APPENDIX

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HYDROGEOLOGICAL INVESTIGATION REPORT

CITY OF BRAMPTON

LAGERFELD DRIVE CLASS ENVIRONMENTAL ASSESSMENT

HYDROGEOLOGICAL INVESTIGATION

MARCH 24, 2021

LAGERFELD DRIVE CLASS ENVIRONMENTAL ASSESSMENT

HYDROGEOLOGICAL INVESTIGATION

CITY OF BRAMPTON

PROJECT NO.: 141-15409-00
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This limitations statement is considered an integral part of this report.

TABLES

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APPENDICES

1 INTRODUCTION

1.1 BACKGROUND

WSP Canada Inc. (WSP) was retained by the Corporation of the City of Brampton (the "Client") to complete a hydrogeological evaluation to support the Environmental Assessment for the proposed Lagerfeld Drive road upgrades near Bovaird Drive and Mississauga Road, in the City of Brampton. A zone of 500-m (the "Study Area") has been added from the approximate boundaries of the proposed road extension, to assess the hydrogeological conditions for this project. The location of the Site and Study Area is shown on **Figure 1**.

It is our understanding that the project will involve the construction of a new roadway that will extend west from Lagerfeld Drive at Creditview Road across Mississauga Road towards Heritage Road. The road is anticipated to require two creek crossing structures to allow crossing of two tributaries of Huttonville Creek. In addition, it is assumed that the project will also include the installation of underground services, such as sewers and watermains.

As part of the hydrogeological assessment, the geological and hydrogeological conditions along the proposed route were reviewed. A general overview of the conditions expected along the planned route is provided. In addition, specific areas of concern with respect to the natural heritage features, private groundwater use, impacts from construction activities, and other factors were closely examined and assessed.

The hydrogeological investigation was co-ordinated and conducted in step with an active geotechnical investigation that was completed by WSP in 2018. The findings of that investigation are provided under separate cover, dated June 2018 (WSP Canada Inc., 2018).

1.2 SCOPE OF WORK

To achieve the investigation objectives, WSP proposed and initiated the following scope of work:

a) Background desktop review of pertinent geological and hydrogeological resources;

b) Review of the Ministry of the Environment, Conservations and Parks Water Well Records (MECP WWRs);

c) Coordination with geotechnical team regarding drilling of six (6) boreholes to a depth of between 3.5 m and 5.2 m below ground surface (m BGS) to investigate the subsurface conditions;

d) Coordination with geotechnical team regarding installation of four (4) 50 mm diameter monitoring wells to observe and monitor groundwater levels at the Site;

e) Performance of Single Well Response Tests (SWRT) at all of the monitoring wells to assess the hydraulic characteristics of the saturated soils at the Site;

f) Water quality analysis to assess groundwater quality to provide general background characteristics;

g) Evaluation of the information collected during the field investigation program, including borehole geological information, particle size distribution, groundwater level measurements and groundwater quality;

h) Estimation of construction and any potential long-term dewatering flow rates;

i) Assess the potential for impacts due to the proposed construction and project scope to the natural groundwater conditions, well users, and groundwater quality;

j) Review the Source Water Protection database to identify any significant groundwater recharge areas or sensitive features;

i) Preparation of a Hydrogeological Investigation Report.

2 REGIONAL SETTING

2.1 REGIONAL PHYSIOGRAPHY

According to the Ontario Geological Survey Map P. 2204, the Study area lies within the physiographic region of Southern Ontario known as the South Slope (Chapman, 2007).

The south slope is considered the southern flank of the Oak Ridges Moraine, which lies north of the Study Area. The ground surface consists of gently undulating till plain of limited relief. Thin lake sediments are found in low-lying areas across the region, similar to those found in the Peel Plain.

2.2 REGIONAL GEOLOGY

According to Ontario Geological Survey mapping, the surficial geology of the Study Area has been described as silt till mapped as Halton Till (Ministry of Northern Development, Mines and Forestry, 2013). Modern alluvial surficial deposits have also been mapped along the tributaries to Huttonville Creek, which consist of non-cohesive silt, sand, and gravel. The surficial geology at the site and surrounding areas is shown on **Figure 2**.

Bedrock of the region corresponds to the Upper Ordovician Queenston Formation consisting of red mudstone, siltstone interbeds, and the occasional thin limestone beds near the base (Gao, 2006). The bedrock is expected to be encountered at a depth of between 15 and 20 m BGS. This corresponds to an elevation of between 230 to 235 metres above sea level (m ASL). Bedrock was not encountered during the field investigation for this assessment, and is not considered significant to the investigation.

2.3 REGIONAL HYDROGEOLOGY

Groundwater movement through the subsurface is controlled by hydraulic gradients, the physical characteristics of the sediments, and the interconnectedness of lithological formations. Fine grained sediments restrict lateral movement of groundwater and induce vertical infiltration, while coarse grained sediments allow vertical flow with increased transmissivity. Weathered bedrock surfaces can also hold and transmit significant volumes of groundwater.

It is expected that shallow groundwater flow will be directed towards area creeks, however, alterations to the natural groundwater flow could occur due to the presence of subsurface infrastructure, including building foundation drains, and linear infrastructure. Groundwater moves through all overburden soil deposits but moves more freely in the surface lacustrine and glaciofluvial sediments represented by fine sands and silts. Fine grained compact tills act as aquitards that restrict groundwater flow. Perched groundwater conditions are common in till, and are generally found within saturated sand and silt lenses interbedded within the till matrix.

The area bedrock generally has low permeability and restricts the movement of groundwater, however, in the weathered zone, at the bedrock surface, groundwater flow can be more significant. This is caused by an increase in preferred groundwater flow paths that exist within the highly fractured and weathered bedrock. Due to the thick overburden and low expected vertical hydraulic conductivity, the bedrock is not considered further in this assessment.

3 SITE SETTING

3.1 SITE TOPOGRAPHY AND DRAINAGE

The topography of the site is generally flat with minor relief. The ground surface elevation ranges from about 245 m ASL along the western and eastern edges of the alignment, sloping down to about 240 m ASL near the two creek crossings. Ground cover on the Site is mainly permeable vegetation covered areas and agricultural farm land with a minor mix of impermeable, including paved areas, buildings, and structures.

Precipitation that falls on the area is inferred to be directed to natural drainage channels and/or stormwater management features installed across the area, with final discharge to the Credit River via tributaries and storm sewers.

3.2 LOCAL SURFACE WATER FEATURES

The Site is located within the jurisdiction of Credit Valley Conservation (CVC). Parts of the alignment are located within a CVC regulated area and as such is regulated by Ontario Regulation (O.Reg.) 166/06. The Study Area is in the Huttonville Creek subwatershed of the Credit River. The West and East branches of Huttonville Creek cross the planned alignment east of Mississauga Road. The West, East and Main branches of the Huttonville Creek are considered to be regulated Redside Dace habitat, and therefore the 30-m buffer zone around each meander belt is protected under the Endangered Species Act (S.O. 2007, Chapter 6).

A review of available resources indicates that the Site alignment does not intersect any Provincially Significant Wetlands (PSW).

3.3 MECP WATER WELL RECORD REVIEW

Well records from the MECP WWR database were reviewed to determine the number of water wells and locations present within the Study Area (Ministry of Environment, Conservation and Parks, 2018).

The MECP WWR database indicated that there are fifty-eight (58) well records within the Study Area. All identified well records are shown on **Figure 3,** and a summary of the well records is included in **Appendix A.** A review of the well records indicates that fourteen (14) well records are considered water supply wells, ten (10) well records are reported as abandoned, twenty (20) records are classified as test wells, and fourteen (14) records reported as unknown.

Of these records, 34 had geological data. Most of the records indicated that the overburden consisted of clay / silt / till, with some more granular layers present as well (sand, gravel). Shale bedrock was identified in seven of the well records, being encountered at depths between 1.2 and 14.6 m bgs.

3.4 WSP GEOTECHNICAL INVESTIGATION

WSP conducted a geotechnical investigation at the Site in April 2018 to report on the subsurface conditions for the proposed roadwork. The field investigation consisted of the advancement of six (6) boreholes (BH18-01 to BH18-06) to depths that ranged from 3.2 m to 5.2 meters below ground surface (m BGS). Four of the boreholes were subsequently completed as monitoring wells (BH18-01, BH18-04, BH18-05 and BH18-06). The location of the boreholes and monitoring wells is presented on **Figure 4**.

The subsurface conditions were reported generally as a layer of topsoil overlying a till unit that extended to the full depth of investigation. The till unit varied in composition across the Site, but was generally comprised of silty sand,

sandy silt or clayey silt. Sand seams interbedded within the till deposit were noted at select locations and depths. The subsurface conditions are briefly summarized below:

TOPSOIL

At each of the six borehole locations, a topsoil of 150 to 560 mm in thickness was encountered and consisted of a silt texture, with significant organic matter noted.

SILTY SAND TILL

Within borehole BH18-01 a silty sand till was encountered underlying the topsoil. Cobbles were noted at a depth of 2.3 to 3.4 m BGS. Within BH18-02, BH18-03 and BH18-05, the silty sand till was encountered below a sandy silt till with the depth ranging from 2.3 m BGS to the full depth of investigation (5.2 m BGS). The till material was generally in a moist to wet condition.

CLAYEY SILT TILL

At BH18-01, a clayey silt till was noted underlying the silty sand till that extended from 1.1 m BGS to 2.3 m BGS. The till consisted predominately of clayey silt, traces of sand and gravel, and occasional cobbles.

SANDY SILT TILL

At BH18-02 to BH18-06, immediately underlying the topsoil, a till comprised of sandy silt was encountered that extended to depths of 2.3 m to 5.2 m BGS. Based on the field observations, the sandy silt till was described as moist to wet.

SAND SEAMS

Interbedded sand seams were observed within the till unit at BH18-06. The sand seams ranged in thickness from 30 to 60 cm. The seams were noted to be in a wet condition in the field.

3.5 SITE HYDROGEOLOGY

According to the subsurface investigation, the lithology at the Site was a sequence of silt and sand till to the maximum explored depth of 5.2 m BGS. There was no evidence of any significant aquifer material to the investigation depths. A 30 to 60 cm sand seam interbedded within the till was encountered at BH18-06 that is inferred to be localized and likely connected hydraulically to the nearby creek. The dominant surficial material across the Study Area is low permeable till that acts as an aquitard, reducing vertical infiltration. The area is not considered to be a source of groundwater recharge. Some shallow groundwater is inferred to be directed to the creeks as discharge.

A cross-section sketch has been included as **Figure 5** along the proposed alignment. The topographical profile was produced from the Canadian Digital Elevation model. Well collar elevations were estimated from this topographical dataset.

4 SITE SPECIFIC CONDITIONS

4.1 GROUNDWATER CONDITIONS

Six (6) boreholes (BH18-01 to BH18-06) were drilled to depths varying between 3.2 m and 5.2 m BGS with solid/hollow stem continuous flight auger equipment by a drilling sub-contractor under the direction and supervision of WSP personnel. The drilling works were carried out in April 2018. The locations of boreholes for this investigation were established by WSP, and designed to provide adequate coverage across the Site. Borehole locations are indicated on **Figure 4**. Complete borehole and monitoring well construction details are presented in **Appendix B**.

Prior to drilling operations, all underground utilities were cleared at the borehole locations by the representatives of public and private utility locate companies.

Samples were retrieved at regular intervals with a 50 mm O.D. split-barrel sampler driven with a hammer weighing 624 N and dropping 760 mm in accordance with the Standard Penetration Test (SPT) method. The samples were logged in the field and returned to the WSP laboratory for detailed examination by the project engineer and for laboratory testing.

In total, four (4) 50 mm diameter monitoring wells were installed at the locations of BH18-01, BH18-04, BH18-05 and BH18-06. The wells were constructed by inserting 10-slot PVC screen and casing assembly into the borehole to the designed depth and then packing a silica sand pack filter around the screen interval. Above the sand pack, a bentonite plugging material was installed to eliminate potential contamination from ground surface along the annular space. The monitoring wells were installed with a stick-up protective monument style casing. **Table 4-1** includes a summary of the monitoring wells installed at the Site.

Table 4-1 Monitoring Well Installation Details

BOREHOLE ID	DATE OF INSTALLATION	TOP OF SCREEN (M BGS)	BOTTOM OF SCREEN (M BGS)	LITHOLOGY SCREENED
BH18-01	April 2, 2018	1.8	3.3	Clayey silt till to cobbly sand till
BH18-04	April 2, 2018	1.6	3.1	Sandy silt till
BH18-05	April 2, 2018	1.1	4.1	Sandy silt till
BH18-06	April 2, 2018	1.5	3.0	Sandy silt till to sand to cobbly sand till

4.2 WATER LEVEL MONITORING

Water levels at each of the monitoring well locations were recorded both after completion of the initial drilling and again in July 2018. A summary of all water level observations and well construction details is included in **Table 4-2**. Stabilized groundwater levels were observed in all monitoring wells in July of 2018, and the depth to groundwater ranged from 1.08 m to 2.58 m BGS. The wells were not surveyed, so groundwater level elevations were not estimated.

Table 4-2 Measured Groundwater Levels

BH / Well No.	Stick Up (m)	Water Level Observations			
		April 2018*		July 23, 2018	
		Depth of W/L from M.P. (m)	Depth of W/L below ground (m BGS)	Depth of W/L from M.P. (m)	Depth of W/L below ground (m BGS)
BH18-01	1.17	-	2.1	2.25	1.08
BH18-04	1.06	-	2.4	3.64	2.58
BH18-05	1.16	-	3.4	2.37	1.21
BH18-06	0.96	-	1.8	3.09	2.13

**water level observations from drilling, not considered stabilized*

Seasonal variability can produce significant changes to the static water level. Additionally, nearby dewatering can also lower the groundwater levels on a local scale. Ongoing monitoring of the groundwater levels is recommended for the Site to provide input for future design.

There are insufficient data available from the recently installed monitoring wells to infer the shallow groundwater flow direction, however, the shallow groundwater flow is inferred to be affected by the Huttonville Creek, its tributaries, and the Credit River.

4.3 HYDRAULIC CONDUCTIVITY TESTING

Hydraulic conductivity testing was completed to estimate the saturated hydraulic conductivity (K) of the overburden at the well screen depth. Single Well Response Test (SWRT) analyses were conducted at all monitoring wells.

In advance of performing SWRT, the monitoring well was developed to remove the potential presence of fine grained sediments. The development process involved purging of the monitoring wells to induce the flow of fresh formation water through the screen. The monitoring well water level was permitted to fully recover prior to performing SWRTs.

During the SWRT, a slug of water was near-instantaneously removed from the well and the response to the water level was recorded. The hydraulic conductivity values for each of the tested wells were calculated from the SWRT data using Aqtesolv Software and the Bouwer-Rice solutions for unconfined conditions (Bouwer, 1976). The semi-log plots for normalized drawdown versus time are included in **Appendix C**. The summary of the hydraulic conductivity (K) values estimated from the SWRT are provided in **Table 4-3.**

Table 4-3 SWRT Hydraulic Conductivity Results

MONITORING WELL	FORMATION SCREENED	ANALYSIS METHOD	K-BOUWER RICE (m/sec)
BH18-01	Clayey silt till to cobbly sand till	Bouwer Rice	8.9×10^{-8}
BH18-04	Sandy silt till	Bouwer Rice	2.9×10^{-9}
BH18-05	Sandy silt till	Bouwer Rice	1.9×10^{-7}
BH18-06	Sandy silt till to sand to cobbly sand till (sand seams)	Bouwer Rice	1.5×10^{-6}

The SWRT provides estimates of the hydraulic conditions for the geological formation in the immediate media zone surrounding the well screen and may not be representative of the bulk formation hydraulic conductivities.

In addition to the *in situ* hydraulic conductivity testing outlined above, the grain size distribution plots were reviewed from selected samples recovered during the borehole drilling program in order to provide an estimation of hydraulic conductivity.

Grain size distribution curves, as shown in **Appendix B,** were used to estimate the hydraulic conductivity of soils using the Hazen approximation empirical relationship (Hazen, 1893). The relationship can be stated as:

$$K = CD_{10}{}^{2}$$

Where:

C = empirical coefficient, generally taken as 1

K = hydraulic conductivity (cm/s)

D_{10} = equivalent particle diameter (in mm) of the 10% passing (by weight)

The suitable samples were from BH18-1 (SS3) and BH18-6 (SS3). BH18-03 (SS2) was inferred based on the interpolated D_{10} value only. **Table 4-4** presents a summary of the results.

Table 4-4 Summary of Hazen Estimation for Hydraulic Conductivity.

SOIL SAMPLE LOCATION	SPLIT SPOON ID	SAMPLE DEPTH (m)	HAZEN (m/sec)
BH18-01	SS3	2.3 to 2.9	2.9×10^{-8}
BH18-03	SS2	1.5 to 2.1	$< 1.0 \times 10^{-8}$
BH18-06	SS3	2.3 to 2.9	5.6×10^{-7}

4.4 GROUNDWATER SAMPLING

To assess the background general water quality, one (1) groundwater sample was collected from BH18-01 on July 23, 2018. The other wells did not recover sufficiently to provide enough water for a sample to be collected. Prior to collection of the samples, approximately three (3) standing well volumes of groundwater were purged from the well.

Each sample was field filtered and placed into pre-cleaned laboratory-supplied vials and/or bottles provided with analytical test group specific preservatives, as required. Dedicated nitrile gloves were used during sample handling. The groundwater samples were submitted to an independent laboratory, AGAT Laboratories, in Mississauga, Ontario, for analysis.

For the assessment purposes, the laboratory analyzed the groundwater for a suite of general chemical parameters, including metals, hardness, pH, dissolved solids, and others. A summary of the analytical results and the laboratory Certificate of Analysis (CofA) are enclosed in **Appendix D**. There were several noted exceedances when comparing the results to the Provincial Water Quality Objectives, including for total phosphorous, aluminium, boron, cobalt, iron, molybdenum, uranium, and zinc. Groundwater discharge will likely require pre-treatment prior to discharging to the natural environment during construction.

5 DEWATERING ASSESSMENT

The proposed road enhancement includes potential crossings of the tributaries to Huttonville Creek. The crossings may require open excavations for footings, support structures, or abutments. In addition, it is expected that linear infrastructure will also be installed below the roadways in the form of sanitary/storm sewers and watermains. The detailed design for these services, including proposed depths and alignments are not available at this stage.

The following preliminary hydrogeological recommendations for consideration during the detailed design phase are based on the field investigation and borehole/monitoring well information collected and discussed in **Section 4**. Recommendations are intended to support the EA phase, and are not to be considered instructions for contractors. Further investigation will likely be required to support detailed design features, including detailed dewatering analysis.

5.1 POTENTIAL EXCAVATIONS – CREEK CROSSING

It is anticipated that some excavation work will be required to facilitate the installation of bridge abutments. In places that the depth of excavation is above the water table, some groundwater seepage could be expected from perched groundwater and other sources of nuisance water. It is expected that traditional pumping from gravity fed filtered sumps would be adequate to control this source of groundwater. Surface water in the form of precipitation should be controlled by directing it away from open excavations.

In cases where a deeper excavation below the water table is required, a dewatering assessment will be required to assess expected flow rates and whether dewatering efforts could potentially require a registration under the Environmental Sector Registry (EASR) program or a Permit to Take Water (PTTW).

5.2 POTENTIAL EXCAVATIONS – LINEAR INFRASTRUCTURE

Additional excavations for underground services will likely be required using open trenches. It is recommended that the length of open trench be limited by using staged construction and backfilling methods. Some minor groundwater seepage from bedding planes, granular base, or perched conditions could require minor dewatering using filtered sumps and pumps where the excavation is done above the water table. In deeper excavations, active lowering of the water table could be required to ensure a dry excavation. Dewatering efforts should focus on lowering the water table to a minimum of 1.0 m below the base of excavation. Limiting the open trench length to distances of less than 50 m for these deeper excavation areas can reduce the dewatering effort and therefore the discharge rates. A dewatering assessment will be required to assess potential flow rates during the detailed design stage to determine whether dewatering efforts could potentially require a registration under the Environmental Sector Registry (EASR) program or a PTTW.

5.3 STORMWATER INTO OPEN EXCAVATIONS

The accumulation of stormwater into open excavations can increase the volumes associated with construction dewatering. Additional capacity should be accounted for to control larger precipitation events that could otherwise disrupt construction. Best efforts should be made to divert stormwater runoff from entering open excavations. The dewatering contractor should consider additional capacity to handle the additional source of water during weather events.

6 EVALUATION OF POTENTIAL GROUNDWATER IMPACTS

6.1 IMPACTS TO GROUNDWATER USERS

The MECP well search uncovered fourteen (14) possible groundwater well users within the Study Area. The proposed project has the potential to impact the water quality and water quantity of these stakeholders. Construction dewatering will lower water levels within the zone of influence, which could impact the supply to nearby users. In addition, dewatering can also cause contaminants to migrate, which could impact the quality of groundwater to nearby users.

It is recommended that at the detailed design stage, a residential well survey be conducted to determine the status, location, and use of private water wells and septic systems within the Study Area. This survey should include attempts to collect baseline information from well users, including water levels, supply, quality, and reliability of the systems.

6.2 IMPACTS TO NEARBY STRUCTURES

There is always a possibility of inducing settlement to neighboring buildings, utilities and underground structures/infrastructure when lowering water levels or depressurizing an aquifer. It is considered a best practice to instigate a pro-active monitoring program in order to identify any potential areas of concern and the need and type of monitoring required. Utilities, and transit owners may have stringent monitoring requirements, which will have to be adhered to. During the detailed design stage, it is recommended that a geotechnical review of potential ground settlement be conducted to ensure that risk to the nearby structures is minimized during active dewatering.

6.3 IMPACTS TO SURFACE WATER FEATURES

The potential construction activities are in close proximity to the West and East Huttonville Creek waterways. These waterways are classified as Redside Dace habitat. Groundwater discharge to these waterways should be maintained to protect these sensitive species. Nearby construction dewatering could alter the natural hydraulic gradient, diverting groundwater discharge from the creek towards the source of pumping. It is recommended that during the detailed design stage, the potential for groundwater discharge to the West and East Huttonville Creek be assessed. Baseline surface water quality should also be established by conducting water sampling from the creeks. Construction methods should be examined that seek to limit excavation depths near the waterway to above the seasonal water table, if practical. If necessary to dewater, a detailed monitoring and mitigation plan will be required that includes adequate sediment and erosion control and possibly the use of drive-point piezometers and staff gauges to evaluate hydraulic gradients. Alternately, a groundwater cut-off structure could be used to reduce the dewatering needs for excavations that extend below the water table.

6.4 SOURCE WATER PROTECTION

The study area lies within the Credit River watershed, which is a part of the larger Great Lakes – St. Lawrence watershed, and is therefore in the Credit Valley-Toronto and Region-Central Lake Ontario (CTC) Source Protection Region (SPR). The CTC SPR is under the jurisdiction of the Toronto and Region Source Protection Authority, Central Lake Ontario Source Protection Authority, and the Credit Valley Source Protection Authority. The *Approved Source Protection Plan* (2015) is the reference document which outlines the relevant policies within the jurisdiction boundaries (CTC Source Protection Region, 2015).

The study boundaries were evaluated to identify any potential drinking water vulnerabilities and threats, including the proximity to any vulnerable areas, including the following:

- Wellhead Protection Areas (WHPA)
- Intake Protection Zones (IPZ)
- Highly Vulnerable Aquifers (HVA)
- Significant Groundwater Recharge Areas (SGRA)
- Wellhead Protection Area-Q (WHPA-Q, Water Quantity)

The MECP Source Protection Information Atlas indicates that the site falls within or near several vulnerable areas, as highlighted in **Table 6-1**.

Table 6-1 Source Water Protection Summary

SOURCE PROTECTION DETAILS FOR LOCATION

Source Protection Area:	Credit Valle	**Wellhead Protection Area (WHPA):**	NO	**Wellhead Protection Area E (GUDI):**	NO
Intake Protection Zone (IPZ):	NO	**Issue Contributing Area:**	NO	**Significant Groundwater Recharge Area (SGRA):**	NO
Highly Vulnerable Aquifer (HVA):	Yes, score = 6	**Event Based Area:**	NO		
Wellhead Protection Area Q1 (WHPA-Q1):	No	**Wellhead Protection Area Q2 (WHPA-Q2):**	No	**Intake Protection Zone Q (IPZ-Q):**	No

As indicated, the study area is not within a WHPA or surface water IPZ. The closest municipal water supply well is located more than 7 km west of the area in Georgetown. The closest IPZ was identified over 26 km south of the area along Lake Ontario**.**

The study area is within an area identified as HVA but just outside a SGRA area. Based on this, and the geological information collected during the field program, it is concluded that it is unlikely that there is a hydrological connection to an aquifer that is a source of drinking water.

6.5 POINTS OF DISCHARGE

During any active construction dewatering, it will be necessary to consider the final point of discharge of any construction effluent produced. The potential source for discharge include the following options:

- Discharge to a municipal storm and/or sanitary sewer;
- Collection onsite for removal by tanker to an approved waste handling facility;
- Discharge to the natural environment.

Any discharge option will potentially require consideration for the pre-treatment of the effluent to ensure it meets the relevant discharge requirements. For discharge to a municipal sewer, the limits are outlined within the municipal sewer use by-law. For discharge to the natural environment, treatment will require compliance with the Provincial

Water Quality Objectives. In either case, a discharge agreement will be required from the relevant authority. The application process will require an assessment of the groundwater quality.

6.6 LONG-TERM DRAINAGE

The proposed options for the road alignment do not feature any long-term foundation drainage systems. Therefore, it is not anticipated that there will be any long-term groundwater discharge. Underground utilities and structures should be designed with sufficient cut-off features to eliminate any preferential groundwater conduits (coarse bedding planes). This will reduce alterations to the natural groundwater regime.

6.7 WELL DECOMMISSIONING

Following the completion of construction activities, all remaining monitoring wells, well points and eductors (if any) installed at various stages of this project must be decommissioned. The installation and eventual decommissioning of the wells and the dewatering system must be carried out by a licenced water well contractor in accordance with Regulation 903 of the Ontario Water Resources Act.

7 MONITORING AND MITIGATION

If dewatering for construction is required, it is recommended that an active monitoring program be implemented. This program should incorporate some baseline monitoring for a period prior to construction to assess the background ground and surface water fluctuations. Water quality should also be assessed prior to construction. Once the baseline has been established, an active monitoring program can be implemented that is designed to trigger mitigation responses in the case that water levels within the water course is impacted. In the case that water levels are lowered to a pre-set threshold, the dewatering system could be altered to discharge directly to the water course (provided quality meets the criteria). The following monitoring program should be implemented using the existing monitoring well network (if available), or a new series of monitoring wells should be installed at preselected locations to carry out the program. The locations should be selected to provide suitable coverage across the site. The complete tabulated monitoring plan is included in **Appendix E**. An overview is presented below.

7.1 PRE-CONSTRUCTION MONITORING

Prior to initiating any construction dewatering, background conditions should be assessed to provide a relevant baseline. The pre-construction monitoring should focus on assessing both on-site, and off-site private well user conditions, including both water levels and water quality. The pre-construction monitoring period includes detailed design.

7.1.1 GROUNDWATER LEVELS

If construction dewatering is required, manual monitoring should be conducted on a monthly basis. This monitoring should aim to provide a background assessment of the groundwater levels across the site. Data loggers should be used to record water levels on a periodic interval (minimum hourly) with appropriate barometric compensation. Private well users identified as willing participants in the initial well survey should be engaged and invited to participate in background level monitoring. If possible, data loggers should be installed in private wells during this period to assess the pre-construction condition. All data loggers should be downloaded during the manual monitoring site visits. A minimum of 6 to 12 months of baseline information shall be collected to assess seasonal fluctuations and the impact of precipitation / spring melt on shallow groundwater levels. Project specific monitoring wells shall be measured on a daily basis for at least one week prior to the start of the dewatering system.

7.1.2 SURFACE WATER LEVEL

The nearby creeks should be assessed for baseflow conditions to ensure that future construction does not impact any groundwater discharge along the waterway. A monitoring network consisting of staff gauges and drive point piezometers should be installed along the waterways within the predicted zone of influence. Pre-construction monitoring should be carried out on a monthly basis to identify the groundwater contribution to the streams near the crossings, with the frequency increasing to daily for at least one week prior to the beginning of dewatering. The pre-construction monitoring will assist in establishing the baseline hydraulic gradient near the surface water features.

7.1.3 GROUNDWATER QUALITY ASSESSMENT

In addition to water levels, background groundwater samples should be collected from preselected monitoring wells to assess the pre-construction water quality. Water quality shall be tested against PWQO parameters to ensure compliance prior to discharge to the natural environment. Water quality exceedances shall be reported to the contractor in order to initiate a treatment plan prior to discharge.

Private well users who, during the well survey, indicated a willingness to participate should also be invited to participate in the background water quality assessment. The baseline water quality will be tabulated and compared against the Ontario Drinking Water Quality Standards (ODWQS). Where exceedances occur, private well users must be notified of any health-related impacts immediately.

7.1.4 SURFACE WATER QUALITY ASSESSMENT

Background surface water quality shall be tested in both branches of Huttonville creek once prior to the start of construction. Water quality shall be tested against PWQO parameters to provide additional baseline information to inform the discharge plan.

7.2 CONSTRUCTION MONITORING

The active construction dewatering stage will require monitoring designed to assess the potential for impacts to water levels in aquifers, water quality, and surface water. In addition to the aforementioned components, the use of responsible construction mitigation methods should also include implementing an Erosion and Sediment Control (ESC) plan for receiving surface water courses.

7.2.1 DISCHARGE VOLUME REPORTING

During active dewatering, the contractor will be required to document discharge pumping rates as a required condition of the PTTW, with regular reporting of water taking volumes via the MECP Water Taking Reporting System. A flow meter should be supplied and all discharged ground and storm water should be discharged through the properly field calibrated device. A non-resettable flow meter that records discharge in both instantaneous and cumulative modes is recommended. Daily recording of the discharge volumes will be required for regular reporting. The total combined daily discharge must never exceed the limits as outlined in the PTTW. Additional storage measures (such as extra tank storage or temporary settling ponds) can be used to control large rain events and reduce the instantaneous discharge/pumping rates.

7.2.2 GROUNDWATER LEVEL MONITORING

Once dewatering proceeds, it is recommended that groundwater levels be monitored across the monitoring well network to detect construction related impacts to water supply in the creeks or adjacent properties. Weekly groundwater monitoring can be undertaken with the use of programmed data loggers installed in preselected monitoring wells and drive points located along the creek. During the first week of construction, the frequency of the data collection should be daily for manual measurements and hourly for data logger reading frequency, and as the target water levels are reached, the frequency of manual measurements can be extended to weekly, with data logger reading frequency extended to daily. Data logger data should be downloaded and reviewed on a weekly basis during the early stages of dewatering to verify that water levels are stable. Once confirmed that impacts are minimal, the monitoring interval can be increased to monthly.

If engagement from the nearby private well users is positive, data can be collected from neighboring wells during the first week of dewatering. If there are no observable impacts to supply, the monitoring program interval can be increased to monthly. During the construction period, if there are any groundwater supply complaints received, they can be reviewed on a case by case basis to determine the cause of the disruption and the need for mitigation, in accordance with groundwater supply protection best management practices.

If remediation is required, the short-term solution must include provisions to supply potable water to any affected users. Long-term remediation will require provisions on a case-by-case basis.

7.2.3 SURFACE WATER MONITORING

During construction, and when area groundwater levels exceed the streambed elevation (i.e. springtime), the water level in the piezometers should be monitored on a daily basis for evidence of any lowering to the water table. If impacts are observed from active dewatering, the pumping rates should be lowered until conditions return or treated water can be directed back to the watercourse to allow for flow supplementation. Reducing excavation areas near the tributaries and within the expected zone of influence to 25 m length can also be implemented to further reduce pumping rates if any impacts are observed. After target water levels are reached, the frequency of monitoring can be extended to weekly.

7.2.4 GROUNDWATER AND EFFLUENT QUALITY MONITORING

A monitoring program should be implemented that is based on the selected discharge option. The monitoring program should consist of daily visual examination of the construction effluent for the presence of any sheen, foam, or odour. Water clarity and sediment level should also be monitored to ensure that the quality is not degrading during construction. Filters should be examined on a regular basis, and any failures to equipment should be repaired immediately. Discharge permitting may also include specific water quality testing that must be adhered to.

To ensure that excess erosion and sediment-laden water is not directed into the nearby watercourse, and in accordance with OPSS 518 (and 185), all dewatering discharge will be laminar and directed through energy dissipating / settling / filtration systems prior to return to the natural environment. Water pumped from the work area should be treated for suspended solids as necessary, prior to release. No dewatering discharge will be released directly into the watercourse. Dewatering discharge will be directed through a filter bag, splash pad, or settling facility located as possible at least 30 m from away from the watercourse, and allow water to flow overland to help equilibrate the temperature of the dewatering discharge with that of the natural watercourse.

Neighboring water users that agree to monitoring will also require regular sampling from a residential tap. During the initial dewatering period, it is recommended that a sample be collected bi-weekly for the initial month and the samples be submitted for comparison against the ODWQS. Any exceedances against the ODWQS as compared with baseline monitoring will require a detailed assessment to determine whether the exceedances are related to dewatering. If exceedances are related to dewatering, short-term remediation shall be provided in the form of a supply of potable water. Long-term measures will need to be determined on a case-by-case basis. Afterwards, testing is to be completed monthly.

Impacts to water quality can be controlled using safe construction practices that eliminate the potential for waste spills and other contamination events. Refueling should be performed in designated areas away from open excavations, and surface water features. In the event of a spill, remedial action must be undertaken immediately by the contractor, following all MECP and provincial spill guidelines.

7.2.5 SURFACE WATER QUALITY MONITORING

Should dewatering discharge back to the natural environment be directed towards either watercourse, additional sampling is to be conducted on a weekly basis during the first month of discharge to evaluate changes from baseline conditions. Samples are to be taken upstream and downstream of the discharge point to assess potential impacts. Should significant changes in water quality occur, mitigation should be initiated, which could include changing discharge locations, reducing dewatering volumes, suspension of dewatering, or adding additional treatment measures.

8 WATER TAKING REQUIREMENTS

8.1 ENVIRONMENTAL ACTIVITY AND SECTOR REGISTRY AND PERMIT TO TAKE WATER

The Environmental Activity and Sector Registry (EASR) guidelines are designed to facilitate groundwater taking during active construction dewatering applications in the cases where the volume of water removed is greater than 50,000 L/day and less than 400,000 L/day.

During the active construction dewatering phase, if the volume of water expected to be pumped does exceed the daily limit on groundwater taking under the Ontario Water Resources Act of 50,000 L/day it will be necessary to register the construction dewatering under the EASR guidelines. If the discharge rate is anticipated to exceed 400,000 L/day, a Category 3 PTTW will be required. Methods to reduce the volume of daily discharge include staged construction, limiting open excavations, diverting surface water away from excavations, and limiting the depth of excavations.

9 CONCLUSIONS AND RECOMMENDATIONS

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

1. The Site is located within the South Slope physiographic region of Southern Ontario, and the land use within the Study Area is a mix of residential, commercial, and agricultural;
2. The surficial soils encountered at the Site is comprised of a mix of silty sand to sandy silt to clayey silt tills with the potential for saturated seams of sand and silt interbedded within the till;
3. The topography across the proposed alignment range from approximate 245 m ASL to 240 m ASL with low gradients converging on the creek channels;
4. Ground cover across the Study Area is dominated by semi-permeable farm land and vegetation covered areas;
5. The Study Area is within the Credit River watershed, and the proposed road alignment crosses the West and East Huttonville Creeks, which are considered as a Redside Dace habitat;
6. The MECP WWRs indicate that there are fifty-eight (58) well records registered with the database within the Study Area; fourteen (14) classified as water supply, ten (10) classified as abandoned wells, twenty (20) test or monitoring wells, and fourteen (14) reported as unknown;
7. Four (4) monitoring wells were installed, monitored, and tested for general hydraulic parameter estimation;
8. Stabilized groundwater levels were observed in all monitoring wells in July of 2018, and the depth to groundwater ranged from 1.08 m to 2.58 m BGS.;
9. Based on in-situ SWRTs the estimated hydraulic conductivity for the shallow overburden ranges from between 2.9×10^{-9} m/sec to 1.5×10^{-6} m/s;
10. Based on the grain size approximation method the estimated hydraulic conductivity for the shallow overburden ranges from between 1.0×10^{-8} m/sec to 5.6×10^{-7} m/s;
11. The proposed road alignment includes an option for two creek crossings that would require excavations for abutments, and other associated structures that may encounter groundwater seepage if excavation is conducted below the water table;
12. The proposed road alignment would also require open cut trenching to accommodate the installation of subsurface linear infrastructure such as sewers and watermains which could encounter groundwater seepage if excavations extend below the water table;
13. Potential impacts from dewatering activities could include the impairment of water quantity to nearby wells that are situated within the zone of influence, impairment to the baseflow of the nearby tributaries to Huttonville Creek, ground settlement around the dewatered areas, and contamination to surface and groundwater resources.

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

1. Equip monitoring wells with data loggers to measure groundwater levels for 6 to 12 months to assess seasonal fluctuations and the impact precipitation/spring melt has on the shallow groundwater,
2. Produce dewatering estimates during the detailed design stage to assess for discharge and permitting needs,
3. Prior to construction dewatering, conduct a door-to-door water well survey for all water supply wells located within the Study Area to provide a baseline assessment of pre-construction conditions,
4. Review the potential impacts to surface and groundwater based on the dewatering assessment to direct future monitoring and mitigation.

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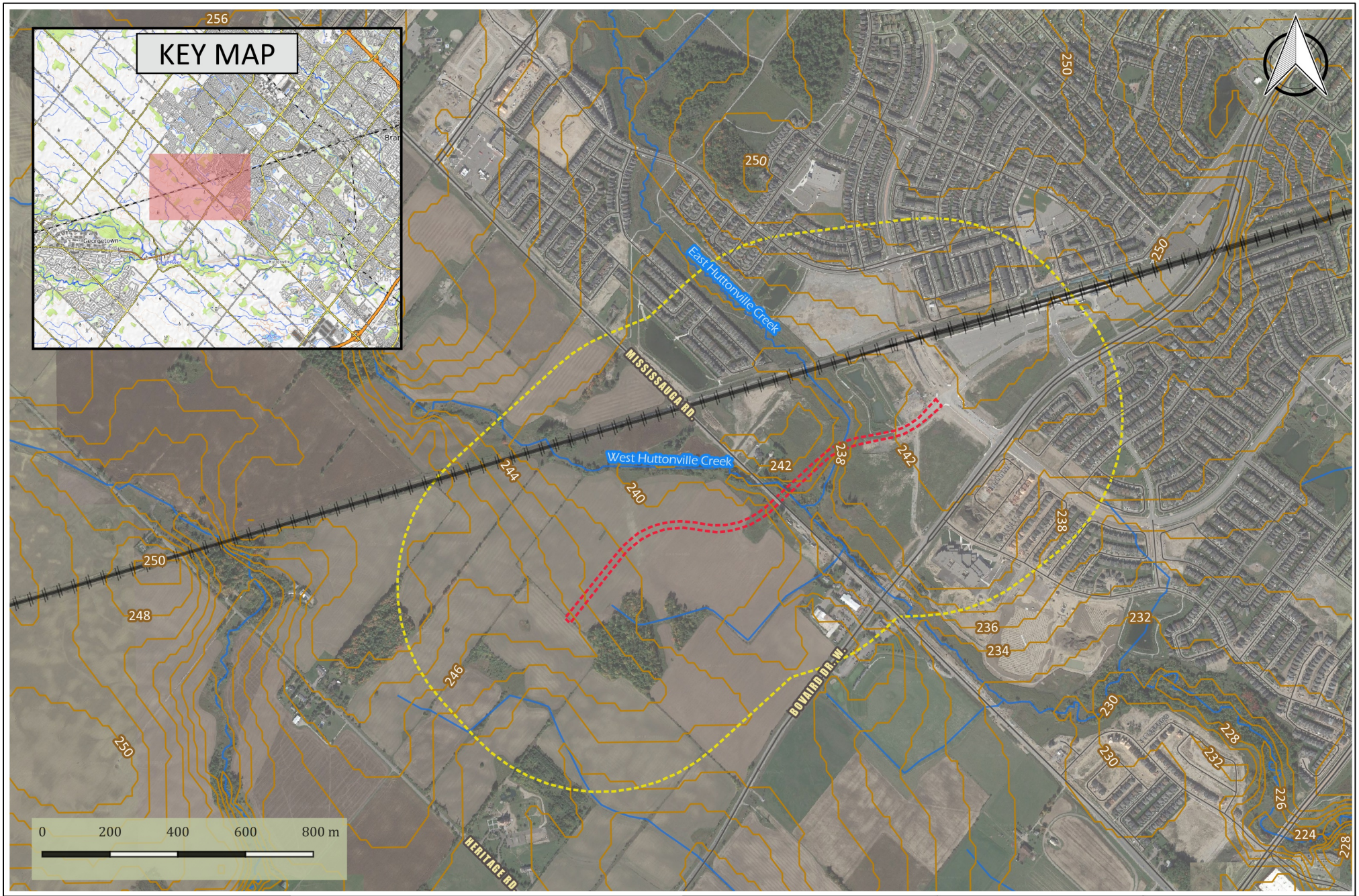
FIGURES



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TEL: 416-798-0065 | FAX: 416-798-0518 |
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LEGEND

Contour (2 m)

Study Area

Alignment

Future Road Alignment

CLIENT: CITY OF BRAMPTON

PROJECT:
HYDROGEOLOGICAL INVESTIGATION LAGERFIELD DRIVE EA CITY OF BRAMPTON, ON

PROJECT NO: 141-15409

DATE: 16-OCT-18

DRAWN BY: RB | CK:

FIGURE NO: 1 | SCALE: as shown

TITLE:
SITE LOCATION MAP

DISCIPLINE: HYDROGEOLOGY

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Source:
Ontario Geological Survey. Surficial geology of Southern Ontario, Ontario Geological Survey, Misc. Release - Data 128 - Revised

0 500 1000 m

CLIENT: CITY OF BRAMPTON

PROJECT:
HYDROGEOLOGICAL INVESTIGATION
LAGERFIELD DRIVE EA
CITY OF BRAMPTON, ON

PROJECT NO: 141-15409-00

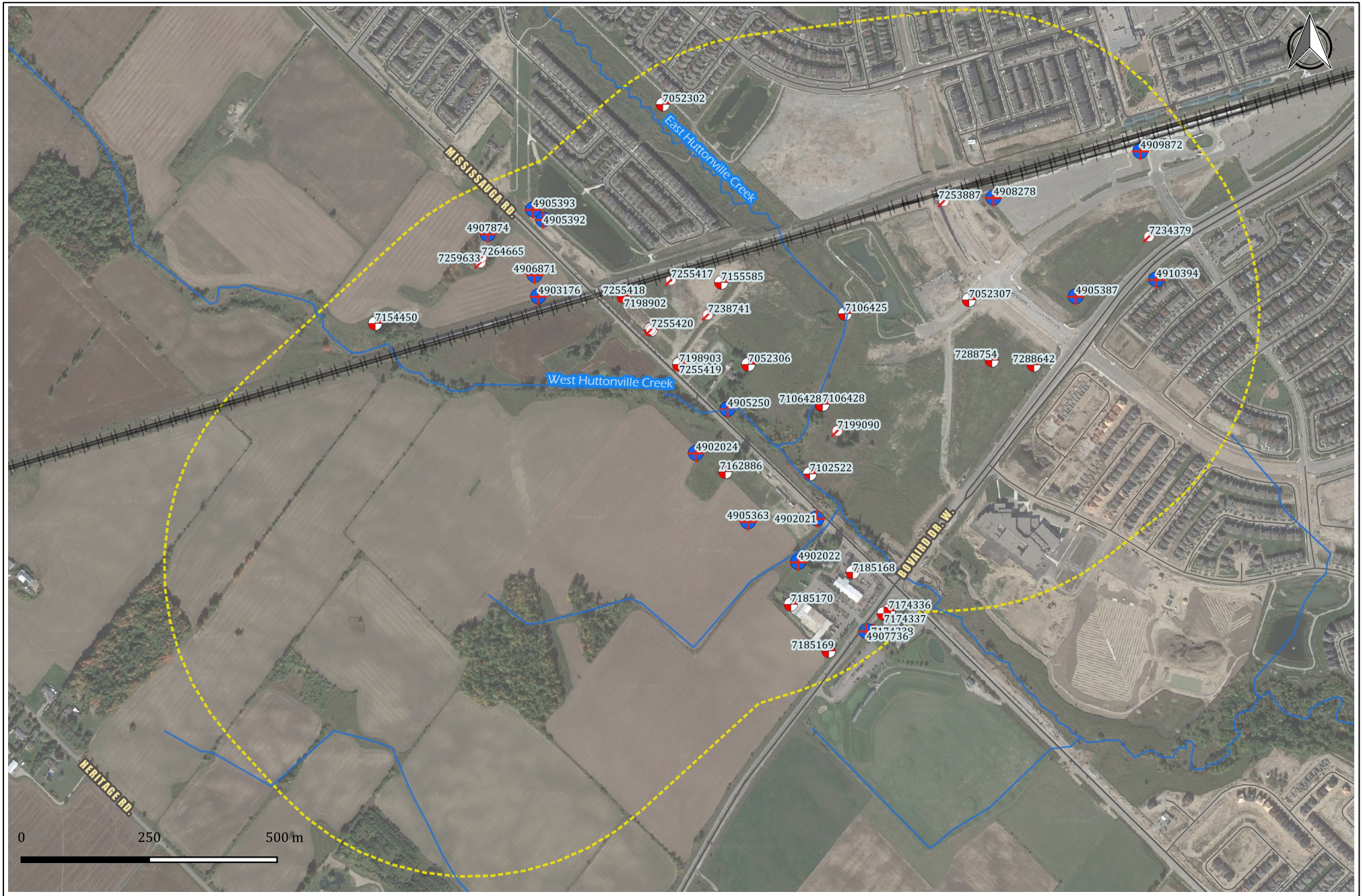
DATE: 16-OCT-18

DRAWN BY: RB CK:

FIGURE NO: 2 SCALE: as shown

TITLE:
SURFICIAL GEOLOGY OF STUDY AREA

DISCIPLINE: HYDROGEOLOGY



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LEGEND

MOECP Wells

- Abandoned
- Observation Well
- Water Supply Well

Study Area

CLIENT: CITY OF BRAMPTON	PROJECT NO: 141-15409	TITLE: **MECP WATER WELL RECORD SUMMARY MAP**
PROJECT: **HYDROGEOLOGICAL INVESTIGATION LAGERFIELD DRIVE EA CITY OF BRAMPTON, ON**	DATE: 16/OCT/18	
	DRAWN BY: RB / CK:	
	FIGURE NO: 3 / SCALE: as shown	DISCIPLINE: HYDROGEOLOGY

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LEGEND

Road Alignment

Contour (2 m)

A - A' Cross-Section

Boreholes

Borehole (WSP, 2018)

Monitoring Well (WSP, 2018)

CLIENT: CITY OF BRAMPTON

PROJECT:
HYDROGEOLOGICAL INVESTIGATION LAGERFIELD DRIVE EA CITY OF BRAMPTON, ON

PROJECT NO: 141-15409

DATE: 01-OCT-18

DRAWN BY: RB | CK:

FIGURE NO: 4 | SCALE: as shown

TITLE:
MONITORING AND BOREHOLE LOCATION MAP

DISCIPLINE: HYDROGEOLOGY

A

A'

WEST

EAST

ELEVATION, masl (Vertical exaggeration = 10x)

245
243
241
239
237
235
233
231
229
227

BH18-1
T.S.
CLSiTill
CobblySiSATill
SiSATill

BH18-2
T.S.
CLSiTill
SiSATill

BH18-3
T.S.
SASiTill
SASiTill
SiSATill

West Huttonville Creek

BH18-4
T.S.
SASiTill
SASiTill

BH18-5
T.S.
SASiTill
SiSATill

East Huttonville Creek

BH18-6
T.S.
SASiTill
SASiTill
SA
CobblySiSATill
SA
SASiTill

Topography based on the Canadian Digital Elevation Model under Open Government Licence

0 metres 50 100 150 200 250 300 350 400 450 500 550 600 650 700 750 800 850 900 950

T:\hydrogy\Projects\WSP Projects\141 (2016)\141-15409-00 Brampton East-West Connector\05 - Figures\X-sections-October 2018.dwg

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LEGEND:

BH18-05 — Borehole/ Monitoring Well No:

Water Level, July 23, 2018

Well

Screen

- Sandy Silt Till
- Top Soil
- Sand
- Culvert

CLIENT: Region of Peel

CLIENT REF. #:

PROJECT: HYDROGEOLOGICAL INVESTIGATION LAGERFIELD DRIVE EA CITY OF BRAMPTON, ON

PROJECT NO: 141-15409-00

DATE: October 2018

DESIGNED BY:

DRAWN BY: NS

CHECKED BY: RB

FIGURE NO: 5

SCALE: as shown

TITLE: CROSS-SECTION A-A'

DISCIPLINE: ENVIRONMENT

ISSUE:

DATE OF:

RV. # 0

APPENDIX

A MECP WATER WELL RECORDS

MECP Water Well Records

Well Record #

4902021 — **Lot** 011 **Conc** 05 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 6/5/1962 **DD/MM/YYYY**

Elev 236.2 (masl) **Easting** 594209 **Northing** 4835689
/ Domestic Water Supply **UTM RC** 5 **margin of error : 100 m - 300 m**
Water Found 12.2 (mbgs) 224.0 (masl) FRESH
Casing Diameter 5 inch **Casing Material:** STEEL
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Flowing? N
SWL 2.4 (mbgs) 233.8 (masl)
Pumping WL 2.4 (mbgs) 233.8 (masl)
Pump Rate 45.5 (LPM) 4 / 0
Spec. Cap. 9,999.99 (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	236.2		
7.0	229.2	GREY	CLAY / MEDIUM SAND /
13.7	222.5	RED	SHALE / /

4902022 — **Lot** 011 **Conc** 05 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 6/24/1965 **DD/MM/YYYY**

Elev 237.8 (masl) **Easting** 594173 **Northing** 4835604
/ Industrial Water Supply **UTM RC** 5 **margin of error : 100 m - 300 m**
Water Found 3.0 (mbgs) 234.7 (masl) FRESH
Casing Diameter 30 inch **Casing Material:** CONCRETE
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Flowing? N
SWL 0.0 (mbgs) 237.8 (masl)
Pumping WL (mbgs) (masl)
Pump Rate 113.7 (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	237.8		
3.0	234.7	BROWN	TOPSOIL / MEDIUM SAND /
6.1	231.7		GRAVEL / /

4902024 — **Lot** 011 **Conc** 05 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 7/25/1967 **DD/MM/YYYY**

Elev 241.1 (masl) **Easting** 593973 **Northing** 4835817
Domestic / Livestock Water Supply **UTM RC** 5 **margin of error : 100 m - 300 m**
Water Found 6.1 (mbgs) 235.0 (masl) FRESH
Casing Diameter 30 inch **Casing Material:** CONCRETE
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Flowing? N
SWL 1.8 (mbgs) 239.3 (masl)
Pumping WL (mbgs) (masl)
Pump Rate 9.1 (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	241.1		
5.5	235.6	BROWN	TOPSOIL / CLAY / MEDIUM SAND
6.1	235.0		GRAVEL / /

4903176 — **Lot** 012 **Conc** 05 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 10/8/1968 **DD/MM/YYYY**

Elev 244.9 (masl) **Easting** 593665 **Northing** 4836123
/ Domestic Water Supply **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found 12.2 (mbgs) 232.7 (masl) FRESH
Casing Diameter 5 inch **Casing Material:** STEEL
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Flowing? N
SWL 9.1 (mbgs) 235.7 (masl)
Pumping WL 18.3 (mbgs) 226.6 (masl)
Pump Rate 9.1 (LPM) 2 / 0
Spec. Cap. 0.99 (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	244.9		
0.6	244.3		TOPSOIL / /
5.5	239.4	BROWN	CLAY / /
14.6	230.3		MEDIUM SAND / GRAVEL /
21.3	223.6	RED	SHALE / /

27-Sep-18
Record Count 4

Well Record #

4905250 — **Lot** 011 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 5/16/1977 (DD/MM/YYYY)

Elev 238.4 (masl) **Easting** 594035 **Northing** 4835903

/ Domestic Water Supply **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found 5.2 (mbgs) 233.2 (masl) FRESH

Casing Diameter 30 inch **Casing Material:** CONCRETE

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing? N

SWL	3.7	(mbgs)	234.7	(masl)
Pumping WL		(mbgs)		(masl)
Pump Rate	31.8	(LPM)		/
Spec. Cap.		(LPM/m)	Hour / Minute	

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	238.4		
0.3	238.1	BROWN	TOPSOIL / /
5.2	233.2	BROWN	CLAY / SAND / WATER-BEARING
8.2	230.2	BROWN	SAND / STONES /
11.0	227.4	GREY	COARSE SAND / SAND /

4905363 — **Lot** 011 **Conc** 05 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 6/1/1978 (DD/MM/YYYY)

Elev 241.1 (masl) **Easting** 594075 **Northing** 4835683

/ Domestic Water Supply **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found 3.7 (mbgs) 237.4 (masl) Not stated

Casing Diameter 30 inch **Casing Material:** CONCRETE

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing? N

SWL	3.7	(mbgs)	237.4	(masl)
Pumping WL	7.0	(mbgs)	234.0	(masl)
Pump Rate		(LPM)	0 / 30	
Spec. Cap.		(LPM/m)	Hour / Minute	

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	241.1		
0.3	240.7	BROWN	TOPSOIL / HARD /
3.0	238.0	BROWN	CLAY / HARD /
8.8	232.2	BROWN	GRAVEL / SAND / STONES

4905387 — **Lot** 011 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 3/3/1978 (DD/MM/YYYY)

Elev 244.7 (masl) **Easting** 594715 **Northing** 4836123

/ Domestic Water Supply **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found 3.7 (mbgs) 241.1 (masl) FRESH

Casing Diameter 30 inch **Casing Material:** CONCRETE

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing? N

SWL	2.1	(mbgs)	242.6	(masl)
Pumping WL	5.5	(mbgs)	239.2	(masl)
Pump Rate		(LPM)	3 / 0	
Spec. Cap.		(LPM/m)	Hour / Minute	

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	244.7		
0.3	244.4	BROWN	TOPSOIL / /
1.2	243.5	BROWN	CLAY / /
6.1	238.6	RED	SHALE / HARD /

4905392 — **Lot** 012 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 5/26/1978 (DD/MM/YYYY)

Elev 245.0 (masl) **Easting** 593675 **Northing** 4836273

/ Domestic Water Supply **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found 8.2 (mbgs) 236.8 (masl) FRESH

Casing Diameter 30 inch **Casing Material:** CONCRETE

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing? N

SWL	1.2	(mbgs)	243.8	(masl)
Pumping WL	9.8	(mbgs)	235.3	(masl)
Pump Rate	113.7	(LPM)	24 / 0	
Spec. Cap.	13.32	(LPM/m)	Hour / Minute	

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	245.0		
2.4	242.6	BROWN	CLAY / /
3.0	242.0	BROWN	SAND / MUCK /
6.7	238.3	BROWN	CLAY / PACKED /
9.1	235.9	BROWN	SAND / CLAY /
9.8	235.3	RED	SHALE / HARD /

Well Record #

4905393 — **Lot** 012 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 5/28/1978 **DD/MM/YYYY**

Elev 245.1 (masl) **Easting** 593655 **Northing** 4836293
/ Domestic Water Supply **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found 8.2 (mbgs) 236.8 (masl) FRESH
Casing Diameter 30 inch **Casing Material:** CONCRETE
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Flowing? N
SWL 1.2 (mbgs) 243.8 (masl)
Pumping WL (mbgs) (masl)
Pump Rate 90.9 (LPM) 16 / 0
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	245.1		
3.0	242.0	BROWN	CLAY / /
7.3	237.7	GREY	CLAY / PACKED /
8.2	236.8	GREY	CLAY / SAND /
10.4	234.7	BROWN	SAND / GRAVEL / LOOSE

4906871 — **Lot** 012 **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 8/13/1987 **DD/MM/YYYY**

Elev 245.0 (masl) **Easting** 593658 **Northing** 4836165
/ Domestic Water Supply **UTM RC** 3 **margin of error : 10 - 30 m**
Water Found 6.1 (mbgs) 238.9 (masl) FRESH
Casing Diameter 30 inch **Casing Material:**
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Flowing? N
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) 24 / 0
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	245.0		
0.3	244.7	BROWN	TOPSOIL / /
6.1	238.9	BROWN	CLAY / /
7.9	237.0	BROWN	SAND / /
9.4	235.5	BROWN	CLAY / / PACKED
10.1	234.9	GREY	SAND / /

4907736 — **Lot** 010 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 3/28/1992 **DD/MM/YYYY**

Elev 240.0 (masl) **Easting** 594306 **Northing** 4835469
/ Domestic Water Supply **UTM RC** 3 **margin of error : 10 - 30 m**
Water Found 3.0 (mbgs) 237.0 (masl) Not stated
Casing Diameter 30 inch **Casing Material:** GALVANIZED
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Flowing? N
SWL 3.0 (mbgs) 237.0 (masl)
Pumping WL 10.7 (mbgs) 229.3 (masl)
Pump Rate 45.5 (LPM) 1 / 0
Spec. Cap. 5.97 (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	240.0		
0.3	239.7	BROWN	TOPSOIL / / HARD
6.1	233.9	BROWN	CLAY / / HARD
11.0	229.0	GREY	CLAY / / HARD

4907874 — **Lot** 013 **Conc** 05 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 8/19/1994 **DD/MM/YYYY**

Elev 245.7 (masl) **Easting** 593566 **Northing** 4836245
Livestock / Domestic Water Supply **UTM RC** 3 **margin of error : 10 - 30 m**
Water Found 2.7 (mbgs) 242.9 (masl) FRESH
Casing Diameter 6 inch **Casing Material:** STEEL
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Flowing? N
SWL 2.4 (mbgs) 243.2 (masl)
Pumping WL 8.2 (mbgs) 237.4 (masl)
Pump Rate 50.0 (LPM) 5 / 0
Spec. Cap. 8.63 (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	245.7		
1.2	244.5		CLAY / SAND /
4.9	240.8		SAND / GRAVEL /
13.4	232.3	BLUE	SHALE / /

Well Record #

4907890 **Lot** 010 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 2/17/1993 **DD/MM/YYYY**

Elev 239.4 (masl) **Easting** 594996 **Northing** 4835876
/ **UTM RC** 9 **unknown UTM**

Water Found (mbgs) (masl)

Casing Diameter **Casing Material:**

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	239.4		

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

/ /

4907891 **Lot** 010 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 2/11/1993 **DD/MM/YYYY**

Elev 239.4 (masl) **Easting** 594996 **Northing** 4835876
/ **UTM RC** 9 **unknown UTM**

Water Found (mbgs) (masl)

Casing Diameter **Casing Material:**

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	239.4		

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

/ /

4907892 **Lot** 010 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 3/3/1993 **DD/MM/YYYY**

Elev 239.4 (masl) **Easting** 594996 **Northing** 4835876
/ **UTM RC** 9 **unknown UTM**

Water Found (mbgs) (masl)

Casing Diameter **Casing Material:**

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	239.4		

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

/ /

4908277 **Lot** 011 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 6/19/1997 **DD/MM/YYYY**

Elev 245.0 (masl) **Easting** 594554 **Northing** 4836316
/ Not Used Abandoned-Other **UTM RC** 9 **unknown UTM**

Water Found (mbgs) (masl)

Casing Diameter **Casing Material:**

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	245.0		

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

/ /

4908278 **Lot** 011 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 6/20/1997 **DD/MM/YYYY**

Elev 245.0 (masl) **Easting** 594554 **Northing** 4836316
Livestock / Domestic Water Supply **UTM RC** 9 **unknown UTM**

Water Found 15.2 (mbgs) 229.8 (masl) FRESH

Casing Diameter 10 inch **Casing Material:** STEEL

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	245.0		
1.2	243.8	RED	CLAY / /
2.4	242.6	RED	SHALE / SOFT /
21.3	223.7	RED	SHALE / LAYERED /

Flowing? N
SWL 8.8 (mbgs) 236.2 (masl)
Pumping WL 18.3 (mbgs) 226.7 (masl)
Pump Rate 4.5 (LPM) 1 / 30
Spec. Cap. 0.48 (LPM/m) Hour / Minute

Well Record #

4909872 — **Lot** 011 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 7/28/2005 **DD/MM/YYYY**

Elev 245.4 (masl) **Easting** 594841 **Northing** 4836407 **UTM RC** 4 **margin of error : 30 m - 100 m**

/ Domestic Water Supply

Water Found 11.0 (mbgs) 234.5 (masl) FRESH

Casing Diameter 7 inch **Casing Material:** STEEL

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing?

SWL	5.1	(mbgs)	240.4	(masl)
Pumping WL	10.7	(mbgs)	234.8	(masl)
Pump Rate	11.4	(LPM)	1 / 0	
Spec. Cap.	2.03	(LPM/m)	Hour / Minute	

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	245.4		
1.8	243.6	BROWN	CLAY / /
		BROWN	CLAY / /
		BROWN	CLAY / /
6.4	239.0	RED	CLAY / SHALE /
		RED	CLAY / SHALE /
		RED	CLAY / SHALE /
11.0	234.5	RED	SHALE / /
		RED	SHALE / /
		RED	SHALE / /

4910394 — **Lot** 011 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 11/1/2006 **DD/MM/YYYY**

Elev 246.4 (masl) **Easting** 594872 **Northing** 4836156 **UTM RC** 3 **margin of error : 10 - 30 m**

/ Not Used Abandoned-Other

Water Found (mbgs) (masl)

Casing Diameter 91 cm **Casing Material:** CONCRETE

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing?

SWL		(mbgs)		(masl)
Pumping WL		(mbgs)		(masl)
Pump Rate		(LPM)	/	
Spec. Cap.		(LPM/m)	Hour / Minute	

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	246.4		
			/ /

7052302 — **Lot** **Conc** BRAMPTON CITY / PEEL

Date 10/23/2007 **DD/MM/YYYY**

Elev 245.5 (masl) **Easting** 593908 **Northing** 4836498 **UTM RC** 3 **margin of error : 10 - 30 m**

/ Monitoring Observation Wells

Water Found (mbgs) (masl)

Casing Diameter **Casing Material:**

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing?

SWL		(mbgs)		(masl)
Pumping WL		(mbgs)		(masl)
Pump Rate		(LPM)	/	
Spec. Cap.		(LPM/m)	Hour / Minute	

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	245.5		
6.1	239.4	BROWN	SILT / TILL / GRAVEL
9.1	236.4	GREY	SILT / /

7052306 — **Lot** **Conc** BRAMPTON CITY / PEEL

Date 10/29/2007 **DD/MM/YYYY**

Elev 241.7 (masl) **Easting** 594075 **Northing** 4835990 **UTM RC** 3 **margin of error : 10 - 30 m**

/ Monitoring Observation Wells

Water Found (mbgs) (masl)

Casing Diameter **Casing Material:**

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing?

SWL		(mbgs)		(masl)
Pumping WL		(mbgs)		(masl)
Pump Rate		(LPM)	/	
Spec. Cap.		(LPM/m)	Hour / Minute	

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	241.7		
2.1	239.6	BROWN	SILT / TILL / HARD
4.6	237.2	GREY	CLAY / SILTY / SOFT
5.2	236.6	BROWN	SAND / GRAVEL / WATER-BEARING

Well Record #

7052307 **Lot** **Conc** BRAMPTON CITY / PEEL

Date 1/26/2007 **DD/MM/YYYY**

Elev 243.4 (masl) **Easting** 594506 **Northing** 4836116
/ Monitoring Observation Wells **UTM RC** 3 **margin of error : 10 - 30 m**
Water Found (mbgs) (masl)
Casing Diameter **Casing Material:**
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	243.4		
5.2	238.2	RED	TILL / SHALE /

7102522 **Lot** **Conc** BRAMPTON CITY / PEEL

Date 11/2/2007 **DD/MM/YYYY**

Elev 235.9 (masl) **Easting** 594195 **Northing** 4835776
/ Monitoring Observation Wells **UTM RC** 3 **margin of error : 10 - 30 m**
Water Found (mbgs) (masl)
Casing Diameter **Casing Material:**
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Flowing? N
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	235.9		
0.4	235.5	BROWN	TOPSOIL / /
3.2	232.7	RED	SILT / CLAYEY /
4.6	231.3	RED	TILL / FINE SAND / TILL
5.8	230.1	RED	/ / WEATHERED

7106425 **Lot** **Conc** BRAMPTON CITY / PEEL

Date 5/28/2008 **DD/MM/YYYY**

Elev 239.0 (masl) **Easting** 594264 **Northing** 4836089
/ Monitoring Observation Wells **UTM RC** 3 **margin of error : 10 - 30 m**
Water Found (mbgs) (masl)
Casing Diameter 2 inch **Casing Material:** PLASTIC
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	239.0		
0.5	238.5	BROWN	TOPSOIL / /
1.5	237.5	BROWN	SILT / CLAY / SAND
2.1	236.9	GREY	SILT / SAND / WATER-BEARING
4.6	234.4	GREY	SAND / GRAVEL /

7106428 **Lot** **Conc** BRAMPTON CITY / PEEL

Date 5/29/2008 **DD/MM/YYYY**

Elev 238.0 (masl) **Easting** 594220 **Northing** 4835912
/ Monitoring Test Hole **UTM RC** 3 **margin of error : 10 - 30 m**
Water Found (mbgs) (masl)
Casing Diameter **Casing Material:**
Top of Screen 3.7 (mbgs) **Bottom of Screen** 5.2 (mbgs)
Screen Interva 1.5 (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	238.0		
			/ /
			/ /

Well Record #

7154450 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 6/9/2010 **DD/MM/YYYY** **Elev** 245.5 (masl) **Easting** 593346 **Northing** 4836070 **UTM RC** 3 **margin of error : 10 - 30 m**

/ Monitoring and Te Monitoring and Test Hole

Water Found (mbgs) (masl)

Casing Diameter 2 inch **Casing Material:** PLASTIC

Top of Screen 4.6 (mbgs) **Bottom of Screen** 6.1 (mbgs)

Screen Interva 1.5 (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions		
0.0	245.5				
0.2	245.4	BLACK	TOPSOIL /	/	
2.4	243.1	BROWN	SAND /	/	
6.1	239.5	GREY	SAND /	/	

7155585 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 10/13/2010 **DD/MM/YYYY** **Elev** 242.0 (masl) **Easting** 594022 **Northing** 4836150 **UTM RC** 3 **margin of error : 10 - 30 m**

/ Monitoring Test Hole

Water Found 5.9 (mbgs) 236.1 (masl) FRESH

Casing Diameter cm **Casing Material:** PLASTIC

Top of Screen 3.0 (mbgs) **Bottom of Screen** 6.0 (mbgs)

Screen Interva 3.0 (m)

Flowing?
SWL 3.9 (mbgs) 238.1 (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions		
0.0	242.0				
1.0	241.0	BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED

Well Record #

1.0	241.0	BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
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		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED

Well Record

1.0	241.0	BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED

Well Record

1.0	241.0	BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
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		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
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		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED

Well Record

1.0	241.0	BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
		BROWN	SAND /	GRAVEL	/ PACKED
4.5	237.5	BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD

Well Record

4.5	237.5	BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
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		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD

Well Record

4.5	237.5	BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
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		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
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		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD

Well Record

4.5	237.5	BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD

Well Record #

4.5	237.5	BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
		BROWN	SAND /	SILT	/ HARD
6.0	236.0	BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
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		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
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		BROWN	SILT /	CLAY	/ HARD
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		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD

Well Record

6.0	236.0	BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
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		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
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		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
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		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
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		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD

Well Record #

6.0	236.0	BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
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		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
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		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD

Well Record

6.0	236.0	BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD
		BROWN	SILT /	CLAY	/ HARD

Well Record #

7162886	**Lot**	**Conc**	BRAMPTON CITY (CHINGUACOUSY) / PEEL
Date 2/17/2010 **DD/MM/YYYY**	**Elev** 241.1 (masl)	**Easting** 594030	**Northing** 4835780
	/ Monitoring	Observation Wells	**UTM RC** 3 **margin of error : 10 - 30 m**
Water Found	(mbgs)	(masl)	
Casing Diameter 2 inch	**Casing Material:** PLASTIC		
Top of Screen 4.6 (mbgs)	**Bottom of Screen** 6.1 (mbgs)		
Screen Interva 1.5 (m)			

Flowing?		
SWL	(mbgs)	(masl)
Pumping WL	(mbgs)	(masl)
Pump Rate	(LPM)	/
Spec. Cap.	(LPM/m)	Hour / Minute

Depth (m)	**Elev (masl)**	**Color**	**Soil Descriptions**		
0.0	241.1				
0.3	240.8	BROWN	TOPSOIL /		/ LOOSE
1.5	239.6	BROWN	SILT /	CLAY	/ SAND
6.1	235.0	BROWN	SILT /	FINE SAND	/ GRAVEL

7173272	**Lot**	**Conc**	BRAMPTON CITY (CHINGUACOUSY) / PEEL
Date 11/16/2011 **DD/MM/YYYY**	**Elev** 244.5 (masl)	**Easting** 593578	**Northing** 4835883
	/		**UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found	(mbgs)	(masl)	
Casing Diameter	**Casing Material:**		
Top of Screen (mbgs)	**Bottom of Screen** (mbgs)		
Screen Interva (m)			

Flowing?		
SWL	(mbgs)	(masl)
Pumping WL	(mbgs)	(masl)
Pump Rate	(LPM)	/
Spec. Cap.	(LPM/m)	Hour / Minute

Depth (m)	**Elev (masl)**	**Color**	**Soil Descriptions**		
0.0	244.5				
			/		/

7174336	**Lot**	**Conc**	BRAMPTON CITY (CHINGUACOUSY) / PEEL
Date 12/14/2011 **DD/MM/YYYY**	**Elev** 239.9 (masl)	**Easting** 594349	**Northing** 4835508
	/ Monitoring and Te	Monitoring and Test Hole	**UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found	(mbgs)	(masl)	
Casing Diameter 2 inch	**Casing Material:** PLASTIC		
Top of Screen 3.0 (mbgs)	**Bottom of Screen** 4.6 (mbgs)		
Screen Interva 1.5 (m)			

Flowing?		
SWL	(mbgs)	(masl)
Pumping WL	(mbgs)	(masl)
Pump Rate	(LPM)	/
Spec. Cap.	(LPM/m)	Hour / Minute

Depth (m)	**Elev (masl)**	**Color**	**Soil Descriptions**		
0.0	239.9				
0.2	239.8	BLACK	TOPSOIL /		/ LOOSE
4.3	235.6	BROWN	SAND /	SILT	/ LOOSE
4.6	235.3	GREY	SILT /	CLAY	/ LOOSE

7174337	**Lot**	**Conc**	BRAMPTON CITY (CHINGUACOUSY) / PEEL
Date 12/14/2011 **DD/MM/YYYY**	**Elev** 240.0 (masl)	**Easting** 594340	**Northing** 4835503
	/ Monitoring and Te	Monitoring and Test Hole	**UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found	(mbgs)	(masl)	
Casing Diameter 2 inch	**Casing Material:** PLASTIC		
Top of Screen 3.0 (mbgs)	**Bottom of Screen** 4.6 (mbgs)		
Screen Interva 1.5 (m)			

Flowing?		
SWL	(mbgs)	(masl)
Pumping WL	(mbgs)	(masl)
Pump Rate	(LPM)	/
Spec. Cap.	(LPM/m)	Hour / Minute

Depth (m)	**Elev (masl)**	**Color**	**Soil Descriptions**		
0.0	240.0				
0.2	239.8	BLACK	TOPSOIL /		/ LOOSE
4.3	235.7	BROWN	SAND /	SILT	/ LOOSE
4.6	235.4	GREY	SILT /	CLAY	/ LOOSE

Well Record #

7174338 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 12/14/2011 **DD/MM/YYYY**

Elev 240.0 (masl) **Easting** 594315 **Northing** 4835469
/ Monitoring and Te **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found (mbgs) (masl)
Casing Diameter 2 inch **Casing Material:** PLASTIC
Top of Screen 3.0 (mbgs) **Bottom of Screen** 4.6 (mbgs)
Screen Interva 1.5 (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	240.0		
0.2	239.9	BLACK	OTHER / /
0.3	239.7	BROWN	SAND / GRAVEL /
4.6	235.4	BROWN	SILT / SAND /

7179239 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 11/28/2011 **DD/MM/YYYY**

Elev 240.0 (masl) **Easting** 594294 **Northing** 4835554
/ **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found (mbgs) (masl)
Casing Diameter **Casing Material:**
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	240.0		
			/ /

7185168 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 3/12/2012 **DD/MM/YYYY**

Elev 239.2 (masl) **Easting** 594279 **Northing** 4835584
/ Monitoring Observation Wells **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found (mbgs) (masl)
Casing Diameter 2 inch **Casing Material:** PLASTIC
Top of Screen 3.4 (mbgs) **Bottom of Screen** 1.8 (mbgs)
Screen Interva -1.5 (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	239.2		
3.4	235.9	BROWN	SAND / SILT / FILL

7185169 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 3/12/2012 **DD/MM/YYYY**

Elev 240.4 (masl) **Easting** 594232 **Northing** 4835430
/ Monitoring Observation Wells **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found (mbgs) (masl)
Casing Diameter 2 inch **Casing Material:** PLASTIC
Top of Screen 2.6 (mbgs) **Bottom of Screen** 1.1 (mbgs)
Screen Interva -1.5 (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	240.4		
2.6	237.8	BROWN	SAND / SILT / FILL

7185170 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 3/12/2012 **DD/MM/YYYY**

Elev 240.5 (masl) **Easting** 594158 **Northing** 4835521
/ Monitoring Observation Wells **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found (mbgs) (masl)
Casing Diameter 2 inch **Casing Material:** PLASTIC
Top of Screen 3.0 (mbgs) **Bottom of Screen** 1.5 (mbgs)
Screen Interva -1.5 (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	240.5		
3.0	237.4	BROWN	SILT / SAND / FILL

Well Record #

7188587 — **Lot** 012 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 2/16/2012 **DD/MM/YYYY**

Elev 246.3 (masl) **Easting** 593871 **Northing** 4836560
/ **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found (mbgs) (masl)

Casing Diameter **Casing Material:**

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	246.3		

/ /

7198901 — **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 3/4/2013 **DD/MM/YYYY**

Elev 244.3 (masl) **Easting** 593885 **Northing** 4836058
/ Monitoring and Te Monitoring and Test Hole **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found (mbgs) (masl)

Casing Diameter 2 inch **Casing Material:** PLASTIC

Top of Screen 3.0 (mbgs) **Bottom of Screen** 6.1 (mbgs)

Screen Interva 3.0 (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	244.3		
3.0	241.3	BROWN	SILT / SAND /
6.1	238.2	GREY	CLAY / SILT / WATER-BEARING

7198902 — **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 3/4/2013 **DD/MM/YYYY**

Elev 245.0 (masl) **Easting** 593832 **Northing** 4836123
/ Monitoring and Te Monitoring and Test Hole **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found (mbgs) (masl)

Casing Diameter 2 inch **Casing Material:** PLASTIC

Top of Screen 3.0 (mbgs) **Bottom of Screen** 6.1 (mbgs)

Screen Interva 3.0 (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	245.0		
2.4	242.6	BROWN	SILT / SAND /
6.1	238.9	GREY	SILT / SAND / WATER-BEARING

7198903 — **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 3/4/2013 **DD/MM/YYYY**

Elev 242.0 (masl) **Easting** 593940 **Northing** 4835990
/ Monitoring and Te Monitoring and Test Hole **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found (mbgs) (masl)

Casing Diameter 2 inch **Casing Material:** PLASTIC

Top of Screen 3.0 (mbgs) **Bottom of Screen** 6.1 (mbgs)

Screen Interva 3.0 (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	242.0		
1.8	240.2	BROWN	SILT / SAND /
5.5	236.5	GREY	SILT / SAND /
6.1	235.9	RED	SILT / STONES /

7199090 — **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 2/19/2013 **DD/MM/YYYY**

Elev 239.7 (masl) **Easting** 594249 **Northing** 4835860
/ Abandoned-Other **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found (mbgs) (masl)

Casing Diameter E+0: cm **Casing Material:**

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing? N
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	239.7		

/ /

Well Record #

7199278 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 9/17/2012 **DD/MM/YYYY** /

Elev 245.3 (masl) **Easting** 593597 **Northing** 4836112 **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found (mbgs) (masl)

Casing Diameter **Casing Material:**

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing?

SWL (mbgs) (masl)

Pumping WL (mbgs) (masl)

Pump Rate (LPM) /

Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	245.3		

/ /

7203380 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date **DD/MM/YYYY** /

Elev 245.1 (masl) **Easting** 593667 **Northing** 4836300 **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found (mbgs) (masl)

Casing Diameter **Casing Material:**

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing?

SWL (mbgs) (masl)

Pumping WL (mbgs) (masl)

Pump Rate (LPM) /

Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	245.1		

/ /

7203381 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date **DD/MM/YYYY** /

Elev 245.0 (masl) **Easting** 593667 **Northing** 4836310 **UTM RC** 5 **margin of error : 100 m - 300 m**

Water Found (mbgs) (masl)

Casing Diameter **Casing Material:**

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing?

SWL (mbgs) (masl)

Pumping WL (mbgs) (masl)

Pump Rate (LPM) /

Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	245.0		

/ /

7211403 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 6/17/2013 **DD/MM/YYYY** /

Elev 236.1 (masl) **Easting** 594475 **Northing** 4835576 **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found (mbgs) (masl)

Casing Diameter **Casing Material:**

Top of Screen (mbgs) **Bottom of Screen** (mbgs)

Screen Interva (m)

Flowing?

SWL (mbgs) (masl)

Pumping WL (mbgs) (masl)

Pump Rate (LPM) /

Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	236.1		

/ /

7215011 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 12/10/2013 **DD/MM/YYYY** /

Elev 243.7 (masl) **Easting** 593924 **Northing** 4836155 **UTM RC** 4 **margin of error : 30 m - 100 m**

Water Found (mbgs) (masl)

Casing Diameter 2 inch **Casing Material:** PLASTIC

Top of Screen 3.0 (mbgs) **Bottom of Screen** 6.1 (mbgs)

Screen Interva 3.0 (m)

Flowing?

SWL (mbgs) (masl)

Pumping WL (mbgs) (masl)

Pump Rate (LPM) /

Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	243.7		
2.1	241.6	BROWN	SILT / SAND /
6.1	237.6	BROWN	SILT / CLAY /

Well Record #

7234379 **Lot** 010 **Conc** 04 BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 12/15/2014 **DD/MM/YYYY**

Elev 245.4 (masl) **Easting** 594858 **Northing** 4836240
/ Abandoned-Other **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found (mbgs) (masl)
Casing Diameter **Casing Material:**
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Depth (m)	Elev (masl)
0.0	245.4

Color **Soil Descriptions**

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

/ /

7238741 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 7/1/2014 **DD/MM/YYYY**

Elev 243.1 (masl) **Easting** 593996 **Northing** 4836087
/ Abandoned-Other **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found (mbgs) (masl)
Casing Diameter 76 cm **Casing Material:** CONCRETE
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Depth (m)	Elev (masl)
0.0	243.1

Color **Soil Descriptions**

Flowing? N
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

/ /

7253887 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 10/8/2015 **DD/MM/YYYY**

Elev 244.6 (masl) **Easting** 594457 **Northing** 4836309
/ Abandoned-Other **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found (mbgs) (masl)
Casing Diameter **Casing Material:**
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Depth (m)	Elev (masl)
0.0	244.6

Color **Soil Descriptions**

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

/ /

7255417 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 12/15/2015 **DD/MM/YYYY**

Elev 243.7 (masl) **Easting** 593924 **Northing** 4836155
/ Abandoned-Other **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found (mbgs) (masl)
Casing Diameter 6 cm **Casing Material:** PLASTIC
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Depth (m)	Elev (masl)
0.0	243.7

Color **Soil Descriptions**

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

/ /

7255418 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 12/15/2015 **DD/MM/YYYY**

Elev 245.0 (masl) **Easting** 593832 **Northing** 4836123
/ Abandoned-Other **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found (mbgs) (masl)
Casing Diameter 6 cm **Casing Material:** PLASTIC
Top of Screen (mbgs) **Bottom of Screen** (mbgs)
Screen Interva (m)

Depth (m)	Elev (masl)
0.0	245.0

Color **Soil Descriptions**

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

/ /

Well Record #

7255419	**Lot**		**Conc**	BRAMPTON CITY (CHINGUACOUSY) / PEEL								**Flowing?**			
Date 12/15/2015	**Elev**	242.0 (masl)	**Easting**	593940	**Northing**	4835990						**SWL**	(mbgs)		(masl)
DD/MM/YYYY	/		Abandoned-Other		**UTM RC**	4	**margin of error : 30 m - 100 m**					**Pumping WL**	(mbgs)		(masl)
	Water Found	(mbgs)		(masl)								**Pump Rate**	(LPM)		/
	Casing Diameter	6 cm	**Casing Material:**	PLASTIC				**Depth (m)**	**Elev (masl)**			**Spec. Cap.**	(LPM/m)		Hour / Minute
	Top of Screen	(mbgs)	**Bottom of Screen**	(mbgs)				0.0	242.0	**Color**		**Soil Descriptions**			
	Screen Interva	(m)													
												/			/
7255420	**Lot**		**Conc**	BRAMPTON CITY (CHINGUACOUSY) / PEEL								**Flowing?**			
Date 12/15/2015	**Elev**	244.3 (masl)	**Easting**	593885	**Northing**	4836058						**SWL**	(mbgs)		(masl)
DD/MM/YYYY	/		Abandoned-Other		**UTM RC**	4	**margin of error : 30 m - 100 m**					**Pumping WL**	(mbgs)		(masl)
	Water Found	(mbgs)		(masl)								**Pump Rate**	(LPM)		/
	Casing Diameter	6 cm	**Casing Material:**	PLASTIC				**Depth (m)**	**Elev (masl)**			**Spec. Cap.**	(LPM/m)		Hour / Minute
	Top of Screen	(mbgs)	**Bottom of Screen**	(mbgs)				0.0	244.3	**Color**		**Soil Descriptions**			
	Screen Interva	(m)													
												/			/
7259633	**Lot**		**Conc**	BRAMPTON CITY (CHINGUACOUSY) / PEEL								**Flowing?**			
Date 3/7/2016	**Elev**	245.8 (masl)	**Easting**	593552	**Northing**	4836189						**SWL**	(mbgs)		(masl)
DD/MM/YYYY	/		Abandoned-Other		**UTM RC**	4	**margin of error : 30 m - 100 m**					**Pumping WL**	(mbgs)		(masl)
	Water Found	(mbgs)		(masl)								**Pump Rate**	(LPM)		/
	Casing Diameter		**Casing Material:**					**Depth (m)**	**Elev (masl)**			**Spec. Cap.**	(LPM/m)		Hour / Minute
	Top of Screen	(mbgs)	**Bottom of Screen**	(mbgs)				0.0	245.8	**Color**		**Soil Descriptions**			
	Screen Interva	(m)													
												/			/
												/			/
												/			/
7264665	**Lot**		**Conc**	BRAMPTON CITY (CHINGUACOUSY) / PEEL								**Flowing?**			
Date 4/26/2016	**Elev**	245.8 (masl)	**Easting**	593554	**Northing**	4836199						**SWL**	(mbgs)		(masl)
DD/MM/YYYY	/		Abandoned-Other		**UTM RC**	4	**margin of error : 30 m - 100 m**					**Pumping WL**	(mbgs)		(masl)
	Water Found	(mbgs)		(masl)								**Pump Rate**	(LPM)		/
	Casing Diameter		**Casing Material:**					**Depth (m)**	**Elev (masl)**			**Spec. Cap.**	(LPM/m)		Hour / Minute
	Top of Screen	(mbgs)	**Bottom of Screen**	(mbgs)				0.0	245.8	**Color**		**Soil Descriptions**			
	Screen Interva	(m)													
												/			/
7281228	**Lot**		**Conc**	BRAMPTON CITY (CHINGUACOUSY) / PEEL								**Flowing?**			
Date 10/28/2016	**Elev**	245.0 (masl)	**Easting**	593665	**Northing**	4836281						**SWL**	(mbgs)		(masl)
DD/MM/YYYY	/				**UTM RC**	4	**margin of error : 30 m - 100 m**					**Pumping WL**	(mbgs)		(masl)
	Water Found	(mbgs)		(masl)								**Pump Rate**	(LPM)		/
	Casing Diameter		**Casing Material:**					**Depth (m)**	**Elev (masl)**			**Spec. Cap.**	(LPM/m)		Hour / Minute
	Top of Screen	(mbgs)	**Bottom of Screen**	(mbgs)				0.0	245.0	**Color**		**Soil Descriptions**			
	Screen Interva	(m)													
												/			/

Well Record #

7288642 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 3/20/2017 **DD/MM/YYYY**

Elev 244.6 (masl) **Easting** 594633 **Northing** 4835989
/ Monitoring Observation Wells **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found (mbgs) (masl)
Casing Diameter 3 cm **Casing Material:** PLASTIC
Top of Screen 3.0 (mbgs) **Bottom of Screen** 6.0 (mbgs)
Screen Interva 3.0 (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	244.6		
0.3	244.3	BROWN	TOPSOIL / / SOFT
3.0	241.6	BROWN	SAND / SILT / SOFT
6.0	238.6	GREY	SILT / TILL / DENSE

7288754 **Lot** **Conc** BRAMPTON CITY (CHINGUACOUSY) / PEEL

Date 3/22/2017 **DD/MM/YYYY**

Elev 243.5 (masl) **Easting** 594551 **Northing** 4835998
/ Monitoring Observation Wells **UTM RC** 4 **margin of error : 30 m - 100 m**
Water Found (mbgs) (masl)
Casing Diameter 3 cm **Casing Material:** PLASTIC
Top of Screen 3.0 (mbgs) **Bottom of Screen** 6.0 (mbgs)
Screen Interva 3.0 (m)

Flowing?
SWL (mbgs) (masl)
Pumping WL (mbgs) (masl)
Pump Rate (LPM) /
Spec. Cap. (LPM/m) Hour / Minute

Depth (m)	Elev (masl)	Color	Soil Descriptions
0.0	243.5		
0.3	243.2	BROWN	TOPSOIL / / SOFT
3.0	240.5	BROWN	SAND / SILT / SOFT
6.0	237.5	GREY	SILT / TILL / DENSE

APPENDIX

B BOREHOLE LOGS

BOREHOLE LOG EXPLANATION FORM

This explanatory section provides the background to assist in the use of the borehole logs. Each of the headings used on the borehole log, is briefly explained.

DEPTH

This column gives the depth of interpreted geologic contacts in metres below ground surface.

STRATIGRAPHIC DESCRIPTION

This column gives a description of the soil based on a tactile examination of the samples and/or laboratory test results. Each stratum is described according to the following classification and terminology.

Soil Classification*		Terminology	Proportion
Silt & Clay	< 0.075 mm	"trace" (e.g. trace sand)	<10%
Sand	0.075 to 4.75 mm	"some" (e.g. some sand)	10% - 20%
Gravel	4.75 to 75 mm	adjective (e.g. sandy)	20% - 35%
Cobbles	75 to 300 mm	"and" (e.g. and sand)	35% - 50%
Boulders	>300 mm	noun (e.g. sand)	>50%

* Extension of USCS Classification system unless otherwise noted.

The use of the geologic term "till" implies that both disseminated coarser grained (sand, gravel, cobbles or boulders) particles and finer grained (silt and clay) particles may occur within the described matrix.

The compactness of cohesionless soils and the consistency of cohesive soils are defined by the following:

COHESIONLESS SOIL		COHESIVE SOIL	
Compactness	Standard Penetration Resistance "N", Blows / 0.3 m	Consistency	Standard Penetration Resistance "N", Blows / 0.3 m
Very Loose	0 to 4	Very Soft	0 to 2
Loose	4 to 10	Soft	2 to 4
Compact	10 to 30	Firm	4 to 8
Dense	30 to 50	Stiff	8 to 15
Very Dense	Over 50	Very Stiff	15 to 30
		Hard	Over 30

The moisture conditions of cohesionless and cohesive soils are defined as follows.

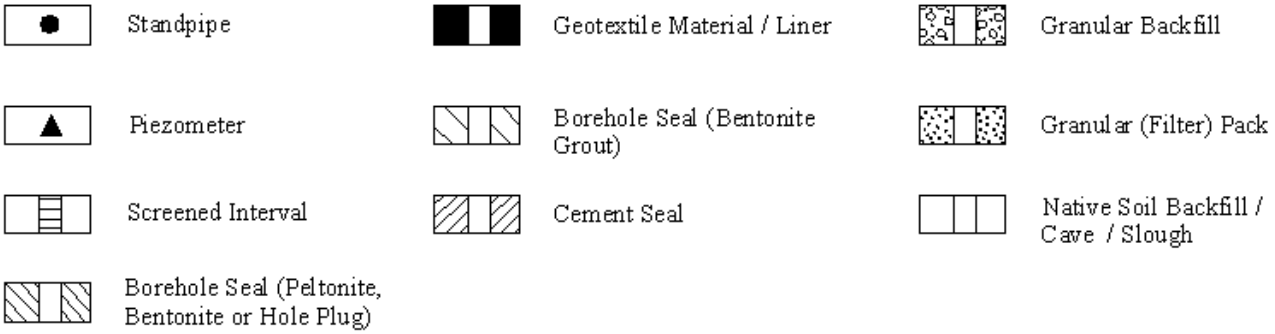
COHESIONLESS SOILS	COHESIVE SOILS		
Dry	DTPL	-	Drier Than Plastic Limit
Moist	APL	-	About Plastic Limit
Wet	WTPL	-	Wetter Than Plastic Limit
Saturated	MWTPL	-	Much Wetter Than Plastic Limit

STRATIGRAPHY

Symbols may be used to pictorially identify the interpreted stratigraphy of the soil and rock strata.

MONITOR DETAILS

This column shows the position and designation of standpipe and/or piezometer ground water monitors installed in the borehole. Also the water level may be shown for the date indicated.



Where monitors are placed in separate boreholes, these are shown individually in the "Monitor Details" column. Otherwise, monitors are in the same borehole. For further data regarding seals, screens, etc., the reader is referred to the summary of monitor details table.

SAMPLE

These columns describe the sample type and number, the "N" value, the water content, the percentage recovery, and Rock Quality Designation (RQD), of each sample obtained from the borehole where applicable. The information is recorded at the approximate depth at which the sample was obtained. The legend for sample type is explained below.

SS	=	Split Spoon	GS	=	Grab Sample
ST	=	Thin Walled Shelby Tube	CS	=	Channel Sample
AS	=	Auger Flight Sample	WS	=	Wash Sample
CC	=	Continuous Core	RC	=	Rock Core

$$\% \text{ Recovery} = \frac{\text{Length of Core Recovered Per Run}}{\text{Total Length of Run}} \times 100$$

Where rock drilling was carried out, the term RQD (Rock Quality Designation) is used. The RQD is an indirect measure of the number of fractures and soundness of the rock mass. It is obtained from the rock cores by summing the length of core recovered, counting only those pieces of sound core that are 100 mm or more in length. The RQD value is expressed as a percentage and is the ratio of the summed core lengths to the total length of core run. The classification based on the RQD value is given below.

RQD Classification	RQD (%)
Very poor quality	< 25
Poor quality	25 - 50
Fair quality	50 - 75
Good quality	75 - 90
Excellent quality	90 - 100

TEST DATA

The central section of the log provides graphs which are used to plot selected field and laboratory test results at the depth at which they were carried out. The plotting scales are shown at the head of the column.

Dynamic Penetration Resistance - The number of blows required to advance a 51 mm diameter, 60º steel cone fitted to the end of 45 mm OD drill rods, 0.3 m into the subsoil. The cone is driven with a 63.5 kg hammer over a fall of 750 mm.

Standard Penetration Resistance - Standard Penetration Test (SPT) "N" Value - The number of blows required to advance a 51 mm diameter standard split-spoon sampler 300 mm into the subsoil, driven by means of a 63.5 kg hammer falling freely a distance of 750 mm. In cases where the split spoon does not penetrate 300 mm, the number of blows over the distance of actual penetration in millimetres is shown as $\frac{xBlows}{mm}$

Water Content - The ratio of the mass of water to the mass of oven-dry solids in the soil expressed as a percentage.

W_P - Plastic Limit of a fine-grained soil expressed as a percentage as determined from the Atterberg Limit Test.

W_L - Liquid Limit of a fine-grained soil expressed as a percentage as determined from the Atterberg Limit Test.

REMARKS

The last column describes pertinent drilling details, field observations and/or provides an indication of other field or laboratory tests that were performed.

BOREHOLE NO. BH18-01

PROJECT NAME: BRAMPTON EAST-WEST CONNECTOR
PROJECT NO.: 141-15409-00
CLIENT: CITY OF BRAMPTON
DATE COMPLETED: Apr 02, 2018
BOREHOLE TYPE: HOLLOW STEM AUGER / 50 mm OD SPLIT SPOON
SUPERVISOR: MN
GROUND ELEVATION: NOT SURVEYED
REVIEWER: PH

UTM CO-ORDINATES
UTM Zone: 17 NAD: 83
Easting: 593558
Northing: 4835526

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH (Intact (MaX) Cu, Remoulded Cu)	WATER CONTENT % (W_P, W_L)	REMARKS
0.0		TOPSOIL (300mm)										
0.3		SILTY SAND TILL: Brown, mottled orange SILTY SAND TILL, trace gravel, trace clay, moist, loose			SS1	6	22	75				
1.1		CLAYEY SILT TILL: Reddish brown CLAYEY SILT TILL, trace gravel, trace sand, occasional cobbles, APL, firm			SS2	6	30	56				Groundwater at 2.1 m below ground surface in open borehole upon completion
2.3		COBBLY SILTY SAND TILL: Reddish brown COBBLY SILTY SAND TILL, trace gravel, trace clay, wet, compact			SS3	25	13	83				GSA SS3: Gravel: 30% Sand: 27% Silt & Clay: 43%
3.4		SILTY SAND TILL: Reddish brown SILTY SAND TILL, trace gravel, trace clay, moist, very dense			SS4	84		71		84		Borehole open to 3.5 m below ground surface upon completion
3.5		Borehole terminated at 3.5 m below ground surface in SILTY SAND TILL.										

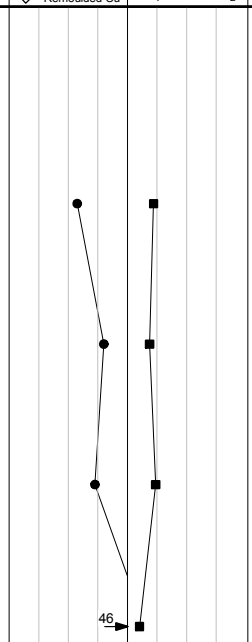
WSP GEOTECH (METRIC) WITH UTM AND MASL 141-15409-00_BRAMPTON EAST-WEST CONNECTOR.GPJ WSP_ENV_V1.GDT 4/20/18

BOREHOLE NO. BH18-02

PROJECT NAME: BRAMPTON EAST-WEST CONNECTOR
PROJECT NO.: 141-15409-00
CLIENT: CITY OF BRAMPTON
DATE COMPLETED: Apr 02, 2018
BOREHOLE TYPE: HOLLOW STEM AUGER / 50 mm OD SPLIT SPOON
SUPERVISOR: MN
GROUND ELEVATION: NOT SURVEYED
REVIEWER: PH

UTM CO-ORDINATES
UTM Zone: 17 NAD: 83
Easting: 593817
Northing: 4835775

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)	REMARKS
0.0		TOPSOIL (300mm)								
0.3		SANDY SILT TILL: Brown SANDY SILT TILL, trace gravel, trace clay, moist, compact to dense								
1.0					SS1	23	13	83		
		- Occasional cobbles			SS2	32	11	75		
2.0										
2.3		SILTY SAND TILL: Light brown SILTY SAND TILL, trace gravel, trace clay, moist, compact to dense			SS3	29	14	92		
3.0										Borehole open and dry upon completion of drilling
					SS4	46	6	83		
3.7		Borehole terminated at 3.7 m below ground surface in SILTY SAND TILL.								
4.0										
5.0										
6.0										
7.0										
8.0										



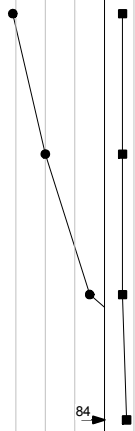
BOREHOLE NO. BH18-03

PROJECT NAME: BRAMPTON EAST-WEST CONNECTOR
PROJECT NO.: 141-15409-00
CLIENT: CITY OF BRAMPTON
DATE COMPLETED: Apr 02, 2018
BOREHOLE TYPE: HOLLOW STEM AUGER / 50 mm OD SPLIT SPOON
SUPERVISOR: MN
GROUND ELEVATION: NOT SURVEYED
REVIEWER: PH

UTM CO-ORDINATES
UTM Zone: 17 NAD: 83
Easting: 593962
Northing: 4835804

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)	REMARKS
0.0		TOPSOIL (150mm)								
0.2		SANDY SILT TILL: Brown SANDY SILT TILL, trace gravel, moist, loose			SS1	9	9	75		
1.5		SANDY SILT TILL: Dark brown SANDY SILT TILL, some clay, trace gravel, occasional cobbles, moist, compact to dense			SS2	20	9	100		GSA SS2: Gravel: 5% Sand: 23% Silt & Clay: 72%
3.0		- Reddish brown			SS3	35	9	92		
3.0		SILTY SAND TILL: Brown SILTY SAND TILL, trace gravel, trace clay, occasional cobbles, moist, very dense			SS4	84	11	71		
3.5		Borehole terminated at 3.5 m below ground surface in SILTY SAND TILL.								
4.0										
5.0										
6.0										
7.0										
8.0										

CONE PENETRATION "N" VALUE 10 20 30
SHEAR STRENGTH 10 20 30 40
Intact (MaX) Cu
Remoulded Cu
WATER CONTENT % 15 30 45
W_P W_L



BOREHOLE NO. BH18-04

PROJECT NAME: BRAMPTON EAST-WEST CONNECTOR
PROJECT NO.: 141-15409-00
CLIENT: CITY OF BRAMPTON
DATE COMPLETED: Apr 02, 2018
BOREHOLE TYPE: HOLLOW STEM AUGER / 50 mm OD SPLIT SPOON
SUPERVISOR: MN
GROUND ELEVATION: NOT SURVEYED
REVIEWER: PH

UTM CO-ORDINATES
UTM Zone: 17 NAD: 83
Easting: 594095
Northing: 4835917

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH (Intact (MaX) Cu, Remoulded Cu)	WATER CONTENT % (W_P, W_L)	REMARKS
0.0		TOPSOIL (360mm)										
0.4		SANDY SILT TILL: Brown SANDY SILT TILL, trace gravel, trace clay, moist, loose to compact			SS1	5	17	75				
1.0		- Occasional cobbles			SS2	22	9	100				
2.0					SS3	27	10	100				Borehole caved at 2.4 m below ground surface upon completion
3.0		- Moist to wet			SS4	28	12	83				
4.0												
4.1		SANDY SILT TILL: Grey SANDY SILT TILL, trace clay, moist, compact			SS5	17	14	100				
5.0												
5.2		Borehole terminated at 5.2 m below ground surface in SANDY SILT TILL.										
6.0												
7.0												
8.0												

BOREHOLE NO. BH18-05

PROJECT NAME: BRAMPTON EAST-WEST CONNECTOR
PROJECT NO.: 141-15409-00
CLIENT: CITY OF BRAMPTON
DATE COMPLETED: Apr 02, 2018
BOREHOLE TYPE: HOLLOW STEM AUGER / 50 mm OD SPLIT SPOON
SUPERVISOR: MN
GROUND ELEVATION: NOT SURVEYED
REVIEWER: PH

UTM CO-ORDINATES
UTM Zone: 17 NAD: 83
Easting: 594218
Northing: 4836002

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH (Intact (MaX) Cu, Remoulded Cu)	WATER CONTENT % (W_P, W_L)	REMARKS
0.0		TOPSOIL (560mm)										
0.6		SANDY SILT TILL: Brown SANDY SILT TILL, trace gravel, trace clay, moist to wet, loose			SS1	4	23	83				
1.0		- Compact			SS2	10	14	100				
2.0		- Grey reddish			SS3	18	19	75				
3.0		- Reddish brown, wet, occasional cobbles			SS4	18	10	67				Groundwater at 3.4 m below ground surface in open borehole upon completion
4.0		SILTY SAND TILL: Brown SILTY SAND TILL, some gravel, trace clay, occasional cobbles, moist, dense			SS5	57		63		57		Borehole caved at 4.0 m below ground surface upon completion
5.0												
5.2		Borehole terminated at 5.2 m below ground surface in SILTY SAND TILL.										
6.0												
7.0												
8.0												

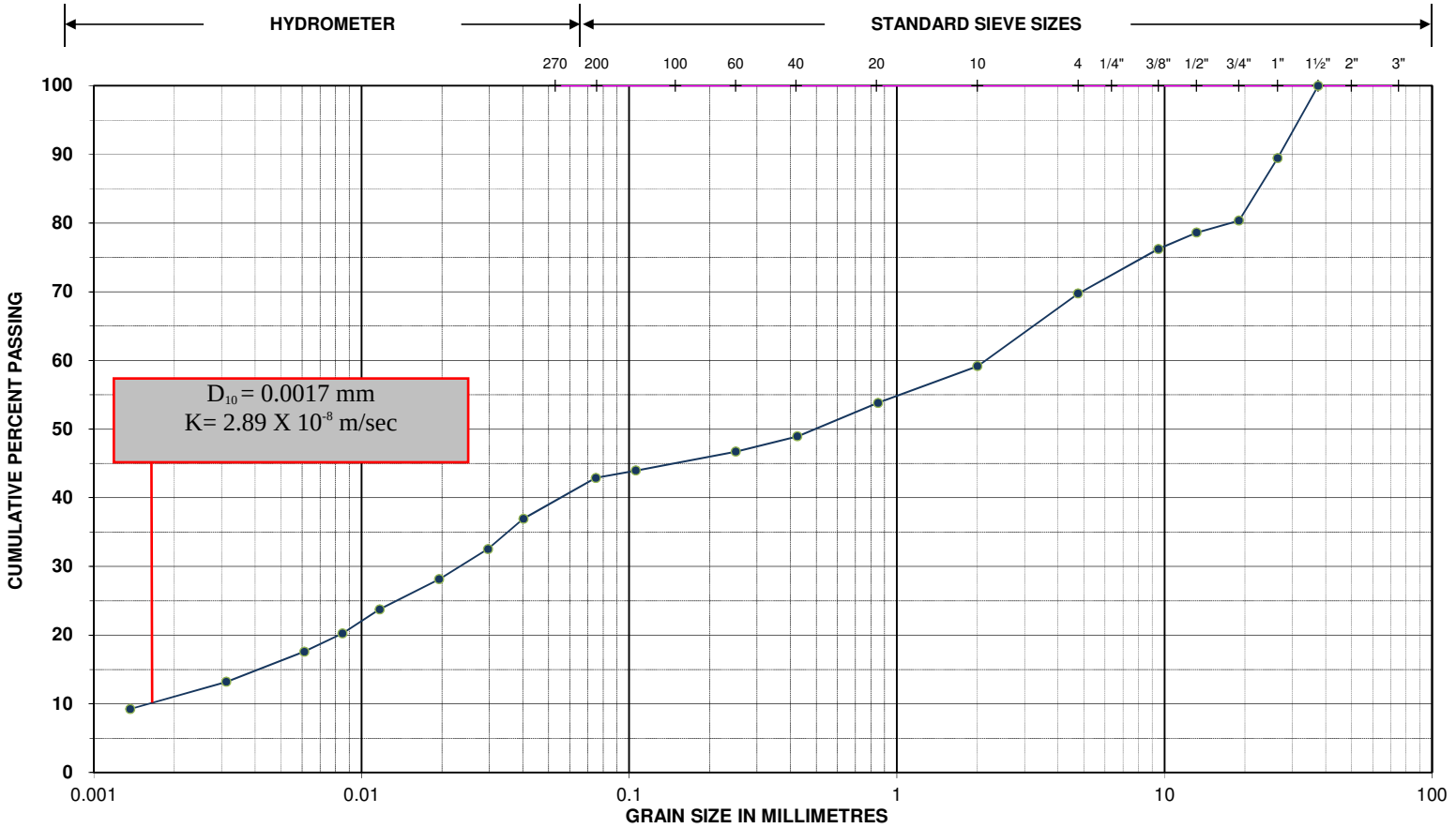
BOREHOLE NO. BH18-06

PROJECT NAME: BRAMPTON EAST-WEST CONNECTOR
PROJECT NO.: 141-15409-00
CLIENT: CITY OF BRAMPTON
DATE COMPLETED: Apr 02, 2018
BOREHOLE TYPE: HOLLOW STEM AUGER / 50 mm OD SPLIT SPOON
SUPERVISOR: MN
GROUND ELEVATION: NOT SURVEYED
REVIEWER: PH

UTM CO-ORDINATES
UTM Zone: 17 NAD: 83
Easting: 594280
Northing: 4836004

DEPTH (m)	ELEV (mASL)	STRATIGRAPHIC DESCRIPTION	STRATIGRAPHY	MONITOR DETAILS	SAMPLE TYPE	N VALUE	% WATER	% RECOVERY	PID/TOV (ppm)	CONE PENETRATION "N" VALUE / SHEAR STRENGTH (Intact (MaX) Cu, Remoulded Cu)	WATER CONTENT % (W_P, W_L)	REMARKS
0.0		TOPSOIL (530mm)										
0.5		SANDY SILT TILL: Light brown mottled orange and grey SANDY SILT TILL, trace gravel, trace clay, occasional cobbles, moist to wet, compact			SS1	11	24	100				
1.5		SANDY SILT TILL: Reddish brown SANDY SILT TILL, trace gravel, occasional cobbles, moist, compact			SS2	23	10	92				Groundwater at 1.8 m below ground surface in open borehole upon completion
2.1		SAND: Light brown SAND, trace silt, wet, dense			SS3	35	16	75				GSA SS3: Gravel: 24% Sand: 43% Silt & Clay: 33%
2.7		COBBLY SILTY SAND TILL: Reddish brown COBBLY SILTY SAND TILL, trace gravel, moist, dense										
3.0		SAND: Light brown SAND, trace silt, saturated, very dense			SS4	87	16	100		87		Borehole caved at 3.0 m below ground surface upon completion
3.3		SANDY SILT TILL: Reddish brown SANDY SILT TILL, trace gravel, occasional cobbles, moist, very dense										
4.8		Borehole terminated at 4.8 m below ground surface in SANDY SILT TILL.			SS5	50/ 75mm	8	100		50		
5.0												
6.0												
7.0												
8.0												

PARTICLE SIZE DISTRIBUTION ASTM D422



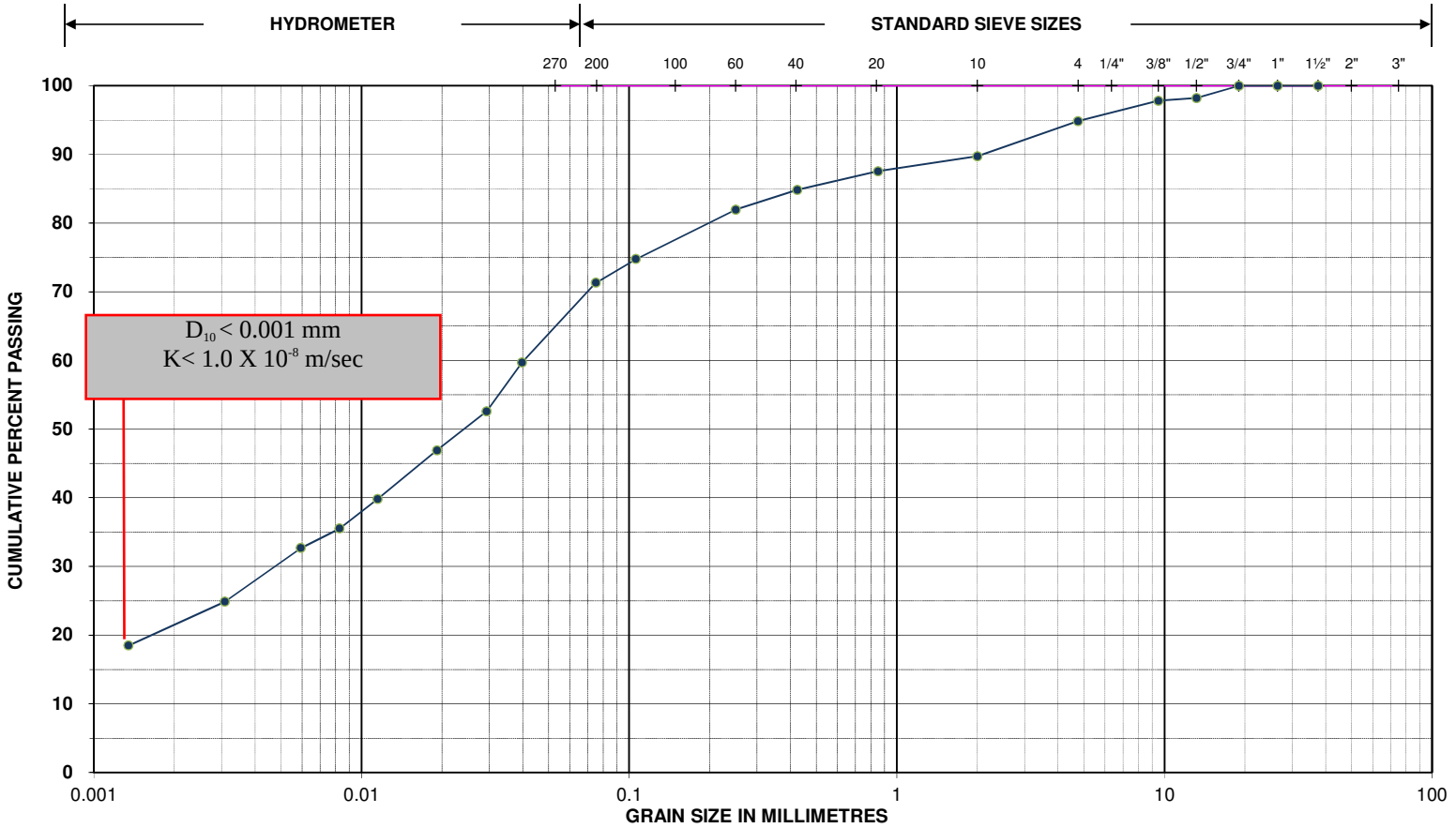
Unified Classification System

SILT AND CLAY	SAND	GRAVEL

Project Name:	Brampton East-West Connector	**Project No.:**	141-15409-00
Location ID.:	BH18-01	**Sample No./Depth:**	SS3 / 2.3-2.9m

Sieve Size	% Passing Coarse	**Sieve Size**	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	59.2	**0.040**	36.9
26.5 mm	89.5	**0.850 mm**	53.8	**0.020**	28.1
19.0 mm	80.4	**0.425 mm**	48.9	**0.008**	20.2
13.2 mm	78.6	**0.250 mm**	46.7	**0.003**	13.2
9.50 mm	76.2	**0.106 mm**	44.0	**0.001**	9.2
4.75 mm	69.7	**0.075 mm**	42.9		

PARTICLE SIZE DISTRIBUTION ASTM D422



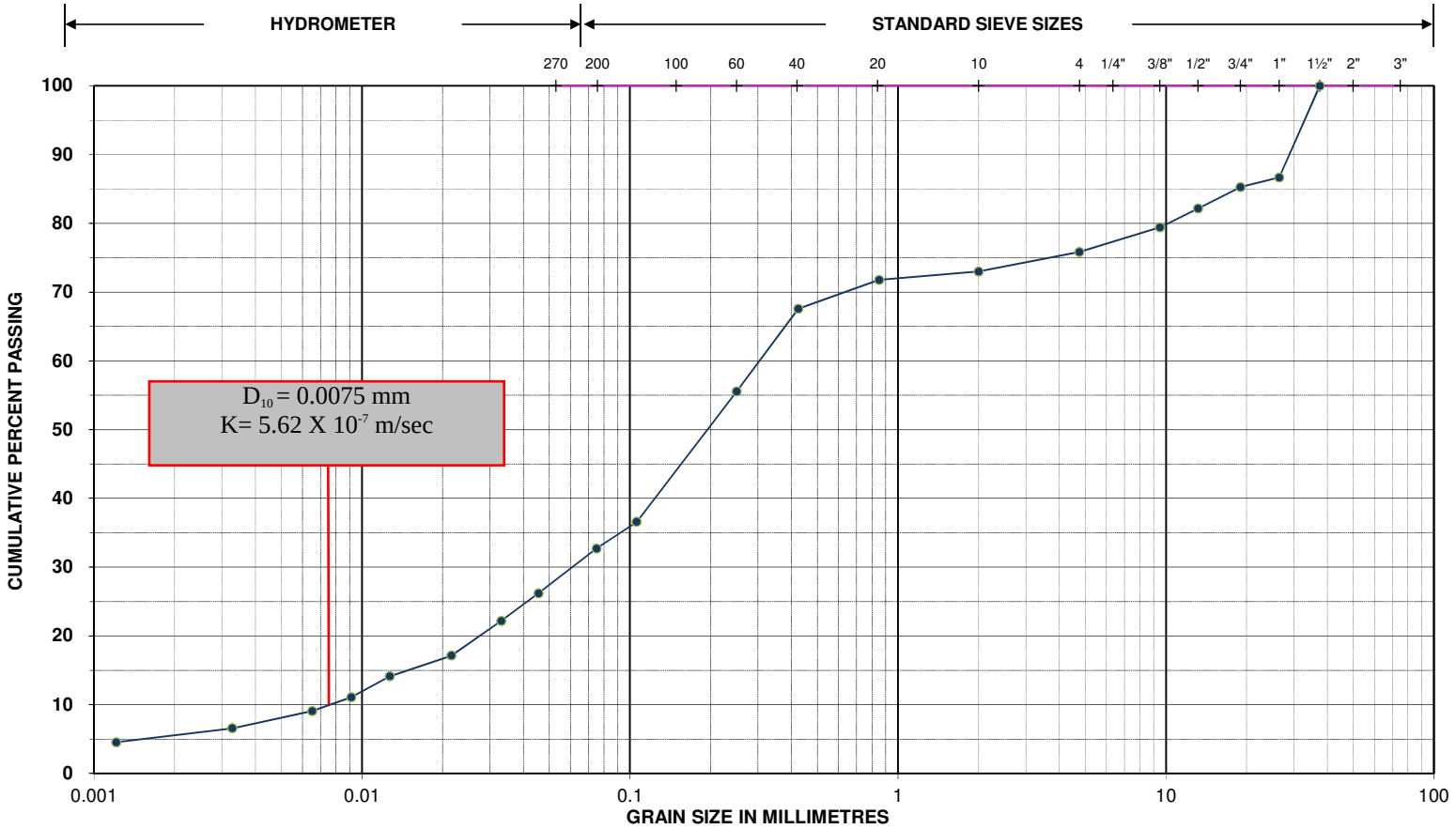
Unified Classification System

SILT AND CLAY	SAND	GRAVEL

Project Name:	Brampton East-West Connector	**Project No.:**	141-15409-00
Location ID.:	BH18-03	**Sample No./Depth:**	SS2 / 1.5-2.1m

Sieve Size	% Passing Coarse	Sieve Size	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	89.7	**0.040**	59.7
26.5 mm	100.0	**0.850 mm**	87.6	**0.019**	46.9
19.0 mm	100.0	**0.425 mm**	84.8	**0.008**	35.5
13.2 mm	98.2	**0.250 mm**	82.0	**0.003**	24.9
9.50 mm	97.8	**0.106 mm**	74.8	**0.001**	18.5
4.75 mm	94.8	**0.075 mm**	71.3		

PARTICLE SIZE DISTRIBUTION ASTM D422



Unified Classification System

SILT AND CLAY	SAND	GRAVEL

Project Name:	Brampton East-West Connector	**Project No.:**	141-15409-00
Location ID.:	BH18-06	**Sample No./Depth:**	SS3 / 2.3-2.9m

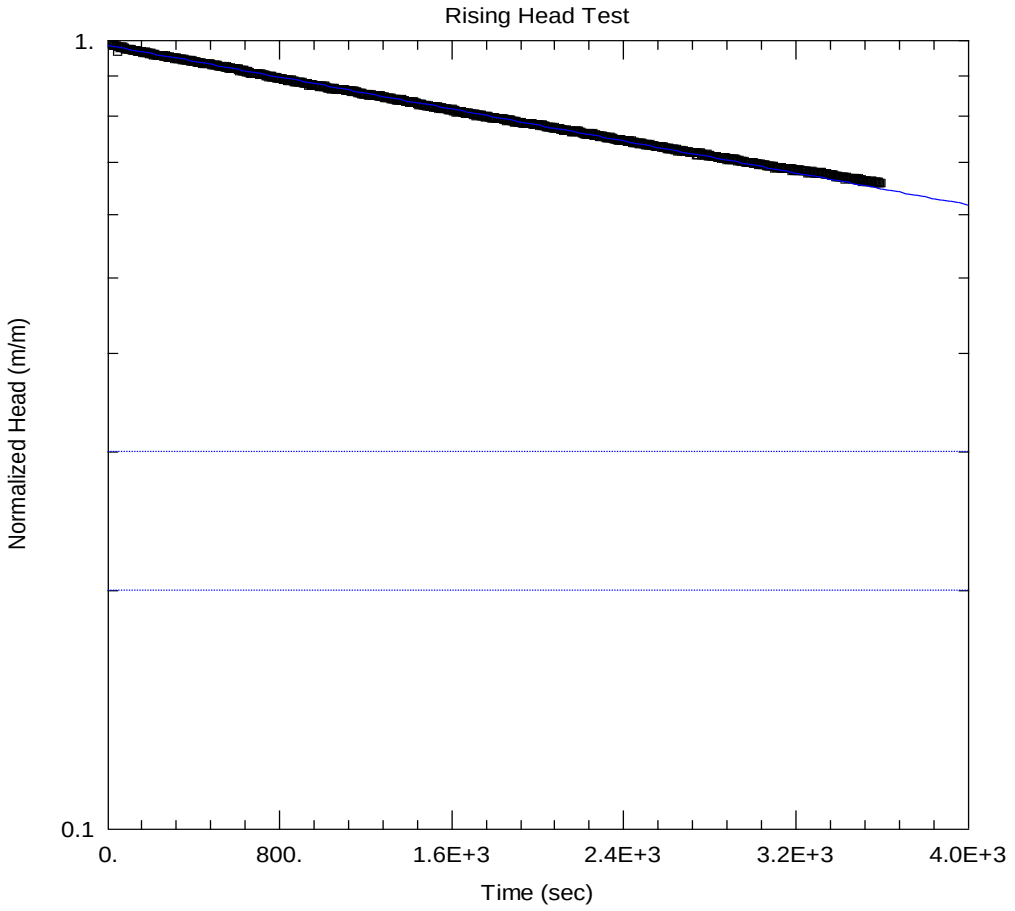
Sieve Size	% Passing Coarse	**Sieve Size**	% Passing Fine	Hydrometer (mm)	% Passing
37.5 mm	100.0	**2.00 mm**	73.0	**0.046**	26.2
26.5 mm	86.7	**0.850 mm**	71.8	**0.022**	17.1
19.0 mm	85.3	**0.425 mm**	67.6	**0.009**	11.1
13.2 mm	82.2	**0.250 mm**	55.5	**0.003**	6.6
9.50 mm	79.4	**0.106 mm**	36.6	**0.001**	4.5
4.75 mm	75.8	**0.075 mm**	32.7		

APPENDIX

C

SINGLE WELL RESPONSE TESTING

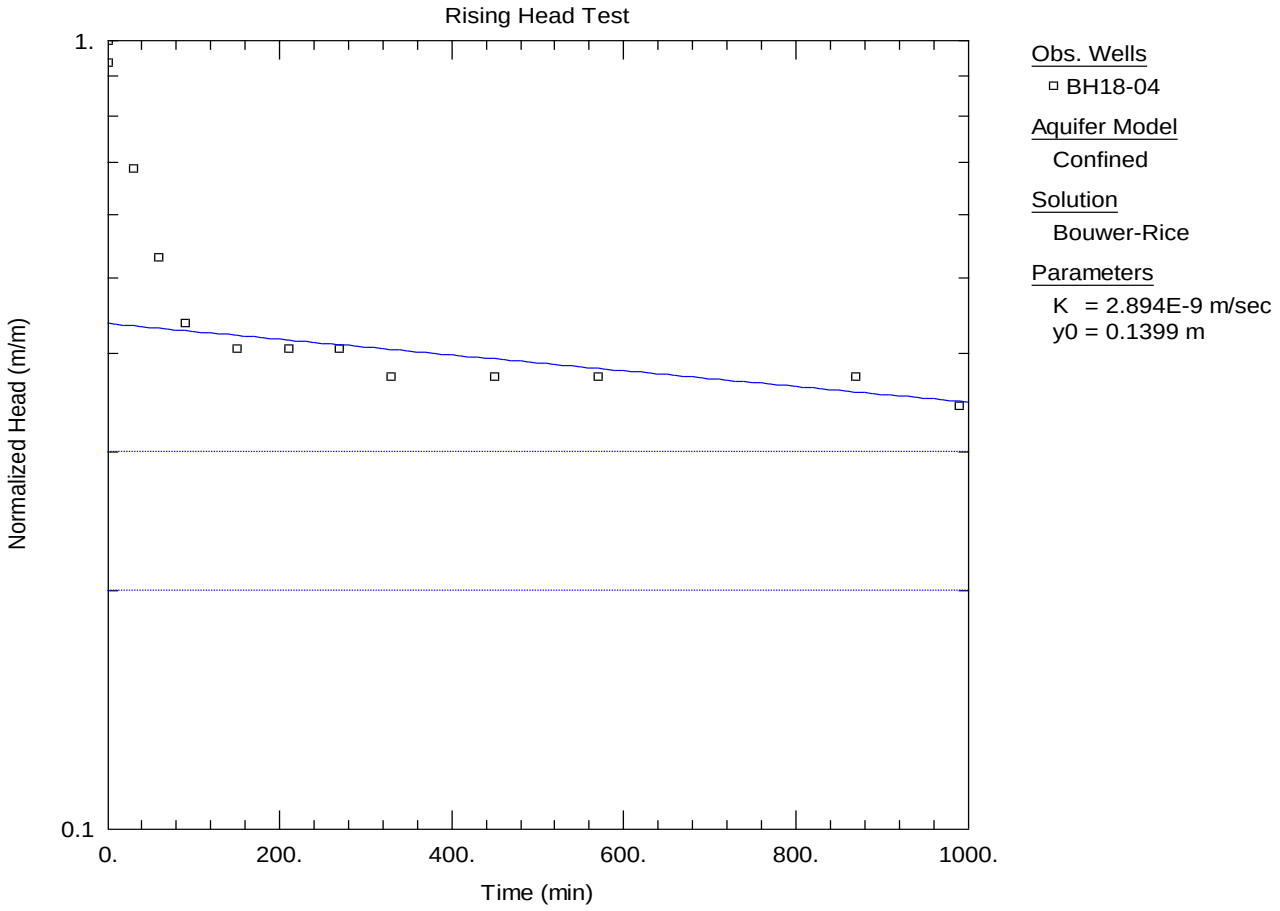
	Slug Test Analysis Report
	Project: 141-15409-00
	Client: City of Brampton
Location: BH18-01	Date: July 28, 2018
Test conducted by: Steve Stamcoff	Analysis Date: 01-October-18
Analysis performed by: Rob Byers	
Aquifer Thickness: 1.5 m Estimated	



Screen Length (m)	1.5		
Hole Radius (mm)	75		
Well Radius (mm)	26		
Static Water Level (mbgs)	1.1		
Ground Elevation (masl)			
Well Depth (mbgs)	4.8		
Top of Pipe (m)	1.2		
Well Diameter (mm)	51.0		
Well Elevation (masl)			
Solution Method:	Bouwer-Rice		
Well ID	Hydraulic Conductivity		
	m/s	m/d	cm/sec
BH18-01	**8.93E-08**	**7.71E-03**	**8.93E-06**
Material Screened	**Silt till**		

FIGURE C-1

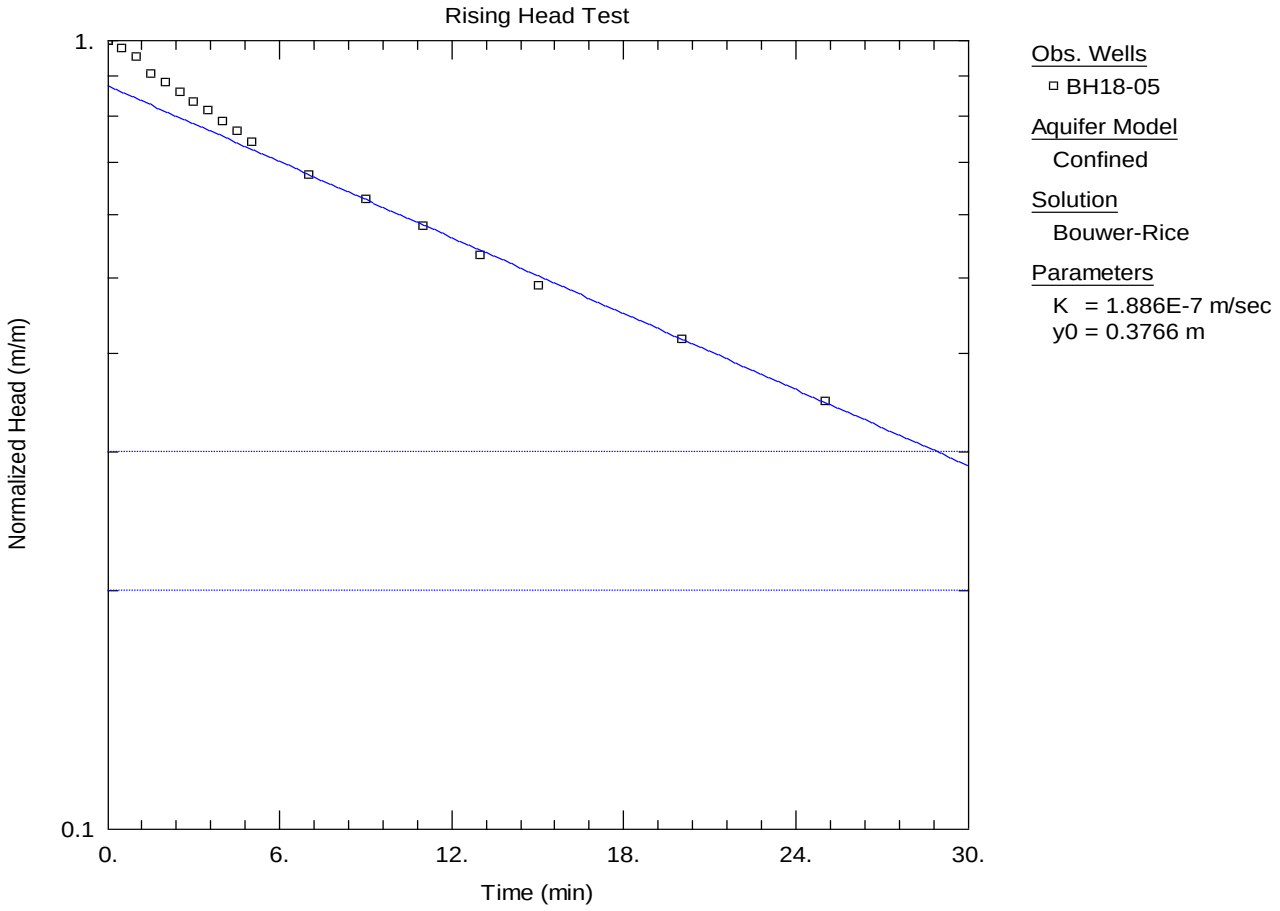
	Slug Test Analysis Report
	Project: 141-15409-00
	Client: City of Brampton
Location: BH18-04	Date: July 28, 2018
Test conducted by: Steve Stamcoff	Analysis Date: 01-October-18
Analysis performed by: Rob Byers	
Aquifer Thickness: 1.5 m Estimated	



Screen Length (m)	1.5		
Hole Radius (mm)	75		
Well Radius (mm)	26		
Static Water Level (mbgs)	2.6		
Ground Elevation (masl)			
Well Depth (mbgs)	3.1		
Top of Pipe (m)	1.1		
Well Diameter (mm)	51.0		
Well Elevation (masl)			
Solution Method:	Bouwer-Rice		
Well ID	Hydraulic Conductivity		
	m/s	m/d	cm/sec
BH18-04	**2.89E-09**	**2.50E-04**	**2.89E-07**
Material Screened	**Silt till**		

FIGURE C-2

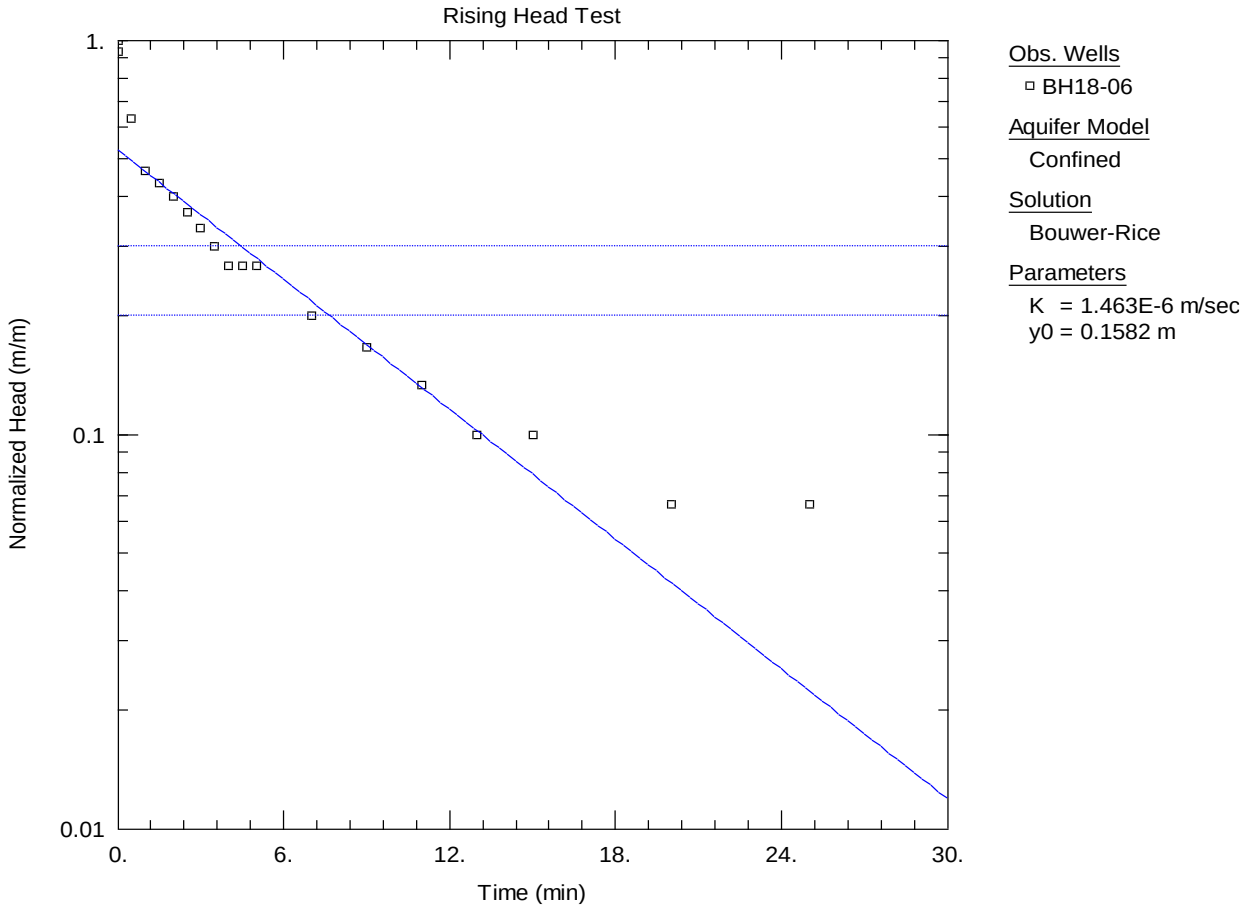
	Slug Test Analysis Report
	Project: 141-15409-00
	Client: City of Brampton
Location: BH18-05	Date: July 28, 2018
Test conducted by: Steve Stamcoff	Analysis Date: 01-October-18
Analysis performed by: Rob Byers	
Aquifer Thickness: 3 m Estimated	



Screen Length (m)	3.0		
Hole Radius (mm)	75		
Well Radius (mm)	26		
Static Water Level (mbgs)	1.2		
Ground Elevation (masl)			
Well Depth (mbgs)	4.2		
Top of Pipe (m)	1.2		
Well Diameter (mm)	51.0		
Well Elevation (masl)			
Solution Method:	Bouwer-Rice		
Well ID	Hydraulic Conductivity		
	m/s	m/d	cm/sec
BH18-05	**1.89E-07**	**1.63E-02**	**1.89E-05**
Material Screened	**Silt till**		

FIGURE C-3

	Slug Test Analysis Report
	Project: 141-15409-00
	Client: City of Brampton
Location: BH18-06	Date: July 28, 2018
Test conducted by: Steve Stamcoff	Analysis Date: 01-October-18
Analysis performed by: Rob Byers	
Aquifer Thickness: 0.3 m Sand unit	



Screen Length (m)	1.5		
Hole Radius (mm)	75		
Well Radius (mm)	26		
Static Water Level (mbgs)	2.1		
Ground Elevation (masl)			
Well Depth (mbgs)	3.4		
Top of Pipe (m)	1.0		
Well Diameter (mm)	51.0		
Well Elevation (masl)			
Solution Method:	Bouwer-Rice		
Well ID	Hydraulic Conductivity		
	m/s	m/d	cm/sec
BH18-06	**1.46E-06**	**1.26E-01**	**1.46E-04**
Material Screened	**Silt till to sand to silt till**		

FIGURE C-4

APPENDIX

D

LABORATORY CERTIFICATE OF ANALYSIS

Table D-1: Summary of General Water Quality

Water Quality Assessment				
Sample Description				**BH18-01**
Date Sampled				**07/24/2018**
Parameter	**Unit**	**G / S**	**RDL**	**9422545**
Electrical Conductivity	µS/cm		2	924
pH	pH Units		NA	8.11
Saturation pH				7.10
Langelier Index				1.01
Total Hardness (as CaCO3)	mg/L		0.5	229
Total Dissolved Solids	mg/L		20	552
Alkalinity (as CaCO3)	mg/L		5	269
Bicarbonate (as CaCO3)	mg/L		5	269
Carbonate (as CaCO3)	mg/L		5	<5
Hydroxide (as CaCO3)	mg/L		5	<5
Fluoride	mg/L		0.25	<0.25
Chloride	mg/L		0.50	34.4
Nitrate as N	mg/L		0.25	6.58
Nitrite as N	mg/L		0.25	0.40
Bromide	mg/L		0.25	<0.25
Sulphate	mg/L		0.50	135
Ortho Phosphate as P	mg/L		0.50	<0.50
Reactive Silica	mg/L		0.10	17.2
Ammonia as N	mg/L		0.02	0.21
Total Phosphorus	mg/L		0.02	0.48
Total Organic Carbon	mg/L		0.5	2.4
Colour	TCU		5	<5
Turbidity	NTU		0.5	260
Calcium	mg/L		0.10	54.2
Magnesium	mg/L		0.10	22.8
Sodium	mg/L		0.10	91.9
Potassium	mg/L		0.10	17.1
Aluminum	mg/L		0.004	0.558
Antimony	mg/L		0.003	<0.003
Arsenic	mg/L		0.003	0.005
Barium	mg/L		0.002	0.090
Beryllium	mg/L		0.001	<0.001
Boron	mg/L		0.010	0.208
Cadmium	mg/L		0.001	<0.001
Chromium	mg/L		0.003	0.005
Cobalt	mg/L		0.001	0.001
Copper	mg/L		0.003	<0.003
Iron	mg/L		0.010	0.720
Lead	mg/L		0.001	0.002
Manganese	mg/L		0.002	0.165
Mercury	mg/L		0.0001	<0.0001
Molybdenum	mg/L		0.002	0.061
Nickel	mg/L		0.003	<0.003
Selenium	mg/L		0.004	<0.004
Silver	mg/L		0.002	<0.002
Strontium	mg/L		0.005	1.62
Thallium	mg/L		0.006	<0.006

Table D-1: Summary of General Water Quality

Sample Description				BH18-01
Date Sampled				07/24/2018
Parameter	Unit	G / S	RDL	9422545
Tin	mg/L		0.002	<0.002
Titanium	mg/L		0.002	0.006
Tungsten	mg/L		0.010	<0.010
Uranium	mg/L		0.002	0.008
Vanadium	mg/L		0.002	<0.002
Zinc	mg/L		0.005	0.032
Zirconium	mg/L		0.004	<0.004
% Difference/ Ion Balance	%		NA	3.38

Comments:

9422545

RDL - Reported Detection Limit; G / S - Guideline / Standard

Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

AGAT Laboratories

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http://www.agatlabs.com

CLIENT NAME: WSP CANADA INC.
220 ADVANCE BOULEVARD
BRAMPTON, ON L6T4J5
(905) 799-8220

ATTENTION TO: Derek Brunner

PROJECT: 141-15409-00 phase 14

AGAT WORK ORDER: 18T365896

WATER ANALYSIS REVIEWED BY: Yris Verastegui, Report Reviewer

DATE REPORTED: Aug 02, 2018

PAGES (INCLUDING COVER): 9

VERSION*: 1

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

NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 18T365896

PROJECT: 141-15409-00 phase 14

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Derek Brunner

SAMPLING SITE:

SAMPLED BY:Stephen stamcoff

Water Quality Assessment

DATE RECEIVED: 2018-07-24

DATE REPORTED: 2018-08-02

		SAMPLE DESCRIPTION:		BH18-01
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2018-07-24
Parameter	Unit	G / S	RDL	9422545
Electrical Conductivity	µS/cm		2	924
pH	pH Units		NA	8.11
Saturation pH				7.10
Langelier Index				1.01
Total Hardness (as CaCO3)	mg/L		0.5	229
Total Dissolved Solids	mg/L		20	552
Alkalinity (as CaCO3)	mg/L		5	269
Bicarbonate (as CaCO3)	mg/L		5	269
Carbonate (as CaCO3)	mg/L		5	<5
Hydroxide (as CaCO3)	mg/L		5	<5
Fluoride	mg/L		0.25	<0.25
Chloride	mg/L		0.50	34.4
Nitrate as N	mg/L		0.25	6.58
Nitrite as N	mg/L		0.25	0.40
Bromide	mg/L		0.25	<0.25
Sulphate	mg/L		0.50	135
Ortho Phosphate as P	mg/L		0.50	<0.50
Reactive Silica	mg/L		0.10	17.2
Ammonia as N	mg/L		0.02	0.21
Total Phosphorus	mg/L		0.02	0.48
Total Organic Carbon	mg/L		0.5	2.4
Colour	TCU		5	<5
Turbidity	NTU		0.5	260
Calcium	mg/L		0.10	54.2
Magnesium	mg/L		0.10	22.8
Sodium	mg/L		0.10	91.9
Potassium	mg/L		0.10	17.1
Aluminum	mg/L		0.004	0.558
Antimony	mg/L		0.003	<0.003
Arsenic	mg/L		0.003	0.005

Certified By: Iris Verástegui

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Certificate of Analysis

AGAT WORK ORDER: 18T365896

PROJECT: 141-15409-00 phase 14

CLIENT NAME: WSP CANADA INC.

ATTENTION TO: Derek Brunner

SAMPLING SITE:

SAMPLED BY:Stephen stamcoff

Water Quality Assessment

DATE RECEIVED: 2018-07-24

DATE REPORTED: 2018-08-02

		SAMPLE DESCRIPTION:		BH18-01
		SAMPLE TYPE:		Water
		DATE SAMPLED:		2018-07-24
Parameter	Unit	G / S	RDL	9422545
Barium	mg/L		0.002	0.090
Beryllium	mg/L		0.001	<0.001
Boron	mg/L		0.010	0.208
Cadmium	mg/L		0.001	<0.001
Chromium	mg/L		0.003	0.005
Cobalt	mg/L		0.001	0.001
Copper	mg/L		0.003	<0.003
Iron	mg/L		0.010	0.720
Lead	mg/L		0.001	0.002
Manganese	mg/L		0.002	0.165
Mercury	mg/L		0.0001	<0.0001
Molybdenum	mg/L		0.002	0.061
Nickel	mg/L		0.003	<0.003
Selenium	mg/L		0.004	<0.004
Silver	mg/L		0.002	<0.002
Strontium	mg/L		0.005	1.62
Thallium	mg/L		0.006	<0.006
Tin	mg/L		0.002	<0.002
Titanium	mg/L		0.002	0.006
Tungsten	mg/L		0.010	<0.010
Uranium	mg/L		0.002	0.008
Vanadium	mg/L		0.002	<0.002
Zinc	mg/L		0.005	0.032
Zirconium	mg/L		0.004	<0.004
% Difference/ Ion Balance	%		NA	3.38

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard

9422545 Elevated RDLs indicate the degree of sample dilutions prior to the analysis to keep analytes within the calibration range, reduce matrix interference and/or to avoid contaminating the instrument.

Certified By: Iris Verástegui

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Quality Assurance

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 18T365896

PROJECT: 141-15409-00 phase 14

ATTENTION TO: Derek Brunner

SAMPLING SITE:

SAMPLED BY:Stephen stamcoff

Water Analysis

RPT Date: Aug 02, 2018			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
Water Quality Assessment															
Electrical Conductivity	9423702		588	587	0.2%	< 2	87%	80%	120%	NA			NA		
pH	9423702		8.04	7.94	1.3%	NA	100%	90%	110%	NA			NA		
Total Dissolved Solids	9422261		48	44	NA	< 20	100%	80%	120%	NA			NA		
Alkalinity (as CaCO3)	9423702		109	109	0.3%	< 5	99%	80%	120%	NA			NA		
Bicarbonate (as CaCO3)	9423702		109	109	0.3%	< 5	NA			NA			NA		
Carbonate (as CaCO3)	9423702		<5	<5	NA	< 5	NA			NA			NA		
Hydroxide (as CaCO3)	9423702		<5	<5	NA	< 5	NA			NA			NA		
Fluoride	9422545	9422545	<0.25	<0.25	NA	< 0.05	99%	90%	110%	97%	90%	110%	100%	80%	120%
Chloride	9422545	9422545	34.4	34.4	0.2%	< 0.10	95%	90%	110%	106%	90%	110%	110%	80%	120%
Nitrate as N	9422545	9422545	6.58	6.64	0.9%	< 0.05	94%	90%	110%	101%	90%	110%	105%	80%	120%
Nitrite as N	9422545	9422545	0.40	0.42	NA	< 0.05	NA	90%	110%	106%	90%	110%	108%	80%	120%
Bromide	9422545	9422545	<0.25	<0.25	NA	< 0.05	106%	90%	110%	107%	90%	110%	104%	80%	120%
Sulphate	9422545	9422545	135	136	0.3%	< 0.10	90%	90%	110%	96%	90%	110%	105%	80%	120%
Ortho Phosphate as P	9422545	9422545	<0.50	<0.50	NA	< 0.10	109%	90%	110%	96%	90%	110%	102%	80%	120%
Reactive Silica	9421674		20.1	19.5	3.0%	< 0.05	108%	90%	110%	107%	90%	110%	107%	80%	120%
Ammonia as N	9421572		0.25	0.25	0.0%	< 0.02	110%	90%	110%	101%	90%	110%	101%	80%	120%
Total Phosphorus	9422545	9422545	0.48	0.47	1.3%	< 0.02	103%	80%	120%	109%	90%	110%	116%	70%	130%
Total Organic Carbon	9416466		15.6	15.8	1.3%	< 0.5	96%	90%	110%	97%	90%	110%	85%	80%	120%
Colour	9423791		12	11	NA	< 5	108%	90%	110%	NA			NA		
Turbidity	9420694		92.9	92.7	0.2%	< 0.5	100%	90%	110%	NA			NA		
Calcium	9421661		104	102	2.1%	< 0.05	104%	90%	110%	104%	90%	110%	104%	70%	130%
Magnesium	9421661		22.5	22.0	2.3%	< 0.05	103%	90%	110%	103%	90%	110%	101%	70%	130%
Sodium	9421661		8.33	8.18	1.8%	< 0.05	98%	90%	110%	98%	90%	110%	96%	70%	130%
Potassium	9421661		1.54	1.51	1.9%	< 0.05	100%	90%	110%	99%	90%	110%	99%	70%	130%
Aluminum	9426936		1.96	1.85	5.8%	< 0.004	101%	90%	110%	97%	90%	110%	127%	70%	130%
Antimony	9426936		<0.003	<0.003	NA	< 0.003	100%	90%	110%	103%	90%	110%	103%	70%	130%
Arsenic	9426936		<0.003	<0.003	NA	< 0.003	100%	90%	110%	101%	90%	110%	107%	70%	130%
Barium	9426936		0.032	0.032	0.0%	< 0.002	96%	90%	110%	101%	90%	110%	97%	70%	130%
Beryllium	9426936		<0.001	<0.001	NA	< 0.001	98%	90%	110%	102%	90%	110%	101%	70%	130%
Boron	9426936		<0.010	<0.010	NA	< 0.010	102%	90%	110%	99%	90%	110%	90%	70%	130%
Cadmium	9426936		<0.001	<0.001	NA	< 0.001	101%	90%	110%	106%	90%	110%	103%	70%	130%
Chromium	9426936		<0.003	<0.003	NA	< 0.003	98%	90%	110%	105%	90%	110%	102%	70%	130%
Cobalt	9426936		0.002	0.001	NA	< 0.001	95%	90%	110%	101%	90%	110%	101%	70%	130%
Copper	9426936		0.004	0.004	NA	< 0.003	99%	90%	110%	102%	90%	110%	103%	70%	130%
Iron	9426936		0.653	0.685	4.8%	< 0.010	102%	90%	110%	109%	90%	110%	127%	70%	130%
Lead	9426936		0.002	0.002	NA	< 0.001	92%	90%	110%	98%	90%	110%	96%	70%	130%
Manganese	9426936		0.036	0.033	8.7%	< 0.002	95%	90%	110%	82%	90%	110%	82%	70%	130%
Mercury	9421661		<0.0001	<0.0001	NA	< 0.0001	103%	90%	110%	100%	90%	110%	104%	80%	120%
Molybdenum	9426936		<0.002	<0.002	NA	< 0.002	100%	90%	110%	107%	90%	110%	104%	70%	130%

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Quality Assurance

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 18T365896

PROJECT: 141-15409-00 phase 14

ATTENTION TO: Derek Brunner

SAMPLING SITE:

SAMPLED BY:Stephen stamcoff

Water Analysis (Continued)

RPT Date: Aug 02, 2018			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
Nickel	9426936		0.004	0.003	NA	< 0.003	99%	90%	110%	106%	90%	110%	99%	70%	130%
Selenium	9426936		<0.004	<0.004	NA	< 0.004	94%	90%	110%	97%	90%	110%	107%	70%	130%
Silver	9426936		<0.002	<0.002	NA	< 0.002	101%	90%	110%	109%	90%	110%	93%	70%	130%
Strontium	9426936		0.027	0.026	3.8%	< 0.005	103%	90%	110%	104%	90%	110%	105%	70%	130%
Thallium	9426936		<0.006	<0.006	NA	< 0.006	101%	90%	110%	103%	90%	110%	102%	70%	130%
Tin	9426936		<0.002	<0.002	NA	< 0.002	106%	90%	110%	110%	90%	110%	105%	70%	130%
Titanium	9426936		0.041	0.037	10.3%	< 0.002	94%	90%	110%	102%	90%	110%	96%	70%	130%
Tungsten	9426936		<0.010	<0.010	NA	< 0.010	91%	90%	110%	100%	90%	110%	103%	70%	130%
Uranium	9426936		<0.002	<0.002	NA	< 0.002	107%	90%	110%	97%	90%	110%	84%	70%	130%
Vanadium	9426936		<0.002	<0.002	NA	< 0.002	95%	90%	110%	102%	90%	110%	99%	70%	130%
Zinc	9426936		0.007	0.006	NA	< 0.005	102%	90%	110%	109%	90%	110%	106%	70%	130%
Zirconium	9426936		<0.004	<0.004	NA	< 0.004	99%	90%	110%	100%	90%	110%	92%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By: Iris Verástegui

AGAT Laboratories

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QA Violation

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 18T365896

PROJECT: 141-15409-00 phase 14

ATTENTION TO: Derek Brunner

RPT Date: Aug 02, 2018			REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Sample Id	Sample Description	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
				Lower	Upper		Lower	Upper		Lower	Upper
Water Quality Assessment											
Manganese		BH18-01	95%	90%	110%	82%	90%	110%	82%	70%	130%

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

AGAT Laboratories

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

Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 18T365896

PROJECT: 141-15409-00 phase 14

ATTENTION TO: Derek Brunner

SAMPLING SITE:

SAMPLED BY:Stephen stamcoff

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Water Analysis			
Electrical Conductivity	INOR-93-6000	SM 2510 B	PC TITRATE
pH	INOR-93-6000	SM 4500-H+ B	PC TITRATE
Saturation pH		SM 2320 B	CALCULATION
Langelier Index		SM 2330B	CALCULATION
Total Hardness (as CaCO3)	MET-93-6105	EPA SW-846 6010C & 200.7	CALCULATION
Total Dissolved Solids	INOR-93-6028	SM 2540 C	BALANCE
Alkalinity (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Bicarbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Carbonate (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Hydroxide (as CaCO3)	INOR-93-6000	SM 2320 B	PC TITRATE
Fluoride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Chloride	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrate as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Nitrite as N	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Bromide	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Sulphate	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Ortho Phosphate as P	INOR-93-6004	SM 4110 B	ION CHROMATOGRAPH
Reactive Silica	INOR-93-6047	SmartChem Method SIL-001-A & SM 4500 Si-F 18 &19th	DISCRETE ANALYZER
Ammonia as N	INOR-93-6059	QuikChem 10-107-06-1-J & SM 4500 NH3-F	LACHAT FIA
Total Phosphorus	INOR-93-6057	QuikChem 10-115-01-3-A & SM 4500-P I	LACHAT FIA
Total Organic Carbon	INOR-93-6049	EPA 415.1 & SM 5310	SHIMADZU CARBON ANALYZER
Colour	INOR-93-6046	SM 2120 B	SPECTROPHOTOMETER
Turbidity	INOR-93-6044	SM 2130 B	NEPHELOMETER
Calcium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Magnesium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Sodium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Potassium	MET-93-6105	EPA SW-846 6010C & 200.7	ICP/OES
Aluminum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Antimony	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Barium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Boron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cadmium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Chromium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Copper	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Iron	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Lead	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Manganese	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Mercury	MET-93-6100	EPA SW 846 7470 & 245.1	CVAAS
Molybdenum	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Nickel	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Selenium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Silver	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Strontium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Thallium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS

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Method Summary

CLIENT NAME: WSP CANADA INC.

AGAT WORK ORDER: 18T365896

PROJECT: 141-15409-00 phase 14

ATTENTION TO: Derek Brunner

SAMPLING SITE:

SAMPLED BY:Stephen stamcoff

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Tin	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Titanium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Tungsten	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Uranium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zinc	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
Zirconium	MET-93-6103	EPA SW-846 6020A & 200.8	ICP-MS
% Difference/ Ion Balance		SM 1030 E	CALCULATION

AGAT Laboratories

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Chain of Custody Record

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

Laboratory Use Only
Work Order #: 18T365896
Cooler Quantity: 1 Med Blue
Arrival Temperatures: 15.5 16.3 16.0 (ice)
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Report Information:
Company: WSP Canada
Contact: Derek Brunner
Address: ~~5T Constellation Ct~~ 220 Advance Blvd, Brampton, On
Phone: 647-500-6691 Fax:
Reports to be sent to:
1. Email: Derek.Brunner@wsp.com
2. Email: Stephen.Stamcoff@wsp.com

Regulatory Requirements:
☑ No Regulatory Requirement
(Please check all applicable boxes)

☐ Regulation 153/04
Table _____ *Indicate One*
☐ Ind/Com
☐ Res/Park
☐ Agriculture
Soil Texture *(Check One)*
☐ Coarse
☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region _____ *Indicate One*
☐ MISA

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other
_____ *Indicate One*

Is this submission for a **Record of Site Condition?** ☐ Yes ☐ No

Report Guideline on *Certificate of Analysis* ☑ Yes ☐ No

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

Project Information:
Project: 141-15409-00 phase 14
Site Location: Brampton
Sampled By: Stephen Stamcoff
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: WSP Canada
Contact: Derek Brunner
Address: 220 Advance Blvd, Brampton, On
Email: Derek.Brunner@wsp.com

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

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Field Filtered - Metals, Hg, CrVI Y/N	O. Reg 153: Metals and Inorganics (☐ All Metals ☐ 153 Metals (excl. Hydrides) ☐ Hydride Metals ☐ 153 Metals (Incl. Hydrides))	O. Reg 153: ORPs: ☐ B-HWS ☐ Cl⁻ ☐ CN ☐ Cr^{6+} ☐ EC ☐ FOC ☐ Hg ☐ pH ☐ SAR	Full Metals Scan	Regulation/Custom Metals	Nutrients: ☐ TP ☐ NH_3 ☐ TKN ☐ NO_3 ☐ NO_2 ☐ NO_3+NO_2	Volatiles: ☐ VOC ☐ BTEX ☐ THM	PHCs F1 - F4	ABNs	PAHs	PCBs: ☐ Total ☐ Aroclors	Organochlorine Pesticides	TCLP: ☐ M&I ☐ VOCs ☐ ABNs ☐ B(a)P ☐ PCBs	Sewer Use	General Chemistry
BH18-01	24-JUL-18	12:30pm	6	GW	Field Filtered - all Samples	✓														✓

Samples Relinquished By (Print Name and Sign):	Date	Time	Samples Received By (Print Name and Sign):	Date	Time
Stephen Stamcoff	24-JUL-18	1:57pm	Neil Ramnarain	July 24/18	1:58PM

Page _____ of _____
Nº: T075132

APPENDIX

E MONITORING AND MITIGATION PLAN

Table E-1 : Ground Water Monitoring and Ground Water Quality Plan

Period	Monitoring Location	Monitoring Frequency	Method	Triggers for Mitigation	Mitigation/Comments
GROUNDWATER LEVELS AND DISCHARGE					
Pre-construction	All monitoring wells	Monthly	Manual readings and data logger downloads	None	Completed to develop baseline water level database
		Hourly	Data logger frequency	None	
During Construction	Discharge volume	Daily	Manual with totalizing flow meter in-line.	Flow exceeds PTTW/EASR	Reduce flow to below PTTW/EASR limit while determining alternatives to manage ground water
	Selected monitoring wells based on active work area	Daily until target water level reached, weekly until water levels stable, monthly thereafeter	Manual readings and data logger downloads	Target Drawdown	Increase pumping rates within PTTW/EASR limits to reach target ground water elevation
		Hourly until target water level reached, daily thereafter	Data logger frequency	Target Drawdown	Increase pumping rates within PTTW/EASR limits to reach target ground water elevation
	Selected private wells based on active work area	Daily during first week of dewatering, monthly thereafter	Manual readings and data logger downloads	Impact to supply	Provide potable water supply
Post Construction	Selected existing monitoring wells	Weekly	Manual or using dataloggers	None	To observe and confirm water levels achieve pre-construction static condictions
SURFACE WATER LEVELS					
Pre-construction	At creek, staff gauge, and drivepoint piezometer network	Monthly	Manual	None	Completed to develop baseline water level database, including natural hydraulic gradient to the creek
		Hourly	Data logger frequency	None	
During Construction	At creek, staff gauge, and drivepoint piezometer network	Daily until target water level reached, weekly thereafter	Manual	Hydraulic Gradient change	Decrease dewatering discharge rate until original gradient maintains, or provide supplementation
		Hourly	Data logger frequency		
Post Construction	At creek, staff gauge, and drivepoint piezometer network	Weekly for 2 weeks	Manual or using dataloggers	None	To observe and confirm water levels achieve pre-construction static condictions

Table E-1 : Ground Water Monitoring and Ground Water Quality Plan

Period	Monitoring Location	Monitoring Frequency	Method	Triggers for Mitigation	Mitigation/Comments
GROUNDWATER QUALITY					
Pre-construction	Selected monitoring wells	Once prior to construction	PWQO	Water Quality Exceedance	Report information to Contractor to initiate treatment plan prior to any discharge
	Selected private wells	Once prior to construction	ODWQS	None	Confirm baseline pre-treated private well water quality.
During Construction	Ground water discharge from dewatering	Once at start of dewatering at point of discharge. Weekly throughout the project dewatering duration	PWQO	Water Quality Exceedance	Report information to Contractor to initiate treatment plan prior to any discharge
	Selected private wells	Bi-weekly for the first month of dewatering, monthly thereafter.	ODWQS	Changes from baseline	Assess exceedances to determine if impacts are related to dewatering. If so, potable water is to be supplied.
SURFACE WATER QUALITY					
Pre-construction	Huttonville Creek (East and West branch)	Once prior to construction	PWQO	Water Quality Exceedance	Background sample, for comparison during later activities
During Construction	Huttonville Creek (East and West branch), Upstream and Downstream of Discharge Point	Only if discharge to creek occurs. Weekly for first month of discharge, monthly thereafter.	PWQO and Upstream Creek Quality	Water Quality Exceedance	Report information to Contractor to initiate mitigation measures, which may include changing discharge locations, reducing volumes, or suspension of dewatering