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Hydrogeological Investigation
Proposed Residential Development
925 Main Street West
Hamilton, Ontario
L8S 4P3

Prepared for:

925 Main Street West (Hamilton) Limited
c/o Effort Trust
50 King St. East
Hamilton Ontario
L8N 1A6

Landtek File: 22371
May 8, 2026

EXECUTIVE SUMMARY

SCOPE OF SERVICES

Proposed Development	It is understood that the proposed development will comprise of a 26 and 29 storey towers, a 6-level podium, with 4-levels of underground parking, below the towers and podium, across the site.
Report Deliverables	The Hydrogeological Investigation is required to assess the current site groundwater conditions, determine potential development/post development effects of the proposed development; and provide monitoring and mitigation plans for the development.

SITE DETAILS AND SETTING

Coordinates	589020, 4790130	Geodetic Elevation	99 m to 101 m
Site Description	The site is located on the south-west corner of Main Street West and Longwood Road South, with the proposed development located on table lands at the top of the valley slope along the Chedoke Expressway. The site is currently unoccupied, with all former structures removed to ground surface level and only locally limited, asphalt surfaced pavements remaining.		
Geology	Existing pavement materials were encountered at the ground surface in all boreholes. Fill material consisting of mainly silt was encountered underlying the pavement materials and extend to depths between approximately 1.5 m and 5.4 m. Interbedded clay, silt and sand deposits under the fill materials. Bedrock was encountered at depths ranging between approximately 39.1 m and 47.2 m, equating to Geodetic elevations of approximately 60.1 m and 50.1 m respectively.		
Groundwater	Groundwater, water seepages or saturated soils were encountered during drilling in the majority of boreholes at depths between approximately 3.0 m and 11.9 m below existing ground level, respectively. Seven return, groundwater monitoring well visits have been completed at the site. Further information pertaining to groundwater conditions is provided in the Hydrogeological Assessment for the site, as reported under separate cover. Depths to groundwater in all monitoring wells at the Site were obtained manually by Landtek staff from December 2022 to May 2023. The readings are presented in Table 3 of this report. Based on the recorded groundwater levels, the highest water level was determined to be 2.06 mbgs (97.42 masl) at MW22-5S on April 19, 2023.		

DEWATERING CONSIDERATIONS

Short Term	The short-term dewatering rate outside periods of active precipitation, under normal conditions, was determined to be approximately 71,746 L/day (0.83 L/s). Normal conditions are considered to be weather conditions that should be expected during the operation of the construction dewatering. Normal operation does not include extreme weather events.
Long Term	The following two options are available to implement groundwater control measures for the above volume. 1. Damp proof of the basements by use of weeping tiles and perimeter drainage to avoid the potential inflow of groundwater into the underground basements post-construction, subject to the approval of The City of Hamilton, <u>or</u> 2. Waterproof of the underground basements below the established "seasonally high groundwater level" plus the required buffer zone (nominally 1.0 m to 1.5 m above).
Monitoring and Mitigation Plans	Monitoring, mitigation, and contingency plans are provided. The monitoring plans include dewatering abstraction, construction, and settlement monitoring. Mitigation includes methods to limit adverse dewatering settlement.

DEWATERING PERMIT

EASR	The dewatering rate of groundwater for the proposed excavation is estimated to be 71,746 L/day (0.83 L/s). Based on this volume, an Environmental Activity and Sector Registry (EASR) registration will be required at the Site.
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IMPACTS CONSIDERATION

Construction	The radius of influence from the proposed dewatering was determined to be approximately 40.0 m. Potential geotechnical impacts are anticipated within 40.0 m of Site during dewatering at the Site. As a result, surrounding buildings and roads should be monitored by geotechnical instrumentation to determine impact, if any.
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1.0 INTRODUCTION

1.1 Background

Landtek Limited (Landtek) has been retained by 925 Main Street West (Hamilton) Limited to complete a Hydrogeological Investigation for the proposed residential development at 925 Main Street West in Hamilton, Ontario (the Site or development).

The Site is located at the southwest corner of the intersection of Main Street West and Longwood Road South. It is bound to the north by Main Street West, to the east by Longwood Road South, to the south by a wooded undeveloped land, and to the west by a high-rise apartment building. The general Geodetic elevation at the site ranges between 99 masl and 101 masl. The Site location is shown on Figure 1, in Appendix A.

It is understood that the proposed development will comprise of a 26/27 tower and a 29-storey tower, 6-level podium, with 4-levels of underground parking, below the towers and podium, across the site. The First Floor and Underground Parking Levels Plans are shown on Figures 2a to 2e, in Appendix A.

The purpose of the Hydrogeological Investigation is to evaluate the groundwater conditions at the site, determine possible development/post-development effects, and suggest mitigation measures to minimize the effects to the shallow groundwater system during and post-development. Specifically, the report provides the following:

- A description of the hydrogeologic setting of the Site and a summary of the existing soil and groundwater conditions at the site.
- Identification of hydrogeologic features such as zones of significant groundwater recharge and discharge.
- Assessment of the requirement for groundwater control during construction, if any.

1.2 Work Scope and Report Organization

The scope of work for this investigation includes the following:

- Review of available background information. A review of published works including available geologic and hydrogeologic information for the site, topographical and geological maps, and water well records was completed. Meteorological data to assess the local climate was also reviewed.
- Site Assessment. A detailed visual inspection of the site and surrounding area to identify and document local topography, surface water drainage features, and the potential presence of significant hydrogeological features such as closed depressions (areas of ground water recharge), seeps, springs, or the presence of phreatophytic vegetation, was carried out.
- A subsurface investigation. This included drilling of boreholes and installation of monitoring wells at the Site to characterize the subsurface soil and/or bedrock as well as assess the site-specific groundwater conditions.

- Hydraulic Conductivity Tests. In-situ rising head tests were completed in selected installed monitoring wells to assess the subsurface soil and/or bedrock hydraulic conductivity.
- Groundwater Monitoring. Groundwater level monitoring was conducted in all monitoring wells in order to assess the seasonal depth of groundwater level across the site.

The report is organized as follows.

Section 1 contains a brief introduction to the project and the scope of work undertaken by Landtek.

Section 2 outlines the methodologies followed during completion of the desktop study and the field investigation.

Section 3 summarizes the findings of the investigation. It includes:

- a description of the physical setting
- the results of the field investigation

Section 4 provides Water Taking Evaluation and Impact Assessment

Section 5 provides Monitoring Plan.

Section 6 provides Mitigation Plan.

Section 7 provides Summary and Conclusions.

Section 8 provides recommendations.

Section 9 provides Closure.

Section 10 provides References.

Section 11 provides Limitations.

2.0 METHODOLOGY

2.1 Desktop Study

A review of published works comprising of available geological and hydrogeological information for the site including topographic and geologic maps was completed.

The Ministry of Environment, Conservation and Parks (MECP) water well database for the local area was also accessed and the individual well record obtained for wells located within 500 m radius of the Site.

2.2 Site Inspection to Assess Hydrogeologic Features

A detailed site inspection was conducted on October 14, 2022, to assess the presence of features which may be significant from a hydrogeologic viewpoint. In particular, the site was inspected to assess the following:

- The presence of closed drainage features, depressions, or sandy areas which may allow for ponding and significant or enhanced infiltration of water.
- Assessment of the presence of phreatophytic vegetation which may indicate seasonally high groundwater levels and/or groundwater discharge and seepage.
- Identification of any zones of visible seepage or groundwater discharge.

2.3 Field Investigation

2.3.1 Drilling and Well Installation

Landtek Limited, 2014, 2016 and 2019.

Landtek has carried out a number of Geotechnical Investigation phases at the site, the findings of which are provided in the following reports:

- “Preliminary Report, Geotechnical Investigation for Proposed Multi-Storey Building Development, 925 Main Street West at Longwood Road South, Hamilton, Ontario”, reference 14293, dated November 19, 2014;
 - October 10 to 15, 2014: Ten boreholes (boreholes BH1 to BH10) to depths between approximately 50.0 m and 39.6 m;
- “Slope Condition, Stability and Rehabilitation Appraisal, Proposed Columbia International School Residence, 925 Main Street West, Hamilton, Ontario”, reference 15014, dated September 19, 2016; and,
- “Supplementary Geotechnical Investigation Letter Report, Proposed CIC Student Residence, 925 Main Street West, Hamilton, Ontario”, reference 19328, dated October 17, 2019.
 - September 25 and October 2, 2019: Four boreholes (boreholes BH101 to BH104) to depths between approximately 30.9 m and 49.1 m;

Landtek, 2022

In September, November, and December of 2022 (in conjunction with geotechnical and



hydrogeological investigations, reported under separate covers), fifteen (15) boreholes (MW22-1S, MW22-1D, MW22-2S, MW22-2D, MW22-3S, MW22-4D, MW22-5S, MW22-6S, MW-6D, MW22-7S, MW22-8S, MW22-8D, BH9, MW22-10S, MW22-10D, and MW22-11) were drilled on the Site, fourteen (14) of which were installed as groundwater monitoring wells. The boreholes were advanced using a track mounted D 70 drill rig and final borehole depths of between 5.0 m to 15.2 meters below ground surface (m bgs) (16.5 ft to 50.0 ft).

Fieldwork undertaken at the site by Landtek included clearance of underground services, borehole layout, borehole drilling and soil sampling, and field supervision. A total of 29 boreholes were drilled at the site for both Geotechnical and Hydrogeological investigation purposes. Full time supervision of drilling and soil sampling operations was carried out by a representative of Landtek.

The boreholes were advanced using a continuous flight power auger track-mounted drill rig equipped with conventional soil sampling and testing tools. The drilling was conducted by Element Geo of Hamilton Ontario under the supervision of a member of Landtek staff who logged the borings and examined the samples as they were obtained. The results of the drilling are recorded in detail on the accompanying borehole logs, provided in Appendix B.

The monitoring wells were constructed with 50 mm inner diameter, Schedule 40 machine slotted PVC screens equipped with a bottom cap, and machine threaded riser pipe. The screen length and slot size are 3.0 m, and 0.10-inch, respectively.

The annular space between the PVC riser pipes and each borehole wall was backfilled to at least 0.3 m above the top of the screen with selected silica sand. A bentonite seal was placed immediately above the sand pack to a height just below grade. Each monitoring well was finished with a flushmount protective steel casing, which was cemented in-place.

A summary of the monitoring well installation details is presented below in Table 1. The locations of the monitoring wells are shown on Figure 3, in Appendix A.

Table 1. Construction Details

Monitoring Well ID	Easting* (NAD83)	Northing* (NAD83)	Ground Surface Elevation (masl)**	Well Depth (mbgs)	Surface Completion	Screened Interval (m)	Screened Material
MW1	589053	4790154	99.14	10.6	Flush Mount	7.6-10.6	Sand
MW22-1S	589077	4790138	99.78	4.5	Flush Mount	1.5-4.5	Clayey/Sandy Silt
MW22-1D	589077	4790138	99.78	12.1	Flush Mount	9.1-12.1	Clayey Silt
MW22-2S	589056	4790129	99.16	4.5	Flush Mount	1.5-4.5	Sandy Silt
MW22-2D	589056	4790129	99.16	12.1	Flush Mount	9.1-12.1	Silt/Sand
MW22-3S	589062	4790154	99.13	4.5	Flush Mount	1.5-4.5	Clayey/Sandy Silt
MW22-4D	589061	4790142	99.32	12.1	Flush Mount	9.1-12.1	Clayey Silt
MW5	589053	4790138	99.30	4.6	Flush Mount	1.5-4.5	Sand and Silt
MW22-5S	589052	4790133	99.48	4.5	Flush Mount	1.5-4.5	Sand and Silt
MW22-6S	589026	4790122	99.55	4.5	Flush Mount	1.5-4.5	Sand and Silt
MW22-6D	589026	4790122	99.55	12.1	Flush Mount	9.1-12.1	Silt
MW22-7S	588995	4790128	99.16	4.5	Flush Mount	1.5-4.5	Sand and Silt
MW22-8S	588978	4790115	99.93	4.5	Flush Mount	1.5-4.5	Silt
MW22-8D	588978	4790115	99.93	13.6	Flush Mount	10.6-13.6	Silt
MW22-10S	588966	4790102	99.10	4.5	Flush Mount	1.5-4.5	Silt
MW22-10D	588966	4790102	99.10	13.7	Flush Mount	10.7-13.7	Silt
MW22-11	588955	4790114	99.26	4.5	Flush Mount	1.5-4.5	Silt

Notes:

masl = meters above sea level



mbgs = meters below ground level

m = meters

* Values are approximate by GPS +/- 4 m

**The approximate geodetic elevations reference: A.T. McLaren Limited, Legal and Engineering Surveys (Dwg No. 34539-T2, December 9, 2019).

2.3.2 Monitoring Well Development and Water Quality Testing

Well Development: Each of the installed monitoring wells was developed to remove any sediment that may have been introduced during installation and to improve the hydraulic properties of the formation against which the wells were screened. The monitoring wells were developed by Landtek staff on December 9, 2022. Development employed electric well pump/waterra tubing with foot valves, and each well was developed until a visible decrease in turbidity and steady flow were observed.

2.3.3 Groundwater Water Quality Testing

On April 21, 2026, groundwater samples were collected from monitoring wells MW22-4D, MW22-15, and MW22-6D after purging. All collected samples were stored in a cooler with freezer packs after collection and during transport to PARACEL Laboratories in Stoney Creek, Ontario. The samples were analyzed for the City of Hamilton Sanitary/Combined and Storm Sewers discharge parameters analysis. PARACEL is accredited by the Canadian Associations for Laboratory Accreditation Inc. (CALA).

2.3.4 Hydraulic Conductivity Testing

Hydraulic conductivity test was completed in the following four monitoring wells (MW22-2S, MW22-3S, MW22-6D and MW22-10D), installed by Landtek in November and December 2022, to provide estimates of the hydraulic conductivity for the zones against which the screens for the wells were set. The rising head tests were conducted by Landtek on December 21, 2022, and February 8, 2023. The tests involved the displacement of a known volume of groundwater and recording of the response groundwater levels with a Datalogger programed at 2 second intervals.

Data Analysis: The rising head test data were analyzed using AqteSolve Professional Version 4.5 software package developed by Glenn M. Duffield of HydroSOLVE Inc. applying the Hvorslev analysis solutions, depending on hydrogeology.

3.0 FINDINGS

3.1 Topography, Drainage and Hydrology

The topography at the site ranges from 99 masl to 101 masl. The Site is located in the Hamilton Region Source Protection Area in a Highly Vulnerable Aquifer Area with a score of 6. It is located in a regulated designated area by the Hamilton Conservation Authority (HCA, November 25, 2021).

According to the Karst Map of Southern Ontario, the Site is not located in a potential Karst area – areas of carbonate rock units identified as most susceptible to karst processes (Ontario Geological Survey).

3.2 Regional Physiography

The site is located within the physiographic region known as the Iroquois Plain, which lies between the foot of the Niagara Escarpment and Lake Ontario (Chapman and Putnam, 1984; Chapman and Putnam, 2007). This Region resulted from inundation of the area in the late Pleistocene by glacial Lake Iroquois. The Iroquois Plain consists of lacustrine deposits and lake-bottom sediments that have been smoothed by wave action and extends around the western end of Lake Ontario. The width of the Plain in the Winona area is approximately 2.5 km. The plain is cut by a number of creeks between Lake Ontario and the Niagara Escarpment (City of Hamilton, 2010).

3.3 Climate

The site is located in the Mixedwood Plains ecozone of Ontario (Natural Resources Canada, 2012). The general climate data presented below in Table 2 was obtained from Environment Canada publications and from the Environment Canada online database. Average climate data was taken from the Hamilton A station (Hamilton Airport) for the period of 1981 to 2010.

Table 2. 1981 to 2010 Climate Normals for Hamilton A Station (as averages)

Month	Daily Average Temperature (°C)	Average Rainfall (mm)	Average Snowfall (cm)	Average Precipitation (mm)
January	-5.5	29.7	40.8	64.0
February	-4.6	28.2	35.1	57.8
March	-0.1	42.6	26.5	68.4
April	6.7	71.3	8.4	79.1
May	12.8	78.7	0.5	79.4
June	18.3	84.9	0.0	84.9
July	20.9	100.7	0.0	100.7
August	20.0	79.2	0.0	79.2
September	15.8	81.9	0.0	81.9
October	9.3	76.5	0.7	77.4
November	3.7	74.4	11.0	84.3
December	-2.3	43.8	33.5	73.0
Year	7.9	791.7	156.5	929.8

3.4 Regional Geology

The City of Hamilton is underlain by clastic and carbonate sedimentary rocks of Late Ordovician to Middle Silurian age, which make up parts of three major depositional sequences (Johnson et al., 1992). The oldest bedrock unit outcropping in the area, the Queenston Formation, is predominantly dark red, fissile, hematitic, calcareous shale (Liberty et al., 1976).

The Queenston Formation is found north of the Niagara Escarpment and consists in many places of up to 4 feet (1.2 m) of very weathered bedrock (red clay) which grades downward into typical brick-red shale. The Queenston shale is overlain by Halton Till in the area of the site.

The Late Wisconsinan Halton Till is a clay to clayey silt till and is exposed in the form of a till plain from Lake Ontario southward to the Niagara Escarpment. It is the youngest glacial unit in the region and has been found to be relatively thick (up to 30 m) in the buried bedrock valley between Grimsby and Grimsby Beach. The basal part of the till is red, relatively coarser textured, and consists almost entirely of Queenston shale. Proglacial Lake Iroquois clay, silt and sand is mapped as overlying the Queenston shale in the southern portion of the site. The lake terrace is mainly underlain by Queenston shale and Halton Till although a sheet of predominantly fine sand was deposited along the shoreline and is relatively thicker (up to 4.5 m) in the vicinity of Grimsby (Feenstra, 1974).

3.5 Local Geology

Based on previous geotechnical investigations completed at the Site by Landtek, the subsurface deposits comprise of silty clay, silt and silty sand deposits. The superficial deposits extend to depths between approximately 39.1 m (Geodetic elevation 60.1 m) and 47.2 m (Geodetic elevation 52.0 m) below existing ground level. Bedrock was encountered in two boreholes underlying the superficial deposits.

3.6 Local and Regional Hydrogeology

Local hydrogeology conditions were assessed on the basis of local water well records and available ground investigation reports for the area.

The hydrostratigraphy (i.e., the vertical sequence and horizontal extent of aquifers and aquitards) in the overburden and bedrock generally follows the geologic layering. Till formations in the overburden act as aquitards while the sandier units generally behave as aquifers. Shale generally acts as an aquitard with an upper weathered bedrock aquifer layer (City of Hamilton, 2010).

The Halton till has low infiltration potential due to the composition of the clay and density of the till. The groundwater recharge potential is classified as moderate to low in the area.

3.7 MECP Water Well Records and Groundwater Resources

The Ministry of Environment, Conservation and Parks (MECP) Water Well Information System is a publicly available database which contains information such as groundwater well location, well construction details, static water level, geologic units encountered with depth, general water quality observations, water use, date of construction, and screened interval.

The MECP records for wells located within approximately 500 meters of the site were reviewed to assess the general nature and use of the groundwater resource in the area and to characterize local hydrogeologic conditions.

Desk Top Study

A search of the MECP water well records within approximately 500 m of the site, conducted on September 13, 2022, returned a total of one hundred and fourteen (114). A summary is presented below. The locations of the wells are shown on Figure 4 in Appendix A.

A summary of the data obtained from the well completed survey is presented below.

Well Uses

• Domestic Wells.....	0
• Observation Wells	54
• Test Hole/Monitoring Wells	32
• Abandoned Wells	17
• No Information.....	11
• Total.....	114

Based on the well records, it was determined that there are no water wells within 500 m radius of the Site.

3.8 Results of Site Inspection

A detailed site inspection was conducted on October 14, 2022, to assess the presence of features which may be significant from a hydrogeologic viewpoint.

Presence of significant hydrogeologic features such as closed depressions (areas of ground water recharge), seeps, springs, or the presence of phreatophytic vegetation were not observed during the inspection.

3.9 Results of Subsurface Investigation

The geology encountered across the site was as anticipated from Landtek's review of the published geological information for the site, as indicated in Section 3.5, with the predominant soils comprising glaciolacustrine silt and clay deposits, till deposits and deeper shale bedrock.

Detailed boreholes and monitoring wells logs are presented in Appendix B, and the lithologies encountered during drilling are discussed further in the following sections.

Organic Soils

Organic soils were not encountered during this investigation.

Existing Pavement Materials

Existing pavement materials were encountered in all boreholes. Asphalt thicknesses of the existing pavements range between approximately 75 mm and 250 mm.

Though variable, the asphalt is underlain in part by a pavement granular material comprising of a sand and gravel product that ranges in measured thicknesses of approximately 110 mm to 380 mm.

Fill Materials

Fill material was encountered underlying the pavement structure in all boreholes and extends to depths of between approximately 1.5 m and 5.4 m below existing ground level. The fill is primarily brown in colour and comprises predominantly of clay and silt with variable fractions of gravel and sand. Asphalt, concrete and brick fragments are also noted.

Clayey Silt and Silt

Clayey silt and interbedded silt deposits were encountered underlying the fill materials in all boreholes. These deposits extend to depths between approximately 15.2 m and 27.5 m. The clayey silt and silt deposits contain variable fractions of clay and fine sand, and are generally brown in colour, becoming grey at depth.

Silty Sand to Sandy Silt

Silty sand to sandy silt deposits were encountered in all boreholes at depths between 3.0 m and 11.5 m below ground level, generally as interbeds with the clayey silt and silty clay deposits. The silty sand and sandy silt layers are between approximately 0.7 m and 3.0 m thick, and include variable but generally trace fractions of gravel, and are brown in colour.

Sand

Sand deposits were encountered locally and at variable depth, ranging between 5.5 m depth and 11.4 m depth. The sands are approximately 2.3 m to 5.2 m thick and include trace fractions of gravel and silt and are generally brown in colour.

Bedrock

Red shale of the Queenston Formation was encountered underlying the silty clay at depths ranging between approximately 39.1 m (borehole BH104) and 47.2 m (borehole BH102) below existing ground level, equating to Geodetic elevations of approximately 60.1 m and 50.1 m respectively.

Groundwater

Groundwater, water seepages or saturated soils were encountered during drilling in the majority of boreholes at depths between approximately 3.0 m and 11.9 m below existing ground level, respectively. These conditions are interpreted as the groundwater 'strike', i.e., the depth at which groundwater is encountered and is associated with the more permeable, silty and sandy deposits.

3.10 Groundwater Monitoring

Depths to groundwater in all monitoring wells were obtained manually by Landtek staff from December 2022 to May 2023. The readings are presented on the following page in Table 3.

Table 3. Groundwater Monitoring Data

MW ID	Date	Total Depth (mbgs)	Water Strike (mbgs)*	Completion	Water Level (mbgs)	Water Level (masl)	Ground Elevation (masl)**
MW1	9-Dec-22	10.6	9.3	Flush Mount	9.36	89.78	99.14
	21-Dec-22				9.60	89.54	
	13-Jan-23				9.37	89.77	
	8-Feb-23				-	NA	
	23-Mar-23				8.36	90.78	
	19-Apr-23				9.39	89.78	
	23-May-23				9.25	89.89	
MW22-1S	9-Dec-22	4.5	3.0	Flush Mount	3.83	95.95	99.78
	21-Dec-22				3.57	96.21	
	13-Jan-23				3.13	96.65	
	8-Feb-23				3.36	96.42	
	23-Mar-23				2.92	96.86	
	19-Apr-23				3.31	96.47	
	23-May-23				3.31	96.47	
MW22-1D	9-Dec-22	12.1	11.5	Flush Mount	9.15	90.63	99.78
	21-Dec-22				9.25	90.53	
	13-Jan-23				9.20	90.58	
	8-Feb-23				-	NA	
	23-Mar-23				9.15	90.63	
	19-Apr-23				9.08	90.70	
	23-May-23				9.0	90.78	
MW22-2S	9-Dec-22	4.5	None	Flush Mount	Dry	NA	99.16
	21-Dec-22				4.27	94.89	
	13-Jan-23				3.43	95.73	
	8-Feb-23				3.57	95.59	
	23-Mar-23				3.06	96.10	
	19-Apr-23				3.55	95.61	
	23-May-23				3.62	95.54	
MW22-2D	9-Dec-22	12.1	11.9	Flush Mount	11.92	87.24	99.16
	21-Dec-22				11.93	87.23	
	13-Jan-23				11.90	87.26	
	8-Feb-23				-	NA	
	23-Mar-23				11.97	87.19	
	19-Apr-23				11.95	87.21	
	23-May-23				11.95	87.21	
MW22-3S	9-Dec-22	4.5	NA	Flush Mount	3.82	95.31	99.13
	21-Dec-22				3.49	95.64	
	13-Jan-23				3.08	96.05	
	8-Feb-23				3.16	95.97	
	23-Mar-23				2.64	96.49	
	19-Apr-23				3.10	96.03	
	23-May-23				3.19	95.94	
MW22-4D	9-Dec-22	12.1	11.5	Flush Mount	9.38	86.94	99.32
	21-Dec-22				9.59	86.73	
	13-Jan-23				9.42	86.90	
	8-Feb-23				9.62	86.70	
	23-Mar-23				9.51	86.81	
	19-Apr-23				8.95	87.37	
	23-May-23				9.39	89.93	
MW5	9-Dec-22	4.6	3.6	Flush Mount	4.00	95.30	99.30
	21-Dec-22				3.55	95.75	
	13-Jan-23				2.08	97.22	
	8-Feb-23				-	NA	
	23-Mar-23				1.88	97.42	
	19-Apr-23				2.21	97.09	
	23-May-23				2.27	97.03	
MW22-5S	9-Dec-22	4.5	None	Flush Mount	4.03	95.45	99.48

	21-Dec-22				3.51	95.97	
	13-Jan-23				2.90	96.58	
	8-Feb-23				-	NA	
	23-Mar-23				2.31	97.17	
	19-Apr-23				2.06	97.42	
	23-May-23				3.60	95.88	
MW22-6S	9-Dec-22	4.5	None	Flush Mount	Dry	NA	99.55
	21-Dec-22				Dry	NA	
	13-Jan-23				3.51	96.04	
	8-Feb-23				-	NA	
	23-Mar-23				2.38	97.17	
	19-Apr-23				2.51	97.04	
	23-May-23				3.75	95.80	
MW22-6D	9-Dec-22	12.1	11.9	Flush Mount	11.21	88.34	99.55
	21-Dec-22				11.30	88.25	
	13-Jan-23				11.01	88.54	
	8-Feb-23				-	NA	
	23-Mar-23				10.90	88.65	
	19-Apr-23				10.21	89.34	
	23-May-23				10.50	89.05	
MW22-7S	9-Dec-22	4.5	None	Flush Mount	3.72	95.44	99.16
	21-Dec-22				3.57	95.59	
	13-Jan-23				2.76	94.40	
	8-Feb-23				-	NA	
	23-Mar-23				2.31	96.85	
	19-Apr-23				3.05	96.11	
	23-May-23				3.21	95.95	
MW22-8S	9-Dec-22	4.5	None	Flush Mount	Dry	NA	99.43
	21-Dec-22				Dry	NA	
	13-Jan-23				Dry	NA	
	8-Feb-23				-	NA	
	23-Mar-23				Dry	NA	
	19-Apr-23				Dry	NA	
	23-May-23				Dry	NA	
MW22-8D	9-Dec-22	13.6	7.6	Flush Mount	10.57	88.86	99.43
	21-Dec-22				11.08	88.35	
	13-Jan-23				10.59	88.84	
	8-Feb-23				-	NA	
	23-Mar-23				10.06	89.37	
	19-Apr-23				10.25	89.18	
	23-May-23				10.71	88.72	
MW22-10S	9-Dec-22	4.5	None	Flush Mount	Dry	NA	99.10
	21-Dec-22				Dry	NA	
	13-Jan-23				Dry	NA	
	8-Feb-23				-	NA	
	23-Mar-23				Dry	NA	
	19-Apr-23				Dry	NA	
	23-May-23				Dry	NA	
MW22-10D	9-Dec-22	13.7	6.8	Flush Mount	10.63	88.47	99.10
	21-Dec-22				10.68	88.42	
	13-Jan-23				10.45	88.65	
	8-Feb-23				-	NA	
	23-Mar-23				9.88	89.22	
	19-Apr-23				9.58	89.52	
	23-May-23				10.38	88.72	
MW22-11	9-Dec-22	4.5	None	Flush Mount	Dry	NA	99.26
	21-Dec-22				Dry	NA	
	13-Jan-23				4.32	94.94	
	8-Feb-23				-	NA	
	23-Mar-23				4.07	95.19	
	19-Apr-23				Dry	NA	

	23-May-23				Dry	NA	
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Notes:

[*] water strike/groundwater seepage
mbgs = meters below ground surface
masl = meters above sea-level

**The approximate geodetic elevations reference: A.T. McLaren Limited, Legal and Engineering Surveys (Dwg No. 34539-T2, December 9, 2019).

Based on the recorded groundwater levels, the highest water level was determined to be 2.06 mbgs (97.42 masl) at MW22-5S on April 19, 2023.

3.11 Hydraulic Gradients and Flow

Vertical Hydraulic Gradient

Groundwater generally flows from the shallow to deeper aquifers as leakage across the aquitards. However, this may vary locally, and the direction of vertical flow depends on the relative heads in the different layers. Leakage rates vary locally depending on the magnitude of the vertical gradients and on the thickness and hydraulic conductivity of the confining units (City of Hamilton, 2010).

Horizontal Hydraulic Gradient

The direction of groundwater flow was obtained by triangulation. Based on groundwater elevation reading obtained at MW22-3S, MW22-6S, and MW22-72 on April 19, the groundwater flow direction was determined to be northwest towards Lake Ontario located approximately 1.4 km northwest of the Site. The flow gradient was determined to be 0.045 mm/mm. The groundwater contour diagram is shown on Figure 5 in Appendix A.

3.12 Estimated Hydraulic Conductivity

3.12.1 Hydraulic Conductivity Tests Analysis

The analyses were completed using the Hvorslev method (Fetter, 1994). The graphical results of the hydraulic conductivity analysis are presented in Appendix C, and the results are summarized below in Table 4.

Table 4. Hydraulic Conductivity Results

Monitoring Well	Hydraulic Conductivity (m/s)	Screened Material
MW22-2S	2.254×10^{-7}	Silt
MW22-3S	5.026×10^{-7}	Silt
MW22-6D	1.012×10^{-6}	Silt
MW22-10D	1.153×10^{-7}	Silt

The results indicate that the hydraulic conductivity of the screened Silt material which appears dominant at the site range from 1.153×10^{-7} m/s to 1.012×10^{-6} m/s with a geometric mean of 3.391×10^{-7} m/s.

3.13 Groundwater Quality

Copies of the laboratory Certificate of Analysis is provided in Appendix D. Based on the result, it was determined that all parameters were within the Sanitary/Combined Sewers discharge guideline limits with the exception of the parameters highlighted in red in the Table on the following page.



April 26, 2026

Monitoring Well	Parameter	Sanitary/Combined Sewer Discharge
MW22-4D	Chloride	2070 mg/L (Limit = 1500 mg/L)
MW22-4D	Total Suspended Solids (TSS)	1120 mg/L (Limit = 350 mg/L)
MW22-15	Aluminum	76.0 mg/L (Limit = 50 mg/L)
MW22-15	Iron	139 mg/L (Limit = 50 mg/L)
MW22-6D	Total Suspended Solids (TSS)	1540 mg/L (Limit = 350 mg/L)
MW22-6D	Chloride	1710 mg/L (Limit = 1500 mg/L)

4.0 WATER TAKING EVALUATION & IMPACT ASSESSMENT

It is understood that the proposed development will comprise of four levels of underground parking across the entire site area (see Figures 2b to 2e, in Appendix A).

The approximate dimensions of each of the underground levels plan were determined to be 118 m x 39 m

Proposed Dewatering Depth

Four levels of underground parking are proposed. As a result, the maximum depth of the underground levels is estimated to be 10.1 mbgs (Level 1 = 4.1 m, Level 2 = 3.0 m, level 3 = 3.0 m, and Level 4 = 3.0 m). A dewatering depth of approximately 0.5 m below the excavation bottom (13.6 mbgs) is assumed in order to keep the bottom of the excavation dry during construction.

Static Water Level

Depths to groundwater in all monitoring wells at the Site were obtained manually by Landtek staff from December 2022 to May 2023. The readings are presented in Table 3 of this report. Based on the recorded groundwater levels, the highest water level was determined to be 2.06 mbgs (97.42 masl) at MW22-5S on April 19, 2023.

4.1 Groundwater Dewatering Requirements

Groundwater seepage will occur where excavations are made below the groundwater level. If groundwater levels are intercepted within the excavation, adequate pumping should be provided to prevent significant groundwater volumes from accumulating.

In order to evaluate the potential groundwater control requirements during construction of the proposed underground parking levels, depth to groundwater of 2.06 mbgs, (the highest groundwater level recorded on April 19, 2023, at MW22-5S was assumed for the entire Site.

The method suitable for dewatering an excavation depends on the location, type, size and depth; and the hydrogeological conditions such as stratification, thickness, and hydraulic conductivity of the soils below the water table into which the excavation extends or is underlain. It is assumed that any groundwater dewatering for the Site excavations would likely be completed with standard construction sump pump/well points or equivalent, depending on conditions encountered such as water table elevation and subsurface materials. The pumps must appropriately be used to prevent the pumping of fines and loss of ground during dewatering activities, and the flow of water should be appropriately managed so that sediment is not pumped into the proposed discharge point.

For the purposes of this assessment, an open excavation was assumed. The use of conventional shoring could further reduce the amount of groundwater infiltration and should be determined in consultation with the selected subcontractor.

4.1.1 Dewatering Calculations

The potential groundwater flow rate to the underground parking excavation was estimated using the dewatering equation for a fully penetrated well of unconfined aquifer fed by circular source (Powers, et. al., 2007):



$$Q = \pi K (H^2 - h_w^2) / (\ln R_o / r_e)$$

Where: Q = pumping rate [m³/s]
K = hydraulic conductivity [m/s]
H = saturated thickness of the aquifer before dewatering [m]
h_w = saturated thickness of the aquifer after dewatering [m]
R_o = radius of cone of depression [m]
r_e = equivalent radius [m]

The radius of cone of depression R can be estimated using:

$$R_o = Ch * \text{Sqrt}(K)$$

Where: C = is a factor equal to 3000 for radial flow to a pumping well

h = H - h_w = required drawdown [m]
K = hydraulic conductivity [m/s]

Dewatering of a rectangular area can be accomplished by using an equivalent radius (r_e) to assess drawdown where r_e is given by the following equation:

$$\begin{aligned} r_e &= (a + b) / \pi && \text{(applies when } a/b < 1.5 \text{ and } R_o \gg r_e) \\ r_e &= \text{Sqrt}(\text{length} * \text{width} / \pi) && \text{(applies when } a/b > 1.5 \text{ and } R_o \ll r_e) \end{aligned}$$

Underground Parking Levels Excavation Dewatering

The volume of groundwater required to be pumped for dewatering the excavation associated with the underground level construction, assuming there is no rainfall and applying a factor of safety of 2.0, was determined be approximately 71,746 L/day (0.83 L/s) and the radius of influence determined to be approximately 40 m. These calculations and associated assumptions are provided on Table 1, Appendix E.

Direct precipitation was not assessed. Therefore, it is advised that dewatering should not be completed during period of active precipitation.

4.2 Dewatering Considerations

4.2.1 Estimating Dewatering Volume

4.2.2 Short Term Dewatering Volume

The short-term dewatering rate outside periods of active precipitation, under normal conditions, was determined to be approximately 71,746 L/day (0.83 L/s). Normal conditions are considered to be weather conditions that should be expected during the operation of the construction dewatering. Normal operation does not include extreme weather events.

4.2.3 Long Term Groundwater Control (Post Construction)

The following two options are available to implement groundwater control measures for the above volume.

1. Damp proof of the basements by use of weeping tiles and perimeter drainage to avoid the potential inflow of groundwater into the underground basements post-construction, subject to the approval of The City of Hamilton, or
2. Waterproof of the underground basements below the established “*seasonally high groundwater level*” plus the required buffer zone (nominally 1.0 m to 1.5 m above).

4.2.4 EASR/Permit to Take Water

The maximum dewatering rate of groundwater for the proposed excavation is estimated to be 71,746 L/day (0.83 L/s). Based on this volume, an Environmental Activity and Sector Registry (EASR) registration will be required at the Site.

4.2.5 Dewatering Procedure

Based on the results of the hydraulic conductivity tests, seepage through the overburden silt till beneath the Site should be feasible to be handled by a sump and/or well point dewatering system. The type of dewatering system to be used should be discussed with a dewatering contractor and evaluated based on volume estimate.

The following general construction practices should be implemented to minimize the volume of water to be extracted:

- Schedule construction outside the spring period when the water table is typically elevated and avoid constructing during period of active precipitation.
- Stage or construct excavation in such a manner to be able to manage dewatering volume conveniently.
- Reduce the length of time during which the excavation remains open.

4.2.6 Water Management and Discharge Plan

Water extracted during construction dewatering is required to be discharged into an approved sewer near the Site.

As per the Sewers ByLaw, in order to issue a discharge approval, information relating to the quality and quantity of the discharge must be provided to City of Hamilton. It is strongly recommended that the applicant provide this information eight to twelve weeks prior to the proposed start of discharge.

The rate and total volume of discharge during dewatering should be recorded. This would require that the discharge line be equipped with a flowmeter capable of monitoring the discharge rate and a volume totalizer to record the total volume of water discharged. The discharge rate and total daily flow should be recorded with the records maintained on site.

If needed, a weir tank and filter bag should be utilized during dewatering to reduce total suspended solids (TSS) and turbidity prior to discharging the water into a sewer system.

A T-Coupling and valves should be installed downstream of the flow meter, which, if necessary, can be operated to divert flow for mitigation purposes.

4.3 Assessment of Potential Impacts and Water Management

4.3.1 Impact to Existing Groundwater Users

A search of the Ontario MECP water well database for wells within an area extending to 500 m radius from the Site was completed.

A summary of the MECP Wells is presented in Section 3.7 of this report. The approximate locations of the wells are shown on Figure 4 in Appendix A. Based on review; no water well was identified within 500 m radius of the Site. As a result, potential impacts of construction excavation dewatering on water wells are not anticipated.

4.3.2 Impact to Surface Water and Natural Functions of the Ecosystem

The nearest surface water or natural functions of the Ecosystem to the Site is located approximately 105 m southeast of the Site. The estimated radius of influence from the proposed underground levels excavation dewatering was determined to be approximately 40.0 m. As a result, it is not anticipated that there will be any impact.

4.3.3 Contaminants Impacts

This occurs when pre-existing soil or groundwater contamination is mobilised and transported where transmission pathways are created.

A Phase 2 ESA was completed for the Site by Landtek in February 2023. Based on the available background information and testing completed during the course of the said investigation, the findings of the Phase Two ESA are summarized as follows:

Soil

Exceedances in soil include the following: Boron, SAR, Conductivity, Benzo(a)pyrene, Anthracene, Benzo(a)anthracene, Benzo(a)pyrene, Benzo(b)fluoranthene, Benzo(k)fluoranthene, Dibenzo(a,h)anthracene, Fluoranthene, and Indeno(1,2,3-cd)pyrene, Benzene, Ethylbenzene, 1,2-Dichloroethane, Xylenes, PHC F1, and Lead.

Pursuant to O. Reg. 153/04, Section 49.1 (1), SAR was determined by the QP to be attributable to the de-icing activities, and exceedance of SAR and/or EC were deemed **NOT** to exceed the Standards for the purposes of Part XV.1 of the EPA.

Impacted fill material was reported to a maximum depth of 3.0 m. Native soils tested were reported to be under the applicable O. Reg. 153/04 Table 3 SCS for R/P/I land uses.

Groundwater

Exceedances in soil include the following: Silver, 1,2-Dichloroethane, Trichloroethylene, VOCs, Xylenes, PHC F1, and PHC F2.

4.3.4 Geotechnical Impacts

Geotechnical impacts occur where the geotechnical properties or state of the ground are changed by groundwater dewatering activities. The most common type of impact in this category is ground settlement, with the corresponding risk of distortion and damage to structures, services and other sensitive infrastructure.

The Site is located at the southwest corner of the intersection of Main Street West and Longwood Road South. It is bound to the north by Main Street West, to the east by Longwood Road South, to the south by a wooded undeveloped land, and to the west by a high-rise apartment building. Based on the location, potential geotechnical impacts are anticipated during dewatering at the Site within a radius of influence of approximately 40.0 m.

Dewatering could be by pumping from a sump and well point dewatering system. The systems used for lowering the water table within the excavation should be properly screened and installed to ensure that pumping will not remove sediment from low permeability overburden aquifers. Removal of significant fines may result in the formation of voids and the loss of ground. It is anticipated that there will not be impact beyond the radius of influence of 40 m.

Surrounding buildings and roads should be monitored by geotechnical instrumentation to determine impact, if any.

It is recommended that a detailed Settlement mitigation and monitoring plan be prepared, based on Landtek's Hydrogeological Report and site conditions, for implementation during construction.

Preliminary monitoring and mitigation plans are presented in Sections 5 and 6, respectively.

5.0 MONITORING PLAN

5.1 Construction Monitoring

Once construction dewatering is initiated it will be difficult to stop pumping or significantly reduce the rate of pumping without disrupting construction activities. It will however be possible to monitor the drawdown response at the construction site and to adjust the pumping rate to optimize drawdown and the associated pumping rate.

5.2 Management of Dewatering Abstraction

5.2.1 Monitoring, Trigger Levels and Management Responses

Abstraction management is critical to ensure target water levels within the construction zone are met, but that over-pumping does not occur.

Target groundwater levels in- and outside excavations should be set individually for each dewatering monitoring well based on location, aquifer and construction requirements, in-line with stated dewatering aims above.

Trigger levels for wells should typically be set 0.5 m above the dewatering target and 1.0 m below the dewatering target to give a 1.5 m target operational zone. These targets may be reviewed and adjusted to decrease size of the operational target zone and increase the factor of safety.

If monitoring indicates that dewatering zone groundwater levels exceed the upper trigger levels (i.e., required drawdown is not being achieved or maintained) the following management actions should be carried out (in order of preference):

- Adjust automatic pump start and stop water levels.
- Increase pumping rates within the constraints of the system; and/or
- Install additional abstraction capacity (well points, spears or sump pumps).

If monitoring indicates that excavation zone groundwater levels are below the lower trigger levels (i.e., excessive drawdown) the following management actions should be carried out (in order of preference):

- Adjust automatic pump start and stop water levels; and/or
- Decrease pumping rates; and/or
- Reduce the number of pumps operating.

5.2.2 Contingency Responses

If management responses prove to be insufficient to achieve and maintain the target levels, excavations should be slowed or suspended to enable contingencies to be implemented. Available contingency measures include the following (in order of preference):

- Construction of additional dewatering wells, spears or sumps.
- Construction of additional drains or groundwater control structures.

Excavation should resume when the required drawdown is able to be reliably obtained.

5.3 Settlement Monitoring

Ground settlement can be caused by two principal mechanisms:

- Increase in effective stress as a result of lowering of groundwater levels, resulting in compression and consolidation of the ground. Such settlements are the unavoidable consequence of lowering of groundwater level.
- Removal of fine particles from the ground (loss of fines) which can occur when poorly controlled sump pumping draws out soil particles with the pumped water. With good design and implementation, loss of fines (and the associated settlement risk) can be avoided.

The potential ground subsidence (settlement) of the soil within the zone of influence due to the lowering of the groundwater level should be assessed considering the maximum drawdown to be achieved. The ground settlement usually results from an increase in effective stresses per metre of drawdown, due to the lowering of the groundwater level and subsequent decrease in pore pressure.

Maximum settlement usually occurs in the area adjacent to maximum drawdown points, and the potential of settlement decreases substantially towards the radius of influence limit. The clayey silt till deposit is relatively compressible and shale bedrock, is considered not readily compressible.

Implementation of a settlement monitoring plan should be completed within an approximate radius of influence of 40 m of the Site, the estimated radius of influence from dewatering. Prior to commencing dewatering, condition surveys of adjacent properties that could potentially be affected by dewatering, considering anticipated effects and specific dewatering design, should be completed.

Temporary access permit should be obtained from properties and utilities owners within the estimated radius of influence of the Site on a case-by-case basis prior to construction

The following monitoring measures are recommended to be carried out before and during the temporary dewatering:

- Complete a pre-excavation condition survey and install settlement monitoring monuments and or markers at the existing buildings and roadways within the estimated zone of influence. This should be done to document existing ground elevations and building/structure conditions.
- The settlement monitoring monuments (markers) should be surveyed prior to the dewatering to establish a baseline and surveyed on a daily basis during the dewatering.
- A typical settlement monitoring system should comprise a series of settlement markers sited at various distances beyond and at the site, within the zone of influence of groundwater drawdown. Monitoring points should be surveyed to an accuracy of ± 2 mm. Note that the reference benchmark must be located beyond the extent of the anticipated influence of groundwater drawdown. For very high-risk projects, incorporation of piezometer standpipes will allow confirmation of the field groundwater drawdown and will enable calibration of field settlement observation with theoretical assessments.

- Alert and Action settlement thresholds should be set, selected through theoretical assessment of anticipated settlements and review of sensitivity of adjacent structures and infrastructures. It is prudent to implement staged groundwater drawdown, providing holding points to allow adequate time to enable observation of the delayed settlement response of the ground, if any.
- The monitoring program should include review and alert levels. If instrument readings exceed “review” levels, the Proponent and its Contractor will jointly assess the necessity of altering the method, rate, or sequence of construction.
- The survey results should be provided to the project geotechnical engineer for evaluation. The estimated potential and actual settlements should also be reviewed by a structural engineer to assess the potential damage to the existing structures.

6.0 MITIGATION PLAN

The groundwater dewatering activities will result in localized depression of the groundwater table within an approximate 40 m radius of the site.

Mitigation should involve the reduction or elimination of the impacts induced by construction dewatering. The potential exists for dewatering to cause ground settlement, with the corresponding risk of distortion and damage to structures, services and other sensitive infrastructure by the Site.

Methods to limit adverse dewatering settlement should include the following:

- Settlement associated with loss of fines should be mitigated through appropriate design of the dewatering system to control flow velocity and provide screens and/or filters matched to the grading of the in-situ soils. Entrainment of fines must be monitored during construction; actions could include analysis of TSS in discharge water and/or monitoring of accumulation of sediment in sedimentation tanks.
- Drawdown-induced ground settlement should be mitigated through pre-construction estimation of groundwater drawdown and settlement coefficients to identify risk prior to drawing the groundwater down, and water level monitoring in monitoring wells to check that larger drawdown than anticipated at distance from the excavation are not occurring.
- Differential settlement is most problematic. This should be reduced by managing the rate of drawdown and understanding where clear changes in soil type occur. Should potentially damaging settlement be indicated, these can be mitigated by installing groundwater cut-offs to stem or restrict groundwater flow and limit drawdown beyond the site.
- Sufficient temporary support should be provided for excavations to maintain stability, where seeps might otherwise induce progressive collapse of the sides of the excavation.
- During dewatering, staged drawdowns (where appropriate) should be implemented and field settlement and water level changes beyond the immediate site monitored, comparing against theoretical settlements and water levels to allow warning of potential dewatering settlement issues.

At “alert” levels, the dewatering should be reduced to a lower rate or ceased temporarily, and alternative measures considered for the excavation, which should be approved by the project geotechnical engineer and project team.

If the settlement monitoring indicates an undesirable deformation, the project manager should order construction operations to cease until the necessary mitigation measures are undertaken.

7.0 GROUND SETTLEMENT STUDY

Introduction

The predominant soils beneath comprising glaciolacustrine silt and clay deposits, till deposits and deeper shale bedrock. Based on the recorded groundwater levels, the highest water level was determined to be 2.06 mbgs (97.42 masl). The monitoring wells logs are provided in Appendix B.

Four levels of underground parking are proposed, with a dewatering depth of approximately 13.6 mbgs (0.5 m below bottom of excavation).

Any work that may influence groundwater and groundwater-related settlement should have a plan for monitoring groundwater elevations, and subsurface ground movements related to selected structures or facilities.

As a result of the dewatering activities, groundwater heads in the subsurface will be lowered below the deepest excavation level of around 0.5 m below the bottom elevation of the proposed underground parking levels

An increase in effective stress due to construction dewatering could cause consolidation in subsurface strata such as clays, and silts, and to a lesser degree in loose sands. The consolidation will typically be transferred to the ground surface in the form of settlement; with the greatest concern being the potential for ground movements that could lead to differential settlement which may be detrimental to structure foundations, utilities, and road surfaces.

Based on the above, an assessment of potential for settlement at the site should be determined, based on the soil type below the water table. Compressible soil types usually include clays and silts. Elastic settlement of sand should also be considered.

Preliminary Assessment of the potential for Settlement

As a first step, a Conservative Preliminary/Feasibility Study using published empirical values should be used to estimate the order-of-magnitude of settlement, during early-stage dewatering impact assessment, in the absence of laboratory consolidation testing.

Empirical values should be selected conservatively, supported by recognized references, and supplemented with sensitivity analysis. Where potential risks are significant, site-specific laboratory consolidation testing is recommended.

If the potential for settlement is high, groundwater control measures should be installed by the construction contractor to minimize dewatering volumes and groundwater draw-down outside of excavation areas.

Limitations of Empirical Correlations

It should be noted that the use of empirical compressibility parameters introduces uncertainty; therefore, calculated settlements should be considered approximate and conservative.

Monitoring

The construction contractor will be responsible for installing a subsidence monitoring network, and for settlement monitoring and reporting.

Depending on the structure or facility being monitored, a monitoring-review level should be set below the movement threshold (action level) at which damage might be anticipated. No action should be taken as long as ground or structure movements remained below the identified monitoring review level, unless it was determined that the rate of movement was increasing.

Mitigation

If it was determined that the rate of ground or structure movement was increasing, or if the monitoring review level were to be attained, then the Site engineer would meet with the construction contractor to discuss how the contractor's construction methods might be contributing to the observed ground movements and what modifications would be appropriate to either stop or limit further movements below the action level.

- The contractor would be required to take steps, as agreed and as necessary, to limit further ground or structure movements. In this context, since the concern is with groundwater-related settlement, the necessary mitigating actions would involve measures to reduce or limit on-going groundwater infiltration to the excavation. Such measures could include grouting of the soil at selected locations around the construction to lower permeability and, therefore, the rate of groundwater infiltration.
 - For excavations, this could include placing temporary or permanent lining to limit infiltration. Actual measures that might be implemented will need to consider the progress of the work, the specific location(s) at which the monitoring review level was attained, the ground conditions and the specific facilities or structures of concern.
- In the unlikely event that an action level was to be attained, the Site engineer would need to evaluate which additional mitigating measures could or should be implemented beyond those already in place.
- Work suspension might be an option; however, this would be a last resort. If any damage did, in fact, occur as a result of project construction activities, including dewatering activities, then the construction contractor would be required to implement repairs.

8.0 SUMMARY AND CONCLUSIONS

The following summarizes the results of the investigation:

- The geology encountered across the site was as anticipated from Landtek's review of the published geological information for the site, as indicated in Section 3.5, with the predominant soils comprising glaciolacustrine silt and clay deposits, till deposits and deeper shale bedrock.
- The topography at the site ranges from 99 masl to 101 masl, and the topography at the vicinity of the Site slopes in a north-easterly direction towards Redhill Lake Ontario.
- Depths to groundwater in all monitoring wells at the Site were obtained manually by Landtek staff from December 2022 to May 2023. The readings are presented in Table 3 of this report. Based on the recorded groundwater levels, the highest water level was determined to be 2.06 mbgs at MW22-5S on April 19, 2023.
- The short-term dewatering rate outside periods of active precipitation, under normal conditions, was determined to be approximately 71,746 L/day (0.83 L/s). Normal conditions are considered to be weather conditions that should be expected during the operation of the construction dewatering. Normal operation does not include extreme weather events.
- The following two options are available to implement long-term groundwater control measures at the site.
 - Damp proof of the basements by use of weeping tiles and perimeter drainage to avoid the potential inflow of groundwater into the underground basements post-construction, subject to the approval of The City of Hamilton, or
 - Waterproof of the underground basements below the established "*seasonally high groundwater level*" plus the required buffer zone (nominally 1.0 m to 1.5 m above).
- The construction dewatering rate for the proposed development excavation was estimated to be 71,74 L/day (0.83 L/s). Based on this volume, an Environmental Activity and Sector Registry (EASR) registration will be required at the Site.

9.0 RECOMMENDATIONS

The following general construction practices are recommended to minimize the volume of water to be extracted:

- Schedule construction outside the spring period when the water table is typically elevated and avoid construction during period of active precipitation.
- Reduce, where practicable, the length of time during which the open cut remains open.
- Install valves on the individual excavation dewatering well point to allow for the flow adjustment.
- A detailed Settlement mitigation and monitoring plan be prepared, based on Landtek's Hydrogeological Report and site conditions, for implementation during construction.

10.0 CLOSURE

We trust this report is satisfactory for your purposes. If you have any questions regarding our submission, please do not hesitate to contact Landtek.

Yours truly,

Landtek Limited



Henry Erebor, M.Sc., P.Geo.,



11.0 REFERENCES

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- Ontario Geological Survey, OGS Earth. Bedrock Geology of Ontario.

12.0 LIMITATIONS

The conclusions and recommendations given in this report are based on information determined at the borehole locations. Subsurface and ground water conditions between and beyond the boreholes may be different from those encountered at the borehole locations, and conditions may become apparent during construction that could not be detected or anticipated at the time of the geotechnical investigation. It is recommended practice that Landtek be retained during construction to confirm that the subsurface conditions throughout the site are consistent with the conditions encountered in the boreholes.

The comments made in this report on potential construction problems and possible remedial methods are intended only for the guidance of the designer. The number of boreholes may not be sufficient to determine all the factors that may influence construction methods and costs. For example, the thickness and quality of surficial topsoil or fill layers may vary markedly and unpredictably. Contractors bidding on the project or undertaking construction on the site should make their own interpretation of the factual borehole information and establish their own conclusions as to how the subsurface conditions may affect their work.

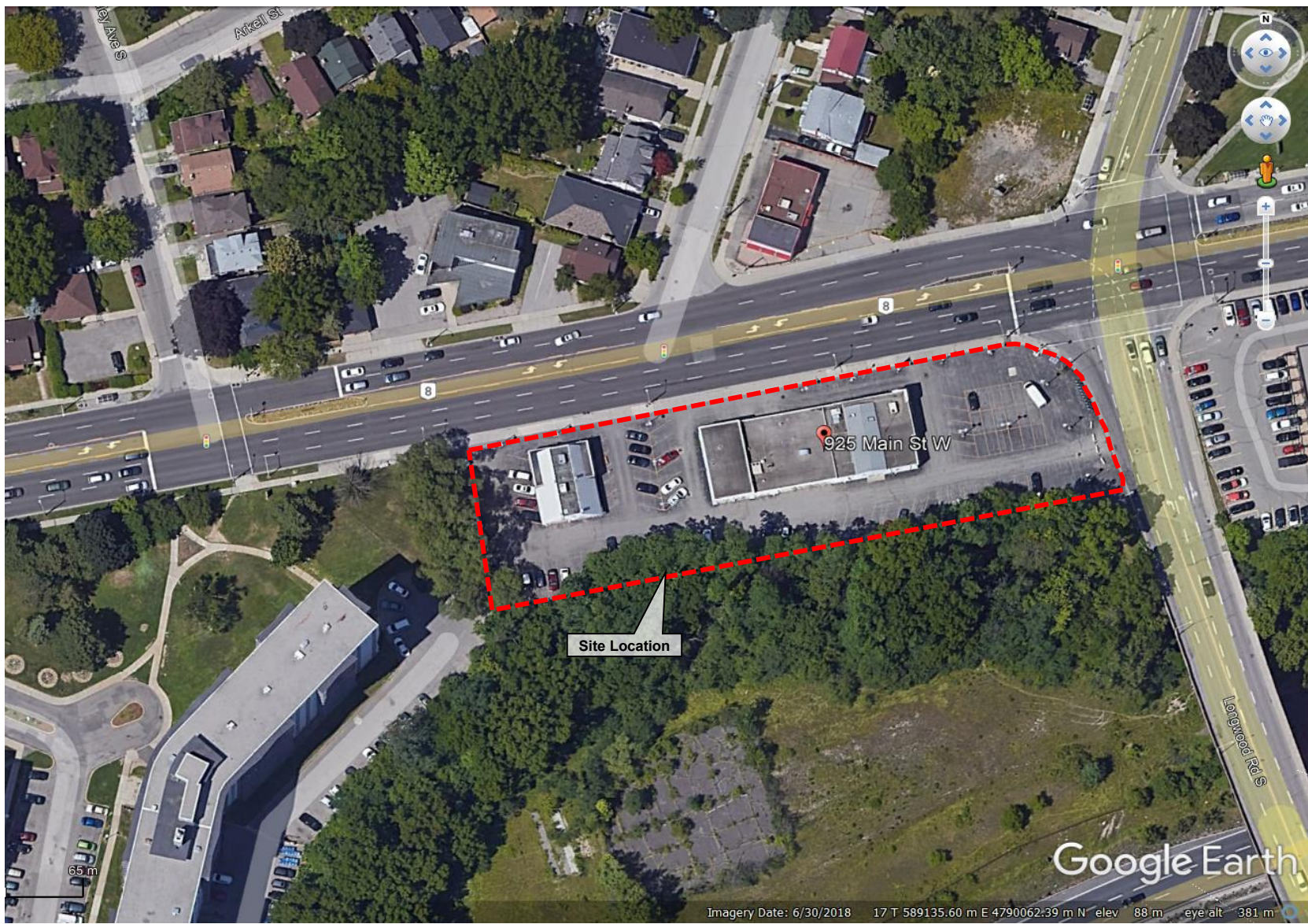
The survey elevations in the report were obtained by Landtek or others and are strictly for use by Landtek in the preparation of the geotechnical report. The elevations should not be used by any other parties for any other purpose.

Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. Landtek accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions taken based on this report.

This report does not reflect environmental issues or concerns related to the property unless otherwise stated in the report. The design recommendations given in the report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, it is recommended that Landtek be retained during the final design stage to verify that the design is consistent with the report recommendations, and that the assumptions made in the report are still valid.

APPENDIX A

FIGURES



LANDTEK LIMITED

CONSULTING ENGINEERS

205 NEBO ROAD, HAMILTON, ONTARIO, L8W 2E1

Scale: On Map Date: September 2022

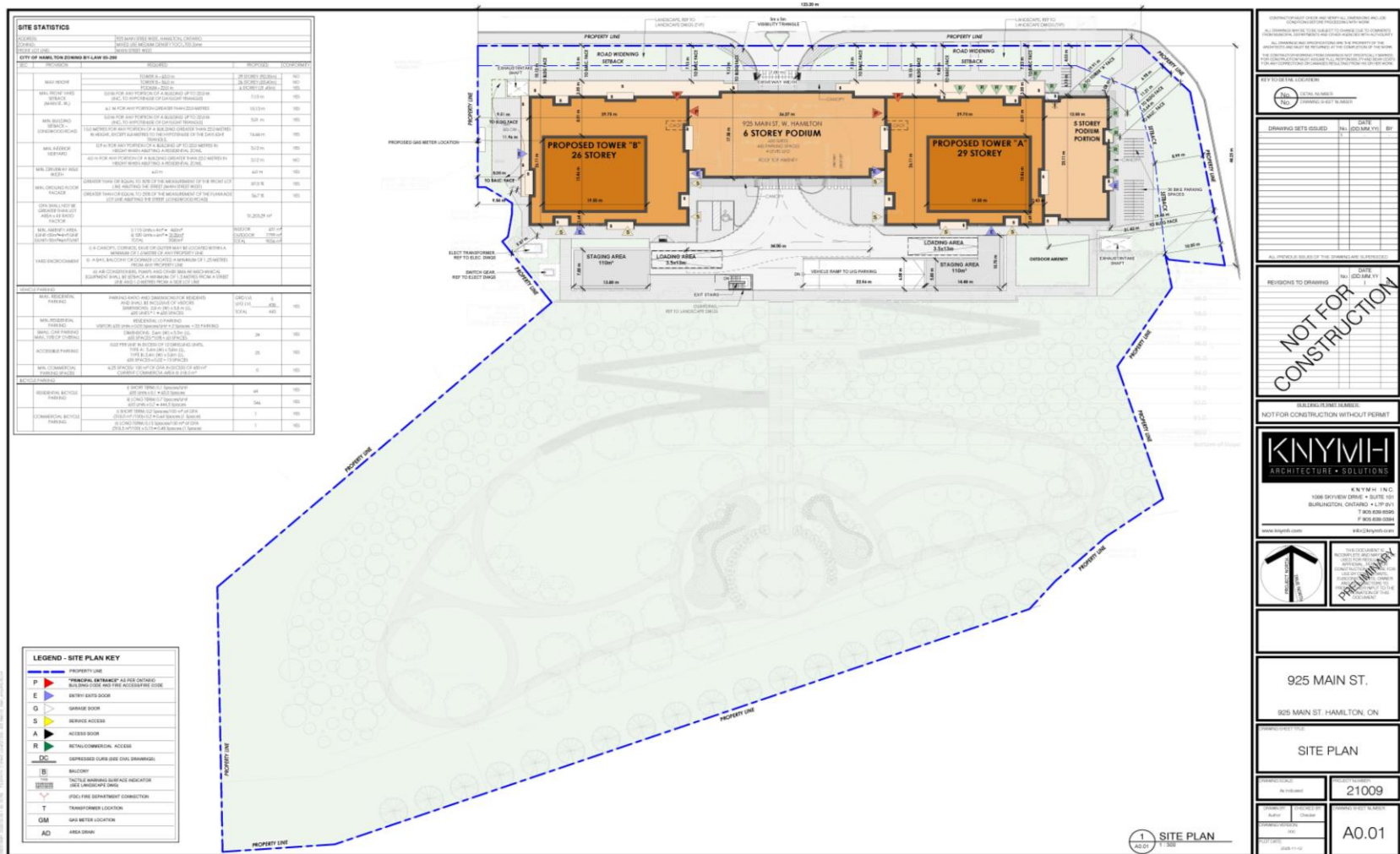
Project: Hydrogeological Investigation

925 Main Street West

Hamilton, Ontario

Title: Hamilton, Ontario

Project No. 22371



LANDTEK LIMITED

CONSULTING ENGINEERS

205 NEBO ROAD, HAMILTON, ONTARIO, L8W 2E1

Scale: NA Date: February 2026

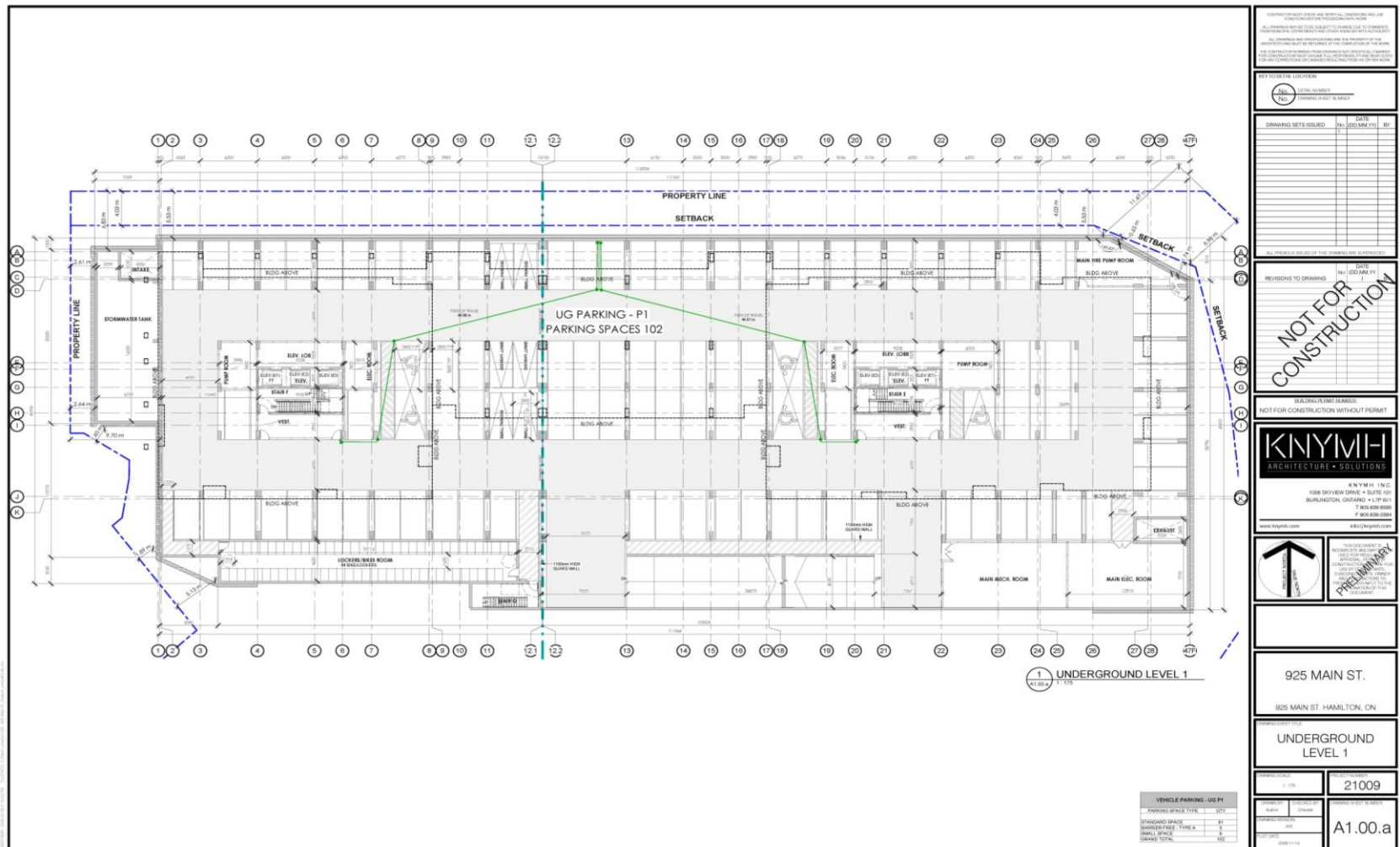
Project: Hydrogeological Investigation

925 Main Street West

Hamilton, Ontario

Title: Figure 2a: Site Plan

Project No. 22371



KNYMIH ARCHITECTURE • SOLUTIONS

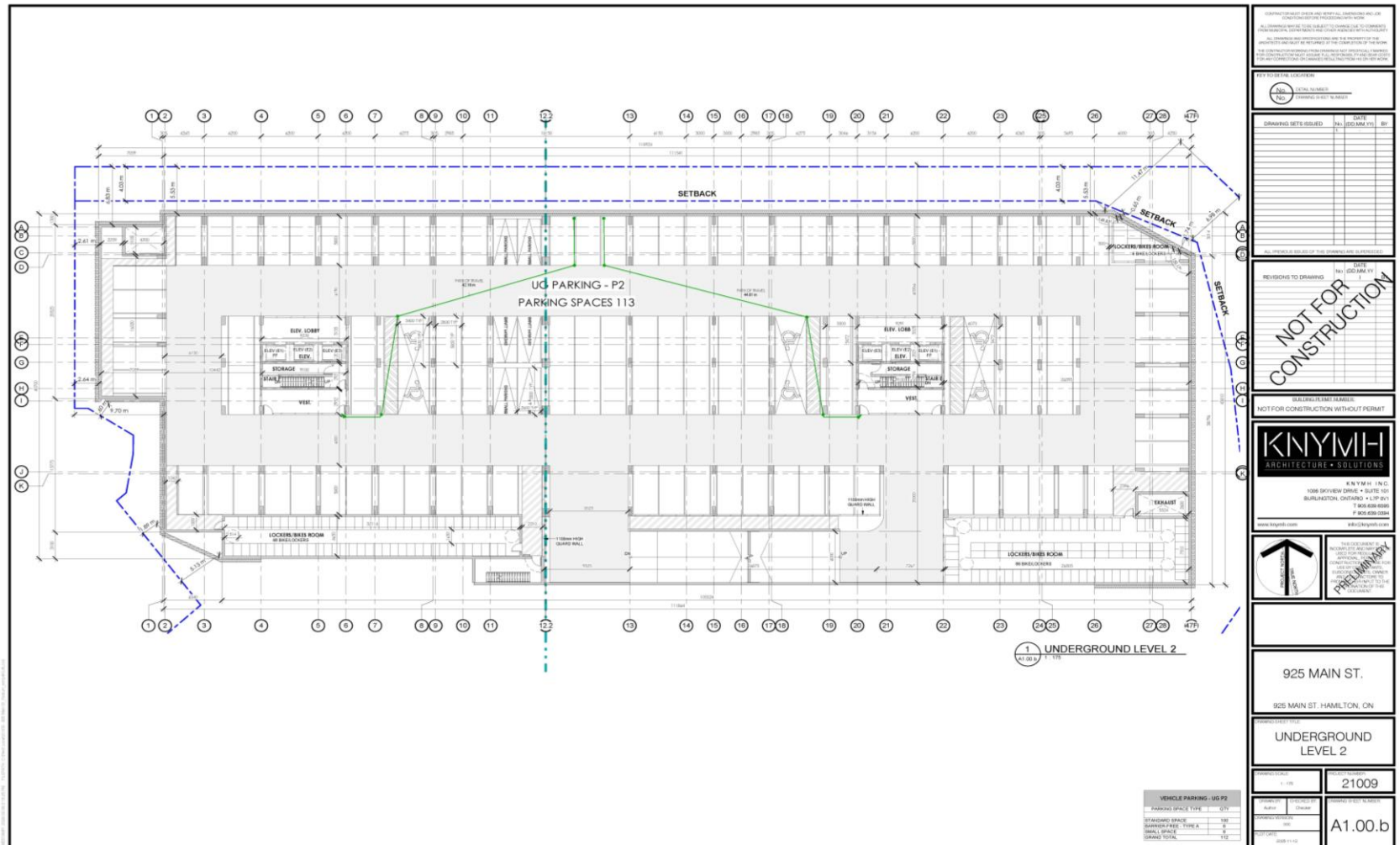
925 MAIN ST.
925 MAIN ST. HAMILTON, ON

UNDERGROUND LEVEL 1

21009

A1.00.a

	LANDTEK LIMITED CONSULTING ENGINEERS	
	205 NEBO ROAD, HAMILTON, ONTARIO, L8W 2E1	
Project:	Scale: NA	Date: February 2026
	Hydrogeological Investigation 925 Main Street West Hamilton, Ontario	
	Title: Figure 2b: Underground Level P1 Plan	
Project No.	22371	



LANDTEK LIMITED

CONSULTING ENGINEERS

205 NEBO ROAD, HAMILTON, ONTARIO, L8W 2E1

Scale: NA Date: February 2026

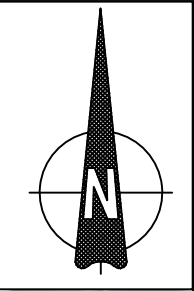
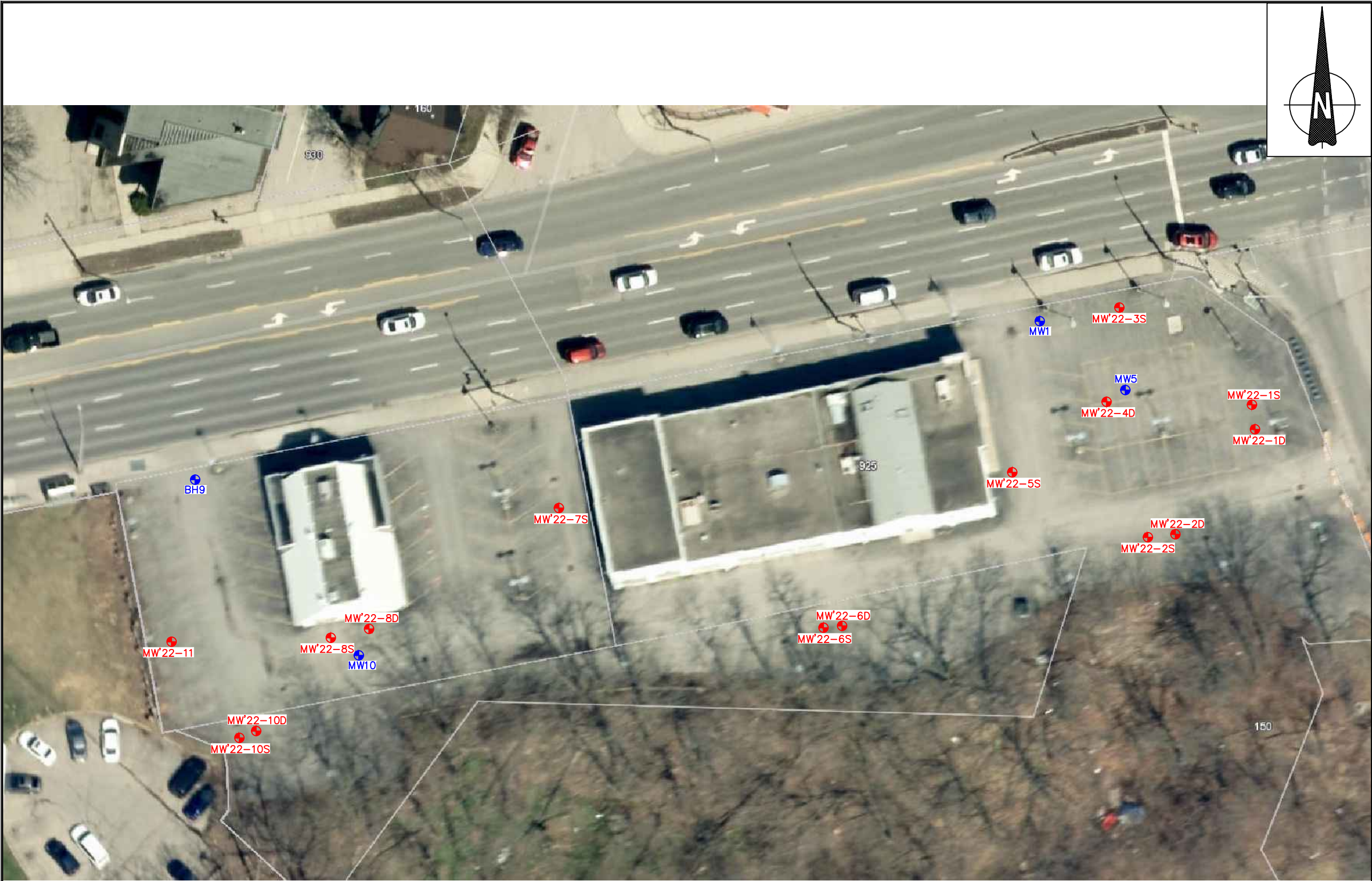
Project: Hydrogeological Investigation

925 Main Street West

Hamilton, Ontario

Title: Figure 2c: Underground Level P2 Plan

Project No. 22371



LANDTEK LIMITED

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engineering@landtek.ca
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project location



Location plan an extract from maps.hamilton.ca

Legend:

- Approximate location of borehole drilled by Landtek Limited at September 8th, 9th, and 10th, 2016.
- Approximate location of borehole drilled by Landtek Limited at November 2nd to 11th, 2022.

Notes:

Base drawing provided by maps.hamilton.ca

revisions

#	date	revision/comment

client

Legacy Constructors

municipality

City of Hamilton

project

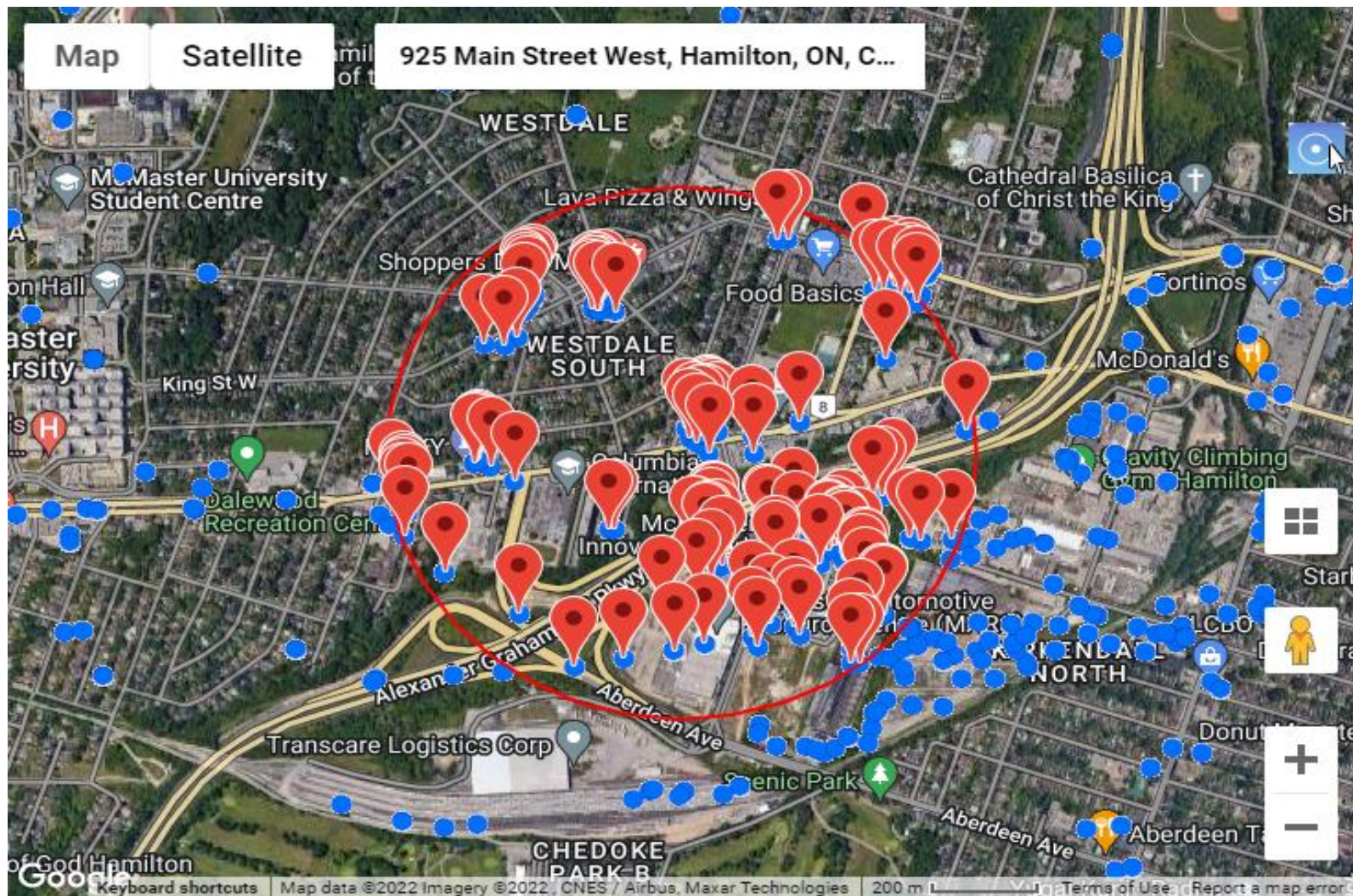
Environmental Investigation
925 Main Street East, Hamilton, Ontario

sheet

Borehole Location Plan
Figure 3

date: December 14th, 2022
drawn: MDC
checked: NH
project #: 22372
scale: NTS

22371



Latitude:43.25878, Longitude:-79.88774 (UTM Zone:17, Easting:590277, Northing:4790153)

● MECP Wells

 LANDTEK LIMITED CONSULTING ENGINEERS		
205 NEBO ROAD, HAMILTON, ONTARIO, L8W 2E1		
	Scale: On Map	Date: September 2022
Project:	Hydrogeological Investigation 925 Main Street West Hamilton, Ontario	
Title:	Figure 4: MECP Wells Locations	
Project No.	22371	



LEGEND

- ⊕ Borehole/Monitoring Well
- Groundwater Flow Direction
- 96.20 m Groundwater Level Elevation
- Groundwater Contour



LANDTEK LIMITED

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205 NEBO ROAD, HAMILTON, ONTARIO, L8W 2E1

Scale: NA Date: January 2026

Project: Hydrogeological Investigation

925 Main Street West

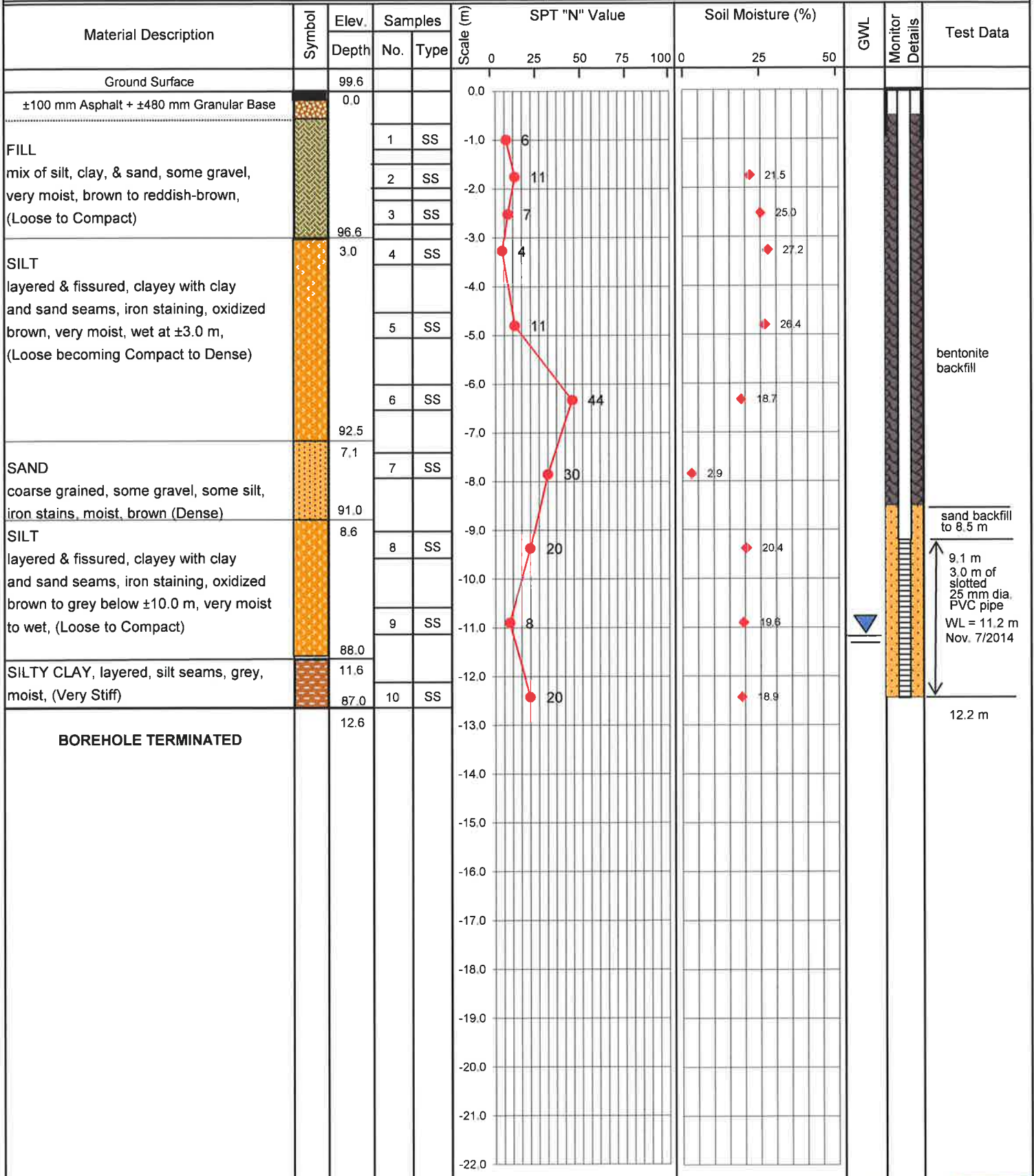
Hamilton, Ontario

Title: Figure 5: Groundwater Table Contours

Project No. 22371

APPENDIX B
MONITORING WELL LOGS

Project No.: 14293	Drill Date: October 10, 2014
Project: Proposed Multi-Storey Building Development	Drill Method: [x] solid stem [] hollow stem [] vibratory
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic



Notes:

- On completion, borehole open to 12.1 m and dry.
- Water level measured at 11.3 m on October 29, 2014.
- Water level measured at 11.2 m on November 7, 2014.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
 PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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Project No.: 14293	Drill Date: October 10, 2014
Project: Proposed Multi-Storey Building Development	Drill Method: ☒ solid stem ☐ hollow stem ☐ vibratory
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic

Material Description	Symbol	Elev.	Samples		SPT "N" Value	Soil Moisture (%)	GWL	Monitor Details	Test Data
		Depth	No.	Type					
Ground Surface		99.0			0 25 50 75 100	0 25 50			
±100 mm Asphalt		0.0			0.0				
+600 mm Granular Base			1	SS	-1.0	2.5			
FILL									
asphalt pieces, concrete pieces, sand and gravel		96.7	2	SS	-1.5	4.6			
BOREHOLE TERMINATED DUE TO AUGER REFUSAL ON LARGE PIECES OF CONCRETE/LIMESTONE RUBBLE									
		2.3							

Notes: 1. On completion, borehole open to 2.3 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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Project No.: 14293	Drill Date: October 10, 2014
Project: Proposed Multi-Storey Building Development	Drill Method: ☐ solid stem ☒ hollow stem ☐ vibratory
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic

Material Description	Symbol	Elev.	Samples		SPT "N" Value	Soil Moisture (%)		GWL	Monitor Details	Test Data
		Depth	No.	Type						
Ground Surface		99.2			0	0				
±100 mm Asphalt & ±380 mm Granular Base		0.0			0.0					
FILL										
mix of silt, clay, & sand, some gravel, black sand & pieces of red brick at , ±1.5 m, moist, (Very Loose)		97.2	1	SS	-1.0	11	21.9			
			2	SS	-2.0	2	7.8			
SILT layered & fissured, clayey with clay & sand seams, iron staining, oxidized brown, moist to very moist, (Compact)		2.0	3	SS	-3.0	9	25.4			
			4	SS	-4.0	10	22.9			
			5	SS	-5.0	10	26.4			
		93.0			-6.0					
SILTY SAND some gravel, coarse grained, moist, brown, (Compact)		6.2	6	SS	-6.0	29	10.0			
		91.4	7	SS	-8.0	19	20.8			
CLAYEY SILT layered & fissured, clay layers & some sand seams, very moist, oxidized brown, (Very Stiff)		7.8			-9.0					
			8	SS	-10.0	15	22.1			
SILTY CLAY layered, silt partings, unoxidized grey, very moist, (Stiff)		86.6			-12.0					
			9	SS	-12.0	10	22.3			
BOREHOLE TERMINATED		12.6			-13.0					
					-14.0					
					-15.0					
					-16.0					
					-17.0					
					-18.0					
					-19.0					
					-20.0					
					-21.0					
					-22.0					

Notes: 1. On completion, borehole open to 12.2 m and water level at 11.9 m.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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Project No.: 14293	Drill Date: October 10, 2014
Project: Proposed Multi-Storey Building Development	Drill Method: [x] solid stem [] hollow stem [] vibratory
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic

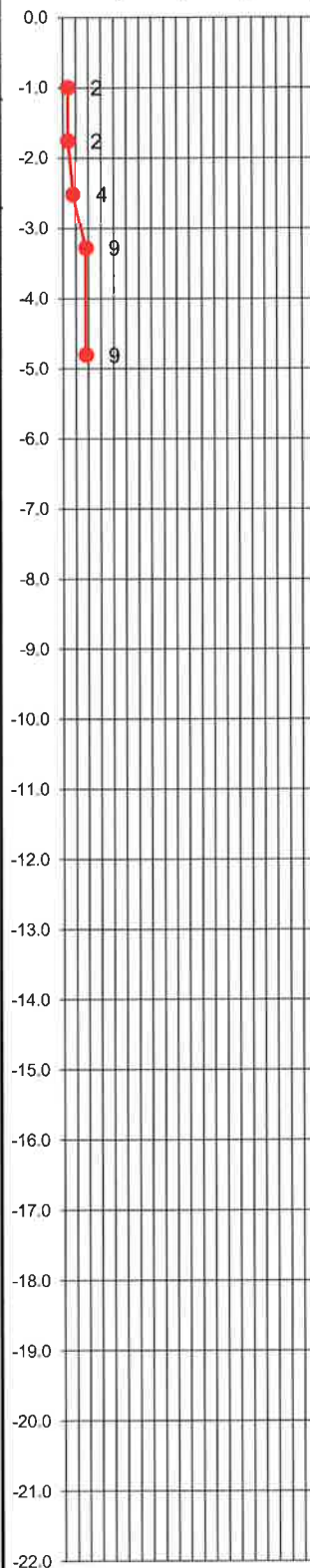
Material Description	Symbol	Elev.	Samples		SPT "N" Value	Soil Moisture (%)		GWL	Monitor Details	Test Data
		Depth	No.	Type						
Ground Surface		99.2								
±115 mm Asphalt & ±350 mm Granular Base		0.0								
FILL										
mix of silt, clay & sand, some gravel & organic inclusions, very moist to wet, brown, (Loose)		97.0	1	SS	8	22.7				
			2	SS	5	26.2				
			3	SS	5	27.4				
			4	SS	8	26.9				
			5	SS	10	25.1				
SILT		2.2								
layered & fissured, clayey with clay & sand seams, trace gravel, dilatant, very moist to wet, brown, (Loose to Compact)		94.2								
BOREHOLE TERMINATED		5.0								

Project No.: 14293	Drill Date: October 10, 2014
Project: Proposed Mixed Use Building Development	Drill Method: ☒ solid stem ☐ hollow stem ☐ vibratory
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic

Material Description	Symbol	Elev.	Samples		SPT "N" Value	Soil Moisture (%)		GWL	Monitor Details	Test Data
		Depth	No.	Type						
Ground Surface		99.5								
±150 mm Asphalt		0.0								
±230 mm Granular										
FILL			1	SS						
silty sand, asphalt pieces & organics, wet, brown, (Very Loose)			2	SS						
CLAYEY SILT		97.4	3	SS						
layered & fissured, iron staining, clay & sand seams, very moist to wet, oxidized brown, (Firm to Stiff)			4	SS						
		94.5	5	SS						
BOREHOLE TERMINATED		5.0								

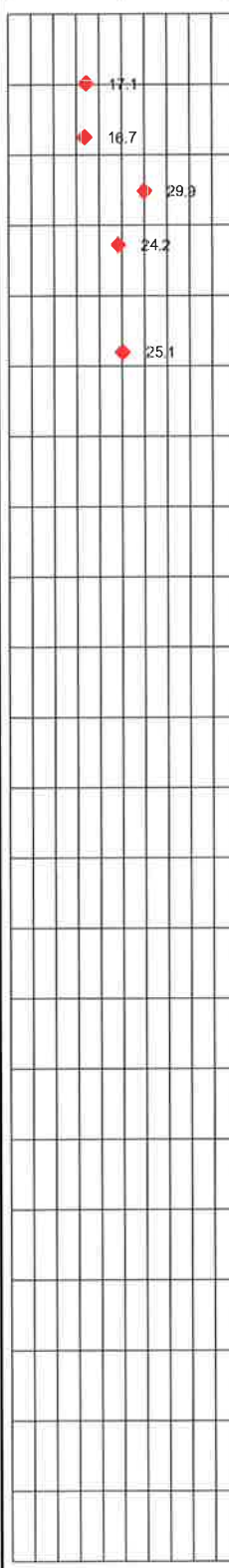
Scale (m)

0 25 50 75 100



Soil Moisture (%)

0 25 50



Notes: 1. On completion, borehole open to 4.6 m and wet at bottom of hole.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
 PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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Project No.: 14293	Drill Date: October 14, 2014
Project: Proposed Multi-Storey Building Development	Drill Method: ☒ solid stem ☐ hollow stem ☐ vibratory
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic

Material Description	Symbol	Elev.	Samples		SPT "N" Value	Soil Moisture (%)			GWL	Monitor Details	Test Data
		Depth	No.	Type		0	25	50			
Ground Surface		99.3			0.0						
±100 mm Asphalt		0.0									
±400 mm Granular Base											
FILL			1	SS							
mix of silt, clay, black sand, gravel, asphalt pieces, very moist, brown, (Loose to Compact)		96.3	2	SS							
			3	SS							
			4	SS							
SILT (Possible Fill)		3.0									
mottled with organics, dark brown, very moist, (Compact)		85.3									
SILT		4.0									
layered & fissured, clayey with clay & sand seams, iron staining, very moist to wet, brown, (Compact)		84.9	5	SS							
			6	SS							
SILTY SAND		6.5									
coarse, gravel, moist, brown, (Dense)		91.5	7	SS							
CLAYEY SILT		7.8									
layered & fissured, clayey with clay & sand seams, iron staining, very moist to wet, brown, ((Very Stiff)			8	SS							
saturated silty sand layer between ±12.2 and 12.6 m		84.9	9	SS							
SILTY CLAY		14.4									
trace gravel, fissured and fractured, very moist, unoxidized grey, (Firm to Very Stiff)			10	SS							
wet below ±18.0 m			11	SS							
see page 2 of 2		77.3									

Notes: 1. On completion, borehole open to 12.2 m and water level at 9.1 m.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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Drill Date:	October 15, 2014
-------------	------------------

Drill Method: ☐ solid stem ☒ hollow stem ☐ vibratory

Datum:	Geodetic
--------	----------

Notes: 1. On completion, borehole open to 12.2 m and water level at 9.1 m.	LANDTEK LIMITED 205 Nebo Road, Unit 3 Hamilton, Ontario, Canada, L8W 2E1 Ph: (905) 383-3733 Fax: (905) 383-8433 www.landteklimited.com
PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density	
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity	LANDTEK

Datum:	Geodetic
--------	----------



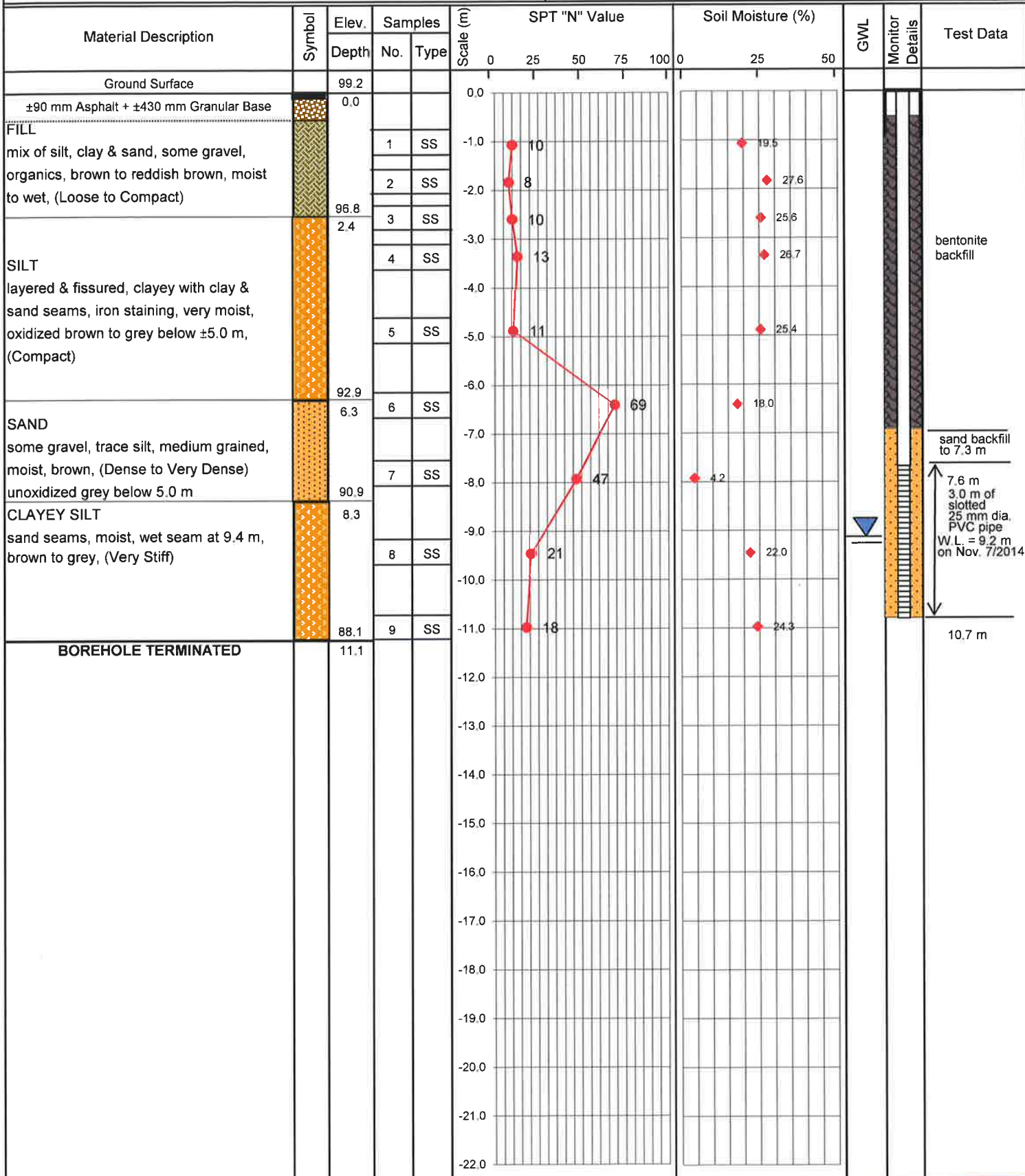
PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

Project No.: 14293	Drill Date: October 15, 2014
Project: Proposed Multi-Storey Building Development	Drill Method: ☒ solid stem ☐ hollow stem ☐ vibratory
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic

Material Description	Symbol	Elev.	Samples		Scale (m)	SPT "N" Value	Soil Moisture (%)	GWL	Monitor Details	Test Data
		Depth	No.	Type						
Ground Surface		99.4			0	0	0			
±115 mm Asphalt + ±500 mm Granular Base		0.0			0.0					
FILL			1	SS	-1.0	13	23.3			
mix of silt, clay, sand, gravel & organics, red-brown to black, moist, ((Compact)			2	SS	-2.0	9	23.2			
		97.0	3	SS	-2.4	13	28.9			
CLAYEY SILT			4	SS	-3.0	19	20.7			
					-4.0					
layered & fissured, clayey with clay seams, some sand, iron staining, very moist, oxidized brown, (Stiff to Very Stiff)		94.4	5	SS	-5.0	15	25.2			
BOREHOLE TERMINATED		5.0			-6.0					
					-7.0					
					-8.0					
					-9.0					
					-10.0					
					-11.0					
					-12.0					
					-13.0					
					-14.0					
					-15.0					
					-16.0					
					-17.0					
					-18.0					
					-19.0					
					-20.0					
					-21.0					
					-22.0					

Notes: 1. On completion, borehole open to 4.6 m and dry.	LANDTEK LIMITED 205 Nebo Road, Unit 3 Hamilton, Ontario, Canada, L8W 2E1 Ph: (905) 383-3733 Fax: (905) 383-8433 www.landteklimited.com	
PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity		

Project No.: 14293	Drill Date: October 15, 2014
Project: Proposed Multi-Storey Building Development	Drill Method: [x] solid stem [] hollow stem [] vibratory
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic



Notes:

1. On completion, borehole open to 10.7 m and water level at 10.4 m.
2. Water level = 9.2 m depth on October 29, 2014.
3. Water level = 9.2 m depth on November 7, 2104.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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Project No.: 14293	Drill Date: October 15, 2014
Project: Proposed Mixed Use Building Development	Drill Method: [x] solid stem [] hollow stem [] vibratory
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic

Material Description	Symbol	Elev.	Samples		SPT "N" Value	Soil Moisture (%)		GWL	Monitor Details	Test Data
		Depth	No.	Type						
Ground Surface		99.5			0	0				
±100 mm Asphalt, ±150 mm Mixed Granular FILL		0.0			0.0					
mixture of limestone, silt, and clay, some stone, trace sand, moist to very moist, brown (Firm to Stiff)			1	SS	-1.0	13	5.9			
			2	SS	-2.0	11	21.1			
Strong hydrocarbon odour at 2.5 m		96.6	3	SS	-3.0	5	28.7			
CLAYEY SILT		2.9	4	SS	-4.0	9	23.6			
very moist, brown, strong hydrocarbon odour (Stiff)			5	SS	-5.0	12	24.7			
unoxidized grey below ± 4.9 m		94.0			-6.0					
SAND		5.5	6	SS	-7.0	67	3.6			
some gravel, coarse grain sizes, moist, slight hydrocarbon odour, (Very Dense)			7	SS	-8.0	50	3.1			
no hydrocarbon odour below ±7.5 m		91.2			-9.0					
CLAYEY SILT		8.3			-10.0					
moist to very moist, grey (Stiff)			8	SS	-11.0	12	20.1			
BOREHOLE TERMINATED		88.4			-12.0					
		11.1			-13.0					
					-14.0					
					-15.0					
					-16.0					
					-17.0					
					-18.0					
					-19.0					
					-20.0					
					-21.0					
					-22.0					

Notes: 1. On completion, borehole open to 10.4 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
 PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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Project No.: 19328	Drill Date: September 25, 2019
Project: Proposed Columbia International School Residence	Drill Method: ☒ solid stem ☐ Hollow stem ☐ DCPT
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic (Approximate)

Material Description	Symbol	Elev.	Samples		SPT "N" Value	Soil Moisture (%)		GWL	Monitor Details	Test Data
		Depth	No.	Type						
Ground Elevation		99.3			0.0					
±150 mm of asphalt		0.0								
FILL: silty clay, moist, brown			1	SS	-0.5					
CLAYEY SILT trace fine sand, sand seams, iron staining, loose to compact, moist			2	SS	-1.0					
			3	SS	-1.5					
		94.8			-2.0					
SILT trace fine sand, brown, compact, moist		4.5	4	SS	-2.5					
		93.3			-3.0					
SILTY SAND trace gravel, brown, loose, very moist to wet		6.0	5	SS	-3.5					
		91.7			-4.0					
SILT trace fine sand, trace clay, sand seams, brown, dense to compact, very moist to wet		7.6	6	SS	-4.5					
			7	SS	-5.0					
					-5.5					
					-6.0					
					-6.5					
					-7.0					
					-7.5					
					-8.0					
					-8.5					
					-9.0					
					-9.5					
					-10.0					
					-10.5					
					-11.0					
					-11.5					
					-12.0					
					-12.5					
					-13.0					
					-13.5					
					-14.0					
					-14.5					
					-15.0					
					-15.5					
					-16.0					
					-16.5					
					-17.0					
					-17.5					
					-18.0					
					-18.5					
					-19.0					
					-19.5					
					-20.0					
					-20.5					
					-21.0					
					-21.5					
					-22.0					
SILTY CLAY trace fine sand, grey, stiff to very stiff, moist		18.2	10	SS	-18.5					
					-19.0					
					-19.5					
					-20.0					
					-20.5					
					-21.0					
					-21.5					
					-22.0					
<i>continued... (page 2)</i>		21.8								

Notes: 1. Groundwater encountered at approximately 11.2 m depth. 2. Cave in recorded at approximately 13.7 m depth.	LANDTEK LIMITED 205 Nebo Road, Unit 3 Hamilton, Ontario, Canada, L8W 2E1 Ph: (905) 383-3733 Fax: (905) 383-8433 www.landteklimited.com	
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PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
 PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

Project No.: 19328	Drill Date: September 25, 2019
Project: Proposed Columbia International School Residence	Drill Method: ☒ solid stem ☐ Hollow stem ☐ DCPT
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic (Approximate)

Material Description	Symbol	Elev.	Samples		SPT "N" Value Scale (N)	Soil Moisture (%)		GWL	Monitor Details	Test Data	
		Depth	No.	Type							
Ground Elevation		77.3									
...continued		22.0			-22.0						
SILTY CLAY trace fine sand, grey, stiff to very stiff, moist			12	SS	-24.5	22					
			13	SS	-27.5	18					
...trace to some sand below approximately 27.5 m depth		68.4	14	SS	-30.5	23					
END OF BOREHOLE AT TARGET DEPTH		30.9			-31.0						

Project No.: 19328	Drill Date: October 1, 2019
Project: Proposed Columbia International School Residence	Drill Method: [x] solid stem [] Hollow stem [] DCPT
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic (Approximate)

Material Description	Symbol	Elev.	Samples		SPT "N" Value	Soil Moisture (%)	GWL	Monitor Details	Test Data
		Depth	No.	Type					
Ground Elevation		99.0			0.0				
±150 mm of asphalt		0.0							
FILL silty clay and clayey silt, moist, brown			1	SS	6	14			
		95.7							
CLAYEY SILT trace fine sand, sand seams, iron staining, loose to compact, moist		3.3	2	SS	10	25			
		93.0							
SILTY SAND trace gravel, brown, loose, very moist to wet		6.0	3	SS	61	24			
		91.2							
CLAYEY SILT trace fine sand, trace clay, sand seams, brown, compact, very moist to wet		7.8	4	SS	27	23			
		83.8							
SILTY CLAY trace fine sand, grey, stiff, moist		15.2	5	SS	20	19			
		77.2							
...firm below approximately 21.5 m depth		21.8	6	SS	8	21			
continued... (page 2)									

Notes: 1. Groundwater encountered at approximately 12.2 m depth.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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Material Description	Symbol	Elev.	Samples		SPT "N" Value	Soil Moisture (%)	GWL	Monitor Details	Test Data
		Depth	No.	Type					
Ground Elevation		77.2							
...continued SILTY CLAY trace fine sand, grey, stiff, moist		22.0							
			7	SS	7	31			
		65.7							
SILT trace clay, trace sand, red and grey, compact, moist to very moist		33.5	8	SS	23	16			
...very soft silt horizon encountered between approximately 39.2 m depths and 42.0 m depth									
		55.6							
continued... (page 3)		43.6							
Notes: 1. Groundwater encountered at approximately 12.2 m depth.					LANDTEK LIMITED 205 Nebo Road, Unit 3 Hamilton, Ontario, Canada, L8W 2E1 Ph: (905) 383-3733 Fax: (905) 383-8433 www.landteklimited.com				



Material Description	Symbol	Elev.	Samples		SPT "N" Value Scale (m)	Soil Moisture (%)	GWL	Monitor Details	Test Data
		Depth	No.	Type					
Ground Elevation		55.2			0 25 50 75 100	0 25 50			
...continued		44.0			-44.0				
SILT trace clay, trace sand, red and grey, compact, moist to very moist		52.0			-44.5				
SHALE BEDROCK (Queenston Formation) moderately weak, highly weathered, red		47.2			-45.0				
		50.1			-45.5				
END OF BOREHOLE AT TARGET DEPTH		49.1			-46.0				
					-46.5				
					-47.0				
					-47.5				
					-48.0				
					-48.5				
					-49.0				
					-49.5				
					-50.0				
					-50.5				
					-51.0				
					-51.5				
					-52.0				
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					-57.5				
					-58.0				
					-58.5				
					-59.0				
					-59.5				
					-60.0				
					-60.5				
					-61.0				
					-61.5				
					-62.0				
					-62.5				
					-63.0				
					-63.5				
					-64.0				
					-64.5				
					-65.0				
					-65.5				
					-66.0				

Notes:
1. Groundwater encountered at approximately 12.2 m depth.

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PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

Project No.: 19328	Drill Date: October 2, 2019
Project: Proposed Columbia International School Residence	Drill Method: ☒ solid stem ☐ Hollow stem ☐ DCPT
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic (Approximate)

Material Description	Symbol	Elev.	Samples		SPT "N" Value	Soil Moisture (%)		GWL	Monitor Details	Test Data
		Depth	No.	Type						
Ground Elevation		99.4			0.0					
±75 mm of asphalt		0.0								
FILL: silty clay, moist, brown			1	SS	9	23				
			2	SS	6	27				
CLAYEY SILT trace fine sand, sand seams, iron staining, compact, moist		94.9								
		4.5	3	SS	14	26				
...wet below approximately 9.7 m depth										
SILTY SAND trace gravel, brown, dense, very moist to wet		87.9								
		11.5	4	SS	30	15				
SILT trace fine sand, trace clay, sand seams, brown and grey, dense to compact, very moist to wet		85.4								
		14.0	5	SS	31	19				
continued... (page 2)		77.6								
		21.8								

Notes: 1. Groundwater encountered at approximately 9.7 m depth.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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Project No.: 19328	Drill Date: October 2, 2019
Project: Proposed Columbia International School Residence	Drill Method: ☒ solid stem ☐ Hollow stem ☐ DCPT
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic (Approximate)

Material Description	Symbol	Elev.	Samples		SPT "N" Value	Soil Moisture (%)	GWL	Monitor Details	Test Data
		Depth	No.	Type					
Ground Elevation		77.4			0 25 50 75 100	0 25 50			
...continued		22.0			-22.0				
SILT trace fine sand, trace clay, sand seams, brown and grey, dense to compact, very moist to wet		75.0			-22.5				
SILTY CLAY trace sand, grey, very stiff to hard, moist		24.4	6	SS	-24.5	17			
					-25.0				
			13	SS	-27.5				
					-28.0				
					-28.5				
					-29.0				
					-29.5				
					-30.0				
		68.5	7	SS	-30.5	18			
					-31.0				
END OF BOREHOLE AT TARGET DEPTH		30.9			-31.5				
					-32.0				
					-32.5				
					-33.0				
					-33.5				
					-34.0				
					-34.5				
					-35.0				
					-35.5				
					-36.0				
					-36.5				
					-37.0				
					-37.5				
					-38.0				
					-38.5				
					-39.0				
					-39.5				
					-40.0				
					-40.5				
					-41.0				
					-41.5				
					-42.0				
					-42.5				
					-43.0				
					-43.5				
					-44.0				

Notes: 1. Groundwater encountered at approximately 11.2 m depth.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
 PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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Project No.: 19328	Drill Date: September 27, 2019
Project: Proposed Columbia International School Residence	Drill Method: [x] solid stem [] Hollow stem [] DCPT
Location: 925 Main Street West, Hamilton, Ontario	Datum: Geodetic (Approximate)

Material Description	Symbol	Elev.	Samples		SPT "N" Value	Soil Moisture (%)		GWL	Monitor Details	Test Data
		Depth	No.	Type						
Ground Elevation		99.2			0.0					
±150 mm of asphalt		0.0								
FILL silty clay and clayey silt, moist, brown			1	SS	8	24				
		96.0								
CLAYEY SILT trace fine sand, sand seams, iron staining, compact to very dense, brown, moist		3.2	2	SS	11	30				
			3	SS	50	22				
		91.7								
SILTY SAND trace gravel, brown, compact, very moist to wet		7.5								
		90.0	4	SS	23	14				
CLAYEY SILT trace fine sand, trace clay, sand seams, brown, compact, very moist to wet		9.2								
		84.7								
SILTY SAND trace gravel, brown, dense, very moist to wet		14.5	5	SS	36	14				
		82.4								
CLAYEY SILT trace fine sand, trace clay, sand seams, brown, compact, very moist to wet		16.8								
...red and grey below approximately 21.5 m depth		77.4	6	SS	26	19				
continued... (page 2)		21.8								
Notes: 1. Groundwater encountered at approximately 3.6 m depth.										
PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity						LANDTEK LIMITED 205 Nebo Road, Unit 3 Hamilton, Ontario, Canada, L8W 2E1 Ph: (905) 383-3733 Fax: (905) 383-8433 www.landteklimited.com				



Notes: 1. Groundwater encountered at approximately 3.6 m depth.	LANDTEK LIMITED 205 Nebo Road, Unit 3 Hamilton, Ontario, Canada, L8W 2E1 Ph: (905) 383-3733 Fax: (905) 383-8433 www.landteklimited.com	
PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity		

LOG OF BOREHOLE BHMW1

SHEET 1 of 2

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2016-09-06

Drilling Method: Hollow Stem

Datum: Geodetic

Northing: 43.25892

Easting: -79.902831

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
		Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲	Penetration Test Values (Blows / 0.3m)	PL MC LL	Moisture / Plasticity				
								×	×	○	○				
			Asphalt ~250 mm												
			Fill Clayey silt, trace sand, trace asphalt pieces. Brown and red, firm, moist.												
1		-1.0		1	SS		5	x							
				2	SS		3	x							
2		-2.0													
			Clayey Silt trace sand, trace organics. Brown and red, firm to stiff, moist.												
				3	SS		8	x							
3		-3.0													
			...no organics.												
				4	SS		8	x							
4		-4.0													
				5	SS		3	x							
5		-5.0													
			Sand some gravel, trace silt. Dense, brown, moist to very moist.												
6		-6.0		6	SS		55								
7		-7.0													



Additional Notes:

- Borehole open to approximately 10.6 depth on completion.
- Groundwater level at approximately 9.3 m below the ground surface, measured on 20/09/2016.
-
-

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LOG OF BOREHOLE BHMW1

SHEET 2 of 2

Project No.: 22372				Drill Date: 2016-09-06				Northing: 43.25892							
Project Name: 925 Main Street West, Hamilton, Ontario				Drilling Method: Hollow Stem				Easting: -79.902831							
Location: 925 Main Street West, Hamilton, Ontario				Datum: Geodetic				Ground Surface Elevation: 0							
Depth Scale (m)	Subsurface Conditions			Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
	Stratigraphic Symbol	Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲	PL MC LL	○ 10 20 30 40 ○					
								Penetration Test Values (Blows / 0.3m)							
								×	20 40 60 80	×					
8		-8.0	...compact.	7	SS		24								
9		-9.0													
10		-10.0		8	SS		18								
11		-11.0	End of Log												
12		-12.0													
13		-13.0													
14		-14.0													
15		-15.0													
Additional Notes: 1. Borehole open to approximately 10.6 depth on completion. 2. Groundwater level at approximately 9.3 m below the ground surface, measured on 20/09/2016. 3. 4. LANDTEK LIMITED 205 Nebo Road, Unit 4B Hamilton, Ontario, L8W 2E1 Ph: (905) 383-3733															



Additional Notes:

- Borehole open to approximately 10.6 depth on completion.
- Groundwater level at approximately 9.3 m below the ground surface, measured on 20/09/2016.
-
-

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LOG OF BOREHOLE BHMW22-1S

SHEET 1 of 1

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-11-02

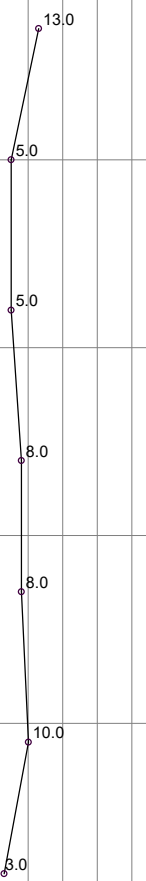
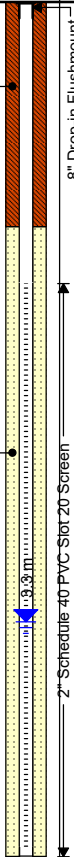
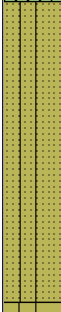
Drilling Method: Hollow Stem

Datum: Geodetic

Northing: 43.258838

Easting: -79.902538

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments					
		Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity										
								▲ 40 80 120 160 ▲	PL MC LL	○ 10 20 30 40 ○										
								Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity										
								× 20 40 60 80 ×												
1		-1.0	Asphalt ~75 mm Fill Clayey silt, trace gravel, trace asphalt pieces, trace sand. Brown, stiff, moist.	1	SS	3 7 6 4	13													
				...very moist.																
2			-2.0		3	SS	2 2 3								5					
					4	SS	3 3 5								8					
3		-3.0	Sandy Silt Brown, loose, very moist to wet.	5	SS	2 4 4	8													
				...loose to compact.																
4		-4.0		6	SS	3 4 6	10													
5		-5.0	Clayey Silt trace sand, trace gravel. Brown and grey, soft, moist.	7	SS	0 0 3	3													
				End of Log																
6		-6.0																		
7		-7.0																		



Additional Notes:

- Borehole open to approximately 4.5 m depth on completion.
- Groundwater or water seepage encountered at approximately 3.0 m below the ground surface.
-
-

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Additional Notes:

- Borehole open to approximately 4.5 m depth on completion.
- Groundwater or water seepage encountered at approximately 3.0 m below the ground surface.
-
-

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LOG OF BOREHOLE BHMW22-1D

SHEET 1 of 2

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-11-02

Drilling Method: Hollow Stem

Datum: Geodetic

Northing: 43.258814

Easting: -79.902537

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
		Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲		PL MC LL					
								× Penetration Test Values (Blows / 0.3m) ×		Moisture / Plasticity					
								20 40 60 80		10 20 30 40					
			Asphalt ~75 mm												
			Fill Clayey silt, trace gravel, trace asphalt pieces.	1	SS	4 3 4 6	7	x		13.0					
1		-1.0		2	SS	5 3 3	6	x		9.0					
			...sandy silt, trace clay, trace gravel, no asphalt pieces. Brown, loose, very moist.	3	SS	5 3 3	6	x		8.0					
2		-2.0		4	SS	3 3 3	6	x		9.0					
			Silt trace gravel, trace sand. Brown, loose, very moist to wet.	5	SS	4 3 4	7	x		5.0					
3		-3.0		6	SS	2 4 6	10	x		8.0					
4		-4.0	...trace clay, trace iron staining. Loose to compact, moist.	7	SS	1 2 3	5	x		7.0					
5		-5.0	...no iron staining. Loose.	8	SS	2 3 23	26	x		25.0					
			...compact, very moist to wet.	9	SS	18 19 22	41	x		49.0					
6		-6.0	Sand trace gravel. Brown, dense, dry to moist.	10	SS	15 15 15	30	x		20.0					
7		-7.0													
</															



Additional Notes:

- Borehole open to approximately 12.1 m depth on completion.
- Groundwater or water seepage upon completion at approximately 11.5 m below the ground surface.
-
-

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LOG OF BOREHOLE BHMW22-1D

SHEET 2 of 2

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-11-02

Drilling Method: Hollow Stem

Datum: Geodetic

Northing: 43.258814

Easting: -79.902537

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
		Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity						
							▲	▲	○	○					
								×	×						
8		-8.0	...no gravel.	11	SS	11 14 18	32			21.0					
			Sandy Silt trace clay. Brown, compact, moist.	12	SS	6 6 8	14			22.0					
9		-9.0													
			Clayey Silt trace sand. Brown, very stiff, wet.	13	SS	8 7 10	17			18.0					
10		-10.0	...brown and grey, very moist to wet.	14	SS	8 7 10	17			9.0					
11		-11.0		15	SS	7 7 10	17			19.0					
12		-12.0		16	SS	5 6 9	15			14.0					
				17	SS	6 7 12	19			4.0					
			End of Log												
13		-13.0													
14		-14.0													
15		-15.0													

1. Borehole open to approximately 12.1 m depth on completion.

2. Groundwater or water seepage upon completion at approximately 11.5 m below the ground surface.

3.

4.

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Additional Notes:

- Borehole open to approximately 12.1 m depth on completion.
- Groundwater or water seepage upon completion at approximately 11.5 m below the ground surface.
-
-

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LOG OF BOREHOLE BHMW22-2S

SHEET 1 of 1

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-11-03

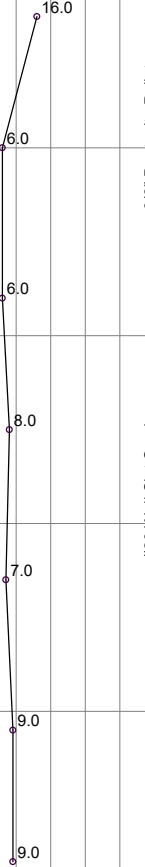
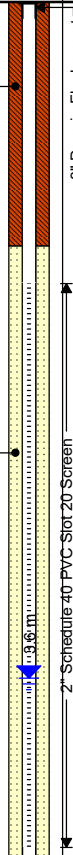
Drilling Method: Solid Stem

Datum: Geodetic

Northing: 43.258702

Easting: -79.902665

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments	
		Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity						
								▲ 40 80 120 160 ▲	PL MC LL	○ 10 20 30 40 ○						
								Penetration Test Values (Blows / 0.3m)								
								× 20 40 60 80 ×								
1		Asphalt ~75 mm	1	SS	6 4 6 6	10								8" Drop-in Flushmount		
		Fill Sandy silt, trace gravel, trace brick fragments, trace asphalt pieces. Brown, loose to compact, moist. ...loose.	2	SS	2 3 3	6										
		...compact.	3	SS	8 6 5	11										
		...no brick fragments, no asphalt pieces.	4	SS	3 3 4	7										
		Sandy Silt Brown and grey, loose, moist to very moist.	5	SS	3 2 4	6										
			6	SS	3 2 3	5										
			7	SS	3 2 5	7										
2		End of Log														
3																
4																
5																
6																
7																



Additional Notes:

- Borehole open to approximately 4.5 m depth on completion.
- Groundwater or water seepage not encountered.
-
-

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Additional Notes:

- Borehole open to approximately 4.5 m depth on completion.
- Groundwater or water seepage not encountered.
-
-

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LOG OF BOREHOLE BHMW22-2D

SHEET 1 of 2

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-11-03

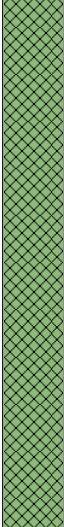
Drilling Method: Hollow Stem

Datum: Geodetic

Northing: 43.25871

Easting: -79.902626

Ground Surface Elevation: 0

Depth Scale (m)	Subsurface Conditions			Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments	
	Stratigraphic Symbol	Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity						
								▲	▲	PL	MC					LL
								Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity						
×	×	○	○													
20	40	60	80	10	20	30	40									
			Asphalt ~75 mm													
			Fill Sandy silt, trace gravel, trace brick fragments, trace asphalt pieces. Brown, compact, moist.	1	SS	6 7 6 6	13	x		13.0						
1		-1.0	...loose.	2	SS	6 5 4	9	x		9.0						
				3	SS	4 4 4	8	x		8.0						
2		-2.0														
				4	SS	4 4 5	9	x		9.0						
3		-3.0	Sandy Silt Brown and grey, loose, moist.	5	SS	3 2 3	5	x		5.0						
4		-4.0	...trace gravel.	6	SS	3 4 4	8	x		8.0						
				7	SS	3 3 4	7	x		7.0						
5		-5.0														
			...compact.	8	SS	5 7 18	25	x		25.0						
6		-6.0	Sand trace gravel, trace silt. Brown, dense, dry to moist.	9	SS	16 26 23	49	x		49.0						
			...compact.													
7		-7.0		10	SS	12 12 8	20	x		20.0						
 Additional Notes: 1. Borehole open to approximately 12.1 m depth on completion. 2. Groundwater or water seepage encountered upon completion at approximately 11.9 m below the ground surface. 3. 4. LANDTEK LIMITED 205 Nebo Road, Unit 4B Hamilton, Ontario, L8W 2E1 Ph: (905) 383-3733																



Additional Notes:

- Borehole open to approximately 12.1 m depth on completion.
- Groundwater or water seepage encountered upon completion at approximately 11.9 m below the ground surface.
-
-

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SHEET 2 of 2

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
		Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values	Moisture / Plasticity							
							(kPa)		Moisture / Plasticity						
	Depth/Elevation (m)														
8	-8.0		11	SS	16 12 9	21				21.0					
		Silt trace sand inclusions. Brown, compact, moist.	12	SS	6 11 11	22				22.0					
9	-9.0														
		...trace red shale fragments. Brown and grey.	13	SS	6 8 10	18				18.0					
10	-10.0		14	SS	3 4 5	9				9.0					
		...moist to very moist.													
11	-11.0		15	SS	3 8 11	19				19.0					
		Sand Brown, compact, wet.	16	SS	9 8 6	14				14.0					
12	-12.0														
		...loose.	17	SS	2 2 2	4				4.0					
13	-13.0	End of Log													
14	-14.0														
15	-15.0														



Additional Notes:

- Borehole open to approximately 12.1 m depth on completion.
- Groundwater or water seepage encountered upon completion at approximately 11.9 m below the ground surface.
-
-

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LOG OF BOREHOLE BHMW22-3S

SHEET 1 of 1

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-11-03

Drilling Method: Solid Stem

Datum: Geodetic

Northing: 43.258938

Easting: -79.902727

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
		Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲	PL MC LL	○ 10 20 30 40 ○					
								× Penetration Test Values (Blows / 0.3m) × 20 40 60 80							
1 															



Additional Notes:

- Borehole open to approximately 5.1 m depth on completion.
- Groundwater or water seepage not encountered.
-
-

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LOG OF BOREHOLE BHMW22-4D

SHEET 1 of 2

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-11-04

Drilling Method: Hollow Stem

Datum: Geodetic

Northing: 43.258838

Easting: -79.902733

Ground Surface Elevation: 0

Depth Scale (m)	Subsurface Conditions			Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
	Stratigraphic Symbol	Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲		PL MC LL					
								Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity					
								× 20 40 60 80 ×		10 20 30 40					
			Asphalt ~75 mm												
			Fill Sandy silt, trace gravel. Brown and black, loose, moist.	1	SS	4 3 2 4	5								
1		-1.0		2	SS	3 2 4 4	6								
			...brownish red, moist to very moist.												
2		-2.0		3	SS	2 3 4	7								
				4	SS	2 3 5	8								
3		-3.0	Silt trace sand. Brown, loose, moist.												
			...very moist to wet.												
				5	SS	3 4 5	9								
4		-4.0													
			...moist.												
				6	SS	3 4 5	9								
			...grey.												
5		-5.0		7	SS	2 2 4	6								
				8	SS	2 2 4	6								
6		-6.0	Sand trace gravel, trace silt. Brown, dense, moist.	9	SS	23 19 17	36								
7		-7.0		10	SS	10 16 15	31								
</															



Additional Notes:

- Borehole open to approximately 12.1 m depth on completion.
- Groundwater or water seepage encountered upon completion at approximately 11.5 m below the ground surface.
-
-

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LOG OF BOREHOLE BHMW22-4D

SHEET 2 of 2

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-11-04

Drilling Method: Hollow Stem

Datum: Geodetic

Northing: 43.258838

Easting: -79.902733

Ground Surface Elevation: 0

Depth Scale (m)	Subsurface Conditions				Samples		Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments	
	Stratigraphic Symbol	Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲	▲	PL					MC
								Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity					
								×	×	○	○				
								20	40	60	80	10	20	30	40
8		-8.0	...trace iron staining, very moist.	11	SS	12 10 9	19					21.0			
				12	SS	9 7 11	18					22.0			
9		-9.0	Clayey Silt trace sand inclusions. Brown, very stiff, moist.	13	SS	7 10 14	24					18.0			
			...grey and brown, very moist.												
10		-10.0		14	SS	4 7 9	16					9.0			
			...stiff, wet.												
11		-11.0		15	SS	4 6 8	14					19.0			
			...very stiff, very moist to wet.												
12		-12.0		16	SS	12 13 15	28					14.0			
			...dense.												
				17	SS	4 9 25 35	34					4.0			
			End of Log												
13		-13.0													
14		-14.0													
15		-15.0													



Additional Notes:

- Borehole open to approximately 12.1 m depth on completion.
- Groundwater or water seepage encountered upon completion at approximately 11.5 m below the ground surface.
-
-

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LOG OF BOREHOLE BHMW22-5s

SHEET 1 of 1

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-11-03

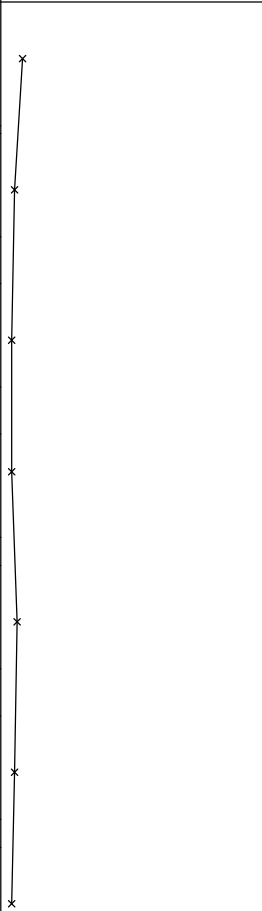
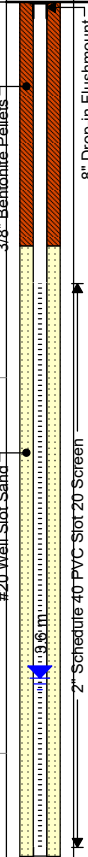
Drilling Method: Solid Stem

Datum: Geodetic

Northing: 43.258778

Easting: -79.902866

Ground Surface Elevation: 0

Depth Scale (m)	Subsurface Conditions			Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments		
	Stratigraphic Symbol	Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity							
								▲ 40 80 120 160 ▲	PL MC LL	○ 10 20 30 40 ○							
								Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity							
								× 20 40 60 80 ×									
1		-1.0	Asphalt ~75 mm Fill Silt, trace sand, trace gravel. Brown and black, loose, moist. PHC odour. ...no gravel.	1	SS	9 6 2 2	8										
				2	SS	3 2 3	5									x	
				3	SS	2 2 2	4										x
				4	SS	2 2 2	4										x
2		-2.0		5	SS	2 2 4	6	x									
3		-3.0		6	SS	2 2 3	5	x									
4		-4.0	Silt trace sand. Brown and grey, loose, moist.	7	SS	2 2 2	4	x									
5		-5.0	End of Log														
6		-6.0															
7		-7.0															

Additional Notes:
1. Borehole open to approximately 4.5 m depth on completion.
2. Groundwater or water seepage not encountered.
3.
4.

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Additional Notes:

- Borehole open to approximately 4.5 m depth on completion.
- Groundwater or water seepage not encountered.
-
-

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LOG OF BOREHOLE BHMW5

SHEET 1 of 1

Project No.: 22372				Drill Date: 2016-09-07				Northing: 43.258851			
Project Name: 925 Main Street West, Hamilton, Ontario				Drilling Method: Hollow Stem				Easting: -79.902709			
Location: 925 Main Street West, Hamilton, Ontario				Datum: Geodetic				Ground Surface Elevation: 0			

Depth Scale (m)	Subsurface Conditions			Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
	Stratigraphic Symbol	Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲		PL MC LL					
								Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity					
								×	20 40 60 80	×	10 20 30 40				

		Asphalt ~250 mm													
1		Fill Sand and gravel. Grey, compact, dry.		1	SS		12								
		...sandy silt, trace gravel.		2	SS		2								
2															
3		Silt trace sand. Brown, loose, very moist to wet.		3	SS		5								
4															
5				4	SS		4								
6															
7															



- Additional Notes:**
- Borehole open to approximately 4.6 m depth on completion.
 - Groundwater level at 3.6 m below the ground surface, monitored on 20/09/2016.
 -
 -

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LOG OF BOREHOLE BHMW22-6S

SHEET 1 of 1

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-11-04

Drilling Method: Hollow Stem

Datum: Geodetic

Northing: 43.258611

Easting: -79.903132

Ground Surface Elevation: 0

Depth Scale (m)	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments	
	Stratigraphic Symbol	Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲	PL MC LL	○ 10 20 30 40 ○					
								Penetration Test Values (Blows / 0.3m)							
								× 20 40 60 80 ×							
1		-1.0	Asphalt ~75 mm Granular Sand and gravel, trace asphalt pieces. Fill Silt, trace gravel. Brown, loose, moist.	1	SS	4 7 9 7	16			5.0					
				2	SS	2 3 3	6			5.0					
2		-2.0	...mosit to very moist.	3	SS	4 3 3	6			4.0					
				4	SS	2 3 5	8			5.0					
3		-3.0	Silt trace clay, trace sand, trace gravel. Brown, loose, very moist.	5	SS	3 3 4	7			6.0					
				6	SS	3 4 5	9			6.0					
4		-4.0													
5		-5.0	Clayey Silt trace sand. Grey, stiff, very moist to wet.	7	SS	3 4 5	9			13.0					
			End of Log												
6		-6.0													
7		-7.0													

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Additional Notes:

- Borehole open to approximately 4.5 m depth on completion.
- Groundwater or water seepage not encountered.
-
-

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LOG OF BOREHOLE BHMW22-6D

SHEET 1 of 2

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-11-04

Drilling Method: Hollow Stem

Datum: Geodetic

Northing: 43.25862

Easting: -79.903101

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments				
		Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity									
								▲	▲	PL	MC					LL			
								Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity									
								×	×	○	○								
								20	40	60	80	10	20	30	40				
1	  	-1.0	Asphalt ~75 mm	1	SS	4 7 9 7	16	x			16.0		 3/8" Bentonite Pellets	8" Drop-in Flushmount					
2		-2.0	Granular Sand and gravel, trace asphalt pieces. Fill Silt, trace gravel. Brown, loose, dry to moist.	2	SS	2 3 3	6	x			6.0								
3		-3.0	Silt trace sand, trace gravel. Brown, loose, very moist.	3	SS	4 3 3	6	x			6.0								
4		-4.0	Clayey Silt trace sand. Grey, stiff, very moist to wet	4	SS	2 3 5	8	x			8.0								
5		-5.0	Silt trace sand, trace gravel. Brown, loose, very moist.	5	SS	3 3 4	7	x			7.0								
6		-6.0	Clayey Silt trace sand. Grey, stiff, very moist to wet	6	SS	3 4 5	9	x			9.0								
7		-7.0	Silty Sand trace gravel. Brown, dense, moist.	7	SS	3 4 5	9	x			9.0								
8		-8.0	Silty Sand trace gravel. Brown, dense, moist.	8	SS	1 3 3	6	x			6.0								
9		-9.0	Silty Sand trace gravel. Brown, dense, moist.	9	SS	30 26 22	48	x			48.0								
10		-10.0	Silty Sand trace gravel. Brown, dense, moist.	10	SS	13 24 20	44	x			44.0								



Additional Notes:

1. Borehole open to approximately 12.1 m depth on completion.

2. Groundwater or water seepage encountered upon completion at approximately 11.9 m below the ground surface

3.

4.

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Additional Notes:

- Borehole open to approximately 12.1 m depth on completion.
- Groundwater or water seepage encountered upon completion at approximately 11.9 m below the ground surface
-
-

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Ph: (905) 383-3733

LOG OF BOREHOLE BHMW22-6D

SHEET 2 of 2

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-11-04

Drilling Method: Hollow Stem

Datum: Geodetic

Northing: 43.25862

Easting: -79.903101

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments	
		Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity							
							▲	▲	PL	MC	LL					
		Depth/Elevation (m)						×	×	○	○					
8		-8.0	...compact, no cobbles.	11	SS	6 7 9	16					16.0				
			...very moist to wet.	12	SS	5 6 7	13					13.0				
9			-9.0	Silt trace sand. Brown, compact, very moist.	13	SS	4 5 6	11					11.0			
				...very moist to wet.	14	SS	4 5 8	13					13.0			
				...brown and grey.	15	SS	3 5 7	12					12.0			
10		-10.0		16	SS	6 8 10	18					18.0				
11		-11.0		17	SS	6 16 23	39					39.0				
12		-12.0														
13		-13.0	End of Log													
14		-14.0														
15		-15.0														

Additional Notes:

- Borehole open to approximately 12.1 m depth on completion.
- Groundwater or water seepage encountered upon completion at approximately 11.9 m below the ground surface
-
-

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Additional Notes:

- Borehole open to approximately 12.1 m depth on completion.
- Groundwater or water seepage encountered upon completion at approximately 11.9 m below the ground surface
-
-

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LOG OF BOREHOLE BHMW22-7S

SHEET 1 of 1

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-12-01

Drilling Method: Solid Stem

Datum: Geodetic

Northing: 43.258729

Easting: -79.903505

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
		Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲	PL MC LL	○ 10 20 30 40 ○					
								× Penetration Test Values (Blows / 0.3m) ×							
								20 40 60 80							
			Asphalt ~150 mm												
			Fill Silt, trace sand, trace clay, trace gravel. Brown, loose, moist.	1	SS	49 36 7 6	42								
1		-1.0		2	SS	2 3 4	7								
			...trace iron staining. Compact.												
2		-2.0		3	SS	3 6 6	12								
			Silt some sand, trace iron staining. Brown, loose, very moist.	4	SS	1 2 3	5								
3		-3.0	...compact.												
				5	SS	3 4 7	11								
4		-4.0	...trace gravel. Brown and grey.												
5		-5.0		6	SS	3 5 5	10								
			End of Log												
6		-6.0													
7		-7.0													



Additional Notes:

- Borehole open to approximately 4.5 m depth on completion.
- Groundwater or water seepage not encountered.
-
-

LANDTEK LIMITED

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LOG OF BOREHOLE BHMW22-8S

SHEET 1 of 1

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-12-01

Drilling Method: Solid Stem

Datum: Geodetic

Northing: 43.258595

Easting: -79.903807

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
		Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲	PL MC LL	○ 10 20 30 40 ○					
						Penetration Test Values (Blows / 0.3m)									
						× 20 40 60 80 ×									
1		-1.0	Asphalt ~150 mm Granular Sand and gravel. Fill Silt, trace clay, trace sand, trace gravel, trace red brick fragments. Brown, loose, dry to moist.	1	SS	5 4 5 4	9			9.0					
				2	SS	2 2 2	4			4.0					
2		-2.0	...trace iron staining, trace concrete/slag.	3	SS	2 1 1	2			2.0					
				4	SS	2 1 4	5			5.0					
3		-3.0		5	SS	2 3 3	6			6.0					
4		-4.0	Silt trace clay, trace sand, trace gravel. Brown, loose, moist.	6	SS	2 2 2	4			4.0					
			...loose to compact.	7	SS	3 5 5	10			10.0					
5		-5.0	End of Log												
6		-6.0													
7		-7.0													

<



Additional Notes:

- Borehole open to approximately 4.5 m depth on completion.
- Groundwater or water seepage not encountered.
-
-

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Hamilton, Ontario, L8W 2E1
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LOG OF BOREHOLE BHMW22-8D

SHEET 1 of 2

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-12-02

Drilling Method: Hollow Stem

Datum: Geodetic

Northing: 43.258607

Easting: -79.903749

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
		Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲	PL MC LL	× Penetration Test Values (Blows / 0.3m) ×	Moisture / Plasticity				
								20 40 60 80		10 20 30 40					
			Asphalt ~150 mm												
			Granular Sand and gravel.	1	SS	5 4 5 4	9	x		9.0					
1		-1.0	Fill Silt, trace clay, trace sand, trace gravel, trace red brick fragments. Brown, loose, dry to moist.	2	SS	2 2 2	4	x		4.0					
			...trace iron staining, trace concrete/slag.					x		11.0					
2		-2.0		3	SS	2 1 1	2	x		2.0					
				4	SS	2 1 4	5	x		5.0					
3		-3.0													
				5	SS	2 3 3	6	x		6.0					
4		-4.0		6	SS	2 2 2	4	x		4.0					
			...loose to compact.												
5		-5.0		7	SS	3 5 5	10	x		10.0					
			...compact.												
				8	SS	3 5 6 33	11	x		11.0					
6		-6.0													
				9	SS	15 12 7 5	19	x		19.0					
			...loose, very moist.												
7		-7.0		10	SS	2 4 4 3	8	x		8.0					
 Additional Notes: 1. Borehole open to approximately 13.6 m depth on completion. 2. Groundwater or water seepage encountered at approximately 7.6 m below the ground surface. 3. 4. LANDTEK LIMITED 205 Nebo Road, Unit 4B Hamilton, Ontario, L8W 2E1 Ph: (905) 383-3733															



Additional Notes:

- Borehole open to approximately 13.6 m depth on completion.
- Groundwater or water seepage encountered at approximately 7.6 m below the ground surface.
-
-

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SHEET 2 of 2

Northing: 43.258607

Easting: -79.903749

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments				
		Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity									
								▲	▲	PL	MC					LL			
								×	×	○	○								
								20	40	60	80	10	20	30	40				
8		-8.0	Silt trace sand, trace clay. Brown, compact, very moist to wet.	11	SS	4 7 8 12	15					15.0							
				12	SS	4 8 10 13	18						18.0						
9		-9.0	...moist.																
				13	SS	8 9 12 15	21					21.0							
10		-10.0	...grey, very moist to wet.																
11		-11.0		14	SS	3 4 7 9	11					11.0							
12		-12.0	...loose.																
				15	SS	3 3 6 6	9					9.0							
13		-13.0	...compact.																
14		-14.0		16	SS	4 6 11 12	17					17.0							
15		-15.0	End of Log																



Additional Notes:

- Borehole open to approximately 13.6 m depth on completion.
- Groundwater or water seepage encountered at approximately 7.6 m below the ground surface.
-
-

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LOG OF BOREHOLE BH9

SHEET 1 of 1

Project No.: 22372				Drill Date: 2022-12-02				Northing: 43.258755							
Project Name: 925 Main Street West, Hamilton, Ontario				Drilling Method: Solid Stem				Easting: -79.903999							
Location: 925 Main Street West, Hamilton, Ontario				Datum: Geodetic				Ground Surface Elevation: 0							
Depth Scale (m)	Subsurface Conditions			Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
	Stratigraphic Symbol	Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲		PL MC LL					
								Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity					
								× 20 40 60 80 ×	○ 10 20 30 40 ○						
1	  	-1.0	Asphalt Asphalt Granular Sand and gravel Fill Silt, trace clay, trace sand, trace gravel. Brown, loose, moist.	1	SS	20 3 5 5	8				8.0				
				2	SS	3 2 2	4		4.0						
				3	SS	2 2 3	5		5.0						
2		-2.0	Silt trace sand, trace clay, trace iron staining. Brown, loose, moist. ...loose to compact.								10.0				
				4	SS	3 4 6	10								
3		-3.0	...compact.								11.0				
				5	SS	2 6 5	11								
4		-4.0	End of Log												
5		-5.0													
6		-6.0													
7		-7.0													



Additional Notes:

- Borehole open to approximately 3.0 m depth on completion.
- Groundwater or water seepage not encountered.
-
-

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Hamilton, Ontario, L8W 2E1
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Additional Notes:
 1. Borehole open to approximately 3.0 m depth on completion.
 2. Groundwater or water seepage not encountered.
 3.
 4.

LANDTEK LIMITED

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 Hamilton, Ontario, L8W 2E1
 Ph: (905) 383-3733

LOG OF BOREHOLE BHMW22-10S

SHEET 1 of 1

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-12-01

Drilling Method: Solid Stem

Datum: Geodetic

Northing: 43.258506

Easting: -79.90391

Ground Surface Elevation: 0

Depth Scale (m)	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments	
	Stratigraphic Symbol	Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲	PL MC LL	○ 10 20 30 40 ○					
								Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity					
								× 20 40 60 80 ×							
1		-1.0	Asphalt ~150 mm	1	SS	9 3 2 3	5	x		5.0					
		-1.0	Fill Silt, trace sand, trace clay, trace gravel. Brown, loose, dry to moist.	2	SS	2 2 3	5	x		5.0					
		-2.0	...trace brick fragments. Very moist.	3	SS	3 2 2	4	x		4.0					
		-2.0							x		5.0				
		-3.0			4	SS	1 2 3	5							
		-3.0			5	SS	2 2 4	6	x		6.0				
		-4.0	Silt trace clay, trace sand. Brown, loose, moist.	6	SS	2 3 3	6	x		6.0					
5		-5.0	...trace iron staining. Grey.	7	SS	3 5 8	13	x		13.0					
			End of Log												
6		-6.0													
7		-7.0													

Additional Notes:

- Borehole open to approximately 4.5 m depth on completion.
- Groundwater or water seepage not encountered.
-
-

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Additional Notes:

- Borehole open to approximately 4.5 m depth on completion.
- Groundwater or water seepage not encountered.
-
-

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SHEET 1 of 2

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
		Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲	▲	×	×				
			Asphalt ~150 mm												
1		-1.0	Fill Silt, trace sand, trace clay, trace gravel. Brown, loose, dry to moist. ...trace brick fragments. Very moist.	1	SS	9 3 2 3	5	x		5.0					
				2	SS	2 2 3	5	x		5.0					
2		-2.0		3	SS	3 2 2	4	x		4.0					
				4	SS	1 2 3	5	x		5.0					
3		-3.0		5	SS	2 2 4	6	x		6.0					
4		-4.0	Silt trace clay, trace sand. Brown, loose, moist. ...trace iron staining. Grey and brown, compact. ...no iron staining, no clay.	6	SS	2 3 3	6	x		6.0					
5		-5.0		7	SS	3 5 8	13	x		13.0					
6		-6.0		8	SS	4 4 6	10	x		10.0					
7		-7.0	Silty Sand ...trace gravel. Brown, compact, moist. ...loose.	9	SS	2 3 19	22	x		22.0					
				10	SS	3 2 3	5	x		5.0					

Additional Notes:

- Borehole open to approximately 13.7 m depth on completion.
- Groundwater or water seepage encountered at approximately 6.8 m below the ground surface.
-
-

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LOG OF BOREHOLE BHMW22-10D

SHEET 2 of 2

Project No.: 22372				Drill Date: 2022-12-01				Northing: 43.258515							
Project Name: 925 Main Street West, Hamilton, Ontario				Drilling Method: Hollow Stem				Easting: -79.90388							
Location: 925 Main Street West, Hamilton, Ontario				Datum: Geodetic				Ground Surface Elevation: 0							
Depth Scale (m)	Subsurface Conditions			Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
	Stratigraphic Symbol	Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲	▲	PL	MC				
								Penetration Test Values (Blows / 0.3m)		Moisture / Plasticity					
								×	×	○	○				
								20	40	60	80	10	20	30	40
8		-8.0	Silt trace sand, trace gravel. Brown, loose, very moist to wet.	11	SS	3 3 2	5	x				5.0			
			...trace red sand seam. Compact.	12	SS	2 7 8	15	x				15.0			
9		-9.0	...trace iron staining.	13	SS	4 5 9	14	x				14.0			
10		-10.0													
11		-11.0		14	SS	2 4 7	11	x				11.0			
12		-12.0	...grey.												
				15	SS	3 5 6	11	x				11.0			
13		-13.0													
			...reddish brown.												
14		-14.0		16	SS	5 8 8	16	x				16.0			
			End of Log												
15		-15.0													



Additional Notes:

- Borehole open to approximately 13.7 m depth on completion.
- Groundwater or water seepage encountered at approximately 6.8 m below the ground surface.
-
-

LANDTEK LIMITED

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LOG OF BOREHOLE BHMW22-11

SHEET 1 of 1

Project No.: 22372

Project Name: 925 Main Street West, Hamilton, Ontario

Location: 925 Main Street West, Hamilton, Ontario

Drill Date: 2022-12-01

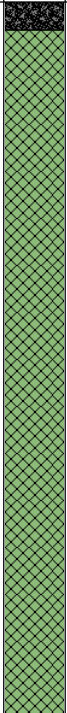
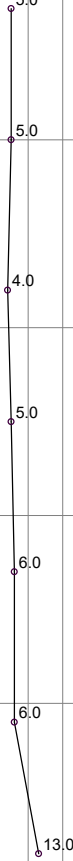
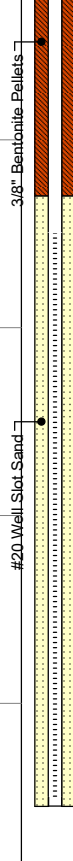
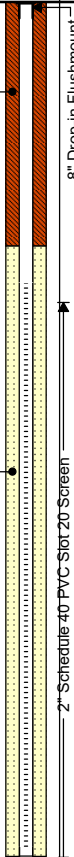
Drilling Method: Solid Stem

Datum: Geodetic

Northing: 43.258602

Easting: -79.904001

Ground Surface Elevation: 0

Depth Scale (m)	Stratigraphic Symbol	Subsurface Conditions		Samples				Penetration / Strength Results		Moisture / Plasticity		Well Details	Groundwater Conditions	Headspace Vapor HEX/IBL (ppm) [LEL(%)]	Comments
		Depth/Elevation (m)	Description	Number	Type	Blow Counts/150 mm	N Value	Undrained Shear Strength Values (kPa)		Moisture / Plasticity					
								▲ 40 80 120 160 ▲	PL MC LL	○ 10 20 30 40 ○					
						Penetration Test Values (Blows / 0.3m)									
						× 20 40 60 80 ×									
1		-1.0	Asphalt ~150 mm Fill Silt with gravel, trace pebbles, trace iron staining. Grey and brown, dense, dry to moist. ...trace sand. Loose, moist. ...sandy silt, trace black staining. Brown and red. ...trace brick fragments.	1	SS	8 7 40 55	47					8" Drop-in Flushmount			
				2	SS	2 2 3	5								
				3	SS	1 1 2	3								
				4	SS	2 3 2	5								
				5	SS	2 2 2	4								
				6	SS	4 4 5	9								
				7	SS	2 2 3	5								
End of Log															
6		-6.0													
7		-7.0													



Additional Notes:

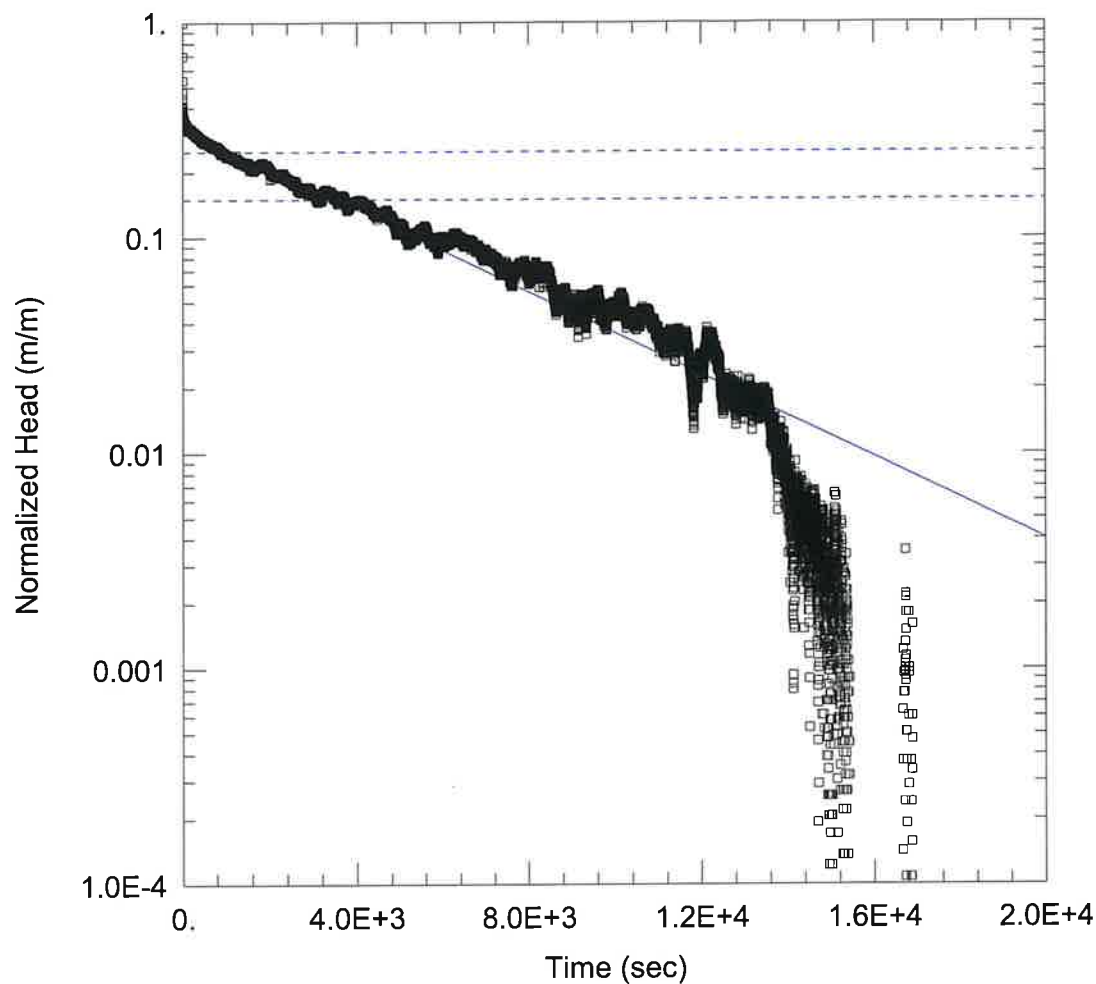
- Borehole open to approximately 4.5 m depth on completion.
- Groundwater or water seepage not encountered.
-
-

LANDTEK LIMITED

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APPENDIX C

HYDRAULIC CONDUCTIVITY TESTING ANALYSIS RESULTS



HDROGEOLOGICAL INVESTIGATION

Data Set: M:\...\MW22-2S.aqt
 Date: 01/13/26

Time: 09:46:03

PROJECT INFORMATION

Company: Landtek Limited
 Client: Legacy Constructorst
 Project: 22371
 Location: 925 Main Street West
 Test Well: MW22-2S
 Test Date: February 8, 2023

AQUIFER DATA

Saturated Thickness: 1.57 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW22-2S)

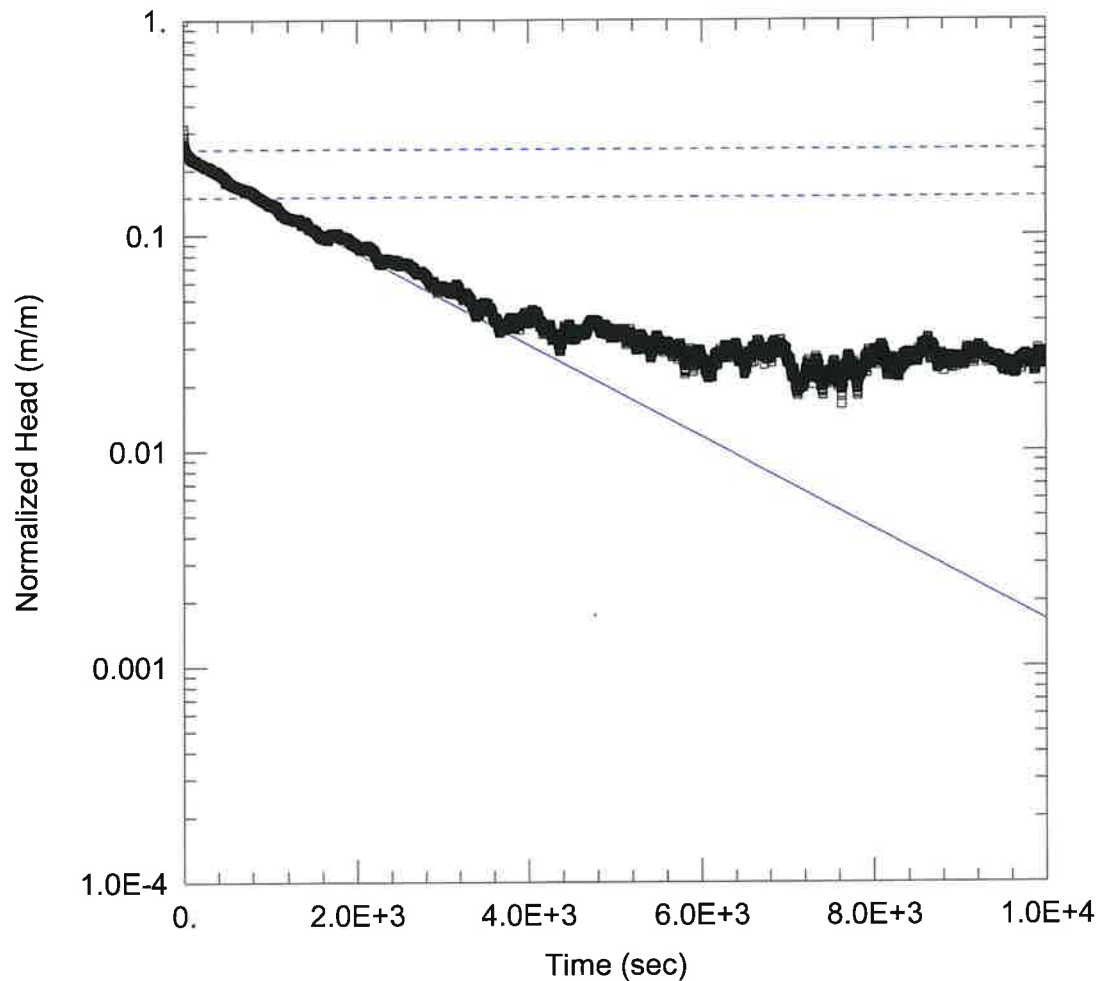
Initial Displacement: 0.2227 m
 Total Well Penetration Depth: 1.57 m
 Casing Radius: 0.0254 m

Static Water Column Height: 1.57 m
 Screen Length: 1.5 m
 Well Radius: 0.0254 m

SOLUTION

Aquifer Model: Unconfined
 $K = 2.254E-7$ m/sec

Solution Method: Hvorslev
 $y_0 = 0.0719$ m



HDROGEOLOGICAL INVESTIGATION

Data Set: M:\...\MW22-3S.aqt
 Date: 01/13/26

Time: 09:46:29

PROJECT INFORMATION

Company: Landtek Limited
 Client: Legacy Constructorst
 Project: 22371
 Location: 925 Main Street West
 Test Well: MW22-3S
 Test Date: February 8, 2023

AQUIFER DATA

Saturated Thickness: 1.94 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW22-3S)

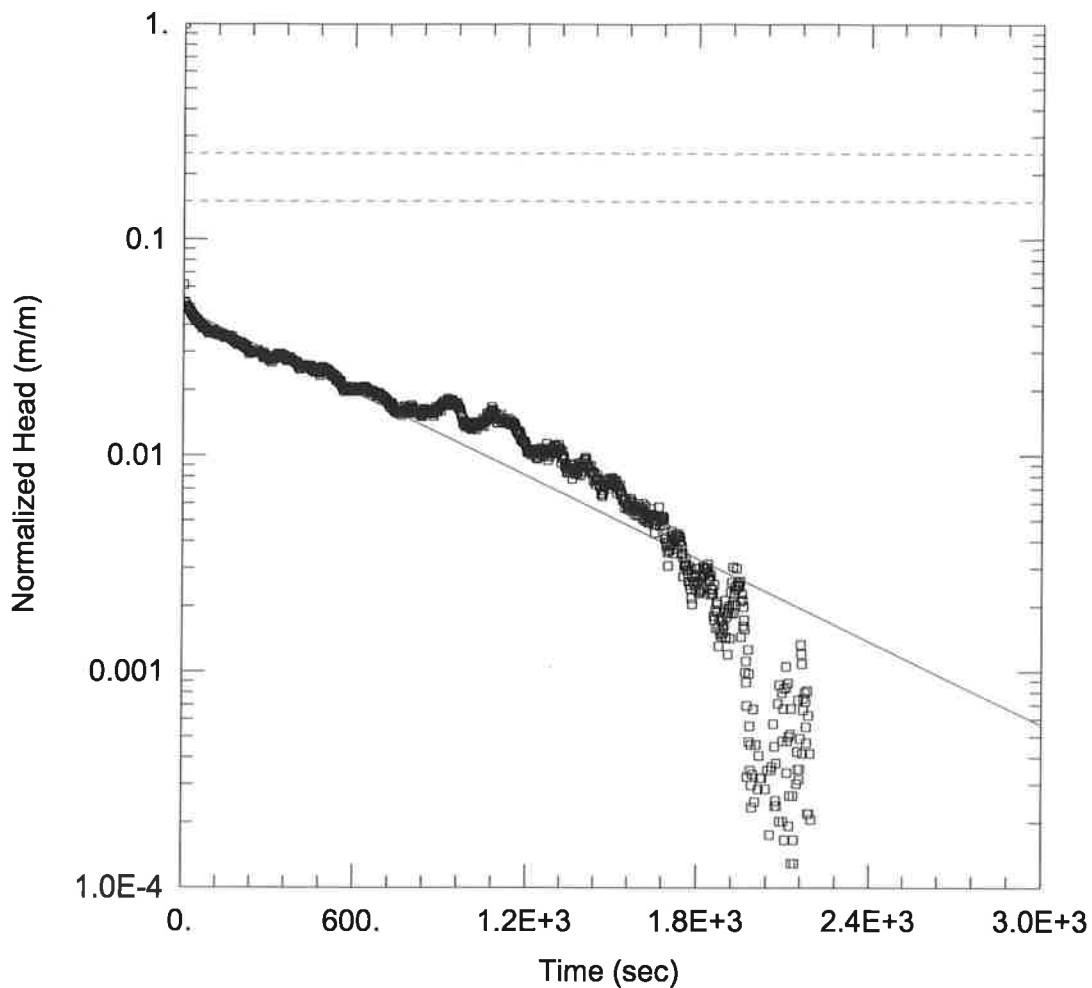
Initial Displacement: 0.4494 m
 Total Well Penetration Depth: 1.94 m
 Casing Radius: 0.0254 m

Static Water Column Height: 1.94 m
 Screen Length: 1.5 m
 Well Radius: 0.0254 m

SOLUTION

Aquifer Model: Unconfined
 $K = 5.026E-7$ m/sec

Solution Method: Hvorslev
 $y_0 = 0.09832$ m



HDROGEOLOGICAL INVESTIGATION

Data Set: M:\...\MW22-6D.aqt
 Date: 06/07/23

Time: 14:18:57

PROJECT INFORMATION

Company: Landtek Limited
 Client: 925 Maain Street W Ltd.
 Project: 22371
 Location: 925 Main Street West
 Test Well: MW22-6D
 Test Date: February 8, 2023

AQUIFER DATA

Saturated Thickness: 2.49 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW22-6D)

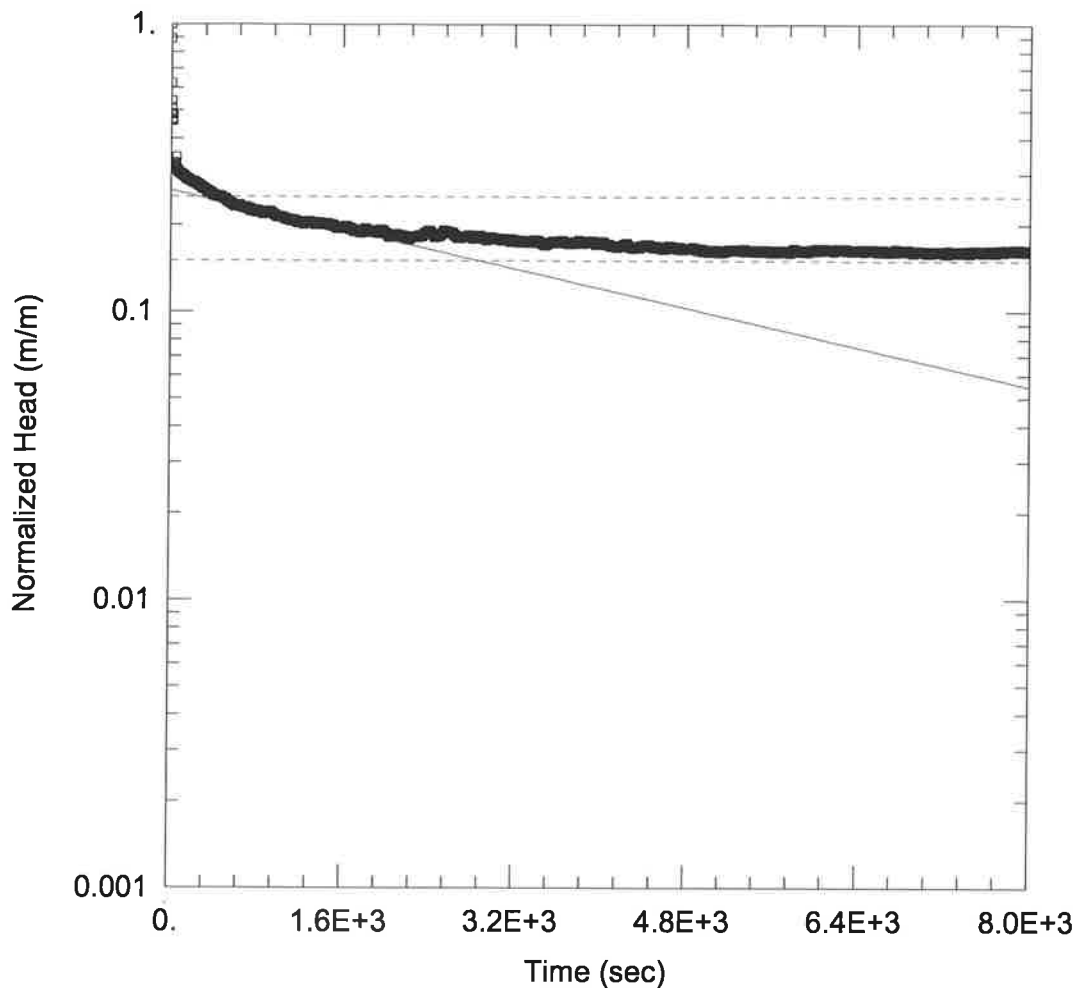
Initial Displacement: 0.8109 m
 Total Well Penetration Depth: 2.49 m
 Casing Radius: 0.0254 m

Static Water Column Height: 2.49 m
 Screen Length: 2.49 m
 Well Radius: 0.0254 m

SOLUTION

Aquifer Model: Unconfined
 $K = 1.012E-6$ m/sec

Solution Method: Hvorslev
 $y_0 = 0.03822$ m



HDROGEOLOGICAL INVESTIGATION

Data Set: M:\...\MW22-10D.aqt

Date: 06/07/23

Time: 14:20:27

PROJECT INFORMATION

Company: Landtek Limited

Client: 925 Main Street W Ltd.

Project: 22371

Location: 925 Main Street West

Test Well: MW22-10D

Test Date: february 8, 2023

AQUIFER DATA

Saturated Thickness: 3.02 m

Anisotropy Ratio (K_z/K_r): 1.

WELL DATA (MW22-10D)

Initial Displacement: 0.3357 m

Static Water Column Height: 3.02 m

Total Well Penetration Depth: 3.2 m

Screen Length: 3. m

Casing Radius: 0.0254 m

Well Radius: 0.0254 m

SOLUTION

Aquifer Model: Unconfined

Solution Method: Hvorslev

$K = 1.153E-7$ m/sec

$y_0 = 0.08839$ m

APPENDIX D

LABORATORY CERTIFICATE OF ANALYSIS

CLIENT NAME: LANDTEK LTD.
205 NEBO ROAD, UNIT 3
HAMILTON, ON L8W2E1
(905) 383-3733

ATTENTION TO: Henry Erebor

PROJECT: 22371

AGAT WORK ORDER: 23H015982

MICROBIOLOGY ANALYSIS REVIEWED BY: Nivine Basily, Inorganics Report Writer

TRACE ORGANICS REVIEWED BY: Neli Popnikolova, Senior Chemist

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Apr 27, 2023

PAGES (INCLUDING COVER): 21

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

*Notes

Disclaimer:

- All work conducted herein has been done using accepted standard protocols, and generally accepted practices and methods. AGAT test methods may incorporate modifications from the specified reference methods to improve performance.
- All samples will be disposed of within 30 days after receipt unless a Long Term Storage Agreement is signed and returned. Some specialty analysis may be exempt, please contact your Client Project Manager for details.
- AGAT's liability in connection with any delay, performance or non-performance of these services is only to the Client and does not extend to any other third party. Unless expressly agreed otherwise in writing, AGAT's liability is limited to the actual cost of the specific analysis or analyses included in the services.
- This Certificate shall not be reproduced except in full, without the written approval of the laboratory.
- The test results reported herewith relate only to the samples as received by the laboratory.
- Application of guidelines is provided "as is" without warranty of any kind, either expressed or implied, including, but not limited to, warranties of merchantability, fitness for a particular purpose, or non-infringement. AGAT assumes no responsibility for any errors or omissions in the guidelines contained in this document.
- All reportable information as specified by ISO/IEC 17025:2017 is available from AGAT Laboratories upon request.
- For environmental samples in the Province of Quebec: The analysis is performed on and results apply to samples as received. A temperature above 6°C upon receipt, as indicated in the Sample Reception Notification (SRN), could indicate the integrity of the samples has been compromised if the delay between sampling and submission to the laboratory could not be minimized.



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 23H015982

PROJECT: 22371

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: LANDTEK LTD.

SAMPLING SITE: 925 Main St. West, Hamilton

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

E. Coli

DATE RECEIVED: 2023-04-19

DATE REPORTED: 2023-04-27

		SAMPLE DESCRIPTION:		MW-1D	MW-4D	MW-8D
		SAMPLE TYPE:		Water	Water	Water
		DATE SAMPLED:		2023-04-19 12:00	2023-04-19 13:15	2023-04-19 14:00
Parameter	Unit	G / S	RDL	4927136	4927152	4927153
Escherichia coli - DC Agar	CFU/100mL	2400		0	0	0

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to City of Hamilton Storm Sewer Discharge
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

4927136-4927153 Escherichia coli RDL = 10 CFU/100mL.

RDL > 1 indicates dilutions of the sample.

The sample was diluted prior to filtration due to the presence of sediments.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



Nivine Basly



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 23H015982

PROJECT: 22371

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: LANDTEK LTD.

SAMPLING SITE: 925 Main St. West, Hamilton

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

Hamilton Sanitary Sewer and Combined Sewer Use - Organics

DATE RECEIVED: 2023-04-19

DATE REPORTED: 2023-04-27

Parameter	Unit	SAMPLE DESCRIPTION:			MW-1D	MW-4D	MW-8D
		SAMPLE TYPE:			Water	Water	Water
		DATE SAMPLED:			2023-04-19	2023-04-19	2023-04-19
					12:00	13:15	14:00
		G / S: A	G / S: B	RDL	4927136	4927152	4927153
Oil and Grease (animal/vegetable) in water	mg/L	150	10	0.5	5.06[<B]	4.71[<B]	3.69[<B]
Oil and Grease (mineral) in water	mg/L	15		0.5	0.87[<A]	0.71[<A]	0.71[<A]
Di-n-butyl phthalate	mg/L	0.08		0.0005	<0.0005	<0.0005	<0.0005
Bis(2-Ethylhexyl)phthalate	mg/L	0.28		0.0005	<0.0005	<0.0005	<0.0005
3,3'-Dichlorobenzidine	mg/L	0.002		0.0005	<0.0005	<0.0005	<0.0005
Pentachlorophenol	mg/L	0.005		0.0005	<0.0005	<0.0005	<0.0005
Phenanthrene	mg/L			0.0003	<0.0003	<0.0003	<0.0003
Anthracene	mg/L			0.0003	<0.0003	<0.0003	<0.0003
Fluoranthene	mg/L			0.0003	<0.0003	<0.0003	<0.0003
Pyrene	mg/L			0.0002	<0.0002	<0.0002	<0.0002
Benzo(a)anthracene	mg/L			0.0002	<0.0002	<0.0002	<0.0002
Chrysene	mg/L			0.0003	<0.0003	<0.0003	<0.0003
Benzo(b+j)fluoranthene	mg/L			0.0002	<0.0002	<0.0002	<0.0002
Benzo(k)fluoranthene	mg/L			0.0002	<0.0002	<0.0002	<0.0002
Benzo(a)pyrene	mg/L			0.0001	<0.0001	<0.0001	<0.0001
Perylene	mg/L			0.0001	<0.0001	<0.0001	<0.0001
Indeno(1,2,3-cd)pyrene	mg/L			0.0003	<0.0003	<0.0003	<0.0003
Dibenzo(a,h)anthracene	mg/L			0.0002	<0.0002	<0.0002	<0.0002
Benzo(ghi)perylene	mg/L			0.0002	<0.0002	<0.0002	<0.0002
Dibenzo(a,i)pyrene*	mg/L			0.0001	<0.0001	<0.0001	<0.0001
Benzo(e)pyrene*	mg/L			0.0001	<0.0001	<0.0001	<0.0001
Dibenzo(a,j)acridine*	mg/L			0.0001	<0.0001	<0.0001	<0.0001
7H-dibenzo(c,g)carbazole*	mg/L			0.0001	<0.0001	<0.0001	<0.0001
Total PAHs	mg/L	0.005		0.0003	<0.0003	<0.0003	<0.0003
Aldrin	mg/L			0.00005	<0.00005	<0.00005	<0.00005
Dieldrin	mg/L			0.00005	<0.00005	<0.00005	<0.00005
Aldrin + Dieldrin	mg/L	0.0002		0.0002	<0.0002	<0.0002	<0.0002
alpha - chlordane	mg/L			0.0001	<0.0001	<0.0001	<0.0001
gamma-Chlordane	mg/L			0.0002	<0.0002	<0.0002	<0.0002

Certified By:

N Popmukolof



Certificate of Analysis

AGAT WORK ORDER: 23H015982

PROJECT: 22371

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
<http://www.agatlabs.com>

CLIENT NAME: LANDTEK LTD.

SAMPLING SITE: 925 Main St. West, Hamilton

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

Hamilton Sanitary Sewer and Combined Sewer Use - Organics

DATE RECEIVED: 2023-04-19

DATE REPORTED: 2023-04-27

		SAMPLE DESCRIPTION:			MW-1D	MW-4D	MW-8D
		SAMPLE TYPE:			Water	Water	Water
		DATE SAMPLED:			2023-04-19 12:00	2023-04-19 13:15	2023-04-19 14:00
Parameter	Unit	G / S: A	G / S: B	RDL	4927136	4927152	4927153
Chlordane (Total)	mg/L	0.1		0.007	<0.007	<0.007	<0.007
op' - DDT	mg/L			0.00005	<0.00005	<0.00005	<0.00005
pp'-DDT	mg/L			0.0005	<0.0005	<0.0005	<0.0005
DDT (o,p' + p,p')	mg/L	0.0001		0.0001	<0.0001	<0.0001	<0.0001
Mirex	mg/L	0.1		0.0005	<0.0005	<0.0005	<0.0005
Hexachlorocyclohexane	mg/L	0.1		0.0001	<0.0001	<0.0001	<0.0001
Hexachlorobenzene	mg/L	0.0001		0.0001	<0.0001	<0.0001	<0.0001
PCBs	mg/L	0.001		0.0002	<0.0002	<0.0002	<0.0002
Benzene	mg/L	0.01		0.0002	<0.0002	<0.0002	<0.0002
Chloroform	mg/L	0.04		0.0002	<0.0002	<0.0002	<0.0002
Methylene Chloride	mg/L	2		0.0003	<0.0003	<0.0003	<0.0003
cis-1,2-Dichloroethylene	mg/L	4		0.0002	<0.0002	<0.0002	<0.0002
trans-1,3-Dichloropropylene	mg/L	0.14		0.0003	<0.0003	<0.0003	<0.0003
Trichloroethylene	mg/L	0.4		0.0002	0.0017[<A]	<0.0002	0.0021[<A]
1,1,2,2-Tetrachloroethane	mg/L	1.4		0.0001	<0.0001	<0.0001	<0.0001
Toluene	mg/L	0.016		0.0002	<0.0002	<0.0002	<0.0002
Ethylbenzene	mg/L	0.16		0.0001	<0.0001	<0.0001	<0.0001
Tetrachloroethylene	mg/L	1		0.0001	<0.0001	<0.0001	<0.0001
1,2-Dichlorobenzene	mg/L	0.05		0.0001	<0.0001	<0.0001	<0.0001
1,4-Dichlorobenzene	mg/L	0.08		0.0001	<0.0001	<0.0001	<0.0001
Xylenes (Total)	mg/L	1.4		0.0002	<0.0002	<0.0002	<0.0002
Surrogate	Unit	Acceptable Limits					
TCMX	%		50-140		76	86	76
Decachlorobiphenyl	%		50-140		88	115	95
Toluene-d8	% Recovery		50-140		104	104	99
4-Bromofluorobenzene	% Recovery		50-140		93	93	92

Certified By:

N Popmukolof



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 23H015982

PROJECT: 22371

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CLIENT NAME: LANDTEK LTD.

SAMPLING SITE: 925 Main St. West, Hamilton

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

Hamilton Sanitary Sewer and Combined Sewer Use - Organics

DATE RECEIVED: 2023-04-19

DATE REPORTED: 2023-04-27

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to City of Hamilton Sanitary Sewer Discharge, B Refers to City of Hamilton Storm Sewer Discharge
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

4927136-4927153 Oil and Grease animal/vegetable is a calculated parameter. The calculated value is the difference between Total O&G and Mineral O&G.
Xylenes total is a calculated parameter. The calculated value is the sum of m&p-Xylene and o-Xylene.

Note: The result for Benzo(b+j)Flouranthene is the total of the Benzo(b)&(j)Flouranthene isomers because the isomers co-elute on the GC column.

Total PAHs is calculated as sum of Anthracene, Benzo(a)pyrene, Benzo(a)anthracene, Benzo(e)pyrene*, Benzo(b+j)fluoranthene, Benzo(k)fluoranthene, Benzo(g,h,i)perylene, Chrysene, Dibenz(a,h)anthracene, Dibenz(a,i)pyrene*, Dibenz(a,j) Acridine*, 7H-Dibenzo(c,g)carbazole*, Fluoranthene, Indeno(1,2,3-cd)pyrene, Perylene, Phenanthrene and Pyrene.

*-not accredited parameters.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 23H015982

PROJECT: 22371

5835 COOPERS AVENUE
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<http://www.agatlabs.com>

CLIENT NAME: LANDTEK LTD.

SAMPLING SITE: 925 Main St. West, Hamilton

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

CBOD5

DATE RECEIVED: 2023-04-19

DATE REPORTED: 2023-04-27

		SAMPLE DESCRIPTION:		MW-1D	MW-4D	MW-8D	
		SAMPLE TYPE:		Water	Water	Water	
		DATE SAMPLED:		2023-04-19 12:00	2023-04-19 13:15	2023-04-19 14:00	
Parameter	Unit	G / S	RDL	4927136	4927152	RDL	4927153
Biochemical Oxygen Demand, Carbonaceous	mg/L	300	2	<2	<2	6	<6

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to City of Hamilton Sanitary Sewer Discharge
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

Analysis performed at AGAT Halifax (unless marked by *)

Certified By:

Iris Veraistegui



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 23H015982

PROJECT: 22371

5835 COOPERS AVENUE
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CLIENT NAME: LANDTEK LTD.

SAMPLING SITE: 925 Main St. West, Hamilton

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics

DATE RECEIVED: 2023-04-19

DATE REPORTED: 2023-04-27

		SAMPLE DESCRIPTION:			MW-1D		MW-4D		MW-8D
		SAMPLE TYPE:			Water		Water		Water
		DATE SAMPLED:			2023-04-19		2023-04-19		2023-04-19
					12:00		13:15		14:00
Parameter	Unit	G / S: A	G / S: B	RDL	4927136	RDL	4927152	RDL	4927153
pH	pH Units	6-11.0	6-11.0	NA	7.56	NA	7.55	NA	7.07
Total Suspended Solids	mg/L	350	15	10	7490[>A]	10	136[B-A]	10	78600[>A]
Phenols	mg/L	1	0.02	0.002	0.010[<B]	0.002	0.019[<B]	0.002	0.029[B-A]
Cyanide, SAD	mg/L	2		0.002	0.007[<A]	0.002	0.007[<A]	0.002	<0.002
Total Kjeldahl Nitrogen	mg/L	100		0.10	0.20[<A]	0.10	0.20[<A]	0.10	0.46[<A]
Total Phosphorus	mg/L	10		0.02	0.91[<A]	0.02	0.04[<A]	0.06	3.31[<A]
Chloride	mg/L	1500		2.4	2960[>A]	2.4	2620[>A]	1.2	815[<A]
Fluoride	mg/L	10		0.26	<0.26	0.26	<0.26	0.13	<0.13
Sulphate	mg/L	1500		1.9	207[<A]	1.9	176[<A]	0.95	329[<A]
Sulphide as Hydrogen sulphide	mg/L			0.01	<0.01	0.01	<0.01	0.01	<0.01
Total Aluminum	mg/L	50		0.20	156[>A]	0.010	4.88[<A]	0.20	137[>A]
Total Antimony	mg/L	5		0.020	<0.020	0.020	<0.020	0.020	<0.020
Total Arsenic	mg/L	1		0.015	0.069[<A]	0.015	<0.015	0.015	0.390[<A]
Total Bismuth	mg/L	5		0.020	<0.020	0.020	<0.020	0.020	<0.020
Total Cadmium	mg/L	0.7	0.008	0.005	<0.005	0.005	<0.005	0.005	<0.005
Total Chromium	mg/L	5	0.08	0.030	0.300[B-A]	0.030	<0.030	0.030	0.246[B-A]
Total Cobalt	mg/L	5		0.020	0.165[<A]	0.020	<0.020	0.020	0.157[<A]
Total Copper	mg/L	2	0.05	0.030	0.373[B-A]	0.030	<0.030	0.030	0.441[B-A]
Total Iron	mg/L	50		0.50	349[>A]	0.050	7.94[<A]	1.00	549[>A]
Total Lead	mg/L	2	0.12	0.020	0.177[B-A]	0.020	<0.020	0.020	0.183[B-A]
Total Manganese	mg/L	5		0.020	11.0[>A]	0.020	0.173[<A]	0.020	9.59[>A]
Total Mercury	mg/L	0.01		0.0002	<0.0002	0.0002	<0.0002	0.0002	<0.0002
Total Molybdenum	mg/L	1		0.020	<0.020	0.020	<0.020	0.020	<0.020
Total Nickel	mg/L	2	0.08	0.030	0.332[B-A]	0.030	<0.030	0.030	0.302[B-A]
Total Selenium	mg/L	1		0.002	0.009[<A]	0.002	0.005[<A]	0.002	0.007[<A]
Total Silver	mg/L	5		0.020	<0.020	0.020	<0.020	0.020	<0.020
Total Tin	mg/L	5		0.020	<0.020	0.020	<0.020	0.020	<0.020
Total Titanium	mg/L	5		0.10	2.13[<A]	0.010	0.117[<A]	0.10	1.70[<A]
Total Vanadium	mg/L	5		0.020	0.334[<A]	0.020	<0.020	0.020	0.286[<A]

Certified By:

José Verástegui



AGAT Laboratories

Certificate of Analysis

AGAT WORK ORDER: 23H015982

PROJECT: 22371

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
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<http://www.agatlabs.com>

CLIENT NAME: LANDTEK LTD.

SAMPLING SITE: 925 Main St. West, Hamilton

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics

DATE RECEIVED: 2023-04-19

DATE REPORTED: 2023-04-27

SAMPLE DESCRIPTION:					SAMPLE TYPE:				
MW-1D					Water				
2023-04-19					2023-04-19				
12:00					13:15				
4927136					4927152				
Parameter	Unit	G / S: A	G / S: B	RDL	RDL	RDL	RDL	RDL	RDL
Total Zinc	mg/L	2	0.5	0.020	0.770[B-A]	0.020	0.022[<B]	0.020	0.755[B-A]

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to City of Hamilton Sanitary Sewer Discharge, B Refers to City of Hamilton Storm Sewer Discharge
Guideline values are for general reference only. The guidelines provided may or may not be relevant for the intended use. Refer directly to the applicable standard for regulatory interpretation.

4927136-4927153 Sulphide as Hydrogen Sulphide is a non accredited calculated parameter.
Dilution required, RDL has been increased accordingly.

Analysis performed at AGAT Toronto (unless marked by *)

Certified By:

Iris Veraestegui



Exceedance Summary

AGAT WORK ORDER: 23H015982

PROJECT: 22371

5835 COOPERS AVENUE
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CLIENT NAME: LANDTEK LTD.

ATTENTION TO: Henry Erebor

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	UNIT	GUIDEVALUE	RESULT
4927136	MW-1D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Chromium	mg/L	0.08	0.300
4927136	MW-1D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Copper	mg/L	0.05	0.373
4927136	MW-1D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Lead	mg/L	0.12	0.177
4927136	MW-1D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Nickel	mg/L	0.08	0.332
4927136	MW-1D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Suspended Solids	mg/L	15	7490
4927136	MW-1D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Zinc	mg/L	0.5	0.770
4927136	MW-1D	ON Hamilton SN	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Chloride	mg/L	1500	2960
4927136	MW-1D	ON Hamilton SN	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Aluminum	mg/L	50	156
4927136	MW-1D	ON Hamilton SN	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Iron	mg/L	50	349
4927136	MW-1D	ON Hamilton SN	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Manganese	mg/L	5	11.0
4927136	MW-1D	ON Hamilton SN	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Suspended Solids	mg/L	350	7490
4927152	MW-4D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Suspended Solids	mg/L	15	136
4927152	MW-4D	ON Hamilton SN	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Chloride	mg/L	1500	2620
4927153	MW-8D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Phenols	mg/L	0.02	0.029
4927153	MW-8D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Chromium	mg/L	0.08	0.246
4927153	MW-8D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Copper	mg/L	0.05	0.441
4927153	MW-8D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Lead	mg/L	0.12	0.183
4927153	MW-8D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Nickel	mg/L	0.08	0.302
4927153	MW-8D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Suspended Solids	mg/L	15	78600
4927153	MW-8D	ON Hamilton SM	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Zinc	mg/L	0.5	0.755
4927153	MW-8D	ON Hamilton SN	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Aluminum	mg/L	50	137
4927153	MW-8D	ON Hamilton SN	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Iron	mg/L	50	549
4927153	MW-8D	ON Hamilton SN	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Manganese	mg/L	5	9.59
4927153	MW-8D	ON Hamilton SN	Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics	Total Suspended Solids	mg/L	350	78600

Quality Assurance

CLIENT NAME: LANDTEK LTD.

PROJECT: 22371

SAMPLING SITE: 925 Main St. West, Hamilton

AGAT WORK ORDER: 23H015982

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

Microbiology Analysis

RPT Date: Apr 27, 2023			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

E. Coli

Escherichia coli - DC Agar	4925588	0	0	NA
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Comments: NA - % RPD Not Applicable.

Certified By:





Quality Assurance

CLIENT NAME: LANDTEK LTD.

PROJECT: 22371

SAMPLING SITE: 925 Main St. West, Hamilton

AGAT WORK ORDER: 23H015982

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

Trace Organics Analysis

RPT Date: Apr 27, 2023			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE		MATRIX SPIKE	
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper

Hamilton Sanitary Sewer and Combined Sewer Use - Organics

Oil and Grease (animal/vegetable) in water	4909986		0.63	0.58	NA	< 0.5	100%	70%	130%	107%	70%	130%	116%	70%	130%
Oil and Grease (mineral) in water	4909986		< 0.5	< 0.5	NA	< 0.5	90%	70%	130%	80%	70%	130%	86%	70%	130%
Di-n-butyl phthalate	4918658		< 0.0005	< 0.0005	NA	< 0.0005	89%	50%	140%	109%	50%	140%	115%	50%	140%
Bis(2-Ethylhexyl)phthalate	4918658		< 0.0005	< 0.0005	NA	< 0.0005	85%	50%	140%	79%	50%	140%	79%	50%	140%
3,3'-Dichlorobenzidine	4918658		< 0.0005	< 0.0005	NA	< 0.0005	105%	30%	130%	85%	30%	130%	85%	30%	130%
Pentachlorophenol	4918658		< 0.0005	< 0.0005	NA	< 0.0005	79%	50%	140%	84%	50%	140%	81%	50%	140%
Phenanthrene	4918658		< 0.0003	< 0.0003	NA	< 0.0003	85%	50%	140%	75%	50%	140%	79%	50%	140%
Anthracene	4918658		< 0.0003	< 0.0003	NA	< 0.0003	84%	50%	140%	82%	50%	140%	83%	50%	140%
Fluoranthene	4918658		< 0.0003	< 0.0003	NA	< 0.0003	79%	50%	140%	85%	50%	140%	85%	50%	140%
Pyrene	4918658		< 0.0002	< 0.0002	NA	< 0.0002	82%	50%	140%	84%	50%	140%	69%	50%	140%
Benzo(a)anthracene	4918658		< 0.0002	< 0.0002	NA	< 0.0002	85%	50%	140%	79%	50%	140%	85%	50%	140%
Chrysene	4918658		< 0.0003	< 0.0003	NA	< 0.0003	84%	50%	140%	82%	50%	140%	84%	50%	140%
Benzo(b+j)fluoranthene	4918658		< 0.0002	< 0.0002	NA	< 0.0002	79%	50%	140%	77%	50%	140%	79%	50%	140%
Benzo(k)fluoranthene	4918658		< 0.0002	< 0.0002	NA	< 0.0002	105%	50%	140%	79%	50%	140%	82%	50%	140%
Benzo(a)pyrene	4918658		< 0.0001	< 0.0001	NA	< 0.0001	79%	50%	140%	86%	50%	140%	84%	50%	140%
Perylene	4918658		< 0.0001	< 0.0001	NA	< 0.0001	85%	50%	140%	68%	50%	140%	79%	50%	140%
Indeno(1,2,3-cd)pyrene	4918658		< 0.0003	< 0.0003	NA	< 0.0003	86%	50%	140%	82%	50%	140%	85%	50%	140%
Dibenzo(a,h)anthracene	4918658		< 0.0002	< 0.0002	NA	< 0.0002	82%	50%	140%	85%	50%	140%	84%	50%	140%
Benzo(ghi)perylene	4918658		< 0.0002	< 0.0002	NA	< 0.0002	85%	50%	140%	84%	50%	140%	79%	50%	140%
Aldrin	4927136	4927136	< 0.00005	< 0.00005	NA	< 0.00005	95%	50%	140%	90%	50%	140%	92%	50%	140%
Dieldrin	4927136	4927136	< 0.00005	< 0.00005	NA	< 0.00005	94%	50%	140%	85%	50%	140%	87%	50%	140%
alpha - chlordane	4927136	4927136	< 0.0001	< 0.0001	NA	< 0.0001	93%	50%	140%	84%	50%	140%	81%	50%	140%
gamma-Chlordane	4927136	4927136	< 0.0002	< 0.0002	NA	< 0.0002	90%	50%	140%	78%	50%	140%	82%	50%	140%
op' - DDT	4927136	4927136	< 0.00005	< 0.00005	NA	< 0.00005	107%	50%	140%	102%	50%	140%	106%	50%	140%
pp'-DDT	4927136	4927136	< 0.0005	< 0.0005	NA	< 0.0005	104%	50%	140%	98%	50%	140%	92%	50%	140%
Mirex	4927136	4927136	< 0.0005	< 0.0005	NA	< 0.0005	106%	50%	140%	86%	50%	140%	88%	50%	140%
Hexachlorocyclohexane	4927136	4927136	< 0.0001	< 0.0001	NA	< 0.0001	95%	60%	130%	84%	60%	130%	86%	60%	130%
Hexachlorobenzene	4927136	4927136	< 0.0001	< 0.0001	NA	< 0.0001	102%	50%	140%	112%	50%	140%	109%	50%	140%
PCBs	4927136	4927136	< 0.0002	< 0.0002	NA	< 0.0002	98%	50%	140%	107%	50%	140%	96%	50%	140%
Benzene	4925184		< 0.0002	< 0.0002	NA	< 0.0002	90%	50%	140%	82%	60%	130%	105%	50%	140%
Chloroform	4925184		< 0.0002	< 0.0002	NA	< 0.0002	104%	50%	140%	80%	60%	130%	110%	50%	140%
Methylene Chloride	4925184		< 0.0003	< 0.0003	NA	< 0.0003	99%	50%	140%	85%	60%	130%	113%	50%	140%
cis-1,2-Dichloroethylene	4925184		< 0.0002	< 0.0002	NA	< 0.0002	107%	50%	140%	88%	60%	130%	119%	50%	140%
trans-1,3-Dichloropropylene	4925184		< 0.0003	< 0.0003	NA	< 0.0003	89%	50%	140%	86%	60%	130%	90%	50%	140%
Trichloroethylene	4925184		< 0.0002	< 0.0002	NA	< 0.0002	81%	50%	140%	78%	60%	130%	100%	50%	140%
1,1,2,2-Tetrachloroethane	4925184		< 0.0001	< 0.0001	NA	< 0.0001	101%	50%	140%	109%	60%	130%	113%	50%	140%
Toluene	4925184		< 0.0002	< 0.0002	NA	< 0.0002	92%	50%	140%	78%	60%	130%	96%	50%	140%
Ethylbenzene	4925184		< 0.0001	< 0.0001	NA	< 0.0001	72%	50%	140%	76%	60%	130%	92%	50%	140%

Quality Assurance

CLIENT NAME: LANDTEK LTD.

PROJECT: 22371

SAMPLING SITE: 925 Main St. West, Hamilton

AGAT WORK ORDER: 23H015982

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

Trace Organics Analysis (Continued)

RPT Date: Apr 27, 2023			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Tetrachloroethylene	4925184		<0.0001	<0.0001	NA	< 0.0001	72%	50%	140%	79%	60%	130%	94%	50%	140%
1,2-Dichlorobenzene	4925184		<0.0001	<0.0001	NA	< 0.0001	92%	50%	140%	87%	60%	130%	105%	50%	140%
1,4-Dichlorobenzene	4925184		<0.0001	<0.0001	NA	< 0.0001	87%	50%	140%	85%	60%	130%	101%	50%	140%

Comments: When the average of the sample and duplicate results is less than 5x the RDL, the Relative Percent Difference (RPD) will be indicated as Not Applicable (NA).

Certified By:



Quality Assurance

CLIENT NAME: LANDTEK LTD.

PROJECT: 22371

SAMPLING SITE: 925 Main St. West, Hamilton

AGAT WORK ORDER: 23H015982

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

Water Analysis															
RPT Date: Apr 27, 2023			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
Hamilton Sanitary Sewer and Combined Sewer Use By-law - Inorganics															
pH	4927276		7.86	7.88	0.3%	NA	100%	90%	110%						
Total Suspended Solids	4925583		<10	<10	NA	< 10	98%	80%	120%						
Phenols	4935569		<0.002	<0.002	NA	< 0.002	96%	90%	110%	100%	90%	110%	98%	80%	120%
Cyanide, SAD	4933890		<0.002	0.002	NA	< 0.002	103%	70%	130%	98%	80%	120%	100%	70%	130%
Total Kjeldahl Nitrogen	4928105		0.78	0.76	2.6%	< 0.10	102%	70%	130%	104%	80%	120%	94%	70%	130%
Total Phosphorus	4927276		0.03	0.02	NA	< 0.02	100%	70%	130%	99%	80%	120%	96%	70%	130%
Chloride	4925745		27.4	27.4	0.0%	< 0.10	100%	70%	130%	94%	80%	120%	NA	70%	130%
Fluoride	4925745		<0.05	<0.05	NA	< 0.05	99%	70%	130%	92%	80%	120%	98%	70%	130%
Sulphate	4925745		14.2	14.2	0.0%	< 0.10	100%	70%	130%	95%	80%	120%	91%	70%	130%
Total Aluminum	4927276		0.014	0.015	NA	< 0.010	97%	70%	130%	106%	80%	120%	98%	70%	130%
Total Antimony	4927276		<0.020	<0.020	NA	< 0.020	102%	70%	130%	99%	80%	120%	97%	70%	130%
Total Arsenic	4927276		<0.015	<0.015	NA	< 0.015	97%	70%	130%	97%	80%	120%	104%	70%	130%
Total Bismuth	4927276		<0.020	<0.020	NA	< 0.020	94%	70%	130%	95%	80%	120%	94%	70%	130%
Total Cadmium	4927276		<0.005	<0.005	NA	< 0.005	98%	70%	130%	93%	80%	120%	90%	70%	130%
Total Chromium	4927276		<0.030	<0.030	NA	< 0.030	95%	70%	130%	95%	80%	120%	94%	70%	130%
Total Cobalt	4927276		<0.020	<0.020	NA	< 0.020	97%	70%	130%	88%	80%	120%	93%	70%	130%
Total Copper	4927276		<0.030	<0.030	NA	< 0.030	95%	70%	130%	95%	80%	120%	89%	70%	130%
Total Iron	4927276		<0.50	<0.50	NA	< 0.050	103%	70%	130%	99%	80%	120%	104%	70%	130%
Total Lead	4927276		<0.020	<0.020	NA	< 0.020	98%	70%	130%	93%	80%	120%	90%	70%	130%
Total Manganese	4927276		<0.020	<0.020	NA	< 0.020	99%	70%	130%	86%	80%	120%	93%	70%	130%
Total Mercury	4925588		<0.0002	<0.0002	NA	< 0.0002	101%	70%	130%	102%	80%	120%	93%	70%	130%
Total Molybdenum	4927276		<0.020	<0.020	NA	< 0.020	101%	70%	130%	100%	80%	120%	98%	70%	130%
Total Nickel	4927276		<0.030	<0.030	NA	< 0.030	92%	70%	130%	96%	80%	120%	87%	70%	130%
Total Selenium	4927276		<0.002	0.003	NA	< 0.002	94%	70%	130%	98%	80%	120%	95%	70%	130%
Total Silver	4927276		<0.020	<0.020	NA	< 0.020	96%	70%	130%	83%	80%	120%	88%	70%	130%
Total Tin	4927276		<0.020	<0.020	NA	< 0.020	92%	70%	130%	100%	80%	120%	95%	70%	130%
Total Titanium	4927276		<0.010	<0.010	NA	< 0.010	NA	70%	130%	92%	80%	120%	95%	70%	130%
Total Vanadium	4927276		<0.020	<0.020	NA	< 0.020	100%	70%	130%	89%	80%	120%	98%	70%	130%
Total Zinc	4927276		<0.020	<0.020	NA	< 0.020	98%	70%	130%	97%	80%	120%	91%	70%	130%

Comments: NA signifies Not Applicable.

If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.

Matrix spike NA: Spike level < native concentration. Matrix spike acceptance limits do not apply and are not calculated.

CBOD5

Biochemical Oxygen Demand, Carbonaceous	4927153	4927153	<6	<6	NA	< 2	81%	70%	130%	NA			NA		
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Comments: If the RPD value is NA, the results of the duplicates are under 5X the RDL and will not be calculated.



Quality Assurance

CLIENT NAME: LANDTEK LTD.

PROJECT: 22371

SAMPLING SITE: 925 Main St. West, Hamilton

AGAT WORK ORDER: 23H015982

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

Water Analysis (Continued)

RPT Date: Apr 27, 2023			DUPLICATE			Method Blank	REFERENCE MATERIAL		METHOD BLANK SPIKE			MATRIX SPIKE			
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:

Iris Veraestegui

Method Summary

CLIENT NAME: LANDTEK LTD.

AGAT WORK ORDER: 23H015982

PROJECT: 22371

ATTENTION TO: Henry Erebor

SAMPLING SITE: 925 Main St. West, Hamilton

SAMPLED BY: LB

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Microbiology Analysis			
Escherichia coli - DC Agar	MIC-93-7010	MOE Method E3407	MF/INCUBATOR

Method Summary

CLIENT NAME: LANDTEK LTD.
PROJECT: 22371
SAMPLING SITE: 925 Main St. West, Hamilton
AGAT WORK ORDER: 23H015982
ATTENTION TO: Henry Erebor
SAMPLED BY: LB

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Trace Organics Analysis			
Oil and Grease (animal/vegetable) in water	VOL-91-5011	modified from EPA SW-846 1664A & SM 5520	BALANCE
Oil and Grease (mineral) in water	VOL-91-5011	modified from EPA SW-846 1664A & SM 5520	BALANCE
Di-n-butyl phthalate	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Bis(2-Ethylhexyl)phthalate	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
3,3'-Dichlorobenzidine	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Pentachlorophenol	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Phenanthrene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Anthracene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Fluoranthene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Pyrene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(a)anthracene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Chrysene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(b+j)fluoranthene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(k)fluoranthene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(a)pyrene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Perylene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Indeno(1,2,3-cd)pyrene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Dibenzo(a,h)anthracene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(ghi)perylene	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Dibenzo(a,i)pyrene*	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Benzo(e)pyrene*	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Dibenzo(a,j)acridine*	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
7H-dibenzo(c,g)carbazole*	ORG-91-5114	modified from EPA 3510C and EPA 8270E	GC/MS
Total PAHs	ORG-91-5114	modified from EPA 3510C and EPA 8270E	CALCULATION
Aldrin	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/ECD
Dieldrin	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/ECD
Aldrin + Dieldrin	ORG-91-5112	modified from EPA SW846 3510C & 8081B	CALCULATION

Method Summary

CLIENT NAME: LANDTEK LTD.

PROJECT: 22371

SAMPLING SITE: 925 Main St. West, Hamilton

AGAT WORK ORDER: 23H015982

ATTENTION TO: Henry Erebor

SAMPLED BY: LB

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
alpha - chlordane	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/MS
gamma-Chlordane	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/ECD
Chlordane (Total)	ORG-91-5112	modified from EPA SW846 3510C & 8081B	CALCULATION
op' - DDT	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/ECD
pp'-DDT	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/ECD
DDT (o,p' + p,p')	ORG-91-5112	modified from EPA SW846 3510C & 8081B	CALCULATION
Mirex	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/ECD
Hexachlorocyclohexane	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/ECD
Hexachlorobenzene	ORG-91-5112	modified from EPA SW846 3510C & 8081B	GC/ECD
TCMX	ORG-91-5112	modified from EPA SW-846 3510 & 8081B	GC/ECD
PCBs	ORG-91-5112	modified from EPA SW846 3510C & 8082A	GC/ECD
Decachlorobiphenyl	ORG-91-5112	modified from EPA SW846 3510C & 8082A	GC/ECD
Benzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Chloroform	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Methylene Chloride	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
cis-1,2-Dichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
trans-1,3-Dichloropropylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Trichloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,1,2,2-Tetrachloroethane	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Toluene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Ethylbenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Tetrachloroethylene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,2-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
1,4-Dichlorobenzene	VOL-91-5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
Xylenes (Total)	VOL-91-5001	modified from EPA 5030B & EPA 8260D	CALCULATION
Toluene-d8	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS
4-Bromofluorobenzene	VOL-91- 5001	modified from EPA 5030B & EPA 8260D	(P&T)GC/MS

Method Summary

CLIENT NAME: LANDTEK LTD.
PROJECT: 22371
SAMPLING SITE: 925 Main St. West, Hamilton
AGAT WORK ORDER: 23H015982
ATTENTION TO: Henry Erebor
SAMPLED BY: LB

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Biochemical Oxygen Demand, Carbonaceous	INOR-121-6023	SM 5210 B	INCUBATOR
pH	INOR-93-6000	modified from SM 4500-H+ B	PC TITRATE
Total Suspended Solids	INOR-93-6028	modified from EPA 1684, ON MOECC E3139, SM 2540C, D	BALANCE
Phenols	INOR-93-6072	modified from SM 5530 D	LACHAT FIA
Cyanide, SAD	INOR-93-6051	modified from MOECC E3015; SM 4500-CN- A, B, & C	TECHNICON AUTO ANALYZER
Total Kjeldahl Nitrogen	INOR-93-6048	modified from EPA 351.2 and SM 4500-NORG D	LACHAT FIA
Total Phosphorus	INOR-93-6022	modified from SM 4500-P B and SM 4500-P E	SPECTROPHOTOMETER
Chloride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Fluoride	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	modified from SM 4110 B	ION CHROMATOGRAPH
Sulphide as Hydrogen sulphide	INOR-93-6054	modified from SM 4500 S2-D	
Total Aluminum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Antimony	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Arsenic	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Bismuth	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cadmium	MET -93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Chromium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Cobalt	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Copper	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Iron	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Lead	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Manganese	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Mercury	MET-93-6100	modified from EPA 245.2 and SM 3112 B	CVAAS
Total Molybdenum	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Nickel	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Selenium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Silver	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Tin	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Titanium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS
Total Vanadium	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS

Method Summary

CLIENT NAME: LANDTEK LTD.

AGAT WORK ORDER: 23H015982

PROJECT: 22371

ATTENTION TO: Henry Erebor

SAMPLING SITE: 925 Main St. West, Hamilton

SAMPLED BY: LB

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Total Zinc	MET-93-6103	modified from EPA 200.8, 3005A, 3010A & 6020B	ICP-MS



AGAT

Laboratories

Short Holding Time

5835 Coopers Avenue
Mississauga, Ontario L4Z 1Y2
Ph: 905.712.5100 Fax: 905.712.5122
web: earth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water consumed by humans)

Report Information:

Company: LANDTEK LIMITED
Contact: HENRY EREGER
Address: 205 NEBO RD. HAMILTON ON
L8W 2E1
Phone: 289-850-3992 Fax: _____
Reports to be sent to: henry@landtek.ca
1. Email: _____
2. Email: _____

Project Information:

Project: 22371
Site Location: 925 Main St. West, Hamilton
Sampled By: LB
AGAT Quote #: _____ PO: _____
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☐ No ☐

Company: LANDTEK LTD
Contact: KATHY CRISTOL
Address: 205 NEBO Road, Unit 4B, Hamilton
Email: kathyc@landtek.ca

Regulatory Requirements:

(Please check all applicable boxes)

☐ Regulation 153/04 ☐ Excess Soils R406 ☒ Sewer Use
☒ Sanitary ☒ Storm
Table _____ Indicate One
☐ Ind/Com ☐ Res/Park ☐ Agriculture
☐ Regulation 558
Soil Texture (Check One) ☐ CCME
☐ Coarse ☐ Fine
☒ Other Hamilton
Indicate One

Is this submission for a Record of Site Condition?

☐ Yes ☐ No

Report Guideline on Certificate of Analysis

☐ Yes ☐ No

Sample Matrix Legend

B Biota
GW Ground Water
O Oil
P Paint
S Soil
SD Sediment
SW Surface Water

Laboratory Use Only

Work Order #: 23H015982
Cooler Quantity: 3 LG COOLERS
Arrival Temperatures: SEE ATTACHED
Custody Seal Intact: ☐ Yes ☐ No ☒ N/A
Notes: NO ITC

Turnaround Time (TAT) Required:

Regular TAT ☒ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)

☐ 3 Business Days ☐ 2 Business Days ☐ Next Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
*TAT is exclusive of weekends and statutory holidays

For 'Same Day' analysis, please contact your AGAT CPM

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Y/N	Metals	Metals	BTEX, p	PAHs	PCBs	VOC	Aroclors	Landfill	TCLP: ☐	Excess SPLP: ☐	Excess pH, ICP	Corrosi	Hg	Co	Potential
MW-1D	Apr. 19/23	12:00	AM	GW		N													X	X	
MW-4D	Apr. 19	1:15	AM	GW		N													X	X	
MW-8D	Apr. 19	2:00	AM	GW		N													X	X	
			PM																		
			PM																		
			PM																		
			PM																		
			PM																		
			PM																		
			PM																		
			PM																		



Sample Temperature Log

Client:

LANDTEK

COC# or Work Order #:

23H015982

of Coolers:

3 LG

of Submissions:

Arrival Temperatures - Branch/Driver

Cooler #1: 14.2 / 14.1 / 14.3

Cooler #2: 11.9 / 12.0 / 12.2

Cooler #3: 12.5 / 12.7 / 12.9

Cooler #4: / /

Cooler #5: / /

Cooler #6: / /

Cooler #7: / /

Cooler #8: / /

Cooler #9: / /

Cooler #10: / /

IR Gun ID:

Taken By:

Date (yyyy/mm/dd):

Time: : AM / PM

Arrival Temperatures - Laboratory

Cooler #1: 7.4 / 6.8 / 7.2

Cooler #2: 4.6 / 4.2 / 3.9

Cooler #3: 4.9 / 4.1 / 4.4

Cooler #4: / /

Cooler #5: / /

Cooler #6: / /

Cooler #7: / /

Cooler #8: / /

Cooler #9: / /

Cooler #10: / /

IR Gun ID:

Taken By:

Date

(yyyy/mm/dd):

Time: : AM / PM

Instructions for use of this form: 1) complete all fields of info including total # of coolers and # of submissions rec'd, 2) photocopy and place in each submission prior to giving a WO#, 3) Proceed as normal, write the WO# and scan (please make sure to scan along with the COC)

APPENDIX E

DEWATERING ASSUMPTIONS AND CALCULATIONS – UNDERGROUND LEVELS

Table 1 – Underground Parking Excavation Dewatering Calculations

$$Q = \pi K (H^2 - h_w^2) / \ln (R_o/r_e)$$

Equation 1: The potential groundwater flow rate to the excavation for the proposed underground levels was estimated using the dewatering equation for a fully penetrated well of unconfined aquifer fed by circular source (Powers, et al., 2007).

Where: Q = pumping rate (m³/s)

K = hydraulic conductivity (m/s)

H = saturated thickness of the aquifer before dewatering (m)

h_w = saturated thickness of the aquifer after dewatering (m)

R = radius of cone of depression (m)

r_e = equivalent radius (m)

C = 3000

$R = C \cdot (H - h) \cdot \sqrt{K}$ Radius of Influence - Sichardt's equation

$r_e = \sqrt{(L \cdot B) / \pi}$ (applies when a/b > 1.5 and R₀ << r_s)

$r_e = (L + B) / \pi$ (applies when a/b < 1.5 and R₀ >> r_s)

Approximate dimensions of the Underground Parking: 118 m x 37.3 m

Basement Levels	H (m)	h _w (m)	R (m)	r _e (m)	Q (m ³ /s)	Q (L/day)	Q (L/day) (2.0 Factor of Safety)	Q (L/s) (2.0 Factor of Safety)
	12.94	1.4	20	39	4.256 x 10 ⁻⁴	36,772	73,544	~ 0.85

Assumptions for hydrogeological setting:

1. An unconfined aquifer is presumed to exist locally, with the highest water table at MW22-5S on April 19, 2023, determined to be 2.06 mbgs, and extending to the maximum drilled depth of 15.0 mbgs.
2. An ideal aquifer is assumed for the preliminary calculations of pumping rates and drawdown, as described by Powers, et al., 2007).
3. The maximum dewatering depth of construction activities is assumed to be 13.6 mbgl (0.5 m below bottom of Excavation).
4. It is assumed that as a requirement of the proposed construction activities the excavation will be pumped dry.
5. The hydraulic conductivity values for the silt fill overburden beneath the site was determined to be 3.391 x 10⁻⁷ m/s