	GTR-22029872-A0
	Brampton ON L6T 4V1		Yogirajsinh.Rana@exp.com	Project Name:	
Tel:	(905) 793-9800 Fax: (905) 793-0641	Tel:	(905) 793-9800 Ext: 2523 Fax:	Site #:	1376 and 1382 Plains Rd E, Bur
Email:	AP@exp.com; Karen.Burke@exp.com	Email:	Francois.Chartier@exp.com	Sampled By:	Thabiso Modise

Order #: 6376

C#926376-01-01

Project Manager: Patricia Legette

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

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

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

Special Instructions:

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

Field Filtered (please circle): Metals / Hg / CrVI

ANALYSIS REQUESTED (PLEASE BE SPECIFIC):

Turnaround Time (TAT) Required:

Please provide advance notice for rush projects

Regular (Standard) TAT: ☑

(will be applied if Rush TAT is not specified)

Standard TAT = 5-7 Working days for most tests.

Please note: Standard TAT for certain tests such as BOD and Dioxins/Furans are > 5 days - contact your Project Manager for details.

Job Specific Rush TAT (if applies to entire submission)

Date Required: ___ Time Required: ___ ☐

Rush Confirmation Number: ___ *(call lab for #)*

	Sample Barcode Label	Sample (Location) Identification	Date Sampled	Time Sampled	Matrix	Burlington Storm Sewer	Dissolved Metals by ICPMS	# of Bottles	Comments
1		BH 3D	23/04/13	11:30	GW	✓		16	Please include COC
2									in final report
3									
4									
5									
6									
7									
8									
9									
10									

* RELINQUISHED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	RECEIVED BY: (Signature/Print)	Date: (YY/MM/DD)	Time	# jars used and not submitted
THABISO MODISE	23/04/13	16:05		23/04/13	16:21	

Laboratory Use Only

Time Sensitive

Temperature (°C) on Recei: 13.1 | 12.1 | 12.3

Custody Seal Present ☑ Yes ☐ No; Intact ☑ Yes ☐ No

* UNLESS OTHERWISE AGREED TO IN WRITING, WORK SUBMITTED ON THIS CHAIN OF CUSTODY IS SUBJECT TO BUREAU VERITAS'S STANDARD TERMS AND CONDITIONS. SIGNING OF THIS CHAIN OF CUSTODY DOCUMENT IS ACKNOWLEDGMENT AND ACCEPTANCE OF OUR TERMS WHICH ARE AVAILABLE FOR VIEWING AT WWW.BVNA.COM/ENVIRONMENTAL-LABORATORIES/RESOURCES/COC-TERMS-AND-CONDITIONS.

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

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

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

White: Bureau Veritas Yellow: Client

DN ice

Bureau Veritas Canada (2019) Inc.

Bureau Veritas Job #: C3A3527
Report Date: 2023/04/20

exp Services Inc
Client Project #: GTR-22029872-A0
Site Location: 1376 and 1382 Plains Rd E, Burlington, ON
Your P.O. #: ENV-BRM
Sampler Initials: TM

Exceedance Summary Table – Burlington Storm Sewer

Result Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
BH 3D	VNS485-09	Total Manganese (Mn)	50	110	2.0	ug/L
BH 3D	VNS485-04	Total Suspended Solids	15	90	10	mg/L

Detection Limit Exceedances

Sample ID	Bureau Veritas ID	Parameter	Criteria	Result	DL	UNITS
BH 3D	VNS485-01	Total PAHs	2	<4	4	ug/L

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

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

Appendix E – Construction and Post-Construction Flow Rate Calculations

APPENDIX E: Dewatering Flow Rates

1376 and 1382 Plains Road East, Burlington, Ontario
GTR-22029872-A0

Table E-1: Construction and Post Construction Dewatering Assessments

Parameters	Symbols	Unit	Construction	Post Construction
Geological Formation	-	-	Glacial Deposit	Glacial Deposit
INPUTS				
Ground Elevation	-	mASL	**99.50**	**99.50**
Highest Groundwater Elevation	-	mASL	**98.16**	**98.16**
Lowest Top Slab Elevation	-	mASL	**95.50**	**95.50**
Lowest Foundation Invert Elevation	-	mASL	**94.00**	-
Height of Static Water Table Above the Base of the Water-Bearing Zone	**H**	m	11.16	11.16
Dewatering Target Elevation	-	mASL	93.00	95.00
Height of Target Water Level Above the Base of Water-Bearing Zone	**h_w**	m	6.00	8.00
Drawdown	**s**	m	5.16	3.16
Dupuit Check (> 45%)		m	54%	72%
Base of Aquifer / Water Bearing Zone	-	mASL	**87.00**	**87.00**
Hydraulic Conductivity	**K**	m/s	**3.2E-07**	**3.2E-07**
Length of Excavation	-	m	**52.40**	**52.40**
Width of Excavation	-	m	**45.30**	**45.30**
Equivalent Radius (equivalent perimeter)	**r_e**	m	31.10	31.10
Method to Calculate Radius of Influence	-	-	**Cooper-Jacob**	**Cooper-Jacob**
Time (days)			**30.00**	**365.00**
Time (seconds)	**t**	s	2592000	31536000
Specific Yield	**Sy**		**0.03**	**0.03**
OUTPUTS				
Cooper-Jacob's Radius of Influence from Sides of Excavation	**Rcj**	m	26.45	92.26
Radius of Influence	**Ro**	m	57.55	123.36
Dewatering Flow Rate (unconfined radial flow component)	**Q**	m^3/day	**12.59**	**3.84**
Factor of Safety	**fs**	-	2.00	1.50
Dewatering Flow Rate (multiplied by factor of safety)	**Q.fs**	m^3/day	**25**	**6**
Precipitation Event	-	mm/day	15	-
Volume from Precipitation	-	m^3/day	36	-
Total Volume (L/day) Discharge of Groundwater (Construction dewatering) **with Safety Factor** (including precipitation)	-	m^3/day	**61**	**-**

Precipitation Event 2 year storm	-	mm/day	56.0
Volume from Precipitation	-	m^3/event	133
Precipitation Event 100 year storm	-	mm/day	121.6
Volume from Precipitation	-	m^3/event	289

Notes:
mASL - meters above sea level

Analytical Solution for Estimating Radial Flow from an Unconfined Aquifer to a Fully-Penetrating Excavation

$$Q_w = \frac{\pi K(H^2 - h^2)}{Ln\,[\frac{R_o}{r_e}]}$$

(Based on the Dupuit-Forcheimer Equation)

$$r_e = \frac{a+b}{\pi} \qquad R_o = R_{cj} + r_e \qquad R_{cj} = \sqrt{2.25KDt/S}$$

Where:

Q_w = Flow rate per unit length of excavation (m^3/s)

K = Hydraulic conductivity (m/s)

H = Height of static water table above base of water-bearing zone (m)

h_w = Height of target water level above the base of water-bearing zone (m)

Rcj=Cooper Jacob Radius of Influence (m)

R_o=Radius of influence (m)

re=Equivalent perimeter (m)

Appendix F – Architectural Drawing



1376 & 1382 Plains Road East

BURLINGTON, ONTARIO

Issued for design updates

2025.08.07

WZMH



WZMH ARCHITECTS		1376 & 1382 PLAINS ROAD EAST Burlington, Ontario	CONTEXT PLAN	N	Project No: 8192.00 / Date 2025-08-07 / Scale: / Drawing No:



PRELIMINARY

WZMH ARCHITECTS		1376 & 1382 PLAINS ROAD EAST Burlington, Ontario	VIEW FROM NORTHEAST	Project No: 8192.00	Date 2025-08-07
				Scale:	Drawing No:



PRELIMINARY

WZMH ARCHITECTS		1376 & 1382 PLAINS ROAD EAST Burlington, Ontario	VIEW FROM NORTHWEST	Project No: 8192.00	Date 2025-08-07
				Scale:	Drawing No:



PRELIMINARY

WZMH ARCHITECTS		1376 & 1382 PLAINS ROAD EAST Burlington, Ontario	VIEW FROM SOUTHWEST	Project No: 8192.00	Date 2025-08-07
				Scale:	Drawing No:



PRELIMINARY

WZMH ARCHITECTS		1376 & 1382 PLAINS ROAD EAST Burlington, Ontario	VIEW FROM SOUTHEAST	Project No: 8192.00	Date 2025-08-07
				Scale:	Drawing No:



PRELIMINARY

WZMH ARCHITECTS

1376 & 1382 PLAINS ROAD EAST
Burlington, Ontario

VIEW FROM PLAINS STREET

Project No:	Date
8192.00	2025-08-07
Scale:	Drawing No:



PRELIMINARY

WZMH ARCHITECTS		1376 & 1382 PLAINS ROAD EAST Burlington, Ontario	BALCONY CLOSEUP VIEW	Project No: 8192.00	Date 2025-08-07
				Scale:	Drawing No:



PRELIMINARY

WZMH ARCHITECTS		1376 & 1382 PLAINS ROAD EAST Burlington, Ontario	BALCONY CLOSEUP VIEW	Project No: 8192.00	Date 2025-08-07
				Scale:	Drawing No:

PLAINS RD E

Gross Floor Area Calculation

The sum of areas of each floor of a building, but shall include a basement or cellar when used for commerical purpose. Measure shall be from the exterior face of outside walls, or from the center line of partition and common walls. GFA shall not include floor spaced devated to:

A) vehicle parking;
B) storage;
C) air handling equipment;
D) enclosed mall and hallways, excluding kiosk, stairways;
E) elevators and associated equipment;
F) washroom;
G) foyers, lobbies, but not waiting areas/rooms

PROPOSED BUILDING GFA	RESIDENTIAL GFA		RETAIL		INDOOR AMENITY		OUTDOOR AMENITY		TOTAL GFA	
	sm	sf	sm	sf	sm	sf	sm	sf	sm	sf
ABOVE GRADE										
GROUND	490	5,274	244	2,626	184	1,981		-	918	9,881
2ND	775	8,342			324	3,488	941	10,129	1,099	11,830
3RD	1,164	12,529					216	2,325	1,164	12,529
4TH	744	8,008					635	6,835	744	8,008
5TH	744	8,008					160	1,722	744	8,008
6TH	744	8,008					160	1,722	744	8,008
7TH	744	8,008				-	160	1,722	744	8,008
8TH	744	8,008					160	1,722	744	8,008
9TH	744	8,008					160	1,722	744	8,008
10TH	744	8,008					160	1,722	744	8,008
11TH	744	8,008					160	1,722	744	8,008
12TH	744	8,008					160	1,722	744	8,008
13TH	744	8,008					160	1,722	744	8,008
14TH	744	8,008					160	1,722	744	8,008
15TH	744	8,008					160	1,722	744	8,008
16TH	744	8,008					160	1,722	744	8,008
17TH	744	8,008					160	1,722	744	8,008
18TH	744	8,008					160	1,722	744	8,008
19TH	744	8,008					160	1,722	744	8,008
20TH	744	8,008					160	1,722	744	8,008
21ST	744	8,008					160	1,722	744	8,008
22ND	744	8,008					160	1,722	744	8,008
23RD	744	8,008					160	1,722	744	8,008
24TH	744	8,008					160	1,722	744	8,008
25TH	744	8,008					160	1,722	744	8,008
TOTAL GFA (ABOVE)	18,797	202,329	244	2,626	508	5,468	5,152	55,456	19,549	210,423
TOTAL GFA	**18,797**	**202,329**	**244**	**2,626**	**508**	**5,468**	**5,152**	**55,456**	**19,549**	**210,423**

***Note: Amenity area included in residential GFA**

	sm	sf	
TOTAL RESIDENTIAL + RETAIL + INDOOR AMENITY GFA (ABOVE GRADE)	**19,549**	**210,423**	
TOTAL INDOOR/OUTDOOR AMENITY**	**5,660**	**2,626**	**20sm/UNIT**

** REQUIRED INDOOR+OUTDOOR AMENITY = 20sm/UNIT (AMENITY INCLUDES TERRACES AND BALCONY)
283 UNITS = 5,660sm AMENITIES REQUIRED; PROVIDED 20sm / UNIT

DENSITY

SITE AREA	**2,749.70**
PROPOSED DENSITY OVER ENTIRE SITE	**7.11**

PROPOSED BUILDING UNIT MIX

	STUDIO	1BED	2BED	3BED	TOTAL
GROUND					0
2ND	1		1	5	7
3RD			4	8	12
4TH		10	2		12
5TH		10	2		12
6TH		10	2		12
7TH		10	2		12
8TH		10	2		12
9TH		10	2		12
10TH		10	2		12
11TH		10	2		12
12TH		10	2		12
13TH		10	2		12
14TH		10	2		12
15TH		10	2		12
16TH		10	2		12
17TH		10	2		12
18TH		10	2		12
19TH		10	2		12
20TH		10	2		12
21ST		10	2		12
22ND		10	2		12
23RD		10	2		12
24TH		10	2		12
25TH		10	2		12
TOTAL UNITS	**1**	**220**	**49**	**13**	**283**
PERCENTAGE	**0%**	**78%**	**17%**	**5%**	**100%**
TOTAL UNITS					**283**

PARKING COUNT

PARKING COUNT	
P1	45
GRD	13
TOTAL	**58**
PARKING RATE	**0.20**

BICYCLE PARKING COUNT

BICYCLE PARKING COUNT		
GROUND		132
TOTAL		132
BICYCLE PARKING RATE		**0.47**

PRELIMINARY

WZMH ARCHITECTS

1376 & 1382 PLAINS ROAD EAST
Burlington, Ontario

STATISTICS

Project No: 8192.00

Date 2025-08-07

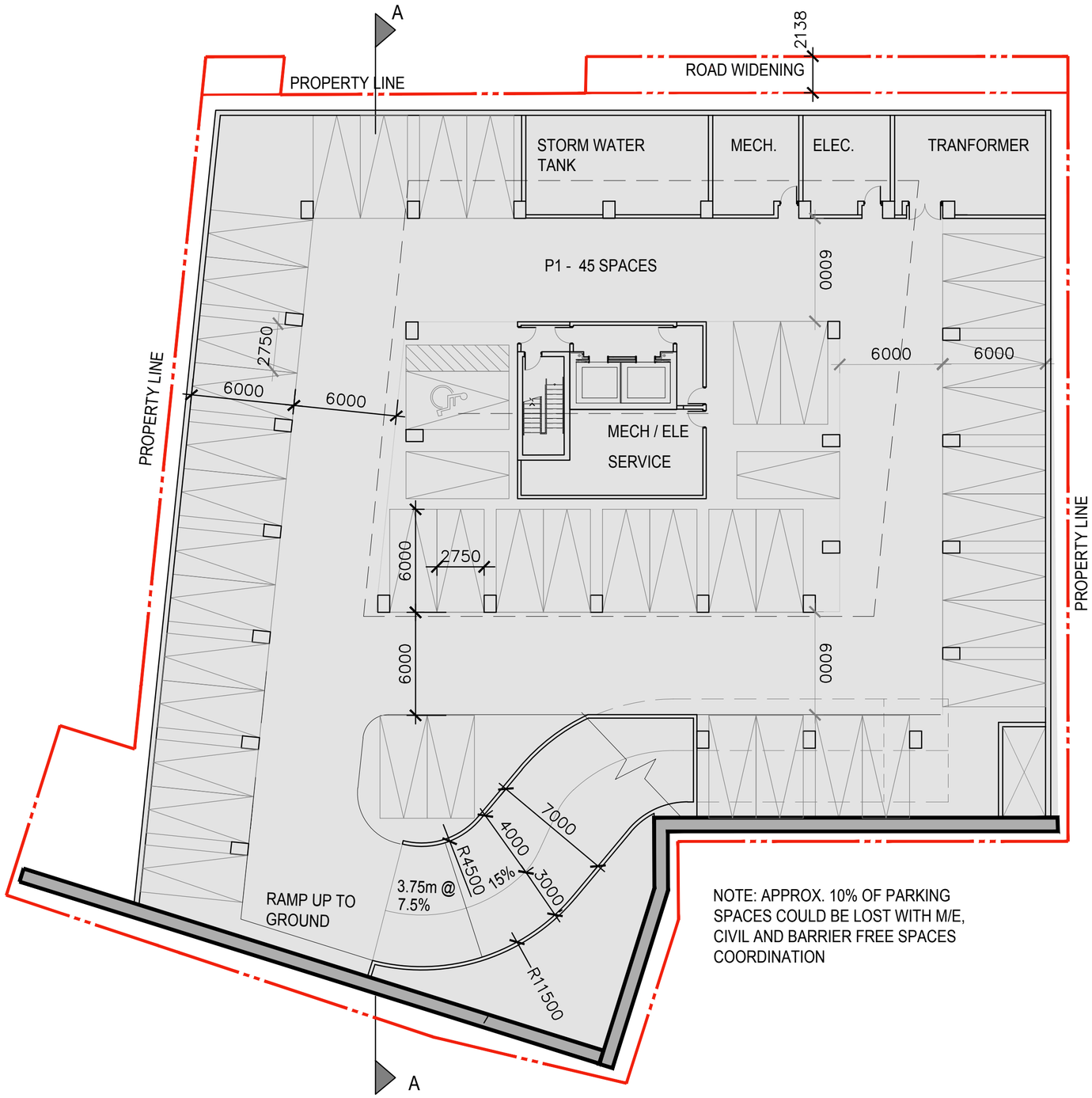
Scale:

Drawing No:



PRELIMINARY

WZMH ARCHITECTS		1376 & 1382 PLAINS ROAD EAST Burlington, Ontario	SITE PLAN	N	Project No: 8192.00 / Date 2025-08-07 / Scale: 1:200 / Drawing No:



NOTE: APPROX. 10% OF PARKING SPACES COULD BE LOST WITH M/E, CIVIL AND BARRIER FREE SPACES COORDINATION

PRELIMINARY

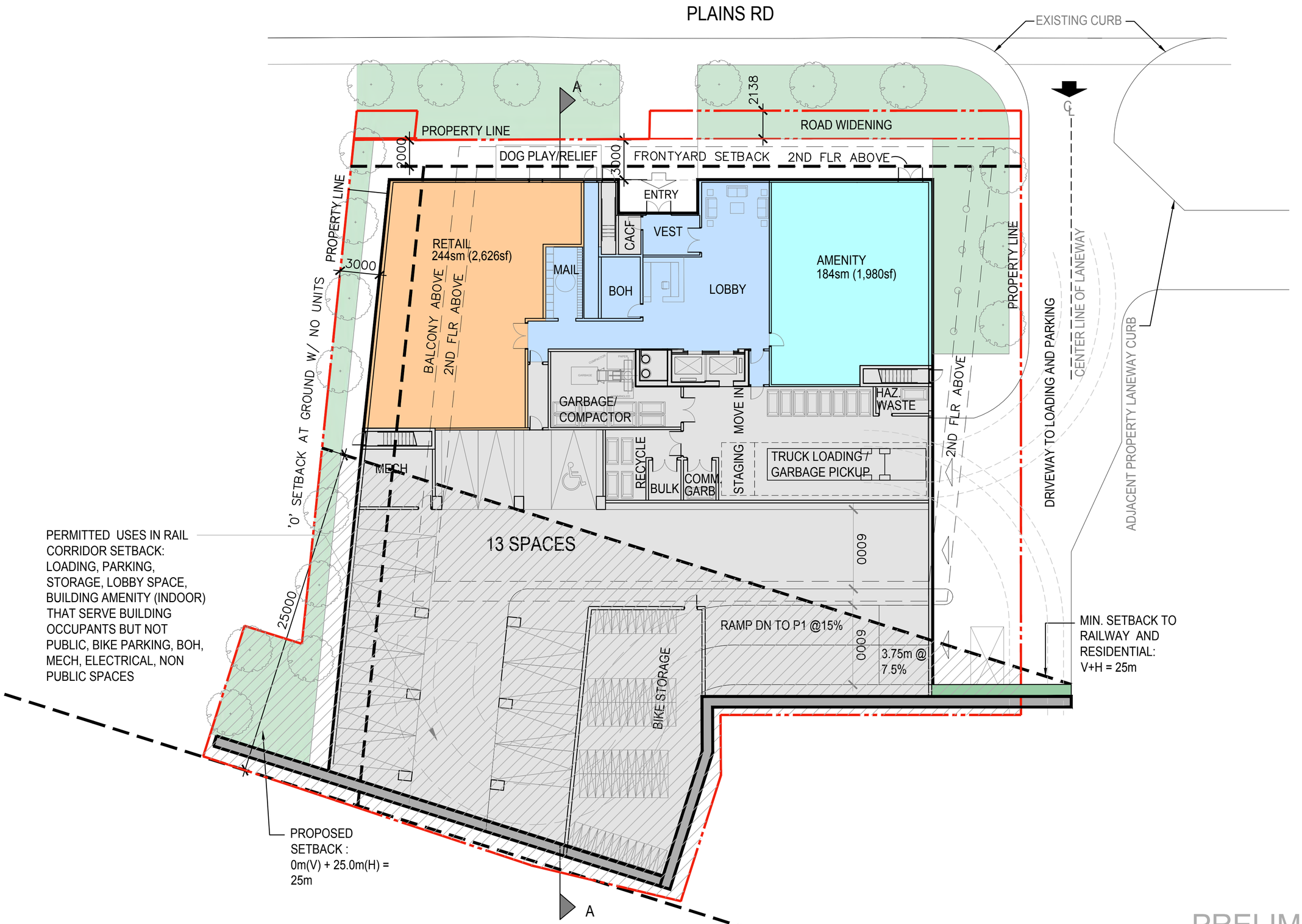
WZMH ARCHITECTS

1376 & 1382 PLAINS ROAD EAST
Burlington, Ontario

PARKING LEVEL P1

N

Project No: 8192.00	Date 2025-08-07
Scale: 1:200	Drawing No:



PRELIMINARY

WZMH ARCHITECTS		1376 & 1382 PLAINS ROAD EAST Burlington, Ontario	GROUND FLOOR	N	Project No: 8192.00 / Date 2025-08-07 / Scale: 1:200 / Drawing No:

PLAINS RD

30M ROW

A

2138

ROAD WIDENING

PROPERTY LINE

2000

FRONTYARD SETBACK

1000

BALCONY

9500

5500

3000

7500

5500

SIDEYARD SETBACK 'O' WITH NO UNITS

SIDEYARD SETBACK WITH UNITS

2ND + 3RD FLOOR PODIUM

SUITE 2
92.9m (1,000sf)
3BED

SUITE 3
93.3sm (1,004sf)
3BED

SUITE 4
93.3sm (1,004sf)
3BED

SUITE 5
114.0sm (1,227sf)
3BED

SUITE 1
132sm (1,420sf)
3BED

SUITE 6
73.3sm (789sf)
2BED

SUITE 7
69.8sm (751sf)
STUDIO

LOADING BELOW

AMENITIES
324sm (3,488sf)

BALCONY

PROPERTY LINE

CENTER LINE OF LANEWAY

SIDEYARD SETBACK WITH UNITS

ACCOMMODATE LOADING, PARKING, STORAGE, LOBBY SPACE, BUILIDNG AMENITY (INDOOR) THAT SERVE BUILDING OCCUPANTS BUT NOT PUBLIC, BIKE PARKING, BOH, MECH, ELECTRICAL, NON PUBLIC SPACES

PROPERTY LINE

2ND FLR 20500

OUTDOOR AMENITIES (414sm) TERRACE + GREEN ROOF AT 2ND FLR.

8 UNITS PER FLOOR

3.6m HIGH X 0.76m THICK CRASH WALL

PROPOSED RAIL CORRIDOR SETBACK : 4.5m(V) + 20.5m(H) = 25m

A

PRELIMINARY

WZMH ARCHITECTS

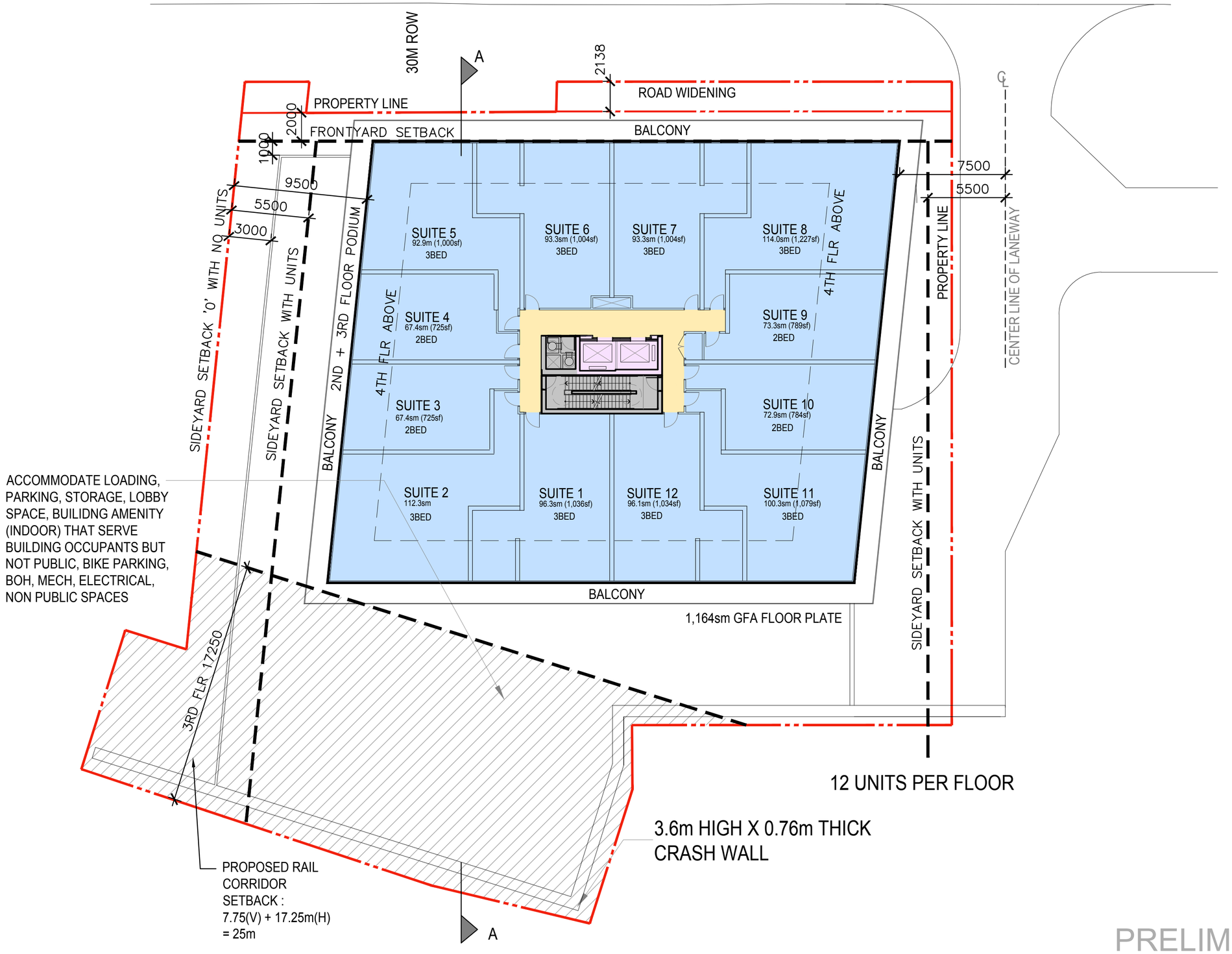
1376 & 1382 PLAINS ROAD EAST
Burlington, Ontario

2ND FLOOR

N

Project No: 8192.00	Date 2025-08-07
Scale: 1:200	Drawing No:

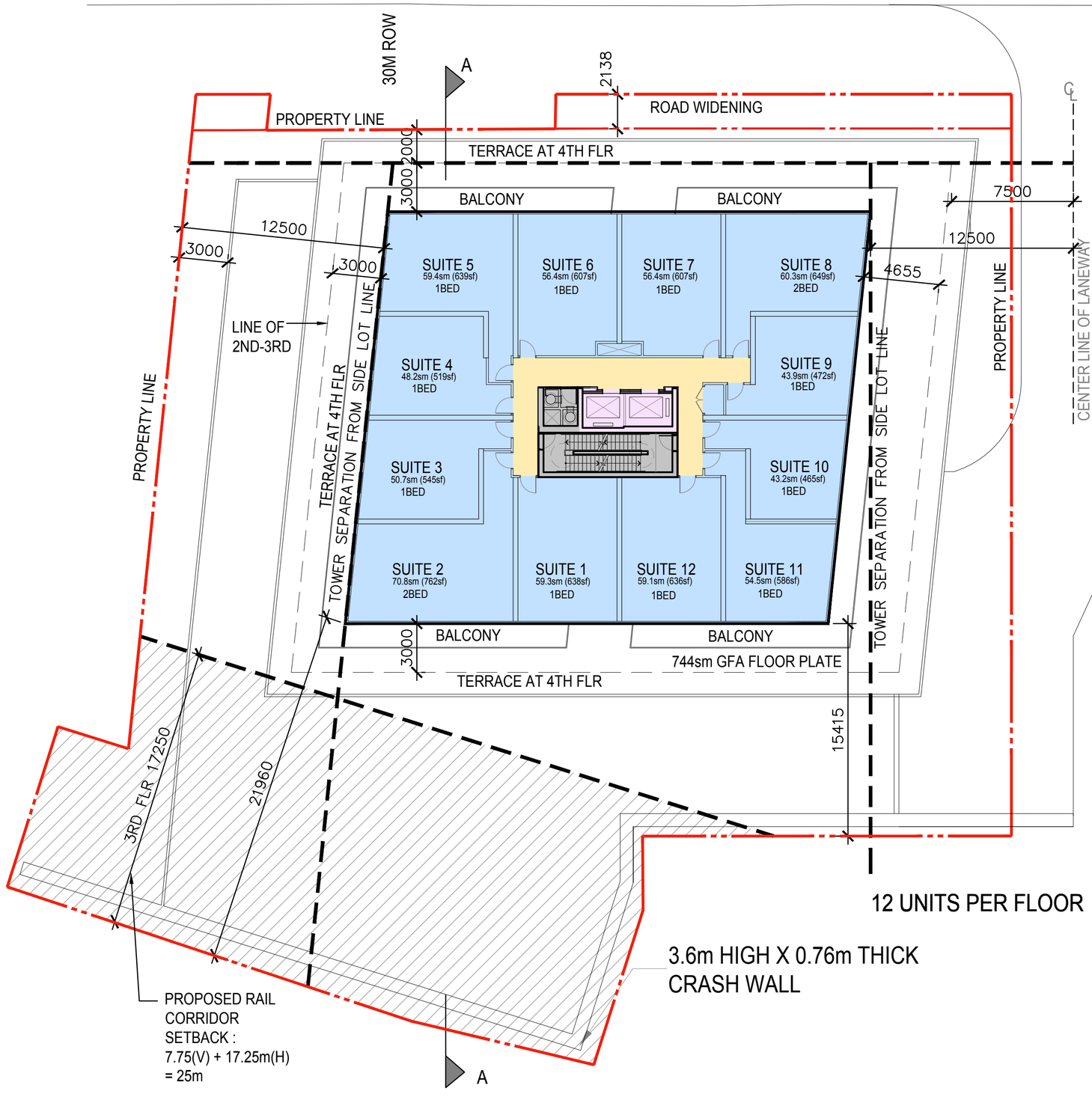
PLAINS RD



PRELIMINARY

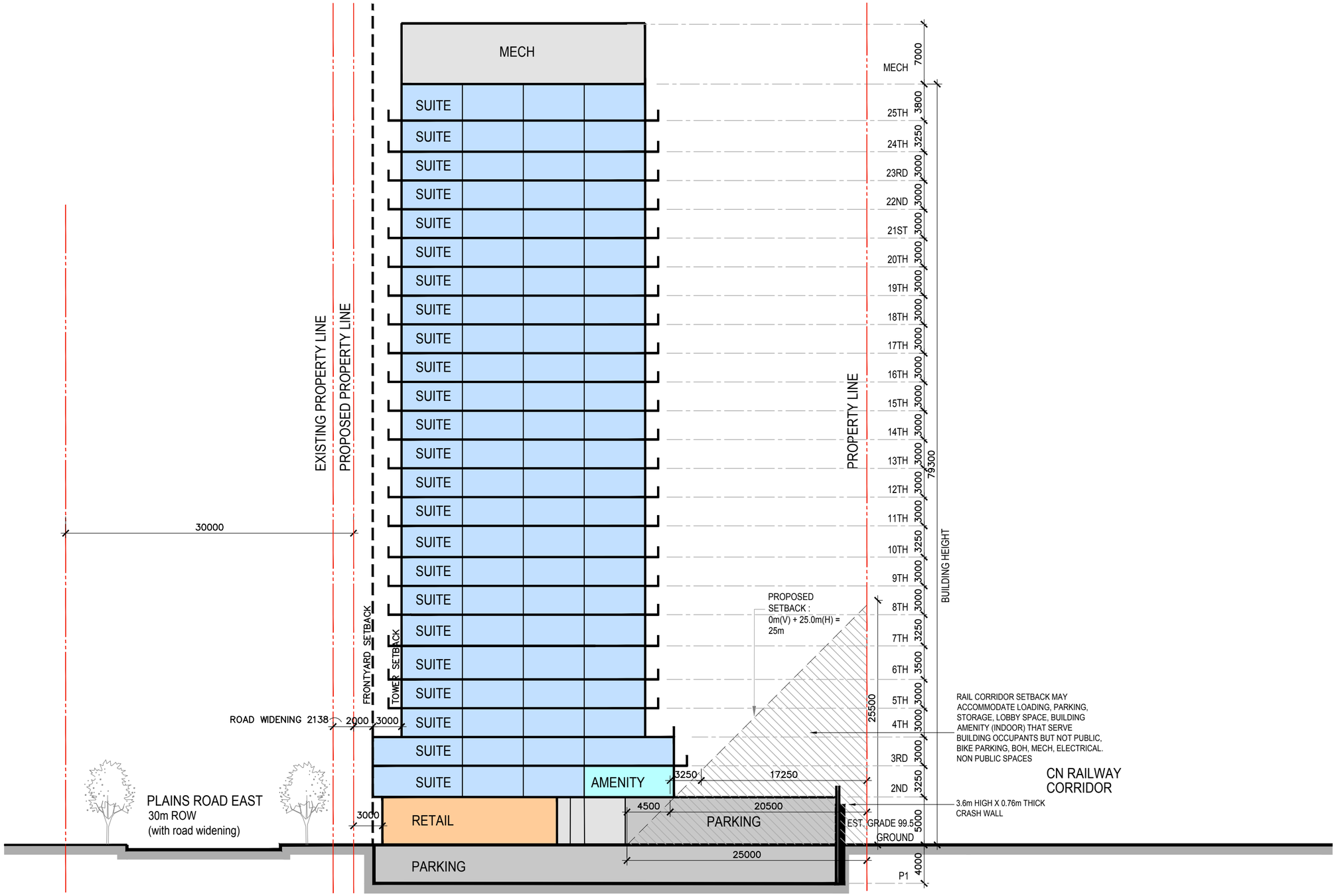
WZMH ARCHITECTS		1376 & 1382 PLAINS ROAD EAST Burlington, Ontario	3RD FLOOR	N	Project No: 8192.00 / Date 2025-08-07 Scale: 1:200 / Drawing No:

PLAINS RD



PRELIMINARY

WZMH ARCHITECTS		1376 & 1382 PLAINS ROAD EAST Burlington, Ontario	4TH TO 25TH FLOORS	N	Project No: 8192.00 / Date 2025-08-07 Scale: 1:200 / Drawing No:



25 STOREY

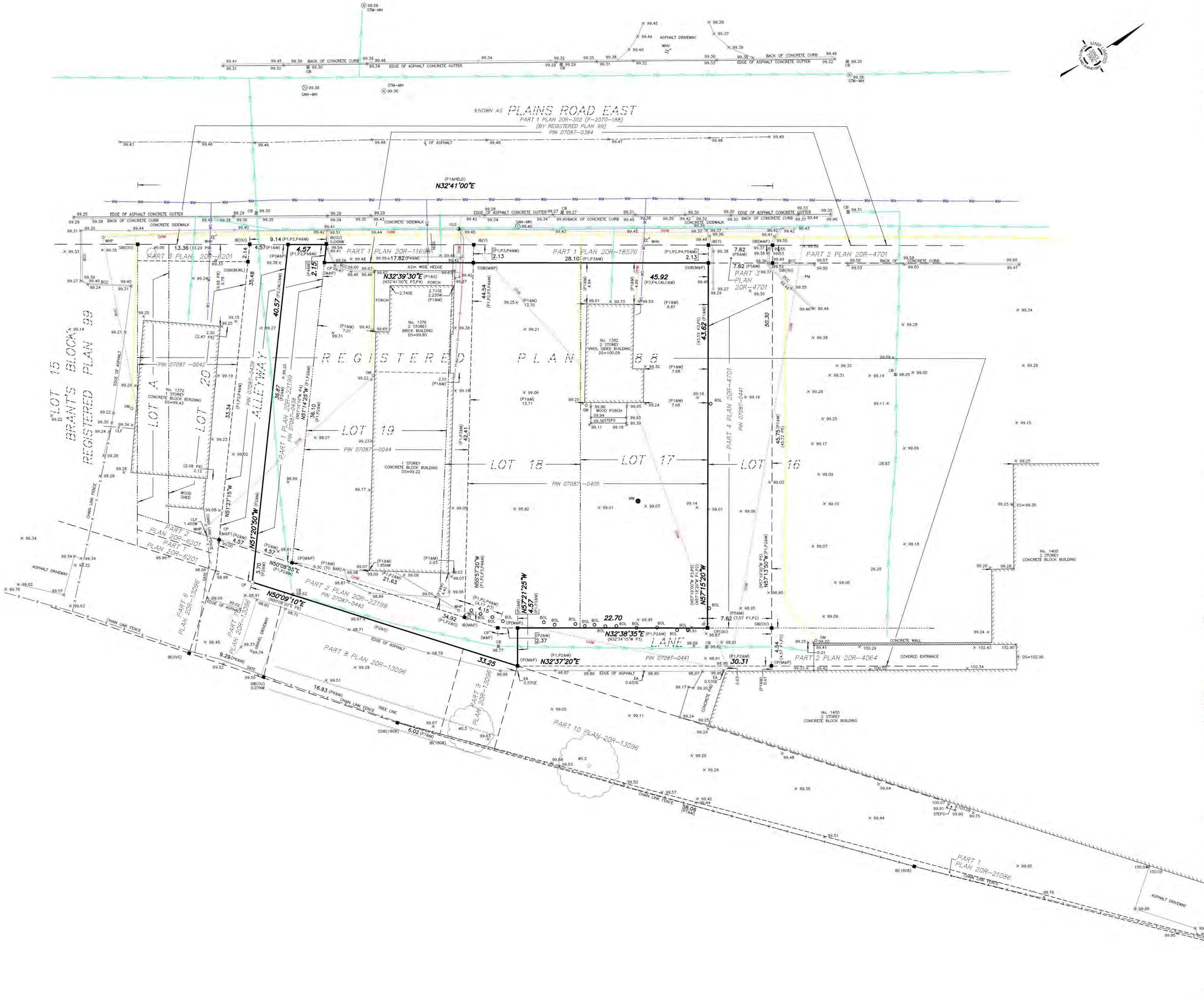
PRELIMINARY

WZMH ARCHITECTS

1376 & 1382 PLAINS ROAD EAST
Burlington, Ontario

SECTION A-A

Project No: 8192.00	Date 2025-08-07
Scale: 1:300	Drawing No:



PLAN OF SURVEY SHOWING TOPOGRAPHY OF

LOTS 17, 18 & 19

AND PART OF

ALLEYWAY AND LANE
REGISTERED PLAN 88

IN THE

CITY OF BURLINGTON

REGIONAL MUNICIPALITY OF HALTON

SCALE 1 : 200

0 5 10 20 metres

THE INTENDED PLOT SIZE OF THIS PLAN IS 910mm IN WIDTH BY 680mm IN HEIGHT WHEN PLOTTED AT A SCALE OF 1:200 (INCLUDING 15mm BEYOND EACH BORDER)

MacKAY, MacKAY & PETERS LIMITED - ONTARIO LAND SURVEYORS
© 2023

METRIC DISTANCES AND COORDINATES SHOWN HEREON ARE IN METRES AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

COLOUR THE ORIGINAL SIGNED PRINT OF THIS PLAN OF SURVEY CONTAINS COLOUR

ASSOCIATION OF ONTARIO LAND SURVEYORS
PLAN SUBMISSION FORM
V-52479

THIS PLAN IS NOT VALID UNLESS IT IS AN EMBOSSED ORIGINAL COPY ISSUED BY THE SURVEYOR IN ACCORDANCE WITH REGULATION 1026, SECTION 29(3)

LEGEND

■ DENOTES A SURVEY MONUMENT FOUND
□ DENOTES A SURVEY MONUMENT PLANTED
SIB DENOTES STANDARD IRON BAR
SSIB DENOTES SHORT STANDAR IRON BAR
IB DENOTES IRON BAR
CP DENOTES CONCRETE PIN
P1 DENOTES PLAN BY MMP LIMITED DATED DECEMBER 14, 2015 (18-312)
P2 DENOTES PLAN 20R-22199
P3 DENOTES PLAN 20R-18576
P4 DENOTES PLAN 20R-11699
P5 DENOTES PLAN 20R-4701
P6 DENOTES PLAN 20R-13096
P7 DENOTES PLAN 20R-21086
P8 DENOTES PLAN BY SEWELL & SEWELL DATED APRIL 3, 1979 (79-142)
PIN DENOTES PROPERTY IDENTIFICATION NUMBER
(OU) DENOTES ORIGIN UNKNOWN
DS DENOTES DOOR SILL ELEVATION
℄ DENOTES CENTRELINE
BCC DENOTES SHORT STANDAR IRON BAR
MW DENOTES MONITORING WELL
PM DENOTES PARKING METER
WHV DENOTES WATER HYDRANT VALVE
CB DENOTES CATCH BASIN
SAN-MH DENOTES SANITARY MANHOLE
STM-MH DENOTES STORM MANHOLE
WHP DENOTES WOOD HYDRO POLE
ULS DENOTES UTILITY LIGHT STANDARD
OHW DENOTES OVERHEAD WIRE
GM DENOTES GAS METER
BOL DENOTES BOLLARD
BF DENOTES BOARD FENCE
CLF DENOTES CHAIN LINK FENCE
EA DENOTES EDGE OF ASPHALT
DENOTES GAS MAIN LOCATE
DENOTES GAS SERVICE LOCATE
—H— DENOTES HYDRO LOCATE
—WM— DENOTES WATER MAIN LOCATE
—WS— DENOTES WATER SERVICE LOCATE
—SAN— DENOTES SANITARY SEWER LOCATE
—STM— DENOTES STORM SEWER LOCATE
(S) DENOTES TREE STUMP
DENOTES DECIDUOUS TREE SCALED TO CANOPY TRUNK SIZE SHOWN IN METRES

ALL BUILDING TIES ARE TO BUILDING SIDING MATERIAL AND ARE PERPENDICULAR TO PROPERTY LINES UNLESS OTHERWISE NOTED

A ROTATION OF 01°05'20" HAS BEEN APPLIED TO BEARINGS ON P2
A ROTATION OF 01°02'20" HAS BEEN APPLIED TO BEARINGS ON P3
A ROTATION OF 00°15'15" HAS BEEN APPLIED TO BEARINGS ON P5

UTILITY LOCATE NOTE

UTILTIY LOCATES UNDERTAKEN BY CONQUEST LOCATING ON APRIL 18, 2023

BENCHMARK NOTE

CITY OF BURLINGTON BENCHMARK No. 446
ELEVATION = 100.192 METRES (CGVD28:78 ADJUSTMENT)
BRASS PLAQUE SET ON EAT FACE OF CONCRETE BOX CULVERT ON PLAINS ROAD APPROXIMATELY 150 METRES EAST OF BRANT STREET AND 0.20 METRES BELOW TOP OF WALL WEST OF THE COURT HOUSE

BEARING REFERENCE

BEARINGS ARE ASTRONOMIC AND REFERRED TO THE SOUTHEASTERLY LIMIT OF PLAINS ROAD EAST AS SHOWN ON P1 HAVING A BEARING OF N32°41'00"E

SURVEYOR'S CERTIFICATE

I CERTIFY THAT:
1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE 13th DAY OF SEPTEMBER, 2023.

SEPTEMBER 15, 2023
DATE

F.K RAD
ONTARIO LAND SURVEYOR
FOR MACKAY, MACKAY AND PETERS LIMITED

E:\(20) Halton\Registered Plans\RP0088\LOT 17, 18, 19\23-070\23-070-PS.dwg

MMP
MacKay, MacKay & Peters Limited
LAND SURVEYORS & MAPPERS
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Unit 101
Burlington, ON
L7N 3J5
(905) 639-1375
halton@mmplimited.com
mmplimited.com

DRAWN BY:	G.S.
PARTY CHIEF:	N.C.
CHECKED BY:	FK
PROJECT No.:	23-070-PS