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Hydrogeological Assessment & Water Balance
Snell's Hollow Secondary Plan Area

Snell's Hollow Developers Group
Caledon, Ontario

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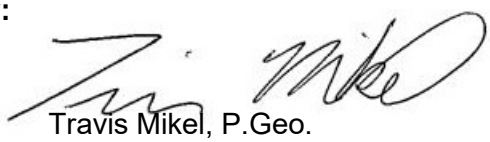

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1.0 Introduction

R.J. Burnside & Associates Limited (Burnside) was retained by Snell's Hollow Developers Group to complete a hydrogeological assessment & water balance to support the Snell's Hollow East Secondary Plan for lands located at the northeast corner of Kennedy Road and Mayfield Road in the Town of Caledon and Region of Peel (subject lands). The subject lands are approximately 61.7 ha in size and are bounded by Highway 410 to the north, Heart Lake Road to the east, Mayfield Road to the south and Kennedy Road to the west (Figure 1). The subject lands contain portions of the Heart Lake Provincially Significant Wetland (PSW) complex. Current land use of the subject lands is primarily agricultural with rural residential in the uplands and meadows on the valley slopes adjacent to the PSW unit (Figure 2). The subject lands are located within the jurisdiction of the Toronto and Region Conservation Authority (TRCA).

1.1 Scope of Work

The scope of work for the hydrogeological assessment included completion of the following tasks:

1. Review of published geological and hydrogeological information: A review of existing regional mapping for the area was completed, including physiography, topography (Figure 3), surficial geology (Figure 4) and bedrock geology.

2. Review of soils data: Boreholes from previous geotechnical investigations on the subject lands were reviewed. In 2019, a study conducted by Golder Associates Ltd. included 19 boreholes across the subject lands and the installation of 13 monitoring wells at 10 locations. In 2017, a study completed by Edward Wong & Associates Inc. included 6 boreholes of which 3 were completed as monitoring wells. The locations of these boreholes and monitoring wells are shown on Figure 5. The borehole logs (Appendix A) were reviewed to characterize the surficial sediments and stratigraphy.

3. Review of the Ministry of the Environment, Conservation and Parks (MECP) well records: The MECP maintains a database that provides geological records of water supply wells drilled in the province. A list of the historical records for local wells is provided in Appendix B and the well locations are shown on Figure 5. It is noted that the well locations listed in the MECP records are approximations only of where they were and may not be representative of the precise well locations in the field.

4. Installation of drive-point piezometers and staff gauges: Twelve piezometers (six nests of two piezometers installed at different depths and one single piezometer) and five staff gauges were installed to monitor groundwater and

surface water interactions in the wetland. The locations of the piezometers and staff gauges are shown on Figure 2.

5. Review of grainsize analyses: Grainsize analyses completed as part of geotechnical studies on the subject lands were reviewed to characterize the surficial sediments and estimate the hydraulic conductivity of the soils encountered. Copies of the soil grainsize analyses are provided in Appendix C.

6. Hydraulic conductivity testing: Single well response tests were completed in five groundwater monitoring wells to assess the in situ hydraulic conductivity of the shallow soils on the subject lands. The hydraulic conductivity field testing results are provided in Appendix D.

7. Monitoring of groundwater levels: Monitoring has been completed to characterize the seasonal water table and the horizontal and vertical groundwater flow conditions. Groundwater level measurements were obtained in monitoring wells and drive-point piezometers since April 2019. Automatic water level recorders (dataloggers) were installed in six of the monitoring wells and four drive-point piezometers in order to record continuous water level fluctuations. The groundwater monitoring data collected to date and hydrographs are provided in Appendix E.

8. Monitoring of surface water levels: Monitoring has been completed to measure the surface water elevation along the watercourse and wetlands adjacent to the drive-point piezometers since April 2019. The surface water data are provided in Appendix F.

9. Water quality testing: Two groundwater samples (MW19-01 and MW19-04d) and one surface water sample (SW4) were collected to characterize the baseline water quality. The water samples were submitted to a qualified laboratory for analysis of general quality indicators (e.g., pH, hardness, and conductivity), basic ions (including chloride and nitrate) and selected metals. The testing results are provided in Appendix G.

10. Water balance calculations: Pre-development water balance calculations (based on existing land use conditions) and post-development water balance calculations (based on the proposed development concept) were completed to assess the potential impacts of land development on the local groundwater recharge conditions. The local climate data and detailed water balance calculations are provided in Appendix H.

2.0 Physical Setting

2.1 Physiography and Topography

The subject lands are located in the physiographic region known as the South Slope of the Oak Ridges Moraine (Chapman and Putnam, 1984). The South Slope physiographic region is characterized by rolling till plains sloping down from the Oak Ridges Moraine (Chapman and Putnam, 1984).

The topography of the subject lands is shown on Figure 3. The subject lands have an undulating topography, with a maximum relief of 16 m. The highest elevation of 272 metres above sea level (masl) is found along the north east property boundary and the lowest elevations occur in central to southern portion along the wetland where the ground elevation is approximately 256 to 257 masl.

2.2 Drainage

The subject lands are within the Spring Creek subwatershed of the Etobicoke Creek watershed, within the jurisdiction of the TRCA. An unnamed tributary of Spring Creek flows through the subject lands from west to east and enters a ponded area at the eastern boundary of the subject lands. There are three catchment areas located on the subject lands (Figure 3): Catchment Area 1 (~46.2 ha) is located in the western and central portions of the subject lands and generally drains towards the watercourse and wetland areas, flowing south beneath Mayfield Road towards Heart Lake (Figure 3); Catchment Area 2 (~12.6 ha) consists of lands on both the west and east sides of Heart Lake Road and drains south beneath Mayfield Road to an existing stormwater management pond located on the southeast corner of the Mayfield Rd and Heart Lake Road intersection (Figure 3); and Catchment Area 3 (~2.9 ha) is the eastern most portion of the subject lands and drains to an existing stormwater management pond located adjacent to Highway 410 (Figure 3).

The subject lands contain portions of the Heart Lake Wetland Complex which is designated as a Provincially Significant Wetland (PSW). Monitoring of the wetland was completed to understand the function and source of water to the feature. The monitoring consisted of monthly water level measurements in 12 drive-point piezometers installed as six 'nests' (i.e., adjacent locations with different depths) and five staff gauges (Figure 2).

The results of the monitoring show the following:

- At PZ1s/d, located at the head of the tributary of Spring Creek, groundwater levels in the shallow piezometer were generally higher than the deep piezometer indicating a downward gradient (Figure E-14, Appendix E). The early monitoring data at PZ1d shows a slow stabilization of groundwater levels indicating low hydraulic conductivity

soils, and the groundwater levels are slow to respond to precipitation events and seasonal water inputs. During a dry period in the summer of 2020 the groundwater levels in the shallow piezometer are slightly lower than the deep piezometer showing an upward gradient.

- PZ2s/d located along the Spring Creek tributary on the northern limits of the wetland show groundwater levels 0.2 mbgs to 1.6 mbgs. Upward gradients are observed during high water table conditions (December to May) and a downward gradient was recorded in September and November 2019 and September 2020 (low water table). The surface water level at SG2 was generally above groundwater levels (Figure E-15, Appendix E).

- The groundwater levels at PZ3s/d were found to be approximately 0.02 mbgs to 1.4 mbgs. A downward hydraulic gradient between PZ3s and PZ3d, is observed indicating recharge conditions, with the exception of October to December 2019 where a slight upward gradient is observed (Figure E-16, Appendix E). The surface water level at the staff gauge (SG3) was found to be approximately the same as the groundwater level in the deep piezometer (PZ3d).

- The groundwater levels in PZ4s/d have been recorded from above ground surface to about 0.8 mbgs. The surface water level at SG4 was generally found to be higher than groundwater levels in the shallow piezometer (Figure E-17, Appendix E). A slow stabilization of groundwater levels in both piezometers and little response to precipitation events suggests low hydraulic conductivity soils. The groundwater levels showed a consistent downward gradient with the exception of late summer 2019 where an upward gradient is observed.

- At PZ5s/d groundwater levels were recorded from 0.2 mbgs to 1.2 mbgs. The groundwater levels show a consistent downward gradient (Figure E-18, Appendix E). Groundwater levels in PZ5s were observed dry during the fall of 2019 and 2020.

- The groundwater levels in PZ6s/d have been recorded from 0.2 mbgs to about 0.5 mbgs, and the surface water level at SG6 was found to be similar to the groundwater level in the shallow piezometer (PZ6s; Figure E-19, Appendix E). The early monitoring data for PZ6d shows a slow stabilization of water levels indicating low hydraulic conductivity soils. The groundwater levels show a downward gradient but reverse temporarily in late summer 2019 and September 2020 during low water table conditions.

The groundwater levels measured in the piezometer nests show a downward gradient between the shallow and deep piezometers suggesting the wetland recharges the shallow soils and creates a shallow perch beneath the wetland. Seasonal upward gradients are observed; however, this apparent reversal in gradient is interpreted to be

the result of increased evapotranspiration and a quicker response of the shallower piezometer to drier conditions than the deeper piezometer. These conditions suggest that the primary sources of water to the wetland are direct precipitation and surface water runoff.

2.3 Geology

2.3.1 Surficial Geology

Surficial geology mapping published by the Ontario Geological Survey (2003) shows that the subject lands is covered by glaciolacustrine-derived silty to clayey till (Figure 4). Organic deposits are mapped along the watercourse and the wetland complex.

A geotechnical investigation completed by Edward Wong (2017) included the drilling of 6 boreholes across the subject lands in October 2017 (BH1 to BH6, Figure 5). Another geotechnical investigation was completed by Golder (2019) which included the drilling of 19 boreholes across the subject lands (BH19-01 to BH19-19) (Figure 5). Copies of the borehole logs from these drilling investigations are provided in Appendix A.

The boreholes on the subject lands ranged in depth from 6.2 m below ground surface (mbgs) and14.3 mbgs. The results of the drilling investigations are generally consistent with the published mapping, with silty clay till or silty clay encountered at surface (or beneath fill materials). The boreholes indicate that the subject lands are underlain by silty clay and silty clay till. Silty sand and sand were encountered beneath the till at depths of 7.6 mbgs to 10 mbgs.

2.3.2 Bedrock Geology

Bedrock beneath the subject lands consists of shale of the Queenston Formation (OGS, 2011). MECP well records in vicinity of the subject lands indicate depth to bedrock ranges from about 29 mbgs to 64 mbgs (Appendix B).

2.3.3 Stratigraphy

The local MECP well records (Appendix B) provide geology data that have been used along with the site-specific geological information obtained from the geotechnical boreholes and groundwater monitoring wells drilled on the subject lands (Appendix A) to assess the local stratigraphy.

To illustrate the local geological conditions, four schematic cross-sections through the subject lands have been prepared. The cross-section locations are shown on Figure 5 and the cross-sections are shown on Figures 6, 7 and 8. The cross-sections show a layer of silt and clay till soils at surface ranging in thickness of about 5 m to 20 m across the subject lands. These fine-grained deposits are underlain by a sand layer which is

approximately 5 m to 12 m in thickness (encountered at an elevation of approximately 240 masl to 255 masl) below the subject lands (Figures 6, 7 and 8).

Regional hydrogeological mapping and modeling of the area by the TRCA as part of the Etobicoke and Mimico Creeks Watershed Technical Update Report (2010) has identified the major overburden aquifer systems in the area (in order of increasing depth) as the Oak Ridges Aquifer Complex (ORAC) and the Thorncliffe Aquifer. The general elevation ranges for these aquifers are as follows:

- Oak Ridges Aquifer (or equivalent) Complex: 225 masl – 250 masl
- Thorncliffe Aquifer: 220 masl

Based on these elevation ranges, it is concluded that the sandy layer found underlying the subject lands between elevations of about 240 masl and 255 masl likely represents the ORAC in this area (Figures 6, 7 and 8).

2.3.4 Soil Hydraulic Conductivity

There are various methods that can be used to assess soil hydraulic conductivity, i.e., the ability of the soil to transmit groundwater. Grainsize data and soil characteristics can be used to provide a general estimate of hydraulic conductivity. Single well bail-down or falling head tests are used in groundwater monitoring wells to assess in situ hydraulic conductivity. These methods have been used to estimate the hydraulic conductivity of the soils encountered in the subject lands as discussed below.

During geotechnical investigations conducted across the subject lands, representative soil samples collected by Golder (17 samples) and Edward Wong (4 samples) were analysed for grainsize distribution (Appendix C). The grainsize analyses were conducted on various soil types found across the subject lands. A summary of the hydraulic conductivity estimated from the grainsize analyses using the Hazen approximation method is provided below in Table 1. The Hazen method is designed to approximate the hydraulic conductivity of more permeable sediments; however, it is still considered useful in finer grained sediments to provide a general indication of the low range of the hydraulic conductivity values.

To assess the in situ hydraulic conductivity of the shallow soils, bail-down tests were completed at monitoring wells MW19-02s, MW19-03, MW19-04s, MW19-04d and MW19-08 and BH5 (refer to Figure 2 for monitoring well locations and Appendix A for borehole logs). The results of these tests are provided in Appendix D and show the following:

- MW19-02s, MW19-03 and MW19-04s are screened in a sandy silty clay till. The results of the bail-down tests completed at these locations suggest moderately high hydraulic conductivities of 1.5×10^{-3} cm/sec to 3.9×10^{-4} cm/sec. This is higher than

would generally be expected for a silty clay till and may reflect the presence of sand layers, cobbles and fracturing within the till.

- MW19-08 is screened across silty clay and clayey silt. The results of the bail-down test completed at this location suggest a moderately low hydraulic conductivity of 2.6×10^{-5} cm/sec.

- MW19-04d is screened across sand. The hydraulic conductivity test completed at this location suggests a moderately high hydraulic conductivity of 4.4×10^{-3} cm/sec.

- BH5 is screened in fill and silty clay. The hydraulic conductivity test completed by Edward Wong (2017) at this location suggests a low hydraulic conductivity of 7.8×10^{-7} cm/sec.

The calculated hydraulic conductivity values from the bail test data (Appendix D) are summarized in Table 1 below.

Table 1: Summary of Hydraulic Conductivity

Soil Type	Hydraulic Conductivity (cm/sec) Hazen Estimation	Hydraulic Conductivity (cm/sec) In Situ Bail Test
Sandy Clayey Silt	$<1.0 \times 10^{-6}$	2.6×10^{-5} to 7.8×10^{-7}
Silty Clay/Clayey Silt to Silty Clay and Sand – Till	$<1.0 \times 10^{-6}$	1.5×10^{-3} to 3.9×10^{-4}
Silt and Sand to Sandy Clayey Silt	1.0×10^{-4} to $<1.0 \times 10^{-6}$	-
Silty Sand/Sand	4.2×10^{-3} to 2.3×10^{-4}	4.4×10^{-3}
Sand Till, some silt, some gravel	9.0×10^{-4}	-

3.0 Hydrogeology

3.1 Local Groundwater Use

The lands surrounding the subject lands includes residential subdivisions that are municipally serviced as well as some rural properties which may still rely on private well supplies. The Town of Caledon provides water from a combination of groundwater wells and Lake Ontario. The subdivisions north and west of the subject lands are serviced by water from Lake Ontario. South of the subject lands, residential subdivisions in the City of Brampton are also supplied with water from Lake Ontario. The proposed development will be municipally serviced and there is no proposed on-site groundwater use for the development.

A review of MECP well records within 500 m of the subject lands identified 81 well records. Of the 81 well records, 30 were water supply wells, 16 were test wells, 12 were monitoring wells, 1 was a dewatering well and 22 were abandonment records. Of the listed water supply well records, the majority are screened in the overburden materials, with only five wells screened in the bedrock. The overburden wells are screened at various depths ranging from 6.4 mbgs to 61 mbgs, but generally target the Thorncliffe Aquifer; however, some shallower wells which are completed in the ORAC are also present. It is noted that the well records do not indicate the current status of the well, i.e., whether or not the well is in use, and many of the wells listed within the developed areas surrounding the subject lands are assumed to be decommissioned.

Well Head Protection Areas (WHPAs) are zones around municipal water supply wells where land uses must be carefully planned and restricted to protect the quality of the water supply. Based on our review of WHPA mapping available from the Region of Peel, the subject lands are not located within a WHPA, and as such, the development is not considered to pose a significant threat to municipal drinking water supplies.

3.2 Groundwater Levels

Groundwater levels have been monitored in monitoring wells and drive-point piezometers across the subject lands since April 2019 and the data are summarized in Table E-1 in Appendix E. Hydrographs for each monitoring location are also provided as Figures E-1 through E-13 (Appendix E) to illustrate the groundwater level fluctuations. In addition to the manual groundwater level measurements recorded at each location, automatic water level recorders (dataloggers) were installed in selected locations.

The groundwater monitoring data show the following (refer to Figure 2 for the monitoring locations and the data tables and hydrographs in Appendix E):

- MW19-01, MW19-02s, MW19-03, MW19-04s, MW19-06, MW19-08, BH2, BH3 and BH5 were installed in the shallow silty clay till soils. Groundwater in the till had seasonal variations ranging from about 2 m to 5 m. Groundwater in the silty clay till soils is interpreted to be a shallow perched water table in deposits of low hydraulic conductivity till encountered above the ORAC.

- Groundwater at MW19-01 and MW19-03, located along the higher lands along the northern boundary of the subject lands ranged in depths from 2.6 mbgs to 9.2 mbgs (Figures E-1 and E-3, Appendix E).

- At MW19-05, the 8.4 m deep well screened in silty clay and clayey silt till was found to be dry or have less than 8 centimetres of groundwater during all monitoring rounds (Figure E-5, Appendix E). The lack of a perched groundwater table may be due to sand seams/layers encountered within the till (see Borehole in Appendix B).

- MW19-02s, MW19-04s, MW19-08, BH2, BH3 and BH5 were installed in vicinity of the wetland in silty clay sediments. Seasonal high groundwater within the perched water table near the wetlands was within 2 m of ground surface (Figures E-2, E-4, E-8, E-11, E-12 and E-13, Appendix E).

- MW19-06 is located on the tablelands within the low lying area east of the PSW. The well is screened in silty clay till from 4.0 mbgs to 6.9 mbgs and the groundwater levels range from 1.6 mbgs to 0.44 m above ground surface (mags). The convergence of shallow groundwater towards the low lying area is expected and results in groundwater pressures measured above ground surface; however, any discharge would be interpreted to be very low because the surrounding low hydraulic conductivity silts and clays. Groundwater has not been observed to discharge in the area.

- MW19-02d, MW19-04d, MW19-07d, MW19-09 and MW19-13 are installed in sand and silty sand interpreted to be the ORAC. The groundwater elevation in the sand was generally found to be between 250 masl and 252 masl. Seasonal variation in these wells ranged from 0.3 m to 0.5 m.

- MW19-13 was installed at an elevation 257.24 masl at the top of the ORAC (see Figure 6). Groundwater levels at MW19-13 were measured with up to 0.42 m of water in the screen but were generally found to be dry (Figure E-10, Appendix E). This data indicates the ORAC is not fully saturated, with the upper 2 m to 4 m of the aquifer found to be unsaturated.

- Continuous groundwater level data shows a response to individual precipitation events at MW19-04s and MW19-08 (Figures E-4 and E-8, Appendix E). On January 11, 2020, 59 mm of rain resulted in an increase in water table of 1.5 m at MW19-04s and 1.2 m at MW19-08. The rapid response to precipitation events would support the presence of fractures and layering within the till and the moderate hydraulic conductivity values discussed in Section 2.4. There was no response to individual precipitation events observed in the wells screened in the ORAC (MW19-04d, MW19-07d) (Figures E-4 and E-7, Appendix E).

- Monitoring well nests (e.g., wells located adjacent to each other but completed at different depths) were installed in MW19-02s/d, MW19-04s/d and MW19-07s/d. The groundwater levels in shallow wells MW19-02s and MW19-04s were consistently higher than the deeper wells MW19-02d and MW19-04d, showing a strong downward hydraulic gradient and recharge conditions (Figures E-2 and E-4, Appendix E). At MW19-07s/d, the shallow well MW19-07s is screened just above the sand aquifer and was mostly dry while water levels at MW19-07d screened in the ORAC were 12.3 mbgs to 12.9 mbgs showing recharge conditions (Figure E-7, Appendix E).

3.2.1 TRCA Monitoring Wells

Three monitoring wells owned by the TRCA (TRCA Mayfield MW-1 through MW-3) are located in the Heart Lake Conservation Area located just southeast of the subject lands (see Figure 2). In addition, one well nest is located adjacent to Etobicoke Creek southwest of the subject lands (TRCA Mayfield MW-4s/d). Monitoring data for these wells was provided by the TRCA for our review and is included in Appendix E. The monitoring wells ranged in depth from 6 mbgs to 14 mbgs. Groundwater levels at MW-1 through MW-3 ranged in elevations from ~246 masl to 254 masl. At monitoring well nest MW-4s/d, the shallow groundwater levels at MW-4s ranged from about 265 masl to 266 masl and the deep groundwater levels at MW-4d ranged from about 266.5 masl to 267 masl. The groundwater levels in the deep well (screened in sand) are higher than groundwater levels in the shallow well (screened in sandy silt) indicating upward gradients at this location.

3.3 Groundwater Flow Conditions

It is interpreted that the shallow perched water table in the surficial till deposits reflects the general surface topography and, where present, the shallow groundwater flow patterns in the till will mimic the surface water flow patterns, with flow generally moving from higher elevations towards lower elevations (Figure 10).

Review of regional groundwater mapping completed by TRCA as part of the Etobicoke and Mimico Creeks Watersheds Technical Update Memo (2010) shows the groundwater in the ORAC in the vicinity of the subject lands generally flows from northwest to southeast. This is consistent with interpreted groundwater flow from groundwater levels measured in the ORAC on the subject lands.

3.4 Recharge and Discharge Conditions

Site-specific findings for the subject lands show a downward gradient between the shallow till soils and underlying sand layer (refer to Section 2.4.2), indicating that the subject lands are in a recharge area. Monitoring at piezometers and staff gauges in the PSW shows a downward hydraulic gradient in this feature (refer to Section 2.2), suggesting this feature provides recharge to the underlying soils. It is interpreted that this feature is primarily supported by surface water runoff as noted in Section 2.2.

Significant Groundwater Recharge Areas (SGRAs) have been mapped by TRCA and reproduced for this study as Figure 10. Review of this mapping shows that the south, and central portions of the subject lands are located within a SGRA. Although the results of the groundwater monitoring on the subject lands show that this is a recharge area, the results of the drilling investigations show that the subject lands is covered by a layer of relatively low hydraulic conductivity silty clay till (refer to Sections 2.3.1 and 2.3.3). As such, the actual amount of water that infiltrates and moves through the

subsurface over most of the area is expected to be limited by the relatively low hydraulic conductivity of the surficial silt and clay sediments. Regardless, as discussed below in Sections 4.5 and 4.6, low impact development (LID) measures to promote post-development infiltration will be implemented to maintain the pre-development recharge volumes.

3.5 Aquifer Vulnerability

The aquifer vulnerability was mapped by CTC for the Approved Updated Assessment Report: Toronto Region Source Protection Area (2015). The aquifer vulnerability designation for the subject lands, as mapped by CTC, is provided on Figure 11. Aquifer vulnerability refers to the susceptibility of the aquifer to potential contamination. Some degree of protection for groundwater quality from natural and human impacts is provided by the soil above the water table. The degree of protection is dependent upon the depth to the water table (for unconfined aquifers) or to the depth of the aquifer (for confined aquifers) and the type of soil above the water table or aquifer. As these two properties vary over any given area, the degree of protection or vulnerability of the groundwater to contamination also varies.

CTC developed the aquifer vulnerability map shown on Figure 11 using the MECP water well records for the area to determine the soil types and depths to aquifer to develop an Aquifer Vulnerability Index (AVI). Areas within the subject lands along the valley of the Spring Creek are identified as having "high groundwater vulnerability". It is noted in the CTC report that this is a very regional scale map and also, due to the uncertainty in the water well records, the mapping should only be used as a guide, and not for site specific planning decisions. The block like pattern is an indication of the grid that was used to assess aquifer vulnerability and reflects the uncertainty of the assessment.

Areas within the subject lands identified as having "high groundwater vulnerability" are located near the valley of the Spring Creek. These areas have likely been identified as a result of the change in topography along the creek resulting in an interpreted decrease in the thickness of the overburden sediments overlying the ORAC. Cross-sections B-B' and C-C' (Figures 7 and 8, respectively) show that there is a decrease in the silty clay till overlying the ORAC at the incised valley. Impacts to the aquifer from the proposed development are not anticipated since the valley lands will remain undeveloped.

3.6 Water Quality

3.6.1 Groundwater Quality

Groundwater samples were collected from two monitoring wells on the subject lands on April 20, 2020 to assess the groundwater quality in the shallow till soils and the underlying ORAC (MW19-01 and MW19-04d, respectively). The samples were submitted to SGS Canada Inc. for analysis of general quality indicators (e.g., pH,

hardness, and conductivity), basic ions (including chloride and nitrate) and selected metals. The results of the analyses were compared to the Ontario Drinking Water Quality Standards (ODWQS) and are provided in Table G-1 in Appendix G. The groundwater testing results from the analytical laboratory show the following:

- The groundwater is hard with reported hardness 613 mg/L at MW1 and 405 mg/L at MW19-04d. Groundwater from overburden sediments is commonly hard and it is likely that many of the local residents that rely on groundwater will have water softeners in their homes. For comparison, the operational guideline for hardness in municipal water systems is in the 80 to 100 mg/L range.

- The groundwater samples also had high turbidity (>4,000 NTU and 583 NTU for MW19-01 and MW19-04d, respectively), compared to the ODWQS of 5 NTU. The turbidity in monitoring well samples may be related to suspended sediments.

- Chloride and sodium concentrations were reported at MW19-01 to be 55 mg/L and 10.9 mg/L, respectively. The chloride and sodium concentrations reported for MW19-04d were 6 mg/L and 18.5 mg/L, respectively. The data suggests that road salt usage on adjacent streets have not impacted the groundwater (ORAC).

- Elevated nitrate was detected in MW19-01 at a concentration of 38.6 mg/L. This is well above the ODWQS for nitrate of 10 mg/L. Nitrate in shallow groundwater is typically associated with areas where agricultural land use results in elevated nitrates in groundwater. Current land use on the subject lands is agricultural and is interpreted to be the cause of the elevated nitrates. There was no nitrate detected in the deep well MW19-04d screened in the ORAC.

- The reported metal concentrations were generally low and below the ODWQS.

3.6.2 Surface Water Quality

Surface water was sampled from the watercourse near PZ4s/d (Sample ID SW4) in April 2020 to characterize the surface water quality. The surface water sample was analysed for pH, conductivity, basic ions and selected metals and the laboratory results are summarized in Table G-2 in Appendix G.

The surface water quality data show the following:

- SW4 had reported chloride concentrations of 370 mg/L and sodium concentrations of 199 mg/L. These concentrations are considered elevated as compared to rainwater and local groundwater concentrations and are interpreted to indicate road salt effects on the surface water runoff quality.

- The total reactive phosphorus concentration was reported below the Provincial Water Quality Objective (PWQO) for phosphorus of 0.03 mg/L.

- Aluminum was reported at a concentration of 0.499 mg/L which exceeds the PWQO of 0.075 mg/L.

- SW4 had elevated iron with a concentration of 3.95 mg/L which is well above the PWQO of 0.3 mg/L. Elevated iron was not observed in the groundwater samples collected.

4.0 Water Balance

A water balance is an accounting of the water resources within a given area. As a concept, the water balance is relatively simple and has been estimated herein using a spreadsheet model based on the following equation:

$$P = S + ET + R + I$$

where:

P	=	precipitation
S	=	change in groundwater storage
ET	=	evapotranspiration/evaporation
R	=	surface water runoff
I	=	infiltration

The components of the water balance vary in space and time and depend on climatic conditions as well as the soil and land cover conditions (i.e., rainfall intensity, land slope, soil hydraulic conductivity and vegetation). Runoff, for example, occurs particularly during periods of snowmelt when the ground is frozen, or during intense rainfall events. Precise measurement of the water balance components is difficult and as such, approximations and simplifications are made to characterize the water balance of a study area. Field observations of the drainage conditions, land cover and soil types, groundwater levels and local climatic records are important considerations for the water balance calculations.

Water balance calculations have been completed for the subject lands using a spreadsheet model and monthly soil-moisture balance approach, which assumes that soils do not release water as potential recharge while a soil moisture deficit exists. During wetter periods, any excess of precipitation over evapotranspiration first goes to restore soil moisture. Once the soil moisture deficit is overcome, any further excess water can then pass through the soil as infiltration.

The SWM Planning and Design Manual (2003) methodology for calculating total infiltration based on topography, soil type and land cover was used, and a corresponding runoff component was calculated for the soil moisture storage conditions. It is very

important to note that the infiltration and runoff components are estimates. Single values are used for the water balance calculations; however, the infiltration rates are dependent upon the hydraulic conductivity of the surficial soils which may vary over several orders of magnitude. As such, the margins of error for the calculated infiltration and runoff component values are potentially quite large. These margins of error are recognized; however, for the purposes of this assessment, the numbers used in the water balance calculations are considered reasonable estimates based on the site-specific conditions and provide a useful for comparison of pre- to post-development conditions.

The water balance components for the subject lands are discussed below.

4.1 Water Balance Components

Precipitation (P)

The long-term average annual precipitation for the area is 786 mm based on data from the Environment Canada Toronto Lester B. Pearson International Airport climate station (Station 6158733 - 43°40'38.000" N, 79°37'50.000" W, elevation 173.40 masl) for the period between 1981 and 2010. Average monthly records of precipitation and temperature from this station have been used for the water balance component calculations in this study (Table H-1, Appendix H).

Storage (S)

Although there are groundwater storage gains and losses on a short-term basis, the net change in groundwater storage on a long-term basis is assumed to be zero so this term is dropped from the equation.

Evapotranspiration (ET)/Evaporation (E)

Evapotranspiration and evaporation components vary based on the characteristics of the land surface cover (i.e., type of vegetation, soil moisture conditions, perviousness of surfaces, etc.). Potential evapotranspiration (PET) refers to the water loss from a vegetated surface to the atmosphere under conditions of an unlimited water supply. The actual rate of evapotranspiration (AET) is often less than the PET under dry conditions (i.e., during the summer when there is a soil moisture deficit). In this report, the monthly PET and AET have been calculated using a soil-moisture balance approach, using average temperature data and climate information adjusted to the local latitude (refer to Table H-1, Appendix H).

Water Surplus (R + I)

The difference between the mean annual P and the mean annual ET is referred to as the water surplus. Part of the water surplus travels across the surface of the soil as surface or overland runoff and the remainder infiltrates the surficial soil.

The infiltration is comprised of two end member components: One component that moves vertically downward to the groundwater table (typically referred to as percolation, deep infiltration or net recharge) and a second component that moves laterally through the shallow soils as interflow that re-emerges locally to surface (i.e., as runoff) at some short time following cessation of precipitation. As opposed to the "direct" component of surface runoff that occurs overland during precipitation or snowmelt events, shallow interflow becomes an "indirect" component of runoff. The interflow component of surface water runoff is not accounted for in the water balance equation cited above since it is often difficult to distinguish between interflow and direct (overland) runoff, but both interflow and direct runoff contribute to the overall surface water runoff component in the spreadsheet calculations.

4.2 Existing Conditions

Representative soil moisture storage capacity values were selected for the silty to clayey till soils that reflect the various vegetation types and topography identified across the subject lands. The values are summarized as follow:

- 200 mm was selected for the existing agricultural vegetation across the majority of the subject lands on hilly to rolling topography (Table H-1; Appendix H).

- 250 mm was selected for the wetland vegetation on rolling to flat topography (Table H-2; Appendix H).

- 250 mm was selected for the dry-moist old field meadow on hilly land (Table H-3; Appendix H).

- 400 mm was selected for forested lands on hilly to rolling topography (Table H-4; Appendix H).

- 100 mm was selected for urban lawns on hilly to rolling topography areas (Table H-5; Appendix H).

Tables H-1 through H-5 in Appendix H detail the monthly potential evapotranspiration calculations accounting for latitude and climate, and then calculate the actual evapotranspiration and water surplus components of the water balance based on the monthly precipitation and soil moisture conditions.

The monthly water balance calculations show that a water surplus is generally available from January to April (Tables H-1 through H-4) for the majority of the vegetation found across the subject lands and from December to April (Table H-5) for the urban lawns. Infiltration occurs during periods when there is sufficient water available to overcome the soil moisture storage requirements. In winter climates, frozen conditions may affect when the actual infiltration will occur, however, the monthly balance calculations show

the potential volumes available for this water balance component. The monthly calculations are summed to provide estimates of the annual water balance component values (Tables H-1 through H-5). A summary of these values is provided in Table 2.

Table 2: Water Balance Component Values

Water Balance Component	Agricultural Lands (mm/year)	Wetland (mm/year)	Dry-Moist Old Field Meadow (mm/year)	Wooded Area (mm/year)	Urban Lawns (mm/year)
Average Precipitation	786	786	786	786	786
Actual Evapotranspiration	617	617	617	617	560
Water Surplus	169	169	169	169	226
Infiltration	68	85	59	85	90
Runoff	102	85	110	85	135

The pre-development infiltration volume for the subject lands as calculated in Table H-7 (Appendix H) is about 42,100 m^3/year. It is important to recognize that this infiltration volume is an estimate provided for the purposes of this assessment.

4.3 Potential Urban Development Impacts to Water Balance

Development of an area affects the natural water balance. The most significant difference is the addition of impervious surfaces as a type of surface cover (i.e., roads, parking lots, driveways, and rooftops). Impervious surfaces prevent infiltration of water into the soils and the removal of the vegetation removes the evapotranspiration component of the natural water balance. The evaporation component from impervious surfaces is relatively minor (estimated to be 10% to 20% of precipitation) compared to the evapotranspiration component that occurs with vegetation (71% to 78% of precipitation in the study area). So, the net effect of the construction of impervious surfaces is that most of the precipitation that falls onto impervious surfaces becomes surplus water and direct runoff, and the infiltration is reduced.

A calculation of the potential water surplus for impervious areas is shown at the bottom of Table H-1 (Appendix H). For the purposes of the calculations in this study, the evaporation from impervious surfaces has been estimated to be 15% of precipitation. The remaining 85% of the precipitation that falls on impervious surfaces is assumed to become runoff. Therefore, assuming an evaporation/loss from impervious surfaces of 15% of the precipitation, there would be a potential water surplus from impervious areas of 668 mm/year.

It is noted that the proposed development will be serviced by municipal water supply and wastewater services. Therefore, there will be no impact on the water balance and local groundwater or surface water quantity and quality conditions related to any on-site groundwater supply pumping or disposal of septic effluent.

4.4 Post-Development with No LID Measures

In order to assess the potential development impact on infiltration volumes, the post-development infiltration volumes have been calculated for the subject lands in Table H-7 (Appendix H). The calculations provided in Table H-7 assume no low impact development (LID) measures to promote infiltration are in place.

The total areas for the proposed land uses have been estimated based on the proposed development concept and the infiltration and runoff components for the post-development land uses have been calculated using the SWM Planning and Design Manual (2003) methodology based on topography, soil type and land cover as shown on Table H-6 (Appendix H). The total calculated post-development infiltration volume (without mitigation) is about 28,700 m^3/year.

Comparison of the pre-development and post-development infiltration volumes from the water balance calculations shows that development has the potential to reduce the natural infiltration on the subject lands by 32%. Again, it is noted that with the assumptive nature of the input values and the wide margins of error associated with this type of analysis, the estimated infiltration deficit volume is simply considered as a reasonable estimate and may not reflect the actual volume of water that may infiltrate on the subject lands.

4.5 Water Balance Mitigation Strategies

The basic premise for low impact development is to try to manage stormwater to minimize the runoff of rainfall and increase the potential for infiltration. As outlined in the SWM Planning and Design Manual (2003) and Low Impact Development Stormwater Management Planning and Design Guide (2010), there are a wide variety of mitigation techniques that can be used to try to reduce the increases in direct runoff that occur with land development and increase the potential for post-development infiltration.

Techniques to maximize the water availability in pervious areas such as designing grades to direct roof runoff towards lawns, side and rear yard swales, and other pervious areas throughout the development where possible can considerably increase the volume of infiltration in developed areas. These types of surface LID techniques promote natural infiltration simply by providing additional water volumes in the pervious areas (i.e., these areas would receive precipitation as well as extra water from roof runoff). This may be particularly effective in the summer months, when natural infiltration would

not generally occur because the additional water overcomes the natural soil moisture deficit.

Other mitigation techniques that can be considered to mitigate increases in runoff and reductions in infiltration include such measures as: permeable pavements, rain gardens, rain barrels, bioswales, subsurface infiltration trenches, galleries and pervious pipe systems. Subsurface methods should only be considered in areas where there is sufficient depth to water table to accommodate the systems within the unsaturated zone and sufficient soil hydraulic conductivity to function effectively. The 2003 SWM manual recommends that subsurface galleries or trenches should generally be about 1 m above the seasonally high water table.

As presented in the Stormwater Management Report prepared by Schaeffers Consulting Engineers (May 2021), the proposed SWM strategy includes the following LID measures:

- Increased topsoil depth across all lots. The intention with increased topsoil depth is to aid retention of runoff through increased soil storage and promote more infiltration in these areas. Typically, topsoil is increased to about 300 mm.

Area 201

- ~11,400 m^2 of rear roof areas from all Detached/Semi-Detached/St. Townhouses will be discharged to pre-cast splash pads and directed to rear/side pervious areas. The TRCA and CVC Stormwater Management Criteria (2010) indicates that a conservative estimate for the reduction in runoff due to roof leader disconnection is 25% for silt to clayey soils.

- Excess runoff from ~11,400 m^2 of rear roof areas from all Detached/Semi-Detached/St. Townhouses and ~18,200 m^2 of rear yards directed to infiltration trenches designed to accommodate the 27 mm storm event for rear roofs and 7 mm storm event from rear yards.

- Runoff from ~13,100 m^2 of Park area directed to infiltration trenches designed to accommodate the 7 mm storm event.

Area 202

- ~10,900 m^2 of rear roof areas from all Detached/Semi-Detached/St. Townhouses will be discharged to pre-cast splash pads and directed to rear/side pervious areas. The TRCA and CVC Stormwater Management Criteria (2010) indicates that a conservative estimate for the reduction in runoff due to roof leader disconnection is 25% for silt to clayey soils.

- Excess runoff from ~10,900 m^2 of rear roof areas from all Detached/Semi-Detached/St. Townhouses and ~17,400 m^2 of rear yards directed to infiltration trenches designed to accommodate the 27 mm storm event for rear roofs and 7 mm storm event from rear yards.

Area 203

- On-site measures to infiltrate the 5 mm storm event.

Based on the existing information, proposed grades and elevations of the bottom of the infiltration measures, it is anticipated that there is generally sufficient depth to groundwater for effective performance of the proposed infiltration measures across the Area 201 and Area 202 lands. The proposed grading suggests that groundwater levels in Area 203 may rise within 1 m of the base of the infiltration facilities during seasonally high groundwater conditions, however, this would be a temporary and short term condition that would not be expected to affect the overall infiltration function of the facilities during the remainder of the year.

4.6 Post-Development with LID Measures in Place

Quantification of these surficial LID techniques is challenging and there are no widely accepted quantification standards. To assess the potential effectiveness of the recommended LID measures for groundwater infiltration and runoff reduction for the subject lands, the water balance component values were recalculated. In the residential areas where select roofs areas are directed to pervious areas (rear/side yards), it has been assumed in the calculations that 25% of the roof runoff will infiltrate, as per the estimation provided in the Low Impact Development Stormwater Management Planning and Design Guide (CVC and TRCA, 2010).

To calculate the annual infiltration volumes in the proposed infiltration trenches, the Toronto Wet Weather Flow Management Guidelines (City of Toronto, 2006) were used to correlate the storm event size these facilities are designed to infiltrate to a percentage of the average annual rainfall depth, which was then applied to the roof area directed to these trenches to calculate an infiltration volume, as shown in Table H-9 (Appendix G). It is reported in these Guidelines, based on the review of rainfall data from 16 rainfall stations across Toronto, the 27 mm storm accounts for approximately 95% of the annual rainfall volume (82% of annual precipitation), the 7 mm storm accounts for approximately 58% of the annual rainfall volume (50% of annual precipitation) and the 5 mm storm accounts for approximately 48% of the annual rainfall volume (43% of annual precipitation).

Recalculation of the water balance for the subject lands with these LID measures in place demonstrates that there would be a 26% increase in infiltration compared to

pre-development volumes (Table H-9, Appendix H). This shows the significant benefit of the proposed LID strategy in increasing recharge volumes in the developed area.

5.0 Construction Considerations

5.1 Dewatering Requirements

The construction dewatering requirements will vary significantly depending on the local soils, the climate conditions, the construction season and the depth and size of the excavations. The perched water table in the till ranges in depth from at ground surface to greater than 8 mbgs. Groundwater within the underlying sand aquifer ranges in depth from 6 m to 14 m. There is the potential for groundwater to be encountered during excavation for services and building foundations depending on the location and depth of excavations. Due to the relatively low hydraulic conductivity of these sediments they would not be expected to produce much water. Minor seepage into excavations within the clayey soils at the site can likely be handled, as required, by pumping from sumps within the trench excavations. Active dewatering may be required if excavations intersect saturated sand, silty sand and sandy silt soils.

Dewatering and/or depressurization requirements and anticipated water flow volumes will be confirmed by geotechnical investigations completed in support of detailed servicing design. The MECP regulates water takings above 50,000 L/day. Dewatering associated to construction with volumes less than 400,000 L/day are permitted under the Environmental Activity and Sector Registry (EASR) process. Volumes greater than 400,000 L/day require a Permit to Take Water (PTTW). Based on our knowledge of the regulations, the dewatering will either be allowed by a Category 3 PTTW or under the EASR process depending on the expected volume of water taking.

5.2 Construction Below Water Table

The construction of buried services below the water table has the potential to capture and redirect groundwater flow through more permeable fill materials typically placed in the base of excavated trenches. Over the long-term, these impacts can lower the local groundwater table. To mitigate this effect, services to be installed below the water table should be constructed to prevent redirection of groundwater flow. This will involve the use of anti-seepage collars or clay plugs surrounding the pipes to provide barriers to flow and prevent groundwater flow along granular bedding material and erosion of the backfill materials.

5.3 Well Decommissioning

Prior to or during construction, it is necessary to ensure that all inactive wells within the development footprint have been located and properly decommissioned by a licensed water well contractor according to Ontario Regulation 903. This regulation applies to the

groundwater monitoring wells installed for this study unless they are maintained throughout the construction for monitoring purposes.

6.0 References

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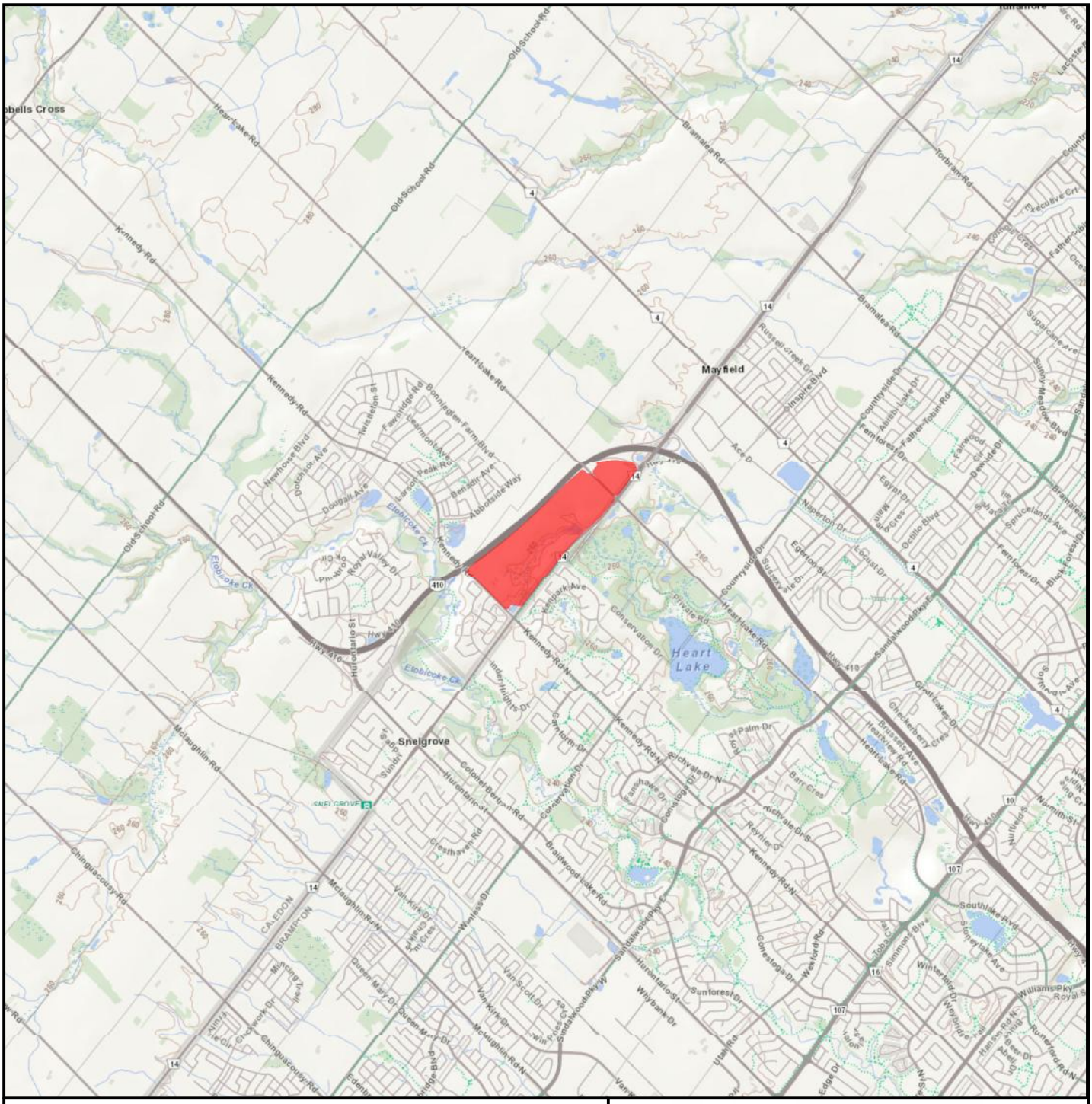
[THE DIFFERENCE IS OUR PEOPLE]

Figures



LEGEND

SUBJECT LANDS

0 500 1,000 1,500 2,000 2,500 3,000 3,500 4,000

Metres

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Client / Report

SNELL'S HOLLOW DEVELOPERS GROUP
CALEDON, ONTARIO
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE

Figure Title:

SITE LOCATION

Drawn	Checked	Date	Figure No.
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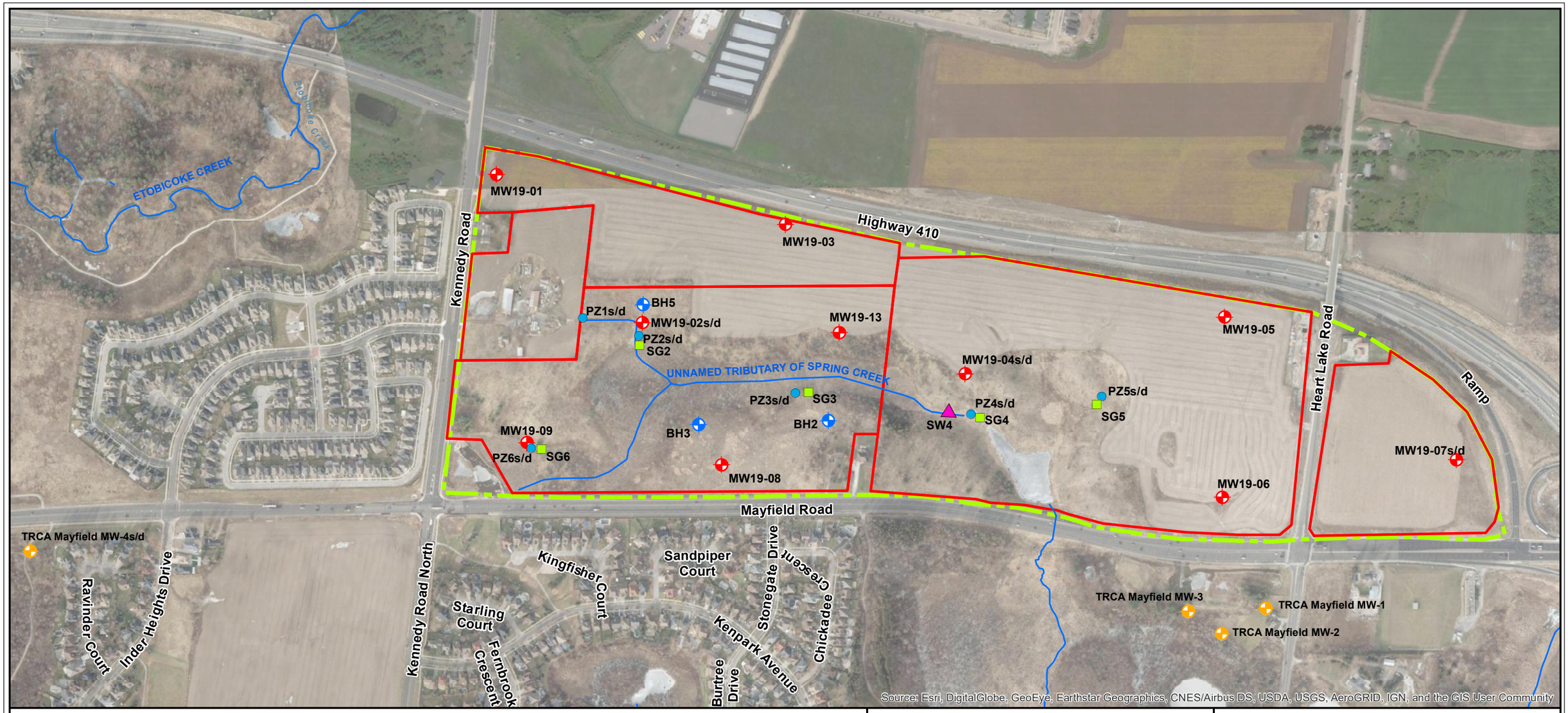

LEGEND

- SUBJECT LANDS
- SECONDARY PLAN AREA
- WATERCOURSE
- MONITORING WELL (EDWARD WONG, 2017)
- MONITORING WELL (TRCA)
- MONITORING WELL (GOLDER, 2019)
- DRIVE POINT PIEZOMETER
- STAFF GAUGE
- WATER QUALITY SAMPLING LOCATION

Sources:

1. Ministry of Natural Resources and Forestry, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
3. Sattelite Imagery - City of Brampton, 2017

0 100 200 300 400
Metres

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Figure Title

MONITORING NETWORK

Drawn	Checked	Date	Figure No.
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Scale		Project No.	
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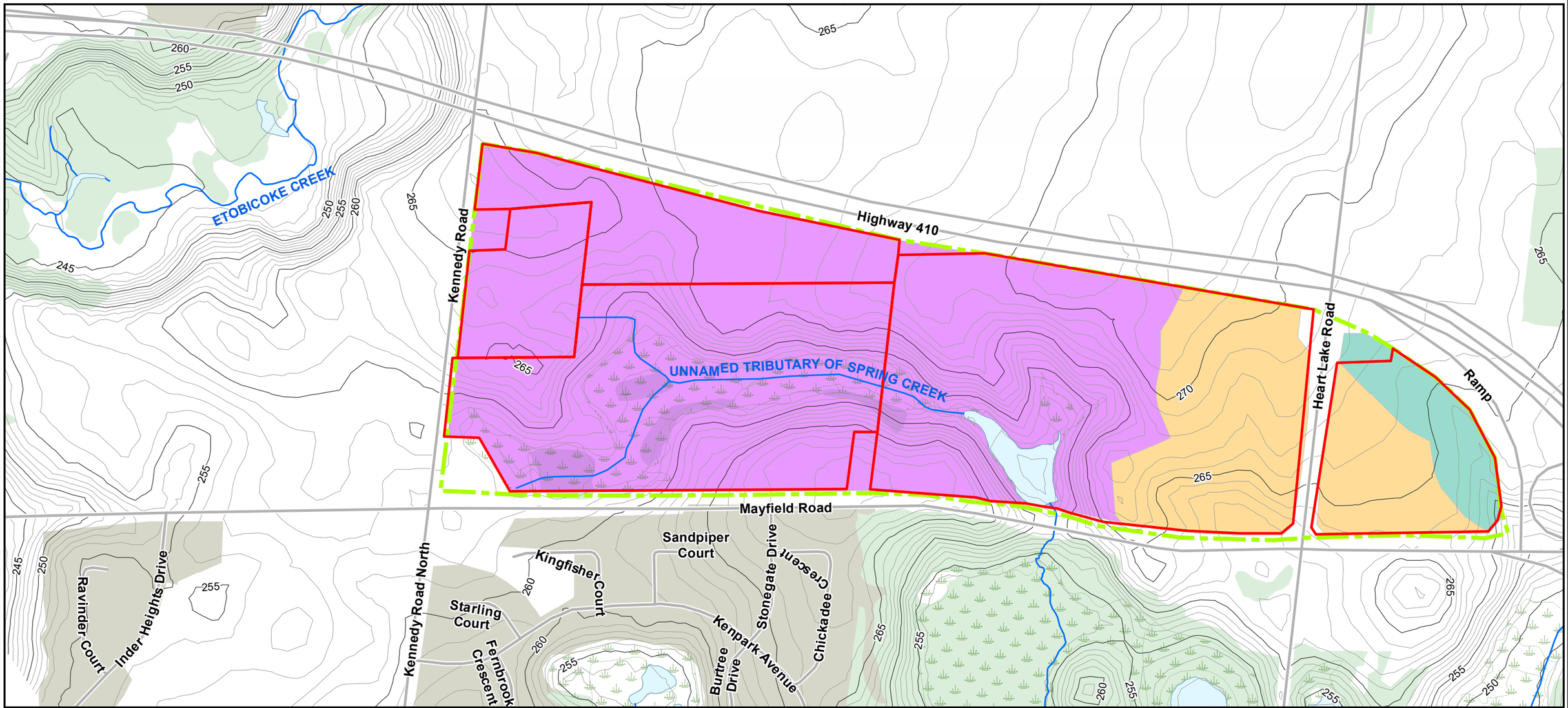

LEGEND

- SUBJECT LANDS
- SECONDARY PLAN AREA
- WATERCOURSE
- CONTOUR (5m intervals - masl)
- CONTOUR (1m intervals)
- WOODED AREA
- BUILT-UP AREA: IMPERVIOUS
- OPEN WATER
- WETLAND

PRE-DEVELOPMENT DRAINGE AREAS:

- AREA 1
- AREA 2
- AREA 3

Sources:

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Metres

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HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE

Figure Title

TOPOGRAPHY AND DRAINAGE

Drawn	Checked	Date	Figure No.
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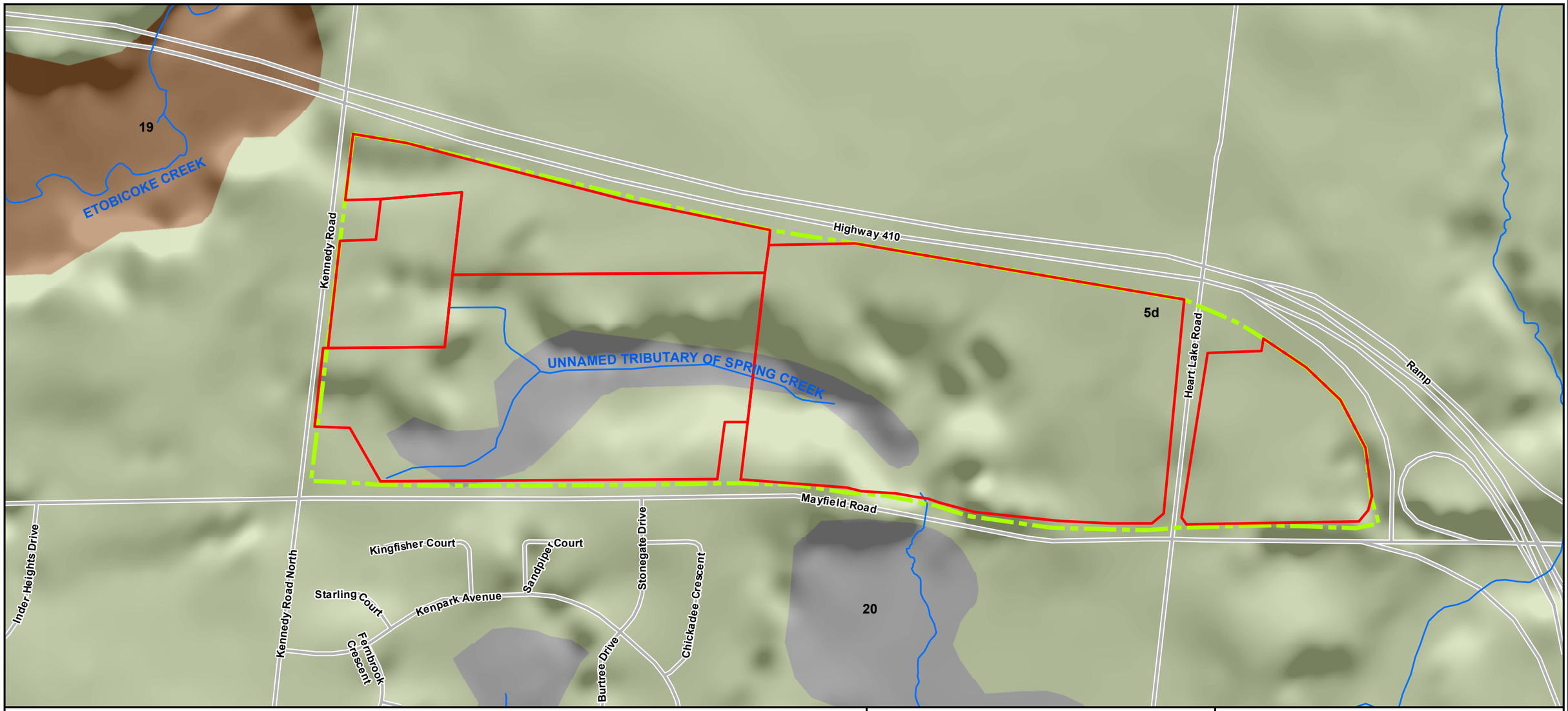

LEGEND

- SUBJECT LANDS
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- WATERCOURSE
- ROADWAY
- 5d: Till: Glaciolacustrine-derived silty to clayey till
- 19: Modern alluvial deposits
- 20: Organic deposits

Sources:

1. Ministry of Natural Resources and Forestry, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
3. Ontario Geological Survey 2010. Surficial geology of southern Ontario; Ontario Geological Survey, Miscellaneous Release—Data 128 – Revised.

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CALEDON, ONTARIO
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE

Figure Title

SURFICIAL GEOLOGY

Drawn	Checked	Date	Figure No.
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Scale		Project No.	
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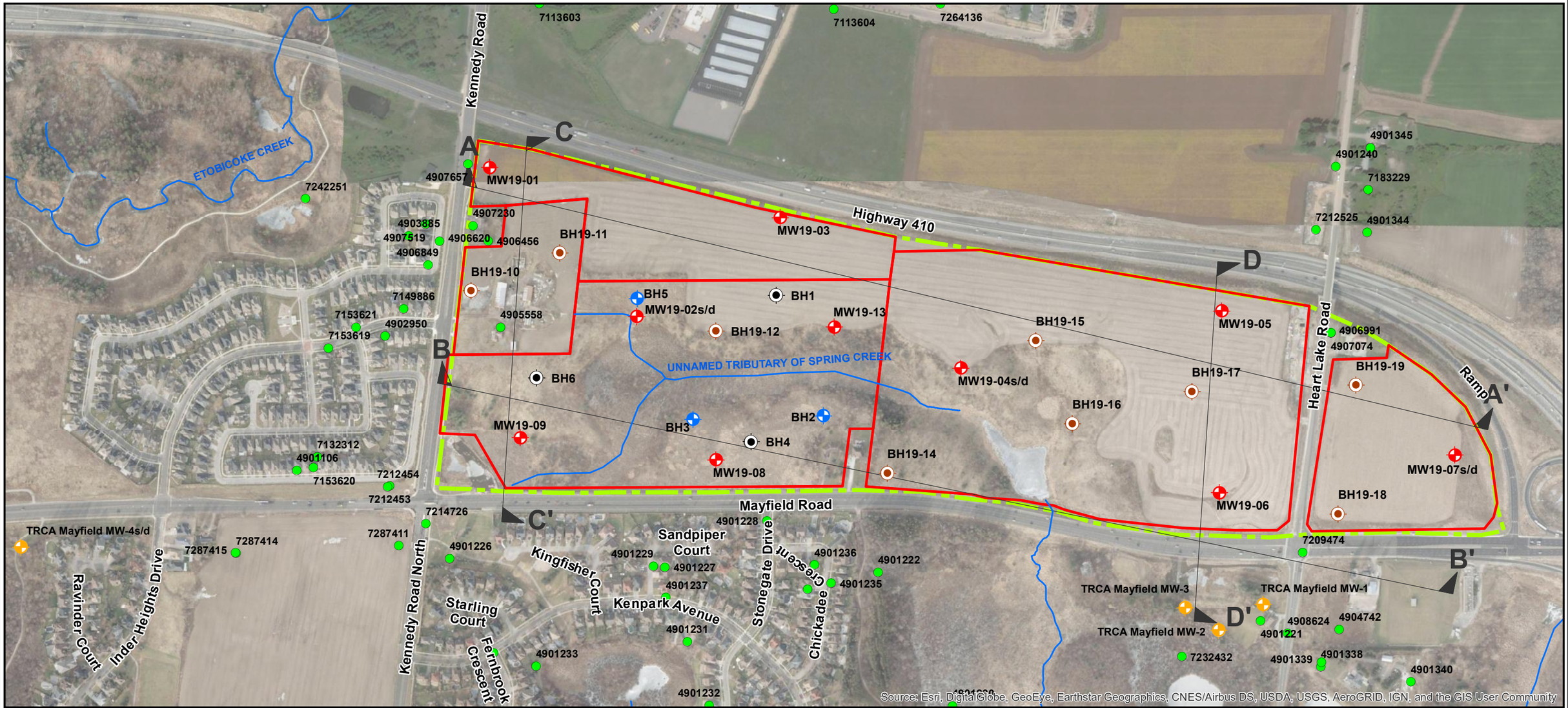

LEGEND

- SUBJECT LANDS
- SECONDARY PLAN AREA
- WATERCOURSE
- MONITORING WELL (EDWARD WONG, 2017)
- MONITORING WELL (TRCA)
- MONITORING WELL (GOLDER, 2019)
- BOREHOLE (GOLDER, 2019)
- BOREHOLE (EDWARD WONG, 2017)
- MECP WELL RECORD LOCATION
- CROSS SECTION LOCATION KEY

Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
3. Sattelite Imagery - City of Brampton, 2017

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Metres

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HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE

Figure Title

BOREHOLE, WELL AND CROSS-SECTION LOCATIONS

Drawn	Checked	Date	Figure No.
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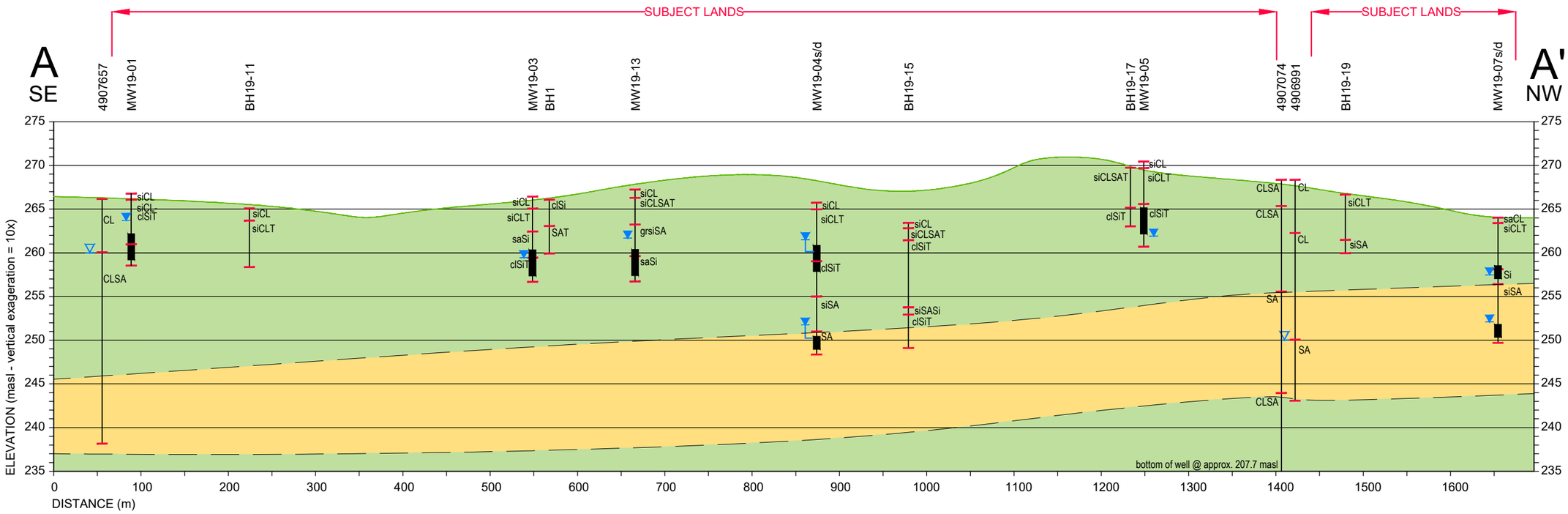

LEGEND

BH1 — WELL NUMBER / ID

EXISTING GROUND PROFILE

GEOLOGICAL CONTACT

MEASURED WATER LEVEL (APRIL 20, 2020)

STATIC WATER LEVEL (MECP WELL RECORD)

WELL SCREEN

si	SILTY
sa	SANDY
cl	CLAYEY
GR	GRAVEL
SA	SAND
Si	SILT
CL	CLAY
ST	STONES
LSMN	LIMESTONE

INTERPRETED STRATIGRAPHY

SAND / SILT / GRAVEL

SILT CLAY TILL

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CALEDON, ONTARIO
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE

Figure Title

INTERPRETED GEOLOGICAL CROSS-SECTION A-A'

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Scale		Project No.	
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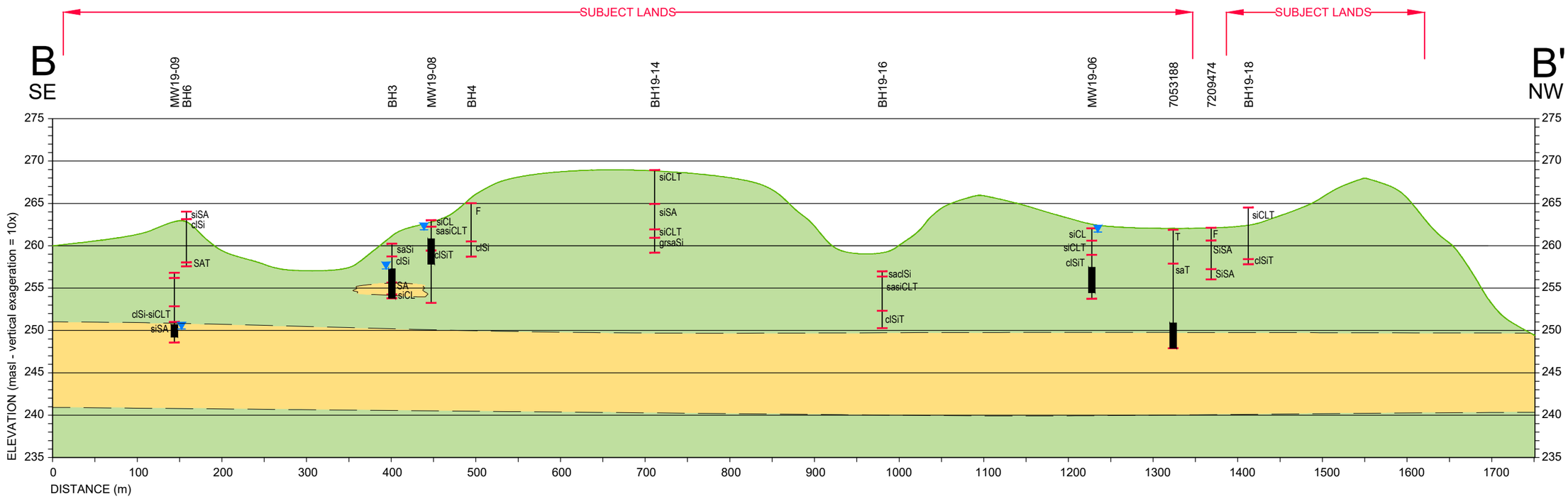

LEGEND

BH1 — WELL NUMBER / ID

EXISTING GROUND PROFILE

GEOLOGICAL CONTACT

MEASURED WATER LEVEL (APRIL 20, 2020)

STATIC WATER LEVEL (MECP WELL RECORD)

WELL SCREEN

si	SILTY
sa	SANDY
cl	CLAYEY
GR	GRAVEL
SA	SAND
Si	SILT
CL	CLAY
ST	STONES
LSMN	LIMESTONE

— — INTERPRETED STRATIGRAPHY

SAND / SILT / GRAVEL

SILT CLAY TILL

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CALEDON, ONTARIO
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE

Figure Title

INTERPRETED GEOLOGICAL CROSS-SECTION B-B'

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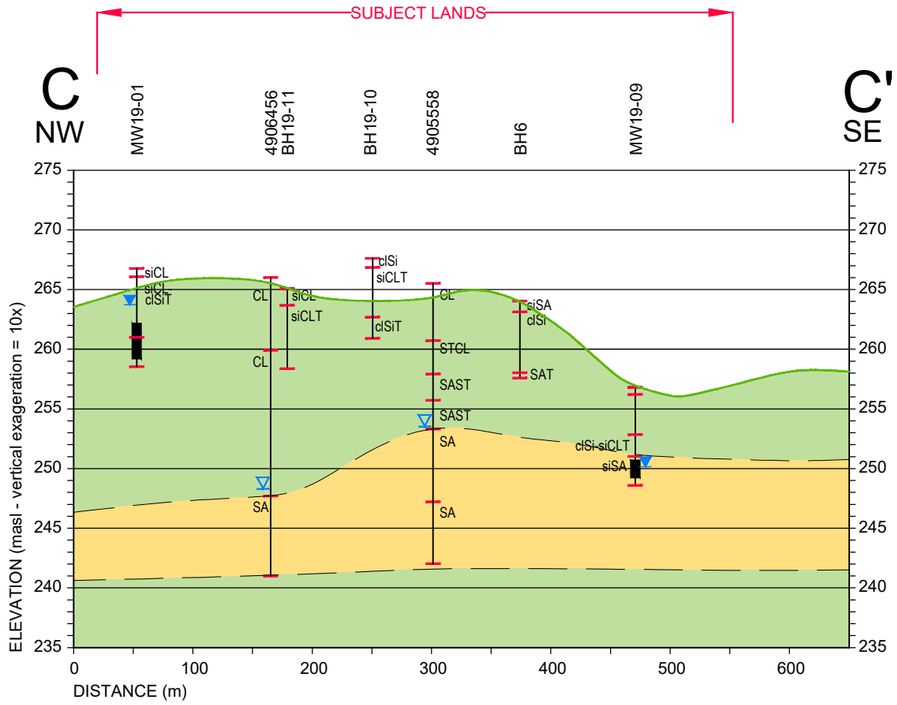

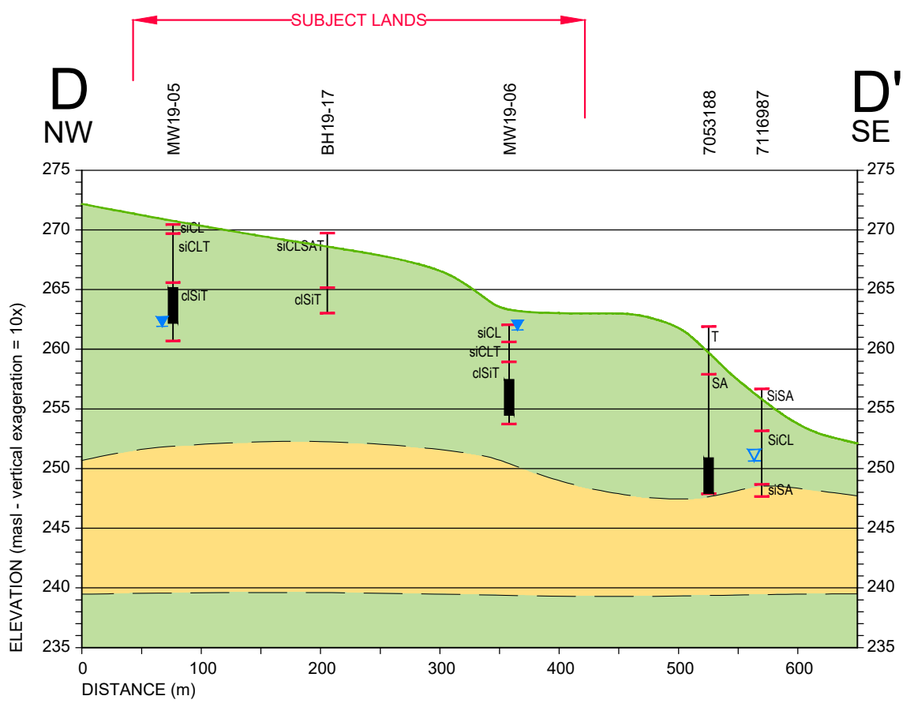

LEGEND

BH1 — WELL NUMBER / ID

EXISTING GROUND PROFILE

GEOLOGICAL CONTACT

MEASURED WATER LEVEL (APRIL 20, 2020)

STATIC WATER LEVEL (MECP WELL RECORD)

WELL SCREEN

si	SILTY
sa	SANDY
cl	CLAYEY
GR	GRAVEL
SA	SAND
Si	SILT
CL	CLAY
ST	STONES
LSMN	LIMESTONE

— — INTERPRETED STRATIGRAPHY

SAND / SILT / GRAVEL

SILT CLAY TILL

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SNELL'S HOLLOW DEVELOPERS GROUP
CALEDON, ONTARIO
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE

Figure Title

INTERPRETED GEOLOGICAL CROSS-SECTION C-C'

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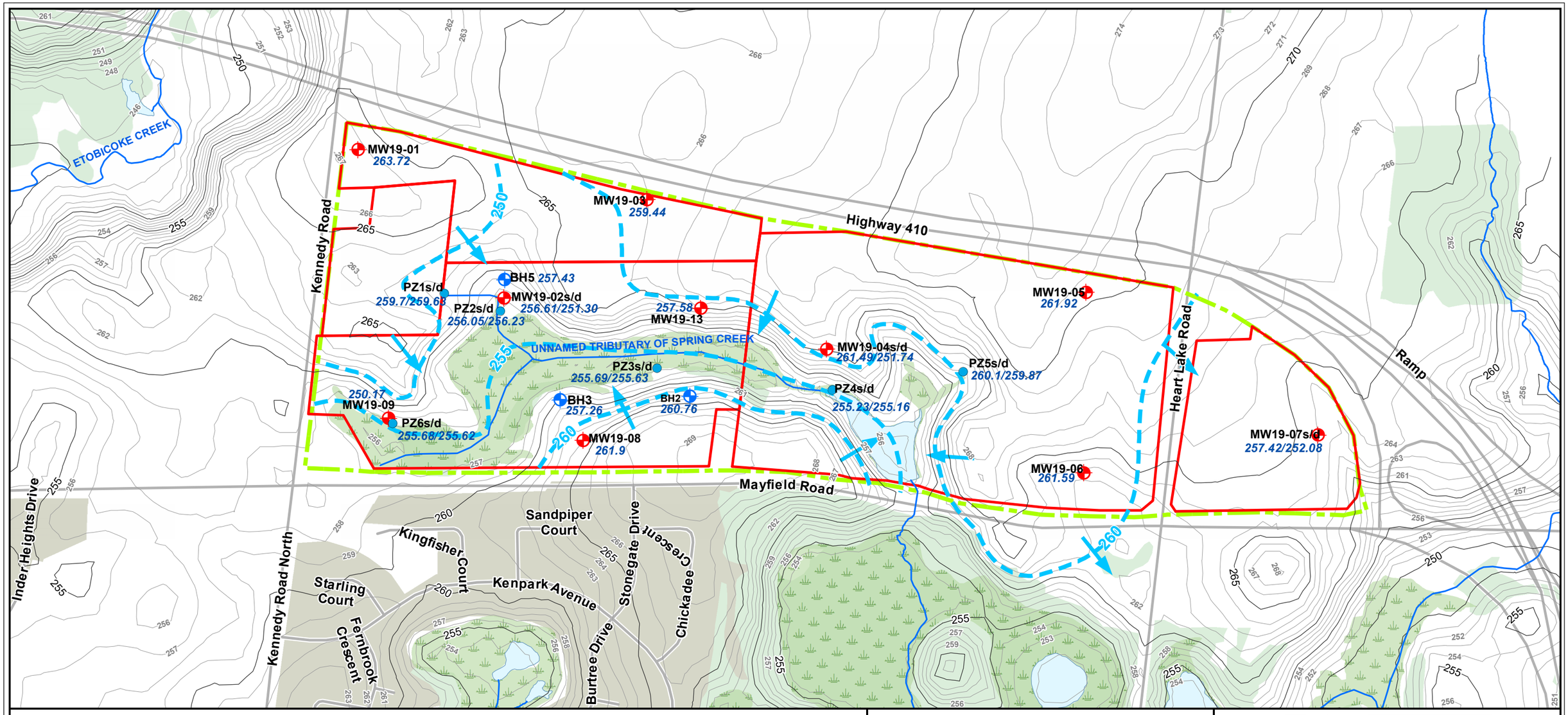


LEGEND

- SUBJECT LANDS
- SECONDARY PLAN AREA
- WATERCOURSE
- CONTOUR (5m intervals - masl)
- CONTOUR (1m intervals)
- OPEN WATER
- WOODED AREA
- BUILT-UP AREA: IMPERVIOUS
- WETLAND
- MONITORING WELL (GOLDER, 2019)
- MONITORING WELL (EDWARD WONG, 2017)
- DRIVE POINT PIEZOMETER
- INTERPRETED GROUNDWATER CONTOUR (masl)
- INTERPRETED GROUNDWATER FLOW DIRECTION
- *177.95* MEASURED WATER LEVEL - masl (APRIL 20, 2020)

Sources:

1. Ministry of Natural Resources and Forestry, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.

0 100 200 300 400
Metres

BURNSIDE

Client / Report

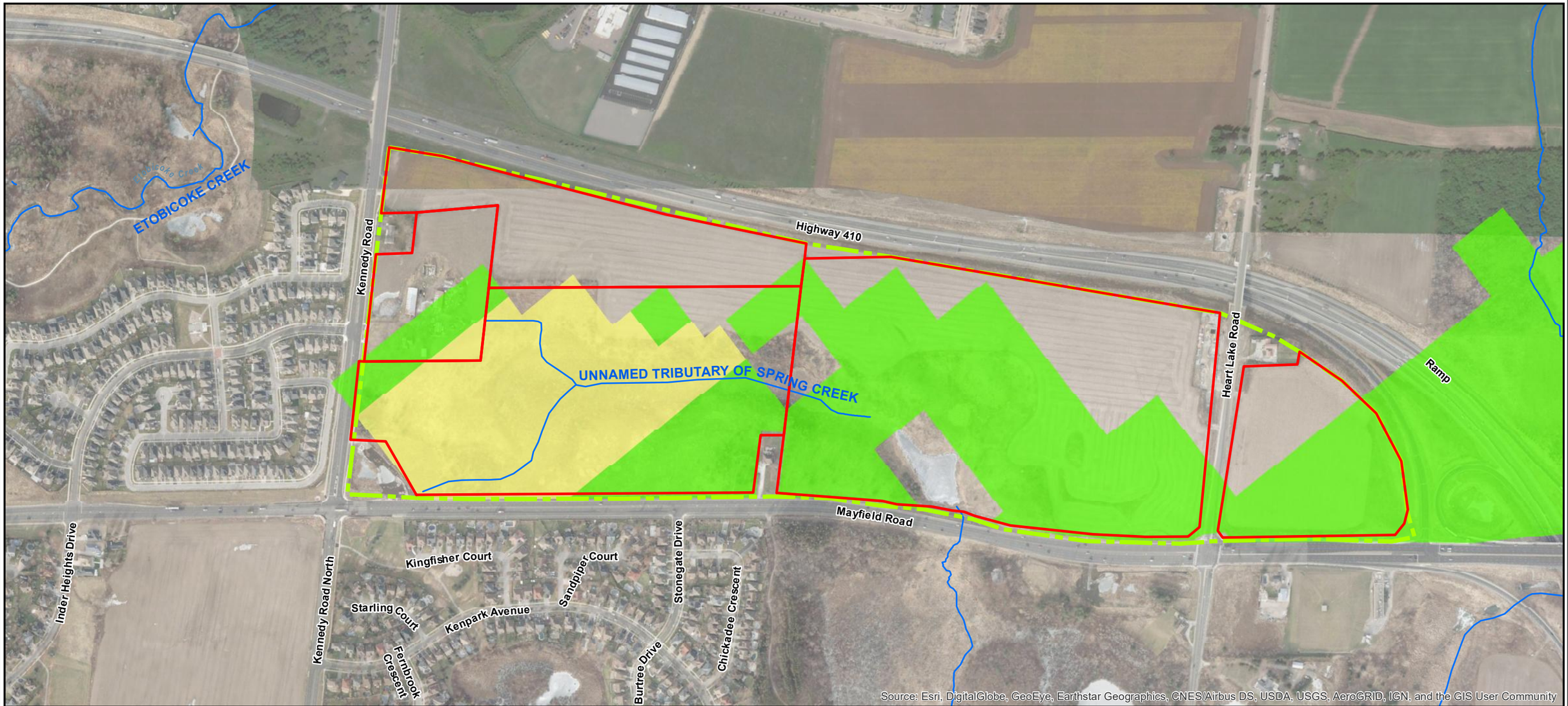
SNELL'S HOLLOW DEVELOPERS GROUP
CALEDON, ONTARIO
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE

Figure Title

INTERPRETED SHALLOW GROUNDWATER FLOW

Drawn	Checked	Date	Figure No.
SK	TM	MAY 2021	9
Scale		Project No.	
1:6,000		300043952	

File Path:Nigel/Shared Work Areas/043952 Snell's Hollow/06_GIS/043952 Groundwater Flow.mxd



LEGEND

- SUBJECT LANDS
- SECONDARY PLAN AREA
- WATERCOURSE

SIGNIFICANT GROUNDWATER RECHARGE AREAS (SGRA)

- HIGH
- MEDIUM

Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
3. SGRA mapping derived from Source Protection Information Atlas, Ministry of the Environment, Conservation and Parks. Land Information Ontario online mapping.

0 100 200 300 400
Metres

BURNSIDE

Client / Report

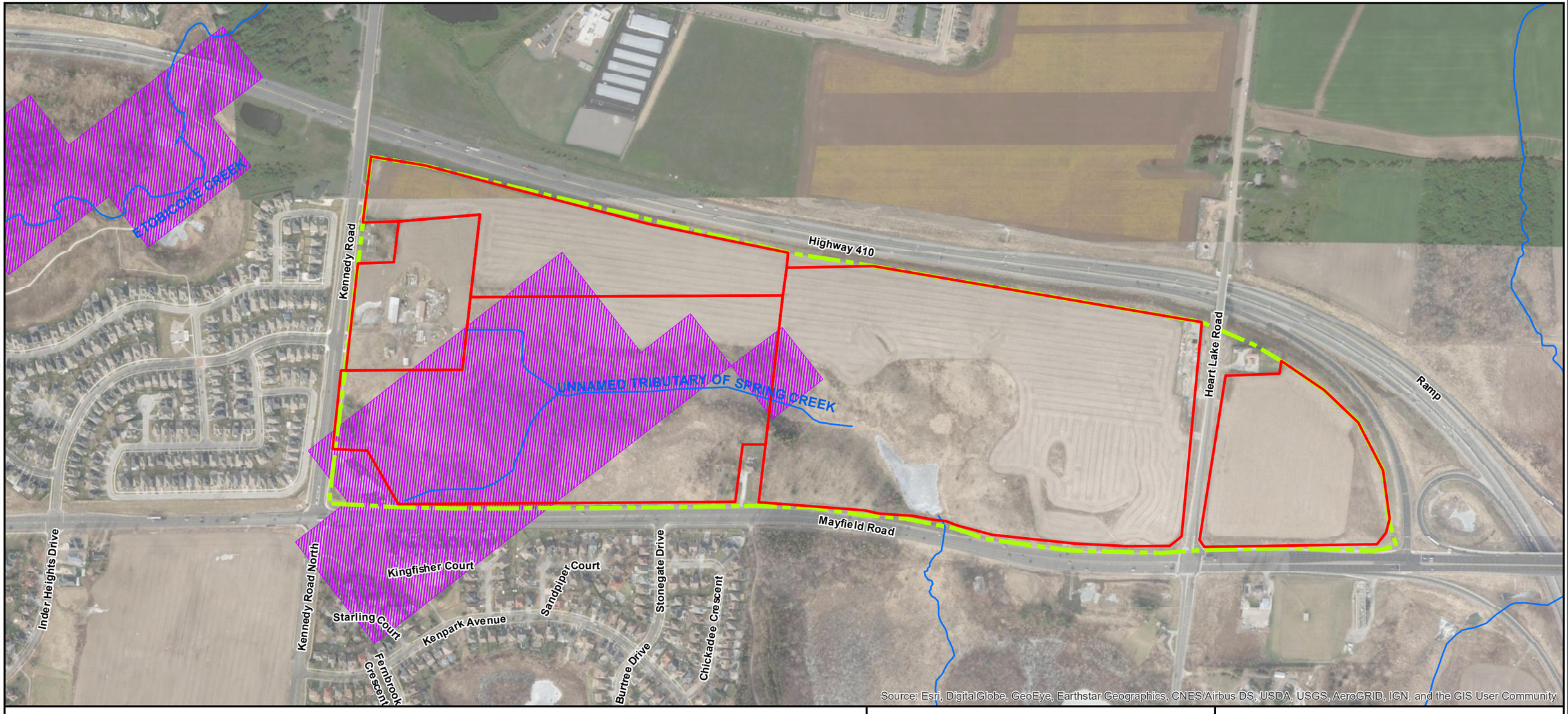
SNELL'S HOLLOW DEVELOPERS GROUP
CALEDON, ONTARIO
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE

Figure Title

SIGNIFICANT RECHARGE AREAS

Drawn	Checked	Date	Figure No.
SK	TM	MAY 2021	10
Scale		Project No.	
1:6,000		300043952	

File Path:N:\gel\Shared Work Areas\043952 Snell's Hollow\06GIS\043952 SGRA.mxd



LEGEND

- SUBJECT LANDS
- SECONDARY PLAN
- WATERCOURSE
- HIGHLY VULNERABLE AQUIFER

Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.
3. HVA mapping derived from Source Protection Information Atlas, Ministry of the Environment, Conservation and Parks. Land Information Ontario online mapping.

0 100 200 300 400
Metres

BURNSIDE

Client / Report

SNELL'S HOLLOW DEVELOPERS GROUP
CALEDON, ONTARIO
HYDROGEOLOGICAL ASSESSMENT AND WATER BALANCE

Figure Title

AQUIFER VULNERABILITY

Drawn	Checked	Date	Figure No.
SK	TM	MAY 2021	11
Scale		Project No.	
1:6,000		300043952	

File Path: Nigel/Shared Work Areas/043925 Snell's Hollow/06_GIS/043952 HVA.mxd

BURNSIDE

[THE DIFFERENCE IS OUR PEOPLE]

Appendix A

Borehole Logs

PROJECT: 19115264-3000

LOCATION: Lat. 43.747371 Long. -79.818742
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-01

BORING DATE: April 4, 2019

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		266.80							
0	CME 75 Track Mount Power Auger, 100 mm Solid Stem	TOPSOIL (250 mm)		0.00 / 266.55	1A	SS					
		(CL) SILTY CLAY, trace sand, trace gravel, trace organics; brown; cohesive, w~PL, stiff		0.25 / 266.10	1B	SS	10				
1		(CL) sandy SILTY CLAY, trace gravel; light brown with oxidation staining, (TILL); cohesive, w<PL, very stiff to hard		0.70	2	SS	16			MH	
		- Some to trace sand below depth of 1.6 m			3	SS	21				Bentonite
2					4	SS	23				
3					5	SS	32				17/04/2019
4											Sand
5		- Silty sand layers/seams encountered below depth of 4.9 m			6	SS	21				
		(CI/CL-ML) SILTY CLAY to CLAYEY SILT, trace to some sand, trace gravel, with inferred cobbles; grey, (TILL); cohesive, w~PL to w>PL, stiff to hard		261.01 / 5.79	7	SS	12				Screen and Sand
6											
7					8	SS	48				Bentonite
8		- Sand layer, approximately 70 mm thick, encountered at a depth of 8.1 m		258.57							
		END OF BOREHOLE.		8.23							
9		Notes: 1. Borehole dry upon completion of drilling. 2. Water level measured in monitoring well as follows: Date / Depth / Elev. (m) April 17, 2019 / 3.95 mbgs / 262.85 m									
10											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-1000/2000

LOCATION: Lat. 43.747664 Long. -79.814643
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-02

BORING DATE: April 2, 2019

SHEET 1 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		257.20							
0	CME 75 Track Mount Power Auger, 100 mm Solid Stem	TOPSOIL (610 mm)		0.00	1	SS	4				17/04/2019 ▽
				256.59							
		(CL)SILTY CLAY, some to trace sand, trace gravel, trace organics; brown/dark brown with oxidation staining; w>PL, firm		0.61							Bent-onite
				256.35	2A	SS					
1		(CL) sandy SILTY CLAY, trace gravel; light brown with oxidation staining, (TILL); cohesive, w~PL, firm to stiff		0.85	2B	SS	8			59.7	
		- Silt/sand seams/layers below 1.7 m			3	SS	8				Sand
2					4	SS	13				
											Screen and Sand
3					5	SS	9				
				253.24							
4		(CL-ML) CLAYEY SILT, some to trace sand, trace gravel; grey, (TILL); cohesive, w>PL, very stiff to stiff to hard		3.96	6	SS	15				Bentonite
5											
6					7	SS	13				17/04/2019 ▽
7											
8					8	SS	17				
9		- Becoming sandy at 9.1 m									
		- Auger grinding at a depth of 9.5 m to 11 m			9	SS	57				
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-1000/2000

LOCATION: Lat. 43.747664 Long. -79.814643
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-02

BORING DATE: April 2, 2019

SHEET 2 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
10	CME 75 Track Mount Power Auger 100 mm Solid Stem	(SW-SM) SAND to SILTY SAND, medium grained, contains inferred cobbles/boulders; light brown; non-cohesive, wet, compact to very dense		247.14 10.06							Bentonite
11					10	SS	26				Sand
12		- Cobbles/boulders inferred from auger grinding at a depth of 12 m									Screen and Sand
					11	SS	52				2/04/2019
				244.40 12.80							
13		END OF BOREHOLE.									
		Notes: 1. Water level measured in monitoring well as follows: Deep Well Date Depth Elev. (m) April 2, 2019 12.67 mbgs 244.53 m April 17, 2019 6.27 mbgs 250.93 m Shallow Well Date Depth Elev. (m) April 17, 2019 0.25 mbgs 256.95 m									
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-3000

LOCATION: Lat. 43.750098 Long. -79.814418
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-03

BORING DATE: April 4, 2019

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80); SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}); WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		266.88							
0	CME 75 Track Mount Power Auger 100 mm Solid Stem	TOPSOIL (350 mm)		0.00 / 266.53	1A	SS	5				
		(CL) SILTY CLAY, some sand, trace gravel, trace organics; brown with oxidation staining; cohesive, w<PL, firm		0.35	1B	SS					
1					2	SS	7				
		(CL) sandy SILTY CLAY, trace gravel, contains inferred cobbles; light brown with oxidation staining, (TILL); cohesive, w<PL, stiff to hard		265.51 / 1.37							
2					3	SS	11				
					4	SS	24				Bentonite
3											
					5	SS	30			MH	
4		(ML) gravelly sandy SILT, with slight plasticity, contains inferred cobbles; light brown; non-cohesive, moist, very dense - Inferred cobbles/boulders from auger grindings at a depth of 2 m and 7.3 m		262.89 / 3.99							
5					6	SS	75				
											Sand
6					7	SS	100				
7		(CL-ML) CLAYEY SILT, some to trace sand; grey, (TILL); cohesive, w<PL, hard		259.88 / 7.00							17/04/2019
					8	SS	100				Screen and Sand
8		- Cobbles/boulders inferred from auger grinding at a depth of 8.4 m									
9					9	SS	77				4/04/2019
		END OF BOREHOLE.		257.13 / 9.75							
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-3000

LOCATION: Lat. 43.750098 Long. -79.814418
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-03

BORING DATE: April 4, 2019

SHEET 2 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		Notes: 1. Water level measured at 9.1 mbgs upon completion of drilling. 2. Water level measured in monitoring well as follows: Date Depth Elev. (m) April 17, 2019 7.34 mbgs 259.54 m									
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-1000/5000

LOCATION: Lat. 43.750748 Long. -79.810026
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-04

BORING DATE: March 28, 2019

SHEET 1 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		266.50									
0	CME 75 Track Mount Power Auger, 100 mm Solid Stem	TOPSOIL (200 mm)		0.00 / 266.30	1A	SS							
		(CL) SILTY CLAY, some sand, trace organics; dark brown; cohesive, w<PL, firm		0.20 / 265.74	1B	SS	8						
1		(CL) gravelly sandy SILTY CLAY; light brown with oxidation staining, (TILL); cohesive, w<PL, stiff to very stiff		0.76	2	SS	16					PP = 150 kPa	
2					3	SS	12					PP = 245 kPa	
					4	SS	12					MH PP = 290 kPa	Bentonite
3					5	SS	19					PP = 345 kPa	
4												17/04/2019	Sand
5					6	SS	28					PP = 390 kPa	
6		- Cobble/boulders inferred from auger grinding at a depth of 6 m - Silty sand seam at a depth of 6.2 m			7	SS	30						Screen and Sand
		(CL-ML) sandy CLAYEY SILT, trace gravel; grey, (TILL); cohesive, w>PL, stiff to hard		259.79 / 6.71									
7					8	SS	13					PP = 340 kPa	
8					9	SS	37					PP = 440 kPa	
9													Bentonite
					10	SS	79						
10		*CONTINUED NEXT PAGE*											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-1000/5000

LOCATION: Lat. 43.750748 Long. -79.810026
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-04

BORING DATE: March 28, 2019

SHEET 2 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	CME 75 Track Mount Power Auger 100 mm Solid Stem	(CL-ML) sandy CLAYEY SILT, trace gravel; grey, (TILL); cohesive, w>PL, stiff to hard		255.76	11A	SS				PP = 150 kPa	
		(SW/SM) gravelly SILTY SAND, coarse to fine; light brown to brown; non-cohesive, dry to wet, compact to very dense		10.74	11B	SS	120/6"				
11											
12					12	SS	62		○		
13											
14					13	SS	19		○		
											17/04/2019 ▽
		(SP) SAND, some silt, trace clay; light grey; wet, compact to dense		251.75 14.75							Sand
15					14	SS	31		○	MH	
16											Screen and Sand
					15	SS	22				
17				249.13							
		END OF BOREHOLE.		17.37							
18		Notes: 1. Water level measured in monitoring well as follows: Deep Well Date Depth Elev. (m) March 29, 2019 14.8 mbgs 251.7 m April 17, 2019 14.55 mbgs 251.95 m Shallow Well Date Depth Elev. (m) April 17, 2019 3.75 mbgs 262.75 m 2. PP = unconfined compressive strength measured using pocket penetrometer on sample in the field.									
19											
20											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-1000/5000

LOCATION: Lat. 43.75409 Long. -79.807715
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-05

BORING DATE: March 28, 2019

SHEET 1 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		270.50							
0	CME 75 Track Mount Power Auger 100 mm Solid Stem	TOPSOIL (280 mm)		0.00	1A	SS	12				
				270.22							
		(CL) SILTY CLAY, trace gravel, trace organics; dark to light brown; cohesive, w~PL, stiff		0.28	1B	SS					
				269.74							
1		(CL) SILTY CLAY, some sand, trace gravel; light brown with oxidation staining, (TILL); w<PL, very stiff		0.76	2	SS	24				
					3	SS	26				
2											Bentonite
					4	SS	23				
3					5	SS	26				
4											
					6A	SS					
				265.64							
5		(CL-ML) CLAYEY SILT, trace sand to sandy, trace gravel; grey, (TILL); cohesive, w<PL, hard		4.86	6B	SS	44				Sand
6		- Becoming sandy, with sand seams below a depth of 6.1 m			7	SS	77				Screen and Sand
7											
		- Silty sand layer/stratum encountered at a depth of 7.6 m			8	SS	94				
8											17/04/2019
9											Bentonite
					9	SS	100				
				260.75							
		END OF BOREHOLE.		9.75							
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-1000/5000

LOCATION: Lat. 43.75409 Long. -79.807715
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-05

BORING DATE: March 28, 2019

SHEET 2 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		Notes: 1. Borehole dry upon completion of drilling. 2. Water level measured in monitoring well as follows: Date — Depth — Elev. (m) March 28, 2019 — Dry — Dry April 17, 2019 — 8.32 mbgs — 262.18 m									
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-1000/5000

LOCATION: Lat. 43.752469 Long. -79.804999
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-06

BORING DATE: March 2, 2019

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		262.00							
0	CME 75 Track Mount Power Auger, 100 mm Solid Stem	TOPSOIL (410 mm)		0.00	1A	SS	9				
				261.59							
		(CL) SILTY CLAY, trace organics, some to trace sand, trace gravel; dark brown; cohesive, w>PL, firm		0.41	1B	SS					17/04/2019 ▽
1					2	SS	5				
				260.55							
		(CL) SILTY CLAY, some sand to sandy, trace gravel; light brown, (TILL); cohesive, w>PL, stiff to very stiff		1.45	3	SS	14				Bentonite
2					4	SS	28				28/03/2019 ▽
				258.88	5A	SS					
3		(CL-ML) CLAYEY SILT, trace sand and gravel; grey, (TILL); cohesive, w>PL, very stiff to hard		3.12	5B	SS	39				
4											Sand
					6	SS	15				
5											
6											Screen and Sand
					7	SS	27				
7											
					8	SS	36				Bentonite
				253.68							
		END OF BOREHOLE.		8.32							
9		Notes: 1. Water level measured in monitoring well as follows: Date Depth Elev. (m) March 28, 2019 2.54 mbgs 259.46 m April 17, 2019 0.38 mbgs 261.62 m									
10											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-6000

LOCATION: Lat. 43.755372 Long. -79.802724
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-07

BORING DATE: March 27, 2019

SHEET 1 OF 2

DATUM: Existing Ground Surface

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp ○ W WI) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	CME 75 Track Mount Power Auger 100 mm Solid Stem	TOPSOIL (230 mm)		0.00	1A	SS					
		(CL) sandy CLAY, trace gravel, trace organics; dark brown; cohesive, w<PL, very stiff		0.23	1B	SS	19		○		
1		(CL) SILTY CLAY, some sand to sandy, trace gravel; light brown with oxidation staining, (TILL); cohesive, w<PL, very stiff to hard		0.61	2	SS	11		○		
2					3	SS	11		○		
					4	SS	24				Bent-onite
3		- Becoming sandy at a depth of 3 m			5	SS	45				
4											
5					6	SS	44		○		Sand
6		(SM/ML) sandy SILT to SILT, trace to some clay, slight plasticity; light brown; non-cohesive,wet, dense to very dense		5.90	7	SS	36		○		Screen and Sand
7		- Cobble/boulder inferred from auger grinding at a depth of 7.3 m			8	SS	100/2"		○		17/04/2019
		(SM) SILTY SAND, fine to medium grained, some to trace gravel; light brown; non-cohesive, moist, dense to very dense		7.62							
8											Bent-onite
9					9	SS	131				
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-6000

LOCATION: Lat. 43.755372 Long. -79.802724
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-07

BORING DATE: March 27, 2019

DATUM: Existing Ground Surface

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	CME 75 Track Mount Power Auger 100 mm Solid Stem	(SM) SILTY SAND, fine to medium grained, some to trace gravel; light brown; non-cohesive, moist, dense to very dense									
11					10	SS	94		○		Sand
12		- Contains wet sandy silt layer at a depth of 12.2 m			11	SS	40		○		Screen and Sand 17/04/2019
13											
14					12	SS	38		○		Bentonite
		END OF BOREHOLE.		14.33							
15		Notes: 1. Water level measured at 12.8 mbgs upon completion of drilling.									
16		2. Water level measured in monitoring well as follows: Deep Well Date Depth Elev. (m) April 17, 2019 12.8 mbgs N/A Shallow Well Date Depth Elev. (m) April 17, 2019 6.9 mbgs N/A									
17											
18											
19											
20											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-1000/2000

LOCATION: Lat. 43.747266 Long. -79.811592
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-08

BORING DATE: April 5, 2019

SHEET 1 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		263.00							
0	CME 75 Track Mount Power Auger, 100 mm Solid Stem	TOPSOIL (350 mm)		0.00	1A	SS	2				
				262.65							
		(CL) SILTY CLAY, trace sand and gravel, trace organics; dark brown; cohesive, w~PL, very soft to soft		0.35	1B	SS				PP = 25 kPa	Bentonite
				262.24							
1		(CL) sandy SILTY CLAY, trace gravel; light brown, (TILL); cohesive, w<PL, very stiff		0.76	2	SS	16			PP = 370 kPa	
											17/04/2019
					3	SS	26			PP = 320 kPa	Sand
2											
					4	SS	24			PP = 320 kPa	
3											
					5A	SS	30			PP = 420 kPa	
				259.43							
		(Cl-ML) CLAYEY SILT, trace to some sand and gravel, contains inferred cobbles/boulders; grey, (TILL); cohesive, w>PL to w~PL, very stiff to hard		3.57	5B	SS				PP = 390 kPa	Screen and Sand
4											15/04/2019
					6	SS	16			PP = 295 kPa	
5		- Cobbles/boulders inferred from auger grinding at a depth of 5 m									
6					7	SS	19			PP = 320 kPa	
7											
8					8	SS	50			PP = 440 kPa	
9											
					9	SS	30			PP = 440 kPa	
				253.25							
		END OF BOREHOLE.		9.75							
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-1000/2000

LOCATION: Lat. 43.747266 Long. -79.811592
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-08

BORING DATE: April 5, 2019

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		Notes: 1. Water level measured in monitoring well as follows: Date Depth Elev. (m) April 5, 2019 3.96 mbgs 259.04 m April 17, 2019 1.24 mbgs 261.76 m 2. PP= unconfined compressive strength measured with pocket penetrometer in the field.									
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-1000/2000

LOCATION: Lat. 43.745322 Long. -79.814288
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-09

BORING DATE: April 3, 2019

SHEET 1 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		256.95							
0	CME 75 Track Mount Power Auger, 100 mm Solid Stem	TOPSOIL (430 mm)		0.00	1A	SS	3				
				256.52							
		(CL) sandy SILTY CLAY, trace organics, trace gravel; light brown mottled with oxidation staining; cohesive, w<PL, soft		0.43 / 256.34	1B	SS				PP = 125 kPa	
				0.61							
1		(CL) SILTY CLAY, some sand, trace gravel, inferred cobbles; brown mottled with oxidation staining, (TILL); cohesive, w<PL, very stiff			2	SS	17			PP = 440 kPa	
					3	SS	22		○	PP = 440 kPa	
2											
		- SAND and silty clay encountered at a depth of 2.3 m to 5.5 m			4	SS	23		○	PP = 420 kPa	Bentonite
3		- Cobbles/boulders inferred from auger grinding at a depth of 3 m			5	SS	23			PP = 245 kPa	
				252.99							
4		(CL-ML/CL) CLAYEY SILT to SILTY CLAY, trace sand, trace gravel; grey, (TILL); cohesive, w~PL, stiff		3.96							
					6	SS	9			PP = 125 kPa	
5											
				251.16							Sand
		(SM-SW) SILTY SAND to sand, medium grained, some silt, trace gravel; light brown; non-cohesive, wet, compact		5.79							
6					7	SS	27		○		17/04/2019
											Screen and Sand
7											
8				248.72	8	SS	16				Bentonite
		END OF BOREHOLE.		8.23							
9		Notes: 1. Water level measured at 6.57 mbgs upon completion of drilling. 2. Water level measured in monitoring well as follows: Date Depth Elev. (m) April 17, 2019 6.54 mbgs 250.41 m 3. PP= unconfined compressive strength measured with pocket penetrometer in									
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-1000/2000

LOCATION: Lat. 43.745322 Long. -79.814288
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-09

BORING DATE: April 3, 2019

SHEET 2 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		the field.									
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-4000

LOCATION: Lat. 43.74607 Long. -79.817117
(See Figure 1)

RECORD OF BOREHOLE: BH19-10

BORING DATE: April 3, 2019

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		267.80							
0	CME 75 Track Mount Power Auger, 100 mm Solid Stem	TOPSOIL (230 mm)		0.00 / 267.57	1A	SS					
		(CL-ML) CLAYEY SILT, some sand, trace gravel; dark brown to brown, mottled; cohesive, w~PL, firm		0.23 / 267.04	1B	SS	5				
1		(CL) sandy SILTY CLAY, some sand, trace gravel, contains inferred cobbles/boulders; light brown with oxidation staining, (TILL); cohesive, w<PL, very stiff to hard		0.76	2	SS	18				
2					3	SS	29			MH	
					4	SS	35				
3		- Auger grinding on inferred cobbles at a depth of 3 m			5	SS	31				
4											2/04/2019
					6A	SS					
5		(CL-ML) CLAYEY SILT, some sand, some gravel; grey, (TILL); cohesive, w~PL to w>PL, stiff to very stiff		4.94 / 262.86	6B	SS	25				
					7A	SS					
6					7B	SS	10				
					8	SS	22				
		END OF BOREHOLE.		6.71 / 261.09							
7		Notes: 1. Water level measured at 4.1 mbgs upon completion of drilling.									
8											
9											
10											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-4000

LOCATION: Lat. 43.74736 Long. -79.816608
(See Figure 1)

RECORD OF BOREHOLE: BH19-11

BORING DATE: April 3, 2019

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		265.00							
0	CME 75 Track Mount Power Auger, 100 mm Solid Stem	TOPSOIL (230 mm)		0.00 / 264.77	1A	SS					
		(CL) sandy SILTY CLAY, trace gravel; brown, mottled brown/light brown; cohesive, w<PL, firm to stiff - Cobbles/boulders inferred from auger grinding at 6 m		0.23	1B	SS	10				
1					2	SS	4			MH	
				263.60							
		(CL) sandy SILTY CLAY, trace gravel; mottled light brown to brown, (TILL); cohesive, w<PL, very stiff to hard		1.40	3	SS	10				
2											
					4	SS	28				
3											
					5	SS	29				
4											
					6	SS	33				
5											
6											
					7	SS	30				
				258.29							
		END OF BOREHOLE.		6.71							
7		Notes: 1. Borehole dry upon completion of drilling.									
8											
9											
10											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-1000

LOCATION: Lat. 43.748408 Long. -79.813559
(See Figure 1)

RECORD OF BOREHOLE: BH19-12

BORING DATE: April 4, 2019

SHEET 1 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		266.33							
0	CME 75 Track Mount Power Auger, 100 mm Solid Stem	TOPSOIL (380 mm)		0.00 / 265.95	1A	SS	5				
		(CL) sandy SILTY CLAY, trace gravel, trace organics; brown with oxidation staining; w<PL, firm		0.38 / 265.57	1B	SS				PP = 25 kPa	
1		(CL) sandy SILTY CLAY, trace gravel; brown with oxidation staining, (TILL); cohesive, w<PL, stiff to hard		0.76	2	SS	10			PP = 220 kPa MH	
					3	SS	9			PP = 220 kPa	
2					4	SS	30			PP = 440 kPa	
3		- Cobbles inferred from auger grinding at 3 m			5	SS	33			PP = 345 kPa	
4		(SM) gravelly SILTY SAND, trace clay nodules, slight plasticity; light brown; non-cohesive, moist, dense to very dense		262.23 / 4.10	6A	SS					
					6B	SS	113			MH	
5		- Cobbles/boulders inferred from auger grinding at 5.3 m									
6		- Becoming silty sand, some gravel below a depth of 6.2 m			7	SS	150			MH	
7											
8					8	SS	32				
9											
		- Contains layers of fine sand and silt, some clay below depth of 9.2 m			9	SS	47			MH	
10					10	SS	42				

CONTINUED NEXT PAGE

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-1000

LOCATION: Lat. 43.748408 Long. -79.813559
(See Figure 1)

RECORD OF BOREHOLE: BH19-12

BORING DATE: April 4, 2019

SHEET 2 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10		(SM) gravelly SILTY SAND, trace clay nodules, slight plasticity; light brown; non-cohesive, moist, dense to very dense		255.81	10	SS	42		○		
		END OF BOREHOLE.		10.52							
11		Notes: 1. Borehole dry upon completion of drilling. 2. PP= unconfined compressive strength measured with pocket penetrometer in the field.									
12											
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-1000/2000

LOCATION: Lat. 43.749709 Long. -79.812182
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-13

BORING DATE: April 4, 2019

SHEET 1 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl; 10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		267.61							
0	CME 75 Track Mount Power Auger 100 mm Solid Stem	TOPSOIL (300 mm)		0.00 / 267.31	1A	SS	5				
		(CL) SILTY CLAY, some sand, trace organics; dark brown; cohesive, w<PL, firm		0.30 / 266.65	1B	SS					
1		(CL) SILTY CLAY and SAND, trace gravel, inferred cobbles/boulders; mottled light brown/brown, (TILL); w<PL, very stiff to hard		0.96	2	SS	17			PP = 320 kPa	
		- Cobbles/boulders inferred from auger grinding at 1.7 m			3	SS	19			PP = 320 kPa	
2					4	SS	22			PP = 340 kPa	
3					5	SS	33			PP = 440 kPa MH	Bentonite
4		(SM) gravelly SILTY SAND, cobbles/boulders inferred from auger grinding; light brown; non-cohesive, dry to moist, very dense		263.61 / 4.00	6	SS	154			MH	
5		- Heavy auger grinding below depth of 5.4 m									
6					7	SS	115				
7		(ML) sandy SILT, with slight plasticity, trace gravel; light brown; moist, very dense		259.99 / 7.62							Sand
8					8	SS	138			MH	
9					9	SS	137				Screen and Sand
10					10	SS	146				17/04/2019
		CONTINUED NEXT PAGE									

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-1000/2000

LOCATION: Lat. 43.749709 Long. -79.812182
(See Figure 1)

RECORD OF BOREHOLE: BH/MW19-13

BORING DATE: April 4, 2019

SHEET 2 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10		(ML) sandy SILT, with slight plasticity, trace gravel; light brown; moist, very dense		257.09	10	SS	146		⊕	MH	Screen and Sand
		END OF BOREHOLE.		10.52							
11		Notes: 1. Borehole dry upon completion of drilling. 2. Water level measured in monitoring well as follows: Date Depth Elev. (m) April 17, 2019 9.45 mbgs 258.16 m 3. PP= unconfined compressive strength measured with pocket penetrometer in the field.									
12											
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-1000/5000

LOCATION: Lat. 43.749015 Long. -79.809338
(See Figure 1)

RECORD OF BOREHOLE: BH19-14

BORING DATE: April 5, 2019

SHEET 1 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		269.00							
0	CME 75 Track Mount Power Auger 100 mm Solid Stem	TOPSOIL (300 mm)		0.00	1A	SS	6				
				268.70	1B	SS					
		(CL) sandy SILTY CLAY, trace to some gravel; brown with oxidation staining, (TILL); cohesive, w<PL, firm to hard		0.30							
1					2	SS	19			PP = 320 kPa MH	
2					3	SS	21			PP = 320 kPa	
		- Cobbles/boulders inferred from auger grinding at 2.3 m			4	SS	23			PP = 245 kPa	
3					5	SS	36			PP = 340 kPa	
4				265.00							
		(SM) SILTY SAND, trace gravel; light brown; moist, compact to dense		4.00							
5					6	SS	24				
6					7	SS	32			MH	
7				261.99							
		(CL) sandy SILTY CLAY, trace gravel; brown, (TILL); cohesive, w~PL, hard		7.01							
					8A	SS	94			PP = 440 kPa	
8				261.00							
		(ML/SM) gravelly sandy SILT to gravelly SILTY SAND, fine grained, trace clay, slight plasticity, trace cobbles inferred from auger grinding; light brown; non-cohesive, moist, very dense		8.00	8B	SS					
9					9	SS	96				
				259.25							
		END OF BOREHOLE.		9.75							
10		*CONTINUED NEXT PAGE*									

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-1000/5000

LOCATION: Lat. 43.749015 Long. -79.809338
(See Figure 1)

RECORD OF BOREHOLE: BH19-14

BORING DATE: April 5, 2019

SHEET 2 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	SOIL PROFILE: STRATA PLOT	SOIL PROFILE: ELEV. / DEPTH (m)	SAMPLES: NUMBER	SAMPLES: TYPE	SAMPLES: BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp — W — Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
10		*--- CONTINUED FROM PREVIOUS PAGE ---*									
		Notes: 1. Borehole dry upon completion of drilling. 2. PP= unconfined compressive strength measured with pocket penetrometer in the field.									
11											
12											
13											
14											
15											
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-1000/5000

LOCATION: Lat. 43.751797 Long. -79.80950
(See Figure 1)

RECORD OF BOREHOLE: BH19-15

BORING DATE: April 1, 2019

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m; SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○)	HYDRAULIC CONDUCTIVITY, k, cm/s; WATER CONTENT PERCENT (Wp, W, Wl)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		263.50							
0	CME 75 Track Mount Power Auger, 100 mm Solid Stem	TOPSOIL (300 mm)		0.00 / 263.20	1A	SS	7				
		(CL) SILTY CLAY, trace organics, trace gravel; brown; cohesive, w>PL, firm		0.30 / 262.89	1B	SS					
1		(CL) SILTY CLAY and SAND, trace gravel; mottled light brown to brown, (TILL); cohesive, w<PL, firm to stiff		0.61	2	SS	7				
					3A	SS	13			PP = 250 kPa	
2		(CL-ML) CLAYEY SILT, some sand to sandy, trace gravel; grey, (TILL); cohesive, w<PL, stiff to hard		1.98	3B	SS					
					4	SS	14			PP = 345 kPa, MH	
3					5	SS	15			PP = 250 kPa	
4											
5					6	SS	31			PP = 300 kPa	
6					7	SS	15			PP = 320 kPa	
7											
8		- Contains sand layers at 7.8 m			8	SS	17			PP = 320 kPa	
9					9A	SS	27			PP = 320 kPa	
				253.84							
10		(SM) SILTY SAND to SILT, trace to some clay; grey; wet, compact		9.66	9B	SS				MH	
		CONTINUED NEXT PAGE									

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-1000/5000

LOCATION: Lat. 43.751797 Long. -79.80950
(See Figure 1)

RECORD OF BOREHOLE: BH19-15

BORING DATE: April 1, 2019

SHEET 2 OF 2

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ●, rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		--- CONTINUED FROM PREVIOUS PAGE ---									
10	CME 75 Track Mount Power Auger 100 mm Solid Stem	(SM) SILTY SAND to SILT, trace to some clay; grey; wet, compact		253.01							
		(CL-ML) CLAYEY SILT, some sand to sandy, trace gravel; grey, (TILL); cohesive, w<PL, hard		10.49							
11					10	SS	45		○	PP = 440 kPa	
12		- Increased sand content below 12.5 m depth			11	SS	41		○ W	PP = 440 kPa MH	
13											
14				249.17	12	SS	31		○	PP = 420 kPa	
		END OF BOREHOLE.		14.33							
15		Notes: 1. Water level measured at 6.0 mbgs upon completion of drilling. 2. PP= unconfined compressive strength measured with pocket penetrometer in the field.									
16											
17											
18											
19											
20											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-1000/5000

LOCATION: Lat. 43.751797 Long. -79.80950
(See Figure 1)

RECORD OF BOREHOLE: BH19-16

BORING DATE: March 26, 2019

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80)	SHEAR STRENGTH Cu, kPa (nat V. +, rem V. ⊕, Q - ●, U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3})	WATER CONTENT PERCENT (Wp, W, Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		257.00									
0	CME 75 Track Mount Power Auger, 100 mm Solid Stem	TOPSOIL (330 mm)		0.00	1A	SS	4						
				256.67	1B	SS						MH	
		(CL-ML) sandy CLAYEY SILT, trace to some gravel, trace organics; brown to grey; cohesive, w>PL, soft		0.33 / 256.39									
		(CL) sandy SILTY CLAY, trace sand, trace gravel; light brown, (TILL); cohesive, w<PL, stiff to very stiff		0.61	2	SS	12						
1													
					3	SS	25						▽ 26/03/2019
2					4	SS	21						
3					5	SS	17						
				252.35	6A								
4		(CL-ML) CLAYEY SILT, trace gravel; grey, (TILL); cohesive, w<PL, stiff to very stiff - Silt/sand layer at a depth of 4.9 m		4.65	6B	SS	14						
5													
6		- Silty sand/sandy silt layer at a depth of 6 m - 6.2 m			7A	SS							
					7B	SS	27						
					7C	SS							
				250.29									
		END OF BOREHOLE		6.71									
7		Notes: 1. Water level measured at 1.4 mbgs upon completion of drilling.											
8													
9													
10													

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-1000/5000

LOCATION: Lat. 43.753061 Long. -79.806846
(See Figure 1)

RECORD OF BOREHOLE: BH19-17

BORING DATE: March 28, 2019

SHEET 1 OF 1

DATUM: Geodetic

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE		269.50							
0	CME 75 Track Mount Power Auger 100 mm Solid Stem	TOPSOIL (330 mm)		0.00 / 269.17	1A	SS	12				
		(CL) SILTY CLAY and SAND to sandy SILTY CLAY, trace gravel; light brown with oxidation staining, (TILL); cohesive, w<PL, stiff to very stiff		0.33	1B	SS					
1					2A	SS	18				
					2B	SS				MH	
2					3	SS	29				
					4	SS	14				
3					5	SS	29				▽ 28/03/2019
4				264.93							
		(CL-ML) CLAYEY SILT, some sand, trace gravel; grey, (TILL); cohesive, w<PL, hard		4.57	6	SS	34				
5											
6					7	SS	46				
				262.79							
		END OF BOREHOLE.		6.71							
7		Notes: 1. Water level measured at 3.4 mbgs upon completion of drilling.									
8											
9											
10											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

PROJECT: 19115264-6000

LOCATION: Lat. 43.753587 Long. -79.803241
(See Figure 1)

RECORD OF BOREHOLE: BH19-18

BORING DATE: March 27, 2019

SHEET 1 OF 1

DATUM: Existing Ground Surface

DEPTH SCALE METRES	BORING METHOD	SOIL PROFILE: DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	SAMPLES: NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	CME 75 Track Mount Power Auger 100 mm Solid Stem	TOPSOIL (200 mm)		0.00	1A	SS					
		(CL) sandy SILTY CLAY, trace to some gravel with cobbles/boulders inferred from auger grinding; brown to light brown with oxidation staining, (TILL); cohesive, w<PL, stiff to hard		0.20	1B	SS	11				
1					2	SS	22				
2					3	SS	38				
					4	SS	35			MH	▽ 27/03/2019
3					5	SS	35				
4											
					6	SS	52				
5											
6		(CL/ML) CLAYEY SILT, trace sand; grey, (TILL); cohesive, w>PL, hard		6.10	7	SS	33				
7		END OF BOREHOLE Notes: 1. Water level measured at 2.7 mbgs upon completion of drilling.		6.71							
8											
9											
10											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

PROJECT: 19115264-6000

LOCATION: Lat. 43.754896 Long. -79.804943
(See Figure 1)

RECORD OF BOREHOLE: BH19-19

BORING DATE: March 26, 2019

SHEET 1 OF 1

DATUM: Existing Ground Surface

DEPTH SCALE METRES	BORING METHOD	DESCRIPTION	STRATA PLOT	ELEV. / DEPTH (m)	NUMBER	TYPE	BLOWS/0.3m	DYNAMIC PENETRATION RESISTANCE, BLOWS/0.3m (20 40 60 80) / SHEAR STRENGTH Cu, kPa (nat V. + Q - ● / rem V. ⊕ U - ○) (20 40 60 80)	HYDRAULIC CONDUCTIVITY, k, cm/s (10^{-6} 10^{-5} 10^{-4} 10^{-3}) / WATER CONTENT PERCENT (Wp W Wl) (10 20 30 40)	ADDITIONAL LAB. TESTING	PIEZOMETER OR STANDPIPE INSTALLATION
		GROUND SURFACE									
0	CME 75 Track Mount Power Auger 100 mm Solid Stem	TOPSOIL (610 mm)		0.00	1	SS	4				
1		(CL) sandy SILTY CLAY, some sand, trace gravel with cobbles/boulders inferred from auger grinding; brown with oxidation staining, (TILL); w<PL, very stiff to hard		0.61	2	SS	26			MH	
2					3	SS	40				
3					4	SS	49				
4		- Increased sand content at a depth of 4.6 m			5	SS	54				
5					6	SS	55				
					7	SS	86				
6		(SM) SILTY SAND, fine grained, inferred cobbles/boulders; light brown; non-cohesive, moist, very dense		5.18	8	SS	95				
					9	SS	100				
7		END OF BOREHOLE.		6.71							
		Notes: 1. Borehole dry upon completion of drilling.									
8											
9											
10											

DEPTH SCALE
1 : 50

GOLDER

LOGGED: JD
CHECKED: EM

GTA-BHS 001 G:_CLIENTS\CLEARBROOKDEVELOPMENTS\CALEDON\12_GINT\19115264-SNELLSHOLLOW BH LOGS.GPJ GAL-MIS.GDT 17/6/19 JMC

EDWARD WONG

BORING NUMBER 1

CLIENT Dilip Kumar Jain
PROJECT NAME 3278 Mayfield Road
PROJECT NUMBER Ma002995a
PROJECT LOCATION Town of Caledon

DATE STARTED 10/19/17 **COMPLETED** 10/19/17
GROUND ELEVATION 270 m **HOLE SIZE** 150 mm
DRILLING CONTRACTOR Fadroy Enterprise
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Augers
AT TIME OF DRILLING Dry
LOGGED BY J.J. **CHECKED BY** E.W.
AT END OF DRILLING Dry
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION
	SS 1	3-4-5-7 (9)	MC = 17%		0.20 **TOPSOIL** - ~200 mm thick. 269.80
1	SS 2	5-6-10 (16)	PP = 400 kPa MC = 17%		**CLAYEY SILT** - some sand, occasional gravel, brown, very moist, hard.
2	SS 3	4-6-10 (16)	PP >450 kPa MC = 15%		
3	SS 4	6-10-14 (24)	PP >450 kPa MC = 14%		3.00 267.00
	SS 5	5-10-12 (22)	PP >450 kPa MC = 11%		**SAND TILL** - trace clay, trace gravel, brown, very moist, compact.
4					
5	SS 6	6-16-20 (36)	PP >450 kPa MC = 13%		-becoming dense below ~4.5 m depth
6					
	SS 7	50-0-0/-0.15	PP >450 kPa MC = 10%		6.15 -becoming very dense below ~6.0 m depth 263.85
					Bottom of hole at 6.15 m.

EDWARD WONG

WELL NUMBER 2

CLIENT Dilip Kumar Jain
PROJECT NAME 3278 Mayfield Road
PROJECT NUMBER Ma002995a
PROJECT LOCATION Town of Caledon

DATE STARTED 10/19/17 **COMPLETED** 10/19/17
GROUND ELEVATION 270 m **HOLE SIZE** 150 mm
DRILLING CONTRACTOR Fadroy Enterprise
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Augers
AT TIME OF DRILLING Dry
LOGGED BY J.J. **CHECKED BY** E.W.
AT END OF DRILLING Dry
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	SS 1	3-7-10-7 (17)	MC = 15%		0.20 **TOPSOIL** - ~200 mm thick. 269.80	
					SILTY SAND - scattered clay seams, brown, moist, loose.	
1	SS 2	2-2-3 (5)	MC = 5%		-becoming loose below ~0.75 m depth	Bentonite
	SS 3	2-4-5 (9)	MC = 20%		-becoming wet below ~1.5 m depth	
2					2.25 267.75	
	SS 4	8-11-14 (25)	PP >450 kPa MC = 14%		**CLAYEY SILT** - trace sand, brown, very moist, hard.	50 mm dia. PVC Riser Pipe, Filter Sand
3						
	SS 5	5-10-15 (25)	PP >450 kPa MC = 14%			
4						
	SS 6	5-10-11 (21)	PP = 400 kPa MC = 14%		4.50 265.50 **SILTY CLAY** - mottled brown and grey, very moist, hard.	50 mm dia. PVC Slotted Pipe, Filter Sand
5						
6						
	SS 7	4-8-11 (19)	PP = 300 kPa MC = 12%		-becoming grey and stiff below ~6.0 m depth	
					6.45 263.55	
					Bottom of hole at 6.30 m.	

EDWARD WONG

WELL NUMBER 3

CLIENT Dilip Kumar Jain
PROJECT NAME 3278 Mayfield Road
PROJECT NUMBER Ma002995a
PROJECT LOCATION Town of Caledon

DATE STARTED 10/18/17 **COMPLETED** 10/18/17
GROUND ELEVATION 270 m **HOLE SIZE** 150 mm
DRILLING CONTRACTOR Fadroy Enterprise
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Augers
AT TIME OF DRILLING Dry
LOGGED BY J.J. **CHECKED BY** E.W.
AT END OF DRILLING 5.25 m / Elev 264.75 m
NOTES
AFTER DRILLING 5.25 m / Elev 264.75 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	SS 1	3-6-8-11 (14)	MC = 14%		0.20 **TOPSOIL** - ~200 mm thick. 269.80 **SANDY SILT** - rootlets, brown, very moist, compact.	
1	SS 2	6-12-27 (39)	MC = 11%		-becoming dense below ~0.75 m depth	Bentonite
	SS 3	10-15-17 (32)	PP >450 kPa MC = 9%		1.50 268.50 **CLAYEY SILT**- some sand, trace gravel, oxidized, brown, very moist, hard.	
2	SS 4	13-17-22 (39)	PP >450 kPa MC = 13%			50 mm dia. PVC Riser, Filter Sand
3	SS 5	11-16-22 (38)	PP >450 kPa MC = 13%			
4						
5	SS 6	19-28-25 (53)	MC = 9%		4.60 265.40 **FINE TO MEDIUM SAND** - some silt, trace clay, brown, wet, very dense.	50 mm dia. PVC Slotted Pipe, Filter Sand
6					6.00 264.00	
	SS 7	12-23-30 (53)	PP = 400 kPa MC = 10%		**SILTY CLAY** - scattered wet sand seams, grey, wet, hard. 6.45 263.55	
					Bottom of hole at 6.45 m.	

EDWARD WONG

BORING NUMBER 4

CLIENT Dilip Kumar Jain
PROJECT NAME 3278 Mayfield Road
PROJECT NUMBER Ma002995a
PROJECT LOCATION Town of Caledon

DATE STARTED 10/18/17 **COMPLETED** 10/18/17
GROUND ELEVATION 270 m **HOLE SIZE** 150 mm
DRILLING CONTRACTOR Fadroy Enterprise
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Augers
AT TIME OF DRILLING Dry
LOGGED BY J.J. **CHECKED BY** E.W.
AT END OF DRILLING Dry
NOTES
AFTER DRILLING Dry

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION
	SS 1	3-11-13-12 (24)	MC = 8%		0.20 **TOPSOIL** - ~200 mm thick. 269.80 **FILL** - ~ 1 m of brown sandy silt with rootlets, very moist over ~3,3 m of brown clayey silt, rootlets, organic inclusions, very moist.
1	SS 2	8-6-6 (12)	MC = 11%		
	SS 3	4-4-6 (10)	MC = 11%		
2					
	SS 4	4-7-8 (15)	MC = 14%		
3					
	SS 5	4-7-7 (14)	MC = 17%		
4					4.50 265.50
	SS 6	8-14-20 (34)	PP >450 kPa MC = 10%		**CLAYEY SILT** - some sand, trace gravel, brown, very moist, hard.
5					
6					6.30 263.70
	SS 7	20-50-0/0.00	PP >450 kPa MC = 8%		Bottom of hole at 6.30 m.

EDWARD WONG

WELL NUMBER 5

CLIENT Dilip Kumar Jain
PROJECT NAME 3278 Mayfield Road
PROJECT NUMBER Ma002995a
PROJECT LOCATION Town of Caledon

DATE STARTED 10/18/17 **COMPLETED** 10/18/17
GROUND ELEVATION 265 m **HOLE SIZE** 150 mm
DRILLING CONTRACTOR Fadroy Enterprise
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Augers
AT TIME OF DRILLING Dry
LOGGED BY J.J. **CHECKED BY** E.W.
AT END OF DRILLING 2.85 m / Elev 262.15 m
NOTES
AFTER DRILLING 2.85 m / Elev 262.15 m

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION	WELL DIAGRAM
	SS 1	1-3-3-3 (6)	MC = 23%		**TOPSOIL** - ~600 mm thick.	
					0.60 / 264.40	
1	SS 2	3-4-5 (9)	MC = 16%		**FILL** - clayey silt, rootlets, topsoil inclusions, dark brown and brown, very moist.	Bentonite
2	SS 3	2-4-5 (9)	MC = 22%			
	SS 4	4-7-10 (17)	MC = 19%			50 mm dia. PVC Riser, Filter Sand
3					▼	
	SS 5	2-5-9 (14)	MC = 21%			
4						
					4.50 / 260.50	
5	SS 6	3-6-8 (14)	PP = 400 kPa MC = 16%		**SILTY CLAY** - trace gravel, grey, very moist, hard.	50 mm dia. PVC Slotted Pipe, Filter Sand
6						
	SS 7	4-6-8 (14)	PP = 250 kPa MC = 16%		-becoming very stiff below ~6.0 m depth	
					6.45 / 258.55	
					Bottom of hole at 6.45 m.	

EDWARD WONG

BORING NUMBER 6

CLIENT Dilip Kumar Jain
PROJECT NAME 3278 Mayfield Road
PROJECT NUMBER Ma002995a
PROJECT LOCATION Town of Caledon

DATE STARTED 10/18/17 **COMPLETED** 10/18/17
GROUND ELEVATION 260 m **HOLE SIZE** 150 mm
DRILLING CONTRACTOR Fadroy Enterprise
GROUND WATER LEVELS:
DRILLING METHOD Solid Stem Augers
AT TIME OF DRILLING Dry
LOGGED BY J.J. **CHECKED BY** E.W.
AT END OF DRILLING Dry
NOTES
AFTER DRILLING ---

DEPTH (m)	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	TESTS	GRAPHIC LOG	MATERIAL DESCRIPTION
	SS 1	4-5-5-5 (10)	MC = 17%		0.20 **TOPSOIL** - ~200 mm thick. 259.80 **SILTY SAND** - scattered clay seams, brown, loose.
1	SS 2	6-13-20 (33)	PP >450 kPa MC = 14%		0.90 259.10 **CLAYEY SILT** - some sand, trace gravel, oxidized, brown, very moist, hard.
2	SS 3	6-16-24 (40)	PP >450 kPa MC = 13%		
3	SS 4	12-17-27 (44)	PP >450 kPa MC = 14%		
4	SS 5	6-11-21 (32)	PP >450 kPa MC = 15%		
5	SS 6	7-24-15 (39)	PP >450 kPa MC = 13%		
6					6.00 254.00
	SS 7	10-20-33 (53)	PP >450 kPa MC = 12%		**SAND TILL** - brown, very moist, very dense. 6.45 253.55 Bottom of hole at 6.45 m.

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Appendix B

MECP Well Records

Water Well Records

Wednesday, March 10, 2021
9:37:41 AM

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
BRAMPTON CITY	17 596375 4844940 W	2008/10 6607	2.31	FR 0020		DE		7116987 (M03959) A078526	BRWN SILT SAND LOAM 0000 BRWN SILT SAND CLAY 0011 GREY SILT CLAY SAND 0026 GREY SAND SLTY 0030
BRAMPTON CITY	17 596297 4844987 W	2008/01 7238			///:			7101931 (Z75197) A	
BRAMPTON CITY	17 596386 4845019 W	2007/11 7238	2.00				0036 10	7053188 (Z72692) A045333	BRWN TILL DNSE 0013 GREY TILL SAND DNSE 0046
BRAMPTON CITY (CHING	17 595484 4844068 W	2013/12 7238						7214726 (Z178723) A	
BRAMPTON CITY (CHING	17 596372 4844869 W	7341						7317249 (Z280513) A161274 A	
BRAMPTON CITY (CHING	17 596834 4845546 W	2005/04 6607	2.00	0021			0044 5	4909799 (Z27785) A026564	BRWN LOAM 0000 BRWN CLAY HARD 0015 BRWN SILT SAND 0025 BRWN SAND WBRG 0050
BRAMPTON CITY (CHING	17 596360 4845117 W	2013/09 7201	2			MO	0015 5	7209474 (Z167937) A088481	BRWN FILL SAND PCKD 0005 GREY SILT SAND HARD 0016 GREY SILT SAND WBRG 0020
BRAMPTON CITY (CHING	17 596864 4844951 W	2004/10 7230	1.97			NU	0005 10	4909676 (Z25166) A019982	BRWN SILT LOAM CLAY 0008 GREY SILT CLAY DNSE 0012 GREY SAND GRVL DNSE 0015
BRAMPTON CITY (CHING	17 596372 4844869 W	2014/05 7360						7232432 (C25987) A161274 P	
BRAMPTON CITY (CHING	17 596581 4845283 W	2014/09 7472						7232910 (Z197043) A	
BRAMPTON CITY (CHING	17 595485 4844014 W	2017/04 7472	2			MO	0010 10	7287411 (Z259492) A222955	BRWN LOAM LOOS 0001 BRWN CLAY SILT GRVL 0010 GREY TILL GRVL PCKD 0020
BRAMPTON CITY (CHING	17 595338 4843807 W	2017/04 7472	2			MO	0010 10	7287414 (Z259489) A222978	BRWN LOAM LOOS 0001 BRWN CLAY SILT GRVL 0015 BRWN SAND SILT GRVL 0020
BRAMPTON CITY (CHING	17 595337 4843807 W	2017/04 7472	2			MO	0032 10	7287415 (Z259488) A227330	BRWN LOAM LOOS 0001 BRWN CLAY SILT PCKD 0015 BRWN SAND SILT GRVL 0030 GREY SAND SILT GRVL 0042
BRAMPTON CITY (CHING	17 595353 4843730 W	2017/10 7383	2			TH MO	0017 5	7300013 (Z269793) A238990	TILL CLAY SLTY 0022

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
BRAMPTON CITY (CHING	17 595319 4843745 W	2017/11 7383	2			TH MO	0015 5	7300014 (Z269813) A238885	BRWN SAND GRVL 0020
BRAMPTON CITY (CHING	17 595386 4843688 W	2017/11 7383	3			TH MO	0018 5	7300015 (Z269812) A238884	BRWN SAND GRVL 0023
BRAMPTON CITY (CHING HS E 01 018	17 595154 4843733 W	1969/10 5420	5	FR 0105	88/118/6/5:0	DO	0124 4	4903391 ()	FILL 0002 BLUE CLAY MSND 0065 BLUE CLAY SILT 0085 GREY FSND 0105 GREY CSND 0128
BRAMPTON CITY (CHING HS E 02 016	17 595764 4843844 W	1962/07 3512	7	FR 0079	36/38/10/11:30	DO	0079 4	4901213 ()	LOAM 0001 YLLW CLAY 0038 BLUE CLAY 0044 BLUE CLAY MSND 0049 BLUE CLAY GRVL 0062 GRVL MSND 0071 GRVL 0083
BRAMPTON CITY (CHING HS E 02 016	17 595766 4843839 W	1964/08 1307	30	FR 0021	10//2/:	DO		4901214 ()	BRWN LOAM 0005 RED SHLE 0021
BRAMPTON CITY (CHING HS E 02 017	17 595978 4844577 W	1958/11 2801	5			NU		4901222 ()	CLAY 0002 BLCK MUCK 0006 MSND GRVL 0036 BLUE CLAY GRVL 0096 LMSN 0097
BRAMPTON CITY (CHING HS E 02 017	17 595908 4844506 W	1964/07 2801	5			NU		4901236 ()	BRWN CLAY GRVL 0008 BLUE CLAY GRVL 0026 GRVL MSND CLAY 0043 MSND GRVL SILT 0063 FSND SILT 0085 FSND CLAY GRVL 0127 MSND GRVL SILT 0141 MSND SILT 0143 MSND GRVL 0148 SHLE 0160
BRAMPTON CITY (CHING HS E 02 017	17 596404 4845000 W	1953/08 4623	5	FR 0127	45/100/10/48:0	DO		4901221 ()	BRWN CLAY 0010 BRWN CLAY GRVL 0070 HPAN 0120 MSND GRVL 0127
BRAMPTON CITY (CHING HS E 02 017	17 596184 4844274 W	1960/12 1307	30	FR 0053	53//1/2:0	PS		4901224 ()	BRWN LOAM MSND 0053 BRWN MSND 0060 GREY MSND 0067
BRAMPTON CITY (CHING HS E 02 017	17 596294 4844495 W	1960/07 3512	4	SA 0300	60/300/1/0:30	NU		4901223 () A	YLLW CLAY 0090 FSND CLAY 0140 FSND 0142 BLUE CLAY MSND 0210 BLUE SHLE 0312
BRAMPTON CITY (CHING HS E 02 017	17 595708 4844028 W	1964/01 2801	2	FR 0136	60///:	NU	0136 11	4901225 ()	BRWN CLAY 0016 BRWN CLAY GRVL 0029 GRVL MSND 0032 MSND GRVL 0043 FSND SILT 0116 GRVL MSND 0119 CLAY MSND GRVL 0145 SHLE 0160
BRAMPTON CITY (CHING HS E 02 017	17 595550 4844064 W	1964/01 2801	5			NU		4901226 ()	BLCK MUCK 0002 BLUE CLAY 0019 MSND GRVL 0021 FSND SILT 0044 BLUE CLAY 0045 SILT FSND 0082 RED CLAY GRVL MSND 0112 FSND SILT GRVL 0128 BLUE SHLE 0140
BRAMPTON CITY (CHING HS E 02 017	17 595766 4844320 W	1964/01 2801	2	FR 0112	32/49/20/6:0	NU	0118 22	4901227 ()	LOAM 0001 CLAY GRVL 0020 MSND CLAY 0037 SILT 0063 SILT CLAY FSND 0112 GRVL FSND 0121 GRVL MSND CLAY 0125 MSND GRVL 0140 CLAY GRVL 0151 SHLE 0161
BRAMPTON CITY (CHING HS E 02 017	17 595808 4844490 W	1964/01 2801	2	FR 0133	66///:	NU	0145 11	4901228 ()	BRWN CLAY GRVL 0027 BLUE CLAY 0048 FSND SILT 0117 FSND SILT CSND 0130 FSND SILT 0133 FSND SILT CSND 0148 GRVL MSND BLDR 0155 BLUE CLAY MSND GRVL 0181 SHLE 0182
BRAMPTON CITY (CHING HS E 02 017	17 595804 4844292 W	1964/07 2801	5			NU		4901237 ()	BRWN CLAY GRVL 0010 BLUE CLAY GRVL 0021 MSND GRVL 0035 CLAY SILT MSND 0109 GRVL FSND 0115 GRVL FSND CLAY 0118 CLAY MSND GRVL 0140 STNS SHLE 0160

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
BRAMPTON CITY (CHING HS E 02 017	17 595946 4844509 W	1964/07 2801	2	FR 0148	68///:	NU	0148 11	4901235 ()	BRWN CLAY GRVL 0037 BLUE CLAY 0045 BRWN MSND GRVL 0053 BLUE CLAY SILT 0058 FSND SILT CLAY 0110 MSND FSND GRVL 0136 GRVL MSND SILT 0159 GREY CLAY MSND 0167 SHLE 0188
BRAMPTON CITY (CHING HS E 02 017	17 595930 4844474 W	1964/07 2801	5			NU		4901234 ()	BRWN CLAY GRVL 0006 BRWN GRVL MSND 0010 BRWN CLAY MSND GRVL 0028 FSND SILT 0109 MSND FSND GRVL 0131 CLAY MSND GRVL 0171 LMSN 0179
BRAMPTON CITY (CHING HS E 02 017	17 595764 4844067 W	1964/07 2801	2	FR 0046	26///:	NU		4901233 ()	BRWN CLAY 0010 BLUE CLAY MSND GRVL 0028 BRWN MSND GRVL 0031 BLUE CLAY MSND GRVL 0046 FSND SILT GRVL 0059 SILT 0085 FSND GRVL BLDR 0095 RED CLAY MSND 0097 BLUE CLAY 0106 RED CLAY MSND 0110 BLUE SHLE 0118
BRAMPTON CITY (CHING HS E 02 017	17 595978 4844242 W	1964/07 2801	2	FR 0031	37///:	NU		4901232 ()	BRWN CLAY GRVL 0027 BLUE CLAY 0031 FSND SILT CLAY 0107 GRVL MSND CLAY 0129 LMSN SHLE 0139
BRAMPTON CITY (CHING HS E 02 017	17 595880 4844276 W	1964/06 2801	2			NU		4901231 ()	BRWN CLAY 0006 MSND GRVL BLDR 0021 BLUE CLAY MSND GRVL 0063 FSND CLAY 0105 MSND FSND GRVL 0112 GREY CLAY GRVL MSND 0137 SHLE 0144
BRAMPTON CITY (CHING HS E 02 017	17 595754 4844307 W	1964/02 2801	5			NU		4901229 ()	LOAM 0001 CLAY MSND 0015 MSND GRVL CLAY 0032 CLAY SILT GRVL 0092 MSND GRVL SILT 0097 CLAY SILT 0117 MSND GRVL CLAY 0132 CLAY GRVL 0153 CLAY GRVL SHLE 0157
BRAMPTON CITY (CHING HS E 02 017	17 596445 4845021 W	2000/09 6409	6	FR 0080	45/72/7/1:30	DO	0093 4	4908624 (219860)	BLCK LOAM 0001 BRWN CLAY SAND LOAM 0023 BRWN SAND CLAY 0045 BLUE CLAY 0050 GREY SAND CLAY 0080 GREY SAND CLN 0097
BRAMPTON CITY (CHING HS E 02 017	17 596212 4844540 W	1964/02 2801	5			NU		4901230 ()	LOAM 0001 CLAY MSND GRVL 0034 CLAY SILT 0055 SILT CLAY 0120 GRVL SILT CLAY 0131 CLAY GRVL 0149 CLAY SHLE 0159
BRAMPTON CITY (CHING HS E 03 017	17 596720 4844871 W	1964/12 5203	5	FR 0069	69/150/4/72:0	DO	0162 8	4901343 ()	PRDG 0047 MSND CLAY 0158 MSND GRVL 0166 BLUE SHLE 0170
BRAMPTON CITY (CHING HS E 03 017	17 596758 4844952 W	1957/02 3514	4	FR 0080	39/69/6/4:0	DO		4901337 ()	PRDG 0048 BLUE CLAY 0080 FSND 0150 GRVL 0165
BRAMPTON CITY (CHING HS E 03 017	17 596518 4845030 W	1958/09 2801	5	FR 0114	25/28/30/1:0	NU		4901338 ()	LOAM 0001 CLAY GRVL BLDR 0114 MSND BLDR 0129 MSND 0132 GRVL 0140 CLAY GRVL 0142 LMSN 0143
BRAMPTON CITY (CHING HS E 03 017	17 596512 4845035 W	1958/10 2801	5	FR 0095	28/36/90/6:0	NU		4901339 ()	LOAM 0001 CLAY MSND 0010 CLAY GRVL 0050 CLAY MSND GRVL 0063 MSND SILT 0095 MSND 0121 GRVL 0138 CLAY GRVL 0139
BRAMPTON CITY (CHING HS E 03 017	17 596622 4845126 W	1958/10 2801	5	FR 0053	25/36/120/8:0	NU	0136 13	4901340 ()	LOAM 0001 CLAY MSND BLDR 0053 FSND 0067 GRVL 0110 CLAY GRVL 0149
BRAMPTON CITY (CHING HS E 03 017	17 596760 4844826 W	1962/10 4813	4	FR 0078	50/71/3/3:0	DO	0083 4	4901341 ()	BLCK LOAM 0001 BRWN CLAY 0026 BLUE CLAY 0067 QSND 0078 MSND 0087
BRAMPTON CITY (CHING HS E 03 017	17 596806 4845639 W	2002/03 1663				NU		4908962 (240034) A	
BRAMPTON CITY (CHING HS E 03 017	17 596824 4845628 W	1963/08 1325	30	FR 0032	2/20/5/1:0	DO		4901342 ()	BRWN CLAY MSND 0006 BLUE CLAY MSND 0032 BLUE CLAY 0033

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
BRAMPTON CITY (CHING HS E 03 017	17 596992 4845439 L	2003/11 6865				NU		4909279 (266867) A	
BRAMPTON CITY (CHING HS E 03 017	17 596490 4845088 W	1975/07 4320	5	FR 0103	65/71/5/3:0	DO	0103 3	4904742 ()	BRWN CLAY 0030 BLUE CLAY 0103 BLUE SAND 0106 BLUE CLAY GRVL SHLE 0155
CALEDON TOWN (ALBION	17 595244 4845062 W	2008/07 6875				MO		7113604 (Z87823) A	
CALEDON TOWN (ALBION	17 594955 4844706 W	2008/07 6875				MO		7113603 (Z87824) A	
CALEDON TOWN (ALBION	17 594892 4844697 W	2008/07 6875				MO		7113602 (Z87825) A	
CALEDON TOWN (ALBION	17 594781 4844912 W	2008/10 6875	1.97					7113601 (Z87868) A	
CALEDON TOWN (CHINGU	17 595340 4845198 W	2016/05 7148						7264136 (Z218595) A	
CALEDON TOWN (CHINGU	17 595467 4844139 W	2013/11 7238						7213014 (Z178703) A	
CALEDON TOWN (CHINGU	17 594880 4844685 W	2008/10 6875	35.4			NU		7120410 (Z87862) A	
CALEDON TOWN (CHINGU 01 018	17 595168 4844319 W	1988/01 4919	30 30	UK 0050	50/70//1:0	DO		4906849 (25712)	BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0050 GREY SAND LOOS 0075
CALEDON TOWN (CHINGU HS E 01 018	17 595294 4843961 W	1964/02 1325	18	FR 0047	44/52/1/1:0	DO		4901106 ()	PRDG 0047 BRWN FSND 0054 BLUE CLAY 0055
CALEDON TOWN (CHINGU HS E 01 018	17 595298 4843999 W	2009/10 7219	29		37///:	NU		7132312 (Z098404) A085720 A	
CALEDON TOWN (CHINGU HS E 01 018	17 595199 4844247 W	2010/05 7219	30		45///:	NU		7149886 (Z111913) A097062 A	
CALEDON TOWN (CHINGU HS E 01 018	17 595175 4844117 W	2010/08 3349				NU		7153619 (Z121403) A	
CALEDON TOWN (CHINGU HS E 01 018	17 595307 4843984 W	2010/08 3349						7153620 (Z121404) A	
CALEDON TOWN (CHINGU HS E 01 018	17 595176 4844171 W	2010/08 3349						7153621 (Z121405) A	
CALEDON TOWN (CHINGU HS E 01 018	17 595214 4844198 W	1968/04 1308	30	FR 0059	59/65/1/0:30	ST DO		4902950 ()	LOAM 0001 BRWN CLAY 0005 GRVL CLAY 0007 BRWN CLAY 0023 HPAN 0047 BRWN MSND 0069
CALEDON TOWN (CHINGU HS E 01 018	17 594970 4844232 W	2015/05 7147	70.8	FR 0003				7242251 (Z203295) A	
CALEDON TOWN (CHINGU HS E 01 018	17 595114 4844323 W	1972/10 3413	30	FR 0056	56/62/3/4:0	DO		4903885 ()	BRWN CLAY 0048 CSND 0056 BLUE SILT 0067

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (CHINGU HS E 01 019	17 594864 4844623 W	1980/07 1663	5	FR 0120	55/125/25/1:0	DO	0132 3	4905788 ()	BLCK LOAM 0001 YLLW CLAY 0016 BLUE CLAY GRVL SILT 0051 GREY GRVL CLAY 0054 BLUE CLAY GRVL 0082 GREY SAND GRVL DRTY 0087 BLUE CLAY GRVL 0105 GREY FSND SILT 0118 GREY MSND CGRD 0142
CALEDON TOWN (CHINGU HS E 01 019	17 594632 4844724 W	1959/01 1325	30	FR 0028	20///:	ST		4901110 ()	BRWN HPAN 0028 MSND 0032
CALEDON TOWN (CHINGU HS E 01 019	17 594702 4844653 W	2014/10 7147	1.97	FR 0008		MO	0003 10	7231012 (Z192028) A160985	BRWN SILT SAND 0027
CALEDON TOWN (CHINGU HS E 01 019	17 594624 4844799 W	1967/11 3413	30	FR 0015	15/22/5/24:0	DO		4901114 ()	BRWN CLAY 0002 MSND 0015 CSND 0026
CALEDON TOWN (CHINGU HS E 02 018	17 595314 4844348 W	1979/11 3637	30 32	FR 0060	59//14/3:0	ST DO		4905558 ()	BLCK LOAM 0002 BRWN CLAY 0016 BRWN STNS CLAY PCKD 0025 BRWN SAND STNS PCKD 0032 BRWN CSND STNS LOOS 0040 BRWN FSND 0060 GREY FSND MUCK 0077
CALEDON TOWN (CHINGU HS E 02 018	17 595150 4844356 W	1986/12 4919	30	UK 0042	42/58//1:0	DO		4906620 (NA)	BRWN LOAM HARD 0001 BRWN SAND PCKD 0062
CALEDON TOWN (CHINGU HS E 02 018	17 595678 4844817 L	2003/09 3108				NU		4909283 (262185) A	
CALEDON TOWN (CHINGU HS E 02 018	17 595196 4844416 W	1985/09 4919	30 30	UK 0060	58/75//:30	DO		4906456 ()	BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0060 GREY SAND LOOS 0082
CALEDON TOWN (CHINGU HS E 02 019	17 594860 4844766 W	1961/09 1325	30	FR 0025	20///:	ST		4901238 ()	BRWN CLAY 0011 BLUE CLAY MSND BLDR 0025 GRVL BLDR 0028
CALEDON TOWN (CHINGU HS E 02 019	17 595918 4845528 W	1966/05 4813	5	FR 0163	77/109/10/4:0	DO	0173 4	4901240 ()	BRWN CLAY 0016 BLUE CLAY 0037 MSND CLAY 0163 MSND 0177
CALEDON TOWN (CHINGU HS E 02 020	17 595116 4844355 W	1991/06 4005	6 6	UK 0192	52//0/3:0	DO		4907519 (76473)	BRWN CLAY SAND LOOS 0015 BRWN CLAY GRVL LOOS 0035 BRWN SAND GRVL LOOS 0040 GREY CLAY SAND LOOS 0105 GREY GRVL SAND LOOS 0108 GREY CLAY 0130 GREY GRVL SAND 0135 GREY CLAY 0155 GREY SHLE LYRD 0415
CALEDON TOWN (CHINGU HS E 02 020	17 595083 4844465 W	1992/05 4919	30	UK 0089	20/40/10/1:0	DO		4907657 (110916)	BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY SAND PCKD 0092
CALEDON TOWN (CHINGU HS E 03 018	17 596030 4845503 W	1964/11 4813	4	FR 0145	110/155/3/:	DO	0160 4	4901344 ()	BLCK LOAM 0001 MSND CLAY 0145 SILT LMSN 0164
CALEDON TOWN (CHINGU HS E 03 018	17 596118 4845362 W	1988/11 4919	30	UK 0060	60/80/5/1:0	DO		4906991 (35163)	BRWN LOAM HARD 0001 BRWN CLAY HARD 0020 GREY CLAY HARD 0060 GREY SAND LOOS 0083
CALEDON TOWN (CHINGU HS E 03 018	17 596118 4845362 W	1989/03 4005	6	UK 0200	65/160/7/8:30	DO		4907074 (42474)	BRWN CLAY SAND LOOS 0010 GREY CLAY SAND PCKD 0042 GREY SAND PCKD 0080 GREY CLAY SAND LOOS 0135 GREY CLAY LOOS 0180 GREY SAND FGVL PCKD 0181 GREY CLAY GRVL PCKD 0199 GREY GRVL FSND PCKD 0200
CALEDON TOWN (CHINGU HS E 03 019	17 595928 4845588 W	1959/05 1325	30	FR 0065	55///:	DO		4901345 ()	HPAN 0025 MSND 0055 BLUE HPAN 0065

TOWNSHIP CON LOT	UTM	DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
CALEDON TOWN (CHINGU HS E 03 019	17 595164 4844412 W	1989/11 3132	6 6	FR 0169	58//12/2:30	DO	0165 4	4907230 (65768)	BRWN CLAY STNS DNSE 0022 BLUE CLAY STNS DNSE 0036 BLUE CLAY GRVL DNSE 0047 BLUE SILT SOFT 0161 BLUE SAND STNS LOOS 0172 BLUE CLAY DNSE 0175
CALEDON TOWN (CHINGU HS E 03 019	17 595978 4845545 W	2012/04 2576				NU		7183229 (Z149233) A	

Notes:
UTM: UTM in Zone, Easting, Northing and Datum is NAD83; L: UTM estimated from Centroid of Lot; W: UTM not from Lot Centroid
DATE CNTR: Date Work Completedand Well Contractor Licence Number
CASING DIA: .Casing diameter in inches
WATER: Unit of Depth in Fee. See Table 4 for Meaning of Code

PUMP TEST: Static Water Level in Feet / Water Level After Pumping in Feet / Pump Test Rate in GPM / Pump Test Duration in Hour : Minutes
WELL USE: See Table 3 for Meaning of Code
SCREEN: Screen Depth and Length in feet
WELL: WEL (AUDIT #) Well Tag . A: Abandonment; P: Partial Data Entry Only
FORMATION: See Table 1 and 2 for Meaning of Code

1. Core Material and Descriptive terms

Code	Description	Code	Description	Code	Description	Code	Description	Code	Description
BLDR	BOULDERS	FCRD	FRACTURED	IRFM	IRON FORMATION	PORS	POROUS	SOFT	SOFT
BSLT	BASALT	FGRD	FINE-GRAINED	LIMY	LIMY	PRDG	PREVIOUSLY DUG	SPST	SOAPSTONE
CGRD	COARSE-GRAINED	FGVL	FINE GRAVEL	LMSN	LIMESTONE	PRDR	PREV. DRILLED	STKY	STICKY
CGVL	COARSE GRAVEL	FILL	FILL	LOAM	TOPSOIL	QRTZ	QUARTZITE	STNS	STONES
CHRT	CHERT	FLDS	FELDSPAR	LOOS	LOOSE	QSND	QUICKSAND	STNY	STONEY
CLAY	CLAY	FLNT	FLINT	LTCL	LIGHT-COLOURED	QTZ	QUARTZ	THIK	THICK
CLN	CLEAN	FOSS	FOSILIFEROUS	LYRD	LAYERED	ROCK	ROCK	THIN	THIN
CLYY	CLAYEY	FSND	FINE SAND	MARL	MARL	SAND	SAND	TILL	TILL
CMTD	CEMENTED	GNIS	GNEISS	MGRD	MEDIUM-GRAINED	SHLE	SHALE	UNKN	UNKNOWN TYPE
CONG	CONGLOMERATE	GRNT	GRANITE	MGVL	MEDIUM GRAVEL	SHLY	SHALY	VERY	VERY
CRYS	CRYSTALLINE	GRSN	GREENSTONE	MRBL	MARBLE	SHRP	SHARP	WBRG	WATER-BEARING
CSND	COARSE SAND	GRVL	GRAVEL	MSND	MEDIUM SAND	SHST	SCHIST	WDFR	WOOD FRAGMENTS
DKCL	DARK-COLOURED	GRWK	GREYWACKE	MUCK	MUCK	SILT	SILT	WTHD	WEATHERED
DLMT	DOLOMITE	GVLY	GRAVELLY	OBDN	OVERBURDEN	SLTE	SLATE		
DNSE	DENSE	GYPS	GYPSUM	PCKD	PACKED	SLTY	SILTY		
DRTY	DIRTY	HARD	HARD	PEAT	PEAT	SNDS	SANDSTONE		
DRY	DRY	HPAN	HARDPAN	PGVL	PEA GRAVEL	SNDY	SANDYOAPSTONE		

2. Core Color

Code	Description
WHIT	WHITE
GREY	GREY
BLUE	BLUE
GREN	GREEN
YLLW	YELLOW
BRWN	BROWN
RED	RED
BLCK	BLACK
BLGY	BLUE-GREY

3. Well Use

Code	Description	Code	Description
DO	Domestic	OT	Other
ST	Livestock	TH	Test Hole
IR	Irrigation	DE	Dewatering
IN	Industrial	MO	Monitoring
CO	Commercial	MT	Monitoring TestHole
MN	Municipal		
PS	Public		
AC	Cooling And A/C		
NU	Not Used		

4. Water Detail

Code	Description	Code	Description
FR	Fresh	GS	Gas
SA	Salty	IR	Iron
SU	Sulphur		
MN	Mineral		
UK	Unknown		

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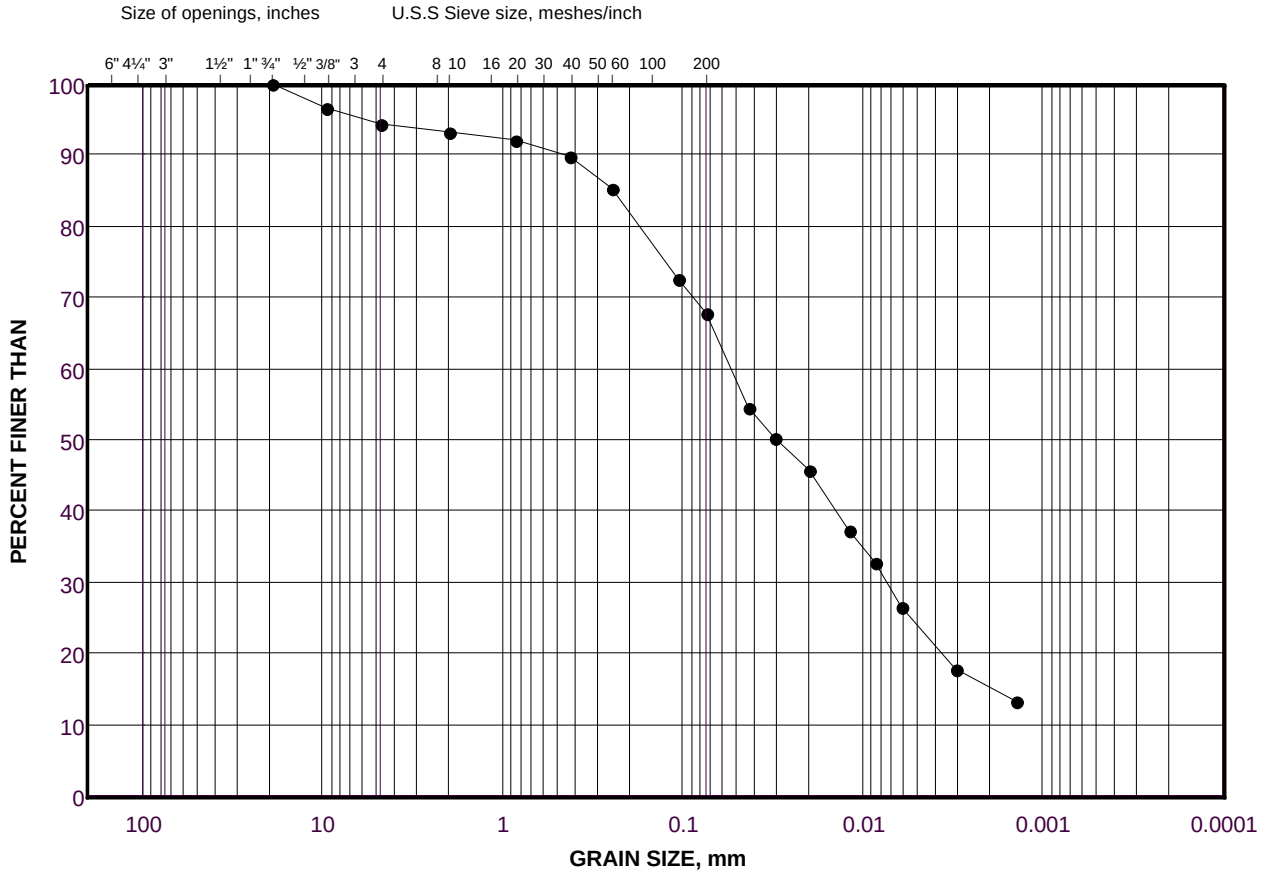
Appendix C

Grainsize Analysis

GRAIN SIZE DISTRIBUTION

Sandy Clayey SILT (CL-ML) - Reworked

FIGURE B1



LEGEND

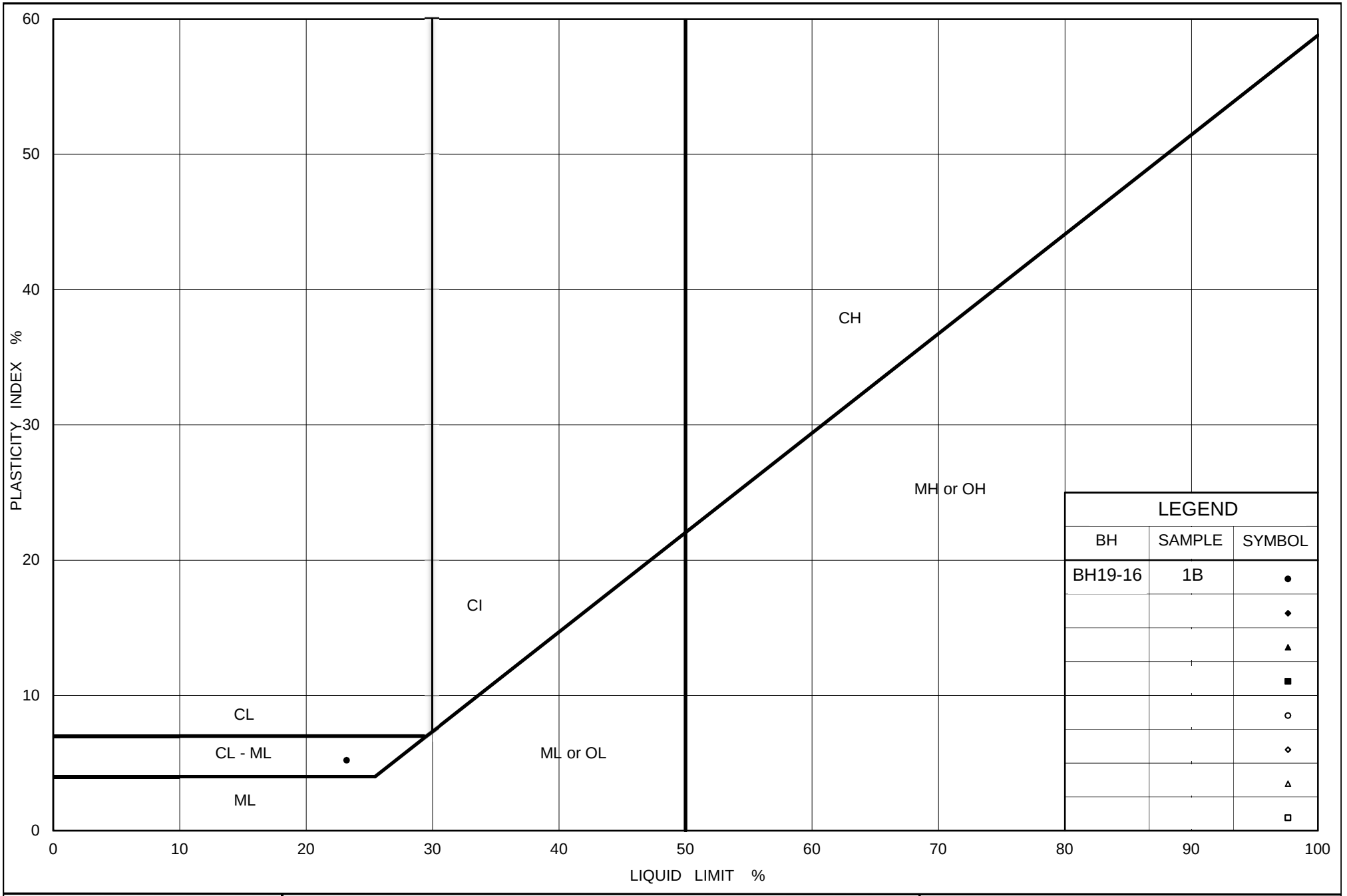
SYMBOL	Borehole	SAMPLE	DEPTH(m)
●	BH 19-16	1B	0.34 - 0.61

Project Number: 19115264

Checked By: _____

Golder Associates

Date: 30-May-19



GOLDER

PLASTICITY CHART
Sandy CLAYEY SILT (CL-ML)

Figure No. B2

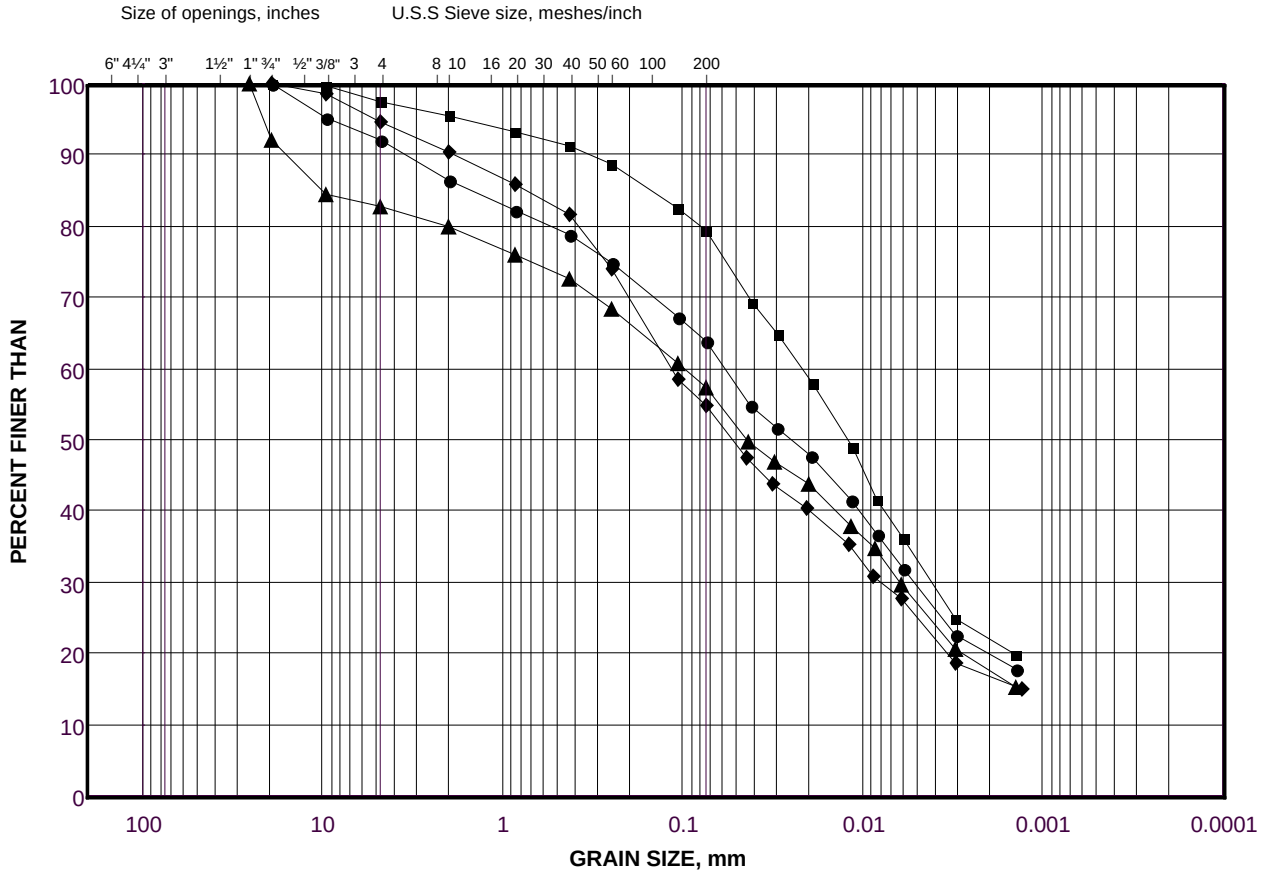
Project No. 19115264

Checked By:

GRAIN SIZE DISTRIBUTION

SILTY CLAY to SILTY CLAY and SAND (CL) - TILL

FIGURE B3



LEGEND

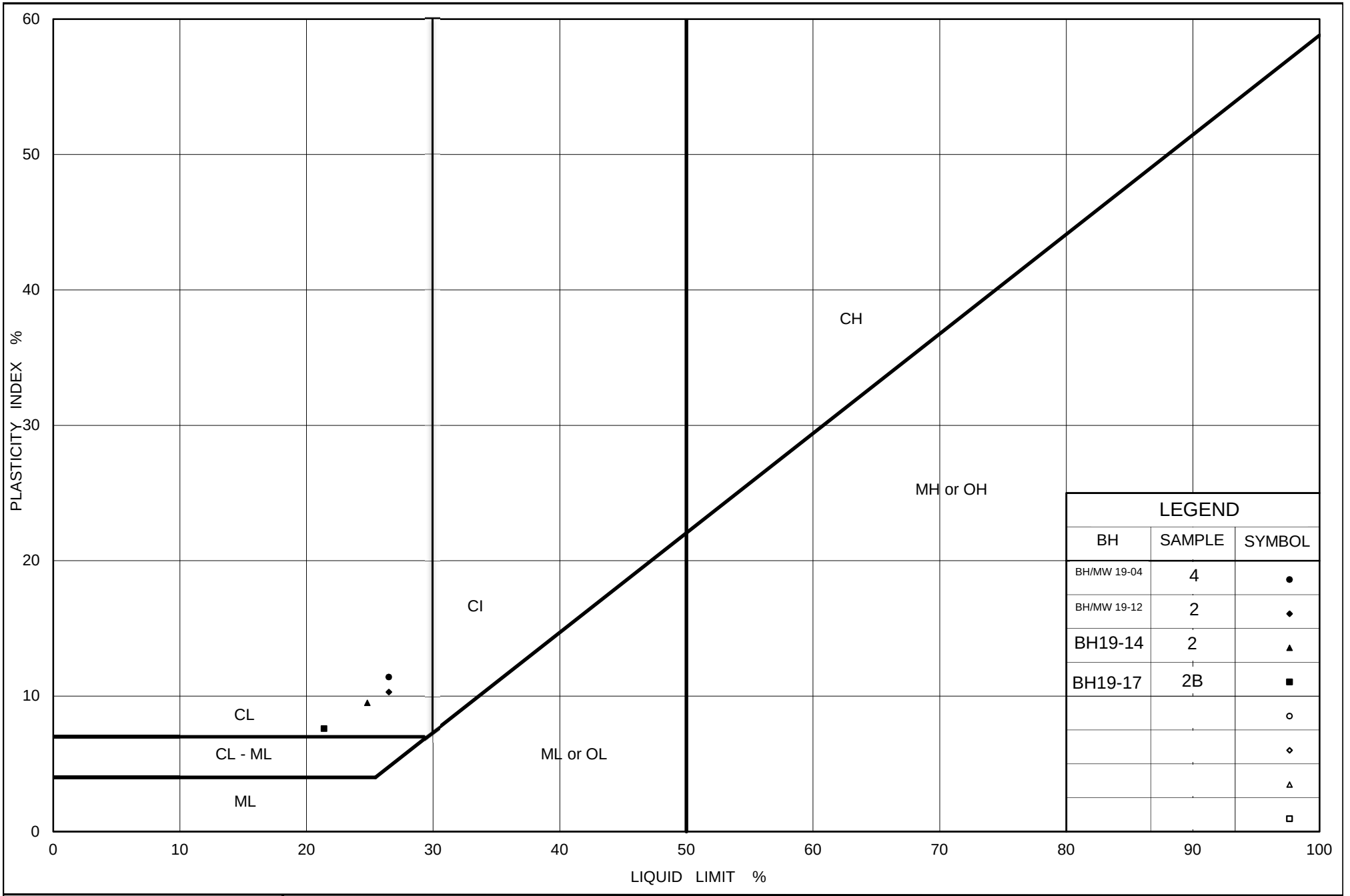
SYMBOL	Borehole	SAMPLE	DEPTH(m)
●	BH 19-14	2	0.76 - 1.37
■	BH/MW 19-12	2	0.76 - 1.37
◆	BH 19-17	2B	1.13 - 1.37
▲	BH/MW 19-04	4	2.29 - 2.90

Project Number: 19115264

Checked By: _____

Golder Associates

Date: 30-May-19



GOLDER

PLASTICITY CHART

SILTY CLAY to SILTY CLAY and SAND (CL) - TILL

Figure No. B4

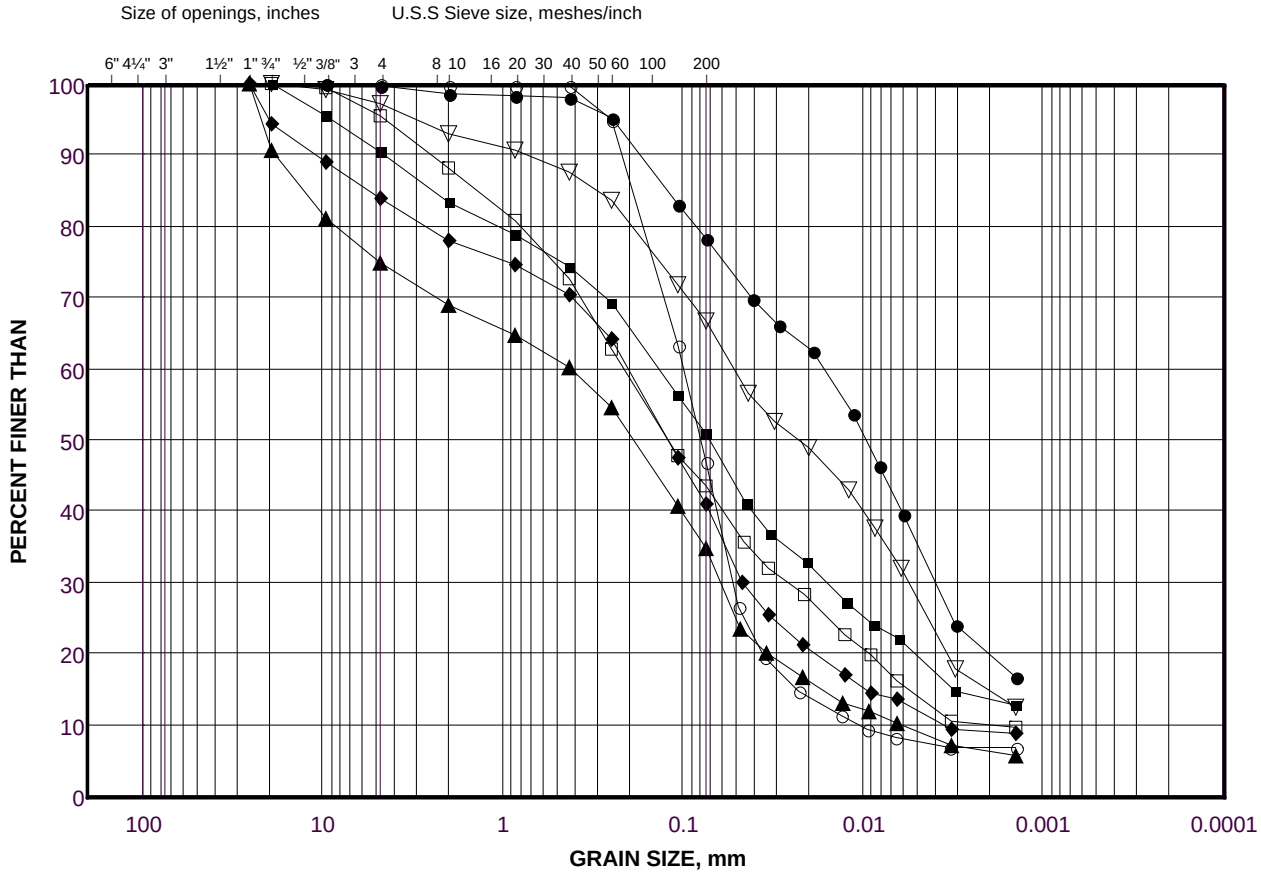
Project No. 19115264

Checked By:

GRAIN SIZE DISTRIBUTION

SILT and SAND to sandy CLAYEY SILT (ML/SM to CL-ML)

FIGURE B5



LEGEND

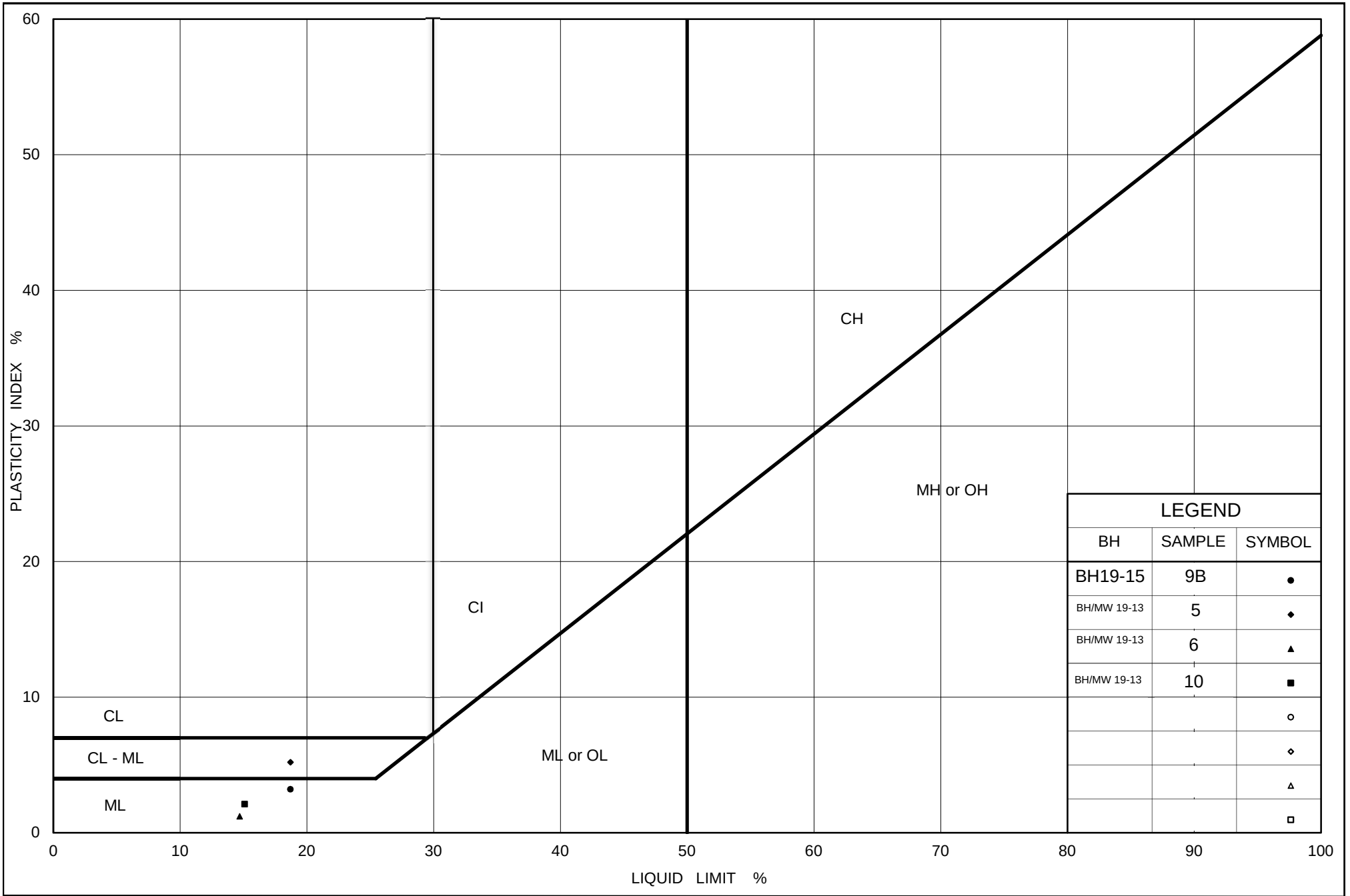
SYMBOL	Borehole	SAMPLE	DEPTH(m)
●	BH/MW 19-13	10	10.67 - 11.28
■	BH/MW 19-13	5	3.05 - 3.66
◆	BH/MW 19-13	6	4.57 - 5.18
▲	BH/MW 19-12	6B	3.05 - 3.66
▽	BH 19-13	8	7.62 - 8.23
❍	BH/MW 19-12	9	9.14 - 9.75
□	BH 19-15	9B	9.69 - 9.75

Project Number: 19115264

Checked By: _____

Golder Associates

Date: 30-May-19



GOLDER

PLASTICITY CHART

SILT and SAND to sandy CLAYEY SILT (ML/SM to CL-ML)

Figure No. B6

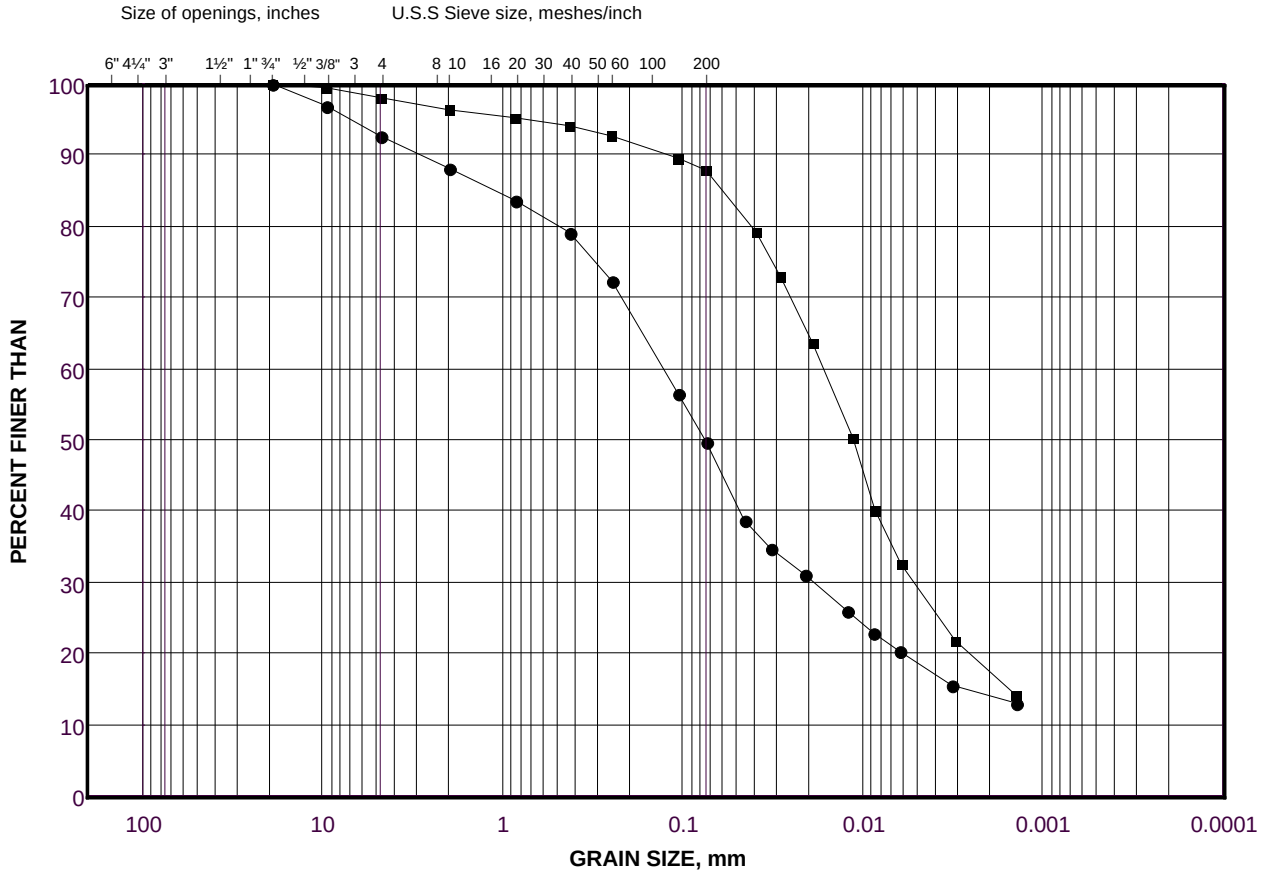
Project No. 19115264

Checked By:

GRAIN SIZE DISTRIBUTION

CLAYEY SILT to sandy CLAYEY SILT (CL-ML) - TILL

FIGURE B7



LEGEND

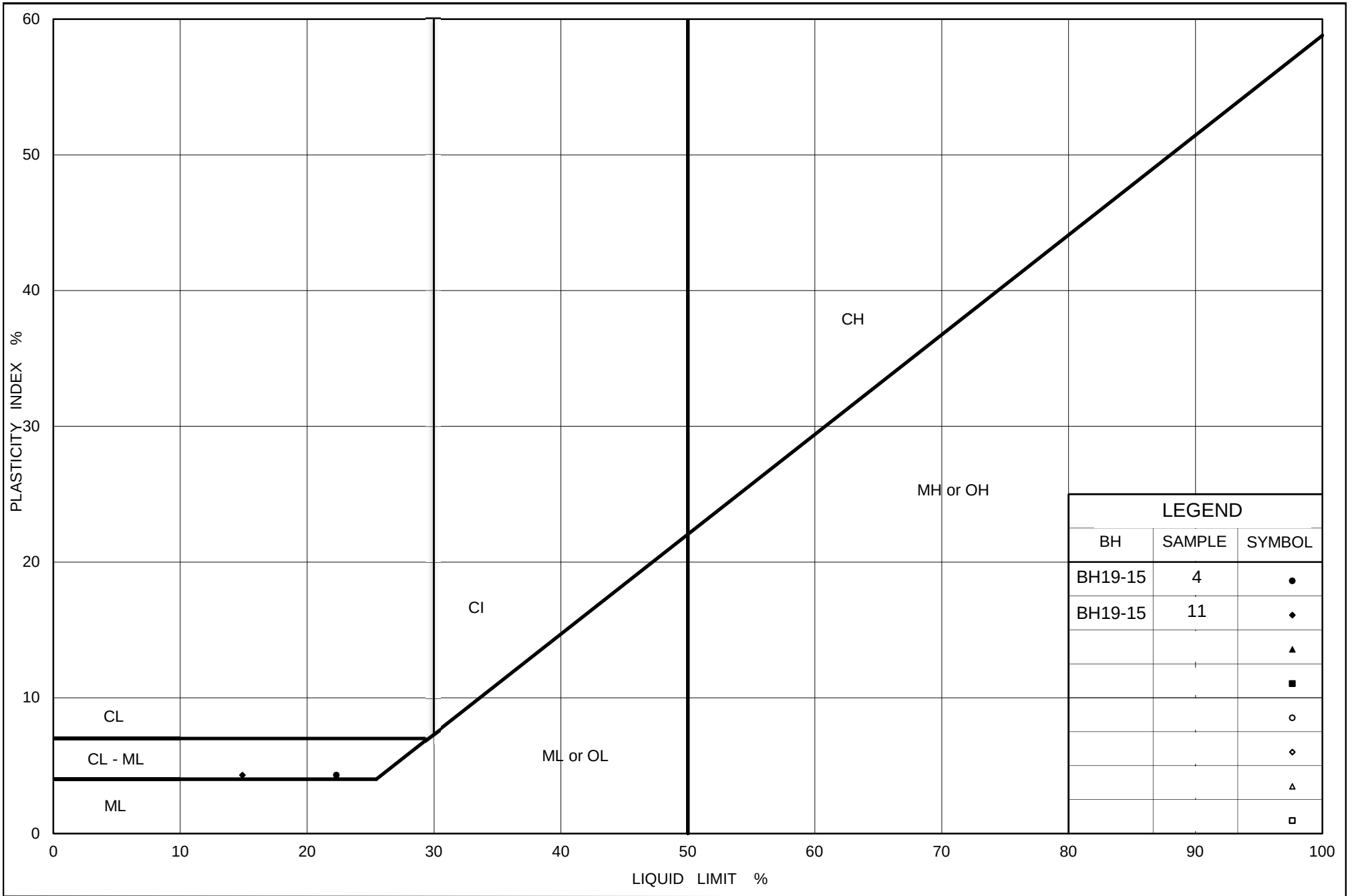
SYMBOL	Borehole	SAMPLE	DEPTH(m)
●	BH 19-15	11	12.19 - 12.80
■	BH 19-15	4	2.29 - 2.90

Project Number: 19115264

Checked By: _____

Golder Associates

Date: 30-May-19



GOLDER

PLASTICITY CHART

CLAYEY SILT to sandy CLAYEY SILT (CL-ML) - TILL

Figure No. B8

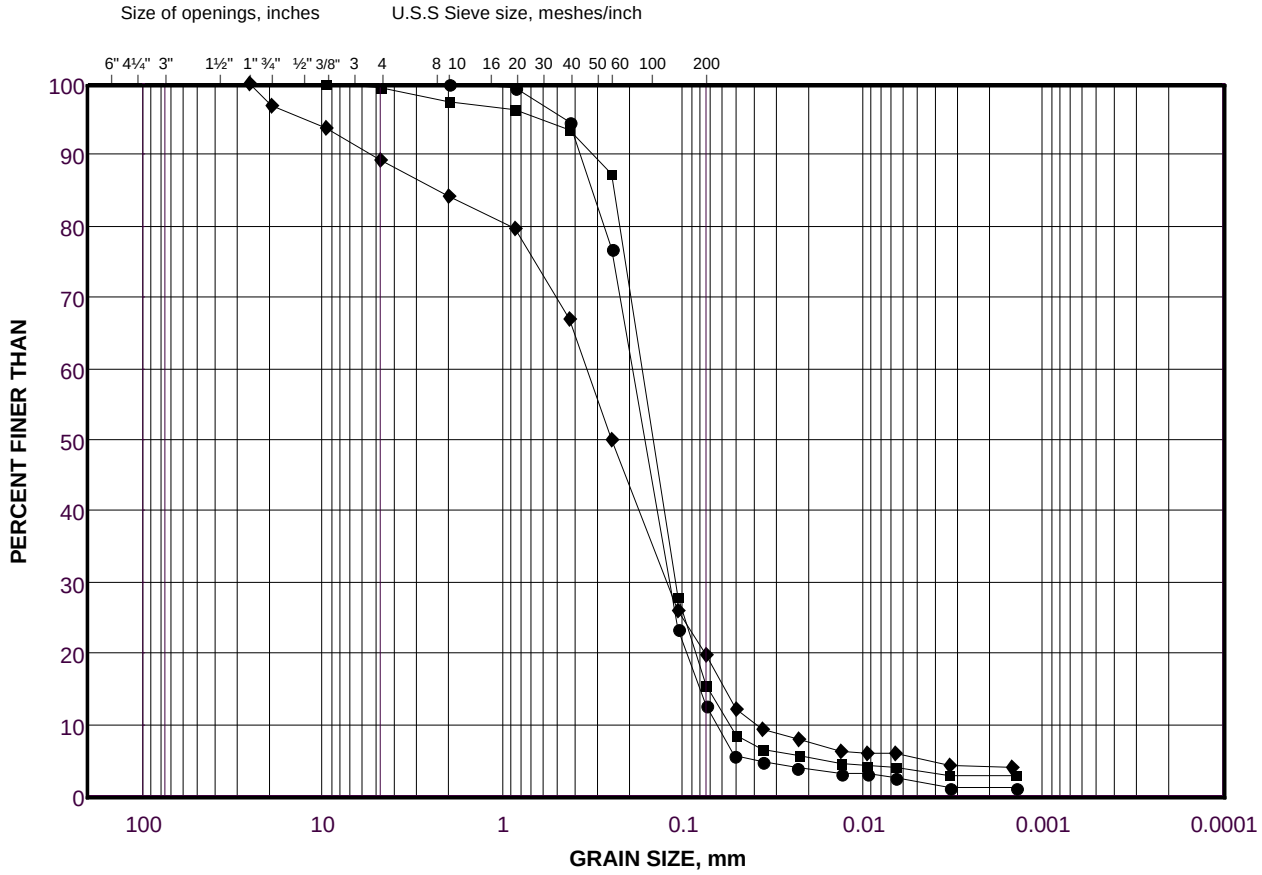
Project No. 19115264

Checked By:

GRAIN SIZE DISTRIBUTION

SILTY SAND to SAND (SM-SW)

FIGURE B9



LEGEND

SYMBOL	Borehole	SAMPLE	DEPTH(m)
●	BH/MW 19-04	14	15.24 - 15.85
■	BH 19-14	7	6.10 - 6.71
◆	BH/MW 19-12	7	6.10 - 6.71

Project Number: 19115264

Checked By: _____

Golder Associates

Date: 30-May-19

EDWARD WONG

Edward Wong & Associates Inc.
441 Esna Park Drive, Unit 19
Markham, Ontario L3R 1H7
Telephone: (416) 903-4288
Fax: (416) 221-0795

Grain Size Analysis and Hydrometer Test

Sample Test No.: 02995c-1 **Report No.:** 1 **Date Reported:** 27/10/2017

Project No.: Ma002995c
Project Name: 3728 Mayfield Road, Town of Caledon

Grain Size Proportion (%)

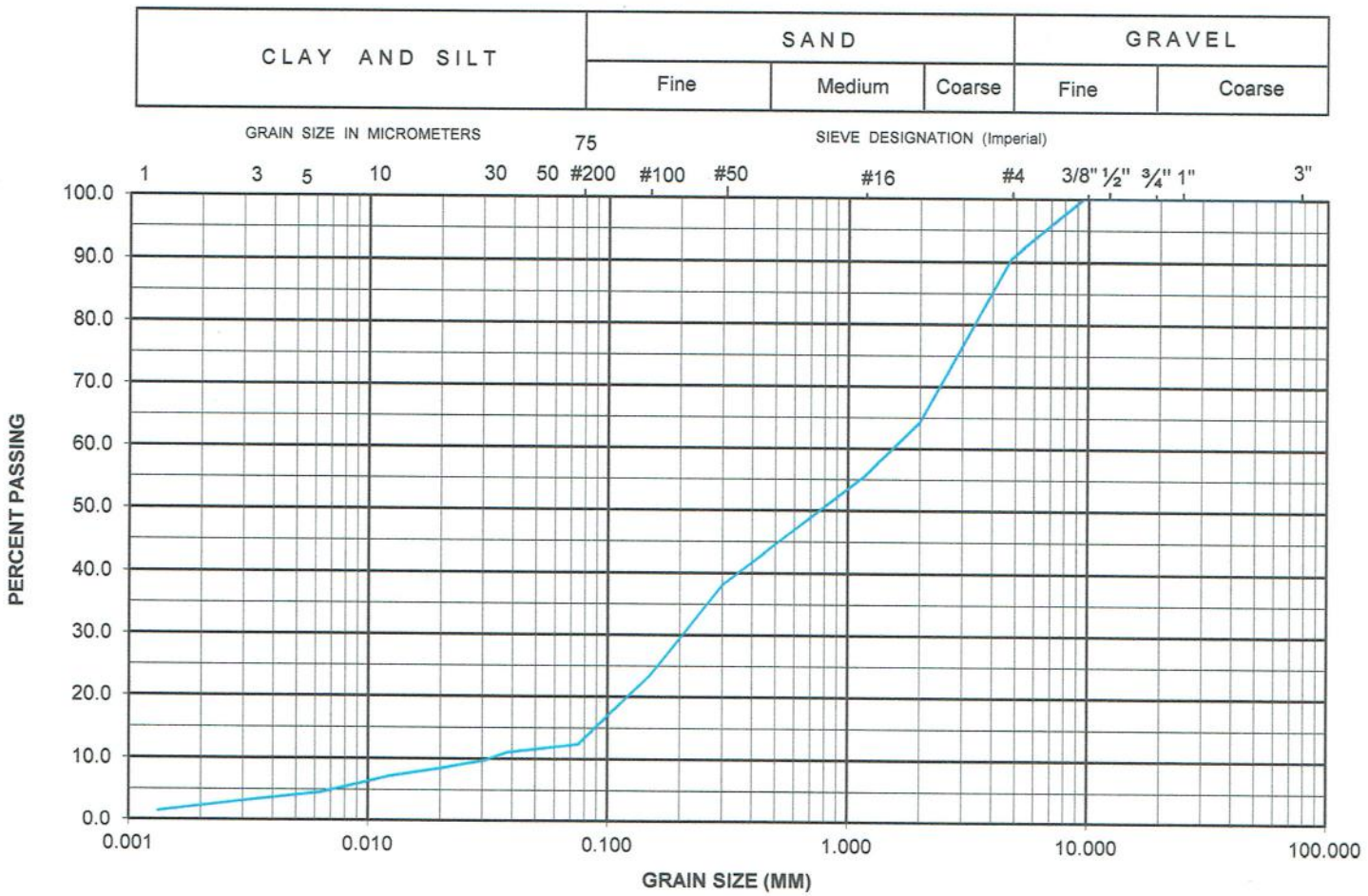
Gravel (> 4.75mm):	**9.5**
Sand (> 75μm, < 4.75mm):	**78.1**
Silt (> 2μm), < 75μm):	**10.1**
Clay (< 2μm):	**2.3**

Sample Information

Sample Location: 1
Sample No.: 6
Sample Method: SPT
Depth (m): 4.5 - 4.95
Sample Description: Brown Sand Till
some silt, some gravel, trace clay
Sampled By: S.R.
Sampling Date: 19/10/2017
Client Sample ID:
Comments:

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
75.00	100.0	**0.009**	5.9
26.50	100.0	**0.006**	4.6
19.00	100.0	**0.003**	3.3
13.25	100.0	**0.001**	1.5
9.50	100.0		
4.75	90.5		
2.00	64.3		
1.180	55.6		
0.600	46.9		
0.300	38.1		
0.150	23.5		
0.075	12.4		
0.038	11.1		
0.031	9.8		
0.020	8.5		
0.012	7.2		

UNIFIED SOIL CLASSIFICATION SYSTEM



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441 Esna Park Drive, Unit 19
Markham, Ontario L3R 1H7
Telephone: (416) 903-4288
Fax: (416) 221-0795

Grain Size Analysis and Hydrometer Test

Sample Test No.: 02995c-2 **Report No.:** 2 **Date Reported:** 27/10/2017

Project No.: Ma002995c
Project Name: 3728 Mayfield Road, Town of Caledon

Grain Size Proportion (%)

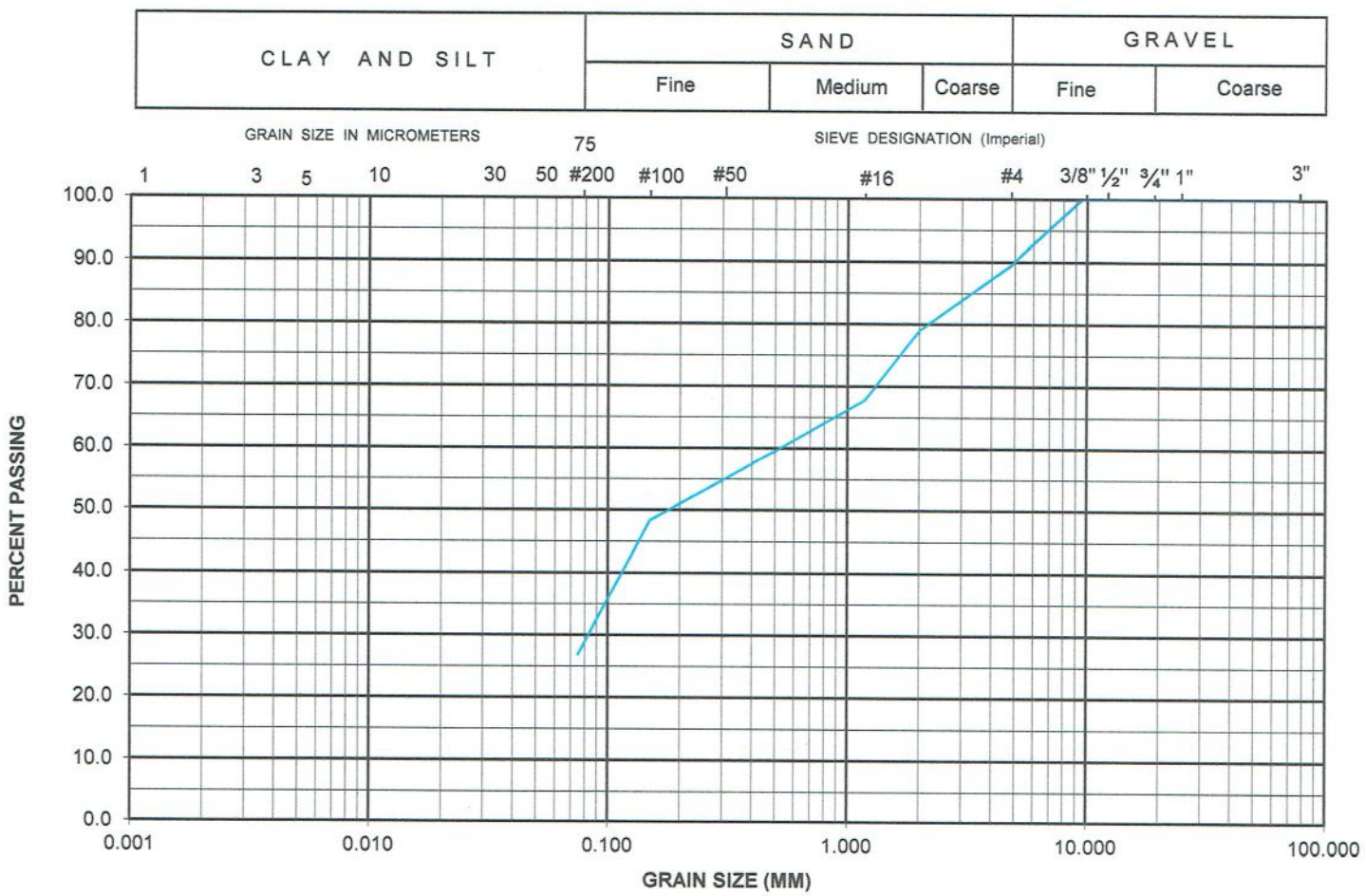
Gravel (> 4.75mm):	10.7
Sand (> 75μm, < 4.75mm):	62.4
Silt (> 2μm), < 75μm):	26.9
Clay (< 2μm):	

Sample Information

Sample Location: 2
Sample No.: 3
Sample Method: SPT
Depth (m): 1.5-1.95
Sample Description: Brown Silty Sand some gravel
Sampled By: S.R.
Sampling Date: 18/10/2017
Client Sample ID:
Comments:

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
75.00	100.0		
26.50	100.0		
19.00	100.0		
13.25	100.0		
9.50	100.0		
4.75	89.3		
2.00	79.0		
1.180	67.8		
0.600	61.3		
0.300	54.8		
0.150	48.3		
0.075	26.9		

UNIFIED SOIL CLASSIFICATION SYSTEM



EDWARD WONG

Edward Wong & Associates Inc.
441 Esna Park Drive, Unit 19
Markham, Ontario L3R 1H7
Telephone: (416) 903-4288
Fax: (416) 221-0795

Grain Size Analysis and Hydrometer Test

Sample Test No.: 02995c-3 **Report No.:** 3 **Date Reported:** 27/10/2017

Project No.: Ma002995c
Project Name: 3728 Mayfield Road, Town of Caledon

Grain Size Proportion (%)

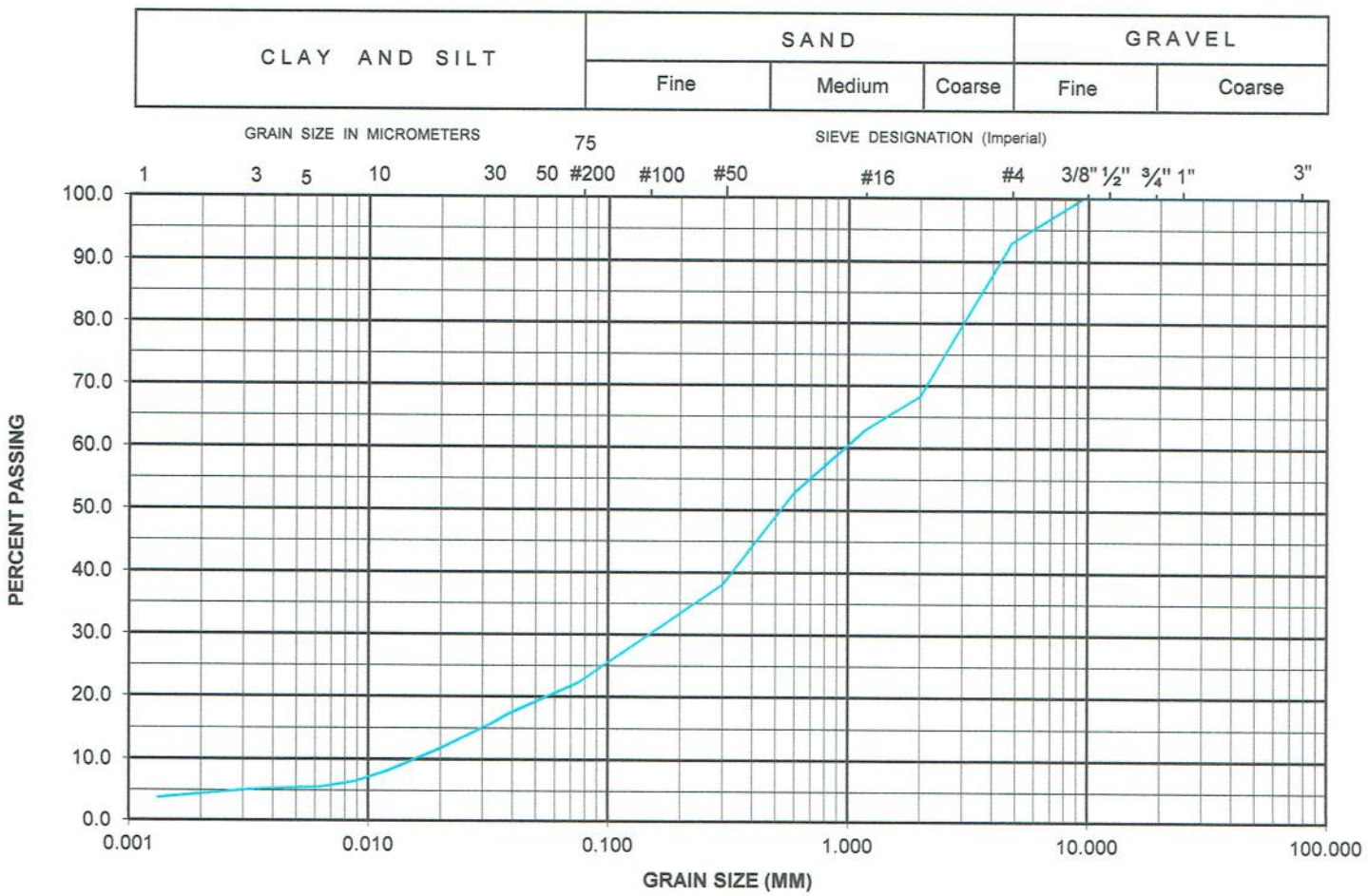
Gravel (> 4.75mm):	**7.2**
Sand (> 75μm, < 4.75mm):	**70.5**
Silt (> 2μm), < 75μm):	**17.8**
Clay (< 2μm):	**4.5**

Sample Information

Sample Location: 3
Sample No.: 6
Sample Method: SPT
Depth (m): 4.5 - 4.95
Sample Description: Brown Fine to Medium Sand some silt trace gravel, trace clay
Sampled By: S.R.
Sampling Date: 19/10/2017
Client Sample ID:
Comments:

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
75.00	100.0	**0.009**	6.5
26.50	100.0	**0.006**	5.6
19.00	100.0	**0.003**	5.1
13.25	100.0	**0.001**	3.8
9.50	100.0		
4.75	92.8		
2.00	68.3		
1.180	62.9		
0.600	52.9		
0.300	38.1		
0.150	30.2		
0.075	22.3		
0.038	17.3		
0.031	15.3		
0.020	11.8		
0.012	8.8		

UNIFIED SOIL CLASSIFICATION SYSTEM



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Edward Wong & Associates Inc.
441 Esna Park Drive, Unit 19
Markham, Ontario L3R 1H7
Telephone: (416) 903-4288
Fax: (416) 221-0795

Grain Size Analysis and Hydrometer Test

Sample Test No.: 02995c-4 **Report No.:** 4 **Date Reported:** 27/10/2017

Project No.: Ma002995c
Project Name: 3728 Mayfield Road, Town of Caledon

Grain Size Proportion (%)

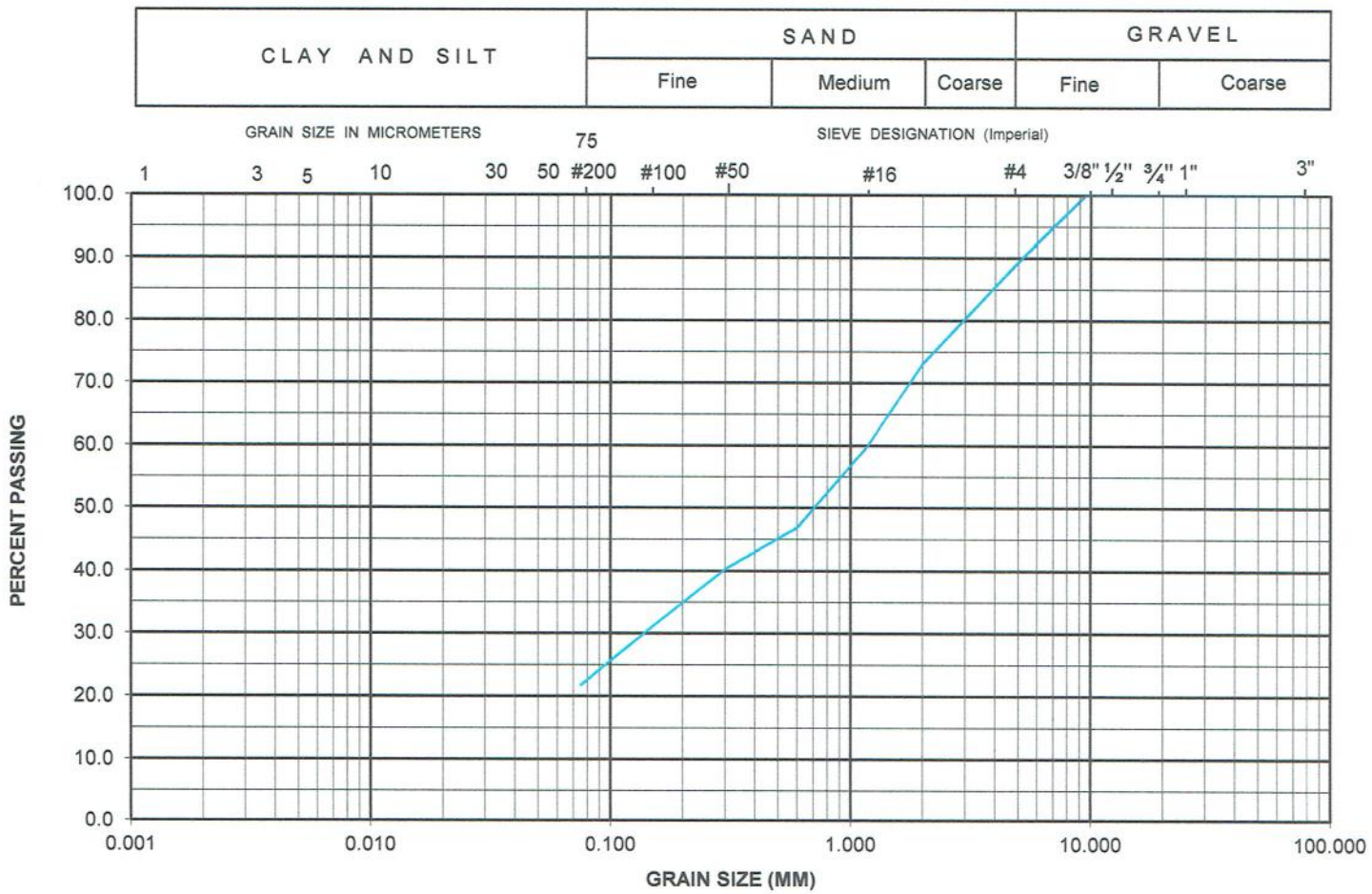
Gravel (> 4.75mm):	**11.5**
Sand (> 75μm, < 4.75mm):	**66.7**
Silt (> 2μm), < 75μm):	**21.8**
Clay (< 2μm):	

Sample Information

Sample Location: 6
Sample No.: 2
Sample Method: SPT
Depth (m): 0.75 - 1.2
Sample Description: Brown Silty Sand some gravel
Sampled By: S.R.
Sampling Date: 18/10/2017
Client Sample ID:
Comments:

Grain Size (mm)	% Passing	Grain Size (mm)	% Passing
75.00	100.0		
26.50	100.0		
19.00	100.0		
13.25	100.0		
9.50	100.0		
4.75	88.5		
2.00	73.1		
1.180	60.0		
0.600	46.8		
0.300	40.3		
0.150	31.1		
0.075	21.8		

UNIFIED SOIL CLASSIFICATION SYSTEM



BURNSIDE

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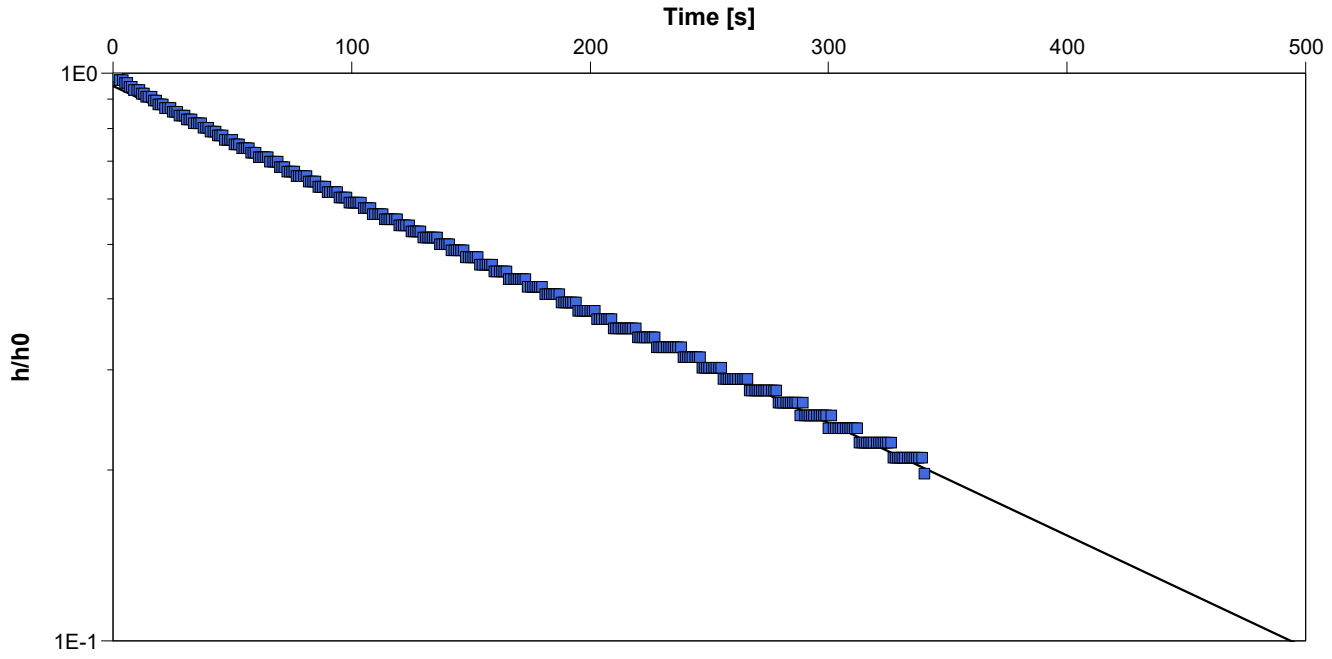
Appendix D

Single Well Response Tests

BURNSIDE	**Slug Test Analysis Report**
	Project: Snell's Hollow
	Number: 300043952.0000
	Client: Snell's Hollow Developers Group

Location: Brampton, Ontario	Slug Test: Slug Test	Test Well: MW2S
Test Conducted by: MV		Test Date: 1/29/2020
Analysis Performed by: MV	Screened in Silty Clay	Analysis Date: 4/5/2020
Aquifer Thickness:		

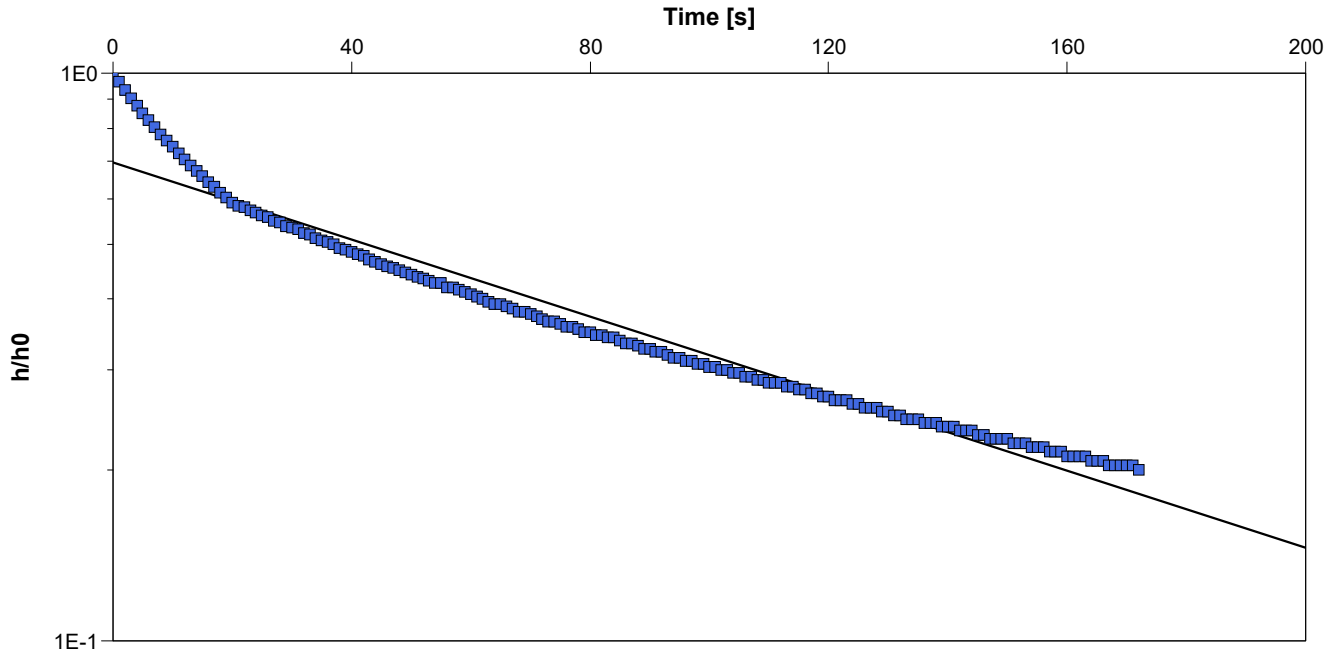


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [cm/s]	
MW2S	3.97×10^{-4}	

BURNSIDE	**Slug Test Analysis Report**
	Project: Snell's Hollow
	Number: 300043952.0000
	Client: Snell's Hollow Developers Group

Location: Brampton, Ontario	Slug Test: Slug Test	Test Well: MW3
Test Conducted by: MV		Test Date: 1/30/2020
Analysis Performed by: MV	Screened in Sandy Silt & Clayey Silt	Analysis Date: 4/5/2020
Aquifer Thickness:		

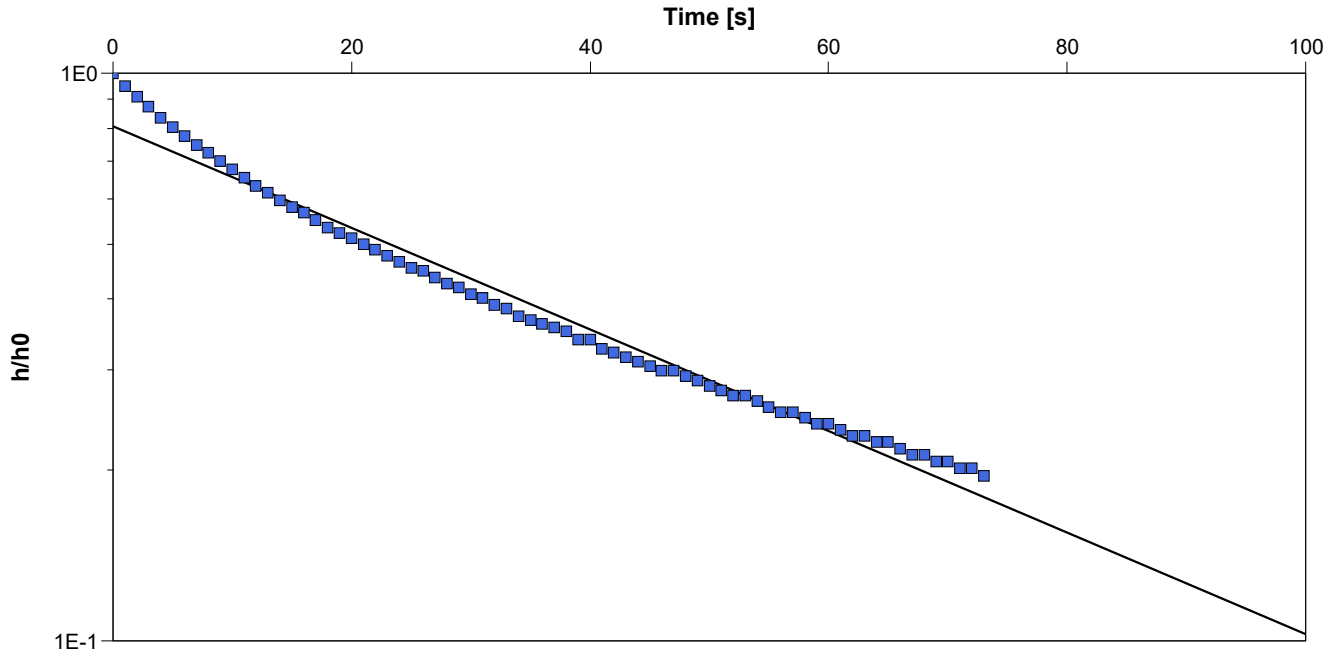


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [cm/s]	
MW3	3.99×10^{-4}	

BURNSIDE	**Slug Test Analysis Report**
	Project: Snell's Hollow
	Number: 300043952.0000
	Client: Snell's Hollow Developers Group

Location: Brampton, Ontario	Slug Test: Slug Test	Test Well: MW4S
Test Conducted by: MV		Test Date: 1/30/2020
Analysis Performed by: MV	Screened in Sandy Silty Clay	Analysis Date: 4/5/2020
Aquifer Thickness:		

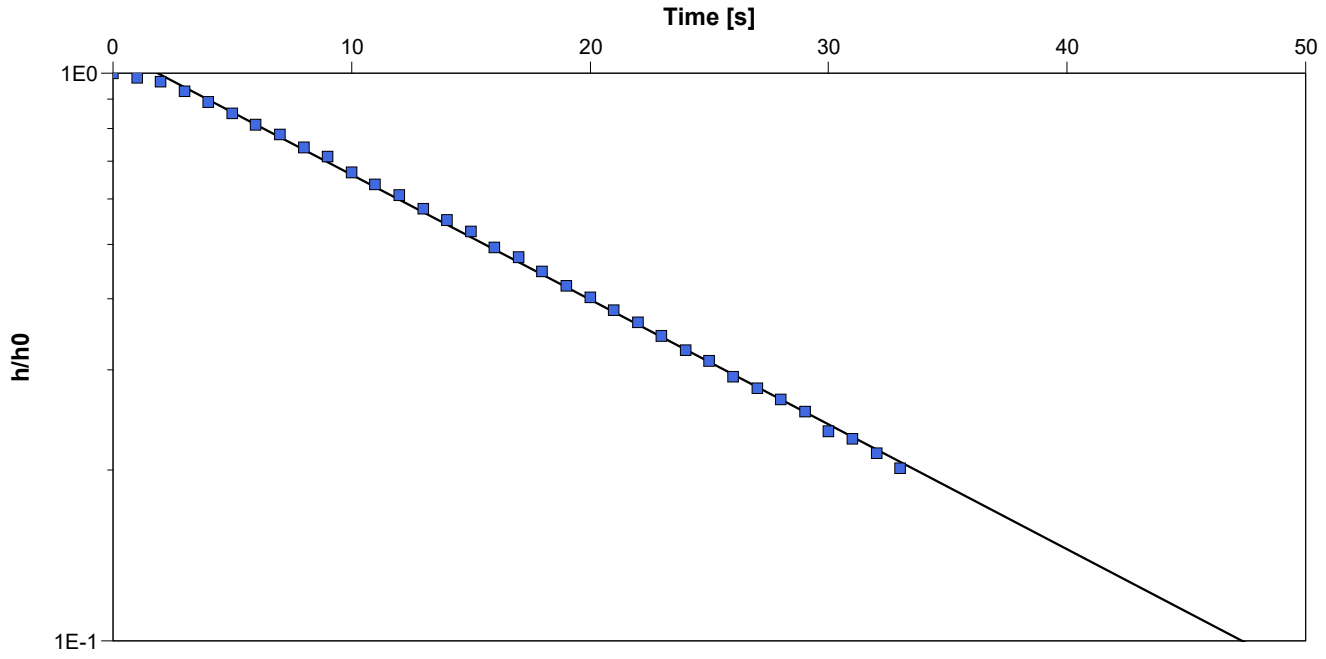


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [cm/s]	
MW4S	1.05×10^{-3}	

BURNSIDE	**Slug Test Analysis Report**
	Project: Snell's Hollow
	Number: 300043952.0000
	Client: Snell's Hollow Developers Group

Location: Brampton, Ontario	Slug Test: Slug Test	Test Well: MW4D
Test Conducted by: MV		Test Date: 1/30/2020
Analysis Performed by: MV	Screened in Sand	Analysis Date: 4/5/2020
Aquifer Thickness:		

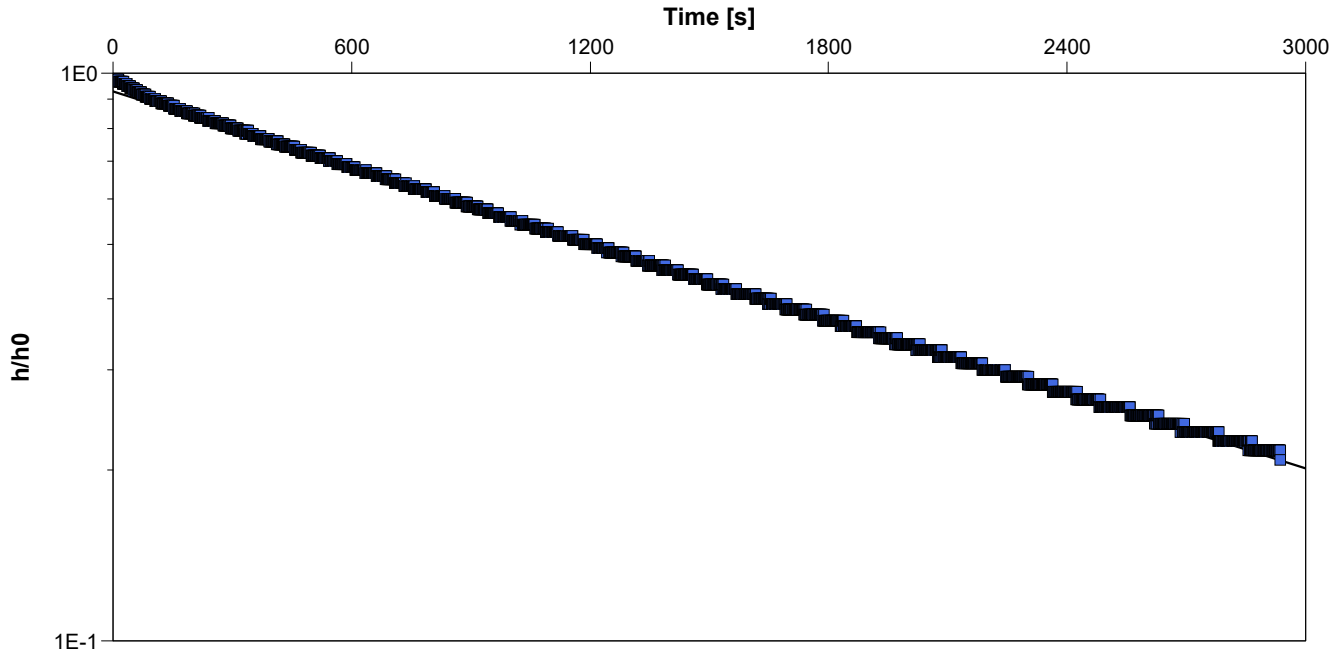


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [cm/s]	
MW4D	4.42×10^{-3}	

BURNSIDE	**Slug Test Analysis Report**
	Project: Snell's Hollow
	Number: 300043952.0000
	Client: Snell's Hollow Developers Group

Location: Brampton, Ontario	Slug Test: Slug Test	Test Well: MW8
Test Conducted by: Matt Valeriote		Test Date: 1/29/2020
Analysis Performed by: MV	Screened in Silty Clay and Clayey Silt	Analysis Date: 4/5/2020
Aquifer Thickness:		

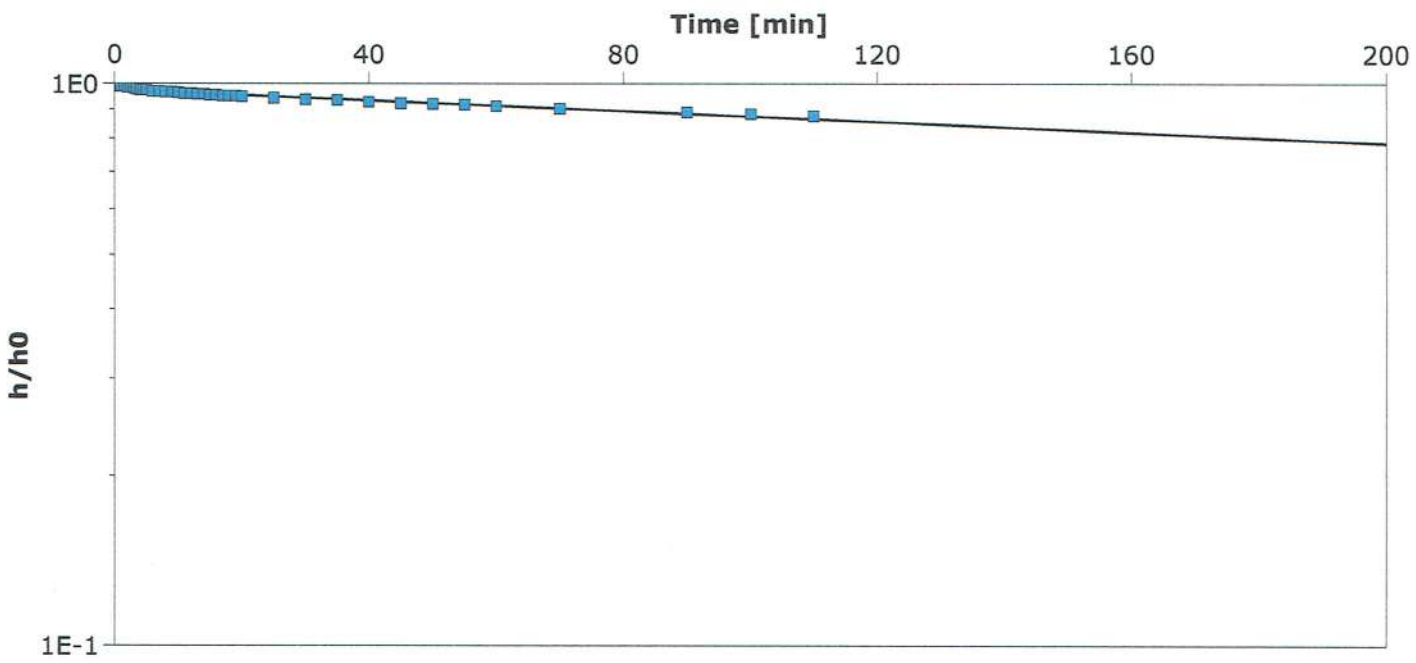


Calculation using Hvorslev

Observation Well	Hydraulic Conductivity [cm/s]	
MW8	2.60×10^{-5}	

Edward Wong & Associates Inc. 441 Esna Park Drive, Unit 19 Markham, Ontario L3R 1H7	**Slug Test Analysis Report**
	Project: 3728 Mayfield Road
	Number: Ma002995c
	Client: Mr. Dilip Kumar Jain

Location: Town of Caledon	Slug Test: Slug Test 1	Test Well: Borehole 5
Test conducted by: Sofel Rana		Test date: 10/26/2017
Analysis performed by: Sofel Rana	New analysis 1	Analysis date: 10/26/2017
Aquifer Thickness:		



Calculation after Hvorslev

Observation well	Hydraulic Conductivity [m/s]	
Borehole 5	7.80×10^{-9}	

BURNSIDE

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Appendix E

Groundwater Elevations

Table E-1
Groundwater Elevations-Wells and Piezometers

Instrument	Well Depth (mbgs)	Stick-up (m)	Ground Surface Elevation (masl)	April 17, 2019		2-May-2019		22-May-2019		19-Jun-2019		24-Jul-2019	
				Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)
MW19-01	7.69	**0.84**	266.55	3.80	262.75	3.18	263.37	3.37	263.18	3.50	263.05	4.12	262.43
MW19-02s	3.57	**0.84**	256.99	0.24	256.75	-	-	0.36	256.63	0.71	256.28	1.29	255.70
MW19-02d	12.86	**0.74**	257.02	6.33	250.69	-	-	6.23	250.79	6.11	250.91	6.11	250.91
MW19-03	9.30	**0.82**	266.41	7.34	259.07	-	-	6.71	259.70	7.15	259.26	8.30	258.11
MW19-04s	7.92	**0.79**	265.68	3.49	262.19	2.23	263.45	3.22	262.46	4.73	260.95	5.10	260.58
MW19-04d	16.39	**0.81**	265.86	14.57	251.29	14.49	251.37	14.40	251.46	14.24	251.62	14.24	251.62
MW19-05	8.42	**0.84**	270.24	8.40	261.84	8.40	261.85	8.38	261.86	8.37	261.87	8.37	261.87
MW19-06	6.90	**0.86**	261.50	-0.43	261.93	-	-	-0.29	261.79	0.12	261.38	0.79	260.71
MW19-07s	6.91	**0.67**	264.28	6.84	257.44	6.84	257.44	6.84	257.44	6.84	257.44	6.84	257.44
MW19-07d	13.60	**0.86**	264.40	12.79	251.61	12.64	251.76	12.51	251.89	12.43	251.97	12.51	251.89
MW19-08	5.23	**0.98**	262.75	1.29	261.46	0.41	262.34	0.56	262.19	1.82	260.93	2.64	260.11
MW19-09	7.60	**0.88**	256.39	6.53	249.86	-	-	6.37	250.02	6.27	250.12	6.29	250.10
MW19-13	9.74	**0.79**	266.98	9.57	257.41	-	-	9.57	257.41	9.64	257.34	9.56	257.42
BH2	5.93	**0.80**	263.11	-	-	-	-	-	-	-	-	-	-
BH3	5.76	**0.99**	260.05	3.00	257.05	-	-	2.53	257.52	3.12	256.93	3.91	256.14
BH5	4.56	**0.61**	257.98	-	-	-	-	-	-	-	-	-	-
PZ1s	0.76	**1.16**	259.88	-	-	Dry	Dry	-0.01	259.89	0.02	259.86	0.06	259.82
PZ1d	1.55	**1.30**	259.94	-	-	Dry	Dry	1.14	258.80	0.92	259.02	0.73	259.21
PZ2s	1.32	**0.60**	256.44	-	-	Dry	Dry	0.86	255.58	0.61	255.83	-	-
PZ2d	1.91	**0.94**	256.46	-	-	Dry	Dry	0.84	255.62	0.45	256.01	-	-
PZ3s	1.34	**0.57**	255.78	-	-	0.91	254.87	0.04	255.74	0.09	255.69	0.22	255.56
PZ3d	1.86	**0.99**	255.72	-	-	1.39	254.33	0.02	255.70	0.09	255.63	0.23	255.49
PZ4s	1.30	**0.62**	255.24	-	-	1.25	253.99	0.51	254.73	0.20	255.04	0.11	255.13
PZ4d	1.59	**1.00**	255.24	-	-	Dry	Dry	0.79	254.45	0.27	254.97	0.18	255.06
PZ5s	1.23	**0.69**	260.39	-	-	Dry	Dry	0.34	260.05	0.60	259.79	0.84	259.55
PZ5d	1.78	**1.04**	260.40	-	-	Dry	Dry	0.73	259.67	0.61	259.79	0.94	259.46
PZ6s	1.27	**0.65**	255.87	-	-	Dry	Dry	0.23	255.64	0.17	255.70	0.32	255.55
PZ6d	1.79	**1.06**	255.86	-	-	1.50	254.36	1.04	254.82	0.60	255.26	0.46	255.40

'-' denotes data unavailable
mbgs- metres below ground level
masl-metres above sea level

Table E-1
Groundwater Elevations-Wells and Piezometers

Instrument	Well Depth (mbgs)	Stick-up (m)	Ground Surface Elevation (masl)	27-Aug-2019		25-Sep-2019		1-Nov-2019		26-Nov-2019		20-Dec-2019	
				Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)
MW19-01	7.69	**0.84**	266.55	5.34	261.21	6.87	259.68	7.61	258.94	6.70	259.85	4.29	262.26
MW19-02s	3.57	**0.84**	256.99	1.69	255.30	1.98	255.01	1.42	255.57	0.77	256.22	0.63	256.36
MW19-02d	12.86	**0.74**	257.02	6.10	250.92	6.13	250.89	6.25	250.77	6.24	250.78	6.32	250.70
MW19-03	9.30	**0.82**	266.41	9.20	257.21	9.21	257.20	9.23	257.18	9.23	257.18	9.21	257.20
MW19-04s	7.92	**0.79**	265.68	5.33	260.35	5.47	260.21	5.59	260.09	5.60	260.08	5.48	260.20
MW19-04d	16.39	**0.81**	265.86	14.23	251.63	14.27	251.59	14.42	251.44	14.40	251.46	14.52	251.34
MW19-05	8.42	**0.84**	270.24	8.36	261.88	8.35	261.89	8.33	261.91	8.33	261.91	8.34	261.90
MW19-06	6.90	**0.86**	261.50	1.11	260.39	1.43	260.07	1.60	259.90	0.64	260.86	0.45	261.05
MW19-07s	6.91	**0.67**	264.28	6.85	257.43	6.85	257.43	6.84	257.44	6.84	257.44	6.85	257.43
MW19-07d	13.60	**0.86**	264.40	12.54	251.86	12.60	251.80	12.52	251.88	12.67	251.73	12.71	251.69
MW19-08	5.23	**0.98**	262.75	3.34	259.41	3.98	258.77	4.35	258.40	4.72	258.03	3.46	259.29
MW19-09	7.60	**0.88**	256.39	6.31	250.08	6.35	250.04	6.46	249.93	6.47	249.92	6.52	249.87
MW19-13	9.74	**0.79**	266.98	9.66	257.32	9.68	257.30	9.38	257.60	Dry	Dry	9.57	257.41
BH2	5.93	**0.80**	263.11	-	-	-	-	-	-	-	-	-	-
BH3	5.76	**0.99**	260.05	4.41	255.64	4.76	255.29	5.17	254.88	5.35	254.70	5.22	254.83
BH5	4.56	**0.61**	257.98	-	-	-	-	-	-	-	-	-	-
PZ1s	0.76	**1.16**	259.88	0.24	259.64	0.16	259.72	0.10	259.78	0.07	259.81	0.10	259.78
PZ1d	1.55	**1.30**	259.94	0.63	259.31	0.58	259.36	0.52	259.42	0.47	259.47	0.49	259.45
PZ2s	1.32	**0.60**	256.44	0.87	255.57	1.19	255.25	1.19	255.25	0.94	255.50	0.82	255.62
PZ2d	1.91	**0.94**	256.46	0.88	255.58	1.26	255.20	1.57	254.89	1.02	255.44	0.70	255.76
PZ3s	1.34	**0.57**	255.78	0.44	255.34	0.53	255.25	0.55	255.23	0.33	255.45	0.22	255.56
PZ3d	1.86	**0.99**	255.72	0.53	255.19	0.63	255.09	0.44	255.28	0.24	255.48	0.16	255.56
PZ4s	1.30	**0.62**	255.24	0.48	254.76	0.71	254.53	0.82	254.42	0.44	254.80	0.23	255.01
PZ4d	1.59	**1.00**	255.24	0.34	254.90	0.57	254.67	0.77	254.47	0.60	254.64	0.45	254.79
PZ5s	1.23	**0.69**	260.39	1.10	259.29	1.21	259.18	Dry	Dry	Dry	Dry	1.03	259.36
PZ5d	1.78	**1.04**	260.40	1.29	259.11	1.43	258.97	Dry	Dry	Dry	Dry	1.53	258.87
PZ6s	1.27	**0.65**	255.87	0.53	255.34	0.55	255.32	0.42	255.45	0.31	255.56	0.26	255.61
PZ6d	1.79	**1.06**	255.86	0.48	255.38	0.52	255.34	0.49	255.37	0.41	255.45	0.38	255.48

'-' denotes data unavailable
mbgs- metres below ground level
masl-metres above sea level

Table E-1
Groundwater Elevations-Wells and Piezometers

Instrument	Well Depth (mbgs)	Stick-up (m)	Ground Surface Elevation (masl)	30-Jan-2020		22-Feb-2020		19-Mar-2020		20-Apr-2020		28-May-2020	
				Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)
MW19-01	7.69	**0.84**	266.55	2.93	263.62	3.13	263.42	2.60	263.95	2.83	263.72	3.38	263.17
MW19-02s	3.57	**0.84**	256.99	0.15	256.84	0.30	256.69	0.23	256.76	0.38	256.61	0.58	256.41
MW19-02d	12.86	**0.74**	257.02	6.24	250.78	6.14	250.88	6.09	250.93	5.99	251.03	5.95	251.07
MW19-03	9.30	**0.82**	266.41	7.79	258.62	7.23	259.18	6.73	259.68	6.97	259.44	8.13	258.28
MW19-04s	7.92	**0.79**	265.68	3.04	262.64	4.39	261.29	2.89	262.79	4.19	261.49	5.08	260.60
MW19-04d	16.39	**0.81**	265.86	14.41	251.45	14.29	251.57	14.24	251.62	14.12	251.74	14.09	251.77
MW19-05	8.42	**0.84**	270.24	8.34	261.90	8.34	261.90	8.34	261.90	8.32	261.92	8.34	261.90
MW19-06	6.90	**0.86**	261.50	Frozen	Frozen	-0.44	261.94	-0.33	261.83	-0.09	261.59	0.42	261.08
MW19-07s	6.91	**0.67**	264.28	6.95	257.33	6.87	257.41	6.86	257.42	6.86	257.42	6.86	257.42
MW19-07d	13.60	**0.86**	264.40	12.58	251.82	12.52	251.88	12.43	251.97	12.32	252.08	12.37	252.03
MW19-08	5.23	**0.98**	262.75	0.29	262.46	1.25	261.50	0.48	262.27	0.85	261.90	2.09	260.66
MW19-09	7.60	**0.88**	256.39	6.41	249.98	6.35	250.04	6.31	250.08	6.22	250.17	6.22	250.17
MW19-13	9.74	**0.79**	266.98	9.62	257.36	9.67	257.31	9.32	257.66	9.40	257.58	9.65	257.33
BH2	5.93	**0.80**	263.11	-	-	2.61	260.50	1.89	261.22	2.35	260.76	3.09	260.02
BH3	5.76	**0.99**	260.05	1.82	258.23	2.94	257.11	2.55	257.50	2.79	257.26	3.56	256.49
BH5	4.56	**0.61**	257.98	-	-	0.58	257.40	0.21	257.77	0.55	257.43	1.19	256.79
PZ1s	0.76	**1.16**	259.88	0.07	259.81	0.12	259.76	0.14	259.74	0.18	259.70	0.24	259.64
PZ1d	1.55	**1.30**	259.94	0.38	259.56	0.36	259.58	0.34	259.60	0.31	259.63	0.28	259.66
PZ2s	1.32	**0.60**	256.44	0.61	255.83	0.53	255.91	0.46	255.98	0.39	256.05	0.45	255.99
PZ2d	1.91	**0.94**	256.46	0.36	256.10	0.30	256.16	0.23	256.23	0.23	256.23	0.39	256.07
PZ3s	1.34	**0.57**	255.78	0.11	255.67	0.13	255.65	0.06	255.72	0.09	255.69	0.13	255.65
PZ3d	1.86	**0.99**	255.72	Frozen	Frozen	0.13	255.59	0.10	255.62	0.09	255.63	0.13	255.59
PZ4s	1.30	**0.62**	255.24	0.09	255.15	0.08	255.16	0.03	255.21	0.01	255.23	-0.04	255.28
PZ4d	1.59	**1.00**	255.24	0.22	255.02	0.15	255.09	0.06	255.18	0.08	255.16	0.02	255.22
PZ5s	1.23	**0.69**	260.39	0.29	260.10	0.34	260.05	0.25	260.14	0.29	260.10	0.58	259.81
PZ5d	1.78	**1.04**	260.40	0.88	259.52	0.73	259.67	0.63	259.77	0.53	259.87	0.59	259.81
PZ6s	1.27	**0.65**	255.87	0.19	255.68	0.19	255.68	0.17	255.70	0.19	255.68	0.23	255.64
PZ6d	1.79	**1.06**	255.86	0.31	255.55	0.27	255.59	0.25	255.61	0.24	255.62	0.24	255.62

'-' denotes data unavailable
mbgs- metres below ground level
masl-metres above sea level

Table E-1
Groundwater Elevations-Wells and Piezometers

Instrument	Well Depth (mbgs)	Stick-up (m)	Ground Surface Elevation (masl)	30-Sep-2020		16-Dec-2020	
				Water Level (mbgs)	Water Elevation (masl)	Water Level (mbgs)	Water Elevation (masl)
MW19-01	7.69	**0.84**	266.55	7.60	258.95	Dry	Dry
MW19-02s	3.57	**0.84**	256.99	1.53	255.46	0.52	256.47
MW19-02d	12.86	**0.74**	257.02	6.05	250.97	6.16	250.86
MW19-03	9.30	**0.82**	266.41	9.21	257.20	9.22	257.19
MW19-04s	7.92	**0.79**	265.68	5.57	260.11	-	-
MW19-04d	16.39	**0.81**	265.86	14.23	251.63	14.41	251.45
MW19-05	8.42	**0.84**	270.24	8.34	261.90	8.34	261.90
MW19-06	6.90	**0.86**	261.50	1.50	260.00	Frozen	Frozen
MW19-07s	6.91	**0.67**	264.28	6.85	257.43	6.87	257.41
MW19-07d	13.60	**0.86**	264.40	12.59	251.81	12.73	251.67
MW19-08	5.23	**0.98**	262.75	4.38	258.37	5.20	257.55
MW19-09	7.60	**0.88**	256.39	6.37	250.02	6.50	249.89
MW19-13	9.74	**0.79**	266.98	9.69	257.29	9.64	257.34
BH2	5.93	**0.80**	263.11	4.45	258.66	5.04	258.07
BH3	5.76	**0.99**	260.05	4.99	255.06	5.66	254.39
BH5	4.56	**0.61**	257.98	2.41	255.57	2.14	255.84
PZ1s	0.76	**1.16**	259.88	0.30	259.58	0.19	259.69
PZ1d	1.55	**1.30**	259.94	0.43	259.51	0.49	259.45
PZ2s	1.32	**0.60**	256.44	0.86	255.58	0.95	255.49
PZ2d	1.91	**0.94**	256.46	1.06	255.40	0.92	255.54
PZ3s	1.34	**0.57**	255.78	0.40	255.38	0.30	255.48
PZ3d	1.86	**0.99**	255.72	0.46	255.26	0.22	255.50
PZ4s	1.30	**0.62**	255.24	0.27	254.97	0.33	254.91
PZ4d	1.59	**1.00**	255.24	0.43	254.81	0.35	254.89
PZ5s	1.23	**0.69**	260.39	1.18	259.21	Dry	Dry
PZ5d	1.78	**1.04**	260.40	1.23	259.17	1.68	258.72
PZ6s	1.27	**0.65**	255.87	0.51	255.36	0.32	255.55
PZ6d	1.79	**1.06**	255.86	0.32	255.54	0.42	255.44

'-' denotes data unavailable

mbgs- metres below ground level

masl-metres above sea level

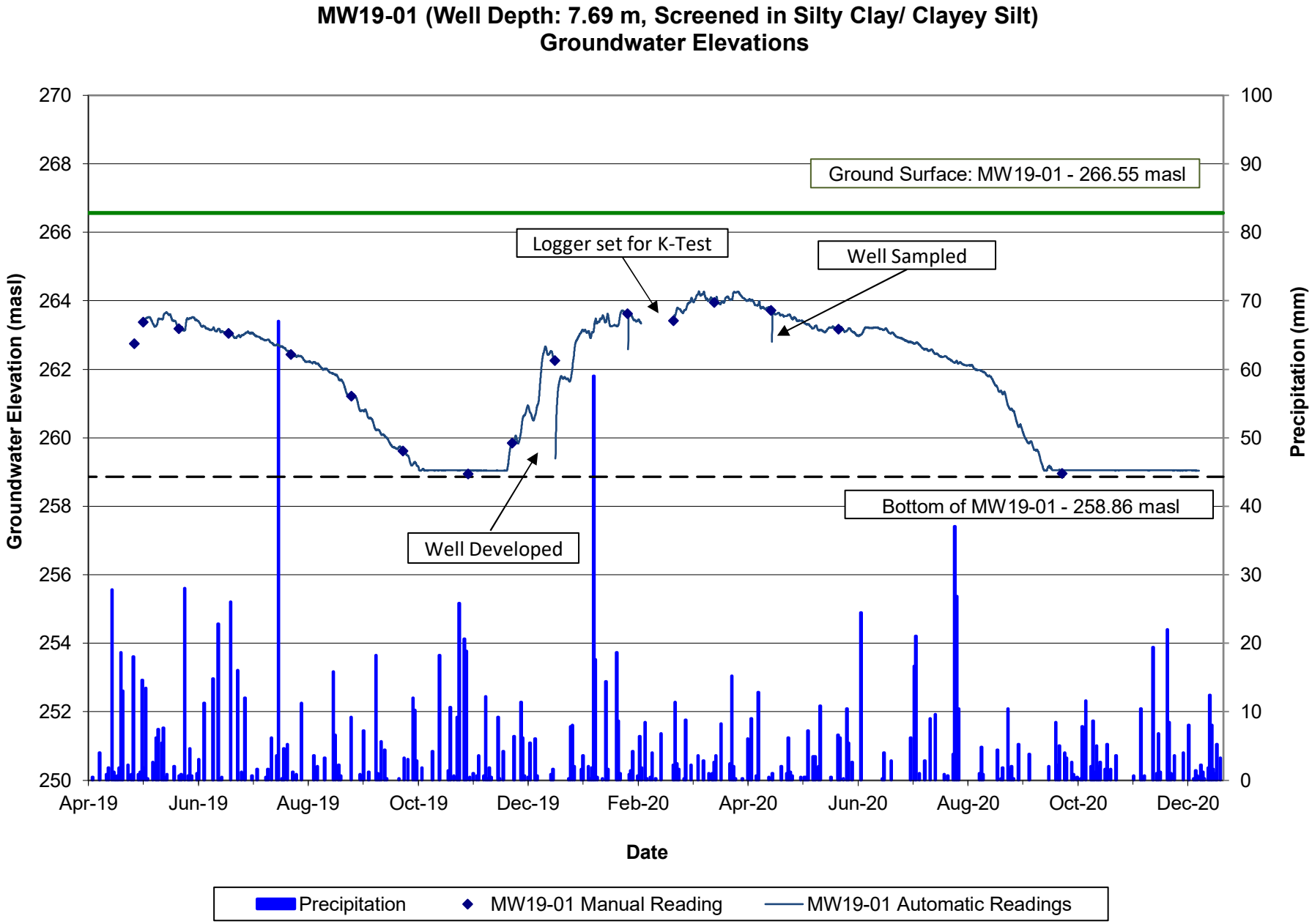

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Figure E-1

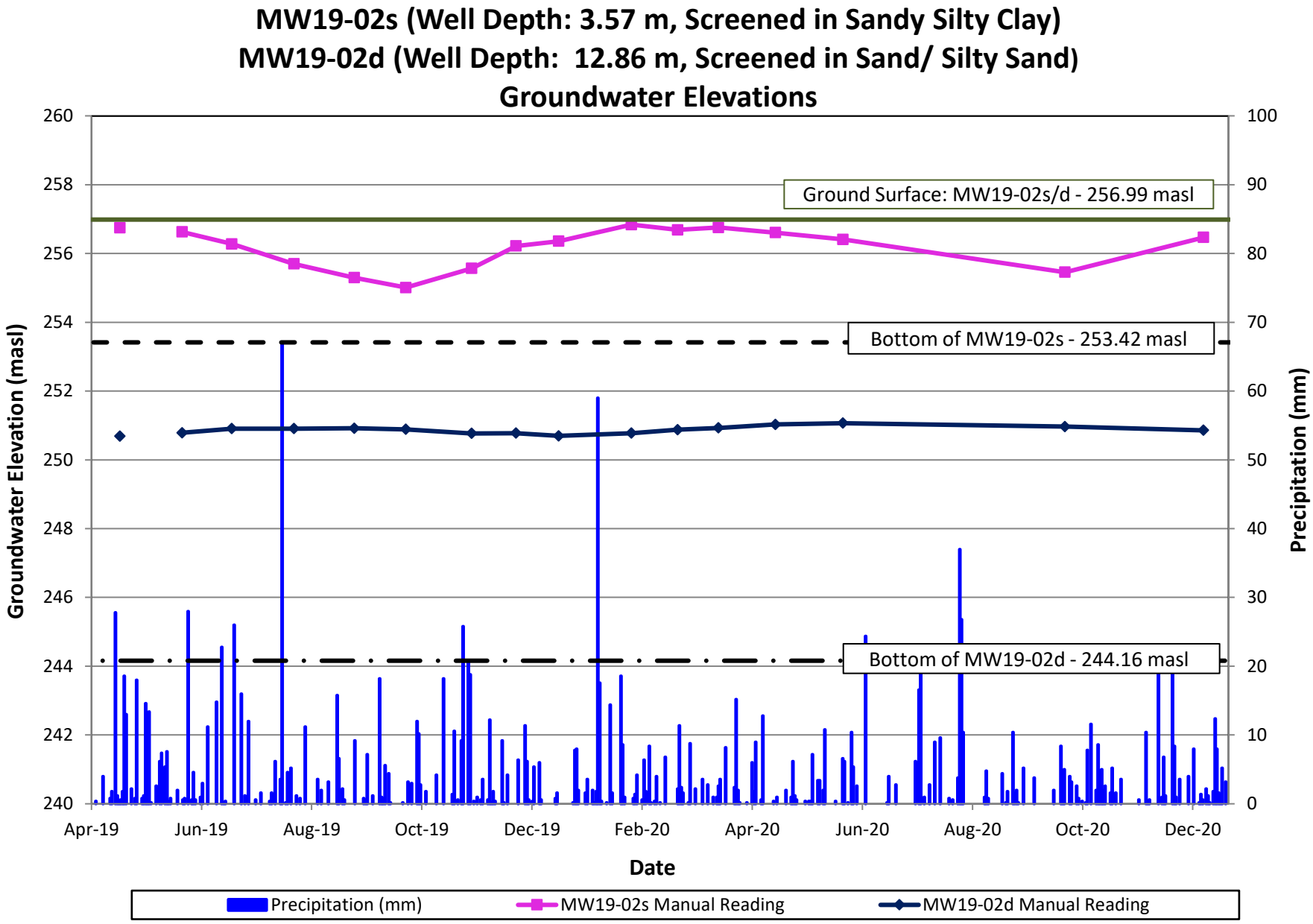

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Figure E-2

MW19-03 (Well Depth: 9.30 m, Screened Clayey Silt)
Groundwater Elevations

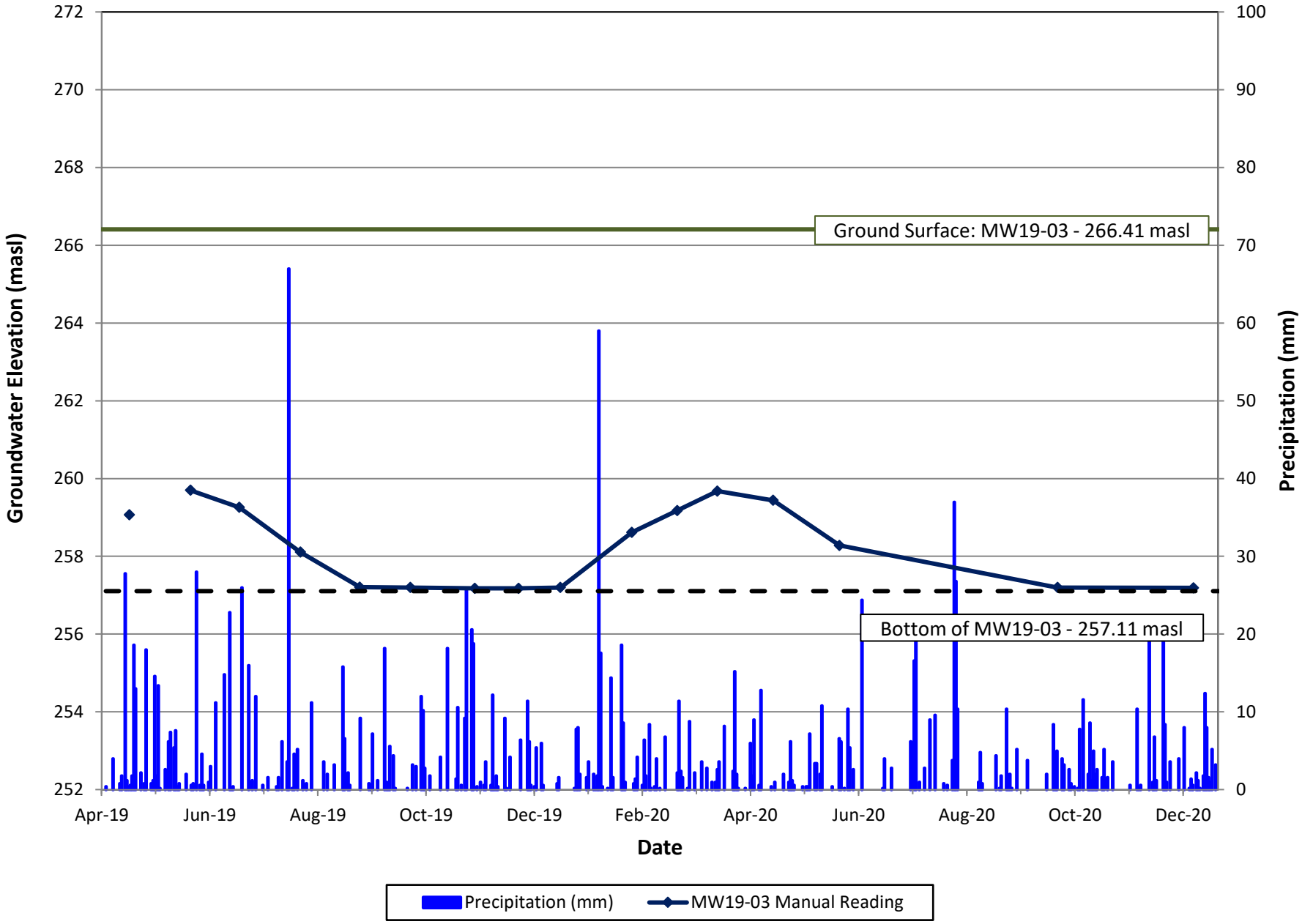

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Figure E-3

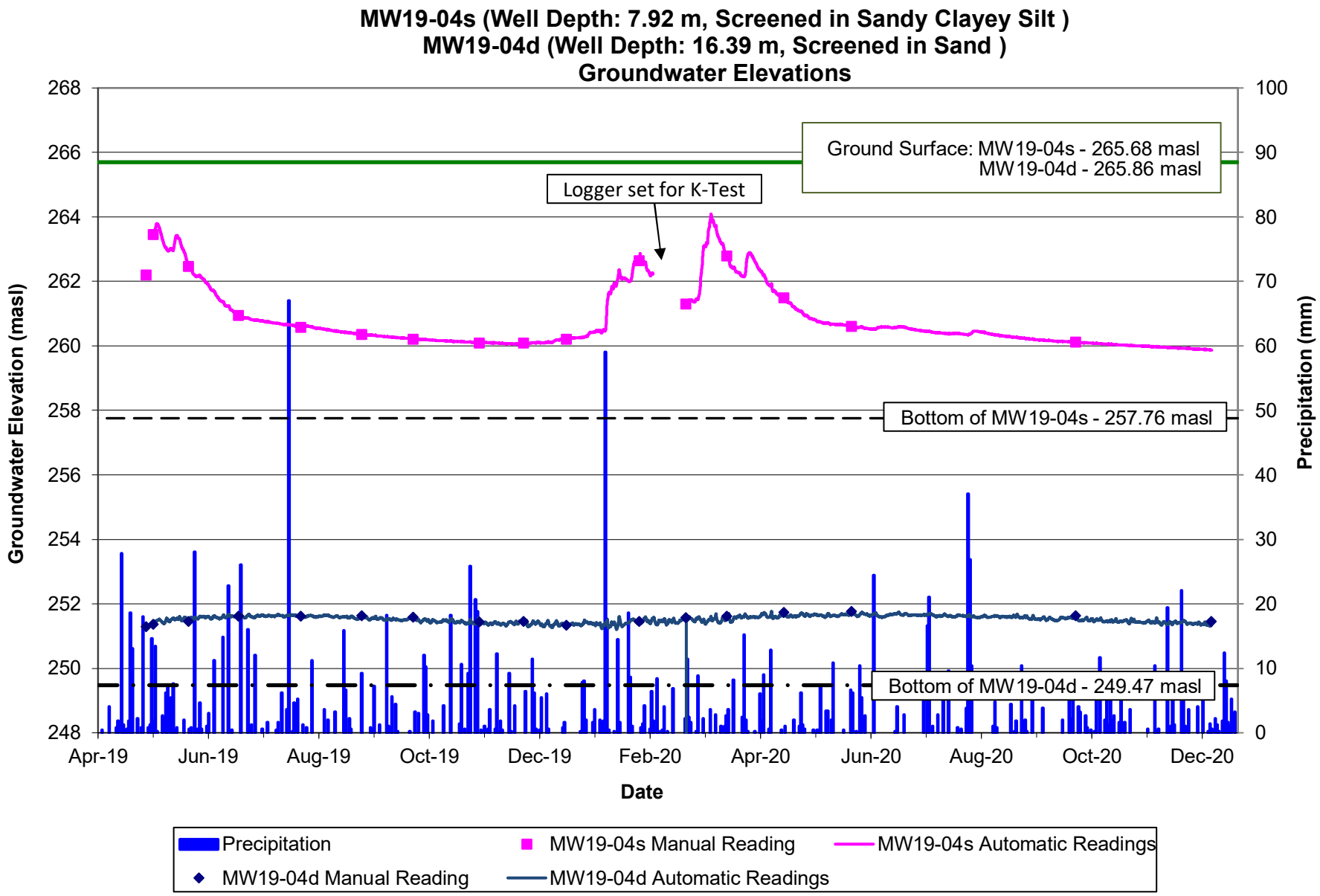

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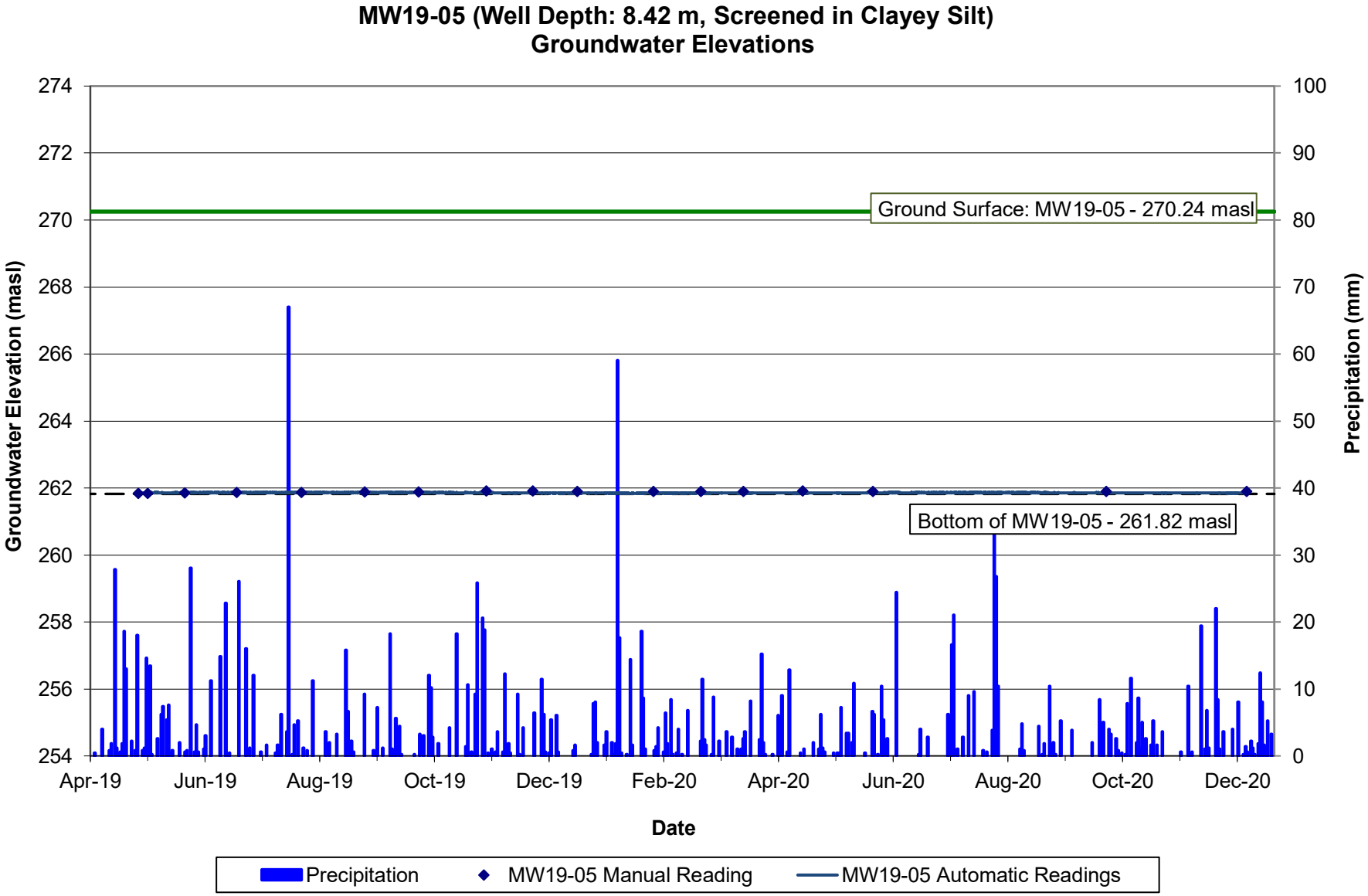
Figure E-4


MW19-05 (Well Depth: 8.42 m, Screened in Clayey Silt)
Groundwater Elevations
Groundwater Elevation (masl)
Precipitation (mm)
Ground Surface: MW19-05 - 270.24 masl
Bottom of MW19-05 - 261.82 masl
274
272
270
268
266
264
262
260
258
256
254
100
90
80
70
60
50
40
30
20
10
0
Apr-19
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Date
Precipitation
MW19-05 Manual Reading
MW19-05 Automatic Readings

MW19-06 (Well Depth: 6.90 m, Screened in Silty Sand Clayey Silt)
Groundwater Elevations

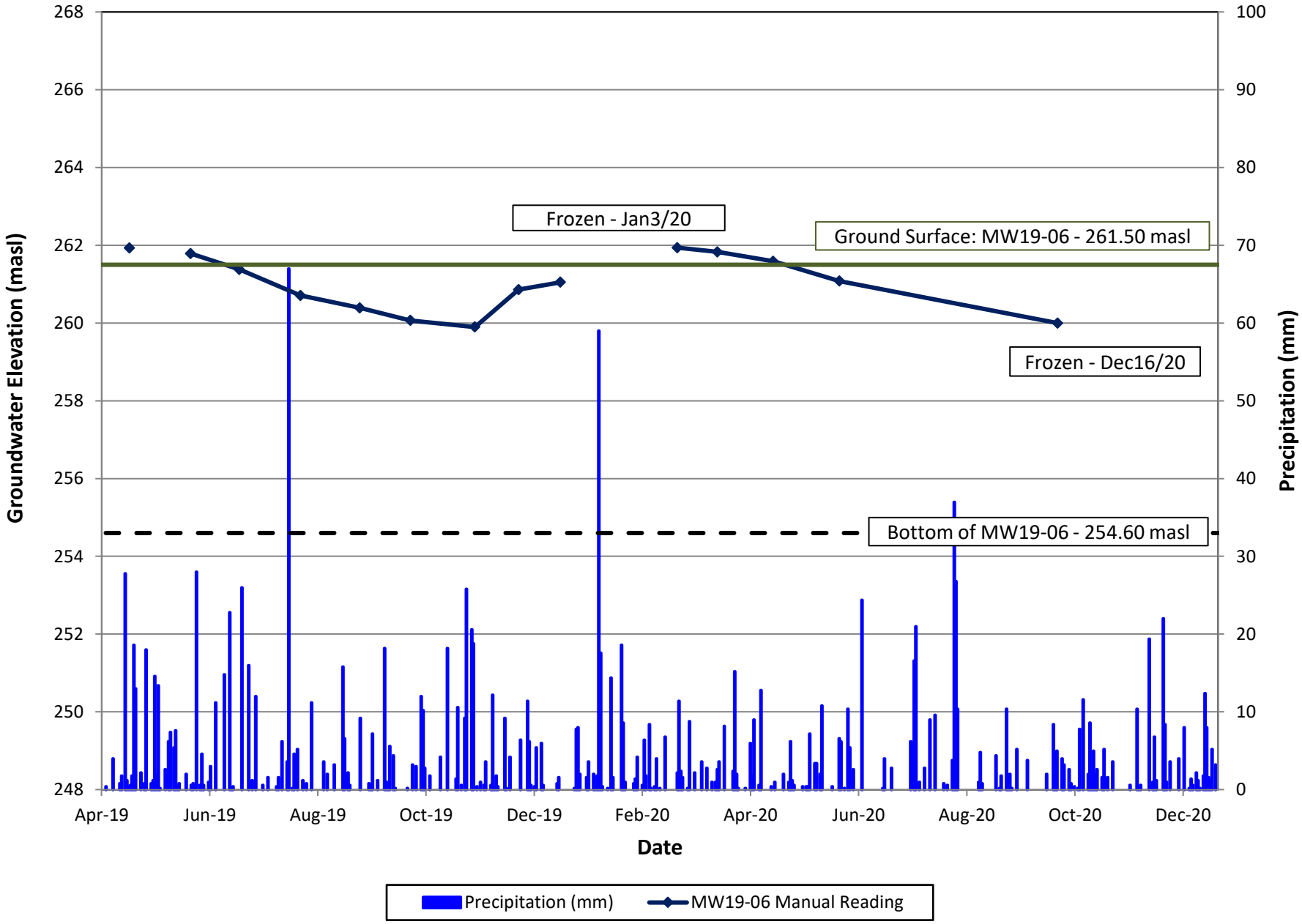


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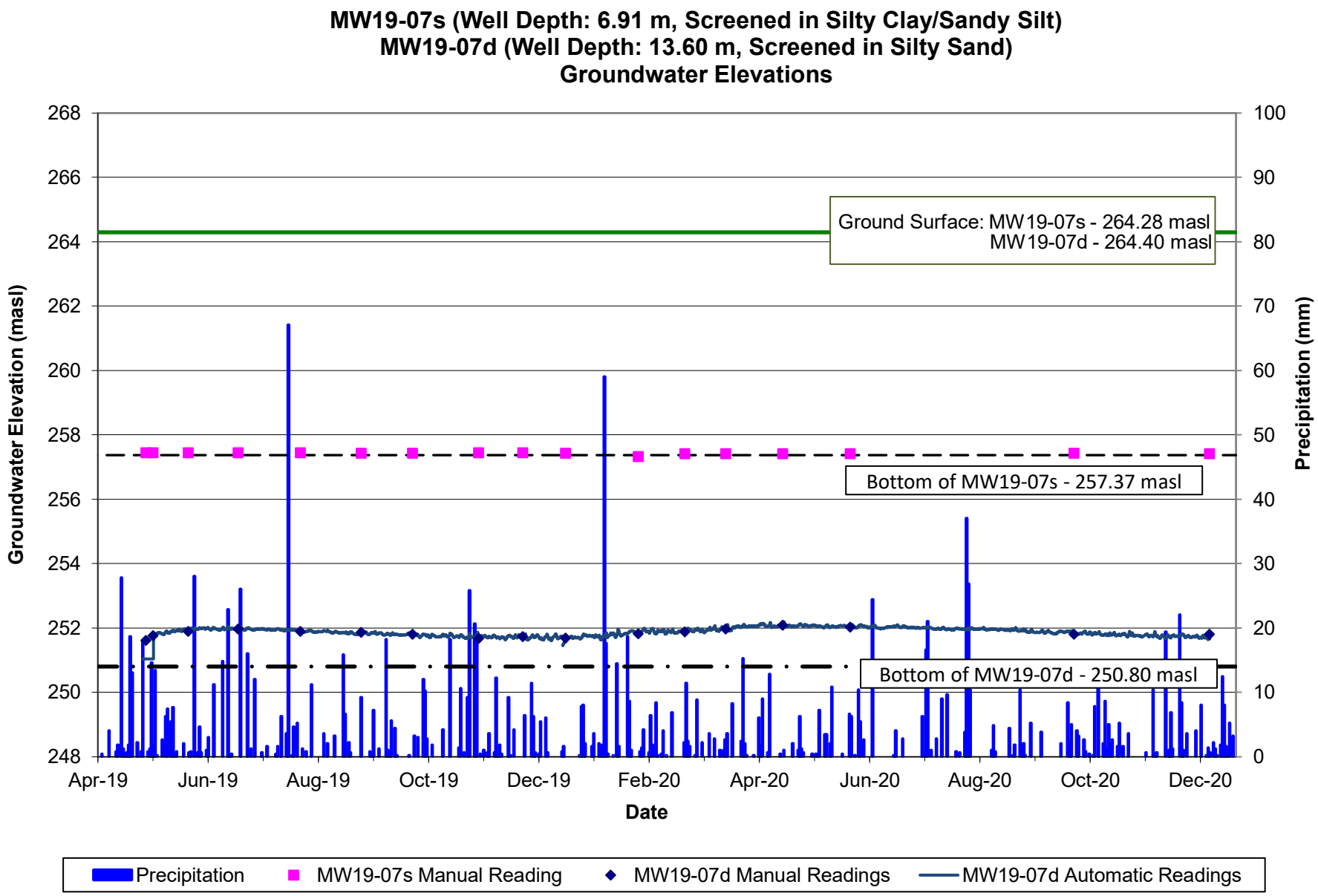
Figure E-6


MW19-07s (Well Depth: 6.91 m, Screened in Silty Clay/Sandy Silt)
MW19-07d (Well Depth: 13.60 m, Screened in Silty Sand)
Groundwater Elevations
Groundwater Elevation (masl)
Precipitation (mm)
Date
Ground Surface: MW19-07s - 264.28 masl
MW19-07d - 264.40 masl
Bottom of MW19-07s - 257.37 masl
Bottom of MW19-07d - 250.80 masl
268
266
264
262
260
258
256
254
252
250
248
100
90
80
70
60
50
40
30
20
10
0
Apr-19
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Precipitation
MW19-07s Manual Reading
MW19-07d Manual Readings
MW19-07d Automatic Readings

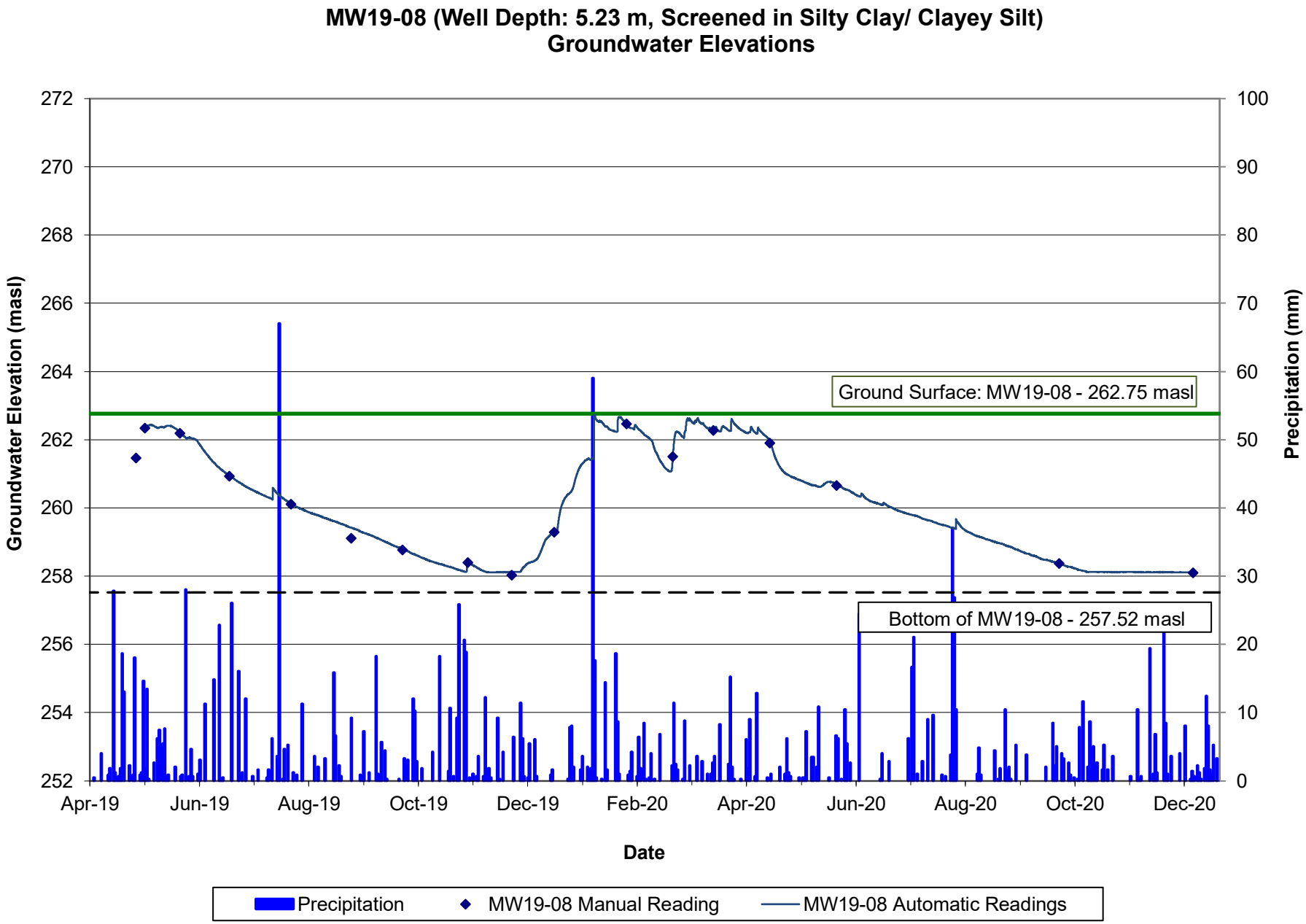


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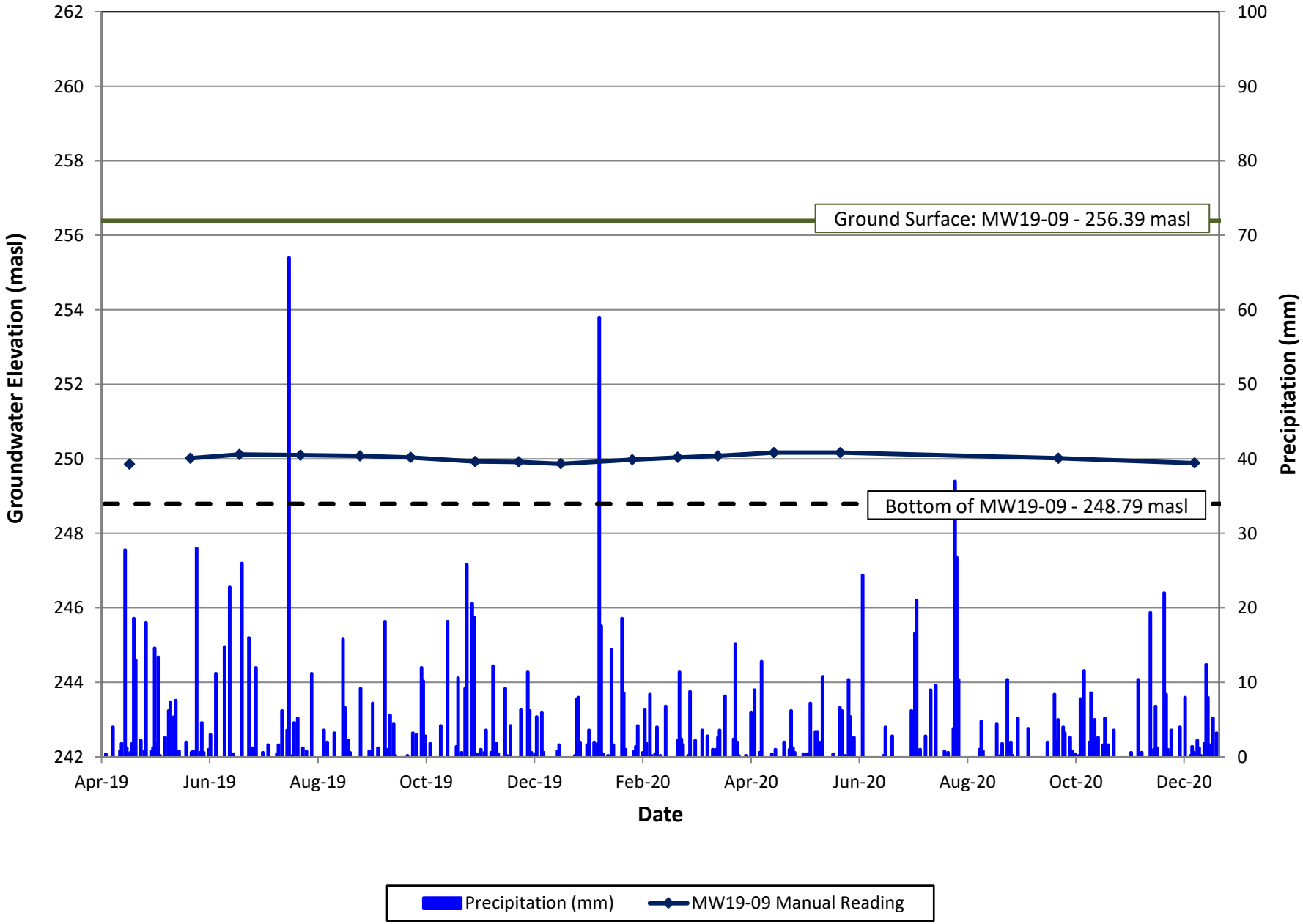
Figure E-8

MW19-09 (Well Depth: 7.6 m, Screened in Silty Sand)
Groundwater Elevations



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FigureE-9

MW19-13 (Well Depth: 9.74 m, Screened in Gravelly Silt Sand)
Groundwater Elevations

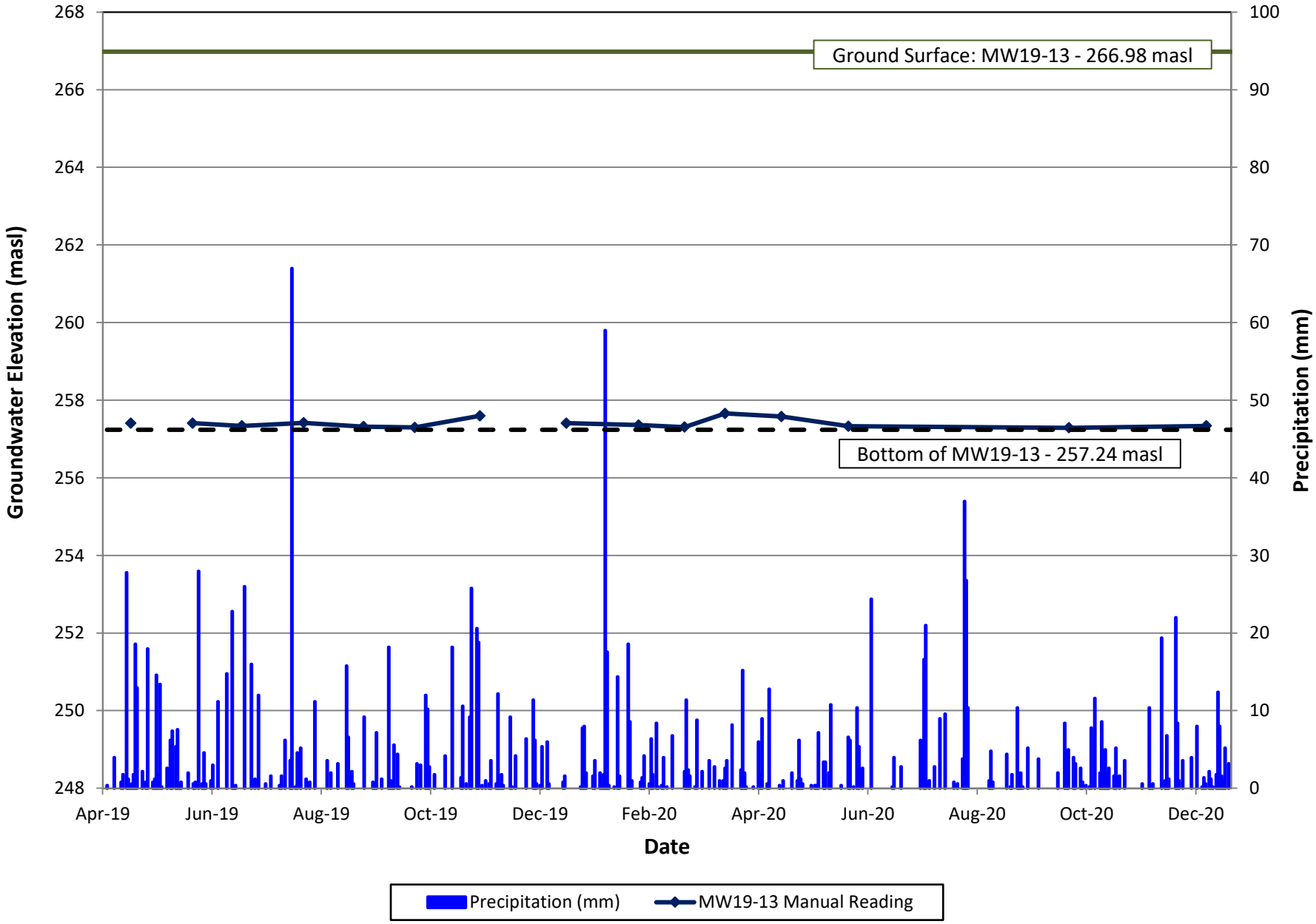

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Figure E-10

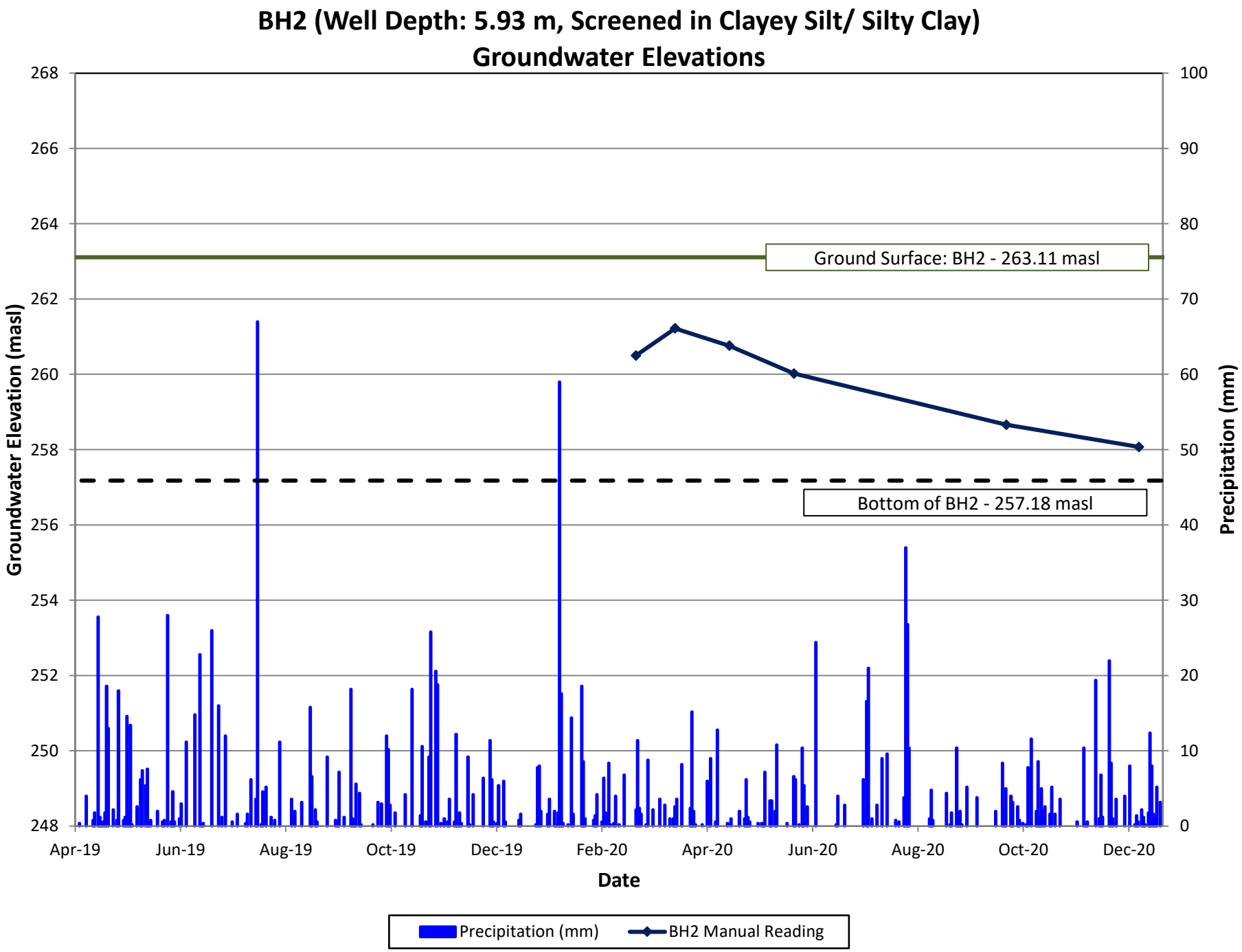

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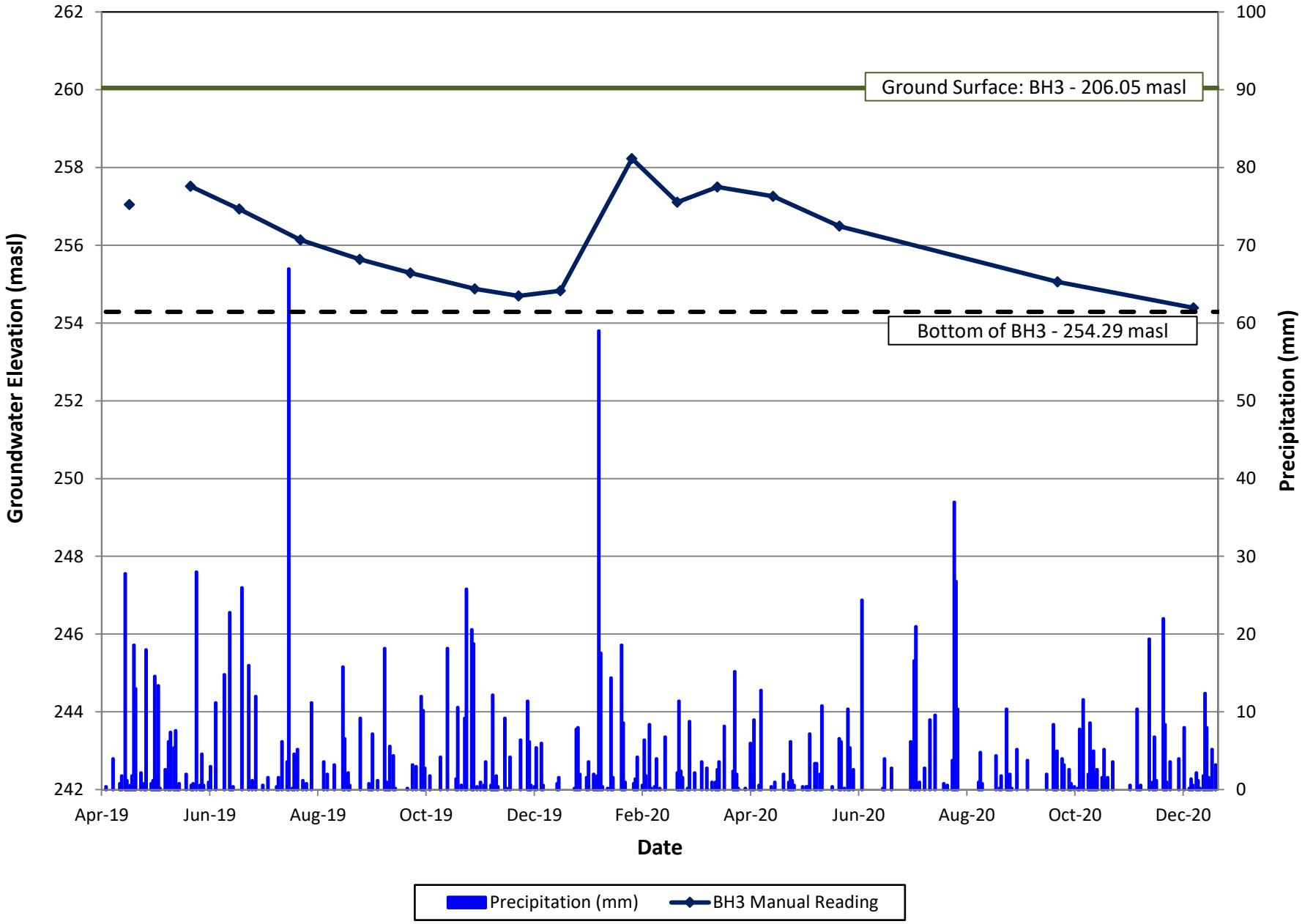
Figure E-11

BH3 (Well Depth: 5.76 m, Screened in Clayey Silt/ Sand/ Silty Clay)
Groundwater Elevations



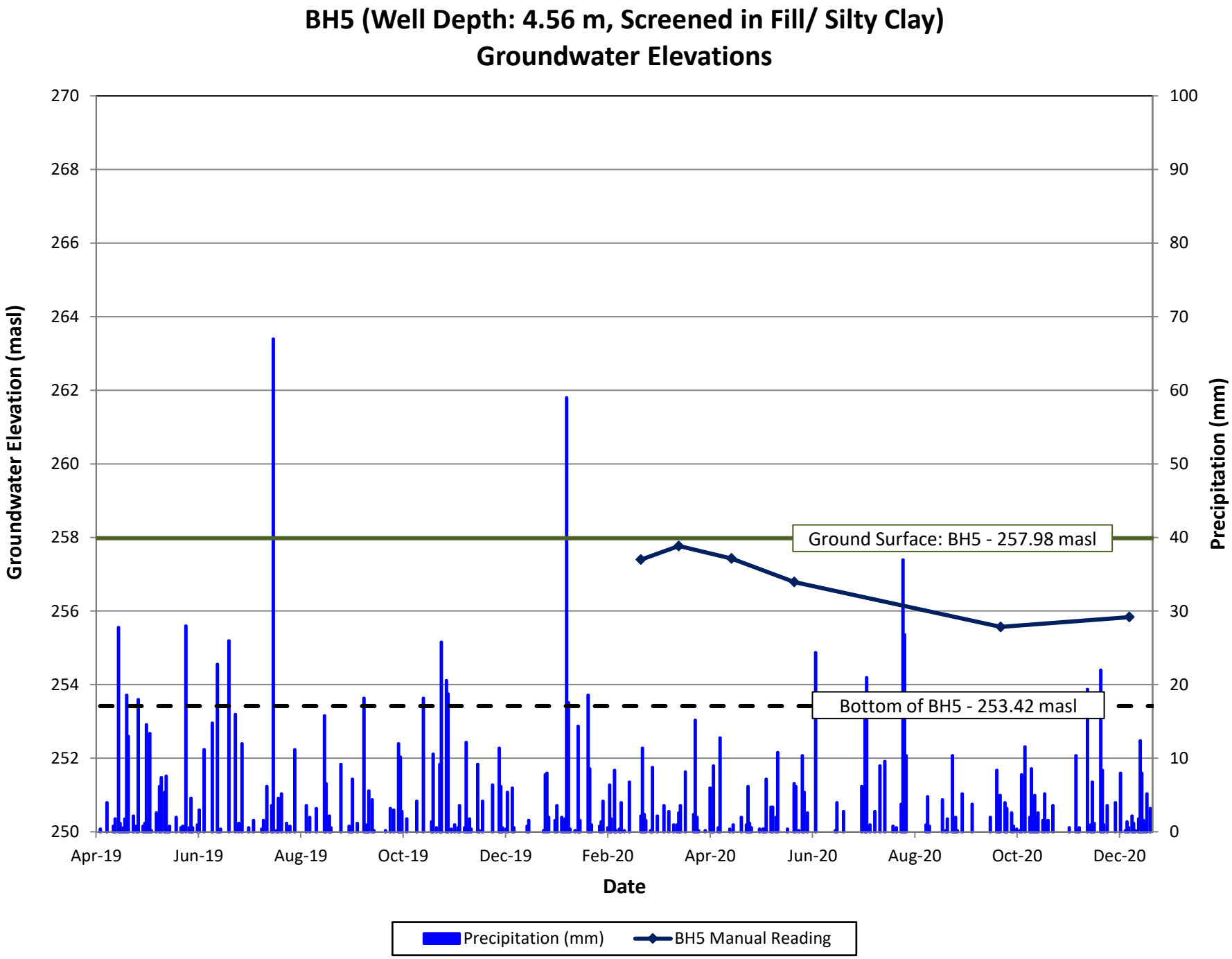


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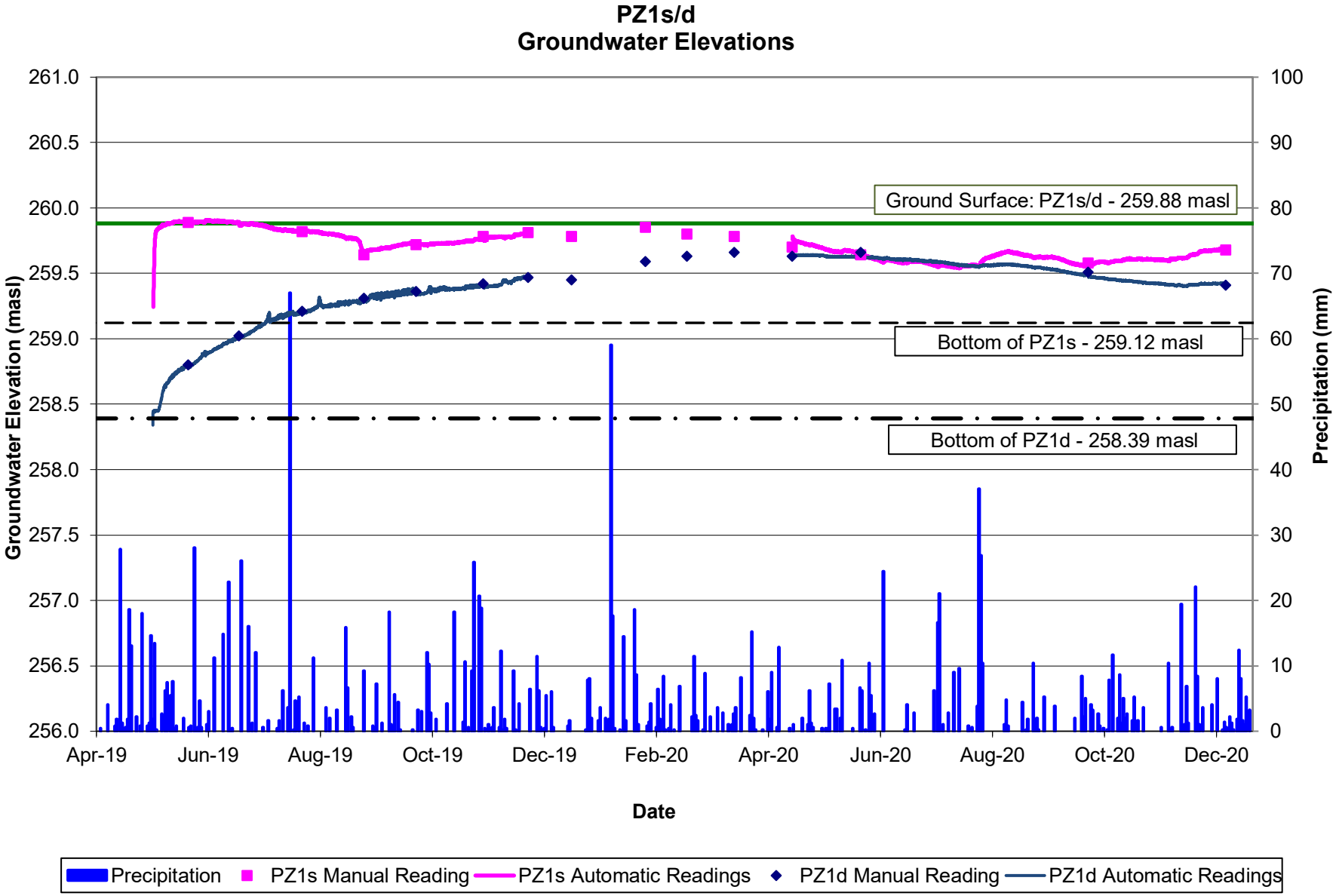
Figure E-13


PZ1s/d
Groundwater Elevations
Groundwater Elevation (masl)
Precipitation (mm)
Date
Ground Surface: PZ1s/d - 259.88 masl
Bottom of PZ1s - 259.12 masl
Bottom of PZ1d - 258.39 masl
261.0
260.5
260.0
259.5
259.0
258.5
258.0
257.5
257.0
256.5
256.0
100
90
80
70
60
50
40
30
20
10
0
Apr-19
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Precipitation
PZ1s Manual Reading
PZ1s Automatic Readings
PZ1d Manual Reading
PZ1d Automatic Readings

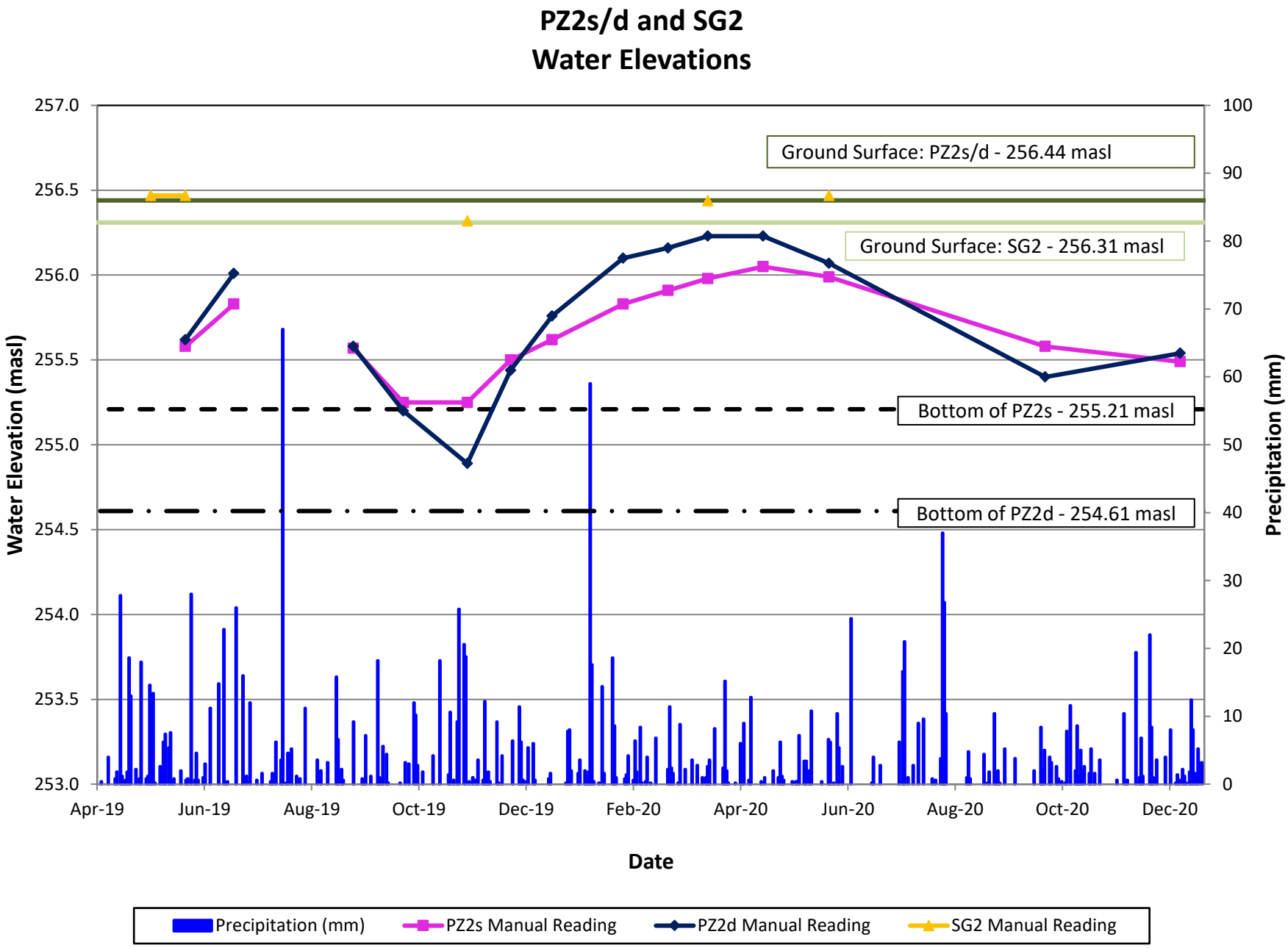


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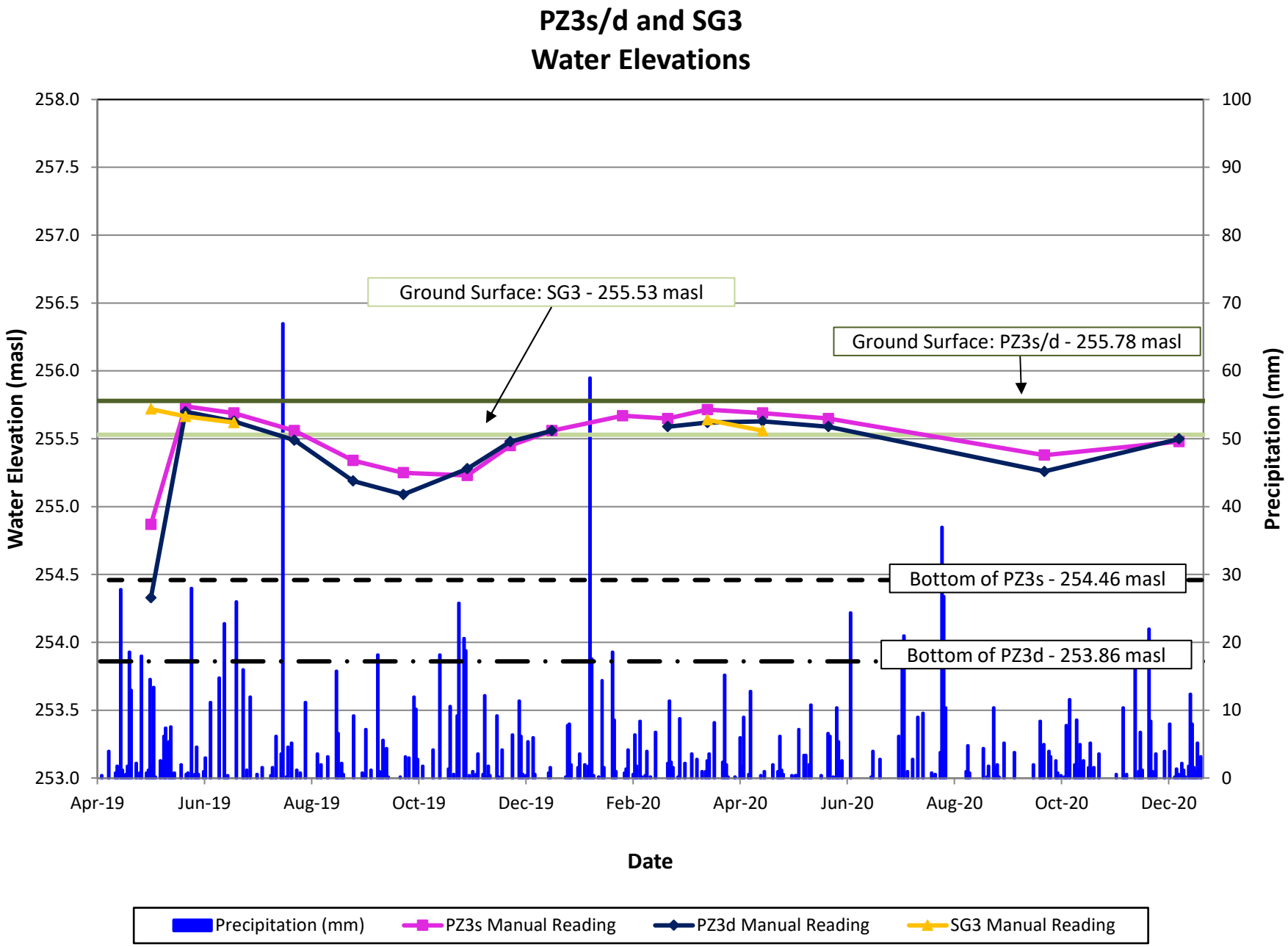
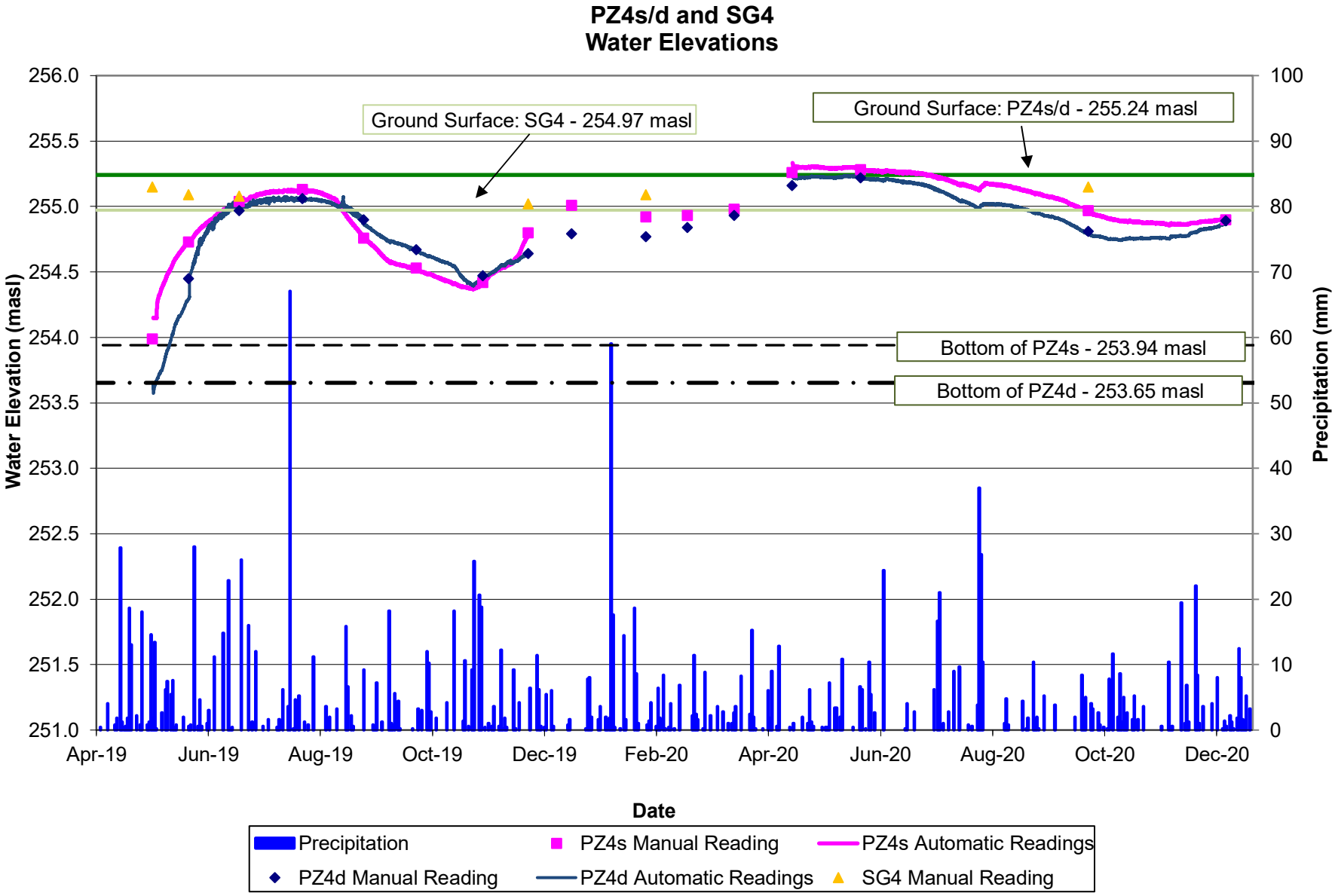
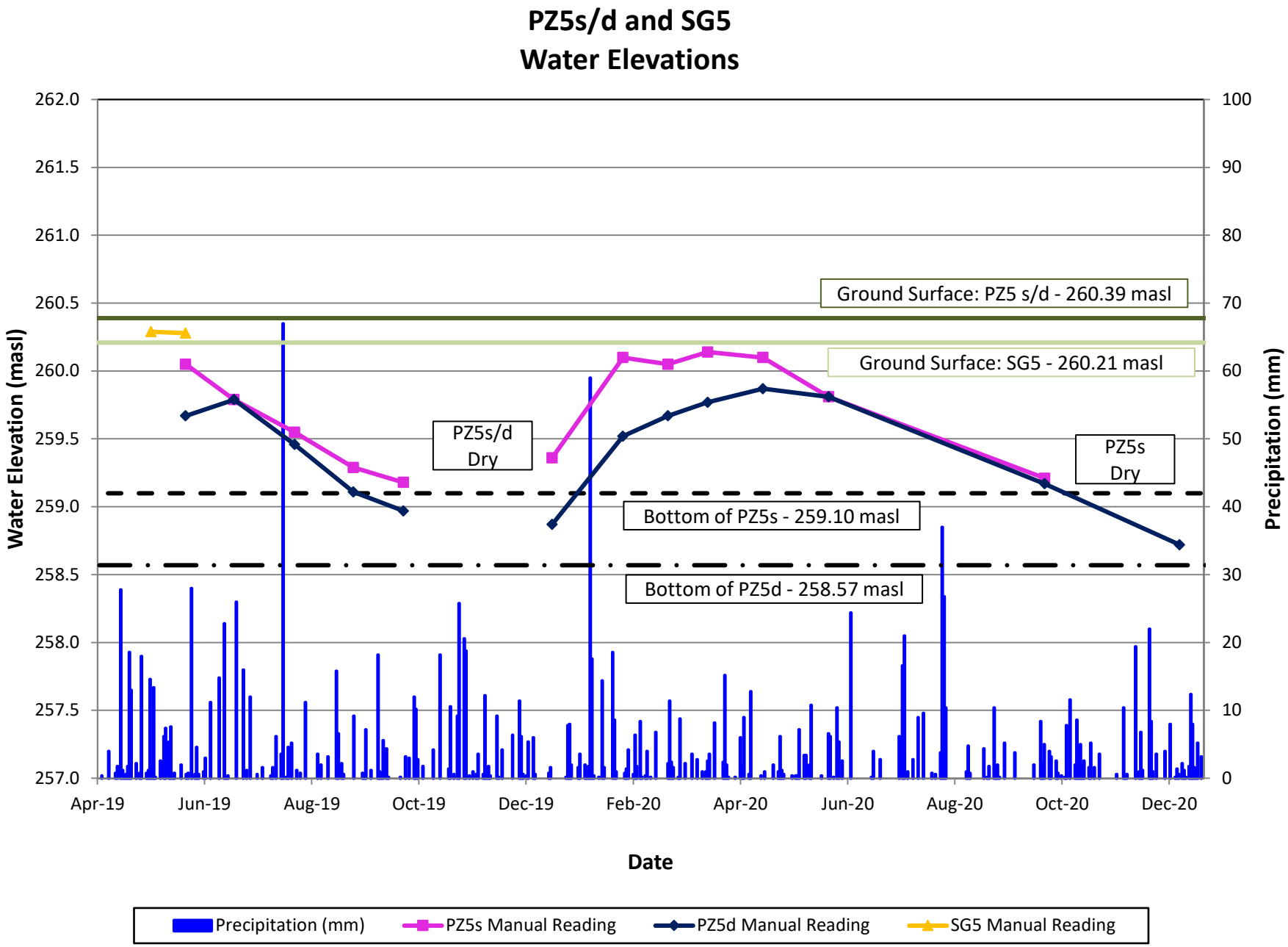
Figure E-15

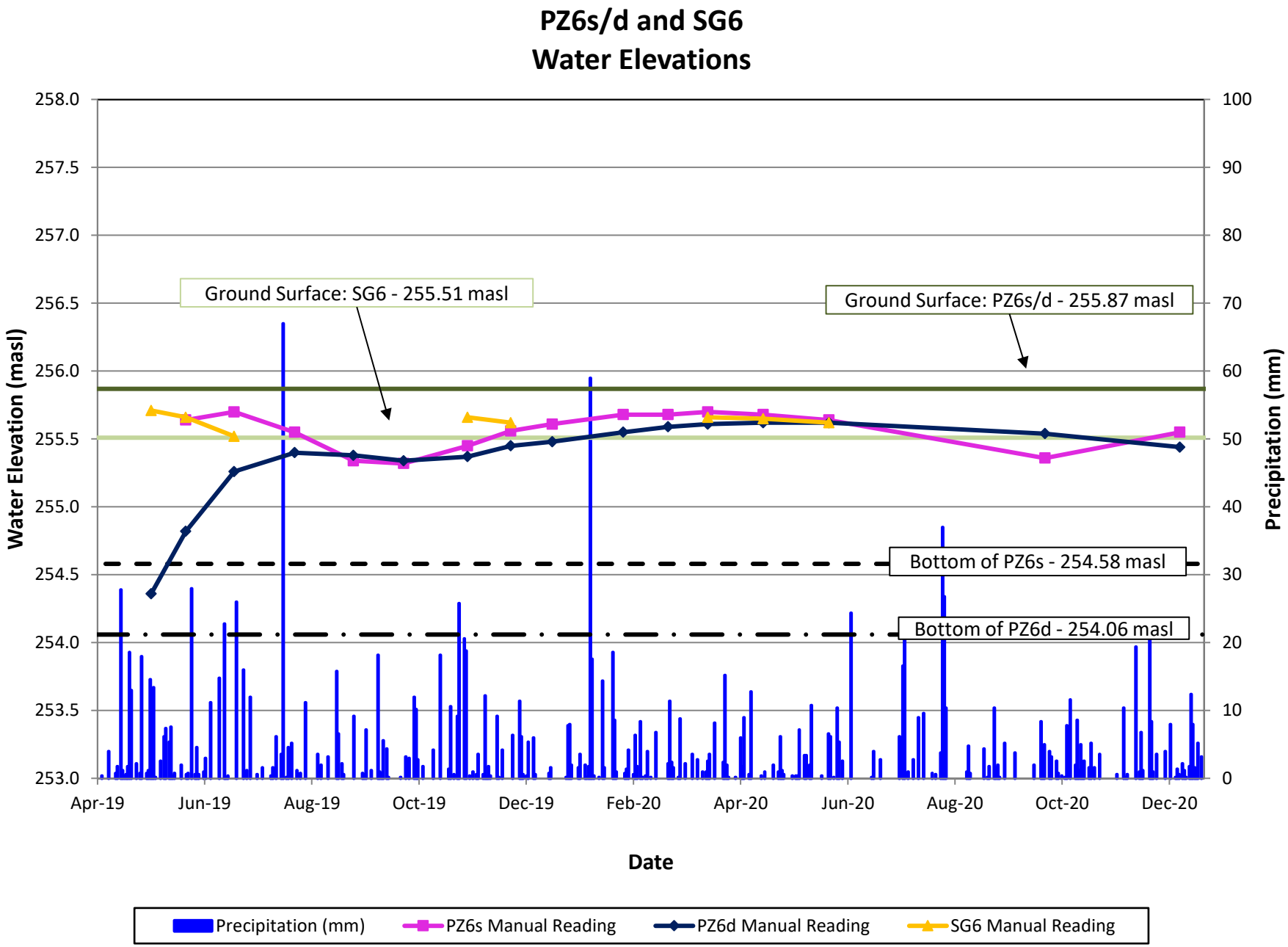

PZ3s/d and SG3
Water Elevations
Water Elevation (masl)
Precipitation (mm)
Date
Ground Surface: SG3 - 255.53 masl
Ground Surface: PZ3s/d - 255.78 masl
Bottom of PZ3s - 254.46 masl
Bottom of PZ3d - 253.86 masl
258.0
257.5
257.0
256.5
256.0
255.5
255.0
254.5
254.0
253.5
253.0
100
90
80
70
60
50
40
30
20
10
0
Apr-19
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Precipitation (mm)
PZ3s Manual Reading
PZ3d Manual Reading
SG3 Manual Reading


PZ4s/d and SG4
Water Elevations
Ground Surface: SG4 - 254.97 masl
Ground Surface: PZ4s/d - 255.24 masl
Bottom of PZ4s - 253.94 masl
Bottom of PZ4d - 253.65 masl
Water Elevation (masl)
Precipitation (mm)
256.0
255.5
255.0
254.5
254.0
253.5
253.0
252.5
252.0
251.5
251.0
100
90
80
70
60
50
40
30
20
10
0
Apr-19
Jun-19
Aug-19
Oct-19
Dec-19
Feb-20
Apr-20
Jun-20
Aug-20
Oct-20
Dec-20
Date
Precipitation
PZ4s Manual Reading
PZ4s Automatic Readings
PZ4d Manual Reading
PZ4d Automatic Readings
SG4 Manual Reading



R.J. Burnside & Associates Limited
300043952

Figure E-18



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300043592

Figure E-19

BURNSIDE

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Appendix E-2

TRCA Groundwater Data

Appendix A

Water Levels

	Alternate Name	MECP Well Tag No.	Interval ID	Northing	Easting	Ground Elevation (masl)	Stickup (m)	Screen Top (masl)	Screen Bottom (masl)	Logger Serial Number	Logger Type	Cable Length
TRCA Mayfield MW-1	TRCA Teapot MW-1	A045333	55823960	4845019	596386	262.53	0.75	251.53	248.53	1037747		11.5[1]
TRCA Mayfield MW-2	TRCA Teapot MW-2	A078526	55835988	4844940	596375	251.45	0.71	246.88	243.83	2040136		6.73
TRCA Mayfield MW-3	TRCA Teapot MW-3		480000015	4844920	596318	254.4	0.675	248.3	245.26	2040132		5.5
TRCA Mayfield MW-4S	TRCA Etobicoke Creek Trail MW1S	A213521	-827483639	4843547	595125	269.55	0.81	265.11	263.59	2069875		6.47
TRCA Mayfield MW-4D	TRCA Etobicoke Creek Trail MW1D	A213521	-827483638				0.835	259.62	258.10	2068686		6.961

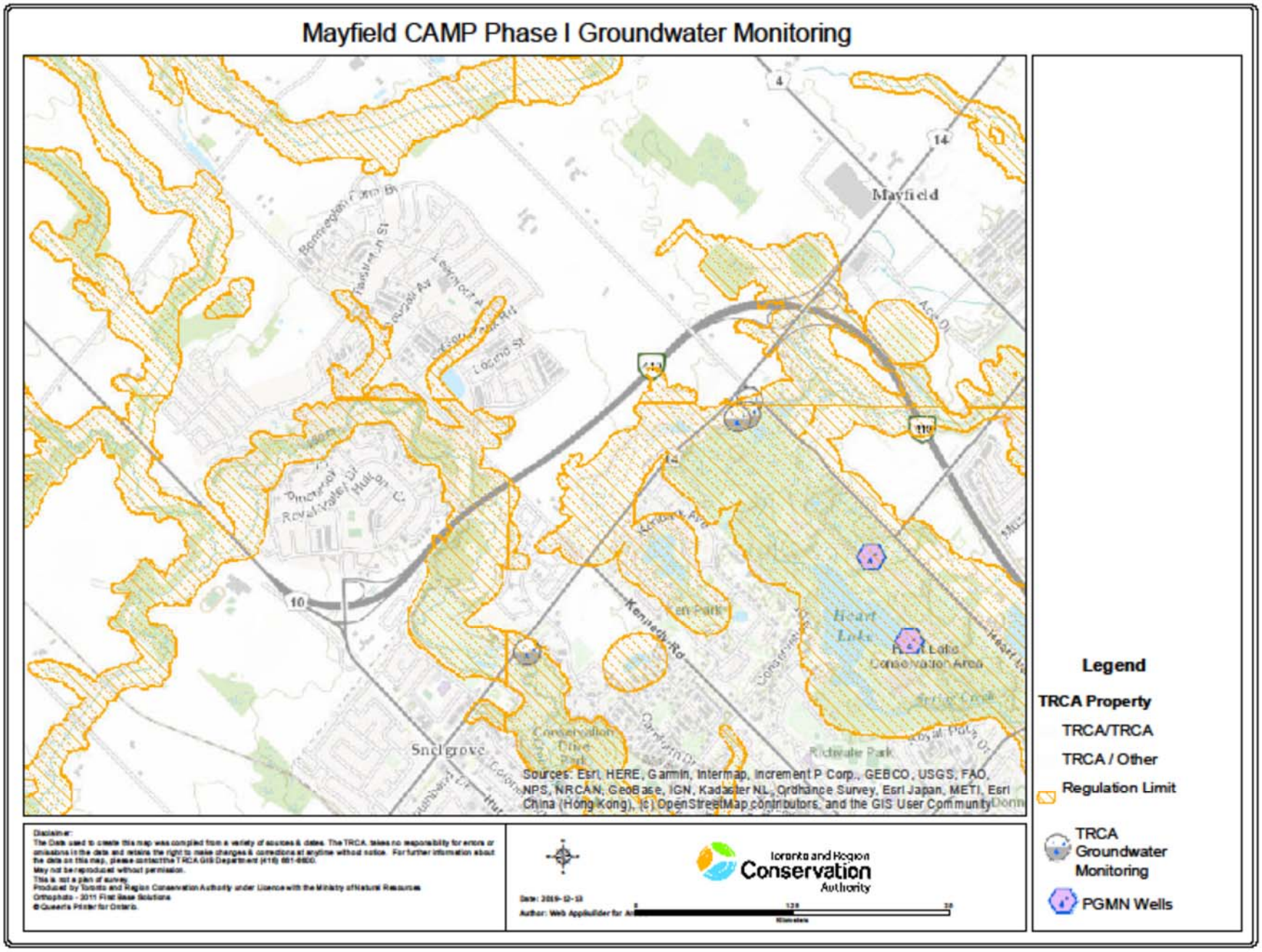
[1]On May 13, 2016 the cable was shortened from 12.5 to 11.5 mbtc to deal with sedimentation issue.

	Date Time	Static Water Level (mbtc)	Date Time	Static Water Level (mbtc)	Date Time	Static Water Level (mbtc)	Date Time	Static Water Level (mbtc)	Date Time	Static Water Level (mbtc)	Date Time	Static Water Level (mbtc)	Date Time	Static Water Level (mbtc)	Date Time	Static Water Level (mbtc)	Date Time	Static Water Level (mbtc)	Date Time	Static Water Level (mbtc)	Date Time	Static Water Level (mbtc)	Date Time	Static Water Level (mbtc)	Date Time	Static Water Level (mbtc)
TRCA Mayfield MW-1	11/20/2015 12:00	11.88	5/13/2016 11:15	10.62	9/28/2016 12:11	10.85	2/1/2017 11:30	10.73	4/19/2017 12:00	9.96	9/28/2017 11:18[1]	10.34	6/11/2018 12:00	9.57	11/14/2018 9:55	10.67	7/3/2019 9:50	9.99							10/28/2019 9:44	10.62
TRCA Mayfield MW-2	11/20/2015 12:00	5.31	5/13/2016 11:55	4.44	9/28/2016 12:38	5.71	2/1/2017 10:30	5.73	4/19/2017 12:00	4.15	9/28/2019 11:25[1]	5.28	6/11/2018 12:00	4.5	11/14/2018 11:33	5.4	7/3/2019 10:06	4.48							10/28/2019 9:55	5.42
TRCA Mayfield MW-3	11/18/2015 12:00	4.52	5/13/2016 12:20	3.24	9/28/2016 12:52	4.43	2/1/2017 11:00	4.82	4/19/2017 12:00	2.95	9/28/2017 11:34[1]	4.06	6/11/2018 12:00	3.37	11/14/2018 13:05	4.55	7/3/2019 10:32	3.14	08/09/2019 13:28[1]	3.73[1]	08/12/2019 10:44[1]	3.66[1]	10/28/2019 11:01	4.35		
TRCA Mayfield MW-4S	-	-	-	-	-	-	-	-	-	-	-	-	6/11/2018 12:00	5.12	10/10/2018 11:06	5.26	7/3/2019 11:19	4.89					10/28/2019 10:12	5.15		
TRCA Mayfield MW-4D	-	-	-	-	-	-	-	-	-	-	-	-	6/11/2018 12:00	3.86	10/11/2018 9:58	3.80	7/3/2019 11:31[2]	3.69					10/28/2019	3.77		

[1]Manuals to be entered into Sitefx
[2]Manual time to be corrected in Sitefx

Appendix B

Location Plan


Mayfield CAMP Phase I Groundwater Monitoring
Mayfield
Snelgrove
Heart Lake Conservation Area
Kennedy Rd
Sources: Esri, HERE, Garmin, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), (c) OpenStreetMap contributors, and the GIS User Community
Legend
TRCA Property
TRCA/TRCA
TRCA / Other
Regulation Limit
TRCA Groundwater Monitoring
PGMN Wells
Toronto and Region Conservation Authority

Appendix C

Hydrographs

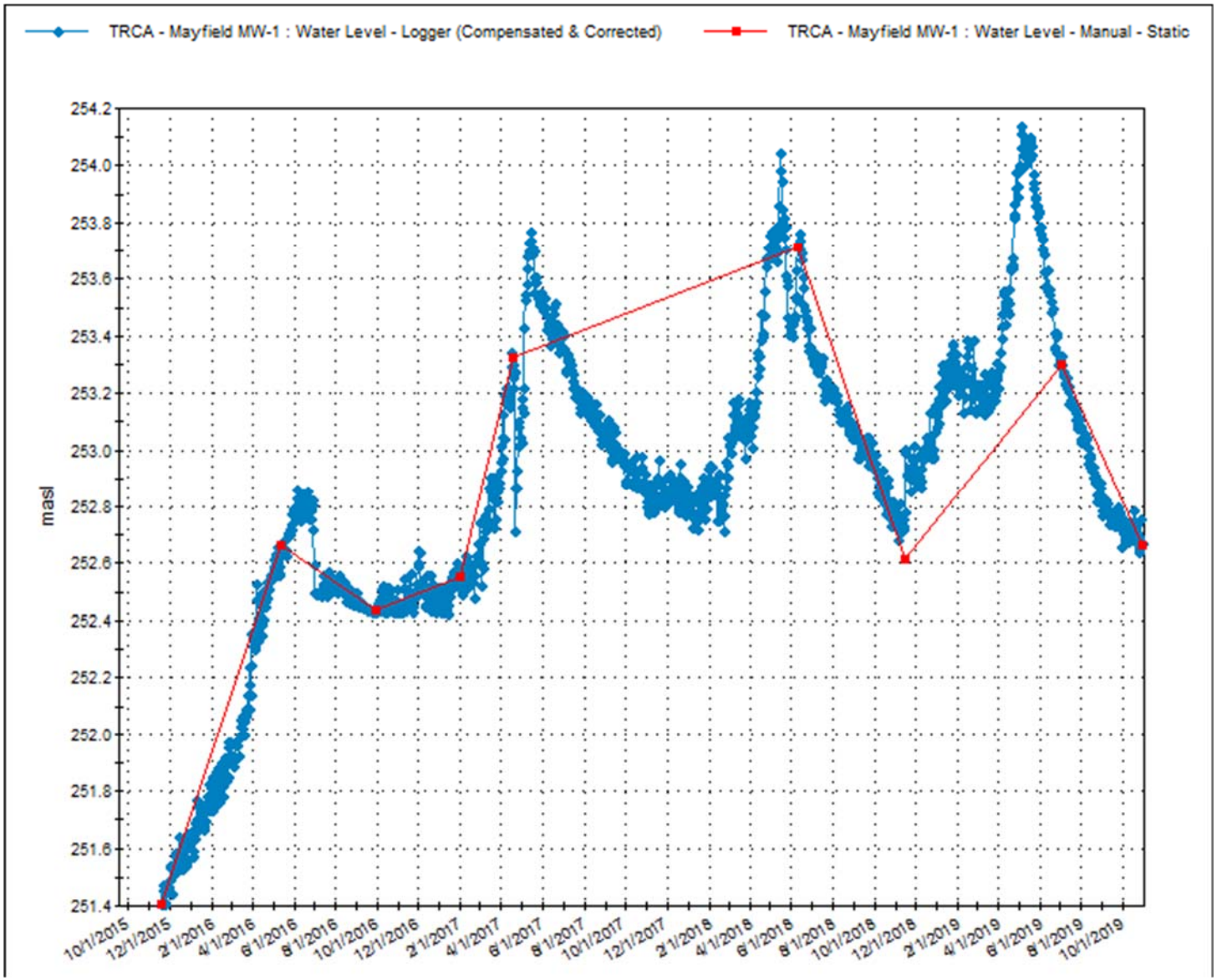


Figure 1 TRCA Mayfield MW1 Hydrograph

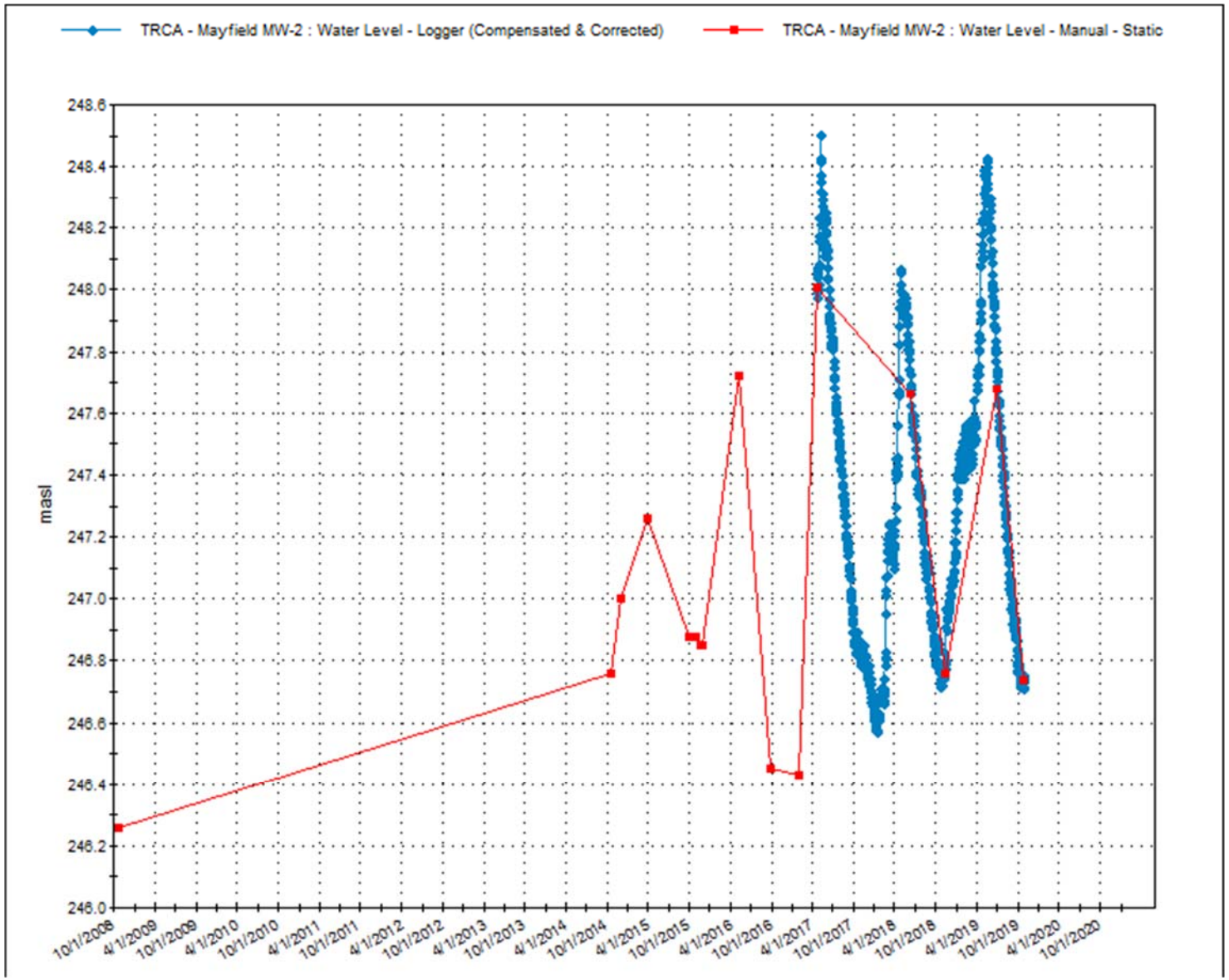


Figure 2 TRCA Mayfield MW2 Hydrograph

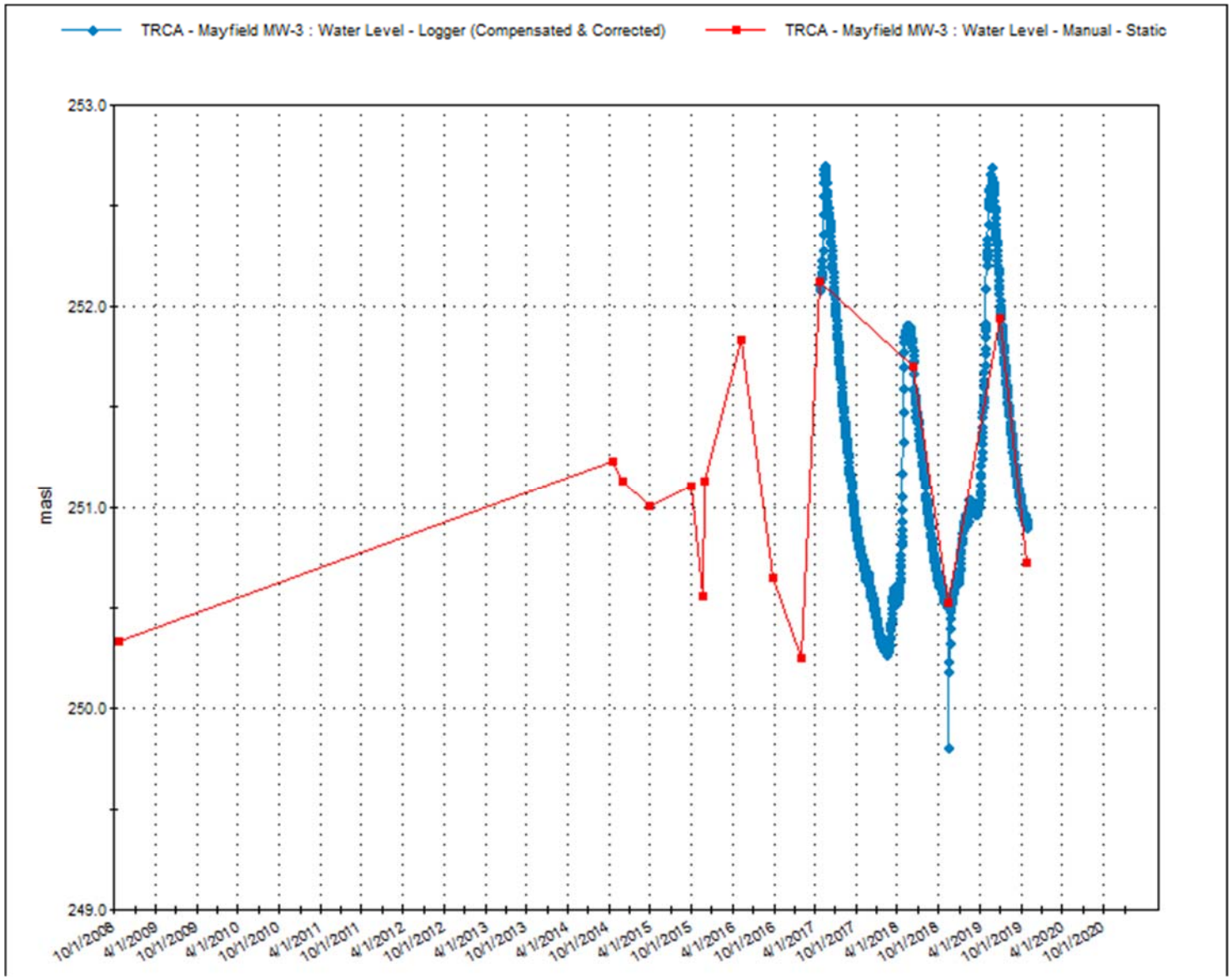


Figure 3 TRCA Mayfield MW3 Hydrograph

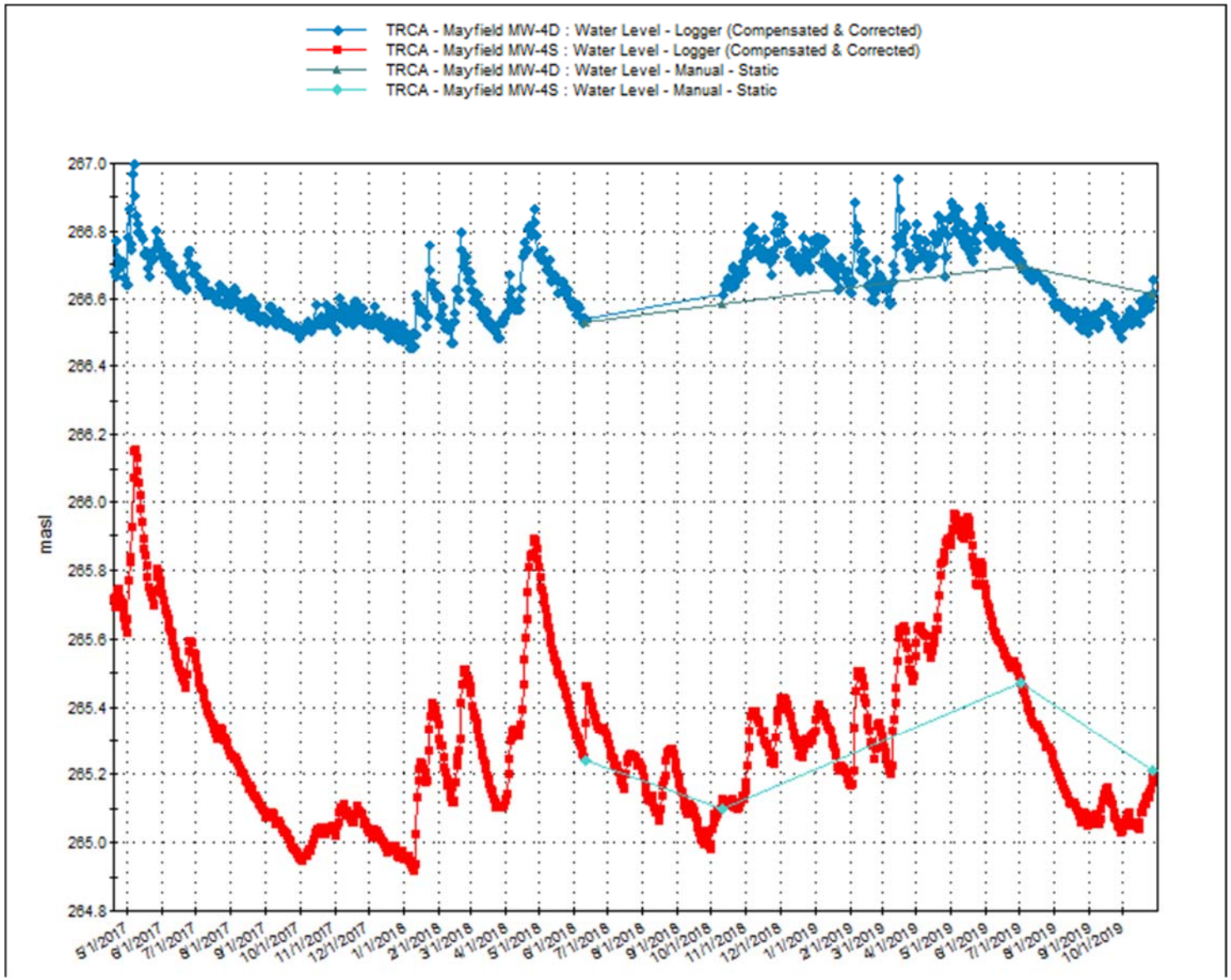
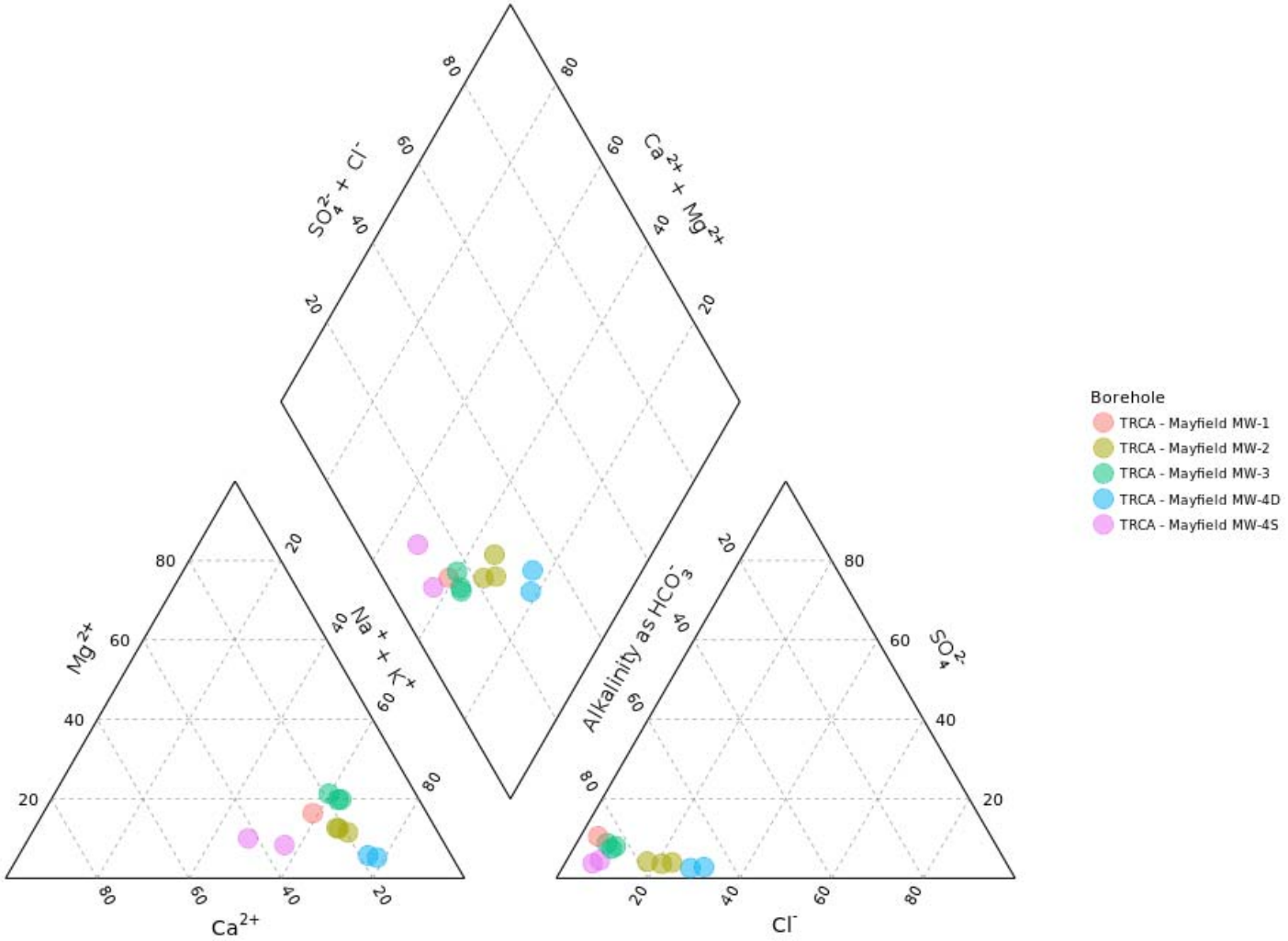


Figure 4 TRCA Mayfield MW4s/d

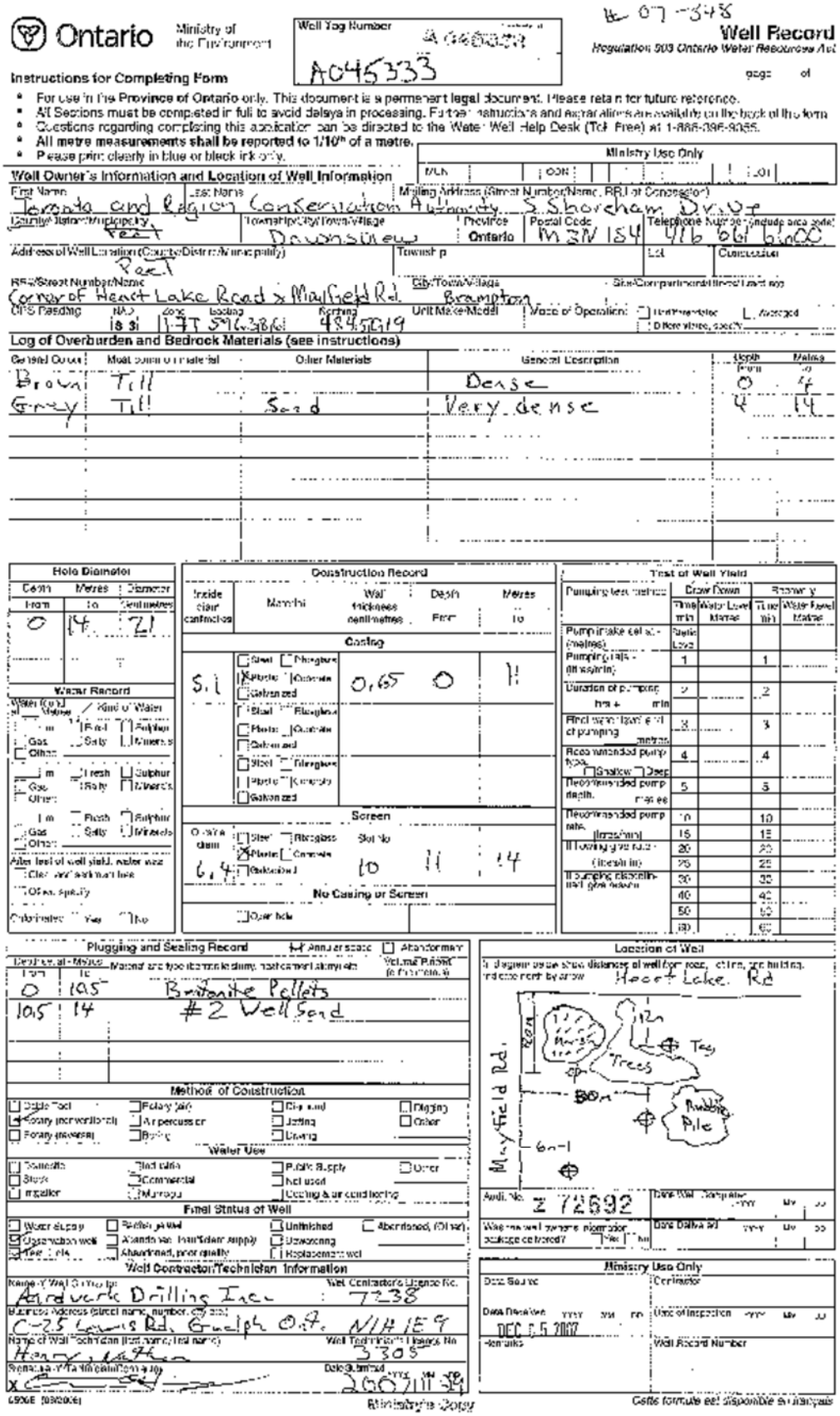
Appendix D

Chemistry


$SO_4^{2-} + Cl^-$
$Ca^{2+} + Mg^{2+}$
Mg^{2+}
$Na^+ + K^+$
Ca^{2+}
Alkalinity as HCO_3^-
SO_4^{2-}
Cl^-
20
40
60
80
Borehole
TRCA - Mayfield MW-1
TRCA - Mayfield MW-2
TRCA - Mayfield MW-3
TRCA - Mayfield MW-4D
TRCA - Mayfield MW-4S

Appendix E

Well Logs



Ontario Ministry of the Environment

Well Tag Number A045533

B-07-348

Well Record

Regulation 903 Ontario Water Resources Act

Instructions for Completing Form

- For use in the Province of Ontario only. This document is a permanent legal document. Please retain for future reference.
- All Sections must be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Help Desk (Toll Free) at 1-888-396-9355.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only

Well Owner's Information and Location of Well Information

First Name: — Last Name: Toronto and Region Conservation Authority

Mailing Address (Street Number/Name, RR# or Concession): 5 Shoreham Drive

County/District/Municipality: Peel

Township/City/Town/Village: Downsview

Province: Ontario

Postal Code: M3N 1S4

Telephone Number (include area code): 416 661 6600

Address of Well Location (County/District/Municipality): Part

Township: — Lot: — Concession:

RR#/Street Number/Name: Corner of Heart Lake Road & Mayfield Rd.

City/Town/Village: Brampton

Site/Compartment/Block/Unit no.

UTM Reading: NAD 83 — Zone: 17 — Easting: 596386 — Northing: 4845619

Unit Make/Model: — Water of Operation: — Untreated — Treated — If other than, specify:

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From	Depth To
Brown	Till		Dense	0	4
Grey	Till	Sand	Very dense	4	14

Hole Diameter

Depth From	Depth To	Diameter (centimetres)
0	14	21

Water Record

Water found at — Kind of Water: Fresh / Salty / Gas / Other / Sulphur / Minerals / Fresh / Salty / Gas / Other / Sulphur / Minerals

After test of well yield, water was: Clear and sediment free / Other, specify

Chlorinated: Yes / No

Construction Record

Casing

Inside diameter (centimetres)	Material	Wall thickness (centimetres)	Depth From (Metres)	Depth To (Metres)
5.1	Steel / Plastic / Galvanized	0.65	0	11

Screen

Outside diameter	Material	Slot No.	Depth From (Metres)	Depth To (Metres)
6.4	Plastic	10	11	14

No Casing or Screen: Open hole

Test of Well Yield

Pumping test method: Draw Down / Recovery

	Draw Down Time (min)	Draw Down Water Level (Metres)	Recovery Time (min)	Recovery Water Level (Metres)
Pump intake set at (metres)	Static Level			
Pumping rate (litres/min)	1		1	
Duration of pumping (hrs + min)	2		2	
Final water level end of pumping (metres)	3		3	
Recommended pump type: Shallow / Deep	4		4	
Recommended pump depth. (metres)	5		5	
Recommended pump rate. (litres/min)	10		10	
If flowing give rate (litres/min)	15		15	
If pumping discontinued give reason	20		20	
	25		25	
	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record — Annular space / Abandoned

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry etc.)	Volume Placed (cubic metres)
0	105	Bentonite Pellets	
105	14	#2 Well Sand	

Method of Construction

Cable Tool / Rotary (air) / Diamond / Digging / Rotary (conventional) / Air percussion / Jetting / Other / Rotary (reverse) / Boring / Driving

Water Use

Domestic / Not used / Public Supply / Other / Stock / Commercial / Cooling & air conditioning / Irrigation / Municipal

Final Status of Well

Water Supply / Replacement well / Unfinished / Abandoned, (Other) / Observation well / Alteration (construction) / Dewatering / Abandoned, poor quality / Replacement well

Well Contractor/Technician Information

Name of Well Contractor: Ardvark Drilling Inc. — Well Contractor's Licence No.: 7238

Business Address (street name, number, city, etc.): C-25 Lewis Rd. Guelph Ont. N1H 1E9

Name of Well Technician (first name, last name): Henry Mathes — Well Technician's Licence No.: 3305

Signature of Technician/Contractor: X — Date Submitted: 2007/11/29

Location of Well

In diagram below show distance of well from road, river, or building and indicate north by arrow. Heart Lake Rd.

Audit No.: Z 72692 — Date Well Completed: — Date Delivered: DEC 05 2007

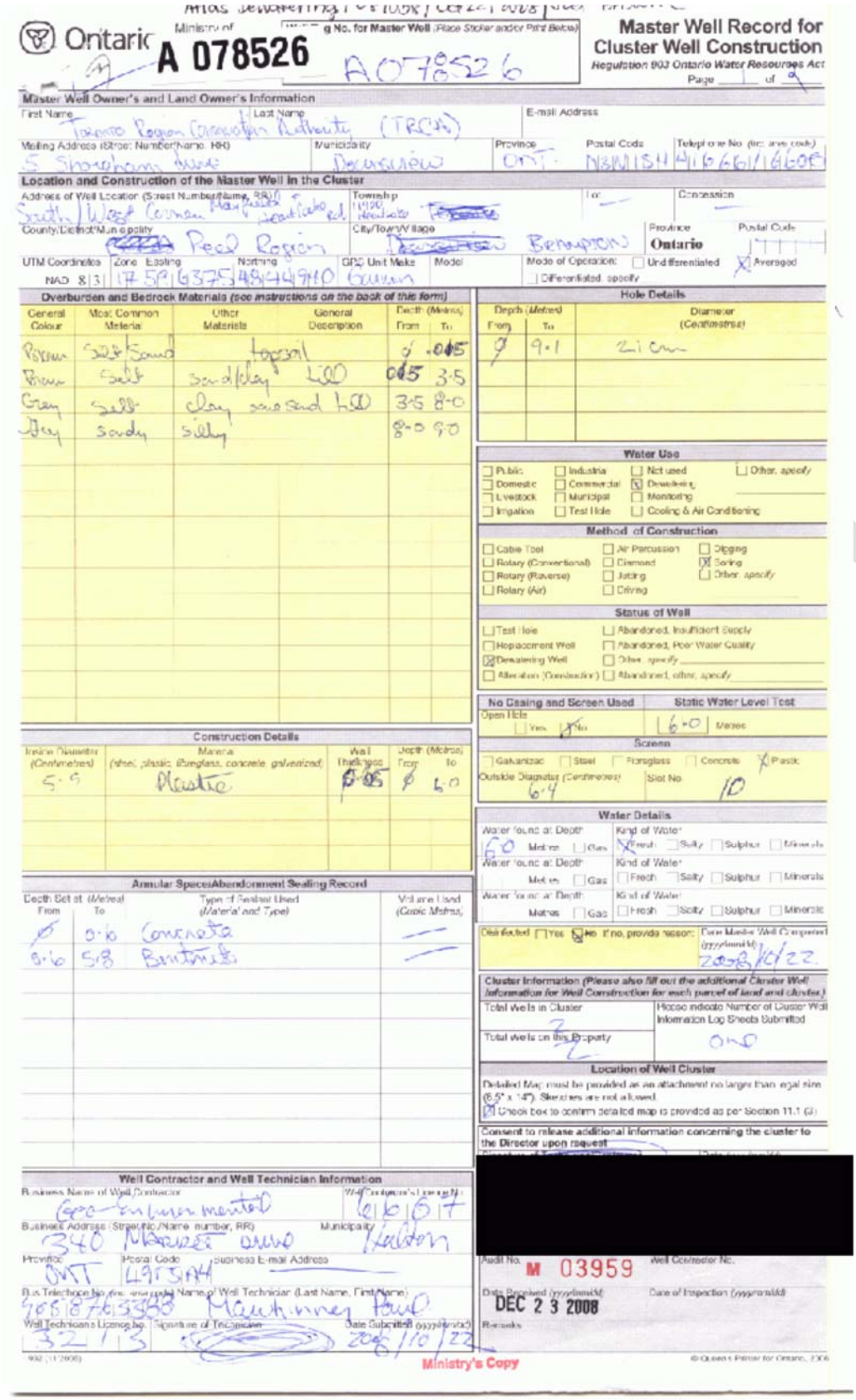
Was the well owner's information package delivered? Yes / No

Ministry Use Only

Date Received: DEC 05 2007 — Data Source: — Contractor — Date of Inspection — Remarks — Well Record Number

Cette formule est disponible en français

Figure 5: TRCA Mayfield MW1



Ontario Ministry of

A 078526

A078526

Master Well Record for Cluster Well Construction

Regulation 903 Ontario Water Resources Act

Page 1 of 2

Master Well Owner's and Land Owner's Information

First Name: Toronto Region Conservation Authority (TRCA) | Last Name | E-mail Address

Mailing Address (Street Number/Name, RR#) | Municipality | Province | Postal Code | Telephone No. (inc. area code)

5 Shoreham Drive | Downsview | ONT | M3N1S4 | 416 661 6600

Location and Construction of the Master Well in the Cluster

Address of Well Location (Street Number/Name, RR#): South West corner Mayfield Rd. and Heartlake Rd.

Township: Albion | Lot | Concession

County/District/Municipality: Peel Region | City/Town/Village: Brampton | Province: Ontario | Postal Code

UTM Coordinates: Zone | Easting | Northing | GPS Unit Make | Model

NAD 8 | 3 | 17 | 592637 | 4844940 | Garmin

Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Overburden and Bedrock Materials *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	To
Brown	Sand	topsoil		0	.05
Brown	Silt	Sand/clay	LOOSE	.05	3.5
Grey	Silt	clay and sand	LOOSE	3.5	8.0
Grey	Sandy	silty		8.0	9.0

Hole Details

Depth (Metres) From	To	Diameter (Centimetres)
0	9.1	21 cm

Water Use

☐ Public ☐ Industrial ☐ Not used ☐ Other, specify

☐ Domestic ☐ Commercial ☒ Dewatering

☐ Livestock ☐ Municipal ☐ Monitoring

☐ Irrigation ☐ Test Hole ☐ Cooling & Air Conditioning

Method of Construction

☐ Cable Tool ☐ Air Percussion ☐ Digging

☐ Rotary (Conventional) ☐ Diamond ☒ Boring

☐ Rotary (Reverse) ☐ Jetting ☐ Other, specify

☐ Rotary (Air) ☐ Driving

Status of Well

☐ Test Hole ☐ Abandoned, Insufficient Supply

☐ Replacement Well ☐ Abandoned, Poor Water Quality

☒ Dewatering Well ☐ Other, specify

☐ Alteration (Construction) ☐ Abandoned, other, specify

Construction Details

Inside Diameter (Centimetres)	Material (steel, plastic, fibreglass, concrete, galvanized)	Wall Thickness	Depth (Metres) From	To
5.5	Plastic	0.5	0	6.0

No Casing and Screen Used

Open Hole: ☐ Yes ☒ No

Static Water Level Test

6.0 Metres

Screen

☐ Galvanized ☐ Steel ☐ Fibreglass ☐ Concrete ☒ Plastic

Outside Diameter (Centimetres): 6.4 | Slot No.: 10

Annular Space/Abandonment Sealing Record

Depth Set at (Metres) From	To	Type of Sealant Used (Material and Type)	Volume Used (Cubic Metres)
0	0.6	Concrete	
0.6	5.8	Bentonite	

Water Details

Water found at Depth (Metres)	Kind of Water
6.0	☒ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals
	☐ Fresh ☐ Salty ☐ Sulphur ☐ Minerals

Water found at Depth: ☐ Gas

Data flushed: ☐ Yes ☒ No If no, provide reason:

Date Master Well Completed (yyyy/mm/dd): 2008/12/22

Cluster Information *(Please also fill out the additional Cluster Well Information for Well Construction for each parcel of land and cluster.)*

Total Wells in Cluster: 2

Total Wells on this Property: 2

Please indicate Number of Cluster Well Information Log Sheets Submitted: ONE

Location of Well Cluster

Detailed Map must be provided as an attachment no larger than legal size (8.5" x 14"). Sketches are not allowed.

☒ Check box to confirm detailed map is provided as per Section 11.1 (3)

Consent to release additional information concerning the cluster to the Director upon request

[redacted]

Well Contractor and Well Technician Information

Business Name of Well Contractor: Geo-Enviromentel | Well Contractor's Licence No.: 6167

Business Address (Street No./Name, number, RR): 340 Maxwell Drive | Municipality: Kitchener

Province: ONT | Postal Code: L9T 5H4 | Business E-mail Address

Bus. Telephone No. (inc. area code) | Name of Well Technician (Last Name, First Name): 905 878 3388 Mawhinney Paul

Well Technician's Licence No.: 3221 | Signature of Technician | Date Submitted (yyyy/mm/dd): 2008/10/22

Audit No.: M 03959 | Well Contractor No.

Date Received (yyyy/mm/dd): DEC 23 2008 | Date of Inspection (yyyy/mm/dd)

Remarks

902 (11/2008)

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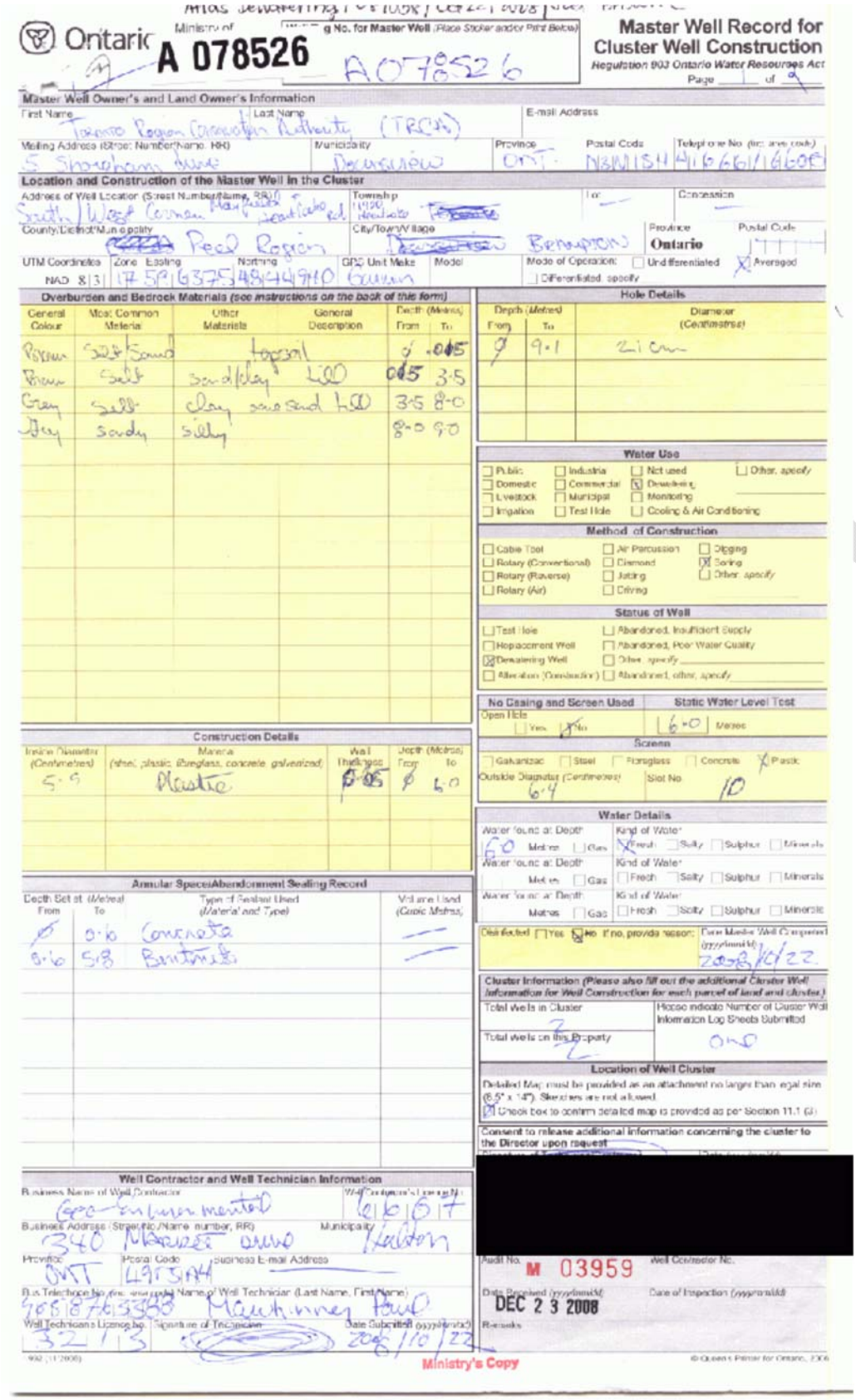
Figure 6: TRCA Mayfield MW2



Ministry of

A 078526

Master Well Record for Cluster Well Construction

Regulation 903 Ontario Water Resources Act

Page 1 of 2

Master Well Owner's and Land Owner's Information

First Name: Toronto Region Conservation Authority (TRCA) | Last Name | E-mail Address

Mailing Address (Street Number/Name, RR#): 5 Shoreham Drive | Municipality: Downsview | Province: ONT | Postal Code: M3N1S4 | Telephone No. (inc. area code): 416 661 6600

Location and Construction of the Master Well in the Cluster

Address of Well Location (Street Number/Name, RR#): South West corner Mayfield Rd. Heartlake Rd. | Township: Albion | Lot | Concession

County/District/Municipality: Peel Region | City/Town/Village: Brampton | Province: Ontario | Postal Code

UTM Coordinates NAD 8 | Zone: 17 | Easting: 592637 | Northing: 4849440 | GPS Unit Make: Garmin | Model | Mode of Operation: Differentiated | Undifferentiated | Averaged

Overburden and Bedrock Materials *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (Metres) From	To
Brown	Sand	topsoil		0	.05
Brown	Silt	Sand/clay	LOOSE	.05	3.5
Grey	Silt	clay and sand	LOOSE	3.5	8.0
Grey	Sandy	silty		8.0	9.0

Hole Details

Depth (Metres) From	To	Diameter (Centimetres)
0	9.1	21 cm

Water Use

Public | Industrial | Not used | Other, specify

Domestic | Commercial | Dewatering | Livestock | Municipal | Monitoring | Irrigation | Test Hole | Cooling & Air Conditioning

Method of Construction

Cable Tool | Air Percussion | Digging

Rotary (Conventional) | Diamond | Boring

Rotary (Reverse) | Jetting | Other, specify

Rotary (Air) | Driving

Status of Well

Test Hole | Abandoned, Insufficient Supply

Replacement Well | Abandoned, Poor Water Quality

Dewatering Well | Other, specify

Alteration (Construction) | Abandoned, other, specify

No Casing and Screen Used

Open Hole: Yes | No

Static Water Level Test

6.0 Metres

Screen

Galvanized | Steel | Fibreglass | Concrete | Plastic

Outside Diameter (Centimetres): 6.4 | Slot No.: 10

Construction Details

Inside Diameter (Centimetres)	Material (steel, plastic, fibreglass, concrete, galvanized)	Wall Thickness	Depth (Metres) From	To
5.0	Plastic	0.05	0	6.0

Annular Space/Abandonment Sealing Record

Depth Set at (Metres) From	To	Type of Sealant Used (Material and Type)	Volume Used (Cubic Metres)
0	0.6	Concrete	
0.6	5.8	Bentonite	

Water Details

Water found at Depth (Metres)	Kind of Water
6.0	Fresh
	Salty / Sulphur / Minerals / Gas
	Fresh / Salty / Sulphur / Minerals / Gas

Date Received: Yes | No. If no, provide reason: | Date Master Well Completed (yyyy/mm/dd): 2008/12/22

Cluster Information *(Please also fill out the additional Cluster Well Information for Well Construction for each parcel of land and cluster.)*

Total Wells in Cluster: 3 | Please indicate Number of Cluster Well Information Log Sheets Submitted: ONE

Total Wells on this Property: 2

Location of Well Cluster

Detailed Map must be provided as an attachment no larger than legal size (8.5" x 14"). Sketches are not allowed.

Check box to confirm detailed map is provided as per Section 11.1 (3)

Consent to release additional information concerning the cluster to the Director upon request

[redacted]

Well Contractor and Well Technician Information

Business Name of Well Contractor: Geo-Environmental | Well Contractor's Licence No.: 6017

Business Address (Street No./Name, number, RR): 340 Maxwell Drive | Municipality: Milton

Province: ONT | Postal Code: L9T 5H4 | Business E-mail Address

Bus. Telephone No. (inc. area code) | Name of Well Technician (Last Name, First Name): 905 878 3388 Mawhinney Paul

Well Technician's Licence No.: 3221 | Signature of Technician | Date Submitted (yyyy/mm/dd): 2008/12/22

Audit No.: M 03959 | Well Contractor No.

Date Received (yyyy/mm/dd): DEC 23 2008 | Date of Inspection (yyyy/mm/dd)

Remarks

902 (11/2008)

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Figure 7: TRCA Mayfield MW3

12/11/2019 - CAMCCore

Options

OakRidgesMoraine GROUNDWATER PROGRAM

ID: -827483641
Well / BH Name: TRCA - Mayfield MW-4
Original Name: 7278783

Easting: 595125.000000551
Northing: 4843547.00011637
Drilling Method: Hollow Stem Auger
Primary Purpose: Engineering
Date Completed: 12/15/2016
Secondary Purpose: Monitoring / Observation Well

Water Level Count: 41326
WL Start Date: 04/19/2017
WL End Date: 10/28/2019
Water Quality Count: 96
WQ Start Date: 10/11/2018
WQ End Date: 10/12/2018
Daily Pumping Count: 0
Rec Pumping Rate: null

Elev. (masl)	Mat 1		Mat 2		Mat 3		Description
		Fill		Sand			brown dry fine sand fill
		Fill		Sand			brown dry mediums sand fill
		Silt		Sand			brown damp sandy silt
		Silt		Sand			brown wet sandy silt
		Silt		Sand			brown wet sandy silt
		Silt		Sand			brown wet sandy silt
264.		Silt		Sand			brown wet sandy silt
		Silt		Sand			brown wet sandy silt
		Silt		Sand			brown wet sandy silt
259.		Sand		Silt			first 6' fracture with iron staining, followed by grey brown fine s
		Sand		Cobbles			grey coarse sand with cobbles

Figure 8: TRCA Mayfield MW4S/D

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Appendix F

Surface Water

Table F-1
Surface Water Levels at Staff Gauges

Staff Gauge No.	SG2	SG3	SG4	SG5	SG6
Ground Elevation (masl)	**256.31**	**255.53**	**254.97**	**260.21**	**255.51**
Date	Water Elevation (masl)	Water Elevation (masl)	Water Elevation (masl)	Water Elevation (masl)	Water Elevation (masl)
2-May-19	256.47	255.72	255.15	260.29	255.71
22-May-19	256.47	255.665	255.09	260.28	255.66
19-Jun-19	Dry	255.62	255.08	Dry	255.52
24-Jul-19	-	Dry	Dry	Dry	Dry
27-Aug-19	Dry	Dry	Dry	Dry	Dry
25-Sep-19	Dry	Dry	Dry	Dry	Dry
1-Nov-19	256.32	Dry	Dry	Dry	255.66
26-Nov-19	Dry	Dry	255.02	Dry	255.62
20-Dec-19	Frozen	Dry	Frozen	Frozen	Frozen
30-Jan-20	Frozen	Frozen	Frozen	Frozen	Frozen
25-Feb-20	Dry	Frozen	Dry	Dry	Frozen
19-Mar-20	256.44	255.64	255.15	Dry	255.66
20-Apr-20	Dry	255.56	Dry	Dry	255.65
28-May-20	256.47	Dry	255.09	Dry	255.62
30-Sep-20	Dry	Dry	Dry	Dry	Dry
16-Dec-20	Frozen	Dry	Dry	Dry	Dry

Notes:
masl - meters above sea level
'-' denotes data unavailable

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Appendix G

Water Quality

Table G-1
Groundwater Chemistry

				Sample ID	MW19-01	MW19-04d
				Sample Date	20-Apr-20	20-Apr-20
Parameter	**Units**	**ODWQS**	**Type of Standard**			
Conductivity (calculated)	uS/cm	---			1432	923
Conductivity	uS/cm	---			1090	742
pH	pH units	6.5-8.5	OG		7.80	8.02
Langeliers Index 4° C		---			0.83	0.60
Langeliers Index 20° C		---			1.15	0.92
Saturation pH 4°C	pH units	---			6.97	7.42
Saturation pH 20° C	pH units	---			6.65	7.10
Total Dissolved Solids	mg/L	500	AO		**709**	411
Total Dissolved Solids (calculated)	mg/L	---			769	467
Total Hardness (as CaCO3)	mg/L	80-100	OG		**613**	**405**
Alkalinity (as CaCO3)	mg/L	30-500	OG		**592**	393
Bicarbonate (as CaCO3)	mg/L	---			592	393
Carbonate (as CaCO3)	mg/L	---			< 2	< 2
Hydroxide (as CaCO3)	mg/L	---			< 2	< 2
Colour	TCU	---			17	15
Reactive Silica	mg/L	---			15.4	11.2
Turbidity	NTU	5	AO		**>4000**	**583**
Total Organic Carbon	mg/L	---			1	< 1
Chloride	mg/L	250	AO		55	6
Fluoride	mg/L	1.5	MAC		0.12	0.13
Ammonia+Ammonium (as N)	mg/L	---			< 0.04	< 0.04
Sulphate	mg/L	500	AO		93	68
Bromide	mg/L	---			< 0.3	< 0.3
Nitrite (as N)	mg/L	1	MAC		< 0.03	< 0.03
Nitrate (as N)	mg/L	10	MAC		**34.8**	0.75
Phosphorus (total)	mg/L	---			2.87	0.68
Phosphorus (total reactive)	mg/L				0.04	< 0.03
Mercury (dissolved)	mg/L	0.001	MAC		< 0.00001	< 0.00001
Aluminum (dissolved)	mg/L	0.1	OG		0.020	< 0.001
Antimony (dissolved)	mg/L	0.006	IMAC		< 0.0009	< 0.0009
Arsenic (dissolved)	mg/L	0.01	IMAC		< 0.0002	< 0.0002
Barium (dissolved)	mg/L	1	MAC		0.0844	0.0718
Beryllium (dissolved)	mg/L	---			< 0.000007	< 0.000007
Boron (dissolved)	mg/L	5	IMAC		0.021	0.039
Cadmium (dissolved)	mg/L	0.005	MAC		0.000006	0.000011
Calcium (dissolved)	mg/L	---			176	90.1
Chromium (dissolved)	mg/L	0.05	MAC		0.00026	0.00011
Cobalt (dissolved)	mg/L	---			0.000102	0.000089
Copper (dissolved)	mg/L	1	AO		0.0011	0.0003
Iron (dissolved)	mg/L	0.3	AO		0.018	< 0.007
Lead (dissolved)	mg/L	0.01	MAC		0.00001	< 0.00001
Magnesium (dissolved)	mg/L	---			42.1	43.7
Manganese (dissolved)	mg/L	0.05	AO		0.00751	0.0291
Molybdenum (dissolved)	mg/L	---			0.00026	0.00939
Nickel (dissolved)	mg/L	---			0.0004	0.0005
Phosphorus (dissolved)	mg/L	---			< 0.003	< 0.003
Potassium (dissolved)	mg/L	---			1.41	3.97
Selenium (dissolved)	mg/L	0.05	MAC		0.00038	0.00060
Silicon (dissolved)	mg/L	---			7.82	6.41
Silver (dissolved)	mg/L	---			< 0.00005	< 0.00005
Sodium (dissolved)	mg/L	200	AO		10.9	18.5
Strontium (dissolved)	mg/L	---			0.379	0.351
Thallium (dissolved)	mg/L	---			< 0.000005	0.000048
Tin (dissolved)	mg/L	---			< 0.00006	< 0.00006
Titanium (dissolved)	mg/L	---			0.00050	0.00005
Uranium (dissolved)	mg/L	0.02	MAC		0.00174	0.00478
Vanadium (dissolved)	mg/L	---			0.00020	0.00012
Tungsten (dissolved)	mg/L	---			< 0.00002	< 0.00002
Zinc (dissolved)	mg/L	5	AO		< 0.002	< 0.002
Zirconium (dissolved)	mg/L	---			< 0.002	< 0.002
Cation sum	meq/L	---			12.8	9.01
Anion Sum	meq/L	---			15.9	9.45
Anion-Cation Balance	% difference	---			-10.84	-2.39

ODWQS- Ontario Drinking Water Quality Standard
AO- Aesthetic Objective
OG- Operational Guideline
MAC-Maximum Allowable Concentration
IMAC- Interim Maximum Acceptable Concentration
Bold- Exceeds ODWQS

Table G-2
Surface Water Chemistry

		Sample ID	SW4
		Sample Date	20-Apr-20
Parameter	**Units**	**PWQO**	
Conductivity	uS/cm	---	1390
Conductivity (calculated)	uS/cm	---	1325
pH	no unit	6.5-8.5	8.01
Langeliers Index @ 4° C	-	---	-0.02
Saturation pH @ 4°C	-	---	8.03
Total Suspended Solids	mg/L	---	323
Total Dissolved Solids	mg/L	---	726
Total Dissolved Solids (calculated)	mg/L	---	746
Alkalinity (as CaCO3)	mg/L	---	138
Bicarbonate (as CaCO3)	mg/L	---	138
Carbonate (as CaCO3)	mg/L	---	< 2
Hydroxide (as CaCO3)	mg/L	---	< 2
Total Hardness (as CaCO3)	mg/L	---	201
Colour	TCU	---	77
Reactive Silica	mg/L	---	0.95
Fluoride	mg/L	---	0.12
Turbidity	NTU	---	33.1
Chloride	mg/L	---	370
Sulphate	mg/L	---	15
Bromide	mg/L	---	< 0.3
Nitrite (as N)	mg/L	---	< 0.03
Nitrate (as N)	mg/L	---	< 0.06
Unionized Ammonia (as N)	mg/L	---	<0.002
Ammonia+Ammonium (as N)	mg/L	---	< 0.1
Phosphorus (total reactive)	mg/L	---	< 0.03
Total Organic Carbon	mg/L	---	11
Mercury	mg/L	---	< 0.00001
Silver	mg/L	0.0001	< 0.00005
Aluminum	mg/L	---	0.0780
Aluminum	mg/L	0.075	**0.499**
Arsenic	mg/L	0.005	0.0007
Barium	mg/L	---	0.0404
Beryllium	mg/L	1.1	0.000028
Boron	mg/L	0.2	0.022
Calcium	mg/L	---	67.1
Cadmium	mg/L	0.0005	0.000012
Cobalt	mg/L	0.0009	0.000436
Chromium	mg/L	---	0.00105
Copper	mg/L	0.005	0.0021
Iron	mg/L	0.3	**3.95**
Potassium	mg/L	---	3.45
Magnesium	mg/L	---	8.09
Manganese	mg/L	---	0.138
Molybdenum	mg/L	0.04	0.00021
Sodium	mg/L	---	199
Nickel	mg/L	0.025	0.0009
Phosphorus	mg/L	---	0.495
Lead	mg/L	0.005	0.00067
Antimony	mg/L	0.02	< 0.00009
Selenium	mg/L	0.1	0.0001
Silicon	mg/L	---	2.15
Tin	mg/L	---	0.00008
Strontium	mg/L	---	0.201
Titanium	mg/L	---	0.0124
Thallium	mg/L	0.0003	< 0.000005
Uranium	mg/L	0.005	0.000229
Vanadium	mg/L	0.006	0.00126
Tungsten	mg/L	---	0.00003
Zinc	mg/L	0.02	0.005
Zirconium	mg/L	---	< 0.002
Anion Sum	meq/L	---	13.5
Cation sum	meq/L	---	13.0
Anion-Cation Balance	% difference	---	-1.98

PWQO- Provincial Water Quality Objectives
Bold- Exceeds PWQO

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Appendix H

Water Balance

WATER BALANCE CALCULATIONS
Snell's Hollow
Town of Caledon, Ontario

PROJECT No.300043952.0000

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TABLE H-1

Pre- Development Monthly Water Balance Components

Based on Thornthwaite's Soil Moisture Balance Approach with a Soil Moisture Retention of 200 mm (moderately rooted vegetation in silt and clay till soils)

Precipitation data from Toronto Lester B. Pearson International Airport Climate Station (1981 - 2010)

Potential Evapotranspiration Calculation	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Average Temperature (Degree C)	-5.5	-4.5	0.1	7.1	13.1	18.6	21.5	20.6	16.2	9.5	3.7	-2.2	**8.2**
Heat index: $i = (t/5)^{1.514}$	0.00	0.00	0.00	1.70	4.30	7.31	9.10	8.53	5.93	2.64	0.63	0.00	**40.1**
Unadjusted Daily Potential Evapotranspiration U (mm)	0.00	0.00	0.25	30.43	60.72	90.16	106.17	101.17	77.16	42.26	14.59	0.00	**523**
Adjusting Factor for U (Latitude 43° 40' N)	0.81	0.82	1.02	1.12	1.26	1.28	1.29	1.2	1.04	0.95	0.81	0.77	
Adjusted Potential Evapotranspiration PET (mm)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
COMPONENTS	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Precipitation (P)	52	48	50	69	74	72	76	78	75	61	75	58	**786**
Potential Evapotranspiration (PET)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
P - PET	52	48	50	34	-2	-44	-61	-43	-6	21	63	58	**169**
Change in Soil Moisture Storage	14	0	0	0	-2	-44	-61	-43	-6	21	63	58	**0**
Soil Moisture Storage max 200 mm	200	200	200	200	198	154	93	49	44	65	128	186	
Actual Evapotranspiration (AET)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
Soil Moisture Deficit max 200 mm	0	0	0	0	2	46	107	151	156	135	72	14	
Water Surplus - available for infiltration or runoff	38	48	50	34	0	0	0	0	0	0	0	0	**169**
Potential Infiltration (based on MOE metholodogy*; independent of temperature)	15	19	20	14	0	0	0	0	0	0	0	0	**68**
Potential Direct Surface Water Runoff (independent of temperature)	23	29	30	21	0	0	0	0	0	0	0	0	**102**
IMPERVIOUS AREA WATER SURPLUS													
Precipitation (P)	786	mm/year											
Potential Evaporation (PE) from impervious areas (assume 15%)	118	mm/year											
P-PE (surplus available for runoff from impervious areas)	668	mm/year											

Assume January storage is 100% of Soil Moisture Storage

Soil Moisture Storage	200 mm	<-- See "Water Holding Capacity" values in Table 3.1, MOE SWMPDM, 2003
*MOE SWM infiltration calculations		
topography - hilly to rolling land	0.15	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
soils - silty and clayey till	0.15	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
cover - agricultural lands	0.1	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
Infiltration factor	**0.4**	
Latitude of site (or climate station)	43 ° N.	

WATER BALANCE CALCULATIONS
Snell's Hollow
Town of Caledon, Ontario

PROJECT No.300043952.0000

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TABLE H-2

Pre- Development Monthly Water Balance Components

Based on Thornthwaite's Soil Moisture Balance Approach with a Soil Moisture Retention of 250 mm (wetland in silt and clay till soils)

Precipitation data from Toronto Lester B. Pearson International Airport Climate Station (1981 - 2010)

Potential Evapotranspiration Calculation	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Average Temperature (Degree C)	-5.5	-4.5	0.1	7.1	13.1	18.6	21.5	20.6	16.2	9.5	3.7	-2.2	**8.2**
Heat index: $i = (t/5)^{1.514}$	0.00	0.00	0.00	1.70	4.30	7.31	9.10	8.53	5.93	2.64	0.63	0.00	**40.1**
Unadjusted Daily Potential Evapotranspiration U (mm)	0.00	0.00	0.25	30.43	60.72	90.16	106.17	101.17	77.16	42.26	14.59	0.00	**523**
Adjusting Factor for U (Latitude 43° 40' N)	0.81	0.82	1.02	1.12	1.26	1.28	1.29	1.2	1.04	0.95	0.81	0.77	
Adjusted Potential Evapotranspiration PET (mm)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
COMPONENTS	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Precipitation (P)	52	48	50	69	74	72	76	78	75	61	75	58	**786**
Potential Evapotranspiration (PET)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
P - PET	52	48	50	34	-2	-44	-61	-43	-6	21	63	58	**169**
Change in Soil Moisture Storage	14	0	0	0	-2	-44	-61	-43	-6	21	63	58	**0**
Soil Moisture Storage max 250 mm	250	250	250	250	248	204	143	99	94	115	178	236	
Actual Evapotranspiration (AET)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
Soil Moisture Deficit max 250 mm	0	0	0	0	2	46	107	151	156	135	72	14	
Water Surplus - available for infiltration or runoff	38	48	50	34	0	0	0	0	0	0	0	0	**169**
Potential Infiltration (based on MOE metholodogy*; independent of temperature)	19	24	25	17	0	0	0	0	0	0	0	0	**85**
Potential Direct Surface Water Runoff (independent of temperature)	19	24	25	17	0	0	0	0	0	0	0	0	**85**
IMPERVIOUS AREA WATER SURPLUS													
Precipitation (P)	786	mm/year											
Potential Evaporation (PE) from impervious areas (assume 15%)	118	mm/year											
P-PE (surplus available for runoff from impervious areas)	668	mm/year											

Assume January storage is 100% of Soil Moisture Storage

Soil Moisture Storage	250 mm	<-- See "Water Holding Capacity" values in Table 3.1, MOE SWMPDM, 2003
*MOE SWM infiltration calculations		
topography - rolling to flat land	0.25	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
soils - silty and clayey till	0.15	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
cover - wetland (pasture & shrubs)	0.1	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
Infiltration factor	**0.5**	
Latitude of site (or climate station)	43 ° N.	

WATER BALANCE CALCULATIONS
Snell's Hollow
Town of Caledon, Ontario

PROJECT No.300043952.0000

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TABLE H-3

Pre- Development Monthly Water Balance Components

Based on Thornthwaite's Soil Moisture Balance Approach with a Soil Moisture Retention of 250 mm (dry-moist old field meadow in silt and clay till soils)

Precipitation data from Toronto Lester B. Pearson International Airport Climate Station (1981 - 2010)

Potential Evapotranspiration Calculation	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Average Temperature (Degree C)	-5.5	-4.5	0.1	7.1	13.1	18.6	21.5	20.6	16.2	9.5	3.7	-2.2	**8.2**
Heat index: $i = (t/5)^{1.514}$	0.00	0.00	0.00	1.70	4.30	7.31	9.10	8.53	5.93	2.64	0.63	0.00	**40.1**
Unadjusted Daily Potential Evapotranspiration U (mm)	0.00	0.00	0.25	30.43	60.72	90.16	106.17	101.17	77.16	42.26	14.59	0.00	**523**
Adjusting Factor for U (Latitude 43° 40' N)	0.81	0.82	1.02	1.12	1.26	1.28	1.29	1.2	1.04	0.95	0.81	0.77	
Adjusted Potential Evapotranspiration PET (mm)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
COMPONENTS	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Precipitation (P)	52	48	50	69	74	72	76	78	75	61	75	58	**786**
Potential Evapotranspiration (PET)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
P - PET	52	48	50	34	-2	-44	-61	-43	-6	21	63	58	**169**
Change in Soil Moisture Storage	14	0	0	0	-2	-44	-61	-43	-6	21	63	58	**0**
Soil Moisture Storage max 250 mm	250	250	250	250	248	204	143	99	94	115	178	236	
Actual Evapotranspiration (AET)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
Soil Moisture Deficit max 250 mm	0	0	0	0	2	46	107	151	156	135	72	14	
Water Surplus - available for infiltration or runoff	38	48	50	34	0	0	0	0	0	0	0	0	**169**
Potential Infiltration (based on MOE metholodogy*; independent of temperature)	13	17	17	12	0	0	0	0	0	0	0	0	**59**
Potential Direct Surface Water Runoff (independent of temperature)	24	31	32	22	0	0	0	0	0	0	0	0	**110**
IMPERVIOUS AREA WATER SURPLUS													
Precipitation (P)	786	mm/year											
Potential Evaporation (PE) from impervious areas (assume 15%)	118	mm/year											
P-PE (surplus available for runoff from impervious areas)	668	mm/year											

Assume January storage is 100% of Soil Moisture Storage

Soil Moisture Storage	250 mm	<-- See "Water Holding Capacity" values in Table 3.1, MOE SWMPDM, 2003
*MOE SWM infiltration calculations		
topography - hilly land	0.1	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
soils - silty and clayey till	0.15	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
cover - dry-moist old field meadow (pasture and shrubs)	0.1	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
Infiltration factor	**0.35**	
Latitude of site (or climate station)	43 ° N.	

WATER BALANCE CALCULATIONS
Snell's Hollow
Town of Caledon, Ontario

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TABLE H-4

Pre- Development Monthly Water Balance Components

Based on Thornthwaite's Soil Moisture Balance Approach with a Soil Moisture Retention of 400 mm (forested lands in silt and clay till soils)

Precipitation data from Toronto Lester B. Pearson International Airport Climate Station (1981 - 2010)

Potential Evapotranspiration Calculation	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Average Temperature (Degree C)	-5.5	-4.5	0.1	7.1	13.1	18.6	21.5	20.6	16.2	9.5	3.7	-2.2	**8.2**
Heat index: $i = (t/5)^{1.514}$	0.00	0.00	0.00	1.70	4.30	7.31	9.10	8.53	5.93	2.64	0.63	0.00	**40.1**
Unadjusted Daily Potential Evapotranspiration U (mm)	0.00	0.00	0.25	30.43	60.72	90.16	106.17	101.17	77.16	42.26	14.59	0.00	**523**
Adjusting Factor for U (Latitude 43° 40' N)	0.81	0.82	1.02	1.12	1.26	1.28	1.29	1.2	1.04	0.95	0.81	0.77	
Adjusted Potential Evapotranspiration PET (mm)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
COMPONENTS	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Precipitation (P)	52	48	50	69	74	72	76	78	75	61	75	58	**786**
Potential Evapotranspiration (PET)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
P - PET	52	48	50	34	-2	-44	-61	-43	-6	21	63	58	**169**
Change in Soil Moisture Storage	14	0	0	0	-2	-44	-61	-43	-6	21	63	58	**0**
Soil Moisture Storage max 400 mm	400	400	400	400	398	354	293	249	244	265	328	386	
Actual Evapotranspiration (AET)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
Soil Moisture Deficit max 400 mm	0	0	0	0	2	46	107	151	156	135	72	14	
Water Surplus - available for infiltration or runoff	38	48	50	34	0	0	0	0	0	0	0	0	**169**
Potential Infiltration (based on MOE metholodogy*; independent of temperature)	19	24	25	17	0	0	0	0	0	0	0	0	**85**
Potential Direct Surface Water Runoff (independent of temperature)	19	24	25	17	0	0	0	0	0	0	0	0	**85**
IMPERVIOUS AREA WATER SURPLUS													
Precipitation (P)	786	mm/year											
Potential Evaporation (PE) from impervious areas (assume 15%)	118	mm/year											
P-PE (surplus available for runoff from impervious areas)	668	mm/year											

Assume January storage is 100% of Soil Moisture Storage

Soil Moisture Storage	400 mm	<-- See "Water Holding Capacity" values in Table 3.1, MOE SWMPDM, 2003
*MOE SWM infiltration calculations		
topography - hilly to rolling land	0.15	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
soils - silty and clayey till	0.15	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
cover - forested lands	0.2	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
Infiltration factor	**0.5**	
Latitude of site (or climate station)	43 ° N.	

WATER BALANCE CALCULATIONS
Snell's Hollow
Town of Caledon, Ontario

PROJECT No.300043952.0000

BURNSIDE

TABLE H-5

Pre- Development Monthly Water Balance Components

Based on Thornthwaite's Soil Moisture Balance Approach with a Soil Moisture Retention of 100 mm (urban lawns in silt and clay till soils)

Precipitation data from Toronto Lester B. Pearson International Airport Climate Station (1981 - 2010)

Potential Evapotranspiration Calculation	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Average Temperature (Degree C)	-5.5	-4.5	0.1	7.1	13.1	18.6	21.5	20.6	16.2	9.5	3.7	-2.2	**8.2**
Heat index: $i = (t/5)^{1.514}$	0.00	0.00	0.00	1.70	4.30	7.31	9.10	8.53	5.93	2.64	0.63	0.00	**40.1**
Unadjusted Daily Potential Evapotranspiration U (mm)	0.00	0.00	0.25	30.43	60.72	90.16	106.17	101.17	77.16	42.26	14.59	0.00	**523**
Adjusting Factor for U (Latitude 43° 40' N)	0.81	0.82	1.02	1.12	1.26	1.28	1.29	1.2	1.04	0.95	0.81	0.77	
Adjusted Potential Evapotranspiration PET (mm)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
COMPONENTS	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Precipitation (P)	52	48	50	69	74	72	76	78	75	61	75	58	**786**
Potential Evapotranspiration (PET)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
P - PET	52	48	50	34	-2	-44	-61	-43	-6	21	63	58	**169**
Change in Soil Moisture Storage	0	0	0	0	-2	-44	-54	0	0	21	63	16	**0**
Soil Moisture Storage max 100 mm	100	100	100	100	98	54	0	0	0	21	84	100	
Actual Evapotranspiration (AET)	0	0	0	34	77	115	130	78	75	40	12	0	**560**
Soil Moisture Deficit max 100 mm	0	0	0	0	2	46	100	100	100	79	16	0	
Water Surplus - available for infiltration or runoff	52	48	50	34	0	0	0	0	0	0	0	42	**226**
Potential Infiltration (based on MOE metholodogy*; independent of temperature)	21	19	20	14	0	0	0	0	0	0	0	17	**90**
Potential Direct Surface Water Runoff (independent of temperature)	31	29	30	21	0	0	0	0	0	0	0	25	**135**
IMPERVIOUS AREA WATER SURPLUS													
Precipitation (P)	786	mm/year											
Potential Evaporation (PE) from impervious areas (assume 15%)	118	mm/year											
P-PE (surplus available for runoff from impervious areas)	668	mm/year											

Assume January storage is 100% of Soil Moisture Storage

Soil Moisture Storage	100 mm	<-- See "Water Holding Capacity" values in Table 3.1, MOE SWMPDM, 2003
*MOE SWM infiltration calculations		
topography - hilly to rolling land	0.15	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
soils - silty and clayey till	0.15	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
cover - urban lawns	0.1	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
Infiltration factor	**0.4**	
Latitude of site (or climate station)	43 ° N.	

WATER BALANCE CALCULATIONS
Snell's Hollow
Town of Caledon, Ontario

PROJECT No.300043952.0000

BURNSIDE

TABLE H-6

Pre- Development Monthly Water Balance Components

Based on Thornthwaite's Soil Moisture Balance Approach with a Soil Moisture Retention of 100 mm (urban lawns in silt and clay till soils) - graded

Precipitation data from Toronto Lester B. Pearson International Airport Climate Station (1981 - 2010)

Potential Evapotranspiration Calculation	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Average Temperature (Degree C)	-5.5	-4.5	0.1	7.1	13.1	18.6	21.5	20.6	16.2	9.5	3.7	-2.2	**8.2**
Heat index: $i = (t/5)^{1.514}$	0.00	0.00	0.00	1.70	4.30	7.31	9.10	8.53	5.93	2.64	0.63	0.00	**40.1**
Unadjusted Daily Potential Evapotranspiration U (mm)	0.00	0.00	0.25	30.43	60.72	90.16	106.17	101.17	77.16	42.26	14.59	0.00	**523**
Adjusting Factor for U (Latitude 43° 40' N)	0.81	0.82	1.02	1.12	1.26	1.28	1.29	1.2	1.04	0.95	0.81	0.77	
Adjusted Potential Evapotranspiration PET (mm)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
COMPONENTS	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Precipitation (P)	52	48	50	69	74	72	76	78	75	61	75	58	**786**
Potential Evapotranspiration (PET)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
P - PET	52	48	50	34	-2	-44	-61	-43	-6	21	63	58	**169**
Change in Soil Moisture Storage	0	0	0	0	-2	-44	-54	0	0	21	63	16	**0**
Soil Moisture Storage max 100 mm	100	100	100	100	98	54	0	0	0	21	84	100	
Actual Evapotranspiration (AET)	0	0	0	34	77	115	130	78	75	40	12	0	**560**
Soil Moisture Deficit max 100 mm	0	0	0	0	2	46	100	100	100	79	16	0	
Water Surplus - available for infiltration or runoff	52	48	50	34	0	0	0	0	0	0	0	42	**226**
Potential Infiltration (based on MOE metholodogy*; independent of temperature)	23	21	22	15	0	0	0	0	0	0	0	19	**102**
Potential Direct Surface Water Runoff (independent of temperature)	28	26	27	19	0	0	0	0	0	0	0	23	**124**
IMPERVIOUS AREA WATER SURPLUS													
Precipitation (P)	786	mm/year											
Potential Evaporation (PE) from impervious areas (assume 15%)	118	mm/year											
P-PE (surplus available for runoff from impervious areas)	668	mm/year											

Assume January storage is 100% of Soil Moisture Storage

Soil Moisture Storage	100 mm	<-- See "Water Holding Capacity" values in Table 3.1, MOE SWMPDM, 2003
*MOE SWM infiltration calculations		
topography - hilly to rolling land - graded	0.2	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
soils - silty and clayey till	0.15	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
cover - urban lawns	0.1	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
Infiltration factor	**0.45**	
Latitude of site (or climate station)	43 ° N.	

WATER BALANCE CALCULATIONS
Snell's Hollow
Town of Caledon, Ontario

PROJECT No.300043952.0000

BURNSIDE

TABLE H-7

Water Balance - Existing Conditions and Post-Development with No Mitigation

	Land Use	Approx. Land Area** (m^2)	Estimated Impervious Fraction for Land Use**	Estimated Impervious Area (m^2)	Runoff from Impervious Area* (m/a)	Runoff Volume from Impervious Area (m^3/a)	Estimated Pervious Area (m^2)	Runoff from Pervious Area* (m/a)	Runoff Volume from Pervious Area (m^3/a)	Infiltration from Pervious Area* (m/a)	Infiltration Volume from Pervious Area (m^3/a)	Total Runoff Volume (m^3/a)	Total Infiltration Volume (m^3/a)
Existing Land Use													
Area 1	Agricultural Lands	183,850	0.00	0	0.668	0	183,850	0.102	18,662	0.068	12,441	18,662	12,441
	Rural Property & Agricultural Buildings	29,700	0.08	2,471	0.668	1,651	27,229	0.135	3,686	0.090	2,457	5,336	2,457
	NHS - Dry-Moist Old Field Meadow	166,300	0.00	0	0.668	0	166,300	0.110	18,287	0.059	9,847	18,287	9,847
	NHS - Mixed Forest & Hedge Row	8,200	0.00	0	0.668	0	8,200	0.085	694	0.085	694	694	694
	NHS - Wetland Area	73,600	0.00	0	0.668	0	73,600	0.085	6,226	0.085	6,226	6,226	6,226
	Sub-Total	*461,650*		*2,471*		*1,651*	*459,179*		*47,553*		*31,664*	*49,204*	*31,664*
Area 2	Agricultural Lands	111,000	0.00	0	0.668	0	111,000	0.102	11,267	0.068	7,511	11,267	7,511
	Rural Property	3,750	0.00	0	0.668	0	3,750	0.135	508	0.090	338	508	338
	NHS - Dry-Moist Old Field Meadow	10,600	0.00	0	0.668	0	10,600	0.110	1,166	0.059	628	1,166	628
	Sub-Total	*125,350*		*0*		*0*	*125,350*		*12,940*		*8,477*	*12,940*	*8,477*
Area 3	Agricultural Lands	17,700	0.00	0	0.668	0	17,700	0.102	1,797	0.068	1,198	1,797	1,198
	Rural Property & Agricultural Buildings	3,100	0.10	295	0.668	197	2,806	0.135	380	0.090	253	576	253
	NHS - Dry-Moist Old Field Meadow	8,000	0.00	0	0.668	0	8,000	0.110	880	0.059	474	880	474
	Sub-Total	*28,800*		*295*		*197*	*28,506*		*3,056*		*1,925*	*3,253*	*1,925*
TOTAL PRE-DEVELOPMENT		**615,800**		**2,766**		**1,848**	**613,034**		**63,549**		**42,066**	**65,397**	**42,066**
Post-Development Land Use													
Area 201	Detached/Semi-detached/St. Townhouses	53,350	0.64	34,144	0.668	22,812	19,206	0.124	2,383	0.102	1,950	25,195	1,950
	Dual Frontage	4,600	0.79	3,634	0.668	2,428	966	0.124	120	0.102	98	2,548	98
	Back-to-Back Townhouses	4,200	0.79	3,318	0.668	2,217	882	0.124	109	0.102	90	2,326	90
	SWM Pond	15,950	0.50	7,975	0.668	5,328	7,975	0.124	989	0.102	810	6,318	810
	Park	13,100	0.00	0	0.668	0	13,100	0.124	1,625	0.102	1,330	1,625	1,330
	Roads	42,000	1.00	42,000	0.668	28,060	0	0.124	0	0.102	0	28,060	0
	Buffer	20,800	0.00	0	0.668	0	20,800	0.124	2,581	0.102	2,112	2,581	2,112
	NHS - Mixed Forest & Hedge Row	3,700	0.00	0	0.668	0	3,700	0.085	313	0.085	313	313	313
	NHS - Dry-Moist Old Field Meadow	140,400	0.00	0	0.668	0	140,400	0.110	15,439	0.059	8,313	15,439	8,313
	NHS - Wetland Area	72,750	0.00	0	0.668	0	72,750	0.085	6,154	0.085	6,154	6,154	6,154
	Sub-Total	*370,850*		*91,071*		*60,845*	*279,779*		*29,713*		*21,168*	*90,558*	*21,168*
Area 202	Detached/Semi-detached/St. Townhouses	47,200	0.64	30,208	0.668	20,182	16,992	0.124	2,108	0.102	1,725	22,290	1,725
	Dual Frontage	9,400	0.79	7,426	0.668	4,961	1,974	0.124	245	0.102	200	5,206	200
	Back-to-Back Townhouses	9,050	0.79	7,150	0.668	4,777	1,901	0.124	236	0.102	193	5,012	193
	SWM Pond	17,300	0.50	8,650	0.668	5,779	8,650	0.124	1,073	0.102	878	6,852	878
	Roads	44,250	1.00	44,250	0.668	29,563	0	0.124	0	0.102	0	29,563	0
	Buffer	20,800	0.00	0	0.668	0	20,800	0.124	2,581	0.102	2,112	2,581	2,112
	Sub-Total	*148,000*		*97,684*		*65,262*	*50,317*		*6,243*		*5,108*	*71,505*	*5,108*
Area 203	Medium-High Density Residential	12,500	0.79	9,875	0.668	6,597	2,625	0.124	326	0.102	266	6,923	266
	Commercial	14,700	1.00	14,700	0.668	9,821	0	0.124	0	0.102	0	9,821	0
	Buffer	3,500	0.00	0	0.668	0	3,500	0.124	434	0.102	355	434	355
	30250 Sub-Total	*30,700*		*24,575*		*16,419*	*6,125*		*760*		*622*	*17,179*	*622*
Area 204	Detached/Semi-detached/St. Townhouses	3,700	0.64	2,368	0.668	1,582	1,332	0.124	165	0.102	135	1,747	135
	Dual Frontage	7,800	0.79	6,162	0.668	4,117	1,638	0.124	203	0.102	166	4,320	166
	Back-to-Back Townhouses	9,200	0.79	7,268	0.668	4,856	1,932	0.124	240	0.102	196	5,095	196
	Medium-High Density Residential	12,750	0.79	10,073	0.668	6,729	2,678	0.124	332	0.102	272	7,062	272
	Park	3,800	0.00	0	0.668	0	3,800	0.124	471	0.102	386	471	386
	Roads	22,600	1.00	22,600	0.668	15,099	0	0.124	0	0.102	0	15,099	0
	Buffer	6,400	0.00	0	0.668	0	6,400	0.124	794	0.102	650	794	650
	Sub-Total	66,250		48,471		32,383	17,780		2,206		1,805	34,589	1,805
TOTAL POST-DEVELOPMENT		**615,800**		**261,800**		**174,909**	**354,000**		**38,922**		**28,703**	**213,831**	**28,703**
											% Change from Pre to Post	327	32
											Effect of development (with no mitigation)	3.3 times increase	32% reduction in infiltration

* figures from Tables H-1 through H-6

** data provided by Schaeffers

To balance pre- to post-, the infiltration target (m^3/a)= **13,363**

WATER BALANCE CALCULATIONS
Snell's Hollow
Town of Caledon, Ontario

PROJECT No.300043952.0000

BURNSIDE

TABLE H-8

Pre- Development Monthly Water Balance Components

Based on Thornthwaite's Soil Moisture Balance Approach with a Soil Moisture Retention of 100 mm (urban lawns in silt and clay till soils) - graded + additional topsoil

Precipitation data from Toronto Lester B. Pearson International Airport Climate Station (1981 - 2010)

Potential Evapotranspiration Calculation	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	YEAR
Average Temperature (Degree C)	-5.5	-4.5	0.1	7.1	13.1	18.6	21.5	20.6	16.2	9.5	3.7	-2.2	**8.2**
Heat index: $i = (t/5)^{1.514}$	0.00	0.00	0.00	1.70	4.30	7.31	9.10	8.53	5.93	2.64	0.63	0.00	**40.1**
Unadjusted Daily Potential Evapotranspiration U (mm)	0.00	0.00	0.25	30.43	60.72	90.16	106.17	101.17	77.16	42.26	14.59	0.00	**523**
Adjusting Factor for U (Latitude 43° 40' N)	0.81	0.82	1.02	1.12	1.26	1.28	1.29	1.2	1.04	0.95	0.81	0.77	
Adjusted Potential Evapotranspiration PET (mm)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
COMPONENTS	**JAN**	**FEB**	**MAR**	**APR**	**MAY**	**JUN**	**JUL**	**AUG**	**SEP**	**OCT**	**NOV**	**DEC**	**YEAR**
Precipitation (P)	52	48	50	69	74	72	76	78	75	61	75	58	**786**
Potential Evapotranspiration (PET)	0	0	0	34	77	115	137	121	80	40	12	0	**617**
P - PET	52	48	50	34	-2	-44	-61	-43	-6	21	63	58	**169**
Change in Soil Moisture Storage	0	0	0	0	-2	-44	-54	0	0	21	63	16	**0**
Soil Moisture Storage max 100 mm	100	100	100	100	98	54	0	0	0	21	84	100	
Actual Evapotranspiration (AET)	0	0	0	34	77	115	130	78	75	40	12	0	**560**
Soil Moisture Deficit max 100 mm	0	0	0	0	2	46	100	100	100	79	16	0	
Water Surplus - available for infiltration or runoff	52	48	50	34	0	0	0	0	0	0	0	42	**226**
Potential Infiltration (based on MOE metholodogy*; independent of temperature)	26	24	25	17	0	0	0	0	0	0	0	21	**113**
Potential Direct Surface Water Runoff (independent of temperature)	26	24	25	17	0	0	0	0	0	0	0	21	**113**
IMPERVIOUS AREA WATER SURPLUS													
Precipitation (P)	786	mm/year											
Potential Evaporation (PE) from impervious areas (assume 15%)	118	mm/year											
P-PE (surplus available for runoff from impervious areas)	668	mm/year											

Assume January storage is 100% of Soil Moisture Storage

Soil Moisture Storage	100 mm	<-- See "Water Holding Capacity" values in Table 3.1, MOE SWMPDM, 2003
*MOE SWM infiltration calculations		
topography - hilly to rolling land - graded	0.2	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
soils - silty and clayey till + additional topsoil	0.2	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
cover - urban lawns	0.1	<-- Infiltration Factors from the bottom section of Table 3.1, MOE SWMPDM, 2003
Infiltration factor	**0.5**	
Latitude of site (or climate station)	43 ° N.	

WATER BALANCE CALCULATIONS
Snell's Hollow
Town of Caledon, Ontario

PROJECT No.300043952.0000

BURNSIDE

TABLE H-9

Water Balance - Existing Conditions and Post-Development with Mitigation (with LIDs)

Land Use		Approx. Land Area** (m^2)	Estimated Impervious Fraction for Land Use**	Estimated Impervious Area (m^2)	Runoff from Impervious Area* (m/a)	Runoff Volume from Impervious Area (m^3/a)	Estimated Pervious Area (m^2)	Runoff from Pervious Area* (m/a)	Runoff Volume from Pervious Area (m^3/a)	Infiltration from Pervious Area* (m/a)	Infiltration Volume from Pervious Area (m^3/a)	Total Runoff Volume (m^3/a)	Total Infiltration Volume (m^3/a)
Existing Land Use													
Area 1	Agricultural Lands	183,850	0.00	0	0.668	0	183,850	0.102	18,662	0.068	12,441	18,662	12,441
	Rural Property & Agricultural Buildings	29,700	0.08	2,471	0.668	1,651	27,229	0.135	3,686	0.090	2,457	5,336	2,457
	NHS - Dry-Moist Old Field Meadow	166,300	0.00	0	0.668	0	166,300	0.110	18,287	0.059	9,847	18,287	9,847
	NHS - Mixed Forest & Hedge Row	8,200	0.00	0	0.668	0	8,200	0.085	694	0.085	694	694	694
	NHS - Wetland Area	73,600	0.00	0	0.668	0	73,600	0.085	6,226	0.085	6,226	6,226	6,226
	Sub-Total	*461,650*		*2,471*		*1,651*	*459,179*		*47,553*		*31,664*	*49,204*	*31,664*
Area 2	Agricultural Lands	111,000	0.00	0	0.668	0	111,000	0.102	11,267	0.068	7,511	11,267	7,511
	Rural Property	3,750	0.00	0	0.668	0	3,750	0.135	508	0.090	338	508	338
	NHS - Dry-Moist Old Field Meadow	10,600	0.00	0	0.668	0	10,600	0.110	1,166	0.059	628	1,166	628
	Sub-Total	*125,350*		*0*		*0*	*125,350*		*12,940*		*8,477*	*12,940*	*8,477*
Area 3	Agricultural Lands	17,700	0.00	0	0.668	0	17,700	0.102	1,797	0.068	1,198	1,797	1,198
	Rural Property & Agricultural Buildings	3,100	0.10	295	0.668	197	2,806	0.135	380	0.090	253	576	253
	NHS - Dry-Moist Old Field Meadow	8,000	0.00	0	0.668	0	8,000	0.110	880	0.059	474	880	474
	Sub-Total	*28,800*		*295*		*197*	*28,506*		*3,056*		*1,925*	*3,253*	*1,925*
TOTAL PRE-DEVELOPMENT		**615,800**		**2,766**		**1,848**	**613,034**		**63,549**		**42,066**	**65,397**	**42,066**
Post-Development Land Use													
Area 201	Detached/Semi-detached/St. Townhouses less select rear roofs	41,950	0.54	22,744	0.668	15,195	19,206	0.113	2,166	0.113	2,166	16,335	2,166
	Detached/Semi-detached/St. Townhouses Rear Roof to grass (assume 25% of runoff volume infiltrates[a]; excess runoff to infiltration trenches (calculated below) and storm)	11,400	1.00	11,400	0.668	7,616	0	0.113	0	0.113	0	1,028	1,904
	Excess runoff from Detached/Semi-detached/St. Townhouses rear roof (1.14 ha) and rear yard (1.82 ha) areas sent to infiltration trenches designed to accommodate the 27 mm storm event from rear roofs and 7 mm storm event from rear yards. The 27 mm storm event accounts for approximately 95% of all rain (i.e., 82% of all precipitation) and 7 mm storm event accounts for approximately 58% of all rain (i.e., 50% of all precipitation).[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,710	NA	5,710
	Dual Frontage	4,600	0.79	3,634	0.668	2,428	966	0.113	109	0.113	109	2,537	109
	Back-to-Back Townhouses	4,200	0.79	3,318	0.668	2,217	882	0.113	99	0.113	99	2,316	99
	SWM Pond	15,950	0.50	7,975	0.668	5,328	7,975	0.113	900	0.113	900	6,228	900
	Park	13,100	0.00	0	0.668	0	13,100	0.113	1,478	0.113	1,478	739	1,478
	Runoff from Park is directed to infiltration trenches designed to accommodate the 7 mm storm event. The 7 mm storm event accounts for approximately 58% of all rain (i.e., 50% of all precipitation).[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA	739	NA	739
	Roads	42,000	1.00	42,000	0.668	28,060	0	0.113	0	0.113	0	28,060	0
	Buffer	20,800	0.00	0	0.668	0	20,800	0.113	2,346	0.113	2,346	2,346	2,346
	NHS - Mixed Forest & Hedge Row	3,700	0.00	0	0.668	0	3,700	0.085	313	0.085	313	313	313
	NHS - Dry-Moist Old Field Meadow	140,400	0.00	0	0.668	0	140,400	0.110	15,439	0.059	8,313	15,439	8,313
	NHS - Wetland Area	72,750	0.00	0	0.668	0	72,750	0.085	6,154	0.085	6,154	6,154	6,154
	Sub-Total	*370,850*		*91,071*		*60,845*	*279,779*		*29,004*		*28,327*	*81,495*	*30,231*
Area 202	Detached/Semi-detached/St. Townhouses less select rear roofs	36,300	0.53	19,308	0.668	12,900	16,992	0.113	1,917	0.113	1,917	13,835	1,917
	Detached/Semi-detached/St. Townhouses Rear Roof to grass (assume 25% of runoff volume infiltrates[a]; excess runoff to infiltration trenches (calculated below) and storm)	10,900	1.00	10,900	0.668	7,282	0	0.113	0	0.113	0	983	1,821
	Excess runoff from Detached/Semi-detached/St. Townhouses rear roof (1.09 ha) and rear yard (1.74 ha) areas sent to infiltration trenches designed to accommodate the 27 mm storm event from rear roofs and 7 mm storm event from rear yards. The 27 mm storm event accounts for approximately 95% of all rain (i.e., 82% of all precipitation) and 7 mm storm event accounts for approximately 58% of all rain (i.e., 50% of all precipitation).[b]	NA	NA	NA	NA	NA	NA	NA	NA	NA	5,460	NA	5,460
	Dual Frontage	9,400	0.79	7,426	0.668	4,961	1,974	0.113	223	0.113	223	5,184	223
	Back-to-Back Townhouses	9,050	0.79	7,150	0.668	4,777	1,901	0.113	214	0.113	214	4,991	214
	SWM Pond	17,300	0.50	8,650	0.668	5,779	8,650	0.113	976	0.113	976	6,755	976
	Roads	44,250	1.00	44,250	0.668	29,563	0	0.113	0	0.113	0	29,563	0
	Buffer	20,800	0.00	0	0.668	0	20,800	0.113	2,346	0.113	2,346	2,346	2,346
	Sub-Total	*148,000*		*97,684*		*65,262*	*50,317*		*5,675*		*11,135*	*63,657*	*12,956*
Area 203	Medium-High Density Residential	12,500	0.79	9,875	0.668	6,597	2,625	0.113	296	0.113	296	4,057	296
	Commercial	14,700	1.00	14,700	0.668	9,821	0	0.113	0	0.113	0	5,598	0
	On-site measures to infiltrate 5mm storm event from impervious surfaces. The 5 mm storm event accounts for approximately 48% of all rain (i.e., 43% of	NA	NA	NA	NA	NA	NA	NA	NA	NA	7,060	NA	7,060
	Buffer	3,500	0.00	0	0.668	0	3,500	0.113	395	0.113	395	395	395
	Sub-Total	*30,700*		*24,575*		*16,419*	*6,125*		*691*		*7,751*	*10,049*	*7,751*
Area 204	Detached/Semi-detached/St. Townhouses	3,700	0.64	2,368	0.668	1,582	1,332	0.113	150	0.113	150	1,732	150
	Dual Frontage	7,800	0.79	6,162	0.668	4,117	1,638	0.113	185	0.113	185	4,302	185
	Back-to-Back Townhouses	9,200	0.79	7,268	0.668	4,856	1,932	0.113	218	0.113	218	5,074	218
	Medium-High Density Residential	12,750	0.79	10,073	0.668	6,729	2,678	0.113	302	0.113	302	7,031	302
	Park	3,800	0.00	0	0.668	0	3,800	0.113	429	0.113	429	429	429
	Roads	22,600	1.00	22,600	0.668	15,099	0	0.113	0	0.113	0	15,099	0
	Buffer	6,400	0.00	0	0.668	0	6,400	0.113	722	0.113	722	722	722
	Sub-Total	*66,250*		*48,471*		*32,383*	*17,780*		*2,005*		*2,005*	*34,389*	*2,005*
TOTAL POST-DEVELOPMENT		**615,800**		**261,800**		**174,909**	**354,000**		**37,375**		**49,219**	**189,590**	**52,943**
											% Change from Pre to Post	290	-26
											Effect of development (with mitigation)	2.9 times increase	26% increase in infiltration

* figures from Tables H-1 through H-5, H-8

** data provided by Schaeffers

[a] based on estimation in the LID SWM Planning and Design Guide (CVC & TRCA, 2010) for hydrologic groups C & D

[b] based on the Toronto Wet Weather Flow Management Guidelines (City of Toronto, 2006)

To balance pre- to post-,
the infiltration target (m^3/a)= **-10,877**

R.J. Burnside & Associates Limited